Amongst the non-provitaminic carotenoids, lutein and zeaxanthin might be used as supplements to the basal diet of poultry and fish, in order to intensify the pigmentation of the body and of the egg yolk and to improve the biological value of alimentary products of poultry and fish origin.

It should be noted that so far the leaves of C.sativa have not been utilized from this point of view, so that yearly great amounts were lost. If the leaves of C.sativa were used in the diet of poultry as sources of carotenoids (both provitaminic and non-provitaminic), there could be spared great amounts of maize flour, presently used in the poultry rearing units as sources of carotenoids.

At the same time this raw material could be turned to a better account, instead of utilising it, - as it happens in various countries, - for producing narcotic drugs, especially of hashish.

As far as the chlorophyll pigments are concerned, it should be pointed out the relatively high content of chlorophyll b. The ratio between chlorophyll a and b was 2,17 times lower that in the instance of several other higher plants.

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INSTITUTUM AGRONOMICUM "DR.PETRU GROZA" CLUJ-NAPOCA/ROMANIA/
NOTULAE BOTANICAE HORTI AGROBOTANICI 1981, XI.

WHEATGRASS VARIABILITY (AGROPYRON, SECT. ELYTRIGIA) IN A NATIVE COLLECTION FROM TRANSYLVANIA. II. AGROPYRON REPENS (L.)P. BEAUV.

A.T. SZABÓ

Abstract:
SZABÓ T.A., 1981, Wheatgrass variability (Agropyron Sect. Elytrigia) in a native collection from Transylvania, II. Agropyron repens (L.) P. Beauv. Not. Bot. Hort. Agrobot. Cluj, XI,61 - 68.
In continuation of former studies regarding Wheatgrass variability (Agropyron Gaertn. sect. Elytrigia /Desv./Rchb.) carried out on 89 different populations collected along a transect in Transylvania (Not. Bot. Hort. Agrobot. Cluj, 1979, X. 89-99) results regarding 31 A.repens (L.) P.Beauv populations are presented in this paper.

Average values per population for open pollination fertility (OPF) varied between 0.0 - 40.0 %; spike length: 59-196 mm; spikelet length: 8.8-17.0 mm; number of caryopses per spike 0.0-40.0 etc.

The results may contribute to the explanation of some microevolutionary processes and differential spreading patterns found in Elytrigia section.

Index words: Agropyron repens, A. intermedium, OP fertility, phenetic variability, germination.

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Phenetic and genetic studies carried out in the members of the genus Agropyron by Y.CAUDERON 1966, D.R.DEWEY 1961-1978, S.SAKAMOTO 1966-1978, G.L.STEBBINS et al. 1946 and others suggests a complex reticulate evolution of the taxa concerned. Results regarding the pat-

:erns of phylogenetic differentiation in the Tribe Triticeae have ›een sythetized recently by S.SAKAMOTO 1973, emphasising that during .he evolution and differentiation process the different species accu-ıulated genoms or parts of genoms of different origin. As a result a ;roup named Agropyron-Elymus-Sitanion Complex have been formed (7). 'his complex is genetically open in many respects to the members ‹f the Tribe Triticeae forming a common secondary or tertiary gene-pool. Members of the section Elytrigia may be regarded as the a broa-ıer genetic bridge between the different species groups.

The heterogenity of the Agropyron-Elymus-Sitanion complex is lso reflected by the often contradictory nomenclature and systema-ics. The genetical background of this heterogenity can be better nderstood if we presume a gene-flow in both directions; not just rom wild species to the cultivated one, but from the crop plants oward the weedy species, too. In a previous paper (Not.Bot.Hort.Agr. . 89-99) results regarding the phenetic (morphological and biologi-al) variability of some Agropyron intermedium populations collected rom Transylvania seems to uphold this assumption. In the case of he examined A.intermedium populations some crop plant characteris-ics widely distributed in cultivated cereals have been observed such . s open seednes, uniform and rapid germination after a very short pe-iod of dormancy, lack of resistance facing rhizome fragmentation etc. ue perhaps to such properties A.intermedium is not a weed in arable ınd and its populations are located around the cultivated fields 9). A.repens ,on the contrary, is one of the most troublesome and requent weed on the cultivated fields of Transylvania.

Material and methods

The mode of collection, localization and taxonomic classifica-ion of samples were presented in the previous paper (9). From the Agropyron samples collected, results regarding the 31 A.repens po-ılations are presented in detail in this peper.

The phenetic variability of the following characters have been ıalyzed: fertility of the flowers in natural populations (open polli-ıtion fertility - OPF%); spike length; spikelet length; awness and ‹n length; hairiness of spikelets; number of flowers per spikelets; ımber of cariopses per spike, number of cariopses per spikelets; sus-ıptibility to fungal disease in natural habitat; germination; growth

of seedlings; growth type of the young plants; regrowth after cut-ting (first year). Open pollination fertility was calculated accor-ding to the formula:

$$OPF = \frac{M \cdot s \cdot 100}{f}$$

where M = mean number of cariopses per spike, s = number of analized spikes per population; f = number of analized flowers per population.

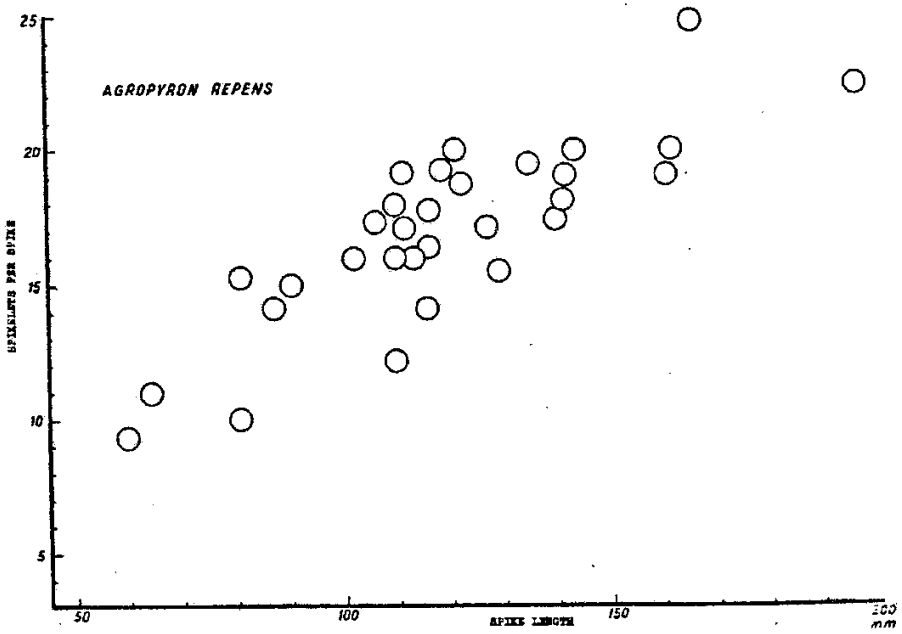

Fig. 1. The scatter diagram of the analyzed A. repens populations in relation to the length of the spike and number of spike-lets per spike.

Results and discussion

The most fertile populations (Tab. 1) were those found in ruderal conditions (36a, b, 61, 35, 39), but some populations collected from crop fields were also fertile (21, 19). The OPF mean values of

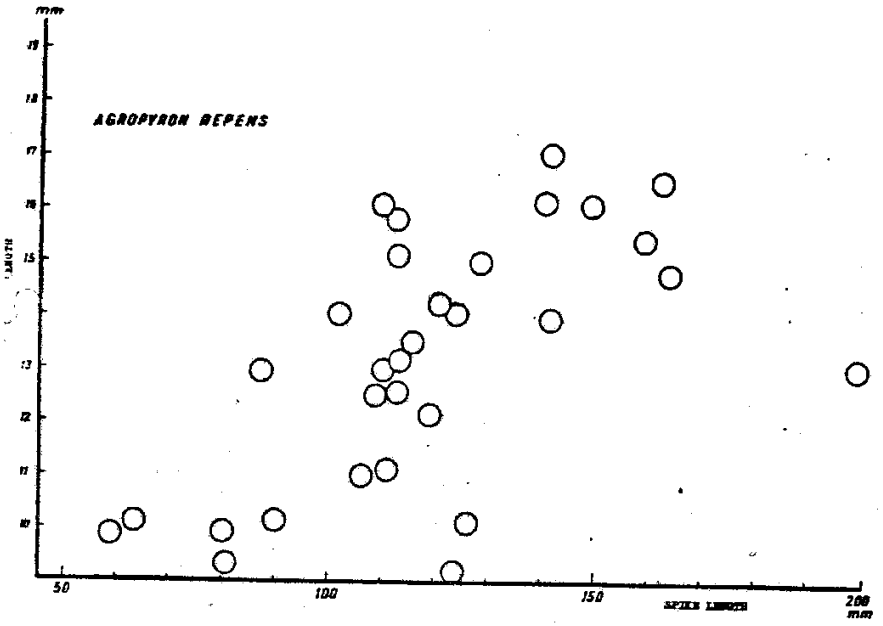

Fig. 2. The scatter diagramm of the analyzed A. repens populations in relation to the length of the spikes and spikelets respectivaly.

the different populations varied between 0.0% and 40.0%, the OPF mean value of the examined 31 populations was 13.2%. It is worth mentioning the striking variability noticed in the case of some cariopses regarding colour, size, shape. These characters (not studied in detail) form the same homologous series of variation, as those observed in the case of wheat.

The mean length of spikes varied between 59 and 196 mm, (the mean value for the 31 examined population x = 111 mm). Populations with ahorter spikes are more frequent along the roadsides. Spikelet length varied between 8.8 - 17.0 mm ($\bar{x}$ = 15.5) number of flowers per spikelets between 3.3 - 6.2 ($\bar{x}$ = 4.2), the number of cariopses per

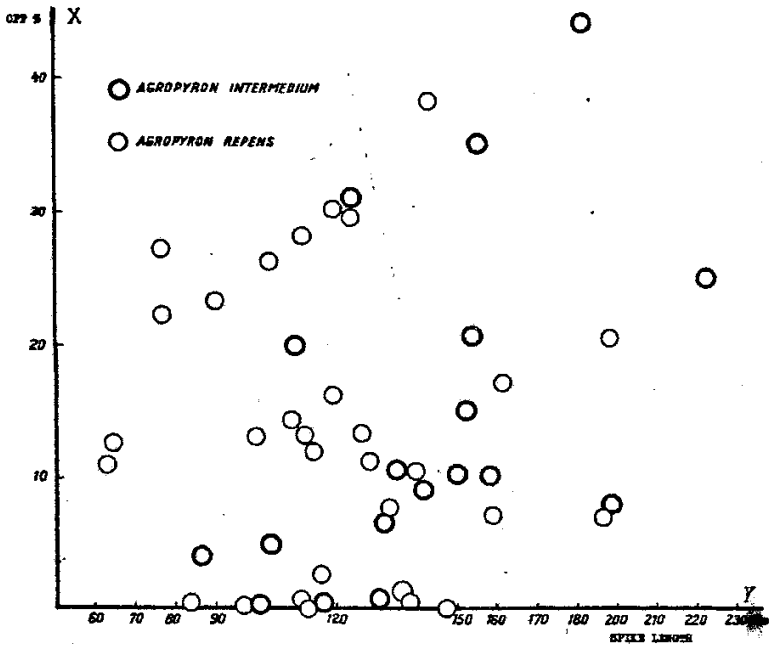

Fig. 3. The scatter diagramm of the analyzed populations of A.intermedium (bold type circles) and A. repens (thin type circles)in relation tothe length of spikes and open pollination fertility, respectively.

spike between 0.0 - 2.0 ($\bar{x}$ = 0.7). About 45% from the analized populations were awned, but notone have been found with hairy spikelets.

The positive correlation between the length of the spike and the number of spikelets (Fig. 1) is stronger than that between the length of the spikes and length of the spikelets (Fig. 2). The scatter diagramm of the analized Agropyron samples (both A.intermedium and A.re-

Tab. 1.

Average values for the Agropyron repens (L.) P.Beauv populations, collected from Transilvania in 1978.

Nr.	Population	OPF%	01	03	05	07	11	13	15
1	Sighişoara-36a	40.0	162.5	16.5	20.0	2.0	5.0	40.0	2.0
2	Mesteacănu-21	37.9	143.3	13.7	21.0	0.7	3.8	30.3	1.5
3.	Sighişoara-36b	30.2	119.8	14.3	20.0	-	4.8	29.0	1.6
4	Zalău-61	29.4	123.0	14.2	18.8	0.5	4.4	24.1	1.5
5	Dumbrava-19	28.0	113.0	11.3	16.6	1.3	3.6	16.8	1.0
6	Hoghiz-35	26.4	81.4	9.4	10.4	0.2	3.5	9.6	0.8
7	Tigmaru-39	25.6	106.6	11.0	17.4	-	4.2	18.9	0.8
8	Olosig-17a	23.0	90.4	10.1	14.9	0.6	4.2	14.7	1.0
9	Miercurea-C.-50	22.2	80.2	9.9	15.2	-	4.3	10.3	0.6
10	Cîmpia-T.-47	17.7	108.0	12.5	18.2	-	4.5	14.5	0.8
11	Sumurduc-67	17.1	164.2	14.7	25.0	0.1	5.3	22.6	0.9
12	Nadeş-37	16.3	118.2	12.3	19.3	-	4.3	13.1	0.6
13	Feldioara-31	14.0	114.3	15.2	16.0	-	4.1	9.5	0.7
14	Gilău-56	13.0	111.0	12.9	19.2	-	4.1	10.2	0.6
15	Voşlobeni-29a	12.7	126.7	10.8	17.1	-	3.7	8.2.	0.6
16	Acăţari-41	12.6	103.0	14.1	16.2	-	4.5	9.2	0.6
17	Cluj-M.-85	11.8	63.9	10.1	11.4	-	3.8	4.5	0.6
18	Gilău-57	11.4	59.2	9.8	9.6	-	3.8	4.2	0.4
19	Gilău-86	10.8	128.0	14.8	15.4	1.1	4.4	7.3	0.5
20	Bica-62a	10.3	142.0	17.0	19.2	0.2	4.5	4.4	0.2
21	Cluj-M.-84b	7.9	196.5	13.2	22.5	0.4	4.5	4.0	0.2
22	Gheorgheni-27	7.3	158.8	15.4	19.1	-	4.5	0.0	0.0
23	Cluj-M.-84c	6.8	133.9	8.8	19.6	0.5	3.3	4.4	0.0
24	Voşlobeni-29b	5.8	112.2	15.6	16.4	4.8	2.9	2.8	0.0
25	Mociu-20	4.4	115.0	13.2	14.2	-	4.0	2.6	0.5
26	Zalău-60	1.7	116.0	13.5	17.8	-	4.7	1.4	0.1
27	Căpuş-52a	0.5	109.3	15.8	12.3	-	3.0	0.0	0.0
28	Dealu-38	0.4	139.0	16.2	17.6	1.2	5.2	0.4	0.0
29	Viştea-58a	0.0	86.6	12.9	14.2	0.1	4.5	0.0	0.0
30	Gîrbău-80	0.0	148.0	16.2	18.0	-	6.2	0.0	0.0
31	Gilău-87	0.0	112.0	12.5	17.1	1.7	4.3	0.0	0.0

Explications: OPF% - open pollination fertility; 01 - length of spike (mm); 03 - length of spikelets (mm); 05 - number of spikelets/spike; 07 - length of awns; 11 - number of flowers/spikelets; 13 - number of seeds/spike; 15 - number of seeds/spikelets;

pens), represented comparatively (OPF% and spike length) indicate a similar dispersion pattern by both species: some short awned and more fertile populations are separated from that with lower OPF values and longer spikes. (Fig. 3).

This is the explanation of the fact, that the mean values calculated for 31 A.repens and 20 A.intermedium populations are not significantly different in respect of open pollination fertility, number of flowers per spikelets (Tab. 2). The difference between generative versus vegetative spreeding strategies between the two species is strongly reflected by the character "number of seeds per spikelets"

Average values of the analyzed characters calculated from the values found by 31 A.repens populations and 20 A.intermedium populations.

Tab. 2.

Cod	Characters	Agropyron repens	Agropyron intermedium
OPF	Open pollination fertility	13.17	12.54
01	Length of spike (mm)	111.70	143.72
03	Length of spikelet (mm)	12.36	13.86
05	Number of spikelets/spike	15.51	16.01
07	% of awned populations	45.45	12.90
09	% of populations with hairy spikelets	0.00	20.00
11	Number of flowers/spikelets	4.24	5.00
13	Number of seeds/spike	10.23	19.00
15	Number of seeds/spikelets	0.70	1.00

A.intermedium forming about twice as much seeds in a spike as A.repens.

The seed germination in sampled A.repens populations was not uniform; germination remained below 30% after a four-month dormancy period (at room temperature and natural light). There were populations with germination below 10%. Some populations (such as that collected in Mesteacănu) germinated quickly (80% after 48 hours) in a manner similar to the A. intermedium populations indicating that generative propagation may be of considerable importance for A. repens too. But, in general terms, the germination pat-

term of A.repens is fitted to tillage and the species is adapted to vegetative spreading strategy. This is reflected also by the fact, that the A.repens samples were much more rhizomatous.

Selection acting against vegetative spreading by A.repens populations have been observed mostly along the roadsides; there the spikelets seems to be the main reproductive units. In such populations (characteristic for example for parking places too) colonies forming short and more fertile spikelets with fragile rachis can frequently be found. The evidences strongly support the assumption that such populations are taking part in a microevolutionary process, in which the main selective forces are the motor-vehicles, and highway traffic.

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NOTULAE BOTANICAE HORTI AGROBOTANICI 1981, XI.

ÜBER DIE ART SISYRINCHIUM MONTANUM GREENE IN RUMÄNIEN

C. SVOBODA

Abstract:
SVOBODA C., 1981, Über die Art Sisyrinchium montanum Greene in Rumänien (Some remarks regarding Sisyrinchium montanum Green in România). Not. Bot. Hort. Agrobot. Cluj., XI, 69 - 73 . In the year 1976 the author discovered a new station with Sisyrinchium montanum Green, a species which is in spreading in Transylvanian Highland. In connection with this finding problems regarding the identification, nomenclature, chorology and variability of this species are discussed and rectifications proposed.

Index words: Sisyrinchium, nomenclature, chorology, România.

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1. Nomenklatorische und taxonomische Bemerkungen

In Rumänien ist die Gattung Sisyrinchium L. (Iridaceae) durch eine einzelne Art vertreten. Die genaue Bestimmung und Benennung dieser Art ist aber sehr kritisch. PRODAN et NYÁRÁDY (1966) und VÁCZY et BELDIE (1976) erkennen als gültigen Namen für die in Rumänien gesammelten Pflanzen Sisyrinchium angustifolium Mill. /Gard. Dict. ed. VIII. (1768) nr. 2; Fl. URSS IV (1935) 578 syn. S.bermudiana L. Sp. pl. ed. I.(1753) 954 pp. - Exs. PRE nr. 2725./
Eine ähnliche nomenklatorische Lösung prasentieren HESS et al. (1967).

Während der Revision der europäischen Sisyrinchium - Arten gelangt INGRAM (1978) zur Schlussfolgerung, dass auf dem Kontinent nur die Art S.montanum E.L. Greene (Pittonia 4:33 (1899) syn. S.angustifo-