

Research article

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A revision of the Afrotropical hover fly genus *Afroxanthandrus* Kassebeer, 2000 (Diptera, Syrphidae), with the description of two new species and one new synonymy

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Abstract. The hover fly (Diptera: Syrphidae) genus *Afroxanthandrus* Kassebeer, 2000 is revised based on morphological and molecular characters. Two new species, *Afroxanthandrus comorosensis* sp. nov., and *Afroxanthandrus conopeum* sp. nov. are described, while *Xanthandrus magnificus* Thompson, 2019 is a new junior synonym of *Afroxanthandrus congensis* (Curran, 1938). We also redescribe *A. congensis* stat. rev. and *A. longipilus* stat. rev. and report additional distribution records for both species.

Keywords. Flower flies, species description, identification key, forest biodiversity.

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Introduction

Hover flies (Diptera: Syrphidae) are a diverse family of true flies, with almost 6500 described species globally (Evenhuis & Pape 2024). They are well-documented flower visitors and are important pollinators (Inouye *et al.* 2015). About 610 species are known from the Afrotropics, less than 10% of the global fauna (Ssymank *et al.* 2021). In the last 25 years, interest in Afrotropical Syrphidae Latreille, 1802 has grown, underscored by the recent publication of an updated key to genera (Ssymank *et al.* 2021).

Also, revisions with identification keys are now available for *Afrosyrphus* Curran, 1927 (Mengual *et al.* 2020), *Amphoterus* Bezzi, 1915 (Midgley *et al.* 2023a), *Ceriana* Rafinesque, 1815 (Thompson 2013), *Chasmomma* Bezzi, 1915 (Kassebeer 2000a), *Ischiodon* Sack, 1913 (Mengual 2018), *Megatrigena* Johnson, 1898 (Doczkal *et al.* 2016), (part of) *Merodon* Meigen, 1803 (Radenković *et al.* 2018; Djan *et al.* 2020; Vujić *et al.* 2021), *Mesembrius* Rondani, 1857 (Jordaens *et al.* 2021), *Phytomia* Guérin-Méneville, 1834 (De Meyer *et al.* 2020a), *Senaspis* Macquart, 1850 (De Meyer *et al.* 2020b), *Syritta* Le Peletier & Serville, 1828 (Lyneborg & Barkemeyer 2005) and *Spheginobaccha* de Meijere, 1908 (Thompson & Hauser 2015). Additionally, several smaller taxonomic works have been published, adding knowledge on *Eristalinus* Rondani, 1845 (subgenus *Merodonoides*) (Thompson 2019), *Meromacroides* Curran, 1927 (Bellingan *et al.* 2021), *Microdon* Meigen, 1803 (Reemer & Bot 2015), *Paramixogaster* Brunetti, 1923 (Ssymank & Reemer 2016), *Spheginobaccha* de Meijere, 1908 (Midgley *et al.* 2023b) and *Syrittosyrphus* Hull, 1944 (Ssymank & Jordaens 2021). Despite this, the Syrphidae of the Afrotropics remain understudied compared to other regions (Whittington 2003; Ssymank *et al.* 2021). Furthermore, even in recently revised genera, undescribed species are regularly encountered (e.g., in the genus *Syritta*: van Steenis 2010). The genus *Afroxanthandrus* Kassebeer, 2000 is an example of this. Despite two publications on the genus in the last 25 years (Kassebeer 2000b; Goeldlin de Tiefenau & Thompson 2019), additional undescribed species have been collected, necessitating this revision.

The status of *Afroxanthandrus* has been contentious, with some authors treating the genus as distinct (Kassebeer 2000b; Whittington 2003) while others have considered the species as members of *Xanthandrus* Verrall, 1901 (Curran 1938; Goeldlin de Tiefenau & Thompson 2019; Ssymank *et al.* 2021). Recent molecular phylogenetic analyses, however, have shown that the Afrotropical species form a separate clade (Mengual 2020; Mengual *et al.* 2022) which warrants a separate genus. *Afroxanthandrus congensis* (Curran, 1938) was described in 1938, based on a single specimen from the Democratic Republic of the Congo (DRC) (Curran 1938). The species was not recorded again until 1995 (De Meyer *et al.* 1995) when three specimens were reported from Kenya. These three, along with one additional specimen from Kenya, were also reported in 2001 (De Meyer 2001) (Fig. 1). No new species were described in the genus until 2000, when *Afroxanthandrus longipilus* Kassebeer, 2000 was described based on two specimens from the DRC, and three additional specimens of *A. congensis* from the DRC were documented (Kassebeer 2000b). It took until 2019 for a third species, *Afroxanthandrus magnificus* Thompson, 2019, to be described based on five specimens from São Tomé. In total, only 15 specimens have been reported in the literature. Here, we describe two additional species from the Afrotropics and put one taxon into synonymy, which brings the total known number of *Afroxanthandrus* species to four. We also report additional distribution records for *A. congensis* and *A. longipilus*.

Material and methods

Specimens or photographs were obtained from the following institutions:

- AMNH = American Museum of Natural History, New York, USA
- ANHRT = African Natural History Research Trust, Leominster, UK
- MZLS = Muséum cantonal des Sciences naturelles, Lausanne, Switzerland
- NMSA = KwaZulu-Natal Museum, Pietermaritzburg, South Africa
- RMCA = Royal Museum for Central Africa, Tervuren, Belgium
- SAMC = Iziko South African Museum, Cape Town, South Africa
- USNM = United States National Museum, Washington, USA

The specimen from RMNH (Naturalis Biodiversity Center, Leiden, The Netherlands) (Kassebeer 2000b) could not be located during a visit in 2020. Similarly, specimens from NMK (National Museums of Kenya, Nairobi, Kenya) (De Meyer *et al.* 1995; De Meyer 2001) could not be traced during visits to the collection in 2016, 2017 and 2019.

Terminology follows Cumming & Wood (2017) and Ssymank *et al.* (2021), except that we use pile to refer to hairs on the body, as in Thompson (1999). Morphological observations were made with a Leica MZ8 stereo microscope. Body length and wing length ranges given are minimum and maximum values observed in the studied material. Body measurements were taken between the frons and the posterior end of tergite 4, while wing measurements were taken between the tegula and the apex of the wing. Male genitalia were macerated for 24–48 hours in a 10% potassium hydroxide (KOH) solution at room temperature, then transferred to glacial acetic acid for 24 hours and finally stored in glycerol. All photographs were taken using a modified version of the system described in Brecko *et al.* (2014), stacked using Helicon Focus 8 and edited in Photoshop ver. 24.0.0. DNA barcoding procedures followed Jordaens *et al.* (2015). Sequences were assembled in Geneious R10 and submitted to GenBank (accession nos.: PP828576 to PP828581 and OM952147). A Neighbour-Joining (NJ) tree (Saitou & Nei 1987) was constructed using K2P distances in MEGA ver. 7 (Kumar *et al.* 2016) and rooted with

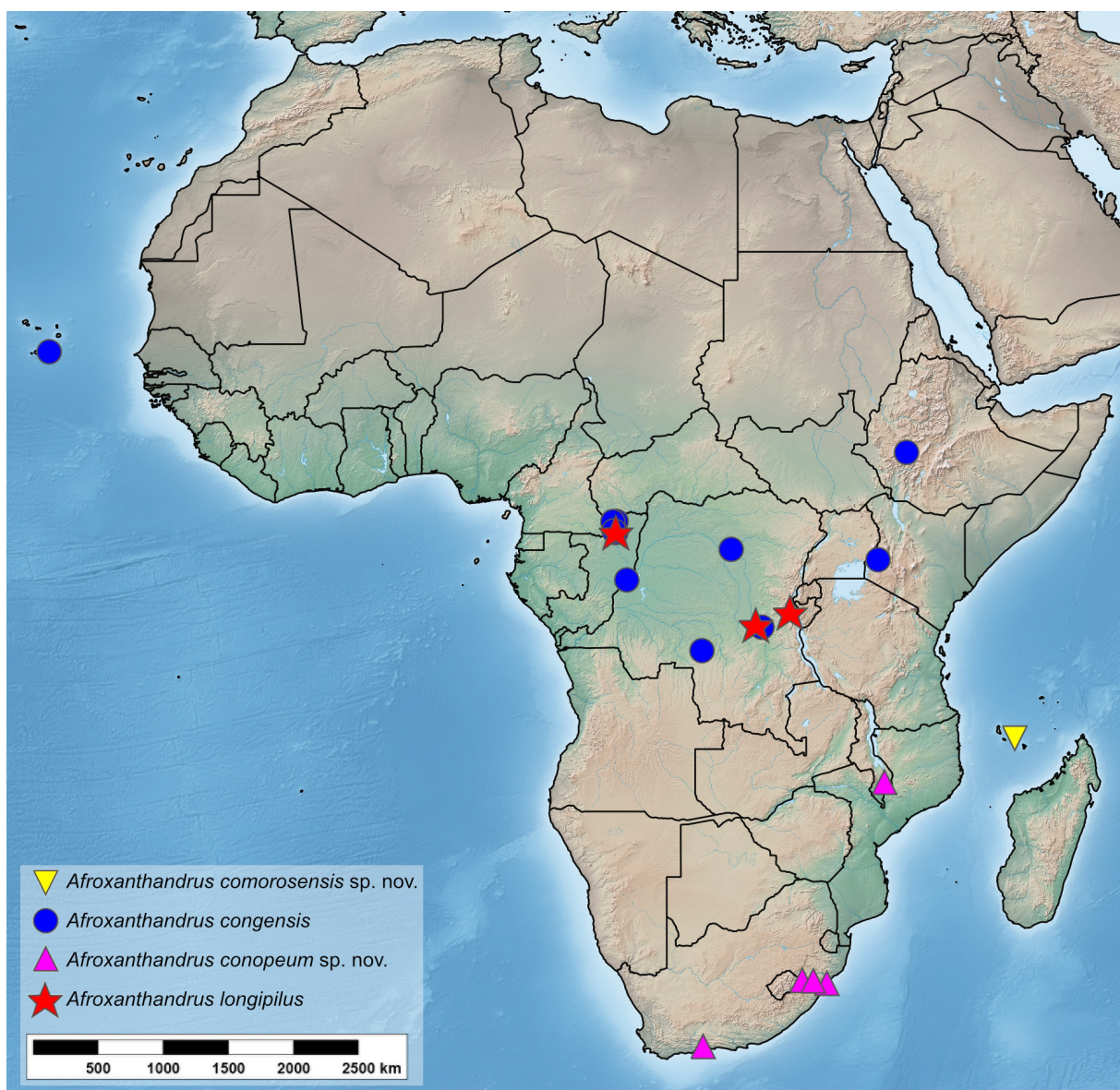


Fig. 1. Map of the known distribution of species of *Afroxanthandrus* Kassebeer, 2000 in the Afrotropical region.

Myolepta sp. RMCA 1587B05 (Republic of the Congo) (GenBank accession no. PP828575). Pairwise p-distances within and among species were calculated in MEGA ver. 7. The distribution map was created in SimpleMappr (Shorthouse 2010) using published distribution records and new records presented here and edited in Photoshop ver. 24.0.0.

Results

Taxonomy

Phylum Arthropoda Latreille, 1829
 Class Insecta Linnaeus, 1758
 Order Diptera Linnaeus, 1758
 Family Syrphidae Latreille, 1802
 Subfamily Syrphinae Latreille, 1802

Genus *Afroxanthandrus* Kassebeer, 2000
 Figs 1–24

Afroxanthandrus Kassebeer, 2000b: 150. Type species: *Xanthandrus congensis* Curran, 1938 (by original designation)

Diagnosis

Afroxanthandrus can be distinguished from other Afrotropical Melanostomini Williston, 1885 by the combination of the pile on the hind coxae (bare in *Melanostoma* Schiner, 1860) and the lack of a marginal groove on the abdomen (present in *Pelloloma* Vockeroth, 1973). While geographically distinct from *Xanthandrus*, Kassebeer (2000b) distinguished the genus by the combination of yellow-brown markings on tergite 1 (dark in *Xanthandrus*), frons of the female medially swollen (evenly curved in *Xanthandrus*), antennae elongated (shorter in *Xanthandrus*), hair on the scutum standing on fine, shiny bases (no raised bases in *Xanthandrus*), scutellum enlarged and bulging (not enlarged and bulging in *Xanthandrus*), front tarsi slightly widened (not widened in *Xanthandrus*) and femora moderately thickened. The genital characters provided in Kassebeer's (2000b) revision were based on a single specimen, and are of questionable value given the variation presented here.

Key to species

1. Tergite 4 entirely dark. Yellow fascia on tergite 2 with curved or triangular posterior border (Figs 13, 15–16) 2
 - Tergite 4 with broad yellow fascia. Yellow fascia on tergite 2 with straight posterior border (Figs 12, 14) 3
2. Tergite 3 with broad fascia, about $\frac{3}{4}$ of the length of the tergite (Figs 13, 15); scutal pile short, half as long or less as length of scape (Figs 8, 10); male genitalia: surstyli short, about 2.5 times as long as wide (Figs 18, 21) *A. congensis* (Curran, 1938)
 - Tergite 3 with narrow fascia, about $\frac{1}{3}$ of the length of the tergite (Fig. 16); scutal pile long, as long as or slightly longer than length of scape (Fig. 11) (male unknown) *A. longipilus* Kassebeer, 2000
3. Tergite 4 with broad fascia, similar in shape to fasciae on tergites 2 and 3 (Fig. 12); male genitalia: surstyli short, about twice as long as wide (Figs 17, 20) *A. comorosensis* sp. nov.
 - Tergite 4 with narrow fascia, clearly narrower than fasciae on tergites 2 and 3 (Fig. 14); male genitalia: surstyli long, about eight times as long as wide (Figs 19, 22) *A. conopeum* sp. nov.

Species accounts

Afroxanthandrus comorosensis sp. nov.

[urn:lsid:zoobank.org:act:2105F4F0-C786-41FD-A40C-A4EE6886063F](https://doi.org/10.21203/rs.3.rs-3811111/v1)

Figs 1–2, 7, 13, 18–19, 24

Diagnosis

Differs from other species of *Afroxanthandrus* in having a broad yellow fascia on tergite 4 (absent in *A. congensis* and *A. longipilus*, narrow in *A. conopeum* sp. nov.) and from *A. congensis* and *A. longipilus* in the straight posterior margin of the yellow marking on tergite 2. Male genitalia small (0.5 mm long), surstyli with a ventral projection in lateral view (genitalia large without ventral projection in *A. conopeum* and *A. congensis*).

Etymology

Named after the Comoros Archipelago from where the type was collected.

Type material examined

Holotype

COMOROS • ♂; Nzwani Island [= Anjouan], Koni-Djodjo; 30 Nov. 2010; M. Jocque leg.; RMCA DNA 1024C07; GenBank: PP828581; RMCA, RMCA ENT 000056900.

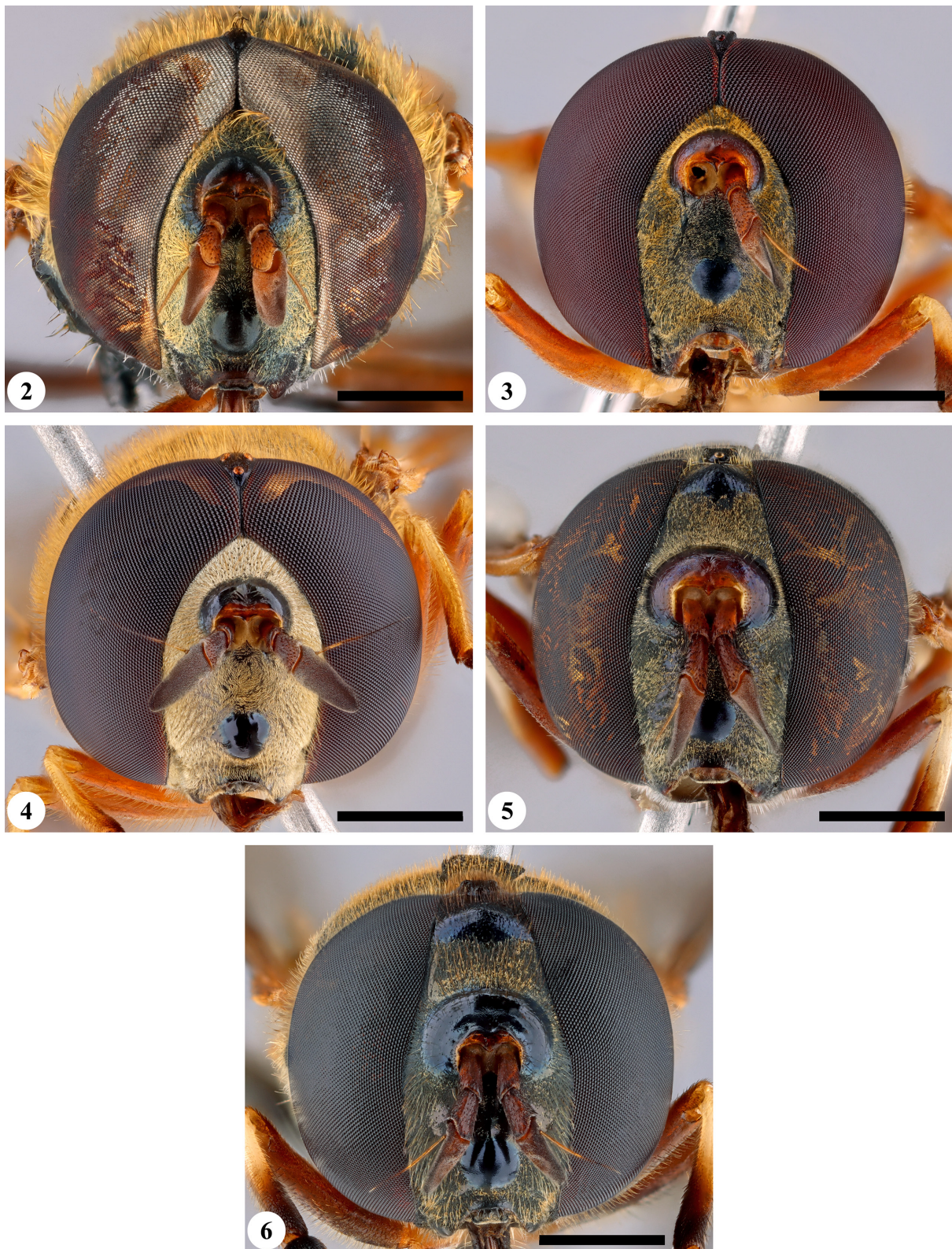
Description

MEASUREMENTS. Body: 9.7 mm; wing: 8.8 mm.

Male

HEAD (Fig. 2). Dark brown to black, with medium sized facial tubercle and a medium sized antennal prominence. Face straight in profile; widest just above the tubercle, where approximately 40% of the maximum head width, with slightly curved sides, about as narrow just below antennae and just above the oral margin, approximately 38% of maximum head width; laterally with dense, yellowish gold pollinosity, completely obscuring the black ground colour, thinner pollinosity on the oral margin, gena and medial strip between the tubercle and antennal base, facial tubercle bare; with long, light yellowish pilosity and a few brown pili just below the antennae, medial region bare from oral margin to antennal base. Frons with dense yellowish-gold pollinosity, reaching from the eye contiguity to the base of the antennal prominence. Antennal prominence and lunule bare, the lunule orange in ground colour while the prominence is dark brown to black. Frons with long light yellow pilosity laterally, some brown pile on antennal tubercle, medial pile yellow with brown tips. Vertex short, eye contiguity almost touching ocellar triangle, angle at eye contiguity approximately 35°; ocellar triangle acutely angled, clearly raised, with long and medium length brown pile anteriorly and long golden pile with brown tips posteriorly, anterior ocellus round, posterior ocelli oval, about 1.5 times as long as wide. Occiput with golden pile dorsocentrally, brown pile dorsolaterally and white pile laterally. All pile of similar thickness; with pale yellow white pollinosity laterally, bare dorsally. Eyes bare, kidney-shaped in lateral view. Frontal ommatidia slightly enlarged in a large area above the antennae. Antennae orange-brown, darker dorsally; elongate, slightly shorter than the maximum width of the face, narrow, parallel sided in lateral view, on dorsal side pedicel about as long as the scape, postpedicel 2.5 times the length of the pedicel; scape and pedicel with short thick dark brown pilosity, postpedicel bare, with sparse brown pollinosity; arista bare, inserted basally, about 1.3 times the length of the postpedicel.

THORAX (Fig. 7). Scutum evenly rounded, except for a medium sized raised oval bump on each side, anterior to the suture; black with bronze sheen, postalar callus and surrounding scutum brownish. Scutum covered in short and long pilosity, slightly shorter dorsomedially and slightly longer laterally, yellowish



Figs 2–6. Frontal view of the head of species of *Afroxanthandrus* Kassebeer, 2000. 2. *A. comorosensis* sp. nov., holotype, ♂ (RMCA ENT 000056900). 3. *A. congensis* (Curran, 1938), ♂ (ANHRTUK 00282353). 4. *A. conopeum* sp. nov., holotype, ♂ (NMSA-Dip 219971). 5. *A. congensis*, ♀ (ANHRTUK 00282352). 6. *A. longipilus* Kassebeer, 2000, ♀ (ANHRTUK 00282356). Scale bars = 1 mm.

with dark brown tips on long pile over most of the scutum, anterolaterally some pili yellowish for entire length, each pilus on a tiny, rounded, raised, non-pollinose base. Scutal pollinosity densest between the postpronotum and transverse suture, a small area along the suture and posteromedial to the postalar calli, yellow-brown. The remainder of the scutum without pollinosity. Scutellum broad and large, ~60% the width and ~35% the length of the scutum; dark brown to black; pilosity long and short, denser and longer than on the scutum, pile yellowish, the longer pile with dark tips. The relatively smaller size of the raised bases makes the scutellum look smoother (particularly on the margin) than in other species; base narrowly bare (may be obscured by the scutal pile), smooth, with a long, multi-rowed, light subscutellar fringe. Pleura black with bronzy sheen; evenly rounded except for a moderate bulge on the posterolateral anepisternum; yellow to white pollinose, most dense on the anterior anepisternum, bare on the triangular part of the anepimeron, evenly spread over other pleurae; pilosity yellowish, bases smaller than on scutum. Dense pilosity limited to patches on the posterior anepisternum, anepimeron, katepisternum and katatergite, pilosity on katepimeron long but less dense. Metasternum bare. Plumule long, yellowish orange.

LEGS. Hind coxae with a small tuft of pile at posteromedian angle and with scattered long, yellow-white pile. Mid coxae with shorter, scattered yellow-white pile, fore coxae with sparse yellow pile. Trochanters with scattered yellow pile. Fore and mid femur orange brown, hind femur orange brown basally and dark brown distally, fore femur curved, mid femur with a slight medial swelling, hind femur swollen in distal $\frac{2}{3}$. Fore femur with long pile on the posterior and ventral surfaces, shorter on the anterior and dorsal surfaces, pile ranges in colour from yellow to brown, shorter pile generally darker, longer pile paler. Pile also somewhat paler basally. Mid femur with long pile posteriorly, shorter on other surfaces; long pile as long as femur thickness; short pile generally brown, long pile golden yellow, but basal pile also paler. Hind femur with shorter pile than other femora, slightly shorter than femur width; mostly brown, though golden basally. Fore tibia orange in basal $\frac{1}{2}$, brown in distal $\frac{1}{2}$, mid tibia orange in basal $\frac{2}{3}$, brown distally, hind tibia brown. Tibial pile short and brown, slightly paler brown basally. Tarsi brown with brown pile.

WINGS. Extensively microtrichose, small bare patches at base of c and cup cells. Cell bm bare basally only, with a small patch of denser microtrichia in the distal region, in line with the knot (the thickened part of the vein in br) of the spurious vein. Cell br bare basally, with a small bare patch basomedially. Cell cua bare basally only. Calypters yellow to orange, darker dorsally, with fringe of very long yellowish orange pile. Halteres whitish.

ABDOMEN (Fig. 13). Elongate, broadly oval. Shorter than the wings, about as wide as the thorax. tergite 1 yellow, with a thin posterior black margin; tergite 2 yellow, with a thin black posterior margin, extending on the lateral margin for a very short distance. Tergites 3–4 yellow, with thin black borders on all sides. Tergite 5 yellow. Tergite 2 slightly shorter than tergite 3, tergite 2 and tergite 4 of the same length, and tergite 5 about $\frac{1}{5}$ the length of tergite 3. Pile on dorsal surface short, brown centrally and light brown laterally, somewhat longer lateral to tergite 1 and basolateral to tergite 2. Pile on margin longer, pale yellow on tergites 1–2, dark brown on posterior of tergite 2 and tergites 3–5. Sternites yellow, pile long, thin and yellow on sternites 1–2, shorter, thicker and brown on sternites 3–5.

MALE GENITALIA (Figs 18–19). Small (0.5 mm long). Superior lobes projecting posteriorly, slightly shorter than surstyli, somewhat truncated apically, with a ventral projection in lateral view. Surstyli small, about twice as long as wide, rounded apically and covered in small hairs. Hypandrium shorter than superior lobes.

Female

Unknown.



Figs 7–8. Lateral view of species of *Afroxanthandrus* Kassebeer, 2000. **7.** *A. comorosensis* sp. nov., holotype, ♂ (RMCA ENT 000056900). **8.** *A. congensis* (Curran, 1938), ♂ (ANHRTUK 00282353). Scale bars = 1 mm.

Distribution

Known only from Nzwani Island in the Comoros Archipelago.

Afroxanthandrus congensis (Curran, 1938) stat. rev.

Figs 1, 3, 5, 8, 10, 12, 14, 16, 20–21, 24

Xanthandrus congensis Curran, 1938: 18. Type-locality: Congo. Lukolela (HT ♀, AMNH).

Xanthandrus magnificus Goeldlin de Tiefenau & Thompson, 2019: 160 syn. nov.

Xanthandrus congensis – Smith & Vockeroth 1980: 494 (catalog citation). — Dirickx 1998: 139 (catalog citation). — Goeldlin de Tiefenau & Thompson 2019: 162.

Afroxanthandrus congoensis [lapsus] – Kassebeer 2000b: 154, figs (antenna, head, ♂ genitalia) (new combination, description). — Whittington 2003: 586 (citation).

Diagnosis

Differs from *A. comorosensis* sp. nov. and *A. conopeum* sp. nov. in the curved posterior margin to the yellow fascia on tergite 2 (margin straight in *A. comorosensis* and *A. conopeum*) and from *A. longipilus* in the large, rounded fascia on tergite 3 (narrow in *A. longipilus*). Genitalia large, superior lobes about twice as long as surstyli (shorter than surstyli in *A. comorosensis* and *A. conopeum*).

Type material examined

Holotype of *Xanthandrus congensis* (photographs only)

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; Équateur Province, Lukolela; 16 Dec. 1930; J.P. Chapin leg.; AMNH.

Lectotype of *Xanthandrus magnificus* (hereby designated)

CAPE VERDE ISLANDS • ♂; Praia Region, São Tomé; 16 Mar. 1977; J. Denon leg.; MZLS.

Paralectotypes of *Xanthandrus magnificus* (hereby designated)

CAPE VERDE ISLANDS • 1 ♀; same data as for holotype; MZLS • 2 ♂♂; same data as for holotype; USNM, USNMENT01842018, USNMENT01842995 • 2 ♀♀; same data as for holotype; USNM, USNMENT01842019, USNMENT01842996.

Other material examined

CENTRAL AFRICAN REPUBLIC – **Prefecture Sangha-Mbaéré** • 1 ♀; Parc National de Dzanga-Ndoki, Mabéa Bai 21.4 km 53° NE of Bayanga; 3°02.01' N, 16°24.57' E; elev. 510 m; 2–3 May 2001; S. van Noort leg.; Malaise trap, CAR01-M19, lowland rainforest, marsh clearing; SAMC, SAM-DIP-A016873 • 1 ♀; Réserve Spéciale de Forêt Dense de Dzanga-Ndoki, 12.7 km 326° NW of Bayanga; 3°00.27' N, 16°11.55' E; elev. 420 m; 12–13 May 2001; S. van Noort leg.; Malaise trap, CAR01-M102, lowland rainforest; SAMC, SAM-DIP-A016988 • 1 ♂; same data as for preceding; 11–12 May 2001; Malaise trap, CAR01-M94; SAMC, SAM-DIP-A016919.

DEMOCRATIC REPUBLIC OF THE CONGO – **Tshopo Province** • 1 ♀; Gazi; 2 Aug. 1940; J. Vrydagts leg.; RMCA, RMCA ENT 000056902. – **Maniema Province** • 1 ♀; Kasongo area; Dec. 1959; P.L.G. Benoit leg.; RMCA, RMCA ENT 000056903.

ETHIOPIA • 1 ♂; Oromia Region, Jimma, Girmo; 07°52'49" N, 36°51'51" E; elev. 1961 m; 19 Feb. 2016; L. Geeraert leg.; random sweepnetting, semi-forest coffee management system; Plot 2; Dani; 12:00; AHE_251; DNA 702C02 K. Jordaens RMCA 2016; AB49487198; GenBank: OM952147; RMCA, RMCA ENT 000028396.

REPUBLIC OF THE CONGO – **Sangha Department** • 2 ♂♂; Nouabalé-Ndoki National Park, Mbeli camp; 2°14'23.8" N, 16°23'52.1" E; elev. 372 m; 14–20 Feb. 2023; N.M. Bakala, V. Derozier, A. Kirk-Spriggs and G. László leg.; carrion bait; ANHRT 2023.3; ANHRT, ANHRTUK 00282353, ANHRTUK 00282359 • 1 ♂; same data as for preceding; RMCA DNA 1587B08, GenBank: PP828576; ANHRT, ANHRTUK 00282358 • 1 ♀; same data as for preceding; RMCA DNA 1587C01, GenBank: PP828577; ANHRT, ANHRTUK 00282352 • 3 ♀♀; same data as for preceding; ANHRT, ANHRTUK 00282354, ANHRTUK 00282355, ANHRTUK 00282357 • 1 ♂; same data as for preceding; banana bait; ANHRT 2023.3; ANHRT, ANHRTUK 00282232 • 2 ♀♀; same data as for preceding; 15–19 Feb. 2023; Malaise trap; ANHRT 2023.3; ANHRT, ANHRTUK 0028282813, ANHRTUK 00282814 • 1 ♀; Nouabalé-Ndoki National Park, Mondika camp; 2°21'50.63" N, 16°16'25.83" E; elev. 365 m; 7–14 Feb. 2023; N.M. Bakala, V. Derozier, A. Kirk-Spriggs and G. László leg.; carrion bait; ANHRT 2023.3; ANHRT, ANHRTUK 00282680 • 1 ♂; Nouabalé-Ndoki National Park, Bomassa camp; 2°12'36.9" N, 16°11'30.2" E; elev. 365 m; 6–14 May. 2023; V. Derozier, A. Kirk-Spriggs, G. László and S. Mvouende leg.; carrion bait; ANHRT 2023.6; ANHRT, ANHRTUK 00311540.

Description

MEASUREMENTS. Body: 8.3–11.8 mm; wing: 6.9–8.5 mm.

Male

HEAD (Fig. 3). Black, with small to medium facial tubercle and a medium sized antennal prominence. Face straight in profile; widest just below the antennae, approximately 44% of the maximum head width, slightly narrowed ventrally, narrowest in line with dorsal oral margin, approximately 38% of maximum head width; covered with dense, yellowish-white pollinosity, completely obscuring the black ground colour, thinner pollinosity on the oral margin and gena, facial tubercle bare; with short, light yellowish pilosity, medial region bare from oral margin to antennal base. Frons with dense yellowish-white pollinosity, reaching from the eye contiguity to the base of the antennal prominence. The antennal prominence and lunule are bare, the lunule orange in ground colour while the prominence dark brown to black. Frons with short light yellow pilosity, sparse on lunule and antennal tubercle. Vertical triangle with very short, dark brown pilosity anteriorly (shorter than the width of the anterior ocellus) which get gradually longer and paler posteriorly, golden at posterior margin; vertex elongated, very narrow, angle at eye contiguity approximately 25°; ocellar triangle acutely angled, clearly raised, anterior ocellus round, posterior ocelli oval, about 1.4 times as long as wide. Occiput with pale brown to dark yellow pilosity dorsally, yellow laterally, thin dorsally but broad and scale like laterally; with pale yellow white pollinosity. Eyes bare, kidney-shaped in lateral view. Frontal ommatidia slightly enlarged only in a small area above the antennae. Antennae orange-brown; elongate, as long as or slightly longer than the maximum width of the face, narrow, parallel sided in lateral view, on dorsal side pedicel about 1.5 times the length of the scape, postpedicel twice the length of the pedicel. Scape and pedicel with short thick dark brown pilosity, postpedicel with sparse pollinosity, bare. Arista bare, inserted basally, about 1.3 times the length of the postpedicel.

THORAX (Fig. 8). Scutum evenly rounded, except for a small raised oval bump on each side, anterior to the suture, black; postpronotum and postalar callus brownish, postalar callus with fine light and dark brown pilosity. Pilosity short dorsomedially, longer laterally, light brown, each pilus on a small, rounded, raised, non-pollinose base. Scutal pollinosity densest between the suture and postpronotum, along the suture and in a wide strip in front of the scutellum, light yellow-brown. Less dense on the remainder of the scutum, with some indistinct longitudinal stripes anterior to the suture. Scutellum very broad and large, ~60% the width and ~45% the length of the scutum; dark brown to black; pilosity denser than on the scutum, the density of the raised bases making the surface rough and the margin appears serrated; base narrowly bare, smooth; with a long, multi-rowed, light subscutellar fringe. Pleura dark brown to black; evenly rounded except for a moderate bulge on the posterolateral anepisternum; yellow



Figs 9–10. Lateral view of species of *Afroxanthandrus* Kassebeer, 2000. **9.** *A. conopeum* sp. nov., holotype, ♂ (NMSA-Dip 219971). **10.** *A. congensis* (Curran, 1938), ♀ (ANHRTUK 00282352). Scale bars = 1 mm.

to white pollinose, most dense on the posterior anepisternum and katepisternum; pilosity yellowish white, bases smaller than on scutum. Dense pilosity limited to patches on the posterior anepisternum, anepimeron, katepisternum, and katatergite, scattered pilosity on the katepimeron. Metasternum bare. Plumule yellow.

LEGS. Hind coxae without a distinct tuft of pile at posteromedian angle, but with scattered long, white pile; fore and mid coxae with shorter, yellow pile on anterior distal margins. Trochanters with scattered yellow pile. Fore and mid femur orange brown with small yellow-orange sections at the base and apex, hind femur orange brown, with yellow-white basal section and more orange ventrodistal section, fore femur curved, mid femur with a slight medial swelling, hind femur swollen in distal two thirds. Fore and mid femur with short yellow pile, hind femur mostly covered with short yellow pile, but with some brown pile in distal area (distal $\frac{1}{7}$ dorsally, $\frac{1}{3}$ ventrally). Fore tibia white in basal $\frac{1}{2}$, brown in distal $\frac{1}{2}$, mid tibia white in basal $\frac{3}{5}$, orange brown distally, hind tibia brown. Pale sections of tibiae with short yellow-white pile, dark sections with short brown pile. Fore basitarsus brown, other fore tarsal segments brown dorsally but golden brown ventrally. Mid tarsus orange brown, slightly darker dorsally. Hind tarsus brown dorsally, orange brown ventrally. All tarsi with brown pile, somewhat darker dorsally than ventrally.

WINGS (Fig. 12). Extensively microtrichose in apical part, bare patches at base of cells c, r_1 , dm, and cup. Alula with bare central patch. Cell bm extensively bare, but with a small dense patch of microtrichia in the distal region, in line with the knot of the spurious vein. Cell br mostly bare, but with some microtrichia anterior to the knot of the spurious vein. Cell cua extensively bare, with some microtrichia centrally. Calypters white to yellow, darker dorsally, with fringe of long yellowish pile. Halteres yellow.

ABDOMEN (Fig. 14). Elongate, broadly oval, though tergite 2 and tergite 3 parallel sided. Slightly shorter than the wings, about as wide as the thorax, basic colour dark brown with dull, orange yellow markings. Tergite 1 completely yellow; tergite 2 light basally, extending medially to form a large medial fascia with rounded posterolateral sides and a small medial point. Lateral margins of tergite 2 thinly yellow, joining with the main yellow marking anteriorly. Tergite 3 anterior with a broad anteromedial macula, about $\frac{4}{5}$ of the length and $\frac{3}{4}$ of the width of tergite 3. Tergite 2 slightly longer than tergite 3, tergite 3 and tergite 4 the same length and tergite 5 about $\frac{1}{2}$ the length of tergite 4. Pile short, light brown centrally and yellow laterally, somewhat longer lateral to tergite 1 and basolateral to tergite 3. Sternites 1–3 light yellowish brown, darker brown from sternite 4 onwards to the genitalia, pile mainly short, sparse yellowish, posterior edges of sternite 3–4 covered with sparse short brown pile.

MALE GENITALIA (Figs 20–21). Large (1.1 mm long). Superior lobes projecting posteriorly about twice as long as surstyli, hatchet shaped in lateral view. Surstyli about 2.5 times as long as wide, rounded apically and covered in small hairs. Hypandrium shorter than superior lobes.

Female

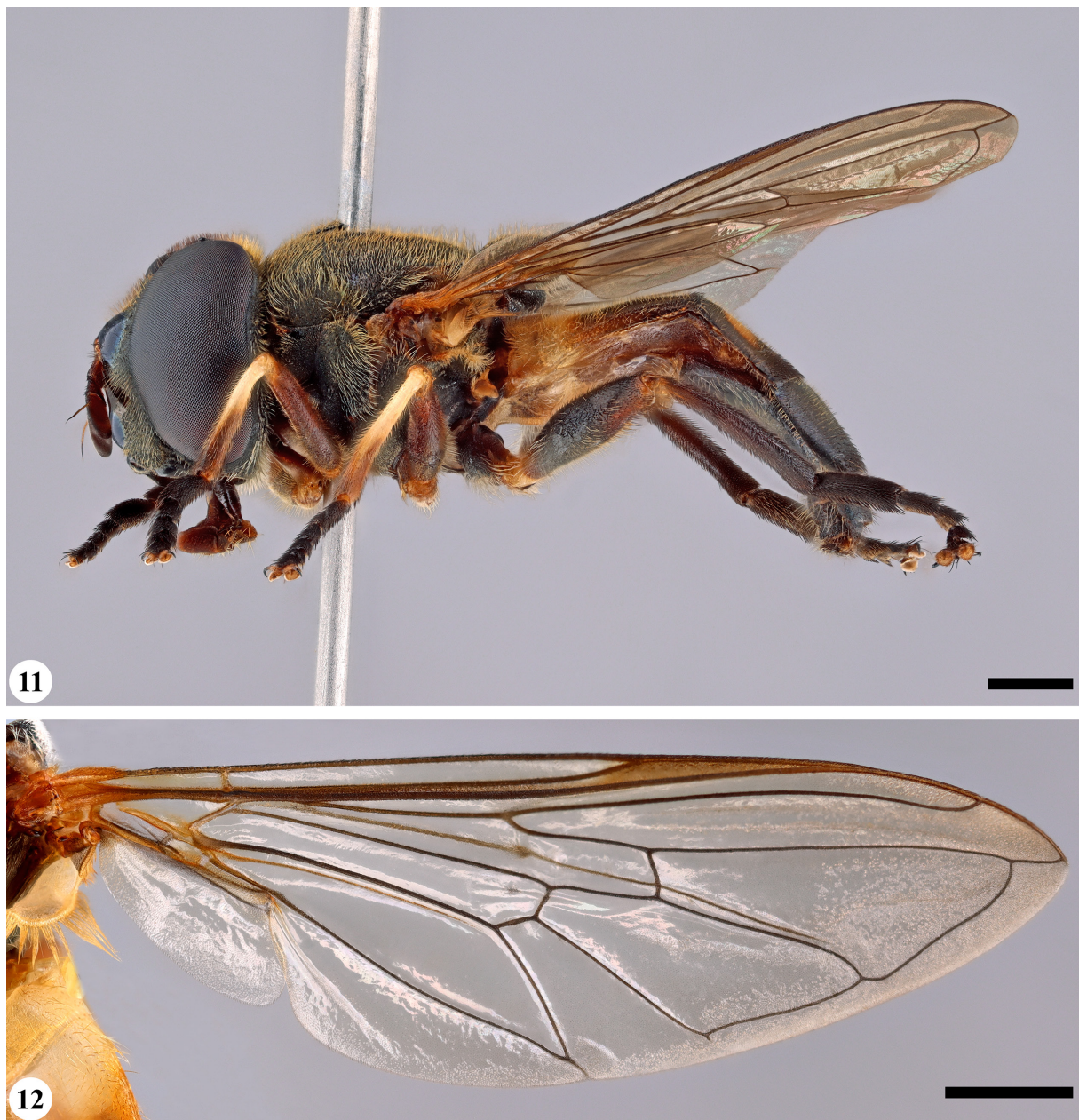
As for male except as noted below:

HEAD (Fig. 5). With medium sized frontal protuberance; widest just below the antennae, approximately 40% of the maximum head width, slightly narrowed ventrally, narrowest in line with dorsal oral margin, approximately 34% of maximum head width. Frons with dense yellowish-white pollinosity on the lower half, reaching from the frontal protuberance to the antennal prominence, the transition from pollinose to bare forming a straight or slightly convex line. Ommatidia equal across the eye.

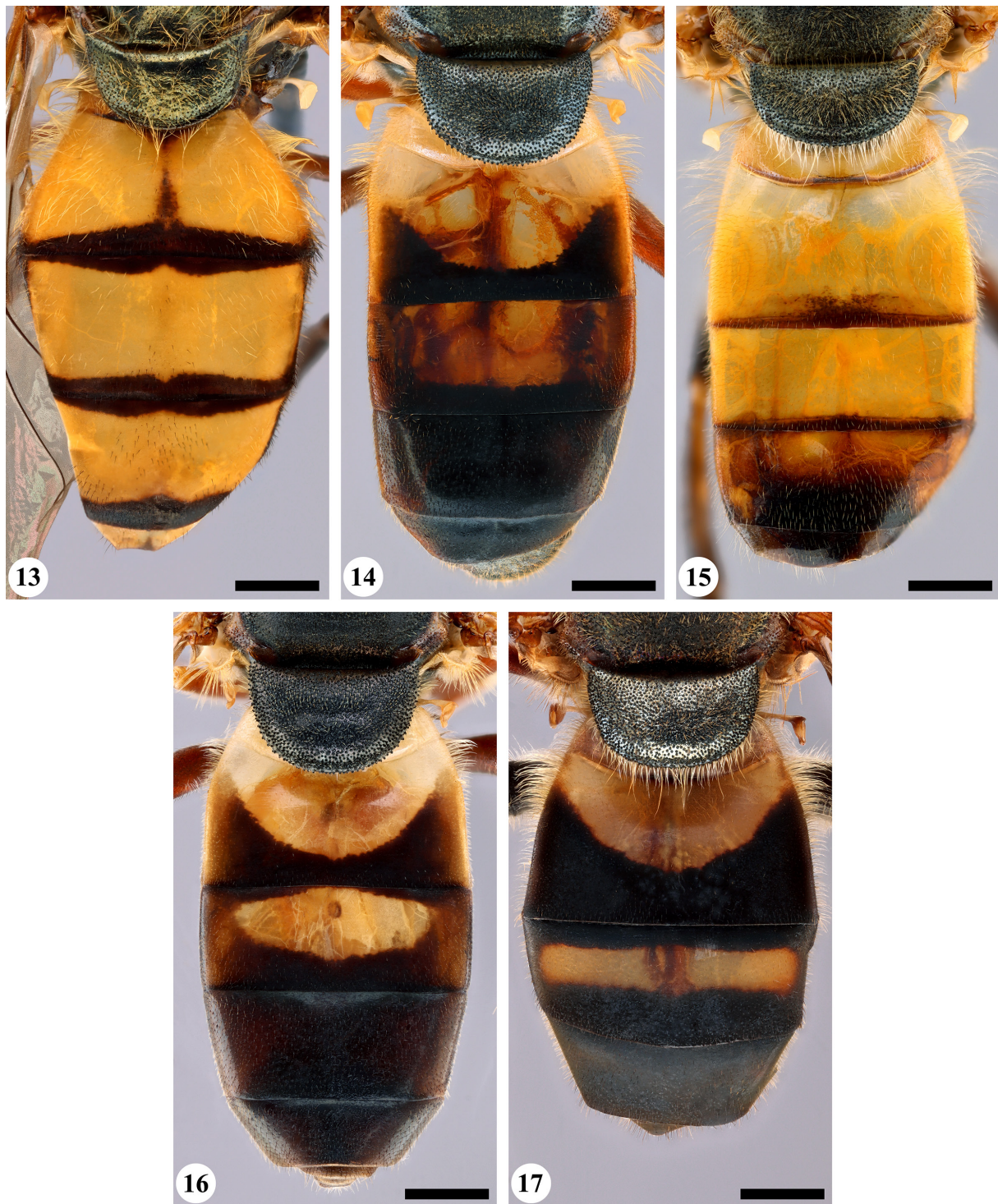
THORAX (Fig. 10). Scutellum slightly shorter than in male ~60% the width and ~40% the length of the scutum.

LEGS. Fore femur straight or only gently curved.

ABDOMEN (Fig. 16). Broadly oval, only tergite 2 parallel sided. Slightly wider than thorax. Macula on tergite 3 narrower than in male, about $\frac{2}{3}$ of the length of tergite 3. Tergite 2 1.5 times the length of tergite 3. Sternites all light yellowish brown, posterior edges of sternites 3–7 covered with sparse short brown pile.



Figs 11–12. Lateral view and wing of species of *Afroxanthandrus* Kassebeer, 2000. **11.** *A. longipilus* Kassebeer, 2000, ♀ (ANHRTUK 00282356), lateral view. **12.** *A. congensis* (Curran, 1938), ♂ (ANHRTUK 00282353), wing. Scale bars = 1 mm.



Figs 13–17. Dorsal view of the abdomen of species of *Afroxanthandrus* Kassebeer, 2000. **13.** *A. comorosensis* sp. nov., holotype, ♂ (RMCA ENT 000056900). **14.** *A. congensis* (Curran, 1938), ♂ (ANHRTUK 00282353). **15.** *A. conopeum* sp. nov., holotype, ♂ (NMSA-Dip 219971). **16.** *A. congensis*, ♀ (ANHRTUK 00282352). **17.** *A. longipilus* Kassebeer, 2000, ♀ (ANHRTUK 00282356). Scale bars = 1 mm.

Distribution

This species is known from the Cape Verde Islands, the Central African Republic, the Democratic Republic of the Congo, Ethiopia, Kenya, and the Republic of the Congo. Most of the habitat is Guineo-Congolian rainforest or forest remnants.

Remarks

The name “*congensis*” was used by Curran (1938) and is thus the correct spelling for this species. Kassebeer (2000b) introduced the incorrect spelling “*congoensis*” which has been used by other authors (Goeldlin de Tiefenau & Thompson 2019; Mengual 2020), though not in formal taxonomic treatments. Due to the two spellings in use, care is needed to ensure all works referencing this species are used in future. In the description of *X. magnificus* (Goeldlin de Tiefenau & Thompson 2019: figs 4–11), the figures of the genitalia show few differences from the drawings in Kassebeer (2000b: fig. 2a–e) or from our photographs (Figs 19, 22). The only notable difference is the shape of the distal end of the postgonites in lateral view. If the postgonites of *A. congensis* are viewed from approximately 25° above the horizontal plane, the shape matches the figures in Goeldlin de Tiefenau & Thompson (2019). Based on the minimal differences in external and genital morphology between *A. congensis* and *X. magnificus* and the large observed interspecific differences in both external and genital morphology in *Afroxanthandrus*, we consider *X. magnificus* a junior synonym of *A. congensis*.

Xanthandrus magnificus was described from a type series of five specimens, all with identical label data. When the specimens were located at USNM, none bore type labels and six specimens with identical label data were found. As it is not possible to determine unequivocally which specimen is the holotype and which is not part of the type series, we consider all six specimens to be syntypes. Two of the six were separate, which we assume were meant as the two specimens to be returned to Lausanne. We designate the male of these as the lectotype and the female as a paralectotype. The four remaining specimens are designated as paralectotypes housed at USNM.

Goeldlin de Tiefenau & Thompson (2019) list the type locality for *X. magnificus* as “...the island of Sao Tome in the Sao Tome group off Gabon, Africa.” However, the label data for the series is “I Cap Vert, Sao Tome, 16 March 1977, J. Denon”. Given the convention of listing the country first on a label, followed by the nearest town or city, this likely refers to the town of São Tomé in the Praia Region on Santiago, Cape Verde Islands, and not the island of São Tomé, São Tomé and Príncipe.

Afroxanthandrus conopeum sp. nov.

[urn:lsid:zoobank.org:act:23AB5783-35B3-45B9-B0BD-23EE2DE87FF3](https://zoobank.org/urn:lsid:zoobank.org:act:23AB5783-35B3-45B9-B0BD-23EE2DE87FF3)

Figs 1, 4, 9, 15, 22–24

Diagnosis

Differs from *A. congensis* and *A. longipilus* in having broad yellow fasciae on tergites 2 and 3 which occupies almost the entire tergite (*A. congensis* with a narrower, curved yellow fascia which occupies at most half of tergites 2 and 3, *A. longipilus* with a narrow, curved fascia on tergite 2 occupying at most half of the tergite, and with a narrow, straight fascia on tergite 3 which occupies at most one third of the tergite) and from *A. comorosensis* sp. nov. in having tergite 4 with a narrower fascia than on tergite 3 (fasciae of equal width in *A. comorosensis*). Surstyli extremely elongated, eight times as long as wide (2 to 2.5 times as long as wide in *A. comorosensis* and *A. congensis*)

Etymology

Named for the canopy inhabiting behaviour observed in this species. To be treated as a noun in apposition.

Type material examined**Holotype**

SOUTH AFRICA • ♂; KwaZulu-Natal, Giant's Castle Nature Reserve, Main caves forest; 29.271814 S, 29.526489 E; 30 Jan. 2023; K. Jordaens, J. Midgley and T. Bellingan leg.; NMSA, NMSA-Dip 219971.

Paratypes

MALAWI • 1 ♂; Southern Region, Zomba Plateau Mountain Road; elev. 1400 m; 5 Oct. 1998; F. Kaplan and A. Freidberg leg. USNM, USNMENT 01842997.

SOUTH AFRICA – **KwaZulu-Natal** • 1 ♂; Croc Vally Nature Reserve near Sheffield Beach; 29°28'37" S, 31°15'04" E; elev. 60 m; 12 Jun. 2001; J.G.H. Londt leg.; in patch of swamp forest; NMSA, NMSA-Dip 064762 • 1 ♂; Karkloof, Shawswood Forest; 29.306404 S. 30.303695 E; 13 Nov. 2018; J. Midgley, K. Williams and K. Jordaens leg.; NMSA, NMSA-Dip 086808 • 1 ♂; same data as for preceding; AB48930365, GenBank: PP828580; NMSA, NMSA-Dip 086809 • 1 ♂; same data as for preceding; AB48930348 GenBank: PP828579; NMSA, NMSA-Dip 086826. – **Western Cape** • 1 ♂; Groenkop forest; 29 Jan. 2022; R. Swart leg.; collected from flowers of *Curtisia dentata*; RMCA, RMCA ENT 000056904.

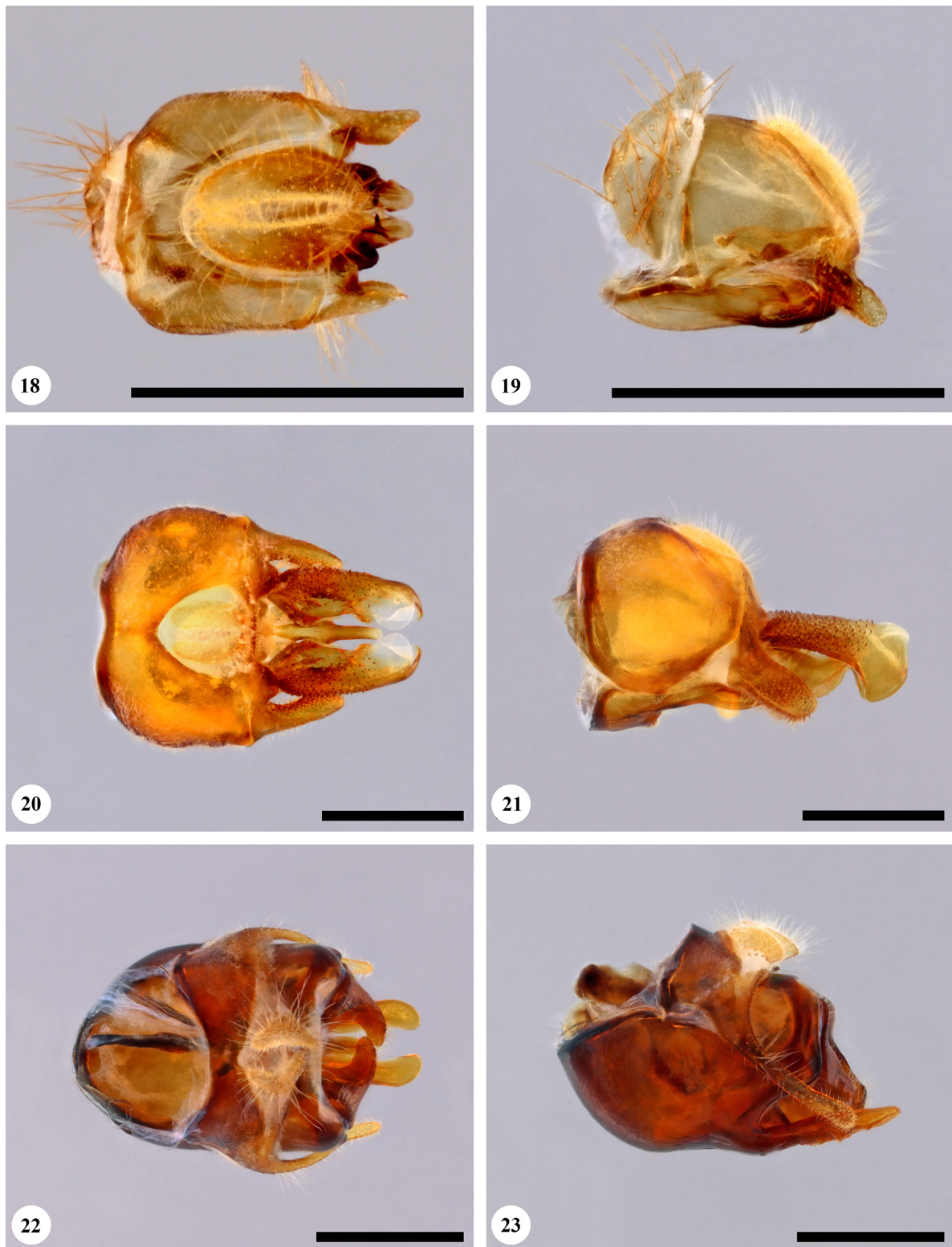
Description

MEASUREMENTS. Body: 9.2–10.1 mm; wing: 7.1–8.0 mm.

Male

HEAD (Fig. 4). Black, with medium facial tubercle and a medium sized antennal prominence. Face straight in profile; parallel sided, approximately 30% of the maximum head width; covered with dense, yellowish-white pollinosity, completely obscuring the black ground colour, thinner pollinosity on the oral margin and gena, facial tubercle bare; with medium to long, light yellowish pilosity, medial region bare from oral margin to antennal base. Frons with dense yellowish-white pollinosity, reaching from the eye contiguity to the base of the antennal prominence. The antennal prominence and lunule are bare, the lunule orange in ground colour, the prominence dark brown to black. Frons with medium to long, light yellow pilosity, lunule and antennal tubercle bare. Vertical triangle with some dark brown pilosity anteriorly, 2–3 times the width of the anterior ocellus, with a few longer, golden brown pili anteriorly and a dense patch of long pile posteriorly; vertex elongated, narrow, angle at eye contiguity approximately 30°; ocellar triangle acutely angled, clearly raised, anterior ocellus round, posterior ocelli oval, about 1.5 times as long as wide. Occiput with pale brown to dark yellow pilosity dorsally, white laterally, thin dorsally but broad and scale like laterally, with pale yellow white pollinosity. Eyes bare, kidney-shaped in lateral view. Frontal ommatidia slightly enlarged only in a small area above the antennae. Antennae orange-brown, paler basally; elongate, slightly longer than the maximum width of the face, narrow, rounded apically, on dorsal side pedicel about the same length as the scape, postpedicel 2.5 times the length of the pedicel. Scape and pedicel orange basally and darker apically, with short to medium, thick, dark brown pilosity, postpedicel dark, with sparse pollinosity but no pilosity. Arista bare, inserted basally, about 1.2 times the length of the postpedicel.

THORAX (Fig. 9). Scutum evenly rounded, except for a small raised oval bump on each side, anterior to the suture; dark brown to black, postalar callus paler brown, postalar callus brown pilosity. Pilosity long, slightly longer and much denser laterally, golden brown, each pilus on a small, rounded, raised, non-pollinose base. Scutal pollinosity densest between the suture and postpronotum and along the suture, a less dense pollinosity forms a wide strip in front of the scutellum and across the anterior half of the scutum, light yellow-brown; sparse on the remainder of the scutum. Scutellum very broad and large, ~60% the width and ~40% the length of the scutum; dark brown to black; pilosity denser than on the scutum, the density of the raised bases making the surface rough and the margin appear serrated; base



Figs 18–23. Male genitalia of species of *Afroxanthandrus* Kassebeer, 2000. **18–20.** Dorsal views. **18.** *A. comorosensis* sp. nov., holotype (RMCA ENT 000056900). **19.** *A. congensis* (Curran, 1938) (RMCA ENT 000028396). **20.** *A. conopeum* sp. nov., paratype (NMSA-Dip 086809). **21–23.** Lateral views. **21.** *A. comorosensis* sp. nov., holotype (RMCA ENT 000056900). **22.** *A. congensis* (RMCA ENT 000028396). **23.** *A. conopeum* sp. nov., paratype (NMSA-Dip 086809). Scale bars = 0.5 mm.

narrowly bare, smooth; with a long, multi-rowed, yellowish brown subscutellar fringe. Pleura dark brown to black; evenly rounded except for a moderate bulge on the posterolateral anepisternum; yellow to white pollinose, most dense on the posterior anepisternum, katepisternum, meron, and katepimeron; pilosity yellowish brown, long, bases smaller than on scutum, longer on dorsal posterior anepisternum. Dense pilosity limited to patches on the posterior anepisternum, anepimeron, katepisternum, the katatergite, scattered pilosity on the katepimeron. Metasternum bare. Plumule brownish anteriorly, yellow posteriorly.

LEGS. Hind coxa with a distinct tuft of pile at posteromedian angle, with scattered long, brown and yellow-white pile on the anterior surface, mid coxa with scattered, yellowish brown pile. Fore coxa with a few, yellow-white pili on medial distal margins. Trochanters with yellowish pile. Fore and mid femur brown with small pale (white to yellow) sections at the base and apex, hind femur dark brown, with white to yellow basal section and lighter brown ventrodiscal section, fore femur curved, mid femur with a slight medial swelling, hind femur swollen in distal two thirds. Fore femur with short, yellowish brown pile, mid femur with long pile basally, longer than width of the femur, gradually shorter distally, at apex less than half the width of the femur, pile yellow-brown basally, brown distally, hind femur covered with a mix of short and long pile, yellowish on pale parts of the femur, brown on darker parts. Fore tibia pale yellow, mid tibia yellowish white, hind tibia orange in basal $\frac{2}{5}$, brown distally. Fore and mid tibiae with short, yellow-white pile, hind tibia with short, dark brown pile on most of the surface, longer on anterior surface. Fore tarsus brown. Mid tarsus with two yellowish basal segments and three brown apical segments. Hind tarsus brown. All tarsi with brown pile, paler dorsobasally on fore and mid tarsi.

WINGS. Extensively microtrichose in apical part, bare patches at base of cells c , r_1 , dm , cup . Alula entirely microtrichose. Cell bm extensively bare, but with a small dense patch of microtrichia in the distal region, in line with the knot of the spurious vein. Cell br mostly bare, but with some microtrichia anterior to and distal of the knot of the spurious vein. Cell cua extensively bare, with some microtrichia centrally. Calypters yellow to orange, darker dorsally, with fringe of long yellowish orange pile. Halteres whitish.

ABDOMEN (Fig. 15). Elongate, broadly oval, though tergite 2 parallel sided. Shorter than the wings, about as wide as or slightly broader than the thorax. Tergite 1 yellow, with a thin dark brown posterior border; tergite 2 yellowish white basally, gradually becoming yellow then orange, posteriorly with small brown maculae that become denser and form a brown band on the posterior margin. Lateral margins of tergite 2 thinly yellow, joining with the main yellow marking anteriorly. Tergite 3 orange, with thin brown posterior border. Tergite 4 orange with broad brown posterior border, occupying about half the length of tergite 4. Tergite 5 brown. Tergite 2 slightly longer than tergite 3, tergite 3 and tergite 4 the same length and tergite 5 small, about $\frac{1}{4}$ the length of tergite 4. Pile numerous but short, light brown centrally and yellow laterally, somewhat longer lateral to tergite 1 and basolateral to tergite 2. Sternite 1 white, sternite 2 white anteriorly, faintly yellow near posterior edge, sternite 3 pale yellow, sternite 4 orange brown, sternite 5 onwards to the genitalia dark brown. Short white pile on sternites 1–2, yellowish on posterior sternites.

MALE GENITALIA (Figs 22–23). Large (1.2 mm long). Superior lobes projecting inwards, about half as long as surstyli, strongly curved in dorsal view, rounded apically in lateral view. Surstyli extremely elongated, about 8 times as long as wide, rounded apically and covered in small hairs. Hypandrium projects past superior lobes.

Female

Unknown.

Distribution

Known from Malawi and South Africa (KwaZulu-Natal and Western Cape provinces).

Remarks

This species has been collected from indigenous forest patches (Southern Afrotemperate Forest, FOz1; Southern Mistbelt Forest, FOz3; Northern Coastal Forest, FOz7 (Mucina & Rutherford 2006)). One specimen was collected from flowers of *Curtisia dentata* (Burm.f.) C.A.Sm. (Cornaceae) in the forest canopy.

Afroxanthandrus longipilus Kassebeer, 2000 stat. rev.
Figs 1, 6, 11, 17, 24

Diagnosis

Differs from *A. comorosensis* sp. nov. and *A. conopeum* sp. nov. in the curved posterior margin to the yellow fascia on tergite 2 (straight in *A. comorosensis* and *A. conopeum*) and from *A. congensis* in the broad but thin fascia on tergite 3 (narrower and thicker in *A. congensis*).

Type material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; South Kivu Province, Kapanga; 1952; Froidebise leg.; RMCA, RMCA ENT 000016800.

Paratype

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; Maniema Province, Nyangwe; Apr.–May 1918; R. Mayné leg.; RMCA, RMCA ENT 000056901.

Other material examined

REPUBLIC OF THE CONGO • 1 ♀; Sangha Department, Nouabalé-Ndoki National Park, Mbeli camp; 2°14'23.8" N, 16°23'52.1" E; elev. 372 m; 14–20 Feb. 2023; N.M. Bakala, V. Derozier, A. Kirk-Spriggs and G. László leg.; carrion bait; ANHRT 2023.3; RMCA DNA 1587B07; GenBank: PP828578; ANHRT, ANHRTUK 00282356.

Description

MEASUREMENTS. Body: 9.1–10.3 mm; wing: 7.3–9.0 mm.

Female

HEAD (Fig. 6). Black, with medium sized facial tubercle and a medium sized antennal prominence and medium sized frontal protuberance. Face straight in profile with a medium sized facial tubercle; widest just below the antennae, approximately 44% of the maximum head width, slightly narrowed ventrally, narrowest in line with dorsal oral margin, approximately 38% of maximum head width; covered with dense, yellowish-white pollinosity, completely obscuring the black ground colour, thinner pollinosity on the oral margin, gena and above the facial tubercle, facial tubercle bare; with medium length, light yellowish pilosity, medial region bare from oral margin to antennal base. Frons with yellowish-white pollinosity on the lower half, dense laterally but thinner medially, reaching from the frontal protuberance to the antennal prominence, the division between the pollinose and bare area forming a straight to slightly concave line. The antennal prominence and lunule are bare, the lunule orange in ground colour while the prominence is dark brown to black. Frons with medium length light yellow pilosity, sparse on lunule and antennal tubercle. Ocellar triangle acutely angled, clearly raised, anterior ocellus oval, about 0.6 times as long as wide, posterior ocelli oval, about 1.4 times as long as wide; with yellowish pilosity, short anteriorly but longer posteriorly. Occiput with pale brown to dark yellow pilosity dorsally, white laterally, thin dorsally but broad and scale like laterally; with pale yellow white pollinosity. Eyes bare, kidney-shaped in lateral view. Ommatidia equal sized across the eye. Antennae orange-brown; elongate,

about as long as the maximum width of the face, narrow, parallel sided in lateral view, on dorsal side pedicel about as long as scape, postpedicel 2.5 times the length of the pedicel. Scape and pedicel with short thick dark brown pilosity, pedicel and postpedicel with sparse pollinosity, postpedicel without pilosity. Arista bare, inserted basally, about 1.2 times the length of the postpedicel.

THORAX (Fig. 11). Scutum evenly rounded, except for a small raised oval bump on each side, anterior to the suture; black, postpronotum and postalar callus brownish, postalar callus with fine golden brown pilosity. Pilosity short dorsomedially, longer laterally, light brown, each pilis on a small, rounded, raised, base, which is not covered in pollinosity. Scutal pollinosity densest between the suture and postpronotum, along the suture, posterior to the suture and in an indistinct strip in front of the scutellum, light yellow-brown. Less dense on the remainder of the scutum. Scutellum very broad and large, ~60% the width and ~35% the length of the scutum; dark brown to black; pilosity denser than on the scutum, the density of the raised bases making the surface rough and the margin appear serrated; base narrowly bare (somewhat obscured by scutal pile), smooth; with a long, multi-rowed, light subscutellar fringe. Pleura dark brown to black; evenly rounded except for a moderate bulge on the posterolateral anepisternum; yellow to white pollinose, approximately even across pleura; pilosity yellowish white, bases smaller than on scutum. Dense pilosity limited to patches on the posterior anepisternum, anepimeron, katepisternum, and katatergite, scattered pilosity on the katepimeron. Metasternum bare. Plumule orangish yellow.

LEGS. Hind coxa with a small tuft of pile at posteromedian angle, with long, yellow-white pile on anterior surfaces; mid coxa with long pile on anterior surfaces; fore coxa with shorter, yellow pile on posterior distal margins. Trochanters with long yellow-white pile. Fore and mid femur orange brown with small yellow-orange sections at the base and apex, hind femur orange brown, with yellow basal section and more orange venterodistal section, fore femur slightly curved and thicker medially, mid femur with a slight medial swelling, hind femur swollen in distal two thirds. Fore and mid femur with medium length yellow pile, hind femur mostly covered with medium to long white pile, but with some dark pile in distal 1/3. Fore tibia completely white on posterior surface, white in basal 1/2 of anterior surface, brown in distal 1/2; mid tibia ranges from completely white in the holotype to white in basal 1/2, brown in distal 1/2; hind tibia brown. Pale sections of tibiae with short to medium yellow white pile, dark sections with short dark brown pile. Fore tarsus dark brown dorsally but paler brown ventrally. Mid basitarsus white in holotype, yellow in paratype and brown in ANHRTUK00282356, distal segments brown in all specimens, slightly darker dorsally. Hind tarsus brown dorsally, orange brown ventrally. All tarsi with brown pile, somewhat darker dorsally than ventrally.

WINGS. Extensively microtrichose in apical part, bare patches at base of c, r1, discal medial, cup cells. Alula evenly microtrichose. Cell bm extensively bare, but with a small dense patch of microtrichia in the distal region, in line with the knot of the spurious vein. Basal radial cell mostly bare, but with some microtrichia anterior to the knot of the spurious vein. Cell cua extensively bare, with some microtrichia centrally. Calypters yellow, darker dorsally, with fringe of long yellowish pile. Halteres yellow.

ABDOMEN (Fig. 17). Elongate, broadly oval, though tergite 3 parallel sided. Slightly shorter than the wings, about as wide as the thorax, basic colour dark brown with dull, orange yellow markings. Tergite 1 orange yellow, slightly darker in a thin band at medial posterior boundary; tergite 2 light basally, extending medially to form a large medial marking with straight posterolateral sides, making the marking triangular in shape. Lateral margins of tergite 2 thinly yellow, joining with the main yellow marking anteriorly. Tergite 3 anterior with a narrow anteromedial band, about 1/3 of the length of tergite 3, almost reaching the borders of the tergite laterally and extending slightly posteriorly. Tergite 2 slightly longer than tergite 3, tergite 3 and tergite 4 of the same length and tergite 5 about 1/2 the length of tergite 4. Pile short centrally, longer laterally, golden brown, somewhat longer and paler lateral to tergite 1 and

basolateral to tergite 2. Lateral fringe of pile Sternites light yellowish brown, slightly darker posteriorly, pile medium to long, yellowish.

Male

Unknown.

Distribution

Known from the Democratic Republic of the Congo (Kivu: Kapanga and Nyangwe) and the Republic of the Congo.

Remarks

Despite being from neighbouring countries, the known localities for *A. longipilus* are spread over ~1500 km, suggesting that the species is widespread but uncommonly encountered. All known localities are in Guineo-Congolian forests.

Discussion

The male genitalia of *X. magnificus* and *A. congensis* show no morphological difference, and the differences between the illustrations in Kassebeer (2000a) and Goeldlin de Tiefenau & Thompson (2019) between both species can be replicated by rotating the angle at which the genitalia are viewed. Moreover, the abdominal colour patterns do not show differences between *A. congensis* and *X. magnificus* (the study included the types of both species). In this regard, the key in Goeldlin de Tiefenau & Thompson (2019) contains an error in the first couplet, as neither *A. congensis* nor *A. longipilus* have grey markings on the abdomen. These features strongly support the synonymy of the two species and that any minor differences observed are likely intraspecific, possibly geographic, variations. Hence, with the two newly described species here, we recognise four species of *Afroxanthandrus* as valid. The four species can be easily separated by the yellow pattern on the abdomen (Figs 13–17). Moreover, for the three species where the male is known, the genitalia show pronounced differences in the shape of the surstyli and superior lobes (Figs 18–23).

We obtained DNA barcodes for all four species, though only one DNA barcode each could be obtained for *A. comorosensis* sp. nov. and *A. longipilus* (Fig. 24). We obtained three barcodes for *A. congensis* and two for *A. conopeum* sp. nov., with a low intraspecific p-distance of 0.004% and 0.0%, respectively, far less than the average interspecific p-distance of 6%. All species can thus be identified using both DNA barcoding and morphology.

Afroxanthandrus is rarely collected, despite considerable effort. Since first described, the details of only 15 specimens have been published, with 25 additional records documented here (Fig. 1). Increased knowledge of *Afroxanthandrus* locality records also allows us to make some comments on the distribution of species in the genus. Based on the published data, the genus could be described as a Guineo-Congolian Rainforest endemic, limited to the DRC, São Tomé and Príncipe, and Kenya. With the addition of new records and reassessment of existing records, the range of the genus is from the Cape Verde Islands (not São Tomé and Príncipe) in the west to the Comoros in the east and from Ethiopia in the north to South Africa in the south, almost spanning the entire Afrotropical region. While seldomly collected, species in the genus appear to be widespread. *Afroxanthandrus conopeum* sp. nov. occurs from South Africa to Malawi, with a distance of ~2400 km between the most southern and northern localities. Similarly, the most eastern (Ethiopia) and western (Cape Verde Islands) localities known for *A. congensis* are more than 6500 km apart.

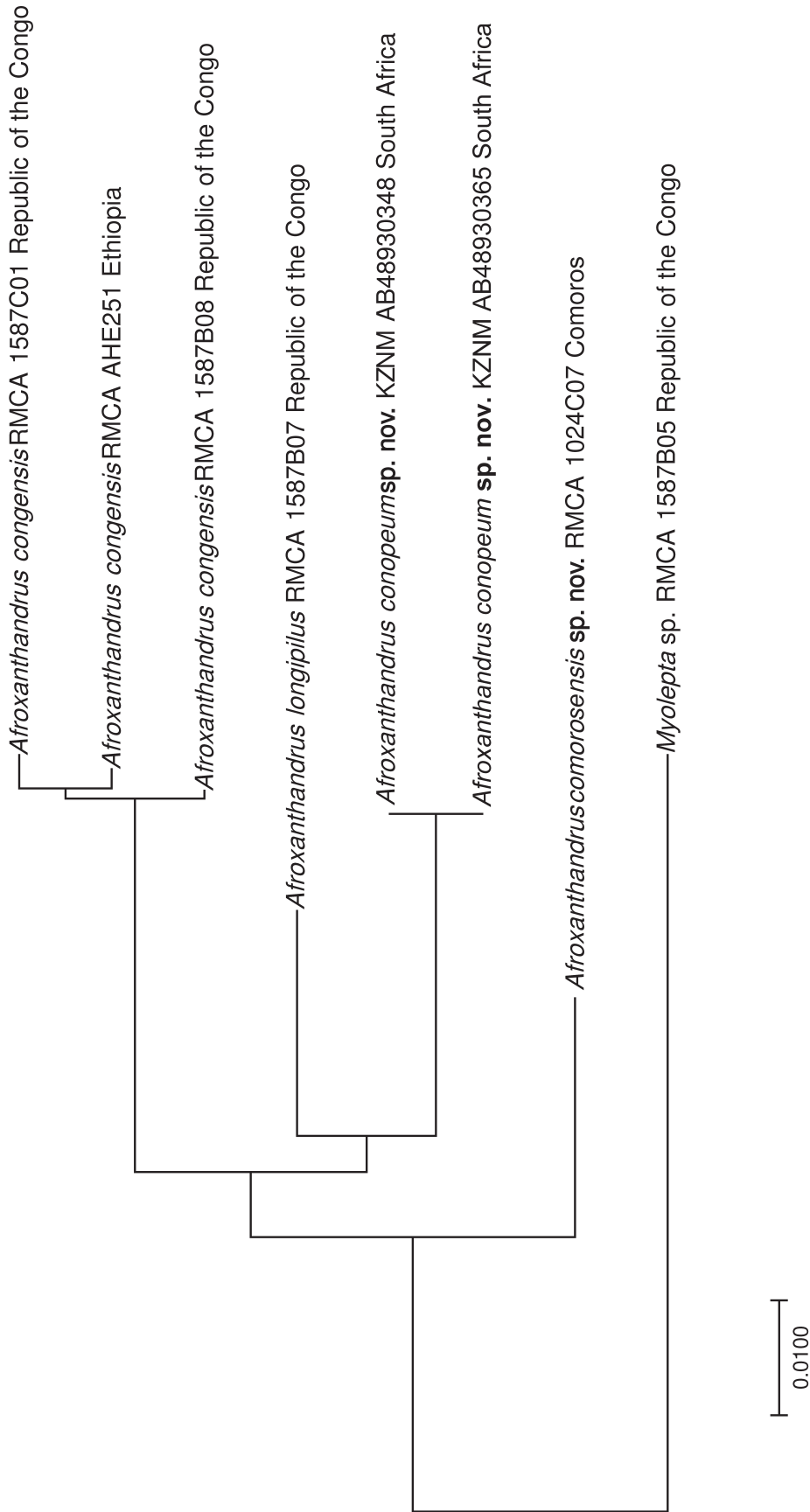


Fig. 24. Neighbour-Joining tree generated from DNA barcode data for four species of *Afroxanthandrus* Kassebeer, 2000.

The habitat of the genus is also broader than previously thought, with most forests appearing to be suitable. The Karkloof Forest in uMngeni Municipality, central KwaZulu-Natal, South Africa, is a relatively well collected site. Routine Malaise sampling was undertaken by Brian Stuckenberg between 1960 and 1980 (Zamisa & Midgley 2022), recently Malaise traps were deployed for a year at the site (Mva 2022), and the authors have collected there on several occasions. Despite these efforts, the three known specimens of *A. conopeum* sp. nov. from the Karkloof were collected on a single day and only males were collected, which suggests that undersampling is due to mismatched efforts, rather than a lack of effort overall. Of potential interest in this regard are the specimens collected at Groenkop Forest and in the Republic of the Congo. The Groenkop specimen of *A. conopeum* was collected from *Curtisia dentata* flowers in the tree canopy (R. Swart pers. com.), while the Republic of the Congo specimens were collected using traps baited with carrion (eight *A. congensis* and one *A. longipilus*) and banana (one *A. congensis*) suspended in the forest canopy (A.H. Kirk-Spriggs pers. com.). These traps also yielded high numbers of *Myolepta* Newman, 1838 (A.H. Kirk-Spriggs unpubl. res.), which is a possible canopy specialist (Thompson 1974).

The low number of records is instead likely related to habitat specialization. This suggests that the canopy is an undersampled biotope in Afrotropical forest ecosystems and that further collecting efforts should include this habitat. Future sampling in the Comoros and western Congo-Guinean rainforests could also result in the discovery of the unknown sexes of *A. comorosensis* sp. nov. and *A. longipilus*.

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