

The taxonomic position of *Aphodius circumdatus* Klug, with some notes on the synonymy of the species of subgenus *Adeloparius* Schmidt (Col. Lamellicornia)

By

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A closer study of the exclusively African *Aphodius* subgenus *Adeloparius* has clearly indicated the taxonomic heterogeneity of this subgenus. This fact has hitherto been unnoticed, mainly because of the earlier misinterpretation of the species *Aphodius circumdatus* Klug which has been placed in the subgenus *Adeloparius* since the introduction of this subgenus (Schmidt 1913, p. 134). When examining the specimens of "*A. circumdatus* Klug" in the Schmidt collection of Riksmuseum, Stockholm, I compared this species with the types of two other ones apparently closely related to "*circumdatus*", viz. *A. emeritus* Péringuey, and *A. excavaticollis* Balthasar. At first sight the three "species" could be divided into two groups: "*circumdatus*" of Schmidt on the one hand, and *emeritus-excavaticollis* on the other, the two last-mentioned having a deep anterior depression in the male pronotum, lacking in both sexes of the "*circumdatus*" specimens of the Schmidt collection. At the same time, I received some very valuable information from my dear friend, Dr. Sebö Endrödi, the famous Hungarian Scarabaeid specialist in Budapest, who had the type of Klug's *circumdatus* on loan from Berlin. He told me that *circumdatus* Klug belongs to the group of species having the pronotum anteriorly depressed in the male. A closer study of the whole complex did, at last, solve the problem of the positions of the different species and their synonymy. I want to express my deep gratitude to Dr. Endrödi for all his kind assistance.

Although the taxonomic value of the subgenera of *Aphodius* — and of the conception of the "subgenus" on the whole — has been doubted (see e.g. Grebenščíkov 1957, p. 72 ff.), I cannot find it unjustified to retain under different subgeneric names those taxonomic units which are closely related to each other without overlapping, but, as regards the main characteristics, are to be considered congeneric. Here, as well as in all judging of higher taxonomic categories, the suggestions will be more or less subjective. However, the retaining of the subgeneric division of a genus containing more than 700 described species must not unconditionally be of only practical value. The subgenus, i.e. a group of morphologically (and phylogenetically) very closely allied species can no doubt be placed in the natural and phylogenetic

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system, provided that the distinctions as well as the mutual relations of the different subgenera are quite obvious. Time has permitted the evolution of many more congeneric species-groups than genera. The term of subgenus seems to be justified also as a phylogenetic indication.

In the present case I do not hesitate to introduce a new subgenus, *Paradeloparius* m., e.g. including the species *circumdatus* Klug. This group is in many morphological respects allied to subgen. *Adeloparius* Schmidt, but its origin is nevertheless doubtful, and its relation to subgen. *Craterocyphus* must be considered from a phylogenetic point of view. These questions, however, will be discussed in my coming revision of the Aphodian fauna of the Ethiopian Region. For the moment I confine myself to the description of the subgenus and its relation to subgen. *Adeloparius*.

I. *Aphodius* subgenus *Paradeloparius* n. subgen. (figs. 1—2)

Taxonomy:

Description: Body rather flattened, broadly elongate.

Labrum anteriorly even, without bristled processes (figs. 1 A, 2 A).

Labium richly pubescent, with more than 2 large median bristles; labial palpi short, the length of the joints almost equal (figs. 1 D, 2 C).

Head large, medially in both sexes feebly elevated, not tuberculate; clypeus not or very feebly emarginate.

Pronotum impunctate, at most with a few diffuse lateral punctures in ♀; base and anterior margin unbordered; anteriorly with a deep median impression in the male; no processes and apophyses occur.

Elytra regularly, more or less finely, striate; shoulder-tooth lacking.

Scutellum small, narrowly triangular.

Hind tibiae shortly but obviously unequally bristled at apex.

Aedeagus elongate, parameres apically very slightly or not at all dilate; basal part longer than the parameres (figs. 1 G, 2 G).

Female genitalia: receptaculum seminis strongly curved, without strictly delimited apical part. Styli narrow, elongate, strongly and heavily bristled (figs. 1 E—F, 2 E—F).

The shape of labrum and labium makes it easy to distinguish this subgenus from *Adeloparius*, and in the shape of the labial palpi as well as of the head it is clearly separable from *Craterocyphus*. From both these subgenera it differs in the shape of pronotum and aedeagus.

Typus subgeneris: *Aphodius circumdatus* Klug.

Species

1. *Aphodius* (*Paradeloparius*) *circumdatus* Klug, 1855 (fig. 1).

Synonymy: *Aphodius circumdatus* Klug, 1855, p. 656.

Aphodius emeritus Péringuey, 1901, p. 382.

Aphodius (*Adeloparius*) *excavaticollis* Balthasar, 1939, p. 10.

Taxonomy: Mouth parts, see fig. 1 A—D. Clypeus not emarginate. Elytral striae finely but very distinctly impressed, obviously punctate, not or very

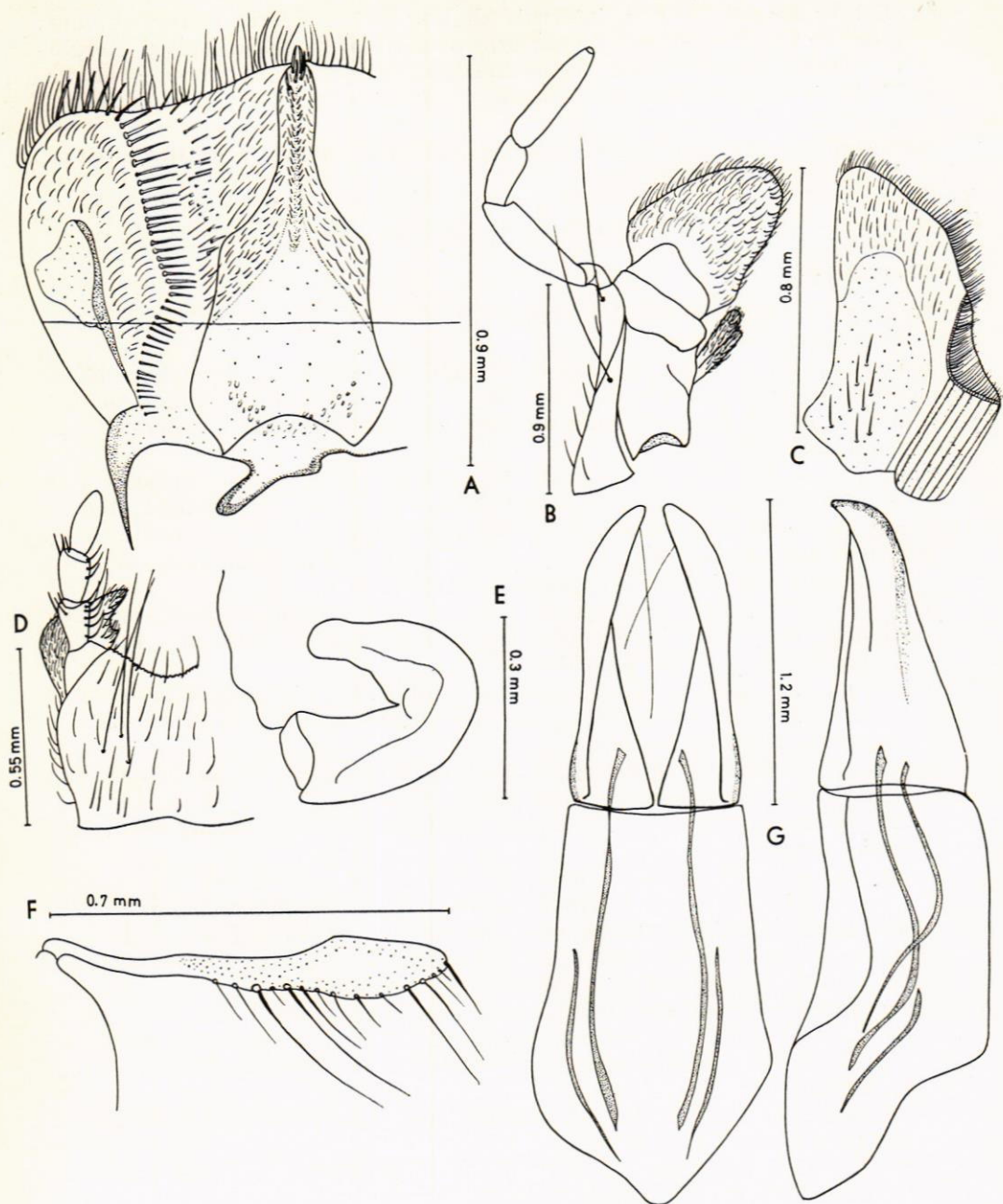


Fig. 1. *Aphodius* (*Paradeloparius*) *circumdatus* Klug A. labrum; B. maxilla; C. mandibula; D. labium; E. receptaculum seminis; F. stylus; G. aedeagus. (Specimens from N. Rhodesia.)

slightly deeper at apex, intervals slightly but evidently convex. Colour: more or less dark brown or red-brown, parts of the head, lateral margins of pronotum, shoulders, margins and apex of elytra light yellowish brown. Underside yellow. Male and female genitalia, see fig. 1 E—G. Length: 11.5—13.5 mm.

Geographical distribution: S.E. Africa. Hitherto known from Mozambique, N. and S. Rhodesia.

2. *Aphodius (Paradeloparius) brincki* n.sp. (fig. 2).

Taxonomy:

Description: A large species, length 13.5—16 mm, width (over the shoulders) 5—6 mm.

Colour: Deep black, seldom more black-brownish, moderately shining, head usually anteriorly and laterally dark brown, lateral margins of pronotum usually narrowly dark red-brownish, underside, legs, antennae, and palpi brownish.

Head with the clypeus very slightly emarginate or almost straight, very slightly and finely punctate (more obvious in ♀), cheeks rounded, slightly but obviously protruding before the eyes. Mouth parts, see fig. 2 A—D.

Pronotum impunctate or, in ♀, with a few diffuse punctures laterally, in ♂ anteriorly with a deep median impression.

Elytra very finely striate, striae basally very feebly impressed, apically slightly but obviously deeper, very inconspicuously punctate. Intervals flattened. Shoulder-tooth lacking.

Underside laterally very moderately punctate, medially almost quite smooth, abdominal segments each with a transverse row of more coarsely impressed bristled punctures.

Legs: Hind tibiae with the larger spur about as long as or slightly shorter than the 1st tarsal joint, the latter about as long as joints 2—5 together (♀), or slightly shorter (♂). The apical hind tibial bristles rather short, but obviously unequal.

Copulatory organs in male and female, see fig. 2 E—G.

Taxonomic position: Closely allied to *A. circumdatus* Klug, but easily distinguished by the greater size, the colour, the more finely impressed elytral striae, and the comparatively longer 1st joint of the hind tibiae. See also the genitalia, figs. 1 and 2.

Geographical distribution: Hitherto only known from the Tanganyika Territory: Msagaa, 35 m. E. of Singida (10.XII.1935, one specimen, holotype, leg. E. Burtt), and Shinyanga (23—31.XII.1934, allotype, paratypes, leg. E. Burtt).

Dynamics: Alae fully developed, and no doubt well functioning. The species has been found flying to light.

Type material: Holotype (♂), allotype (♀), 3 paratypes (♂♂), all preserved in the British Museum, N.H., London.

This magnificent species is named in honour of Professor Per Brinck, Lund, who, together with Dr. G. Rudebeck, brought home from the 1950—51 South African Expedition the great *Aphodius* collections now being worked up by the present author.

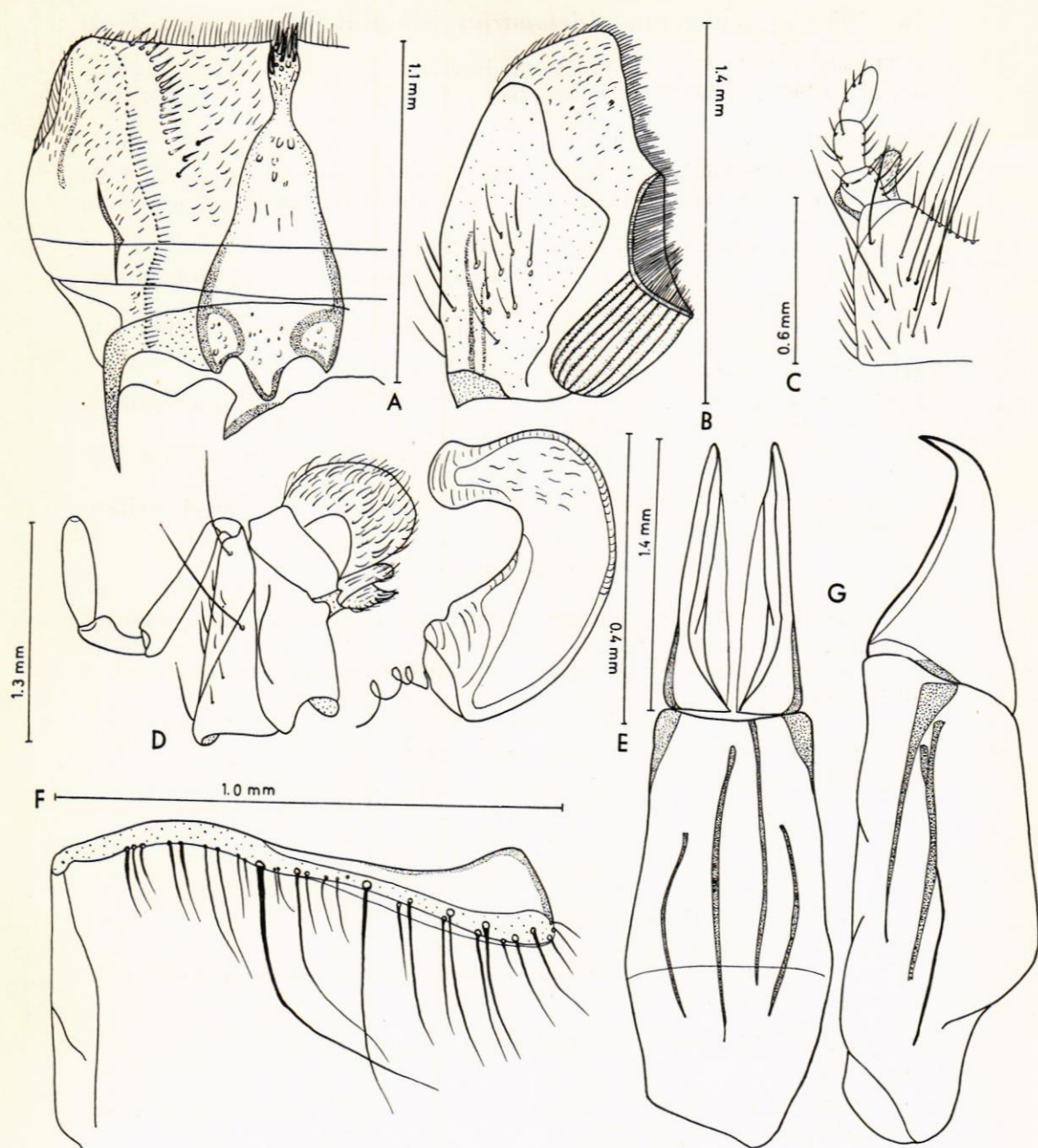


Fig. 2. *Aphodius* (*Paradeloparius*) *brincki* n.sp. A. labrum; B. mandibula; C. labium; D. maxilla; E. receptaculum seminis; F. stylus; G. aedeagus. (A—D, G=holotype; E—F=allotype.)

II. *Aphodius* subgenus *Adeloparius* Schmidt, 1913 (Figs. 3—4)

The characteristics of this subgenus in relation to subgen. *Paradeloparius* are given below, together with a survey of the species and their synonymy.

Taxonomy:

Labrum: anterior margin with bristled elevated processes (figs. 3 A, 4 A).
Labium poorly setulose, with 2 large median bristles; labial palpi varying in length. (Figs. 3 B, 4 C).

Head on the whole shaped as in *Paradeloparius*.

Pronotum impunctate, or (more seldom) punctate; no anterior impression medially in ♂.

Elytra very varying concerning striation and punctures; scutellum as in *Paradeloparius*.

Metatibiae apically obviously unequally bristled.

Aedeagus not very elongate, basal part about as long as the parameres, these apically more or less strongly dilatate (figs. 3 E, 4 G).

Female genitalia generally resembling those of *Paradeloparius* (fig. 4 E—F).

Typus subgeneris: *Aphodius trimaculatus* Schmidt (by subsequent designation of Paulian 1942, p. 65).

Species

The following list gives a short synonymical survey over the species belonging to this subgenus. Furthermore, the description of two new species is given, one of which is the hitherto misinterpreted *Aphodius circumdatus* auctt., nec Klug.

A. The *trimaculatus* group

1. *Aphodius (Adeloparius) trimaculatus* Schmidt, 1909.

Synonymy: *Aphodius trimaculatus* Schmidt, 1909, p. 103.

Aphodius (Adeloparius) trimaculatus, Schmidt 1913, p. 134.

Adeloparius trimaculatus, Paulian 1942, p. 67.

B. The *formosus* group

2. *Aphodius (Adeloparius) formosus* (Paulian, 1942).

Synonymy: *Adeloparius formosus* Paulian, 1942, p. 66.

Adeloparius formosus var. *ealaensis* Endrödi, 1957, p. 131 (in the references=1957 a).

3. *Aphodius (Adeloparius) blattoides* n.sp. (fig. 3).

Taxonomy:

Description: Length 12.5 mm, width (over the shoulders) 5 mm. Body broadly elongate, fairly convex.

Colour: Brownish, pronotum medially with two large, elongate black spots, one on each side. Legs and antennae lighter yellowish, tarsi, spurs, and bristles darker.

Head: **Labrum** (fig. 3 A) broadly rounded with the central body narrowly elongate; four central bristles occur. Anterior margin with two bristled

processes; the inner bristle-line of the labrum plate emanates from the second process (seen from the central part). The outer bristle-line reaches the base of the labrum plate, this laterally widely pubescent. Mandibles (fig. 3 C) with the sclerotized part pubescent, the margin bristles of the membranous part rather long, not very dense. Labium (fig. 3 B) with two long median bristles, anterior margin rather sparsely pubescent. Labial palpi longer than the labium plate, first joint shorter than the others, and with a row of long bristles along the inner side. Paraglossae large and wide, reaching almost to the apex of the first joint of the labial palpi. Maxillary palpi (fig. 3 D) long and slender, 3rd joint obviously shorter than the 2nd and 4th joints. Clypeus evenly rounded, anteriorly in the middle slightly square, clypeal margin very clearly bordered. Frontal line feebly elevate; cheeks quite rounded, not protruding, and not passing the eyes. The whole head quite smooth, impunctate. Reticulation formed by small, rounded meshes.

Pronotum wider than long, with the sides moderately rounded; frontal angles protruding, hind angles rounded. The sides clearly bordered; the bordering passes the hind angles, but leaves the base otherwise unbordered. The whole surface smooth, quite impunctate (σ). The reticulation formed by very small, rounded meshes, more conspicuous laterally.

Scutellum rather narrow, triangular, very finely reticulated by small, rounded meshes.

Elytra with the sides evenly rounded, shoulder-tooth very obviously protruding. Striae fine, but distinct, very finely, hardly visibly punctate, striae and punctures, however, quite as visible at the apex as at the base of the elytra. Intervals plain, their reticulation formed by very fine and dense, irregularly transverse meshes, basally mixed up with small, rounded meshes. Striae 8 and 9 anteriorly abbreviated, slightly surpassing the middle.

Pygidium coarsely and rather densely punctate, apically sparsely so, the punctures carrying bristles. Margins apically with a row of 10 coarse bristle-punctures on each side (bristles there much shorter than in *A. formosus*). Reticulation formed by irregular meshes.

Underside impunctate, with a very dense reticulation formed by small, rounded meshes. Each ventral segment with a transverse row of hard bristles. Metasternum with a very narrow, but distinctly impressed median furrow.

Legs slender, especially the meso- and metatarses which are much longer than the tibiae. The biggest apical spur of the metatibias shorter than first tarsal joint, this about as long as joints 2+3+half of 4 together. In the mesotibias the biggest apical spur is comparatively longer, but not quite as long as first tarsal joint. Apical bristles in metatibias unequal. Fig. 3 F.

Male genitalia: parameres about as long as the basal part of aedeagus, apically strongly dilatate, outer margins strongly curved, clearly, but not very strongly fringed. Aedeagus basally square, concave. See fig. 3 E.

Taxonomic position: The structures of the labrum and the labial palpi, together with the very long tarsi, indicate a close relationship between *A. blattoides* and *A. formosus*, and justify the placing of the former in the *formosus* group. According to some outer morphological

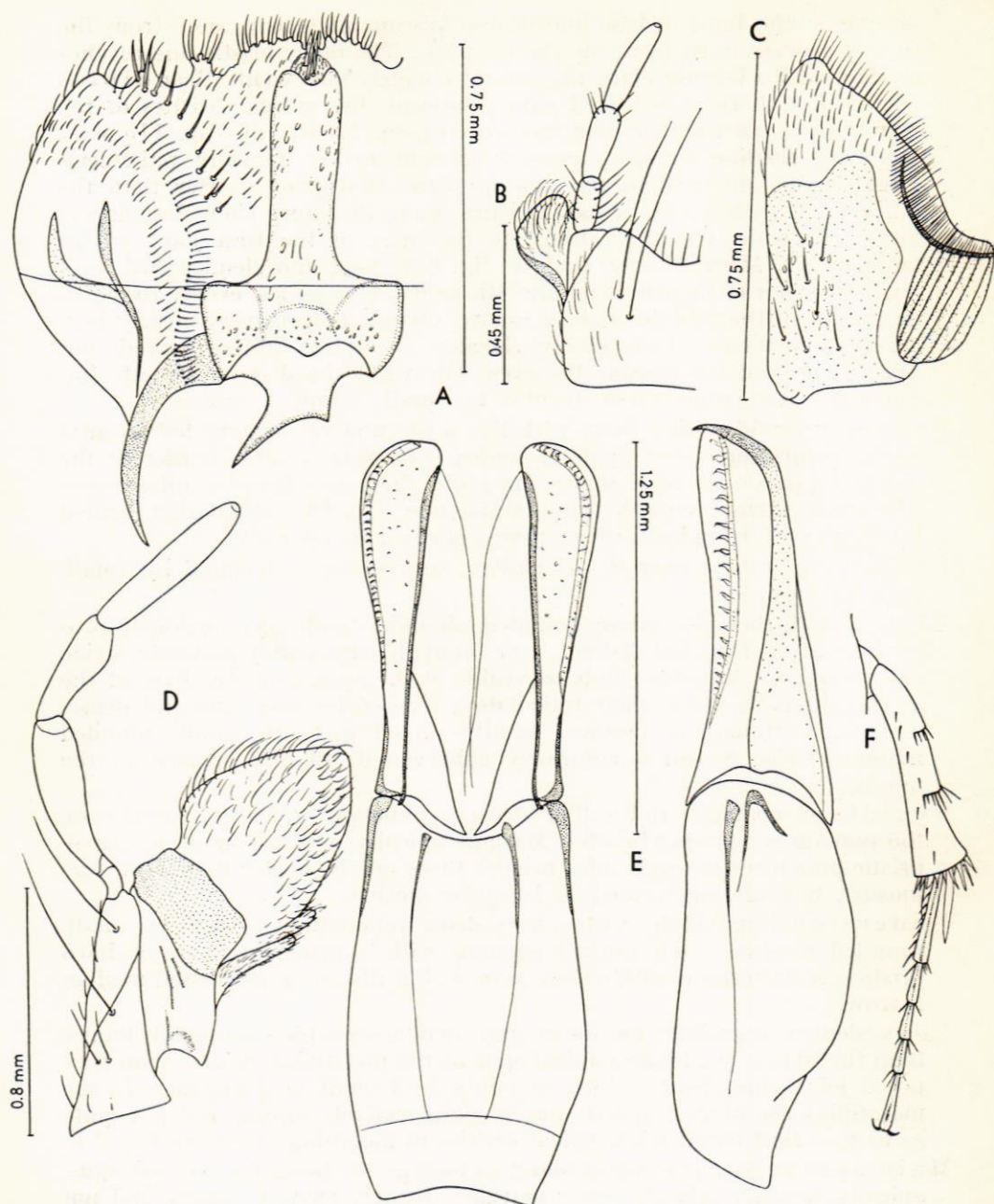


Fig. 3. *Aphodius (Adeloparius) blattoides* n.sp. A. labrum; B. labium; C. mandibula; D. maxilla; E. aedeagus; F. hind tibia and tarsus. (Holotype)

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characteristics, the "blattoid" appearance, body-form, size and colour, it seems also to be allied to *A. wittei* (Paulian).

Geographical distribution: Belgian Congo: Bambesa (1.VI.1938, 1 male specimen, leg. J. Vrydagh).

Dynamics: Flight wings are full-size, and no doubt functioning.

Type material: Holotype (♂), belonging to the Musée Royal du Congo Belge, Tervuren.

C. The *luridipes* group

4. *Aphodius* (*Adeloparius*) *luridipes* Harold, 1861.

Synonymy: *Aphodius luridipes* Harold, 1861, p. 106.

Aphodius (*Adeloparius*) *luridipes*, Schmidt 1913, p. 134.

Adeloparius luridipes, Paulian 1942, p. 68.

Aphodius (*Adeloparius*) *luridipes* ab. *partitus* Endrödi, 1957, p. 210 (in the references = 1957 b).

Aphodius (*Adeloparius*) *le-moulti* Kozhantshikov, 1916, p. 196.

Adeloparius Lemoulti, Paulian 1942, p. 69.

Taxonomy: I have had the opportunity to compare with the lectotype one specimen of *A. lemoulti* from the Zoological Institute of Leningrad. This specimen had itself been compared by Dr. O. Kryzhanovskij with a series of 5 "cotypes" of *A. lemoulti* in the Leningrad Institute. Furthermore, I have examined one specimen of *A. lemoulti* Kozh. in the Paris Museum, determined by Dr. R. Paulian, and quite well corresponding with the original description as well as with the original material of *A. luridipes* Harold. There is no doubt that *A. luridipes* Har. and *A. lemoulti* Kozh. are conspecific.

5. *Aphodius* (*Adeloparius*) *endroedii* n.sp. (fig. 4).

Synonymy: *Aphodius* (*Adeloparius*) *circumdatus* Schmidt et auctt., nec Klug, 1855.

Taxonomy:

Description: Length 13—14 mm, width (over the shoulders) 5 mm.

Colour: Dark brown, head lighter brownish, or red yellowish, with an anterior dark spot (which can be diffuse); pronotum with the lateral margins more or less broadly, and the median line narrowly red yellowish; elytra along the sides, and at apex very broadly light coloured; underside more or less light brownish, or yellowish; legs, antennae, and palpi reddish brown.

Head with the clypeus anteriorly almost straight, or very slightly emarginate; impunctate (♂), or with a very fine punctation before the frontal line (♀); cheeks small, quite rounded, not protruding before the eyes. Mouth parts, see fig. 4 A—D.

Pronotum impunctate (♂), or with diffuse lateral punctation (♀); anterior impression lacking in both sexes.

Elytra distinctly striate, striae finely, but obviously punctate; intervals slightly convex. Shoulder-tooth lacking.

Underside laterally finely punctate, medially almost smooth, abdominal segments each with a transverse row of coarsely impressed bristled punctures. Penultimate ventral segment without deep furrows.

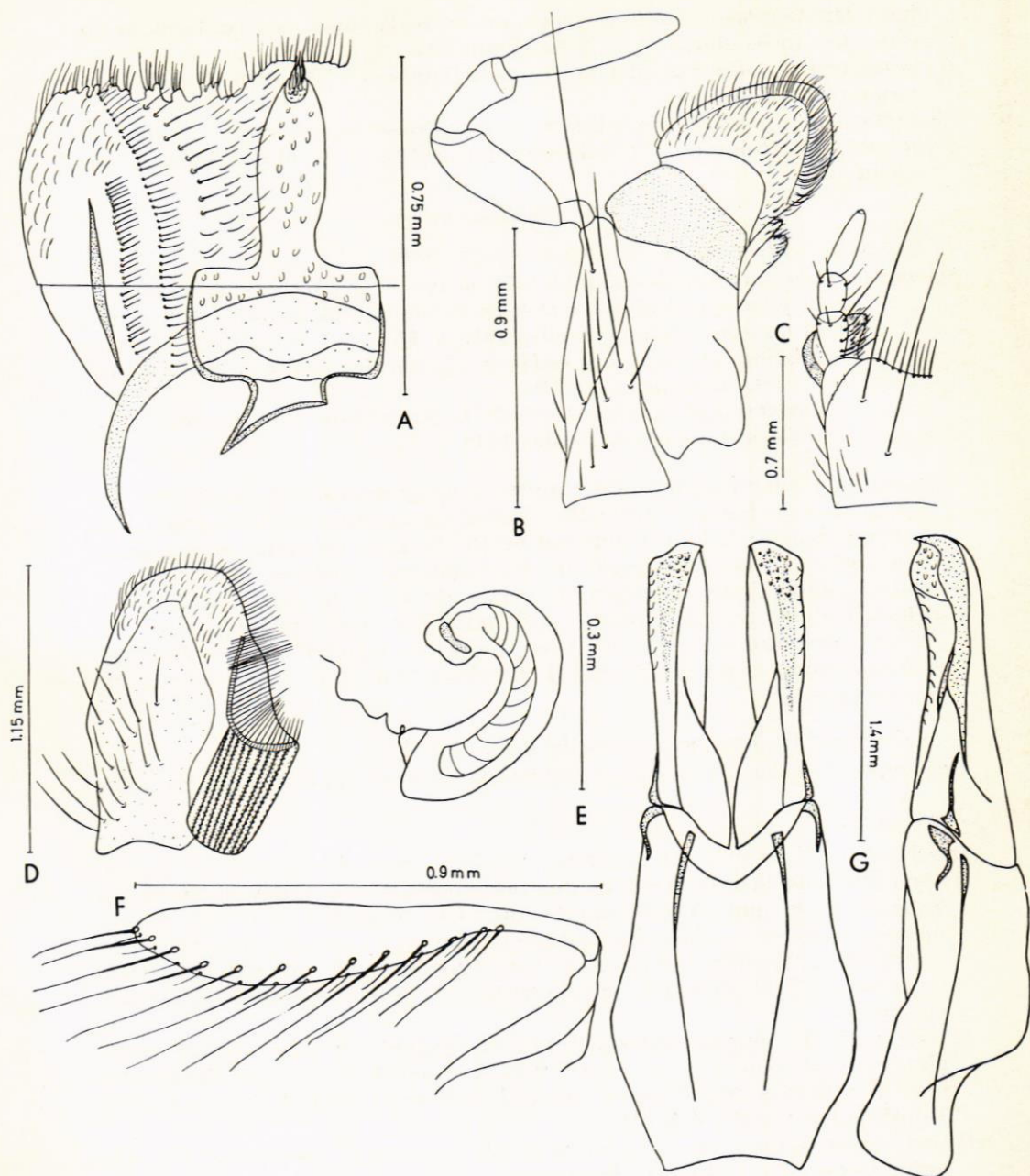


Fig. 4. *Aphodius (Adeloparius) endroedii* n.sp. A. labrum; B. maxilla; C. labium; D. mandibula; E. receptaculum seminis; F. stylus; G. aedeagus. (A—F=allotype; G=holotype.)

Legs: Hind tibiae with the larger spur about as long as first tarsal joint, this as long as joints 2+3+4 together. The apical bristles of the hind tibiae rather short, but obviously unequal.

Copulatory organs in male and female, see fig. 4 E—G.

Taxonomic position: Similar to *A. (Paradeloparius) circumdatus* in coloration, but easily distinguished by the subgeneric characteristics. The broad, convex body-form, together with the size, makes it possible to compare the species with *A. overlaeti* Bouc., but it differs clearly in many respects, as in colour, shape of the central body of labrum (shorter and stouter in *endroedii*, very elongate in *overlaeti*), punctures of the head (in *overlaeti* the much more obvious punctures occur also behind the frontal line), and shape of female styli as well as of receptaculum seminis. Allied to *A. luridipes* in the shape of labrum and in the punctuation of the head, but quite differing in colour, body-form (in *endroedii* apically widened, in *luridipes* more paralleled), convexity, and details in the copulatory organs of both sexes.

Geographical distribution: The Cameroons: Joko (holotype and allotype); British East Africa: Sese Islands (one paratype, leg. R. Koch).

Dynamics: Flight wings fully developed, and no doubt functioning.

Type material: Holotype (♂), allotype (♀), 2 paratypes (♀♀, one of which without locality, labelled "Collection E. Candèze"), all belonging to the Schmidt collection in Riksmuseum, Stockholm.

The species is named in honour of my friend and collaborator in the studies on the African Aphodiin fauna, Dr. Sebö Endrödi, Budapest.

6. *Aphodius (Adeloparius) overlaeti* Boucomont, 1936.

Synonymy: *Aphodius (Adeloparius) Overlaeti* Boucomont, 1936, p. 497.

Adeloparius Overlaeti, Paulian 1942, p. 70.

Adeloparius crassus Paulian, 1942, p. 68 (nec Schmidt, 1916, p. 107: *Aphodius (Bodilus) crassus*).

Aphodius (Adeloparius) paulianianus Balthasar, 1945, p. 166, nomen novum for *Aphodius crassus* (Paulian).

Taxonomy: The holotype of *overlaeti* Bouc. and *crassus* Paul. were studied by the present author and found conspecific.

7. *Aphodius (Adeloparius) wittei* (Paulian, 1942).

Synonymy: *Adeloparius Wittei* Paulian, 1942, p. 67.

Note: A series of specimens in the collection of the Tervuren Museum, labelled "*A. Bambesai* Paul.", but never described, are conspecific with *A. wittei*. The name of "*Bambesai*" will remain as a nomen in litteris (according to correspondence between Dr. Paulian and the present author).

D. The *septemmaculatus* group

8. *Aphodius (Adeloparius) septemmaculatus* (Fabricius, 1781)

Synonymy: *Scarabaeus septemmaculatus* Fabricius, 1781, p. 20.

Aphodius (Adeloparius) septemmaculatus, Landin 1956, p. 216.

Aphodius (Acrossus) pulcherrimus Reiche, 1847, p. 345.

- Aphodius (Adeloparius) pulcherrimus*, Schmidt 1913, p. 134.
Adeloparius pulcherrimus, Paulian 1942, p. 69.
Aphodius pulcherrimus var. *aequabilis* Schmidt, 1908, p. 62.
Aphodius (Adeloparius) pulcherrimus var. *aequabilis*, Schmidt 1913, p. 135.
Adeloparius pulcherrimus ab. *aequabilis*, Paulian 1942, p. 69.
Aphodius coloratus Roth, 1851, p. 130.
Aphodius Wahlbergi Boheman, 1857, p. 350.
Aphodius (Adeloparius) Wahlbergi, Schmidt 1913, p. 135.
Adeloparius Wahlbergi, Paulian 1942, p. 69.
Aphodius Smithi Shipp, 1897, p. 451.
Aphodius (Adeloparius) Wahlbergi var. *Smithi*, Schmidt 1913, p. 135.
Adeloparius Wahlbergi ab. *Smithi*, Paulian 1942, p. 70.
Aphodius Holubi Dohrn, 1883, p. 107.
Aphodius (Adeloparius) Holubi, Schmidt 1913, p. 135.
Aphodius nigrosignatus Péringuey, 1885, p. 91.

Taxonomy: The extremely varying coloration of this species has led to the description of many species, varieties, and aberrations, and is to blame for the length of the synonymical list. A closer morphological study of the types and typical materials has clearly indicated the conspecific status of the above formae. In my opinion, all of them keep strictly within the limits of the intraspecific variation. As regards the lateral furrows of the penultimate abdominal segment, all intermediate types are found within the species.

9. *Aphodius (Adeloparius) nobilis* Harold, 1874.

- Synonymy:** *Aphodius nobilis* Harold, 1874, p. 176.
Aphodius (Adeloparius) nobilis, Schmidt 1913, p. 134.
Adeloparius nobilis, Paulian 1942, p. 68.
Aphodius (Adeloparius) zygomatus G. Müller, 1942, p. 82.
? *Aphodius binotatus* Thunberg, 1818, p. 401.

Taxonomy: The varying colour (from almost entirely black to reddish yellow with a few small black spots) has led to the description of *A. zygomatus* G. Müll. (the black-coloured type). The study of the holotype has convinced me that it cannot be specifically separated from *A. nobilis* Har. The description of *A. binotatus* Thunb. indicates this species to be identical with *nobilis*. The original material of Thunberg's species is lost.

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