

# REINWARDTIA

BEING A CONTINUATION OF THE  
*BULLETIN DU JARDIN BOTANIQUE DE BUITENZORG*  
(*BULLETIN OF THE BOTANIC GARDENS, BUITENZORG*)

EDITORS

M. A. DONK  
(Herbarium Bogoriense)

AND

C. G. G. J. VAN STEENIS  
(Flora Maletiana)

Price U.S. \$ 2.25  
or equivalent in other currency.

Published by  
HERBARIUM BOGORIENSE,  
KEBUN RAYA INDONESIA

REINWARDTIA  
ANNALES BOGORIENSES  
TREUBIA

Published by

KEBUN RAYA INDONESIA  
(BOTANIC GARDENS BOGOR, INDONESIA)

Subscription agents for domestic and foreign subscribers

**G.C.T VAN DORP & Co Ltd**

Publishers Booksellers

Djalan Nusantara 22 DJAKARTA Indonesia

VAN DORP'S SUBSCRIPTION SERVICE

includes

Subscriptions to any periodical published by  
Botanic Gardens, Bogor

Sample copies of Reinwardtia

Replacement of missing issues

Replacement of lost back numbers at lowest prices

REINWARDTIA

Published by Herbarium Bogoriense, Kebun Raya Indonesia  
Volume 1, Part 3, pp. 221-450 (1951)

THE GENUS CAREX IN MALAYSIA

E. NELMES \*

SUMMARY

This is a fully descriptive account of the 108 species of *Carex* known to occur in Malaysia. They are arranged in three subgenera: Subgenus *Indocarex* Baill. (43 species), Subgenus *Carex* (*Eucarex* Coss. et Germ.) (57 species), and Subgenus *Vignea* (P. Beauv.) Nees (8 species). These are in turn divided into 33 sections. The classification of these Malaysian *Carices* differs radically from past systems (cf. that of Kiiikenthal, Engl. Pflanzenreich, 1909) and is based on the phylogenetic views of the author.

Following the descriptions are citations of all the specimens seen by the author, and a few not seen but which have mainly been determined by Kiiikenthal. The majority of the specimens came from Bogor (Buitenzorg) (about 1500 sheets) and Leiden (about 600, including important historical specimens).

About half of the species are restricted (endemic) to one or another of the 'island areas' into which Malaysia can be conveniently divided: 18 species in New Guinea, 10 in the Philippines, 5 in Borneo and in Sumatra, 4 in the Malay Peninsula, 3 in Java and in Celebes, 2 in the Moluccas, and 1 in the Lesser Sunda Islands. The remaining 58 species have a slightly to much wider distribution, the chief connection being with India, and, to a slightly less extent, Japan and China.

Keys are provided to the species as a whole, to the subgenera, the sections, and to the species in each section.

The introductory part of the work explains, among other things, the classification, the relative taxonomic value of characters in the descriptions, distribution, and sources of the material.

Introduction

Kiiikenthal's great monograph on *Carex* and the three much smaller genera, *Schoenoxiphium*, *Kobresia*, and *Uncinia*, which all together form his subfamily Caricoideae (tribe Cariceae Nees), appeared in Engler's "Pflanzenreich" as long ago as 1909, and in recent years there has been an increasing need for a complete revision of the genus *Carex*. Kiiikenthal's account comprised fewer than 800 species: those now known and described are probably three times that number or even more. The task of bringing *Carex* up to date has already been partly accomplished, and, as might be expected, on a regional basis. The monographing of such a vast group of plants would be too great a task for one man. In the nineteen-thirties Mackenzie produced a volume on the North and Central American *Carices*,

\* Royal Botanic Gardens, Kew, England.

[Part 2 of this volume was issued August 18, 1951]

Krechetovich gave us an account of the species occurring in the U.S.S.R., and Ohwi and Akiyama revised the sedges of greater Japan, while, more recently, Barros has completed the description of those of southern South America.

My own studies on *Carex* commenced about a quarter of a century ago, beginning with the British species, but gradually giving special attention to those of Australia, India, and Tropical Africa. In the early years of the last war I prepared a descriptive account of the forty to fifty Australian *Carices*. A key to these species appeared in the 1942-43 "Proceedings of the Linnean Society of London."

#### PHYLOGENY AND CLASSIFICATION OF THE CARICEAE

In those early war years something happened to upset my plans for producing a series of 'Empire' *Carex* revisions. My attention became diverted to *Carex* in Malaysia, and it occurred in this way. Before the war I had formed exchange relations with the Russian caricologist, Krechetovich, and among his writings which he sent me was one entitled "Are the sedges of the subgenus *Primocarex* primitive?" A few years later I had the good fortune to be closely associated with my friend and colleague, Mr. H. K. Airy Shaw, and he translated the Krechetovich thesis. This proved of great interest to both of us, for phylogeny had long been a favourite study of the translator, while my interest lay in its relation to *Carex*. Krechetovich more or less reverses the classification of Kükenthal, maintaining that the multispicate tropical *Indoearices* represent the more primitive forms, and that the unispicate '*Primocarices*, with which Kükenthal commences his classification, are their most degraded derivatives, the former having arisen in warm Tertiary times and the latter being the product of mountain upthrusting and glacial periods, in which polar 'wandering' and accompanying equatorial changes played a part. Malaysia is thus one of the few areas in the world which may have had a relatively constant tropical climate, and its *Carices* have undergone little structural modification, in contrast to those of many other, colder lands, which have responded to harsh environments by various kinds of reduction, thus producing such numerous species of varied size and form that *Carex* is to-day, with its 2500 species, one of the very largest and most widespread of plant genera. This is not the place to give a more detailed description of Krechetovich's theory, especially as Mr. Shaw hopes to publish his translation in the near future.

It would not be fair to say that Kükenthal's views on the classification of *Carex* are exactly the opposite of those of Krechetovich, except as regards *Primocarex*. Kükenthal took the 'partial spikelet,' or ultimate

axis, which in the tribe Cariceae is best developed in *Schoenoxiphium*, as the most primitive character in this group of genera. He traced its reduction through *Kobresia* into the hooked rhachilla of *Uncinia* and into the still more vestigial rhachilla of the *Primocarices*. His other subgenera, *Vignea*, *Indocarex*, and *Carex* ('*Eucarex*'),\* placed in this order in his monograph, all normally lack the rhachilla, so it seemed to him that they had been derived from the subgenus *Primocarex*—*Vignea* and *Indocarex* equivalently, and '*Eucarex*' as a later development from *Indocarex*.

My views on evolution in *Carex* differ from those of both Krechetovich and Kükenthal, but especially from those of the latter. My one point of agreement with Kükenthal is that '*Eucarex*' has been derived from *Indocarex* or earlier indocaricoid types. I believe, further, that '*Eucarices*' have descended from *Indoearices* with long, stoutish spikes such as those of Section *Polystachyae* (compare Section *Elatae* of Subgenus *Carex*), and that Subgenus *Vignea* originated in some way from the shorter-spiked *Indoearices* which form the larger part of this subgenus. It is interesting to note at this point that *Indocarex* is more concentrated in Malaysia and south Asia than in any other part of the world, while *Vignea* is very poorly represented, whereas at the other end of the world, in North America, 40 per cent of the *Carices* belong to *Vignea*, *Indoearices* being entirely absent north of Mexico. This, together with the fact that *Indoearices* thin out westwards from Malaysia through Tropical Africa into Tropical America, supports the view that *Carex* had its origin in the Indo-Malaysian region and that its early species were of an indocaricoid type. I, therefore, follow Krechetovich in the view that *Indoearices* are the most primitive of existing *Carices*, but I do not agree with him that Subgenus *Primocarex* has been wholly derived from them, nor with Kükenthal that they have been derived from *Primocarex*! This unispicate group puzzled both of these great caricologists. Krechetovich was not quite happy in deriving its rhachilla-bearing species from others which normally lack this vestigial axis, and Kükenthal, having, rightly as I think, regarded the axis- or rhachilla-bearing *Schoenoxiphium* and *Kobresia* as the most primitive genera of the group, felt bound, in spite of possible contrary evidence, to regard the rhachilla-bearing *Carices* (*Primocarex*) as representing the earliest members of this later genus. Some *Primocarices* have no rhachilla and a few of these may be true, reduced *Carices*, but I am in course of developing a theory which postulates the derivation of the majority of them from the genus *Uncinia*.

\* Subgenus *Eucarex* becomes Subgenus *Carex* in accordance with a decision of the International Botanical Congress, Stockholm, 1950 (Art. 28 bis: De Wit in *Flora Males. Bull.*, no. 7, 209: 1950).

*Schoenoxiphium*, *Kobresia*, *Uncinia*, and *Carex* are not clearly distinguishable morphologically from one another, as is shown in Kiikenthal's key. I do not think one *can* distinguish them in morphological terms. Kiikenthal sought to separate *Schoenoxiphium* and *Kobresia*, taken together, from *Uncinia* and *Carex*, by androgynaeous partial spikelets borne on an axis from the base of an achene in a more or less open prophyll, in the former pair, as against a vestigial or absent rhachilla in a wholly closed prophyll (utricle or perigynium) in the latter pair of genera. One finds, however, in both *Schoenoxiphium* and *Kobresia*, the partial spikelets reduced to a rhachilla in a closed prophyll. Kukenthal's attempt to separate *Schoenoxiphium* from *Kobresia* is equally ineffective. The only definitely stated difference is "rhacheola elongata complanata" (*Schoenoxiphium*) as against "rhacheola inconspicua" (*Kobresia*), but *Kobresia curvata* is described as possessing ". . . rhacheolam viridem complanatam"! *Uncinia* is distinguished from *Carex* by the rhachilla being invariably exerted from the mouth of the utricle and strongly hooked at the apex. In Kukenthal's system, almost the only species of *Carex* approaching *Uncinia* in the rhachilla character are those contained in his subgenus *Primocarex*, where the rhachilla is often present but varyingly vestigial, not hooked and, except in one species, *C. microglochis* Wahlenb., not exerted. *C. microglochis* is most interesting in this respect, having an exerted but not hooked rhachilla. Sprengel named it *Uncinia microglochis*. My new theory of descent in these genera, mentioned above, I will not anticipate here, except to say that while I think it will be sounder phylogenetically, it may leave the morphological distinctness still less capable of description. This will exasperate those botanists who measure and describe what they see without further enquiry or imagination. This attitude is deplorable and illusive. It will cause to be placed together in an artificial genus species of *Schoenoxiphium*, *Kobresia*, *Uncinia*, and possibly even *Carex*!

After what has been said above concerning the difficulty of explaining how *Carex* differs from the other genera of the tribe Cariceae it may seem a waste of time to discuss the question of splitting *Carex* into several genera. It could, however, be argued that just as some consider the genus *Cyperus*, *sensu* Kiikenthal, to contain, besides *Cyperus*, *sensu stricto*, the Clarkean genera *Pycreus*, *Mariscus*, *Kyllinga*, and others, so *Carex* could be split into three genera corresponding to the present subgenera, *Indocarex*, '*Eucarex*,' and *Vignea*. Reichenbach, in fact, did treat *Vignea* Beauv. as a genus in his "Flora Germanica Excursoria," 1830-32, including in it also distigmatic species of '*Eucarex*,' and S. F. Gray (Nat. Arrang. Brit. Pl. 2: 53: 1821), put much of '*Eucarex*' into his genus *Trasus*. Various other authors have in the past taken groups of *Carex*

and made separate genera of them. There is no clear division between *Indocarex* and '*Eucarex*,' but *Vignea* is separated from both in a rather more distinct way. The characters distinguishing these three groups are set out below. I do not propose to discuss further here the pros and cons of splitting *Carex* as at present understood or of leaving it intact.

#### TAXONOMICALLY USEFUL MORPHOLOGICAL CHARACTERS

The character recognised as the most important taxonomically in *Carex* is the utricle or perigynium, and it is a remarkable fact that the species of this vast genus, about 2500, are distinguished from one another primarily on the variations in shape, form, nervation, texture, etc., of this unique sac-like structure, which is usually quite small (between 2 and 5 mm in length in the majority of species), though specific determination is often difficult by this means alone. The achene or nut is also of considerable use in distinguishing between species, especially in certain groups such as Section *Lageniformes* Ohwi and Section *Rhomboidales* Kiikenth., but is, on the whole, of less value than the utricle, and one feels that if *Carex* lacked this remarkable organ, as in the other tribes of Cyperaceae, the number of species might be much reduced! Next in taxonomic value is the glume, or scale, which subtends the utricle, and which may be glabrous or hispidulous on the back, of varying texture, muticous, mucronate, or aristate, and varied, within rather narrow limits, in colour, with sometimes silvery margins. Other characters used in most descriptions, in more or less descending order of importance, are the rhizome (tufted or creeping, i.e. length of internodes), leaves (width, length, texture), bracts (length, sheathing or not), stem or culm (length, thickness, degree of angularity, rough or smooth towards apex—all stems are smooth below), and bracteoles, especially in Subgenus *Indocarex*. The cladoprophyll is mainly a subgeneric character. The leaves vary very little in width (about 1—5 mm) over a large number of species, yet within any one of many of these species the leaf-width often varies by as much as 2 mm.

#### CYTOLOGY

There has been considerable cytological study of north temperate *Carices*, and this has revealed an apparently unique state of things in this group of plants. Chromosome numbers in *Carex* appear to give no clue to species relationship, nor to throw any light on evolutionary trends in the genus. They are not in multiple series, as in the genera of so many other families, but occur in series of consecutive or nearly consecutive numbers, a phenomenon to which the term aneuploidy has been applied. These apparently taxonomically meaningless sets of numbers may

have resulted from loss or addition of chromosomes, which is suggested by the fact that there is considerable difference in size amongst them. It will be interesting, eventually, to see whether our present views on evolution in *Carex*, based mainly on morphological evidence, are confirmed by future cytological investigation of the tropical species.

#### EXPLANATORY NOTES ON THE DESCRIPTIONS

To avoid unduly lengthening the descriptions, the following leaf characters, which are present in most Malaysian *Carices*, are omitted: Leaves multinerved, but midrib and two equidistant lateral nerves stronger and more prominent than the others, the midrib keeled on the under- and the two lateral ones on the upper surface; surfaces smooth below but scaberrulous above on the midrib only on the under-surface, on the margins, and on several or many nerves on the upper surface, especially towards the apex, where the surface between the nerves is also sometimes scaberrulous.

By rhizome "creeping" is meant that the internodes are more or less elongated. Kii Kenthal's term "stoloniferous" does not appear appropriate for rhizomes which run underground at various levels.

Stem thickness is understood as exclusive of leaf-sheaths, and the measurement given is taken just above the base. Most *Carex* stems gradually become more slender upwards, and most are smooth except on and just below the rhachis. Many species have ribbed and consequently also grooved or striate stems.

Leaves "stiff," "coriaceous," "flat or flattish," refer to their dried, not living, condition. When leaves are not septate-nodulose this is not mentioned. Leaf-sheaths which split in a certain manner are said by Kii Kenthal and other authors to split reticulately. I use the term "herring-bone shaped," as the fibres slant obliquely from a central one.

The inflorescence in *Indocarex* is a panicle, composed of secondary panicles in the axils of (usually) leafy bracts. In '*Eucarex*' and *Vignea* the secondary inflorescence is usually reduced to one or a few spikes. The term inflorescence includes infructescence. The length of panicles and spikes is measured from the lowest flowers upwards, not from the base of the peduncle (node). In *Indocarex* the spikes are usually numerous, and this is then not mentioned in the descriptions. By the term spikes is meant the ultimate unbranched inflorescences. The shape of the spike varies much in '*Eucarex*,' and to a less extent in *Vignea*, and is usually given in the descriptions, but the spikes of *Indocarex* are so uniformly small and similar in shape that this is usually omitted. It may be said to be more or less shortly cylindrical. Spike breadth measurements include fully developed, spreading utricles.

Male glumes are not included in the descriptions unless they differ markedly from the female ones. Glume lengths are minus mucros and awns. I have followed Kii Kenthal, Mackenzie, and others in describing the whitish, nerveless margins of glumes by the conventional term "hyaline."

Utricle and achene length includes that of stipes and beak, but these are also measured separately. The beak is often ill-defined and is taken as extending upwards from the narrowing of the utricule at the apex of the achene, unless, as in some species, there is a definite junction between the utricule and its beak. The margins of the utricule are formed by the twin ribs of the prophyll from which the utricule evolved. Usually the angles of the biconvex achenes of distigmatic species coincide, rather surprisingly perhaps, with the "margins" of the utricule, and two of the three angles of the trigonous species also often coincide with the two margins. Sometimes, however, the angles do not coincide, and then the margins become the "bilateral nerves" of some authors, such as are well seen in the European *Carex binervis* Sm.\*

The utriculiform cladoprophyll which distinguishes Subgenus *Indocarex* from the other two subgenera occurs only at the base of the lateral spikes on the secondary panicles and their branches. The ocreiform cladoprophyll of Subgenus *Carex* (*Eucarex*) occurs, usually hidden, at the base of the peduncles of the spikes. It is sometimes visible when the accompanying bract has no sheath, as in Section *Acutae*, but hidden when the bract has a closed sheath, as is more common. The cladoprophyll is absent from Subgenus *Vignea*. Some species of '*Eucarex*,' with single spikes at nodes, occasionally produce small lateral branch-spikes, and it is interesting to note that when this ancestral form of inflorescence recurs the cladoprophyll reappears at the base of the lateral spikes.

#### GEOGRAPHICAL DISTRIBUTION

*Carex*, in Malaysia, is mostly a highland genus. *Indocarex*, as befits its more primitive and warm-age origin, still retains a foothold in the lowlands of its ancestors, but it ascends to nearly 3000 m. Species of Subgenus *Carex* occur from just above sea-level up to 4000 m. Subgenus *Vignea* ranges from 900 m to well over 3000 m.

Habitats are very varied—dry to wet, open savannah to rain-forest, flat plains to steep slopes, but, as with the *Carices* of other lands, damp-loving species greatly outnumber those found in drier situations.

*Indocarex* has 43 species in Malaysia, *Carex* 57, *Vignea* only 8. As *Vignea* is so poorly represented in what may have been the birth-place of the genus, and so rich in species in temperate regions such as North

\* See Nelmes in Kew Bull. 1949: 318: 1949.

America, it may have arisen at a considerably later date than *Carex* which, however, is the most widespread of the three subgenera.

Of the 108 Malaysian *Carices*, 54 species and varieties are restricted (endemic) to one or another of the 9 subareas in which the larger area is conveniently divided: 18 (including 3 varieties) occur only in New Guinea, 10 in the Philippines, 7 in Borneo, 5 (including 2 varieties) in Sumatra, 4 in the Malay Peninsula and (all varieties) in Java, 2 (including 1 variety) in the Moluccas, in Celebes, and in the Lesser Sunda Islands. Thirteen of the other plants occur in only 2 subareas, 7 occur in 3, 2 in 4, and 1 in 5 and 6. None is found in more than 6 of the 9 subareas. The remaining *Carices* are recorded from 1—6 Malaysian subareas and also from 1—7 extra-Malaysian areas. *C. curta* is still more widely distributed.

These other countries involved in the distribution of Malaysian *Carex* are, in order of frequency, India (25), China (18), Japan, including Formosa (17), Australia (15), Indo-China, including Siam (13), Burma (11), New Zealand and Polynesia (4 each), and New Caledonia (3). It will be seen that the strongest connection is with India, but there is a marked link with China and Japan, rather less strong ones with Australia, Indo-China, and Burma and distinctly weaker ones with New Zealand, Polynesia, and New Caledonia.

#### HISTORICAL SUMMARY

There was no special account of Malaysian *Carex* before the early years of the present century, but several species were included in the few Floras of the area which appeared during the previous century. The most important of these is Miquel's "Flora van Nederlandsch Indië" (Fl. Ind. Bat.), 1855-56, which contains descriptions of 20 *Carices*, 4 of them new species based on specimens collected by Junghuhn and Reinwardt. *C. verticillata* Zoll. et Mor. was described in one of two lists of Zollinger's collections published between 1845 and 1854, and Steudel, in his "Synopsis Plantarum Glumacearum. Pars II. Cyperaceae," 1855, described a few more of Zollinger's Malaysian gatherings.

In 1904 appeared C.B. Clarke's "List of the *Carices* of Malaya" (Journ. Linn. Soc. Bot. 37: 1-16: 1904). It contains the names of 50 species and varieties from Malaysia proper, 15 of them (including 5 varieties) new (with accompanying descriptions), and the names of about ten extra-Malaysian species, under which are cited Balansa's Tonkin numbers. (Clarke included the 'Tonkin Peninsula' in his 'Malaya.') Most of these *Carices* are classified in subgenera, sections, and unspecified lower groups, the nomenclature of which was Clarke's own. According to modern con-

ceptions some of Clarke's classification is unacceptable, almost incomprehensible. He takes gynaeandry and androgyny, and other characters such as a bifid versus a trifid style, and makes use of them without apparent regard to other characters, to form his subgenera *Vigneandra* and *Vignegyne*. Section A. *Brevispicae* of *Vigneandra* is composed of 1. *C. Thomsonii* Boott and 2. *C. nubigena* Nees, and Section B. *Longispicae* of 3. *C. brunnea*, Thunb. and 4. *C. Graeffeana* Boeck. Species 1 and 2 are fairly closely related, but 3 and 4 are much farther apart from each other. The contrast of this subgenus with Subgenus *Vignegyne* supplies the chief incongruity. In this subgenus we get species 5. *C. alta* Boott and 6. *C. remota* L. forming "Sect. 1," and 7. *C. cernua* Boott "Sect. 2." The point of our criticism of this scheme can now be made, thus: species 1 and 2 in *Vigneandra* are really much more closely akin to 5 and 6 in *Vignegyne* than either pair is to species 3 and 4 or 7. Species 3 from *Vigneandra* and species 7 from *Vignegyne* belong to the same group in our modern classification, and to this group, Section *Acutae* Fries, belong also the three species forming Clarke's next subgenus, *Euvignea*! Yet Clarke was considered in his day to be a leading authority on the sedges!

The next and the most important authority on Malaysian—indeed, on world—*Carices* was Dr. G. Kükenthal, who, in his monograph of the Caricoideae in Engler's "Pflanzenreich" (IV, 20: 1909), recognised about the same number of species and varieties of *Carex* from the Flora Maleisiana area as Clarke, but with a rather greater leaning to varieties. These *Carices*, as I believe, were much better understood by Kükenthal than by Clarke, being much more accurately grouped in relation to one another and to other *Carices* than in Clarke's classification.

During the thirty years which elapsed between the publication of his monograph and the early years of the last war, Kükenthal was the only author of note on Malaysian *Carex*. In Engler's "Botanische Jahrbücher," volume 59 (1924), 69 (1938), and 70 (1940), he worked out the New Guinea Cyperaceae collected by Schlechter, Ledermann, Carr, the Clemenses, Mayr, Brass, and others, and in the "Bulletin du Jardin Botanique de Buitenzorg," (série 3, 16: 1940), he elucidated various Malaysian collections, especially that of Dr. C. G. G. J. van Steenis from Atjeh, north Sumatra, in 1937.

It would not be appropriate here to give an appraisal of Kükenthal's general work on *Carex*, nor of that of Krechetovich, who had no occasion to study tropical *Carices*, and whose important views on the evolution of the genus I have explained above.

In the "Kew Bulletin," 1946, 5-29, appeared my "Key to the *Carices* of Malaysia and Polynesia," including brief descriptions of 12 new species,

and an enumeration of the 138 species known from Indo-China and Lower Burma, Malaysia, and Polynesia, including Hawaii.

S. T. Blake, in the following year (*Journ. Arn. Arb.* 28: 99-116), published an account, with descriptions of 9 new species, of L. J. Brass's New Guinea *Carices*, collected between 1933 and 1939.

I, also in the "Kew Bulletin," 1949, wrote about Brass's New Guinea collections, and in the same journal and year published an account of the Arnold Arboretum set of the Clemens New Guinea species. In the following year I dealt with the new and other interesting *Carices* among the extensive collections at the Leiden and Buitenzorg herbaria, including descriptions of 12 new species and 9 new varieties (*Kew Bull.* 1950: 189-208).

#### SOURCES OF THE MATERIAL

The Bogor (Buitenzorg) herbarium provided the main basis for this revision—over 1500 sheets—, Leiden supplied over 600 sheets, including Junghuhn, Reinwardt, and other important historical specimens, while Kew and the British Museum (Natural History) made considerable contributions. The Director of the Arnold Arboretum loaned to Kew for me the Brass New Guinea collections and many Clemens numbers from that country, the Director of the Singapore Botanic Garden sent his specimens from the Malay Peninsula and the islands of Malaysia. The Director of the New York Botanical Garden, and the Chief Curator, Department of Botany, Chicago Natural History Museum, also loaned specimens. Owing to difficulties connected with borrowing, I have not seen a small number of important specimens, among which are included some of Zollinger's Java plants, a few Clemens New Guinea gatherings, several Van Steenis numbers from Atjeh, Sumatra, and some Philippines ones. Most of these have been seen and determined by Kükenthal, and I include a majority of his citations in my work, rejecting only those which I consider doubtful identifications.

The following abbreviations are used for the herbaria from which I have seen specimens: A A = Arnold Arboretum; B = Bogor (Buitenzorg); BM = British Museum (Natural History); Br = Brisbane; K = Kew; L = Leiden; Melb = Melbourne; and S = Singapore. The few other herbaria mentioned are given in full.

#### ACKNOWLEDGEMENTS

I should like to express my gratitude to my friend and colleague, Mr. H. K. Airy Shaw, for his inspiration and varied help so readily given over a long period. Our numerous discussions on phylogeny started when

we were thrown together during the war and have continued down to the present time. Other kindnesses are too many to mention: I have already referred to his translating of Krehetovich's thesis on Subgenus *Prinocarex* Kükenth., which has shed considerable light on the murky and complex evolutionary story of the caricoid sedges. My thanks are also due to the Director of Kew and to the Keeper of the Herbarium for allowing me time and other facilities for carrying out this revision. I have to thank Miss P. Kies, Dr. N. L. Bor (Kew Assistant Director), Mr. I. H. Burkill, and Mr. W. C. Worsdell, for their help with the data written in Dutch on the labels of the Bogor and Leiden sheets. The Director of the Rijksherbarium, Leiden, also gave assistance with labels. To Dr. E. D. Merrill I am grateful for enabling me to clear up several long-standing misidentifications. Among other helpful friends, my colleague, Mr. C. E. Hubbard, always at hand with good advice when needed, should have special mention.

#### LITERATURE ON MALAYSIAN CAREX

- MIQUEL, F. A. W. 1855-57. Flora van Nederlandsch Indië. (Flora Indiae Batavae.) [*Carex* in vol. 3: 346-354.]
- CLARKE, C. B. 1904. List of the Carices of Malaya. *Journ. Linn. Soc. Bot.* 37: 1-1C.
- KÜKENTHAL, G. 1909. Cyperaceae-Caricoideae, in Engler, *Das Pflanzenreich*, IV, 20 [*Carex*: 67-767].
- KÜKENTHAL, G. 1911. Conspectus Cyperacearum insularum Philippinensium: Cyperaceae-Caricoideae. *Philipp. Journ. Sci. C. Bot.* 6: 57-64.
- MERRILL, E. D. 1923. Enumeration of Philippine Flowering Plants. Vol. 1: Monocotyledons [*Carex*: 136-142].
- KÜKENTHAL, G. 1924. Beiträge zur Cyperaceen-Flora von Papuasien. *Engl. Bot. Jahrb.* 59: 41-60 [*Carex*: 59-60].
- VAN STEENIS, C. G. G. J. 1934. On the origin of the Malaysian Mountain Flora. Pt. 1. *Bull. Jard. Bot. Buitenzorg*, sér. 3, 13: 135-262 [*Carex*: 197-199].
- KÜKENTHAL, G. 1938. Neue Beiträge zur Cyperaceen-Flora von Neuguinea. *Engl. Bot. Jahrb.* 69: 255-265 [*Carex*: 261-265].
- KÜKENTHAL, G. Jan. 1940. Neue Cyperaceen aus Neuguinea. *Engl. Bot. Jahrb.* 70: 463-468 [*Carex*: 464-468].
- KÜKENTHAL, G. Feb. 1940. Neue Cyperaceen aus dem malayischen und papuanischen Gebiet I. *Bull. Jard. Bot. Buitenz.* sér. 3, 16: 300-323 [*Carex* 313-322].
- NELMES, E. 1946. Key to the Carices of Malaysia and Polynesia. *Kew Bull.* 1946: 5-29.
- BLAKE, S. T. 1947. Cyperaceae collected in New Guinea by L. J. Brass, I [*Carex*]. *Journ. Arn. Arb.* 28: 99-116.
- NELMES, E. 1949. Brass's New Guinea Carices. *Kew Bull.* 1949: 378-386.
- NELMES, E. 1949. The Clemens New Guinea Carices. *Kew Bull.* 1949: 387-392.
- NELMES, E. 1950. New and interesting Carices, mostly from the Leiden and Buitenzorg Herbaria. *Kew Bull.* 1950: 189-208.

Carex Linn.

Perennial herbs, with tufted or creeping subterranean rhizomes. Stems mostly trigonous and solid, rarely terete and hollow, usually central, sometimes lateral, usually more or less erect, often clothed at the base by persistent withered leaves or their fibrous remains. Leaves 3-ranked (tristichous), usually narrowly linear, rarely more or less elliptic, usually mostly near and/or at the base, with 0—several on the stem proper, sheathing below, lower sometimes reduced to sheaths, upper (bracts) subtending the panicles or spikes, sometimes glumiform, sheathing or not; sheaths often closed. Plants monoecious, rarely dioecious, the flowers arranged in spikes. Spikes 1—numerous, spicate or paniced, sessile or peduncled, wholly female, wholly male, androgynaeceous, or gynaeceandrous, the base of the lateral spikes or their peduncle often with a utriculiform or ocreiform cladoprophyll surrounding it. Flowers unisexual, solitary in the axils of glumes (scales). Perianth none. Male flowers consisting of 3 stamens, filaments filiform, free, rarely connate at the base, anthers linear. Female flowers consisting of a single pistil, enclosed in a sac-like organ (utricle, perigynium), and one style branched above into 2 or 3 stigmas, which protrude through the small orifice at the apex of the utricle. Style sometimes thickened, sometimes persistent, at the base. Utricles chartaceous, membranaceous, or coriaceous, closely enveloping the achene and conforming to its shape, or more or less inflated, bicarinate, often marginate, sometimes winged, rostrate or erostrate, sessile or stipitate, nerveless or nerved or costate, glabrous, pubescent, or hispidulous, smooth, papillose or punctulate, sometimes spongy at the base, apex of beak entire, oblique, bidentate or bilobed. Achenes trigonous, plano-convex, or lenticular, sessile or stipitate.

KEY TO THE SUBGENERA OF CAREX

- 1. Spikes bisexual, sessile. Cladoprophyll absent. Stigmas 2, very rarely 3 . . . 3. Vignea
1. Spikes bisexual or unisexual, often peduncled. Cladoprophyll present. Stigmas 3, rarely 2:
2. Spikes always bisexual, sessile or subsessile. Cladoprophyll utriculiform 1. Indocarex
2. Spikes usually unisexual, often peduncled. Cladoprophyll ocreiform . . . 2. Carex

Subgen. 1. Indocarex Baill.

Spikes androgynaeceous, usually short, usually numerous, rarely few, sessile or subsessile, usually more or less paniced. Cladoprophyll utriculiform, sterile, rarely containing an achene. Utricles more or less trigonous. Stigmas 3.

Subgen. 2. Carex (Eucarex Coss. et Germ.)

Spikes usually unisexual (male or female), sometimes bisexual, often long, several, rarely 1, often peduncled, usually solitary, sometimes fascicled at each node, simple, rarely compound at the base, often more or less distantly spaced from one another. Cladoprophyll ocreiform, sterile. Utricles usually more or less trigonous. Stigmas 3, rarely 2.

Subgen. 3. Vignea (P. Beauv.) Nees

Spikes bisexual (androgynaeceous or gynaeceandrous), very rarely unisexual or dioecious, short, several to numerous, rarely 1, sessile, usually contiguous or approximate. Cladoprophyll absent. Utricles plano-convex or biconvex. Stigmas 2, rarely 3.

ARTIFICIAL KEY TO THE MALAYSIAN SPECIES OF CAREX

- 1. Spike 1, terminating the stem:
2. Female glumes 3—4 mm long; utricles 4.5—5 mm long . . . 85. C. eremostachya
2. Female glumes 1.25—3 mm long; utricles 2—3.2 mm long:
3. Leaves 0.4—0.75 mm wide; female glumes 1.25—1.5 mm long; utricles 2—2.3 mm long . . . 86. C. capillacea
3. Leaves 0.7—2 mm wide; female glumes 2—3 mm long; utricles 2.5—3.2 mm long . . . 86. C. capillacea var. major
1. Spikes more than 1 on a stem:
4. Terminal and most of the other numerous spikes female, a few smaller ones male (a very tall plant—100-240 cm—with a regularly and extremely leafy stem)
2. C. hypolytroides
ibis. Terminal spike gynaeceandrous, i.e. male below and female above, or sometimes male at both ends and female at the middle, never female at the base (for 4 ter see p. 234) :
5. Spikes all sessile, 0.4—1.5 cm long, male flowers at the base usually so few that the spikes have a wholly female appearance:
6. Lower bracts foliaceous; inflorescence 2—16 cm long; utricles winged on the margins:
7. Spikes 5—21; female glumes 2—3 mm long; utricles 2.75—3 mm long . . . 105. C. allti
7. Spikes 3—8; female glumes 2.75—3.75 mm long; utricles 4—4.5 mm long . . . 106. C. monopleuria
6. Lower bracts glumiform; inflorescence 1.5—5 cm long; utricles not winged:
8. Leaves 1—2 mm wide; female glumes 2.5—3.5 mm long; utricles 4.25—5.5 mm long, strongly nerved, beak about 2 mm long . . . 107. C. perileia
8. Leaves 2—3(—5) mm. wide; female glumes 2—2.5 mm long; utricles 2—2.3 mm long, slenderly nerved, beak 0.25 mm long . . . 108. C. curta
5. Spikes usually all, but at least the lowest, peduncled, 0.5—9 cm long, basal male part often as long as or much longer than the female part:
9. Stigmas 2; utricles plano-convex or biconvex:
10. Inflorescence 11—13 cm long; female parts of spikes 4.5—7.5 mm thick; utricles ovate to elliptic, 2.75—3.5 mm long (beak 0.5—0.75 mm long) ; achene 1.5—2 mm long . . . 97. C. petectiealis
10. Inflorescence 7—10 cm long; female parts of spikes 5—10 mm thick; utricles elliptic to obovate, 3.5—4.5 mm long; achene 2—2.5 mm long:
11. Utricles elliptic (3.5—4.5 mm long), nerveless or very slenderly and obscurely few-nerved, densely papillose, beak 0.5—0.75 mm long, straight (female parts of spikes 7—10 mm thick) . . . 95. C. kemiriensis
11. Utricles elliptic to obovate (3.5—4.5 mm long), nerveless to distinctly up to 6-nerved on each face, not papillose, beak 1—2 mm long, sometimes bent and/or twisted (female parts of spikes 5—9 mm thick) . . . 96. C. spatulata



9. Stigmas 3; utricles more or less trigonous:
12. Female glumes 1—2 mm long; awn of male glumes 1.75—7 mm long (terminal spike sometimes male). . . . . 82. *C. Brownii*
12. Female glumes 2—4 mm long; awn of male glumes 0—0.75 mm long:
13. Leaves 5—10 mm wide (terminal spike often male) . . . . . 83. *C. Doniana*
13. Leaves 1—4(—5) mm wide:
14. Female spikes 2—9 cm long; utricles 5—7 mm long, beak 2.5—3 mm long (terminal spike often male). . . . . 85. *C. finitima*
14. Female spikes 0.5—5 cm long; utricles 2.25—4.5 mm long, beak 0—1.5 mm long:
15. Utricles ciliolate-hispidulous on the margins above; achene dilate-annulate at the apex (terminal spike sometimes male) . . . . . 67. *C. perciliata*
15. Utricles glabrous; achenes not dilate-annulate at the apex:
16. Stems 4—45 cm tall; female spikes 3—4.5 mm thick; female glumes ferruginous; utricles 2.25—3 mm long, ferruginous, erostrate or very shortly beaked (terminal spike sometimes male). . . . . 92. *C. elibates*
16. Stems 2—4(—12) cm tall; female spikes 4—6 mm thick; female glumes whitish; utricles 3.5—4.5 mm long, greenish-white, beak 1.25—1.5 mm long (terminal spike usually male) . . . . . 83. *C. Doniana* var. *cacuminis*
- iter.* Terminal spike male (*C. breviculmis*, *C. Brownii*, and *C. phacota* sometimes have a few female flowers at about or above the middle of the terminal spike) (for *Aquater* see p. 237):
17. Flowering stems arising from the axils of leaves produced on a short shoot:
18. Female glumes muticous; utricles lageniform, 7—7.5 mm long 62. *C. malayana*
18. Female glumes shortly aristate; utricles fusiform, 3.5—4 mm long . . . . . 65. *C. multifolia*
17. Flowering stems developing from lateral shoots, not from those bearing normal foliage leaves:
19. Leaves 2—7 mm wide; female glumes 2.75—3.75 mm long, longly aristate; utricles 2—2.25 mm broad . . . . . 76. *C. lateralis*
19. Leaves 1.5—3 mm wide; female glumes 3.75—4.25 mm long, muticous, utricles 1.75—2 mm broad. . . . . 75. *C. Loheri*
17. Flowering stems arising from the centre of the foliage leaves and developed from the shoot on which these are borne:
20. Spikes on 3 or more main peduncles from at least 1 node of the inflorescence:
21. Stems 2.5—10 cm tall; spikes 5—8, forming an inflorescence 2—4 cm long; female glumes 2.2—3 mm long; utricles 2.3—3(—3.25) mm long 51. *C. celebica*
21. Stems 12—95 cm tall; spikes 10-numerous, forming an inflorescence. 5—48 cm long; female glumes 3—6 mm long; utricles 4—6 mm long:
22. Fascicles 1—6-spiked; utricles plurinerved:
23. Fascicles 1—3-spiked; spikes subdense-flowered; utricles ellipsoid . . . . . 50. *C. phacelostachys*
23. Fascicles 3—6-spiked: spikes lax-flowered; utricles ellipsoid-lanceolate . . . . . 50. *C. phacelostachys* var. *losirensis*
22. Fascicles 1—20-spiked; utricles nerveless:
24. Leaves and bracts mostly shorter than, sometimes about as long as, the stem . . . . . 49. *C. verticillata*
24. Leaves and bracts mostly longer than the stem:

25. Female glumes blackish-red . . . . . 49. *C. verticillata* var. *Havilandii*
25. Female glumes golden to fulvous . . . . . 49. *C. verticillata* var. *lutescens*
20. Spikes solitary (rarely 2) at each node of the inflorescence:
26. Lower bracts not, or lowest 1 only and usually very shortly, completely sheathing the stem, but often subamplexicaul, and sometimes auricled in front, at the base (lowest bract rarely longly sheathing in *C. fascicularis* and *C. olivacea*):
27. Utricles plano-convex or biconvex; stigmas 2:
28. Spikes all straight and erect or suberect; bract of the lowest spike slightly exceeding the apex of the inflorescence; glumes not mucronate nor aristate; utricles densely punctulate. . . . . 100. *C. lacerans*
28. Spikes, or at least the lower ones, subcernuous to pendulous; bract of the lowest spike much exceeding the apex of the inflorescence; lower glumes mucronate to aristate; utricles densely whitish- to reddish-papillose:
29. Spikes 2—8(—10) cm long, 4—6 mm thick; female glumes oblong or obovate-oblong, apex very obtuse to bilobed-emarginate; utricles 2.25—3(—3.5) mm long, elliptic, obovate or suborbicular, usually ferruginous-papillose. . . . . 98. *C. phacota*
29. Spikes 1—5.5 cm long, 5—7 mm thick; female glumes elliptic, ovate, or oblong-lanceolate, apex acute to obtuse; utricles 3—4 mm long, elliptic, ovate, or ovate-lanceolate, whitish- to reddish-papillose 99. *C. pruinosa*
27. Utricles more or less trigonous; stigmas 3:
30. Stems 2—30 cm tall; leaves 1—4(—5) mm wide; spikes 0.6—3 cm long:
31. Stems 13—30 cm tall; spikes 1—3 cm long; utricles 3—3.5 mm long . . . . . 84. *C. subtransversa*
31. Stems 2—4(—12) cm tall; spikes 0.6—1.2(—1.7) cm long; utricles 3.5—4.5 mm long . . . . . 83. *C. Doniana* var. *cacuminis*
30. Stems 30—155 cm tall; leaves 5—20 mm wide; spikes 1.5—16 cm long:
32. Leaves 7—20 mm wide; spikes 3—16 cm long; utricles obovoid, oblong-ovoid, or ellipsoid-obovoid, rugose, beak about 1 mm long, bidentulate . . . . . 80. *C. olivacea*
32. Leaves 5—10 mm wide; spikes 1.5—8 cm long; utricles ellipsoid or ovoid-lanceolate, not rugose, beak 1—2 mm long:
33. Utricles ovoid-lanceolate, 4.75—5.5 mm long, beak 1.5—2 mm long, teeth about 1 mm long (leaves 6—10 mm wide). . . . . 79. *C. fascicularis*
33. Utricles ellipsoid, 3—4 mm long, beak 1—1.75 mm long, teeth 0.2—0.3 mm long (leaves 5—10 mm wide). . . . . 83. *C. Doniana*
26. Lower bracts, often all the bracts, completely sheathing the stem:
34. Margins of male glumes more or less connate in front:
35. Margins connate for more than halfway up from the base . . . . . 72. *C. pocilliformis*
35. Margins connate for less than halfway up from the base 71. *C. tristachya*
34. Margins of male glumes not connate:
36. Utricles sparsely to densely hairy or hispidulous, usually on one or both faces, rarely only on the margins:
37. Leaves numerous but normal ones situated only on the upper part of the stem; female glumes 1.3—2 mm long . . . . . 87. *C. Maubertiana*

37. Leaves mostly at or near the base of the stem, where they are more or less crowded, and only 0—2 above; female glumes 2—4.5 mm long:
38. Utricles 5.5—7.25 mm long:
39. Female glumes 3.75—4.25 mm long; utricles fusiform, 6.25—7.25 mm long. . . . . 75. *C. Loheri*
39. Female glumes 2—3 mm long; utricles rhomboid-lageniform, 5.5—6 mm long. . . . . 63. *C. rhynchachaeniwm*
38. Utricles 2.5—5 mm long:
40. Lowest bract much shorter than the inflorescence; female glumes truncate or emarginate at the apex; achene not annulate at the apex. . . . . 88. *C. tricuspidata*
40. Lowest bract longer than the inflorescence; female glumes not truncate nor emarginate at the apex; achene annulate at the apex:
41. Leaves 3—6.25 mm wide; spikes 1—3 cm long; utricles 3.5—5 mm long. . . . . 64. *C. breviscapa*
41. Leaves 1—4 mm wide; spikes 0.5—1.5 cm long; utricles 2.3—3.5 mm long:
42. Female glumes milky- to dirty-white, aristate, awn 0.2—4 mm long; utricles ellipsoid to ellipsoid-lageniform or obovoid; achene obovoid or ellipsoid-obovoid:
43. Spikes 3—7; utricles obovoid, hirtillous (terminal spike rarely gynaeandrous). . . . . 66. *C. breviculmis*
43. Spikes 2—4; utricles ellipsoid or ellipsoid-lageniform, glabrous or very sparsely hispidulous above. . . . . 70. *C. rugata*
42. Female glumes fulvous or brownish or castaneous with whitish margins, mucicous or mucronulate; utricles ellipsoid; achene ellipsoid or ovoid-ellipsoid:
44. Female glumes often mucronulate; utricles ciliolate-hispidulous on the margins, otherwise glabrous or glabrescent (terminal spike sometimes gynaeandrous). . . . . 67. *C. perciliata*
44. Female glumes usually mucicous; utricles surface densely hispidulous, at least above. . . . . 68. *C. brevis*
36. Utricles glabrous, even on the margins of the beak:
45. Leaves 6—20 mm wide; utricles 7.25—10.25 mm long. . . . . 73. *C. anomocarya*
45. Leaves 1—10 mm wide; utricles 2—7.5 mm long (2—4.5 mm long except in *C. Jackiana*, 5.75—7.5 mm long, and in *C. finitima*, 5—7 mm long):
46. Peduncles bristly over the whole surface, **at least** above; female glumes usually sparsely hispidulous:
47. Achene ellipsoid or slightly oblong-ellipsoid, 2—2.25 mm. long, about 0.9—1.2 mm broad. . . . . 81. *C. oedorrhamptha*
47. Achene ellipsoid, obovoid, or orbicular-obovoid, 1.25—1.5 mm long, about 1 mm broad. . . . . 81. *C. oedorrhamptha* var. *microcarya*
46. Peduncles smooth, or scabrid only or. the angles; female glumes glabrous:
48. Awn of male glumes as long as or longer than the glume itself (terminal spike occasionally gynaeandrous). . . . . 82. *C. Brownii*
48. Awn of male glumes 0 or shorter, usually very much shorter, than the glume itself:
49. Female glumes 3—5.5 mm long; utricles 5—7.5 mm long:

50. Female spikes 5—8 mm thick (when fruits mature); utricles distinctly multinerved. . . . . 74. *C. Jackiana*
50. Female spikes 3—4.5(—5) mm thick (when fruits mature); utricles nerveless or obscurely <ery few-nerved. . . . . 85. *C. finitima*
49. Female glumes 1.75—3.5 mm long; utricles 2—4 mm long:
51. Utricles not papillose:
52. Stems 12—42 cm tall; female glumes fulvo-castaneous, mucicous or mucronulate; utricles ellipsoid or oblong-ellipsoid, 3—4 mm long; achene ellipsoid-ovoid. . . . . 69. *C. montivaga*
52. Stems 1—17 cm tall; female glumes whitish, aristate; utricles ellipsoid or ellipsoid-lageniform, 2.5—3.5 mm long; achene obovoid, ellipsoid-obovoid or pyriform-obovoid. . . . . 70. *C. rugata*
51. Utricles ferrugineous-papillose:
53. Terminal spike sometimes gynaeandrous; leaves 1—4 mm wide; female glumes ferrugineous; utricles usually erostrate 92. *C. elibates*
53. Terminal spike always male; leaves 2—8 mm wide; female glumes castaneous; utricles beaked:
54. Leaves often much longer than the stem; spikes 5—6, male spike 1.5—4 mm thick; female glumes usually mucronulate; utricles strongly nerved. . . . . 90. *C. nenrochlaniys*
54. Leaves mostly shorter than but some as long as the stem: spikes mucronulate; utricles nerveless or (usually slenderly) nerved. . . . . 91. *C. maculata*
- Aquater*. Terminal and most of the other spikes androgynaeceous, i.e. female below and male above:
55. Flowering stems arising from the axils of leaves produced on a short shoot. . . . . 61. *C. cryptostachys*
55. Flowering stems developing from lateral shoots, not from those bearing normal foliage leaves. . . . . 1. *C. oligostachya*
55. Flowering stems arising from the centre of the foliage leaves and developed from the shoots on which these are borne:
56. Lower bracts not, or lowest 1 only, completely sheathing the stem, but often subamplexicaul, and sometimes auricled in front at the base; inflorescence at each node often a simple spike and sometimes sessile:
57. Lower spikes longly peduncled, 2—13 cm long:
58. Female glumes about as long as the utricles, 2.25—3 mm long. . . . . 93. *C. exploratorum*
58. Female glumes much shorter than the utricles, 1.5—2 mm long. . . . . 94. *C. philippinensis*
57. Lower spikes sessile, rarely subsessile, 3—14 mm long:
59. Stigmas 2; utricles plano-convex: . . . . . 102. *C. nubigena*
60. Lower bracts longer than the inflorescence. . . . . 104. *C. Pairaei* var. *javanica*
60. Lower bracts much shorter than the inflorescence:
61. Inflorescence 1.5—2.5 cm long. . . . . 104. *C. Pairaei* var. *javanica*
61. Inflorescence 4—20 cm long:
62. Leaves 3—10 mm wide; spikes numerous, forming a continuous panicle. . . . . 101. *C. appressa*

62. Leaves about 2.5 mm wide; spikes about 12, lower distantly spaced  
103. *C. divulsa* var. *javonica*
59. Stigmas 3; utricles more or less trigonous:
63. Spikes 12—numerous:
64. Stems 42—51 cm tall; leaves 6—12 mm wide; female glumes 4.25—5.5 mm long; utricles 6.5—8 mm long . . . . . 4. *C. leucostachys*
64. Stems 3—19 cm tall; leaves 2—7 mm wide; female glumes 2—3 mm long; utricles 2.3—4 mm long . . . . . 43. *C. satsumensis*
63. Spikes 2—8:
65. Female glumes 1.5—2 mm long; utricles rhomboid or rhomboid-lageniform  
12. *C. palawanensis*
65. Female glumes 2.25—4.25 mm long; utricles ellipsoid or obovoid:
66. Leaves 3.5—11 mm wide; utricles (ellipsoid) 4.25—5.75 mm long, densely hispidulous-pilose . . . . . 7. *C. tricephala*
66. Leaves 2—6 mm wide; utricles 5—7 mm long, glabrous except on the margins:
67. Female glumes 2.75—4.25 mm long; utricles ellipsoid, 6.5—7 mm long  
9. *C. Ramosii*
67. Female glumes 2.25—2.5(—3) mm long; utricles obovoid, 5—6.75 mm long . . . . . 8. *C. malaccensis*
56. Lower and usually upper bracts sheathing, lower often longly sheathing the stem; inflorescence at each node often branched and peduncled:
68. Partial inflorescence at each node consisting of 1—6 unbranched, peduncled spikes:
69. Stigmas 2 (rarely 3 in *C. aerophila*); utricles plano-convex to biconvex (rarely trigonous in *C. aerophila*):
70. Spikes 1—5 at each node:
71. Spikes 1—3 at each node; female glumes 4—7.5 mm long, sometimes aristate; utricles 5—6.25 mm long, 0.9—1.4 mm broad, beak about 2 mm long . . . . . 56. *C. aerophila*
71. Spikes 2—5 at each node; female glumes 4—5.25(—6) mm long, rarely mucronate; utricles 3.25—4.25 mm long, (0.9—) 1 mm broad, beak 1.25—1.5 (—1.75) mm long . . . . . 57. *C. spathaceo-bracteata*
70. Spike 1 at each node:
72. Stems slender (0.5—1.5 mm thick); leaves 1.5—4 mm wide; utricles 5—7 mm long . . . . . 60. *C. longipes*
72. Stems very slender (about 0.3 mm thick); leaves subfiliform; utricles 3.5—4.25 mm long . . . . . 59. *C. buruensis*
69. Stigmas 3 (rarely 2 in *C. atosanguinea*); utricles more or less trigonous:
73. Spikes 4—6 at each node . . . . . 48. *C. atosanguinea*
73. Spike 1, less commonly 2 spikes, at each node:
74. Spikes 1—3 (1 at each node), the lower or lowest often arising from basal leaf-sheaths; female glumes muticous:
75. Leaves 3—11 mm wide; spikes 1—4 cm long, female part 4—7 mm thick; utricles 4.25—6 mm long . . . . . 77. *C. speciosa*
75. Leaves 2—3 mm wide; spikes 3—8 cm long, female part 2.5—3 mm thick; utricles about 4 mm long . . . . . 78. *C. stenura*

74. Spikes 2—7 (1—2 at each node), situated in the upper part of the stem; female glumes aristate:
76. Stems 17—48 cm tall; leaves 2—3.5 mm wide; utricles 5—5.75 mm long (densely hispidulous except at base), beak 1.75—2 mm long . . . . . 55. *C. Eymae*
76. Stems 40—138 cm tall; leaves 3—9 mm wide; utricles 6—8 mm long, beak 2—3 mm long:
77. Female glumes ovate-lanceolate to oblong-lanceolate, apex subacute to obtuse, sparsely to subdensely hispidulous; utricles (6—)7—8 mm long, subdensely to densely hispidulous . . . . . 53. *C. kinabaluensis*
77. Female glumes oblong-ovate, apex obtuse to very obtuse, glabrous; utricles 6—6.5 mm long, glabrous or sparsely hispidulous  
54. *C. borneënsis*
- 68bis. Partial inflorescence on 2 or more main peduncles at 1 or more of the nodes, some of the peduncles branching into 2 to numerous spikes (for 68ter see p. 241):
78. Utricles glabrous, or hispidulous on the margins:
79. Spikes 2—8 cm long . . . . . 45. *C. turrata*
79. Spikes 3—15 mm long:
80. Females glumes 0.75—1.25 mm long (leaves 3—6 mm wide, densely scabrid on upper surface, female glumes hispidulous) . . . . . 39. *C. tytholepis*
80. Female glumes 1.25—4.5 mm long:
81. Female glumes 3—4.5 mm long (reddish-ferruginous, glabrous)  
30. *C. saturata*
81. Female glumes 1.25—3 mm long':
82. Utricles spongy-nerved, at least on the centre of the dorsal face:
83. Secondary panicles often single at the nodes, bracts slightly to much exceeding the stem; spikes 6—14 mm long . . . . . 18. *C. cruciata*
83. Secondary panicles always binate at some nodes, bracts exceeded by the stem or slightly exceeding it; spikes 3.5—6 mm long:
84. Leaves 9—15 mm wide; female glumes 1.5—2 mm long, apex obtuse to rotund; utricles becoming subinflated, strongly nerved  
22. *C. Buennemeijeri*
84. Leaves 7—10 mm wide; female glumes 2—2.3 mm long, apex acute to obtuse; utricles not inflated, nerveless except for 1—2 spongy nerves on the dorsal face . . . . . 23. *C. semiglomerata*
82. Utricles not spongy-thickened:
85. Leaves 1.5—5 mm wide:
86. Spikes 4—10 mm long; female glumes 1.75—3 mm long; utricles 2.75—4.5 mm long, dorsally plurinerved . . . . . 37. *C. sarawaketensis* var. *glabrinux*
86. Spikes 3—5 mm long; female glumes 1.5—1.9 mm long; utricles 2.5—3 mm long, nerveless except for 1(—2) submarginal dorsal nerves  
34. *C. xestogyne*
85. Leaves 2—20 mm wide (6—20 mm wide except in . . . . . *C. neo-guinënsis*, 3—10 mm, and in *C. filicina* var. *angustifolia*, 2—10 mm wide):
87. Leaves densely scabro-hispidulous on the upper surface; female glumes fulvous . . . . . 35. *C. lamprochlamys*
87. Leaves scabrid only towards the apex; female glumes reddish or castaneous:

88. Utricles wholly glabrous:  
 89. Leaves 7—20 mm wide; secondary panicles 4—12 cm long  
     31. *C. filicina*  
 89. Leaves 2—10 mm wide; secondary panicles 2.5—9 cm long  
     31. *C. filicina* var. *angustifolia*
88. Utricles hispidulous on the margins above or only on the beak:  
 90. Lower bracts much shorter than the inflorescence 24. *C. Clarkeana*  
 90. Lower bracts equalling or exceeding the inflorescence:  
 91. Leaves 10—14 mm wide; utricles 2.75—3.5 mm long  
     25. *C. Rafflesian/i*,  
 91. Leaves 3—10 mm wide; utricles 3—4 mm long:  
 92. Leaves 7—10 mm wide; spikes patent; female glumes aristate,  
 awn 0.5—1.25 mm long; beak of utricle with a scarcely oblique  
 mouth, bidentate . . . . . 35. *C. lamprochlamys* var. *diplocolea*  
 92. Leaves 3—10 mm wide; spikes suberect to patulous; female glumes  
 muticous or mucronate; beak of utricle with a very oblique mouth,  
 bidentulate, becoming erose-entire . . . . . 33. *C. neo-guineensis*
78. Utricles hispidulous on a part of their surface besides the margins:  
 93. Stigmas 2; utricles plano-convex to biconvex:  
 94. Utricles 5—5.75 mm long . . . . . 58. *C. brunnea* var. *dolichocarpa*  
 94. Utricles 2.5—4.5 mm long:  
 95. Female glumes 2.5—4 mm long; utricles distinctly nervose, whitish-  
 setulose; achene 2—2.25 mm long . . . . . 58. *C. brunnea*  
 95. Female glumes 1.75—3 mm long; utricles more slenderly nervose, nearly  
 glabrous to very sparsely whitish-setulose above; achene 1.5—2 mm long  
     58. *C. brunnea* var. *subteinogyne*
93. Stigmas 3; utricles obscurely to distinctly trigonous:  
 96. Spikes 1—6 cm long:  
 97. Leaves 8—16 mm wide:  
 98. Utricles 8—9 mm long . . . . . *C. Vansteenisii* (p. 444)  
 98. Utricles 4.75—6 mm long:  
 99. Stems 58—175 cm tall; female glumes 3.5—4 mm long 6. *C. tonkinensis*  
 99. Stems 55 cm tall; female glumes 5—6 mm long . . . . . 44. *C. aridens*  
 97. Leaves 2—9 mm wide (2—5 mm wide except in *C. perakensis*, 4—9 mm,  
 and in *C. breviglumis*, 5—8 mm, wide) :  
 100. Spikes sessile, in panicles. . . . . 5. *C. perakensis*  
 100. Spikes peduncled, fascicled:  
 101. Leaves 5—8 mm wide; utricles 5—7 mm long  
     52. *C. breviglumis*  
 101. Leaves 2—5 mm wide; utricles 3—3.75 mm long:  
 102. Utricles 0.8—1 mm broad, not papillose, olive-green, dull blackish-red  
 above, beak 1—1.5 mm long, teeth 0.2 mm long . . . . . 47. *C. Pullei*  
 102. Utricles 0.6—0.8 mm broad, densely glandular-papillose, wholly black-  
 ish-red, beak about 1 mm long, teeth 0.25—0.5 mm long  
     46. *C. Merrillii*
96. Spikes 3—12 mm long (3—9 mm long except in *C. gembolensis*, 6—12 mm,  
 and in *C. sarawaketensis*, 4—10 mm, long) :

103. Utricles with 2 spongy-thickened nerves on the dorsal face  
     20. *C. spongoneura*
103. Utricles not spongy-nerved:  
 104. Leaves densely vesiculose on the upper surface, the small, pale vesicles  
 or protuberances becoming rough towards the apex of the leaf:  
 105. Spikes 3—8 mm long; female glumes 0.75—1.25 mm long; utricles  
 2.5—3.2 mm long . . . . . 39. *C. tytholepis*  
 105. Spikes 6—12 mm long; female glumes 2—4.25 mm long; utricles 3.5—5  
 mm long:  
 106. Secondary panicles 5—10, at 4—6 nodes, lax to dense  
     26. *C. gembolensis*  
 106. Secondary panicles 8—18, at 6—8 nodes, very dense  
     26. *C. gembolensis* var. *crebra*
104. Leaves not vesiculose on the upper surface:  
 107. Leaves 1—5 mm wide; secondary panicles 1—5 cm long; glumes and  
 utricles reddish to blackish-red:  
 108. Leaves 1.5—5 mm wide; spikes 4—10 mm long; female glumes 1.75—3  
 mm long; utricles 2.75—4.5 mm long . . . . . 37. *C. sarawaketensis*  
 108. Leaves 1—2.5 mm wide; spikes 3—6 mm long; female glumes 1.25—1.9  
 mm long; utricles 2.4—2.6 mm long 37. *C. sarawaketensis* var. *minor*  
 107. Leaves 6—18 mm wide:  
 109. Leaves 6—12 mm wide; spikes 3—5 mm long; utricles sparsely to  
 densely hispidulous above . . . . . 25. *C. Rafflesiana* var. *macrothyrsa*  
 109. Leaves 7—18 mm wide; spikes 4—9 mm long; utricles sparsely to  
 subdensely hispidulous above . . . . . 25. *C. Rafflesiana* var. *virgata*
- 68ter. Partial inflorescences on only 1 main peduncle at each node, but 1 or more  
 branching into few or many spikes:  
 110. Utricles more or less hairy or hispidulous on at least a part of the surface  
 besides the margins:  
 111. Spikes (excluding small, lateral ones) 2—10 cm long:  
 112. Leaves 5—10 mm wide; secondary panicles composed of 3—rather numer-  
 ous spikes . . . . . 41. *C. myosuriis*  
 112. Leaves 2—0 mm wide; secondary panicles composed of 1—7 spikes  
     42. *C. longibracteata*
111. Spikes 3—13 mm long:  
 113. Leaves 7—36 mm wide:  
 114. Leaves 12—36 mm wide; utricles ellipsoid, 6—7 mm long 3. *C. Helferi*  
 114. Leaves 7—16 mm wide; utricles ellipsoid-rhomboid, 4(—4.5) mm long  
     10. *C. nodiflora*
113. Leaves 1—8 mm wide:  
 115. Leaves 1—2.5 mm wide; utricles 2.4—2.6 mm long  
     34. *C. sarawaketensis* var. *minor*
115. Leaves 2—8 mm wide; utricles 3—5 mm long:  
 116. Utricles ellipsoid or oblong-ellipsoid:  
 117. Spikes 6—13 mm long; female glumes 1.5—2 mm long; utricles 3.5—4  
 mm long . . . . . 38. *C. ceramica*  
 117. Spikes 4—7 mm long; female glumes 2—2.75 mm long; utricles 4—4.5  
 mm long . . . . . 27. *C. oblonga*

116. Utricles more or less obovoid:  
 118. Leaves hispidulous on the under-surface; secondary panicles 0.8—2.5 cm long; utricles 4.25—5 mm long . . . . . 21. *C. pycnothyrsos*  
 118. Leaves smooth on the under-surface, except on midrib; secondary panicles 2—7 cm long.; utricles 3—4 mm long:  
 119. Secondary panicles 5—9; female glumes 1.25—2 mm long . . . . . 28. *C. continua*  
 119. Secondary panicles 4; female glumes 2—2.5 mm long . . . . . 29. *C. timorensis*  
 110. Utricles wholly glabrous, or hispidulous on the margins:  
 120. Stigmas 2; utricles biconvex or plano-convex . . . . . 60. *C. longipes*  
 120. Stigmas 3; utricles more or less trigonous:  
 121. Spikes 2—6 cm long . . . . . 40. *C. baccans*  
 121. Spikes 4—22 mm long:  
 122. Spikes 10—22 mm long, male part of spike much longer than the female part; utricles inflated and obscurely trigonous . . . . . 16. *C. indica*  
 122. Spikes 4—15 mm long, male part of spike shorter to very much shorter than the female part; utricles not inflated (except in *C. Dietrichiae*);  
 123. Leaves 13—28 mm wide; utricles sometimes dorsally transversely rugose . . . . . 13. *C. blepharolepis*  
 123. Leaves 3—20 mm wide (3—14 mm wide except in *C. Horsfieldii*, 7—18 mm, and in *C. stramentitia*, 6—20 mm, wide); utricles not rugose:  
 124. Female, glumes 0.75—1.8 mm long:  
 125. Spikes 4—10 mm long; female glumes ovate or ovate-triangular, 1.2—1.8 mm long; utricles 2.25—3 mm long . . . . . 32. *C. sclerioides*  
 125. Spikes (4—)5 mm long; female glumes oblong with a rounded apex, 0.75—1 mm long; utricles 4 mm long . . . . . 11. *C. cirrhulosa*  
 124. Female glumes 1.5—3.5 mm long:  
 126. Female glumes milky to dirty white:  
 127. Leaves 5—8 mm wide . . . . . 19. *C. galactolepis*  
 127. Leaves 6—20 mm wide:  
 128. Utricles rhomboid-ovoid or rhomboid-ellipsoid (leaves 6—20 mm wide) . . . . . 14. *C. stramentitia*  
 128. Utricles ellipsoid or ellipsoid-obovoid (leaves 7—18 mm wide):  
 129. Utricles 3.75—4.5 mm long, mostly recurved, beak 1.5—2 mm long . . . . . 15. *C. Horsfieldii*  
 129. Utricles 5.2—5.8 mm long, straight or slightly recurved, beak 2.5—2.8 mm long . . . . . 15. *C. Horsfieldii* var. *major*  
 126. Female glumes fulvous, brownish, castaneous, or reddish, or flecked or splashed with one or another of these colours:  
 130. Utricles subinflated, obscurely trigonous:  
 131. Secondary panicles sometimes binate; female glumes ovate or triangular-ovate, 1.75—2.25 mm long; utricles 2.8—4 mm long, spongy-thickened-plurinerfed, beak 1—1.5 mm long; achene 1.5—2 mm long . . . . . 18. *C. cruciata*  
 131. Secondary panicles always single; female glumes oblong, oblong-ovate, or lanceolate, 2—3.5 mm long; utricles 3.5—5 mm long, nerves not spongy-thickened, beak 1.5—2 mm long; achene 2.25—3 mm long . . . . . 17. *C. Dietrichiae*

130. Utricles not inflated, distinctly trigonous:  
 132. Leaves 6—8 mm wide; secondary panicles 1.5—3 cm long; utricles 4—4.5 mm long . . . . . 31. *C. filicina* var. *Zipelii*  
 132. Leaves 3—6 mm wide; secondary panicles 3—5 cm long; utricles 4 mm long . . . . . 36. *C. papuana*

### Subgen. 1. Indocarex Baill.

#### KEY TO THE SECTIONS

1. Lateral spikes arising from a fertile (achene-bearing) utricle or cladoprophyll . . . . . 8. *Pacificae*  
 1. Lateral spikes arising from a sterile (empty) utricle or cladoprophyll:  
 2. Spikes 1—6 cm long . . . . . 7. *Polystachyae*  
 2. Spikes 3—15 mm long:  
 3\*. Spikes unisexual; leaves sparsely hairy on the under-surface . . . . . 2. *Hypolytroides*  
 3. Spikes androgynaeceous; leaves glabrous on the under-surface (hispidulous in *C. pycnothyrsos*, Section *Cruciatae*):  
 4. Stems lateral; panicles few-spiked . . . . . 1. *Scabrellae*  
 4. Stems central; panicles usually many-spiked:  
 5. Stems subscapiform; bracts brown-spadiceous . . . . . 3. *Mapaniifoliae*  
 5. Stems leafy below; at least the lower bracts foliaceous:  
 6. Female glumes and utricles whitish to stramineous; angles of achene thickened at the centre, apex sometimes discoid-annulate . . . . . 4. *Stramentitiae*  
 6. Female glumes and utricles pale with reddish spots, streaks or patches, or wholly reddish or castaneous; angles of achene not thickened at the centre, apex not discoid-annulate:  
 7. Female glumes pale with reddish or castaneous flecks or spots; style base more or less thickened . . . . . 5. *Cruciatae*  
 7. Female glumes light to dark reddish, fulvous, or castaneous; style base not or scarcely thickened . . . . . 6. *Filicinae*

#### Sect. 1. SCABRELLAE Kükenth.

in Engl. Pflanzenr. IV, 20: 286: 1909

*Stems* sometimes lateral. *Inflorescence* consisting of 6—12 single or binate secondary panicles, each secondary panicle consisting of 1—4(—5) peduncled spikes. *Bracts* short, sheaths ampliate. *Female glumes* usually sparsely hispidulous above, with nerves often reddish. *Utricles* subinflated, glabrous or hispidulous, greenish to reddish-brown. *Achene* obovoid. *Style* base not thickened.

Only Malaysian species . . . . . 1. *C. oligostachya*

I consider that Kükenth's Section *Scabrellae* is a heterogeneous group, and I have restricted it to four of the five species (which include *C. scabrella* Wahlenb.) under B in his key to the species in the "Pflanzenreich." The fifth, *C. moupinensis* Franch., goes with its obvious relative, *C. hypoly-*

As might be expected from such a wide-ranging species, *C. oligostachya* varies somewhat in its characters. The utricles, for example, vary from wholly glabrous (*C. breviceps* Kükenth.) to sparsely hispidulous above and in length from 2.5—3.75 mm.

In its lateral stems this species differs from most other *Indocarices*, and this character together with its simple panicle, reddish utricles, and other points of resemblance, suggest its derivation from such a species as the very wide-leaved Indochinese *C. Adrienii* E. G. Camus.

Kükenthal (*in* Engl. Bot. Jahrb. 70: 464: 1940) published the combination *C. breviceps* Kükenth. var. *recurvirostris* Kükenth., based on Clemens 8032, from North-East New Guinea. I have not seen this plant, and from its description alone I am unable to identify it with confidence.

Sect. 2. HYPOLYTROIDES Nelmes  
*in* Kew Bull. 1951: 121: 1951

*Stems* sometimes extremely tall, nodose. *Leaves* regularly situated throughout the stem, not crowded at the base, under-surface sparsely hairy. *Spikes* unisexual, those of the lower panicles all or mainly female (usually 2 male), those of the uppermost panicle sometimes all male. *Utricles* small, becoming patent, reddish, abruptly small-beaked.

Only Malaysian species. . . . . 2. *C. hypolytroides*

2. CAREX HYPOLYTROIDES Ridley

*Carex hypolytroides* Ridley *in* Journ. F. M. S. Mus. 8, Pt. IV, Bot.: 124: 1917. — Sumatra, Robinson & Kloss 55.

*Carex hypolytroides* Gross & Mattf. (pro sp. nov.) *in* Notizbl. Bot. Gart. Berlin 14: 190: 1938. — Tonkin, Petelot 317 4.

Tufted. *Rhizome* woody. *Stems* subacutely trigonous, 100—240 cm tall, 3—5 mm thick throughout, below the rhachis, faintly to slenderly ribbed, smooth and glabrous below the rhachis, pale yellowish, surrounded at the base by very few, small, reddish-brown cataphylls or leafless sheaths. *Leaves* situated at regular intervals throughout the stem (in striking contrast to the usual crowding at or near the base), shorter than the stem, 4—8.5 mm wide, flattish with revolute margins, stiff, subcoriaceous, under-surface sparsely covered with subadpressed, long, palish hairs; *sheaths* smooth, often dark reddish-brown below, especially near the nodes, hairy above as the under-surface of the leaf, membranous and often ferruginous in front, mouth concave; ligule rather long, ferruginous, produced into a hairy lobe. *Inflorescence* a compound, rather slender, interrupted panicle, occupying the upper 25—40 cm of the stem; *secondary panicles* 6—8, erect or suberect, single or lowest sometimes binate, corymbose, upper approximate, lower at increasing distances from one another downwards, 2—3 cm long, 3—5 cm broad, rather lax, all on exerted peduncles, all branches in lower panicles and lower branches in upper panicles branched

again into 2—7 simple spikes, upper branches in upper panicles simple spikes, branches and spikes patulous to patent; *peduncles* wiry, more or less trigonous, hairy, *Rhachis* covered with long, whitish subadpressed hairs. *Bracts* foliaceous, but upper reduced in size, slightly exceeding the apex of the whole inflorescence, from (uppermost) shortly to (lowest) very longly sheathing; *sheaths* similar to leaf-sheaths. *Spikes* unisexual, females numerous, 10—20 on each secondary panicle, shortly cylindrical, on short, straight to curved, very slender, peduncles or pedicels, dense-flowered, 5—8 mm long, 3.5—4.5 mm thick, male spikes few, 2 (rarely 1), situated, opposite each other, just below the base of the terminal female of each branch, sessile, patent, subdense, but rather few-flowered, more or less ellipsoid, about 4 mm long, 1.5—1.75 mm thick, inconspicuous. *Bracteoles* glumiform, longly to shortly aristate. *Cladoprophylls* utriculiform, multinerved, hairy, apex glumiform with margin narrowly whitish-erose, 2—6 mm long. *Female glumes* ovate-lanceolate, sometimes slightly oblong, incurved at the base, otherwise deeply cymbif or acute or subacute, 2—2.75 mm long, 1—1.5 mm wide, whitish subadpressed-hispidulous, slenderly nerved, reddish but often paler at the base, margin irregularly whitish-hyaline, erose, midrib shortly excurrent. *Utricles* obovoid, obtusely trigonous, angles prominent, faces flattish above, shallowly concave below, 1.25—2 mm long, 0.75—1 mm broad, submembranaceous, glabrous, straight, becoming patent, dorsally dull blackish-red and papillose above, dull reddish below, ventrally pale but densely glandular-spotted, ventrally nerveless or slenderly about 2-nerved above, dorsally sometimes nerveless but usually 3-5-nerved above, margins often displaced, tapering below to a spongy-thickened, semi-bulbous base, apex abruptly beaked; *beak* conic, about 0.25 mm. long, reddish, very shortly bidentulate or bilobed; *mouth* very small, not or scarcely oblique; *teeth* with membranous apices which become erose and subentire. *Achene* obovoid to subglobose but tapering below, trigonous, angles prominent, faces concave below, 1—1.5 mm long, 0.5—1 mm broad, brown, overlaid whitish-papillose, often slightly bent at the base, not stipitate, apex rounded, erostrate. *Style* very short, base thickened. *Stigmas* 3.

SUMATRA: West Coast; Mt. Korinchi [G. Kerintji], 2190m, 24 April 1914, Robinson & Kloss 55 (BM) !; *ibid.*, 2500 m, 29 April 1920, *Biinnemeijer* 9820 (B, K, L, S) !; *ibid.*, 2750 m, 30 April 1920, *Biinnemeijer* 9856 (B) !; *ibid.*, forest, 2200—2700 m, 6—9 May 1920, *Biinnemeijer* 10,175, 10,283, 10,3J,8, 10,384, (B) !; *ibid.*, along the way from Kajuaro (1400 m) to the summit (3805 m), that is, the route taken by the Singapore expedition (Robinson & Kloss, 1914) at 2600 m, 2 Aug. 1931, *Frey-Wyssling* 124 (B) !; *ibid.*, by stream, in wet spot, 2400 m, 15 Feb. 1933, *Holttm* (*Sing. Field No.* 26,243) (B, s)!

Indo-China.

This *Carex* has a stem remarkably like that of *Scleria*, and unlike that of other *Carices* except such as *C. insignis* Boott [*Carex* sect. *Decorae* (Kükenth.) Ohwi], and *C. Maubertiana* and its few allies in Section *Hirtae* Tuckerm., with the leaves not concentrated at the base but evenly spaced

throughout its length. The stem, including the rhachis, is also taller than that of most *Carices*, while the arrangement of its flowers and those of the only other member of the section, *C. moupinensis* Franch., a plant of Central China, is unique in the genus. The secondary panicles are in general structure much like those of other *Indocarices*, but whereas the spikes of these are invariably androgynaeceous, those of *C. hypolytroides* and *C. moupinensis* are all, or nearly all, unisexual. Most of the spikes are female, but two lateral ones of each secondary panicle, which may have been degraded from an originally terminal position, are male. In *C. moupinensis* all the spikes of the uppermost panicle are usually male.

Sect. 3. MAPANIIFOLIAE Nelmes et Airy-Shaw  
in Hook., Ic. Pl. 35: t. 3434: 1943

*Stems* central, subscapiform, bearing spadiceous bracts in pale of foliage leaves, which loosely surround the base of the stem. *Leaves* conduplicate-petiolate below, very wide (up to over 3 cm). *Secondary panicles* contracted and very dense. *Female glumes* obtuse to truncate-bilobed at the apex, whitish to brown. *Utricles* with a more or less globose apex; beak very long, curved and sometimes twisted; mouth extremely oblique! *Style* with a thickened discoid base.

Only Malaysian species. . . . . g. *C. Helfer*

3. CAREX HELFERI Boeck.

*Carex Helfer* Boeck. in Linnaea 40: 365: 1876; Kiikenth., 286; Nelmes in Kew Bull. 1950: 189: 1950. — Lower Burma, *Heifer* 61111Z.

Tufted. *Rhizome* short, stout, woody. *Stems* erect to subcurved, central, subscapiform, subterete to trigonous, strongly ribbed, 20—40 cm tall, 1—2 mm thick below, angles smooth to scaberulous, faces glabrous to minutely setose, pale to light brown, base rather closely enveloped by several brown to fuscous, short-bladed, sheathing bract-like leaves, 5—10 cm long, these surrounded by 2—6 foliage leaves, around the base of which are some spadiceous to pale and withered, brownish- to blackish-nerved, cataphylls or their fibrous remains, very short up to 16 cm long. *Foliage leaves* few, mostly much longer than the stems, 40—90 cm long, 1.2—3.6 cm wide, conduplicate-petiolate below, gradually widening upwards into a flat and widely linear blade which is longly acuminate towards the firm, acute to obtuse apex, stiff but thinnish when dried, oblique to arcuate, upper surface densely alveolate, upper surface above sometimes sparsely covered with pale, adpressed, minute bristles, slenderly but distinctly septate-nodulose in many places, scarcely to shortly sheathing. *Inflorescence* a compound, interrupted panicle, 8—22 cm long; *secondary panicles* 3—6, single, more or less oblong-ovoid, erect to patulous, 2—3.5 cm long, 1.25—2.5 cm broad, upper subapproximate to rather distant, lower distant to remote, contracted and very dense, upper on shortly to rather longly, lower on longly to very longly, exerted peduncles,

lower branches extremely short, probably again branched into several sessile, simple spikes, upper branches in the form of simple spikes; *peduncles* subterete to trigonous, 1—1.3 mm thick, angles smooth to finely scaberulous, faces often minutely setose above, otherwise smooth. *Rhachis* of the secondary panicles hispidulous on the angles, which are acute. *Bracts* not foliaceous but light brown to light spadiceous, usually about as long as the peduncles, none exceeding their secondary panicles, blades short, densely and minutely subadpressed-setose or paleaceous on the back except at the base, acuminate, apex acute, conduplicate to flattish, uppermost shortly, remainder longly, sheathing; *sheaths* ampliate, deeply concave and easily splitting at the mouth, often lighter in colour at the node. *Spikes* numerous, androgynaeceous (some terminal ones possibly wholly male), more or less oblong, becoming more or less ovoid, 6—10 mm long, patulous to patent, sessile, densely crowded, male part dense-flowered, usually much longer and later more slender than the female part, which is few-flowered, becoming 5—8 mm or more thick. *Bracteoles* almost indistinguishable from the glumes. *Cladophylls* utriculiform below, glumiform above, 3 mm long, 1.5 mm wide above, sparsely scurfy-hispidulous, apex acute to obtuse, not aristate. *Female glumes* more or less oblong or ovate-oblong, shallowly cymbiform, base thickened and incurved, apex obtuse to truncate-bilobed, 2—4 mm long, 1.5—2 mm wide, translucent, especially the wide, thin, whitish, slenderly nerved, becoming-erose margins, otherwise thickish-multinervose, densely and minutely alveolate, glabrous to densely scurfy-hispidulous, pale brown to whitish, midrib and 2 adjacent nerves converging upwards and excurrent in a wide, hispidulous-margined, sometimes curved or flexuous awn, 1—3.75 mm long. *Utricles* ellipsoid, trigonous, angles very prominent, obtuse, faces shallowly concave, 6—7 mm long, 1.5—1.8 mm broad, membranaceous to subcoriaceous, strongly 6—8-nerved on each of the 3 faces, marginate, glabrous below, hispidulous or paleaceous above, patulous, stramineous, becoming brown, tapering below, then contracted into a short, stout stipe, abruptly contracted above into a more or less globose apex, 0.5 mm or more in diameter, then subabruptly or abruptly beaked; *beak* oblong, compressed, 3—3.5 mm long, scarcely to narrowly marginate, sparsely to subdensely hispidulous, curved and sometimes twisted, whitish, becoming brownish; *mouth* extremely oblique, its base, on the dorsal side, being 1.5—1.75 mm from the entire apex. *Achene* ellipsoid to obovoid-ellipsoid, trigonous, angles prominent, obtuse, faces shallowly concave, about 2.75 mm long, 1.5—1.75 mm broad, stramineous, becoming dark brown with paler angles, tapering below, abruptly scarcely to very shortly and stoutly stipitate, tapering above, abruptly scarcely to very shortly beaked at the rounded apex. *Style* pyramidally thickened at the base, forming a subpersistent disc, about 0.5 mm in diameter, on the beak of the nut. *Stigmas* 3, rather thick and rather long.

JAVA: Waterfall, November, ex Herb. Reinwardt (B); Bogor (Buitenzorg); Pasir Gombong, near Tjidadap, south of Tjibeber, forest, one or two plants, 1100 m, 11 Sept. 1917, *Backer* 22,966 (B) !  
Lower Burma, Siam.

*Carex Helferi* is the only member known from Malaysia of a group of apparently relict species, with very wide leaves and other distinctive characters, which appear to be almost confined to Indo-China. These were included in my "Key to the Carices of Malaysia and Polynesia" (in Kew Bull. 1946, No. 1), but are omitted here so as to bring this revision into accord with the Flora Malesiana area. It is hoped that an account of Indo-Chinese *Carices* will be published soon after this Malaysian one, when these remarkable, wide-leaved sedges can be more fully discussed.

#### Sect. 4. Stramentitiae (C. B. Clarke) Nelmes, *sect. nov.*

[Series] *Stramentitiae* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 4: 1904

*Secondary panicles* usually single. *Spikes* few to numerous. *Cladophylls* utriculiform or vestigial. *Female glumes* whitish to stramineous (except in *C. Dietrichiae*), *Utricles* not inflated (except in *C. Dietrichiae* and *C. indica*), multinerved, whitish to stramineous, mouth often dorsally oblique. *Achene* ellipsoid or rhomboid-ellipsoid, angles very prominent, centrally thickened, beak straight, apex sometimes discoid-annulate. *Style* pyramidally much thickened, base sometimes discoid-annulate.

1. Lower bracts not, or lowest 1 only, completely sheathing the stem:
  2. Spikes rather numerous . . . . . 4. *C. leucostachys*
  2. Spikes 2—8:
    3. Female glumes 1.5—2 mm long; utricles rhomboid or rhomboid-lageniform . . . . . 12. *C. palaivanensis*
    3. Female glumes 2.25—4.25 mm long; utricles ellipsoid or obovoid:
      4. Leaves 3.5—11 mm wide; utricles (ellipsoid) 4.25—5.75 mm long, densely hispidulous-pilose . . . . . 1. *C. tricephala*
      4. Leaves 2—6 mm wide; utricles 5—7 mm long, glabrous except on the margins:
        5. Female glumes 2.75—4.25 mm long; utricles ellipsoid, 6.5—7 mm long . . . . . 9. *C. Ramosii*
        5. Female glumes 2.25—2.5(—3) mm long; utricles obovoid, 5—6.75 mm long . . . . . 8. *C. malaccensis*
  1. Lower and usually upper bracts sheathing, lower often longly sheathing the stem:
    6. Upper secondary panicles binate or ternate:
      7. Leaves 8—16 mm wide; secondary panicles 12—20 . . . . . 6. *C. tonkinensis*
      7. Leaves 4—9 mm wide; secondary panicles up to 6 . . . . . 5. *C. perakensis*
    6. Secondary panicles all single:
      8. Utricles whitish-setulose . . . . . 10. *C. nodiflora*
      8. Utricles glabrous except sometimes the margins:
        9. Glumes more or less castaneous . . . . . 17. *C. Dietrichiae*
        9. Glumes whitish or stramineous:
          10. Spikes 10—22 mm long, male part of spike much longer than the female part; utricles inflated and obscurely trigonous . . . . . 16. *C. indica*
          10. Spikes (4—) 15 mm long, male part of spike shorter to very much shorter than the female part; utricles not inflated:

11. Spikes (4—) 5 mm long; female glumes 0.75—1 mm long (leaves about 5—8 mm wide) . . . . . 11. *C. cirrhulosa*
11. Spikes 5—15 mm long; female glumes 1.5—3 mm long:
  12. Leaves 13—28 mm wide; utricles sometimes dorsally transversely rugose . . . . . 13. *C. blepharolepis*
  12. Leaves 6—20 mm wide; utricles not rugose:
    13. Utricles rhomboid or rhomboid-ellipsoid . . . . . 14. *C. stramentitia*
    13. Utricles ellipsoid or ellipsoid-obovoid:
      14. Utricles 3.75—4.5 mm long, mostly recurved, beak 1.5—2 mm long . . . . . 15. *C. Horsfieldii*
      14. Utricles 5.2—5.8 mm long, straight or slightly recurved, beak 2.5—2.8 mm long . . . . . 15. *C. Horsfieldii* var. *major*

Five of the 14 species in this section come from Kiikenthal's Section *Scabrellae*, three from his Subsection *Turgidulae* of Section *Indicae* Tuckerm., and *C. Horsfieldii* is taken from his closely related Subsection *Gracilirostres*. The remaining five species have been published since the date of his monograph, two by himself, *C. palaivanensis*, which he placed in Section *Scabrellae*, and *C. Ramosii*, which he considered to belong to his Section *Rhomboidales*, in Subgenus *Carex*. For the resulting group I have adopted Clarke's name *Stramentitiae*, which he used in a similar sense, but for a lower rank. I use Clarke's name because it seems so appropriate for a group of *Indocarices* which differs from the other large section of this subgenus strikingly in its pale glumes and often pale utricles.

#### 4. CAREX LEUCOSTACHYS Ridley

*Carex leucostachys* Ridley in Kew Bull. 1928: 77: 1928. — Malay Peninsula, *Md. Nur* 18,912.

Loosely tufted. *Rhizome* woody. *Stems* more or less erect, trigonous, angles prominent, obtuse to subacute, 42—51 cm tall, 2—2.5 mm thick below, smooth below, sparsely scabrid on the acute angles above, surrounded, below the leaves, by thickish, brown, polished, blackish-nerved, cataphylls or leafless sheaths. *Leaves* subbasal, few, with 1—2 higher on the stem, lowest short-bladed, upper very far exceeding the stem, 6—12 mm wide, flat, septate-nodulose in places, apices shortly attenuated; *sheaths* rather long and loose, brown and membranous in front, mouth darker brown, often setulose. *Inflorescence* a dense or little interrupted panicle, forming an oblong-lanceolate, ovate-lanceolate, or subpyramidal, terminal head, 4—8 cm long, 2—3 cm broad; *secondary panicles* probably 3—4 but too crowded to be distinguished from one another, or lowest somewhat separated, single or some possibly binate, each branched once, sometimes probably twice, into several simple sessile or subsessile spikes, lowest panicle on a rather longly exerted peduncle, which is obtusely angled and glabrescent below, acutely and ciliolate-hispidulously angled above. *Rhachis* hispidulous or hispidulous-angled. *Bract* of the lowest (subdistant)



panicle foliaceous, shortly sheathing, upper bracts subfoliaceous, much reduced, not or scarcely sheathing, lower exceeding, upper equalling or exceeded by, the apex of the main inflorescence. *Spikes* androgynaeceous, more or less cylindrical but male part tapering, 8—15 mm long, rather few- and subax- or subdense-flowered, male part about equalling or rather longer than the female part, 1.5—2 mm thick, female part much thicker. *Bracteoles* indistinguishable from the female glumes. *Cladoprophylls* subocreaform below, glumiform above, 2—3 mm long. *Female glumes* lanceolate or ovate-lanceolate, base amplexicaul, deeply cymbiform, margins involute, apex acute to obtuse and often bilobed, 4.25—5.5 mm long, 2.5—3 mm wide, translucent, thin and whitish, often golden-flushed above, strongly yellowish to reddish-brown, nervose, glabrous to sparsely hispidulous below, sparsely to densely hispidulous above, 3 central nerves coalescing above and usually excurrent from a point below the apex in a hispidulous mucro or awn up to about 1 mm long. *Utricles* ellipsoid to obovoid with a tapering base, distinctly trigonous, faces flattish, 6.5—8 mm long, 1.5—2.3 mm broad, membranaceous or subcoriaceous, dorsally slenderly 6—12-nerved, ventrally nerveless or slenderly 6—16-nerved, dorsal nerves sometimes reddish-brown tinged, narrowly marginate or margins displaced, base often glabrescent, otherwise densely whitish subadpressed hispidulous, straightish or obliquely bent at the apex, patulous, whitish- or pale green-stramineous, to light-reddish brown, densely alveolate, base spongy, not stipitate, subgradually to subabruptly narrowing above into a beak; *beak* gradually tapering, compressed to subterete, about 3 mm long, stoutish, marginate, glabrescent to densely hispidulous, sometimes slightly twisted, bilobed; *mouth* dorsally oblique; *lobes* shortish, straight, apex whitish-hyaline, becoming erose. *Achene* ellipsoid-obovoid, or obovoid with a tapering base, conspicuously trigonous, faces flattish, or slightly concave below, 3—4 mm long, 1.4—2 mm broad, dark brown to blackish, angles golden, scarcely to very shortly pale stipitate, apex slightly tapering and suddenly contracted into a beak; *beak* stout, very short, slightly bent at the base, apex slightly annulate. *Style* thickened towards the base, which is sometimes sparsely hirtellous and persistent on the beak of the achene. *Stigmas* 3, dark reddish-brown, sharply contrasting with the pale spikes.

MALAY PENINSULA: Pahang; Island of Tioman, Mt. Kajang, 750 m, 17 May 1927, *Md. Nur 18,912* (K)!

SUMATRA: Palembang; north slopes of Mt. Pesagi, east-south-east of Ranau lake, damp humus in forest, ± 1500 m, 5 Nov. 1929, *van Steenis 3671* (B)!

This, together with *C. perakensis* and *C. tonkinensis*, forms a group of related and obviously reduced species, but not reduced to the same extent as the otherwise similar trio, *C. tricephala* Boeck., *C. malaccensis* C. B. Clarke, and *C. Ramosii* Kiiikenth. In each group the contraction of the floral structure has affected and rendered semi-vestigial the utriculiform cladoprophyll which is normally so well developed at the base of each spike or spikelet in Subgenus *Indocarex*, and so in each group the problem arose

as to whether it were preferable to leave-in or omit from the *Indocarices*, and it was decided to leave them in.

#### 5. CAREX PERAKENSIS C. B. Clarke

*Carex perakensis* C. B. Clarke in Hook, f., Fl. Brit. Ind. 6: 720: 1894; C. B. Clarke, 9; Ridley, Fl. Malay Penins. 5: 184: 1925.—Malay Peninsula, Wray.

*Carex Wightiana* Nees var. *perakensis* (C. B. Clarke) Kiiikenth. in Engl. Pflanz. IV, 20: 288: 1909.

*Carex Vansteenisii* Kiiikenth. var. *brevispiculosa* Kiiikenth. in Bull. Jard. Bot. Buitenz. sér. 3, 16: 321: 1940.—Sumatra, van Steenis 9934.

Loosely tufted. *Rhizome* elongated, 3—4 mm. thick, woody, clothed with brown to fuscous sheathing scales. *Stems* more or less erect, trigonous, angles acute above, 58—120 cm tall, 2—2.5 mm thick below, smooth throughout, or angles sparsely scaberulous here and there towards the apex of the rhachis. *Leaves* regularly spaced throughout the stem, shorter bladed and more aggregated at the base, merging downwards into thick, elongated, acuminate, spadiceous to fuscous, often nitidous cataphylls or nearly leafless sheaths, normal leaves long, some exceeding the stem, 4—9 mm wide, flat or flattish, sometimes slightly involute, septate-nodulose in places, apices longly acuminate; *sheaths* rather long, dark brown- or blackish-nerved on the back, front dark brown, membranous, hispidulous above. *Inflorescence* a much interrupted, narrowly oblong panicle, occupying the upper third or less of the stem; *secondary panicles* up to 6, lower single or binate, upper binate or ternate, more or less oblong, 2—5 cm long, upper approximate, forming a continuous inflorescence, lower 1—2 rather distant, each composed of 3—6 simple sessile spikes, lower on longly exerted, upper sessile or on shortly exerted, peduncles (unequally peduncled when binate or ternate); *peduncles* obscurely trigonous, very slender, smooth or rarely sparsely scaberulous. *Bracts* of the lower panicles foliaceous, exceeding or much exceeding the apex of the stem, longly sheathing, upper bracts much reduced, subfoliaceous to glumiform-aristate, shortly sheathing; *sheaths* membranous, dark-brown, and sometimes hispidulous, at the mouth. *Spikes* androgynaeceous, more or less cylindrical but tapering at the apex, 1—1.5 cm long, subax- or subdense-flowered, male part about as long as the female or sometimes longer, about 1.5 mm thick, female part 5—7 mm thick. *Bracteoles* reduced to long-awned glumes. *Cladoprophylls* utriculi-glumiform, about 3.5 mm long, sometimes much smaller and ligulate. *Female glumes* ovate, ovate-oblong, oblong, or oblong-obovate, apical part triangular or sublanceolate, strongly incurved below, cymbiform above, apex acute to obtuse, 3.25—4.5 mm long, 1.75—2.5 mm wide, translucent, thin and whitish, or fulvous with wide whitish margins, golden-brown nervose, glabrous, or sparsely and minutely hispidulous towards the apex, margins ciliolate-erose, midrib usually excurrent from a point about 0.5 mm below the apex in a ciliolate-hispidulous awn up to 1.5 mm long; *male glumes* similar but longer, more or less oblong, narrowing near the apex. *Utricles* ellipsoid, obovoid-ellipsoid, or obovoid but tapering below, trigonous, angles rather prominent, 4.75—6 mm long,

1.3—1.9 mm broad, membranaceous or subcoriaceous, multinerved, nerves sometimes reddish-brown towards the base, very narrowly marginate, base glabrous or glabrescent, otherwise densely pale to golden, subadpressed hispidulous, straight or slightly curved, patulous, very pale green or yellowish-green to golden or lightish brown, base spongy, truncate, not stipitate, subgradually narrowing above into a beak; *beak* conic, 1—2 mm long, narrowly marginate, glabrescent or hispidulous, bilobed; *mouth* dorsally oblique; *lobes* short, straight, apex whitish-hyaline, becoming erose. *Achene* obovoid or ellipsoid-obovoid, but longly tapering towards the base, conspicuously trigonous, faces flattish, 2.75—3 mm long, 1.1—1.8 mm broad, dark brown to blackish, base pale, not stipitate, apex slightly tapering, beaked; *beak* stout, short or very short, often slightly bent, pale. *Style* slightly thickened at the trigonous, whitish-hispidulous-angled base, which persists on the equally thick beak of the achene. *Stigmas* 3, long, dark reddish brown, in striking contrast to the pale glumes and utricles.

MALAY PENINSULA: Perak; Taiping Hills, comm. Aug. 1885, Wray (K) !; *ibid.*, Dec. 1902, Ridley 11,423 (K) !; Maxwell's Hill, 870 m, 6 March 1924, Burkill & Haniff 12,694 (K) ! — Pahang; Telom, Nov. 1908, Ridley 13,865 (BM) ! — Selangor; Semangkok Pass [Ridley] !

SUMATRA: Atjeh; Gajo Lands, Putjuk Angasan, forest slope and crest above Penosan, ± 1600 m, 27 Jan. 1937, van Steenis 8277 (B) !; *ibid.*, Kapi fields, Paja, swamp near the confluence of the rivers Kapi and Aunan, flat forest ridge, with cold solfatara field, giving rise to H<sub>2</sub>S, 1100—1250 m, 21 March 1937, van Steenis 9934 (B) !

BORNEO: Sarawak; near Long Kapa, Mt. Dulit (Ulu Tinjar), IVth Division, Dulit Trail, ± 800 m, on moist rocks in slight shade, 27 and 29 Aug. 1932, Richards 1492 (K) !

CELEBES: South-West Celebes; Mt. Pokapindjang, Latimodjong Mts., alang-alang, 1700 m, 28 May 1929, Kjelberg 14.79 (B) !

#### 6. CAREX TONKINENSIS Franch.

*Carex tonkinensis* Franch. in Nouv. Arch. Mus. Hist. Nat. sér. 3, 8: 251: 1896; Kükenth., 292; Nelmès in Kew Bull. 1950: 190: 1950. — Tonkin, Balansa 2814.

Tufted. *Rhizome* stout, woody, clothed with brown to fuscous sheathing scales. *Stems* erect, trigonous, angles acute above, 80—175 cm tall, 2.75—4 mm thick below, smooth, including most of the rhachis. *Leaves* basal but not crowded, and spaced throughout the stem, the basal ones not very aggregated, merging below into thickish, blackish-brown or spadiceous with reddish or dark nerves, often very shortly pubescent, cataphylls or nearly leafless sheaths, normal leaves usually much shorter than the stem, 8—16 mm wide, flat or flattish, thickish, rigid, subcoriaceous, both surfaces sometimes bristly above, sometimes transversely undulate towards the acute or attenuated apices; *sheaths* glabrous or glabrescent below, densely setulose above, brown in front. *Inflorescence* a rather slender, compound, interrupted panicle, occupying the upper,

30—103 cm of the stem; *secondary panicles* 12—20, at 5—7 nodes, lower single, upper unequally binate or ternate, more or less cylindric, 5—9.5 cm long, upper 2 approximate and subfastigate, lower distant or remote, upper spikes unbranched, lower again branched into 1—several simple spikes, lower on longly or very longly, upper on scarcely to longly, exserted peduncles; *peduncles* trigonous, slender, angles obtuse and smooth below, more acute and scaberulous above. *Bracts* foliaceous, lower much exceeded by the stem, longly or very longly sheathing, upper reduced but some slightly exceeding the stem, shortly or rather longly sheathing; *sheaths* membranous, brown, and hispidulous at the mouth. *Spikes* erect, androgynaceous, slenderly cylindric, 1—4 cm long, subax-flowered, sessile or subsessile, male part about as long as the female or sometimes considerably shorter. *Bracteoles* indistinguishable from the glumes or, sometimes, longer awned. *Cladophylls* more or less ocreiform, hispidulous. *Female glumes* more or less oblong, with rounded upper corners, strongly incurved below, cymbiform or flatter towards the rounded-obtuse apex, 3.5—4 mm long, 1.75—2.5 mm wide, translucent, pale golden-brown, glabrous, or minutely hispidulous above, margins widely whitish-hyaline above, especially round the ciliolate-erose apex, slenderly nervose, midrib coalescing with 2 adjacent nerves above and extending to the apex or excurrent in a minutely hispidulous mucro or awn up to 1 mm long. *Utricles* ellipsoid to obovoid but tapering below, trigonous, 4.75—5.5 mm long, 1.5—1.8 mm broad, subcoriaceous, multinerved, very narrowly marginate, base glabrescent, otherwise sparsely to densely, pale, subadpressed hispidulous, straightish, subpatulous, stramineous-brown with a dark reddish-brown base, shortly and stoutly stipitate, subgradually or subabruptly beaked above; *beak* slightly tapering, about 1 mm long, scarcely marginate, hispidulous below, glabrous or glabrescent above, bilobed; *mouth* scarcely or slightly oblique; *lobes* short, straight, whitish-hyaline, becoming erose. *Achene* ellipsoid-obovoid, or obovoid but tapering below, conspicuously trigonous, faces flattish, about 3 mm long, about 1.8 mm broad, black overlain pale-scurfy, base pale, not stipitate, apex slightly tapering, stoutly but very shortly pale-beaked. *Style* slightly thickened at the trigonous, whitish-hispidulous angled base, which persists on the equally thick beak of the achene. *Stigmas* 3.

SUMATRA: Atjeh; Gajo Lands, Blangkedjeren, towards Gadjah, in meadow among pines, 15 Feb. 1937, van Steenis 8783 (B, K) ! — East Coast; Berastagi forest, 13 Feb. 1921, Ridley (K) !; Dolok Singgalang, north of the Toba lake, primitive forest, ± 1700 m, not rare, 25 May 1922, Lörzing 8874 (B) !

BORNEO: British North Borneo; Mt. Kinabalu, above Penataran river basin, steep rocky spur, 2550 m, 21 June 1933, Clemens 33,652 (BM, L) !  
Indo-China.

Kükenth. misidentifies, as I think, the Van Steenis, Lörzing, and Clemens numbers as *C. pseudorivulorum* Kükenth. (*in* Bull. Jard. Bot. Buitenz. sér. 3, 16: 319: 1940).

It should be stated here that there is some doubt as to whether these Malaysian plants are conspecific with the Tonkin type, which is rather a poor specimen.

#### 7. CAREX TRICEPHALA Boeck.

*Carex tricephala* Boeck. in Flora 58: 263: 1875; Kükenth., 289; Nelm. in Kew Bull. 1950: 190: 1950. — Madura, Zollinger 1778.

*Carex madoerensis* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 15: 1904. — Madura (Madoera), Zollinger 1778.

*Rhizome* short, horizontal, 2—4 mm thick, woody, covered with the fuscous, fibrous remains of scales. *Stems* trigonous, angles obtuse below, narrowly winged above, especially just below the spikes, erect, 13—50 cm tall, slender, 0.6—1 mm thick below, 1—1.75 mm thick in the winged upper part, smooth below, densely pale hispid-scaberulous on the angles above, and often on the ribs just below and on the rhachis, clothed at the base with the fuscous fibrous remains of cataphylls and old leaf-sheaths. *Leaves* mostly basal or subbasal, 1—2 cauline, shorter than to much exceeding the stem, 3.5—11 mm wide, flat, thin, slightly septate-nodulose, bright light green, apices shortly attenuated, basal leaves loosely sheathing; *sheaths* of the basal leaves membranous in front, those of the stem leaves longer and tighter and membranous only at the dark-brown, truncate, sometimes minutely pubescent mouth: *Spikes* 1—3(—4), androgynous, subglobose, ovoid, or ellipsoid, 6—10(—12) mm long and nearly as broad, terminal larger than the others, the uppermost lateral spike, sometimes absent or represented by a bract, branching from the base or up to 5 mm below the base of the terminal and forming a pyramidal or subglobose head, lowest spike 2—5 cm distant, all sessile, male part about as long as, but, of course, much more slender than the female and inconspicuous when the utricles are fully developed. *Bract* of the lowest 1—2 spikes foliaceous and much exceeding the stem, upper bracts much reduced, subherbaceous or glumiform with a very long hispidulous awn, not sheathing but with short ciliolate-hispidulous pale auricles which meet round the stem; *bracteoles* glumiform, broadly oblong to suborbicular, 5—7 mm long, densely whitish-setulose, aristate, the flattish setulose-margined awn twice or more as long as the glume. *Cladophylls* subutriculiform below, glumiform above. *Female glumes* oblong-ovate to more or less oblong, truncate and slightly spongy-gibbous at the base, subobtusely to very obtuse at the apex, flattish to cymbiform, 2.5—4 mm long, 1.5—1.75 mm wide, thin and easily tearing between the strongish nerves, densely whitish-subadpressed-setulose, milky-white to brownish, with thin, whitish, ciliolate-erose margins, midrib and 2 adjacent nerves, stronger than the others, coalescing above and excurrent in a wide, minutely setulose awn, 0.5—1 mm long. *Utricles* ellipsoid, becoming distinctly trigonous, 4.25—5.75 mm long, 1.8—2 mm broad, membranaceous, mutinerved, densely hispidulous-pilose in upper two-thirds, narrowly marginate, margin or margins displaced by developing achene, becoming patulous to subpatent, whitish to brownish, not or very shortly stout-stipitate,

subgradually to subabruptly narrowed above into a *beak*, which is conic below, compressed-cylindric above, less hairy towards its bidentate apex, 1—2 mm long; *mouth* slightly dorsally oblique; *teeth* short, straight. *Achene* ellipsoid to obovoid-ellipsoid, trigonous, angles very prominent, faces flattish to concave, 2.5—3 mm long, 0.7—2 mm broad, becoming dark reddish-brown on the angles and cinereous on the faces, tapering to a scarcely stipitate base, slightly rounded at the scarcely or very shortly and stoutly beaked apex. *Style* pyramidally thickened and persistent below to a sometimes subdiscoid-annulate base, overlapping the apex of the nut. *Stigmas* 3.

JAVA: MADURA; in the west of the Island, in muddy places among teak trees, 13 June 1858, Zollinger 1778; hills north-west of Rapa, on heavy calcareous marl, grassy field in a bushy savannah, few plants, 150 m, 15 March 1915, Backer 20,2U (B) !; Pagantenan, grassy field, numerous, 200 m, 20 March 1915, Backer- 20 462 (B, K, L)!

Upper Burma, Siam, Laos, Cambodia.

When I discussed the peculiar distribution of this species with my colleague, Mr. H. K. Airy Shaw, he suggested that it might coincide with that of teak (*Tectona grandis* L.). A glance at the map on teak distribution published by Dr. C. G. G. J. van Steenis seemed to support this. Later, when part of the type material of *C. tricephala* came to Kew on loan from Leiden, Zollinger's description of its habitat brought confirmation.

This species, together with *C. malaccensis* C. B. Clarke and probably *C. Ramosii* Kükenth., show strongly reductive features, and seem to have been derived from species similar to some of those placed with them in Section *Stramentitiae* (C. B. Clarke) Nelm. It does not seem logical, therefore, to remove them from the *Indocarices*, nor even, perhaps, from Section *Stramentitiae*, in spite of their great reduction in number of spikes, the sometimes vestigial nature of the cladophyll in *C. malaccensis*, and its apparently complete disappearance in *C. Ramosii*. It is of interest to note that the three species do not overlap in their distribution, *C. malaccensis* and *C. Ramosii* being endemic in the Malay Peninsula and the Philippines respectively and *C. tricephala* having the peculiar distribution discussed above.

#### 8. CAREX MALACCENSIS C. B. Clarke

*Carex malaccensis* C. B. Clarke in Hook, f. Fl. Brit. Ind. 6: 722: 1894; C. B. Clarke, 9; Kükenth., 289; Ridley, Fl. Malay Penins. 5: 183: 1925. — Malay Peninsula, Curtis 166(1).

Densely tufted. *Rhizome* short, horizontal, woody, slender (0.75—1 mm thick), covered with strongly nerved, brown, readily fraying scales. *Stems* trigonous, angles obtuse below, acute to very narrowly winged

above, below the uppermost spikes, erect, up to about 50 cm tall, slender (0.75—1.3 mm thick throughout), smooth below, scaberulous on the angles above, clothed at the base with thin, membranous, pale to dark brown cataphylls. *Leaves* very few, basal or subbasal, lower short, upper much longer, shorter to longer than the stem, 2—6 mm broad, usually strongly revolute, not septate-nodulose, bright green on the under-surface, grey-green to glaucous and minutely alveolate on the upper surface, shortly pale-setulose over most of the upper surface towards the longly attenuated apex; sheaths brown and membranous in front. *Inflorescences* 1—4 (upper 2 sometimes contiguous), each composed of 1—4 crowded sessile spikes, forming subglobose, ovoid, or subpyramidal heads, which are 5—10 mm long and 8—15 mm broad, on usually shortly but sometimes rather longly exerted peduncles, at nodes throughout the upper half to nearly the whole of the stem; *peduncles* and *rhachis* trigonous, obtusely to acutely angled, smooth to scaberulous on the angles. *Bracts* foliaceous, much exceeding the stem, usually not, lowest sometimes shortly, sheathing; *sheaths* pale or brown, membranous at the mouth. *Spikes* androgynaeceous, at first cylindrical to ellipsoid, later more or less broadly ovoid, 5—10 mm long and nearly as broad, subdense-flowered, terminal erect, lateral patulous at first, ultimately subpatent to patent, sessile or subsessile, male part equaling or exceeding the female part. *Bracteoles* glumiform, aristate, as long as the spike, or less, awn hispidulous-margined, usually whitish but sometimes subherbaceous. *Cladoprophylls* subutriculiform below and glumiform above, or vestigial. *Female glumes* broadly ovate, oblong-ovate, or more or less oblong with rounded upper angles, truncate, spongy-gibbous and incurved at the base, obtuse to very obtuse at the apex, shallowly cymbiform, 2.25—2.5(—3) mm long, 1.5—1.75 mm wide, thin, translucent and fragile between the strong whitish nerves, glabrous, milky-white to light brown, ciliolate-erose above, midrib, with two adjacent nerves which coalesce with it at the apex, excurrent in a stoutish, hispidulous-margined awn, 0.5—1 mm long. *Utricles* obovoid, tapering at the base, contorted-trigonous, inflated above, 5—6.75 mm long, 1.8—2.25 mm broad, membranaceous or subcoriaceous, strongly multinerved, glabrous, narrowly marginate, scaberulous on the margins at the apex, becoming patulous to subpatent, stramineous, not stipitate, becoming contorted at the apex and subabruptly contracted into a *beak*, which is broad, compressed, conico-linear, usually bent or contorted, narrowly marginate to narrowly winged, especially below, scaberulous-margined, strongly nerved, bidentulate, 2—2.5 mm long; *mouth* dorsally oblique; *teeth* very short, straight. *Achene* pyriform, trigonous, with very prominent but rounded, golden, or whitish angles, concave and whitish or brown faces, 2—2.25 mm long, 1.75—1.9 mm broad, scarcely to very shortly and stoutly, sometimes bent, stipitate, abruptly beaked, beak very short, stout, slightly expanded-annulate-triangular at its apex. *Style* with a pyramidally thickened base, persistent on the beak of the nut. *Stigmas* 3.

MALAY PENINSULA: Kedah: Langkawi Islands; Kuala Malacca, Aug. 1888, Curtis 1669 (K) !; Burau, Nov. 1916, H. C. Robinson 6186 (K, L) !; Telok Afan, 17

Nov. 1921, Md. Haniff & Md. Nur (Sing. Field No. 7081) (B, K) !; Batu Ayam, Selat Panchor, on limestone in open places, about 15 m, 22 Nov. 1934, Henderson (Sing. Field No. 29,188) (B, K) !; Dayang Bunting; sea level, on seashore limestone, 17 Nov. 1941, Corner (Sing. Field No. 37,808) (L) !; Chupa, 19 Nov. 1941, Corner (Sing. Field No. 37,850) (L) !

Endemic.

#### 9. CAREX RAMOSII Kiikenth.

*Carex Ramosii* Kiikenth. in Fedde Repert. Spec. Nov. 8:8: 1910; Merrill, Enrmn, Philipp. PL PI. 1: 141: 1923. — Philippine Islands, Ramon H3/4.

Not tufted. *Rhizome* probably shortly creeping, woody. *Stems* erect to subcurved, central, scapose, compressed-trigonous, angles acute to obtuse, 12—24 cm tall, very slender (0.5—0.75 mm thick, except for an expansion to 0.75—1 mm just below the inflorescence), smooth, ribbed, surrounded, below the leaves, by a few brown cataphylls. *Leaves* basal, slightly longer to twice as long as the stems, 2—5 mm wide, flat to strongly revolute, grey-green when dried, apices attenuated; *sheaths* dark brown and membranous in front, where they soon split. *Spikes* 1—3, androgynaeceous, crowded, sessile, forming a terminal, ovoid, or oblong-ovoid head, 1—1.8 cm long, 7—13 mm thick, usually additional 1—2, single or twinned, near the base of the stem, subsessile in the axil of a leafy bract longer than the stem, androgynaeceous, more or less ellipsoid, but broadening as the utricles mature, 6—10 mm long, becoming 5—7 mm thick, female flowers few but mature utricles hiding the much longer male part of the spike. *Bract* of the lower or lowest spike of the terminal head subfoliaceous, 2.5—12 cm long, next bract above subfoliaceous and 3 cm long, or almost indistinguishable from the glumes, uppermost, when 3, an aristate glume, none sheathing, but brown-auricled at the base. *Female glumes* ovate-lanceolate to oblong-lanceolate, base thickened, shallowly cymbiform, apex obtuse to very obtuse, 2.75—4.25 mm long, 1.75—2 mm wide, translucent between the strong nerves, stramineous below, submarginally spadiceous, with wide to very wide, white and thin margins, tending to become erose, pallid in a very wide central stripe, where the midrib and two adjacent ribs coalesce above and are excurrent in a pale, flat, wide, minutely scaberulous-margined awn, 1—1.75 mm long. *Utricles* ellipsoid, trigonous or subinflated-trigonous, ventrally flat to shallowly concave, dorsally slightly to prominently angled, 6.5—7 mm long, 2—2.3 mm broad, subcoriaceous, strongly multinerved, scarcely to narrowly marginate below, narrowly to widely winged and sparsely scaberulous-margined above, glabrous, straight, suberect to subpatulous, pallid, becoming brownish-stramineous, tapering below to a base scarcely to very shortly and stoutly stipitate, gradually to subgradually tapering above into a *beak* which is tapering, compressed-plano-convex or subconic, about 3 mm long, very wide, winged-marginate below, winged above, irregularly scaberulous-margined, strongly nerved, bidentulate; *mouth* very oblique, extending 1 mm down the dorsal side; *teeth* very short, stout, straight, obtuse, about 0.25 mm long on the ventral face. *Achene* ellipsoid

or rhomboid-ellipsoid, trigonous, angles extremely prominent (especially at the middle) but rounded, faces deeply concave, about 3 mm long, 1.75—2 mm broad, livid, tapering below, not stipitate, more gradually tapering above, forming slight shoulders, the apex being subtruncate and suddenly contracted into a stout, straight, short beak. *Style* pyramidally much thickened at the base, with 3 prominent rounded angles, lobe-like and completely covering and persistent on the beak of the nut. *Stigmas* 3, not exerted from the beak of the utricle, reddish and papillose.

PHILIPPINE ISLANDS: Luzon: Rizal; Morong, Aug. 1908, *Ramos* 1434 (B, S)!; *ibid.*, Antipolo, 24 Oct. 1910, *Robinson & Ramos* (*Bur. Sci.* 11,859) (B, K)!; *ibid.*, June 1913, *Ramos* (*Bur. Sci.* 20,990) (B, BM, K, L, S)!; *ibid.*, Mt. Angilog, April 1922, *Ramos* (*Bur. Sci.* 40,798) (S)! - Mindanao; Davao, March—April 1927, *Ramos & Edaño* (*Bur. Sci.* 49,202) (B)!

"In forests at medium altitudes."—Merrill (*I.e.*).

""Endemic.

An interesting species, which, owing to its greatly reduced condition, is difficult to classify. Kiiikenthal placed it in his Section *Rhomboidales*, but I incline to the view that its chief affinity is with *C. tricephala* Boeck. and *C. malaccensis* C. B. Clarke. It is one of a considerable number of remarkable, reduced, but often unrelated *Carices* which have been recorded from the Philippines.

#### 10. CAREX NODIFLORA Boeck.

*Carex nodiflora* Boeck. in *Engl. Bot. Jahrb.* 5: 516: 1884; Kiiikenth., 288; Merrill, *Enum. Philipp. Fl. Pl.* 1: 140: 1923. — Philippine Islands, *Wichura*.

*Carex Cumingii* Vidal, *Phanerog. Cuming*, 156: 1885; C. B. Clarke, 11. — Philippine Islands, *Cuming* 1408.

*Carex vuleanica* Elmer, *Leafl. Philipp. Bot.* 10: 3526: 1938. — Philippine Islands, *Elmer* 17,275.

Densely tufted. *Rhizome* woody. Stems erect to suboblique, trigonous, 50—70 cm tall, 1.25—2.25 mm thick below, smooth, including the rhachis below, sparsely to densely setulose towards the apex, sometimes surrounded, below the leaves, by a few short, wide, brown, fuscous-veined, membranous-margined cataphylls, or sometimes their fuscous fibrous remains. *Leaves* basal and sometimes 1—2 higher on the stem, lower shorter-bladed, others long, some much exceeding the stem, 7—16 mm wide, flat or flattish, sometimes revolute, rigid, coriaceous, slenderly septate-nodulose in a few places, apices longly attenuated; *sheaths* of the basal leaves short, membranous and brown margined, fuscous-veined on the back, of the stem leaves long, mouth dark brown and membranous, concave, often dark at the nodes. *Inflorescence* a compound slender panicle, continuous above, interrupted below, occupying the upper 16—33.5 cm of the stem; *secondary panicles* erect, 4—6, single, more or less oblong, 2—6 cm long, 0.6—1.8 cm broad, upper at subapproximate or distant nodes but subfastigate, lower distant to very distant, rather dense, lower

and sometimes middle branches again branched into several crowded, simple spikes, upper and sometimes middle branches in the form of simple spikes, branches and spikes suberect to patulous, upper on wholly included to shortly exerted peduncles, lower on shortly to longly exerted peduncles; *peduncles* trigonous, slender but firm, smooth below, minutely setulose above. *Rhachis* of the secondary panicles glabrous to sparsely hispidulous below, densely hispidulous on the acute angles above. *Bracts* foliaceous but upper much reduced, usually exceeding the stem, lower longly upper shortly sheathing; *sheaths* sometimes minutely hispidulous at the mouth. *Spikes* numerous, androgynaeceous, more or less oblong to subglobose, 5—8 mm long, subdense-flowered, female part rather longer than the male, 4—6 mm thick, male part stoutish, inconspicuous, sessile or in some middle spikes pseudo-sessile, due to basal empty glumes. *Bracteoles* glumiform to thickish and subherbaceous, often excurrent in a hispidulous-margined, flexuous awn up to 3 mm long. *Cladoprophylls* 1.5—2 mm long, subocreateiform or subutriculiform below, glumiform at the rounded, sparsely ciliolate apex, sub-rudimentary. *Female glumes* oblong-lanceolate or ovate-lanceolate, base incurved, thickened, cymbiform above, apex subacute to obtuse, about 2 mm long, 1—1.5 mm wide, more or less translucent, glabrescent to shortly subadpressed scurfy-setulose in places, especially above, pale greenish-white, tinged light-brown, margins thin, whitish-hyaline, sparsely ciliolate, nervose, midrib slender, excurrent in a smooth to hispidulous awn 0.3—0.5 mm long. *Utricles* ellipsoid-rhomboid but acuminate-arcuate above and below, trigonous, angles prominent, sides flattish, 4(—4.5) mm long, 1.4—1.9 mm broad, subcoriaceous, distinctly multinerved, scarcely to narrowly marginate, margins often displaced, whitish-setulose but base glabrous or glabrescent, straight or straightish, suberect to patulous, becoming darkish brown, scarcely or very shortly stipitate at the base, subgradually to subabruptly beaked above; *beak* conic below, oblong above, compressed, 1 mm or more long, stoutish, narrowly marginate, usually sparsely and minutely hispidulous but sometimes glabrescent, usually straight or straightish, sometimes slightly twisted, throat sometimes subinflated, often pale or pale greenish, bidentulate; *mouth* slightly ventrally oblique; *teeth* lanceolate, up to 0.3 mm long, straightish, smooth or minutely and sparsely ciliolate-hispidulous, tips whitish-hyaline. *Achene* ellipsoid or rhomboid-ellipsoid, trigonous, angles very prominent, faces usually concave, sometimes a slight transverse ridge across the middle of the three faces, the lower halves then concave and the upper ones flattish, 2.25—2.5 mm long, 1.5—1.75 mm broad, golden, becoming blackish-ferruginous, without stipe and beak. *Style* thickened pyramidally below and suddenly expanded into an annulate-discoid base which is persistent on the large apex of the achene. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Ilocos Norte; Bangui to Claveria, Aug. 1918, *Ramos* (*Bur. Sci.* 33,013) (B, BM, L)! Isabela; *Ramos* (*Bur. Sci.* 8006). Cagayan; Penablanca, April 1926, *Ramos & Edaño* (*Bur. Sci.* 46,615) (B, New York, S)! Benguet; Kias, May 1904, *Elmer* 6440 (K)! Pampanga; Arayat, *Loher* 704 (K), 712 (K)! Rizal; Sept. 1912, *Ramos* (*Bur. Sci.* 1481) (B, BM, L, S)!; *Ramos* (*Bur. Sci.* 3350); Manila,

*Wichura* (K) !; Montalban, May 1905, *Lner 7H9* (K) ! Laguna; Los Banos, May 1905, *Alberto* (K) !; *ibid.*, April 1906, "*Elmer 8284* (B, K), *8304* (B, K) !; Mt. Maquiling, March—April 1915, *Mabesa* (*Bur. Sci.* 23,802) (BM) !, June—July 1917, *Elmer 17,781* (B, BM, K, L) ! Albay; 1841. *Cuming 1408* (BM, K) ! Sorsogon; Irosin, in primary woods or forests, 225 m, *Elmer 15,328*; Irosin; Mt. Balusan, in subalpine regions, Sept. 1916, *Elmer 17,275* (Chicago) !

"In primary forests at low and medium altitudes."—Merrill (*l.e.*).

Endemic.

An interesting feature of this species is the discoid-annulate base of the style. Allied and some other species of *Carex* have a discoid-annulate apex to the achene, but this type of style-base is unusual.

### 11. CAREX CIRRHULOSA Nees

*Carex cirrhulosa*, Nees *in* Hook. *Kew Journ.* 6: 29: 1854. — Philippine Islands, *Cuming 1764*.

*Carex fibrata* Boott *a.pud* Vidal, *Phanerog.* Cuming. 156: 1885, nomen. — Philippine Islands, *Cuming 1704*,

*Carex fuireoides* Gaudich. var. *cirrhulosa* (Nees) Kükenth. *in* Engl. *Pflanzenr.* IV, 20: 287: 1909.

*Rhizome* and most of *stem*, and *leaves* missing from type specimen. *Inflorescence* may be partly absent, but evidently a compound, slender panicle, continuous above, interrupted below, about 18 cm long; *secondary panicles* 6, single, more or less oblong, erect to suberect, 1.5—3.5 cm long, 1—1.3 cm broad, upper at subapproximate to subdistant, lower at distant, nodes, subdense, lowest 1 or more branches again branched into several crowded, sessile, simple spikes, middle and upper branches simple spikes, branches patulous, spikes mostly patent, upper on wholly included or, sometimes, on shortly, lower on longly exerted peduncles; *peduncles* trigonous, not very slender (0.6—1 mm in diameter), smooth or sparsely scabrid. *Rhachis* of the main inflorescence trigonous, 1.8 mm thick below, angles obtuse and smooth below, acute or narrowly winged and sparsely scabrid above and also on the *rhachis* of the secondary panicles. *Bracts* foliaceous, lower, probably not much smaller than the (absent) leaves, 5—8 mm wide, flat to revolute, stiff, apices longly attenuated, upper reduced, all very much exceeding the apex of the stem, lower longly upper shortly sheathing; *sheaths* often dark at the nodes, mouth brown, membranous, often split. *Spikes* numerous, androgynaeceous, more or less oblong, ovoid, or subglobose, (4—) 5 mm long, subdense- or dense-flowered, male part equal to somewhat shorter than the female part, stoutish (0.5—1 mm thick, or including long, spreading awns, 2—3 mm thick), female part 5—8 mm thick. *Bracteoles* glumiform, awned; *awns* hispid-winged, often curved or flexuous, up to 10 mm long or more. *Cladoprophylls* utriculiform below, glumiform above, apex rotund. *Female glumes* widely oblong with a rounded, sparsely ciliolate apex, widely ovate, or suborbicular, base thickened and incurved, cymbiform or flattish above, apex rounded, erose-ciliolate, 0.75—1 mm long, 0.5—0.8 mm wide, more or less translucent,

glabrous, margins thin and pale, centre thicker and brownish, where the midrib and 2 adjacent nerves, coalescing above, are excurrent in a stout, flattened, sparsely hispid, straight or slightly curved awn, 1.25—2.5 mm long; *male glumes* similar but more shortly awned. *Utricles* ellipsoid or somewhat rhomboid-ellipsoid, trigonous but surface uneven and irregular, with concavities, convexities, giving an asymmetrical appearance, 4 mm long to a little longer, 1—1.25 mm broad, subcoriaceous, strongly light reddish-brown-nerved, nerves running up into the beak, where they coalesce to form grooved-convex faces, narrowly marginate, margins sometimes displaced, glabrous, smooth, or, at the apex, margins sometimes very sparsely serrulate, usually slightly curved, becoming patulous to patent, pale greenish above, stramineous to brown below, tapering to a somewhat spongy-thickened base, which is abruptly scarcely or very shortly stipitate, subgradually to subabruptly narrowing-above into a beak; *beak* not or scarcely tapering, biconvex to compressed, about 1.5 mm long, broadish, narrowly to rather widely marginate, sparsely vitreous-serrulate-margined, straight or slightly curved and/or twisted, pale or whitish but greenish-margined, bidentate; *mouth* straight or straightish; *teeth* lanceolate, 0.25—0.4 mm long, straight or slightly converging, hispidulous below, pale. *Achene* ellipsoid or rhomboid-ellipsoid, trigonous, angles very prominent, especially at the middle, faces concave, about 2.25 mm long, 1—1.25 mm broad, light reddish-brown, not stipitate, at the apex a very short, thick neck, which expands into an annulate-discoid apex about 0.5 mm in diameter. *Style* thickened pyramidally at the base which is persistent on the centre of the discoid-annulate apex of the achene. *Stigmas* 3,

PHILIPPINE ISLANDS: Cebu; 1841, *Cuming 1764* (BM, K) !

Endemic.

Kükenthal (*in* Engl. *Bot. Jahrb.* 69: 263: 1938) cites Clemens s.n. from North-East New Guinea under this species. I have not seen this gathering, but I feel it may well be *C. Dietrichiae* Boeck., a species which Kükenthal had earlier (Schlechter 18,277) misidentified as *C. cirrhulosa*.

This is a remarkable species. It is a true *Indocarex*, with its panicked inflorescence and utriculiform cladoprophyll, allied to the still more indocaricoid *C. nodiflora* Boeck., but it seems equally clearly to have an affinity, through its faceted utricle, with *C. cryptostachys* Brongn., and through its achene, which has a stout neck and a discoid-annulate apex, with Section *Lageniformes* (Ohwi) Nelmes. Of equal phylogenetic interest is the next species, *C. palawanensis* Kükenth.

### 12. CAREX PALAWANENSIS Kükenth.

*Carex palawanensis* Kükenth. *in* Elmer, *Leafl. Philipp. Bot.* 4: 1169: 1911; Merrill, *Enum. Philipp. Fl. Pl.* 1: 140: 1923. — Philippine Islands, *Elmer 13,146*.

*Stems* erect to somewhat curved, trigonous, 25—50 cm tall, 0.6—1 mm thick below, smooth except just below and on the rhachis where it

is sparsely or very sparsely scabrid, surrounded, below the leaves, by persistent, fuscous, fibrous remains of old leaf-sheaths. *Leaves* crowded at the base, and 1 about half-way up the stem, exceeding the stem, 3—3.5 (—5) mm wide, subplicate, sometimes conduplicate, margins usually revolute, stiff, subcoriaceous, grey-green, basal ones shortly sheathing; *sheaths* brown and membranous in front, strongly blackish-nerved on the back. *Spikes* 2—5, at 2—4 nodes (lowest paired), but with 1—several empty bracts below the uppermost, indicating the suppression of other spikes, androgynaceous, becoming subglobose, 5—8 mm long, becoming 7 mm broad (male part 1—1.5 mm broad), dense-flowered, sessile or on short, wholly-included peduncles, male and female parts about equal in length but male part becoming inconspicuous as the utricles develop, forming a terminal, slender inflorescence 2—4 cm long, at nodes about 1 cm apart. *Bract* of the lowest spike foliaceous, subpatulous to patent, much exceeding the stem, shortly or very shortly sheathing, upper bracts suboliate (much reduced), or glumiform with a long or very long, setaceous, hispid-margined awn; *sheath* brown, submembranous. *Cladoprophyll* described by Kiikenthal as utriculiform—not examined by me because of paucity of material. *Female glumes* ovate, ovate-lanceolate, or oblong-lanceolate, flattish to cymbiform, often involute above, apex subacute to obtuse and minutely ciliolate-erose, 1.5—2 mm long, 1—1.25 mm wide, translucent, glabrous, whitish suffused brown, slenderly or substrongly nervose, but narrowly to widely thin, whitish, and nerveless-margined, midrib excurrent in a sparsely hispidulous, complanate awn, 0.75—1 mm long. *Utricles* rhomboid or rhomboid-lageniform, trigonous, angles strongly thickened, causing the rhomboid shape, at about 1.5 mm from the base, with a slight secondary inflation 1—1.5 mm above the thickened angles, faces sometimes flattish but oftener with a transverse ridge across some at least of the 3 faces joining with the thickened angles, faces above and below concave, causing utricule surface to be very uneven, 4.25—5 mm long, 1.5—1.75 mm broad, subcoriaceous, multinerved, very narrowly marginate, glabrous and smooth except for very few scattered setae, especially on nerves on the ventral side, and the margins which are sparsely or very sparsely vitreous-hispid in about the upper two-thirds, straightish, patulous, pale, becoming greenish-brown, curved-tapering from the inflated (middle) point to a spongy-thickened base, not stipitate, gradually to subgradually narrowed above, slightly interrupted by a secondary inflation, into a *beak*, which is compressed, 1.5—2 mm long, broad, narrowly marginate, sparsely vitreous-hispid margined, sometimes slightly bent and/or twisted, bidentate; *mouth* slightly dorsally oblique; *teeth* about 0.5 mm long, straightish, hispidulous below, glabrous above, pale. *Achene* rhomboid but curved-tapering downwards and upwards from a rounded-thickened central point on the angles, downwards to a stout, very short, cylindrical stipe, and upwards into a very stout (0.5—0.7 mm), neck, 0.4—0.5 mm long, truncate at the apex, with a slightly raised rim (in the centre of which is the comparatively slender base of the style), trigonous, 2.5 mm long, 1.5—1.6 mm broad, with a girdling ridge at about the centre, associated with the thickened angles, across the faces, causing these to

be concave above and below. *Style* slightly thickened towards the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Palawan; Puerto Princesa (Mt. Pulgar), "common in wet, sandy, gravelly soil among shrubs bordering streams in the hills at 500 ft. [150 m] altitude. The foliage has a very characteristic metallic hue," May 1911, *Elmer* 13,146 (B, BM, K, L)!

Endemic,

The only mature specimen of this gathering which I have seen is in the Bogor herbarium, and this enabled me to complete the description of this remarkable species.

The Philippines have produced a large proportion of striking *Carices*, but this is one of their most interesting. It seems less of an *Indoearez* than its obvious ally, *C. cirrhulosa*, but Kiikenthal says it has a utriculiform cladoprophyll, so I place it here. It is, however, evidently another step in the direction of the *Lageniformes* (which lead on to the *Mitratae*), through its rhomboid-lageniform utricule and its weirdly shaped achene. I feel, also, that it shows some affinity to *C. malaccensis* and its allies, with which species Kiikenthal most closely associates it.

### 13. CAREX BLEPHAROLEPIS Nelmes

*Carex blepharolepis* Nelmes in Kew Bull, 1946: 18: 1946. — Java, *van Steenis* 5<sup>57</sup>.

*Carex spatiosa* Boott var. *bogorensis* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 12: 1904. — Java, *Kurz*,

Loosely tufted. *Rhizome* very slowly elongating horizontally, stout; *roots* stout, wiry. *Stems* erect, obtusely trigonous, 48—82 cm tall, 2—3.5 mm thick below, subrigid, smooth, including the lower part of the rhachis, strongly ribbed and striate, base clothed with pale to fuscous, membranous, dark-nerved cataphylls or their fibrous remains. *Leaves* subbasal, except a few regularly spaced on the stem above, linear-elliptic-oblongate, tapering below, longly acuminate above, lower shorter, upper equalling to much longer, than the stem, 1.3—2.8 cm wide, flat, indistinctly and slenderly septate-nodulose; *sheaths* of the basal leaves short, loose, of the stem-leaves long, tighter. *Inflorescence* an erect, compound, much interrupted, rather spreading panicle, occupying the upper 7—22 cm of the stem; *secondary panicles* 2—5, suberect to patulous, single, subpyramidal to oblong-lanceolate, 3.5—6 cm long, 1.25—3 cm broad, upper 2—4 forming a continuous inflorescence, lowest, when more than 2, distant, lax to subdense, lower branched into 1—several simple spikes, upper simple spikes, branches and spikes patulous to patent, lower on longly exerted, upper on short or shortly exerted, peduncles; *peduncles* angled, subdensely hispidulous. *Rhachis* of the secondary panicles acutely angled, hispidulous. *Bracts* of the lower panicles foliaceous, longly sheathing, sheaths scurfy-hispidulous just below the concave, membranous mouth, upper bracts

reduced, subherbaceous, not or scarcely sheathing. *Spikes* not very numerous, androgynaeceous, 5—10 mm long, subdense but rather few-flowered, sessile or subsessile, male part 1—1.5 mm thick, female part 5—7 mm thick, about equal in length. *Bracteoles* glumiform, but much smaller than the glumes, adpressed-hispidulous, margin fimbriate round the obtuse apex, midrib excurrent in a very long, hispidulous, often curved awn. *Cladoprophylls* utriculiform below, smaller than the utricles, base spongy, gibbous, glumiform above, apex very obtuse, subtruncate, or bilobed, ciliolate. *Female glumes* ovate or oblong-ovate, cymbiform, apex obtuse to rotundate, 2—3 mm long, 1.25—1.5 mm wide, translucent, dirty white, tinged brown, margins paler, ciliolate-erose, especially at apex, slenderly nervose, midrib and two adjacent nerves coalescing above and excurrent in a hispidulous awn, 0.5—1.75 mm long. *Utricles* ellipsoid, trigonous with prominent angles and flattish to slightly concave faces, 4—5 mm long, 1.4—1.9 mm broad, membranaceous, multinerved, sometimes transversely rugose on parts of the angled dorsal face, narrowly marginate above, glabrous, smooth or slightly scurfy above, margins sometimes sparsely scaberulous towards the apex, usually straight or straightish but sometimes slightly bent or recurved, becoming patulous, base spongy-thickened, not stipitate, subgradually or subabruptly beaked; *beak* gradually tapering, 1.5—2 mm long, narrowly marginate, glabrescent to sparsely scabrid-margined, bilobed; *mouth* slightly dorsally oblique; *lobes or teeth* 0.2—0.75 mm long. *Achene* ellipsoid, trigonous, angles prominent, faces shallowly concave, 2.5—2.75 mm long, 1.4—1.8 mm broad, faces becoming pale over reddish-brown, angles reddish-brown, scarcely to very shortly and stoutly pale-stipitate, erostrate. *Style* pyramidally thickened at the base, which is persistent on the apex of the achene. *Stigmas* 3.

SUMATRA: Bengkulu (Bencoolen); Subanajam, 1200 m, 3 July 1916, *Ajoeb* 253 (Exped. Jacobson) (B) !

JAVA: Banten; Mt. Karang, March, 900—1200 m, *Kuhl & van Hasselt* (L) !; *ibid.*, near Galurur, primitive forest, 800 m, 80 May \*1912, *Koorders* 40,633 *ji* (B) !; *ibid.*, above Pandeglang, secondary forest, 800 m, 26 March 1913, *Backer* 7481 (B) !; woods, (Mt.) Pulosari, *Zoiling er 1254* (BM) ! — Jakarta (Batavia); Mt. Burangrang, north slope, secondary forest, 1000 m, 23 June 1914, *Backer* 14,148 (B) !; *ibid.*, 1050 m, 30 June 1914, *Backer* 14,465 (B) !; *ibid.*, 1200 m, 1 July 1914, *Backer* 14,507 (B) !; Pasir Kohok, Mt. Burangrang, south of Purwakarta, ± 1200 m, forest, common, 24 July 1920, *Bakhuizen van den Brink* 4473 (B, L) !; Wanajasa, Mt. Burangrang, south of Purwakarta, ± 1000 m, 26 July 1920, *Bakhuizen van den Brink* 4707 (B, L) ! — Bogor (Buitenzorg); south of Tjisarua, 1100 m, 21 Oct. 1934, *van Steenis* 6601 (B, L, S) !; Mt. Salak, ex Herb. *Zipelius* (B, L) !; north slope of Mt. Salak, above Tjiapus, near "Imah Leutik," ± 850 m, secondary forest, 20 Aug. 1939, *van Steenis* 11,509 (B) !; Megamendung ridge, Pondok Walanda, Mt. Kendeng, north slope of Mt. Beser, 1000—1520 m, 30—31 May 1940, *van Steenis* 12,201 (B) !; Mt. Gede(h), ex Herb. *Zipelius* (B, L) !; 900—1500 m, lower forests of Mt. Gede, Herb. *Junghuhn* (B) !; Mt. Gede, Situgunung, 1200 m, May 1938, *de Voogd* (B) !; Tjadasmalang, near Tjidadap, Tjibeber, forest, common, 1000 m, 24 Febr. 1917, *Bakhuizen van den Brink* 2827 (B) !; *ibid.*, 11 March 1917, *Bakhuizen van den Brink* 2852 (B) !; *ibid.*, ± 1000 m,

27 July 1923, *Winckel* 1511 *ji* (B, K, L) !; Mt. Beser, near Tjidadap, south of Tjibeber, forest, 1200 m, 13 June 1917, *Backer* 22,543 (B, S) !; *ibid.*, 1100 m, 15 June 1917, *Backer* 22,543 (B, S) !; *ibid.*, 1100 m, 15 June 1917, *Backer* 22,638 (B) !; *ibid.*, ± 1000 m, 19 June 1918, *Winckel* 203 (B, L) !; Pasir Gombojig, near Tjidadap, south of Tjibeber, forest, few plants seen, 1100 m, 11 Sept. 1917, *Backer* 23,044 (B) !; saddle between Mt. Beser and Mt. Genlis, ± 1300 m, secondary forest, 3 Sept. 1933, *van Steenis* 5457 (B, K, L) ! — Priangan; Mt. Tampakrjong, primitive forest, 1500m, 20 May 1914, *Backer* 12,350 (L) ! — Pekalongan: between Doro and Petungkriyono, margin of forest, 1000 m, 8 Sept. 1914, *Backer* 15,721 (B) !

Hort. Bogor., *Kurz* (K) !; ex Herb. *Korthals?* (B) !; Java, south-east, 1880—82, *Forbes* 1079b (BM) !; forests near Kapandungan, *Kuhl & van Hasselt* (Herb. Reinwardt) (L) !

Zollinger (Verz. Ind. Archip. 60: 1854) misidentified this species as *C. indica* L., citing Zollinger 1254. Kii Kenthal (*in* Engl. Pflanzenr. IV, 20: 273: 1909) mistook it for *C. Horsfieldii* Boott. These are strange misidentifications as the leaves of *C. blepharolepis* reach a much greater width, which, with other differences, give this species a quite distinct facies.

Zollinger 1254 in Herb. Zürich (very immature) appears to be a form of *C. Rafflesiana* Boott. It seems to be the plant described by Steudel (Syn. Pl. Glum. II. Cyper. 207: 1855) as *C. commixta*. This name was based on part of Zollinger 1254; its description agrees with the Zürich specimen, but not with the British Museum specimen of this number, which is my *C. blepharolepis*, and which seems to have been misidentified by Steudel as *C. indica* L.

#### 14. CAREX STRAMENTITIA Boott ex Boeck.

*Carex stramentitia* Boott ex Boeck. *in* Linnaea 40: 351. 1876; C. B. Clarke, 9; Kuenth., 264. — India, Sikkim, *Hooker f.*

Loosely tufted. *Rhizome* woody, stout, short, clothed with dark-nerved sheathing scales or their fuscous, fibrous remains. *Stems* more or less erect, obtusely but distinctly trigonous, 30—127 cm tall, about 1.5—3.5 mm thick below, smooth below the inflorescence except below its lowest node, where the surface is sometimes bristly, and below the only stem leaf proper where one of the three flat surfaces is sometimes sparsely bristly (unusual in *Indocarex*), clothed, below the leaves, by fuscous fibrous remains of old leaf-bases. *Leaves* basal and subbasal, and sometimes 1—2 on the stem above, the basal ones not or not much smaller than the others, some shorter, or equalling, but others much exceeding, the stems, 6—20 mm wide, flat to strongly plicate and fevolute, sometimes septate-nodulose, apices longly attenuated; *sheaths* brown, membranaceous in front, fuscous-nerved on the back. *Inflorescence* a compound, much interrupted, narrow panicle, occupying the upper 9—36 cm of the stem; *secondary panicles* 2—4, single, suberect, more or less lanceolate, oblong, rhomboid or pyramidal, upper dense, lower subdense, 2—9 cm



long, 1.5—6.5 cm thick, upper shortly separated to rather distant, lower distant, from one another, upper on peduncles scarcely or very shortly, lower on peduncles shortly to longly or very longly exerted, middle and lower branches again branched (lowest sometimes twice) into several or more numerous simple spikes, upper branches unbranched, i.e. simple spikes, branches becoming patulous, spikes patulous to patent; *-peduncles* obscurely to acutely trigonous, smooth to scaberulous, 0.5—1 mm thick. *Rhachis* of the main inflorescence scaberulous on the angles but bristly on the surface just below the node only; *rhachis* of the secondary panicles densely hispid on angles and surface, except below on the lower ones. *Bracts* foliaceous but upper reduced, lowest much, upper little, exceeding the stem, sheathing; *sheaths* of the lower long or very long and the upper short or very short, glabrous below, hispidulous in front or at the membranous mouth, nodes brown. *Spikes* numerous, androgynaeceous, 5—15 mm long, sessile, female part 1—few-flowered, rather shorter than the male part. *Bracteoles* glumiform, but much smaller than the glumes (about 1 mm square), glabrous to hispidulous, midrib excurrent in long, often curved and flexuous, hispidulous-margined awns. *Cladoprophylls* small, 1.5—3 mm long, utriculiform below, flattened above, glabrous. *Female glumes* oblong or oblong-ovate or subtriangular, base thickened and incurved, deeply cymbiform above, margins sometimes involute, apex obtuse, rounded, truncate, or subbilobed-marginate, 2—2.75 mm long, 1.3—2 mm wide, translucent, glabrous, rarely sparsely hispidulous above, dirty whitish, slenderly nervose, midrib and two adjacent nerves, converging upwards and coalescing with it, and excurrent, from a point on the back below the apex of the glume, in a sparsely hispidulous-margined awn, 0.75—2 mm long. *Utricles* rhomboid-ovoid or rhomboid-ellipsoid, but curved-tapering below into a spongy, cylindric-bulbous or cuneate-cylindric basal part, up to 0.75 mm long and broad, trigonous with prominent angles and flattish faces, 4—5 mm long, 1.5—1.9 mm broad, submembranaceous, not marginate because margins displaced, multinerved, glabrous, rarely very sparsely hispidulous on the margins above, smooth, greenish to light-brownish, straight or straightish, or slightly recurved, patulous to subpatent, not stipitate, subabruptly narrowed above into a *beak*, which is often slightly inflated at the base, compressed above, very gradually tapering, 1.5—2 mm long, incurved-marginate on the ventral side, glabrous, rarely extremely sparsely scaberulous-margined, usually straight but sometimes slightly curved and/or twisted, palish, nerveless above the inflated base, with a subentire, subobtuse, or subacute-erose ventral apex; *m,outh* very dorsally oblique, the base of the orifice, where the stigmas emerge, being 0.5—1 mm from the ventral apex. *Achene* rhomboid-ellipsoid, trigonous, angles prominent, faces concave, especially below, 2.25—3 mm long, 1.5—1.8 mm broad, straight to very slightly curved, light to warm brown, curved-tapering below into a stout, scarcely stipitate basal part, erostrate at the *apex*. Style thickened below into a discoid-annulate-triangular base, which has a greater diameter than the apex of the achene. *Stigmas* 3,

JAVA: Djakarta (Batavia); Krawang, Palered, near Purwakarta, savannah, common, 20 Oct. 1924, *Bakhuizen van den Brink* 6565 (B, L) !

India, Burma.

The Javan specimen of this species is rather more robust and the stems more bristly below the nodes than Indian plants.

Such a distribution as that so far known for *C. stramentitia* suggests that it will eventually be found in intermediate areas.

#### 15. CAREX HORSFELDII Boott

*Carex Horsfieldii* Boott in Proc. Linn. Soc. 1: 257: 1845; C. B. Clarke, 11. — Java, *Horsfield*.

*Carex Fleckeri* Nelmes in Kew Bull. 1939: 313: 1939. — Queensland, *Flecker* 923.

Loosely tufted. *Rhizome* very short, stout, woody. *Stems* erect, trigonous, angles prominent, obtuse, faces shallowly concave, 50—105 cm tall, 2—4 mm thick near the base, smooth below or nearly throughout, including most of the *rhachis*, which is scaberulous on the angles in places or only at the apex, stiff, wiry, surrounded, below the leaves, by a few thin, flaccid, brown or pale, cataphylls and/or their fuscous fibrous remains. *Leaves* basal and subbasal as well as a few sometimes higher on the stem, long or very long, some exceeding the stem, 7—18 mm wide, flat or flattish, margins sometimes revolute, rather thin, not very stiff, apices very longly attenuated; *sheaths* of the basal leaves blackish-nerved on the back, eventually fraying into a mass of blackish fibres. *Inflorescence* a compound, much interrupted panicle, occupying the upper 20—80 cm of the stem; *secondary panicles* 5—8, single, oblong-pyramidal to ovate-lanceolate, erect or suberect, 3—10 cm long, 2—5 cm broad, upper subdistant, lower distant or remote, from one another, lax or rather lax, lower branches again branched, some twice, into simple spikes, upper simple spikes, branches and spikes patulous to subpatent, upper on shortly or rather longly, lower on longly to very longly, exerted peduncles; *peduncles* trigonous, rather slender (0.5—1 mm thick) but firm, smooth below, angles scabrid above. *Rhachis* of the secondary panicles scabrid-hispidulous on the angles. *Bracts* foliaceous but upper reduced, all exceeding the stem, upper scarcely to longly lower longly or very longly sheathing; *sheaths* sometimes hispidulous in front near the membranous mouth, nodes often dull yellowish-brown. *Spikes* numerous, androgynaeceous, 4—10(—15) mm long, sublax- or subdense-flowered, becoming subpatent to patent, sessile or subsessile, male and female parts about equal in length. *Bracteoles* glumiform, smaller than the glumes, glabrous or sparsely hispidulous, squarish-oblong, spatulate, or suborbicular, midrib excurrent in a long or very long, straight to curved or flexuous, hispidulous-margined awn. *Cladoprophylls* utriculiform below, glumiform above. *Female glumes* oblong-ovate, oblong-obovate, or oblong-lanceolate, base gibbous and strongly incurved, cymbiform to flattish above, apex subobtuse to very obtuse, 1.5—2.2 mm long, 0.75—1 mm wide, thin and translucent, glabrous except the lower which are sometimes very sparsely

hispidulous, whitish, sometimes flushed light brown, margins becoming erose above, slenderly nervose, midrib and 2 adjacent strong nerves coalescing above and excurrent in a smooth to hispidulous-margined, often curved awn, 0.5—3mm long; *male glumes* lanceolate, acuminate, apex acute, much longer than the female glumes but more shortly awned. *Utricles* ellipsoid to ellipsoid-obovoid, distinctly trigonous, faces flattish, not inflated, 3.75—4.5 mm long, 1—1.5 mm broad, subcoriaceous, multi-nerved, scarcely marginate, glabrous, smooth, mostly recurved or bent at the apex, patulous, olive-brown, or greenish above and brownish below, tapering to a not or scarcely stipitate base, usually subabruptly, but sometimes subgradually, beaked at the apex; *beak* slightly or not tapering, compressed or subterete, 1.5—2 mm long, stout, scarcely marginate, glabrous or, less often, sparsely hispidulous-margined, bent at base, often twisted, pale, bidentate; *mouth* dorsally very oblique, base 0.5—0.75 mm from apex of the *teeth*, which are only 0.25 mm or less long on the ventral side of the beak, straight or slightly converging. *Achene* rhomboid-obovoid, or ellipsoid-obovoid, trigonous, angles prominent, pale, faces shallowly concave, especially below, becoming dark brown, 2—2.25 mm long, 1.1—1.2 mm broad, not stipitate, apex rounded-truncate, scarcely to very shortly and stoutly beaked. *Style* pyramidally thickened at the base. *Stigmas* 3.

MOLUCCAS: Ceram; near Maneo, primitive forest, 500—600 m, 13 Oct. 1917, *Rutten* 379 (B) !

NEW GUINEA: North-East New Guinea; Morobe District, Sattelberg, forest trail, 1050 m, 8 Oct. 1935, *Clemens* 380 (L) !; *ibid.*, Malalo Mission, forest trail, 600—900 m, 12 Nov. 1936, *Clemens* 4378 (AA) !; *ibid.*, Kajabit, bank of wooded stream, rare, 330 m, 20 Oct. 1939, *Clemens* 40,818 (Michigan Univ.) !

JAVA: B o g o r (Buitenzorg) ; Bodjonglopang, secondary forest, here and there, 600m, 11 Nov. 1914, *Backer* 16,966 (B) !; Lengkong (Djampang region), primitive secondary forest, common, 700 m, 13 Nov. 1914, *Backer* 17,020 (B) !; Tjisokan (river), near Tjidadap (Tjibeber), forest, very common, 750 m, 15 Aug. 1917, *Bakhuizen van den Brink* 436 (B) !; valley of the Tjisokan, east of Tjidadap, south of Tjibeber, forest border, 625 m, 9 Sept. 1917, *Backer* 22,875 (B, L) !; Kiarapajung, north of Tjiandjur, secondary forest, 600 m, 29 March 1918, *Backer* 23,713 (B) ! — D j a p a r a - R e m b a n g ; north-west Mt. Murjo (Moeriah), ± 300m, river-side, primitive forest, 7 Oct. 1902, *Docters Leeuwen-Reijnvaan* 892 (B) ! • — K e d i r i ; Mt. Pandan, road from Tritik to Djomblangdjati, shade of thin wild wood, common, 28 Nov. 1919, *Thorenaar* 218 (B) ! — M a l a n g ; Puspo, above Pasuruan, shady ravine, overgrown with grass and shrubs, 750 m, 28 Nov. 1926, *Backer & Posthumus* 36,614 (L) ! — B e s u k i ; Mt. Ringgit, forest, ± 600m, 8 March 1940, *Buwalda* 7520 (B) !; Idjen Mts., near Pantjur, forest area, 1100 m, 28 Oct. 1893, *Koorders* 19,8720 (B) !, *ibid.*, forest, 1400 m, 12 Nov. 1895, *Koorders* 21,2310 (B) !; Mt. Watangan, near Puger, primitive forest, 18 Oct. 1895, *Koorders* 21,1510 (B) !, *ibid.*, primitive forest, calcareous ground, 100 m, 18 Oct. 1895, *Koorders* 21,1730 (B) !, *ibid.*, forest, calcareous rocks, common, 100 m, 21 Dec. 1914, *Backer* 17,854 (B) !, *ibid.*, 200 m, 24 Dec. 1914, *Backer* 18,029 (B) !; Puger, primary forest on calcareous rocks, 100—200 m, 28 Feb. 1940, *Buwalda* 7231 (B) !

*Horsfield* (BM, K) !; Mt. Gede, forest, *Junghuhn* (L) !; Bandung, *Zoilinger*. Queensland.

The name *C. Horsfieldii* was misapplied by Kiikenthal and others to the plant since described by me as *C. blepharolepis*, while *C. Horsfieldii* itself has been hitherto misidentified as *C. indica* L.

This species is closely related to *C. indica* L., differing chiefly in its shorter male part of the spike and its distinctly trigonous utricles.

#### Var. MAJOR Nelmēs

*Carex Horsfieldii* Boott var. -major Nelmēs in *Kew Bull.* 1950: 190: 1950. — Moluccas, Tanimbar Islands, *Buwalda* 4469.

*Secondary panicles* 3—4. *Spikes* not very numerous, 4—10(—15) mm long. *Female glumes* with more or less truncate, rotund-truncate, or slightly bilobed-emarginate apex. *Utricles* 5.2—5.8 mm long, 1.3—1.6 mm broad, straight or slightly recurved; *beak* 2.5—2.8 mm long; *teeth* 0.25—0.5 mm long. *Achene* with angles thickened at about the middle, about 2.8 mm long, about 1.5 mm broad.

MOLUCCAS: T a n i m b a r I s l a n d s (Timorlaut) ; P. Jamdena, Otimer, primary forest, low altitude, 28 March 1938, *Buwalda* 4469 (B, K) !

#### 16. CAREX INDICA L.

*Carex indica* L., *Mant.* II, 574: 1771; *Miq.*, *Fl. Ned. Ind.* 3: 350: 1855; Boott, *Illustr.* 2: 87 *tt.* 250, 252, 253: 1860; C. B. Clarke, 8; Kiikenth., 262; Ridley, *Fl. Malay Penins.* 5: 185: 1925. — "India orientalis."

*Carex Moritzii* Steud., *Syn. Pl. Glum. II. Cyper.* 207: 1855; *Miq.*, *Fl. Ned. Ind.* 3: 350: 1855. — Java, *Zollinger* 313.

Loosely tufted, *Rhizome* shortly creeping, rather thick, woody. *Stems* erect, trigonous, angles prominent, obtuse, faces flattish, about 60—100 cm long, about 3.5 mm thick below, smooth, surrounded at the base by cataphylls or leafless-sheaths and a fuscous mass of their fibrous remains. *Leaves* mostly basal, but several spaced on the stem, long, some being much longer than the stems, 5—14 mm wide, flattish-plicate, margins sometimes slightly revolute, stiff, upper surface scabrid above, apices longly attenuated; *sheaths* brown to fuscous on the back, often blackish-nerved. *Inflorescence* a compound interrupted panicle, occupying more or less the upper half of the stem; *secondary panicles* 3—7, single, more or less oblong to pyramidal in outline, erect, 3.5—10 cm long, 2—6 cm broad, upper subapproximate and continuous to rather distant, lower distant, from one another, lax to subdense, lower branches again branched into 3—7 simple spikes, upper ones simple spikes, branches and spikes becoming more or less patent, upper panicles on rather longly lower on very longly exerted peduncles; *peduncles* trigonous, angles usually distinct and scabrid but sometimes obscure and smooth, firm, slender or

rather stout. *Rhachis* of the secondary panicles scabrid-hispidulous on the angles, which are acute or narrowly winged. *Bracts* foliaceous but upper much reduced, all much exceeding the stem, upper shortly to longly lower longly to very longly sheathing; *sheaths* with a brown, glabrous mouth, often dark at the nodes. *Spikes* rather numerous, androgynaeceous, 10—22 mm long, subdense-flowered, sessile, male part much longer than the few-flowered female part, and slenderly cylindric, but tapering towards the apex. *Bracteoles* glumiform, more or less square or oblong, 1—2 mm long, 1—1.5 mm wide, margins widely whitish-hyaline, midrib excurrent in a long, filiform, ciliolate-scaberulous, often curved awn. *Cladophylls* small, utriculiform below, glumiform above. *Female glumes* triangular-lanceolate to triangular-ovate, subcymbiform, apex acute to obtuse, 2—3 mm long, 1.25—2 mm wide, glabrous, dirty white tinged light brown, margins sometimes becoming slightly erose towards the apex, midrib and 2 adjacent nerves coalescing near the apex and excurrent in a stoutish, recurved, scaberulous awn, 0.25—3 mm long. *Utricles* ellipsoid to subsylbose, more or less inflated and obscurely trigonous, 3.5—4.5 mm long, 1.5—2.3 mm broad, subcoriaceous, strongly multinerved, not or scarcely marginate. glabrous, often more or less bent at the apex, patulous to patent. olive-brown, not or scarcely stipitate, apex subabruptly or abruptly beaked; *beak* tapering, subterete or compressed, about 1.5 mm long, usually glabrous and smoothish but sometimes narrowly marginate and sparsely hispidulous on the margins, usually straight, sometimes somewhat twisted; *mouth* dorsally very oblique, the apex being subacute and hyaline-tipped, *Achene* obovoid to subglobose, pyriform or ovoid-rhomboid, trigonous, angles very pronounced, faces concave, especially below. 2—2.5 mm long, 1.5—2 mm broad, scarcely or shortly, stoutly stipitate, beak very short. *Style* Gradually thickened towards the conical or discoid-annulate, pale base, which persists on the beak of the achene. *Stigmas* 3.

MALAY PENINSULA: Kedah: Langkawi Islands; Sungai Batu Asap, Febr. 1911, *Haniff* 15,514 (K)!; Burau Langkawi, April 1911, *Ridley* 15,801 (K)!; Nov. 1916, *Robinson* (K)!; Rawei Island, Adang, April 1911, *Ridley* 15,721 (K)!; Mt. Raya, waterfall, 21 Nov. 1941, *Corner* (L)! (Mainland:) Kedah Peak, 900 m, June 1893, *Ridley* 5117 (K)!; Kedah Peak, Pedang, To Seh, 900 m, 29 Nov. 1915, *Robinson & Kloss* 5970 (K)!; Bukit Pinang, Alor Star, Feb. 1910, *Ridley* 14,088 (BM, K)!; 18th mile, Nerang Road, 17 March 1924, *Burkill & Haniff* (*Sing. Field No. 13^20*) (K)! — Penang; Jerjok, *F. Guard* (*W. Fox's collector*) 12,563 (BM, S)!; 180—240 m, March 1881, *King's collector* 1496 (K)!; Batu Jeringi, Dec. 1882, *Ridley* 11,387 (BM, K)!; Sept. 1887, *Curtis* 1207 (S)!; back of West Hill, 600 m, April 1890, *Curtis* 2273 (S)! — Perak; Trang, Feb. 1880, *Kunstler* 1383 (K)! — Selangor; Bukit Kulu, 15 Oct. 1899, *Goodenough* 10,516 (S)! — Malacca; stream, Mt. Mering, June 1892, *Ridley* 3136 (S)! — Johore: Kota Tinggi, Jan. 1910, *Ridley* 15,368 (K)!

CELEBES: South-East Celebes: Rumbia, Liano, mountain scrub, dry ground, 25—150 m, 12 Sept. 1909, *Elbert* 3006 (K, L)!

JAVA: Tjikoja and Bandong, margins of woods, *Zollinger* 313 (K, L)!

India?, Indo-China.

This was apparently the only member of the Subgenus *Indocarex* seen by Linnaeus. His specimen came from "India orientalis." The male part of its androgynaeceous spike is longer than that of any other member of Section *Indicae* Tuckerm., to which the great majority of *Indocarices* belong. It seems to have a less extended distribution than was formerly thought, being found mostly in Indo-China and the Malay Peninsula, and the Indian plants identified as *C. indica* by Clarke and Ktikenthal may be found to belong to *C. Dietrichiae* or to some other species.

#### 17. CAREX DIETRICHIAE Boeck.

*Carex Dietrichiae* Boeck. in Flora 58: 122: 1875; C. B. Clarke, 8. — Queensland, *Dietrich* 644, 653.

*Carex indica* L. var. *laete-brunnea* C. B. Clarke in Hook, f., Fl. Brit. Ind. 6: 715: 1894; C. B. Clarke, 8; Ktikenthal, 264; Ridley, Fl. Malay Penins. 5: 185: 1925. — Ceylon, *Thwaites* 2628.

*Carex indica* L. var. *Milnei* Boott ex C. B. Clarke in Hook, f., Fl. Brit. Ind. 6: 715: 1894; Ridley, Fl. Malay Penins. 5: 185: 1925. — Fiji, *Milne*.

Loosely to densely tufted. *Rhizome* short, stout, woody. *Stems* erect, trigonous, faces flattish, (15—) 25—77 cm tall, 1—2.5 mm thick below, smooth except for the sparsely hispidulous angles on the rhachis above, surrounded, below the leaves, by more or less entire, pale, brownish to blackish-nerved, leafless sheaths and below these by the fuscous fibrous remains of withered ones. *Leaves* basal and subbasal, 0—1 higher on the stem, long, some of them much exceeding the stems, 5—10 mm wide, flat or flattish, margins sometimes revolute, subcoriaceous, stiffish, apices longly attenuated; *sheaths* brown to fuscous or with blackish nerves on the back, membranous in front. *Inflorescence* a compound, rather slender panicle, occupying the upper 16—35 cm of the stem; *secondary panicles* 3—8, single, erect, more or less oblong or oblong-lanceolate, 2—7 cm long, 1—2.5 cm broad, upper approximate to rather distant, lower distant or rather distant, subdense, branches often simple spikes, occasionally lower again branched into several simple spikes, branches and spikes patulous to subpatent, upper on shortly or very shortly, lower on shortly to longly, exerted peduncles; lower *peduncles* obscurely angled and smooth, especially below, upper distinctly and scaberulous-angled, especially above, all rather slender but firm. *Rhachis* of the secondary panicles acutely and hispidulously angled. *Bracts* foliaceous but upper much reduced, usually all exceeding, some rarely exceeded by, the stem, lower longly to very longly, upper longly to shortly, sheathing; *sheaths* at the mouth membranous, brown, glabrous to hispidulous, and concave. *Spikes* numerous, androgynaeceous, cylindric but male part the more slender, and tapering at the apex, 5—15 mm long, subdense-flowered, patulous, becoming patent, sessile, rarely subsessile, male and female parts usually about equal in length, but variable, uncommonly male part considerably the longer. *Bracteoles* glumiform, squarish, spatulate, or suborbicular, about 1 mm in diameter, midrib excurrent in a long (up to 5 mm or more) filiform.

hispidulous, often curved awn. *Cladophylls* utriculiform. *Female glumes* more or less oblong, oblong-ovate, or lanceolate, cymbiform, margins often involute, apex truncate to rotund, sometimes bilobed-emarginate, less commonly subacute to subobtuse, 2—3.5 mm long, 1—1.5 mm wide, usually glabrous but sometimes sparsely hispidulous in the centre towards the apex, castaneous above and on the margins below, or stramineous with castaneous patches, whitish stramineous below and usually in a narrow, central stripe above with widely whitish-hyaline margins above, distinctly nervose, midrib, coalescing with 2 adjacent nerves above, excurrent in a widish, hispidulous awn 0.5—3.5 mm long; *male glumes* oblong-lanceolate to lanceolate, longer than the female glumes, scarcely or shortly awned. *Utricles* ellipsoid or broadly ellipsoid to obovoid-ellipsoid, rarely subglobose, subinflated and obscurely trigonous, faces often concave below, 3.5—5 mm long, 1.25—2 mm broad, subcoriaceous, multinerved, narrowly marginate, glabrous, sometimes slightly scurfy, margins sometimes sparsely hispidulous at the apex, usually straight or straightish, rarely slightly bent, patulous to subpatent, brownish-olive, not or very shortly stout-stipitate, subabruptly beaked; *beak* subterete or compressed, 1.5—2 mm long, stoutish, narrowly marginate, glabrescent to sparsely hispidulous margined, straight, rarely slightly twisted; *mouth* castaneous, oblique, forming an acuminate, acute, whitish-hyaline, erose apex. *Achene* broadly or rhomboid-ellipsoid, trigonous, angles pale, prominent, especially at about the middle of the achene, faces rather concave, especially below, 2.25—3 mm long, 1.25—1.8 mm broad, becoming very dark brown, abruptly extremely shortly stout-stipitate, abruptly very shortly beaked; *beak* stoutish, cylindrical, slightly expanding into a discoid-annulate apex. *Style* slightly thickened pyramidally at the base, which is subpersistent on the more slender beak of the achene. *Stigmas* 3.

MALAY PENINSULA: Kelantan; Jeram Pandjang, Kelantan river, rocks, 10 Feb. 1917, *Ridley s.n.* (K) !; Kelumpun, 3 Feb. 1923, *Haniff & NUT* (*Sing. Field No.* 10,383) (K) !; Sungai Galas at Gua Musang, low alt., 12 Aug. 1929, *Henderson* (*Sing. Field No.* 22,632) (B, S) ! — Pahang; Pahang river, 1891, *Ridley 2143a* (K) !; Takan river, 1891, *Ridley 2143* (BM, S) !, 2145 (K, S) !; Sungei Jelei, May 1903, *Mackado 11,534* (K, S) !; Kuala Takan, Nov. 1920, *Seimund 826, 827* (S) ! — Johore; Central Johore, Kuala Serabron, 1892, *Lake & Kelsall 4099* (K, S) !; Kota Tinggi, river bank, Dec. 1892, *Ridley 4138* (BM, S) !; Panti river, Kota Tinggi, Jan. 1910, *Ridley 15,368* (BM, S) !

BORNEO: Western Division; Sanggau, 1893—94, *Hallier 941* (B) ! — South-Eastern Division: Bukit Kasian, *Jaheri 1048* (B) !; Bluii, *Jaheri 1123a* (B) !; between Lamina Sewakong and Lumo Sibak, 10 Aug. 1908, *Hub. Winkler 3164* (B, BM, K, L) ! — Sarawak; 1865—68, *Beccari 2741* (K) !, 3873 (K) !; Busau, river bank, abundant, Sept. 1904, *Ridley 12,332* (BM, K, S) !; Kuching, Jan. 1915, *Ridley s.n.* (BM, K) !; Gat, upper Rejang river, frequently gregarious along the river margins, 1929, *Clemens 21,853* (B, K) !; near Long Kapa, Mt. Dulit (Ulu Tinjar), IVth Division, under 300 m, among boulders on river bank, 15 Oct. 1932, *Richards 2231* (K) ! — British North Borneo; East Coast, reed, at Kew Aug. 1895, *Governor Creagh* (K) !

PHILIPPINE ISLANDS: Palawan; bank of Inhuit river, May 1906, *Foxworthy* (*Bur. Sci.* 844) (K) ! — Luzon; Nueva Vizcaya; Quiangan, damp ground, 6 June 1902, *Merrill 109\** (K) ! Isabela; San Mariano, Feb.—March 1926, *Ramos & Edaño* (*Bur. Sci.* 47,192) (S) ! Tayabas; Tagcauyan, March 1911, *Ramos* (*Bur. Sci.* 13,381) (S) ! — Samar; March—April 1914, *Ramos* (*Bur. Sci.* 17,605) (K) !

"On river banks, probably at low and medium altitudes." — Merrill (*l.e.*).

NEW GUINEA: Netherlands New Guinea; Idenburg R., hilly ground, rotting wood, ± 65 m, 2 June, *Feuilletau de Bruyn 57* (B) ! — North-East New Guinea; Kaiser-Wilhelmsland, Ibo mountain above Boroai, 23 Sept. 1908, *Schlechter 18,277* (K) !, 18,279 (K) !

India?, Solomon Islands, New Caledonia, Fiji, Queensland.

Not many *Indocarices* have been so misunderstood as *C. Dietrichiae*. Kukenthal (*l.c.* p. 264), while including some collections under Clarke's synonym of the species, *C. indica* L. var. *laete-brunnea*, misidentified others on the same page as *C. indica* L. var. *fissilis* (Boott) Kiikenth. In Engl. Bot. Jahrb. 59: 59-60: 1924 he determined the two Schlechter, New Guinea, numbers as *C. fuirenoides* Gaudich. var. *cirrhuosa* (Nees) Kiikenth. and *C. cryptostachys* Brongn. respectively, unless, of course, the Kew sheets bear different species from those seen by Kukenthal.

*C. Dietrichiae* is the only member of Section *Stramentitiae* which has not pale glumes, but in other, more important characters, it clearly belongs to this group. It is nearest to *C. india* L., and these two species differ from most other *Indocarices* principally by their subinflated utricles.

The following plant is almost certainly a new species but too young to describe. It seems to be near *C. Dietrichiae* Boeck.

*Stems* slender, up to 45 cm tall. *Leaves* 1.5—2.5 mm wide, up to slightly longer than the stems. *Secondary panicles* shortly to very longly peduncled, 1.5—4.5 cm long. *Female glumes* oblong-ovate, apex usually very obtuse, rarely subacute, 2.5—3 mm long, yellowish and nervose below, very thin and whitish above and on the margins, midrib slender, not nearly extending to the apex. *Utricles* immature, 4—4.5 mm long, plurinerved, glabrous or glabrescent below, whitish-hispidulous above, fulvous; *mouth* ventrally oblique; *teeth* lanceolate, straight, pale, longish.

CELEBES: Central Celebes; Matana, 300m, sunny slope, on conglomerate, just one large tuft, Nov. 1929, *Kjellberg 3738* (Herb. C. G. Aim, B) !

#### Sect. 5. Cruciatæ (C. B. Clarke) Nelmès, *sect. nov.*

[Series] *Cruciatæ* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 4: 1904.

*Secondary panicles* single or binate. *Spikes* numerous or very numerous. *Cladophylls* utriculiform. *Female glumes* pale with more or less

\* Misidentified by C. B. Clarke (*in* Journ. Linn. Soc. Bot. 37: 11: 1904) and by Kükenenthal (*in* Engl. Pflanzenz. IV, 20: 287: 1909) as *C. fuirenoides* Gaudich.

reddish or castaneous lines or flecks, mouth usually not or scarcely dorsally oblique. *Achenes* more or less ellipsoid or ellipsoid-obovoid, angles sometimes prominent, not centrally thickened, beak and/or stipe straight or sometimes somewhat bent, apex not discoid-annulate. *Style* base more or less thickened.

1. Secondary panicles all single:

2. Leaves 6—14 mm wide; utricles subinflated and obscurely trigonous, spongy-plurinerve . . . . . 18. *C. cruciata*

2. Leaves 3.5—8 mm wide; utricles not inflated, distinctly trigonous, not, spongy but pluri-, or multinerved:

3. Leaves 3.5—5 mm wide, under-surface hispidulous; utricles 4.25—5 mm long, hispidulous above. . . . . 21. *C. pyenothyrsos*

3. Leaves 5—8 mm wide, under-surface glabrous; utricles 3—4 mm long, glabrous . . . . . 19. *C. galactolepis*

1. Some secondary panicles binate:

4. Utricles more or less hispidulous. . . . . 20. *C. spongoneura*

4. Utricles glabrous except the margins of the beak, and the apex of the ventral face, which is sometimes sparsely setulose:

5. Bracts slightly to much exceeding the stem; spikes 5—14 mm long . . . . . 18. *C. cruciata*

5. Bracts shorter than the stem or slightly exceeding it; spikes 3.5—6 mm long:

6. Leaves 9—15 mm wide; female glumes 1.5—2 mm long, apex obtuse to rotund; utricles becoming subinflated, strongly nerved. . . . . 22. *C. Buennemeijeri*

6. Leaves 7—10 mm wide; female glumes 2—2.3 mm long, apex acute to obtuse; utricles not inflated, usually nerveless except for 1—2 spongy nerves on the dorsal face. . . . . 23. *C. semiglomerata*

I have taken Clarke's name *Cruciatae* to accommodate *C. cruciata* and five other species, which seem to me to be intermediate between Section *Stramentitiae*, with its single secondary panicles and pale glumes, and Section *Filicinae*, which usually has binate panicles and reddish or castaneous glumes. The secondary panicles of Section *Cruciatae* are sometimes single, sometimes binate, and its glumes are usually pale but reddish or castaneous streaked. The only species here included in Section *Cruciatae* which Clarke also included in his (lower) group *Cruciatae* is *C. cruciata* itself, my other species having been described since his time, and his other species which are included in my revision being placed by me partly in Section *Filicinae* and partly in Section *Stramentitiae*. As, however, *C. cruciata* is such a well known species, especially compared with those associated with it, I thought it well to give its name to the section. In his Pflanzenreich monograph, 1909, Kiikenthal includes *C. cruciata* in the subsection which also contains *C. indica*, *C. Dietrichiae*, and *C. stramentitia* (Section *Indicae*, Subsection *Turgidulae*): the other species in Section *Cruciatae* have been described since 1909.

## 18. CAREX CRUCIATA Wahlenb.

*Carex cruciata* Wahlenb. in Vet. Akad. Handl. Stockholm, 24: 149: 1803; C. B. Clarke, 9; Kiikenth., 185; Boott, Illustr. 2: 85 *tt.* 240-243: 1860 (as *C. bengalensis* Roxb.); Ridley, Fl. Malay Penins. 5: 185: 1925. — China, Canton, *Wannman* (ex Herb. Bergiano).

Loosely tufted. *Rhizome* shortly, often curved or obliquely creeping, stout (3—6 mm thick), woody. *Stems* erect, stiff, trigonous, angles obtuse to subacute, prominent, faces flattish, 50—135 cm tall, 2—4.5 mm thick below, smooth, including the lower part of the rhachis, surrounded, below the leaves, by a few more or less entire dark-reddish or vinaceous cataphylls and the brownish-fuscous withered remains of old leaf sheaths. *Leaves* mostly basal but also situated on the stem at intervals, long, usually some much exceeding the stem, lower shorter bladed, 6—14 mm wide, flattish-plicate, margins sometimes slightly revolute, coriaceous, stiff, sometimes slightly septate-nodulose in places, long-sheathing, apex long-attenuated; *sheaths* of the lower leaves brown, dull reddish, or dull vinaceous to fuscous, of the stem leaves subampliate, dark brown at the concave mouth. *Inflorescence* a compound panicle, continuous above, usually interrupted below, occupying the upper 14—58 cm of the stem; *secondary panicles* 3—11, at 3—8 nodes, often all single but sometimes binate at middle nodes, upper difficult to distinguish from one another, more or less oblong-lanceolate to subpyramidal in outline, erect to patulous, 3.5—11 cm long, 2—5 cm broad, upper subapproximate to rather distant but usually overlapping one another and fastigiate or subfastigiate, lower distant to very distant, lax to dense, lower branches again branched once or twice into simple spikes, branches and spikes patulous to patent, upper simple spiker, lower panicles on usually longly to very longly, upper on scarcely to shortly, exerted peduncles; *peduncles* trigonous, usually angles acute and scabrid, sometimes obtuse and smooth, slender to rather stout, firm. *Rhachis* of the main axis above, and of the secondary panicles, hispidulous on the angles, which are acute. *Bracts* foliaceous but upper reduced, slightly to much exceeding the stem, upper shortly or rather shortly lower longly or rather longly sheathing; *sheaths* often somewhat golden at the nodes. *Spikes* numerous, androgynaeceous, 5—14 mm long, subdense-flowered, patulous to patent, sessile, male part about as long as to longer than the female part. *Bracteoles* glumiform, oblong to oblong-ovate, 1.5—2 mm long, hispidulous in places, midrib excurrent in a long, ciliolate-hispidulous, often curved awn. *Cladophylls* utriculiform, glabrous, apex glumiform. *Female* glumes ovate to widely ovate, or triangular-ovate, sometimes acuminate, base thickened and often incurved, deeply cymbiform above, margins sometimes involute, apex acute to very obtuse, 1.75—3 mm long, 1.25—2 mm wide, translucent, thin between the nerves, glabrous, pale to light brown with castaneous or darker brown patches, lines, and flecks, margins paler and erose, nervose, midrib and 2 adjacent nerves coalescing above and about extending to the apex in a firm tip or excurrent in a smooth or scabridulous awn up to 1 mm long. *Utricles* ovoid, oblong-ellipsoid, oblong-ovoid, oblong-obovoid, or almost subglobose, sub-

inflated, obscurely trigonous, 2.8—4 mm long, 1—1.5 mm broad, spongy-thickened, spongy few-nerved on each face, scarcely to narrowly marginate, glabrous, straight or straightish, becoming patulous to patent, stramineous or golden with sometimes reddish spots or small patches, usually a very short, stout, whitish, spongy, bulbous, stipe-like base, subabruptly beaked at the apex; *beak* compressed to terete, 1—1.5 mm long, narrowly marginate, glabrous to sparsely scaberulous-margined, usually straight, sometimes slightly twisted, bidentulate; *mouth* dorsally oblique; *teeth* very short, often light reddish, whitish-hyaline tipped. *Achene* ellipsoid, trigonous, angles prominent, faces flattish or shallowly concave, 1.5—2 mm long, 0.8—1.1 mm broad, olive-brown to blackish with sometimes paler angles, not or scarcely beaked, scarcely to very shortly, sometimes somewhat bent stipitate. *Style* thickened towards the base. *Stigma* 3.

MALAY PENINSULA: Pahang; Island of Tioman, Ayer Surin, ± 270 m, 18 May 1927, *Md. Nur* (*Sing. Field. No. 18,40%*) (K, S)!; *ibid.*, Mt. Rokan, 810 m, 2 May 1927, *Md. Nur* (*Sing. Field. No. 18,816*) (B, K, S)!; Cameron Highlands, by streams, 1440 m, 18 April 1930, *Henderson 23,607* (B)!

SUMATRA: Atjeh; Takingeun (Takengon), 1400 m, 3 Aug. 1926, *R. Wind 4* (B)!; *ibid.*, 1180—1400 m, 28 Aug. 1934, *van Steenis 5799* (B)!; Gajo Lands, from Lau Alas, crest via Agusan to Blangkedjeren, bushy mountain, 2400 m, 8 Feb. 1937, *van Steenis 8748* (B)! — East Coast; above Bandarbaru, forest border, very scattered, ± 1100 m, 30 Dec. 1916, *Lorzing 4575* (B)!; Karo plateau near Berastagi, savannah, not scarce, ± 1350 m, 27 Aug. 1918, *Lorzing 5958* (B, K, L)!; *ibid.*, dry savannah, not rare, ± 1350 m, 24 May 1921, *Lorzing 8391* (B)!; *ibid.*, 1350—1550 m, 12 Nov. 1921, *Lorzing 8590* (B)!; north by east of Mt. Sibajak, open places, ± 1700 m, rare, 15 May 1923, *Lorzing 9770* (B)!; savannah, between Sibuatan and Piso-piso, north-west of Toba lake, rather common, ± 1400 m, 29 Jan. 1920, *Lörzing 7194* (B)!; summit of Piso-piso, north-west of Toba lake, savannah, burnt forest area, rare, ± 1940 m, 30 Dec. 1922, *Lorzing 9423* (B)!; Seribudolok, north of Toba lake, savannah, rather common, 1420 m, 21 May 1923, *Lorzing 9842* (B); Fates 571 (BM)! — Tapaneli; Habinsaran, high plain, east-south-east of Toba lake, savannah, not rare, 1200—1300 m, 11 May 1919, *Lorzing 6487* (B)!; *ibid.*, near Parsoburan, ravine, light place in forest, scattered, ± 1000 m, 13 Nov. 1920, *Lorzing 7801* (B)!; *ibid.*, between Parsoburan and Nassau, near Kuwalu R., secondary forest, scattered, ± 900 m, 15 Nov. 1920, *Lorzing 7929* (B)!; Bonandolok, ± 1050 m, 30 April 1897, *Ouwehand 233* (B)! — West Coast: Bukit Batubanting, secondary forest, 1200 m, 23 June 1918, *Jacobson* (B)!; Mt. Malintang, ± 1150 m, forest margin, common, 18 July 1918, *Biinnemeijer 3644* (B, L)!; *ibid.*, forest, ± 1600 m, 24 July 1918, *Biinnemeijer 3880* (L)!; *ibid.*, ± 1800 m, 29 July 1918, *Biinnemeijer 4126* (L)!; Mt. Korinchi [G. Kerintji], Sanggaranagung, 25 May 1914, *Robinson & Kloss 91* (BM)!; *ibid.*, Kumantan, ± 900 m, 10 Feb. 1920, *Biinnemeijer 8U7* (B)!; *ibid.*, Bt. te Bakar, ± 1100 m, 13 Feb. 1920, *Biinnemeijer 8202* (B, L)!; Batangpalupuh, edge of path, 900 m, 25 Aug. 1932, *Kleinhoonte 641* (B)!, 656 (B)! — Bengkulu (Bencoolen); Ketatin river, boulder bed, 850 m, 12 Aug. 1937, *Rappard 167* (B)!; Kenali, Negarabatin, 28 Aug. [1915], *Cramer 128, 129* (B)! — Lampung: between the Bungur and Pilomasin rivers, gentle slope, light primary forest, wet clay ground, scattered, very common, 120 m, 8 March 1931, *Szemian 7* (B)!

BORNEO: Western Division; Lumar, Mt. Serentak, mountain forest, 500 m, 9 July 1936, *Dunselman 26* (B)! — Sarawak: near Long Kapa, Mt. Dulit (Ulu Tinjar), IVth Division, on wet rocks in slight shade, on spur of mountain, small tussocks, 29 Aug. 1932, *Richards 1549* (K) — British North Borneo: Mt. Kinabalu, Marai Parai spur, 22—23 Nov. 1915, *Clemens 10,885* (B, K)!; *ibid.*, Dallas, bridle path, 900 m, 13 Aug. 1931, *Clemens 26,072* (BM)!; *ibid.*, Dallas, 900 m, 13 Aug. 1931, *Clemens 26,072* (BM)!; *ibid.*, Dallas 900 m, Nov. 1931, *Clemens 30,068* (K)!; *ibid.*, Penibukan, 1200 m, Dahobang, river bed, below falls, 4 Jan. 1933, *Clemens 30,691* (B, BM)!; Mt. Nunkok, 900—1200 m, forest, 13—17 April 1933, *Clemens 32,763* (B, BM)!; Penataran river basin, rocky place near water, 900 m, 16 June 1933, *Clemens 32,581* (BM)!; *ibid.*, 22 July 1933, *Clemens 34,045* (B)!; *ibid.*, Penataran river basin, Wusser falls, among river bank, boulders, 1050—1350 m, abundant, 25 July 1933, *Clemens 34,123* (B, BM, K, L).

JAVA: Banten; Mt. Karang, summit, 4000—5000 ft., March, *Kuhl & van Hasselt* (B)! — Bogor (Buitenzorg); Mt. Panindjoan, near Nanggung, south of Djasinga, secondary forest, 800 m, 15 Oct., 1913, *Backer 10,582* (B)! — Priangan; Mt. Guntur, south side on grassy plain, 1000—1500 m, 15 May 1913, *Koens 87* (B)! — **Madiun**; between Patjitan and Tulakan, ± 500 m, 15 April 1912, *Backer 292S* (B, L)! — India, Lower Burma, Indo-China, China, Japan.

This sedge, the best known and most widely spread species of its group, is chiefly characterised by its subinflated utricles, the surface and nerves of which are more than ordinarily spongy-thickened. In India its varied appearance and frequent occurrence have led to numerous synonyms in Indian botanical literature.

The following immature plant is an *Indocarex*, possibly near *C. crudata* Wahlenb.

Tufted. *Rhizome* descending. *Stem* about 50 cm tall, not yet fully developed. *Leaves* 3—5 mm wide, flattish-revolute, very long, lowest sheaths fraying into persistent fuscous fibres. *Inflorescence* very immature.

CELEBES: Central Celebes; Masamba, near Dodolo, open situation, 800—900 m, 3 Aug. 1937, *Eyma 1533* (B)!

#### 19. CAREX GALACTOLEPIS Nelmes

*Carex galactolepis* Nelmes in Kew Bull. 1946: 20: 1946 — Malay Peninsula, Perak, King's collector 1906.

*C. repanda* C. B. Clarke var. *implumis* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 9: 1904. — Perak, Wray 1982.

Probably loosely tufted. *Rhizome* woody. *Stems* erect or suberect, trigonous, angles prominent, faces often rather concave, 50—100 cm or more tall, stoutish (about 2 mm thick), smooth, surrounded at the base, below the leaves, by dull reddish-brown leaf-sheaths breaking up into fibres. *Leaves* basal and spaced throughout the stem, shorter to longer than the stem, 5—8 mm or more wide, flat, stiff and subcoriaceous, apices longly attenuated; *sheaths* long, mouth concave, front membranous. *In-*

*florescence* a compound, rather interrupted panicle, occupying the upper 20—50 cm of the stem; *secondary panicles* 6—8, single, erect to suberect, oblong-lanceolate to subpyramidal, 2.5—10 cm long, 1—6 cm broad, upper subapproximate, lower rather distant, from one another, lax to dense, lower and often middle branches again (rarely twice) branched into 2—10 simple spikes, upper simple spikes, patulous to patent, upper on shortly, lower on longly or very longly, exerted peduncles; *peduncles* trigonous, angles obtuse below acute above, slender, firm, hispidulous on the acute angles. *Rhachis* obtusely angled and glabrous below, acutely angled and hispidulous above and on the secondary panicles and branches. *Bracts* foliaceous, equalling to much exceeding the apex of the stem, uppermost 1—2 much reduced, upper shortly to rather shortly, lower rather longly to longly, sheathing; *sheaths* glabrous, concave, and sometimes membranous, at the mouth, nodes golden or golden-brown. *Spikes* subnumerous, androgynaeous, 5—10(—12) mm long, sublax- to subdense-flowered, subpatent to patent, sessile, male part shorter to longer than the female. *Bracteoles* glumiform, midrib excurrent in minutely hispidulous-margined, short and straight, or long and curved or flexuous awns. *Cladoprophylls* utriculiform below, glumiform, whitish, and sparsely hispidulous above, about 2 mm long. *Female glumes* ovate, base strongly incurved, cymbiform above, apex usually subacute to obtuse, but sometimes slightly bilobed-emarginate, 2—2.75 mm long, 1.5—1.75 mm wide, thin and translucent, glabrous, milky-white with faint and slender light reddish streaks, nerveless or very slenderly nervose, with a 3-nerved, pale green central stripe, coalescing above, from very shortly to 0.5 mm excurrent, often from a point a little below the apex, in a ciliolate-hispidulous mucro or awn. *Utricles* ellipsoid, distinctly trigonous with flattish faces, not inflated, 3—4 mm long, 0.8—1 mm broad, subcoriaceous (from the strong nerves), dorsally strongly 8—10-, ventrally 3—4-, nerved, narrowly marginate, glabrous, straight, straightish, or apex sometimes reflexed, patulous to patent, light brown with reddish-brown streaks and patches, base spongy-thickened, not stipitate, subgradually narrowing above into a beak; *beak* tapering, plano-convex, 1—1.5 mm long, marginate, sparsely or very sparsely hispidulous-margined, straight, pale, bidentulate or bilobed; *mouth* very dorsally oblique; *teeth* or *lobes* very short, slightly converging, whitish, glabrous, becoming erose. *Achene* ellipsoid, trigonous, angles prominent, rounded, faces concave, especially below, about 1.75 mm long, about 0.8 mm broad, stramineous-brown, not or scarcely stipitate, very shortly and stoutly beaked; *beak* slightly inflated-annulate at the apex. *Style* somewhat thickened at the base, which persists on the beak of the achene. *Stigmas* 3.

MALAY PENINSULA: Perak; Larut, 90—180 m, June 1881, *King's collector* 1906 (K) !; Waterfall, 90 m, June 1888, *L. Wray Jr.* 1982 (K) !

BORNEO: British North Borneo; Mt. Kinabalu, Gurulau spur, forest-clad ridge, 1500 m, Feb. 1910, *Gibbs 4004* (K) !—This Gibbs specimen was determined by Stapf & Turrill (*in Journ. Linn. Soc. Bot.* 42: 182: 1914) as *C. filicina* Nees.

In the "Pflanzenreich" (IV, 20: 288: 1909), Kükenthal dubiously places Wray 1892 under *C. Wightiana* Nees var. *repanda* (C. B. Clarke) Kükenth. The affinity of this species seems to me to lie more with *C. cruciata* Wahlenb. than with *C. Wightiana*, but the specimens of *C. galactolepis* so far available are not sufficient to be certain of affinities. Of the two Perak plants, Wray's is immature and the other is in fruit but depauperate. Otherwise, the two closely resemble each other, the glumes being well matched, so that it is pretty certain they represent but one species.

## 20. CAREX SPONGONEURA Nelmes

*Carex spongoneura* Nelmes *in Kew Bull.* 1946: 18: 1946. — Borneo, *Gibbs U093*.

Probably loosely tufted. *Rhizome* woody. *Stems* erect or suberect, trigonous, angles obtuse but prominent, faces flattish, 80—100 cm tall, about 3 mm thick below, stiffish. smooth below, scabrid below the nodes on the upper part of the rhachis, base clothed in a few withered leaf-sheaths. *Leaves* subbasal, except for about 3 spaced on the stem proper, long but all a little shorter than the apex of the stem, 5—10 mm wide, margins revolute, sometimes conduplicate, rarely flattish-plicate, stiff, coriaceous, slightly septate-nodulose and transversely wrinkled in places, longly sheathing, apex longly attenuated; *sheaths* of the lower leaves reddish, vinaceous, or reddish-nerved, especially below. *Inflorescence* a compound panicle, interrupted below, occupying the upper 27—30 cm of the stem; *secondary panicles* 7—9, at 5 nodes, lower single, remainder binate, more or less oblong, erect to suberect, 2—5 cm long, 1—2 cm broad, upper subapproximate to rather distant, lower distant, from one another, subdense, a few lower branches sometimes again branched- into several simple spikes, upper branches simple spikes, usually patent, sometimes patulous, upper on scarcely to shortly lower on shortly to very longly exerted peduncles; *peduncles* slender, wiry, lower smooth below, otherwise usually wholly scabrid. *Rhachis* of the secondary panicles and branches densely scabrid. *Bracts* foliaceous, but upper reduced, more or less extending up to the apex of the stem, upper rather shortly to rather longly, lower longly, to very longly, sheathing. *Spikes* numerous, androgynaeous, more or less oblong to subglobose, 4—7 mm long, subdense- to dense-flowered, sessile, male and female parts about equal. *Bracteoles* glumiform, hispidulous in places, with long, flexuous awns. *Cladoprophylls* utriculiform below, glumiform and sometimes bilobed above. *Female glumes* ovate-acuminate, base thickened and incurved, deeply cymbiform, often with slightly involute margins above, apex usually acute, sometimes subobtuse or obtuse, (2—)2.5—3 mm long, 1.5—1.8 mm wide, glabrous, whitish tinged light reddish-brown, apex, when obtuse, often slightly ciliolate-erose, slenderly but distinctly nervose, midrib conspicuous, often from below the apex, in a hispidulous awn about 0.5 mm long. *Utricles* obovoid-oblong to ellipsoid-oblong, trigonous, sometimes slightly inflated, 3—3.5 mm long, about 1 mm

broad, two spongy-thickened longitudinal nerves or ridges centred on the dorsal face, in addition obscurely 8—12-nerved dorsally, more slenderly 4—6 nerved or almost nerveless ventrally, subcoriaceous, scarcely marginate (sutures displaced), glabrous below, hispidulous above in longitudinal lines to covering the surface, straightish, becoming patulous, nitidous, fusco-stramineous, spongy thickened on each side of the scarcely stipitate, hence, squarish, base, subgradually to subabruptly beaked above, *beak* scarcely tapering, piano- or concave-convex, about 1 mm long, broad, marginate, densely hispidulous-margined, otherwise glabrous to (less often) minutely hispidulous, straight, pale, bidentulate; *mouth* straight; *teeth* up to 0.5 mm long, straight, pale-hyaline tipped, often somewhat erose. *Achene* narrowly oblong-obovoid, trigonous, faces concave, about 2 mm long, nearly 1 mm broad, golden, very stoutly, shortly, brownish stipitate, shortly to very shortly beaked, stipe and beak straight to somewhat basally bent. *Style* somewhat thickened at the base. *Stigmas* 3.

BORNEO: British North Borneo; Mt. Kinabalu, Penibukan spur, between Dahobang and Kinitaki rivers, in high forest, 1500 m, Feb. 1910, *Gibbs* 4093 (BM, K) !; *ibid.*, Penibukan, Marai Parai, open place, 1200—1500 m, 8 Jan. 1933, *Clemens s.n.* (B, BM) !; *ibid.*, Marai Parai, open place on rock ledge, 1500 m, 17 May 1933, *Clemens* 33,157 (B, BM, K, L) !; *ibid.*, Penataran river, 900m, 22 July 1933, *Clemens* 34, 045 (BM, K, L) !

Endemic.

Stapf and Turrill (*in Journ. Linn. Soc. Bot.* 42 : 182 : 1914) determined Gibbs 4093 as *C. cruciata* Wahlenb.

## 21. CAREX PYCNOTHYRSOS Kükenth.

*Carex pycnothyrsos* Kükenth. *in Philipp. Journ. Sci.* 6: 60: 1911; Merrill, Enum. Philipp. Fl. Pl. 1: 140: 1923. — Philippine Islands, Ramos & Edaño (*Bur. Sci.* 37,881).

*Rhizome* descending, woody, clothed with large reddish or blackish-red scales, fraying into fibres. *Stems* more or less erect, trigonous, 55—90 cm tall, 1.5—2 mm thick below, smooth except on the rhachis, just below the lower nodes and throughout the upper part where the whole surface is minutely hispidulous, surrounded, below the leaves, by thick, short, blackish-red or vinaceous leafless sheaths. *Leaves* few, basal and subbasal with 2—3 others, spaced, higher on the stem, much shorter to exceeding the stem, 3.5—5 mm wide, rather stiff, apices longly attenuated, upper surface pale dotted below, under-surface hispidulous except at the base; *sheaths* of the basal leaves shortish, red- to vinaceous-nerved on the back, reddish and membranous in front, which tends to fray into fibres, some herring-bone shaped. *Inflorescence* a simple, slender panicle, continuous above, interrupted below, occupying the upper 7.5—15 cm of the stem; *secondary panicles* or branches 4—5, erect, single, lower oblong or oblong-lanceolate, upper shorter, ovate, elliptic, or obovate, 0.8—2.5 cm long, 4—7 mm wide (utricle not quite developed), lower distant or subdistant, upper at approximate or subapproximate nodes, each composed of 2—4 erect to subpatulous, simple spikes, lowest sometimes again branched into 2 simple spikes,

upper panicles sessile, middle ones on included peduncles, lowest on shortly or rather shortly exerted peduncles; these densely and minutely bristly. *Spikes* androgynaeceous, narrowly ellipsoid, 5—9 mm long, sessile, male part 1—1.25 mm thick, subdense-flowered, female part 3.5—6 mm thick, sublax-flowered, each about equal in length. *Bracts* of the lower panicles foliaceous, exceeding the inflorescence, rather to very longly sheathing, upper bracts much reduced, setaceous, glumiform below, scarcely to shortly sheathing; *sheaths* membranaceous, at least at the mouth. *Bracteoles* glumiform, more or less oblong. *Cladophylls* utriculiform below, glumiform and deeply bilobed above, about 2 mm long. *Female glumes* widely ovate, base thickened, gibbous, and subincurved, cymbiform above, apex obtuse to very obtuse, often bilobed-emarginate, 1.8—2.3 mm long, 1.5—2 mm wide, translucent, thin and pale, lined and flecked lightish red-brown, margins widely whitish-hyaline and erose, very slenderly multinerved, midrib often excurrent in an awn up to 0.75 mm long. *Utricles* (not quite fully developed) cuneate-obovoid, ellipsoid, or narrowly oblong-ellipsoid-obovoid, compressed-trigonous, ventrally shallowly-concave, 4.25—5 mm long, 1—1.5 mm broad, subcoriaceous, dorsally strongly multi-nerved, ventrally less strongly so, narrowly marginate except when margins displaced, glabrous below, hispidulous above, especially towards and on the margins and in longitudinal lines, straight to recurved, subpatulous to patulous, pale greenish above, brownish towards the base, scarcely to very shortly stoutish stipitate, subgradually to subabruptly beaked above; *beak* at first tapering, compressed biconvex, about 1.25 mm long, broad, narrowly marginate, hispidulous margined, bidentate, dorsally longitudinally grooved; *mouth* scarcely oblique; *teeth* lobe-like, 0.3—0.4 mm long, straightish, often brownish, tips sometimes whitish-hyaline, becoming erose. *Achene* (not fully developed) ellipsoid to ellipsoid-obovoid, trigonous, faces concave, 2.5—2.75 mm long, 1.1—1.2 mm broad, pale greenish-stramineous, stoutly 0.4 mm long stipitate, stoutly and very shortly beaked. *Style* slightly thickened at the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Bontoc sub-province, Mt. Masapilid, March 1920, Ramos & Edaño (*Bur. Sci.* 37,881) (K, L) !

Endemic.

Known to me only from this one gathering. A nondescript plant, with a depauperate appearance, yet differing from most other *Indocarices* by the hispidulous under-surface of its leaves.

Merrill (*I.e.*) cites the following additional numbers: Merrill 543, Weber 1113, Ramos & Edaño (*Bur. Sci.* 26,309). He gives the habitat as "Primary forests, alt. 250—1200 m."

## 22. CAREX BUENNEMEIJERI Nelmes

*Carex Buennemeijeri* Nelmes *in Kew Bull.* 1950: 191: 1950. — Sumatra, *Biinne-meijer* 2530.

Tufted. *Rhizome* stout, woody, descending. *Stems* erect, but rhachis possibly subcernuous at the apex, trigonous, angles mostly acute, 110—150



cm tall, stout, 3—4 mm thick below, smooth up to the rhachis. *Leaves* basal and subbasal, and 1 or 2 higher on the stem, long but probably not exceeding the stem, 9—15 mm wide, flat or flattish, sometimes slenderly septate-nodulose in places, upper surface covered with minute protuberances which are rough towards the longly attenuated apices; *sheaths* dark reddish or reddish-nerved on the back below. *Inflorescence* a compound, continuous or interrupted panicle, occupying the upper 50—70 cm (approx.) of the stem; *secondary panicles* 8—10, mostly binate, lowest usually single, oblong to lanceolate, 4—12 cm long, 1—3.5 cm broad, subdense or dense, middle and lower branches again branched (lower sometimes twice) into simple spikes, upper in the form of simple spikes, branches patulous, spikes patulous to patent, upper at subapproximate or subdistarit nodes but overlapping, lower distant or very distant, upper on scarcely to longly, lower on longly to very longly, exerted peduncles: *peduncles* slender to stoutish, trigonous or compressed, acutely angled, mostly hispidulous, especially on the angles. *Rhachis* smooth below, except below the secondary panicles, hispidulous above and on the rhachis of the secondary panicles. *Bracts* foliaceous, but upper reduced, lower shorter than, upper equalling or slightly exceeding, the stem, upper shortly to longly, lower longly to very longly, sheathing; *sheaths* glabrous, but hispidulous at the brown membranous mouth, golden or golden-brown at the nodes. *Spikes* numerous, androgynaeceous, 3.5—6 mm long, subdense-flowered, sessile, male and female parts about equal in lensrth. *Bracteoles* glumiform, small, hispidulous, shortly to longly awned. *Cladophylls* utriculiform. *Female glumes* ovate, cymbiform, apex usually obtuse to rotund, but sometimes subacute, often erose-ciliolate, 1.5—2 mm long, 1—1.4 mm wide, translucent, glabrous, pale or whitish with longitudinal light reddish flecks, rather strongly nervose, midrib prominent. 2 adjacent nerves sometimes coalescing with it above, usually excurrent, from a point on the back below the apex, in a smooth to minutely hispidulous awn up to 0.25 mm long. *Utricles* more or less ellipsoid, obtusely trigonous, becoming subinflated, 2.5—3.25 mm long, about 1 mm broad, membranaceous, strongly plurinerved, one or two on the centre of the dorsal face becoming spongy-thickened, causing a slender groove, glabrous, or sometimes very sparsely setulose at the apex on the ventral face, scarcely or very narrowly marginate, straight to slightly recurved, greenish with reddish spots, becoming fulvous or brownish, spongy-thickened at the base, not stipitate, subgradually to subabruptly beaked; *beak* plano-convex, scarcely to gradually tapering, 1—1.25 mm long, broadish, marginate, sparsely hispidulous-margined, bidentate; *mouth* not oblique; *teeth* 0.2—0.4 mm long, straight. *Achene* ellipsoid or oblong-ellipsoid, trigonous, 1.5—1.75 mm long, 0.8—0.9 mm broad, not stipitate, *beak* abrupt, very short, slightly bulbous, often bent. *Style* slightly thickened at the base. *Stigmas* 3.

SUMATRA: East Coast; Mt. Sinabun(g), north slopes, primitive light forest, widespread, ± 1550 m, 19 Jan. 1921, *Lörzing* 8223 (B); *ibid.*, Berastagi, light rain-forest, common, 1600 m, 9 Dec. 1928, *Beumée* A818 (-B)! — West Coast; Mt. Marapi, forest, near river, 1400 m, 16 Sept. 1918, *Biinnemcijer* U651 (B)!; Mt. Singga-

lang, among brush-wood, common, ± 1300 m, 25 May 1918, *Biinnemcijer* 2530 (K, L, S)!

MOLUCCAS: Ceram; West Ceram; Mt. Salahua—Mt. Toplana—Meiite—Huni-tetu, 1160 m, 31 Jan.—2 Feb. 1938, *Eyma* 2725 (B, K)! Central Ceram; central mountains, Mt. Huale, 1000 m, May—Aug. 1911, *Stresemann* 160 {K, L}!

This species and *C. semiglomerata* Kiikenth. though suggesting close affinity with *C. cruciata* Wahlenb., by reason of their utricles being subinflated and/or with thickened nerves, appear through other characters to be linked with Section *Filicinae*.

### 23. CAREX SEMIGLOMERATA Kiikenth.

*Carex semiglomerata* Kiikenth. in Bull. Jard. Bot. Buitenz. sér. 3, 16: 315: 1940. — Sumatra, van Steenis 9963.

*Rhizome* short, stout, woody. *Stems* erect, trigonous, angles obtuse to acute, 80—147 cm tall, stout (2—4 mm thick below), smooth but hispidulous above on the rhachis, a few persistent fibres at the base. *Leaves* basal and 1—2 stem leaves proper, about as long as to shorter than the stems, 7—10 mm wide, flat but revolute on the margins, stiff and subcoriaceous, apices longly attenuated; *sheaths* of the basal leaves densely but minutely hispidulous and fuscous-nerved on the back, brown, membranous, and reticulately split in front, upper sheaths glabrous, yellowish at the nodes. *Inflorescence* a compound, much interrupted, slender, panicle, occupying the upper 40—60 cm of the stem; *secondary panicles* 8—12, lowest single, others mostly binate, at 4—6 nodes, linear-oblong, more or less erect, 5—10 cm long, 0.7—2 cm broad, upper subapproximate or rather distantly, lower very distantly spaced, lower branches short, again branched into 2—9 simple spikes, upper and middle ones simple spikes, branches patulous, spikes erect to subpatent, upper on unequally scarcely or rather longly, lower on unequally shortly to extremely longly (up to 10—13 cm long) exerted peduncles; *peduncles* compressed-trigonous, wiry, erect to curved, lowest smooth below, otherwise all scaberulous. *Bracts* foliaceous, scarcely extending to the apex of the stem, longer or shorter than their secondary panicles, upper reduced, lower longly or very longly upper shortly sheathing; *sheaths* as those of the upper leaves. *Spikes* numerous, androgynaeceous, broadly ovoid to subglobose, 4—5 mm long, subdense-flowered, sessile, male and female parts about equal in length. *Bracteoles* in the form of smaller, more squarish-oblong, hispidulous, apically very obtuse to emarginate, often erose-ciliolate, awned. *Cladophylls* utriculiform below, glumiform above, small (about 2 mm long). *Female glumes* ovate or lanceolate-ovate, sometimes shortly acuminate, cymbiform, apex (upper) acute to (lower) obtuse, 2—2.3 mm long, 1.25—1.5 mm wide, translucent, (upper) glabrous to (lower) sometimes sparsely setulose, pale or light castaneous with darker reddish or castaneous streaks and flushes, margins sometimes narrowly to widely but irregularly palish-hyaline towards the apex, distinctly and relatively strongly nervose, midrib conspicuous, that of the lower glumes excurrent, some-

times from below the apex, in a smooth or minutely and sparsely hispidulous awn, up to 0.5 mm long. *Utricles* ellipsoid or ovoid-ellipsoid, trigonous or compressed-trigonous (associated with ridge on ventral face, due to displaced achene), 3—3.25 mm long, 0.9—1.25 mm broad, membranaceous, nitidous, ventral usually nerveless, dorsally sometimes nerveless but usually having 1—2 central, and often several other, strong, spongy nerves below, with corresponding narrow grooves, narrowly marginate, glabrous or very sparsely setulose at the apex, straight or slightly recurved, becoming patulous, light greenish-brown below, browner above, sometimes with brownish-castaneous patches, or wholly light brownish, base much spongy-thickened not or scarcely stipitate, subgradually beaked; *beak* gradually at first, then scarcely, tapering, compressed plano-convex, 1—1.5 mm long, broad below, narrowly marginate, hispidulous margined, bidentate; *mouth* scarcely dorsally oblique; *teeth* lanceolate, 0.2—0.3 mm long, straight, glabrous. *Achene* ellipsoid or ellipsoid-obovoid, trigonous, 1.4—1.5 mm long, 0.8—1 mm broad, brown, straight or somewhat bent (with beak), very shortly stipitate and beaked. *Style* slightly thickened at the base. *Stigmas* 3.

SUMATRA: A t j e h: Peuetsagoe (mountain), marshy base of old crater, 2300 m, 22 June 1939, *Gall* 70 (B, K) !; Gajo Lands, Kapi fields, at the confluence of the rivers Kapi and Anan, flat forest ridges, with cold solfatara fields, mountain swamp, Paja Kapi, 1100—1250m, 21 March 1937, *van Steenis* 9963 (B, K) ! — West Coast; Mt. Korinchi [G. Kerintji], forest, 1900 m, 9 April 1920, *Bunnemeijer* 9327 (B) !

Endemic.

Sect. 6. **Filicinae** (C. B. Clarke) Nelves, *sect. nov.*

[Series] *Filicinae* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37: 4: 1904.

*Secondary panicles* often binate. *Spikes* numerous or very numerous. *Cladophylls* utriculiform. *Female glumes* light to dark reddish or castaneous. *Utricles* usually nerveless or plurinerved, light to dark reddish or castaneous, or stramineous to greenish with reddish or castaneous flecks or patches, mouth sometimes dorsally oblique, sometimes very oblique. *Achene* more or less ellipsoid or obovoid, angles sometimes prominent, not centrally thickened, beak and/or stipe usually more or less bent, apex not discoid-annulate. *Style* base usually not or scarcely thickened.

1. Secondary panicles single (middle ones rarely binate in *C. eontinua*) :
2. Utricles more or less hispidulous:
  3. Leaves 1—2.5 mm wide; utricles 2.4—2.6 mm long  
37. *C. sarawaketensis* var. *minor*
  3. Leaves 2—8 mm wide; utricles 3—5 mm long:
  4. Utricles ellipsoid or oblong-ellipsoid:
    5. Spikes 6—13 mm long; female glumes 1.5—2 mm long; utricles 3.5—4 mm long  
38. *C. ceramica*
    5. Spikes 4—7 mm long; female glumes 2—2.75 mm long; utricles 4—4.5 mm long  
27. *C. oblonga*

4. Utricles more or less obovoid:
  6. Secondary panicles 5—9; female glumes 1.25—2 mm long . . . . . 28. *C. eontinua*
  6. Secondary panicles 4; female glumes 2—2.5 mm long . . . . . 29. *C. timorensis*
2. Utricles glabrous, or hispidulous on the margins:
  7. Leaves 6—8 mm wide; secondary panicles 1.5—3 cm long; utricles 4—4.5 mm long  
31. *C. filicina* var. *Zipelii*
  7. Leaves 3—6 mm wide; secondary panicles 3—5 cm long; utricles 2.25—4 mm long:
  8. Utricles about 4 mm long; achene about 2 mm long . . . . . 36. *C. papuana*
  8. Utricles 2.25—3 mm long; achene 1.25—1.3 mm long . . . . . 32. *C. sclerioides*
1. Some secondary panicles binate:
  9. Utricles glabrous, or hispidulous on the margins:
    10. Female glumes 0.75—1.25 mm long . . . . . 39. *C. tytholepis*
    10. Female glumes 1.25—4.5 mm long:
      11. Female glumes 3—4.5 mm long . . . . . 30. *C. saturate/*,
      11. Female glumes 1.25—3 mm long:
        12. Leaves 1.5—5 mm wide:
          13. Spikes 4—10 mm long; female glumes 1.75—3 mm long; utricles 2.75—4.5 mm long, dorsally plurinerved . . . . . 37. *C. sarawaketensis* var. *glabrinux*
          13. Spikes 3—5 mm long; female glumes 1.5—1.9 mm long; utricles 2.5—3 mm long, nerveless except for 1(—2) submarginal dorsal nerves . . . . . 34. *C. xestogyne*
        12. Leaves 2—20 mm wide (6—20 mm wide except in *C. neoguineensis*, 3—10 mm, and in *C. filicina* var. *angustifolia*, 2—10 mm, wide) :
          14. Leaves densely scabro-hispidulous on the upper surface; female glumes fulvous  
35. *C. lamprochlamys*
          14. Leaves scabrid on the upper surface only towards the apex; female glumes reddish or castaneous:
            15. Utricles wholly glabrous:
              16. Leaves 7—20 mm wide; secondary panicles 4—12 cm long . . . . . 31. *C. filicina*
              16. Leaves 2—10 mm wide; secondary panicles 2.5—9 cm long  
31. *C. filicina* var. *angustifolia*
            15. Utricles hispidulous on the margins above or only on the beak:
              17. Lower bracts much shorter than the inflorescence . . . . . 24. *C. Clarkeana*
              17. Lower bracts equalling or exceeding the inflorescence:
                18. Leaves 10—14 mm wide; utricles 2.75—3.5 mm long . . . . . 25. *C. Rafflesiana*
                18. Leaves 3—10 mm wide; utricles 3—4 mm long:
                  19. Leaves 7—10 mm wide; spikes patent; female glumes aristate, awn 0.5—1.25 mm long; beak of utricle with a scarcely oblique mouth, bidentate . . . . . 35. *C. lamprochlamys* var. *diplococlea*
                  19. Leaves 3—10 mm wide; spikes suberect to patulous; female glumes muticous or mucronate; beak of utricle with a very oblique mouth, bidentulate, becoming erose-entire . . . . . 33. *C. neo-guineensis*
      9. Utricles more or less hispidulous:
        20. Leaves densely vesiculose on the upper surface, the small, pale vesicles or protuberances becoming rough towards the apex of the leaf:
          21. Spikes 3—8 mm long; female glumes 0.75—1.25 mm long; utricles 2.5—3.2 mm long . . . . . 39. *C. tytholepis*
          21. Spikes 6—12 mm long; female glumes 2—4.25 mm long; utricles 3—5 mm long;
            22. Secondary panicles 5—10, at 4—6 nodes, lax to dense . . . . . 26. *C. gembolensis*

22. Secondary panicles 8—18, at 6—8 nodes, very dense

26. *C. gembolensis* var. *crebra*

20. Leaves not vesiculose on the upper surface:

23. Leaves 1—5 mm wide; secondary panicles 1—5 cm long; glumes and utricles reddish to blackish-red:

24. Leaves 1.5—5 mm wide; spikes 4—10 mm long; female glumes 1.75—3 mm long, utricles 2.75—4.5 mm long . . . . . 37. *C. sarawaketensis*

24. Leaves 1—2.5 mm wide; spikes 3—6 mm long; female glumes 1.25—1.9 mm long; utricles 2.4—2.6 mm long . . . . . 37. *C. sarawaketensis* var. *minor*

23. Leaves 6—18 mm wide:

25. Leaves 6—12 mm wide; spikes 3—5 mm long; utricles sparsely to densely hispidulous above. . . . . 25. *C. Raffle'siana* var. *vmcrothyrsa*

25. Leaves 7—18 mm wide; spikes 4—9 mm long; utricles sparsely to subdensely hispidulous above. . . . . 25. *C. Rafflesiana* var. *virgata*

Yet another of Clarke's names in adopted here, in an amended and much wider application, to cover all those *Indocarices* with small spikes, which differ from the other closely related groups, Section *Stramentitiae* and Section *Cruciatae*, principally in reddish or castaneous glumes. Also, their secondary panicles are usually binate and their spikes very numerous. Those species in Section *Filicinae* which were described up to the time of Kiiikenthal's monograph in Engler's "Pflanzenreich," 1909, were included by him in Section *Indicae* Tuckerm., and either in his Subsection *Gracilirostres* or Subsection *Hispidulae*, groups separated by characters of little taxonomic value, and not always clearly separated, as evidenced by the descriptions.

#### 24. CAREX CLARKEANA Kiiikenth.

*Carex Clarkeana* Kiiikenth. in Bull. Herb. Boiss. sér. 2, 4: 52: 1904; in Engl. Pflanzenr. IV, 20: 282: 1909; Ridley, Pl. Malay Penins. 5: 183: 1925. — Malay Peninsula, Wray 4104-

Tufted. *Rhizome* shortly creeping, stout, woody, covered with dull reddish fibrous remains of sheathing scales. *Stems* erect, trigonous, 50—150 cm tall, 2—3 mm thick below, smooth below, angles minutely setulose below the nodes, mainly hidden by leaf-sheaths, especially below, surmounted at the base, below the leaves, by a few reddish cataphylls or leafless sheaths and/or their fibrous remains. *Leaves* basal and subbasal, and 1—few higher on the stem, long but usually much shorter than the stems, 6—10 mm wide, flat or flattish, stiff, apex longly attenuated, longly sheathing; *sheaths* brown at the mouth, stramineous above the dark nodes. *Inflorescence* a compound, interrupted panicle, 21—54 cm long; *secondary panicles* 5—14, single and unequally binate, more or less oblong to lanceolate, erect, to patulous, 2—10 cm long, 0.7—3 cm broad, upper subapproximate and subfastigiate, or distinctly separated, lower distant to remote from one another, very lax to subdense, upper simple spikes, lower once or twice branched into simple spikes, upper on scarcely to

rather longly, lower on shortly to longly, exerted peduncles; *peduncles* trigonous or compressed, slender to very slender, shortly setulose or hispidulous, or lower glabrous below. *Rhachis* of the main inflorescence minutely setulose on the upper half of the internodes, glabrous below; *rhachis* of the secondary panicles and branches more acutely angled, hispidulous. *Bracts* foliaceous, lower longer than their secondary panicles but much exceeded by the main inflorescence, longly or rather longly sheathing, upper reduced in size, shortly sheathing; *sheaths* golden and glabrous below, often setulose in front above and near the brown mouth. *Spikes* numerous, androgynaeceous, 4—5.5 mm long, subdense - to sub-lax - and few-flowered, patulous to patent, sessile, male and female parts about equal in length. *Bracteoles* glumiform, small, hispidulous, longly and often curved- or flexuous-aristate. *Cladophylls* small, utriculiform below, glumiform above. *Female glumes* ovate or ovate-lanceolate, base incurved, cymbiform above, apex usually obtuse, sometimes bilobed-emarginate or subacute, 1.8—2.8 mm long, 1.5—1.75 mm wide, translucent, glabrous or lower ones lightly hispidulous near the apex, light reddish-castaneous below, sometimes margins widely whitish-hyaline, very slenderly nervose, midrib slender, coalescing with two lateral nerves above, usually excurrent in a minutely hispidulous mucro or awn up to nearly 1 mm long. *Utricles* oblong-ellipsoid, distinctly trigonous, 3.5—4 mm long, 1—1.2 mm broad, subcoriaceous, from almost nerveless to multinerved, narrowly marginate, glabrous, apex rarely very sparsely setulose on the ventral face and/or on the margins, straight to obliquely recurved, patulous, stramineous with castaneous stripes and patches to wholly dull reddish-castaneous, becoming nitidous, base spongy-thickened but not stipitate, subgradually to subabruptly narrowing above into a beak; *beak* tapering at first, plano-convex or compressed, 1.5—1.75 mm long, narrowly marginate, sparsely hispidulous-margined, bidentate; *mouth* somewhat dorsally oblique; *teeth* 0.3—0.5 mm long, straight or slightly converging. *Achene* ellipsoid, sometimes somewhat bent, trigonous, angles prominent, faces flat or shallowly concave, 2—2.25 mm long, 0.8—1 mm broad, dark warm brown, very shortly stout-stipitate, beak very short, usually somewhat bent. *Style* base slightly thickened, persistent. *Stigmas* 3.

MALAY PENINSULA: Kedah/Perak; Mt. Bintang, June 1917, *Evans 13,194-* (BM, K, S) ! — Perak; Wray 4104. — Pahang; Mt. Berambau, Nov. 1908, *Ridley 13,865a* (mounted with *C. pseudorivulorum* Kiiikenth.) (S) !; *ibid.*, 1800 m, 17 June 1923, *Henderson (F.M.S.Mus. 11,099)* (K) !; Mt. Takau, July 1911, *Ridley 16,343* (K) !; Brinchang, Cameron Highlands, open swampy place, 1500 m, 16 May 1936, *Holtum (Sing. Field. No. 31,298)* (L, S) !; Mt. Jasar, Cameron Highlands, open summit, abundant, ± 1800 m, August 1946, *Holtum* (S) !

SUMATRA: West Coast; Mt. Malintang, in forest and in open places, 1800 m, 29 July 1918, *Biinnemeijer 4126* (B) !

I have not seen the type of *C. Clarkeana* (Wray 4104), which is the only specimen cited by Kiiikenthal, and the other specimens cited by me

above have been otherwise determined by other botanists. They seem to me to agree with Kükenthal's description of the type, and I have prepared my description from them.

### 25. CAREX RAFFLESIANA Boott

*Carex Rafflesiana* Boott in Trans. Linn. Soc. 20: 132: 1846; Illustr. 1: 12 t. 33: 1858; C. B. Clarke, 10; Kükenth., 282. — Java, Horsfield.

*Carex commixta* Steud., Syn. Pl. Glum. II. Cyper. 207: 1855. — Java, Zollinger.

Scarcely or loosely tufted. *Rhizome* stout, woody, short, not creeping. *Stems* erect, trigonous, angles subacute to obtuse, 135—197 cm tall, stout, 3.5—5 mm thick below, ribbed, striate, smooth, surrounded below the leaves by a few dark reddish-brown disintegrating leaf-sheaths. *Leaves* mainly subbasal, often 1—2 higher on the stem, tall but shorter than the stems, 10—14 mm wide, coriaceous, flattish to revolute, stem leaves longly sheathing; *sheaths* ampliate, especially towards the reddish-brown nodes. *Inflorescence* a compound interrupted panicle, occupying the upper 25—70 cm of the stem; *secondary panicles* 8—10, all or mostly binate, at 5—6 nodes, erect or suberect, more or less oblong-lanceolate, 4—15 cm long, 1.5—3 cm broad, lax or sublax, upper branches simple spikes, lower again branched (sometimes some lower ones twice) into simple spikes, upper subapproximate to rather distant, lower distant or remote, from one another, upper on scarcely to shortly, lower on shortly or longly, unequally, exerted peduncles; *peduncles* more or less trigonous, angles and sometimes surface hispidulous. Main *rhachis* with angles scabro-hispidulous below, more generally subadpressed-hispidulous above; *rhachis* of the secondary panicles trigonous or narrowly winged, mostly densely subadpressed hispidulous, especially on the angles and wings. *Bracts* foliaceous, lower equalling or exceeding the stem, longly sheathing, upper much reduced, sometimes extending up to the apex of the stem, shortly to rather longly sheathing; *sheaths* smooth, upper sometimes hispid at the mouth, sometimes dark at the nodes. *Spikes* numerous, androgynaeceous, 4—7 mm long, sublax- and few-flowered, becoming subpatent to patent, sessile, male and female parts about equal in length. *Bracteoles* glumiform, small, with slender ciliolate-scaberulous awns, those of the spikes not longer than their spikes, those of the branches long to very long and often curved. *Cladophylls* small, utriculiform below, glumiform above. *Female glumes* ovate-lanceolate, cymbiform, slightly involute, apex acute or subacute, 1.5—2 mm long, 1—1.5 mm wide, subtranslucent, glabrous or lower sometimes slightly hispidulous above, nervose, pale but covered with reddish-brown flecks and stripes, midrib conspicuous, sometimes shortly excurrent in a smooth or ciliolate-hispidulous awn. *Utricles* ellipsoid to oblong-ellipsoid, or slightly obovoid-ellipsoid, distinctly trigonous, 2.75—3.5 mm long, 0.8—1 mm broad, membranaceous or subcoriaceous, obscurely to conspicuously several-nerved on each half of the dorsal face, ventral face similarly nerved or nerveless, glabrous or very sparsely hispidulous in the upper third, patulous, scarcely to very narrowly marginate, straight to obliquely recurved, stramineous with stripes, spots,

and splashes of bright reddish-brown, especially on the dorsal face, not stipitate, subabruptly beaked at the apex; *beak* gradually tapering, compressed-trigonous, 1—1.2 mm long, narrowly marginate, glabrous or sparsely or very sparsely hispidulous-margined, bidentulate; *mouth* not or scarcely oblique; *teeth* straight. *Achene* ellipsoid, distinctly trigonous, angles prominent, faces concave, about 1.5 mm long, about 0.8 mm. broad, stramineous to brown, scarcely to very shortly stipitate and beaked. *Style* not or scarcely thickened towards the base. *Stigmas* 3.

SUMATRA: West Coast; Mt. Ophir (G. Talakmau), north-west slope, forest, widespread, 1700 m, 13 May 1917, *Biinnemeijer 704b* (B) !; Barungbaru, Tapan, 4 June 1914, *Robinson & Kloss* (BM, K) !

MOLUCCAS: Ceram: West Ceram; Mt. &alahua—Mt. Toplana—Meüti—Hunitetu, 1160 m, 31 Jan.—2 Feb. 1938, *Eyma 2725* (B) ! Central Ceram; Mt. Murkele, primitive forest, 1000—1900 m, SO June 1918, *Kornassi 146U* (B) !

JAVA: B o g o r (Buitenzorg) ; Tjianten, south of Leuwiliang, south-west of Bogor (Buitenzorg), bushy "wilderness," 900 m, 30 Aug. 1918, *Backer 25,692* (B) !; Mt. Salak, in primeval forest on north-west side, rainy regions, 800—900 m, 5 Dec. 1893, *Schiffner 1588* (L) !; Nirmala, west-south-west of Bogor (Buitenzorg), swampy hollows, 950 m, 24 Dec. 1913, *Backer 11,058* (B) !; north-west of Puntjak, above Bogor (Buitenzorg), edge of forest, 1450 m, 19 April 1918, *Backer 24,001* (B) !; Puntjak, forest-border, 1300 m, 3 March 1927, *Beumee 399* (B) !; Mt. Kantjana, east of Sukabumi, ancient forest, 1200 m, 3 Feb. 1918, *Backer 23,254* (B) ! — Priangan; Mt. Tangkubanprahu, south slope, primitive forest, 1800 m, 4 March 1912, *Backer 2396* (B) !; Mt. Papandajan, *Blume* (B) !; Tjinjiruuan, 1000 m, 1 April 1911, *J.J. Smith & Rant 15* (B) !; Tirtasari, Pengalengan, 4 April 1911, *J.J. Smith & Rant 168* (B) !; and about twelve other gatherings from Priangan. — Banjumas; Djeng Plateau, Telaga Leri, 8 April 1906, *Ernst* (B) !; *ibid.*, south slope, common, 1800 m, 25 Jan. 1817, *Backer 21,859* (B) ! — Kedu; north-east Mt. Sumbing, often in dry sunny ground amongst stones and rocks, ± 1700 m, 14 May 1912, *Lb'zing 417* (B) !; Mt. Merbabu, above Melangbong, grassy and bushy savannah, common, 1800—2400 m, 29 March 1920, *Backer 30,285* (B) ! — Malang; Djunggo, above Punten, half open ground, grassy slopes, ± 1200 m, 28 Dec. 1928, *van Steenis 2525* (B) !; Tengger Mts., by path on forest-border, 1000—1500 m, Feb. 1912, *Mousset 2* (B) !; Mt. Lamongan, 27 March 1930, *Jesiviet* (B) ! *Horsfield* (K) !; Bandung, *Zollinger 1254*, partim.

Queensland.

A robust, polymorphic species, which, with its varieties, has been much collected in Malaysia. Its many variations are difficult to segregate, and they have been variously treated, with a resulting crop of synonyms.

The following immature specimen appears to be close to *C. Rafflesiana* Boott.

*Rhizome* and lower part of *stem* wanting. Upper *leaves* 6—8 mm wide, flattish. *Inflorescence* immature, hispidulous.

MOLUCCAS: Ternate; Mt. Kei Duku (Peak of Ternate), alt.?, 27 Feb 1938, *Anang 12* (B) !

Var. *MACROTHYRSA* (Miq.) Kiiikenth.

*Carex Rafflesiana* Boott var. *macrothyrsa* (Miq.) Kiiikenth. in Pflanzenr. IV, 20: 282: 1909.

*Carex macrothyrsa* Miq., Fl. Ned. Ind. 3: 351: 1855. — Java, *Junghuhn U2*.

*Carex bengalensis* Roxb. var. *scaberrima* Boeck. in Linnaea 40: 347: 1876.—Philippine Islands, *Cuming 936*.

*Carex scaberrima* (Boeck.) C. B. Clarke in Journ. Linn. Soc. Bot. 37: 10: 1904.

*Carex Rafflesiana* Boott var. *scaberrima* (Boeck.) Kiiikenth. in Engl. Pflanzenr. IV, 20: 282: 1909; Merrill, Enum. Philipp. Fl. Pl. 1: 140: 1923.

*Inflorescence* 23—50 cm long. *Spikes* 3—5 mm long. *Female glumes* ovate to ovate-lanceolate, apex subacute to very obtuse, lower mostly subdensely hispidulous. *Utricles* reddish-castaneous, base pale, glabrous below, hispidulous above; *beak* hispidulous or hispidulous-margined; *mouth* dorsally oblique.

MALAY PENINSULA: Kedah; Gunong Jerai, Kedah Peak, 900—1200 m, June 1921, *Evans & Gordon 84* (S) !

SUMATRA: East Coast; Kabanjahe, jungle patch, 19 May 1939, *Batten Pool* (S) ! (doubtful determination). — Tapanuli; Habinsaran, high plain, east-south-east of Toba lake, savannah, not rare, 1200—1300 m, 11 May 1919, *Lorzing 6515* (B) !; central Habinsaran, between Parsoburan and Nassau, on the right side of Kuwalu R., secondary forest, widespread, ± 900 m, 15 Nov. 1920, *Lorzing 7930* (B) ! — West Coast; Mt. Singgalang, Padang Highlands, June—July 1878, *Beccari 21* (BM) ! — Bengkulu (Bencoolen)/Palembang; Mt. Dempo, 2550 m, 1881, *Forbes 2389* (K) ! (doubtful determination); Mt. Seminung, landslip, open situation, 1100 m, 20 Dec. 1935, *Rappard S. 30* (B) !; Mt. Seminung, summit, open steep places, 1880 m, 19 Dec. 1935, *Rappard S. 23* (B) !

PHILIPPINE ISLANDS!: Palawan; Mt Pulgar, ± 1300 m, Feb. 1906, *Curran (For. Bur. 3890)* (K) !; *ibid.*, forest, March—April 1906, *Foxworthy (Bur. Sci. 554)* (K) !; *ibid.*, Mt. Victoria, forest, 1100 m, March—April 1906, *Foxworthy (Bur. Sci. 665)* (B, K) !; *ibid.*, 679 (K) ! — Luzon: Benguet; Nov.—Dec. 1910, *Fenix (Bur. Sci. 12,704)* (B) !; Benguet, Burias, open lands, ± 1500 m, Oct.—Nov. 1905, *Merrill 4669* (K) !; *ibid.*, Pauai, mossy forest, ± 2200 m, Oct.—Nov. 1905, *Merrill 474-2* (K) !; Pauai to Baguio, ± 2000 m, Oct.—Nov. 1905, *Merrill 4795* (K) !; Baguio, Aug. 1906, *Curran (Bur. Sci. 4868)* (B) !; *ibid.*, March 1907, *Elmer 8356* (K) !; Heights in the Oaks, 2100, July 1907, *Mearns 4259* (B, L) !; Bataan; Batanes, Mt. Iraya, June—July 1930, *Ramos (Bur. Sci. 80,267)* (K) !; Rizal; Mt. Makiling, April 1906, *Loher 7142* (K) !; *ibid.*, summit 1 June 1914, *Baker 8459* (S) !; Pampanga; Mt. Arayat, forests ± 800 m, Sept. 1905, *Merrill 4221* (K) !; Camp Stotsenburg, Mt. Pinatubo, May 1927, *Elmer 22,202* (BM, K, L, S) !; Laguna; Mt. Maquiling, 19 Feb. 1910, *C.B. Robinson (Bur. Sci. 9736)* (K, L) !; *ibid.*, June—July 1917, *Elmer 17,692* (BM, K, L) !; Albay; 1841, *Cuming 936* (BM, K, L) !; Sorsogon; July—Aug. 1915, *Ramos (Bin. Sci. 23,321)* (BM) !; Lake Polog, Aug. 1915, *Ramos (Bur. Sci. 23,623)* (BM) ! — Negros; Dumaguete, Cuernos Mts., May 1908, *Elmer 10,180* (BM) ! — Leyte; 25 May 1912, *Wenzel 791* (BM) ! — Mindanao; Davao, Todaya, Mt. Apo, Aug. 1909, *Elmer 11,554* (B, L) !; *ibid.*, Mt. Apo, Sept. 1909, *Elmer 11,607* (B, BM, K, L) !; Bukidnon, Mt. Lipa, June—July 1920, *Ramos & Edano (Bur. Sci. 38,505)* (B, L) !

"Common on ridges in and near the mossy forest, alt. 1000—2000 m."—Merrill (*l.e.*).

JAVA: Bogor (Buitenzorg); Pasir Dalem, above Pasir Pogor, south-west of Masing, forest, near waterfall of the Tjimadja, few plants, ± 1000 m, 13 June 1922, *Bakhuizen van den Brink Jr. 1268* (B, L) !; Mt. Salak, north slope, above Tjiapus near "Imah Leutik," secondary forest, ± 850 m, 20 Aug. 1939, *van Steenis 11,506* (B) !; Mt. Gede, 13 Feb. 1915, *Ridley* (BM, K) !; Tjibodas, 25 Aug. 1896, *Sapiin* (B) !; Mt. Gede, above Tjibe'ureum, primitive forest, by path, ± 1800 m, 25 Nov. 1930, *van Steenis 4649* (B) !; Mt. Limo, above Puntjak, moss forest, ± 1800 m, 15 Sept. 1933, *van Steenis 5636* (B) !; Mt. Pangrango, *Kuhl & van Hasselt* (L) !; Tjadasmalang, near Tjidadap, south of Tjibeber, forest, common, ± 1000 m, 11 July 1923, *Winckel 1258 j* (L) !; *ibid.*, 27 July 1923, *Winckel 1495/3* (K, L, S) ! — Priangan; Mt. Papandajan, scrub, between Tegal Bungbrung and Tegal Pandjang, ± 2100 m, 29 March 1930, *van Steenis 4183*, partim (B) !; *ibid.*, dry Avena slope, 2040 m, 31 March 1930, *van Steenis 4332* (B) !; above Tjikakapa, 2000 m, 10 July 1936, *van Slooten 2615* (B) !; Mt. Malabar (Malawar), 1800m, *Forbes 785* (BM) ! (doubtful determination). — Banjarmasin; Dijeng, flat grassy places and in neighbouring woods, March, *Junghuhn 442* (L) ! — Banjarmasin/Semarang; Mt. Pra(h)u, summit, 2560 m, June 1930, *Brinkman 262* (B) !; Mt. Pra(h)u, 12 July 1932, *Kleinhoonte 117* (B) ! — Madiun; Mt. Lawu, Dec. 1916, *Jacobson* (B) !; Sarangan, ± 1200 m, 20 April 1922, *Wisse 809* (B) ! — Malang; near Podokojo, Tosari, 30 Jan. 1915, *Ridley* (BM, K) !; Tengger Mts., ± 2000 m, April 1914, *Leefmans 24* (B) ! — Besuki; Ijang Plateau, 2100m, 12 Aug. 1914, *Koorders 43,4590* (L) !; Mt. Kendeng, above Kajumas, north slopes of Idjen Mts., scrub-border, here and there, 1500' m, 10 June 1927, *Backer 37,511* (L) !

LESSER SUNDA ISLANDS: Bali, Mt. Abang, grassy meadow, very common, 1500—2150 m, 9 April 1936, *van Steenis 8012* (B) ! — Lombok; Rindjani Volcano, north side, Ladjang, monsoon high forest, loamy soil, 700—800 m, 30 April 1909, *Elbert 832* (L) !; *ibid.*, east side Sembalun valley, north slope of the. Pussuk Mts., light monsoon high forest, rather damp slopes, tufa and breccia under a loamy soil, 1300—1500 m, 2 June 1909, *Elbert 1706* (L) ! — Flores; Ruteng, Jan. 1940, *Vecartsenijk Dienst 13* (B) !

Miquel's type of *C. macrothyrsa*, taken alone, might well be treated as a species distinct from *C. Rafflesiana*, but I found it difficult to separate the former from the Philippine specimens which, added to it, draw it closer to the species.

Var. *virgata* (Miq.) Nelmès, *comb. nov.*

*Carex virgata* Miq., Fl. Ned. Ind. 3: 351: 1855. — Java, *Junghuhn, Reinwardt. Carex bengalensis* Roxb. var. *virgata* (Miq.) Boeck. in Linnaea 40: 347: 187C.

*Secondary panicles* dense with very many spikes. *Spikes* 4—9 mm long, subdense-flowered. *Female glumes* 2—2.5 mm long, 1—1.25 mm wide, ovate or ovate-lanceolate, light to dark castaneous, very sparsely hispidulous in places, otherwise glabrous. *Utricles* 3.25—4.25 mm long, 0.8—1 mm broad, glabrous except at the hispidulous apical portion, subgradually to subabruptly beaked; *beak* gradually to scarcely tapering, 1—1.5 mm long; *mouth* dorsally oblique. *Achene* about 2 mm long, 0.75—0.9 mm broad.

CELEBES: North Celebes; Minahassa, Manado, Mt. Klabat, summit, 2000 m, stony ground, 19 Jan. 1895, *Koorders 16,678* (L) !; *ibid.*, 19 Jan. 1895, *Koorders 16,669jj* (K, L) !; *ibid.*, along path from Kakaskasen, near summit of Mt. Lokon, volcanic sand, *Koorders 16,674/1* (K, L) !; *ibid.*, highest peaks, 1200—1400 m, dry andesite gravel on bare plains, 5 May 1895, *Koorders 16,672ft* (B, L) !, *16,686ft* (L) !; Mt. Klabat, 2000 m, andesite soil, grassy place in forest, 23 Jan. 1934, *Steup 169* (B) !. — South-East Celebes; Mt. Watuwila, rain-forest, 1300 m, 25 March 1929, *Kjellberg 1040* (B) ! — South-West Celebes; Goa, Beru, overgrown volcanic area, scattered, ± 1600 m, 19 Aug. 1936, *Steup 192* (B) !

JAVA: Bogor (Buitenzorg); Geger Bintang, above Bogor (Buitenzorg), primitive forest, streamside, 1600—1800 m, 31 May 1914, *Backer 13,683* (B) ! — Priangan; Sukaati, south of Mt. Patuha, wet forest, common, March 1916, *Leefmans* (B) !; Mt. Papandajan, summit, in undergrowth on the crest, here and there, 2650 m, 12 May 1931, *van Steenis 4779* (B) ! — Kediri; Wilis Mts., east side of Mt. Wanasegara, grassy ridge, widespread, 1700 m, 14 Feb. 1914, *Backer 11,529* (B) ! — Malang; west of Tosari, on Junghuhn's route, 2000 m, 4 Feb. 1899, *Kobus* (B) !; Kletak, by paths and on slopes of Tengger Mts., 1500 m, 1911, *Moussset* (B) !; Tengger Mts., Tiorth slope, Ngepuh, roadside, 1100 m, 2 April 1915, *van Harreveld 8* (B) !; Tengger Mts., frequent, grassy fields and thickets 2200 m, 2 April 1927, *Gisius 13* (L); Tengger Mts., above Tosari, savannah, frequent, 1800 m, 15 April 1927, *Backer 36,918* (L) !; "Smeroe-hoeve," Banu Regulo, giant plant, savannah, 2100 m, 11 June 1935, *van Steenis 7266*, (B) !; Mt. Tarub, Lamongan, east slope, on summit, near Tiris, top zone among grass, 1600m, 12 July 1938, *van Steenis 10,753* (B) ! — Besuki; Idjen Plateau, Djampit, roadside, 1400 m, 20 June 1918, *Backer 25,086* (B) !; *ibid.*, north slopes of Mt. Kendeng, above Kajumas, wood-border, 1600 m, 18 April 1920, *Backer 30,722* (B) !

Grassy plain of Mt. Ungurup (Ungaran), above the village of Tirkilo, April, *Jiinghuhn* (L) !; on volcanic mountains, *Reinwardt 2593* (L) !; *Horsfield* (K) !

LESSER SUNDA ISLANDS: Bali; Mt. Abang, 1700 m, 24 March 1936, *de Voogd 2756* (B) ! — Timor; Bioba, Mt. Timaii, west slope, savannah, along river, 4 March 1939, ± 1300 m, *Bloembergen 3405* (B, K) !

The specimens placed here under the variety *virgata* were found particularly difficult to understand, made more difficult by the immature state of a number of them, and future study may lead to different alignments.

*Carex Rafflesiana* var. *tenuior* C. B. Clarke (*in Journ. Linn. Soc. Bot.* 37: 10: 1904) was based on three gatherings: Zollinger s.n. (Java), Forbes 2389 (Sumatra), and Moseley s.n. (Moluccas: Ternate). The Zollinger plant I have not seen, and I have not been able, with any degree of certainty, to determine the other two very immature ones.

## 26. CAREX GEMBOLENSIS C. B. Clarke

*Carex gembolensis* C. B. Clarke *in Journ. Linn. Soc. Bot.* 37: 10: 1904. — Java, *Zollinger, ser. II, no. 7.*

Loosely tufted. *Rhizome* shortly creeping, clothed in sheathing scales or their fibrous remains. *Stems* erect to oblique, apex of rhachis possibly slightly cernuous, trigonous, angles obtuse or subacute, faces often shallowly concave, 45—112 cm tall, 1.75—3 mm thick below, ribbed, glabrous and smooth below the rhachis, stiff, surrounded at the base, below the leaves, by a few reddish to fuscous cataphylls, entire or frayed into herring-bone fibres, and a mass of their older fibrous remains. *Leaves* basal and subbasal, crowded, and about 2 spaced evenly above on the stem proper, often short but sometimes long, usually shorter to much shorter than the stems, 3—10 mm wide, flat-plicate, margins usually strongly revolute, stiff to subcoriaceous, straight to much curved, often slenderly septate-nodulose below, especially on the lower sheaths, upper surface vesiculose, or with protuberances which become rough above towards the longly attenuated, often more or less circinnate, apices; *sheaths* membranous and often reddish-brown at the mouth, lower often reddish-nerved, soon fraying into sometimes reticulate, reddish to fuscous fibres, those of the stem leaves often fulvous or yellowish near and at nodes, all glabrous. *Inflorescence* a compound, interrupted panicle, 16.5—32cm long; *secondary panicles* erect or suberect, 5—10 at 4—6 nodes, lowest 1—2 often single, remainder usually and unequally binate, more or less oblong or oblong-ovate, 1.5—11 cm long, 1.5—4.5 cm broad, upper approximate or somewhat distant, but overlapping and continuous, lower distant, from one another, dense or sometimes lax, lower branches again branched (sometimes twice) into several simple spikes, upper branches simple spikes, branches and spikes suberect to patulous, lower on shortly to very longly, upper subsessile or on scarcely or very shortly, exerted peduncles; *peduncles* trigonous or compressed, wiry, smooth or angles hispidulous. *Rhachis* smooth below, more or less hispidulous above, of the secondary panicles more or less densely hispidulous. *Bracts* foliaceous, lower longer than their own panicles but exceeded or much exceeded by the main inflorescence, longly to very longly sheathing, upper much reduced, exceeding or exceeded by the main inflorescence; *sheaths* sometimes minutely hispidulous above or only at the mouth. *Spikes* numerous, androgynaeceous, 5—12 mm long, subdense-flowered, sessile, female part, in the shorter spikes, about equalling, but in the longer spikes shorter or much shorter than, the male part. *Bracteoles* glumiform, oblong to squarish, 1.5—2.5 mm long, about 1.5 mm wide, midrib excurrent in a straight to curved or flexuous, short to long, hispidulous awn, *Cladophylls* 2—3 mm long, utriculiform below, glumiform above, usually bilobed, sometimes containing an achene. *Female glumes* oblong-ovate or ovate-lanceolate, base incurved, cymbiform or flattish above, apex obtuse usually very obtuse, sometimes lightly bilobed-emarginate, 2—4.25 mm long (lower shorter than upper), 1.75—2.75 mm wide, subtranslucent, glabrous (upper) or more or less hispidulous (lower), reddish, vinaceous, or castaneous, pale or yellowish below, margins widely whitish-hyaline, sometimes with reddish flecks, apex pale, thin, erose-excised, distinctly nervose, midrib sometimes not extending to the apex but usually excurrent in a hispidu-

lous-margined awn up to 1.75 mm long. *Utricles* cuneate-obovoid or ellipsoid-obovoid, less commonly ellipsoid, trigonous, angles prominent, faces flattish, 3—5 mm long, 1—1.75 mm broad, subcoriaceous, slenderly 6—8-nerved ventrally, usually obscurely nerved dorsally, narrowly marginate, glabrous below, more or less densely setulose above, straight or slightly recurved, or sideways curved, or bent from the apex, becoming subpatulous to patulous, fulvous or yellowish below, reddish or vinaceous above, or palish with castaneous flecks and patches, scarcely to very shortly stipitate, subgradually or subabruptly beaked at the apex; *beak* scarcely tapering, more or less plano-convex, 1.25—2 mm long, broad, marginate, glabrous or short-setulose, always setulose-margined, castaneous to dull vinaceous, bidentate; *mouth* not oblique; *teeth* lanceolate, 0.5—0.8 mm long, straight to strongly diverging, sometimes minutely ciliolate-hispidulous. *Achene* ellipsoid to cuneate-obovoid, trigonous, faces concave, especially below, sometimes convex at the apex, 1.5—2.75 mm long, 1—1.5 mm broad, apex sometimes bent, whitish-stramineous, tapering below, abruptly, about 0.5 mm long and stoutly, stipitate, at the apex abruptly beaked; *beak* stout, 0.3—0.5 mm long, trigonous, apex sometimes thickened. *Style* stout, not or scarcely thickened at the base, which is persistent or subsistent on the beak of the achene. *Stigmas* 3, thickish, glandularly hispidulous.

JAVA: Priangan; Mt. Papandajan, Tegal Alun-alun, grassy meadow, 2500 m, 21 Jan. 1930, *Docters van Leeuwen 13,144* (L, K) !; *ibid.*, 2450 m, 22 Jan. 1930, *van Steenis 4140* (B, L) !; *ibid.*, Tegal Pandjang, dry *Avena* association, common, 2041 m, 29 March 1930, *van Steenis 4262* (B, L) ! — Banjumas; Mt. Slamet, south-west slope, alpine forest, common, 2600 m, 19 April 1911, *Backer 515* (B) !; Djeng Plateau, border of march, ± 2000 m, 28 Dec. 1914, *Docters van Leeuwen-Reijnvaan 2287* (B) ! — Banjumas/Semarang; Mt. Pra(h)u, east edge of the Djeng Plateau, secondary forest, 2550 m, 24 Jan. 1917, *Backer 21,805* (B) ! — Pekalongan; Mt. Slamet, west slope, mountain plateau, Igir Klantjeng, above Bumiaju, ± 2000 m, July 1941, *Hoogerwerf* (B) ! — Kedu; Mt. Sumbing, 3000—3300 m, 1919, *Kuyper* (B) !; *ibid.*, summit, in *Festucetum*; ± 3200 m, 13 May 1927, *Docters van Leeuwen-Reijnvaan 8743* (B) ! — Kedu/Semarang; Mt. Merbabu, summit, locally common, 2400—2700 m, *Kooper 221* (B) !; *ibid.*, 3145 m, 6 Nov. 1907, *Wurth* (B) !; *ibid.*, ± 3125 m, 29 Dec. 1912, *Docters van Leeuwen-Reijnvaan 1174* (B) ! — Djocjakarta; Mt. Merapi, above Babadan, fresh volcanic ash ground, open places, very common, 1700—2000 m, 6 April 1935, *de Haan 158* (B) !; *ibid.*, summit, 27 April 1920, *Coert 114* (K, L) ! — Madiun; Mt. Lawu, Sarangan, 14 Jan. 1930, *Coert 941* (K, L) !; *ibid.*, Argo Dalem, ± 3150 m, 18 Nov. 1924, *Docters van Leeuwen-Reijnvaan 8134* (B) !; Sarangan, 1928, *Geerts-Ronner* (B) !; Mt. Lawu, summit, ± 3000 m, 13 Nov. 1933, *van Slooten 2536* (B) ! — Kediri: Mt. Lawu, 25 Nov. 1934, *Coert 34-77* (B) ! — Kediri/Malang; Mt. Kawi, Oro-oro plain, 2690 m, 23 April 1916, *Arens & Wurth* (B) !; and about twenty-five other collection from Malang and the Kediri-Malang boundary. — [Surabaya?]; Modjokerto; Mt. Gembolo, 1290m, *Z oiling er, ser. II, no. 7* (BM, K) ! — Malang; Tengger Mts., volcanic sand, 2100—2300 m, *Z oiling er 2563* (BM) ! — Besuki; Ijang Mts., Mt. Krintjing, grassy plain, 2700m, 27 Oct. 1913, *Backer 9829* (B) !; *ibid.*, 2200 m, 26 April 1914, *Backer 13,348* (B) !; *ibid.*, near Selonjang, 2800 m,

May 1916, *Wurth* (B) !; *ibid.*, Alun-alun, dry place, very common, 2100 m, 15 Aug. 1916, *Koorders 43,490ji* (B) !; *ibid.*, Mt. Argopuro, summit, 3020 m, 15 Aug. 1916, *Koorders 43,573ji* (B, K, L) !; *ibid.*, Mt. Welirang (Mt. Argopuro), summit, 2900 m, 16 July 1938, *van Steenis 10,955* (B) !

LESSER SUNDA ISLANDS: Bali; Mt. Agung, summit, scattered singly on rocks, ± 3100 m, 2 June 1912, *Ahrens 7* (B) !; *ibid.*, grassy, very common, 2000—3100 m, 2 March 1934, *de Voogd 1955* (B) !; *ibid.*, 27 Sept. 1934, *de Voogd 1846* (B) !; *ibid.*, south slope, grassy, 1700 m, 6 April 1936, *van Steenis 7850* (B) !; *ibid.*, rocks of the debris slope, 3150 m, 7 April 1936, *van Steenis 7898* (B) !; Mt. Abang, 1700 m, 24 March 1936, *de Voogd 2756* (with *C. Rafflesiana* var. *virgata*) (B) ! — Lombok; Mt. Rindjani, 2000—3000 m, Oct. 1925, *Tengwall 35* (B, K, L) !; *ibid.*, 2600—3000 m, grassy slope, ashy debris, common, 1927, *Rensch 183* (B, K) !; *ibid.*, savannah, 2400 m, 14 June 1936, *de Voogd 2595* (B) !; *ibid.*, Segare Anak, in *Dodonea* forest, on old lava, 16 June 1936, *de Voogd 2639* (B) !; *ibid.*, open forest, 2000 m, 18 June 1936, *de Voogd 2686* (B) !; *ibid.*, top zone, ± 3600 m, July 1936, *van der Veen 40* (B) ! — Flores; Keli Mutu (mountain), summit, stony place, common, 1500 m, 28 Sept. 1921, *Horst 2* (B) ! — Timor; Mt. Mutis, summit, 2300 m, 15 Nov. 1935, *de Voogd 2293* (B, L) !; and 9 *Elbert*, 1909, gatherings from this volcanic mountain (K, L) !

This species was misidentified by Kükenthal (*in Engl. Pflanzenr. IV, 20: 283: 1909*) with the Indian *C. vesiculosa* Boott, a closely allied plant but of quite distinct appearance.

Some of the cladophylls of this species are fertile, a rare phenomenon in *Carex*.

#### Var. CREBRA Nelmes

*Carex gembolensis* C. B. Clarke var. *crebra* Nelmes *in Kew Bull.* 1950: 194: 1950. — Lesser Suiida Islands, Flores, *de Voogd 1830*.

*Leaves* coriaceous, rigid. *Secondary panicles* 8—18, at 6—8 nodes, very dense. *Spikes* dense-flowered. *Female* glumes with an acute to obtuse apex. *Utricles* ovoid or ellipsoid; *beak* 1—1.4 mm long.

LESSER SUNDA ISLANDS: Flores; 30 July 1933, *de Voogd 1830* (K, L) !; Keli Mutu (mountain), summit, stony, open crater-field (solfataradump), generally scattered, ± 1580 m, 4 Nov. 1932, *Posthumus 3037* (B) !

#### 27. CAREX OBLONGA Nelmes

*Carex oblonga* Nelmes *in Kew Bull.* 1950: 192: 1950. — Celebes, *Bilnemeijer 11,972*.

?*Carex pentacarpa* Boeck. *in Flora* 58: 265: 1875. — Java, *Zollinger*.

Tufted. *Rhizome* short, woody, clothed with dark reddish, ribbed scales or their fibrous remains. *Stems* more or less erect, trigonous, 47—127 cm tall, 1—1.5 mm thick below, smooth up to the upper part of the rachis where, at first below the nodes, the angles become more and more hispidulous. *Leaves* crowded near the base of the stem, except sometimes for 1—2 higher up the stem, a few lower reduced to blackish-red sheaths, older ones sometimes persisting at the base of the stem as reddish-fuscous

fibres, 3—7 mm wide, stiff, subcoriaceous, most nearly as long as the stems, flat to revolute, smooth below, vesiculose-rough on the upper surface above, apices longly attenuated; *sheaths* of the basal leaves reddish, tending to fray into thinnish, herring-bone shaped fibres. *Inflorescence* a compound, interrupted panicle, 15—53 cm long; *secondary panicles* 4—5, single, erect to more or less cernuous, 2.5—7.5 cm long, 8—13 mm broad, more or less oblong, sublax to subdense, upper at approximate or subapproximate nodes and subfastigate, lower distant or very distant, upper on scarcely to shortly, lower on longly to very longly, exerted peduncles, all branches in the form of simple spikes or, more often, lower branches again branched into 2—5 simple spikes, branches and spikes patulous to patent; *peduncles* slender, wiry, smooth below, hispidulous above, trigonous or compressed. *Rhachis* of the secondary panicles mostly densely hispidulous, especially on the angles. *Bracts* foliaceous but upper much reduced in size, falling short of to somewhat exceeding the apex of the stem, lower longly upper shortly sheathing; *sheaths* of the upper bracts more or less densely setulose, lower only near the mouth. *Spikes* androgynaeceous, rather numerous, sessile, subdense-flowered, 4—7 mm long, male and female parts about equally few-flowered. *Bracteoles* glumiform, more or less oblong with a rounded apex, about 1 mm long, setulose, dark reddish, midrib excurrent in a usually long, straight to flexuous, hispidulous-margined awn. *Cladoprophylls* more or less setulose, dark reddish, utriculiform below, glumiform above, with an erose, rounded apex, about 2 mm long. *Female glumes* ovate or oblong-ovate, apex obtuse, usually very obtuse, 2—2.75 mm long, 1.5—2 mm wide, translucent, glabrous or lowest sometimes sparsely hispidulous, midrib sometimes shortly excurrent in a smooth or ciliolate-hispidulous awn, 0—0.25 mm long. *Utricles* ellipsoid or oblong-ellipsoid, trigonous or compressed-trigonous, 4—4.5 mm long, 1—1.25 mm broad, subcoriaceous, centrally ventrally ridged, ventrally 4—6-nerved, dorsally obscurely 8—10-nerved, pale subadpressed setulose above, often in longitudinal lines, usually straight or straightish, sometimes slightly recurved or bent at the apex, becoming patulous, marginate, especially above, reddish to very dark reddish above, stramineous below or at the base, scarcely stipitate, gradually beaked at the apex: beak compressed-trigonous, gradually tapering, 1.25—1.5 mm long, dark reddish, bidentate; *mouth* straight to slightly dorsally oblique; *teeth* 0.25—0.5 mm long. *Achene* oblong-ellipsoid, trigonous, faces usually deeply concave below, concave to flattish above, about 2 mm long, 0.8—1 mm broad, extremely shortly, straight or slightly bent, stipitate, abruptly straight- and stoutish-beaked. *Style* base not or scarcely thickened. *Stigmas* 3.

CELEBES: South-West Celebes; Lombasang, forest, ± 950 m, 20 April 1921, *Biinnemeijer lfi&U* (B, L) !; *ibid.*, Peak of Bonthain [Mt. Lompobatang], north-west slopes, forest, ± 2200 m, 6 June 1921, *Biinnemeijer 11,858B* (flowering) (B, L) !; *ibid.*, ± 2450 m, 8 June 1921, *Biinnemeijer 11,972* (fruiting) (K, L) ! — Central Celebes; Masamba, west outlier of Kambuna, very thin forest, 2200 m, 27 July 1937,

*Eyma 131?* (B, K) !; Mendano, Palu, east of Lindu lake, west slope of Mt. Ngilalaki, ± 1600 m, *Agathis* forest, 7 July 1939, *Bloembergen 3910* (B\*) !

JAVA: Bogor (Buitenzorg); Mt. Gede, Tjikopo, *Boerlage* (B) ! — Malang; near Selorowo, Nongkodjadar, deforested valley slope, ± 1450 m, 4 April 1925, *van Breemen U2* (L) !; *ibid.*, near Putuk, damp soil, ± 1200 m, 15 April 1925, *van Breemen 50* (L) !; Tengger Mts., north slope near Bendoh, volcanic sand, mixed with ash, ± 1100 m, 5 May 1926, *E. de Vries* (L) ! — Besuki; Mt. Kendeng, above Kajumas, north slope of Idjen Mts., margin of scrub, here and there, 1500 m, 10 June 1927, *Backer 37,511* (B) !

LESSER SUNDA ISLANDS: Lombok; Rindjani Volcano, north side, below Tengengeah, dry sandy soil, 900—1350 m, 3 May 1909, *Elbert 922* (K, L) !, *923* (K, L) !; *ibid.*, damp sandy soil, 1300—1450 m, 3 May 1909, *Elbert 1016* (K, L) !

This species, in its small, oblong secondary panicles and narrow leaves, has a distinctly different facies from its near relative, *C. Rafflesiana* Boott.

The Java and Lombok specimens, which represent *C. pentacarpa* Boeck., may be better placed under some part of *C. Rafflesiana*, as was done, with some doubt, by Kiikenthal in the "Pflanzenreich," but they are not at all easy to classify. Their glumes and utricles are lighter and less reddish, and, because of the considerable doubt about their true affinity, they have not been included in the above description.

## 28. CAREX CONTINUA C. B. Clarke

*Carex continua* C. B. Clarke in Hook, f., Fl. Brit. Ind. 6: 717: 1894; C. B. Clarke, 11; Kiikenth., 281. — India, *Wallich, C.B. Clarke*.

*Carex Rafflesiana* Boott var. *continua* (C. B. Clarke) Kiikenth. in Philipp. Journ. Sci. C. Bot. 6: 60: 1911; in Engl. Bot. Jahrb. 59: 59: 1924; in Bull. Jard. Bot. Buitenz. sér. 3, 16: 315: 1940; Merrill, Enum. Philipp. Fl. Pl. 1: 141: 1923.

Loosely tufted. *Rhizome* very short. *Stems* erect, trigonous, angles obtuse, faces flattish to shallowly concave, 35—62 cm tall, 1—2.75 mm thick near the base, smooth, including the lower part of the rhachis, surrounded, below the leaves, by palish to blackish-red leaf-sheaths or their fibrous remains. *Leaves* basal, and 1 higher on the stem, long, most of them much exceeding the stems, 2—8(—10) mm wide, flat or flattish, apices longly to very longly attenuated; *sheaths* short, often blackish-red at the concave mouth and sometimes down the front. *Inflorescence* a compound, interrupted panicle, occupying the upper 13—25 cm of the stem; *secondary panicles* 5—9, single, or middle ones rarely binate, at 5—7 nodes, erect or suberect, oblong or pyramidal-oblong, 2—7 cm long, 1—4.5 cm broad, upper subapproximate, on rather shortly to scarcely exerted peduncles, lower rather distant, on shortly to longly exerted peduncles, upper branches simple spikes, middle and lower ones again branched into 3—8 simple spikes, rather lax, branches and spikes becoming



patulous to patent; *peduncles* more or less trigonous, wiry, slender, smooth, or scabrid on the angles above. *Rhachis* at the apex and of the secondary panicles sparsely hispidulous on the angles below, usually densely hispidulous above. *Bracts* foliaceous, exceeding to much exceeding the apex of the stem, upper very shortly to shortly sheathing, lower rather longly to longly sheathing; *sheaths* of the lower leaves glabrous, mouth, or sometimes the whole front including the node, sometimes blackish-red, sometimes pale, upper often minutely hispidulous, especially near the concave mouth. *Spikes* numerous, androgynaeceous, 4—9 mm long, subdense-flowered, sessile, male and female parts about equal in length. *Bracteoles* glumiform, widely ovate to squarish, about 1 mm in diameter, hispidulous, awn straight to curved, 3—5 mm long. *Cladophylls* utriculiform, strongly nerved. *Female glumes* widely ovate, cymbiform, apex obtuse to very obtuse, 1.25—2 mm long, 1—1.2 mm wide, usually glabrous but sometimes minutely hispidulous towards the apex, light castaneous with darker streaks, margins narrowly to widely whitish-hyaline, and becoming erose, towards the apex, slenderly nervose, midrib slender, scarcely to excurrent in a smooth to minutely hispidulous-margined awn up to 0.75 mm long. *Utricles* narrowly ellipsoid, ellipsoid-obovoid, cuneate-obovoid, or oblong-obovoid, distinctly trigonous, faces flattish, 3—3.5 mm long, 0.8—1 mm broad, membranaceous, ventrally 4—6-nerved, dorsally 6—10-nerved, narrowly marginate, glabrous below, and over the centre of the dorsal face, otherwise rather sparsely hispidulous, or hispidulous only along several nerves above, somewhat reflexed or recurved or, less often, straight or obliquely bent at the apex, becoming patulous to subpatent, light grey-green, or stramineous below, and reddish spots or flushes or light reddish-brown above, base spongy-thickened, giving a cuneate shape to the lower part of an otherwise ellipsoid utricule, scarcely or pale bulbously and very shortly stipitate, subgradually beaked; *beak* gradually tapering, trigonous or compressed, about 1 mm long, narrowly marginate, hispidulous-margined, often narrowly dorsally grooved, bidentate; *mouth* scarcely oblique; *teeth* 0.2—0.4 mm long, straight to slightly converging, apices often whitish-hyaline. *Achene* ellipsoid, trigonous, angles prominent, faces flattish to concave, 1.75—2.25 mm long, 0.8—1 mm broad, straight or slightly curved, light to very dark brown, angles sometimes rather pale, stipe about 0.3 mm, beak up to 0.2 mm long; *beak* bent or straight. *Style* rather slender, subtrigonous and sometimes thickened towards the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Arayat, June 1896, *Loher* 707, 707B (K) !; Susongdalaga-Rosobow-Morong, 25 March 1893, *Loher* 708 (K) !; Naguliang, 1420 m, 5 Nov. 1893, *Loher* 709, 710 (K) ! Ilocos Norte; Mt. Nagapatan, Aug. 1918, *Ramos* (*Bur. Sci.* 33,143) (S) ! Nueva Viscaya; near Dupax, March—April 1912, *McGregor* (*Bur. Sci.* 14,247) (BM, K, L) ! Benguet; Baguio, loose tufts among rocks in shady ravines, March 1904, *Elmer* 6089 (K) !; *ibid.*, Baguio 14 May 1904, *R. S. Williams* 1241 (K) ! Bataan; Lamao R., March 1905, *Whitford* 1121, 1145 (K) !; *ibid.*, Lamao R., Mt. Mariveles, exposed ridges, 1300 m, rain-forest, Oct. 1903, *Merrill* 3197 (BM, K) !; *ibid.*, banks of river canon, 510 m, common, May 1904, *Whitford* 189 (B, K) !; *ibid.*, Mt. Mariveles,

Nov., 1904, *Elmer* 6985 (K) ! Rizal; Montalban, Batoy, 18 April 1905, *Loher* 7146 (K) !; *ibid.*, Angilog, 1200 m, March 1906, *Loher* 7152 (K) !; *ibid.*, Mt. Susong-Dalaga, Aug. 1917, *Ramos & Endano* (*Bur. Sci.* 29,388) (B, BM) ! Tayatas; March 1911, *Foxworthy & Ramos* (*Bur. Sci.* 13,168) (BM, K) ! Laguna; 5—11 March 1908, *C. B. Robinson* (*Bur. Sci.* 6076) (B) !; *ibid.*, San Antonio, June 1912, *Ramos* (*Bur. Sci.* 15,141) (BM, K) ! Batangas; July—Aug. 1914, *Ramos* (*Bur. Sci.* 22,411) (K) ! — Mindanao: Davao; Todaya (Mt. Apo), May 1909, *Elmer* 10,728 (B, BM, K, L) !

"On ridges in and near the mossy forest."—Merrill (*l.e.* p. 141).

MOLUCCAS: Ternate; North Foramadiah, forest, ± 1400 m, 11 March 1921, *Beguín* 1510 (B, L) !

India, Upper Burma, China.

Malaysian specimens of this species often have paler, greener, utricles, which are more abruptly beaked, than those of the Asiatic mainland, but they do not seem to me to differ sufficiently to be treated as a distinct species.

There is no doubt in my mind about the distinctness of this plant from *C. Rafflesiana*, and it seems to be, with *C. timorensis*, the end of the series formed by *C. Rafflesiana*, *C. gembolensis*, and *C. oblonga*.

#### 29. CAREX TIMORENSIS (C. B. Clarke) Nelmes

*Carex timorensis* (C. B. Clarke) Nelmes in *Kew Bull.* 1946: 24: 1946.

*Carex gembolensis* C. B. Clarke var. *timorensis* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37: 10: 1904. — Timor, Newton.

Tufted. *Rhizome* short, woody. *Stems* erect, trigonous, angles obtuse, faces flattish, 50—80 cm tall, slender (1—2 mm thick below) stiffish, smooth except on the rhachis above where the angles are scaberulous below the secondary panicles, surrounded, below the leaves, by fibrous remains of old leaf-sheaths. *Leaves* mainly basal but 2—3 spaced on the stem above, long but probably shorter than the stems, 3—8 mm wide, mostly flat of flattish, whole surface minutely punctulate, slightly septate-nodulose in places, apex longly attenuated, base longly sheathing; *sheaths* often brown and membranous at the mouth. *Inflorescence* a compound, much interrupted panicle, occupying the upper 13—20 cm of the stem; *secondary panicles* about 4, single, erect to patulous, narrowly pyramidal to more or less oblong, 2—5.5 cm long, 1—2 cm wide, distant to remote from one another, very lax, lower branches usually again branched into 2—6 simple spikes, upper branches simple spikes, branches and spikes subpatent to more than patently reflexed, upper on scarcely, lower on longly or very longly, exerted peduncles; *peduncles* more or less trigonous, slender, wiry, smooth below, hispidulous above. *Rhachis* of the secondary panicles and branches hispidulous. *Bracts* foliaceous, shorter than to exceeding the inflorescence, upper shortly to rather longly, lower longly to very longly, sheathing; *sheaths* similar to those of the stem leaves, but upper hispidulous at the mouth. *Spikes* subnumerous, androgynaeceous, 5—11 mm long, sublax-and (female) few-flowered, sessile,

male part equal to or longer than the female part. *Bractioles* glumiform, small, hispidulous, awn long, straight or curved. *Cladophylls* utriculiform below, subglumiform above. *Female glumes* ovate or oblong-ovate, shortly acuminate, base thickened and incurved, cymbiform above, apex obtuse to very obtuse, 2—2.25(—2.5) mm long, 1.5—1.75 mm wide, translucent, usually glabrous, sometimes minutely hispidulous towards the apex, pale reddish with darker reddish lines and streaks, margins often whitish-erose round the apex, otherwise slenderly nervose, midrib slender but much stronger than the other nerves, usually not extending beyond the apex, sometimes shortly excurrent in a smooth or minutely ciliolate-hispidulous mucro or awn. *Utricles* cuneate-obovoid or oblong-obovoid, trigonous, 3—4 mm long, 0.9—1 mm broad, coriaceous, pluri- or multinerved, narrowly marginate, glabrous below or at the base, more or less densely subadpressed white-setulose above, straightish to recurved or obliquely curved or curved-bent at the apex, becoming patulous, stramineous, sometimes reddish or reddish-flecked above, base spongy-thickened but scarcely or very shortly stipitate, subgradually or subabruptly narrowing into a beak above; *beak* trigonous or plano-convex, slightly or scarcely tapering, 1—1.75 mm long, narrowly marginate, densely whitish-setulose, palish to reddish, bidentate; *mouth* somewhat dorsally oblique; *teeth* about 0.25 mm long, straightish, reddish. *Achene* ellipsoid or oblong-ellipsoid, trigonous, angles prominent, faces flat or shallowly concave, 1.75—2 mm long, 0.8—0.9 mm broad, straight or very slightly curved, stramineous, becoming dark- or blackish-brown, stoutly and pale, 0.25—0.3 mm long, stipitate, scarcely to very shortly, stoutly, pale beaked. *Style* not or scarcely thickened towards the base. *Stigmas* 3.

LESSER SUNDA ISLANDS: Timor; (H)ermera, 1080 m, wet places on river banks, reed, at Kew in July 1897, Newton (K) !

Endemic.

This plant is included under *C. vesiculosa* Boott by Kükenthal (*in Engl. Pflanzenr.* IV, 20: 283: 1909).

Known only from the type specimens, which are poor and not mature.

### 30. CAREX SATURATA C. B. Clarke

*Carex saturata* C. B. Clarke *in Journ. Linn. Soc. Bot.* 37: 12: 1904. — Borneo, Haviland 1402

*Carex filicina* Nees var. *hirta* O. Ktze, *Rev. Gen.* 2: 748: 1891. — Java, O. Kuntze.

*Carex filicina* Nees var. *saturata* (C. B. Clarke) Kükenth. *in Engl. Pflanzenr.* IV, 20: 1909 (treated by Kükenthal as forma *saturata* *in Philipp. Journ. Sci. Bot. C.* 6: 59: 1911).

Loosely tufted. *Rhizome* short, scarcely creeping, stout, woody, clothed with blackish-red or fuscous sheathing scales, or their fibrous remains. *Stems* erect to oblique, trigonous, angles acute to obtuse, faces often shallowly concave, 40—120 cm tall, 2—3 mm thick below, ribbed, smooth up to the rhachis, stiff, surrounded, below the leaves, by a few strongly

nerved, reddish, blackish-red, or vinaceous cataphylls, entire to semi-fibrous. *Leaves* subbasal, crowded, and about 2, spaced higher on the stem, mostly long but exceeded by the stems, 5—12 mm wide, flat or flattish, thinnish but stiffish, or thicker and subcoriaceous, sometimes slenderly septate-nodulose in places, especially below, rough on nerves on the upper surface towards the longly attenuated apices, longly sheathing; *sheaths* of the lower leaves often reddish, vinaceous, or reddish veined, the membranous fronts readily fraying into thin fibres, mouth concave, often brownish. *Inflorescence* a compound, interrupted panicle, occupying the upper 13—45(—57) cm of the stem; *secondary panicles* erect to subpatulous, 7—10 at about 6 nodes, single and some of the middle and possibly upper ones binate, more or less lanceolate, 3—8 cm long, 2—5 cm broad, upper at approximate nodes, forming a continuous inflorescence, lower distant and subfastigate, to very distant from one another, dense to very dense, lower branches again branched into 2—10 simple (rarely again branched) spikes, upper branches simple spikes, suberect to patulous, upper subsessile or on scarcely or very shortly, lower on longly or very longly exerted peduncles; *peduncles* trigonous, slender, wiry, smooth below, hispidulous above. *Rhachis* smooth below, hispidulous above and on the secondary panicles and branches, mainly on the angles. *Bracts* foliaceous, exceeding their secondary panicles but mostly shorter than the main apex, upper much reduced, slightly exceeding or exceeded by the apex of the main inflorescence, lower longly or very longly, upper scarcely to shortly, sheathing; *sheaths* of the upper panicles hispidulous at the mouth. *Spikes* numerous, androgynaceous, 7—15 mm long, subdense-flowered, sessile, male and female parts about equal in length. *Bractioles* glumiform, usually oblong or oblong-ovate, apex very obtuse, 2—3 mm long, setulose in places, especially towards the apex, midrib excurrent in an awn 1—8 mm long, straight or straightish when short, often curved or flexuous when long. *Cladophylls* utriculiform, glabrous, and palish to reddish below, glumiform and setulose in places above. *Female glumes* ovate-lanceolate to triangular-lanceolate, deeply cymbiform to subconduplicate below, cymbiform with often involute margins above, apex subacute to very obtuse, 3—4.5 mm long, 1.5—2 mm wide, subtranslucent, thickened below, glabrous, reddish-ferruginous, margins whitish-hyaline, narrowly below widely above, soon becoming erose round the apex, otherwise very slenderly pluri- or multinerved, midrib pale, glabrous below, sparsely hispidulous towards the apex, from considerably failing to extend to the apex to excurrent, from a point up to 0.5 mm below the apex, in a hispidulous mucro or awn up to about 1 mm long. *Utricles* ellipsoid to obovoid and tapering below, trigonous, 4—5 mm long, 0.75—1 mm broad, submembranaceous, pluri- or multinerved, scarcely marginate (margins displaced), glabrous, nitidous, straight to subrecurved, subpatulous to patent, dark ferruginous-red or sometimes stramineous with reddish patches below, very shortly and spongy-bulbous stipitate, subabruptly beaked above; *beak* scarcely tapering, biconvex, 2—2.5 mm long, narrowly marginate, very sparsely hispid on the greenish margins, dark reddish, bidentulate; *mouth* very dorsally oblique; *teeth* short, soon erose-subentire.

*Achene* ellipsoid, trigonous, about 2.25 mm long, about 1 mm broad, stramineous, base abruptly contracted into a stout, straight or bent stipe, 0.2–0.4 mm long, apex abruptly contracted into a stout, straight beak, 0.2–0.25 long, apex of beak slightly thickened. *Style* slightly thickened towards the base. *Stigmas* 3.

BORNEO: British North Borneo; Mt. Kinabalu, 3150 m, reed, at Kew in Aug. 1892, *Haviland 11+09* (K) !; *ibid.*, above Pakapaka, under vegetation, 3000–3300 m, Feb. 1910, *Gibbs 1+193* (K) !; *ibid.*, Paka Cave, 12–14 Nov. 1915, *Clemens 10,587A* (B, K) !; *ibid.*, Kamburangah, open seepage 2400 m, 8 Jan. 1932, *Clemens s.n.* (BM) !; *ibid.*, Paka, 3000 m, trail, 26 March 1932, *Clemens 29,007* (B, K, L) !; *ibid.*, Colombon river basin, base of great wall, 1500–2700 m, 30 June 1933, *Cleniens s.n.* (B) !; *ibid.*, Upper Kinabalu, Gurulau spur, south slope, rocky place, 2400 m, 14 Dec. 1933, *Clemens 51,183* (BM, K) !; *ibid.*, top of Gurulau spur, open granite, 3000 m, 18 Dec. 1933, *Clemens 50,6U = 51,1+55* (K, L) !

Endemic.

Stapf (*in* Trans. Linn. Soc. Bot, ser. 2, 4: 246: 1893) determined this Bornean plant as *C. filicina* Nees, and Kiikenthal (see above) has treated it first as a variety and later as a form of this species. Its larger and darker glumes give it such a distinctive appearance that I venture to keep it up as a full species.

### 31. CAREX PILICINA Nees

*Carex filicina* Nees *in* Wight, Contrib. Bot. Ind. 123: 1834; Boott, Illustr. 3: 105 *tt.* 311-312: 1862; Kiikenth., 274. — India, Wight.

Loosely tufted. *Rhizome* stout, woody, short, not creeping. *Stems* erect, trigonous, angles obtuse to acute, 70–160 cm tall, stout (2.5–6 mm thick near the base), ribbed, smooth, including the rhachis below. *Leaves* basal, except for several evenly spaced on the stem proper, long but probably not exceeding the stem, 0.7–2 cm wide, flat or flattish, sometimes slenderly septate-nodulose in places, longly sheathing, few lower reduced to vinaceous, reddish, or blackish-red cataphylls; *sheaths* brownish-membranous at the mouth, glabrous, lower often vinaceous, reddish, or reddish-nerved, front fraying into fibres, upper often pale yellowish towards and at the nodes. *Inflorescence* a compound, continuous or interrupted panicle, occupying the upper 15–60 cm of the stem; *secondary panicles* 5–13, single; and (middle ones) binate, at 4–8 nodes, lanceolate, oblong-lanceolate, or pyramidal, 4–12 cm long, 2–5.5 cm broad, dense to sublax, few or many lower branches again (or twice) branched into 2–7 simple spikes, upper unbranched (simple) spikes, branches and spikes patulous to patent, upper at subapproximate or distant nodes, lower distant or remote, upper sessile or on shortly, lower on shortly to very longly, unequally exerted peduncles; *peduncles* slender, why, lower smooth below, otherwise hispidulous, especially on the angles. *Rhachis* smooth below, hispidulous above and on the rhachis of the secondary panicles. *Bracts* foliaceous, lower mostly shorter but some equalling or slightly

exceeding the inflorescence, all longer than their own panicles, longly to very longly sheathing, upper much reduced; *sheaths* as those of upper leaves. *Spikes* numerous, androgynaeceous, 4–15 mm long, subdense- to lax-flowered, sessile male part slightly shorter than to about equalling the female part in the shorter but shorter to much shorter in the longer spikes. *Bracteoles* glumiform, squarish-ovate, 1–1.5 mm long, hispidulous above, especially towards the very obtuse apex, midrib excurrent in a short and straight, or long and curved or flexuous, hispidulous awn. *Female glumes* ovate to lanceolate, acuminate, shallowly cymbiform, apex usually obtuse but sometimes acute, 1.5(lower)–2(upper) mm long, 0.6(lower)–1.4(upper) mm wide, light reddish, sometimes flecked darker red, to ferruginous, margins not whitish-hyaline, subtranslucent, lower glabrescent to hispidulous, upper glabrous to glabrescent, scarcely visibly nervose, midrib slender, sometimes pale, not mucronate; *male glumes* larger, glabrous, brighter red. *Utricles* ellipsoid, trigonous, 3–5 mm long, 0.6–1 mm broad, membranaceous, conspicuously nerved on each of the three faces, glabrous, patulous to patent, not or scarcely marginate, straightish to recurved, pale green to stramineous, often with reddish patches, somewhat spongy-thickened at the base, scarcely to very shortly stipitate, subabruptly beaked at the apex; *beak* subterete, 1.5–2 mm long, scarcely marginate, scarcely to slightly narrowing upwards, slender, glabrous, rarely very sparsely hispidulous-margined, reddish; *mouth* very, oblique, base dorsally about 0.5 mm from the apex. *Achene* ellipsoid, trigonous, 1.5–1.75 mm long, 0.7–0.8 mm broad, scarcely or shortly, sometimes bent, beaked and stipitate; *beak* slightly thickened at the apex. *Style* slightly thickened towards the base. *Stigmas* 3.

SUMATRA: West Coast; Ophir District, north-west slope of Mt. Ophir (G. Talakmau), forest, frequent, 1700 m, 13 May 1917, *Biinnemeijer 701+a* (L) !; Mt. Singalang, secondary forest, 1700m, 26 May 1918, *Biinnemeijer 2600'* (B) !; *ibid.*, forest, ± 1800 m, 28 May 1918, *Biinnemeijer 2734* (L) !; *ibid.*, forest, common, ± 2600 m, 1 June 1918, *Biinnemeijer 281+7* (B, L, S) !; Mt. Marapi, forest, ± 1800 m, 14 Sept. 1918, *Biinnemeijer 1+603* (B, L) !; Mt. Korinchi [G. Kerintji], 2920 m, *Robinson & Kloss 18* (BM) !; *ibid.*, Sungai Kumbang, 1350m, 1 April 1914, *Robinson & Kloss 1+1* (BM, K) !; *ibid.*, 2190 m, 24 April 1914, *Robinson & Kloss 59* (BM, K) !; *ibid.*, by river in forest, ± 2200 m, 7 April 1920, *Biinnemeijer 9238* (B, L) !; *ibid.*, by lake in forest, ± 2020 m, 15 April 1920, *Biinnemeijer 9473* (B, K, L, S) !; *ibid.*, ± 2200 m, 21 April 1920, *Biinnemeijer 9679* (B) !; *ibid.*, ± 2500 m, 29 April 1920, *Biinnemeijer 9821* (B, L) !; *ibid.*, river-side in forest, 1900 m, 9 April 1920, *Biinnemeijer 9325* (B) !; *ibid.*, 19 April 1920, *Biinnemeijer 9619* (B) !; *ibid.*, 2500 m, 2 May 1920, *Biinnemeijer 9953* (B) !; *ibid.*, between primitive forest and open area, common, 2500–2800 m, Feb. 1934, *Stoutjesdijk 5* (B) !

India, China, Japan.

*C. filicina* is a difficult species to deal with in Malaysia. These Sumatran plants, though exhibiting a rather different facies from the Indian ones, do not seem capable of being separated morphologically. The Philippine and other gatherings, which follow, seem still further removed from

the species and I have ventured to treat them as variety *angustifolia*. This is a distinctly more slender plant.

Var. *ANGUSTIFOLIA* Nelmes.

*Carex filicina* Nees var. *angustifolia* Nelmes in Kew Bull. 1950: 194: 1950. — Philippine Islands, Merrill *s.n.*

*Leaves* 2—10 mm wide. *Secondary panicles* 2.5—9 mm long, 1—5 cm broad.

SUMATRA: Atjeh; Gajo Lands, Putjuk Angasan, mountain ridge, undergrowth, ± 2600 m, 28 Jan. 1937, *van Steenis* 8369 (B) !; *ibid.*, Goh Lembuh, summit, ± 3000 m, stream-side in mossy forest, 21—22 Feb. 1937, *van Steenis* 9137 (B, K) !

PHILIPPINE ISLANDS: Luzon; Benguet; Pauai, mossy forest, 2200 m, Oct.—Nov. 1905, *Merrill* 4743 (K) !; Mt. Pulogloco, Sept. 1921, *Ramos & Edano* (*Bur. Soi.* 40,371) (B, ex Herb. Kew.) !; Mt. Pulog, Feb.—March 1925, *Ramos & Edano* (*Bur. Sci.* 44,922) (L) ! Bontoc; Mt. Polis, Feb. 1920, *Ramos & Edano* (*Bur. Sci.* 37,682) (B, BM, L) ! Lepanto, Mt. Data and vicinity, Jan. 1928, *Clemens* 17,776 (B, ex Herb. Kew.) !; *ibid.*, Mt. Data, mossy forest, ± 2250 m, Nov. 1905, *Merrill* 4513 (K) !; *ibid.*, Mt. Sinapsapan, Oct. 1921, *Ramos & Edano* (*Bur. Sci.* 40,530) (B, ex Herb. Kew.) ! Rizal; Sept. 1915, *Ramos* (*Bur. Sci.* 23,855 (BM, K) ! Laguna; Mt. Banajao, summit, 2250 m, 7 Feb. 1906, *Loher* 7155, 7156, 7162 (all K) !; *ibid.*, Feb. 1911, *Merrill* 7496 (BM, K, L) !; *ibid.*, Jan. 1913, *Ramos* (*Bur. Sci.* 19,559) (BM, L) ! Tayabas; Mt. Banahao, 2200 m, 22 June 1904, *Klemme* (*For. Bur.* 866) (K) !; *ibid.*, Oct. 1904, *Whitford* 949 (K) ! — Negros; Caulaon Volcano, wet open places and on bushy slopes, ± 1800 m, April 1910, *Merrill* (K, L) ! — Mindanao; Davao, Todaya, Mt. Apo, Aug. 1909, *Elmer* 11,554 (BM, K, L) !; Zamboanga, Nov.—Dec. 1911, *Merrill* 8208 (BM, K, L) !; Bukidnon, Mt. Lipa, June—July 1920, *Ramos & Edano* (*Bur. Sci.* 38,567) (B) !

Merrill (*Enum. Philipp. Fl. Pl.* 1: 138: 1923) cites several other gatherings [under var. *ceylanica* (Boeck.) Kükenth.].

CELEBES: South-West Celebes; Peak of Bonthain [Mt. Lompobatang], forest, 2200 m, 6 June 1921, *Binnemeijer* 11,858 (B) !; Mt. Asumtatumpang, 2500 m, July 1936, *Toxopeus* 11 (B) !; Enrekang, Mt. Pokapindjang—Tinabang, 2800—3000 m, 16 June 1937, *Eyma* 651 (B, K) !

NEW GUINEA: Netherlands New Guinea; New Guinea Exped. 1912—13, peaty ground, primitive forest, swamp, 1700 m, Hellwig Mts., 15 Dec. 1912, *Pulle* 699 (B, K) !; Wissel Lake region, Odero, 1750—1850 m, 20 March 1939, *Eyrda* 7453 (B) !—This placing is doubtful for Eyma's poor specimen.

Kiikenthal (*in* Philipp. Journ. Sci. C. Bot. 6: 59: 1911; *in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 315: 1940) has determined this plant as *C. filicina* Nees var. *ceylanica* (Boeck.) Kükenth. and *C. ceylanica* Boeck., respectively. In my opinion, *C. ceylanica* Boeck. is a species distinct from *C. filicina* Nees and endemic to Ceylon.

Var. *ZIPELII* Nelmes

*Carex filicina* Nees var. *Zipelii* Nelmes in Kew Bull. 1950: 194: 1950. — Ex Herb. *Zipelius*.

*Leaves* 6—8 mm wide. *Secondary panicles* single, 1.5—3 cm long, 1.5—1.75 cm broad. *Female glumes* ovate-triangular or triangular, aristate; *awn* 0.25—0.75 mm long. *Utricles* 4—4.5 mm long, 0.9 mm broad, strongly nerved, recurved; *beak* about 2 mm long. *Achene* about 2 mm long.

NEW GUINEA: Netherlands New Guinea; 18 km north-east of Lake Habbema, occasional clumps on open banks of Bele R., 2200 m, Nov. 1938, *Brass* 11,540 (AA) ! Utakwa Exped. to Mt. Carstensz, Camp VII—VIII, 1080—1470 m, 7—8 Jan. 1913, *Boden Kloss* (BM) !; *ibid.*, Camp Via, 930 m, 11 Jan. 1913, *Boden Kloss*, partim (BM) ! — Papua; Owen Stanley Range, near summit, 2760 m, 1889, *W. MacGregor*, partim (Melb) !; Central Division, near summit of Owen Stanley Range, 2760 m, 1889, *W. MacGregor* (Melb) !

"On rocks, ex Herb. Zippelius." (L) !

Endemic.

Ridley (*in* Trans. Linn. Soc. Bot. ser. 2, 9: 247: 1916) misidentified the Boden Kloss gatherings as *C. indica* L. var. *Milnei* Boott ex C. B. Clarke (i.e. *C. Dietrichiae* Boeck.).

This variety of *C. filicina* Nees seems to form a link between this species and *C. papuana* Nelmes, and it is not easy to decide to which of these it really belongs. Further knowledge of it may lead to its being treated as specifically distinct from both of them.

### 32. CAREX SCLERIOIDES Ridl.

*Carex sclerioides* Ridley in Trans. Linn. Soc. Bot. ser. 2, 9: 247: 1916. — Netherlands New Guinea, *Boden Kloss*.

Tufted. *Rhizome* probably short. *Stems* erect or suberect, trigonous, angles prominent, faces shallowly concave, 35—45 cm tall, 1.5—1.75 mm thick below, smooth, including the rhachis, surrounded, below the leaves, by a few reddish or blackish-brown cataphylls. *Leaves* basal and subbasal, sometimes 1 higher on the stem, much shorter than the stems, 3.5—6 mm wide, flat-plicate, thickish, rough above on the upper surface from minute protuberances, especially towards the longly attenuated apex, longly sheathing the lower part of the stem. *Inflouescence* a compound, interrupted panicle, occupying the upper 16—18 cm of the stem; *secondary panicles* 4—5, single, perhaps binate at one of the 4 nodes, ovate-pyramidal, ovate-lanceolate, or oblong, suberect, 3—4 cm long, 1.25—2 cm broad, upper approximate and subfastigate, lower distantly spaced, upper in the form of simple spikes, lower branches once or twice branched into simple spikes, upper on shortly lower on longly or very longly exerted peduncles; *peduncles* obscurely to subacutely trigonous, very slender but wiry, glabrous below, adpressed-hispidulous above. *Rhachis* of the secondary panicles and its branches comparatively thick, angles acute to winged and densely hispidulous. *Bracts* foliaceous, lower exceeding their panicles but exceeded by the stem, upper much reduced but about extending to the stem, lower rather longly upper rather shortly sheathing; *sheaths*

glabrous, nodes golden or brown, mouth scarcely membranous. *Spikes* numerous, androgynaeceous, 4—10 mm long, sublax- to lax-flowered, patulous to patent, sessile, male part shorter, usually very much shorter, than the female part. *Bracteoles* glumiform with short to long and sometimes curved awns. *Cladophylls* utriculiform below, flattened above, small. *Female glumes* ovate to ovate-triangular, flattish to deeply cymbiform or incurved, apex subobtusate or obtuse, rarely subacute, 1.2—1.8 mm long, 0.8—1 mm wide, glabrous, or sparsely hirtellous in places, reddish-castaneous, margins narrowly whitish-hyaline and erose-ciliolate towards the apex, midrib slender, not or scarcely extending to the apex, or mucronulate. *Utricles* ellipsoid or obovoid-ellipsoid, trigonous, faces flattish or slightly convex, 2.25—3 mm long, 0.5—0.75 mm broad, membranaceous, slenderly plurinerved, sometimes nerveless on the dorsal face, scarcely marginate, glabrous, smooth, recurved, patulous to subpatent, greyish or stramineous below, brownish- to blackish-red above, or almost wholly blackish-red, punctulate, base very short, spongy, stipe-like, subabruptly beaked; *beak* slightly or scarcely tapering, subterete, 1—1.3 mm long, very narrowly marginate, glabrous and smooth or sparsely hispidulous-margined, bilobed; *mouth* dorsally very oblique; *lobes* whitish-hyaline, becoming erose. *Achene* ellipsoid, distinctly trigonous, faces flattish, angles slenderly keeled, 1.25—1.3 mm long, 0.5—0.75 mm broad, becoming very dark brown, sometimes with cinereous patches, without or with a very short bent stipe and beak. *Style* not or scarcely thickened at the base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; crest of Hellwig Mts. slope, primitive forest, 2500 m, 2 Dec. 1912, *Pulle 587A* (B) !; heathy south slope of Mt. Treub, slate (schist), 2400 m, 17 Feb. 1913, *Pulle 1112A* (B) !; Utakwa Exped. to Mt. Carstensz, Camp XI—IX, 1650—2490 m, 13 Feb. 1913, *Boden Kloss* (BM, type, K) !; Camp VIII—IX, 1470—1650 m, 13 Jan. 1913, *Boden Kloss* (BM) !; Camp XI—IX, 1650—2490 m, 13 Feb. 1913, *Boden Kloss* (BM, K) !

Endemic.

This is obviously related to *C. filicina* Nees; its utricles are still smaller than the small ones of this species.

### 33. CAREX NEO-GUINEENSIS C. B. Clarke

*Carex neo-guineensis* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 12: 1904; Kükenth., 280. — Papua, *Giulianetti & English*.

f*Carex filicina* Nees var. *ciliata* O. Ktze, Rev. Gen. 2: 748: 1891. — Java, *O. Kuntze*.

*Carex neo-guineensis* var. *laxior* Kükenth. in Engl. Bot. Jahrb. 69: 262: 1938. — North-East New Guinea, various numbers cited.

Loosely tufted. *Rhizome* stout, woody. *Stems* erect or suberect, trigonous, angles acute to obtuse and prominent, faces flattish to concave, 35—145 cm tall, 2—3 mm or more thick below, smooth and glabrous, including sometimes the lower part of the rhachis, surrounded, below the leaves, by brownish to blackish-red or vinaceous cataphylls. *Leaves* basal and subbasal, and 1—few higher on the stem, shorter than the stem,

3—10 mm wide, flattish-plicate to strongly revolute, stiff or rigid, apices attenuated, firm; *sheaths* of the basal leaves brownish, reddish, or vinaceous, or reddish-nerved. *Inflorescence* a compound, interrupted, panicle, erect, or sometimes apically cernuous, occupying the upper 10—50 cm of the stem; *secondary panicles* 4—10, upper and lower single, middle ones, or nearly all, unequally binate, erect or suberect, more or less oblong, oblong-ellipsoid, or oblong-lanceolate, 2.5—9 cm long, 0.8—2 cm thick, upper approximate or subapproximate and subfastigiate, lower distant or remote from one another, usually dense, sometimes somewhat lax, upper branches simple spikes, lower often branching again into 2—7 simple spikes (or one or two lower again branched), upper sessile or on scarcely to rather longly, lower on longly or very longly, exerted peduncles; *peduncles* of the lower panicles obtusely angled or compressed and glabrous or glabrescent, of the upper ones more acutely angled and hispidulous on the angles and sometimes on the whole surface, slender, wiry. *Rhachis* of the main inflorescence obtusely trigonous and glabrous above, of the secondary panicles acutely angled and densely hispidulous. *Bracts* of the lower panicles foliaceous, longly or very longly sheathing, upper bracts much reduced, subherbaceous, or glumiform with long hispidulous awns, shortly to scarcely sheathing, exceeding or exceeded by the apex of the stem; *sheaths* glabrous, mouth and sometimes the nodes brownish. *Spikes* numerous, androgynaeceous, cylindric, 4—12 mm long, sublax-flowered, suberect to patulous, sessile or subsessile, female part equalling or longer, sometimes much longer, than the male part, rarely the male part longer than the female. *Bracteoles* glumiform, small, with short to long, hispidulous, usually more or less curved and/or flexuous awns. *Cladophylls* rather small and in conspicuous, utriculiform. *Female glumes* ovate, ovate-lanceolate, ovate-triangular, or triangular-lanceolate, base incurved, deeply cymbiform to flattish above, apex acute to obtuse, 1.25—2.5 mm long, 0.8—1.75 mm wide, translucent, often glabrous but sometimes sparsely hispidulous, especially near the margins and towards the apex, thickly flecked or splashed castaneous on a pale ground or wholly castaneous, margins sometimes very narrowly whitish-hyaline and becoming slightly erose-ciliolate, with a paler central stripe, finely nervose, midrib slender, sometimes not extending to the apex but often minutely hispidulously excurrent, from below the apex, in an awn up to 0.5 mm long. *Utricles* ellipsoid to oblong-ellipsoid, sometimes slightly obovoid, obtusely trigonous, dorsal angle sometimes compressed, not or slightly inflated, 3—4 mm long, 0.75—1.25 mm broad, subcoriaceous, slenderly and rather obscurely to rather strongly plurinerved, narrowly marginate, glabrous and smooth, or margins sometimes very sparsely hispidulous at the apex, straight to somewhat recurved or reflexed, patulous, castaneous to blackish red, or pale greenish to stramineous with reddish-castaneous streaks and splashes, especially above, base spongy-thickened, not stipitate, subgradually to subabruptly beaked at the apex; *beak* scarcely or gradually tapering, piano- or concave-convex, 1.25—2 mm long, very narrowly marginate, shortly bilobed or bidentulate; *mouth* dorsally very oblique, the base of

the aperture being 0.5—0.75 mm below the more or less acute apex, which is usually whitish-hyaline and becomes erose. *Achene* ellipsoid, or oblong-ellipsoid, trigonous, angles prominent, pale, faces flattish or concave, brown, 1—2 mm long, 0.6—1 mm broad, stoutly and very shortly stipitate; *beak* stout, very short, sometimes bent and/or twisted, apex slightly annulate-bulbous. *Style* slightly pyramidally thickened at the persistent base. *Stigmas* 3.

MALAY-PENINSULA: Pa hang; Tanah Rata clearing, Cameron Highlands, 1440 m, 23 Nov. 1925, *Henderson* (Sing. Field No. 17,941) (B, S) !; *ibid.*, 18 April 1930, *Henderson* 23,607 (B, S) !; *ibid.*, Nov. 1939—Jan. 1940, *Batten Pooll* (S) !

SUMATRA: West Coast; Mt. Korinchi [G. Kerintji], forest margin, ± 2700 m 4—9 May 1920, *Biinnemeijer* 10,039 (B, K, L) !, 10,383 (B, K, L) ! — B e n g k u l u (Bencoolen)/Palembang; Mt. Dempo, 2550 m, 1881 *Forbes* 2389 (BM, K) !; Mt. Pesagi, bare chopped summit, south-south-east of Ranau lake, 2232 m, 4 Nov. 1929, *van Steenis* 368iA, 368iB (B) !; *ibid.*, in mossy wood, ± 1800 m, 4 Nov. 1929, *van Steenis* 3701 (B) ! — Lampung; Mt. Tanggamus, 1900 m, Dec. 1934—Jan. 1935, *Lieftinck*. 3k (B) !, 35 (B) !

BORNEO: British North Borneo; Mt. Kinabalu, Kina Taki river, 2400 m, 24 Feb. 1933, *Clemens* 31,71,9 (B, BM, L) !; *ibid.*, head of Dahobang river, mossy jungle spur, open place, 2100 m, 25 March 1933, *Clemens* 32,929 (B, BM, K, L) !; *ibid.*, Marai Parai, ridge south-east of camp, 1800 m, 12 April 1933, *Clemens* 32,844 (B, BM) !; *ibid.*, Marai Parai spur, Kina Taki river margin, 1500 m, 25 April 1933, *Clemens* 32,961 (B, BM, K, L) !; *ibid.*, Marai Parai, forest near Sadikan river, 1500—1700 m, 7 May 1933, *Clemens s.n.* (BM) !; *ibid.*, Penataran river basin, on rocks in Wusser river, 900—1050 m, 16 June 1933, *Clemens* 32,573 (B, BM) !; 32,580 (B, BM, L) !; *ibid.*, 900 m, 22 July 1933, *Clemens* 34,045 (K) !; *ibid.*, Penibukan, base of wall, north of Pinokok falls, 2100 m, 27 Oct. 1933, *Clemens* 50,037 (BM) !; Masilau river, 2100 m, 25 Dec. 1933, *Clemens* 51,341 (BM) !

CELEBES: North Celebes; [Minahasa, Mt. Sopotan,] mountain range, 5 May 1895, *Koorders* 16,672*i* (L) ! — South-West Celebes; Peak of Bonthain, [Mt. Lompobatang], underwood, 2890 m, 17 June 1921, *Biinnemeijer* 12,259 (B) !; Enrekang, Mt. Rantemario, open spot, common, 3100—3400 m, 17 June 1937, *Eyma* 695 (B, K) !

NEW GUINEA: Netherlands New Guinea; Lake Habbema, with *Sphagnum* and grasses in shrubby edges of forest, 3225 m, Aug. 1938, *Brass* 9210 (AA) !; 9 km north-east of Lake Habbema, open stony bed of stream in forest, 2750 m, Oct. 1938, *Brass* 10,560 (AA) !; *ibid.*, few, mostly sterile small clumps in mossy forest, 2800 m, Oct. 1938, *Brass* 10,625 (AA) !; *ibid.*, wet bank of open stream in forest, 2650 m, Oct. 1938, *Brass* 10,882 (AA) !; *ibid.*, common on wet sandy soil of openings in forest, 2800 m, Oct. 1938, *Brass* 10,925 (A A) ! — North-East New Guinea; Kaiser-Wilhelmsland, Mt. Sarawaket, Mt. Bolan, 2400—3000 m, 1913, *Keysser* (BM) !; Morobe District, Mt. Sarawaket, near Busu river, open trails, common, 31 Jan. 1937, *Clemens* 5259 (AA) !; *ibid.*, 2400—2700 m, 8 March 1937, *Clemens* 6080 (AA) !; *ibid.*, 6 April 1937, *Clemens* 6081 (AA) !; Morobe District, Sattelberg, Sambanga, mountain trail above village bridge, 7 Sept. 1937, *Clemens* 6985B (AA) !; Ulap Trail, 6 April 1940, *Clemens* 41,141 (AA) ! — Papua; Owen Stanley Range, Mt. Victoria, 1889,

*MacGregor*, partim (Melb) !; lower regions of British New Guinea, 1894, *MacGregor* (Melb) (det. S. T. Blake) ; 1897, *Giulianetti & English* (K) !; Central Division, Mt. Albert Edward, small colony on open grassland slope, 3600 m, May—July 1933, *Brass* 4391 (B, L) !; Murray Pass, Wharton Range, common on grasslands and recently burnt areas, 2840 m, June—Sept. 1933, *Brass* 4623 (B, L) !

JAVA: Bogor (Buitenzorg) ; Mt. Salak, summit, 2130 m, 17 July 1860, ex herb. *Junghuhn* (L) !; Mt. Gadjah, Mt. Salak, savannah on peak, common, 2200 m, 7 Nov. 1920, *Bakhuizen van den Brink* 4154 (B) !; Mt. Salak, summit, among shrubs and bushes, ± 2100 m, 2 Aug. 1929, *van Steenis* 2994 (B) !; Mt. Pangerango, Alun-alun, alpine savannah and scrub, on very stony, volcanic ground, streamside, 3020 m, 7 June 1917, *Backer* 22,348 (B) !; Mt. Pangrango, 2100—2700 m, Nov. 1861, *Kurz* 1830 (L) !; chu Baram [Tjibeureum], 16 July 1894, *Hullett*, partim (mounted with specimen of *C. verticillata* Zoll. et Mor.) !; and about twenty-five other collections from these regions. — B a n j u m a s / S e m a r a n g; Dijeng Mts., Mt. Pra(h)u, 12 July 1932, *Kleinhoonte* 117 (B) ! — Kedu; Mt. Sundoro, south slope, burnt alpine area, amongst grass, ± 2800 m, 22 May 1927, *Docters van Leeuwen-Reijnvaan* 8951 (B) !; *ibid.*, savannah, 2700 m, 22 May 1927, *Docters van Leeuwen-Reijnvaan* 8957 (B, L) ! — Madiun; Mt. Lawu, summit and south-east slope, Nov. 1907, 2300—3200 m, *Elbert* 65 (L) ! — Kediri/Malang; Mt. Kawi, Tjemorokandang, ± 2600 m, damp alpine spot, 17 April 1929, *Docters van Leeuwen-Reijnvaan* 12,351 (B, K) ! — Malang; Tengger Mts., Tosari, 26 Jan. 1900, *Kobus* (B) !; Tengger Mts., 9 Aug. 1918, *Jeswiet* (B) !; near Ngadisari, 2500 m, 24 Oct. 1899, *Koorders* 37,541 *fj* (L) ! — Malang; Mt. Welirang, pass, south slope, kembars to Sumberbrantas, leafy wood, side of path, 2300m, 7 June 1935, *van Steenis* 7187 (B, K, S) ! — Besuki; Ijang Mts., Mt. Gilap, ravine, 2000 m, 20 Oct. 1913, *Backer* 9633 (B) !

*Horsfield*. (K, S) !; ex Herb. *Reinwardt?* (L) !; ex Herb. *Blume?*

The following plant may belong to this species. It is too young for me to be certain of its identification. Netherlands New Guinea: 15 km south-west of Bernhard Camp, Idenburg River, rain-forest, one clump in sandy stream-bed, 1500 m, Jan. 1939, *Brass* 12,371 (AA) !

This species is very closely related to *C. filicina* Nees, and where the variety *angustifolia* of this Indian species meets that from New Guinea, in Malaysia, it sometimes becomes difficult to distinguish between them. *C. filicina*, *sensu lato*, has a smaller utricle with a more slender beak which is more clearly oblique and bidentate at the apex.

#### 34. CAREX XESTOGYNE Nelmès

*Carex xestogyne* Nelmès in Kew Bull. 1946: 16: 1946. — Netherlands New Guinea, *Boden Kloss*.

Probably tufted. *Rhizome* woody. *Stem* erect, trigonous, angles prominent but obtuse, faces concave, 30—36 cm tall, about 1.25 mm thick below, glabrous and smooth up to the rhachis, clothed, below the leaves, by persistent, reddish-brown fibrous remains of cataphylls or leaf-sheaths. *Leaves* basal and subbasal, shorter to longer than the stem, about 3 mm

wide, conduplicate below, flattish above, upper surface rough with minute protuberances above, apices longly attenuated; *sheaths* dark reddish-brown, minutely hispidulous on the back. *Inflorescence* a compound, interrupted panicle, occupying the upper 10—20 cm of the stem; *secondary panicles* 5—7, at 4—5 nodes, the middle ones being unequally binate, erect, more or less oblong, 1.5—4 cm long, 3—10 mm broad, upper approximate, f astigiate, lower subapproximate to more distant, subf astigiate, subdense, lower branches usually again branched into several simple spikes, upper branches simple spikes, branches and spikes suberect to patulous, upper panicles on shortly to rather longly, lower on longly to very longly, exerted peduncles; *peduncles* trigonous, slender but wiry, densely hispidulous, except the lowest, which is subterete and glabrescent below. *Rhachis* glabrescent below, densely hispidulous above, as is the whole rhachis of the secondary panicles. *Bracts* foliaceous, lower and upper about extending to the apex of the stem, middle bracts exceeding it, upper scarcely to shortly lower longly sheathing; *sheaths* reddish-brown, densely and shortly hispidulous. *Spikes* numerous, androgynaeceous, 3—5 mm long, subdense-flowered, sessile, male part usually shorter than the female, inconspicuous. *Bracteoles* glumiform with long, pils sometimes curved awns. *Cladophylls* subutriculiform below, glumiform above, about 1 mm long, about 0.75 mm broad. *Female glumes* ovate, shallowly cymbiform, apex subacute to obtuse or emarginate, 1.5—1.9 mm long, about 1 mm wide, nitidous, glabrous, dark reddish-castaneous, whitish-hyaline margins above, but not or narrowly whitish-hyaline below, apex tending to become erose, plurinerved, midrib prominent and keeled, scarcely mucronate, or excurrent in a glabrescent or ciliolate-hispidulous awn up to 0.3 mm long. *Utricles* ellipsoid, compressed-trigonous, 2.5—3 mm long, about 1 mm broad, subcoriaceous, nerveless except for 1(—2) submarginal dorsal nerves, marginate, glabrous, smooth, margins sparsely ciliolate-hispidulous from about or above the middle upwards, straight to subrecurved, patulous, base, pale otherwise polished blackish-red, base spongy, not stipitate, gradually tapering above into a beak-like apical part, which is plano-convex, tapering, 0.5—0.75 mm long, broad, marginate, margins sparsely ciliolate-hispidulous, bidentulate; *mouth* ventrally oblique. *Achene* ellipsoid or obovoid-ellipsoid, trigonous, faces flattish to subconcave, 1.5 mm long, 0.75 mm broad, brown, shortly and rather stoutly stipitate and beaked. *Style* scarcely thickened at the subsistent base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Utakwa Exped. to Mt. Carstensz, 2010—3150 m, Camp X—XII, 27 Jan. 1913, *Boden Kloss* (BM)!; *ibid.*, Camp XIII—XI, Feb. 1913, *Boden Kloss* (BM, K)! — North-East New Guinea; Sambanga, scrub-border above village bridge, 1500—1800 m, 7 Sept. 1937, *Clemens* 6089 (AA)!

Endemic.

Ridley (*in Trans. Linn. Soc. Bot. ser. 2, 9: 246: 1916*) determined the Boden Kloss specimens as *C. neo-guineensis* C. B. Clarke.

Closely related to *C. neo-guineensis* C. B. Clarke, but its polished and nearly nerveless utricles, with other minor differences, make it a distinct species.

### 35. CAREX LAMPROCHLAMYS S. T. Blake.

*Carex lamprochlamys* S. T. Blake *in Journ. Arn. Arb.* 28: 104: 1947. — Papua, Brass 5323.-

Tufted. *Stems* erect, trigonous, angles acute, 75—93 cm tall, about 3 mm thick below, ribbed, smooth except the upper part of the rhachis which is densely hispidulous. *Leaves* basal, except 1 halfway up the stem, long but shorter than the stem, 7—10 mm wide, revolute, surfaces densely scabro-hispidulous from minute pale protuberances, rigid, strongly nerved; *sheaths* of the basal leaves reddish-spadiceous, densely but minutely hispidulous, of the stem leaf and bracts golden, subampliate, glabrous, 5—6 cm long. *Inflorescence* a compound, interrupted panicle, occupying the upper 46 cm of the stem; *secondary panicles* up to 12, single and binate, at 6—8 nodes, erect, oblong-ovate or oblong-lanceolate, 3—9 cm long, 1.5—3.5 cm broad, subdense, upper branches simple spikes, middle and lower ones again branched into several simple spikes, on scarcely to rather shortly exerted peduncles; *peduncles* trigonous, rigid, hispidulous, especially on the angles. *Bracts* foliaceous, lower equalling or exceeding the stem, shortly to longly sheathing, upper much reduced. *Spikes* numerous, androgynaeceous, 4—10 mm long, subdense-flowered, patent, sessile, male part about equalling the female, except in the longer spikes, where it is shorter to much shorter. *Bracteoles* glumiform, small, with short to very long and sometimes flexuous, hispidulous-margined awns. *Cladophylls* utriculiform below, glumiform above. *Female glumes* ovate, cymbiform, apex subobtuse to very obtuse, 1.3—2 mm long, about 1 mm wide, translucent, upper glabrous, lower often minutely scurfy-hispidulous in places, plurinerved, fulvous, margins often whitish-hyaline and erose, especially above, midrib, with 2 strong adjacent nerves which coalesce with it above, excurrent from just below the apex in a hispidulous awn, 0.5—1.25 mm long. *Utricles* ellipsoid or obovoid-ellipsoid, trigonous with flattish faces, 3—4 mm long, about 1 mm broad, membranaceous, 3—5-nerved on the ventral face, 2—4-nerved on each half of the angled dorsal face, nitidous, smooth, except the margins at the apex which are sometimes very sparsely scaberulous, becoming patulous to subpatent, narrowly marginate, straight to slightly recurved, light green to pale stramineous, base slightly spongy-thickened, not stipitate, subabruptly contracted into a beak at the apex; *beak* acuminate, compressed, 1—1.5 mm long, scarcely to narrowly marginate, nearly smooth to sparsely scaberulous-margined, reddish-brown above, centrally grooved down the back, bidentate; *mouth* scarcely oblique; *teeth* 0.25—0.3 mm long, straight. *Achene* ellipsoid, trigonous with prominent angles and shallowly concave faces, 1.8—2 mm long, 0.9—1 mm broad, brown with pale angles, scarcely stipitate, abruptly beaked; *beak* sometimes bent at the base, about 0.2 mm long, apex slightly enlarged or inflated-annulate. *Style* slightly thickened towards the base. *Stigmas* 3.

NEW GUINEA: Papua; Central Division; Mafulu, common erect ground plant in *Castanopsis* forest, 1250 m, Sept.—Nov. 1933, *Brass* 5323 (AA, Br) !; Boridi, young secondary forest, ± 1410 m, Sept. 1935, *Carr* 13,160 (BM, Canberra, K) !

The following plant may be *C. lamprochlamys*, but it is too young for certainty.

NEW GUINEA: Papua; Central Division, Mt. Tafa, scattered on thinly vegetated face of an old landslip, 2400 m, May—Sept. 1933, *Brass* 5088 (L) !

Endemic.

*Brass* 5323 was placed by Kiikenthal under *C. Rafflesiana* Boott var. *continua* (C. B. Clarke) Kiikenth. (*in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 315: 1940), and *Carr* 13,160 under *C. indica* L. (*in* Engl. Bot. Jahrb. 69: 262: 1938).

An interesting species which, with its variety and *C. papuana* Nelmes, forms a distinct group of New Guinea *Indocarices*.

#### Var. *DIPLOCOLEA* Nelmes

*Carex lamprochlamys* S. T. Blake var. *diplocolea* Nelmes *in* Kew Bull. 1949: 379: 1949. — Papua, *Boden Kloss*.

*Leaves* usually smooth on the upper surface except towards the apex (as is usual in the genus); *sheaths* of the stem-leaf reddish-vinaceous. *Female glumes* reddish-splashed. *Utricles* hispidulous on the margins from about or above the middle upwards, including the beak, sometimes reddish-splashed.

NEW GUINEA: Netherlands New Guinea; 4 km south-west of Bernhard Camp, Idenburg R., occasional tufts on open banks of rain-forest stream, 850 m, March 1939, *Brass* 13,211 (AA) !, 13,722 (AA) !; Utakwa Exped. to Mt. Carstensz, Camp Via, 930 m, 5 & 9 Jan. 1913, *Boden Kloss* (BM, K) !; *ibid.*, 11 Jan. 1913, *Boden Kloss*, partim (BM) !

Endemic.

Mayr 135, 163, Netherlands New Guinea, Arfak Mountains, 1200—1500 m, 7—8 June 1928 (B) ! may belong here, but the material is too poor for certain determination.

Ridley (*in* Trans. Linn. Soc. Bot. ser. 2, 9: 247: 1916) misidentified the *Boden Kloss* gatherings as *C. indica* L. var. *Milnei* Boott ex C. B. Clarke (i.e. *C. Dietrichiae* Boeck.), and S. T. Blake determined the *Brass* numbers (*in* Journ. Arn. Arb. 28: 105: 1947) as *C. continua* C. B. Clarke, a species which, as I think, has not so far been seen from New Guinea.

This plant appears to be varietally distinct from *C. lamprochlamys* but the limits of the members of this group are not yet clearly defined.

#### 36. CAREX PAPUANA Nelmes

*Carex papuana* Nelmes *in* Kew Bull. 1949: 379: 1949. — Papua, *Brass* 5007.

Tufted. *Stem* trigonous, angles subacute, 64—76 cm tall, ribbed and striate, smooth except the upper part of the rhachis where the whole

surface is hispidulous. *Leaves* basal and subbasal, except sometimes 1 situated about 20 cm from the base, long but shorter than the stem, 3—6 mm wide, revolute, surfaces densely scabro-hispidulous from minute pale protuberances, rigid, ribbed, especially on the under-surface; *sheaths* dark reddish vinaceous, densely minutely hispidulous, fraying into fibres. *In-florescence* a compound, interrupted panicle, occupying the upper 17—43 cm of the stem; *secondary panicles* 4—6, single, erect, oblong-ovate or oblong-lanceolate, upper subapproximate, lower distant or very distant from one another, 3—5 cm long, 2—3 cm wide, subdense, upper branches simple spikes, lower branched into several simple spikes, on shortly to longly exerted peduncles; *peduncles* trigonous or compressed, lower smooth below, otherwise hispidulous. *Rhachis* of the secondary panicles hispidulous, especially on the angles. *Bracts* foliaceous, equalling or exceeding the stem, shortly to rather longly sheathing, densely scabro-hispidulous on both surfaces above; upper bracts smaller. *Spikes* numerous, androgynaeceous, 5—12 mm long, slender, subdense-flowered, patent, sessile, male part about equalling the female, except in the longer spikes where it is shorter to much shorter. *Bracteoles* glumiform, small, with long to very long hispidulous-margined and often flexuous awns. *Cladophylls* utriculiform below, glumiform above, apex white-hyaline. *Female glumes* ovate, apex subobtusate to very obtuse, cymbiform, 1.5—2 mm long, about 1 mm wide, translucent, glabrous, multinerved, dark reddish with broad white-hyaline margins above, midrib, with 2 strong adjacent nerves which coalesce with it above, excurrent in a hispidulous awn, 0.25—1 mm long. *Utricles* ellipsoid, trigonous, faces flattish, all about 4 mm long, about 1 mm broad, submembranaceous, 3—6-nerved on the ventral face, strongly 3—4-nerved on each half of the angled dorsal face, nitidous, glabrous, smooth except above or at the apex, where the margins are sometimes sparsely or very sparsely vitreous-hispidulous, narrowly marginate, straight or slightly recurved, becoming patulous to subpatent, stramineous-green, sometimes splashed reddish, base slightly spongy, not stipitate, subgradually narrowed into a beak at the apex; *beak* tapering, compressed to plano-convex, 1.5—2 mm long, narrowly marginate, very sparsely to subdensely vitreous-hispidulous-margined, usually reddish except the margins, centrally grooved down the back, bidentate; *mouth* scarcely oblique; *teeth* 0.2—0.3 mm long, straight. *Achene* ellipsoid, trigonous with prominent angles and flattish to shallowly concave faces, 2 mm long, about 1 mm broad, brown with pale angles, abruptly beaked; *beak* slightly bent, about 0.2 mm long, apex scarcely enlarged. *Style* slightly thickened towards the base. *Stigmas* 3.

NEW GUINEA: Papua; Central Division; Mt. Tafa, plentiful on roadside in forest, 2400 m, May—Sept., 1933, *Brass* 4842 (L) !; Mt. Tafa, common roadside species, also found occasionally on forest floor, 2400 m, May—Sept. 1933, *Brass* 5007 (AA, K) !; Mafulu, common erect ground plant in *Castanopsis* forest, 1250 m, Sept.—Nov. 1933, *Brass* 5323 (B) !

The following plant may be a form or a variety of *C. papuana*, but it is too immature for certainty.



NEW GUINEA: Netherlands New Guinea; Bele R., 18 km north-east of Lake Habbema, Fagaceae forest, common in moist hollows, clumps 50 cm high, 2300 m, Nov. 1938, *Brass* 11,2,25 (AA) !

Brass 5007, which is the type of *C. papuana*, was misidentified by Kükenthal (*in* Bull. Jard. Bot. Buitenz. sér. 3, 16: 315: 1940) as *C. Raffle-siana* Boott var. *continua* (C. B. Clarke) Kiikenth. and by Blake (*in* Journ. Arn. Arb. 28: 104: 1947) as *C. continua* C. B. Clarke.

*C. papuana* is a near neighbour of *C. lamprochlamys* but, as at present known, with much narrower leaves and differently coloured glumes, and utricles, it seems to be specifically distinct.

### 37. CAREX SARAWAKETENSIS Kiikenth.

*Carex sarawaketensis* Kiikenth. *in* Engl. Bot. Jahrb. 69: 262: 1938. — North-East New Guinea, *Clemens* 5546.

*Carex melanophora* S. T. Blake *in* Journ. Arn. Arb. 28: 106: 1947. — Netherlands New Guinea, *Brass & Meyer Drees* 9828.

Tufted. *Rhizome* elongated, usually curved, 1.5—2.5 mm thick, clothed with blackish-red sheathing scales, which become frayed into persistent fibres, woody. *Stems* erect to somewhat curved, obtusely trigonous, ribbed and striate, 3—50 cm tall, 0.5—1 mm thick below, smooth up to the rhachis, below the lower nodes of which, and on its upper part, as well as on the secondary panicles, the angles, and sometimes the faces, are hispidulous, surrounded, below the leaves, by reddish-black cataphylls which, with old leaf-bases, fray into persistent, herring-bone fibres. *Leaves* basal-and sometimes 1 higher on the stem, straight to recurved, much shorter than the stems on the taller plants, some exceeding the stems on the shorter plants, 1.5—5 mm wide, flattish to revolute on the margins, stiff to rigid, apices attenuated, firm, sometimes subcircinnate; *sheaths* dull reddish-brown, tending to fray into fibres. *Inflorescence* a narrow, compound, interrupted panicle, occupying the upper 2—20(—30) cm of the stem; *secondary panicles* 3—14, single and binate, at 2—8 nodes, more or less oblong, oblong-lanceolate, or oblong-pyramidal, 1—5 cm long, 5—20 mm thick, upper approximate or subapproximate, lower usually rather distant to distant, dense, lower branches usually each composed of 2—3 simple spikes, middle and upper branches in the form of simple spikes, branches and spikes suberect to patulous, upper panicles on scarcely to very shortly, lower on shortly or longly, exerted peduncles; *peduncles* compressed or trigonous, slender, usually glabrous below, minutely hispidulous above, sometimes becoming flexuous. *Bracts* of the lower panicles foliaceous, upper much reduced, setaceous, longer than their own panicles, and sometimes longer than the stem, but usually not exceeding or even reaching the apex, lower shortly to longly upper very shortly sheathing; *sheaths* often blackish-red at the nodes and mouth, minutely hispidulous, or lower glabrous or glabrescent. *Spikes* rather numerous, ancirogynae-

ceous, 4—10 mm long, subdense-flowered, densely congested, sessile, male part usually about equalling but sometimes shorter than the female part, *Bracteoles* glumiform, more or less minutely hispidulous, with long, pale, conspicuous, sometimes curved, hispidulous-margined awns. *Cladophylls* very small (about 1 mm long), subutriculiform. *Female glumes* ovate to ovate-lanceolate, cymbiform, apex acute to obtuse, 1.75—3 mm long, 1.25—1.75 mm wide, nitidous, glabrous except that the lower ones are sometimes sparsely and minutely hispidulous, dark reddish with sometimes blackish red patches, margins whitish-hyaline, narrowly so below, widely above especially at the apex, plurinerved, midrib keeled, sometimes excurrent, from just below the apex, in a pale or reddish, glabrous or sparsely hispidulous, awn, up to 0.75 mm long. *Utricles* ellipsoid, trigonous, 2.75—4.5 mm long, 0.9—1.2 mm broad, membranaceous, ventrally nerveless or few-nerved, dorsally rather strongly strongly few-nerved, narrowly marginate below rather widely above, glabrous at the base of the ventral and up over the centre of the dorsal face, otherwise subadpressed-hispidulous, vitreous-hispidulous on the margins above the base, straight to very slightly incurved, becoming patulous, red or blackish-red, often with stramineous patches and base, base spongy, not stipitate, subgradually narrowing into the beak; *beak* slightly tapering, subterete to plano-convex, often narrowly centrally grooved dorsally, 1.25—1.75 mm long, stoutish, marginate, densely hispidulous-margined, bidentate; *mouth* usually slightly ventrally oblique; *teeth* lanceolate, about 0.5 mm long, straight or slightly converging, glabrous, very pale. *Achene* ellipsoid or oblong-ellipsoid, trigonous, faces usually shallowly concave, about 1.75 mm long, 0.75—1 mm broad, warm brown, stipe and beak pale, stoutish, straight or bent, varying in length up to 0.25 mm long, beak sometimes slightly enlarged at the apex. *Style* slightly or scarcely thickened at the base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Crest of Hellwig Mts., limestone rock face, 2600 m, 4 Jan. 1913, *Pulle* 910 (B, K) !; Utakwa Exped. to Mt. Carstenz, Camp VIII, 1470 m, 29 Jan. 1913, *Boden Kloss* (BM) !; Mt. Wilhelmina, 7 km north-east of summit, abundant on moist grassy cliffs, 3560 m, Sept. 1938, *Brass & Meijer Drees* 9828 (AA, Br) !; *ibid.*, north slopes, wet places in alpine grass-land, common, 3950m, Sept. 1938, *Brass & Meijer Drees* 10,046 (AA) !; *ibid.*, northern slopes, alpine grass-land, matted on a rock, 3950 m, Sept. 1938, *Brass & Meijer Drees* 10,080 (AA) ! — North-East New Guinea; Morobe District; Mt. Sarawaket, grassy rise near a pond, 2400—2700 m, March 1937, *Clemens* 5546 (AA) !; *ibid.*, Sattelberg, shelter of summit, ridges, open grassland, 2400—3000 m, 20 Oct. 1937, *Clemens* 7391 (AA, K) !; *ibid.*, 3300 m, 7—15 Oct. 1937, *Clemens* 7392 (AA, K) !; *ibid.*, Samanzing vicinity, 11 March 1939, *Clemens* 10,013 (AA, K) !

This species, with its very dark-red silvery-margined glumes, and hispidulous utricles, is a distinct member of the Malaysian *Indocarices*.  
Var. MINOR Kiikenth.

*Carex sarawaketensis* Kiikenth. var. *minor* Kiikenth. *in* Engl. Bot. Jahrb. 69: 263: 1938. — North-East New Guinea, *Clemens* 5355.

*Rhizome* 1—1.5 mm thick. *Leaves* 1—2.5 mm wide, upper surface above covered with pale, minute, rough protuberances. *Secondary panicles* 3—6, at 2—5 nodes, 1—2 cm long, 5—10 mm broad. *Spikes* 3—6 mm long. *Bracteoles* scarcely or shortly awned. *Female glumes* ovate, apex subacute to very obtuse, 1.25—1.9 mm long, 0.75—1 mm wide, relatively strongly plurinerved, midrib usually just extending to the apex, sometimes shortly excurrent. *Utricles* 2.4—2.5 mm long, 0.5—1 mm broad, scarcely marginate below, narrowly above, dark reddish; *beak* 0.5—1 mm long; *teeth* 0.2—0.4 mm long. *Achene* 1—1.3 mm long, 0.5—0.75 mm broad, angles prominent, palish as are also stipe and beak.

NEW GUINEA: North-East New Guinea; Kaiser-Wilhelmsland; Finisterre mountains, bare slopes, 1200m, *Schlechter 18,234*; *ibid.*, forests, 1250m, 13 Jan. 1909, *Schlechter 19,076* (K)!; Morobe District; Bulung R., in scrub, 865 m, 9 Feb. 1937, *Clemens 5355* (AA)!

Endemic.

I have not seen the smaller Schlechter number but venture to place it here as both were found at a similar altitude—though in different situations. Kiiikenthal (*in Engl. Bot. Jahrb.* 59: 59: 1924) determined these Schlechter plants as *C. Rafflesiana* Boott var. *continua* (C. B. Clarke) Kiiikenth.

This plant is treated here as a variety of *C. sarawaketensis*, from which, however, it has considerable deviation, and further material may prove it to be better regarded as a different species.

#### Var. GLABRINUX Ktikenth.

*Carex sarawaketensis* Ktikenth. var. *glabrinux* Ktikenth. *in Engl. Bot. Jahrb.* 70: 464: 1940. ^ North-East New Guinea, *Clemens 6082*.

*Utricles* densely punctate-papillose, glabrous except on the margins which are vitreous-hispidulous from about or above the middle of the utricle upwards or only on the beak.

CELEBES: Eastern Peninsula; stony summit of Mt. Lumut, 4 Sept. 1938, *Eyma 3601* (B)!

NEW GUINEA: North-East New Guinea; Morobe District; Mt. Sarawaket, steep and rocky mountain slopes, 2400—2700 m, March 1937, *Clemens 6082* (AA)!; *ibid.*, Sambanga, forest track, 1500—1800 m, Aug. 1937 *Clemens 6860a*; *ibid.*, above Sambanga, mountain forest on the Masak R., 1800 m, 9 Dec. 1937, *Clemens 7898b*; *ibid.*, Samazing, alpine meadows, 2400—2700 m., 8 Dec. 1938, *Clemens 9419b* (AA)!; *ibid.*, wet scrub hills, Ulap trail, 6—7 April 1940, *Clemens 41,167* (AA)!

#### Var. BREVIROSTRIS Ktikenth.

*Carex sarawaketensis* Ktikenth. var. *brevirostris* Ktikenth. *in Engl. Bot. Jahrb.* 70: 464: 1940.

"Squamae utriculique minores, hi ovati in faciebus glabri brevius et abruptius rostrati."

Six Clemens numbers, from North-East New Guinea, are cited under the above combination. I have seen only 6989, and this is, for me, my *C. xestogyne*.

#### 38. CAREX CERAMICA Nelmes

*Carex ceramica* Nelmes *in Kew Bull.* 1950: 193: 1950. — Ceram, *Stresemann 275*.

Scarcely tufted. *Rhizome* creeping, horizontal to perpendicular, rather slender but thickened by being completely clothed with large fuscous or blackish-red sheathing scales, eventually splitting into coarse fibres. *Stems* 30—50 cm or more long, erect or somewhat curved, trigonous, 1—1.25 mm thick, smooth, including the lower part of the rhachis. *Leaves* subbasal and basal, rather numerous, one or more higher on the stem, shorter than the stem, 4—6 mm wide, flattish, stiff; *sheaths* of the basal leaves reddish or blackish-red, eventually fraying into a mass of fuscous fibres which thickly clothe the base of the stem. *Inflorescence* a compound, interrupted, slender, erect to curved panicle, occupying the upper 10—20 cm of the stem; *secondary panicles* 4—5, single, erect or suberect, oblong or oblong-lanceolate, or subpyramidal, 3—7 cm long, 1—2.5 cm thick, upper approximate, slightly overlapping, lower distant from each other, subdense, all branches in the form of simple spikes or lower again branched into 2—5 simple spikes, upper branches simple, unbranched spikes, lower panicles on long exserted, upper on scarcely to shortly exserted peduncles; *peduncles* slender, acutely trigonous, sparsely to densely hispidulous, especially on the angles. *Bracts* foliaceous but upper smaller than lower, equalling or falling short of apex of inflorescence, upper shortly lower longly sheathing; *sheaths* glabrous or uppermost sparsely hispidulous, greenish or reddish in places, nodes dull yellowish. *Spikes* numerous, androgynaeceous, 6—13 mm long, subdense- to lax-flowered, sometimes female part very lax-flowered below, suberect to patulous, sessile, male part very much longer to considerably shorter than the female part. *Bracteoles* glumiform, varying from muticous to longly aristate. *Cladophylls* utriculiform below, glumiform above. *Female glumes* ovate or triangular-ovate, cymbiform, apex acute to obtuse, 1.75—3 mm long, 1.5—2 mm wide, translucent, lower sparsely to densely hispidulous in places, upper sparsely hispidulous to glabrescent, nerveless to very slenderly nervose, castaneous with narrow whitish-hyaline margins above to castaneous below and wholly thin and whitish above, midrib usually not extending up to the apex, but sometimes excurrent in a hispidulous mucro or awn up to 0.75 mm long. *Utricles* (slightly immature) ellipsoid, obtusely trigonous, sides flattish, 3.5—4 mm long, 0.8—0.9 mm broad, submembranaceous, rather strongly but indistinctly 3—4-nerved ventrally and 6—8-nerved dorsally, narrowly marginate, usually densely whitish subadpressed vitreous-hispid from near the base upwards, sometimes glabrous or glabrescent over the lower part of the angled dorsal face, straight to slightly recurved, becoming patulous, pale at the base, otherwise dark reddish-castaneous, not or very shortly spongy-stipitate, subgradually

to subabruptly narrowed at the apex into a relatively very long beak; *beak* plano-convex, 1.75—2 mm long, not to slightly tapering, narrowly marginate, sparsely to densely hispid, especially on the margins, bidentate; *mouth* very (0.75—1 mm) dorsally oblique; *teeth* rather short, whitish-hyaline tipped, becoming erose. *Achene* (immature) ellipsoid or oblong-ellipsoid, trigonous, 1.75—2 mm long, 0.75—0.9 mm broad, extremely shortly bent-, sometimes twisted-beaked. *Style* not or scarcely thickened at the base. *Stigmas* 3.

MOLUCCAS: Ceram; Central Ceram, Mt. Binaia (Pinaia), ± 2860m, "Matten-region" of the west peaks, near the crest, end of August 1911, *Stresemann* (II. *Freiburger Molukken-Exped. No. 253*) (L) !; *ibid.*, ± 2750—3000 m, *Stresemann* (*ibid.*, No. 275) (K, L) !

NEW GUINEA: Netherlands New Guinea; Hellwig Mts. crest, primitive forest on slope, 2500 m, 2 Dec. 1912, *Pulle* 587 (B) ! (doubtful; the 4—5 mm long utricles, fulvous-red, appear abnormal-?galled).

This species is so far known only from somewhat immature or depauperate specimens, but it seems to be near *C. sarawaketensis* Kiikenth.

### 39. CAREX TYTHOLEPIS Nelmes

*Carex tytholepis* Nelmes in *Kew Bull.* 1949: 388: 1949. — North-East New Guinea, *Clemens* 4611.

Probably loosely tufted. *Rhizome* woody, 3—4 mm thick. *Stems* erect, trigonous, angles obtuse to acute, about 50—100 cm tall, 1.5—2.5 mm thick below, smooth below, minutely hispidulous on the angles above, surrounded, at the base, with a few reddish-black to vinaceous cataphylls and withered leaf-sheaths. *Leaves* basal and/or subbasal, sometimes 1 above, long but exceeded by the stems, 3—6 mm wide, flattish to strongly revolute, rigid, densely scabrid on the upper surface above the base where there are pale protuberances; *sheaths* vinaceous, the membranous margins fraying into herring-bone shaped fibres. *Inflorescence* a compound, continuous or interrupted, slender, erect panicle, 14—35 cm long; *secondary panicles* 5—8, single and unequally binate, at about 4—5 nodes, more or less oblong or lanceolate-oblong in outline, 2—6 cm long, 1—3 cm wide, erect or suberect, distantly or rather distantly spaced, subdense to sublax, lower branches again branched into 2—10 spikes, upper spikes unbranched, panicles on shortly to very longly exerted peduncles; *peduncles* trigonous or compressed, rather slender, smooth below, scabro-hispidulous above. *Rhachis* of the secondary panicles, and upper part of main rhachis, densely hispidulous. *Bracts* of the lower panicles foliaceous, much exceeding the stem, rather longly sheathing, upper much reduced, shortly sheathing; *sheaths* often minutely hispidulous, especially above, often reddish-veined, the membranous mouth often splitting. *Spikes* rather numerous, androgynaeceous, 3—8 mm long, 3—4 mm thick, sublax- to subdense-flowered, becoming patulous to patent, sessile, female part equalling to much exceeding the male part. *Bracteoles* glumiform but with

awns up to 7 mm long. *Cladophylls* utriculiform except for a glumiform whitish-hyaline margined apex, pale yellowish below, brownish above, about 1 mm long and wide. *Female glumes* mostly ovate, sometimes triangular- or oblong-ovate, cymbiform to flattish, obtuse to very obtuse at the apex, 0.75—1.25 mm long, 0.7—1.2 mm wide, subtranslucent, whitish subadpressed-hispidulous, less commonly glabrescent, nerveless to slenderly plurinerved, fulvous or castaneous, with a wide whitish-hyaline margin, especially towards the often erose-ciliolate apex, midrib, with two adjacent nerves which coalesce with it above, excurrent in a hispidulous awn, 0.5—1.4 mm long. *Utricles* obovoid-ellipsoid to ellipsoid, trigonous, (2.5—)2.75—3.2 mm long, 0.8—1 mm wide, submembranaceous, 6—8-nerved on the angled dorsal face, about 3—6-nerved on the ventral face, glabrous, or ventrally very sparsely setulose at the apex, scarcely to narrowly marginate, margins sometimes sparsely setulose at the apex, patulous to subpatent, apex usually recurved, dull yellowish-green tinged brown, scarcely to very shortly subbulbously stipitate, apex subabruptly to abruptly beaked; *beak* plano-convex or subcylindric, scarcely or slightly tapering, 1—1.25 mm long, very narrowly marginate, glabrous to hispidulous-margined, often reddish, bidentulate; *mouth* probably dorsally oblique; *teeth* about 0.25 mm long, whitish-hyaline apex becoming erose. *Achene* ellipsoid to oblong-ellipsoid, sometimes also slightly obovoid, trigonous, ventral face concave, dorsal half-faces concave below, flattish above, 1.5—2 mm long, 0.75—0.9 mm broad, becoming warm brown, not or very shortly and bent-stipitate, abruptly beaked; *beak* sometimes extremely (on to the surface of the nut) bent, 0.1—0.25 mm long. *Style* slender, scarcely or slightly thickened, sometimes bent, at the base. *Stigmas* 3.

CELEBES: Central Celebes; between Malino and Poso, south side of pass, forest, 22 Aug. 1938, *Eyma* 3475 (B) !—This is a doubtful determination of an immature specimen.

NEW GUINEA: Netherlands New Guinea; Wissel Lake Region, stony ridge on slope approaching summit, 31 July 1939, *Eyma* 4989 (B) !—A depauperate plant which seems to belong here. — North-East New Guinea; Morobe District; Sattelberg, Yunzaing, 1590 m, 26 Aug. 1936, *Clemens* 4003 (AA, K) !; *ibid.*, Ogeramang, by forest paths, 1740 m, 14 Dec. 1936, *Clemens* 4611 (AA) !; *ibid.*, Sattelberg, Sambanga, mountain trail above village bridge, 1500—1800 m, 7 Sept. 1937, *Clemens* 6985A (AA) ! *ibid.*, Sattelberg, Sambanga to Ulap, mountain trail bank, 1200—1500m, 11—12 Dec. 1938, *Clemens* 7999 (AA, K) ! — Papua; Owen Stanley Range, below the Gap, forest, 1950 m, 7 Jan., 1936, *Carr* 15,012 (BM, K, L) !

This species does not appear to have any obviously close affinity with any other, but it may have some connection with the New Caledonian *C. fissilis* Boott and also with the *C. lamprochlamys* S. T. Blake and *C. filicina* Nees groups.

The type number of *C. tytholepis* was previously determined by Kukenthal (*in Engl. Bot. Jahrb.* 69: 262: 1938) as *C. neo-guineensis* C. B. Clarke var. *laxior* Kiikenth.

Sect. 7. POLYSTACHYAE Tuckerm.,  
Enum, Meth. 10: 1843

*Stems* tall, stout, smooth. *Leaves* with reddish or vinaceous sheaths which split into herring-bone shaped fibres in front. *Secondary panicles* single. *Spikes* 6—very numerous, 1—6 cm long, the lateral ones arising from a utriculiform cladoprophyll. *Bracts* foliaceous, longly sheathing. *Female glumes* castaneous to reddish. *Utricles* subabruptly or abruptly beaked.

1. Utricles inflated, glabrous except the margins at the apex . . . . 40. *C. baccans*  
1. Utricles not inflated, hispidulous:  
2. Leaves 5—10 mm. wide; secondary panicles composed of 3—rather numerous spikes  
41. *C. myosurus*  
2. Leaves 2—6 mm. wide; secondary panicles composed of 1—7 spikes  
42. *C. longibracteata*

This small group of *Indocarices* differs from the other seven sections most strikingly in its much longer and often thicker spikes. In view of the few species involved, the variability in number of spikes is remarkable and points to considerable extinction of species and/or transformation into other groups. This latter suggestion, which is referred to in more detail elsewhere, is borne out, as I think, by certain groups clearly related to Section *Polystachyae*, particularly the African Section *Elatae* Kiiikenth., which in turn gave rise to the European Section *Spirostachyae* Drejer and the Australasian Section *Echinochlaenae* Th. Holm.

40. CAREX BACCANS Nees

*Carex baccans* Nees in Wight, Contrib. Bot. Ind. 122: 1834; Boott, Illustr. 2: 83 tt. 234-236, 238, 239: 1860; C. B. Clarke, 14; Kiiikenth., 258 fig. 39, E-H; Merrill, Enum. Philipp. Fl. PL 1: 136: 1923; Ridl., Fl. Malay Penins. 5: 184: 1925. — India, Wight 1912.

*Carex curvirostris* Kunze, Suppl. Riedgr. 79 . t. 20: 1840-50; Miq., Fl. Ned. Ind. 3: 350: 1855; C. B. Clarke, 14. — Java, Hoffmansegg.

*Carex recurvirostra* Steud., Syn. PL Glum. II. Cyper. 207: 1855. — Java, Goering 164; Zollinger 1590.

*Carex javanica* Boeck., Cyp. Nov. 1: 43: 1888. — Java, O. Kuntze.

Loosely tufted. *Rhizome* short, oblique, stout, woody. *Stems* erect, trigonous, angles prominent, often subacute, 60—150 cm tall, stout (4—5 mm or more thick below), smooth, clothed at the base by vinaceous to fuscous leaf-sheaths, splitting at the front into herring-bone fibres. *Leaves* throughout the stem, but especially in the lower third, long, some at least exceeding the stem, 4—14 mm wide, usually more or less revolute but sometimes flattish, stiff and coriaceous, upper surface scabro-papillose above, apices longly attenuated; *sheaths* membranous and often blackish-red in front, tending to split from the mouth downwards into herring-bone shaped fibres. *Inflorescence* a compound, interrupted panicle,

occupying the upper third to more than half of the stem; *secondary panicles* about 5—7, upper not often readily distinguishable from one another, erect or suberect, single, ellipsoid or oblong-ellipsoid, 5—30 cm long, 3—5 cm thick, upper approximate forming a more or less dense head, lower distant or remote from one another, lax, becoming dense, lower and middle branches simple or spikes again branched into 2—10 mostly simple spikes, upper spikes unbranched, peduncles of upper panicles usually wholly included in sheaths, lower shortly to very longly exerted; *peduncles* subterete and smooth to obscurely and slightly scaberulously angled. *Rhachis* of the secondary panicles obscurely and smoothly to acutely and scaberulously angled. *Bracts* (lower) usually exceeding the stem, longly to very longly sheathing, upper much reduced, subsetaceous, extending up to or slightly exceeding the apex of the stem, sheathing; *sheaths* glabrous, upper brown near the whitish-hyaline mouth. *Spikes* numerous or very numerous, androgynaeceous, 2—6 cm long, subdense-flowered, suberect to subpatent, sessile, female part cylindric, often longer but sometimes shorter than the male part, which is more slenderly cylindric, tapering at the apex. *Bracteoles* represented by typical glumes, sometimes shortly aristate. *Cladoprophylls* utriculiform below, glumiform above. *Female glumes* ovate, oblong-ovate or oblong, cymbiform, apex subacute to obtuse, 2.5—3.5 mm long, 1.8—2.25 mm wide, glabrous or, less frequently, hispidulous, castaneous with a pale central stripe and wide whitish-hyaline margins, especially above, where the margins often become erose, midrib from failing to extend to the apex to excurrent in a scaberulous mucro. *Utricles* ellipsoid, obovoid, or subglobose, inflated and obscurely trigonous, 3.5—4.25 mm long, 1.75—2.5 mm broad, subcoriaceous, strongly nerved, narrowly marginate above at least, glabrous except the margins at the apex, which are minutely hispidulous, usually becoming curved at the apex, patulous to patent, sometimes nitidous above, dull yellowish-green at first but sometimes becoming reddish, below, reddish to blackish-red above, scarcely to very shortly stout-stipitate, subabruptly to abruptly beaked at the apex; *beak* subterete, or compressed, usually minutely scaberulously-margined, castaneous, bidentate; *teeth* straight or slightly diverging, 0.2—0.4 mm long. *Achene* ellipsoid, trigonous, angles prominent, faces flattish or shallowly concave, 2.75—3 mm long, 1—1.25 mm broad, becoming dark brown or fuscous, usually shortly and bent-stipitate and rostrate. *Style* slender, short, not thickened at the base. *Stigmas* 3.

MALAY PENINSULA: Pahang; Telom, 21 Nov. 1908, Ridley 13,863 (BM)!, Ridley 13,864 (BM, K) !; Cameron Highlands, 1200 m, 1 April 1937, Md. Nur 32,621 (L)!

SUMATRA: Atjeh; Peuetsagee (mountain), slope 2000 m, 22 June 1939, Gall 82 (B)! - East Coast; Berastagi, Yates 2004 (L) !; ibid., Feb. 1921, Ridley (K) !; north slope of Mt. Sinabun(g), widespread, forest or in lighter places, ± 1550 m, 19 Jan. 1921, Lorzing 8223a, 8224 (B) !; Karo plateau, flat ground near Sibaraja, ± 1200 m, 25 Sept. 1924, Lorzing 11,294 (L) ! - West Coast; Mt. Singgalang, Reinwardt? (L) !; ibid., June—July 1878, Beccari 21 (K) !; Mt. Korinchi [G. Kerintji], 2190 m, 24

April 1914, *Robinson & Kloss* 62 (BM) !; *ibid.*, 25 April 1914, *Robinson & Kloss* 72 (K) !; *ibid.*, 1900 m, 9 April 1920, *Binnemeijer* 9324 (B) !

PHILIPPINE ISLANDS: Luzon; Benguet; *Loher* 700, partim (K) !; *Loher* 706 (K) !; Benguet; Dec. 1908, *Ramos (Bur. Sci. 5908)* (L) !; Lepanto; *Vidal* 1948 (comm. 1884) (K) !; *ibid.*, Mt. Data, mossy forest, ± 2250 m, Nov. 1905, *Merrill* 4515, 4555 (K) !; Mt. Santo Tomas, June 1904, *Elmer* 6270 (K) !; Baguio, 24 Sept. 1904, *R. S. Williams* 1973 (K) ! Baguio, March 1907, *Elmer* 8355 (K, L) !; Pauai to Baguio, border of mossy forest, ± 2200 m, Oct.—Nov. 1905, *Merrill* 4791\* (K) !; Pauai, April–June 1918, *Santos (Bur. Sci. 31,689)* (BM, L, S) !; Pauai, "Heights in the Oaks," 2100 m, July 1907, *Mearns (Bur. Sci. 4259)* (mixed with *C. rafflesiana* Boott) (L) !

"In damp thickets and in the mossy forest on the higher mountains, 1600–2400 m." *Merrill (I.e.)*.

NEW GUINEA: Papua; Boridi, 1260 m, 17 Sept. 1955, *Carr* 13,204 (BM, K, L) !

JAVA: D j a k a r t a (Batavia) ; Krawang, *Blume?* (B) !; Mt. Burangrang, north slope, secondary forest, 1200 m, 1 July 1914, *Backer* 14,509 (B) ! — B o g o r (Buitenzorg); Mt. Salak, north-west slope, 1200 m, Aug. 1909, *J. J. Smith* (B) !; Nirmala, 1400 m, 17 Dec. 1913, *Backer* 10,631 (B) !; Megamendung, 1350 m, 4 June 1875, *O. Kuntze* 4790 (New York) !; Mt. Megamendung, near Mt. Gede, *Junghuhn* (L) !; Mt. Gede, near Tjibodas, *Boerlage* 641 (B) ! — P r i a n g a n; Mt. Papandajan, woods, 11 Feb. 1915, *Ridley* (BM) !; *ibid.*, Tegal Bungbrung, very common amongst *Vaccinium*, inside and outside the crater, and also on the plain, forming communities, 2300 m, 19 Jan. 1927, *Coert* 1763 (L) !; and about twenty other collections seen from Bogor and Priangan Res. — T j i r e b o n (Cheribon); Mt. Tjareme (Tjerimai), east slope, 1800–2400 m, 28 Oct. 1912, *Backer* 5111, partim (B) ! — B a n j u m a s; Mt. Slamet, above Baturaden, savannah, few plants, 2500 m, 19 April 1911, *Backer* 515bis (B) !; Dijeng Plateau, 2100 m, 22 Jan. 1917, *Backer* 21,669 (B) ! — P e k a l o n g a n; Petungkriyono, wood-border, 1500–1600 m, 10 Sept. 1914, *Backer* 15,854 (B) !; Mt. Slamet, west slope, mountain plateau, Igir Klantjeng, above Bumiayu, ± 2000 m, July 1941, *Hoogerwerf* (B) ! — K e d u; Mt. Sundoro, thin forest, ± 1600 m, 8 June 1912, *Lorzing* 464 (B) ! — S e m a r a n g; Medinie [Medini], Ungarang [Mt. Ungaran], primeval forest, north slope, 900–1500 m, April–June, *Junghuhn* 481 (L) !; Mt. Telemojo, bushy ground, 22 June 1897, *Koorders* 27,724\$ (B, L) !; *ibid.*, 14 May 1899, *Koorders* 35,805 lj (B, L) ! — D j o g j a k a r t a; Mt. Merapi, north of Djokjakarta, south slope, ± 1450 m, Sept., *Junghuhn* 541 (L) ! — M a d i u n; Ngebel, Wilfs Mts., bushy ground, 1300–1400 m, 27 May 1896, *Koorders* 23,107 [S (L) !; 1200–1400 m, 1907, *Elbert* 62 (L) !; Mt. Lawu, 25 April 1923, *Coert* 251 (K, L) !; *ibid.*, summit, 3250 m, 20 July 1928, *van Leer* (B) ! — K e d i r i; Mt. Keloed (Kloet) 900–1300 m, 30 May, 1935, *Clason-Laarman* K65 (B) ! — M a l a n g; Tengger Mts., Mt. Penandjakan, 3 June 1900, *Kobus* (B, K, L) !; and nearly twenty other collections seen from Malang Res. — B e s u k i; Ijang, Mts., Mt. Gilap, 2000 m, 20 Oct. 1913, *Jeswiet* 289 (B) !; Idjen Mts., Ungup to Mt. Merapi, 1750–2500 m, underwood and grassy meadows, 25 May 1931, *Clason-Laarman* E.4 (B) !; and about fifteen other collection seen from Besuki Res.

Mt. Prahau, *Horsfield* 117 (BM, K, S) !; ex Herb. *Zipelius* 249; ex Herb. *Korthals?* on high mountains, Herb. *Reinwardt* (L) !; south coast, *Blume* (L) !; Bandung, *Zollinger*.

LESSER SUNDA ISLANDS: Bali; Mt. Abang, 1700 m, 24 March 1936, *de Voogd* 2755 (B) !; Mt. Abang, grassy slope in forest, 1800 m, 9 April 1936, *van Steenis*

8013 (B) ! — L o m b o k; Rindjani Volcano, north side, Ladjang, monsoon high forest, 750–900 m, loamy soil, 2 May 1909, *Elbert* 867 (K, L) !, 906 (L) !

India, Upper Burma, Indo-China, Formosa, China, Japan.

This handsome sedge, with its turgid berry-like utricles, bears numerous spikes. It belongs to a small group of the *Indocarices*, but together with its allies it seems to have had a disproportionate share in giving rise to other groups, placed in Subgenus *Carex*. The species itself, for example, bears a striking resemblance to certain members of Section *Decorae* Kiiikenth., notably *C. Daltonii* Boott, *C. decora* Boott, and *C. Walkeri* Arn. ex Boott, (See also under *C. longibracteata* Steud.)

#### 41. CAREX MYOSURUS Nees

*Carex myosurus* Nees in Wight, Contrib. Bot. Ind. 122: 1834 (excl. pi. Nepal.); Boott, Illustr. 2: 82 tt. 229, 230, 232: 1860; Kiiikenth., 258. — India, *Wight* 1913.

*Carex myosurus* var. *celebica* Nelmes in Kew Bull. 1950: 195: 1950. — Celebes. *Binnemeijer* 12,343.

Loosely tufted. *Rhizome* elongated but scarcely creeping, stout, woody, covered with fibrous remains of sheathing scales. *Stems* 60–200 cm tall, more or less erect, 2–4 mm thick above the basal leaves, obtusely but prominently trigonous, mainly smooth, clothed at the base by a few more or less entire, reddish-brown to blackish leaf-sheaths or their fuscous, fibrous remains. *Leaves* basal and subbasal, and also a few widely spaced between the subbasal leaves and the inflorescence, long, some at least equalling or even exceeding the stems, 5–10 mm wide, flattish or sometimes revolute; *sheaths* reddish or blackish-red, their membranous fronts tending to fray into fine herring-bone shaped fibres. *Inflorescence* cernuous or subcernuous, narrow and interrupted, occupying the upper 25–100 cm of the stem; *secondary panicles* 5–9, suberect to cernuous, more or less oblong or oblong-lanceolate, single, each consisting of about 3 to rather numerous spikes, panicles 6–25 cm long, 2–3 cm thick, upper approximate and fastigiate, lower distant to very distant from one another, upper sessile or on shortly exerted peduncles, lower on rather to very longly exerted peduncles, branches often again branched into 2–8 simple spikes, but sometimes all except the lower and uppermost branches in the form of simple spikes, suberect to patulous; *peduncles* more or less trigonous, mainly scabrid or scaberulous. *Rhachis* of the main and secondary panicles minutely scaberulous, at least above. *Bracts* of the lower panicles foliaceous and mostly exceeding the apex of the stem, upper bracts very much reduced, subfoliaceous or glumiform; *sheaths* also rapidly decreasing in length, the lowest being very long and the uppermost very short, glabrous or sparsely hispidulous, nodes sometimes reddish-brown. *Spikes* androgynaeceous, 1–8 cm long, the simple, unbranched spikes and the main spikes of the compound ones being longer or much longer than the secondary or lateral spikes, male and female parts often about equal in length but on some plants the terminal or main spikes

sometimes almost wholly male, and on others some of the lateral spikes almost wholly female, sessile, subdense-flowered. *Bracteoles* glumiform. *Cladophylls* in process of elimination or transformation, inconspicuous, hidden by the bracteole and squeezed between it and the spike-axis, utriculi-ocreiform with a glumiform apex. *Female glumes* oblong-obovate, oblong-ovate, or oblong with a rounded or subtriangular apex, incurved below, flattish to deeply cymbiform above, apex acute to obtuse or very obtuse 2.5—4 mm long, 1—1.5 mm wide, translucent, slenderly nervose, pale below, bright chestnut above with wide silvery margins, midrib usually excurrent in an awn up to 1.5 mm long and smooth to minutely hispidulous. *Utricles* ellipsoid, sometimes slightly obovoid-ellipsoid, trigonous or subtrigonous, sometimes asymmetrically so, the angle on the dorsal face being sometimes small, making (sometimes unequal) halves much smaller than the ventral face, 3.25—4.75 mm long, 1—1.6 mm broad, narrowly marginate, membranaceous, 6—8-nerved on the dorsal 3—6-nerved on the ventral face, nerves more or less distinct, very sparsely to subdensely subadpressed pale hispidulous in the upper half or more than two-thirds, pale or often castaneous in the upper two-thirds or less, straight or straightish, subpatulous to patulous, the basal 0.5—0.8 mm cuneate and spongy stipitate, subgradually or subabruptly narrowed into a beak; *beak* plano-convex or compressed, slightly tapering, 0.75—1 mm long, narrowly marginate, hispidulous-margined, castaneous, bidentate; *mouth* not oblique; *teeth* slender, firm, smooth or minutely hispidulous, straight or slightly diverging, 0.25—0.5 mm long. *Achene* ellipsoid or oblong-ellipsoid, and sometimes slightly obovoid, trigonous with prominent angles and flat to concave faces (especially the ventral one), 2—3 mm long, excluding stipe and beak, 0.7—1 mm broad, straight or straightish, becoming dark brown, scarcely to shortly, straight to slightly bent-stipitate, abruptly beaked; *beak* sometimes short but usually 0.3—0.7 mm long, straight to bent or curved. *Style* short, not thickened towards the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Bontoc, Vanoverbergh 992.

"On slopes, altitude about 1700 m."—Merrill (*l.c.* p. 139).

CELEBES: South-West Celebes; north-west side of Peak of Bonthain [Mt. Lompobatang], ~± 1450 m, 18 May 1921, *Bunnemeijer 11,630* (K, L)!; *ibid.*, ± 1700 m, 19 June 1921 *Bunnemeijer 12,343* (L)!; *ibid.*, ± 1850 m, 21 June 1921, *Bunnemeijer 12,410* (L)!

LESSER SUNDA ISLANDS: Lombok; Rindjani Volcano, north side, Segare Anak, crater-lake, *Casuarina* forest, mountain scrub, volcanic breccia and andesite rocks with springs, 1925—2000 m, 11 May 1909, *Elbert 1235* (K, L)! *ibid.*, south side, slope above Kembangkerang, monsoon high forest, sandy ground, 1900—2050 m, 25 June 1909, *Elbert 2272* (K, L)!

India, Burma.

The Celebes specimens of this species appeared to me to differ variationally from the type, but the Lombok plants, more recently received from Leiden, seem to link them up with the species.

#### 42. CAREX LONGIBRACTEATA Steud.

*Carex longibracteata* Steud., Syn. PL Glum. II. Cyper. 205: 1855; Miq., Fl. Ned. Ind. 3: 348: 1855 (incl. var. *major*); C. B. Clarke, 15; Kiikenth., 260 (incl. ff. *distans* et *angustifolia*). — Java, *Zollinger 524Z*.

*Carex Kuntzeana* Boeck., Cyp. Nov. 1: 51: 1888. — Java, *O. Kuntze 4628*.

Loosely tufted. *Rhizome* scarcely or shortly creeping, curved-elongate, clothed with reddish scales or their fibrous remains. *Stems* more or less erect, trigonous, (22—)50—150 cm tall, 1—3 mm thick below, strongly ribbed, smooth but angles sometimes very sparsely scaberulous in places towards the apex of the rhachis, surrounded, below the leaves, by reddish, reddish-purple, or vinaceous cataphylls or leafless sheaths, which readily fray in front into reticulate (herring-bone) fibres. *Leaves* situated throughout the stem but most on the lower 10 cm, long, some much exceeding the stem, 2—6 mm wide, flat to strongly revolute, stiff, upper surface scabrid except at the base, apex very longly attenuated; *sheaths*, especially the lower ones, reddish, membranous, and thin, in front, margins fraying into herring-bone shaped fibres. *Inflorescence* 10—50 cm long, consisting of 5—8 *secondary panicles*, the uppermost and lower ones sometimes each consisting of 2—7 spikes, the terminals being larger to much larger than the laterals, all sometimes reduced to simple terminal spikes, sometimes all composed of several spikes, lateral spikes in the lower panicles rarely having 1—2 small spikes branching from their base. *Spikes* (terminals) erect, lateral spikes suberect to patulous, upper perhaps subcernuous, straight to subcurved or flexuous, androgynaeceous, more or less cylindrical, terminal spikes or when solitary 2—10 cm long, lateral ones, when present, 1—4 cm long, female part 5—9 mm thick, male part 1—3 mm thick, subdense-flowered, lower, especially when simple, sometimes laxer-flowered towards the base, female part in the upper terminal and, especially, the upper lateral spikes not much longer, sometimes equal or little shorter, but in the lower terminal spikes much longer, than the male part, upper approximate or subapproximate and subfastigiate, lower distant (lowest remote) from one another but sometimes subfastigiate through increasing length of spikes and their peduncles, lower on rather to very longly exerted peduncles, upper sessile or on scarcely to shortly exerted peduncles; *peduncles* compressed to trigonous, sometimes subcurved or flexuous, very slender, smooth or rarely very sparsely scaberulous towards the apex. *Bracts* of the lower spikes (or panicles) foliaceous, far exceeding the stem, longly to very longly sheathing, upper bracts subfoliaceous with a glumiform base, more or less extending to the apex of the stem, scarcely to shortly sheathing; *bracteoles* of the lateral spikes glumiform with long awns; *sheaths* membranous and often reddish-streaked in front. *Cladophylls* only at the base of the sheathless or scarcely sheathing upper spikes, and of the small, lateral spikes, ocreiform-utriculiform below, squamiform above, hidden behind the glume and squeezed between the stem and base of the peduncle. *Female glumes* oblong-ovate to oblong-lanceolate, thickened, gibbous, and subincurved at the base, margins sometimes involute above, otherwise cymbi-

form, apex subacute to very obtuse, rarely excised, 3.25—5 mm long, 1.75—2.25 mm wide, translucent, pale but often flushed and splashed light reddish-brown above and on the sides, or castaneous to dark reddish-brown with a pale central stripe and wide or very wide whitish-hyaline margins, especially towards and at the apex, becoming erose on the margins, very slenderly nervose, midrib and 2 adjacent nerves coalescing at the apex, usually excurrent in a scaberulous awn up to 2 mm long. *Utricles* usually ellipsoid but sometimes ellipsoid-obovoid, compressed-trigonus or trigonus or sometimes tetragonous through an angular swelling on the ventral face, 3.5—5.25 mm long, 1.75—2.75 mm broad, somewhat papyraceous, nerveless or very slenderly 3—5-nerved on each face, narrowly but distinctly marginate, glabrous below, sparsely to subdensely hispidulous above, especially towards the sparsely hispidulous margins above, straight or straightish, becoming patulous, pale green, sometimes dark reddish above, or reddish to vinaceous splashed, more or less tapering below to a slightly spongy-thickened base, very shortly stipitate, subabruptly to abruptly beaked at the apex; *beak* oblong, compressed, often with a reddish, longitudinal, dorsal groove 0.75—1.25 mm long, broad, narrowly marginate, sparsely hispidulous-margined, pale, or reddish splashed, or dark reddish, bidentate; *teeth* lobe-like, 0.3—0.6 mm long, usually somewhat diverging, sometimes whitish-hyaline and becoming erose at the tips; *mouth* scarcely oblique. *Achene* obovoid-ellipsoid, oblong-ellipsoid, ellipsoid, ovoid, obovoid, or subglobose, trigonus, becoming dark brown, angles prominent, palish, faces flattish above, often concave below, 1.8—3 mm long (excluding stipe), 1—1.8 mm broad, stoutly up to 0.5 mm stipitate, stoutly up to 0.3 mm beaked, stipe and beak straight to extremely bent at the base. *Style* scarcely or slightly thickened towards the base. *Stigmas* 3.

SUMATRA: Atjeh; Bur ni Geredong, mossy forested ridge, common 2500—2650 m, 3—5 Sept. 1934, *van Steenis* 6489 (B, L)!, 6504 (B, K, L, S)!: Gajo Lands, peak of Goh Lembuh, 3000 m, by stream in moss forest, 22 Feb. 1937, *van Steenis* 9136 (type of var. *gigantea* Kiikenth.); Gajo Lands, Mt. Kemiri, east slope, forest ridge and plateau, heath formation, 2900—3314 m, 7 March 1937, *van Steenis* 9627 (B)! — West Coast; Korinchi Peak [G. Kerintji], 2190 m, 1914, *Robinson & Kloss* 9 (BM)!: *ibid.*, ± 2900 m, scrub, 4 May 1920, *Bunnemeijer* 10,037 (B)!: *ibid.*, 9 Sept. 1920, *Bunnemeijer* 10,382 (L)!: Padang, *Junghuhn* 138 (L)!

CELEBES: South-West Celebes; Mt. Asumtatumpang, 2500m, July 1936, *Toxopeus* 10 (B)!

JAVA: Bogor (Buitenzorg); Mts. Gede-Pangrango, 2200 m, 30 May 1875, *O.Kuntze* 4628; Mt. Gede, Kandangbadak, ex Herb. *Blume?* (L)!: Mt. Gede, forest, 1800 m, 7—9 Sept. 1932, *Clemens* 30,380 (K)!: and about twenty-four other collections from this region.\* — Tjirebon (Cheribon); Mt. Tjareme (Tjermai), 2800 m, 21 Dec. 1940, *van Steenis* 12,816 (B)!: *ibid.*, 21 Dec. 1940, *van Steenis* 12,817 (B)!, 12,833 (B)! — Pekalongan; Mt. Slamet, north of Djurangmanggu, by way of Pondok Guha, open mountain forest at foot of rubbish cone, 2500—3300 m, 20—22 Oct. 1939,

\* *Usteri* 100 (K)!, Java, Buitenzorg, was misidentified by C. B. Clarke (*I.e.* p. 14) as *C. composita* Boott.

*van Steenis* 11,633 (B)! — Banjarmasin; Dijeng Plateau, edge of path, 2000m, 22 Jan. 1917, *Backer* 21,668 (B)!: *ibid.*, Wonosobo (in Kedu Res.), sunny slope among ferns, 2100m, 10 June 1931, *Brinkman* 387 (B)! — Kedu; Mt. Sundoro, summit, *Junghuhn* (var. *major* Miq.); Mt. Sundoro, forming islands, *Junghuhn* 519 (L)!: Mt. Sundoro, summit, among underwood in sandy plain, ± 3000 m, 21 May 1927, *Docters van Leeuwen-Reijnvaan* 8928 (B)!: Mt. Sumbing, crater ± 3200 m, near solfatara, dry ground, not common, 23 Aug. 1912, *honing* 622 (B)!: Mt. Sumbing, summit, crater, among stones, ± 3300 m, 14 May 1927, *Docters van Leeuwen-Reijnvaan* 8791 (B)!: Mt. Merbabu, 4 July 1920, *Bally* (B)! — Madiun; Mt. Lawu, open wet place by a cave, ± 3100 m, 20 Nov. 1924, *Docters van Leeuwen-Reijnvaan* 8196 (B)!: *ibid.*, 3000 m, 17 June 1941, *Buwalda* 8142 (B)! — Malang/Surabaya; Mt. Welirang (Waliran), south summit, 3000 m, *Zollinger* 524a; Mt. Welirang, 2900 m, 4 Oct. 1927, *Backer* 36,104 (L)!: Mt. Welirang above Lalidjiwo, subalpine savannah, 2800 m, 8 June 1929, *Backer & Skottsberg* 37,426 (L)!: Mt. Welirang (Mt. Ardjuno), near summit, in coarse volcanic sand, ± 3100 m, 4 June 1935, *van Steenis* 7065 (B, S)! — Malang; Tengger Mts., Bromo, sandy waste, rare, ± 2200 m, 28 Oct. 1914, *Jeswiet* 603 (B)!: Mt. Semeru, Ranu Kumbolo, 6 July 1929, *Jeswiet* 39 (L)! — Besuki; Ijang Mts. (Mt. Argopuro), summit, shady place, 3000 m, 15 Aug. 1916, *Koordera* 43,525/1 (B)!: *ibid.*, Mt. Welirang (Mt. Argopuro), summit, among blocks of basalt, crater hole, locally common, 2950 m, 16 July 1938, *van Steenis* 10,973 (B, K)!

Herb. *Waitz* (K, L)!

I have not seen the variety *gigantea* Kiikenth. (*in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 314: 1940), based on Van Steenis 9136 from Sumatra, Atjeh, Goh Lembuh peak, 3000 m, near stream, mossy forest, February 22, 1937.

This species is very polymorphic in its characters, and variable in the number of its spikes. This instability may have some relation to its being, as I think, an archetype from which various *Eucarices* have evolved. Among these I would specially mention the species of Section *Elatae* Kiikenth. and the almost certainly secondarily derived sections, Section *Spirostachyae* Drejer and Section *Echinochlaenae*. Th. Holm. *C. longibracteata*, when reduced to a terminal spike of each secondary panicle, has lost its cladophylls with its vanished lateral spikes, and automatically become a member of Subgenus *Carex*!

#### Sect. 8. PACIFICAE Ohwi

*in* Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11: 458: 1936.

*Stems* subfirm, short. *Spikes* 12—numerous, short, oblong-ovoid, subdense-flowered, single, patulous, becoming patent, the lateral ones arising from a gaping, fertile utricle or utriculiform cladophyll. *Bracts* glumiform (upper), subherbaceous or subfoliaceous (lower), not sheathing. *Utricles* longly beaked.

Only Malaysian species. . . . . 43. *C. satsumensis*

## 43. CAREX SATSUMENSIS Franch. &amp; Savat.

*Carex satsumensis* Franch. et Savat., Enum. Pl. Japon. 2: 132 & 558, no. 2085: 1879. — Japan, *Savatier 35U6*.

*Carex nikoensis* Franch. et Savat., Enum. Pl. Japon. 2: 132 & 558, no. 2086: 1879; Kiikenth., 252; Merrill, Enum. Philipp. Fl. PL 1: 140: 1923. — Japan, *Savatier 2210, 3485*.

Loosely tufted. *Rhizome* descending and/or horizontally creeping, (0.8—1 mm in diameter), long, clothed with large, strongly nerved, brown sheathing scales. *Stems* erect, trigonous, relatively strongly ribbed and striate, 8—19 cm tall, 0.75—1.5 mm thick below, smooth, or angles sometimes minutely scaberulous just below and in the lower part of the rhachis, which is usually smooth above, deep longitudinal furrows extending upwards from the insertion of each partial panicle, giving the rhachis an irregularly winged appearance, stem proper surrounded at the base, below the leaves, by a few brown cataphylls and fibrous remains of older ones or leaf-sheaths. *Leaves* basal and subbasal, enclosing the lower third or quarter of the stem by their sheaths, lower reduced to shortly bladed sheaths, upper exceeding the stem, many recurved, a few straightish and oblique to suberect, 2—7 mm wide, conduplicate to flattish or flat-plicate, upper surface scabrid towards the longly attenuated, firm apex; *sheaths* membranous in front. *Inflorescence* a simple or nearly simple, subdense, terminal, oblong, to subpyramidal panicle, consisting of 12—numerous simple spikes, or lower few infrequently bearing 1—2 branch-spikes, 2—6 cm long, 1.3—2.5 cm broad at the base. *Spikes* androgynaeceous, lower 6—14 mm, upper 3—7 mm, long, subdense-flowered, patulous, becoming patent, sessile, female part very much longer than the male in the longer spikes and equal to longer in the shorter spikes (some perhaps wholly female), each arising from a gaping utricle or utriculiform cladoprophyll, which is fertile, containing a female flower which develops into an achene. *Bract* of the lowest spikes subfoliaceous or subherbaceous, usually shorter than the inflorescence, lower bracts subherbaceous, or glumiform with long awns, slightly longer to shorter than their spikes, upper bracts reduced to long-awned glumes, none sheathing, caducous. *Female glumes* ovate, ovate-lanceolate, or oblong-elliptic, base slightly thickened and subincurved, cymbiform above, apex acute to very obtuse, 2—3 mm long, 1—1.3 mm wide, translucent, mainly thin and whitish but fulvous or castaneous above on a wide band inside the upper margin, which is often narrowly or widely whitish and erose-ciliolate, almost nerveless except for the slender midrib and 2 more slender adjacent nerves coalescing above and usually not or only extending to the apex, rarely excurrent up to 0.3 mm long. *Utricle's* ellipsoid, oblong-ellipsoid, or more or less obovoid, scarcely to slightly inflated, obtusely trigonous, 2.3—4 mm long, 0.75—1 mm broad, membranaceous, dorsally nerveless or obscurely nerved, ventrally slenderly to somewhat obscurely several-nerved, narrowly marginate, glabrous, often becoming reflexed, becoming patent, dorsally greyish, ventrally brownish green, tapering below to a short or very short, stoutish, spongy, sulcate, stipe-like base, subgradually to subab-

ruptly beaked at the apex; *beak* tapering below, pale and flattish below, subterete and often castaneous above, 1—2 mm long, broad below, narrowly marginate, glabrous, bilobed; *mouth* dorsally oblique; *lobes* whitish, often becoming erose-truncate. *Achene* obovoid or ellipsoid-obovoid, trigonous, angles prominent, faces shallowly concave at the base, flattish above, 1.3—1.5 mm long, 0.7—0.9 mm broad, sometimes slightly and irregularly longitudinally striate, becoming very dark brown, not stipitate, scarcely to very shortly and stoutly beaked. *Style* pyramidally thickened at the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Benguet, Pauai, along trails in the mossy forest, ± 2300 m, May 1909, *Merrill 6631* (K) !; Pauai, auto road-bank under *Pinus*, 2250 m, 19 June 1934, *Clemens 51,750* (BM, K) !

Japan.

This species is the sole representative of its section but it shares its fertile cladoprophyll character with the three members, two Himalayan and one Japanese, of Section *Mundae* Kiikenth. The numerous species of the other sections of Subgenus *Indocarex* have, lateral spikes emanating from a sterile cladoprophyll. Future study may lead to the conclusion that the three above-mentioned species with achene-bearing cladoprophylls are more closely connected with the African genus *Schoenoxiphium*, a species of which has recently been found in Sumatra, or with the allied, Asiatic-based genus, *Kobresia*.

The following *Indocarex* is too young for more precise determination:

Tufted. *Rhizome* short. *Stem* about 40 cm tall, scaberulous above. *Leaves* 4—8 mm wide, long, flattish-revolute, stiff, thick, upper surface minutely scabrid, lowest sheaths fraying into persistent reddish-fuscous fibres; *sheaths*, of the stem leaves glabrous, of the bracts hispidulous. *Inflorescence* immature, very hispidulous.

NEW GUINEA: Netherlands New Guinea; Anggi lakes, Arfak Mts. [Lina Mts.], in forest, rare, 1200 m, 4 April 1940, *Kanehira & Hatusima 13,429* (B)!

Subgen. 2. *Carex*

## KEY TO THE SECTIONS

1. Spike 1:
  2. Spike 1—4 cm long; utricles large (4.5—5 mm long), trigonous, subpatulous to patulous, longly beaked . . . . . 23. *Rhizopodae*
  2. Spike 0.4—2 cm long; utricles small (2—3.5 mm long), subinflated, becoming subpatent to patent, shortly beaked . . . . . 20. *Capitellatae*
1. Spikes few to numerous:
  3. Stigmas 2; utricles plano-convex or biconvex:
    4. Bracts sheathing, usually lower longly sheathing; spikes 1—5 at each node; utricles usually more or less hispidulous; stigmas often longer than the utricles . . . . . 11. *Graciles*



4. Bracts not sheathing; spikes single, rarely binate at each node; utricles glabrous; stigmas shorter than the utricles:
5. Spikes erect, sessile or subsessile. . . . . 27. *Vulgares*
5. Spikes more or less cernuous, peduncled:
6. Spikes 3—6, not longly peduncled, always single. . . . . 26. *Praelongae*
6. Spikes rather numerous, longly peduncled, sometimes binate . . . . . 25. *Longispicae*
3. Stigmas 3; utricles more or less trigonous:
7. Stems arising from axils of leaves on a short, undeveloped shoot  
12. *Cryptostachyae*
7. Stems arising from the centre of the foliage leaves and developed from the shoot on which these are borne:
8. Spikes in fascicles of 1—20 at each node, usually androgynaeceous . . . . . 9. *Decorae*
8. Spikes single, less often paired at each node:
9. Spikes androgynaeceous:
10. Female glumes spongy-thickened and gibbous at the base, thin and whitish above, glabrous; utricles spongy-thickened at the base . . . . . 16. *Radicales*
10. Female glumes not spongy-thickened nor gibbous at the base, more or less castaneous above, sometimes hispidulous; utricles not spongy-thickened at the base. . . . . 10. *Borneenses*
9. Terminal spike male, rarely gynaeceous:
11. Utricles lageniform . . . . . 13. *Lageniformes*
11. Utricles not lageniform:
12. Achene mitrate, i.e. discoid-annulate at the apex . . . . . 14. *Mitratae*
12. Achene not mitrate:
13. Stems often lateral. . . . . 15. *Rhomboidales*
13. Stems central:
14. Normal leaves numerous but all on the upper part of the stem, lower reduced to sheaths. . . . . 21. *Scleriiculm.es*
14. Normal leaves basal or subbasal, with 0—2 leaves on the upper part of the stem:
15. Bracts not or rarely lowest sheathing:
16. Spikes erect; female glumes mucronate or aristate; beak of utricles shortly bidentate. . . . . 18. *Tumidae*
16. Lower spikes cernuous; female glumes longly aristate; beak of utricle rigidly bifurcate, teeth subulate, very long; style flexuous  
17. *Pseudocypereae*
15. Bracts sheathing:
17. Utricles ferruginous-papillose . . . . . 24. *Anomalae*
17. Utricles not papillose:
18. Utricles glabrous. . . . . 19. *Sylvaticae*
18. Utricles hispidulous. . . . . 22. *Ferrugineae*

## Sect. 9. DECORAE (Kükenth.) Ohwi

in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11: 338: 1936.

*Spikes* in fascicles, simple or bearing smaller branch-spikes, all androgynaeceous or at least one in each fascicle often male or female, lax- to subdense-flowered, lower usually longly peduncled. *Bracts* sheathing. *Female glumes* usually more or less dark reddish, sometimes fulvous,

castaneous, or vinaceous, usually strongly incurved at the base. Utricles suberect to patulous, membranaceous, ellipsoid or oblong-ellipsoid but tapering at each end, often more or less nerveless, often dark reddish or with dark reddish patches; *beak* long or very long, apex usually bidentulate.

1. Terminal spike male:
2. Stems 2.5—10 em tall; spikes 5—8, forming an inflorescence 2—4 cm long; female glumes 2.2—3 mm long; utricles 2.3—3(—3.25) mm long . . . . . 51. *C. celebica*
2. Stems 12—95 cm tall; spikes 10—numerous, forming an inflorescence 5—48 cm long; female glumes 3—6 mm long; utricles 4—6 mm long:
3. Fascicles 1—6-spiked; utricles-plurinerved:
4. Fascicles 1—3-spiked; spikes subdense-flowered; utricles ellipsoid  
50. *C. phacelostachys*
4. Fascicles 3—6-spiked; spikes lax-flowered; utricles ellipsoid-lanceolate  
50. *C. phacelostachys* var. *losirenste*
3. Fascicles 1—20-spiked; utricles nerveless:
5. Leaves and bracts mostly shorter than, sometimes about as long as, the stem  
49. *C. verticillata*
5. Leaves and bracts mostly longer than the stem:
6. Female glumes blackish-red. . . . . 49. *C. verticillata* var. *Havilandii*
6. Female glumes golden to fulvous. . . . . 49. *C. verticillata* var. *lutescens*
1. Terminal and all the other spikes androgynaeceous:
7. Leaves 9—12 mm wide. . . . . 44. *C. arridens*
7. Leaves 2—1 mm wide:
8. Spikes all simple. . . . . 48. *C. atosanguinea*
8. One to several spikes at each node branched into one to several smaller spikes:
9. Spikes 2—8 cm long; female glumes 3.25—3.5 mm long; utricles glabrous, 5.5—6 mm long. . . . . 45. *C. turrita*
9. Spikes 1—4 cm long; female glumes 2—3 mm long; utricles sparsely to subdensely setulose or hispidulous, 3—4 mm long:
10. Utricles 0.8—1 mm broad, not papillose, olive-green, dull blackish-red above, beak 1—1.5 mm long, teeth 0.2 mm long . . . . . 47. *C. pullei*
10. Utricles 0.6—6.8 mm broad, densely glandular-papillose, wholly blackish-red, beak about 1 mm long, teeth 0.25—0.5 mm long. . . . . 46. *C. Merrillii*

"Spikes in fascicles" characterize this and the two following sections. This form of inflorescence is treated by me in this classification as more primitive than the succeeding sections, where the spikes are, with few exceptions, single (solitary) at each node. It is interesting to speculate as to whether the fasciculate partial panicle has been derived from ancestors such as present-day *Indocarices* by the pressing down into the node of the 1—2-peduncled polystachyous partial panicle, or from extinct ancestors with a combination of fasciculate and paniculate inflorescence.

## 44. CAREX ARRIDENS C. B. Clarke

*Carex arridens* C. B. Clarke in Hook, f., Fl. Brit. Ind. 6: 726: 1894; C. B. Clarke, 13; Kükenth., 548; Ridley, Fl. Malay Penins. 5: 184: 1925. — Lower Burma, *Kurz*; Malay Peninsula, *Kmistlei*:

*Stem* erect, trigonous, ribbed and striate, 55 cm long, about 2 mm thick below, almost entirely hidden, below the rhachis, by leaf-sheaths, smooth but sparsely scaberulous at the apex of the rhachis, clothed below the leaves at the base by a few strongly nerved spadiceous cataphylls. *Leaves* about 10, crowded on the lower 10 cm of the stem, mainly 40—70 cm long and 9—12 mm wide, but lower few shorter and narrower, flat or flattish, subcoriaceous, upper surface scabrid towards the apex, stiff, yellowish-green, apex shortly to rather longly attenuated, often inconspicuously septate-nodulose in places; *sheaths* spadiceous, strongly blackish-nerved, hispidulous on the dark reddish-brown or spadiceous and membranous front. *Inflorescence* not fully developed and in this state a much interrupted, slender panicle, 30 cm long; *secondary inflorescences* 6—7, single except at a middle node where binate, narrowly oblong or oblong-lanceolate, 2.5—5 cm long, 5—7(—10) mm broad, 2—3 upper approximate and fastigate, remainder distant from one another, each branched into 5—7 simple, sessile spikes, upper on scarcely or shortly exerted peduncles, lower on longly exerted peduncles; *peduncles* obtusely trigonous, 0.5—0.8 mm thick, smooth. *Rhachis* of the secondary inflorescences smooth below, angles sometimes sparsely hispidulous above. *Bracts* foliaceous, lower much exceeding the stem, longly sheathing, upper smaller, exceeding or exceeded by the stem, shortly to very shortly sheathing; *sheaths* membranous, densely hispidulous and castaneous at the deeply concave to almost truncate mouth. *Spikes* erect to suberect, fastigate or subfastigate, androgynaeceous, very narrowly ellipsoid or cylindrical-lanceolate, 1—1.8 cm long, 1.5—2 mm thick (in flower), dense-flowered, male part very much longer than the female part. *Bracteoles* large and often longly awned glumes, glabrous, or very sparsely hispidulous above, clasping the rhachis and base of spike. *Cladophylls* more or less oblong with rounded upper corners, subtricoliform below, glumiform above, about 4 mm long, and 2 mm broad, densely subadpressed-hispidulous, except on the wide, whitish, ciliolate margin round the apex, stramineous splashed castaneous. *Female glumes* ovate, deeply cymbiform, base incurved, apex very obtuse, sometimes bilobed-emarginate, 5—6 mm long, about 3 mm wide, translucent, stramineous below, castaneous above, margins very widely whitish, especially above, becoming erose, apex sometimes ciliolate, multinerved, some nerves vinaceous, midrib reddish, coalescing with 2 adjacent vinaceous nerves above, and excurrent from just below the wide whitish apical margin in a minutely hispidulous mucro or awn, up to 0.5 mm long. *Utricles* very undeveloped, lanceolate, probably trigonous later, up to 6 mm long and 1.5 mm broad, strongly plurinerved, narrowly marginate, hispidulous, especially on the margins, stramineous, gradually tapering above into a *beak* which is very long, broad, hispidulous, castaneous above, bidentate; *teeth* long, white, hispidulous. *Stigmas* 3.

MALAY PENINSULA: Perak; Larut, 900—1050m, Feb. 1882, *King's collector*

(*Kunstler*) 2801 (K)!

Lower Burma.

I have not seen, neither did Kiikenthal see, the Burma specimen, collected by Kurz at Pegu and cited by Clarke. It is apparently fruiting, for Clarke (*I.e.*) describes the utricle and achene. The Perak specimen is young, with undeveloped fruits, but its wide leaves alone distinguish it at once from the other Malaysian species of its section.

#### 45. CAREX TURRITA C. B. Clarke

*Carex turrita* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 13: 1904; Merrill, Enum. Philipp. Fl. PL 1: 142: 1923. — Philippine Islands, *Loher* 700.

*Carex Walkeri* Arn. ex Boott var. *turrita* (C. B. Clarke) Kiikenth. in Engl. Pflanzenz. IV, 20: 546: 1909.

*Rhizome* elongated, slender, woody. *Stems* erect but apex cernuous, obtusely trigonous, up to 105 cm or more tall, 2—3 mm thick below, pale green, ribbed, smooth, or slightly scaberulous just below the uppermost panicle. *Leaves* basal and subbasal, and up to 3, spaced, higher on the stem, long but shorter than the stems, 4—7 mm wide, flattish but margins involute or revolute, stiff; *sheaths* fulvous, reddish, or reddish-nerved, membranous in front, mouth prolonged into a rounded, membranous tongue about 1 mm long, basal sheaths vinaceous or reddish, eventually fraying into fibres. *Inflorescence* a continuous or little interrupted panicle, occupying the upper 28—42 cm of the stem; *secondary panicles* or *fascicles* about 9—13, at about 7 nodes, single and binate, lowest and 1—2 middle ones single, remainder binate, upper approximate or subapproximate and fastigate, lower distant or very distant from one another, several upper ones, usually the scarcely peduncled, reduced to a simple spike, but the great majority each branched into 2—6 (mostly 3—4) simple spikes, middle and lower on longly or (lowest) very longly, upper on scarcely or shortly, exerted peduncles; *peduncles* subterete to trigonous, very slender (0.2—0.3 mm thick), smooth below, angles often scaberulous above. *Bracts* foliaceous, mostly shorter than the stem, more or less equalling their own panicles, longly to very longly sheathing, upper much reduced, shortly to rather longly sheathing; *sheaths* dark-reddish and membranous above in front, lower glabrous to scurfy, upper sometimes minutely hispidulous at the mouth, which is shallowly concave to tongue-like, nodes mainly golden to golden-brown. *Spikes* approximate at the apex of the peduncle, usually secund and fastigate, androgynaeceous, slenderly cylindrical, 2—8 cm long, subclax- to subdense-flowered, suberect to cernuous, straight to curved or flexuous, mostly sessile or subsessile or on peduncles shortly included in, uncommonly very shortly exerted from, the usually rather short sheaths of the bracteoles, male part mostly longer, much longer in some apical spikes, especially in the upper panicles, but sometimes, especially in basal spikes, no longer or even slightly shorter than the female part, 1—1.5 mm thick, female part about 4 mm thick. *Bracteoles* tubular glumiform sheaths, minutely sparsely whitish subadpressed-hispidulous, about 3.5 mm long, awned, awn about 2 mm long, hispidulous-margined. *Cladophylls* hidden in the

bracteoles, obscurely utriculiform below, incurved-glumiform above, apex rounded, erose, 2.5—2.75 mm long, about 0.4 mm broad, very sparsely hispidulous in the centre above, otherwise glabrous. *Female glumes* cuneate-oblong, upper quarter deltoid, incurved below, cymbiform above, apex obtuse to rotund, 3.25—3.5 mm long, 1.5—2 mm wide, translucent, glabrous, or very sparsely hispidulous near the apex, dark reddish or reddish-brown, or sometimes pale below and splashed reddish-brown above, with a wide, whitish and erose or erose-ciliolate margin on the deltoid portion, strongly and reddish-nervose, midrib and 2 adjacent nerves forming a pale central stripe and coalescing above and excurrent in a minutely hispidulous-margined awn, 0.5—2 mm long; *male glumes* much larger. *Utricles* narrowly ellipsoid, tapering at each end, trigonous, 5.5—6 mm long, 0.8—1 mm broad, subcoriaceous, very slenderly and obscurely 4—6-nerved ventrally, obscurely 8—12-nerved dorsally, narrowly marginate, glabrous, smooth, nitidous, margins sparsely hispidulous from about or above the middle upwards, sometimes slightly so also on one or two lateral nerves near the apex, straight to slightly recurved, becoming patulous, golden, splashed reddish or blackish-red, gradually 0.6 mm long, stoutish, pale green stipitate, gradually narrowing into a *beak*, which is plano- or concavo-convex, gradually tapering, about 2 mm long, stoutish, narrowly marginate, sparsely hispidulous-margined, often dorsally reddish grooved, bidentate; *mouth* not oblique; *teeth* 0.5—0.75 mm long, rather slender, straightish, sparsely minutely hispidulous, reddish. *Achene* narrowly ellipsoid, trigonous, angles prominent, faces concave, 3 mm long, 0.75—1 mm broad, shortly, stoutly stipitate, very shortly, stoutly beaked; *beak* bent at the base, apex slightly discoid. *Style* scarcely thickened at the base. *Stigmas* 3, rather long.

PHILIPPINE ISLANDS: Luzon: Benguet; *Lohr* 700 (K) !; *ibid.*, Mt. Simacoco, Oct. 1921, *Ramos & Edano* (*Bur. Sci. U0,85U*) (B) !; *ibid.*, Mt. Pulog, Feb.—March 1925, *Ramos & Edano* (*Bur. Sci. U,9S2*) (B, BM, S) ! Bontoc; Mt. Polis, Feb. 1920, *Ramos & Edano* (*Bur. Sci. 37,720*) (B, BM, K, L) ! Ifugao; Mt. Polis, Feb. 1913, *MacGregor* (*Bur. Sci. 19,665*) (BM, K, L) !

"Apparently in open places, alt. probably above 1400 m."—Merrill (*l.e.*).

Endemic.

I have not seen Binnemeijer 10,450 (Sumatra; West Coast, Mt. Korinchi, 2400 m, 10 May 1920), identified by Kiikenthal (*in Bull. Jard. Bot. Buitenz. sér. 3, 16: 319: 1940*) as this species.

#### 46. CAREX MERKILLII Kiikenth.

*Carex Merrillii* Kiikenth. *in*, Fedde, *Repert. Spec. Nov.* 8:7: 1910; Merrill, *Enum. Philipp. Fl. PL 1: 139: 1923.* — Philippine Islands, *Merrill* 6623.

Tufted. *Stems* erect, or apex subcernuous, trigonous, 21—113 cm tall, 0.6—2.25 mm thick below, smooth but angles scaberulous towards the apex of the rhachis, sometimes surrounded at the base, below the leaves, by a few dark- to blackish-red cataphylls. *Leaves* basal, crowded, and

usually 1—2 higher on the stem, erect to oblique, straight to subcurved, very much shorter than the stems, lower ones short-bladed, 2—5 mm wide, flat or flatfish, margins sometimes slightly revolute or involute, rather stiff, numerous raised dots over the upper surface becoming more and more scabrid towards the longly attenuated apices, septate-nodulose in places on the under-surface; *sheaths* usually reddish or blackish-red, especially near the nodes, sometimes pale dull yellowish, membranous and dark reddish in front, glabrous, mouth concave to convex and tongue-like. *Inflorescence* a continuous or little interrupted panicle, rather lax below, occupying the upper 6.5—44 cm of the stem; *secondary panicles* at about 4—8 nodes, comprising 9—20 or more spikes, 1—5 at each node, lowest spikes single or binate, middle ones binate to quinate, and the upper binate or ternate, upper fascicles approximate or subapproximate and fastigate, at nodes approximate to subdistant, lower often overlapping and subfastigate, though at nodes distant to remote from one another, spikes on scarcely or shortly to longly or very longly and unequally exerted peduncles, the shortly and some of the longly peduncled spikes being simple, but most of the longly peduncled ones often branched into 2—5, sessile, simple spikes; *peduncles* obtusely trigonous to subterete, very slender (0.15—0.4 mm thick), smooth. *Bracts* of the lower fascicles foliaceous, usually shorter than their fascicles, longly to very longly sheathing, upper much reduced, shortly to rather longly sheathing; *sheaths* similar to those of the leaves. *Spikes* mostly distinctly androgynaeceous, but some nearly wholly female, the former being those composing the upper fascicles and the upper ones of the compound spikes, while the simple spikes and the lower ones of the compound spikes have usually only a few male flowers at their apices, slenderly cylindric, 1—4 cm long, 2—3 mm thick, lax- to subdense-flowered, erect to oblique, straight to flexuous, apical ones probably subcernuous, fastigate. *Female glumes* oblong-ovate to oblong-obovate, base thickened and incurved, cymbiform above, apex obtuse to very obtuse, 2—2.5 mm long, 1—1.25 mm wide, light- to rich dark-reddish, margins thin, wide, whitish, becoming erose, especially towards the apex, slenderly nervose, midrib and 2 strongish adjacent nerves coalescing above and usually excurrent in an awn, up to 0.5 mm long. *Utricles* ellipsoid, sometimes slightly obovoid-ellipsoid, trigonous, 3—3.75 mm long, 0.6—0.8 mm broad, membranaceous, densely glandular-papillose, nerveless except for 2 submarginal "nerves" (displaced margins) on the dorsal face, glabrous to sparsely subadpressed-hispidulous below, sparsely to subdensely so above, straight, becoming subpatulous to patent, blackish-red, with a stoutish, gibbous, 0.3 mm long, pale green stipe, subgradually beaked; *beak* plano-convex, about 1 mm long, stoutish, slightly marginate, hispidulous-margined, pale but often

reddish below, bidentate; *mouth* slightly ventrally oblique; *teeth* 0.25—0.5 mm long, lanceolate, slightly diverging, tips whitish, becoming erose. *Achene* ellipsoid to oblong-ellipsoid, distinctly trigonous, faces flattish to subconcave, 1.5—1.75 mm long, 0.6—0.75 mm broad, nut-brown, scarcely to shortly, and straight to slightly basally bent-stipitate, stoutly beaked; *beak* usually much bent at the base, whitish and slightly discoid at the

apex. *Style* stoutish, scarcely thickened towards the base. *Stigmas* 3, rather thick.

PHILIPPINE ISLANDS: Luzon; Benguet, Pauai, May 1909, *Merrill* 6623 (K, L) !; *ibid.*, Benguet, May 1911, *Merrill* 7806 (BM, K) !; *ibid.*, Mt. Osdung, March 1931, *Quisumbing & Sidit* (*Bur. Sci.* 82,490) (K)!

"In the mossy forest and in open places along trails, alt. about 2250 m."—*Merrill* (*l.e.*).

Endemic.

Rather an attractive plant with its fascicles of dark reddish or blackish-red spikes.

#### 47. CAREX PULLEI Nelmes

*Carex Pullei* Nelmes in *Kew Bull.* 1950: 198: 1950. — Netherlands New Guinea, *Pulle* *IMB*.

Loosely tufted. *Stem* erect, though rhachis may be slightly cernuous, trigonous, about 80 cm tall, 1—2 mm thick below, smooth except in the upper part of the rhachis, where the angles are usually minutely scaberulous, dark reddish cataphylls at the base. *Leaves* basal and subbasal, with 1 or 2 also higher on the stem, shorter than the stems, 2—4 mm wide, flat to canaliculate-conduplicate, often with small protuberances on the upper surface, becoming scab rid towards the apex, rigid; *sheaths* wholly dark reddish from, node to mouth, those of the stem-leaves long, basal ones ultimately fraying into reddish fibres. *Inflorescence* an interrupted, slender panicle, occupying the upper 25—40 cm of the stem, and consisting of 4—6 nodal fascicles, each consisting of 1—7 spikes, the majority simple but 1 or 2 of the longer ones in most fascicles bearing 1 or several small spikes at their lowest node (bracteole), lower fascicles distant, upper subapproximate with overlapping spikes. *Bracts* of the lower fascicles foliaceous, longer than, upper about equalling, their fascicles, upper bracts much reduced, setaceous and shorter than their fascicles, lower longly upper shortly sheathing; *sheaths* glabrous or upper minutely hispidulous, especially at the mouth, reddish-spadiceous in the lower part at least, especially at the nodes, membranous in front. *Spikes* erect, or longer ones slightly cernuous, cylindric, unequally peduncled in each fascicle but fastigiate, androgynaeceous, 1—4 cm long including the branched basal part, male part, at least in the longer, simple spikes, much shorter than the female, slender, female part 2—3 mm thick, subax-flowered, spikes of upper fascicles on unequally scarcely to rather shortly exerted peduncles, those of lower ones on unequally longly to very longly exerted peduncles; *peduncles* slender (0.2—0.25 mm thick), trigonous or compressed, glabrous or minutely scaberulous on the angles. *Female glumes* more or less oblong or oblong-obovate with a triangular apical portion, much incurved below, less so or cymbiform above, apex acute to obtuse, often slightly ciliolate, 2—3 mm long, 1—1.8 mm wide, subtranslucent, usually glabrous, but occasionally minutely scurfy-hispidulous above, dark vinaceous or dark reddish, with wide white-hyaline margins, especially above,

and pale at the base, or dark reddish only at the base and otherwise whitish, white parts very thin, becoming erose, slenderly nervose, midrib sometimes pale, coalescing above with two adjacent nerves and usually excurrent in a smooth or minutely hispidulous-margined awn, up to 0.75 mm long. *Utricles* narrowly ellipsoid or oblong-ellipsoid but tapering at each end, distinctly trigonous, faces flattish, 3—4 mm long, 0.8—1 mm broad, membranaceous, almost nerveless to rather slenderly 1—3-nerved ventrally, slenderly about 2-nerved on each half of the dorsal face, scarcely to very narrowly marginate, glabrous on the dorsal face, very sparsely to sparsely setulose ventrally in lines along nerves above, shortly setulose on the margins from the middle or near the base upwards, straight or slightly recurved, becoming patulous, dull olive-green below, especially dorsally, sometimes with reddish or dark vinaceous patches, otherwise dull blackish-red, tapering to a spongy-thickened stipe-like base, stipe proper very short (0.2—0.4 mm long), subgradually tapering into the beak; *beak* gradually tapering, plano-convex, 1—1.5 mm long, narrowly marginate, setulose-margined, bidentulate; *mouth* scarcely dorsally oblique; *teeth* glabrous, pale, becoming erose, straight, lanceolate, very short (0.2 mm). *Achene* ellipsoid or oblong-ellipsoid, trigonous, faces flattish or shallowly concave, 1.6—2 mm long, 0.75—0.8 mm broad, becoming reddish-brown, not or scarcely stipitate, scarcely to very shortly (up to 0.2 mm), straight or sometimes slightly bent-beaked. *Style* slightly thickened at the sometimes bulbously spongy base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; heathy south slope of Treub Mt., slate (schist), 2400 m, 17 Feb. 1913, *Pulle* *IMB* (B) ! — North-East New Guinea; Morobe District, Matah Station, mossy and bushy slope, 1500—1800 m, 13 March 1940, *Clemens* *J+1,023* (AA) !

Endemic.

A smaller species than *C. atrosanguinea*, with sometimes "compound" spikes.

#### 48. CAREX ATROSANGUINEA Nelmes

*Carex atrosanguinea* Nelmes in *Kew Bull.* 1950: 197: 1950. — Papua, *Brass* 4068.

Scarcely tufted, *Rhizome* elongated but not longly creeping, moderately thick, woody. *Stem* erect or rhachis slightly cernuous, trigonous, 77 cm tall, 1.5 mm thick below, strongly ribbed, smooth, including the lower part of the rhachis, which is sparsely scaberulous on the acute angles towards the apex, especially just below the nodes. *Leaves* basal, rather crowded, long but much shorter than the stem, 4—5 mm wide, flattish to revolute, stiff, upper surface covered with small protuberances which become scabrid towards the longly attenuated apex; *sheaths* very short, reddish to very dark reddish, ultimately fraying into coarse fibres. *Inflorescence* an interrupted slender panicle, occupying the upper 49 cm of the stem and consisting of 7 nodal fascicles, each fascicle consisting of 4—6 simple (*i.e.* unbranched) spikes, lower fascicles distant, upper subapproximate with slightly overlapping spikes. *Bracts* of the lower fascicles foliaceous, exceeding or about equalling their fascicles, upper

bracts much reduced, setaceous and much shorter than their fascicles, lower rather longly upper rather shortly sheathing; lower *sheaths* glabrous, upper minutely setulose above, blackish-red below, greenish red above on the back, front membranous. *Spikes* erect, or longer ones slightly cernuous, unequally peduncled in each fascicle but fastigiate, androgynaeceous but shorter peduncled ones with short and longer peduncled ones with rather short male apices, whole 2—4 cm long, male part very slender (0.6—0.8 mm thick), female part 2.5—3.5 mm thick, subax-flowered, spikes of upper fascicles on unequally scarcely to shortly, those of lower ones on unequally longly, exerted peduncles; *peduncles* slender (0.5—0.6 mm thick), trigonous or compressed, more or less minutely scaberulous on the angles. *Female glumes* obovoid or oblong-obovate with a triangular apical portion, or oblong with rounded upper corners, incurved below, deeply cymbiform above, apex subacute to, very obtuse, 2.75—3.3 mm long, 1.5—2 mm wide, subtranslucent, glabrous, light greenish below on the margins, otherwise blackish-red, but narrowly to rather widely whitish hyaline towards the apex, which is often minutely erose-ciliolate, slenderly but distinctly nervose, midrib coalescing and paler above with 2 adjacent nerves and excurrent just below the apex in a minutely hispidulous-margined awn up to 1.2 mm long. *Utricles* ellipsoid but tapering at each end, trigonous, faces flattish, 5—6 mm long, 0.9—1.1 mm broad, membranaceous, slenderly 1—4-nerved ventrally, 1—4-nerved on each half of the dorsal face, narrowly marginate, rather sparsely whitish subadpressed-hispidulous above the glabrous base, often in lines along nerves, and on the margins, straight, subpatulous to patulous, usually pale yellowish-green below and blackish-red above but green only at base ventrally, tapering to a stout stipe-like base, spongy, stipe proper very short (0.2—0.4 mm long), gradually to sub-gradually tapering into the beak; *beak* gradually tapering, plano-convex, 1.75—2.25 mm long, narrowly marginate, hispidulous-margined, dark-red below, greenish above, bidentate; *mouth* not oblique; *teeth* straight, lanceolate, 0.3—0.5 mm long. *Achene* oblong-ellipsoid-obovoid, trigonous, faces concave, 3—3.5 mm long, 0.8—0.9 mm broad, stramineous with whitish base, stipe 0.3—0.4 mm long; *beak* subtrigonous, 0.2—0.5 mm long, straight or sometimes slightly bent. *Style* slightly thickened at the base. *Stigmas* 3, rarely 2, 3—4 mm long, curved or flexuous.

NEW GUINEA: Papua; Central Division, Mt. Tafa, a few plants on open burnt-over ground in mossy forest, 2350 m. May—Sept. 1933, Brass 4.068 (K, L) !  
Endemic.

Its closest relative is *C. Gibbsiae* Rendle (Fiji). It is the only species with simple spikes among the androgynaeceous-spiked *Decorae* in Malaysia.

#### 49. CAREX VERTICILLATA Zoll. & Mor.

*Carex, verticillata* Zoll. et Mor. in Moritzi, Syst. Verz. 98: 1845-46; Miq., Fl. Ned. Ind. 3: 353: 1857. — Java, Zollbiger 1792.

*Carex: hypsophila* Miq., Fl. Ned. Ind. 3: 354: 1857; C. B. Clarke, 13; Kükenth., 546 t. 89. — Java, Jungkuhn 479.

*Carex tartarea* Ridley in Journ. Bot. 23: 35: 1885. — Sumatra, Forbes 2444.  
*Carex sumatrensis* C. B. Clarke in Journ. Linn. Soc. Bot. 37: 13: 1904. — Sumatra, Forbes 2388.

*Carex hypsophila* Miq. var. *verticillata* (Zoll. et Mor.) Kükenth. in Engl. Pflanzenz. IV, 20: 546: 1909.

Tufted. *Rhizome* creeping, 1—2 mm in diameter, woody. *Stems* usually somewhat cernuous at the apex, trigonous, 25—95 cm tall, 1.25—2 mm thick below, smooth including the rhachis which is sometimes somewhat curved or flexuous, surrounded, below the leaves, by dark reddish, entire to semi-fibrous remains of old, leaf-sheaths. *Leaves* numerous, basal, and 1—2 on the stem proper, except when this, below the rhachis, is very short, usually much shorter than, rarely about equalling, the stem, 3—7 mm wide, curved, or sometimes straight or straightish and then erect or oblique, flattish-caniculate, margins often strongly revolute, stiff, coriaceous, thick, often densely pitted on the under-surface, with corresponding minute or small protuberances on the upper surface which are scabrid above, especially towards the longly attenuated apices, sometimes septate-nodulose in places; *sheaths* of the lower leaves often tinged reddish or blackish-red, membranous at the mouth, upper sheaths pale. *Inflorescence* a lax, somewhat interrupted, or dense and almost continuous, panicle, consisting of 4—7 fascicles, and occupying the upper 15—48 cm of the stem; *fascicles* at bracteate nodes, each consisting of 1—20 or more spikes, simple or longest ones sometimes branching into 1—3 short spikes, lower usually rather distant from one another and consisting of few spikes, upper at approximate or subapproximate nodes and composed of numerous spikes, fastigate and dense. *Bracts* of the lower fascicles foliaceous, equalling or exceeding their own fascicles, but mostly much exceeded by the stem, rather longly sheathing, upper much reduced, rather shortly sheathing; *sheaths* ampliate, especially where the spikes are numerous, glabrous, membranous and often reddish at the mouth, which is often prolonged into a very short erose-margined tongue. *Spikes* in each fascicle wholly female with usually (upper), or sometimes (lower), one wholly male spike (usually 1—2 male spikes in the uppermost fascicles), slenderly cylindrical, densely fastigiate in each fascicle, lax- to subdense-flowered, erect or suberect and straight to patulous and flexuous, apical ones probably somewhat cernuous, lower on rather to very longly, upper on scarcely to very shortly, exerted peduncles, male spikes 2—5 cm long, 1—2 mm thick, female 1.5—4.5 cm long, 3—5 mm thick; *peduncles* obtusely or obscurely trigonous, very slender, smooth. *Female glumes* oblong-elliptic-lanceolate to oblong-ovate-lanceolate, strongly incurved below, cymbiform above, apex obtuse to very obtuse, 3—4.75 mm long, 1.5—2 mm wide, translucent, glabrous, base stramineous, otherwise fulvous, often with reddish patches, to shining dark-reddish with wide whitish margins, especially above where the margins are erose-excised, plurinerved below, midrib and 2 adjacent nerves, often forming a some-

what paler, central stripe, coalescing above and often excurrent in a smooth or minutely hispidulous awn up to 1 mm long; *male glumes* more or less oblong-lanceolate but somewhat tapering towards the base, about twice as long as the female, 2—2.5 mm wide, rather longer awned, otherwise similar. *Utricles* ellipsoid but tapering at each end, trigonous, 4.5—6 mm long, 0.8—1 mm broad, membranous, minutely glandular-punctulate, or papillose on the dark patches, nerveless, narrowly marginate, glabrous, often somewhat recurved but sometimes straight or straightish, suberect to patulous, blackish-red to golden with reddish patches, longly tapering below into a stipitate base 0.75—1 mm long, base pale, gibbous in front, very longly tapering above and subgradually to subabruptly beaked; *beak* gradually tapering, plano-convex and reddish below, subterete and pale or paler above, 2—2.75 mm long, very narrowly marginate, sparsely hispidulous-margined, bidentulate to subentire; *mouth* slightly ventrally oblique; *teeth* very short, whitish hyaline, erose. *Achene* ellipsoid or slightly oblong-ellipsoid, distinctly trigonous, faces flat or flattish, 1.75—2 mm long, 0.8—1 mm broad, grey-punctulate over brown, scarcely or very shortly stoutish-stipitate, pale, stoutly, and shortly beaked, stipe and beak straight. *Style* stoutish, not or scarcely thickened towards the beak. *Stigmas* 3.

SUMATRA: Atjeh; Gajo Lands, Mt. Leuser (Losir), camp 4—5, stream-valley, water-divide, 2700—2800 m, 31 Jan. 1937, *van Steenis* 8523 (B, K)! - West Coast; Korinchi Peak [G. Kerintji], 3260 m, 8—9 May 1914, *Robinson & Kloss* (BM, K, S)!; *ibid.*, 3750 m, and lower, Aug. 1915, *Jacobson* 2475 (B)!; *ibid.*, stony field among underwood, 3000—3600 m, 4 May 1920, *Bunnemeijer* 10,038 (K, L)!, 10,044 (B, K)!; *ibid.*, 2700 m, 9 May 1920, *Bunnemeijer* 10,383, partim (with *C. filicina*) (B)!; *ibid.*, forest, 2400 m, 10 May 1920, *Bunnemeijer* 10,450 (B)!; *ibid.*, along the way from Kajuaro (1400 m) to the summit (3805 m), that is, the route taken by the Singapore expedition (Robinson and Boden Kloss, 1914), 3700 m, 1 Aug. 1931, *Frey-Wyssling* 138 (B)!; *ibid.*, 3300 m, highest part of the mountains, 14 Feb. 1933, *Holtum* (Sing. Field No. 26,230) (K, S)! — Bengkulu (Bencoolen)/Palembang; Mt. Dempo, 2550 m, *Forbes* 2388 (BM, K, L)!; *ibid.*, 2700 m, 1880, *Forbes* 2444 (BM, K, L, S)!; *ibid.*, damp places on crater-bottom, ± 3000 m, 6 April 1933, *de Voogd* 1563 (L, S)!; Mt. Pesagi (Ranau), 2000 m, 21 July 1935, *Rappard* P. 3 (B)!

JAVA: Bogor (Buitenzorg); in sandy stretches along the bank of the Tjiapus, Nov. 1843, *Zollinger* 1792; Mt. Pangrango, summit, 2760 m, Herb. *Kurz* 1831 (L)!; Kandangbadak, Mt. Gede, [probably] *Reinwardt* (L)!; on the great lake [?] by the crater Gede, ex Herb. *Blume*? (L)!; near the crest of Mt. Gede, ex Herb. *Blume* (L)!; Mt. Pangrango, summit, alpine region, ± 3000 m, 9 May 1894, *Schiffner* 1659 (K, L)!; Chi Baram [Tjibeureum], 16 July 1894, *Hullett*, partim (with *C. neo-guineensis*) (K, S)!; L.Mt.] Mandalawangi, 2700 m, *Junghuhn* 479 (L)!; [Mt.] Mandalawangi, central plateau, of highest peaks, April, *Junghuhn* 543 (K, L)!; and 14 other gatherings seen from these region. — Tjirebon (Cheribon); Mt. Tjareme (Tjerimai), June 1920, *van der Meer Mohr* 14 (B)!; Mt. Tjareme (Tjerimai), west crater-edge, sunny place, common, 3051 m, May 1921, *Vermeiden* 53 (B)! — Banjumas; Mt. Slamet, southwest slope, 3100 m, 20 April 1911, *Backer* 522 (B)! — Surakarta; in grass near

Selo (Mt. Merbabu), Herb. *Waltz* (L)! — Kediri/Malang; Mt. Kawi, Oro-oro, ± 2650 m, 18 May 1929, *Docters van Leeuwen-Rijnvaan* 162 (B)!

[Locality?], ex Herb. *Korthals* (L)!; Sederatote, *Korthals* (L)!; [locality?], 16 July 1894, *Hullett* (K, S)!

I have not seen the type of *C. verticillata* but there seems little doubt about it being the same species as the common West Java plant which we have long known under the later name *C. hypsophila* Miq. Like other common and striking sedges it has been the victim of a number of synonyms.

#### Var. HAVILANDII (C. B. Clarke) Nelmes

*Carex verticillata* Zoll. et Mor. var. *Havilandii* (C. B. Clarke) Nelmes in *Kew Bull.* 1950: 195.

*Carex hypsophila* Miq. var. *Havilandii* (C. B. Clarke) Kükenth. in *Engl. Pflanzenr.* IV, 20: 546: 1909.

*Carex Havilandii* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37: 13: 1904. — Borneo, *Haviland* 1403.

*Stems* 12—50 cm or more tall. *Leaves* often longer than the stems. *Inflorescence* 5—20 cm long. *Bracts* mostly, often far, exceeding the apex of the stem. *Spikes* straight or straightish, erect to patulous. *Female glumes* 3—5.5 mm long, oblong-ovate to oblong-lanceolate, apex often very obtuse, sometimes bilobed-emarginate, often blackish-red, awn 0.5—1.5 mm long. *Utricles* 4—5.5 mm long, 1 mm or less broad, usually very dark, margins sparsely hispidulous in the upper third, margins of the beak hispidulous.

BORNEO: British North Borneo; Mt. Kinabalu, 3000 m, reed, at Kew, Aug. 1892, *Haviland* 1403 (K)!; cracks in granite on summit, 3990 m, Feb. 1910, *Gibbs* 4191 (K)!; damp places, Kamborangah, 2100 m, Feb. 1910, *Gibbs* 4230 (BM, K)!; above Kamborangah, with ferns amongst moss on prostrate trunks of trees, 2100—2400 m, Feb. 1910, *Gibbs* 4243 (K)!; Paka Cave, 12—14 Nov. 1915, *Clemens* 10,578 (B, BM)!; and 10 other *Clemens* numbers from the Mt. Kinabalu area.

Endemic.

∴

Varying from the species through its very dark glumes and a few other characters.

#### Var. LUTESCENS Nelmes

*Carex verticillata* Zoll. et Mor. var. *lutescens* Nelmes in *Kew Bull.* 1950: 195: 1950. — Java, *Jeswiet* 40.

*Rhizome* creeping, slender (1—1.5 mm thick), clothed with orange-red, long sheathing scales. *Stems* rather taller, on average, than those of *C. verticillata*. *Leaves* strikingly longer than those of *C. verticillata*. *Bracts* sometimes much exceeding the stem. Male and female *spikes* both up to 6 cm long. *Female glumes* 3.5—4 mm long, golden to fulvous, awn 0—0.25 mm long. *Utricles* 4—4.5 mm long, pale with fulvous to orange-brown patches.

JAVA: Malang; Mt. Semeru, Ranu Kumbolo, 6 July 1929., *Jeswiet 40* (K, L) !  
Endemic.

Colour and other minor characters differentiate this strikingly from the species.

#### 50. CAREX PHACELOSTACHYS Nelmes

*Carex phacelostachys* Nelmes in Kew Bull. 1950: 195: 1950. — Malay Peninsula, H. C. Robinson.

Tufted. *Rhizome* oblique, shortly creeping, slender, woody, clothed with short, strongly nerved, brown scales. *Stems* erect or suberect, apex apparently somewhat cernuous, trigonous, 30—50 cm tall, about 1.5 mm thick below, smooth except at the sparsely scaberulous apex, often largely hidden by leaf-sheaths below the rhachis, surrounded at the base, below the leaves, by a few reddish cataphylls. *Leaves* mostly basal and subbasal, but 1—several higher on the stem, mostly considerably shorter than but a few about equalling the stem, 2.5—6 mm wide, mainly flat or flattish but upper margins sometimes revolute, stiff and subcoriaceous, upper surface covered with minute rough protuberances towards the longly attenuated apices; *sheaths* of the basal leaves membranous and often reddish in front, concave and glabrous at the mouth. *Inflorescence* a slender, continuous, or little interrupted panicle, occupying the upper 24—27.5 cm of the stem, and consisting of 5—7 *fascicles*, at nodes, each fascicle consisting of 1—3 unequally peduncled spikes, the shortly peduncled ones being simple but the longly peduncled ones often branched into 2—6 simple spikes, upper fascicles approximate or subapproximate and fastigiate or subfastigiate, lower rather distant but often subfastigiate. *Bracts* of the lower fascicles foliaceous, much shorter than to slightly exceeding the stem, upper bracts much reduced, subfoliaceous, filiform, usually failing to reach but sometimes slightly exceeding the apex of the stem, lower longly, upper shortly to rather longly sheathing; *sheaths* partly to wholly reddish and membranous. *Spikes* straight and erect or suberect except the uppermost and some of the other long ones which are apparently sometimes curved and/or subcernuous, those of the lower and middle fascicles, if simple, wholly female, middle ones, if branched or longly peduncled, androgynaeous, upper spikes wholly male or with a few female flowers at their bases, cylindric, 1—8 cm long, subdense-flowered, male spikes and parts of spikes 1—2 mm thick, female-ones 4—5 mm thick; *peduncles* obtusely trigonous to subterete, slender (0.25—0.5 mm thick), smooth. *Bracteoles* (at the base of the branched spikes) in the form of large tubular sheaths, clasping the bases of the spikes and completely enclosing the cladophylls. *Cladophylls*. (in the bracteoles and upper, glumiform bracts) 2—4.5 mm long, surrounding the axes of the spikes but split to the base and more or less ocreiform, though subutriculiform below, apex sometimes bilobed with 2 midribs. *Female glumes* oblong-ovate or oblong-lanceolate, base gibbous and much incurved; cymbiform above, apex usually obtuse or very obtuse but sometimes at least subacute, 4—6 mm long, about 2 mm wide, translucent, reddish,

margins very widely whitish-hyaline, becoming erose, slenderly nervose, midrib often palish, hispidulous towards the apex, keeled, excurrent in an hispidulous awn, 0.25—1.5 mm long; *male glumes* somewhat longer and wider. *Utricles* ellipsoid, trigonous, 5.5—5.75 mm long, about 1 mm broad, membranaceous to subcoriaceous, 3—6-nerved on the angled dorsal and 2—5-nerved on the ventral face, very narrowly marginate, glabrous, smooth, straight to slightly and sometimes obliquely recurved, becoming subpatulous, olivaceous, splashed red or blackish-red, tapering below into a long, spongy, stipe-like base, gradually to subgradually narrowing into a beak above; *beak* slightly tapering, concave-convex, 1.5—2.5 mm long, broad, narrowly marginate, glabrescent to sparsely hispidulous-margined, bilobed or bidentate; *mouth* ventrally somewhat oblique; *teeth or lobes* straight, whitish-hyaline, becoming erose. *Achene* oblong-ellipsoid, sometimes oblong-obovoid, conspicuously trigonous, faces flattish, 1.75—2 mm long, 0.9 mm broad, tapering below, not or scarcely stipitate, apex subrotund, erostrate. *Style* thickened at the base, which is subpersiste'nt. *Stigmas* 3, longish.

MALAY PENINSULA: Perak; Mt. Kerbau, 1980m, 12 March 1913, H. C. Robinson (K, S) !  
Endemic.

This species was determined by Ridley (Fl. Malay Penins. 5: 184: .1925) as "*C. walkeri* Arn. ex Boott var.," and thus tentatively, named it has lain in the Kew and Singapore herbaria since it was collected, nearly forty years ago.

#### Var. LOSIRENSIS (Kiiikenth.) Nelmes

*Carex phacelostachys* Nelmes var. *losirensis* (Kiiikenth.) Nelmes in Kew Bull. 1950: 196: 19.50.— Sumatra, *van Steenis* 8658.

*Carex decora* Boott var. *losirensis* Kiiikenth. in Bull. Jard. Bot. Buitenz. ser. 3, 16: 319: 1940. — Sumatra, *van Steenis* 8658, 8682.

*Fascicles* composed of 3—6 spikes. *Spikes* lax-flowered. *Utricles* ellipsoid-lanceolate; *beak* 2—3 mm long.

SUMATRA: Atjeh. Gajo Lands, Mt. • Leuser (Losir), mid-summit and 'burnt-over, east summit and ridge, common, 2950—3500 m, 6 Feb. 1937, *van Steenis* 8682 (B)J; i)id., mountain heath, *van Steenis* 8658 (B, K) !  
Endemic.

It is, perhaps, doubtful whether this Sumatra plant should be placed here or under *C. verticillata* Zoll. et Mor. In my opinion the Indian *C. decora* Boott is a more distant relative.

#### 51. CAREX CELEBICA Kukenth.

*Carex celebica* Kukenth. in Engl. Bot. Jahrb. 70: 465: Jan. 1940; in Bull. Jard. Bot. Buitenz. s.sr. 3, 16: 318-319: Feb. 1940. — Celebes, *Kjellberg* 3730.

*Carex constricta* S. T. Blake in Journ. Arn. Arb. 28: 112: 1947. — Papua, MacGregor.

Tufted. *Rhizome* elongated, curved-horizontal, slender (about 1 mm in diameter). *Stems* erect or curved, obtusely trigonous, 2.5—10 cm tall, up to 1.75 mm thick, ribbed, sulcate, smooth, mostly hidden in leaves and leaf-sheaths, surrounded below the leaves by reddish or vinaceous, ribbed, large scales or cataphylls or their fibrous remains. *Leaves* subbasal, oblique to recurved, mostly longer than the stem, 1.5—5 mm wide, rigid, flattish but centrally canaliculate and slightly revolute-margined, slenderly septate-nodulose in places, upper surface rough-dotted, except at the base, leaf-apices attenuated to a thick, firm point; *sheaths* pale to bright reddish or vinaceous. *Spikes* 5—8, 0.5—2 cm long, cylindrical, terminal usually male, 1—2 mm thick, 4—7 lateral spikes female or androgynaeceous with short male apices, at 2—4 nodes, suberect, lower or lowest usually solitary, upper in fascicles of 2—3 at each node, forming a slender terminal inflorescence about 2—4 cm long, fascicles approximate and fastigiate, sometimes lowest spike arising from the sheaths of a distant, basal leaf (bract), 1.5—4 mm thick, lax- to subdense-flowered, lower on longly, upper on shortly, exerted peduncles; *peduncles* obscurely trigonous, stoutish, smooth. *Bracts* (lower) foliaceous, much exceeding the terminal spike, upper very much reduced, subfoliaceous to setaceous, about reaching up to or slightly exceeding the apex of the terminal spike, sheathing; *sheaths* rather short or short; *male spike* ebracteate. *Female glumes* ovate, oblong-ovate, or more or less oblong, deeply cymbiform, often incurved, upper margins often involute, sometimes acuminate with an acute apex, more often apex obtuse, bilobed-emarginate, truncate, or erose-rounded, 2.2—3 mm long, 1.5—1.75 mm wide, translucent, reddish below and sometimes above, otherwise brownish, with wide, thin, whitish margins, especially at the apex, soon becoming erose, nerveless or slenderly few-nerved, midrib sometimes greenish, prominent, thickening by coalescing with adjacent nerves towards the apex, where it forms a firm tip or is excurrent in a hispidulous-margined awn up to 0.75 mm long. *Utricles* ovoid, ellipsoid or obovoid-ellipsoid, distinctly trigonous, faces flat or flattish, 2.3—3(—3.25) mm long, 0.9—1 mm broad, membranaceous, nerveless, or obscurely 1—2-nerved on each half of the dorsal face, narrowly marginate when the conspicuous margins coincide with the angles of the achene, glabrous, smooth, usually slightly recurved, sometimes sideways curved, becoming subpatulous or patulous, olivaceous, sometimes with reddish or blackish-red blotches, becoming dark-brownish, shortly and sometimes bulbously-spongy stipitate, apex subabruptly beaked; *beak* gradually tapering, plano-convex, 0.7—1.2 mm long, scarcely to narrowly marginate, smooth or sometimes extremely sparsely hispidulous-margined, reddish-blotched; *mouth* bidentate or subentire, becoming erose-entire, whitish-hyaline. *Achene* ellipsoid, ellipsoid-ovoid, or ellipsoid-obovoid, trigonous, faces flattish, 1.5—1.75 mm long, 0.8—1 mm broad, minutely alveolate, dark reddish-brown with sometimes cinereous patches, abruptly beaked; *beak* stoutish, 0.1—0.2 mm long, sometimes pale and

dilate-annulate at the apex. *Style* more or less thickened at the base. *Stigmas* 3.

CELEBES: South-West Celebes; Latimodjong Mts., Mt. Pokapindjang, mountain heath, 2700 m, June 1929, Kjellberg 3730 (Herb. C. G. Aim, B) !; Enrekang, Mt. Pokapindjang, open place, 2800 m, 16 June 1937, Eyma 659 (B) !

NEW GUINEA: North-East New Guinea; Morobe District; Mt. Sarawaket, 2400—2700 m, 8 March 1937, Clemens 6073B (AA) !; ibid., 4050 m, 8 Apr. 1937, Clemens 6076C (AA) !; ibid., Sattelberg, steep, scrubby rock-wall, 7 Oct. 1937, Clemens 7389A (AA, K) ! — Papua; Central Division; Mt. Victoria, Owen Stanley Range, 1889, W. MacGregor (Melb) ! (photo of specimen with analytical drawings in Heib. Gray, Brisbane, and Kew).

Kiikenthal describes the glumes of his *C. celebica* as having acute apices, but they vary from acute through obtuse to bilobed-emarginate. Its spikes become thicker than described, and the utricles more spreading, at maturity. Thus the differences between it and Blake's *C. constricta* are eliminated, and I have no doubt that these two names represent not two species but one. A small plant; the most reduced species of Section *Decorae*.

Sect. 10. BORNEENSES Nelmes  
in Kew Bull. 1951: 121: 1951

Tufted. *Stems* surrounded at the base by spadiceous cataphylls. *Leaves* often covered with rough protuberances above, stiff and subcoriaceous. *Spikes* 2—8(—14), androgynaeceous, 1—5.5 cm long, lax-flowered, single or binate, simple or slightly compound, lower longly peduncled. *Bracts* sheathing; *sheaths* spadiceous, sometimes setulose. *Female glumes* incurved or amplexicaul at the base, usually oblong-ovate, sometimes oblong-lanceolate and acuminate, apex usually obtuse, glabrous or subadpressed-hispidulous, brownish or ferruginous with wide whitish margins, usually aristate. *Utricles* narrowly ellipsoid, tapering at each end, distinctly trigonous, multinerved, usually subadpressed-hispidulous, greenish, often becoming brownish, tapering above into a beak; *beak* long, bilobed, mouth oblique.

1. Some spikes bearing 2—4 smaller spikes. . . . . 52. *C. breviglumis*
1. Spikes all simple (unbranched) :
2. Stems 17—48 cm tall; leaves 2—3.5 mm wide; utricles 5—5.75 mm long (densely hispidulous except at the base), beak 1.75—2 mm long. . . . . 55. *C. Eymae*
2. Stems 40—138 cm tall; leaves 3—9 mm wide; utricles 5.75—8 mm long, beak 2—3 mm long:
3. Female glumes with subacute to obtuse apex, sparsely to subdensely hispidulous; utricles multinerved, subdensely to densely hispidulous . . . . . 53. *C. kinabaluensis*
3. Female glumes with obtuse to very obtuse apex, glabrous; utricles plurinerved, glabrous or sparsely hispidulous. . . . . 54. *C. borneensis*



In his great monograph (*in* Engl. Pflanzenr. IV, 20: 598: 1909), Kiiikenthal treated *C. borneensis* C. B. Clarke, the only species of my Section *Borneenses* then known, as a variety of *C. fusiformis* Nees, a Himalayan species, and placed it in Subsection *Debiles* Carey (of Section *Hymenochlaenae* Drejer). I consider that *C. borneensis* is a good species and that it has no place in any of the six subsections into which Kiiikenthal divides Section *Hymenochlaenae*. It and its allies seem to me sufficiently distinct to warrant the creation of a new section, and I have accordingly done so. They certainly have an affinity with the species of Section *Decorae*, and also, I think, but a more distant one, with *C. perakensis* C. B. Clarke and its allies, aberrant *Indocarices* in Section *Stramentitiae*.

The four species comprising this section are very closely related to one another, particularly *C. kinabaluensis*, *C. borneensis*, and *C. Eymae*, but so far as one can tell from the material available, and this is scanty except that of *C. kinabaluensis*, they appear to be distinct species.

## 52. CAREX BREVIGLUMIS Ridley

*Carex breviglumis* Ridley, Fl. Malay Penins. 5: 183: 1925. — Malay Peninsula, Ridley 13,865.

*Carex rivulorum* Ridley in Journ. F. M. S. Mus. 6: 195: 1915; Fl. Malay Penins. 5: 184: 1925, non Dunn (1908). — Malay Peninsula, Ridley 16,342.

*Carex pseudorivulorum* Kiiikenth. in Bull. Jard. Bot. Buitenz. ser. 3, 16: 319: 1940. — Based on *C. rivulorum* Ridley.

Probably tufted. *Rhizome* shortly creeping, woody. *Stems* erect, apex possibly cernuous. distinctly trigonous, faces often concave, about 85—100 cm tall, 1.75—2 mm thick below, glabrous and smooth throughout, surrounded, below leaves, by glabrescent to minutely hispidulous, spadiceous cataphylls. *Leaves* crowded, subbasal, and 1—3 higher on the stem, lower 1—3 short-bladed, others up to as long as the stem and 5—8 mm wide, flat to slightly revolute, stiff and subcoriaceous, upper surface hispidulous above, slenderly septate-nodulose in places, apices longly attenuated; *sheaths* of the basal leaves minutely hispidulous, nerves reddish-brown to blackish. *Inflorescence* consisting of a number of simple and slightly compound branching spikes at 4—6 or more nodes, occupying the upper 20—30 cm of the stem. *Spikes* erect to suberect, 7—14 (including those of branched spikes), lowest single, others binate, upper approximate and fastigiate, lower distant to remote, androgynaecous, cylindrical, 1—4 cm long, lax-flowered, female part 2—4 mm thick, as long as to very much longer than the male part, spikes unequally peduncled, on scarcely to very longly exserted ones, simple, or branched into 2—4 sessile or shortly peduncled spikes; *peduncles* subcylindric to obtusely trigonous, slender, smooth or sparsely scaberulous. *Bracts* foliaceous or subfoliaceous, upper much reduced, uppermost reduced to a longly awned membranaceous sheath, all much exceeded by the inflorescence, upper shortly lower longly

sheathing; *sheaths* glabrous, or minutely hispidulous at the mouth. *Female glumes* widely oblong-ovate, base thickened and amplexicaul, cymbiform to flattish above, apex obtuse to very obtuse, 2.5—4 mm long, 1.75—2.5 mm wide, translucent, glabrous below, especially in the centre, pale adpressed-hispidulous above, light castaneous, with wide whitish-hyaline-ciliolate margins above, nervose, midrib coalescing above with 2 adjacent nerves and excurrent in a minutely hispidulous-margined awn, 0.75—2.5 mm long. *Utricles* narrowly ellipsoid, trigonous, with prominent obtuse angles and flattish faces, 5—7 mm long, 1—1.3 mm broad, subcoriaceous, multinerved, scarcely to very narrowly marginate, adpressed-hispidulous from near the base to the apex, straight or straightish, becoming subpatulous, greenish-stramineous to greenish-brown, tapering below and then contracted into a scarcely to very shortly stoutish, dark-brown stipe, tapering above into a beak; *beak* slightly tapering, plano-convex to subterete, 0.75—2 mm long, narrowly marginate, hispidulous, pale, bilobed; *mouth* slightly oblique; *lobes* whitish, hispidulous or glabrescent, becoming erose. *Achene* oblong-ellipsoid, trigonous, angles prominent, pale brown, faces flattish to concave, 3.25—4 mm long, 1—1.25 mm broad, subabruptly stipitate; *stipe* 0.25—0.5 mm long, pale, more abruptly beaked; *beak* 0.3—0.6 mm long, pale, apex not or scarcely bulbous. *Style* scarcely to slightly thickened at the base, which is subpersistent. *Stigmas* 3.

MALAY PENINSULA: Pa hang; Telom, Mt. Berumban, Nov. 1908, Ridley 13,865 (K)!, 13,865a (S)!, (mounted with *C. clarkeana* Kiiikenth.); *ibid.*, Mt. Tahan, mountain on mossy wooded stream-banks, rare, 1680 m, July 1911, Ridley 16,342 (K)!: *ibid.*, ca. 1500 m, Feb. 1921, Seimund 805 (K)!: *ibid.*, Mt. Jasar, Cameron Highlands, 1800 m, in forest near summit of mountain, always with few spikelets, Aug. 1946, Holtum (S)!

Endemic.

Kiiikenthal (*in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 319: 1940) cites one Bornean (Clemens 33,652) and two Sumatran gatherings (Lörzing 8874 and Van Steenis 8783) under *C. pseudorivulorum*. In my opinion the Clemens and Lörzing numbers are not this species but may be *C. tonkinensis* Franch. I have not seen Van Steenis 8783 (Sumatra; Atjeh, Gajo Lands, Blang Kedjeren, towards Gadjah, in meadows among pines, 15 Feb. 1937).

## 53. CAREX KINABALUENSIS Stapf

*Carex kinabaluensis* Stapf in Journ. Linn. Soc. Bot. 42: 183: 1914. — Borneo, Gibbs 4H0.

*Carex Clemensii* Kiiikenth. in Fedde, Report. Spec. Nov. 29: 202: 1931. — Sarawak, Clemens 20,066, 20,389.

*Carex borneensis* C. B. Clarke var. *Clemensii* (Kiiikenth.) Kiiikenth. in Bull. Jard. Bot. Buitenz. ser. 3, 16: 320: 1940.

*Carex borneensis* var. *Clemensii* forma *angustifrons* Kiiikenth. in Bull. Jard. Bot. Buitenz. ser. 3, 16: 320: 1940. — Borneo, Clemens 31,412.

Loosely tufted. *Rhizome* short, woody. *Stems* erect or suberect, trigonous, 40—138 cm tall, 0.75—1.25 mm thick below, smooth, surrounded, below the leaves, by glabrescent to densely but minutely hispidulous, spadiceous cataphylls or their fibrous remains. *Leaves* crowded, subbasal, except for 1—3 higher on the stem, much shorter than to slightly exceeding the stem, 3—9 mm wide, flat to revolute, stiffish, sometimes somewhat glaucous, upper surface covered with minute setae above, apex longly attenuated; basal *sheaths* often minutely hispidulous, especially at the dark brown, membranous mouth, nerves reddish-brown to blackish on the back. *Inflorescence* consisting of 2—6 spikes, single or middle ones binate, occupying the upper 6.5—32 cm of the stem. *Spikes* erect to suberect, androgynaeceous, upper 2—4 approximate, fastigiate, lower distant to remote, cylindric, simple, 2—5.5 cm long, male part subdense-flowered, 1—1.5 mm thick, female part lax-flowered, 5—6 mm thick, usually about half as long as but up to longer than the male part, spike sometimes nearly wholly male, lower on longly or very longly, upper on scarcely to shortly, exerted peduncles; *peduncles* trigonous to subterete, slender, smooth or angles slightly scaberulous. *Bracts* of the lower spikes foliaceous or subherbaceous and filiform, upper reduced to glumiform, minutely hispidulous *sheaths*, with long, setaceous awns, lower longer upper shorter than their spikes, lower with long, green *sheaths*, which are hispidulous only near the mouth. *Female glumes* oblong, oblong-ovate or ovate-lanceolate, less often oblong-lanceolate, base incurved, cymbiform above, acuminate, apex subacute to obtuse, sometimes subtruncate owing to tapering being arrested and glume expanding near the apex, 2.5—4 mm long, 1.75—2.25 mm wide, subtranslucent, glabrous or glabrescent below and sparsely adpressed-hispidulous above, or wholly subdensely hispidulous, light castaneous-brown, margins widely pale, becoming erose, nervose, some lower nerves often dark-brown, midrib with 2 adjacent nerves coalescing above and excurrent in a stoutish minutely hispidulous-margined awn, 0.5—2.5 mm long. *Utricles* ellipsoid, or ellipsoid-lanceolate, trigonous, (5.5—)7—8 mm long, 1—2 mm broad, subcoriaceous, multinerved, very narrowly marginate, base glabrous or glabrescent, otherwise adpressed-hispidulous, straight or straightish, becoming subpatulous, stramineous or greyish-green to greenish-brown, tapering below to a spongy, scarcely to shortly stipitate base, tapering above into a beak; *beak* gradually to scarcely tapering, plano-convex to subterete, 2—3 mm long, scarcely or narrowly marginate, sparsely hispidulous margined, bilobed; *mouth* very oblique. *Achene* oblong-ellipsoid, trigonous, dark reddish-brown, sometimes with darker spots, about 4 mm long, 1.5—1.75 mm broad, shortly and stoutly pale-stipitate and pale-beaked; *beak* sometimes bent, up to 0.4 mm long, apex not bulbous. *Style* not or slightly thickened towards the base. *Stigmas* 3.

BORNEO: British North Borneo; Mt. Kinabalu, Penitukan spur, jungle, 1200 m, Feb. 1910, *Gibbs* 4070 (BM, K) !; *ibid.*, Marai Parai spur, mossy forest, 2100 m, Feb. 1910, *Gibbs* U097 (K) !; below Pakapaka cave, 2700 m, under trees, Feb. 1910, *Gibbs* 4240 (BM) ! *ibid.*, Dallas, 900 m, Nov. 1931, *Clemens* 30,068

(L) !; and 14 other *Clemens* numbers from the Mt. Kinabalu area. — Sarawak; Mt. Poe', *Hewitt* (K) !; Mt. Poe', mossy forest, 19 Sept. 1929, *Clemens* 20,066 (K) !; Mt. Dulit, Dulit Ridge, ca. 1230 m, "transition" forest, 9 Sept. 1932, *Richards* 1663 (K) !; *ibid.*, ca. 1200 m, sandy bank of stream, in shade, 10 Sept. 1932, *Richards* 1686 (K) !; *ibid.*, ca. 1250 m, shady moss forest, 11 Sept. 1932, *Richards* 1700 (K) !

Endemic.

#### 54. CAREX BORNEENSIS C. B. Clarke

*Carex borneensis* C. B. Clarke in Journ. Linn. Soc. Bot. 38: 14: 1904. — Borneo, *Haviland* 1404.

*Carex jusiformis* Nees var. *borneensis* (C. B. Clarke) Kiienth. in Engl. Pflanzenz. IV, 20: 598: 1909.

Loosely tufted. *Rhizome* shortly creeping, woody. *Stems* erect or suberect, apex slightly cernuous, trigonous, about 50 cm tall, about 0.75 mm thick below, ribbed, smooth, surrounded, below the leaves, by the fuscous, fibrous remains of cataphylls and withered leaf-sheaths. *Leaves* crowded, subbasal, except for 1 stem leaf proper, from half as long to about as long as the stem, 3—4 mm wide, flat or flattish, stiffish, sparsely and slenderly septate-nodulose in places, apex longly attenuated. *Inflorescence* consisting of 7 spikes at 6 nodes (binate at 1 node), occupying the upper 16 cm of the stem. *Spikes* erect to suberect, androgynaeceous, upper 3 approximate and fastigiate, median ones subapproximate to rather distant from one another, lowest remote, cylindric, simple, 1—3 cm long, lax-flowered, male part more slender and much shorter (upper spikes) to very much shorter (lower spikes) than the female part, which is 3—5 mm thick, lower on rather longly, upper on scarcely to shortly, exerted peduncles; *peduncles* trigonous to subterete, slender, smooth. *Bracts* of the 2 lower spikes foliaceous or subfoliaceous, middle bracts setaceous, upper reduced to membranous or subherbaceous sheaths, the midrib excurrent in a long setaceous awn, all except the upper bracts, which are short, nearly extending to the apex of the stem, upper shortly lower longly to very longly sheathing; *sheaths* dark- or purplish-spadiceous and nitidous below, mouth concave or nearly truncate. *Female glumes* oblong-ovate, base thickened, much incurved, cymbiform above, apex obtuse to very obtuse, sometimes subtruncate owing to tapering being arrested and glume expanding near the apex, 3.5—4 mm long, 1.75—2 mm wide, translucent, glabrous, light castaneous-brown, margins widely whitish-hyaline, especially above, becoming erose, very slenderly nervose, midrib with 2 adjacent other strong nerves, on a sometimes light-green central stripe, coalescing above and excurrent in a stoutish, minutely hispidulous-margined awn 0.75—2.75 mm long. *Utricles* narrowly ellipsoid, distinctly trigonous, angles prominent but obtuse, faces flattish, 6—6.5 mm long, about 1 mm broad, subcoriaceous, 4—6-nerved on each of the 3 sides, scarcely to very narrowly marginate, usually dorsally glabrous but scurfy above, ventrally and sometimes dorsally sparsely or very sparsely subadpressed-hispidulous in the upper third, margins sparsely subadpressed-hispidulous from about or above the middle upwards, straight

or straightish, becoming subpatulous, olivaceous, or bright green splashed brownish, tapering below to a spongy, scarcely to very shortly stipitate base, tapering above into a beak; *beak* gradually to scarcely tapering, plano-convex to subterete, 2—2.5 mm long, scarcely marginate, glabrous to very sparsely hispidulous-margined, pale or brownish, bilobed; *mouth* very oblique; *lobes* whitish, becoming erose. *Achene* ellipsoid to oblong-ellipsoid, trigonous, angles prominent, pale brown, faces flattish to concave, dark brown, 3—3.5 mm long, 0.9—1 mm broad, subabruptly shortly stipitate (0.3 mm) and beaked (0.4 mm) at each sometimes blackish-brown end, apex of beak pale and slightly bulbous. *Style* scarcely to slightly thickened at the base. *Stigmas* 3.

BORNEO: British North Borneo; Mt. Kinabalu, 3000 m, *Haviland UOU* (K)!

Endemic.

#### 55. CAREX EYMAE Nelmes

*Carex Eymae* Nelmes in Kew Bull. 1950: 199: 1950. — Celebes, *Eyma A82*.

Tufted. *Rhizome* probably short and not very stout. *Stems* erect or suberect, trigonous, 17—48 cm tall, very slender (0.5—0.75 mm thick), smooth at the base, scaberulous on the angles below the nodes in about the upper two-thirds, surrounded at the base, below the leaves, by a few short, thick, strongly nerved, spadiceous cataphylls. *Leaves* basal and subbasal, and often 2 higher on the stem, more or less as long as the stems, 2—3.5 mm wide, flattish to revolute, stiffish, upper surface covered with small protuberances, at least above, which become scabrid above or towards the apex; *sheaths* of the basal leaves very short, glabrous to densely but minutely setulose, spadiceous, tending to fray into fibres. *Inflorescence* consisting of 4—8 spikes, at 4—6 nodes, sometimes all single but middle ones usually unequally binate, occupying the upper 5—18 cm of the stem. *Spikes* androgynaeceous, erect or suberect, upper approximate or subapproximate and fastigate, lower distant from one another, 15—35 cm long, male part usually much shorter, but sometimes equalling or even longer than the female part, slender (about 1 mm thick), female part 2.5—4 mm thick, lax- or sublax-flowered, upper spikes and 1 spike of the binate ones on scarcely or shortly exerted peduncles, lower spikes and the remaining 1 of each binate inflorescence on longly exerted peduncles; *peduncles* very slender, glabrous to densely hispidulous. *Bracts* of the lowest spike foliaceous or subfoliaceous, longer or shorter than its spike, those of the middle spikes setaceous, upper bracts reduced to sheaths with short or long awns, upper shortly lower longly sheathing; *sheaths* mostly densely but minutely pale setulose, spadiceous or ferruginous, darker at the nodes. *Fertile glumes* oblong-ovate or oblong with a triangular apical third, incurved below, cymbiform towards the obtuse to very obtuse or slightly bilobed-emarginate, rarely subacute, apex, 2.25—3 mm long, 1.4—2 mm wide, subtranslucent, glabrous or glabrescent right at the base, otherwise densely subadpressed-hispidulous, light- less commonly darker-ferruginous, scarcely to widely whitish-

hyaline, nerveless, and becoming erose on the margin in the apical part, otherwise nervose, midrib prominent, from just failing to extend to the apex to excurrent in a minutely hispidulous-margined awn up to 1 mm long. *Utricles* narrowly ellipsoid or oblong-ellipsoid but longly tapering at each end, trigonous, the 3 faces flattish or the larger ventral one shallowly concave, 5—5.75 mm long, 0.9—1 mm broad, subcoriaceous, slenderly but distinctly multinerved dorsally, less distinctly so ventrally, margins often displaced, scarcely to narrowly marginate, pale subadpressed-hispidulous, often sparsely towards the base, otherwise densely, straightish, greenish-ferruginous, tapering below and subabruptly stipe-like, the stipe proper only 0.2—0.4 mm long, gradually to subgradually passing above into a beak; *beak* gradually tapering, plano-convex, 1.75—2 mm long, narrowly marginate, minutely hispidulous, bidentate; *mouth* not or scarcely oblique; *teeth* straight, up to 0.5 mm long. *Achene* oblong or oblong-ellipsoid, trigonous, about 3 mm long, 0.8—0.9 mm broad, warm brown, very shortly stipitate, abruptly beaked; *beak* very short (about 0.2 mm long), straight or slightly bent. *Style* scarcely or slightly thickened at the persistent base. *Stigmas* 3, perhaps sometimes 2.

CELEBES: South-East Celebes; Enrekang, between Angin-angin and Pintealon, forest, 1550—2600 m, 15 June 1937, *Eyma A82* (B, K)!

Endemic.

#### Sect. 11. GRACILES Tuckerm.,

Enum. Meth. 10: 1843

Tufted. *Rhizome* slender, rarely elongate. *Stems* slender or very slender, but fairly firm, tall. *Leaves* narrow. *Spikes* usually androgynaeceous, simple or branched (compound), often in fascicles, sometimes single at each node, lax- to subdense-flowered, on slender peduncles, erect to somewhat cernuous. *Bracts* sheathing. *Utricles* usually elliptic, sometimes ovate, plano-convex, less often biconvex, often hispidulous, sometimes glabrous, erect to subpatulous, membranaceous, nervose, usually conspicuously and cuneate-stipitate, usually longly beaked. *Stigmas* 2,, slender, often long or very long.

1. Spikes single at each of 1—7 nodes:

2. Leaves subfiliform; utricles 3.5—4.25 mm long . . . . . 59. *C. buruensis*  
 2. Leaves 1.5—4 mm wide; utricles 5—7 mm long . . . . . 60. *C. longipes*

1. Spikes in fascicles of 1—5 at each of 4—8 nodes:

3. Spikes all simple:

4. Spikes 1—3 at each node; female glumes 4—7.5 mm long, sometimes aristate; utricles 5—6.25 mm long, 0.9—1.4 mm broad, beak about 2 mm long

56. *C. aerophila*

4. Spikes 2—5 at each node; female glumes 4—5.25(—6) mm long, rarely mucronate; utricles 3.25—4.25 mm long, (0.9—)1 mm broad, beak 1.25—1.5(—1.75) mm long

57. *C. spathaeo-bracteata*

3. One spike in each fascicle usually having 2—5 smaller spikes branching from it:

5. Utricles 5—5.75 mm long . . . . . 58. *C. brunnea* var. *dolichocarpa*

5. Utricles 2.5—4.75 mm long:

6. Female glumes 2.5—4 mm long; utricles distinctly nervose, whitish-setulose; achene 2—2.25 mm long. . . . . 58. *C. brunnea*

6. Female glumes 1.75—3 mm long; utricles more slenderly nervose, nearly glabrous to very sparsely whitish-setulose above; achene 1.5—2 mm long

58. *C. brunnea* var. *subteinogyna*

The species forming Section *Graciles* are very interesting from the fact that their flowers have only 2 stigmas and their fruits are biconvex or plano-convex. This is uncommon in Subgenus *Carex* outside the bounds of Section *Acutae* Fries. Its bearing on phylogeny is discussed at the end of the account of *C. acrophila* S. T. Blake, the species placed first in Section *Graciles*. In spite of the above-mentioned distigmatic agreement between the *Graciles* and the *Acutae*, there has been no suggestion, hitherto, that the two groups are otherwise akin. It may, however, be significant that the very rare character of very long stigmas, which occurs in several species of Section *Graciles*, is found also in two species, one Indian and one Japanese, of Section *Acutae*.

#### 56. CAREX ACROPHILA S. T. Blake

*Carex acrophila* S. T. Blake in Journ. Arn. Arb. 28: 114: 1947; Nelves in Kew Bull. 1949: 382: 1949. — Netherlands New Guinea, Brass 9515.

Tufted. *Rhizome* short, rather slender, woody. *Stems* erect, obtusely to acutely trigonous, 20—85 cm tall, 0.75—1.5 mm thick below, smooth throughout, or scabro-hispidulous on the acute angles, at least above, ribbed, surrounded at the base by strongly nerved, mostly entire, spadiceous to fuscous, often nitidous, cataphylls or leafless sheaths. *Leaves* basal and subbasal, crowded, erect, but often flexuous towards the longly attenuated apices, 1—2.5 mm wide when flattened out, thick, rigidly subconduplicate, midrib on the back strongly keeled; *sheaths* brown, spadiceous, or brownish-fuscous, tending to split in front into subreticulate fibres. *Spikes* androgynaeceous, about 4—20, in fascicles, 1—3 simple spikes in each fascicle, from 4—6 nodes, erect to suberect, some possibly slightly cernuous, forming an interrupted, terminal inflorescence 6—16 cm long, linear-cylindric, 1.5—3.5 cm long, subdense-flowered, female part usually considerably longer than, but sometimes about equaling, the male part, 3—5 mm and 1 mm thick respectively, lowest fascicle usually distant, others at approximate or subapproximate nodes, upper sessile or subsessile, or on wholly included peduncles, lower on included to longly exserted peduncles; *peduncles* slender, smooth or scaberulous. *Bracts* of the lower fascicles subfoliaceous, shorter to longer than their fascicles, rarely extending up to or slightly exceeding the apex of the whole inflorescence, suddenly widening into a glumiform base, which is strongly nerved and reddish-brown with membranous margins, clasping the base of the spikes, with ampliate, short or long sheaths, upper bracts

similar but lamina reduced and varying upwards from setaceous to aristate, their sheaths short or very short. *Cladophylls* probably in transition from utriculiform to ocreiform. *Female glumes* oblong-lanceolate or oblong-ovate, base usually incurved, cymbiform to flattish above, apex acute to very obtuse or even subrotund, 4—7.5 mm long, 1.5—1.8 mm wide, translucent, glabrous, or, frequently, very sparsely hispidulous towards the apex on the midrib and/or on one or two adjacent nerves, reddish-fulvous or ferruginous, often with whitish hyaline margins, which are narrow below but wide and tending to become erose above, slenderly multinerved except on the margins, midrib and 2 converging adjacent nerves coalescing above and from failing to extend to the apex to excurrent in a smooth or hispidulous-margined awn up to 2.5 mm long. *Utricles* elliptic to elliptic-lanceolate, plano-convex, very rarely trigonous, 5—6.25 mm long, 0.9—1.4 mm broad, membranaceous, slenderly about 4-nerved on the ventral face, more strongly and distinctly about 8-nerved on the dorsal face, narrowly marginate, very sparsely subadpressed whitish-hispid on one or several nerves on both faces towards the apex, whitish-hispid on the margins from below or above the middle upwards, straight, erect to subpatulous, reddish-brown, sometimes stramineous or lutescent below, subgradually or subabruptly contracted below into a stout, spongy, oblong or cuneate-oblong, incurved-marginate stipe or stipe-like base, 0.5—1 mm long, gradually to subgradually passing above into a *beak*, which is gradually tapering, plano-convex, about 2 mm long, narrowly to scarcely marginate, glabrescent to very sparsely whitish-hispid with whitish-hispid margins, bidentulate; *mouth* straight; *teeth* short, whitish-hyaline-tipped, soon becoming erose. *Achene* oblong-elliptic or (Brass 9409 sometimes) oblong-obovate, plano-convex or subbiconvex, rarely obscurely to distinctly trigonous, about 2 mm long, 0.9—1.3 mm broad, warm brown, sometimes becoming cinereous, subrotund at base and apex, abruptly scarcely to very shortly pale stipitate and rostrate. *Style* slender, slightly thickened towards the base, not persistent on the achene. *Stigmas* 2, rarely 3, curved and/or flexuous, 3—6 mm long.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, common about native camps, 3225 m, Aug. 1938, Brass 9515 (AA, Br); Mt. Wilhelmina, 5 miles east of top, common in marshy hollows, 3440 m, Aug. 1938, Brass 9409 (AA) !; *ibid.*, 7 km north-east of top, alpine grassland, occasional erect tufts on wet ground, 3560 m, Sept. 1938, Brass & Meijer Drees 9829 (AA) !; *ibid.*, 7 km north-east of top, plentiful amongst long grasses of a marshy slope, slender tufts, 3560 m, Sept. 1938, Brass & Meijer Drees 9923 (AA) ; *ibid.*, northern slopes, common on old grassy screes, 4050 m, Sept. 1938, Brass & Meijer Drees 10,072 (AA) !

Endemic.

Numbers 9409 and 9926 have narrower leaves, smaller and narrower utricles, and narrower and sometimes (9409) oblong-obovate achenes, than the other specimens, but these differences scarcely warrant varietal ranking and I have included them in the general description.

This handsome species is of special phylogenetic interest, as it seems to be a link between Section *Graciles* and Section *Decorae*. It sometimes has the plano-convex utricle, biconvex achene, and distigmatic style of the former, but, less frequently, the trigonous utricle and achene, and the tristigmatic style of the latter. On balance of characters, and greater frequency of the above-mentioned important Section *Graciles* ones, I place it at the head of this section. There are other species in the vast genus *Carex*, perhaps also in other genera of Cyperaceae, which have thus a 'foot in two camps,' and help to indicate relationships between various pairs of the sections into which the genus is usually divided, relationships which might otherwise remain hidden or at least obscure.

#### 57. CAREX SPATHACEO-BRACTEATA Kiienth.

*Carex spathaceo-bracteata* Kiienth. in Engl. Bot. Jahrb. 70: 466: 1940. — New Guinea, Clemens 7388, 7S95A.

Tufted. *Rhizome* short, rather slender, woody. *Stems* erect, obtusely to acutely trigonous, up to 80 cm tall, up to 1.5 mm thick below, smooth except on the acute angles above, which are scabrid, surrounded at the base, below the leaves, by strongly nerved, mostly entire, spadiceous, becoming fuscous, often nitidous, cataphylls or leafless sheaths. *Leaves* basal and subbasal, long but shorter than the taller stems, crowded, erect, but often flexuous towards the attenuated apices, 1—2.5 mm wide when flattened out, thick, rigidly subconduplicate; *sheaths* brown or spadiceous, becoming fuscous, tending to split in front into subreticulate fibres. *Spikes* androgynaeous, about 8—20, in fascicles, 2—5 simple spikes in each fascicle, arising from 4—5-nodes, erect to suberect, some possibly slightly cernuous, forming an interrupted terminal inflorescence, 6—14 cm long, linear-cylindric, 1—3.5 cm long, subdense-flowered, female part usually considerably longer than but sometimes about equalling the male part, 3—5 mm and about 1 mm thick respectively, fascicles at approximate or subapproximate nodes, except lowest which is usually distant, upper spikes sessile or subsessile or on wholly included peduncles, lower on included to longly exerted peduncles; *peduncles* slender, smooth or scaberulous. *Bracts* of the lower fascicles subfoliaceous, shorter to longer than their fascicles, rarely extending up to or slightly exceeding the apex of the whole inflorescence, suddenly widening into a subspathaceous or glumiform base, which is strongly nerved and reddish-brown with membranous margins clasping the base of the spikes with ampliate, short or long sheaths, upper bracts similar but lamina reduced and varying from setaceous to aristate, their sheaths short or very short. *Cladoprophylls* probably in transition from utriculiform to ocreiform. *Female glumes* oblong-lanceolate or oblong-ovate, base usually incurved, cymbiform to flattish above, apex acute to very obtuse, 4—5.25(—6) mm long, 1.2—1.9 mm wide, translucent, glabrous or, less commonly, very sparsely hispidulous towards the apex on the midrib, sometimes also on 1 or 2 other

nerves, ferrugineo-castaneous, margins above usually rather widely whitish-hyaline, slenderly nervose except on the margins, pale midrib and 2 adjacent nerves coalescing above, usually extending nearly or quite to the apex, rarely very shortly excurrent. *Utricles* elliptic, plano-convex, 3.25—4.25 mm long, (0.9—) 1 mm broad, membranaceous, slenderly and sometimes rather indistinctly about 4-nerved ventrally, more strongly and distinctly about 8-nerved on the convex dorsal face, marginate, narrowly above, more widely below, often glabrous dorsally, but sometimes, and usually ventrally, very sparsely whitish-hispidulous on several nerves towards the apex, margins sparsely whitish-hispidulous from about the middle upwards, straight, erect to subpatulous, warm reddish-brown, sometimes paler below, subgradually to subabruptly contracted below into a stout, spongy, oblong or cuneate-oblong, incurved-marginate stipe or stipe-like base, 0.4—0.75 mm long, subgradually to subabruptly narrowed above into a *beak* which is gradually then scarcely tapering, plano-convex, 1.25—1.5(—1.75) mm long, narrowly to scarcely marginate, glabrescent or very sparsely whitish-hispidulous-marginate, bidentulate; *mouth* not or scarcely oblique; *teeth* about 0.25 mm long, tips whitish-hyaline, becoming erose. *Achene* elliptic or oblong-elliptic, plano-convex to compressed-biconvex, 1.8—2.2 mm long, 0.9—1 mm broad, olive-brown with pale margins, not stipitate, abruptly about 0.2 mm long and pale beaked. *Style* slender, grandually thickened towards the base. *Stigmas* 2, often curved and flexuous, up to about 5 mm long.

NEW GUINEA: North-East New Guinea; Morobe District, Mt. Sarawaket, high mountain ridges, not far from Keab, 3000—8600 m, 6—7 Oct. 1937, Clemens 7388; *ibid.*, marshy grassland, 3300 m, Oct. 1937, Clemens 7S95A; Morobe District, 2100—3600 m, 25 July 1941, Clemens 12,4-05 (AA)!; *ibid.*, alt.?, 14 Aug. 1941, Clemens 12,b88 (AA)!

Endemic.

In the "Kew Bulletin" (1949, p. 382), I expressed the view that this was scarcely specifically distinct from *C. acrophila*. After further consideration I have decided to treat them here as separate species, though I still regard them as extremely closely related. The vegetative parts are similar in the two plants, and the spikes are similar in number, but the glumes are slightly and the utricles distinctly smaller in *C. spathaceo-bracteata*. Further, this species, so far as is known, does not vary towards the tristigmatic Section *Decorae* as *C. acrophila* does.

#### 58. CAREX BRUNNEA Thunb.

*Carex brunnea* Thunb., Fl. Japon. 38: 1784; Schkuhr, Riedgr. 2: 16 \*. Xx fig. III: 1806; C. B. Clarke, 5; Kiienth., 599; Merrill, Enum. Philipp. PI. PI. 1: 137: 1923. — Japan.

Tufted. *Rhizome* very short, woody, 1—2 mm in diameter, clothed with dark, nitidous, sheathing scales. *Stems* erect to oblique, obtusely

trigonus, slenderly ribbed, finely striate, firm, 40—104 cm tall, 1—1.75 mm thick below, smooth below and sometimes also above, scaberulous above or only on the upper part of the rhachis, surrounded, below the leaves, by longish, dull, olive-brown, scurfy, firm cataphylls, brown and nitidous inside, membranous front tending to split into somewhat reticulate fibres. *Leaves* basal and subbasal, long, usually exceeded by, but sometimes equalling or even exceeding, the stem, 1.5—4 mm wide, flattish, stiff, upper surface usually covered with small protuberances which are scabrid above, attenuated towards a firm apex. *Inflorescence* erect, or cernuous at the apex, a rather slender, continuous to interrupted panicle, consisting of 4—8 *fascicles*, each consisting of 1—5 spikes, one at each node usually longer than the others, especially below, with 2—5 smaller spikes branching from it, and occupying the upper 6—56 cm of the stem, upper fascicles subapproximate and some fastigate, lower rather distant. *Spikes* androgynaeous, 0.7—4.5 cm long (including branched spikes), subax- to subdense-flowered, erect or suberect, female part usually very much exceeding the male part, male part slender (0.5—1 mm thick), female part 2—3.5 mm thick, upper spikes on scarcely or shortly, lower on longly, exerted peduncles; *peduncles* smooth to scaberulous, slender but firm. *Bracts* of the lower fascicles foliaceous or subfoliaceous, longer than their fascicles but much shorter than the whole inflorescence, longly sheathing, upper bracts reduced, rather longly to shortly sheathing, uppermost 1—2 reduced to large glumes with long awns, not sheathing; *sheaths* dark brown or castaneous and concave at the mouth. *Female glumes* oblong-ovate, ovate, or ovate-lanceolate, cymbiform but margins involute, apex acute to obtuse, 2.5—4 mm long, about 1.25 mm wide, slenderly nervose, light castaneous, margins above not or sometimes very narrowly whitish, often erose, midrib keeled, green, extending nearly or quite to the apex of the glume. *Utricles* ovate, oblong-elliptic, or elliptic, plano-convex, 3.25—4.75 mm long, 1.2—1.5 mm broad, membranaceous, prominently multinerved, narrowly marginate, shortly and rather thinly whitish-setulose, more densely so towards the apex and on the margins, straight or straightish, subpatulous, castaneous to cinnamomeous-brown, cuneately tapering towards the base with incurved margins, forming a winged, sometimes pallid, pseudo-stipe, 0.5 mm long or rather longer, subabruptly beaked; *beak* slightly tapering, plano-convex or compressed, 0.5—1 mm long, narrowly marginate, setulose margined, bidentulate; *mouth* not oblique; *teeth* very short, becoming erose. *Achene* ovate or oblong-ovate, compressed, about 2—2.25 mm long, about 1.25 mm broad, stramineous, not stipitate, not or scarcely beaked. *Style* somewhat thickened towards the base. *Stigmas* 2, up to about as long as the utricle.

PHILIPPINE ISLANDS: Luzon; *Loher* 711 (K) !; Baguio, March 1907, *Elmer* 8587 (K, L) !; Mt. Pulog, Sept. 1921, *Ramos & Edano* (*Bur. Sci.* 40,384) (B, L, S) !; Mt. Santo Tomas, Dec. 1922, *Merrill* 11,724 (B, L) !; Abra; Mt. Posney, Feb. 1917, *Ramos* 27,034 (B) !; Rizal; Mt. Lumutan, July 1917, *Ramos & Eddno* (*Bur. Sci.* 29,607, 29,775) (B, K, L) !; Ilocos Norte; Mt. Nagapatan, Aug. 1918, *Ramos* (*Bur. Sci.* 33,144) (B, BM, K, L, S) !; Mt. Palimbim, Aug. 1918, *Ramos* (*Bur. Sci.* 33,368) (BM, K) !; Bataan;

Mt. Mariveles, Lamao R., exposed ridges, rain forest, 1300 m, Oct. 1903, *Merrill* 3196 (B, BM, K) !; *ibid.*, Aug. 1904, *Merrill* 3880 (BM, K) !; *ibid.*, very common, 1000 m, Aug. 1904, *Merrill* 4223 (B, K) !; *ibid.*, Sept. 1905, *Whitford* 13U6 (B, K) !; *ibid.*, 10 Dec. 1908, *Merrill s.n.* (BM, K, L) !; Pampanga; Mt. Arayat, in forests, ± 800 m, Sept. 1905, *Merrill* 4223 (BM, K) !, 4224 (BM, K) !; Lepanto; Mt. Data, mossy forest, ± 2250 m, Nov. 1905, *Merrill* 4514 (B, BM, K) !, 4529 (K) ! — Bo hoi; Aug.—Oct. 1923, *Ramos* (*Bur. Sci.* 42,961) (B) ! — Mindanao; Davao, Todaya, Mt. Apo, Aug. 1909, *Elmer* 11,495 (B, BM, K, L) !

MOLUCCAS: Buru; Fakal—Mnges' Waen, limestone rocks, 900m, 5 Sept. 1921, *Toxopeus* 510 \* (B) !

JAVA: Priangan; Mt. Rakutak, thin forest, rather common, 1700 m, 31 Aug. 1931, *van der Pijl* 443 (B) ! — Besuki; Ijang Mts., rain-forest, 2100 m, 25 Oct. 1913, *Backer* 9746 (B) !

LESSER SUNDA ISLANDS: Lombok; Plambi, monsoon forest scrub, dry calcareous soil, 200—400 m, 2 July 1909, *Elbert* 2424 (K, L) ! — Flores; Mt. Kasteno, north-west slope, primary forest, ± 1800 m, 13 Nov. 1932, *Posthumus* 3242 (B) !

India, Upper Burma, China, Japan, Queensland.

It frequently happens that one species in a group is much more widespread, and often more varied in form, than its allies. Such a species is *C. brunnea*.

Var. SUBTEINOZYNA Kiiikenth.

*Carex brunnea* Thunb. var. *subteinogyna* Kiiikenth. in Fedde, Repert. Spec. Nov. 8: 8: 1910; Merrill, Enum. Philipp. Fl. PI. 1: 137: 1923. — Philippine Islands, *Merrill* 1,731, 6505; *McGregor* 8866.

*Carex s-padiceo-vaginata* Ohwi in Bot. Mag. Tokyo 56: 215: 1942. — New Guinea, *Kanehira & Hatusima* 13,924.

*Female glumes* oblong-ovate, 1.75—3 mm long, 1—1.5 mm wide, very slenderly nervose, thin and translucent, glabrous or sometimes hispidulous on some nerves. *Utricles* elliptic, 2.5—4 mm long, 0.9—1.4 mm wide, more slenderly 12—20-nerved, often nearly glabrous, sometimes very sparsely setulose on some nerves above, warm reddish-brown, sometimes greenish-stramineous below, 0.5—0.8 mm stipitate; *beak* 0.75—1.3 mm long, margins sparsely or very sparsely setulose. Achene 1.5—2 mm long, 0.9—1.25 mm broad.

PHILIPPINE ISLANDS: Luzon; Benguet, Mt. Pulog, *Merrill* 6505; *McGregor* 8866; Mt. Pulog, Feb.—March 1925, *Ramos & Edano* (*Bur. Sci.* 44,994) (L) !; Pauai, dry open slopes, ± 2200 m, Oct.—Nov. 1905, *Merrill* 4731 (BM, K, L) !; Pauai, April—June 1918, *Santos* (*Bur. Sci.* 31,690) (B, BM, L) !; Mt. Jonglon, mossy forest, ± 2100 m, Oct.—Nov. 1905, *Merrill* 4819 (B, BM, K, L) !

"Borders of the mossy forest."—Merrill (*l.e.*)

CELEBES: Eastern Peninsula; Mt. Lumut, summit, 4 Sept. 1938, *Eyma* 3587 (B) !; Luwuk, between Pinapuang and Mt. Loloa and Mt. Beabis, in brook under summit of Mt. Loloa, 27 Sept. 1938, *Eyma* 3862 (B, K) !

\* Determined by Kiiikenth (in Bull. Jard. Bot. Buitenz. ser. 3, 16: 320: 1940) as var. *subteinogyna* Kiiikenth.

wide, flat or flattish or margins revolute, not very stiff, apices attenuated; *sheaths* truncate and membranous at the mouth, sometimes minutely scurfy-hispidulous near the mouth. *Spikes* 1—7, androgynaceous, uncommonly wholly female, but the male part, except sometimes in the terminal spike, where it may be nearly the uppermost third, is very short, sometimes 1—3 lower "spikes" have 2—3 short spikes on the peduncle just below the spike, cylindrical to lanceolate, 1—3.5 cm long, except compound "spikes," which are 3—4.5 cm long, female part 4—7 mm thick, male part very slender, whole lax-to subdense-flowered, upper 2—4 approximate and fastigiate, sometimes the terminal solitary, but sometimes with an empty or nearly empty bract a little below it, remaining spikes distant, lowest sometimes from a subbasal node, upper lateral 1—2 spikes sessile or subsessile or on shortly exerted peduncles, lower on rather shortly to very longly exerted peduncles, perhaps nutant; *peduncles* trigonous or compressed-trigonous, very slender to filiform (0.2—0.6 mm thick), long ones sometimes curved to flexuous, minutely scaberulous above. *Bracts* of the lower spikes foliaceous, nearly always falling far short of the apex of the stem, rather longly to longly sheathing, upper bracts much reduced, subfoliaceous or aristate-glumiform, usually not extending to the apex of the stem, scarcely to shortly sheathing; *sheaths* minutely hispidulous at the mouth, or glabrous. *Cladophylls* sometimes subvisible at the base of the spikes in the scarcely sheathing upper bracts, where they are subtricoliform. *Female glumes* ovate-lanceolate to oblong-ovate-lanceolate, incurved and thickened at the base, cymbiform above, sometimes flattish, margins often involute above, apex usually subtruncate-obtuse, sometimes subacute, sometimes bilobed-emarginate, 3.25—5 mm long, 1.5—2 mm wide, nerveless and light ferruginous or paler, with very narrow to wide, nerveless, whitish-hyaline margins which become erose, and a wide, 3-nerved, darker brown central stripe, the midrib, which is sometimes hispidulous above, coalescing above with 2 adjacent nerves and excurrent as a stoutish, straightish, compressed, hispidulous-margined awn 0.25—5 mm long. *Utricles* elliptic, compressed-biconvex to subplanoconvex, 5—7 mm long, 1.5—2 mm broad, subcoriaceous, dorsally strongly and distinctly 6—9-nerved, ventrally less distinctly 4—7-nerved, scarcely marginate, glabrous and smooth, straight, suberect to patulous, pale yellowish-green, becoming light reddish-brown, nitidous, cuneate below, base spongy-thickened but scarcely stipitate, subabruptly beaked; *beak* gradually then scarcely tapering, compressed, 2—3 mm long, broadish, narrowly marginate, sparsely hispid-margined above, deeply bidentate, often dorsally narrowly grooved; *mouth* not or slightly ventrally oblique; *teeth* lanceolate-setaceous, 0.5—0.75 mm long, whitish-hyaline above, glabrous and smooth, straight. *Achene* broadly elliptic, to oblong-elliptic or oblong-ovoid, sometimes subobovoid, subcompressed-biconvex or subplanoconvex, 2.3—3 mm long, 1.5—1.8 mm broad, dirty-whitish on reddish-brown, subabruptly very stoutly, 0.25—0.3 mm stipitate, abruptly beaked; *beak* subterete, 0.1—0.2 mm long, stout, scarcely annular-thickened at the apex. *Style* thickened into an oblong, centrally grooved, compressed

basal portion, subpersistent on the beak of the achene. *Stigmas* 2, up to 3 or 4 mm long.

NEW GUINEA: North-east New Guinea; Morobe District; Sattelberg, Sambanga, forest trail, 1500—1800 m, 26 Aug. 1937, *Clemens 6841*; *ibid.*, high, mossy forest, 1800 m, 1 Sept. 1937, *Clemens 6900B* (AA)!; *ibid.*, base of mountain forest near clearing, 1500—1800 m, 15—17 Nov. 1937, *Clemens 7590b* (AA, K)!

JAVA: Priangan; the mountain meadow Tegal Harendong, very common, 3 Jan. 1923, *van Slooten 752* (B, S)!; swamp near Danau Tjibitung, 1800 m, 22 June 1931, *van der Pijl 407* (B)!; Mt. Papandajan, 2041 m, 12—14 April 1935, *van Steenis 6788* (B, L, S)!; *ibid.*, Tegal Kirinjuh, grassy plain, 2060 m, 17 May 1936, *van der Pijl 5U* (B, K)!; above Tjikakapa, 10 July 1936, *van Slooten 2619* (B)! — Pekalongan; Djeng Plateau, Telaga Dringu, 7 Aug. 1930, ± 2200 m, *van Steenis 4588* (B)! — Malang; Tosari district, Feb. 1915, *Ridley* (K)!; "Smeroe-hoeve," Ranu Regulo, by the lake in high savannah, 2100 m, 11 June 1935, *van Steenis 7264* (B, L, S)!

India, China.

I have seen one of the two Clemens numbers cited under Kukenthal's description of the variety *ramosa*, and knowing how readily this and other normally simple-spiked species regress to branched spikes, I have no hesitation in joining the variety to the species.

#### Sect. 12. *Cryptostachyae* (Ohwi) Nelmès, *sect. nov.*

Subsect. *Cryptostachydeae* Ohwi in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11: 340: 1936.

*Flowering stems* few to numerous, arising from the axils of leaves produced on a short shoot, usually single, sometimes binate, often flexuous, subscapose. *Spikes* androgynaceous. *Bracts* subherbaceous; *sheaths* tubulose-infundibuliform. *Female glumes* involvent-cucullate. *Utricles* obovoid-fusiform, concave-faceted (thus conforming to the achene). *Achene* deeply concave-faceted, medianly on the 3 angles, apically and basally on the faces; beak strongly deflexed. *Style* bent down with beak of achene below, upper part bent and twisted upwards, thickened, flattened, and papillose at the apex (below the stigmas).

Only Malaysian species. . . . . 61. *C. cryptostachys*

I raise *C. cryptostachys* to sectional status. Its androgynaceous spikes and the deep median cavities on the three angles of the achene, which also has an extremely deflexed beak, distinguish it sharply from the species comprising the sections most closely related to it, Section *Lageniformes* and Section *Mitratae*.

#### 61. CAREX CRYPTOSTACHYS Brongn.

*Carex cryptostachys* Brongn. in Duperry, Voy. Coquille Bot. 152 t. 25: 1828; Miq., Fl. Ned. Ind. 3: 352: 1855; Boott, Illustr. 3: 103 t. SIO: 1860; C. B. Clarke, 8; Kiiikenth., 471; Ridley, Fl. Malay Penins. 5: 181: 1925; Merrill, Enum. Philipp. Fl. PI. 1: 137: 1923. — New Guinea, Waigeo, d'Urville.

Tufted. *Rhizome* erect or oblique to horizontal, 4—6 mm thick, thickly clothed with fibrous remains of sheaths, woody; *rootlets* stout, wiry. *Stems* suberect, often flexuous, arising singly or binate from the axils of leaves produced on a short shoot, scapiform, more or less hidden in the leaf-sheaths, compressed-trigonous, 10—50 cm tall, smooth below the rhachis, naked except the base which, though hidden in the sheath, is clasped by a few ferruginous bract-like sheaths. *Leaves* crowded on a short stem, themselves very much longer than the flowering stems, 3—18 mm wide, bright rich green in life, grey- to somewhat glaucous-green when dried, flat, apex very longly attenuated, sparsely septate-nodulose, upper surface minutely asperous above; *sheaths* ferruginous; leafy *stem* surrounded at the base by withered, fibrous remains of older leaves. *Spikes* 8—30, erect to suberect, androgynaeceous, male part much shorter than the female part, cylindrical, 1—3 cm long, 3—4(—5) mm thick, lax-flowered, sometimes all simple, usually lowest or lower on elongated branches, bearing up to 8 but usually about 4 spikes, the whole forming a slender, scarcely interrupted inflorescence 10—40 cm long, subapproximate, often overlapping and subfastigate, upper on included peduncles, lower on shortly excluded ones; *peduncles* trigonous, usually much less than 0.75 mm in diameter, angles sparsely scaberulous. *Rhachis* often flexuous, mainly trigonous, very sparsely scaberulous. *Bracts* subfoliaceous to subherbaceous, each usually much shorter than, rarely exceeding, its spike, upper shortly lower longly sheathing; *sheaths* tubulose-infundibuliform, thinly brown-membranous. *Female glumes* ovate to oblong-ovate, involucre-cucullate, apex acute to subacute, 2.25—2.75 mm long, about 2 mm wide, very thin between the many slender striae, often minutely adpressed-hairy, especially above, whitish-stramineous tinged brown, ciliolate on the margins, especially above, midrib usually very shortly, hispidulously mucronate. *Utricles* obovoid to obovoid-fusiform, obscurely trigonous to more or less biconvex, 3.5—5.5 mm long, 1.5—2 mm broad, covered with shallow concavities (undulate) (conforming to surface of nut), subcoriaceous, multistriate or multinerved, narrowly marginate, ventrally sparsely whitish puberulous or scurfy-setulose above, dorsally almost glabrous to somewhat scurfy, ciliolate on the margins from base to apex, but especially above, subpatulous, stramineous-green, tinged brown, longly and stoutly stipitate, subabruptly beaked; *beak* subterete to plano-convex, 0.4—0.75 mm long, stout, marginate, glabrous or glabrescent; *mouth* very oblique, so that the often ciliolate apex is only shallowly notched dorsally, but ventrally the aperture extends two-thirds down to, or almost to, the base of the beak. *Achene* ellipsoid, oblong-ellipsoid, rhomboid-ellipsoid, or oblong-obovoid, equally divided by three longitudinal, rounded, pale to brown ribs, faces dark to light brown or stramineous, faces excavated at base and apex, ribs excavated at their halfway, the whole surface being thus regularly concave-faceted, cavities sometimes whitish-scurfy, sometimes a wrinkled, warty band round the middle, at the base broadening, after contraction, into a round spongy mass, 0.5—0.75 mm in diameter, and 0.3—0.5 mm long, or, sometimes, not broadening but passing insensibly into a thick basal subcylindric

stipe, 0.75—0.8 mm in diameter, 0.75—1 mm long; *beak* short, bent and so strongly deflexed that it and the style are adpressed to the achene, the style then twisted and bent upwards equally strongly, carrying the stigmas through the oblique mouth of the utricle. *Style* thickened, flattened, and papillose above. *Stigmas* 3.

MALAY PENINSULA: Kedah: Langkawi Islands; Burau, 13 Dec. 1916, H. C. Robinson 6267 (K, L) !; Mt. Raya, to summit, 864 m, 15 Nov. 1941, Corner (Sing. Field No. 37,863) (L) ! (Mainland:) Kedah Peak, 2 Aug. 1919, 750 m, Haniff (Sing. Field No. U97) (B) ! — Penang; 1831, Wallieh 3383 (K) !; 600—750 m, May 1881, King's collector (L) ! — Perak; Government Hill, July 1889, Curtis 1910 (BM) !; Thaiping, open jungle, rich soil, top of high mountains, 1050—1200 m, Nov. 1885, King's collector [Kunstler-] 8517 (K) !; Thaiping Hills, Dec. 1898, Ridley 11,399 (K) !; Maxwell Hill, 1140 m, 22 March 1924, Burkill & Haniff 13,181 (K) ! — Pahang; Telom, Nov. 1908, Ridley 13,868 (BM, K) !; Island of Tioman, Tanah Runto, 390 m, 7 May 1927, Md. Nur 18,877 (B) ! — Negri Sembilan; Mt. Tampin, waterfall, 17 Jan. 1917, Ridley (BM) !; Mt. Tampin, path-side, 360 m, 4 May 1918, Burkill 3238 (B, K) ! — Johore; Batu Pakat, Nov. 1900, Ridley 11,001 (K) !; Sungai Pulau Dua, 25 April 1922, Md. Nur & Kiah 7735 (B) ! — Singapore; Bukit Timah, 23 Sept. 1890, Ridley 1720 (BM, K) !

SUMATRA: East Coast; Karo plateau, on the Siosar, ancient forest, semi-clearing, ± 1575 m, 12 Nov. 1921, Lörzing 8614 (B, K, L) ! — West Coast; Mt. Korinchi [G. Kerintji], Sanggarangagung, 735 m, 25 April 1914, Robinson & Kloss (K) !; *ibid.*, 25 May 1914, Robinson & Kloss 58 (BM) !; *ibid.*, 29 May 1914, Robinson & Kloss 168 (BM) ! — Palembang; Mt. Pakiwang, north slopes, north-west side of Ranau lake, marshy places, primitive forest, ± 800 m, 7 Nov. 1929, van Steenis 3790 (B, L) ! — BANGKA; Muntok, near water, common, ± 40 m, 10 Oct. 1917, Biinnemeijer 1355 (B, L) !; Koba, Mt. Pading, 250 m, 2 Dec. 1917, Biinnemeijer 2210 (B, L) !

PHILIPPINE ISLANDS: Luzon; Nueva Vizcaya, near Dupax, March—April 1912, McGregor (Bur. Sci. 14,240) (BM, K, L) !; Isabela; San Mariano, Feb.—March, 1926, Ramos & Edano (Bur. Sci. 1,6,767) (B, S) !; Rizal; Mt. Susong-Dalaga, Aug. 1917, Ramos & Edano (Bur. Sci. 29,334) (B) !; Mt. Irig, Feb. 1923, Ramos (Bur. Sci. 41,869) (B, S) !; Sorsogon; small tufts in rich loose wood-soil, Nov. 1905, Elmer 7306 (B, K) !; Irosin, Mt. Bulusan, wet humus-covered ground, woods on steep slopes, ± 600 m, Oct. 1915, Elmer 14,595 (B, BM, KL) !; *ibid.*, May 1916, Elmer 16,110 (B, BM, K, L) ! — Mindanao; Zamboanga, Nov.—Dec. 1911, Merrill 8218 (B, BM, K, L) !

"In forests at medium altitudes, ascending to 1000 m."—Merrill (*l.c.*), who cites two numbers additional to the above: Ramos (Bur. Sci. 1760), and Ramos & Edano (Bur. Sci. 29,334).

MOLUCCAS: Aru Islands, Papakula, poor forest, 22 April 1922, Jensen 258 (B) !; I. of Trangan, Cape Ngaibor [T. Ngabordamlu], primary forest, few metres above sea-level, 27 June 1938, Buwalda 5391 (B, K) !

NEW GUINEA: Netherlands New Guinea; I. of WAIGEO, d'Urville. — North-East New Guinea; Morobe District, Quembung, wooded hill, 750 m, 9 Dec. 1935, Clemens 1178 (AA, L) ! — Papua; Kanosia, forest, sea level, 4 April 1935, Carr 11,767 (BM, L) !; Koitaki, waysides, 450 m, 4 July 1935, Carr 12,790 (K, L) !

JAVA: Bantén/Djakarta (Batavia); damp woods near Tjikoja, Zollinger 1152 (BM) ! — Bogor (Buitenzorg); Salak, ex Herb. *Zipellius* (L) !; Nirmala, wet



ravine, a few plants seen, 1000 m, 19 Dec. 1913, *Backer 10,836* (B) !; near Nirmala, primitive forest, few plants seen, 1250 m, 23 Dec. 1913, *Backer 10,986* (B) !; Mt. Salak, above Pasir Pogor, south-west of Masing, forest, common, 13 June 1922, *Bakhuizen van den Brink 5538* (B, L) !; Pasir Keruh, West of Leuwiliang and Bogor (Buitenzorg),  $\pm$  600 m, 10 June 1924, *Bakhuizen van den Brink 6424* (B, K, L, S) !; Situhiang (west of Puraseda, south of Leuwiliang), few plants in wood by lake, 500 m, 22 June 1924, *Bakhuizen van den Brink 3408* (B) !; Takokak, forest, 1000 m, 27 Feb. 1894, *Koorders 15,0080* (B) !; Mt. Gede, Pasir Guntur, forest,  $\pm$  1000 m, 19 Dec. 1940, *Bloembergen s.n.* (B) !; and about fifteen other gatherings seen from Bogor and Priangan. — Batavia/Priangan; Mt. Sanggabuwana, primitive forest, 1000 m, 30 March 1918, *Backer 23,736* (B) !

Herb. *Ploem* [? Sumbawa] (L) !; Mt. Putjak-tatjing, *Forbes 785k* (B, BM) !; *Forbes 1048* (BM, L) !

Indo-China, Hongkong, Formosa, Queensland.

### Sect. 13. **Lageniformes** (Ohwi) Nelmès, *sect. nov.*

Subsect. *Lageniformes* Ohwi in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11: 340: 1936.

*Stems* central or arising from the axils of basal leaves, weak and very slender to slender, subscapose, or leafy below. *Leaves* longer to very much longer than the stems. *Spikes* few, terminal male, remainder female or androgynaceous. *Bracts* subherbaceous or foliaceous; *sheaths* sometimes subtubular to infundibuliform. *Female scales* usually more or less oblong-ovate. *Utricles* more or less lageniform or rhomboid-lageniform. *Achene* with a central transverse ridge, sometimes with an apical cylindrical neck, truncate or (usually) discoid-annulate at the apex, 0.7—1 mm in diameter.

1. Utricles 3.5—5 mm long; achene without an apical neck . . . 64. *C. breviscapa*

1. Utricles 5.5—7.5 mm long; achene with a cylindrical, apical neck:

2. Leaves 5—7 mm wide; utricles 7—7.5 mm long, beak 2—2.25 mm long

62. *C. malayana*

2. Leaves 1—3 mm wide; utricles 5.5—6 mm long, beak 0.75—1 mm long

63. *C. rhyngachaenium*

This section, often with weak, short stems, which sometimes arise from lower leaf-axils, and also with its remarkable, more or less lageniform utricles and its rhomboid, sometimes horizontally-ridged achene, which departs from the usual *Carex* achene also in apical cylindrical necks and/or discoid-annulate apices, represents the most unusual group, I think, in the whole of this large subgenus. Several other species belonging to this section occur in Indo-China, China, Formosa, and Japan.

### 62. CAREX MALAYANA Nelmès

*Carex malayana* Nelmès in Kew Bull. 1950: 209: 1950. — Malay Peninsula, *Ridley 16,340*.

*Rhizome* longly creeping, about 1.5 mm thick. *Stems* erect, arising from basal leaf-axils, usually more or less hidden amongst the crowded leaves, and 10—11 cm tall, but sometimes, or perhaps always by the fruiting stage, more elongated (about 24 cm), trigonous, slender (0.75—1 mm thick), smooth below, scaberulous on the angles at the apex (below the inflorescence). *Leaves* rather numerous, basal, very much longer than the stems, 5—7 mm wide, plicate to flat, apex longly attenuated, surrounded at the base by spadiceous to fuscous fibrous remains of older leaves; sheaths light brown. *Spikes* 4—6 and single at each node, sometimes 1 with a smaller spike branching from its base, approximate or crowded and fastigiate, or lowest subapproximate, more or less cylindrical, erect or suberect, 1—3.6 mm long, terminal male, very slender (about 1 mm thick), lateral spikes female, or androgynaceous with the male part usually very much shorter than the female, female part 2—3 mm thick, lax-flowered, on scarcely to shortly exserted peduncles; *peduncles* trigonous, angles smooth or scaberulous. *Bracts* subfoliaceous, lower exceeding the stem, upper much reduced, lower shortly upper very shortly or scarcely sheathing. *Female glumes* oblong-ovate to oblong-lanceolate, incurved at the base, flattish to cymbiform above, apex acute to very obtuse, 2.75—4 mm long, 1.6—1.8 mm wide, slenderly nervose, pale, becoming brownish, with wide, thin, whitish margins above, apex erose-ciliolate, midrib slenderly keeled, falling short of or reaching the apex, not or scarcely excurrent. *Utricles* lageniform, the greater and less rounded inflations, scarcely ridged, being 2—2.5 and 4—4.5 mm from the base respectively, obscurely trigonous, 7—7.5 mm long, 1.6—1.8 mm broad at the lower, larger inflation, subcoriaceous, strongly multinerved, scarcely marginate, sparsely puberulous, straight, suberect to subpatulous, greenish above, stramineous below, curved-tapering from the lower inflation to a scarcely or shortly stipitate base, gradually tapering above the upper inflation into the beak; *beak* scarcely tapering, compressed, 2—2.25 mm long, brownish or palish, bidentulate; *mouth* apparently not oblique; *teeth* straight. *Achene* oblong but tapering below, trigonous, faces concave below, and one face above central girdling transverse ridge, remaining 2 upper faces slightly inflated-convex, stramineous, becoming brown, stoutly and longly (1 mm) stramineous-stipitate at the base, slightly constricted at the apex and re-expanded into a cylindrical, or slightly enlarging upwards, 1 mm long, stramineous, 0.8 mm (base), 0.8—0.9 mm (apex), in diameter, neck or beak, its apex truncate, faintly undulate, hollowed out (not annulate), the whole achene about 4 mm long. *Style* short, base thickened, centred in the hollow apex of the beak of the achene. *Stigmas* 3.

MALAY PENINSULA: Pahang; Mt. Tahan, July 1911, *Ridley 10,340* (BM, K) !  
Endemic.

This plant was misidentified by Ridley (Fl. Malay Penins. 5: 181: 1925) as *C. ligata* Boott, a Hongkong plant.

## 63. CAREX RHYNCHACHAENIUM Merrill

*Carex rhyrachchaenium* C. B. Clarke ex Merrill in Bull. Dep. Bur. Gov. Labor. Manila no. 35, 5: 1905; Kiiikenth., 480; Merrill, Enum. Philipp. Fl. Pl. 1: 142: 1923. — Philippine Islands, *Elmer* 6983.

Densely tufted. *Rhizome* not longly creeping. *Stems* subflexuous, central, trigonous, very slenderly ribbed, 3.5—30 cm tall, very slender (0.25—0.5 mm thick below), smooth and less distinctly angled below, scaberulous on the more distinct angles above, surrounded, below the leaves, by fibrous remains of old leaf-sheaths. *Leaves* basal, crowded, longer than the stems, 1—3 mm wide, flat-plicate or flattish, margins sometimes slightly revolute, upper surface scabrid, especially towards the longly attenuated apices; *sheaths* pubescent on the back and on the membranous front. *Spikes* 3—5, somewhat hidden among the leaves, upper 3 at approximate to more widely separated nodes but fastigiate or subfastigiate because of the lower being longer-peduncled, lower 1—2 remote and subradical, from basal leaf-sheaths, cylindrical, suberect, lax-flowered, terminal male, 8—10 mm long, very slender (rather less than 1 mm thick), others androgynaeceous, male part usually much shorter than the female part, single, 6—15 mm long, slender (female part 3—4 mm thick), upper on shortly lower on shortly to longly exerted peduncles; *peduncles* more or less trigonous, 0.25—0.4 mm thick, smooth or angles scaberulous. *Bracts* of the lower spikes foliaceous, exceeding, lower far exceeding, the terminal spike, sheathing, bract of the uppermost female spike much reduced, shorter to longer than its spike, shortly sheathing; *sheaths* glabrous to minutely pubescent. *Female scales* oblong-ovate to oblong-lanceolate, or triangular with a rounded apex, to triangular-acuminate and acute, base thickened and rigidly incurved, otherwise cymbiform, margins sometimes involute towards the apex, 2—3 mm long, 1—1.5 mm wide, nervose, thickish and stiff, except on the thinner, wide, whitish-hyaline margins, pale brownish, glabrous to sparsely adpressed setulose, margins often slightly erose-ciliolate towards the apex, midrib not extending to the apex of the obtuse or rounded apices, reaching and sometimes excurrent from the acute apices in a smooth to hispidulous awn up to 0.5 mm long. *Utricles* trigonous, rhomboid-lageniform, broadest in a rounded, girdling ridge at about 2 mm from the base, with a secondary rounded mitrate ridge just below the beak, 5.5—6 mm long, 1.25—1.6 mm broad, subcoriaceous, distinctly multinerved, scarcely marginate, covered sparsely, or subdensely above, with minute pale bristles, base glabrous, straight, suberect to patulous, pale greenish-stramineous, becoming tinged brownish, subgradually tapering below to the subrotund base, which is abruptly, rather stoutly, 0.25—0.4 mm long, stipitate, tapering above and then swelling into the secondary ridge, whence subabruptly beaked; *beak* subconic, subterete or subcompressed, 0.75—1 mm long, very narrowly marginate, minutely hispidulous, bidentulate; *mouth* oblique; *teeth* 0.3—0.5 mm long, slender, straight or slightly converging. *Achene* ovoid-ellipsoid, and slightly rhomboid from an interrupted, rounded transverse ridge below the middle,

trigonous, faces deeply concave below, flat to slightly convex above, becoming dark-spadiceous with whitish patches, angles pale, about 4 mm long, 1.3—1.6 mm broad, tapering below, base abruptly contracted into a cylindrical-trigonous, 0.75—1 mm long, stout (0.3—0.4 mm thick), pale stramineous stipe, tapering above, apex subabruptly contracted into a cylindrical, 0.75—1 mm long, 0.65—0.75 (base)—0.7—0.8 mm (apex) in diameter, pale or reddish brown, neck or beak, its apex pale, truncate, faintly undulate, hollowed out (not annulate). *Style* short, base not or scarcely thickened, centred in the hollow apex of the beak of the achene. *Stigmas* 3, short.

PHILIPPINE ISLANDS: Luzon: Pampanga; Mt. Arayat, Feb. 1906, Merrill (BM, K, L, S) ! Bataan; Mt. Mariveles, on recently burned place, near summit, 1140 m, Nov. 1904, *Elmer* 6983 (K) ! Benguet; Mt. Pulog, Sept. 1921, Ramos & Edaño (*Bur. Sci.* 40,391) (B, S) ! Laguna; Mt. Banajao, March 1911, Merrill 802U (BM, K, L) ! — Mindanao: Bukidnon; Tangulan and vicinity, Ramos & Edaño (*Bur. Sci.* 39,081) (B, BM) !; Zamboanga, Nov.—Dec. 1911, Merrill 8213 (L) !

"On forested ridges in and near the mossy forest, alt. 800—2100 m."—Merrill (*I.e.*).

Endemic.

Clemens 34,431, an immature plant from Borneo, is closely related to *C. rhyrachchaenium* and also to *C. hatusimana* Ohwi, a Formosan species.

## 64. CAREX BREVISCAPA C. B. Clarke

*Carex breviscapa* C. B. Clarke in Hook, f, Fl. Brit. Ind. 6: 736: 1894; Kiiikenth., 474; Merrill, Enum. Philipp. Fl. Pl. 1: 137: 1923. — Based on *C. Jackiana* var. *breviculmis* Thwait. et Hook, f.

*Carex Jackiana* Boott var. *breviculmis* Thwait. et Hook, f, Enum. PL Zeyl. 356: 1884. — Ceylon, *Thwaites* 3781.

*Carex Curtisii* Ridley, Mat. Fl. Malay Penins. pt. 3, 117: 1907; Fl. Malay Penins. 5: 183: 1925. — Malay Peninsula, *Curtis* 1798.

Tufted. *Stems* suberect, central, usually more or less hidden in the centre of the crowded leaves and their sheaths, the rhachis only being visible, but sometimes 1 cm or more of the stem proper is free, trigonous, 4—16 cm tall, rather less than 1 mm thick, smooth. *Leaves* rather numerous, basal, very much longer than the stems, 3—6.25 mm wide, flat-plicate, apex attenuated, lowest reduced to leafless sheaths or their fibrous remains; *sheaths* brown. *Spikes* usually 5—7 and single at each node, rarely up to about 20 through branching, partly hidden amongst the leaves, approximate and fastigiate except the lower 1—2 which are farther apart and only subfastigiate or scarcely overlapping, cylindrical, erect or suberect, terminal male, 1—2.25 cm long, very slender (about 1 mm thick), lateral spikes female, or androgynaeceous with the male part usually very much shorter than the female, 1—3 cm long, female part 3—4 mm thick, lax flowered, upper sessile or shortly peduncled, lower on rather shortly, lowest sometimes on longly, exerted peduncles; *peduncles* trigonous, less

than 0.5 mm thick, angles scaberulous. *Bracts* foliaceous, lower much exceeding the stem, upper much reduced, from shorter than their own spikes to extending to the apex of the stem, lower rather shortly upper shortly or scarcely sheathing. *Female glumes* more or less oblong or oblong-ovate, flattish to cymbiform with somewhat involute margins below, apex acute to rounded, 2—3 mm long, 1—1.75 mm wide, slenderly nervose, pale brownish-white, with wide, thin, whitish-hyaline margins above, apex becoming erose, and a pale, green-white central stripe, midrib slenderly keeled, from scarcely extending to the apex to up to 1 mm hispidulously excurrent. *Utricles* rhomboid-lageniform, broadest in a rounded girdling ridge at about the middle, with a secondary rounded mitrate ridge just below the base of the beak, distinctly trigonous, 3.5—5 mm long, 1.25—1.5 mm broad, subcoriaceous, multinerved, scarcely marginate, glabrous below, glabrescent or sparsely puberulous above, lightly scurfy, straight, suberect to patulous, light green to stramineous, sometimes brownish, gradually tapering to a somewhat rounded base and then abruptly, 0.3—0.8 mm long, rather stoutly stipitate, gradually tapering upwards from the primary to the secondary ridge and then abruptly beaked; *beak* subconic, plano-convex or compressed, 0.5—1 mm long, hispidulo-puberulous, bidentulate; *mouth* not oblique; *teeth* straight. *Achene* more or less rhomboid, trigonous, faces concave above and below a central horizontal ridge, especially below, 2.25—3 mm long, 1.25—1.5 mm broad, tapering to a subbulbously stipitate base, tapering more gradually from the central ridge upwards to a broad, truncate apex, which has a discoid-annulate margin, becoming dark brown with pale stipe, apex, and angles. *Style* slender, sometimes slightly thickened towards the subpersistent base. *Stigmas* 3.

MALAY PENINSULA: Penang; Government Hill, 750 m, July 1889, *Curtis* 1798 (K)! — Pahang; Kuala Teku, Feb. 1921, *Seimund* U72 (K)!

SUMATRA: East Coast; Bandarbaru, ± 1250 m, 10 June 1919, *Lb'rzing* 6678 (B, L)! — Palembang; north slopes of Mt. Pakiwang, north-west of Ranau Lake, marshy places in forest, ± 800 m, 7 Nov. 1929, *van Steenis* 3769 (B)!

BORNEO: Sarawak; Mt. Matang, trail in forest, 600 m, 1929, *Clemens* 22,362 (K)!

PHILIPPINE ISLANDS: Palawan; Mt. Capoas, April 1913, *Merrill* 9521 (BM, K)! — Luzon: Sorsogon; Irosin, foothills of subalpine regions, 300 m, *Elmer* 15,353 (K)!

"On forested ridges."—*Merrill (I.e.)*

NEW GUINEA: North-East New Guinea; Morobe District, Sattelberg, Quembung, forest path, 960 m, 26 Nov. 1935, *Clemens* 985 (AA, L)!; *ibid.*, Mt. Ako, Malalo Mission, Salamau, bank by forest path, 600 m, 12 Nov. 1936, *Clemens* M20 (AA)!

JAVA: Bogor (Buitenzorg); Mt. Batu, near Tjianten, south of Leuwiliang, south-west of Bogor (Buitenzorg), secondary forest, very common, 1000 m, 31 Aug. 1918, *Backer* 25,744 (B)!; Mt. Wiru, forest, above Nangela, south-west of Leuwiliang, 500 m, 27 Dec. 1930, *Bakhuizen van den Brink* 7781 (B, K, L, S)!; Mt. Beser, near Tjidadap, south of Tjibeber, forest, old volcanic ground, 1200 m, 15 June 1917, *Backer*

22,633 (B)!; Tjadasmalang, near Tjidadap, south of Tjibeber, forest, 1000 m, 19 June 1923, *Winckel* H08 (B, K, L, S)!; *ibid.*, 27 July 1923, *Winckel* 151U\$ (B, L, S)!; Mt. Beser, Tjampaka, near Tjidadap, forest, 1000—1300 m, 25 Dec. 1937, *Buwalda* 3470 (B)! Ceylon, Formosa, Queensland.

Sect. 14. MITRATAE Kiiikenth.

in Engl. Pflanzenr. IV, 20: 458: 1909

*Stems* usually rather slender and short, usually central, rarely arising from the axils of leaves produced on a short shoot. *Spikes* few, terminal male, lateral female or, less often, androgynaceous. *Female glumes* usually more or less oblong-ovate. *Utricles* usually more or less ellipsoid. *Achene* mitrate, i.e. contracted and then expanded discoid-annulate at the apex, 0.25—0.6 mm in diameter; *beak* straight.

1. Stems arising from the axils of leaves produced on a short shoot . . . 65. *C. multifolia*
1. Stems arising from the centre of the foliage leaves:
  2. Margins of male glumes more or less connate in front:
    3. Margins connate for more than halfway up from the base . . . 72. *C. pocilliformis*
    3. Margins connate for less than halfway up from the base . . . 71. *C. tristachya*
  2. Margins of male glumes not connate:
    4. Utricles glabrous, or very sparsely hispidulous above:
      5. Female glumes fulvo-castaneous, muticous or mucronulate; utricles glabrous, even on the margins. . . . . 69. *C. montivaga*
      5. Female glumes milky- or dirty-white, aristate; utricles glabrous, or very sparsely hispidulous above. . . . . 70. *C. rugata*
    4. Utricles hirtillous, densely hispidulous, or glabrous with ciliolate-hispidulous margins:
      6. Female glumes milky-white, aristate; utricles obovoid, hirtillous . . . . . 66. *C. breviculmis*
      6. Female glumes brownish, castaneous, or fulvous, with whitish margins, muticous or mucronulate; utricles ellipsoid, densely hispidulous, or glabrous with ciliolate-hispidulous margins:
        7. Female glumes often mucronulate; utricles ciliolate-hispidulous on the margins, otherwise glabrous or glabrescent . . . . . 67. *C. perciliata*
        7. Female glumes usually muticous; utricles densely hispidulous, at least above . . . . . 68. *C. brevis*

This section seems to be a development from Section *Lageniformes*, with the plants smaller, and the utricles and achenes more nearly resembling the normal ones of the genus, the achene, however, retaining the discoid-annulate apex which gives the section its name. It is a large group, widely spread in the Old World.

#### 65. CAREX MULTIFOLIA Ohwi

*Carex multifolia* Ohwi in Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 5: 254: 1930. — Japan, various plants cited.

Densely tufted. *Rhizome* not creeping. *Stems* erect to oblique, arising from the sheathed axils of the outer leaves of a short shoot, trigonous, compressed below, 13—40 cm tall, 0.5—0.9 mm thick below, smooth or sparsely scaberulous on the more acute angles on the rhachis above, just below the spikes, bearing below, mainly hidden in the leaf-sheaths, a few light-brown, short-bladed, small bract-like leaves. *Foliage leaves* crowded on short shoots, straight and erect to oblique, about as long as the stem, except lower shortly bladed ones, 3—8 mm wide, flat, slightly stiff when dried, probably subflaccid in life, slenderly septate-nodulose in a few parts, alveolate, apices attenuated; *sheaths* short, not well developing a membranous front, reddish-brown or spadiceous, subentire, older fibrous; *ligule* subtruncate. *Spikes* 3—6, single, situated in about the upper two-thirds of the stem, cylindrical, terminal male, erect, 1.5—3.5 cm long, 1.25—2 mm thick, subdense-flowered, lateral spikes female or sometimes with very few male flowers at the apex, erect to suberect, upper 1—2 approximate and fastigate, together with the terminal, lower at nodes 4.5—10 cm separated from one another, lowest sometimes more distant (basal), 1—2 (—2.25) cm long, 2.5—3.5 mm thick, subax- to lax-flowered, upper on included or shortly exerted peduncles, lower on scarcely to longly exerted peduncles; *peduncles* trigonous or compressed-trigonous, slender (0.2—0.3 mm thick), smooth or slightly scaberulous above. *Bracts* (or *bracteoles*) vaginiform with a subfoliaceous short blade, lower much longer to shorter, upper equalling to much shorter, than their own spikes, sometimes all reduced almost to bladeless sheaths, all much exceeded by the apex of the terminal spike; *sheaths* subampliate, long, mouth membranous, margin whitish-hyaline. *Female glumes* oblong or oblong-obovate, rarely oblong-ovate, base much incurved, cymbiform to subincurved and often with slightly involute margins above, apex irregularly rotund or truncate-rotund, rarely obtuse to subobtuse, 2.5—3 mm long, 1.2—1.5 mm wide, translucent, whitish to brownish, margins thin, irregularly pale or whitish, becoming erose, slenderly nervose, except on the margins, midrib and 2 strongish adjacent nerves, in an often greenish central stripe, coalescing above, are often excurrent in a ciliolate-hispidulous-margined awn, usually about 0.5 mm long; *male glumes* very much longer (5.5—8 mm long), elliptic but long-tapering at each end, apex subobtuse to subacute. *Utricles* ellipsoid but long-tapering at each end, sometimes oblong-obovoid, trigonous faces flattish, 3—4 mm long, about 1 mm broad, membranaceous, strongly multinerved, scarcely marginate, middle portion sparsely whitish-hispidulous, especially above, straight, becoming subpatulous, light brown with pale extremities but middle portion olivaceous, obscurely stipitate, apex subabruptly slightly constricted, then expanded-beaked; *beak* conic, subinflated, about 1 mm long, not marginate, glabrous or glabrescent, or slightly hispidulous below, pale, bidentulate, often dorsally very narrowly grooved, *mouth* scarcely dorsally oblique; *teeth* very short (0.1—0.2 mm long), straightish, tapering, smooth to minutely ciliolate, very pale. *Achene* ellipsoid to oblong-ellipsoid, trigonous, angles prominent, faces shallowly concave, 1.75—1.9 mm long, 0.9 mm broad, dark or blackish-ferruginous, sometimes partly overlaid whitish, rather stoutly compressed-cylindrical,

pale stipitate, apex suddenly contracted into a very short slender neck, which is suddenly re-expanded into pale, discoid-annulate, 0.3 mm in diameter, apex. *Style* short, slender, base pyramidally thickened and persistent. *Stigmas* 3.

PHILIPPINE ISLANDS. Luzon; Kalinga, Lubuagan, Mt. Masingit, Feb. 1920, Ramos & Edaño (*Bur. Sci.* 37,491) (K) !; *ibid.*, 37,516 (B) ! Rizal, Mt. Angilog, April 1922, Ramos (*Bur. Soi.* 40,765) (K) !

Probably misidentified as *C. ligata* Boott var. *nexa* (Boott) Kükenth. by Kükenth. (*in Philipp. Journ. Sci. Bot.* 6: 63: 1911) who cites *Vanoverbergh 496*, and by Merrill (*Enum. Philipp. Fl. PL* 1: 139: 1923) who cites also *Vanoverbergh 1139*, Ramos & Edaño (*Bur. Set.* 37,491 ; 37,516); Ramos (*Bur. Sci.* 40,765)!

"In forests, alt. about 1600 m"—Merrill (*I.e.*)

Japan.

This is a new name given to Japanese plants which had been misidentified in the past as *C. foliosissima* Fr. Schmidt.

#### 66. CAKEX BREVICULMIS R. Br.

*Carex breviculmis* R. Br., Prodr. Fl. Nov.-Holland. 242: 1810; Boott *in* Hook. f., Fl. Nov.-Zeland. 1: 283 t. 63A: 1853; Kükenth., 469; S. T. Blake *in* Journ. Arn. Arb. 28: 112: 1947; Nelmes *in* Kew Bull. 1949: 383: 1949.

Tufted. *Stems* erect or oblique, obtusely trigonous, 5—25 cm tall, slender (0.3—1 mm thick), smooth or angles scaberulous above and on the rhachis. *Leaves* basal, numerous, lower reduced to sheaths surrounded by the fibrous remains of older leaf sheaths, mostly much longer than the stems, 1—4 mm wide, flat to revolute, erect to spreading, sometimes recurved, rough minute protuberances on the upper surface above, apex long-attenuated. *Spikes* 3—7, erect to patulous, upper crowded to approximate, lower subapproximate to distant or rather distant, cylindrical, 7—15 mm long, terminal male, 1—2 mm thick, rarely gynaeandrous, or with female flowers at about the middle, pale, subdense-flowered, remainder female, upper sometimes with a few male flowers at the apex, 3—4 mm thick, sessile or subsessile to shortly peduncled; *peduncles* trigonous, smooth or angles scaberulous. *Bracts* of the female spikes foliaceous, lower, or lowest only, far exceeding the stem, upper much reduced, usually not extending to the apex, lower shortly, upper scarcely, sheathing; *sheaths* pale and membranous at the mouth. *Female glumes* oblong-ovate or oblong-acuminate, cymbiform, rigidly incurved at base, apex acute to very obtuse, 2.25—3 mm long, 1—1.5 mm wide, thin, milky-white, midrib light-green, slenderly keeled and excurrent in a smooth, glabrous or sparsely ciliolate-margined awn, 0.2—4 mm long. *Utricles* obovoid, obtusely to obsoletely trigonous, 2.5—3 mm long, 1—1.3 mm broad, membranaceous, strongly multinerved, very narrowly marginate, hirtillous, straight, suberect to patulous, bright green, becoming light-brownish, conically shrunken-sulcate longly (0.5—0.75 mm) stipitate, subabruptly beaked at the apex; *beak* conic, 0.6—0.8 mm long, stout below, very narrowly marginate, apex

glabrous and whitish-hyaline, emarginate or scarcely bidentulate. *Achene* ellipsoid-obovoid, obtusely trigonous, with 2 or 3 of the 3 faces flattish or slightly convex above and deeply concave below, sometimes a slight, transverse, central ridge, 1.5—2.25 mm long, 1—1.2 mm broad, stramineous, becoming fuscous, shortly and stoutly stipitate, abruptly and very shortly beaked; *beak* discoid-annulate and 0.25—0.3 mm in diameter at the apex. *Style* slightly thickened at the base, which is subpersistent on the centre of the expanded apex of the beak of the achene. *Stigmas* 3.

CELEBES: South-West Celebes, Peak of Bonthain [Mt. Lompobatang], north-west side, among shrubs, 2550 m, 8 June 1921, *Bunnemeijer* 11,973 (B)!

NEW GUINEA: Papua; Central Division, Murray Pass, Wharton Range, scattered on grassland slopes, 2840 m, June—Sept. 1933, Brass 4697 (AA, B, L)!

Australia.

The Brass gathering was determined by Kiiikenthal (*in* Engl. Bot. Jahrb. 70: 465: 1940) as *C. breviculmis* R. Br. subsp. *Royleana* (Nees) Kiiikenth. Indian *C. Royleana* Nees may be conspecific with *C. breviculmis* but it differs in several characters and is not included in the above description. It has narrower leaves, which are shorter, not longer, than the stems, and a more slenderly nerved, more hairy, utricle.

#### 67. CAREX PERCILIATA (Kiiikenth.) Nelmès

*Carex perciliata* (Kiiikenth.) Nelmès *in* Kew Bull. 1946: 26: 1946; *in* Kew Bull. 1949: 383: 1949.

*Carex breviculmis* R. Br. var. *perciliata* Kiiikenth. *in* Engl. Pflanzenr. IV, 20: 469: 1909. — Papua, *Giulianetti*.

*Carex bulbostylis* Kiiikenth. var. *ciliato-marginata* Kiiikenth. *in* Engl. Bot. Jahrb. 70: 464: Jan. 1940; *in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 318: Feb. 1940. — Papua, Brass 4316.

*Carex tricholoma* S. T. Blake *in* Journ. Arn. Arb. 28: 110: 1947. — Based on the foregoing variety.

Tufted. *Rhizome* short, descending. *Stems* erect, obtusely to subacutely trigonous, straight to somewhat curved, 2—30 cm tall, 0.5—1.25 mm thick, smooth, or sometimes slightly scaberulous at the apex, surrounded, below the leaves, by a fibrous mass of withered leaf-sheaths. *Leaves* numerous at the base, 1—2 subbasal, much shorter to slightly longer than the stems, 2—4 mm wide, flattish above, conduplicate below, margins recurved or revolute, rigid, suberect to strongly curved, rough with minute protuberances towards the attenuated apices. *Spikes* 3—5, 6—12 mm long, subdense-flowered, terminal male or gynaeandrous, cylindrical or clavate, 1—2 mm thick, remainder female, more or less cylindrical, 2.5—3.5 mm thick, suberect to patulous, sessile or on shortly included peduncles, lowest sometimes on longly or very longly exerted peduncles, forming a terminal, usually crowded inflorescence, 1—1.5 cm long (excluding the lowest spike when distant, as it sometimes is). *Bracts* foliaceous, lower sheathing, usually

much exceeding the stem, upper much reduced, scarcely sheathing; mouth of sheath truncate to slightly concave. *Female glumes* ovate to oblong, cymbiform, sometimes more or less acuminate, apex acute to obtuse, or even emarginate, 2—3 mm long, 1.5—1.75 mm wide, brown or brownish, castaneous, with a very wide, thin, translucent, whitish margin, which tends to become erose, midrib often ciliolate-mucronulate, rarely failing to extend to the apex. *Utricles* ellipsoid, obscurely or obtusely trigonous, 2.3—3 mm long, 0.9—1.25 mm broad, membranaceous, more or less nerveless or slenderly multinerved, usually distinctly marginate, at least above, glabrous below, sometimes sparsely setose in the upper half to two-thirds, especially on the ventral face, margins very sparsely to densely ciliate-hispid in the upper third to half, straight, subpatulous, light greenish, becoming stramineous-brown and sometimes nitidous, scarcely stipitate, subgradually narrowing into a beak at the apex; *beak* conic-cylindric, sometimes slightly inflated below, 0.5—0.75 mm long, ciliolate-marginate, at least below, sometimes glabrous above, pale or more or less castaneous, bidentulate or emarginate, apex whitish-hyaline and sometimes becoming erose-entire. *Achene* ellipsoid, trigonous, faces flattish or convex above, concave in about the lower third, 1.5 mm long, 0.9 mm broad, becoming reddish-brown, with a punctate-cinereous over-surface, very shortly stout-stipitate, apex rounded-truncate, suddenly constricted into a very slender, short neck, with a dilate-annulate apex. *Style* reddish-brown, base pyramidally-thickened, persistent on the wider, flat apex of the nut. *Stigmas* 3.

NEW GUINEA: North-East New Guinea; Morobe District, Mt. Sarawaket, 4050m, 8 April 1937, *Clemens* 6076B (AA)!; *ibid.*, 2400—2700m, 11 March 1937, *Clemens* 6078B (AA)!; *ibid.*, [alt.?], March—April 1937, *Clemens* 6079B (AA)! — Papua; Mt. Scratchly, 1896, 3660m, *Giulianetti* (K)!; Central Division, Mt. Albert Edward, few plants among grass on banks of a grassland pond, 3680 m, May—July 1933, Brass 4274 (AA, Br); *ibid.*, sporadic in forest glades, not common, 3680 m, May—July 1933, Brass 4316 (AA, B, Br, L)!

Endemic.

Misidentified by C. B. Clarke (*in* Journ. Linn. Soc. Bot. 37: 16: 1904) as *C. breviculmis* R. Br.

The utricles of this species are striking by their ciliate-hispid margins and otherwise glabrous or nearly glabrous surfaces, but the relationship with *C. brevis* S. T. Blake is close.

#### 68. CAREX BREVIS S. T. Blake

*Carex brevis* S. T. Blake *in* Journ. Arn. Arb. 28: 111: 1947. — Papua, Brass 4418. *Carex bulbostylis* Kiiikenth. var. *hispidula* Kiiikenth. *in* Engl. Bot. Jahrb. 70: 464: Jan. 1940; *in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 317: Feb. 1940. — Borneo and Papua, type not indicated.

Tufted. *Stems* erect, obtusely trigonous except just below the inflorescence, where the angles are acute and sometimes scaberulous, 1.5—50 cm tall, 0.75—1 mm thick, surrounded at the base, below the leaves, by

withered leaves and semi-fibrous remains of older leaf-sheaths. *Leaves* basal and subbasal, 5—11 cm long, 2—4 mm wide, mostly conduplicate, some plicate with recurved margins, mostly recurved but some oblique, suberect, and/or curved upwards, rigid and coriaceous, apices attenuated, but thick, hardened. *Spikes* 3—5, crowded at the apex of the stem, sometimes lowest remote on a very shortly to longly exerted peduncle from the sheaths of a basal leaf (bract), cylindrical, ovoid, or ellipsoid, 5—8 mm long, subdense-flowered, terminal male, erect, about 1 mm thick, remainder female, 1.5—3 mm thick, suberect to subpatulous, upper sessile or subsessile, lower on wholly included peduncles, forming a terminal inflorescence 5—7 mm long (excluding lowest spike when basal); *peduncle* smooth or angles scaberulous. *Bracts* of the female spikes foliaceous, erect, much exceeding the inflorescence, uppermost sometimes subfoliaceous or glumiform, lower shortly, upper scarcely, sheathing, male spike ebracteate. *Female glumes* oblong-ovate or widely oblong-ovate, base thickened and gibbous-incurved, cymbiform above, apex acute to obtuse, 2—2.5 mm long, 1—1.8 mm wide, translucent, margins widely very thin, pale or whitish, otherwise fulvous, sometimes erose-ciliolate towards and at the apex, midrib sometimes ciliolate-scaberulous towards the apex, which it usually more or less reaches, less commonly mucronate. *Utricles* ellipsoid, obscurely or obtusely trigonous, 2.5—3 mm long, about 1 mm broad, subcoriaceous, dorsally slenderly multinerved below, obscurely nerved or nerveless above, ventrally very slenderly plurinerved at the base, otherwise nerveless, but often centrally ridged, narrowly marginate, densely silvery subadpressed hispidulous, but at the base of the ventral and in the lower third of the dorsal face glabrous to glabrescent, surface dull stramineous to light fulvous or lutescent, straight, suberect, becoming subpatulous, scarcely to very shortly stout-stipitate, stipe sulcate, gradually narrowing at the apex into a *beak*, which is slightly inflated below, compressed-conic, 0.25—0.5 mm long, glabrous, sometimes hispidulous-margined, sometimes castaneous above, bidentulate; *teeth* very short, whitish-hyaline tipped, castaneous below, often becoming erose and subentire, straight or slightly converging. *Achene* more or less ellipsoid, or ovoid-ellipsoid, trigonous, faces slightly convex above, concave in the lower third, 1.5—1.75 mm long, 0.75—1 mm broad, stramineous, becoming reddish-brown under a minutely densely punctulate-cinereous surface, apex rounded-truncate, suddenly contracted into an extremely short neck, as suddenly expanded into a pale, dilate-annulate apex, about 0.3 mm in diameter. *Style* pyramidally thickened at the base, which persists on the apex of the achene. *Stigmas* 3, rather thick.

BORNEO: British North Borneo: Mt. Kinabalu; above Paka, 3300—3900 m, 26 March 1932, *Clemens* 29,005 (B, BM, K, L)!; Paka to summit, damp places, seepage, 3000—3900 m, 2 June 1932, *Clemens* s.n. (BM)!; Marai Parai, base of great wall above Kamborangah, 3150 m, 26 May 1933, *Clemens* 32,3U (B, BM, L)!; granite dome, head of Pinokok and Dahogong river, rock crevices, 3600—3900 m, 16 Dec. 1933, *Clemens* 51,180 (BM, K)!

CELEBES: South-West Celebes; Enrekang, Mt. Rantemario, open ground, 3300 m, 17 June 1937, *Eyma* 753 (B)!; *ibid.*, open bare ground, plateau south-east of summit, very general, locally common, 3400 m, 20 June 1937, *Eyma* 86U (B, K)!

NEW GUINEA: Papua; Mt. Scratchley, 1896, 3660 m, *Giulianetti* (K)! Central Division; Mt. Albert Edward, common in small tufts on a barren rocky ridge crest, 3680 m, May—July 1933, *Brass* U18 (AA, B, Br, L)!

Although I have not seen Blake's type, I have seen specimens of the same number from several herbaria, including the type of Kiikenthal's variety at Bogor (Buitenzorg). Remarkably variable in length of stem, as, indeed, to a somewhat less extent, are its nearer relatives.

#### 69. CAREX MONTIVAGA S. T. Blake

*Carex montivaga* S. T. Blake in Journ. Arn. Arb. 28: 109: 1947. — New name for *C. bulbostylis* Kükenth.

*Carex bulbostylis* Kükenth. in Engl. Bot. Jahrb. 69: 264: 1938, non Mackenzie (1935). — New Guinea, *Clemens* 6069, pro parte.

Tufted. *Stems* erect, straight to slightly curved, obscurely to obtusely trigonous, 12—42 cm tall, 0.5—0.8 mm thick, ribbed, sulcate, smooth, clothed in the basal 2—3 cm with fusco-spadiceous subentire to fibrous leaf-sheaths. *Leaves* subbasal, mostly much shorter than the stems, 1.75—3 mm wide, canaliculate, thickish, rigid, often more or less recurved, apices attenuated, firm, sometimes smooth throughout. *Spikes* 3—5, more or less cylindrical, 6—12 mm long, subdense-flowered, approximate, fastigiate, terminal male, erect, 1—2 mm thick, remainder female, erect to patulous, 2.5—4 mm thick, upper sessile or on very shortly included peduncles, lower on shortly or very shortly included peduncles, forming a crowded terminal head 1.5—2 cm long and 8—10(—12 mm) broad. *Bracts* of the lower spikes subfoliaceous, longer to shorter than the inflorescence, shortly or very shortly sheathing, upper bracts much reduced, very shortly or scarcely sheathing. *Female glumes* oblong-ovate, base gibbous and incurved, cymbiform to flattish above, apex acute to obtuse or very obtuse, 2.5—3.25 mm long, 1.5—2 mm wide, fulvo-castaneous with wide whitish-hyaline margins which are translucent and thin and tend to become erose and involute, with a wide, tapering, pale green, 3-nerved central stripe, midrib and 2 converging adjacent nerves coalescing above and from failing to reach the apex to mucronulate. *Utricles* ellipsoid or oblong-ellipsoid, trigonous, 3—4 mm long, about 1 mm broad, subcoriaceous, dorsally slenderly, ventrally sometimes scarcely visibly several-nerved, narrowly marginate, glabrous, smooth, straight, becoming subpatulous to patulous, pale green, base spongy-thickened but not stipitate, gradually to subgradually narrowing at the apex into a *beak* which is compressed-conic, slightly swollen below, about 1 mm long, scarcely (below) or not (above) marginate, glabrous, smooth, rarely extremely sparsely hispidulous below, castaneous above, apex whitish-hyaline, subentire, becoming erose. *Achene* ellipsoid-ovoid, trigonous, dorsal faces flattish or slightly

convex in the upper two-thirds, concave below, ventral face wholly flattish or shallowly concave, about 2 mm long, 0.8—1 mm broad, stramineous, becoming brown, stoutly short-stipitate, apex rounded-truncate, suddenly contracted into an extremely short neck, which is as suddenly expanded, pale, discoid-annulate, 0.3—0.4 mm in diameter. *Style* slightly thickened at the base, which is subpersistent in the hollowed-out disc. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, common on wet sandy soil of open ridges, 3225 m, Aug. 1938, *Brass* 9032 (AA) !; *ibid.*, common on sandy patches on wet grassy slopes, 3225 m, Aug. 1938, *Brass* 9339 (AA) !; *ibid.*, alpine grassland, in a sandy pool, tufted, 3225 m, Aug. 1938, *Brass* 9582 (AA) ; Mt. Wilhelmina, 11 km north-east of top, in small bog, 3450 m, Sept. 1938, *Brass* 9759 (AA) ! — North-East New Guinea; Mt. Sarawaket, mossy forest, 2700—3300 m, 10 April 1937, *Clemens* 6069, partim.

Endemic.

Blake and I have not seen Kiikentha's type of this species, but as Brass's specimens agree so well with the description of the type we feel little doubt about their being the same species.

#### 70. CAREX RUGATA Ohwi

*Carex rugata* Ohwi in Acta Phytotax. et Geobot. 1: 76: 1932. — Japan, various gatherings cited.

*Carex kingiana* Lévl. et Van. in Bull. Acad. Intern. Géogr. Bot. 10: 272: 1901, quoad part. pi. Jap.

*Carex breviculmis* R. Br. subsp. *Royleana* (Nees ex Wight) Kiikenth. var. *Kingiana* (Lévl. et Van.) Kiikenth. in Engl. Pflanzenr. IV, 20: 470: 1909, quoad part. pi. Jap.; in Philipp. Journ. Sci. Bot. 6: 62: 1911; Merrill, Enum. Philipp. Fl. PL 1: 137: 1923.

More or less densely tufted. *Stems* erect to oblique, obtusely to acutely trigonous, 1—17 cm tall, slender (0.5 mm thick), sometimes undeveloped below the rhachis, or hidden by leaf-sheaths, glabrous and smooth, or sometimes angles scaberulous just below the spikes, surrounded at the base, below the leaves, by withered remains of leaf-sheaths. *Rhachis* smooth or scaberulous. *Leaves* basal and subbasal, sometimes sheathing the whole stem, about as long as to much longer than the stems, 1—2.5 mm wide, flattish or margins revolute, erect to oblique or sometimes recurved, septate-nodulose in places, apex firm, attenuated. *Spikes* 2—4, erect or suberect, more or less cylindrical, or terminal ellipsoid, obovoid or ellipsoid-cylindrical, subax-flowered, 5—10 mm long, terminal male, 1.5—2 mm thick, lateral female, 2.5—3.75 mm thick, sessile to peduncled, upper contiguous, all often fastigiate; *peduncles* similar to the stems. *Bracts* of the lateral spikes foliaceous, upper scarcely lower shortly sheathing or longer-sheathing basal leaves, male spike sometimes subtended by a subfoliaceous bract. *Cladophylls* utriculi-glumiform to utriculi-ocrei-form. *Female glumes* oblong with rounded upper corners, oblong-ovate, or oblong-lanceolate, base thickened, gibbous, and incurved, cymbiform

but margins involute above, apex obtuse or very obtuse, 2—3.5 mm long, 1.5—2 mm wide, thin, translucent, milky- or dirty-white, upper margins often becoming erose, a wide, whitish to greenish, 3-nerved central stripe, coalescing near the apex and excurrent in a subterete or flattish, smooth or ciliolate-hispidulous-margined awn, 0.25—2.5 mm long. *Utricles* ellipsoid or ellipsoid-lageniform, subinflated-trigonous, 2.5—3.5 mm long, 1—1.25 mm broad, membranaceous, multinerved below, nerveless or slenderly few-nerved above, narrowly marginate, especially above, glabrous, or very sparsely hispidulous above, straight, becoming patulous, stramineo-olivaceous to pale brownish, shortly (0.4—0.6 mm) stoutly, and deeply sulcate-stipitate, constricted just above the (broadest) middle part, inflated above the constriction, then compressed-cylindrical and gradually tapering to the apex, this upper, apical, conico-cuneate *beak-like* portion 0.8—1.25 mm long, marginate, apex emarginate or shortly bidentulate; *mouth* oblique, small. *Achene* obovoid, ellipsoid-obovoid, or pyriform-obovoid, or subglobose with a tapering base obscurely (inflated?)-trigonous, sutures prominent, sometimes concave above, faces concave below, flattish to slightly convex above, 1.5—2 mm long, 0.8—1.25 mm broad, stramineous, becoming light brown, apex rounded or rounded-truncate, suddenly contracted into an extremely short neck or beak, then equally suddenly expanded into a discoid or discoid-annulate apex, about 0.5 mm in diameter. *Style* pyramidally thickened at the base, which is subpersistent on the apex of the achene. *Stigmas* 3, slender.

BORNEO: British North Borneo; Mt. Kinabalu, granite ridge, 3900 m, 10 Jan. 1932, *Clemens* 28,023 (B, BM, K, L) !; *ibid.*, in mats on granite seepage slope, north-west base of Victoria Peak, 3750 m, 17 Dec. 1933, *Clemens* 51,349 (BM, K, L) !

PHILIPPINE ISLANDS: Luzon; Benguet, Panay, May 1909, *Merrill* 6628 (B, K) !; *ibid.*, April—June, 1918, *Santos* (*Bur. Sci.* 31,771) (B, BM, K) !

"In open grassy meadows and on damp open slopes, altitude 2200—2700 m." — Merrill, (*i.e.*), who cites, besides the two Philippines gatherings above-mentioned, "Benguet, *Merrill* 6609, *Phil. Pl.* 561, *Santos* 8853, *McGregor*," under *C. breviculmis*, subsp. *Royleana*, var. *Kingiana*. Kiikenth. (*in* Philipp. Journ. Sci. Bot. 6: 62: 1911) determines these additional citations of Merrill as *C. breviculmis* subsp. *Royleana*.

JAVA: Besuki, Ijang Plateau, summit of Mt. Welirang (Mt. Argopuro), ± 2900—3050 m, stony summit-meadow, 16 July 1938, *van Steenis* 10,959 (B) !

Owing to lack of authentic material of *C. rugata*, I am not certain about the above cited specimens being correctly determined by me, nor, because of the scantiness of the Malaysian material, am I quite sure that it represents only one species.

#### 71. CAREX TRISTACHYA Thunb.

*Carex tristachya* Thunb., Fl. Japon. 38: 1784; Schkuhr, Riedgr. 2: 48 *t.Ww.*, fig. 109: 1806; Boott, Illustr. 4: 131 *t.4U*: 1867; Kükenth., 471. — Japan, no type indicated.

Densely tufted. *Rhizome* short, slender, woody. *Stems* erect to curved or flexuous, trigonous, 12—38 cm tall, 0.3—0.8 mm thick below, smooth,

semi-fibrous remains of leaf-sheaths, and usually a dense mass of older reddish-brown to fuscous fibres. *Leaves* numerous, crowded-basal, with sometimes 1 leaf higher on the stem, erect to oblique, longer to shorter than the stems, lower short-bladed, 1.5—4 mm wide, flattish, margins sometimes revolute or subconduplicate, stiff, sometimes slenderly septate-nodulose towards the base, apices attenuated, upper surface sometimes rough with small protuberances above; *sheaths* pale, mouth truncate to shallowly concave. *Spikes* 3—5, upper, or all, approximate and fastigiate, lower often subapproximate (sometimes distant or even arising on a long slender peduncle from a basal leaf-sheath and rarely with 2 small spikes branching from it), terminal male, very slenderly cylindrical 1.2—2 cm long, 0.75—1.5 mm thick, subdense-flowered, lateral spikes female, 0.8—2 cm long, 2.5—3 mm thick, lower on rather shortly to longly, upper on wholly included or very shortly, exerted peduncles; *peduncles* trigonous, slender (0.2—0.5 mm thick), smooth. *Bracts* of the lower spikes foliaceous or subfoliaceous, usually longer than their spikes (lowest sometimes exceeding the apex of the terminal spike), upper bracts setaceous with vaginiform bases, shorter than their spikes, lower shortly to rather longly, upper shortly or very shortly, sheathing; *sheaths*, at the mouth, whitish-hyaline, membranous, and concave. *Female glumes* oblong-ovate, or oblong-obovate, base strongly incurved, incurved or cymbiform above, apex very obtuse, rounded, or somewhat bilobed-emarginate, 1.8—2.5 mm long, 1.3—1.6(—1.9) mm wide, thickish, translucent, glabrous, minutely scurfy, whitish or greenish-white, tinged brown, margins thin, often apically erose-ciliolate, nerveless, otherwise very slenderly nervose, midrib and 2 adjacent nerves, forming a narrow greenish stripe, converging above and coalescing, not extending to the apex or excurrent up to 1 mm; *male glumes* less than half connate in front and thus infundibuliform, 2—2.5 mm long, midrib not extending to the apex, otherwise as female glumes. *Utricles* oblong-fusiform or more or less ellipsoid, trigonous with sometimes a very ill-defined bounded ridge round the dorsal face a little below halfway, faces shallowly concave below, flattish to slightly concave above, 3—3.5 mm long, 1—1.3 mm broad, submembranaceous, multinerved, scarcely or very narrowly marginate, subadpressed scurfy-setulose, except at the base, straight or straightish, becoming patulous, greenish-stramineous, tinged brown, subgradually tapering below to a slightly thickened subrotund base, then abruptly and shortly stipitate (0.2—0.3 mm long), gradually tapering above, apex slightly inflated in a more or less transverse rounded ridge, then subgradually to subabruptly beaked; *beak* subconic, ventrally gibbous, 0.3—0.75 mm long, marginate, glabrous or sparsely hispidulous-margined, palish, emarginate; *mouth* not or scarcely oblique; *teeth* extremely short or becoming erose and subentire, minutely ciliolate, pale. *Achene* ellipsoid or ovoid-ellipsoid, base shortly tapering, trigonous, angles prominent, faces flattish or slightly concave, 2—2.5 mm long, 1—1.25 mm broad, reddish-brown, becoming minutely whitish-punctulate, not or scarcely transversely ridged, very stoutly and slightly bent stipitate, gradually tapering above, not contracted into a neck but expanded into a pale

discoid-annulate apex, 0.5—0.6 mm in diameter. *Style* short, slender, base pyramidally thickened and persistent on the centre of the achene's apex. *Stigmas* 3. *Stamens* with *filaments* slightly connate at the base, dilated and narrowly spatulate, including the *anthers* except for an apical portion.

BORNEO: British North Borneo; Mt. Kinabalu, Penibukan, Dahobang Falls, marginal boulders, 1350 m, 11 Sept. 1933, *Clemens* 40,281 (BM, K) !  
China, Japan.

## 72. CAREX POCILLIFORMIS Boott

*Carex pocilliformis* Boott, Illustr. 4: 175 t. 593: 1867. — Tsus-Sima, Straits of Korea, Wilford 763.

*Carex tristachya* Thunb. var. *pocilliformis* (Boott) Kukenth. in Engl. Pflanzenr. IV, 20: 473: 1909; Merrill, Enum. Philipp. Fl. PL 1: 142: 1923.

Densely tufted. *Rhizome* slender, short. *Stems* erect to oblique, more or less trigonous, 8—33 cm tall, very slender (less than 0.5 mm thick below), smooth, including the rhachis, clothed, below the leaves, by reddish-brown to fuscous fibrous remains of old leaf-sheaths. *Leaves* crowded, basal and subbasal, equalling or longer than the stems, 1.5—4 mm wide, flat-plicate, erect to oblique, upper surface rough on nerves above, stiffish, sometimes very slightly septate-nodulose, apices attenuated; *sheaths* inconspicuous. *Spikes* 3—7, upper approximate and fastigiate, lower subapproximate or distant, lower 1—3 sometimes arising on long filiform peduncles from basal leaf-sheaths (one of these sometimes paired), subax-f lowered, terminal male, very slenderly cylindrical, 0.5—2.5 cm long, 0.5—1 mm thick, lateral spikes female, 0.5—1.5 cm long, 2—2.75 mm thick, lower on rather shortly to longly, upper on scarcely or shortly, exerted peduncles; *peduncles* trigonous, slender (0.2—0.3 mm thick), smooth. *Bracts* of the lower spikes foliaceous (leaves), upper bracts subfoliaceous with vaginiform bases, shorter than their spikes or, less commonly, exceeding the apex of the terminal spike, lower shortly to rather longly, upper shortly or very shortly, sheathing; *sheaths* at the mouth whitish-hyaline, membranous and concave. *Female glumes* oblong with a rounded apex, base slightly thickened and strongly incurved, cymbiform above, 1.8—2 mm long, 1.25—1.75 mm wide, thickish, translucent, glabrous, lightish brown except the wide to very wide (especially towards the apex), whitish, thin, erose, nerveless, often apically ciliolate, margins, otherwise slenderly nervose, midrib and 2 adjacent nerves, forming a greenish or brownish stipe, thickening and coalescing above, to form a hard tip which is often extremely shortly (0.25 mm) excurrent, but sometimes fails to extend to the apex; *male glumes* more than half connate in front and thus infundibuliform, 1.6—1.75 mm long, midrib not extending to the apex, otherwise as the female glumes. *Utricles* ellipsoid or lageniform-ellipsoid, trigonous with often a rather ill-defined transverse rounded ridge a little below halfway, faces shallowly concave below, flattish to slightly convex above, 2.75—3 mm long, 0.75—1 mm broad, submembranaceous, multinerved,



not marginate, sutures often displaced, glabrous, or subdensely pubescent except at the base, recurved or reflexed at the apex, subpatulous, green to dull golden brown, subgradually tapering below to a slightly thickened subrotund base, then abruptly and shortly stipitate (0.3—0.5 mm long), gradually tapering above and at the bent apex subgradually to subabruptly beaked; *beak* subconic, ventrally gibbous, about 0.5 mm long, marginate, glabrous or hispidulous margined, palish, emarginate; *mouth* not or scarcely oblique; *teeth* extremely short, pale. *Achene* oblong ovoid or oblong ellipsoid, shortly tapering at the base, trigonous, angles prominent, 2 faces flattish above, concave below, third face wholly shallowly concave, sometimes causing a slightly transversely and irregularly ridged appearance, about 2 mm long, 0.75—1 mm broad, stramineous to dark brown, not or shortly and stoutly pale stipitate, the rounded truncate apex abruptly contracted into a slender, extremely short neck, then abruptly re expanded into a pale discoid annulate apex, 0.3—0.5 mm in diameter. *Style* short, slender, base pyramidally thickened and persistent in the centre of the apex of the nut. *Stigmas* 3. *Stamens* with *filaments* slightly connate at the base, dilated and narrowly spatulate, including the *anthers* except for an apical portion.

PHILIPPINE ISLANDS: Luzon; Benguet, Mt. Pulog, May 1909, Merrill 6606 (K)!; Pauai, May 1909, Merrill 6629 (B, K, L)!

"In open meadows and on grassy slopes, alt. 2200—2500 m."—Merrill (*I.e.*)

NEW GUINEA: North East New Guinea; Morobe District, Mt. Sara waket, grassy slope, 2400—2700 m, 3 April 1937, Clemens 6087 (AA)!

Korea, Formosa, Japan.

*Carex pocilliformis* and, to a less extent, *C. tristachya* are, so far as is known, unique in the genus in having the male glumes more or less connate in front. Their monadelphous anthers also are almost equally rare, the only other example known being in *C. acaulis* d'Urv., of the Falkland Islands, recently reported to me by Dr. M. Barros, the eminent authority on South American Cyperaceae.

I have not seen the following Papuan plant, and know no more of it than the following quotation from S. T. Blake (*in Journ. Arn. Arb.* 28: 116: 1947): "Appears to represent an undescribed species of the *Mitratae*, but only very immature flowers and one over ripe utricle are present on the specimen."

NEW GUINEA: Papua; Central Division; from a broken cliff face, Mt. Albert Edward, 3680 m, Brass 4407.

Sect. 15. RHOMBOIDALES Kiikenth.

*in Engl. Pflanzenr.* IV, 20: 622: 1909

*Stems* often lateral. *Leaves* often wide, flat. *Spikes* 2—6, terminal male, cylindrical or clavate, lateral female or androgynaeous, few or

lax to subdense flowered, single or binate, lower often remote on long slender peduncles. *Bracts* usually short, usually longly sheathing. *Female glumes* oblong truncate to lanceolate acuminate, fulvous or whitish, muticous to aristate. *Utricles* rhomboid or more or less ellipsoid, trigonous or inflated, often of large size, glabrous or hispidulous, multinerved, tapering below, usually subabruptly beaked; beak long or very long, bilobed or bidentate. *Achene* usually ellipsoid to obovoid, faces concave below, often medianly excavated on the angles, apex of beak sometimes dilate annulate. *Style* usually much thickened towards the base.

1. Leaves 6—20 mm wide; utricles 7.25—10.25 mm long; angles of achene medianly excavated. . . . . 73. *C. anomocarya*
1. Leaves 1.5—4 mm wide; utricles 5.25—7.5 mm long; angles of achene not excavated:
  2. Stems lateral:
    3. Leaves 2—7 mm wide; female glumes 2.75—3.75 mm long, longly aristate; utricles 2—2.25 mm broad. . . . . 76. *C. lateralis*
    3. Leaves 1.5—3 mm wide; female glumes 3.75—4.25 mm long, muticous; utricles 1.75—2 mm broad. . . . . 75. *C. Loheri*
  2. Stems central:
    4. Leaves 3—10 mm wide; spikes 1—3 cm long; utricles glabrous . . . . . 74. *C. Jackiana*
    4. Leaves 1.5—3 mm wide; spikes 6—10 mm long; utricles hispidulous above . . . . . 75. *C. Loheri*

This is not a very homogeneous section, yet it is difficult to divide, so I reluctantly follow Kiikenth, except that I have brought here *C. Loheri*, which he included in Section *Digitatae* Fries, Subsection *Eu Digitatae* Kiikenth. In some species the stems are lateral, in others central, some have the angles of the achene medianly excavated, some not.

#### 73. CAREX ANOMOCAEYA Nelmes

*Carex anomocarya* Nelmes *in Kew Bull.* 1950: 202: 1950. — Java, Winckel 1692

Loosely tufted. *Rhizome* short, not creeping. *Stems* central, erect, obtusely to acutely trigonous, 30—46 cm tall, 1.5—2 mm thick below, ribbed, smooth, including the rhachis. *Leaves* numerous, basal only, most much exceeding the stems, 6—20 mm wide, flat or flattish, probably subflaccid in life, smooth except towards the attenuated apices, not, or only slightly in places, septate nodulose. *Spikes* 3—4, uppermost lateral node rarely with 2 spikes, making 5, erect, terminal male, very slenderly cylindrical (about 1 mm thick, or, including its long, spreading glumes, up to 2.5 mm thick), 2.5—5.5 cm long, lax flowered, its "peduncle" abruptly much more slender than the stem of which it is the termination, and somewhat turned aside by the uppermost lateral spike, lateral spikes female, oblong cylindrical, 3.5—8 cm long, 6—9 mm thick (including awns of spreading glumes), all except lowest approximate and fastigate with one another and with the male spike which is sometimes exceeded by the uppermost lateral spike, lowest often distant, lax to subdense flowered, on shortly or very shortly exerted peduncles; *peduncles* obscurely trig

onous, stoutish, smooth. *Bracts* of the lateral spikes foliaceous, decreasing rapidly in size from lowest to uppermost, lower much upper little exceeding apex of terminal spike, shortly sheathing; *sheaths* pale and membranous in front or only at the mouth, subampliate, readily splitting in front; male spike ebracteate or bract in form of long-awned glume. *Female glumes* oblong or gradually narrowing upwards, rarely oblong-lanceolate, thickened and slightly incurved at the base, otherwise cymbiform to flattish, apex subtruncate or subbilobed emarginate, rarely more gradually merging into the awn, 3—4.5 mm long, 1.5—2.5 mm wide, dirty-white, marginal third on each side thin, translucent, and nerveless, ciliolate round the apex, central part thickened by midrib and 2 equally strong adjacent nerves, which converge upwards and coalesce at or beyond the apex in a broad, tapering, smooth to subdensely scaberulous-margined awn, 2—10 mm long; *male glumes* narrower, long-awned. *Utricles* distorted-ellipsoid, the surface being uneven with concavities and convexities corresponding to the surface of the nut, subinflated, 7.25—10.25 mm long, 2—2.8 mm broad, coriaceous, rather strongly multinerved, smooth, glabrous, scarcely marginate, straight, becoming subpatulous to patulous, spongy but scarcely stipitate at the base, subgradually to subabruptly beaked; *beak* compressed, 2.5—4 mm long, basally subabruptly inflated then scarcely tapering, smooth, glabrous, dorsally narrowly, ventrally broadly and pale grooved, green-margined, bidentate; *teeth* lanceolate, 0.75—1.75 mm long, diverging, pale, nearly smooth; *mouth* not oblique. *Achene* unevenly-ellipsoid, distorted-trigonous, 4—5.5 mm long (including beak and stipe), 0.8—2 mm broad, faces flattish above, convex in the centre and concave below, angles deeply sunk into a cavity at the centre, surface densely but minutely alveolate, abruptly shortly and stoutish, sometimes bent, pale stipitate, abruptly or subabruptly beaked; *beak* cylindrical, stoutish, 0.5—1 mm long, sometimes flexuous, expanding into a discoid-annulate, pale apex, *Style* thickened at the base, which is persistent on the smaller apex of the beak of the nut. *Stigmm* 3.

SUMATRA: East Coast; Dolok Singgalang, in thin forest, 1700m, 25 May 1922, *Lörzing* 8871 (B) !

JAVA: Bog or (Buitenzorg); Mt. Beser, near Tjidadap, south of Tjibeber, forest, abundant, 1200 m, 20 June 1923, *Bakhuizen van den Brink Jr.* 2793 (B) !; *ibid.*; Tjadasmalang, damp forest, 1000 m, 1 Oct. 1923, *Winckel* 1692ft (B, K, L) !

Indo-China, Hainan.

This is very near to *C. Harlandii*, a Chinese species, but its narrower leaves, longly aristate glumes, and utricles with longer teeth to the beak, give it a quite different appearance.

#### 74. CAREX JACKIANA Boott

*Carex Jackiana* Boott in Proc. Linn. Soc. 1: 260: 1846; Miq., Fl. Ned. Ind. 3: 353: 1857; C. B. Clarke, 15; Kfikenh., 638. — Java, *Horsfield*.

Loosely tufted. *Rhizome* short, about 2 mm thick, clothed with sheathing scales. *Stems* erect, central, compressed-trigonous, probably

subflaacid in life, angles prominent, obtuse to acute or narrowly pale-winged, 15—105 cm tall, 1—2.5 mm thick below, smooth, including the rhachis, surrounded, below the leaves, by a few pale to brown sheaths or their fibrous remains. *Leaves* rather few, basal and subbasal, and sometimes at least 1 leaf higher on the stem (with sometimes a depauperate spike in its axil), usually much shorter than the stem (lower shorter and narrower), 3—10 mm wide, flat or flattish, subflaacid, slenderly and usually sparsely septate-nodulose, apices acuminate or shortly attenuated; *sheaths* pale to whitish, thin and soft, soon tearing down the membranous front. *Spikes* 3—6, terminal male, slenderly cylindrical, 1.25—3 cm long, 2—4 mm thick, or gynaeandrous with male and female parts about equal in length, lateral female or, infrequently, androgynaeceous, more or less cylindrical, 1—3 cm long, 5—8 mm thick, subax-flowered, upper 2—3 subapproximate to crowded with the male spike, fastigiate to subradiant, sessile or very shortly peduncled, lower distant, often with 1—3 shorter spikes branching from their peduncles, which (peduncles) vary from wholly included to longly exerted from sheaths (lowest spike frequently depauperate, probably cernuous); *peduncles* trigonous or compressed, slender, smooth. *Bracts* of the lower spikes foliaceous, exceeding the stem, longly to very longly sheathing, upper bracts foliaceous or subfoliaceous, exceeding or exceeded by the stem, scarcely to shortly sheathing, male spike ebracteate; *sheaths* not so thinly membranous in front as those of the leaves. *Female glumes* oblong-ovate to oblong-lanceolate, more or less acuminate, usually cymbiform to conduplicate, margins involute above, apex acute to subobtuse, 3—5.5 mm long, 2—2.5 mm wide, very thin, margins often becoming erose, dirty white except for a central pale greenish stripe, formed by the slender midrib and 2 adjacent nerves which coalesce with it near the apex, forming a hard tip, sometimes mucronulate, rarely excurrent in a smooth to hispidulous-margined awn up to 1 mm or more long. *Utricles* fusiform-ellipsoid, trigonous, faces often with irregularly transverse depressions or shrinkings, giving a subinflated-undulate appearance, 5.75—7.5 mm long, 1.5—2 mm broad, coriaceous, distinctly multinerved, narrowly marginate, glabrous, smooth, straight to very slightly curved, patulous, golden-brown, base thickened and abruptly contracted into a short, stout stipe, apex gradually to subgradually beaked, *beak* tapering below, compressed, usually shrunken-undulate, 2.5—3 mm long, stout below, scarcely to narrowly marginate, glabrous, smooth, usually straight, bidentate; *mouth* not or scarcely oblique; *teeth* lanceolate, 0.25—0.75 mm long, becoming erose and subentire, somewhat diverging. *Achene* obovoid, oblong-obovoid, cordiform-obovoid to suborbicular, trigonous, angles prominent, faces shallowly concave below, subconvex above, 2.25—3 mm long, 1.5—2 mm broad, pale to yellowish, very stoutly substipitate, apex rounded-truncate, suddenly contracted into a very short, stoutish beak. *Style* not thickened at the base. *Stigmas* 3.

SUMATRA: West Coast; Sungai Kumbang, in Danau Bento (swamp), 1350 m, April 1914, *Robinson & Kloss* 81 (BM, K, S) !

JAVA: Priangan; [south of] Bandung, Tjibeureum, 1550 m, 2 April 1911, *J. J. Smith & Rant 35* (B)!; Mt. Papandajan, swamp, 2040—2350 m, 29 March 1930, *van Steenis 4249* (B, K, L)!; *ibid.*, Tegal Alun-alun, marsh, common, 2350 m, 30 March 1930, *van Steenis 4288* (B, S)!; *ibid.*, Tegal Alun-alun, source of the Tjiparugpug, ± 2550 m, 25 Oct. 1939, *van Steenis 11,659* (B)!; *ibid.*, Tegal Mariuk, marshy plain, common, 2250 m, 31 March 1930, *van Steenis 4379* (B)!; *ibid.*, Tegal Kirinjuh, 2060 m, 17 May 1936, *van der Fiji 547* (B)!; above Tjikakapa, common, 2000 m, 10 July 1936, *van Slooten 2612* (B)!; Rantja Gede, near Kertasari, marsh, ± 1700 m, 24 Oct. 1939, *van Steenis 11,656* (B)!; near Pengalengan, Rantja Gede, marsh, 1800 m, 20 June 1931, *van der Pijl 421* (B)!; Mt. Ipis, Tegal Primula, grassy plain, 2300 m, 5 May 1930, *Docters van Leeuwen 13,356* (B)!; Mt. Patuha, Rantja Upas, 1700 m, 31 Dec. 1935, *van Steenis 7414* (B, L, S)!; Rantja Upas, near Rantja Walini, 1750 m, 27 March 1914, *Backer 12,730* (B)! — B a n j u m a s; Dijeng Mts., Telaga Balekambang, local, 2000 m, 6 Aug. 1930, *van Steenis 4548* (B, S)!; *ibid.*, Tegal Pangonan, marsh, abundant, with *C. nubigena*, *C. phacota*, and *C. pruinosa*, 2200 m, 6 Aug. 1930, *van Steenis 4559* (B)!; *ibid.*, Telaga Dringu, common on peaty floating islets in lake, 2200 m, 7 Aug. 1930, *van Steenis 4579* (B, L)!

Mt. Prahau, *Horsfield 1092* (BM, K, S)!  
India, Australia.

#### 75. CAREX LOHERI C. B. Clarke

*Carex Loheri* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37: 14: 1904; *Kükenth.*, 487; Merrill, *Enum. Philipp. Fl. PL* 1: 139: 1923. — Philippine Islands, *Loher 701*.

*Carex Loheri* 1. *grandimacula* *Kükenth. in Philipp. Journ. Sci. Bot.* 6: 64: 1911. — Philippine Islands, *Merrill 4729*.

Densely tufted. *Rhizome* very shortly creeping, slender, clothed with ferruginous or fuscous subentire sheathing scales or their fibrous remains. *Stems* erect or suberect or more or less nutant, central (or perhaps sometimes lateral), trigonous, 10—40cm tall, filiform (0.25mm thick), ribbed, smooth except that the angles on the rhachis, just below the terminal spikes are minutely hispidulous, clothed at the base, around the leaves, by entire and subentire ferruginous cataphylls and/or by their fibrous remains, and those of former leaf-sheaths. *Leaves* crowded at and near the base, shorter to (mostly) exceeding the stems, 1.5—3 mm wide, flat or flattish, but margins sometimes revolute, subuplicate in life, stiff, not or scarcely septate-nodulose, grey-green to glaucous-green (when dried) basal nerves often reddish-brown, apices attenuated. *Spikes* 3—6, single or binate, 1—2 upper approximate and fastigiate, 1 from a node in the upper third, and 1—3 arising on unequally long, filiform (0.1—0.2 mm) peduncles, from the axils of basal, sheathing leaves, terminal male, ellipsoid-cylindric, 7—10 mm long, 1—1.5(—2) mm thick, lateral spikes androgynaceous, 6—10 mm long, 4—6 mm thick, male and female parts each few-flowered and about equal in length but male part very inconspicuous when the utricles are mature, uppermost on a wholly included, middle and basal ones on longly exerted, peduncles; *peduncles* obscurely (below) to distinctly (above) trigonous, filiform, smooth, or minutely hispidulous just below the spike. *Bracts* of the lower spikes

subbasal leaves, of the other later spikes subfoliaceous (uppermost only sometimes exceeding the stem), shortly to longly sheathing; *sheaths* brown and membranous in front; *male spike* ebracteate. *Female glumes* usually oblong-lanceolate, sometimes ovate-oblong-lanceolate, base thickened and incurved, deeply cymbiform to incurved-conduplicate above, apex acute to subobtuse, 3.75—4.25 mm long, about 1.75 mm wide, translucent, whitish to dirty white, margins thin and nerveless, otherwise thickened by numerous nerves, midrib and 2 adjacent, strong nerves coalescing near the apex and forming a hard tip at or just below the apex, sometimes possibly mucronulate. *Utricles* fusiform, trigonous, angles prominent, faces often shallowly concave, especially below, sometimes flattish to subconvex above, 6.25—7.25 mm long, 1.75—2 mm broad, coriaceous or subcoriaceous, nitidous, multinerved, scarcely to narrowly marginate (i.e. sutures coinciding with achene angles or displaced), glabrous below, sparsely to subdensely pale hispidulous above, usually slightly reflexed at the apex, becoming suberect to patulous, castaneous towards the base, light brownish-green above, tapering below to a spongy base, which is then subabruptly constricted into a stoutish, subsulcate stipe, 0.75 mm long, subabruptly beaked above; *beak* conico-trigonous and sometimes slightly inflated below, cylindric-trigonous above, 2—2.5 mm long, stoutish, narrowly marginate. subdensely hispidulous below, glabrous or glabrescent above, straight to slightly twisted, paler above, shortly bilobed or bidentate; *mouth* dorsally oblique, rather large; *lobes or teeth* rather short, lanceolate, tips whitish-hyaline and becoming erose. *Achene* ellipsoid to oblong-ellipsoid, trigonous, angles prominent, faces concave, sometimes flattish above, 3.25—4 mm long, about 1.75 mm broad, golden, subabruptly 0.5 mm long and very stoutly stipitate, with an enlarged base, very shortly and stoutly pale beaked. *Style* subbulbously thickened towards the base which is situated inside the slightly inflated lower part of the beak of the utricle. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon; Benguet, Banominor, *Loher 701* (K)!, *702* (K)!, *703* (K)!, *ibid.*, Morong, 25 March 1893, *Loher 708 bis* (K)!, *ibid.*, Pauai, dry open slopes, ± 2200 m, Oct.—Nov. 1905, *Merrill 4729* (K)! *ibid.*, Pauai, April—June 1912, *Santos (Bur. Sci. 31,685)* (S)!, *ibid.*, Baguio, March 1907, *Elmer 8582* (B, K, L)!, *ibid.*, Mt. Pulog, Feb.—March 1925, *Ramos & Edaño (Bur. Sci. 45,002)* (L)! Bontoc: Lepanto; mossy forest, Mt. Data, ± 2250 m, Nov. 1905, *Merrill 4488* (K)!, *ibid.*, Mt. Data, Dec. 1928, *Clemens 18,708* (B)! Laguna; Mt. Banahao, 7 Feb. 1906, *Loher 7154* (K)!, *ibid.*, March 1911, *Merrill 8025* (BM, K, L)!

Merrill (*l.e.*) cites *Merrill 6506, 6605, 6607, Phil. Pl. 563, Ramos (Bur. Sci. 5133, 19,565)*, numbers which I have not seen. He gives the altitude of the species in the Philippines as 1300—2400 m.

Endemic.

This species is, for me, so clearly allied to *C. lateralis* *Kiikenth.*, and through this to *C. Jackiana* *Boott.*, that I have no hesitation in bringing it here from Section *Digitatae* *Fries*, where it is placed in *Kiikenth.*'s monograph (1909).

*Carex Loheri* f. *grandimascula* is known only from the type, which is somewhat immature. I agree with Merrill (*I.e.*) that it is "scarcely distinguishable from the species."

#### 76. CAREX LATERALIS Kükenth.

*Carex lateralis* Kükenth. in Engl. Pflanzenr. IV, 20: 1909; Nelmes in Kew Bull. 1950: 204: 1950. — India, Clarke 11,061.

*Carex Elmeri* Kükenth. in Pedde, Repert. Spec. Nov. 8: 326: 1910; Merrill, Enum. Philipp. Fl. PL 1: 137: 1923. — Philippine Islands, Elmer 8U4.

Tufted or densely tufted. *Rhizome* very short, woody. *Stems* weakly erect to suberect or somewhat cernuous, straight to curved, lateral trigonous or compressed-trigonous, 3—45 cm tall, very slender (0.25—0.8 mm thick), ribbed, bearing, subbasally (sometimes also 1 higher on the stem), a few small, brownish or subfoliaceous, bract-like leaves, and, surrounding the base, a few small, dark brown cataphylls or nearly leafless sheaths. *Foliage leaves* borne on short shoots, the fully developed ones mostly very much longer than most of the stems, few but crowded, straight to curved, 2—7 mm wide, flat to subplicate, revolute on the margins, sometimes slenderly septate-nodulose below, upper surface thickly covered with small protuberances above, which become rough towards the longly attenuated apex; *sheaths* dark brown on the membranous front, lower often fuscous-nerved on the back. *Spikes* 2—4, usually contiguous or crowded at the apex of the stem and more or less fastigate-patulous, sometimes the lowest, when 3 or 4, subdistant (2.5—3 cm) from the next above, terminal male, cylindrical or ellipsoid-cylindrical, 6—13 mm long, 0.6—1 mm thick, often very inconspicuous when lateral spikes have developed utricles, few-flowered, lateral spikes female, 7—12 mm long (including length of terminal utricles), 5—7 mm thick, few- (2—4-) flowered, uppermost sometimes pushing the male spike slightly aside on development, on shortly exerted to wholly included peduncles. *Bracts* of the female spike(s) foliaceous or subfoliaceous, much to little exceeding the terminal spike, shortly to very shortly sheathing; *sheaths* glabrous to hispidulous, membranous in front; *male spike* ebracteate or bract represented by longly awned lowest glume. *Female glumes* oblong with upper corners rounded, oblong-ovate, or ovate-lanceolate and acuminate, base thickened, usually strongly incurved, otherwise cymbiform or with margins strongly incurved, apex subacute to rounded, 2.75—3.75 mm long, 1—2 mm wide, whitish, thin and translucent, margins tending to become erose, with a wide, greenish, central stripe, which is thickened by the midrib and 2 adjacent nerves, converging but scarcely coalescing, excurrent, from below the apex of the glume, in a wide, marginate, flat, hispidulous-margined awn, 1.5—6 mm long, *Utricles* ellipsoid to ovoid-ellipsoid, trigonous, angles prominent but obtuse, faces flattish to subconvex above, shallowly concave below, 5.25—7 mm long, 2—2.25 mm broad, subcoriaceous, densely minutely alveolate, pluri-multinerved below, but few nerves extending more than halfway towards the apex, not (owing to displaced margins) or narrowly marginate, sparsely and shortly hispid to glabrous, nitidous, straight,

becoming suberect to patulous, green, subabruptly curved-tapering below to a spongy base, which is sometimes subabruptly 0.5 mm long, stoutish and subsulcate-stipitate, subabruptly contracted above into a *beak*, which is conico-trigonous and slightly inflated below, compressed-cylindrical and sometimes paler towards the apex, 1.75—2 mm long, stout to stoutish, narrowly marginate, sparsely hispidulous to glabrous, straight, shortly bilobed or bidentate; *mouth* not or scarcely oblique; *lobes* tapering, 0.2—0.3 mm long, straight, glabrous to minutely hispidulous, becoming erose. *Achene* ellipsoid, ovoid-ellipsoid or oblong-ovoid, trigonous, angles prominent, faces concave in lowest third, flattish above, 2.75—4 mm long, 1.75—2.25 mm broad, faces brown to fuscous, angles sometimes pale, subabruptly and stoutly straight or curved stipitate, abruptly scarcely or extremely shortly pale beaked at the rotund-truncate apex. *Style* much thickened towards the base. *Stigmas* 3.

SUMATRA: Bengkulu (Bencoolen) / Palembang; Mt. Dempo, Air Njiruk, 1400 m, 7 Aug. 1916, Ajoeb U6 (B, L)!

PHILIPPINE ISLANDS: Mindoro; Mt. Calavite, April 1921, Ramos (*Bur. Sci. 39, Jfoi*) (K, L)! — Luzon; Benguet, Baguio, March 1907, Elmer 8Ui (B, K, L)!; Kalinga, Mt. Masingit, Lubuagan, Feb. 1920, Ramos & Edano (*Bur. Sci. 87, 573*) (BM, K, L)! — Negros; Canlaon volcano, April 1910, Merrill 6972 (BM, K)!

"In forests, alt. 1500—2200 m."—Merrill (*I.e.*, where is also cited Vanoverbergh 868).

JAVA: Priangan; Mt. Papandajan, forest, south of Tegal Pandjang, here and there along the path, 2100 m, 12—14 April 1935, van Steenis 6798 (L)! India.

#### Sect. 16. Radicales (Kükenth.) Nelmes, *sect. nov.*

Subsect. *Radicales* Kükenth. in Engl. Pflanzenr. IV, 20: 480: 1909.

*Stems* clothed at the base, below the leaves, by fuscous leaf-sheaths and their fibrous remains. *Spikes* 1—3(—4), distantly spaced, lowest sometimes arising from a basal leaf-sheath, androgynaeceous, peduncled; *peduncles* with acute angles. *Female glumes* spongy-thickened and gibbous at the often strongly incurved base, pale with brownish nerves, margins erose-ciliolate above; *male glumes* cucullate. *Utricles* coriaceous, multinerved, more or less ciliolate-hispidulous on the margins; *beak* short, shortly bilobed. *Style* thickened at the base.

1. Leaves 3—11 mm wide; spikes 1—4 cm long, female part 4—7 mm thick; utricles 4.25—6 mm long . . . . . 77. *C. speciosa*

1. Leaves 2—3 mm wide; spikes 3—8 cm long, female part 2.5—3 mm thick; utricles about 4 mm long . . . . . 78. *C. stenura*

A small group of sedges, with few, distantly spaced spikes, which, with other characters, suggest not distant reduction from some indo-caricoid ancestor. Kükenth places them as a subsection of Section *Digitatae*, with which to me they seem to have no close connection.

## 77. CAREX SPECIOSA Kunth.

*Carex speciosa* Kunth, Enum. PL 2: 504: 1837; Kiikenth., 481. — India, Wallich 5391.

*Carex speciosa* var. *abscondita* Kukenth. in Bull. Jard. Bot. Buitenz. sér. 3, 16: 318: 1940. — Sumatra, Lörzing 8676.

Tufted. *Rhizome* short, woody. *Stems* erect to oblique or even somewhat curved, trigonous with subacute to very narrowly winged angles; 4—55 cm tall, slender (0.5—1.5 mm thick), more or less smooth or finely scaberulous throughout, clothed, often densely, at the base, below the leaves, by old, fuscous, semi fibrous leaf sheaths, *Leaves* crowded, sub basal, mostly longer or much longer than the stems, 3—11 mm wide, flat or flattish plicate, margins sometimes up to strongly revolute, stiff, grey to glaucous green, often septate nodulose, with minute rough protuberances on the upper surface towards the longly attenuated apices. *Spikes* 1—3(—4), at nodes 5—10 cm or more distant from one another, lowest sometimes arising from a basal leaf sheath, androgynaeceous, more or less cylindric, 1—4 cm long, dense or subdense flowered, female part sublax flowered, 4—7 mm thick, usually much longer but sometimes about as long as the male part, which is slender and usually tapers to an acute apex, on usually shortly exerted peduncles; *peduncles* trigonous, angles acute, usually smooth. *Bracts* of the lateral spike or spikes foliaceous, usually exceeding the terminal spike, sheathing; *sheaths* membranous in front; *bract* of the terminal spike glumiform, amplexicaul or shortly sheathing the stem, aristate or subherbaceous. *Female glumes* more or less oblong ovate, base spongy thickened, gibbous, often strongly incurved, deeply cymbiform above, apex often obtuse but sometimes subacute or even acute, 2.5—3 mm long, about 2 mm wide, translucent, thin and whitish stramineous, but brownish nervose, the glume easily tearing longitudinally, margins erose ciliolate above, midrib prominent, scarcely or about extending in a firm tip at the apex. *Utricles* ellipsoid or ellipsoid lanceolate, trigonous, ventral face much wider than each half of the angled dorsal face, 4.25—6 mm long, 2.25—2.5 mm broad, coriaceous, strongly multinerved, narrowly marginate, smooth to slightly scurfy, dorsally glabrous, ventrally glabrous or whitish hispidulous above, margins more or less hispidulous from near the base upwards, straightish or slightly curved, suberect or patulous, greenish or brownish stramineous, base spongy turgid, scarcely stipitate, gradually beaked; *beak* subtrigonous or planoconvex, stoutish, pale, 0.4—0.5 mm long, glabrescent or ventrally minutely hispidulous, shortly bilobed; *lobes* 0.1—0.25 mm long, straightish, palish. *Achene* obovoid, oblong obovoid, or ellipsoid, trigonous, angles prominent, pale, faces flattish to concave, pale to dark brown, 3—3.5 mm long, 2 mm broad, base abruptly or subabruptly, shortly, stoutly stipitate, apex rounded, abruptly, stoutly, and very shortly beaked. *Style* pyramidally thickened, and persistent, at the base, angles ciliolate. *Stigmas* 3.

SUMATRA: Atjeh; Takegeun (Takengon), slopes of hills, east of Laut Tawar, ± 1200 m, 17 Jan. 1924, Palm 20 (L)! — East Coast; Mt. Sibajak, east side, ancient forest, fertile ground, locally frequent, ± 1500 m, 12 Jan. 1922, Lorzina 8676 (B)!

JAVA: Bogor (Buitenzorg); Tjadasmalang, 28 June 1917, J.J. Smith 760 (B)!; Tjadasmalang, near Tjibeber, ancient forest, common, ± 1000 m, 27 July 1923, Winkel U97fi (B, L)!; Mt. Beser, west of Tjidadap, south of Tjibeber, wild wood on breccia, 1000 m, 15 April 1918, Winkel 55p (B, K)!; *ibid.*, forest, common, 1200 m, 20 June 1923, Bakhuizen van den Brink 2815 (B, K, L)!; Kebon Kawung, near Tjadasmalang, Tjidadap, south of Tjibeber, by forest path, 1000 m, 19 June 1923, Bakhuizen van den Brink 2765 (B, K, L, S)!; Kebon Kandung, near Tjidadap, ± 1000 m, 11 July 1923, Winkel U800 (B, L)! — P i a n g a n; Padalarang, 800 m, 4 Dec. 1932, van der Pijl 528 (B)! — P e k a l o n g a n; East Tegal, 50 m, 16 Jan. 1919, Beumee 3719 (B)!; Margasari, teak forest, red soil, few, scattered, 90 m, April 1920, Beumee 5143 (B)! — S e m a r a n g; Manggar, teak forest, calcareous marl, locally very common, ± 100 m, Oct. 1917, Beumee 1145 (B)!; north west of Wirosari, teak forest, calcareous marl, 50 m, Oct. 1918, Beumee 3426 (B)!; Ngarangan, teak forest, red volcanic soil, scattered, 50 m, Dec. 1918, Beumee 3624 (B)! — M a d i u n; forest district Ngawi, complex Alastuwa, teak forest, heavy marly ground, common in forest, 100 m, Jan. 1918, Beumee 1296 (B)!; and six further Beumee gatherings seen from Madiun Res. — D j a p a r a R e m b a n g; Tjabak, not common, 150 m, 15 Feb. 1914, Koorders • 12, A30 (B)! Pajaman, ancient teak forest, calcareous marl, damp, locally common, ± 100 m, June 1917, Beumee 876 (B)!; Pandangan, complex Wadeng, teak forest, calcareous marl, ± 100m, Aug. 1917, Beumee 995 (B)! — K e d i r i; North Kediri, complex Berbek, teak forest on red volcanic ground, 500 m, April 1918, Beumee 2238 (B)! — S u r a b a j a; South Surabaya, complex Djabung, 200—300 m, 28 May 1918, Beumee 21\*23 (B)! — M a l a n g; forest district Pasuruan, complex Ngebruk, teak forest, red volcanic soil, 325 m, 6 June 1918, Beumee 2751 (B)! — B e s u k i; complex Puger, scattered, ± 30 m, 22 Aug. 1918, Beumee 2908 (B)! — K A N G E A N I S L A N D S: P. Kangean; Kaju Waru, teak forest, 15 m, 9 April 1919, Backer 28,189 (B)!, Pandeman, virgin forest, 50 m, 14 May 1919, Backer 29,96U (B)!; P. Paliat, Paliat, teak forest, on heavy marl, common, 10 m, 2 May 1919, Backer 29,383 (B)!

India, Indo China.

Kükenthal (*in* Engl. Bot. Jahrb. 70: 465: 1940) identifies Clemens 7909a from North East New Guinea as *C. speciosa* Kunth var. *angustifolia* Boott. I have not seen this plant, but feel very doubtful about the determination. The species is very polymorphic throughout its range, and it is difficult to decide how best to deal with its extreme deviations. *C. stenura* seems clearly specifically distinct, but the Indian *C. courtallensis* Nees apud Boott, assuming it to have been correctly determined by Kükenthal (*in* Engl. Pflanzenr. IV, 20: 481: 1909), does not seem quite clearly distinguished from *C. speciosa*, and there is a similarly wide leaved sedge in Indo China.

## 78. CAREX STENURA Nelves

*Carex stenura* Nelves in Kew Bull. 1950: 202: 1950. — Borneo, Motley 1222.

Tufted. *Rhizome* extremely short, woody. *Stems* erect to oblique or even somewhat curved, trigonous, angles acute, 15—52 cm tall, very slender (not more than 0.5 mm thick), more or less smooth, clothed at the base, below the leaves, with light spadiceous to fuscous leaf-sheaths and fibres. *Leaves* subbasal, mostly longer or much longer than the stems, 2—3 mm wide, flat or flattish, margins sometimes revolute, stiffish, rough on the upper surface towards the longly attenuated apices. *Spikes* 1—3, at nodes rather distant from one another, lowest sometimes arising from a basal leaf-sheath, androgynaeceous, more or less cylindric, 3—8 cm long, very slender, subdense-flowered, female part 2.5—3 mm thick, from half the length to about as long as the male part, not tapering, spikes on usually shortly exerted peduncles; *peduncles* trigonous, angles acute, usually smooth. *Bracts* of the lateral spike or spikes, when present, foliaceous, usually exceeding the terminal spike, sheathing; *sheaths* membranous in front; *bract* of the terminal spike glumiform, aristate. *Female glumes* ovate or oblong-ovate, base spongy-thickened, gibbous, incurved, cymbiform above, apex obtuse to acute, about 2.5 mm long, 2 mm wide, translucent, thin and whitish-stramineous, brownish nervose, margins erose-ciliolate above, midrib scarcely or about extending to and forming a firm tip at the apex. *Utricles* more or less ellipsoid but curved-tapering below, trigonous, ventral face not much wider than the dorsal half-faces, about 4 mm long, about 1 mm broad, subcoriaceous, slenderly multinerved, narrowly marginate, glabrous, margins ciliolate-hispidulous from the middle or near the base upwards, straight, patulous, greenish-stramineous, base scarcely stipitate, gradually beaked at the apex; *beak* tapering, sub-trigonous or plano-convex, short, glabrescent, palish, extremely shortly bibbed; *lobes* about 0.1 mm long, margins pale. *Achene* ellipsoid, trigonous, angles prominent, pale, faces flattish to concave, brown, about 3 mm long, about 1 mm broad, tapering below, subabruptly 0.75 mm long stipitate, apex rounded, abruptly 0.2 mm long beaked. *Style* slightly thickened at the base. *Stigmas* 3.

BORNEO: Southern Division: Banjermasin; on dry serpentine rocks, Mt. Pandamaran, 1857—58, Motley 1222 (K)!

?Borneo or ?Java; "Arch. Ind." Herb. Waitz (L) !

Endemic.

The Motley specimen was included by Kiiikenthal (*in* Engl. Pflanzenr. IV, 20: 481: 1909) under *C. speciosa* Kunth.

Sect. 17. PSEUDOCYPHEREAE Tuckerm.,  
Enum. Meth. 13: 1843

*Stems* tall and usually stout, acute-angled. *Leaves* conspicuously septate-nodulose; lower sheaths sometimes splitting into reticulate fibres.

Upper 1—3 *spikes* male, remainder female, dense-flowered, upper approximate, lower 1—2 often distant, often longly peduncled and cernuous. *Bracts* usually evaginate, lower very long. *Female glumes* longly aristate. *Utricles* more or less inflated, becoming patulous to reflexed, 3—8 mm long, glabrous, smooth, several to closely multicostate, stipitate; *beak* often long, deeply bidentate; *teeth* stiff, slender. *Achene* much smaller than the utricle. *Style* long, flexuous, not thickened at the base.

Only Malaysian species. . . . . 79. *C. fascicularis*

A group of sedges very well-marked, with tall and stout stems, often pendulous spikes, sheathless bracts, and with multicostate utricles longly and strongly toothed, represented in all the corners of the earth.

## 79. CAREX FASCICULARIS Soland.

*Carex fascicularis* Soland. in Hook, f, Fl. Nov.-Zeland. 1: 283: 1853; Boott, Illustr. 1: 53 tt. 139, HO (pi. dextra): 1858. — New Zealand, Banks & Solander.

*Carex pseudocyperus* L. var. *fascicularis* (Soland.) Boott, Illustr. 4: 141: 1867; Kfikenh., 696.

Tufted. *Rhizome* very short, stout. *Stems* erect, trigonous, angles subacute to obtuse, prominent to winged below, faces flattish to subconcave, 48—155 cm tall, 3—4 mm thick below, smooth except just below and on the rachis, where the acute to winged angles are scabrid or scaberulous, strongly ribbed, septate-nodulose in places, surrounded at the base, below the leaves, by a few leafless sheaths, the margins of which become split into reticulate fibres. *Leaves* subbasal, longer than the stems, 6—10 mm wide, flat, stiffish, conspicuously septate-nodulose especially below, bright light or yellowish green, apex longly acuminate or attenuated. *Spikes* 3—7, 1.5—8 cm long, patulous to subpatent, dense-flowered, terminal male, slenderly cylindric, 3—7 mm thick (including awned glumes), lateral female, rarely with a few apical male flowers, cylindric, 7—15 mm thick, upper approximate to subapproximate and fastigiate, lowest 1—2 sometimes distant, upper subsessile to shortly peduncled, lower shortly to longly peduncled (lowest sometimes exerted from a sheath), lowest 1—2 rarely with a short spike branching from its base; *peduncles* 2—3 angled or narrowly winged, slender (0.5—0.75 mm thick), angles smooth to densely scaberulous. *Bracts* of the lower spikes foliaceous, far exceeding the terminal spike, upper, including the male, subfoliaceous to setaceous, exceeding or exceeded by the terminal spike, lowest scarcely to longly sheathing, others not sheathing. *Female glumes* oblong with rounded upper corners, oblong-elliptic, or oblong-spathulate, flattish to cymbiform, sometimes subconduplicate, apex obtuse to very obtuse, 2—2.5 mm long, 0.75—1 mm wide, translucent, whitish or golden-brown to castaneous, ciliolate-hispidulous and becoming erose on the margins above, slenderly nervose, midrib and 2 adjacent strong nerves, forming a green stripe, gradually converging, excurrent in a wide, flat, gradually tapering, hispidulous-margined awn, 2—4 mm long. *Utricles* ovoid-lanceolate, subin-

flated- or inflated-trigonous, 4.75—5.5 mm long, 0.75—1.5 mm broad, membranaceous to coriaceous, multicostate, narrowly marginate, glabrous, nitidous, densely alveolate, straight, patulous to patent, rarely deflexed, stramineous to golden, sometimes reddish-brown above, abruptly oblique or curved, 0.75—1 mm long stipitate, subgradually to subabruptly beaked; *beak* subterete to compressed, 1.5—2 mm long (including teeth) stoutish, narrowly marginate, glabrous, smooth, deeply bidentate; *mouth* not oblique; *teeth* slender, strong, about 1 mm long, divergent. *Achene* obovoid or orbicular-pyriform, conspicuously trigonous, faces flattish above, subconcave below, 1.25—1.5 mm long, about 1 mm broad, golden, minutely papillose, scarcely to very shortly stipitate, abruptly beaked; *beak* ill-defined, curved, 0.25—0.5 mm long. *Style* long, from the apex of the small achene to the mouth of the utricle, strongly bent to flexuous and slightly twisted, not or scarcely thickened towards the base, which seems continuous with the beak of the achene. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, 3225 m, lining open lake-shores, on hummocked marshy ground, large erect clumps, Aug. 1938, Brass 9211 (AA) !; Wissel Lake region, upper Ara R., Toimoeti in Arandora, 8 March 1939, *Eyma* 4709 (B, K) !; *ibid.*, pools, Weaboe delta, Weaboe, 1750 m, 9—10 May 1939, *Eyma* 4921 (B, K) !

JAVA: *Horsfield* (BM, K) !

Australia, New Zealand.

Very close to the well-known *C. pseudocyperus* L. of the northern hemisphere, with which C. B. Clarke (*in Journ. Linn. Soc. Bot.* 37: 16: 1904) identified the *Horsfield* specimen, but differing in its usually darker glumes, and subinflated or inflated-trigonous utricles, with more divergent teeth to their beaks.

#### Sect. 18. TUMIDAE Kükenth.

*in Engl. Pflanzenr.* IV, 20: 611: 1909

*Terminal spike* male or gynaeandrous, lateral spikes female, erect, rarely cernuous. *Bracts* sheathing or not. *Utricles* subinflated-trigonous, patulous to patent, sometimes nitidous, pluri- or multinerved. *Style* not or slightly thickened towards the base.

1. Leaves 7—20 mm wide; spikes 3—16 cm long . . . . . 80. *C. olivacea*  
 1. Leaves 1—8 mm wide; spikes 1—12 cm long:  
 2. Leaves 4—8 mm wide; spikes 2—12 cm long:  
 3. Achene ellipsoid or oblong-ellipsoid, 2—2.25 mm long: . . . 81. *C. oedorrhampha*  
 3. Achene ellipsoid or obovoid, 1.25—1.5 mm long.  
 81. *C. oedorrhampha* var. *microcarya*  
 2. Leaves 1—10 mm wide; spikes 0.6—5 cm long:  
 4. Leaves 5—10 mm wide; spikes 2—5 cm long. . . . . 83. *C. Doniana*  
 4. Leaves 1—4 mm wide; spikes 0.6—3 cm long:  
 5. Spikes 6—12 mm long . . . . . 83. *C. Doniana* var. *cacuminis*

5. Spikes 1—3 cm long:

6. Female glumes 2—2.5 mm long; utricles 3—3.5 mm long, slenderly plurinerved; beak 1.25—1.5 mm long . . . . . 84. *C. subtransversa*

6. Female glumes 1—2 mm long; utricles 3.5—4.5 mm long, strongly multinerved; beak 0.5—1 mm long . . . . . 82. *C. Brownii*

Ohwi, in his "Cyperaceae Japoniceae I" (*in Mem. Coll. Sci. Kyoto Imp. Univ.* ser. B, 11: 450: 1936) creates a new section, Section *Molliculae*, to accommodate *C. Doniana*, *C. subtransversa*, and six other *Carexes* which occur in Japan, placing *C. Brownii* in Section *Confertiflorae* Franch. In this latter section he would probably place *C. olivacea* and *C. oedorrhampha*, allies of *C. Brownii*, which do not grow in the area covered by his work. I have compared the descriptions of Section *Molliculae* and Section *Confertiflorae*, as given by Ohwi, and except for softer leaves, sometimes cernuous spikes, and nitidous utricles, attributed to the former section, the two descriptions are almost identical. Because of this difficulty of dividing these species, and because the original contents of Section *Confertiflorae* (which, incidentally, did not include *C. confertiflora* Boott—a later name for *C. olivacea* Boott) were, as I think, extremely heterogeneous, I retain Section *Tumidae* Kükenth., in its original concept, for this revision.

#### 80. CAREX OLIVACEA Boott

*Carex olivacea* Boott *in Proc. Linn. Soc.* 1: 286: 1846; *Illustr.* 1: 56 *t.* 149: 1858; C. B. Clarke, 15; Kükenth., 617. — Assam, *Jenkins*.

Loosely tufted. *Rhizome* stout, woody, probably creeping. *Stems* compressed-trigonous, angles obtuse to acute, 50—90 cm or more tall, 2—5 mm thick below, ribbed, smooth below, angles scabrid above. *Leaves* basal and subbasal, lower reduced to sheaths with or without short blades, not numerous, much exceeding the stem, 7—20 mm wide, flattish or margins revolute, septate-nodulose in places, apex acuminate, subflaccid; *sheaths* deeply concave, reddish or ferruginous and membranous in front. *Spikes* 5—9, erect to somewhat cernuous, upper subapproximate, lower situated at more widely spaced nodes, all fastigiate or subfastigiate, cylindric, upper 1—2 male, terminal 3—16 cm long, 2.5—5 mm thick, dense-flowered, second male, when present, similar but shorter, usually much shorter, than the terminal, remaining spikes female, or androgynaeceous with short or very short male apices, 3—16 cm long, 5—8 mm thick, dense-flowered or sometimes lax-flowered towards the base, sessile or subsessile, but lowest sometimes shortly to very longly peduncled. *Bracts* of the lower female spikes foliaceous, much exceeding the terminal spike, upper subfoliaceous, exceeding or not extending to the apex of the terminal spike, usually none sheathing but lower semi-amplexicaul with dark reddish or ferruginous auricles in front, lowest sometimes shortly to

very longly sheathing; *sheaths* with dark reddish membranous fronts; male spikes ebracteate or having very short subherbaceous bracts. *Female glumes* oblong-lanceolate or oblong, sometimes acuminate, flattish or margins involute, apex ill-defined, usually obtuse or subtruncate, 1.25—3 mm long, 0.5—0.75 mm wide, pale flushed vinaceous to dark reddish, margins above sometimes rather narrowly whitish-hyaline, thicker and flatter in a pale, 3-nerved central stripe which narrows upwards and is excurrent in a wide scabrid-margined awn 0.75—3 mm long. *Utricles* obovoid, oblong-ovoid, or ellipsoid-obovoid, inflated, 3—4.5 mm long, 1.5—2 mm broad, membranaceous, rugose, alveolate, rather slenderly plurinerved, scarcely marginate, glabrous, becoming patulous to patent, dark olive-brown, spongy-thickened but not stipitate at the base, abruptly contracted at the apex into a conic, about 1 mm long, slender, scarcely marginate, glabrous, sometimes basally recurved, dark-reddish, bidentulate *beak*; *teeth* reddish, pale-tipped. *Achene* obovoid or ellipsoid-obovoid, trigonous, angles prominent, faces flattish to shallowly concave, 2—2.25 mm long, 1—1.3 mm broad, stramineous to yellowish, shortly stipitate and beaked, beak and stipe straight or bent. *Style* not or slightly thickened towards the base. *Stigmas* 3.

JAVA; Mt. Bodas, in warm water, 1500 m, April 1880, *Forbes 1091* (B, BM, K, L)!

India, Indo-China, Japan.

Distinguished at once from all other members of its section by its very wide leaves and very long spikes.

#### 81. CAREX OEDORRHAMPHA Nelmes

*Carex oedorrhampa* Nelmes in Kew Bull. 1939: 659: 1939. — New name for *C. tumida* Boott.

*Carex tumida* Boott, Illustr. 1: 66 t.181: 1858; Boeck. in Linnaea 41: 243: 1877; C. B. Clarke, 16; Kükenth., 615; non *C. tumida* Beilschm. (1850). — India, *Hooker f.*

*Carex olivacea* Boott var. *altissima* Kükenth. in Engl. Bot. Jahrb. 70: 467: Jan. 1940; in Bull. Jard. Bot. Buitenz. sér. 3, 16: 321: Feb. 1940. — Papua, *Brass 4865*.

*Carex oedorrhampa* Nelmes var. *arfakiana* Ohwi in Bot. Mag. Tokyo 56: 214: 1942. — New Guinea, *Kanehira & Hatusima 19,922*.

Tufted. *Stems* erect, trigonous with prominent angles and faces often concave, 50—114 cm tall, 1.75—3 mm thick below, scarcely thinning upwards, ribbed and striate, smooth, including most of the rhachis, which is sometimes scaberulous near the apex. *Leaves* crowded near the base, subdistichous, with 1—2 higher up, lower of the basal ones short-bladed, few lowest reduced to reddish-purple sheaths, most about as long as the stem, 4—8 mm wide, conduplicate below, flattish to plicate above, nerves sinuous on the upper surface, green above, pale below, apices longly attenuated; *sheaths* often dark reddish-brown or reddish-purple, membranous and readily fraying into thin strips. *Spikes* 4—8, erect or suberect, or subcernuous, upper approximate to subapproximate and fastigate, lower or lowest distant from one another, rarely one of these with small

spike at its base, forming a terminal inflorescence 9—90 cm long, subdense-flowered, cylindric, lower sometimes laxer towards the base, 2—12 cm long, terminal male, its apex extending up to or slightly exceeding that of the uppermost lateral spike, 1—3 mm thick, lateral spikes female, uncommonly androgynaceous, with male apices 5—7 mm long, 4—7 mm thick, upper on scarcely or shortly, lower on longly or very longly exerted peduncles; *peduncles* rather slender, usually hispidulous, especially on the angles, lowest sometimes glabrous below. *Bracts* of the lateral spikes usually all foliaceous and much exceeding the apex of the terminal spike, but uppermost sometimes much reduced and failing to reach the apex, upper shortly lower longly to very longly sheathing; *bract* of the male spike short and setaceous to subfoliaceous and half or more as long as the spike; *sheaths* ferruginous and often scabrid at the mouth, otherwise glabrous to sparsely scurfy-scabrid. *Female glumes* oblong-lanceolate to ovate-lanceolate, much incurved at the base, deeply cymbiform above, often truncate-obtuse at the apex, 1.75—3 mm long, 1—1.5 mm wide, thin, translucent, glabrous or sparsely hispidulous in places, especially near the midrib, whitish or pale, sometimes with light to dark castaneous spots and patches and irregular whitish margins, midrib, with 2 adjacent nerves, excurrent in a widish, sparsely hispidulous or serrulate-margined awn, 0.75—2 mm long; *male glumes* 4—5.5 mm long, involute-conduplicate, with an awn up to 2—5 mm long. *Utricles* obovoid-ellipsoid to ellipsoid, subinflated-trigonous, 3—3.75 mm long, 1—1.25 mm broad, membranaceous, raised plurinerved, glabrous, narrowly marginate, straight, becoming patulous to subpatent, lurid, becoming fuscous-brown, not or scarcely stipitate, subgradually to subabruptly beaked; *beak* subterete, 1—1.3 mm long, glabrous, narrowly marginate, smooth, palish, gradually tapering but slightly to conspicuously swollen at or below the middle; *mouth* minutely notched, becoming erose and often subentire. *Achene* ellipsoid to slightly oblong-ellipsoid, trigonous, with prominent angles and flattish to (below) concave faces, 2—2.25 mm long, 0.9—1.2 mm broad, minutely punctulate, pale yellowish to brownish-golden, scarcely stipitate, beaked; *beak* cylindric, about 2 mm long, straight or bent. *Style* gradually or bulbously thickened towards the base. *Stigmas* 3, small and caducous.

MOLUCCAS: Buru; Liku Ewali (Kunturun), ± 1200 m, mountain forest, boggy ground, 9 July 1921, *Toxopeus 275* (B)!

NEW GUINEA: Netherlands New Guinea; Arfak Mts. [Lina Mts.], in forest by Iray, Anggi Giji lake, 1900 m, 7 April 1940, *Kanehira & Hatusima 13,922* (!) — Papua; Central Division, Mt. Tafa, very abundant in large tussocks on muddy banks of pond in forest, 2400 m, May—Sept. 1933, *Brass 4865* (AA, B, L)!

JAVA: Priangan; Mt. Papandajan, Tegal Kirinjuh, 2060 m, 17 May 1936, *van der Pijl 564* (B, K)!

India, Indo-China, China.

In India, Indo-China, and China this species has glabrous or nearly glabrous glumes and the Indian specimens often show a marked swelling



in the beak of the utricle. The Malaysian plants sometimes have more hispidulous glumes, and utricles with less inflated beaks. Ohwi's variety *arfakiana*, which he later misidentified as *C. olivacea*, belongs here. I do not feel that there is sufficient warrant for varietal separation. The Sumatran representative of the species, however, has in addition a smaller and differently shaped achene, and I have treated it as a variety.

Kükenthal (*in* Bull. Jard. Bot. Buitenz. sér. 3, 16: 321: 1940) cites under "*C. tumida* Boott" Van Steenis 8431, from Sumatra (Atjeh; Gajo Lands, Losir Massif, wet places by a stream 2100—2500 m, 29 Jan. 1937). I have not seen this gathering.

#### Var. MICROGARYA Nelmès

*Carex oedorrhampha* Nelmès var. *microcarya* Nelmès *in* Kew Bull. 1950: 204: 1950. — Sumatra, *Biinnemeijer* 9138.

*Female glumes* 1.5—2 mm long. *Utricles* sub-membranaceous, fuscous, beak scarcely swollen. *Achene* ellipsoid, obovoid, or orbicular-obovoid, 1.25—1.5 mm long, about 1 mm broad, more coarsely punctate-papillose, brown-cinereous.

SUMATRA: West Coast; Mt. Korinehi [G. Kerintji], forest, 1750 m, 23 March 1920, *Biinnemeijer* 9138 (B, K, L, S)!; *ibid.*, forest, lake margin, 2020 m, 15 April 1920, *Biinnemeijer* 9U7G (B) !; *ibid.*, 19 April 1920, *Biinnemeijer* 9618 (B, L)!  
Endemic.

These three numbers were misidentified by Kükenthal (*in* Bull. Jard. Bot. Buitenz. sér. 3, 16: 321: 1940) as *C. olivacea* Boott.

#### 82. CAREX BROWNII Tuckerm.

*Carex Brownii* Tuckerm., Enum. Meth. 21: 1843; Boott, Illustr. 4: 161 *t.* 532 (pi. dextr.): 1867; Kükenth., 612; S. T. Blake *in* Journ. Arn. Arb. 28: 115: 1947; Nelmès *in* Kew Bull. 1949: 384: 1949. — New South Wales, *Brown*.

Tufted. *Rhizome* elongated, perhaps creeping. *Stems* erect, obscurely to distinctly trigonous, 27—73 cm tall, 1—1.5 mm thick, ribbed, striate, smooth. *Leaves* not crowded, basal and subbasal, few lowest ones reduced to short bladed and bladeless sheaths, which are light brown or reddish-tinged, lower leaves rather short, upper longer but usually considerably shorter than the stems, 3—4 mm wide, flat, sometimes slightly revolute, attenuated towards the apices. *Spikes* 3—4(—5), terminal male, erect, occasionally gynaeandrous, slenderly cylindrical (when male), 1—2.5 cm long, 1.5—2 mm thick, subdense-flowered, pale, lateral spikes female, sub-erect, two upper usually contiguous with each other and with the male spikes and fastigate, lowest approximate to and subfastigate with the others or more or less distantly spaced from them, cylindrical, 1.3—3 cm long 5—6 mm thick, dense-flowered, uppermost sessile to very shortly peduncled, others increasingly more exerted-peduncled downwards, low-

est sometimes on a very longly exerted peduncle; *peduncles* often trigonous with scaberulous angles, but sometimes subterete and smooth, slender (0.4—0.6 mm thick). *Bract* of the male spike subfoliaceous, shorter, usually much shorter, than its spike; *bracts* of the female spikes foliaceous, uppermost slightly exceeding the apex of the male spike, not or scarcely sheathing, lower much exceeding the male spike, shortly to longly sheathing; *sheaths* brown and membranous at the mouth, often with a whitish-hyaline margin. *Female glumes* ovate or oblong-ovate, cymbiform, apex obtuse to subtruncate, 1—2 mm long, 0.75—1.5 mm wide, very thin and whitish, thicker central stripe excurrent in a wide, smooth or scaberulous, often somewhat curved and twisted awn 0.5—3.75 mm long; *male glumes* cuneate or oblong-cuneate, margins often incurved, apex more or less truncate or bilobed-emarginate, 1.5—3.5 mm long, 0.75—2 mm wide, very thin, translucent, pale-ferruginous, widely whitish-hyaline margined, a thicker and greener central stripe excurrent in a wide, hispidulous-margined, sometimes curved awn, 1.75—7 mm long. *Utricles* ellipsoid, oblong-ellipsoid, or ellipsoid-obovoid, subinflated, trigonous, 3.5—4.5 mm long, 1.5—1.75 mm broad, membranaceous, strongly multinerved, scarcely marginate, glabrous, straight, becoming patulous to patent, dark olive-green, becoming dark brown, not stipitate, abruptly contracted at the apex into a beak; *beak* subterete, 0.5—1 mm long, not marginate, glabrous, whitish, bidentulate; *teeth* straightish, whitish-hyaline above; *mouth* slightly oblique. *Achene* ellipsoid, obovoid, or ellipsoid-obovoid, trigonous, angles prominent, faces concave, 2.25—2.5 mm long, 1.3—1.6 mm broad, yellowish, with a very short, bent stipe and beak. *Style* slightly thickened at the base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Balim R., frequent in shallow grassy pools, erect tufts 50—60 cm high, 1600 m, Dec. 1938, Brass 11,791 (AA) !  
Japan, Australia, New Zealand.

The very long-awned male glumes of this species are much more unlike the female ones than is usual in *Carex*.

Brass's locality lies between the only other known areas in which this species occurs: Australasia in the south, and Japan and Korea in the north.

#### 83. CAREX DONIANA Spreng.

*Carex Doniana* Spreng., Syst. 3: 825: 1826; Drejer, Symb. Caric. 26 *l.* 13: 1844; S. T. Blake *in* Journ. Arn. Arb. 28: 115: 1947; Nelmès *in* Kew Bull. 1949: 391: 1949. — A new name for *C. chlorostachys* D. Don.

*Carex chlorostachys* D. Don *in* Trans. Linn. Soc. 14: 330: 1825, hon Steven (1813). — India, *Wallich*.

*Carex japonica* Thunb. var. *chlorostachys* (Don) Kükenth. *in* Engl. Pflanzenr. IV, 20: 620: 1909, partim; Merrill, Enum. Philipp. Fl. PI. 1: 139: 1923.

*Carex japonica* Thunb. var. *mesogyna* Kükenth. *in* Engl. Bot. Jahrb. 69: 265: 1938. — New Guinea, no indication of type.

Loosely tufted. *Rhizome* creeping, slender (about 1 mm thick). *Stems* erect, trigonous, 30—84 cm tall, 1.5—2 mm thick below, smooth below, angles scaberulous above, surrounded at the base, below the leaves, by a few pale cataphylls or almost leafless sheaths. *Leaves* basal and subbasal, and 1 higher on the stem, shorter to much longer than the stem, 5—10 mm wide, flattish, subcoriaceous, stiffish, slenderly septate-nodulose in places, apex longly attenuated. *Spikes* 3—6, (1.5—)2—5 cm long, dense-flowered, terminal male, or sometimes gynaeandrous, slenderly cylindrical but sometimes slightly thickening upwards, 1—3 mm thick, lateral spikes female, with sometimes a few male flowers at the apex of the two lowest spikes, cylindrical, 4—6 mm thick, upper approximate and fastigate with the terminal spike, lower 1—2 sometimes at nodes 2—3 cm distant from one another, subfastigate, uppermost sessile, remainder shortly or rather shortly peduncled; *peduncles* smooth or slightly scaberulous. *Bracts* of the lower spikes foliaceous, lower exceeding upper slightly exceeded by the terminal spike, upper bracts subfoliaceous (lower) to glumiform-aristate (upper), not sheathing. *Female glumes* more or less oblong, oblong-ovate, or ovate-lanceolate, subcymbiform, apex acute to obtuse, 2—2.5 mm long, 0.8—1.5 mm wide, thin and whitish, margins involute and sub-erose above, nerveless except for the midrib and 2 adjacent nerves coalescing at the apex and excurrent in a widish, often tapering, sometimes ill-defined, slightly scaberulous-margined awn, 1—1.75 mm long. *Utricles* ellipsoid, subinflated-trigonous, 3—4 mm long, 1—1.25 mm broad, membranaceous, pluri- to multinerved, narrowly marginate, glabrous, subnitidous, patulous, sometimes ultimately becoming patent, straight or straightish, stramineous, scarcely or very shortly and stoutly stipitate, apex gradually or subgradually beaked; *beak* conic below, cylindrical or compressed-cylindrical above, 1—1.75 mm long, broad below, narrowly marginate, glabrous and smooth or sparsely scaberulous-margined, bidentulate; *mouth* not oblique; *teeth* 0.2—0.3 mm long, straight or slightly diverging. *Achene* oblong or oblong-obovoid, but tapering towards the base, apex slightly rounded, distinctly trigonous, faces slightly concave, especially below, 1.5—1.7 mm long, 0.75—1 mm broad, sometimes very shortly stipitate and rostrate. *Style* not or scarcely thickened at the base, which is sometimes slightly bent. *Stigmas* 3.

SUMATRA: West Coast; Mt. - Korinchi [G. Kerintji], peak, 1914, *Robinson & Kloss* (BM, K, S) !; *ibid.*, forest, river-side, 1900 m, 9 April 1920, *Bunnemeyer* 9326 (B) !

PHILIPPINE ISLANDS: Luzon; Benguet, Mt. Simacoco, Oct. 1921, *Ramos & Edano* (*Bur. Set.* 40,359) (K, L, S) !

"Openings in the mossy forest on Mt. Simacoco, alt. 1900 m."—Merrill (*I.e.*).

NEW GUINEA: North-East New Guinea; Morobe District, Tobou, Kuak R., mossy forest trail, fairly common, 1500 m, 25 Nov. 1936, *Clemens* 4451 (*Scleria* sp. stem on same sheet) (AA) !; Mt. Sarawaket, in tall grass, by damp paths, 2400—2700 m, March 1937, *Clemens* 5551 (AA) !; *ibid.*, 2400—2700 m, 11 March 1937, *Clemens* 6078 A (AA) !; *ibid.*, March—April 1937, *Clemens* 6079 A (AA) ! — Papua; Central Division, Murray Pass, Wharton Range, 2840 in, few plants at edge of forest,

June—Sept. 1933, *Brass* 4676 (L) !; Gap, open ridge top, 360 m, 10 Dec. 1935, *Carr* 13,731 (L) !

JAVA: Priangan; Mt. Wajang, 28 May 1871, *Scheffer* 6371 (B) ! — Malang; "Smeroe-hoeve," Ranu Regulo, grass-savannah, 2100 m, June 1935, *van Steenis* 7263 (B) !

Ex Herb. *Korthals* (L) !

India, China, Japan.

It is difficult to decide just where to draw the line between this species and *C. subtransversa* C. B. Clarke, mainly because of the scantiness of the material available of the latter species. There is no doubt that the two are very closely related, but they are here treated as separate species without prejudice to future treatment. The degree of reflexion of the utricles is used by Ohwi and others as an important means of distinguishing *C. Doniana* and its closest allies, but reflexion of fruits usually depends upon maturity and in my opinion is to be used with care in the delimitation of species.

#### Var. CACUMINIS Nelmés

*Carex Doniana* Spreng var. *cacuminis* Nelmés in *Kew Bull.* 1950: 204: 1950. — Celebes, *Eyma* 1395.

*Stems* 2—4(—12) cm tall, 0.75 mm thick. *Leaves* 1—4(—5) mm wide, most exceeding the stems, flat, rather soft. *Spikes* 2—4(—5), 6—12(—17) mm long, 4—6 mm thick, contiguous, forming a crowded, fastigate head, or lowest subapproximate. *Female glumes* shortly acuminate, very slenderly plurinerved, awn 0.2—0.75 mm long. *Utricles* 3.5—4.5 mm long, 1—1.4 mm broad, rugulose-alveolate, slenderly and obscurely plurinerved. *Achene* 1.8—2 mm long, about 1 mm broad.

CELEBES: Central Celebes: Masamba; Mt. Kambuno, summit, open situation, common, partly grazed [probably by anoa—the small wild buffalo of Celebes, *Bos (Bubalus) depressicornis*], 2880 m, 28 July 1937, *Eyma* 1395 (B, K) !

Endemic.

Except for the specimen with the 12 cm stem, this gathering looks very distinct with its shorter stems, narrower leaves, shorter but stouter spikes, and its larger utricles.

#### 84. CAREX SUBTRANSVERSA C. B. Clarke

*Carex subtransversa* C.B. Clarke in *Philipp. Journ. Sci.* ser. 2, 2: 108: 1907; *Kiikenth.*, 614; Merrill, *Enum. Philipp. Fl. PL* 1: 142: 1923. — Philippine Islands, *Merrill* 4730.

Tufted. *Rhizome* creeping, descending, or curved-descending, slender. *Stems* erect, trigonous, 13—30 cm tall, 0.75—1.5 mm thick below, smooth or angles just below the spikes minutely scaberulous, surrounded at the

base, below the leaves, by a few pale cataphylls or almost leafless sheaths. *Leaves* basal and subbasal, and 1 higher on the stem, usually shorter to much shorter, sometimes slightly longer, than the stem, 1.5—4 mm wide, margins usually revolute, sometimes flattish-plicate, subcoriaceous, stiffish, not septate, nodulose, upper surface above covered with minute rough protuberances, apices attenuated. *Spikes* 3—5, 1-3 cm long, subdense- to dense-flowered, terminal male, slenderly cylindric, 1—2 mm thick, lateral spikes female, cylindric, 4—5 mm thick, often all approximate to (lowest) subapproximate and fastigiate, sometimes lowest somewhat distant, upper very shortly to shortly lower shortly to rather longly peduncled; *peduncles* smooth. *Bracts* of the lower spikes foliaceous, little to much exceeding the terminal spike, upper bracts much reduced, subfoliaceous to setaceous, usually shorter than their spikes, not sheathing. *Female glumes* lanceolate, oblong-lanceolate, or ovate-lanceolate, cymbiform or incurved, apex usually acute or subacute, less often obtuse, 2—2.5 mm long, 0.8—1.2 mm wide, thin, milky-white, becoming suffused brown, margins becoming erose, nerveless except for the midrib and 2 adjacent nerves coalescing at the apex and excurrent in a firm, smooth or minutely and sparsely scaberulous-margined awn, 0.25—1.5 mm long. *Utricles* ellipsoid, subinflated-trigonus, 3—3.5 mm long, 1—1.2 mm broad, membranaceous, slenderly plurinerved, narrowly marginate, glabrous, subnitidous, patulous, straight or straightish, greenish above, stramineous below, with sometimes reddish-brown patches towards the apex, slightly spongy-thickened at the pseudo-stipitate base, apex subgradually or subabruptly beaked; *beak* tapering, compressed-terete or biconvex, 1.25—1.5 mm long, not or scarcely marginate, glabrous and smooth or nearly so, sometimes pale, or reddish-flushed, bidentulate; *mouth* scarcely oblique; *teeth* very short, offeff becoming erose and sub-entire. *Achene* obovoid or ellipsoid-obovoid, distinctly trigonus, faces flattish, 1.3—1.7 mm long, about 1 mm broad, not stipitate, apex suddenly contracted into an often slightly bent, very short beak. *Style* not or scarcely thickened at the base, where it is sometimes somewhat bent or curved. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon: Benguet; Pauai, dry open slope, ± 2200 m. Oct.—Nov. 1905, Merrill U750 (K) !; *ibid.*, Pauai, April—June 1918, Santos (*Bur. Sci.* 51,68U) (B, BM, K, L) !, 31,958 (K) !; Benguet, May 1914, Merrill (*Bur. Sci.* 1763) (B, BM, S) !

Merrill (*Enum. Philipp. Fl. PL* 1: 139: 1923) misidentifies Santos 31,68U and 31,958 as *C. ligata* Boott var. *formosensis* (Lév. et Van.) Kükenth. He also cites there Merrill 562 and Ramos (*Bur. Sci.* 13,987), which I have not seen.

"On dry open slopes of recent clearings, along trails, etc., 1900—2300 m."—Merrill (*l.c.* p. 142).

Endemic.

Sect. 19. SYLVATICAE Tuckerm.,  
Enum. Meth. 12: 1843

Tufted. *Leaves* flat. *Stems* slender. *Terminal spike* male, rarely gynaeandrous, lateral female, slender, lax-subdense-flowered, lower some-

times cernuous, on long and slender peduncles. *Bracts* foliaceous, sheathing. *Female glumes* often pale. *Utricles* light greenish, glabrous, nerveless or slenderly nerved, nitidous, longly beaked, apex of beak whitish-hyaline, bidentulate, mouth oblique.

Only Malaysian species . . . . . 85. *C. finitima*

Kiikenthal includes *C. finitima* in Section *Hymenochlaenae* Drejer, Subsection *Debiles* Carey. Carey's group is cited by Mackenzie (*in N. Amer. Fl.* 18: 283: 1935) as a section, in synonymy, under Section *Sylvaticae* Tuckerm., an older name which I adopt here in its sectional status.

85. CAREX PINITIMA Boott

*Carex finitima* Boott, *Illustr.* 1: 44 t.112: 1858; Kükenth., 598; Nelmes *in* Kew Bull. 1949: 385, 391: 1949; *ibid.*, 1950: 204: 1950. — India, Hooker f.

*Carex fusiformis* Nees var. *enervosa* Kükenth. *in* Engl. Bot. Jahrb. 70: 467: 1940. — New Guinea, Clemens 6072, 6090.

*Carex atjehensis* Kükenth. *in* Bull. Jard. Bot. Buitenz. ser. 3, 16: 314: 1940. — Sumatra, van Steenis 8366.

Tufted. *Rhizome* short. *Stems* erect, trigonus, 12—80 cm or more tall, 0.5—2 mm thick below, ribbed, smooth, including the rhachis, surrounded at the base, below the leaves, by a few strongly nerved, fulvous, reddish, or blackish-red, short cataphylls or leafless sheaths. *Leaves* basal, except 0—2 situated on the stem between the base and the inflorescence, much shorter than the stem to slightly exceeding it, 2—8 mm wide, oblique to erect, straight to slightly curved, flat or flattish, smooth except for minutely scaberulous margins towards the attenuated apices; *sheaths* reddish or blackish-red. *Spikes* 4—8, cylindric, terminal male, or sometimes gynaeandrous, or female flowers near middle of spike, 1.25—4.3 cm long, about 1 mm thick, remaining spikes female, 2—9 cm long, 3—4.5(—5) mm thick, wholly lax-flowered or subdense-flowered above, sometimes very lax-flowered below, erect or lower sometimes cernuous, upper subapproximate, often fastigiate, lower or lowest distant or remote, on (upper) shortly to (middle or lower) longly or very longly exerted peduncles; *peduncles* very slender, smooth below, sometimes sparsely scaberulous above. *Bracts* of the lower spikes foliaceous, shorter than to exceeding the stem, longly or very longly sheathing, upper bracts much reduced, shortly sheathing; *sheaths* pale to reddish-brown and membranous at the mouth, sometimes dilated towards the base. *Female glumes* oblong-ovate or oblong-lanceolate, strongly incurved below, cymbiform above, apex acute to very obtuse or even rounded, 3.5—4 mm long, 1.5—1.75 mm wide, translucent, slenderly nervose and fulvous or brownish, except the very thin, nerveless, very wide, white margins, especially above and at the apex, sometimes whole glume whitish except narrow greenish midrib, which usually fails, sometimes by 1 mm, to extend to the apex, but sometimes excurrent, from a point on the back of the glume, in a smooth or minutely hispidulous awn

up to 1 mm long. *Utricles* ellipsoid, trigonous, 5—7 mm long, 1—1.75 mm broad, membranaceous, nerveless or slenderly and obscurely very few-nerved, scarcely to narrowly marginate, glabrous, smooth, nitidous, straight or straightish, becoming subpatulous, light green, becoming brownish tinged, very shortly pale stipitate, subgradually to subabruptly beaked; *beak* slightly tapering, compressed-cylindric, sometimes slightly inflated at the middle, apical 1 mm very slender, 2.5—3 mm long, not marginate above, glabrous, smooth, apex bidentulate but whitish-hyaline and soon becoming erose; *mouth* oblique. *Achene* ellipsoid, oblong-ellipsoid, or ellipsoid-obovoid, trigonous, angles distinct, faces flattish or shallowly concave, 2.5—3 mm long, 1—1.5 mm broad, stramineous, becoming dark brown, tapering below, not or scarcely stipitate, apex sub-rotund, abruptly beaked; *beak* 0.2—0.25 mm long. *Style* thickened at the base. *Stigmas* 3, longish and slender.

SUMATRA: Atjeh, Gajo Lands, Putjuk Angusian, among underwood on the mountain crest, 2400—2700 m, 28 Jan. 1937, *van Steenis* 8366 (B, K)!

NEW GUINEA: North-East New Guinea; Morobe District, Mt. Sarawaket, edge of a thicket, 2400—2700 m, 1 April 1937, *Clemens* 6072; *ibid.*, frequent on grassy and bushy slopes 3600—3900 m, 6 April 1937, *Clemens* 6090 (AA)!; *ibid.*, Samanzing, marsh meadow, alpine region, 2400—2700 m, 2 Dec. 1938, *Clemens* 9423a (A A, K)! — Papua; Central Division, Mt. Albert Edward, broken cliff face, rare, 3680 m, May—July 1933, Brass U07 (AA, L)!

I have not seen *Clemens* 6072, and it may not, of course, be *C. finitima*.  
India, China.

There is an inflorescence of this species mixed with *Clemens* 6087, cited under *C. pocilliformis* Boott.

Kiikenthal's choice of epithet in treating the *Clemens* numbers as a variety of *C. fusiformis* Nees is interesting from the fact that the nerveless utricle is the chief character distinguishing *C. fusiformis* from *C. finitima*. His misidentification of Van Steenis 8366 as a new species, closely related to *C. longibracteata*, is difficult to understand.

#### Sect. 20. CAPITELLATAE Meinsh.

in Act. Hort. Petrop. 18: 309: 1901

*Stems* firm, smooth. *Leaves* very narrow, comparatively thick. *Spike* 1, androgynaeceous. *Utricles* often subinflated-trigonous, small, slenderly nerved, glabrous, becoming reflexed, usually shortly or very shortly beaked. *Stigmas* 3.

Only Malaysian species. . . . . 8G. *C. capillacea*

Krechetovich, the eminent Russian caricologist, in his treatise on Subgenus *Primocarex* Kiikenth., has revealed its artificial classification. This is discussed in the introductory part of this revision and need not be more than touched upon here. The disruption of Kiikenthal's *Primocari-*

*ces* does present new problems of relationship. Krechetovich points out the misplacing of the *Capitellatae*, which lack a rhachilla in the utricle, as a subsection in the rhachilla-bearing Section *Unciniaeformes* Kiikenth., and suggests their relationship to Section *Spirostachyae*, a section placed by Kiikenthal late in Subgenus *Carex* (*Eucarex*). I accept his suggestion for this revision, on the basis of the morphological resemblances between the two groups, but one can not, on morphological data alone, be sure of the true affinities of such extremely reduced groups of sedges as Section *Capitellatae*.

#### 86. CAREX CAPILLACEA Boott

*Carex capillacea* Boott, Illustr. 1: 44 I.110: 1858; C. B. Clarke, 7; S. T. Blake in Journ. Arn. Arb. 28: 101: 1947; Nelmes « Kew Bull. 1949: 381: 1949. — India *Hooker* l., *Griffith*.

*Carex rara* Boott subsp. *capillacea* (Boott) Kiikenth. in Engl. Pflanzenr. IV, 20: 102: 1909; Merrill, Enum. Philipp. Fl. PL 1: 141: 1923.

Densely tufted. *Rhizome* short, slender, woody. *Stems* more or less erect, obscurely to obtusely trigonous, 6—35 cm tall, very slender (0.4—0.5 mm thick), finely ribbed, smooth, clothed at the base, below the leaves by pale brown leafless or almost leafless cataphylls and their fibrous remains. *Leaves* few, subbasal, most much shorter than, but some equalling or slightly exceeding, the stems, 0.4—0.75 mm wide, relatively thick, flat to involute-canaliculate, usually erect to oblique and straight but sometimes subcurved; *sheaths* pale and membranous in front. *Spike* solitary, terminal, androgynaeceous, more or less cylindric, 4—10 mm long, female part becoming 4—5 mm thick, male part usually about as long as or somewhat longer than the female part, both few-flowered, ebracteate. *Female glumes* ovate or oblong-ovate, base thickened and incurved, cymbiform to flattish above, apex obtuse to very obtuse, less commonly acute, 1.25—1.5 mm long, 1—1.25 mm wide, translucent, castaneous, margins sometimes narrowly paler and erose in places, nerveless or nearly so, except for the midrib and 2 adjacent nerves, forming a paler central stripe, coalescing above, scarcely or just extending to the apex. *Utricles* oblong-ellipsoid to oblong-ovoid, subinflated and obscurely trigonous, 2—2.3 mm long, 0.8—1.1 mm broad, membranaceous, 5—6-nerved on the often centrally ridged ventral face, nearly nerveless or obscurely few-nerved on the flattened or obscurely trigonous dorsal face, narrowly marginate, glabrous, usually straight but sometimes slightly recurved, becoming subpatent to patent, greenish-stramineous, sometimes minutely red dotted, spongy-thickened at the truncate-rotund base, scarcely to very shortly stipitate, subgradually to subabruptly beaked; *beak* subtapering, compressed-terete, about 0.5 mm long, narrowly marginate, glabrous, subentire; *mouth* not or scarcely oblique. *Achene* ellipsoid to oblong-ellipsoid, trigonous, faces flat to concave, 1.3—1.5 mm long, about 0.8 mm broad, straight, stramineous to brownish, very shortly stout-stipitate, suddenly

beaked; *beak* terete, 0.2—0.25 mm long, slender, sometimes slightly bent. *Style* slightly thickened at the base. *Stigmas* 3.

PHILIPPINE ISLANDS: Luzon: Benguet; *Loher* 705 (K)!; *ibid.*, Pauai, border of cold open swamp, ± 2200 m, Oct.—Nov. 1905, *Merrill* 4732 (K)!; *ibid.*, Pauai, May 1909, *Merrill* 6632 (K)!; *ibid.*, May 1911, *Merrill* 7715 (BM, K, L)!; *ibid.*, Pauai, April—June 1918, *Santos* (*Bur. Set.* 31,7U) (B, BM, K, L)!; *ibid.*, Heights in the Oaks, 2100 m, July 1907, *Mearns* (*Bur. Sci.* 4260) (L)!; *ibid.*, Mt. Nangaoto, March 1931, *Quisumbing & Sulit* (*Bur. Sei.* 82,471) (K)!

"In open wet borders of small streams, alt. 2200—2600 m."—*Merrill* (*l.e.* p. 141).

CELEBES: South-West Celebes: Enrekang; crest of Mt. Rantemario—Batubollong, in cup-shaped, small ravine on the north side, open place, tiny tufts, 3300 m, 23 June 1937, *Eyma* 944 (B)!

NEW GUINEA: Netherlands New Guinea; 11 km north-east of top of Mt. Wilhelmia, in wet grassy valley, 3400 m, Sept. 1938, *Brass & Meijer Drees* 9751 (AA)!

India, China, Japan, New South Wales, New Zealand.

Var. MAJOR *Nelmes*

*Carex capillacea* Boott var. *major* *Nelmes* in *Kew Bull.* 1949: 381: 1949. — Java, *van Steenis* 4289.

*Stems* 15—55 cm tall, 0.4—0.75 mm thick, sometimes slightly scabrous just below the spike. *Leaves* 0.7—2 mm wide, *Spike* slenderly cylindrical to ellipsoid in flower, cylindrical or subglobose in fruit, 5—15 mm long, becoming 4—7 mm thick, male and female parts about equal in length or the male much shorter. *Female glumes* ovate, oblong, or elliptic, apex obtuse or very obtuse, 2—3 mm long, 1.25—1.5 mm wide. *Utricles* ovoid to oblong-ovoid, inflated-trigonous, 2.5—3.2 mm long, 1—1.3 mm broad, slenderly to conspicuously plurinerved, often recurved, stramineous to castaneous, base sometimes spongy and subbulbous, beak very shortly bidentulate. *Achene* 2—2.5 mm long, 1—1.2 mm broad, straight to slightly curved.

SUMATRA: Atjeh, Gajo Lands, Mt. Leuser (Losir), middle peaks, wet meadows in stream-valley, 2950—3500 m, 5 June 1937, *van Steenis* 8661 (B, K)!

BORNEO: British North Borneo; Mt. Kinabalu, 3300 m, [reed, at Kew in Aug. 1892], *Haviland* 1393 (K)!; Lumomid, cracks in granite, 3990 m, Feb. 1910, *Gibbs* 4196 (K)!; above Kamburangah, open seepage, 3000 m, 26 March 1932 (8 Jan. 1932?), *Clemens* 28,021 (B, BM, K, L, S)!; Mt. Kinabalu, granite dome, sheltered places, 3300 m, and above, 2 June 1932, *Clemens s.n.* (B)!

NEW GUINEA: Netherlands New Guinea; Lake Habbema, scattered along grassy shores of lake, 3225 m, Aug. 1938, *Brass* 9085 (AA)!

JAVA: Priangan; Mt. Papandajan, Tegal Alun-alun and Tegal Bungbrung, marshy spots above course of Tjiparugpug, Tjibeureum-gede, common, ± 2300 m and 2450 m, 21 Jan. 1930, *van Steenis* 4073 (B)!; *ibid.*, boggy ground, common, thick tufts in valley of the Tjiparugpug, 2350 m, 14 May 1931, *van Steenis* 4825 (B)!; *ibid.*, 2550 m, 25 Oct. 1939, *van Steenis* 11,680 (B)!; *ibid.*, Tegal Alun-alun, ± 2500 m, *Docters*

*van Leeuwen-Reijnvaan* 13,141 (B, L)!; *ibid.*, Tegal Alun-alun, marshy valley, common, ± 2350 m, 30 March 1930, *van Steenis* 4289 (B, K, L, S)!; *ibid.*, Tegal Alun [-alun], ± 2650 m, 31 May 1930, *Polak* (B)!; *ibid.*, Tegal Pandjang, marsh in valley, few plants, 2041 m, 29 March 1930, *van Steenis* 4247 (B)!; *ibid.*, Tegal Mariuk, open marshy plain in forest, 2200 m, 31 March 1930, *van Steenis* 4315 (B)!

The Bornean plant, as represented by *Haviland* 1393, was misidentified by C. B. Clarke (*in Journ. Linn. Soc.* 37: 7: 1904), and this and a *Loher* specimen from the Philippines by *Kukenthal* (*in Engl. Pflanzenr.* IV, 20: 102: 1909), as the Indian species, *C. rara* Boott. *Kiikenthal* has continued in recent years to regard the Malaysian plants of this group as either subspecies *capillacea* (Philippines gatherings—by *Merrill* and others—*in Philipp. Journ. Sci. Bot.* 6: 58: 1911) or *C. rara* itself (*Van Steenis* 8661—*in Bull. Jard. Bot. Buitenz.* ser. 3, 16: 313: 1940).

In my opinion, *C. capillacea* Boott and its variety *major* *Nelmes* are quite specifically distinct from *C. rara* Boott. I have included the Philippines gatherings under the species, as their deviation from typical Indian examples seems only slight. It is interesting to note that Australian, and the recently discovered New Zealand, representatives match the Indian *C. capillacea* very closely.

Sect. 21. SCLERICULMES *Nelmes*  
*in Kew Bull.* 1951: 121: 1951

*Rhizome* shortly creeping. *Stems* golden, nearly wholly hidden by leaf-sheaths. *Leaves* of normal kind only on the upper half of the stem, merging above into the leafy bracts, merging below into purplish or vinaceous, bladeless sheaths, which cover the lower half of the stem, not septate-nodulose, liguliferous, glabrous, upper surface covered with minute, rough protuberances, *sheaths* glabrous or subadpressed-hispidulous. *Spikes* 4—9, terminal male, lateral female or androgynaceous, subdense- or dense-flowered. *Bracts* foliaceous, lower at least very much exceeding the whole inflorescence, longly sheathing. *Female glumes* small, pale but covered with small, glandular reddish flecks and streaks. *Utricles* small, ellipsoid or ellipsoid-obovoid, nerveless, densely whitish-setulose, green with glandular reddish spots, subabruptly or abruptly beaked. *Achene* obovoid or ellipsoid-obovoid. *Style* thickened at the base.

Only Malaysian species. . . . . 87. *C. Maubertiana*

I have taken *C. Maubertiana* Boott, *C. ligulata* Nees, and *hebecarpa* C. A. Mey. out of Section *Hirtae* Tuckerm. because I think they represent a natural group sufficiently distinct to form a separate section. The chief character on which Section *Sclericulmes* is based is the arrangement of the leaves on the stem. These are fully developed and rather numerous

in the upper part of the stem, merging into the leafy bracts, but they gradually decrease in length, and become fewer, towards the base of the stem, where they merge into bladeless sheaths. The yellowish stem resembles that of *Scleria*, and it shares this resemblance with several other *Carices* in wholly unrelated sections, especially *C. hypolytroides* Ridley (Section *Hypolytroides* Nelmes) and *C. insignis* Boott [Section *Decorae* (Kükenth.) Nelmes].

### 87. CAREX MAUBERTIANA Boott

*Carex maubertiana* Boott, Illustr. 1: 45 t.HU: 1858. — Indo-China, Gaudichaud.

*Carex hebecarpa* C. A. Mey. var. *Maubertiana* (Boott) Franch. in Nouv. Arch. Mus. Paris sér. 3, 10: 70: 1898; Kükenth., 745.

Loosely tufted. *Rhizome* very short. *Stems* erect or suberect or sometimes slightly curved at the base, trigonous, visible only for short lengths and only below and on the rhachis, otherwise hidden by leaf-sheaths, 38—60 cm tall, 2—3 mm thick below, smooth, except on the upper part of the rhachis where the angles are sparsely scaberulous, rather slenderly ribbed, golden. *Leaves* of normal length only in the upper half of the stem, merging above into the similar lower bracts, lower leaves progressively shorter and farther apart towards the base of the stem, where they become more numerous, merging into purplish or vinaceous, rather tight, glabrous or minutely scurfy bladeless sheaths, which do not soon wither and split into fibres, upper leaves failing to reach (lower) to far exceeding (upper) the apex of the stem, S—7 mm wide, flattish to strongly revolute, stiffish, greyish-green, upper surface more or less covered with pale, minute, rough protuberances towards the attenuated apices; *sheaths* long, rather tight, lower dull-vinaceous below, upper greener, uppermost ones sparsely subadpressed-hispidulous in places; *ligule* obtuse, membranaceous, ferruginous, hispidulous in front. *Spikes* 4—9, erect or suberect, cylindric, 1.5—4 cm long, subdense-flowered, upper 2—6 approximate or subapproximate, fastigate, on wholly included or very shortly exerted peduncles, remainder a little farther apart, reaching or slightly overlapping one another, on scarcely to rather longly exerted peduncles, terminal spike male, rarely another, about half the length and at the base of the terminal, with a few female flowers at the apex of the spike or interspersed, 1—2 mm thick, lateral spikes female, or androgynaceous with very few male flowers at their apices, 4—6 mm thick; *peduncles* obtusely angled to terete, slender (about 0.5 mm thick), bristly. *Bracts* foliaceous but upper reduced, mostly far exceeding the apex of the terminal spike, minutely bristly on the upper surface, lower rather longly, upper rather shortly to shortly sheathing; *sheaths* subadpressed-hispidulous, especially near the mouth; *bract* of male spike a long-awned scale. *Female glumes* ovate, oblong-ovate, or triangular-ovate, base thickened, gibbous, and incurved, otherwise flattish or cymbiform to incurved, apex obtuse to very obtuse or rounded, 1.3—2 mm long, 1.25—1.5 mm wide, thin, transparent, glabrous except on the

inner surface which is minutely setose in places near the midrib, pale but covered with small reddish, glandular flecks and streaks, margins rather widely whitish and erose-ciliolate above, nerveless or very slenderly nervose, midrib and 2 closely parallel nerves, forming a pale stripe, coalescing above and from failing to reach the apex to excurrent in a mucro up to 0.3 mm long. *Utricles* ellipsoid to ellipsoid-obovoid, trigonous with obtuse angles and flattish faces, 3—3.8 mm long, 1.25—1.75 mm broad, submembranaceous, nerveless but margins displaced on to the dorsal face, densely whitish subadpressed-setulose, becoming patulous, surface glandular-reddish, or light greenish with reddish spots, curved or bent below, where it subabruptly narrows into a stout, conic, marginate, glabrescent stipe-like base, otherwise straightish, subabruptly to abruptly narrowed into a *beak*, which is gradually tapering, plano-convex, 1—1.2 mm long, broadish, marginate, setose and densely whitish setose-margined, bidentate; *mouth* not or slightly ventrally oblique; *teeth* about 0.3 mm long, straight. *Achene* obovoid or ellipsoid-obovoid, distinctly trigonous, faces flat to shallowly concave, 2—2.4 mm long, 1—1.5 mm broad, pale to warm brown, stipe-like base bent, not or extremely shortly beaked. *Style* thickened at the base. *Stigmas* 3.

SUMATRA: Atjeh; Pegasing, rather common in *Pinus Merkusii* vegetation, ± 1200 m, 19 Jan. 1924, *Jochems* 299 (L)!; between Ketol arid Lampahan, primary forest, infrequent, ± 1000 m, 22 Jan. 1924, *Jochems* 578 (L)!; Bur ni Bias, sparse, ravine-slope, 1500 m, 31 Aug. 1934, *van Steenis* 6159 (B, L)! — West Coast; Mt. Korinchi [G. Kerintji], Bt. te Bakar, secondary forest, ± 1000 m, 13 Feb. 1920, *Bunnemeijer* 8201 (B, K, L, S)!

• JAVA: Priangan; Mt. Telagabodas, west slopes, above Pangentjongan, forest-border, ± 1500 m, Jan. 1909, *Backer* 32,381 (B)!; ravine of the Tjisokan, east of Tjidadap, south of Tjibeber, forest, 650 m, 11 June 1917, *Backer* 22,327bis (B)!; Tjidadap, Tjibeber, common, ± 1000 m, 25 July 1917, *Bakhuizen van den Brink* 658 (B, L)! — Priangan: Mt. Malabar, forest, 2100 m, June 1930, *van der Pijl* 233 (B)!; Mt. Manglajang, common, 1400 m, 10 May 1931, *van der Pijl* 307 (B)! — Besuki; Ijang Mts., north-east slopes, young rain-forest, common, 1350 m, 18 Oct. 1913, *Backer* 9619 (B)!; Idjen Mts., near Pantjur, in ancient wood, ± 1100 m, 23 Nov. 1893, *Koorders* 15,191ji (B, L)!; *ibid.*, north slope of Mt. Kendeng above Kajumas, forest, 1100 m, 18 April 1920, *Backer* 30,717 (B)!

Ex Herb. *Korthals*.

India, Indo-China, China.

### Sect. 22. FERRUGINEAE Tuckerm.,

Enum. Meth. 12: 1843

*Stems* slender. *Spikes* 3—6, upper 1—3 male, remainder female, erect to cernuous, lax- to subdense-flowered, slender, lower on long or very long, slender peduncles. *Bracts* rather short, sheathing. *Female glumes* acute to truncate or emarginate at the apex, fuscous or reddish. *Utricles* suberect to patulous, glabrous or subadpressed-hispidulous, nerveless or slenderly nerved.

Only Malaysian species. . . . . 88. *C. tricuspidata*

## 88. CAREX TRICUSPIDATA Ktikhent.

*Carex tricuspidata* Ktikhent. in Engl. Bot. Jahrb. 70: 466: 1940. — New Guinea, Clemens 7385bis.

*Carex tricuspidata* var. *brevispiculosa* Ktikhent. in Engl. Bot. Jahrb. 70: 466: 1940. — New Guinea, Clemens 726AB.

*Carex tricuspidata* var. *minor* Ktikhent. in Engl. Bot. Jahrb. 70: 466: 1940. — New Guinea, Clemens 726UC.

Tufted. *Rhizome* sometimes elongated, oblique, or descending. *Stems* erect or suberect, apex of the rhachis sometimes curved or flexuous, obtusely to obscurely trigonous, 20—70 cm tall, 1—1.25 mm thick below, smooth, strongly nerved and slenderly striate, at its junction with the rhizome covered with a thick mass of fibrous, brownish remains of leaf sheaths. *Leaves* basal, numerous, 0—2 higher on the stem, shorter to much shorter than the stems, 1—3.5 mm wide, flat or flattish, sometimes conduplicate or canaliculate-involute, subcoriaceous, stiffish, apices longly attenuated. *Spikes* 3—5, single, rarely lowest with 2 other female spikes near the top of its peduncle, erect, suberect, or cernuous, sometimes apparently flexuous, occupying, when mature, the upper 17—25 cm of the stem, slenderly cylindrical, upper 2—3(—4) subapproximate or more distant, often subfastigiate through the lower being carried up on longer peduncles, lowest, when more than 2—3(—4), distant from the next above, 1.5—6 cm long, subdense-flowered above, lax- or very lax-flowered below, terminal male, 1—2.5 mm thick, remainder female, 2.5—3.5 mm thick, lower spikes on shortly to very longly exserted peduncles, upper on shortly or rather longly exserted peduncles; *peduncles* more or less trigonous, slender (0.25—0.5 mm thick), smooth. *Bracts* of the lower spikes foliaceous, upper reduced and subherbaceous, lower slightly longer, upper equal or rather shorter, than their own spikes, lower longly upper more shortly sheathing, male spike ebracteate but there is often an empty one just below it; *sheaths*, especially the upper ones, dark brown and membranous in front, often split, freeing the peduncles of the spikes. *Female glumes* oblong, with slightly rounder upper corners, apex asymmetrically truncate (each side of the midrib on a different level), sometimes emarginate, often becoming erose, margins incurved, 3—4.5 mm long, 1.5—2 mm wide, subpellucid, golden brown to brown, margins narrowly to very widely whitish-hyaline above, especially at the apex, faintly nervose, except for a conspicuous, strong, pale midrib, which is excurrent in a broad, ciliolate-hispidulous awn, 0.25—1 mm long. *Utricles* obovoid, ellipsoid-obovoid, or ellipsoid, obtusely or compressed-trigonous, often flattened-convex dorsally and angled ventrally, 3.3—4.5 mm long, about 1 mm broad, membranaceous, nerveless, narrowly marginate, glabrescent or sparsely subadpressed-hispidulous dorsally, sparsely to densely subadpressed-hispidulous ventrally, hispid on the margins at the apex, suberect to patulous, whitish or pale yellowish below, brownish above, subgradually or subabruptly narrowing into a glabrous, stout, pale, spongy-thickened stipe, 0.25—0.75 mm long, subabruptly beaked; *beak* stout, compressed, 1—1.3 mm long, marginate, glabrescent or sparsely hispidulous with

hispid margins, at least below, straight or sometimes slightly bent at the base, sometimes reddish-brown, bidentate; *mouth* dorsally oblique; *teeth* short, straight, apices whitish-hyaline. *Achene* ellipsoid, but tapering below and less tapering above to a broader, rotund-truncate apex, or oblong-ellipsoid, trigonous, 2—2.25 mm long, nearly 1 mm broad, dark reddish-brown, without stipe or beak. *Style* pyramidally thickened and sulcate at the persistent base. *Stigmas* 2 or 3.

NEW GUINEA: Netherlands New Guinea; Utkwa Exped. to Mt. Carstenz, Camp XIII, 3150 m, 29 Jan. 1913, *Boden Kloss* (BM) !; *ibid.*, Camp XIII—XIV, 3150—3750 m, 31 Jan. 1913, *Boden Kloss* (BM, K) !; *ibid.*, Camp XIV, 3750 m, 1 Feb. 1913, *Boden Kloss* (BM) !; Quarles Valley, 3600—4000 m, 23 Feb. 1913, *Versteeg* 2546 (B, K) !; Mt. Carstenz, Meerendal river, 4000—4100 m, Nov.—Dec. 1936, *Wissel* 26 (B) !; Mt. Wilhelmina, 11 km north-east of top, covering the sandy bottom of a stream, 3400 m, Sept. 1938, *Brass & Meyer Drees* 9803 (AA, Br) !; 4 km north-east of top, tufted on grassy seepages, 3650 m, Sept. 1938, *Brass & Meijer Drees* 9970 (AA, Br) ! — North-East New Guinea; Morobe District, Mt. Sarawaket, Lake Camp, crack in steep rocks, 3000 m, 10 Oct. 1937, *Clemens* 726UB; *ibid.*, mountain grassland, 3000 m, 20 Oct. 1937, *Clemens* 726UC (AA, K) !; *ibid.*, between a small stream and a large lake, 3000 m, 15 Oct. 1937, *Clemens* 7385bis; *ibid.*, Sattelberg, steep and scrubby rock-wall, 7 Oct. 1937, *Clemens* 7389B (AA, K) !

Endemic.

Ridley (*in* Trans. Linn. Soc. ser. 2, 9: 247: 1916) misidentified the Boden Kloss numbers from Mount Carstenz as *C. breviculmis* R. Br. var. *perciliata* Ktikhent. [*C. perciliata* (Ktikhent.) Nelmes].

I have included Ktikhent's two varieties in synonymy because, having seen a considerable number of specimens of *C. tricuspidata*, I find the species exhibits a high degree of variability in size, time of flowering, and in other ways, possibly due to its growing at high altitudes and sometimes in uncongenial habitats.

This species may be *C. brachyathera* Ohwi (*in* Jap. Journ. Bot. 7: 190: 1934), of which I have been unable to see the type.

The glumes of this species are more nearly oblong than those of most other *Carices*.

I have not been able to see the type of *C. tricuspidata*, but have no doubt that the numerous specimens cited above represent this species.

Sect. 23, RHIZOPODAE Ohwi

*in* Mem. Coll. Sci. Kyoto Imp. Univ. ser. B, 11: 443: 1936

*Stems* subflaccid, scaberulous on the angles above. *Leaves* narrow, subflaccid. *Spike* solitary, androgynaceous, long. *Utricles* distinctly trigonous, large, plurinerved, glabrous, becoming subpatulous or patulous, longly beaked. *Stigmas* 3-

Only Malaysian species.

89. *C. eremostachys*

This species has only recently been described and is as yet too little known to be classified with any certainty. Besides, it is unispicate and thus one of the *Primocarices* which, as explained in the introduction to this revision, have been shown by Krechetovich to be artificially grouped. Mr. S. T. Blake, the author of *C. eremostachya*, has pointed out its alliance with *C. rhizopoda* (Section *Circinatae* Meinsh.). If one follows Krechetovich, as I do, and believes that *C. eremostachya* has been derived from multispicate ancestors, the problem of classifying such a greatly reduced species in Subgenus *Carex* on morphological evidence alone is considerable.

### 89. CAREX EREMOSTACHYA S. T. Blake

*Carex eremostachya* S. T. Blake in Journ. Am. Arb. 28: 99: 1947; Nelmes in Kew Bull. 1949: 381: 1949. — New Guinea, Brass 10,255.

Loosely tufted. *Rhizome* short, slender (about 1 mm in diameter), clothed with brownish, entire or subentire sheathing scales. *Stems* subflaccid, suberect or obliquely drooping, acutely trigonous, 20—45 cm tall, 0.5—1 mm thick, smooth below, scaberulous on the angles above. *Leaves* few, subbasal, with basal ones reduced to brown almost bladeless sheaths, as long as to longer than the stems, 1.5—2.5 mm wide, flat or flattish, straight or somewhat curved, slenderly nerved, subflaccid, smooth below, scaberulous towards the acuminate or shortly attenuated apices. *Spike* 1, androgynaeous, shortly cylindrical or ellipsoid-cylindrical, 1—1.6 cm long, 5—6 mm thick, dense-flowered, male part shorter to much shorter than the female part. *Bract* reduced to an aristate glume. *Female glumes* ovate to (lower) ovate-lanceolate, or oblong-ovate-lanceolate, sometimes acuminate, lower acute, upper acute to very obtuse, at the apex, cymbiform, 3—4 mm long about 2 mm wide, translucent, glabrous, pale below, reddish-brown above, except for a usually pale central stripe, bounded by 2 ribs which coalesce with the midrib at the apex in a firm tip in the upper glumes, and in the lower in a smooth or nearly smooth awn up to 1 mm long. *Utricles* ellipsoid, distinctly trigonous, 4.5—5 mm long, 1.25—1.5 mm broad, membranaceous, rather strongly but irregularly 4—5-nerved on the large ventral face, 8—10-nerved on the angled dorsal face, nerves sometimes reddish-brown, glabrous, smooth, straight or straightish, becoming subpatulous or patulous, pale stramineous-green, subabruptly contracted below into a sub-bulbous base which is 0.4—0.75 mm in length and breadth, abruptly shortly and stoutly stipitate, at the apex abruptly or subabruptly beaked; *beak* linear-trigonous, often with an acute, subwinged, reddish dorsal angle, 1.25—1.5 mm long, glabrous, smooth, scarcely marginate, bidentate; *mouth* scarcely dorsally oblique; *teeth* about 0.25 mm long, straight, reddish-brown with whitish-hyaline tips, which become erose. *Achenes* obovoid, distinctly trigonous, 1.8—2 mm long, 1.2—1.3 mm broad, minutely punctulate, with cinereo-fuscous flattish faces, and pale, red-

dish-tinged, prominent rounded angles, base and extremely short beak both pale. *Style* slightly thickened towards the base. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; 9 km north-east of Lake Habbema, massed on open beaches of a small stream in forest, 2800 m, Oct. 1938, Brass 10,255 (AA, Br)!

Endemic.

### Sect. 24. ANOMALAE Carey in Gray, Man. ed. 1, 557: 1848.

*Terminal spike* male, less commonly gynaeandrous, lateral usually female, dense-flowered, erect or cernuous. *Bracts* foliaceous, sheathing or sheathless. *Female glumes* small, fulvous, castaneous, or ferruginous, muticous or aristate. *Utricles* small, membranaceous, compressed or trigonous, glabrous, densely but minutely papillose, greenish-ferruginous or cinnamomeous, erostrate or shortly beaked; *beak* emarginate-bidentulate at the apex.

1. Terminal spike male, sometimes gynaeandrous; leaves 1—4 mm wide; female glumes ferruginous; utricles usually erostrate. . . . . 92. *Celibates*
1. Terminal spike always male; leaves 2—8 mm wide; female glumes castaneous; utricles beaked:
2. Leaves often much longer than the stem; spikes 5—6; male spike 1.5—4 mm thick; female glumes usually mucronulate; utricles strongly nerved. . . . . 90. *C. neurochlamys*
2. Leaves mostly shorter than but some as long as the stem; spikes 3—5(—6); male spike 1—2 mm thick; female glumes not usually mucronulate; utricles nerveless or (usually slenderly) nerved. . . . . 91. *C. maculata*

This very homogeneous group, the outstanding character of which is the minutely papillose utricle, appears to have some affinity with the northern Section *Atratae* Kunth and, more remotely perhaps, with the *Acutae* Fries.

### 90. CAREX NEUROCHLAMYS F. Muell.

*Carex neurochlamys* F. Muell., Fragm. 8: 258: 1874. — Australia, Stuart, Dal-lachy.

*Carex maculata* Boott var. *neurochlamys* (F. Muell.) Kiienth. in Engl. Pflanzenr. IV, 20: 428: 1909.

Densely tufted. *Rhizome* not elongated, woody. *Stems* erect to oblique, obtusely trigonous, 15—30 cm tall, 1—1.5 mm thick below, smooth, including the rhachis, surrounded, below the leaves, by a few reddish-brown or reddish-spotted cataphylls and/or their withered, fibrous remains. *Leaves* subbasal, often much longer but sometimes shorter than the stems, 3—6 mm wide, flattish but margins often slightly revolute, suberect to oblique, often somewhat recurved, upper surface scabro-hispidulous towards the longly attenuated apices; *sheaths* pale to ferruginous or ferru-



gineous-spotted, membranous in front. *Spikes* 5—6, upper 3—4 crowded to approximate and fastigate, remainder from subapproximate to rather distant from one another, cylindrical, dense-flowered, 1—3.5 cm long, terminal male, 1.5—4 mm thick, pale in contrast to the dark female spikes, remainder female or upper one or more androgynaeous with short male apices, suberect to patulous, 4—5 mm thick, upper sessile or on shortly, lowest 1—2 on shortly to longly exerted peduncles; *peduncles* trigonous, 0.4—0.9 mm thick, smooth. *Bracts* of the female spikes foliaceous, with firm and rather hard apices, lower far exceeding the male spike, upper much reduced, lower shortly to longly upper not or shortly sheathing; *sheaths* light ferruginous and thinly membranous at the mouth. *Female glumes* ovate or oblong-ovate, base thickened and slightly gibbous, shallowly cymbiform to flattish above, apex acute or subobtuse and often minutely ciliolate, 1.75—2.5 mm long, 1—1.5 mm wide, thin and translucent, castaneous, margins sometimes very narrowly and irregularly whitish-hyaline, especially above, with a pale green, 3-nerved, central stripe converging and coalescing above, rarely failing to reach the apex, and usually very shortly mucronate. *Utricles* elliptic or ellipsoid, trigonous or somewhat shrunken and compressed-trigonous, a longitudinal ridge on the ventral face, and a raised-flattish or asymmetrically trigonous dorsal face, 2.25—3 mm long, 1.2—1.5 mm broad, membranaceous, strongly multinerved (5—7 ventrally, 7—9 dorsally), narrowly marginate, glabrous, straight, becoming patulous, green or olive-green to warm reddish, ferruginous-papillose, scarcely to very shortly and stoutly stipitate, subgradually to subabruptly contracted into a beak above; *beak* cylindrical-conic, 0.25—0.4 mm long, scarcely marginate, straight or sometimes slightly bent and/or twisted, entire or minutely pale notched (emarginate). *Achene* obovoid, or sometimes ellipsoid-obovoid, conspicuously trigonous, faces flattish to shallowly concave, 1.25—2 mm long, 0.75—1.3 mm broad, densely and minutely alveolate, stramineous to dark brown, rather shortly to longly and rather stoutly stipitate, and a very short beak, both stipe and beak pale and often bent and/or twisted, especially the stipe. *Style* somewhat thickened and pale towards the base. *Stigmas* 3.

NEW GUINEA: North-East New Guinea; Morobe District, Mt. Sarawaket, Buru river and vicinity, mossy woods and open places, 1800—2400 m, 12 May 1937, *Clemens* 6326 (AA)!

Australia, New Caledonia, Samoa.

#### 91. CAREX MACULATA Boott

• . *Carex maculata* Boott in Trans. Linn. Soc. 20: 128: 1846; Illustr. 1: 9 t. 26: 1858; Kükenth., 427; Nelmès in Kew Bull. 1950: 205: 1950. — Ceylon, *Thwaites*.

Tufted or densely tufted. *Rhizome* not creeping, woody. *Stems* erect, obtusely trigonous, 20—36 cm and more tall, 1.25—2.3 mm thick below, smooth, including the rhachis, surrounded, below the leaves, by a few pale to ferruginous, leafless or nearly leafless sheaths. *Leaves* crowded, subbasal, and 1—few more spaced on the lower part of the stem proper,

mostly shorter than but some as long as the stems, 2—8 cm wide, revolute or flattish, sometimes septate-nodulose below; *sheaths* ferruginous, or pale with minute red spots, membranous from the truncate mouth downwards, readily tearing. *Spikes* 3—5(—6), erect, cylindrical, upper 2—4 crowded, contiguous, or approximate and fastigate, lowest sometimes subapproximate, but usually rather distant to distant, uppermost male, 1.5—4.5 cm long, 1—2 mm thick, base sometimes lax-flowered, otherwise subdense-flowered, remaining spikes female, rarely with short male apices, 0.7—4 cm long, 2.5—5 mm thick, dense-flowered, upper spikes sessile or subsessile or on peduncles wholly included or very shortly exerted from sheaths, lower on shortly to longly exerted peduncles; *peduncles* obtusely trigonous, 0.3—0.5 mm thick, smooth. *Bracts* of the female spikes foliaceous, lower 2 unequally exceeding the stem, shortly to longly sheathing, uppermost bract much reduced, shorter to slightly longer than its spike, shortly or scarcely sheathing; *sheaths* pale to ferruginous and membranous at the mouth in front only, or in varying degree downwards; male spike ebracteate. *Female glumes* oblong-ovate or oblong, sometimes acuminate, flat or flattish, thickened and slightly gibbous at the base, apex subacute to subobtuse, sometimes minutely ciliolate, 1.75—2 mm long, 0.6—1 mm wide, very thin, translucent, suffused castaneous, sometimes very narrowly silvery-margined, especially above, midrib and 2 adjacent nerves coalescing above, not usually extending to the apex, rarely very shortly excurrent; *male glumes* more or less oblong, tapering near the apex, 3—3.5 mm long, about 1 mm wide, light reddish. *Utricles* elliptic or ellipsoid, compressed and shrunken into longitudinal ridges or trigonous, a longitudinal ridge on the ventral face, and a raised-flattish or asymmetrically trigonous dorsal face, 2—3 mm long, 1—1.75 mm broad, membranaceous, densely and minutely ferruginous-papillose, nearly nerveless or obscurely and slenderly to strongly several-nerved on both faces, scarcely to narrowly marginate, glabrous, suberect, becoming patulous to subpatent, scarcely stipitate, subgradually to subabruptly beaked; *beak* terete, 0.2—0.5 mm long, straight to slightly bent and twisted; *mouth* entire, tiny. *Achene* ellipsoid, obovoid, or suborbicular, conspicuously trigonous with flattish or shallowly concave faces, 1.5—2 mm long (including stipe and beak), 0.9—1.3 mm broad, densely and minutely alveolate, stramineous, becoming dark brown, usually less tapering and more rounded at the apex than at the base, stipe 0—0.25 mm long, beak 0—0.4 mm long, both stoutish, pale, and often bent and/or twisted. *Style* scarcely to somewhat thickened at the base. *Stigmas* 3.

[CELEBES: Minahasa:] by the crater-lake of Mt. Masarang, *Warburg* 625.

MOLUCCAS: Buru; Liku Ewali, Kunturun, in Cyperaceae belt in swamp, ± 1200 m, 9 July 1921, *Toxopeus* 276 (B) !

JAVA: Priangan; Mt. Papandajan, Tegal Alun-alun, marshy vale, common, 2350 m, 30 March 1930, *van Steenis* 4290 (B, K, L, S) !; *ibid.*, Tegal Alun-alun, marsh near source of Tjipanupuh, ± 2400 m, 3 May 1930, *Docters van Leeuwen-Reijnvaan* 13,317 (L) !; *ibid.*, Tjiparugpug, Tegal Alun-alun, very thinly scattered, 2300 m, 14 May 1931, *van Steenis* 4819 (B) !; *ibid.*, Tegal Alun-alun, along creek, 2500 m, 25 Oct. 1939,

*van Steenis 11,662* (B)!; *ibid.*, Tegal Mariuk, marshy plain, widespread,  $\pm$  2250 m, 31 March 1930, *van Steenis 4-358* (B)!; Mt. Patuha, boggy, grassy meadows above kawah, 1900 m, end of Dec. 1935, *van Steenis 6950* (B)!; Kawah Putih, Mt. Patuha, sandy places,  $\pm$  2100m, 8 June 1930, *van Steenis 4-4-19* (B)! — • B a n j u m a s; Mt. Dijeng, ditch, 27 Dec. 1914, *Docters van Leeuwen-Reijnvaan 2258* (B)!; *ibid.*, Telaga Dringu, marshy plain, sporadic,  $\pm$  2300 m, 7 Aug. 1930, *van Steenis 4581* (B)!; *ibid.*, Telaga Balekambang, here and there,  $\pm$  2000 m, 6 Aug. 1930, *van Steenis 4-54-7* (B)! — M a l a n g; Tengger Mts., *Kobus* (B)!; "Smeroe-hoeve," Ranu Regulo, stagnant water, 2100 m, June 1935, *van Steenis 7259* (B)! — B e s u k i; Ijang Plateau, rawah, path to the peak, 2500 m, 13 Aug. 1916, *Koorders 43,489/1* (B)!; *ibid.*, path to Mt. Argopuro, 2600 m, 15 Aug. 1916, *Koorders 43,535ft*, partim (B, L)! (part is *C.pruinosa* Boott).  
India, Ceylon, Formosa, China, Japan.

Van Steenis 4290 and Docters van Leeuwen-Reijnvaan 13,317 have lighter utricles than those of typical Indian plants, but they match well the utricles of specimens at Kew collected on the Nilgiri Hills by A. Barnes. The utricles of the Van Steenis number are not so distinctly nerved as those of the other number mentioned.

## 92. CAREX ELIBATES Nelmès

*Carex elibates* Nelmès in Kew Bull. 1937: 353: 1937; *ibid.*, 1950: 205: 1950. — Malay Peninsula, *Henderson 17,901*.

*Carex maculata* Boott var. *sanguineo-squamata* et f. *humilior* Kükenth. in Bull. Jard. Bot. Buitenz. sér. 3, 16: 317: 1940. — Sumatra, *van Steenis*, various numbers.

Densely tufted. *Rhizome* very short, somewhat oblique, slender, woody, clothed with reddish-brown sheathing scales. *Stems* erect or suberect, trigonous, 4—45 cm tall, 0.5—1 mm thick throughout, ribbed, striate, smooth, including the rhachis. *Leaves* subbasal, lowest reduced to cataphylls which are thick, short, strongly nerved, pale reddish-brown, with wide dark-reddish membranaceous margins, lower normal ones short-bladed and much shorter than the stems, upper longer but mostly shorter than, some exceeding, the apex of the terminal spike, 1—4 mm wide, flattish-canalicate, often conduplicate below, thickish, stiff, greyish-green, sometimes covered by minute red dots, longly attenuated to a firm, obtuse to subacute apex; *sheaths* ferruginous and membranaceous in front, readily splitting. *Spikes* 2—5, erect to patulous, upper 2—4 approximate and fastigate or crowded, lowest at a more distant node, ellipsoid to cylindrical, 0.5—2.7 cm long, dense- or subdense-flowered, terminal male, gynaeceandrous, or male at each end with female flowers on the central part, male parts about 2 mm thick, lateral spike female, rarely having a few apical male flowers, 3—4.5 mm thick, lowest on shortly to longly exerted peduncles, others sessile or on shortly exerted peduncles; *peduncles* subterete to trigonous, 0.25—0.5 mm thick, smooth. *Bracts* of the lower spikes foliaceous, usually much exceeding the stem, shortly to rather longly sheathing, upper bracts much reduced, subfoliaceous, more or less extending up to the apex of the terminal spike, scarcely to shortly sheathing, bract of male spike a large scale; *sheaths* similar to those of

the leaves. *Female glumes* more or less oblong with rounded upper corners, oblong-elliptic, or oblong-ovate, base gibbous and incurved, cymbiform to flattish above, apex usually obtuse to rounded, sometimes subacute or even acute, 2—3 mm long, 1.25—1.5 mm wide, thin, translucent, ferruginous, with minute reddish spots in places, sometimes narrowly whitish-margined above, nerveless except for a few slender nerves near the midrib, which extends up to near the apex or is sometimes mucronulate. *Utricles* ellipsoid, less frequently ovoid, compressed and sometimes sterile to trigonous, sometimes shrunken into depressions and ridges, causing the margins to be more prominent and the achene to bulge, 2.25—3 mm long, 1—1.5 mm broad, membranaceous, slenderly to strongly plurinerved on each face, narrowly to (above) rather broadly marginate, glabrous, suberect to patulous, densely minutely papillose, ferruginous, spongy-thickened at the scarcely to very shortly stipitate base, usually erostrate but sometimes shortly beaked, apex subentire to slightly notched. *Achene* obovoid, less often ellipsoid or subglobose, compressed or distinctly trigonous, faces flattish to shallowly concave, 1.25—2 mm long, 0.9—1 mm broad, stramineous, becoming brown, scarcely stipitate, shortly or very shortly beaked, beak sometimes bent. *Style* scarcely or slightly thickened towards the base. *Stigmas* 3.

MALAY PENINSULA: Pahang; Cameron Highlands, Mt. Batu Brinchang, on the cleared summit of the hill, ca. 2000 m, 22 Nov. 1925, *Henderson (Sing. Field No. 17,901)* (K, S)!; *ibid.*, 9 April 1930, *Holtum (Sing. Field No. 23,527 & s.n.)* (K)!; *ibid.*, 25 May 1931, *Symington 20,839* (K)!; summit of Mt. Iran, 14 April 1934, *Symington 36,554* (K)!

SUMATRA: Atjeh; Gajo Lands, Putjuk Agusan, wet mountain heath on summit, 2700 m, 28 Jan. 1937, *van Steenis 8406* (B, K)!; *ibid.*, Mt. Leuser (Losir), edge of middle peak, 3300—3500 m, 2 Feb. 1937, *van Steenis 8581* (B, K)!; *ibid.*, edge of middle peak, camp 6, stony ground, poor area, 3400 m, 3 Feb. 1937, *van Steenis 8631* (B, K)!; *ibid.*, Mt. Leuser (Losir), on burnt mountain ridges, 2600m, 7 Feb. 1937, *van Steenis 8720* (B)!; *ibid.*, Goh Lembuh, summit, near brook in damp mossy forest,  $\pm$  3000 m, 21—22 Feb. 1937, *van Steenis 9125* (B)!; *ibid.*, Mt. Kemiri, wet meadows on mountain slope at summit, 3150—3314 m, 8—9 March 1937, *van Steenis 9674* (B, K)!

CELEBES: Central Celebes; Poso, Boro—Puna, 1700—1800 m, quartz-peat plateau, on sandy path, common, 10 Aug. 1937, *Eyma 1605* (B, K)!; *ibid.*, on peaty places, *Eyma 1616* (B, K)!

Sect. 25. LONGISPICAE C. B. Clarke  
in Journ. Linn. Soc. Bot. 37: 3: 1904

*Stems* tall, stout, angles acute and scabrid above. *Leaves* usually longer than the stems, usually wide, stiff and subcoriaceous, margins often revolute, lower reduced to blackish-red or vinaceous cataphylls or leafless sheaths, which fray into fibres which are sometimes reticulate. *Spikes* 5-numerous, upper 1—6 male, lateral androgynaeceous with short male apices, or all androgynaeceous (except 2 short spikes at the base of the terminal which are male), dense-flowered, sometimes laxer below, 1—6 at each node, erect or cernuous, lower longly peduncled; peduncles often

scabrid on the angles. *Bracts* foliaceous, lower much exceeding the stem, not sheathing but lower subamplexicaul. *Female glumes* usually oblong to ovate, apex obtuse to emarginate, blackish-red, with a pale 3-nerved central stripe converging and coalescing above and often mucronate or aristate. *Utricles* ovate, elliptic, or obovate, plano-convex to biconvex, glabrous, suberect to patent, usually strongly plurinerved to multinerved, punctulate or minutely papillose, base spongy and usually stipitate, apex emarginate or shortly beaked; mouth very small. *Achene* elliptic to obovate, biconvex, not medianly constricted. *Style* not thickened towards the base. *Stigmas* 2.

1. Female glumes about as long as the utricles, 2.25—3 mm long . 93. *C. exploratorum*  
1. Female glumes much shorter than the utricles, 1.5—2 mm long . 94. *C. philippinensis*

C. B. Clarke (*in Journ. Linn. Soc. Bot.* 37: 3: 1904) placed in his new Section *Longispicae* two species only, *C. brunnea* Thunb. and *C. Graeffeana* Boeck. In Kiikentha's monograph in the "Pflanzenreich" the *C. brunnea* group, which does not include *C. Graeffeana*, forms Subsection *Graciles* Tuckerm. of Section *Hymenochlaenae* Drejer. The other member of Clarke's section is placed by Kiikenthal in his Section *Fecundae*. This species has closer affinity, I think, with several which seem to be wrongly placed in Section *Acutae* Fries, Subsection *Cryptocarpae* Fries. I have, therefore, taken these out of the *Cryptocarpae*, added them to *C. Graeffeana*, *C. exploratorum*, and *C. philippinensis*, and adopted for them Clarke's aptly named section *Longispicae*, thus emended and enlarged.

### 93. CAREX EXPLORATORUM Nelmes

*Carex exploratorum* Nelmes *in Kew Bull.* 1938: 108: 1938. — Borneo, *Clemens* 34,297.

Tufted. *Stems* compressed-trigonous, erect, well above 70 cm tall, about 4 mm thick, smooth below, scabrid on the angles at the apex and on the rhachis. *Leaves* basal, most exceeding the stem, about 9—11 mm wide, flattish, sometimes revolute, stiff and subcoriaceous; *sheaths* wanting. *Spikes* cylindric, 14—15, dense-flowered, 1—2 situated at the base of the uppermost spike male and very much smaller than the others, 1—2 cm long, 1—2 mm thick, remaining 12—14 androgynaeceous, erect to oblique, straight, solitary at nodes in the upper 20—29 cm of the stem, lower much, upper little, separated, all overlapping one another and fastigiate, all simple except the lower 1—3 which have 2—10 male spikes, up to 5 cm long, branching from the base, 6—13 cm long, male part slenderly cylindric, 1—4 mm thick, 14,—nearly  $\frac{1}{2}$  the length of the spike, female part cylindric, 5—7 mm thick, not laxer towards the base, upper spikes on short, lower on long peduncles; *peduncles* trigonous above, compressed-trigonous below, 0.5—1.3 mm thick, scabrid on the angles. *Bracts* of the lower spikes foliaceous, much exceeding the stem, middle ones subfoliaceous, failing to reach the apex of the stem, upper bracts reduced to

long-awned glumes, none sheathing but lower semi-amplexicaul and often prominently blackish-red auricled. *Female glumes* suboblong with a rounded apex, to oblong-ovate or oblong-lanceolate, thickened and incurved at the base, obtuse to rounded at the apex, cymbiform, or flattish above, 2.25—3 mm long, about 1 mm wide, subtranslucent, dark-or blackish-red, with bright reddish glandular spots, and with a narrow to wide whitish-hyaline margin, and a wide, greenish-stramineous central stripe coinciding with 2 nerves adjacent to the midrib and coalescing with it above to form a firm tip, in the upper part of the spike, or, in the lower part, excurrent in a flat, wide but tapering, hispidulous-margined awn up to 1 mm long; *male glumes* up to 4 mm long. *Utricles* elliptic to oblong-elliptic, plano-convex to sub-biconvex, 2.5—3 mm long, 1.2—1.3 mm broad, subcoriaceous, distinctly multinerved, but less so on the ventral face, which, however, has a central rib, glabrous and smooth or slightly furfuraceous, narrowly marginate, becoming patulous, slightly recurved, not nitidous nor punctulate or papillose, stramineous with reddish or blackish patches, spongy-thickened at the base, not stipitate, not or scarcely beaked; *mouth* small, slightly dorsally oblique. *Achene* obovate, biconvex, about 1.75 mm long, 1—1.25 mm broad, not stipitate, scarcely beaked. *Style* short, scarcely or not thickened towards the base. *Stigmas* 2.

BORNEO: British North Borneo; Mt. Kinabalu, Penataran R., head of gorge, one large clump, 1200 m, 28 July 1933, *Clemens* 34,297 (B, BM, K, L)!

Endemic.

Most of the utricles are much compressed and apparently sterile but possibly immature.

### 94. CAREX PHILIPPINENSIS Nelmes

*Carex philippinensis* Nelmes *in Kew Bull.* 1938: 109: 1938; *ibid.*, 1949: 385, 392: 1949. — Philippine Islands, *Loher* 9842.

*Carex pandanus* Ohwi *in Bot. Mag. Tokyo* 56: 214: 1942. — New Guinea, *Kanehira & Hatusima* 13,732.

*Carex euphlebica* S. T. Blake *in Journ. Arn. Arb.* 28: 108: 1947. — New Guinea, *Brass* 10,877.

Densely tufted. *Rhizome* short, stout, woody. *Stems* erect, trigonous, angles acute, 20—110 cm tall, 1—4 mm thick below, smooth below, scabrid on the angles above. *Leaves* numerous, completely sheathing the lower third or more of the stem, 0—2 higher up the stem, lower reduced to blackish-red, acuminate, leafless or nearly leafless sheaths, the membranous margins of which tend to fray into fibres, very long, many exceeding stem, 2.5—12 mm wide, flattish, sometimes revolute, stiff and subcoriaceous, scabrid on much of the upper surface above; *sheaths* long, brown to blackish-red, membranous in the front or at the mouth, sometimes splitting on the margins into fine herring-bone shaped fibres. *Spikes* cylindric, (6—) 10—22, dense-flowered, often 2 situated at the base of the terminal spike very much smaller than the others and male or with a few female flowers at their base, remainder androgynaeceous, erect to oblique,

straight or sometimes cernuous, usually solitary, sometimes some or nearly all binate, at nodes in the upper part of the stem, forming an inflorescence, 15—23 cm long, lower much upper little separated, so that the long spikes overlap one another, fastigiate, all simple, or rarely with a small spike branching from the base, 2—9 cm long, male part slenderly cylindrical, 1—3 mm thick, 1/4—nearly 1/2 the length of the spike, female part cylindrical, 3.5—6 mm thick, not laxer towards the base, upper spikes on short, lower on long peduncles, binate spikes unequally peduncled; *peduncles* trigonous or compressed-trigonous, 0.5—1 mm thick, scabrid, especially on the angles, upper often somewhat curved or flexuous. *Bracts* of the lower spikes foliaceous, much exceeding the stem, middle ones subfoliaceous, failing to reach the apex of the stem, upper bracts reduced to long-awned glumes, none sheathing but lower semi-axillary and often prominently blackish-red auricled. *Female glumes* ovate or oblong-ovate, apex obtuse to very obtuse, thickened and incurved at the base, cymbiform to flattish above, 1.5—2 mm long, about 0.75 mm wide, subtranslucent, blackish-red, sometimes extremely narrowly whitish-hyaline on the margins, with a pale-greenish 3-nerved central stripe, nerves coalescing above to form a firm apical tip, or shortly and hispidulously excurrent; *male glumes* usually oblong, with a rounded apex, up to 3 mm long. *Utricles* elliptic, obovate-elliptic, or obovate, biconvex or compressed-biconvex, 1.6—2.75 mm long, 1—1.25 mm broad, subcoriaceous, distinctly, sometimes reddish, multinerved on both faces, with a central rib on the ventral face, rarely obscurely and fewer nerved, glabrous and smooth, or slightly furfuraceous, narrowly marginate, becoming patent, sometimes arranged in spiral rows, straight, subnitidous, not punctulate nor papillose, dark-olivaceous to pale brown, sometimes castaneous at the base, subabruptly contracted below into a spongy stipe-like base, more broadly marginate towards the apex, where the margins are sometimes sparsely vitreous-setulose, apex minutely emarginate, entire, or extremely shortly beaked; *mouth* straight, tiny. *Achene* elliptic or obovate, tapering below, biconvex, 1.5—1.75 mm long, 1—1.25 mm broad, pale-substipitate, not or minutely, brown to blackish-red beaked. *Style* slender, not thickened towards the base. *Stigmas* 2.

PHILIPPINE ISLANDS: Luzon; Bontoc, Mt. Polis, Feb. 1920, *Ramos & Edano* (*Bur. Sci.* 37,710) (B) ! Nueva Vizcaya; May 1909, *Ramos* (*Bur. Sci.* 8177) (L) !; *ibid.*, Mt. Alzapan, May—June, 1925, *Ramos & Edano* (*Bur. Sci.* 45,746) (B) ! Benguet; *Loher* 699 (K) !; *ibid.*, May 1914, *Merrill* 9652 (B, BM, K, L, S) !; *ibid.*, Baguio, March 1907, *Elmer* 8532 (B, K, L) !; *ibid.*, Pauai, April—June 1918, *Santos* (*Bur. Sci.* 31,742) (K) !; *ibid.*, Mt. Pulog, Jan. 1909, *Curran, Merritt, & Zsohokhe* (*Bur. Sci.* 16,132) (L) !; *ibid.*, Simacoco, Oct. 1921, *Ramos & Edano* (*Bur. Sci.* 40,342) (B, K, L) !; *ibid.*, Mt. St. Tomas, Feb. 1925, *Ramos & Edano* (*Bur. Sci.* 45,114) (BM) ! Zambales; Mt. Pinatubo, March 1927, *Clemens* 17,358 (L) ! Rizal: Mt. Lumutan, April 1923, *Ramos* (*Bur. Sci.* 42,251) (B) ! — Negros; Negros Oriental, Dumaguete, Cuernos Mts., April 1908, *Elmer* 9842 (B, BM, K, L) ! — Leyte; 9 Nov. 1914, *Wenzel* 625 (BM) ! — Mindanao; Davao, Todaya, river bank, 810 m, Oct. 1904, *Copeland* (*Herb. Bur. Gov. Labs.* 1250) (K) !; Davao, Todaya, Mt. Apo, Aug. 1909, *Elmer* 11,590 (B, BM, K, L) !;

*ibid.*, Mt. Mayo, April—May 1927, *Ramos & Edano* (*Bur. Sci.* 49,381) (K, S) ! Bukidnon, Mahilucot R., June—July 1920, *Ramos & Edano* (*Bur. Sci.* 38,642) (B, K) !

"On slopes in open places, along streams, and in the mossy forest, alt. 1600—2200 m."—Merrill (*I.e.* p. 138).

NEW GUINEA: Netherlands New Guinea; 9 km north-east of Lake Habbema, common on open banks of a stream, 2650 m, Oct. 1938, *Brass* 10,877 (AA, Br) ; 9 km north-east of Lake Habbema, few scattered clumps in stony bed of stream, 2800 m, Oct. 1938, *Brass* 10,559 (AA) !; 9 km north-east of Lake Habbema, common about native huts on open banks of streams etc., 2800 m, Oct. 1938, *Brass* 10,734 (AA) !; Arfak Mts. [Lina Mts.], very rare, in inundation area of Iray R., Anggi Giji lake, 1900 m, 8 April 1940, *Kanehira & Hatusima* 13,732 (B) ! — North-East New Guinea; Morobe District, Sattelberg, Kuak R. divide, 2010 m, 26 Feb. 1936, *Clemens* 4421 (AA) ! Ogeramang, 1755 m, 1 Dec. 1936, *Clemens* 4455 (AA) !; *ibid.*, Jan. 1937, *Clemens* 4940a (AA) !; *ibid.*, Sambanga, forested mountain, 1500—1800 m, 6 Sept. 1937, *Clemens* 6937a (K) !; Wantoat, mountain, open wet place, 1200—1500 m, 12 Jan. 1940, *Clemens* 10,976B (AA) !; Matap, 1500—1800 m, 6 Feb.—6 April 1940, *Clemens* 11,250 (AA) ! — Papua; Central Division, Mt. Albert Edward, amongst coarse tussock grasses on deforested slope, stiff sedge in broad spreading tussocks, 3800 m, May—July 1933, *Brass* 4386 (AA, B, L) !

JAVA: Bogor (Buitenzorg); mountain-garden Tjibodas, left waterfall, Tjibeureum, 1600 m, 27 Sept. 1927, *van Woerden* 1 (B) !; Tjibeureum, 1600 m, March 1928, *Yates* 2979 (S) !; Mt. Gede, north slope, Tjibeureum, 1750 m, among stones at the left waterfall, with *Curculigo* by the stream, 17—24 Oct. 1938, *van Steenis* 11,163 (B, K, S) !; near sources of the Tjibeureum, Mt. Gede, *Blume* 247 (L) !; Tjibeureum, waterfall, *Boerlage* (B) !

Ex Herb. *Korthals?* (L) !; Herb. *Ploem* (L) !

Clarke (*in Jour. Linn. Soc. Bot.* 37: 5: 1904) and Kiikenthal (*in Engl. Pflanzenr.* IV, 20: 403: 1909) identified the Philippines plant, as represented by *Loher* 699, as *C. Graeffeana* Boeck.

Sect. 26. *Praelongae* (Kiikenth.) Nelmes, *sect. nov.*

Subsection *Praelongae* Kiikenth. *in Engl. Pflanzenr.* IV, 20: 345: 1909.

*Rhizome* creeping or tufted. *Stems* usually stoutish, leaves stiff or rather rigid; sheaths splitting in front, often into herring-bone shaped fibres. *Terminal spike* male or gynaeandrous, remainder female or gynaeandrous, often fastigiate, more or less peduncled, often cernuous, *Female glumes* mucronate or aristate. *Utricles* becoming patulous to subpatent.

1. Terminal spike male, remainder female or androgynaeous:
2. Spikes 2—8(—10) cm long, 4—6 mm thick; female glumes oblong or obovate-oblong, apex very obtuse to bilobed-emarginate; utricles 2.25—3(—3.5) mm long, elliptic, obovate or suborbicular, usually ferruginous-papillose. . . . . 98. *C. phacota*
2. Spikes 1—5.5 cm long, 5—7 mm thick; female glumes elliptic, ovate, or oblong-lanceolate, apex acute to obtuse; utricles 3—4 mm long elliptic, ovate or ovate-lanceolate, whitish-to reddish-papillose. . . . . 99. *C. pruinosa*
1. Terminal spikes gynaeandrous, remainder female or gynaeandrous:

3. Inflorescence 11—13 cm long; female parts of spikes 4.5—7.5 mm thick; utricles ovate to elliptic, 2.75—3.5 mm long (beak 0.5—0.75 mm long); achene 1.5—2 mm long. . . . . 97. *C. petecticalis*
3. Inflorescence 7—10 cm long; female parts of spikes 5—10 mm thick; utricles elliptic to obovate, 3.5—4.5 mm long; achene 2—2.5 mm long:
4. Utricles elliptic (3.5—4.5 mm long), nerveless or very slenderly and obscurely few-nerved, densely papillose, beak 0.5—0.75 mm long, straight (female parts of spikes 7—10 mm thick). . . . . 95. *C. kemiriensis*
4. Utricles elliptic to obovate (3.5—4.5 mm long), nerveless to distinctly up to 6-nerved on each face, not papillose, beak 1—2 mm long, sometimes bent and/or twisted (female parts of spikes 5—9 mm thick). . . . . 96. *C. spathidata*

A widespread group but found chiefly from India to Japan. Treated by Kiikenthal in his monograph (*in Engl. Pflanzenreich*, 1909) as a subsection of Section *Acutae* Fries.

#### 95. CAREX KEMIRIENSIS Nelmes

*Carex kemiriensis* Nelmes *in Kew Bull.* 1950: 206: 1950. — Sumatra, *van Steeni?* 5587.

*Rhizome* unknown. *Stems* erect, trigonous, angles acute, 55—108 cm tall, 2—3 mm thick below, smooth, but angles sparsely scaberulous on the rhachis above, a few thick, dark reddish, strongly nerved, short cataphylls at the base. *Leaves* subbasal and above, their long sheaths hiding about the lower third of the stem, then naked up to the bracts, lower leaves reduced to short-bladed sheaths, some of the upper ones exceeding the stem, 4.5—7 mm wide, flattish to revolute, stiff; *sheaths* very long, lower vinaceous or reddish-nerved to pale on the back, very thin, membranous, pale to golden in front, and fraying into very slender, sometimes herringbone fibres. *Spikes* 5—6, erect to cernuous, all but the lowest peduncled from approximate or subapproximate nodes and spikes fastigate, lowest from a node 4—6 cm below the next node above, but usually overlapping the next above, because of its long peduncle, forming a terminal inflorescence 7—10 cm long, all or nearly all gynaeandrous, the basal male part from very short to as long as or longer than the apical female part, 1 or 2 lower sometimes wholly female or nearly so, more or less cylindrical, (1.5—) 2—5 cm long, female parts 7—10 mm thick, male parts 2—3 mm thick, dense-flowered, or with a few lax-flowered male flowers at the base, upper on short lower on long peduncles; *peduncles* slender (0.4—0.5 mm in diameter), often curved, obscurely trigonous, smooth. *Bracts* of the lower 1—2 spikes foliaceous and much to little exceeding the stem, upper bracts much reduced, subherbaceous to setaceous, short, none sheathing but having dark reddish or pale, membranous twin auricles at the base in front. *Female glumes* elliptic-oblong to oblong-obovate, flattish to shallowly cymbiform, sometimes margins incurved, apex obtuse or truncate-rotund, 3—3.8 mm long, 0.9—1.8 mm wide, scarcely subtranslucent, dark reddish-brown or blackish-brown, nerveless except for a 3-nerved, concolorous, central area, tapering above and excurrent in a wide, flat,

tapering, reddish-brown, sparsely hispidulous-margined or smooth, awn, 1—2 mm long. *Utricles* ellipsoid, subplano-convex to compressed-biconvex, 3.5—4.5 mm long, 1.9—2 mm broad, membranaceous, narrowly marginate, wholly nerveless or very slenderly and very obscurely few-nerved, densely but minutely papillose, especially on the upper darker part, glabrous, straight becoming patulous, golden or stramineous below, blackish-reddish-brown in the upper third and extending marginally lower down, spongy thickened at the truncate-rotund base, abruptly scarcely or very shortly stipitate, gradually tapering above to a beak; *beak* compressed and gradually tapering below, subcylindric above, 0.5—0.75 mm long, usually narrowly marginate below, not or scarcely marginate above, not or scarcely nerved, dark- or blackish-brown, subtentire to emarginate; *mouth* tiny, not or slightly dorsally oblique. *Achene* broadly elliptic or suborbicular, sometimes obovate, compressed-biconvex, always about 2 mm long (excluding beak), 1.5—1.6 mm broad, brown, little tapering to a stoutly, very shortly stipe-like base, abruptly very slenderly and very shortly (about 0.2 mm) beaked at the apex. *Style* very small and slender, scarcely thickened towards the base. *Stigmas* 2.

SUMATRA: Atjeh; Gajo Lands, Mt. Kemiri, east slope, near summit, forest ridge and plateau, damp mountain meadow, 2900—3314 m, 7 March 1937, *van Steenis* 9587 (B)!

Endemic.

#### 96. CAREX SPATHULATA (Kiikenth.) Nelmes

*Carex spathulata* (Kiikenth.) Nelmes *in Kew Bull.* 1950: 207: 1950.

*Carex teres* Boott var. *spathulata* Kiikenth. *in Bull. Jard. Bot. Buitenz.* ser. 3, 16: 316: 1940. — Sumatra, *van Steenis* 8746.

Loosely tufted? *Rhizome* curved-ascending, woody, about 3 mm thick. *Stems* erect, trigonous, angles acute, 60—100 cm tall, 1.5—2.5 mm thick below, smooth throughout, or sometimes very sparsely scaberulous on the angles at the apex of the rhachis, a few blackish-red, thick, strongly nerved, short cataphylls at the base. *Leaves* subbasal, and above, their long sheaths hiding up to the lower third or more of the stem, and then naked up to the bracts, lower leaves reduced to short-bladed sheaths, some of the upper ones much exceeding the stem, 4—7 mm wide, flat to revolute, stiffish; *sheaths* very long, lower ones more or less reddish or vinaceous on the back, very thin, membranous, and golden to fulvous in front, and fraying into very slender, sometimes herringbone fibres. *Spikes* 4—6, more or less cernuous, all but the lowest peduncles from approximate or subapproximate nodes and spikes fastigate, lowest from a node 4—7 cm below the next node above, but usually overlapping the next above because of its long peduncle, forming a terminal inflorescence 7—10 cm long, upper 2 gynaeandrous, the basal male part very much shorter than the apical female part, remaining spikes female except that any of them, especially the upper, may have a few empty or male flowers at the base or male flowers at the apex, more or less cylindrical, 2—4.5 cm long, female

parts 5—9 mm thick, male parts 1.5—2 mm thick, dense-flowered except that the few basal empty and/or male flowers are lax- or very lax-flowered, upper on short or rather long, lower on long or very long peduncles; *peduncles* very slender (0.15—0.3 mm in diameter), often curved or flexuous, obscurely trigonous or compressed, smooth. *Bracts* of the lowest 1(—2) spike(s) foliaceous and exceeding the apex of the stem, middle bracts much reduced, subfoliaceous to setaceous, not extending to the apex of the stem, upper bracts in the form of awned glumes, none sheathing but having dark-reddish, membranous, twin auricles at the base in front. *Female glumes* more or less oblong or elliptic-oblong, base incurved, otherwise flattish or shallowly cymbiform, upper margins sometimes subincurved, apex obtuse to truncate-rotund, 2.5—3.25(—3.8) mm long, 0.75—1.1 mm wide, subtranslucent, dark-reddish to blackish-red, nerveless, except for a wide, pale, 3-nerved central stripe, tapering above and excurrent in a wide, pale, tapering, sparsely hispid-margined to smooth, awn, 1—1.75 mm long. *Utricles* elliptic, sometimes becoming obovate, subplanoconvex to compressed biconvex, 3.5—4.5 mm long, 1.75—2 mm broad, membranaceous, narrowly marginate, nerveless to distinctly but slenderly up to 6-nerved on each face, the nerves often not extending from base to apex, glabrous, straight or straightish below the beak, becoming patulous, stramineous, castaneous below, darker above, smooth (not papillose), glabrous, sometimes covered with roundish reddish (glandular) spots, spongy-thickened at the truncate-rotund base, abruptly and very shortly stipitate, subgradually to subabruptly "beaked" at the apex; *beak* or beak-like portion gradually tapering, very broad to narrow at the base, compressed, straight to sideways bent at the base and sometimes slightly twisted. 1—2 mm long, distinctly marginate, often nerved, greyish above, entire to emarginate; *mouth* tiny, not oblique. *Achene* obovate, or oblong-obovate to suborbicular, compressed-biconvex, 2—2.5 mm long, 1.6—1.9 mm broad, brown, curved below to a stoutly, very shortly stipe-like base, abruptly very slenderly and very shortly (about 0.2 mm) beaked at the apex. *Style* very small and slender, slightly thickened towards the base. *Stigmas* 2.

SUMATRA: Atjeh; Gajo Lands, Mt. Leuser (Losir), camps 4—5, watershed, wet stream-valley, locally common, 2700—2800, 31 Jan. 1937, *van Steenis* 8536 (B, K) !, camps 6—8, middle and east peak and ridge, mountain heath, 2950—3500 m, 5—6 Feb. 1937, *van Steenis* 8657 (B, K) !; *ibid.*, from Lau Alas, over the Agusan crest towards Blangkedjeren, at the margin of a small swamp in ericoid forest on the ridges of the Senubong mountains, 2500 m, 8 Feb. 1937, *van Steenis* 87U6 (B)! — West Coast; Mt. Korinchi [G. Kerintji], resam zone, 2500 m, 2 May 1920, *Biinnemeijer* 9950 (B)!

Endemic.

#### 97. CAREX PETECTICALIS Nelves

*Carex petecticalis* Nelves in *Kew Bull.* 1950: 205: 1950. — Java, *van Slooten* 2622.

Loosely tufted? *Rhizome* curved-ascending, woody, 2—4 mm thick. *Stems* erect, trigonous, angles acute, 75—120 cm tall, 2.5—3 mm thick, smooth throughout, including the rhachis, blackish-red-brown, thick, strongly nerved, short cataphylls at the base. *Leaves* subbasal, and above, their long sheaths hiding about the lower third or so of the stem, then naked up to the bracts, lower leaves reduced to short-bladed sheaths, often vinaceous on the back, the membranous fronts fraying into fine herring-bone shaped fibres, upper ones long, but probably falling short of the stem, 3—11 mm wide, flattish to revolute, stiff; *sheaths* very long, dark red on the back, pale to reddish-brown or red-spotted and membranous in front, and fraying into fine herring-bone shaped fibres. *Spikes* 4—8, cernuous, upper at subapproximate nodes, lower at nodes more separated from one another, lowest at a node 3.5—10 cm below the next node above, all except sometimes the lowest fastigiate, forming a terminal inflorescence 11—13 cm long, gynaeandrous, especially the upper, usually with short, lower very short, male bases, or lower wholly female, upper sometimes having male apices, more or less cylindrical, 3—6 cm long, female parts 4.5—7.5 mm thick, male parts 3—5 mm thick, dense-flowered, often laxer-flowered towards the base, upper on short or very short lower on long peduncles; *peduncles* very slender (0.2—0.3 mm in diameter), obtusely trigonous to terete, smooth. *Bracts* of the lower 1—2 spikes foliaceous, much to little exceeding the stem, upper bracts much reduced, subherbaceous or setaceous to glumiform with long awns, none sheathing but having dark brown membranous twin auricles at the base in front. *Cladophylls* ocreiform or utriculiform, blackish. *Female glumes* elliptic, oblong-elliptic, oblong-ovate, or more or less oblong, incurved at the base and sometimes above, or flattish to cymbiform above, apex sometimes subobtuse, often very obtuse, or more or less truncate, 1.75—3.25 mm long, 1.1—1.3 mm wide, dark or blackish-red, margins sometimes narrowly pale above, nerveless except for a wide, 3-nerved, pale central stripe, tapering above and excurrent in a wide, flat, tapering, pale, nearly smooth to sparsely hispidulous-margined awn, 0.25—1.25 mm long. *Utricles* ovate to elliptic, plano-convex or compressed subplano-convex, 2.75—3.5 mm long, 1.3—1.9 mm broad, submembranaceous, narrowly marginate, obscurely to distinctly 3—5-nerved on each face from the apex downwards, only some of the strong ones extending to near or to the base, glabrous, straight, becoming patulous, greyish-stramineous and densely covered with reddish flecks, sometimes suffused light reddish, or blackish-red above, where also minutely papillose, often cinereous towards the apex, more or less rounded and scarcely stipitate at the base, gradually to subgradually beaked above; *beak* compressed and tapering below, subcylindrical above, 0.5—0.75 mm long, not or scarcely marginate, usually pale, subentire to emarginate; *mouth* not or slightly dorsally oblique. *Achene* broadly elliptic to suborbicular, compressed-biconvex, 1.5—2 mm long, 1.25—1.8 mm broad, brown, little tapering to a stoutly, very shortly stipe-like base, abruptly very slenderly and very shortly (about 0.2—0.3 mm) beaked at the apex. *Style* very small and slender, slightly thickened towards the base. *Stigmas* 2.

SUMATRA: West Coast; Mt. Ophir (G. Talakmau), north-west slope, margin of "resam zone," forest, 2100 m, 23 May 1917, *Biinnemeijer* 795 (B)!; Mt. Singgalang, underwood, near lake, 2800 m, 1 June 1918, *Biinnemeijer* 2907 (B)!; Mt. Korinchi [G. Kerintji], 2190 m, 24 April 1914, *Robinson & Kloss* 60 (BM, K, S)!; *ibid.*, forest, near river, 2300 m, 10 May 1920, *Biinnemeijer* 10,438 (B)!

JAVA: Priangan; Mt. Papandajan, *Warburg* 2582; Mt. Papandajan, Tegal Bungbrung, marsh near the source of the Tjibeureum-gede, ± 2300 m, 21 Jan. 1930, *van Steenis* 4104a, partim (B)!; *ibid.*, Tegal Bungbrung, 2300 m, 27 Dec. 1930, *van der Fiji SOI* (B)!; *ibid.*, damp ground, common, ± 2300 m, 27 July 1936, *van Slooten* 2622 (B, K)!

#### 98. CAREX PHACOTA Spreng.

*Carex phacota* Spreng., Syst. 3: 826: 1826; Drejer, Symb. Caric. 15 t. l.: 1844 (excl. syn. *C. notha* et *C. punctata*); Boott, Illustr. 1: 63 t. 168: 1858; C. B. Clarke, 6-7; Kiikent., 350; Merrill, Enum. Philipp. Pl. PL 1: 140: 1923. — Based on *C. lenticularis* D. Don, non Michx.

*Carex lenticularis* D. Don in Trans. Linn. Soc. 14: 331: 1824, non Michx. — Nepal, Wallich.

*Carex hexasticha* Reinw. ex Miq., Fl. Ned. Ind. 3: 353: 1857, partim. — Java, Reinwardt.

*Carex pruinosa* Boott var. *aristata* O. Ktze, Rev. Gen. 2: 748: 1891. — Java, O. Kuntze.

Loosely tufted. *Rhizome* shortly creeping. *Stems* erect, acutely trigonous, 22—120 cm tall, 1—3 mm thick below, smooth up to, or sparsely scaberulous just below, the inflorescence, scaberulous on the rachis, at least above, ribbed, surrounded below the leaves, by a few shortish, almost leafless, dark brown or ferruginous, sheaths, which are entire or split in front into very fine reticulate fibres. *Leaves* subbasal, and occasionally 1—2 situated higher up the stem, from much shorter to much longer than the stems, 3—8 mm wide, usually very stiff with strongly revolute margins, apex attenuated; *sheaths* membranous, ferruginous or reddish-spotted, often splitting into fine, sometimes reticulate fibres. *Spikes* 4—6, rarely more, subapproximate and fastigate, or the lowest more distant and subfastigate, cylindrical, 2—8(—10) cm long, dense-flowered, not noticeably laxer at the base, uppermost male with sometimes a few female flowers above, erect, 1.25—4.5 mm thick, remainder androgynaeceous, less commonly wholly female, the majority having a few male flowers at the apex, suberect to cernuous, 4—6 mm thick, upper shortly, lower longly, peduncled; *peduncles* subterete or obtusely trigonous, slender (0.25—0.5 mm thick), smooth to sparsely scaberulous. *Bracts* of the lower female spikes foliaceous, usually much exceeding the terminal spike, upper bracts much smaller, about equalling to much shorter than their own spikes, none sheathing or scarcely sheathing, but having two conspicuous ferruginous or dark brown membranous auricles in front at the base; *bract* of the male spike a long-awned glume. *Female glumes* oblong or obovate-oblong, flattish to shallowly cymbiform, often becoming deeply canaliculate by the concaving of a central stripe and flattening of wide

margins, gibbous at the base, usually very obtuse to bilobed-emarginate, rarely subacute, 1.25—3 mm long, 0.75—1.5 mm wide, thinly membranaceous, castaneous or ferruginous with pale margins, or pale with reddish flecks, and with a pale 3-nerved central stripe, narrowing and coalescing above and excurrent in a very wide but tapering, sometimes smooth but usually sparsely scaberulous-margined awn, 0.5 mm (upper)—2 mm (lower) long. *Utricles* broadly elliptic, obovoid, or suborbicular, rarely elliptic-lanceolate, usually compressed or compressed-biconvex, often with a slight longitudinal ridge down the centre of the dorsal face, 2.25—3 (—3.5) mm long, 1.5—2.2 mm broad, membranaceous to subcoriaceous, wholly nerveless or obscurely 1—few-nerved on the dorsal face, very narrowly marginate, glabrous, usually densely and ferruginously, sometimes light reddish, glandular-papillose, except on the margins above and towards the apex where the surface is cinereous-papillose, suberect to subpatulous, becoming patulous to subpatent, very shortly and conically stipitate, subabruptly beaked; *beak* conic or cylindrical, extremely short, stramineous or cinereous, entire, apex rounded; *mouth* tiny. *Achene* pyriform-orbicular, pyriform-obovoid or suborbicular, compressed-biconvex, 1.75—2 mm long, 1.25—1.8 mm broad, brownish, tapering to a short, stipe-like base, apex rounded-truncate, abruptly contracted into a short, terete, straight to bent beak. *Style* not or scarcely thickened towards the base. *Stigmas* 2.

SUMATRA: East Coast; south of Piso-piso, north-west of the Toba lake, damp to swampy grassland, not common, ± 1400 m, 29 Dec. 1922, *Ldrzing* 9393 (B)!

PHILIPPINE ISLANDS: Luzon; Benguet, Baguio, in open damp places, ± 1500 m, *Merrill* 565; 14 May 1904, *Williams* 1246 (K)!; *Mearns* (*Bur. Sci.* 2505).

CELEBES: North Celebes; Bolaang Mongondow; margin of swamp, via Danau lake, Aug. 1917, *Kaudern* H6 (L)!

NEW GUINEA: Netherlands New Guinea: Arfak Mts. [Lina Mts.]: Anggi lakes; humus on granite, ± 1900 m, 2 May 1912, *Gjellerup* 1243 (B, K)!; *ibid.*, on shore or in "kebon," 10—14 June 1928, *Mayr* 681 (B)!; *ibid.*, in open marsh by Iray, Anggi Giji lake, 1900 m, fairly common, 8 April 1940, *Kanehira & Hatusima* 13,921 (AA, B)! — Papua; Eastern Division, Mt. Dayman, summit, ca. 1894, [*collector?*] (Melb)!

JAVA: Priangan; "in de Rawa," ?Burangrang, Aug., ex Herb. *Blume?* (L)!; Situlembang, Mt. Burangrang, water-side bog, 1620 m, 24 July 1920, *Bakhuizen van den Brink* 4552 (B, K, L)!; near Pengalengan, 1350 m, 22 March 1880, *Forbes* 926 (BM, K, L)!; Mt. Papandajan, 2400 m, abundant in a grassy spot near the crater, Feb. 1915, *Ridley* (BM, K)!; *ibid.*, Tegal Bungbrung, marsh near source of the Tjibeureum-gede, 2300 m, 21 Jan. 1930, *van Steenis* 4104a, partim (B, L)!; *ibid.*, Tegal Bungbrung, bog on the Tjibeureum-gede, 29 March 1930, *van Steenis* 4185 (B, L)!; *ibid.*, Tegal Mariuk, marshy plain, ± 2250 m, 31 March 1930, *van Steenis* 4356 (B)! Mt. Ipis, Tegal Primula] grassy plain, ± 2300 m, 5 May 1930, *Docters van Leeuwen-Reijnvaan* 13,359 (B)!; *ibid.*, very common, ± 2250 m, 18 May 1931, *van Steenis* 4932 (B)!; Mt. Patuha', Rantja Tjibodas, boggy peat-hillock, 1900 m, 19 July 1935, *de Haan* 20 (B)!; *ibid.*] marsh, not common, 1900 m, end Dec. 1935, *van Steenis* 6878 (B)!; Rawa Tji'bitung (Pengalengan), marsh in forest, ± 1700m, 24 Oct. 1939, *van Steenis* 11,650 (B)! —

Ban ju mas; in wet plain, Dijeng, Aug., *Junghuhn* 520 (L)!; Dijeng Mts., marsh, damp, very common, 2000 m, 18 June 1908, *Wiriosapoetro* 10 (L)!; *ibid.*, 1917, *van der Meer Mohr* (B)!; *ibid.*, Telaga Tjebong, *Sphagnum* bog,  $\pm$  2100 m, 5 Aug. 1930, *van Steenis* 4497 (B)!; *ibid.*, Tegal Pangonan, marshy places with *Scirpus mucronatus*,  $\pm$  2200 m, 6 Aug. 1930, *van Steenis* 4562 (B)!; *ibid.*, Tegal Dringu, stump-forming, in marsh with *Scirpus mucronatus*,  $\pm$  2000 m, 7 Aug. 1930, *van Steenis* 4578 (B, L)! — Malang; Tengger, *Kobus* (B)!; Ranu Regulo (Mt. Semeru), damp ground, common, 2100 m, 20 Aug. 1927, *Gisius* 46 (L)!; Mt. Semeru, 6 July 1929, *Jeswiet* 41 (L)!; *ibid.*, savannah, 2100 m, 11 June 1935, *van Steenis* 7263 (B, L)!; *ibid.*,  $\pm$  2000 m, 1 July 1941, *Gisius* 11 (B)!.

Mt. Prahū, *Horsfield* (BM, K, S)!; *Reinwardt* (L)!; *Junghuhn* 417, 494 (L)!; *O. Kuntze*; *Warburg* 2577, 2590, 3543.

India, Burma, Japan.

#### 99. CAREX PRUINOSA Boott

*Carex pruinosa* Boott in Proc. Linn. Soc. 1: 255: 1845; Miq., Fl. Ned. Ind. 3: 352: 1855; C. B. Clarke, 7; Kiikenth., 352. — Java, *Horsfield*.

*Carex hexasticha* Reinw. ex Miq., Fl. Ned. Ind. 3: 353: 1857, partim. — Java, *Reinwardt*.

Tufted. *Stems* erect, trigonous, 33—95 cm tall, 1—15 mm thick, ribbed, smooth, but rhachis sometimes slightly scaberulous just below each spike, naked above the leaves. *Leaves* basal and subbasal, lower reduced to sheaths, which do not split into reticulate fibres, upper long and from exceeding the stem to much exceeded by it, 25—6 mm wide, flat to somewhat revolute, grey-green to subglaucous, apices long attenuated, hardened at the tip; *sheaths* ferruginous or brown spotted and membranous in front, mouth truncate, ligule conspicuous, brown. *Spikes* 3—5, suberect to (lateral) subcernuous, approximate or lowest subapproximate or even subdistant, 1—5.5 cm long, forming a terminal inflorescence 2.5—7(—10) cm long, fastigiate, dense-flowered, not laxer at the base, terminal male (rarely a smaller one at its base), cylindrical-clavate, 1.5—3.5 mm thick, lateral female or androgynaeceous with short male apices, cylindrical, 5—7 mm thick, uppermost sessile or shortly peduncled, remainder more longly peduncled; *peduncles* terete to obtusely angled, slender (0.25—0.5 mm thick), smooth or sparsely scaberulous, often stramineous. *Bracts* of the lower spikes foliaceous, much exceeding the stem, upper very much reduced, from about as long as to much shorter than their spikes, not sheathing, 2 ferruginous auricles in front; *male spike* ebracteate, or bract represented by longly awned glume. *Female glumes* elliptic, ovate, or oblong-lanceolate, flattish, shallowly cymbiform, or sometimes canaliculate, especially below, with wide flat margins, acuminate and apex acute (lower part of spike), or subacute to obtuse (upper part of spike), 2.4—3.5 mm long, 1.25—2 mm wide, thinly membranaceous, bright to dull castaneous, sometimes paler with castaneous spots, margins narrowly to widely whitish and often erose, in places, a prominently 3-nerved, pale, or pale green with castaneous spots, central stripe, coalescing above in a firm tip (upper glumes) or excurrent in a

nearly smooth to sparsely hispidulous awn, up to 1 mm long (lower glumes). *Utricles* elliptic, ovate, or ovate-lanceolate, plano-convex to biconvex, often subcompressed, 3—4 mm long, 1.8—2.3 mm broad, subcoriaceous, dorsally obscurely or slenderly 2—5-nerved, ventrally nerveless to slenderly 1—3-nerved, slightly marginate, especially above, where the margins are sometimes slightly involute or revolute, glabrous, densely and glandularly whitish- or partly reddish-papillose-tubercled, straight, patulous to subpatent, not or very shortly and conically stipitate, subabruptly beaked; *beak* conic-cylindric, very short, stoutish, reddish-castaneous, entire or subentire; *mouth* slightly dorsally oblique, small. *Achene* orbicular, suborbicular, or pyriform-orbicular, compressed-biconvex, 1.8—2 mm long, 1.4—1.9 mm broad, curved-tapering below and subabruptly contracted into a stout stipe-like base, abruptly beaked at the rounded apex; *beak* 0.1—0.4 mm long. *Style* thickened towards the base. *Stigmas* 2.

SUMATRA: Herb. *Waitz* (L)!

JAVA: Priangan; Rantja Gede, near Pengalengan, damp grassy meadow, common, 1600 m, 13 Oct. 1908, *Backer* 26,098 (B)!; *ibid.*, marsh, 1800 m, 22 June 1931, *van der Pyl* 420 (B)!; [south of] Bandung, Tjibeureum, 1550 m, 2 April 1911, *J. J. Smith & Rant* 34 (K, L)!; Rantja Bali, near Telaga Patengan, pool, 1700 m, 23 March 1914, *Backer* 1,2470 (B)!; Mt. Patuha, Rantja Upas, stream-side, near Rantja Walini, 1750 m, 27 March 1914, *Backer* 12,706 (B)!; *ibid.*, Rantja Upas, very common in grassy marsh, 1700 m, 31 Dec. 1935, *van Steenis* 7415 (S)!; Mt. Papandajan, Tegal Pandjang, marshy vale, not very common, 2041m, 18 May 1931, *van Steenis* 4964 (B)!; above Tjikakapa, Tegal Harendong, common, 10 July 1936, *van Slooten* 2613 (B)! — Pekalongan; Dijeng Plateau, *Junghuhn*; *ibid.*, Telaga Dringu, marsh, 2200m, 7 Aug., 1930, *van Steenis* 4583 (B)!; *ibid.*, Merdada, grassy margins,  $\pm$  2050 m, 9 Aug. 1930, *van Steenis* 4624 (B, S)! — Besuki; Ijang Mts., stream-side, 22 Oct. 1913, *Backer* 9689 (B)!; *ibid.*, source of river Tanggul, stream-side, 2460 m, 24 Oct. 1913, *Jeswiet* 368 (B)!; Ijang Plateau, 2100 m, 2 Aug. 1916, *Koorders* 43,504ft (B)!; *ibid.*, path to Argopuro, 2500 m, 15 Aug. 1916, *Koorders* 43,535ft, partim (K, L)! (other part is *C. maculata* Boott in Herb. Bogor.)!

*Horsfield* (BM, K)!; Herb. *Reinwardt* (L)!; ex Herb. *Forster* (L)!; *O. Kuntze*; *Warburg* 2575.

Assam.

#### Sect. 27. Vulgares (Aschers.) Nelmes, *sect. nov.*

[Subsect.?] *Vulgares* Aschers., Fl. Brandenb. 1: 774: 1864.

*Rhizome* usually creeping. *Stems* usually rather slender. *Leaves* often somewhat flaccid, sheaths not splitting into fibres. *Terminal* 1—2 spikes male, remainder female or androgynaeceous with short or very short male apices, all except the lowest sessile. *Female glumes* usually muticous. *Utricles* suberect or subpatulous.

Only Malaysian species . . . . . 100. *C. lacerans*

This species, and *C. Gaudichaudiana* Kunth of Australasia, are extremely similar, at least morphologically, to *C. nigra* (L.) Reichard, a



common European and North American plant; and *C. Gaudichaudiana* also shares with *C. nigra* an extreme polymorphism. This makes all the more interesting the fact that these species occupy areas which are so very far apart. For further comments on this subject the reader is referred to the final paragraph of the accounts of *C. appressa* R. Br. (p. 433), and of *C. divulsa* var. *javanica* Nelmès (p. 437). It may perhaps be added that the problems of bipolar distribution in sedges are being studied and it is hoped to publish some conclusions in the not too distant future.

#### 100. CAREX LACERANS Kükenth.

*Carex lacerans* Kükenth. in Engl. Pflanzenr. IV, 20: 326: 1909; Nelmès in Kew Bull. 1949: 385-386, 392: 1949. — Papua, Giulianetti & English.

*Carex Gaudichaudiana* Kunth var. *humilior* Kükenth. in Engl. Bot. Jahrb. 69: 264: 1938. — North-East New Guinea, Clemens 5549 & s.n.

Loosely to densely tufted. *Rhizome* short to rather longly creeping, horizontal to curved-descending, 1—2 mm thick, clothed with large reddish, ribbed, sheathing scales. *Stems* erect, distinctly trigonous, 5—40 cm tall, 0.75—1.25 mm thick below, smooth below, angles sparsely scaberulous above, including the rhachis. *Leaves* subbasal, crowded, shorter to longer than the stems, 1.5—3 mm wide, mostly conduplicate, apex firm and acute, lower reduced to reddish, blackish-red, or reddish-brown, shining sheaths, strongly pale-nerved, fronts membranous, tending to split into straight fibres; *leaf-sheaths* similar. *Spikes* 3—5, straight, approximate or subapproximate, rarely lowest distant, subfastigiate or fastigiate, forming a terminal inflorescence 1.5—3.5(—9) cm long, terminal spike male, erect, cylindrical, 1—2 cm long, 1.5—3 mm thick, dense-flowered, lateral androgynaeceous with short or very short male apices, or wholly female, suberect to subpatulous, usually cylindrical or subcylindrical, sometimes ovoid or ovoid-conic, 1—1.7(—4) cm long, 3—4(—4.5) mm thick, subdense- to dense-flowered, rarely laxer-tapering at the base, sessile except the lowest which is subsessile or shortly peduncled. *Bracts* of the lower spikes foliaceous, lower 1—2 exceeding the terminal spike, upper reduced, falling short or much short of the apex of the terminal spike, none sheathing; male spike ebracteate (bract represented by a large glume). *Female glumes* ovate, oblong-ovate, or oblong-elliptic, rarely lanceolate, flattish to cymbiform, upper margins sometimes involute, giving the apex, which is obtuse to rounded, rarely acute, an acute appearance, 2—3.5 mm long, 1—2 mm wide, reddish, blackish-red, or dark-spadiceous, sometimes very narrowly whitish-hyaline and thinner on the margins, with a central, 3-nerved, pale stripe, not usually extending to the apex, midrib rarely extremely shortly excurrent. *Utricles* elliptic, plano-convex to subbiconvex, 2—2.5 mm long, 1—1.5 mm broad, submembranaceous, narrowly marginate, strongly 5—7-nerved on the dorsal, 3—5-nerved on the ventral, face, glabrous, straight, subpatulous, greenish, becoming brownish or greyish-white, with blackish-red blotches, often minutely reddish-glandular, densely and minutely punctulate, especially towards the apex, spongy at

the base, scarcely or very shortly stipitate, subabruptly beaked; *beak* subterete, 0.1—0.3 mm long, pale brown or subcinereous, entire or extremely shortly bidentulate; *mouth* not oblique, slightly blackish-red. *Achene* elliptic or obovate to subpyriform or suborbicular, subbiconvex to compressed plano-convex, 1.5—1.9 mm long, including a very short beak and a stout, scarcely stipitate base, 1—1.4 mm broad, brown. *Style* not or scarcely thickened towards the base, not clearly articulated with the beak of the nut. *Stigmas* 3.

NEW GUINEA: Netherlands New Guinea; Arfak Mts. [Lina Mts.], Anggi lakes, lake-side, granite sand, ± 1900 m, 28 April 1912, *Gjellerup 1144* (B)!; *ibid.*, sandy marsh by edge of lake, 2100 m, Dec. 1913, *Gibbs 5898* (BM, K, L)!; *ibid.*, Anggi lakes, on the shore and in "kebon," 10—14 June 1928, *Mayr 690* (B)! (doubtful, immature); *ibid.*, in open marsh near Anggi Gita lake, rare, 1900 m, 5 April 1940, *Kanehira & Hatusima 13,535* (B)!; *ibid.*, in open marsh by Iray, Anggi Giji lake, common, 1900 m, 8 April 1940, *Kanehira & Hatusima 13,828* (B)!; Wissel Lake region, Jawei river, between Enarotali and proa bivouac, 1750 m, 17 March 1939, *Eyma 4730* (B, K)!; *ibid.*, Dejatej, 1750 m, Sept. 1939, *Eyma 5218* (B, K)!; Lake Habbema, common on marshy banks of streams, 3225 m, Aug. 1938, *Brass 9324* (AA)!; Mt. Wilhelmina, 7 km north-east of top, few plants on boggy grass-lands, 3700 m, Sept. 1938, *Brass & Meijer Drees 9923* (AA)! — North-East New Guinea; Morobe District, Mt. Sarawaket, Bog Meadow camp, about ponds, marsh land, common, 2400—3000 m, April 1937, *Clemens 5549* (AA, K)!; *ibid.*, sides of ponds, 2400—2700 m, *Clemens 5555B* (AA)!; *ibid.*, 8 March 1937, *Clemens 6073A* (mixed with *C. celebica* Kükenth., 6073B) (AA)!; *ibid.*, 5 March 1937, *Clemens 6074* (AA)!; 5 April 1937, *Clemens 6075* (AA)!; *ibid.*, 4050 m, 8 April 1937, *Clemens 6076A* [mixed with *C. perciliata* (Kükenth.) Nelmès, 6076B, and *C. celebica* Kükenth., 6076C] (A, A, K)! — Papua; 1897, Giulianetti & English (K)!

Endemic.

This species appears to differ, in its muticous glumes and its smaller and more abruptly beaked utricles, from *C. Gaudichaudiana* Kunth, but until this very polymorphic Australian sedge has been carefully studied, the classification of the New Guinea specimens cited above can be only tentative.

C. B. Clarke (in Journ. Linn. Soc. Bot. 37: 6: 1904) identified the Giulianetti & English New Guinea specimen, which later became the type of *C. lacerans* Kükenth., as *C. Gaudichaudiana* Kunth.

#### Subgen. 3. Vignea Nees

##### KEY TO THE SECTIONS

1. Spikes androgynaeceous:
  2. Utricles coriaceous, margins obtuse, setulose above. . . . . 28. *Paniculatae*
  2. Utricles membranaceous, margins smooth or finely hispidulous above:
    3. Utricles nervose, margins acute to winged. . . . . 29. *Multiflorae*
    3. Utricles usually nerveless, margins not winged . . . . . 30. *Muehlenbergianae*

1. Spikes gynaeandrous:  
 4. Utricles densely pale-punctulate . . . . . 33. *Heleonastes*  
 4. Utricles not pale-punctulate:  
 5. Utricles suberect, margins winged . . . . . 31. *Elongatae*  
 5. Utricles reflexed at maturity, margins acute but not winged . . . 32. *Stellulatae*

## Sect. 28. PANICULATAE Kunth,

Enum. PI. 2: 389: 1837

*Spikes* androgynaeceous, numerous. *Utricles* coriaceous, margins obtuse, setulose above.

Only Malaysian species . . . . . 101. *C. appressa*

## 101. CAREX APPRESSA R. Br.

*Carex appressa* R. Br., Prodr. Fl. N. Holl. 242: 1810; Kunze, Suppl. Riedgr. 45 t.U: 1840-50; Boott, Illustr. 1: 46 tt.119, 120: 1858; Kükenth., 178 fig. 29, E-J; in Engl. Bot. Jahrb. 69: 261: 1938; Nelmès in Kew Bull. 1946: 13, 28: 1946; ibid., 1949: 386, 392: 1949; S. T. Blake in Journ. Arn. Arb. 28: 101: 1947. — New South Wales, R. Brown.

Densely tufted. *Rhizome* woody, stout, not creeping. *Stems* erect, trigonous, angles sometimes very acute, ribbed and striate, rigid, 35—150 cm tall, 2—4 mm thick below, smooth below, angles scabrid above or just below the rhachis, clothed at the base, below the leaves, by spadiceous or lighter cataphylls with dark to black nerves, and/or, lower still, their fuscous fibrous remains. *Leaves* subbasal (above the cataphylls) and above, shorter to longer than the stem, 3—10 mm wide, flat, sometimes with revolute margins, to conduplicate, very stiff, margins scabrid above, longly sheathing; *sheaths* reddish-brown-nerved on the back, whitish-membranous in front and fraying into sometimes reticulate fibres. *Inflorescence* a slender, contracted, oblong-cylindric panicle, 4—20 cm long, 7—20 mm broad; *panicle branches* numerous, lower oblong-lanceolate, upper ovoid or ovoid-lanceolate, apparently adnate or more or less adpressed to the stem below, upper down to 5 mm, lower up to 3.5 cm, long, 0.3—1 cm thick, upper (short) ones contiguous or crowded and dense, lower (long) ones at approximate or subapproximate nodes but continuous because of their length, sessile, with closely aggregated simple or branched spikes along their length, some of the upper sometimes reduced to simple spikes. *Spikes* androgynaeceous, more or less ovoid or ovoid-lanceolate, 4—8 mm long, few-flowered, patulous, sessile, male and female parts about equal in length. *Bracts* of the lower panicle branches setaceous, sometimes as long as the branches, upper "bracts" reduced to glumes with long, ciliolate-hispidulous awns, all inconspicuous. *Female glumes* widely ovate to ovate-elliptic, cymbiform, apex acute to subacute, 2—2.8 mm long, 1.8—2.25 mm wide, thin and translucent, glabrous, wholly bright light castaneous, margins sometimes irregularly widely whitish and nerveless, pale below and usually with a pale midrib, or wholly whitish, very slenderly plurinerved, margins ciliolate from near the base upwards, midrib often excurrent in

a ciliolate awn up to 0.4 mm long. *Utricles* ovate to oblong-ovate, planoconvex, 2.3—3.5 mm long, 1.2—1.9 mm broad, coriaceous, hard, 6—8-nerved dorsally, 3—6-nerved ventrally, scarcely to narrowly marginate below, distinctly marginate above, glabrous, margins setulose from above the middle upwards or only at the apex, straight, patulous to subpatent, stramineous-brown to dark brown, base rounded to truncate and very spongy-thickened, distinctly very shortly to more longly (0.2—0.5 mm) stipitate, subgradually to subabruptly beaked; *beak* tapering below, planoconvex, 0.5—1.25 mm long, broadish, marginate, glabrous, margins setulose, straight, bidentate, very narrowly brown-notched or -grooved down the back; *mouth* slightly dorsally oblique; *teeth* lanceolate, straight, short, pale to reddish, glabrous or glabrescent. *Achene* obovate, ovate, or elliptic, sometimes slightly rhomboid, subplanoconvex to compressed-biconvex, 1.5—1.8 mm long, about 1 mm broad, tapering to a stout, stipe-like base, sometimes tapering above to a rounded or rounded-truncate apex, beakless to very shortly, sometimes bent-beaked. *Stigmas* 2.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, gregarious on wet low shore of lake, 3225 m, Aug. 1938, Brass 9248 (AA) !; Arf ak Mts. [Lina Mts.], in open marsh by Anggi Gita Lake, 1900m, 5 April 1940, Kanehira & Hatusima 13,830 (B)! — North-East New Guinea; Morobe District, Mt. Sarawaket, 900 m, 30 Jan. 1937, Clemens 5219 (AA) !; Morobe District, Samanzing to alpine meadows, 2400—2700 m, 6 Dec. 1938, Clemens 9419a (AA, K)!

Australia, New Zealand, New Caledonia.

This species, long known and widespread in Australia, makes an interesting addition to the New Guinea sedge flora.

This New Guinea material agrees very well with some of the Australian specimens at Kew, but this is not surprising because the species is considerably polymorphic.

The Australian species and its allies have Section *Paniculatae* counterparts (*C. paniculata* L., *C. appropinquata* Schumacher, etc.) in western Europe, and the same kind of sectional bisection occurs in some other groups, which are represented in both hemispheres. It seems to suggest extensive plant migrations in glacial and interglacial periods, unless parallel evolution is the cause of these great distance between members of a group. It seems to me that the latter is the much less likely reason.

## Sect. 29. MULTIFLORAE Kunth,

Enum. PI. 2: 387: 1837.

*Spikes* androgynaeceous; usually numerous or very numerous, simple, or lower compound, lower often in the axils of foliaceous bracts. *Utricles* membranaceous, nervose, margins acute or winged, smooth or minutely serrate-hispidulous above.

Only Malaysian species . . . . . 102. *C. nubigena*

## 102. CAREX NUBIGENA D. Don

*Carex nubigena* D. Don in Trans. Linn. Soc. 14: 326: 1825; Boott, Illustr. 1: 1 t. 2: 1858; C. B. Clarke, 5; Kiikenth., 145. — India, Nepal, *Wallich*.

*Carex fallax* Steud., Syn. PL Glum. II. Cyper. 189: 1855; Miq., Fl. Ned. Ind. 3: 347: 1855. — Java, *Zollinger 2554*.

*Carex nubigena* D. Don. var. *fallax* (Steud.) C. B. Clarke in Journ. Linn. Soc. Bot. 37: 5: 1904; Kiikenth., 146.

Densely tufted. *Rhizome* extremely short, woody, covered with ferruginous sheathing scales and/or their fibrous remains. *Stems* erect, obtusely trigonous above, obscurely below, 20—100 cm tall, 1—3 mm thick below, subfirm to rigid, slenderly ribbed, often more or less hollow, naked below the inflorescence, clothed below the leaves basally and subbasally by brownish-ferruginous to pale leafless or nearly leafless sheaths, lower ones semi-fibrous. *Leaves* subbasal, mostly short, lower merging into the leafless sheaths, upper longer but shorter to much shorter than the stems, 1.75—3 mm wide, mostly conduplicate, thickish, rigid, very longly sheathing; *sheaths* reddish-ferruginous, or paler with reddish spots, from the truncate mouth down to the node, thin and membranous, strikingly distinct from the glaucous-green thick back of the sheath. *Spikes* 5—10, crowded to closely contiguous, lowest 1—2 sometimes slightly separated from the rest and from each other, androgynaeceous, ovoid, ellipsoid, or subglobose, 5—9 mm long, 4.5—7 mm thick, dense-flowered, subpatulous to patent, sessile, male flowers very few so that the spike looks wholly female, forming a terminal, pyramidal to cylindrical, sometimes narrowly ellipsoid head, 1—3(—4) cm long and 7—13 mm thick. *Bracts* of the 2, rarely 3, lower spikes foliaceous, erect and straight to patulous and curved or flexuous, lowest 4—12.5 cm, the other 1—7.5 cm, long, lowest much exceeding, other equalling to much exceeding, the apex of the stem, widely membranous-margined at the base, remainder very longly awned to normal glumes, none sheathing, but lower with their membranous margins semi- to completely amplexicaul. *Female glumes* ovate-acuminate, ovate-lanceolate, or oblong-lanceolate, base thickened and incurved, cymbiform above, apex acute to obtuse, 2.25—3.5 mm long, 1.25—1.75 (—2) mm wide, very thin, translucent, nitidous, milky white, margins becoming erose, slenderly and irregularly few-nerved, midrib slender, with 2 adjacent nerves, in a brownish, sometimes greenish, central stripe, coalescing below the apex, not extending to the apex, or shortly excurrent in a smooth mucro or awn up to 0.75 mm long. *Utricles* broadly ovate, or elliptic, ovate-lanceolate, or elliptic-lanceolate, plano-convex, becoming biconvex as the achene develops, compressed above, 3.5—4.5 mm long, 1.3—2 mm broad, membranaceous, strongly 9—12-nerved on each face, nerves converging at each end, margins widely pale green- to grey- or glaucous-green-winged, except at the base, wings flat-tish or slightly turned towards the ventral face, glabrous, often slightly curved, sometimes straight, becoming subpatulous, greenish to bright brownish, often thinly reddish-spotted, base spongy-thickened, scarcely or abruptly very shortly stipitate, subgradually to subabruptly beaked;

*beak* compressed, tapering at first, then linear, 1.25—1.75 mm long, broad, winged-margined below, narrowly marginate above, minutely denticulate-, scabro-ciliate-, or serrulate-margined, dorsally brown-grooved between 2 rounded ridges formed by the confluence of converging nerves, bidentate; *mouth* dorsally oblique, *teeth* short. *Achene* elliptic to suborbicular, dorsally convex, ventrally compressed-convex, 1.3—1.75 mm long, 0.9—1 mm broad, stramineous or livid, becoming coffee-coloured, nitidous, becoming vernicose, shortly and stoutly stipitate, shortly and very slenderly beaked. *Style* long, very slender, base not or scarcely thickened. *Stigmas* 2.

SUMATRA: Atjeh; Gajo Lands, Mt. Leuser (Losir), central peak, stream-valley in meadows, 3300 m, 2 Feb. 1937, *van Steenis 8591* (det. Kiikenth. as var. *fallax*); Mt. Kemiri, wet meadows on the mountain plateau, 3150—3314 m, 8—9 March 1937, *van Steenis 9673, 9679* (det. Kiikenth. as var. *fallax*).

JAVA: B an j urn as; Dijeng Plateau, wet field, 2000 m, 22 Jan. 1917, *Backer 21,632* (B) !; *ibid.*, Tegal Pangonan, marshy place, in abundance, 6 Aug. 1930, ± 2300 m, *van Steenis 4566* (B, L) ! — K e d i r i / M a l a n g; Mt. Kawi, Oro-oro plain, ± 2630 m, 9 Dec. 1916, *Arena* (B, L) !; Mt. Kawi, Oro-oro, in marsh, sod forming, 16 April 1929, *Docters van Leeuwen-Reijnvaan 12,250* (B) ! — M a l a n g; Tengger Mts., Tosari, "in Graminosis," *Zollinger 2554* (BM) !; Tengger Mts., Tosari 26 Jan. 1900, *Kobus 285* (B) !; Tengger Mts., *Kjellberg* (B) !; *ibid.*, 2000 m, *Mousset 327* (B) !; *ibid.*, *Kobus 204* (B) !; Tengger Mts., near Ngadisari, 2000—2200 m, 18, 28 & 29 Oct. 1899, *Koorders 37,453/]*—*37,455 ji* (B, K, L) !; Mt. Bromo, "Zandzee," Jan. 1915, *Ridley* (BM, K) !; Tengger Mts., Wonotoro ravine, Aug. 1918, *Jeswiet* (B, K) !; Tengger Mts., Rudjak, with *Foeniculum*, *Pteridium*, *Imperata*, and *Avena*, 2000 m, 10 June 1930, *van Steenis 7228* (B, L, S) !; Mt. Semeru, Ranu Kumbolo, 6 July 1929, *Jeswiet* (L) !; "Smeroe-hoeve," ± 2000m, 1 July 1941, *Gisius 10* (B) ! — B e s u k i; Ijang Plateau, river bank, 2200 m, 19 Oct. 1913, *Backer & Bremekamp 9572* (B) !; and about ten other gatherings from Besuki Res.

Kurz (K)!

Afghanistan, India, China.

I am unable to separate *C. fallax* Steud., even varietally, from *C. nubigena*. Kiikenth's distinguishing characters for variety *fallax*, such as spikes more congested, forming a shorter inflorescence, are found throughout the species range, and seem to be typical intraspecific variations.

## Sect. 30. MUEHLENBERGIANAE Tuckerm.,

Enum. Meth. 9: 1843.

*Spikes* androgynaeceous, not numerous (3—15), usually all simple but lower sometimes compound, subbracteate. *Utricles* membranaceous, usually nerveless, margins not winged, usually minutely serrate-hispidulous above.

1. Spike about 12, lower longly spaced from one another, the whole inflorescence about 17 cm long . . . . . 103. *C. divulsa* var. *javanica*

1. Spikes 5—8, lower subcontiguous, the whole inflorescence 1.5—2.5 cm long

104. *C. Pairaei* var. *javanica*

103. CAREX DIVULSA Stokes var. JAVANICA Nelmes

*Carex divulsa* Stokes var. *javanica* Nelmes in Kew Bull. 1950: 208: 1950. — Java, Ridley.

*Rhizome* unknown. *Stems* (broken off and lower part missing, the part present being about 25 cm in length, excluding the rhachis), trigonous, angles obtuse and smooth below, acute and scaberulous above and on the rhachis, about 1 mm thick below, angles obtuse and smooth below, acute and scaberulous above and on the rhachis. *Leaves* missing except 2 situated near the apex of the stem, which much exceed the stem, about 2.5 mm wide, flat or flattish, upper surface covered with minute, whitish dots. *Spikes* about 12, androgynaeous, male and female parts about equal in length but the male part inconspicuous, suberect to patulous, 3 apical ones forming a dense, broadly ovoid to subglobose head, the 3 next below at approximate nodes, half overlapping, remainder at increasing distances downwards, the whole forming a terminal, very slender inflorescence, about 17 cm long and up to 6 mm broad, all except the lowest simple and sessile, subdense-flowered, obovoid, ellipsoid, ovoid, and even subglobose, 4—7 mm long, 3—5 mm broad, lowest elongated and bearing, below the spike proper which is rather more than the upper third, several empty squamiform bracteoles, a shortly peduncled short spike branching from the base, the whole elongated axis 1.5 cm long. *Bracts* glumiform, upper not to longly, lower longly to very longly awned; *awn*s flexuous, hispidulously margined. *Female glumes* oblong-lanceolate to ovate-lanceolate, often longly acuminate, sometimes widely ovate and shortly acuminate, base thickened and incurved, cymbiform to flattish above, apex acute to obtuse, 3—4 mm long, 1.6—2 mm wide, glabrous, milky white, nerveless on wide margins, otherwise plurinerved, the midrib and 2 adjacent nerves, stronger than the others, bounding a green central stripe, coalescing with the midrib near, and forming a stoutish, firm tip at the apex, or excurrent in a nearly smooth or minutely ciliolate-hispidulous awn up to 0.3 mm long. *Utricles* very immature except 2 which are approaching full development, and are elliptic-lanceolate, not much rounded at the base, compressed plano-convex, 4.25—4.5 mm long, nearly 2 mm broad, membranaceous, nerveless, narrowly marginate, glabrous, smooth, straight, suberect, pale greenish-white, shortly, stoutly stipitate, gradually to subgradually beaked; *beak* gradually tapering, compressed, 1.5—1.75 mm long, widely marginate, smooth or very sparsely, minutely scaberulous-margined near the apex, often centrally dorsally and partly ventrally pale- or brownish-furrowed, bidentate; *mouth* not oblique; *teeth* lanceolate, 0.2—0.3 mm long, straight, smooth, pale. *Achene* not examined because of condition of utricles. *Stigmas* 2.

JAVA: Priangan; Mt. Papandajan, 1500 m, woods, Feb. 1915, Ridley (K) !  
Endemic.

This gathering consists of one flowering culm, collected with, and apparently not distinguished by the collector from, much more ample material of the following variety, *C. Pairaei* var. *javanica* Nelmes. Both varieties are in immature fruit, but even at this stage it can be seen that they are at least varietally distinct from their respective species, which are not known to occur outside Europe, West Asia, North Africa, Madeira, the Canary Islands, and the Azores.

These two interesting discoveries recall the speculations which have been made as to how such 'outposts' and the more truly 'bipolar' plants have travelled so far from the apparent headquarters of their species. Other *Carex* examples are *C. canescens* L. (*C. Buxbaumii* Wahlenb.), *C. curta* Gooden., and *C. echinata* Murr. on the Australian Alps, *C. curta* in New Guinea, several 'British' species in New Zealand, and others in South Africa and South America, some agreeing closely with, others differing more or less from, their 'home' species in the northern hemisphere.

As I am preparing a thesis on the derivation of some of the unispicate *Carices* (*Primocarex* Kiikenth.), which involves a consideration of bipolar distribution, transtropic migration, and even pole-wandering, I will not pursue the subject further here.

104. CAREX PAIRAEI F. Schultz var. JAVANICA Nelmes

*Carex Pairaei* F. Schultz var. *javanica* Nelmes in Kew Bull. 1950: 208: 1950. — Java, Ridley.

Densely tufted. *Rhizome* not or scarcely creeping, woody, densely clothed with reddish to fuscous tough fibrous remains of sheathing scales. *Stems* erect, obtusely trigonous, 30—50 cm long (not nearly developed), about 1 mm or less thick below, smooth but angles usually sparsely scaberulous towards and on the rhachis, stiff and firm, ribbed, surrounded, below the leaves, by a few short, palish to dull reddish-brown cataphylls and/or their reddish-brown to fuscous fibrous remains. *Leaves* erect or suberect, rather numerous, basal and subbasal, sheathing the lower half or so of the stems, mostly long and longer to shorter than the stems, lower ones progressively shorter-bladed towards the stem-base, 1.5—2.3 mm wide, flat or flattish, apex longly attenuated; *sheaths* of the upper leaves green, lower sometimes salmon-pink-tinged, on the back, thin, membranous, and whitish to pale greenish in front. *Spikes* about 5—8, androgynaeous, aggregated into a terminal head, oblong or cylindrical, 1.5—2.5 cm long, upper contiguous, lower subcontiguous, more or less ellipsoid, 4—7 mm long, 2—4 mm broad, (with utricles half developed), dense- or subdense-flowered, subpatulous (at this stage), sessile, male and female parts about equal in length. *Bracts* glumiform, lower with long upper with very short or short awns; *awn*s minutely hispidulous-margined. *Female glumes* mostly ovate-lanceolate, base thickened and incurved,

deeply cymbiform to conduplicate above, apex acute to subobtuse, (3.25—) 3.5—4 mm long, 1.6—1.8 mm wide, translucent, thin, nitidous, bright yellowish-castaneous, margins scarcely to widely but irregularly whitish and nerveless, otherwise slenderly nervose, 2 stronger ones adjacent to the midrib, bounding an often pale-green central stripe, coalesce with it above and are excurrent in a minutely hispidulous awn up to 0.5 mm long or longer. *Utricles* immature, elliptic-lanceolate to ovate-lanceolate, plano-convex, 3—3.75 mm long, about 1 mm or more broad, membranaceous, nerveless, narrowly marginate, glabrous, and smooth, margins finely hispidulous from just above the middle upwards, straight, patulous, pale above, brownish below, scarcely or very shortly pale stipitate, subgradually beaked above; *beak* slightly tapering, probably becoming plano-convex, 1—1.5 mm long, widely greenish-scabrid-marginated, bidentate, with often a dorsal brown to palish furrow; *teeth* lanceolate, 0.3—0.6 mm long, straight, pale, sometimes brown-tipped, sometimes minutely and sparsely hispidulous. *Achene* little developed. *Stigmas* 2.

JAVA: Priangan; Mt. Papandajan, 1500 m, woods, Feb. 1915, Ridley (K) !  
Endemic.

Sect. 31. ELONGATAE Kunth,

Enum. Pl. 2: 402: 1837

*Spikes* gynaecandrous, more or less bracteate. *Utricles* suberect, margins winged.

1. Spikes 5—21; female glumes 2—3 mm long; utricles 2.75—3 mm long . 105. *C. alta*

1. Spikes 3—8; female glumes 2.75—3.75 mm long; utricles 4—4.5 mm long

106. *C. monople'ura*

105. CAREX ALTA Boott

*Carex alta* Boott in Proc. Linn. Soc. 1: 254: 1845; Illustr. 1: 59 t.15,3: 1858; Miq., Fl. Ned. Ind. 3: 347: 1855; C. B. Clarke, 6 — Java, *Horsfield*.

*Carex brizopyrum* Kunze, Suppl. Riedgr. 168 t. 43: 1840-50. — Java, *Z oiling et SI 92*.

*Carex remota* L. subsp. *alta* (Boott) var. *brizopyrum* (Kunze) Boeck. in Linnaea 39: 126: 1875; Kukenth., 234.

*Carex remota* L. subsp. *alta* (Boott) Kukenth. in Engl. Pflanzenr. IV, 20: 234.: 1909.

Densely tufted. *Rhizome* very short, woody, densely covered with scales or their fibrous remains. *Stems* obtusely trigonous, flaccid and erect to weakly suberect, 15—20 cm tall, 1—1.5 mm thick below, ribbed. *Leaves* on and sheathing the lower third of the stem, basal ones reduced to sheaths, lowest persisting as brown fibres, shorter to longer than the stems, 1.25—4 mm wide, flat or flattish, upper surface minutely alveolate, smooth except near the longly attenuated apices, flaccid or subflaccid; *sheaths* long, mouth concave. *Spikes* 5—21, suberect to patulous, upper with apices overlapping, lower approximate, contiguous to separated up to their own length from one another, lowest sometimes distant, forming

a terminal more or less oblong inflorescence, 3.5—16 cm long and 3—10 mm broad, gynaecandrous but male flowers so few that spikes have a wholly female appearance, subglobose, ellipsoid, ovoid, oblong-ovoid, cylindrical, or ellipsoid-cylindric, 4—15 mm long, 3—5 mm thick, dense-flowered, sessile. *Bracts* of the lower spikes foliaceous, 1—2 far exceeding the stem, upper bracts glumiform, lower with very long, upper with much shorter awns, not sheathing. *Female* glumes ovate, oblong-ovate, or oblong-elliptic, shallowly cymbiform to flattish or margins incurved or involute, base rounded, shortly acuminate above, apex acute to subacute, 2—3 mm long, 1.25—1.5 mm wide, thin and translucent, very finely nerved, whitish, sometimes tinged brown, midrib greenish to brown, slender, keeled, usually excurrent in a mucro, 0.2—0.5 mm long and smooth or ciliolate-hispidulous at the apex. *Utricles* oblong-elliptic, plano-convex, spongy-thickened above, centrally grooved above on each face, 2.75—3 mm long, 1—1.25 mm broad, membranaceous, distinctly but slenderly 2—5-nerved on the ventral and about 6-nerved on the dorsal face, but only in the lower centre (the raised area of the nut), converging and becoming fewer towards the apex, glabrous, smoothly marginate below, subdensely denticulate-winged in about the upper half, wings slightly ventrally upturned or flattish, straight or slightly curved, becoming subpatulous, pale yellowish-green to brownish, base scarcely to shortly stipitate, apex subabruptly beaked; *beak* flattish, about 0.5 mm long (including teeth) wide, denticulate-marginate, bidentate; *teeth* slender, straight, glabrescent to ciliolate-hispidulous; *mouth* slightly dorsally oblique. *Achene* elliptic, narrowly quadrato-ovate, or oblong-ovate, slightly compressed biconvex, 1.3—1.5 mm long, 0.75—0.8 mm broad, stramineous to orange-brown, shortly stipitate, shortly beaked. *Style* slender, slightly thickened below. *Stigmas* 3.

JAVA: Priangan; Talun, near Pengalengan, forest border, 1650 m, 30 Oct. 1918, *Backer* 26,089 (B) !; Tjinjiruan, 1600 m, 4 Dec. 1911, *Kawakami* (B) !; Mt. Papandajan, Tegal Bungbrung, swamp, 2200 m, 29 March 1930, *van Steenis* 4201 (B, K) !; Tegal Warna, Mt. Papandajan, 2080 m, 17 May 1936, *van der Pijl* 570 (B) !; Tjikakapa, very common, ± 2000 m, 3 Jan. 1923, *van Slooten* 761 (B, K, S) !; above Tjikakapa, 2000 m, 10 July 1936, *van Slooten* 2616 (B) !; Mt. Patuha, edge of path in grassy meadow, above Kawah Tjiwidej, 1900 m, end of Dec. 1935, *van Steenis* 6975 (B) !; Rawa Tjibitung (Pengalengan), marsh in forest, ± 1700 m, 24 Oct. 1939, *van Steenis* 11,648, partim (B) ! — B a n j u m a s; Dijeng, damp wood border, 1800 m, 23 Jan. 1917, *Backer* 21,734 (B) !; Dijeng, near Kawah Sileri, 2100 m, 7 Aug. 1930, *van Steenis* 4570 (B) ! — M a l a n g; Tengger Mts., near Ngadisari, 2000 m, 29 Oct. 1899, *Koorders* 37,448ft (B, K) !; Wonosari, 1150 m, 1910, *Mousset* (L) !; and about twelve other gatherings seen from Malang Res. — B e s u k i; Ijang Mts. Gilap, ravine, 2000m, 20 Oct. 1913, *Backer* 9659 (B) !; Nymphs Bath [Nymphenbad], Tosari, 29 Jan. 1915, *Ridley* (K) !; Ijang Plateau, 2100 m, 11 Aug. 1916, *Koorders* 43,403/ (B, K, L) !; *ibid.*, ravine of Djeluwang, by a cataract, damp stony ground, 1500—1900 m, 18—19 July 1938, *van Steenis* 11,050, 11,075 (B, S) !.

Mt. Bodas, in hot water of crater, 1500 m, April 1880, *Forbes* 1110 (BM) !, 1120 (B, BM, L, S) !; *Horsfield* 1067 (BM, K, S) !; Bandong, *Zollinger* 3192 (BM) !

India, China.

Kiikenthal distinguishes "var. *brizopyrum* (Kunze) Boeck." as a smaller plant, with fewer and smaller spikes, than the species. Some specimens, however, which I have seen, consist of this smaller plant and the larger one of the typical species, so that one feels that the 'variety' is scarcely worthy of its rank.

C. B. Clarke (*in Journ. Linn. Soc. Bot.* 37: 6: 1904) misidentified *C. alta* as *C. remota* L. var. *Rochebrunii* C. B. Clarke, citing Zollinger 3192.

*Carex alta* has, in its winged utricle alone, sufficient distinctness to remove it specifically from *C. remota*.

#### 106. CAREX MONOPLEURA Krech.

*Carex monopleura* Krech. *in Not. Syst. ex Herb. Inst. Bot. Acad. Sci. URSS* 7: 35: 1937; Nelmès *in Kew Bull.* 1950: 208: 1950. — India, Sikkim, *C. B. Clarke* 25,710.

Densely tufted. *Rhizome* extremely short. Stems erect, obtusely trigonous, 10—70 cm tall, 0.6—1.3 mm thick well above the sheath-clothed base, strongly few-ribbed, subfirm, probably subflaccid in life, smooth, clothed at the base, below the leaves and bladeless sheaths by older, brown leafless-sheaths or their fibrous remains. *Leaves* not crowded but clothing the lower 5—10 cm of the stem, lower reduced to leafless sheaths, often shorter than the stems but some exceeding them, 1.5—2.75 mm wide, flat or flattish, slightly stiff, probably soft and flaccid in life, minutely alveolate, apices longly attenuated, longly sheathing; *sheaths* concave or prolonged-truncate and brown-margined at the mouth, membranous in front. *Spikes* 3—8, gynaeandrous, male flowers very few so that the spikes have a wholly female appearance (terminal sometimes more or less sterile and very slender), becoming at maturity more or less obovoid, ovoid, or ellipsoid, 6—10 mm long, becoming 3—5 mm thick, subdense-flowered, suberect to patulous, sessile, upper contiguous to approximate, lower more widely spaced, forming a terminal, oblong, slender inflorescence, 2—9 cm long. *Bracts* of the lower spikes foliaceous or subfoliaceous, far exceeding to slightly exceeded by the stem, upper bracts glumiform, longly to shortly aristate, none sheathing. *Female glumes* oblong- to ovate-lanceolate, or oblong-ovate, acuminate, apex acute, or sometimes, when the midrib does not extend to it, obtuse and slightly ciliate, base thickened and strongly incurved, obversely deltoid-truncate, otherwise deeply cymbiform or incurved-cymbiform, margins often involute above, 2.75—3.75 mm long, 1.25—1.5 mm wide, translucent, milky-white flushed pale brown or greenish-brown, margins thin, slenderly nervose towards the midrib, which is slender below, but, forming a pale green central stripe with 2 adjacent nerves, with which it coalesces and thus becomes stouter above, usually extending to or just below the apex, sometimes excurrent in a smooth mucro up to 0.25 mm long. *Utricles* elliptic-lanceolate, plano-convex, 4—4.5 mm long, 1—1.25(—1.4) mm broad, membranaceous, dorsally indistinctly 4—6-nerved, nerves confluent at the apex, ventrally

nerveless or with 1 central longitudinal nerve, margins winged, wings strongly turned towards the ventral face, finely denticulate from about or above the middle upwards, glabrous, smooth, straight, becoming subpatulous to patulous, pale greenish-stramineous, becoming tinged brown, tapering below to a plano-convex-conic stipe-like basal portion, 0.5—0.75 mm long, scarcely stipitate below, tapering above into a beak-like portion which is compressed, with turned up finely denticulate wings, tapering, about 1.5 mm long, broad, bidentate, usually with a central, longitudinal groove on each face; *mouth* slightly dorsally oblique; *teeth* lanceolate, 0.3—0.4 mm long, minutely scaberulous, or glabrous above, straight. *Achene* elliptic-oblong, subplano-convex, ventrally with a slight, central, longitudinal ridge, about 2 mm long, 0.9—1 mm broad, stramineous-brown, becoming warm brown, abruptly, shortly, and stoutly stipitate and beaked, beak very slightly annulate at the apex. *Style* somewhat thickened towards the base which is subpersistent on the beak of the achene. *Stigmas* 2.

SUMATRA: West Coast; Mt. Korinchi [G. Kerintji], peak, 2190 m, 25 April 1914, *Robinson & Kloss* (BM, K) !; river margin, 1900 m, 19 April 1920, *Bunnemeijer* 9822 (B) !

JAVA: Priangan; Tegal Alun-alun, Mt. Papandajan, streamlet, a few tufts together, 2350 m, 14 May 1931, *van Steenis* 4-826 (B, K) !; Rawa Tjibitung (Panglengan), marsh in forest, ± 1700 m, 24 Oct. 1939, *van Steenis* 11,648, partim (B) !

India.

The sterile terminal spike, which sometimes occurs in this species, is a rare phenomenon in Subgenus *Vignea*.

*Carex monopleura* was described from Sikkim material; *C. Rochebrunii* Franch. et Savat. is a Japanese plant. Kiikenthal linked the two plants together as *C. remota* L. subsp. *Rochebrunii* (*in Engl. Pflanzenr.* IV, 20: 234: 1909), and I misidentified the Sumatran one as *C. Rochebrunii* (*in Kew Bull.* 1946: 7, 29: 1946). *C. monopleura* differs from *C. Rochebrunii*, inter alia, by its much less distinctly nerved, bidentulate (not bidentate), and more widely winged, utricles.

#### Sect. 32. STELLULATAE Kunth, Enum. PI. 2: 399: 1837

Spikes gynaeandrous, with inconspicuous bracts. Utricles reflexed at maturity, margins acute but not winged.

Only Malaysian species . . . . . 107. *C. perileia*

#### 107. CAREX PERILEIA S. T. Blake

*Carex perileia* S. T. Blake *in Journ. Arn. Arb.* 28: 102: 1947. — Netherlands New Guinea, *Brass* 9583.

Tufted. *Rhizome* slender, creeping. *Stems* erect, sometimes slightly curved, obtusely or obscurely trigonous and smooth below, subacutely and

scaberulously angled towards the spikes, 20—55 cm tall, 0.75—1 mm thick below, scarcely more slender above, ribbed and striate. *Leaves* few, sub-basal, shorter to longer than the stems, 1—2 mm wide, canaliculate-conducuplicate, apices attenuated, lower leaves reduced to bladeless sheaths. *Spikes* 4—6, gynaeandrous, but male flowers so few that spikes appear wholly female, oblong-ovoid or oblong-ellipsoid and 5—7 mm long in flower, ovoid or subglobose, 7—10 mm long and 7—8 mm thick in fruit, subdense-flowered, spreading, sessile, crowded or approximate, lowest sometimes subapproximate, forming a terminal, oblong or, less commonly, ovoid head, 1.5—2.5 cm long, and up to 1 cm, less commonly 1.75 cm, thick. *Bracts* glumiform, lowest with a setaceous awn about as long as its spike, others more shortly aristate or indistinguishable from the glumes. *Female glumes* ovate, or slightly ovate-lanceolate, cymbiform, base incurved, apex acute to obtuse, 2.5—3.5 mm long, about 2 mm wide, translucent, very slenderly plurinerved and brownish-castaneous, nerveless on the thinner, wide, whitish-hyaline margins, sometimes pale, at the base and pale on a central stripe, midrib prominent, with which 2 adjacent nerves coalesce above, forming a scarcely excurrent firm tip, or sometimes not extending to the whitish-hyaline apex. *Utricles* ovate or oblong-ovate, plano-convex, 4.25—5.5 mm long, 1.5—1.8 mm broad, membranaceous, 4—6-nerved on the whole or lower part of the ventral, more strongly and distinctly 8—10-nerved on the convex dorsal, face, narrowly but distinctly marginate, glabrous, smooth, straight or slightly recurved, suberect at first, becoming patulous to subpatent, light green or yellowish-green at first, becoming brownish, spongy-thickened and rounded at the base, scarcely stipitate, subgradually narrowing into a *beak*, which is tapering, compressed, about 2 mm long, narrowly smooth or very sparsely scaberulous and greenish-marginate, with a reddish-brown groove, split at least above, and with overlapping margins, extending down the centre of the dorsal side on to the apex of the utricle proper, bidentulate; mouth not or scarcely oblique; teeth very short, reddish-brown, tips pale, often becoming erose. *Achene* oblong-ovate, plano-convex, 2—2.25 mm long, 1.2—1.4 mm broad, slightly recurved, stramineous, becoming brownish, scarcely stipitate or beaked. *Style* slightly thickened towards the base. *Stigmas* 2.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, marshy shores of lake, 3225 m, Aug. 1938, Brass 9583 (AA, Br)! — North-East New Guinea: Morobe District; Mt. Sarawaket, 2400—2700 m, 10 March 1937, Clemens 5554a (AA)!; *ibid.*, 2400—2700 m, April 1937, Clemens 5555 (AA)!

Endemic.

The Brass gathering has the spikes in an ovoid head and the Clemens specimens in an oblong head with rather longer utricles. I have no doubt that they are all the same species. Clemens 5554a is mainly a species of *Luzula* but it includes one culm, minus leaves, but bearing an infructescence, of *C. perileia*.

*C. perileia* is closely related to the Hawaiian *C. Svenonis* Skottsberg. They are both clearly distinct from the widespread *C. echinata* Murr., with which Kiikenthal (*in Engl. Bot. Jahrb.* 69: 262: 1938) misidentified Clemens 5555.

Sect. 33. HELEONASTES Kunth,  
Enum. PL 2: 393: 1837

*Spikes* gynaeandrous, ebracteate. *Utricles* densely whitish-punctulate, erostrate or shortly beaked.

Only Malaysian species . . . . . 108. *C. curta*

108. CAREX CURTA Gooden.

*Carex curta* Gooden. *in Trans. Linn. Soc.* 2: 145: 1794; Schkuhr, *Riedgr.* 1: 43, t. C, fig. 13. — Described from European plants.

Tufted. *Stems* erect, trigonous, 10—18 cm tall, 1 mm or rather more thick below, smooth except for slight scabridity on the angles just below the spikes, surrounded, below the leaves, by brown, withered leaf-bases. *Leaves* basal and subbasal, shorter to longer than the stems, 2—3(—5) mm wide, conducuplicate to flattish, grey-green, longly attenuated to the hardened apex. *Spikes* 4—6, usually gynaeandrous, male part usually very short, inconspicuous, and few-flowered, often longest in the terminal spike, female part subdense-flowered, rarely wholly female, androgynaeceous, or with male flowers at each end, simple, rarely lowest with one or two smaller spikes branching from it, ellipsoid, obovoid, or ovoid, rarely subcylindric or subglobose, 6—9 mm long, 4—5 mm broad, ebracteate, i.e. bracts in the form of slightly enlarged and shortly aristate glumes, lowest rarely subherbaceous and about as long as its spike, sessile, usually approximate or contiguous, rarely subcrowded, forming a more or less oblong, terminal inflorescence, 1.8—2(—2.3) cm long and 7—8 mm broad. *Female glumes* ovate or ovate-elliptic, cymbiform, apex acute, 2—2.5 mm long, 1.25—1.5 mm wide, very thin and whitish, or golden-whitish, a 3-nerved golden central stripe tapering above, midrib sometimes shortly excurrent. *Utricles* ovate, elliptic, or ovate-elliptic, 2—2.3 mm long, 1—1.5 mm broad, membranaceous, slenderly 6—8-nerved dorsally, and 4—6-nerved ventrally, narrowly or scarcely marginate, glabrous or slightly papillose-hispidulous at the apex and base of the beak, golden above, paler below, densely whitish-punctulate to minutely papillose-alveolate, straight, becoming patulous or subpatulous, very shortly and stoutly stipitate, subabruptly or abruptly beaked; *beak* scarcely tapering, subcompressed, 0.2—0.3 mm long, sometimes sparsely hispidulous-marginate, light-reddish; *mouth* hyaline-erose-entire, or minutely bilobed or bidentate. *Achene* elliptic to sub-orbicular, plano-convex or compressed biconvex, about 1.5 mm long, about 1 mm broad, light warm brown, scarcely stoutly stipitate, abruptly beaked; *beak* about 1 mm long, subcylindric. *Stigmas* 2.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, common on marshy flats, 3225 m, Aug. 1938, *Brass* 9037 (AA) !; *ibid.*, moist burnt-over ground in a native camp, 3225 m, Aug. 1938, *Brass* 9119 (AA) !; *ibid.*, in open grassland, plentiful on wet sandy soil, 3225 m, Aug. 1938, *Brass* 9539 (AA) !

Europe, Asia, North and South America, Australia.

This New Guinea plant, in its slenderly nerved utricles, is nearer to typical European material than is the Australian form, whose utricles have fewer and stronger nerves.

The majority of authorities on the sedges, including Boott, Boeckeler, L. H. Bailey, C. B. Clarke, Kiikenthal, and Mackenzie, have treated this species as *C. canescens* L., the identity of which has not yet, I think, been established. Linnaeus's diagnostic phrase under *C. canescens* applies equally well to several common European sedges, including *C. curta*, to which also some of Linnaeus's citations seems to refer. This species, however, is not included in the Linnaean material of *C. canescens*, which are *C. angarae* Steud. and *C. Buxbaumii* Wahlenb. in this order. Moreover Linnaeus has himself written "11 canescens" on the sheet of *C. angarae*, *C. canescens* being *Carex* no. 11 in the *Species Plantarum*, ed. 2. Until this question has been settled I use Goodenough's epithet for the species described above.

#### ADDITIONAL SPECIES

##### CAREX VANSTEENISII Kiikenth.

*Carex Vansteenisii* Kiikenth. in *Bull. Jard. Bot. Buitenz. ser. &*, 16: 320: 1940. — Sumatra, *van Steenis* 8461.

*Rhizome* short, stout, woody. *Stems* erect, trigonous, with acute angles below, about 150—160 cm tall, stout (3—4 mm thick below), smooth throughout including the rhachis, surrounded, below the leaves, by a few thick, strongly nervose, entire, spadiceous cataphylls or leafless sheaths. *Leaves* basal and subbasal, and 1—2 widely spaced, hiding much of the stem, and, except a few short basal ones, long and very long but shorter than the stem, 10—15 mm wide, flat or flattish, subcoriaceous, sometimes the whole under-surface scaberulous above, indistinctly septate-nodulose; *sheaths* short, spadiceous or dark-nerved on the back, narrowly brown-membranous in front. *Inflorescence* subnutant above, much interrupted, lax, compound-paniculate, occupying the upper third or more of the stem, and composed of 5—7 *fascicles* at nodes, each fascicle consisting of 2—3 unequally peduncled spikes, the shortest one simple but the longer 1—2 having 1—6 short branch-spikes, upper fascicles subapproximate or distant, lower distant or remote, from one another. *Bracts* of the lower fascicles foliaceous, much shorter than the stem, upper bracts much reduced, subfoliaceous to setaceous, lower longly upper shortly sheathing; *sheaths*

brown-membranous at the mouth. *Spikes* androgynaeceous, erect to subnutant, oblong-cylindric, 2—6 cm long, 5—8 mm thick, sublax-flowered, male part much shorter than the female part; *peduncles* short to very long, trigonous, slender, smooth. *Bracteoles* (at the base of the branch-spikes) in the form of long glumes, amplexicaul at the base. *Cladoprophylls* 0. *Female glumes* oblong-lanceolate, incurved, strongly so below, apex acute or sometimes obtuse and erose-ciliolate, 4.5—5.5 mm long, 2—2.75 mm wide, membranaceous, translucent, glabrous or nearly so below, sparsely to subdensely subadpressed-hispidulous above, reddish brown which is lighter above, nervose, midrib prominent, sometimes hispid towards the apex, which is often excurrent in a rather wide, flattish, glabrous awn up to 1 mm long. *Utricles* (not fully developed) oblong-fusiform or ellipsoid-lanceoloid, trigonous, 7.5—9 mm long, 1—1.5 mm broad, membranaceous, distinctly nervose, narrowly marginate, subdensely subadpressed-hispidulous, sometimes glabrescent below, margins hispid, usually somewhat revurved, suberect to patulous, pale greenish, becoming light reddish-brown, rather longly (0.5—0.75 mm) stipitate, gradually beaked; *beak* tapering, compressed-trigonous, 2—3 mm long, narrowly marginate, subadpressed-hispidulous, straightish, light brownish, bilobed or bidentate; *mouth* dorsally very oblique; *teeth* or *lobes* pale, glabrous, straight or converging, short ventrally but 1 mm long dorsally. *Achene* (immature) ellipsoid-oblong or slightly oblong-obovoid, trigonous, faces flattish to concave, 3.5—4 mm long, 1—1.3 mm broad, dark reddish-brown, shortly stipitate, beak slightly to extremely bent, 0.3—0.4 mm long. *Style* slightly thickened towards the base. *Stigmas* 3, long.

SUMATRA: Atjeh; Gajo Lands, Leuser (Losir) massif, on the upper course of the Lau Alas, mountain heath, 2100—2250 m, 29 Jan. 1937, *van Steenis* 8A61 (B)!

Indo-China.

The Indo-Chinese plant differs from the Sumatran one in several respects, chiefly in having more spikes in its fascicles, sometimes obtuse glumes, and smaller utricles, but, so far as one can judge from its poor condition, it is conspecific with *C. Vansteenisii*.

The type material of *Carex Vansteenisii* did not reach me until the typescript of this Revision was in the hands of the printer. Its description is therefore given here. Kiikenthal is probably right in relating this plant to *C. polycephala* Boott, which he places in Section *Hymenochlaenae* Drejer, Subsection *Longirostres* Kiikenth. It has, however, strong affinities also with Section *Stramentitiae* (C. B. Clarke) Nelmes, some members of which, through being in process of shedding the cladoprophyll, form a link between Subgenera *Indocarex* and *Carex* (*Eucarex*). *C. Vansteenisii* has gone further along this road and completely lost the cladoprophyll. In some future account of Malaysian *Carex*, when more material is available, it will probably be recognised as forming a distinct group.



## DOUBTFUL SPECIES

There are several described Malaysian *Carices* of which I have not seen the types but which, for one reason or another, I have felt justified in including in the above work. I am, however, in too much doubt about *C. subfilicina* Ohwi to be able to place it in my classification, but add it here with the original description translated and shortened.

## CAREX SUBFILICINA Ohwi

*Carex subfilicina* Ohwi in Bot. Mag. Tokyo 56: 213: 1942. — New Guinea, Kanehira & Hatusima 13,815.

*Rhizome* rather elongate. *Stems* obtuse-angled, smooth. *Leaves* subequal in length to the stems, flat, 4—6 mm wide; *sheaths* blackish-brown, subdissolute. *Secondary panicles* 3 or 4, ovate-triangular, 4—5 cm long, lowest remote, branches of the rhachis scabrid. *Spikes* androgynaeceous, oblong-ovate, 8—10 mm long, patent, male part about 3 mm long. *Female glumes* broadly ovate, several-nerved, red-purplish, white-hyaline above, pilosulous on the back above, aristate. *Utricles* ovate, trigonous, scarcely inflated, 3.5—4 mm long, obliquely patent, excurved above, membranaceous, ventrally several-ribbed, dorsally subnerveless, hispidulous, brownish, abruptly narrowed at the apex into a flattish beak of medium length; *mouth* hyaline, bidentulate. *Stigmas* 3, slender, short.

"Habit of *C. filicina* Nees. Apparently near *C. ceylanica*, from which it differs, however, in its aristate glumes."

NEW GUINEA: Netherlands New Guinea; Arfak Mts. [Lina Mts.], in secondary forests fringing Iray R., Anggi Giji lake, 1900 m, 8 April 1940, Kanehira & Hatusima 13,815; *ibid.*, in forest, rare, 1200 m, 4 April 1940, Kanehira & Hatusima 13,429.

Endemic.

From its description this species seems most closely related to *C. plebeia* C. B. Clarke, recorded from India and Siam, but it suggests close affinity also with *C. ceramica* Nelmes, *C. neo-guineensis* C. B. Clarke, and *C. po/puana* Nelmes.

## CAREX SP.

Aff. *C. arenicola* Fr. Schmidt, Reis. Amurl. u. Ins. Sachal. 191 t. 6, ff. 18-24: 1868.

*Rhizome* creeping, slender (about 1 mm in diameter), clothed with brown, subentire, sheathing scales. *Stems* 7—14 cm tall, trigonous, smooth, or sometimes scaberulous above, erect to curved or flexuous, slender (0.3—0.5 mm in diameter), bearing a tuft of leaves at about 1.5—4 cm from the base, which is apparently buried in light soil, and clothed with brown, almost leafless sheaths, stem naked above. *Leaves* shorter than the stem, curved, sometimes flexuous, thick, canaliculate, up to 1 mm wide, smooth, sometimes minutely scaberulous towards the circinate, attenuated apices.

*Spikes* 4—7, ellipsoid-lanceolate, 5—7 mm long, androgynaeceous, male part about as long as the female, subdenseflowered, sessile, approximate, forming a terminal, more or less oblong head, 1—1.5 cm long and 4—7 mm broad. *Bracts* glumiform, lower with setaceous blades up to as long as the whole inflorescence, upper glumiform, sometimes aristate. *Female glumes* ovate-lanceolate, oblong-ovate, or oblong-lanceolate, sometimes acuminate, apex acute to subobtusate, cymbiform, about 3.5 mm long, 1.75—2 mm wide, translucent, castaneous, thin, whitish-hyaline, at least above, midrib slender, pale, or centred in a pale stripe, below, not or just extending to the apex in a firm tip, or very shortly excurrent. *Utricles* very immature, 3—4 mm long, about 1 mm broad, compressed (through immaturity) plane-convex, apparently nerveless, glabrous, oblong or oblong-elliptic, tapering above into a castaneous beak, otherwise stramineous, margins finely hispidulous from above the middle upwards to the beak, which diminishes to an acute apex; *mouth* dorsally oblique, with a groove and sometimes slightly split and overlapping margins down the back of the beak. *Stigmas* 2, thickish.

NEW GUINEA: Netherlands New Guinea; Lake Habbema, sunny bogs, 3225 m, Brass 9235 (AA)!

Endemic.

S. T. Blake (*in* Journ. Arn. Arb. 28: 116: 1947) related this to *C. stenophylla* Wahlenb., and rightly remarked that the utricles were far too undeveloped for certain determination.

## INDEX

- Carex* 221-226, 228-230, 232, 244, 247, j 248, 260, 262, 297, 356, 366, 395, 399, 408, 411, 437, 445, 446.
- Subgen.* *Carex* 221, 223, 227, 232, 251, 325, 329, 331, 354, 405, 412, 445; *Eucarex* 221, 223-227, 232, 329, 405, 445; *Euviginea* 229; *Indocarex* 221-227, 232, 243, 244, 246, 248, 251-253, 257, 263, 265, 273, 275, 279, 283, 288, 314, 317, 322, 325, 331, 333, 348, 445; *Primocarex* 222-224, 231, 404, 412, 437; *Viginea* 221, 223-227, 232, 233, 431, 441; *Vigneandra* 229; *Vignegyne* 229.
- Sect.* *Acutae* 227, 229, 354, 418, 422; *Anomalae* 332, 413; *Borneenses* 229, 332, 347, 348; *Capitellatae* 331, 404, 405; *Circinatae* 412; *Confertiflorae* 395; *Cruciatae* 243, 275, 276, 288, 243; *Cryptostachyae* 332, 363; *Decorae* 247, 325, 332, 340, 347, 348, 356, 357, 408; *Digitatae* 383, 387, 389; *Echinochlaenae* 322, 329; *Elatae* 223, 322, 329; *Elongatae* 432, 438; *Fecundae* 418; *Ferrugineae* 332, 409; *Filicinae* 243, 276, 285, 286, 288; *Graciles* 331, 353, 354, 356; *Heleonastes* 432, 443; *Hirtae* 247, 407; *Hymenochlaenae* 348, 403, 418, 445; *Hypolytroides* 243, 244, 246, 408; *Indicae* 251, 273, 276, 288; *Lageniformes* 225, 263, 265, 332, 363, 366, 371; *Longispicae* 229, 332, 417, 418; *Mapaniifoliae* 243, 248; *Mitratae* 265, 332, 363, 371, 382; *Molliculae* 395; *Muehlenbergianae* 431, 435; *Multiflorae* 431, 433; *Mundae* 331; *Pacificae* 243, 329; *Paniculatae* 431, 432, 433; *Polystachyae* 223, 243, 322; *Praelongae* 332, 421; *Pseudocypereae* 332, 392; *Radicales* 332, 389; *Rhizopodae* 331, 411; *Rhomboidales* 225, 251, 260, 332,

382; Scabrellae 243, 244, 251; Scleriaculmes 332, 407; Spirostachyae 322, 329, 405; Stellulatae 432, 441; Stramentitiae 243, 244, 250, 257, 275, 276, 288, 348, 445; Sylvaticae 332, 402, 403; Tumidae 332, 394, 395; Unciniaeformes 405; Vulgares 332, 429.

*Subject.* Cryptocarpaceae 418; Cryptostachydeae 363; Debiles 348, 403; Eu-Digitatae 383; Graciles 418; Gracilirostres 251, 288; Hispidulae 288; Lageniformes 366; Longirostres 445; Praelongae 421; Radicales 389; Turgidulae 251, 276; Vulgares 429.

[*Series*] Cruciatæ 275, 276; Filicinae 286; Stramentitiae 250, 251;

acaulis 382; acrophila 238, 353, 354, 357; Adrienii 246; alta 229, 233, 438, 440; angarae 444; anomocarya 236, 383; appressa 237, 430, 432; appropinquata 433; arenicola 446; arfakiana 398; aridens 240, 333; atjehensis 403; atrosanguinea 238, 333, 339; baccans 232, 322; bengalensis 277; *var. scaberrima* 292; *var. virgata* 293; binervis 227; blepharolepis 242, 251, 265, 267, 271; borneensis 239, 347, 348, 351; *var. Clemensii* 349; *var. Clemensii* / *angustifrons* 349; brachyathera 411; breviceps 244, 246; *var. recurvirostris* 246; breviculmis 234, 236, 371, 373-375; *subsp. Royleana* 374, 379; *subsp. Royleana var. Kingiana* 378, 379; *var. perciliata* 374, 411; breviglumis 240, 347, 348; breviscapa 236, 366, 369; brevis 236, 371, 375; brizopyrum 438; Brownii 234, 236, 395, 398; brunnea 229, 240, 354, 357, 359, 418; *var. dolichocarpa* 240, 353, 360; *var. subteinogyna* 240, 354, 359; Buennemeijeri 239, 276, 283; bulbostylis 377; *var. ciliato-marginata* 374; *var. hispidula* 375; buruensis 238, 353, 360; Buxbaumii 437, 444; canescens 437, 444; capillacea 233, 404, 405, 407; *var. major* 233, 406, 407; celebica 234, 333, 345, 347, 431; ceramiea 241, 286, 319, 446; cernua 229; ceylanica 306, 446; chlorostachys 399; cirrhulosa

242, 251, 262, 263, 265; Clarkeana 240, 287, 288, 289, 349; Clemensii 349; comixta 267, 290; composita 328; conferitiflora 395; continua 242, 286, 287, 299, 314, 316; constricta 346, 347; courtallensis 391; cruciata 239, 242, 276, 277, 279, 281, 282, 285; cryptostachys 237, 263, 275, 363; Cumingiana 244; Cuminii 260; curta 228, 233, 437, 443, 444; Curtisii 369; curvirostris 322; Daltonii 325; decora 325, 345; *var. losirensis* 345; Dietrichiae 242, 250, 263, 273, 275, 276, 307, 314; divulsa *var. javanica* 238, 430, 435, 436; Doniana 234, 235, 394, 395, 399, 401; *var. cacuminis* 234, 235, 394, 401; eehinata 437, 443; elibates 234, 237, 413, 416; Elmeri 388; eremostachya 233, 411, 412; euphlebica 419; exploratorum 237, 418; Eymae 239, 347, 348, 352; fallax 434, 435; fascicularis 235, 393; fibrata 262; filicina 240, 280, 287, 304-308, 311, 321, 342, 446; *var. angustifolia* 239, 240, 287, 306, 311; *var. ceylanica* 306; *var. ciliata* 308; *var. hirta* 302; *var. saturata* 302; *var. Zipelii* 243, 287, 306; / *saturata* 302; finitima 234, 236, 237, 403, 404; fissilis 321; Fleckeri 269; foliosissima 373; fuirenoides 244, 275; *var. cirrhulosa* 262, 275; fusiformis 348, 404; *var. borneensis* 351; *var. enervosa* 403; galactolepis 242, 276, 279, 281; Gaudichaudiana 429, 430, 431; *var. humilior* 430; gembolensis 240, 241, 287, 294, 301; *var. crebra* 241, 288, 297; *var. timorensis* 301; Gibbsiae 340; Graefea 229, 418, 421; Harlandii 384; hatuimana 369; Havilandii 343; hebecarpa 407; *var. Maubertiana* 408; Helferii 241, 248, 250; hexasticha 426, 428; Horsfieldii 242, 251, 267, 269, 271; *var. major* 242, 251, 271; hypolytroides 233, 243, 246, 248, 408; hypsophila 341; *var. Havilandii* 343; *var. verticillata* 341; indica 242, 250, 267, 271, 273, 275, 276, 314; *var. fissilis* 275; *var. laete-brunnea* 273, 275; *var. Milnei* 273, 307, 314; insignis 247, 408; Jackiana 236, 237,

383, 384, 387; *var. breviculmis* 369; *var. chlorostachys* 399; *var. mesogyna* 399; javanica 322; kemiriensis 233, 422; kinabaluensis 239, 347, 348, 349; kingiana 378; kuntzeana 327; lacerans 235, 429, 430, 431; lamprochlamys 239, 287, 313, 314, 316, 321; *var. diplocolea* 240, 287, 314; lateralis 234, 383, 387, 388; lenticularis 426; leucostachys 238, 250, 251; ligata 367; *var. formosensis* 402; *var. nexa* 373; ligulata 407; Loheri 234, 236, 383, 386; / *grandimacula* 386, 388; longibracteata 241, 322, 325, 327, 329, 404; *var. gigantea* 328, 329; *var. major* 327, 329; / *angustifolia* 327; / *distans* 327; longipes 238, 242, 353, 361; *var. ramosa* 361, 363; macrothyrsa 292, 293; maculata 237, 413, 429, 414; *var. neurochlamys* 413; *var. sanguineo-squamata* 416; / *humilior* 416; madoerensis 256; malaccensis 238, 250, 252, 257, 260, 265; malayana 234, 366; Maubertiana 235, 247, 407, 408; melanophora 316; Merrillii 240, 333, 336; microglochis 224; monoppleura 233, 438, 440, 441; montivaga 237, 371, 377; Moritzii 271; moupinensis 248; multifolia 234; 371; myosurus 241, 322, 325; *var. celebica* 325; neoguineensis 239, 240, 287, 312, 313, 342, 308, 446; *var. laxior* 308, 321; neurochlamys 237, 413; nigra 429, 430; nikoensis 330; nodiflora 241, 250, 260, 263; notha 426; nubigena 229, 237, 386, 433, 434, 435; *var. fallax* 434, 435; oblonga 241, 286, 297, 301; oedorrhapha 236, 394, 395, 396; *var. arfakiana* 396; *var. microcarya* 236, 394, 398; oligostachya 237, 243, 244, 246; olivacea 235, 394, 395, 398; *var. altissima* 396; Pairaei *var. javanica* 237, 436, 437; palawanensis 238, 250, 251, 263; pandanus 419; paniculata 433; papuana 243, 287, 307, 314-316, 446; pentacarpa 297, 299; perakensis 240, 250, 252, 253, 348; perciliata 234, 236, 371, 374, 411, 431; perileia 233, 441-443; petecticalis 233, 422, 424; phacelostachys 234, 333, 344;

*var. losirensis* 234, 333, 345; phacota 234, 235, 386, 421, 426; philippinensis 237, 418, 419; plebeia 446; pocilliformis 235, 371, 381, 382 > 404; polycephala 445; pruinosa 235, 386, 416, 421, 428; *var. aristata* 426; pseudocyperus 394; *var. fascicularis* 393; pseudorivulorum 255, 289, 348, 349; Pullei 240, 333, 338; punctata 426; pycnothyrsos 242, 276, 282; Rafflesiana 240, 267, 287, 290, 291, 293, 299, 301, 324; *var. continua* 299, 314, 316, 318; *var. macrothyrsa* 241, 288, 292; *var. scaberrima* 292; *var. tenuior* 294; *var. virgata* 241, 288, 293, 294, 297; rara 407; *subsp. capillacea* 405, 407; recurvirostra 322; Ramosii 238, 250-252, 257, 259; remota 229, 440; *subsp. alta* 438; *subsp. alta var. brizopyrum* 438, 440; *subsp. Rochebrunii* 441; *var. Rochebrunii* 440; repanda *var. implumis* 279; rhizomatosa 244; *var. aristulata* 244; rhizopoda 412; rhynchachaenium 236, 366, 368, 369; rivulorum 348; Rochebrunii 441 p Royleana 374; rugata 236, 237, 371, 378, 379; sarawaketensis 240, 241, 288, 316, 318, 320; *var. brevirostris* 318; *var. glabrinux* 239, 287, 318; *var. minor* 241, 286, 288, 317; satsumensis 238, 329, 330; saturata 239, 287, 302; scaberrima 292; scabrella 243; scleroides 242, 287, 307; semiglomerata 239, 276, 285; sp. 446; spathaceo-bracteata 238, 353, 356, 357; spadiceo-vaginata 359; spathulata 233, 422, 423; spatiosa *var. bogorensis* 265; speciosa 238, 389, 390-392; *var. abscondita* 390; *var. angustifolia* 391; spongoneura 241, 276, 281; stenophylla 447; stenura 238, 389, 391, 392; stramentitia 242, 251, 267, 269, 276; subfilicina 446; subtransversa 235, 395, 401; sumatrensis 341; Svenonis 443; tartarea 341; teinogyna 360; teres *var. spathulata* 423; thomsonii 229; timorensis 242, 287, 301; tonkinensis 240, 250, 252, 254, 349; tricephala 238, 250, 252, 256, 257, 260; tricholoma 374; tricuspida 236, 409, 410, 411;

*var. brevispiculosa* 410; *var. minor* 410; *tristachya* 235, 371, 379, 382; *var. pocilliformis* 381; *tumida* 396, 398; *turrita* 239, 333, 335; *tytholepis* 239, 241, 287, 320, 321; *Vansteenisii* 240, 444, 445; *var. brevispiculosa* 253; *verticillata* 228, 234, 311, 333, 340, 343, 345; *var. Havilandii* 233, 335, 343; *var. lutescens* 235, 333, 343; *vesiculosa* 297, 302; *virgata* 293; *vulcanica* 260; *Walkeri* 325; *var. turrita* 335; *var. 345*; *Wightiana var. perakensis* 253; *var. repanda* 281; *xestogyne* 239, 287, 311, 319.  
*Kobresia* 224; *curvata* 221, 223, 224, 331.  
*Schoenoxiphium* 221, 223, 224, 331.  
*Trasus* 224.  
*Uncinia* 221, 223, 224; *microglochis* 224.