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A REVISION OF AFROTROPICAL SPECIES OF THE *EUPYRGOTA* (DIPTERA, PYRGOTIDAE): THE *VARIPENNIS* AND *MELANCHOLICA* SUBGROUPS OF SPECIES

V. A. Korneyev

Royal Museum for Central Africa, Leuvensesteenweg 13, Tervuren, B-3080 Belgium and Schmalhausen Institute of Zoology, NAS of Ukraine, Bogdan Chmielnicky str., 15, Kyiv, 01601 Ukraine E-mail kot-vasilyl@yandex.ru

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Ревизия афротропических видов рода Eupyrgota (Diptera, Pyrgotidae): подгруппы видов varipennis и melancholica. Корнеев В. А. – На основании изучения типовых материалов, описанных Ч. Кэреном, Ю. Брунетти, Г. Эндерляйном и П. Вансхётбруком и исчерпывающих материалов из многочисленных энтомологических коллекций, представлены описания видов из подгрупп varipennis и melancholica и таблица для определения видов рода Eupyrgota Coquillett, встречающихся в Афротропической области и на Аравийском полуострове. Описаны Eupyrgota echinata Когneyev, sp. n. из Демократической Республики Конго и Уганды и Eupyrgota crassipes Korneyev, sp. n. из Демократической Республики Конго. Установлена следующая синонимия. Eupyrgota Coquillett, 1898 = Peltodasia Enderlein, 1942, syn. n. Eupyrgota varipennis (Curran, 1928), comb. n. и Eupyrgota vespiformis (Enderlein, 1942), comb. n. перемещены соответственно из Campylocera Macquart и Peltodasia Enderlein. E. rugosigenis Hendel восстановлена из синонимии. Впервые указание хозяин Eupyrgota latipennis Walker – взрослая бронзовка Pachnoda interrupta Olivier (Coleoptera, Cetoniidae); это также первое указание хозяина для видов рода Eupyrgota и для афротропических пирготид.

Ключевые слова: Diptera, Cyclorrhapha, Tephritoidea, Pyrgotidae, *Eupyrgota*, Афротропическая область, фауна, таксономия, новые таксоны, синонимия.

A Revision of Afrotropical Species of the *Eupyrgota* (Diptera, Pyrgotidae): the varipennis and melancholica Subgroups of Species. Korneyev V. A. – Based on the study of the type specimens described by C. Curran, E. Brunetti, G. Enderlein and P. Vanschuytbroeck and exhaustive material from many entomological collections, the species of the varipennis and melancholica subgroups of *Eupyrgota* Coquillett are redescribed and a key to all the species occurring in the Afrotropical Region and Arabian Peninsula is provided. *Eupyrgota echinata* Korneyev, sp. n. from the Democratic Republic of Congo and Uganda and *Eupyrgota crassipes* Korneyev, sp. n. from the Democratic Republic of Congo are described. The following synonymy is established. *Eupyrgota* Coquillett, 1898 = *Peltodasia* Enderlein, 1942, syn. n. The following species are transferred to *Eupyrgota: E. varipennis* (Curran, 1928), comb. n., from *Campylocera* Macquart; and *E. vespiformis* (Enderlein, 1942), comb. n. from *Peltodasia* Enderlein. *E. rugosigenis* Hendel is resurrected from synonymy. The host species of *Eupyrgota* latipennis Walker is recorded for the first time: the adult beetle *Pachnoda interrupta* Olivier (Coleoptera, Cetoniidae). This is the first host record for any representative of the genus *Eupyrgota* and for any Afrotropical pyrgotids.

Key words: Diptera, Cyclorrhapha, Tephritoidea, Pyrgotidae, *Eupyrgota*, Afrotropical Region, fauna, taxonomy, new taxa, synonymy.

This paper is the conclusion of revision of Afrotropical *Eupyrgota* (Korneyev, 2006). It contains also some additional data on the species omitted in the previous paper, including designation of lectotype of *Adapsilia rugosigenis* Hendel from Uganda, and resurrection of *E. rugosigenis* from synonymy based on this name-bearing specimen.

Material. The list of abbreviations of the depositaries mentioned in this paper is given in the first part of this paper (Korneyev, 2006), except SMWN – the State Museum of Namibia, Windhoek. Copyrights of the pictures of specimens deposited in the BMNH used in this paper belong to the Natural History Museum, London.

Eupyrgota Coquillett, 1898

Type species: *Eupyrgota luteola* Coquillett, 1898, by original designation.

Peltodasia Enderlein, 1942, syn. n.

Type species: Peltodasia vespiformis Enderlein, 1942, by original designation.

Taxonomy. Enderlein (1942) established the separate monotypic genus *Pelto*dasia, but this study shows that it is closely related to *E. melancholica* in all essential features, and that name therefore is synonymized with *Eupyrgota*. *Peltodasia mageraen*sis Vanschuytbroeck, the second species assigned to that genus, is similar to species of *Siridapha* Enderlein and belongs either to that genus or elsewhere (Korneyev, in prep.).

latipennis group of species

varipennis subgroup

Diagnosis. Parafacial subshining to shining, with more or less distinct wrinkles and sometimes also pits. Supraclypeal sclerite smooth, low, 0.8-0.9 times as high as width of antennal groove. Wing pale brown, with subapical brown spot and hyaline cell bm and base of cell dm (fig. 1, 2; 2, 3). Phallus glans with symmetrical sclerites of praeputium, dentate sclerite ventrobasal to gonopore and right flap not appressed to corpus.

Species included. E. varipennis and E. rugosigenis.

Eupyrgota varipennis (Curran, 1928), comb. n. (fig. 1)

Campylocera varipennis Curran, 1928: 342; Steyskal, 1980: 557.

Type material. Holotype d: **Democratic Republic of Congo:** "Stanleyville, Cgo. / 25°10' E 0°30' N / IV.14.1915", "Lang et Chapin / Collectors", "Campylocera / varipennis / Curran / No [red paper label]", "Campylocera / varipennis / Curran / det. C. H. Curran [white label w/ black frame]" (AMNH).

Diagnosis. Superficially resembles *E. caffra* in robust and dark body, differing by wide gena, waxy shining parafacial (also in *E. rugosigenis*); with *E. rugosigenis* also shares very similar shape of phallus glans and differing from that species by longer setae and almost smooth parafacial and elongate oval compound eye.

Redescription. Head reddish yellow, with brownish frons and postgenae; frons twice (at vertex) and 2.5 times as wide as eye (at lunula level), conspicuously broadened anteriorly; eye narrow oval (eye ratio 0.5); genal-eye ratio 0.36; first flagellomere-pedicel ratio 1.2; medial vertical seta 0.23 times as long as longest (vertical) diameter of eye; lateral vertical seta 0.25 times as long as medial vertical seta; postocellar setae (2 pairs) 0.5 times as long as medial vertical seta; orbital seta 0.3 times as long as medial vertical seta, indistinguishable from surrounding setulae. Fronto-orbital plates and parafacial wide, shining yellow (at eye margin) to brown, with one shallow wrinkle at level of base of antenna. Antennal groove subshining black. Epiclypeal sclerite 0.2 times as high as facial carina.

Mesonotum mostly brown to black, with black setae and brownish setulae; scutellum yellow, with one pair of black apical setae as long as scutellum. Wing brown in anterior half, yellowish or pale brown in posterior half and between R_1 and stump vein in anterior half, with hyaline bd and d cells, with distinct subapical spot. Femora brown, short setulose, without outstanding dorsal setae; forefemur conspicuously thickened, 3.3 times as long as wide; tibiae brown, brown setulose, thickened.

Abdomen dark brown, reddish brown setulose, with short marginal setae on tergite 5; syntergite 1+2 moderately narrowed, 3 times as long as wide at middle and 1.5 times



Fig. 1. Eupyrgota varipennis, holotype σ (AMNH): 1 – habitus, left; 2 – labels; 3-4 – head (3 – right; 4 – anterior); 5 – parafacial, enlarged; 6 – scutellum; 7 – abdomen, dorsal; 8 – hypopygium, ventral, enlarged; 9-10 – glans (9 – lateral, 10 – ventral).

Рис. 1. *Eupyrgota varipennis*, голотип σ (AMNH): 1 – общий вид, слева; 2 – этикетки; 3–4 – голова (3 – справа; 4 – спереди); 5 – скула, увеличено; 6 – щиток; 7 – брюшко, дорсально; 8 – гипопигий вентрально, увеличено; 9–10 – гланс (9 – сбоку, 10 – вентрально).

as long as wide at posterior margin, 1.2 times as long as tergites 3 and 4 together and twice as long as tergite 5; synsternite 1+2 almost 7 times as long as wide at posterior margin. Abdomen and male terminalia not dissected; phallus glans as in fig. 1, 9-10, with almost symmetrical preputium, dentate sclerite ventral to gonopore and left flap not appressed to glans; apical lobe slightly sclerotized, almost symmetrical.

Wing length: male 10.0 mm.

Female unknown.

Remarks. This species can be recognized from the combination of wide head, narrow oval eyes, shining, almost smooth parafacial with mostly dark colored body and wing. The glans of the phallus does not differ from that in *E. rugosigenis*. The two species are obviously closely related, but differ mainly in head shape and eye and genal-eye ratio; in addition, *E. varipennis* has conspicuously longer setae on the head and thorax. It also differs from other species of the *latipennis* group by having only one pair of scutellar setae, but the range of variability is not clear for this character, as the holo-type is the only known specimen.

Eupyrgota rugosigenis (Hendel, 1934) (fig. 2)

Adapsilia rugosigenis Hendel, 1934: 342; Steyskal, 1980: 557. Non Eupyrgota rugosigenis sensu Enderlein, 1942: 120, nec sensu Korneyev, 2006: 14.

Type material. Lectotype (here designated). \circ , "Uganda / H. Hargreaves / Kiynga / 8.2.1924", "Adapsilia / rugosigenis / H. \circ / Hendel det.," "Syntype [blue-boarded circle]", "Syntype / Adapsilia / rugosigenis / Hendel / verified by J. E. Chainey, 2002", "BMNH (E) σ / 252189" (BMNH).

Non-type material. Angola: "A25", Rio Longa, 4 mls. S. Lussusso "Southern / African Exp. / B. M. 1972–I", 8.03.1972", σ ; "A37", 5 mls. NE Negola, "Southern / African Exp. / B. M. 1972-I", 25.03.1972, \circ (BMNH); South Africa: Eastern Cape: Katberg [Karberg?], 4,000 ft., "S. Africa / R. E. Turner / Brit. Mus. / 1933–79", 1–15.01.1933, σ (BMNH) ("Adapsilia (subg. Euthioza)") [blue ballpen handwriting]; Grahamstown, 23.11.1959, σ , (Jaquot-Guillarmod); 17.11.1960, σ ; 22.11.1960, \circ , ("E. McC. Callan" [sic!]); Howison's Poort, Grahamstown, Malaise trap, 26–29.11, \circ ; 1–6.12, \circ ; 6–8.12, \circ ; 8–14.12, 2 σ ; 23–28.12.1971, 2 \circ (Gess) (AMGS); KwaZulu-Natal: Cedara, 1958, σ (M. B. Bayer) (SANC); "Maritzburg / 1917", \circ (Akerman); Pietermaritzburg, "Wattle Res. Inst. \ 4WI", "Comm. Inst. Ent. / Coll. No. 13492", 1953, σ , (BMNH) ("Adapsilia sp. indet. Van Emden det. 1954"); Durban, 21.12.1909, σ , \circ , (Leigh) (NMPM).

Diagnosis. Differs from all other Afrotropical *Eupyrgota* species by robust, dark body, midfemur without femoral organ, pitted and wrinkled fronto-orbital plate and parafacial, small eye and high gena.

Redescription. Head yellow, often with brownish frons and postgenae; frons width as in *E. varipennis*; eye small, oval; eye ratio 0.51-0.66; genal-eye ratio 0.53-0.67; antenna reddish yellow to black; first flagellomere-pedicel ratio 1.0-1.2; medial vertical seta 0.1-0.15 times as long as vertical diameter of eye, or often setula-like; lateral vertical seta indistinct; postocellar, ocellar and orbital setae absent or at most 0.5 times as long as medial vertical seta. Fronto-orbital plates and parafacial wide, waxy shining, yellow to brown, with numerous wrinkles and sparse pits. Antennal groove yellow, with black or brown medial and ventral margins. Epiclypeal sclerite 0.2 times as high as facial carina.

Thorax from mostly brown, with yellow postpronotum and scutellum to entirely brownish black, with black setae and brownish setulae; scutellum with 2–5 (usually 3) pairs of setae half as long as scutellum; mesonotum length 2.9–3.6 (holotype) mm, Wing pale brown, gradually darkened towards apex, with hyaline bd and d cells, in 25% specimens with rather distinct dark brown subapical spot and pale brown area between R_1 and stump vein in anterior half. Wing length 10.0–12.0 mm

Coxae and trochanters without spinulose setulae. Femora brown, short setulose, without outstanding dorsal setae; forefemur slightly thickened, 3.8–4.1 times as long as wide, slightly wrinkled, short setulose, sometimes with 2–3 short setae on dorsal side; midfemur in both sexes without femoral organ; tibiae brown, brown setulose, thickened.

Male and female trochanters without thickened setulae, femora narrow, short setulose, without outstanding dorsal setae; midfemur without femoral organ. Male terminalia as in fig. 2, 9-14.

Abdomen dark brown, reddish brown setulose, with lateromarginal setae on tergites 4 and 5 in male and 4–6 in female; syntergite 1+2 moderately narrowed, 2.4 times as long as wide at middle and 1.3 times as long as wide at posterior margin in male and 1.71 and 0.95–1.05 in female, respectively, 1.35 times as long as tergites 3 and 4 together and 1.7 as long as tergite 5 in male and 1.2 times as long as tergites 3–6 in female; synsternite 1 + 2 4.2–4.8 times as long as wide at posterior margin in male and 3 times in female.

Male terminalia brown, epandrium as in fig. 2, 9–10, surstyli elongate, densely setulose; phallus glans as in *E. varipennis*.

Female terminalia: oviscape subshining yellowish brown to dark brown, robust, 0.6–0.7 times as long as preabdominal tergites combined and slightly wider than long on ventral side; apicoventrally with pair of rather soft lobes, densely covered by trichoid sensillae and closing oviscape aperture in rest; pair of strong black hooks medial to each inverted in rest and exposed ventrobasally of everted membrane; ventral surface of ovis-



Fig. 2. Eupyrgota rugosigenis, non-type specimens (NMPM): 1-2 – head (1 – left; 2 – anterior); 3 – wing; 4 – female preabdomen; 5 – male abdomen; 6 – oviscape, ventral, enlarged; 7 – spermathecae; 8 – aculeus, ventral; 9-10 – hypopygium (9 – lateral, 10 – ventral); 11-12 – sperm pump (11 – lateral, 12 – ventral); 13-14 – glans (13 – lateral; 14 – ventral); 15 – labels of the lectotype.

Рис. 2. *Eupyrgota rugosigenis*, нетиповые экземпляры (NMPM): *1*—2 – голова (*1* – слева; 2 – спереди); 3 – крыло; 4 – преабдомен самки; 5 – брюшко самца; 6 – основной членик яйцеклада, вентрально, увеличено; 7 – сперматеки; 8 – лезвие яйцеклада, вентрально; 9–10 – гипопигий (9 – сбоку, 10 – вентрально); *11*—12 – эякулятор (*11* – сбоку; *12* – вентрально); *13*—14 – гланс (*13* – сбоку, *14* – вентрально); *15* – этикетки лектотипа.

cape anterior to hooks broadly desclerotized, with rather narrow stripes bearing 15-20 yellow setulae in 3-4 rows in basal portion and numerous trichoid sensillae apically; aculeus with base gradually, without determinable border transiting into stiletto-like piercing part approximately 1.5-2 times as long as its bulky base; spermathecae not examined (lost in dissected female).

Remarks. F. Hendel (1934) gave only a brief diagnosis of *A. rugosigenis* in the key: "[Frontoorbital plates] in the anterior portion of the frons with transverse wrinkles. Parafacial twice as wide as flagellomere 1; antennal groove only 2/3 as long as face... 11—16 mm. Uganda" (translated from German). In the first part of this paper it was stated that the only specimen in Hendel's collection (NHMW) under this name is a large female of *A. caffra* from Mlanje (Malawi), which did not originate from "Uganda", and that the original statement of Hendel is a lapsus calami. That specimen was considered a possibly unique syntype of *E. rugosigenis*, as Mr. D. Notton informed me that no specimens of that species were in the collection of the Natural History Museum, London.

However, while the first part of this paper was in print, I have got a chance to visit London and study the collections of the Natural History Museum. I found there another specimen of *A. rugosigenis*, which was marked as syntype, but placed under a bottom label with a misspelled species name, so it simply could not be recognized.

The type series of *Adapsilia rugosigenis* is considered here to include 2 female syntypes, one with 11 mm long wing, from Uganda, and the other with wing 16 mm long, from "Mlanje, Nyassaland", which have very similar determinative labels and served Hendel for compiling that brief diagnosis of species. Therefore, they were syntypes of *Adapsilia rugosigenis*. As they belong to two different species, lectotype designation is needed to fixate the application of the species name.

Herewith, I designate the type specimen from Uganda (BMNH) as lectotype of *Adapsilia rugosigenis*, as it is the only syntype, which fits the type locality given in the original diagnosis.

The paralectotype from "Nyassaland" (which is a female of E. caffra) is not a name-bearing specimen anymore.

The binomen *Eupyrgota rugosigenis* is therefore resurrected from synonymy with *E. caffra* and is applied to the above-described species as valid.

melancholica subgroup

Diagnosis. Parafacial subshining or shining, with shallow, indistinct pits and wrinkles. Supraclypeal sclerite smooth, low, 0.7-0.9 times as high as width of antennal groove or indistinct. Wing widely brown along whole anterior margin (fig. 3, 3; 4, 5). Trochanters without spinulose setulae; femora slender, midfemur without femoral organ. Abdomen petiolate, with narrow segment 1 + 2. Hooks apically tapered into sharp angle. Aculeus elongate, with rather narrow base gradually tapered to apex.

Eupyrgota echinata Korneyev, sp. n. (fig. 3)

Lygiohypotyphla nigripennis: Vanschuytbroeck, 1963: 61 (misidentification, non L. nigripennis Hendel, 1934).

Type material. Holotype φ: **Democratic Republic of Congo:** "Coll. Mus. Congo / Kibali-Ituri / Terr. Wamba / 810 m / 11–XI–1955 / (R. Castelain)" (RMCA) ("P. Vanschuytbroeck det. 1963 / Lygiohypotyphla / nigripennis Hend."). **Paratypes: Ghana:** σ, "Sep. '66 / Forest / 5°23' N / 2°28' W / Ghana / L. R. Cole", σ, "Ghana: / V. F. Eastop. / B. M. 1957–525", "Tafo Ghana / light 6 v 1957 / V. F. Eastop" (BMNH); **Democratic Republic of Congo:** φ, "Congo-Belge / Uéle: Titule / 8.12.49 / Ch. Verbeke", "R. In. S. N. B. 24.236 / Coll. M. Bequaert" (RBINH) (abdomen dissected); φ, "Coll. Mus. Congo / Sankuru- / Komi VI 1930 / J. Ghesquiere" (RMCA); **Uganda:** φ, "X1259 – EgS8" [Districts Masindi, Bundibugyo, and Mbale, 1°25' N, 31°35' E, canopy fogging on specific trees, 1995+1997 (Wagner), wet alcohol material] (FBUB).

Diagnosis. Facial carina gently sloping, wider than or as wide as antennal groove. Flagellomere 1 slightly shorter than pedicel. Wing with brown anterior half and pale grayish or brownish posterior half. Abdominal sternites 3–5 of female densely spinulose.

Description. Body brown with contrasting yellow pattern; setae and setulae black; mesonotum length 2.2 (holotype)—3.1 mm, wing length 8.0—10.0 (holotype 8.2 mm).



Fig. 3. *Eupyrgota echinata*, paratypes \circ (BMNH) (1–3, 7–10) and \circ (RBINH) (4–6): 1 – head and pleuron, left; 2 – head, anterior; 3 – wing; 4 – female abdomen, ventral; 5 – spermatheca; 6 – aculeus; 7 – male abdomen, ventral; 6 – oviscape, ventral, enlarged; 7 – spermathecae; 8 – epandium and proctiger, right; 9–10 – glans (9 – lateral, 10 – ventral).

Рис. 3. *Eupyrgota echinata* sp. п., паратипы ♂ (BMNH) (*1—3, 7—10*) and ♀ (RBINH) (*4—6*): *1* – голова и плевра, слева; *2* – голова, спереди; *3* – крыло; *4* – брюшко самки, вентрально; *5* – сперматека; *6* – лезвие яйцеклада; *7* – брюшко самца, вентрально; *6* – основной членик яйцеклада, вентрально, увеличено; *7* – сперматеки; *8* – эпандрий и проктигер, справа; *9—10* – гланс (*9* – сбоку, *10* – вентрально).

Head (fig. 3, 1-2) yellow, usually with brown frons, anterior and ventral part of parafacial, gena and occiput partially or entirely brown; frontal-head ratio 0.35-0.54, eye ratio 0.45-0.57, genal-eye ratio 0.17-0.20 in female, 0.27-0.30 in male; first flag-ellomere-pedicel ratio 0.8 in female and 0.83-0.90 in male; medial vertical seta 0.09-0.16 times as long as vertical diameter of eye; lateral vertical seta indistinguishable; ocellar seta (sometimes 2 pairs) 0.5 times as long as medial vertical seta or lacking; orbital seta as long as ocellar; frons brownish to brown; frontal vitta matt with sparse setulae; frontal plate and parafacial shining, sometimes shallow wrinkled, setulae indistinguishable; antenna brown to black; first flagellomere brown or slightly yellowish at base, densely microtrichose, twice times as long as wide, blunt at apex; arista bare; face shining yellow to brownish yellow, often with partially or entirely black antennal

groove; facial carina rather wide at ventral end, 1.0—1.2 times as wide as antennal groove at ventral one-third of face height, gently sloping; parafacial shining brown, often with contrasting yellow spot at eye margin, inconspicuously pitted and shallow wrinkled, 1.7—2.0 times as wide as 1st flagellomere in male, 1.0—1.2 times in female; gena with matt, brown genal groove and shining brown or black subocular spot; genal dilation linear, black; postgena yellow to brown; occiput often with large brown mark medially; mouthparts brown, large, as long as antenna; palpus yellow with short black-ish setulae, very slightly widened before apex, hidden in most specimens.

Thorax dark brown with contrasting yellow areas: postpronotal lobe, notopleural triangle, triangular area anterior to scutellum, scutellum itself, posterior half of anepistenum, and also katatergite and anatergite. Postpronotal lobe with 5–7 setulae and one weak seta, often indistinguishable from setulae. Scutum with short black setae and black setulae; scutellum with 2 pairs of scutellar setae, apical seta 0.7 times as long as scutellum and basal half as long as apical, sometimes indistinguishable; presternum with 3–5 brown setulae on apex of each process; proepisternum with 10–15 black setae 0.5–0.8 times as long as notopleural setae; anepisternum with 1 seta and 2 groups of 5–7 moderately long setulae in dorsal and posterior part; katepisternum with 1 short seta, 7–8 short dorsolateral setulae half as long as katepisternal seta and 3–4 ventral setae and 2–3 finer setulae at posteroventral margin; anepimeron with 1 anepimeral seta and 3–5 setulae.

Legs brownish yellow, often with contrasting brown coxa and ventroapical onethirds of femora; forecoxa with 10—12 black setae and 2—3 stronger setae; mid- and hindcoxa with rather weak setae and setulae as described for *E. caffra*; trochanters with fine setulae only, rarely slightly curled on apices in female; forefemur 4.0—4.5 times as long as wide, with long and thin basiventral seta and two rows of 6—8 short, slightly thickened setae apicoventrally; midfemur without femoral organ; mid- and hindfemur moderately slender, with very short basiventral seta and two rows of 3—5 short and thin spines apicoventrally; no outstanding setae on dorsal surface of femora.

Wing brown in anterior half, including whole cell br and anterior half of cell r_{4+5} ; hyaline or with yellowish tinge and grayish microtrichiae in posterior half; wing-thorax ratio 3.0–3.1, vein R₄₊₅ ratio 1.7–2.0, vein M ratio 1.9–2.3.

Male abdomen, brown, sometimes with yellow spots at middle of syntergite 1+2 and on its posterior margin; sparsely microtrichose and short black, setulose; tergites 4 and 5 with 3–5 posteromarginal setae; syntergite 1+2 1.5–1.6 times as long as tergites 3 and 4 combined; and 2.1 times as long as tergite 5; synsternite 1+2 long and narrowed to posterior margin, 8 times as long as wide at posterior margin, sternites 3–5 sparsely and finely setulose; epandrium with rather short surstyli; glans of phallus with almost symmetrical sclerites of praeputium of loop-like appearance and short semitubular sclerite of acrophallus; lateral flap of glans corpus short and almost appressed; apical lobe slightly sclerotized, almost symmetrical.

Female abdomen (fig. 3, 4) brown with yellow crossband on syntergite 1+2; syntergite 1+2 approximately 0.8 times as long as wide at posterior margin and twice as long as tergites 3–6 combined (abdomens shriveled in all specimens!); synsternite 1+2 shorter than in male, 3.5-4.0 times as long as wide at posterior margin; sternites 3 and especially 4–5 spinulose, sternite 6 with fine setae and setulae; oviscape subshining reddish brown, robust, 0.8-0.9 times as long as preabdominal tergites combined and slightly wider than long on ventral side; apicoventrally with pair of elongate lobes, setulose at base and covered by trichoid sensillae in apical part; pair of acute black hooks; aculeus with base gradually transiting into rather short piercing part without conspicuous constriction at base (fig. 3, 6); spermathecae oval (fig. 3, 5), 3.0-3.5 times as long as wide.

Remarks. The two known males of this species have body coloration and wing pattern like in all species of the *melancholica* group, and only the gently sloping, wide shape of the facial carina permits identification of them as E. *echinata*, as other char-

acters are either sexually dimorphic (spinulose abdominal sternites) or possibly more variable than in this small sample (first flagellomere-pedicel ratio).

Eupyrgota melancholica (Brunetti) comb. n. (fig. 4)

Adapsilia melancholica Brunetti, 1929: 23; Steyskal, 1980: 556. *Campylocera pisciventris*: Vanschuytbroeck, 1963: 10, 69 (pro parte: misidentification; misspelling of *piceiventris*).

Type material. Holotype \circ Adapsilia melancholica: Nigeria: "N. Nigeria / 14.06.1912 / Dr. J. W. Scott Macfie / around COMU near / stream in thick bush", "Type [red bordered circle]", "Holo / type [red bordered circle]", "Adapsilia / melancholica / Brun Type / Det. E. Brunetti 1926", "Pres by / Imp. Bur. Ent. / Brit. Mus. / 1929–48", "Holotype Adapsilia melancholica Brunetti verified by J. E. Chainey 2002", "BMNH σ 252164" (BMNH).

Non-type material. Central African Republic: "La Maboke" [= Mbaka?], 1968, \circ (dissected) (Bernard) (MNHNP); Democratic Republic of Congo: Kibali-Ituri: Yindi, 1949, \circ ("P. Vanschuytbroeck det. / Campylocera / pisciventris Hend.") (Bernard) (RMCA).

Diagnosis. Facial carina sharp, narrow, linear except ventral one-quarter. Flagellomere 1 as long as or slightly longer than pedicel. Wing with brown anterior half and pale grayish posterior half and cells r_{2+3} and r_{4+5} between veins r-m and dm-cu. Abdominal sternites of female with sparse and fine setulae.



Fig. 4. Eupyrgota melancholica, holotype \circ (BMNH) (1–6) and non-type \circ (MNHNP) (7–9): 1 – habitus, left; 2 – labels; 3–4 – head (3 – left, 4 – anterior); 5 – wing; 6–7 – abdomen (7 – dorsal, 8 – ventral, dissected); 8 – spermatheca; 9 – aculeus.

Рис. 4. *Eupyrgota melancholica*, голотип \circ (BMNH) (*1*—6) и нетиповая \circ (MNHNP) (*7*—9): *1* – общий вид, слева; *2* – этикетки; *3*—4 – голова (*3* – слева, *4* – спереди); *5* – крыло; *6*—7 – брюшко (*7* – дорсально, *8* – вентрально, вскрыто); *8* – сперматека; *9* – лезвие яйцеклада.

Description. Body brown with contrasting yellow pattern; setae and setulae black; mesonotum length 2.9-3.6 (holotype) mm, wing length 9.5-11.5 (holotype 10.0 mm).

Head (fig. 4, 3-4) coloration as in *E. echinata* sp. n.; frontal-head ratio 1.8–2.4 in holotype (at posterior and anterior side, respectively), eye ratio 0.55–0.63, genal-eye ratio 0.23–0.31; first flagellomere-pedicel ratio 1.0–1.1; chaetotaxy and coloration as in *E. echinata* sp. n.; facial carina sharp, narrow, linear except ventral one-quarter, 0.4–0.7 times as wide as antennal groove at ventral one-third of face height; parafacial as in *E. echinata* sp. n., 1.6–1.8 times as wide as 1st flagellomere.

Thorax dark brown with yellow areas, and also with chaetotaxy as described for E. echinata, in holotype less extensive than in other specimens. Scutellum with 2 pairs of setae as long as scutellum.

Legs brownish yellow, in holotype with contrasting brown forecoxa and femora; shape and chaetotaxy as described for *E. echinata* sp. n.

Wing as in *E. echinata* sp. n., except pale cells r_{2+3} and r_{4+5} between veins r-m and dm-cu grayish; wing-thorax ratio 3.0–3.6, vein R_{4+5} ratio 1.8–1.9, vein M ratio 1.75–2.10.

Female abdomen brown with yellow posterior margins of tergites 5 and 6; syntergite 1+2 as long as wide at posterior margin and 1.25 times as long as tergites 3–6 combined; synsternite 1+2 0.38–0.4 times as long as wide at posterior margin; sternites 3–6 with fine setae and setulae; oviscape subshining brown, robust, 0.5–0.7 times as long as preabdominal tergites combined; hooks and allied stripes of setae and trichoid sensillae as in *E. echinata* sp. n.; aculeus with base gradually transiting into long stiletto-like piercing part more than 2.2 times as long as its bulky base; spermathecae elongate oval, 3.0-3.2 times as long as wide (fig. 4, 8).

Male unknown.

R e m a r k s. The coloration of the holotype is similar to that of *E. echinata*; my pictures of this specimen, taken in the very beginning of this study, do not include a ventral view of the abdominal sternites, but Dr. D. Notton (BMNH) kindly re-examined the holotype on my request and confirmed that it has fine and sparse setulae, like the two other specimens.

Eupyrgota vespiformis (Enderlein, 1942), comb. n. (fig. 5)

Peltodasia vespiformis Enderlein, 1942: 120; Steyskal, 1980: 559; non Peltodasia vespiformis: Vanschuytbroeck, 1963: 61: misidentification of *E. caffra, E. latipennis* and *E. varipennis* (see above).

Type material. Holotype φ : **Central African Republic**: "Dapu-Afrika / Monguniba a. Ubangi / Dr. A. [rnold] Schultze S. G. [blue printed label]", "wespenännlich Diptere / Monguniba 7.04. [19]30 [folded pencil-written label]", "Typus [pale red label, Enderlein's style]", "Peltodasia vespiformis / Type Enderl. φ / Dr. Enderlein det. 1941" (ZMHB).

Non-type material. **Guinea**: "N'Zérékoré, Fr. Guinea", 8.03.1951, \circ (Olsen) (ZMUC). **Kenya**: "Forest Nakamega" [sic! = Kakamega], 21.04.1973, \circ (Laurens) (ZMAN).

Diagnosis. This species can be easily differentiated from other species of *Eupyrgota* by its long petiolate abdomen in female: syntergite 1+2 more than 3 times as long as tergites 3-6 together and more than 3 times as long as wide at apex; synsternite 1+2 more than 3 (4.5-6.0) times as long as wide at posterior margin. Flagellomere 1 as long as or slightly shorter than pedicel. Facial carina sharp, narrow. Abdominal sternites of female with sparse and fine setulae.

Description. Body brown with contrasting yellow pattern; setae and setulae black; mesonotum length 3.1–3.5 (holotype) mm, wing length 9.5–10.5–11.5 (holotype) mm.

Head (fig. 5, 4) coloration mostly as in *E. echinata* sp. n., but frons, face and occiput mostly brownish yellow in holotype, and fronto-orbital plate, parafacial (including subocular dilation) and antennal groove widely dark brown in specimen from



Fig. 5. Eupyrgota vespiformis, holotype \circ (ZMHB) (1–3) and non-type \circ (ZMAN) (4–8): 1–2 – habitus (1 – left, 2 – dorsal); 3 – labels; 4 – head, anterior; 5 – abdomen, ventral, dissected; 6 – spermatheca (1 of 3); 7 – aculeus; 8 – hooks and ventral field of sensilla.

Рис. 5. *Eupyrgota vespiformis*, голотип ϕ (ZMHB) (1–3) и нетиповая ϕ (ZMAN) (4–8): 1–2 – общий вид (1 – слева, 2 – дорсально); 3 – этикетки; 4 – голова, спереди; 5 – брюшко, вентрально, вскрыто; 6 – сперматека (1 из 3); 7 – лезвие яйцеклада; 8 – крючья и вентральное поле сенсилл.

Kenya; frontal-head ratio 1.8-2.4 in holotype (at posterior and anterior side, respectively), eye ratio 0.48-0.60, genal-eye ratio 0.22-0.31; first flagellomere-pedicel ratio 0.77-0.9; chaetotaxy and coloration as in *E. echinata* sp. n.; facial carina as in *E. melan-cholica*; parafacial as in *E. echinata* sp. n., 1.45-1.8 times as wide as 1st flagellomere.

Thorax brown or brownish yellow with yellow or brownish yellow pleura and yellow scutellum, without contrasting pattern. Postpronotal lobe with 3–5 setulae and one moderately strong seta. Scutum with black setae and setulae; scutellum with 2 pairs of scutellar setae almost as long as scutellum; presternum with 3–4 brown setulae on apex of each process; proepisternum with 10–12 black setae 0.4–0.5 times as long as notopleural setae; anepisternum with 1 seta and 2 groups of 7–10 fine setulae in dorsal and posterior part; katepisternum with 1 short seta, 10–15 short dorsolateral setulae 0.2 times as long as katepisternal seta and 2 ventral setae at posteroventral margin; anepimeron with 1 anepimeral seta and 4–5 setulae half as long as seta. Legs yellow to brown, with brown tibiae; shape and chaetotaxy as described for E. echinata sp. n.

Wing almost uniformly brownish yellow, slightly paler at posterior margin; alula hyaline; wing-thorax ratio 3.5, vein R_{4+5} ratio 1.8–1.85, vein M ratio 1.7–1.9.

Halter yellow with dark brown knob.

Female abdomen brownish yellow to brown; syntergite 1+2 yellow to brownish yellow, as long as wide at posterior margin and 1.25 times as long as tergites 3-6 combined; synsternite 1+2 4.5–6.0 times as long as wide at posterior margin; sternites 3-6 with rather long and sparse setae and setulae; oviscape subshining brownish yellow, robust at base, elongate and ventrally curved at apex, as long as syntergite 1+2; hooks acute, allied stripes of setae and trichoid sensillae conspicuously elongate; aculeus with base gradually transiting into piercing part more without visible border; spermathecae elongate oval, 2.9-3.1 times as long as wide (fig. 5, 6).

Male unknown.

Remarks. The abdomen is extremely long even in female (which usually have shorter and wider abdomens than males in most *Eupyrgota* species), and it is expected to be even longer in male, which are still unknown.

Species not assigned to subgroups

The following species have shining or subshining parafacial, and do not fit the diagnosis of the *latipennis* subgroup; on the other hand, it has no other characters that support its placement in the *varipennis* or *melancholica* subgroups. I therefore consider their position uncertain until additional material is available and the genus *Eupyrgota* is revised worldwide.

Eupyrgota crassipes Korneyev, sp. n. (fig. 6)

Adapsilia vespiformis: Vanschuytbroeck, 1963: 61 (pro parte; misidentification).

Type material. Holotype φ : **Democratic Republic of Congo**: Sankuru: Komi, 06.1930, ("P. Vanschuytbroeck det 1963 / Peltodasia / vespiformis End. ") (Ghesquiere) (RMCA).

Diagnosis. Large robust fly, which can be easily recognized from the combination of wide, shiny parafacial, wing with 2 brown spots, midfemur of female with femoral organ, fore- and hindfemur with strong semierect setae on dorsal surface; hindfemur thickened.

Description. Female orange yellow, similar to male, except antennal groove orange, with narrow black area at ventral margin. Head deformed in female; frontal plates and parafacial shining yellow, latter 2.0–2.2 times as wide as flagellomere 1; subocular dilation with black spot; face yellow with narrow black patch at ventral margin of each antennal groove. Thorax reddish yellow, scutellum yellow with 2 pairs of moderately long setae 0.9–1.5 times as long as scutellum. Wing pale yellowish, except hyaline cell bm and base of dm, brown subapical spot and vellow anterior half of wing; wing-thorax ratio 3.0; vein R₄₊₅ ratio 1.8, vein M ratio 0.5. Foretrochanter with sparse spinulose setulae. Femora thickened. Forefemur 3.2 times as long as wide, with strong, somewhat appressed setae on dorsal surface, similar to those in E. caffra. Midfemur with short oval femoral organ as long as femur width; 4-5 long dorsoapical setae. Hindfemur very thick, 3 times as long as wide, with 12–15 stout setae in dorsoapical half. Female abdomen reddish to brownish yellow, similar to E. caffra; synsternite 1+2 3.5 times as long as wide at posterior margin; oviscape subshining reddish vellow, 0.69 times as long as preabdominal tergites combined and 0.75 as long as wide on ventral side; hooks simple; ventral surface of oviscape anterior to hooks with 5-6 thick



Fig. 6. Eupyrgota crassipes, holotype \circ (RMCA): 1-2 - habitus (1 - left, 2 - dorsal); 3-4 - head (3 - right, 4 - anterior); 5 - parafacial; 6 - foretrochanter, enlarged; 7 - midfemur; 8 - hindfemur; 9 - preabdomen, ventral, dissected; 10 - apex of oviscape, left; 11 - spermatheca (1 of 3); 12 - aculeus, ventral; 13 - label.

Рис. 6. *Eupyrgota crassipes*, голотип \circ (RMCA): *I*—2 – общий вид (*1* – слева, *2* – дорсально); *3*—4 – голова (*3* – справа, *4* – спереди); *5* – скула; *6* – передний вертлуг, увеличено; *7* – среднее бедро; *8* – заднее бедро; *9* – преабдомен, вентрально, вскрыт; *10* – вершина основного членика яйцеклада, слева; *11* – сперматека (1 из 3); *12* – лезвие яйцеклада, вентрально; *13* – этикетка.

black setulae as in *E. latipennis*; ventral fields of sensillae short, like in *E. caffra* and *E. latipennis*; aculeus with piercing part 2 times as long as its bulky base; spermathecae oval (fig. 6, 11), 3.1 times as long as wide.

Wing length 11.6 mm.

Remarks. This species is similar to *E. caffra* in its robust appearance and setose femora with femoral organ, but clearly differs by its much wider hindfemur, smaller femoral organ, black, thickened setulae on the oviscape anterior to the hooks, and shining, inconspicuously wrinkled and pitted parafacial. By the structure of the ovipositor it is very similar to *E. caffra*, but numerous differences from that species show that it is not merely an aberrant specimen of the latter.

The holotype is in fair condition (head with frons almost entirely cracked), and measurements of certain structures are impossible; however, the other characters clearly differentiate it from all other *Eupyrgota*.

Biology of Afrotropical Eupyrgota

Two additional specimens of *Eupyrgota latipennis* not mentioned in the first part of this paper (Korneyev, 2006) were reared from adult beetles:

Material. Ethiopia: Minjar 150 km E of Addis Abbaba N 9°02.383', E 39°33.683', ex adult beetle Pachnoda interrupta 3.10.2001, σ , \circ (Hivot Lemma) (BMNH).

Pachnoda interrupta Olivier (Coleoptera: Cetoniidae) is a key pest of sorghum in many African countries. This is the first record on rearing of Afrotropical Pyrgotidae, as well as of an *Eupyrgota* and a pyrgotid reared from the lamellicorn beetles of the Cetoniidae; other records from Asia and Americas were all from the Melolonthidae beetles. The puparium is located with its anterior end in the posterior end of the beetle abdomen and almost completely fulfill it.

Key to species occurring in the Afrotropical Region Таблица для определения видов, обитающих в Афротропической области

Face with well expressed facial ridge separating antennal grooves. Wing widely vellowish, with large brown subapical spot or widely darkened along anterior and, sometimes, posterior margin. 2-4 pairs of scutellar setae (if only one pair present, then wing widely darkened). latipennis group Postpronotal seta and anepisternal setae present; postpronotal lobe with 4-8 setulae. Female: 2. midfemur with femoral organ (Korneyev, 2006: fig. 3, 4). Oviscape on ventral side with numerous thickened setae (Korneyev, 2006: fig. 3, 8). Nigeria, Democratic Republic of Congo. E. spinifemur (Hendel, 1934) Postpronotal seta and an episternal setae absent; postpronotal lobe with 0-2 setulae. Female: midfemur without femoral organ. Oviscape on ventral side with sparse and thin setae (Korneyev, 2006: fig. 3, 1-2). Côte-d'Ivoire, Nigeria, Democratic Republic of Congo. E. saegeri (Vanschuytbroeck, 1963) Eye vertical diameter at most 3.0 (1.6-2.8) times as high as gena; parafacial very wide, more than 3. 0.75 (usually 0.8-1.0) times as long as horizontal diameter of eye, waxy shining, often with deep and Eye vertical diameter more than 3.0 times as high as gena; parafacial usually narrower, 0.4–0.6 times as long as horizontal diameter of eye, if larger (at most 0.8), then midfemur with femoral organ in First flagellomere 1.33 times as long as pedicel. Ocellar and postocellar seta black and rather strong, 4. as long as medial vertical seta. Scutellum with 1 pair of black setae 0.65 times as long as scutellum. Democratic Republic of Congo. E. varipennis (Curran, 1928) First flagellomere 0.87–1.05 times as long as pedicel. Ocellar, postocellar and vertical setae brown and weak, usually indistinguishable from setulae or absent. Scutellum with 2-4 pairs of brown setae 0.25-0.40 times as long as scutellum. Angola, Uganda, South Africa. E. rugosigenis (Hendel, 1934) 5. Parafacial matt, finely shagreened (if subshining in old, greased specimens, then with distinct and numerous small pits) (Korneyev, 2006: fig. 4, 2; 7, 9, 9, 3). Supraclypeal sclerite conspicuously wrinkled, high, 1.1–1.2 times as high as width of antennal groove. Wing hyaline with 2 distinct brown spots (on pterostigma and at antero-distal part), separated by pale yellowish area distal of R1 apex (Korneyev, 2006: fig. 9, 6).latipennis subgroup Parafacial subshining or shining, with shallow, indistinct pits and wrinkles. Supraclypeal sclerite Female: femoral organ well developed; forefemur dorsally with 5-8 setulae 2-3 times as long as 6. surrounding setulae; oviscape with uniformly thin setulae on ventral side (Korneyev, 2006: fig. 5, 5-6). Aculeus base gradually narrowed into long stiletto-like piercing part more than 2.8 times as long as its bulky base (Korneyev, 2006: fig. 5, 7). Spermathecae sausage-like, 3.5-7 times as long as wide (Korneyev, 2006: fig. 5, 3). Male: forefemur conspicuously thickened, less than 3.9 times as long as wide; glans of phallus with almost symmetrical sclerites of praeputium loop-like. Nigeria, Namibia,

Botswana, Malawi, South Africa. E. caffra (Hendel, 1914)

- Female: femoral organ not developed; forefemur dorsally with short setulae [oviscape various: either with thickened setae anterior to sensillar lobe or with uniformly thin setulae on ventral side]. Aculeus wide at base, then sharply narrowed into short stiletto-like piercing part less than 2.5 times as long as its bulky base (Korneyev, 2006: fig. 8, 5; 9, 12). Spermathecae elongate oval, 1.5–2.5 times as long as wide (Korneyev, 2006: fig. 8, 4). Male: forefemur narrow, more than 4 times as long as wide; glans of phallus with clearly asymmetrical sclerites of praeputium, one of which is large and fan-like (Korneyev, 2006: fig. 8, 9–10; 9, 14–15).
- 7. Parafacial usually conspicuously pitted, frontal plates wrinkled or almost smooth. Female: oviscape on ventral side, anterior to ventral sensillar lobe and hooks, with 4–5 brown thickened setulae on each side (Korneyev, 2006: fig. 8, 1–3); foretrochanter with at most 10–15 thickened setulae. Senegal, Côte-d'Ivoire, Ghana, Nigeria, Sudan, southern Egypt, Saudi Arabia, Yemen, Democratic Republic of Congo, Rwanda, Burundi, Uganda, Kenya, Malawi, Namibia, Zimbabwe.
- 8. Fore- and hindfemur thickened, in female with strong appressed setae dorsally (fig. 6, 7–8); femoral organ well developed (fig. 6, 7). Frons at anterior margin wide, 0.55–0.65 times as wide as head. Flagellomere 1 slightly longer than pedicel and less than half as wide as parafacial (fig. 6, 3). Oviscape: thickened black setae anterior to hooks (similar to those in *E. latipennis*) present. Democratic Republic of Congo. *E. crassipes* sp. n.
 Fore- and hindfemur narrow, without enlarged setae on dorsal side (fig. 4, *I*; 5, *I*); midfemur without
- femoral organ. Frons at anterior margin narrower, 0.4–0.5 times as wide as head. Wing widely brown along whole anterior margin (fig. 3, 3; 4, 5; 5, 1). Other characters various. melancholica subgroup
- Wing with brown anterior half and pale gray or yellowish posterior half. Female: abdomen short clavate: syntergite 1+2 at most 1.2 times as long as tergites 3–6 together and at most 2.5 times as wide at base; synsternite 1+2 less than 3 (1.5–2.5) times as long as wide at posterior margin; other characters various.

..... E. melancholica (Brunetti, 1929)

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Brunetti E. I. New African Diptera // Ann. Mag. Nat. Hist. - 1929. - (10) 4. - P. 1-35.

Curran C. H. Diptera of the American Museum Congo Expedition. P. 2: Asilidae, Conopidae, Pyrgotidae, Micropezidae, Chloropidae, Drosophilidae, Lonchaeidae, Sapromyzidae, Muscidae, Calliphoridae, and Tachinidae // Bull. Am. Mus. Nat. Hist. - 1928. - 57, N 6. - P. 327–399. Coquillett C. D. Report on a collection of Japanese Diptera, presented to the U. S. National Museum by the Imperial University of Tokyo // Proceedings of the United States National Museum. - 1898. - 21 [= No. 1146]. - P. 301–340.

Enderlein G. Klassifikation der Pyrgotiden // Sitzungsberichte der Gesellschaft Naturforschenden Freunde zu Berlin. – 1942 (**1941**). – H. 2. – S. 98–134.

Hendel F. Übersicht über die Gattungen der Pyrgotiden, nebst Beschreibung neuer Gattungen und Arten // Encyclopedie Entomologique. (B) II. Dipt. – 1934. – 7. – S. 141–156.

Korneyev V. A. A Revision of Afrotropical Species of the Eupyrgota (Diptera, Pyrgotidae): the spinifemur group and latipennis subgroup of species // Vestnik zoologii. - 2006. - 40, N 1. - P. 3-25.

Steyskal G. C. 42. Family Pyrgotidae // Catalogue of the Diptera of the Afrotropical Region / Ed. R. W. Crosskey. – London : British Museum (Natural History), 1980. – P. 556–562.

Vanschuytbroeck P. Pyrgotidae (Diptera Otitoidea) // Inst. des Parcs Nat. du Congo et du Rwanda, Explor. du Parc Nat. de la Garamba, Miss. H. De Saeger. – 1963. – Fasc. 38. – P. 1–76.