

Pseudeumecops n. gen., a new genus of Cleonini from East Africa (Coleoptera, Curculionidae, Lixinae)

MASSIMO MEREGALLI

Dipartimento di Biologia Animale e dell'Uomo,
Via Accademia Albertina 17, I-10123 Torino (Italy)
Email: massimo.meregalli@unito.it

ABSTRACT

Pseudeumecops n. gen., a new genus of Cleonini, is proposed, with *Cleonus (Cossinoderus) lutulentus* Fairmaire, 1888 as the type species. A second species of *Pseudeumecops*, *P. carpanetoi* n. sp., from Somalia [type locality: Soomaaliya, Muqdishu (Somalia, Mogadishu), 02°04' N 45°22' E] is also described. The phylogenetic significance of 20 traits of *Pseudeumecops* and the high level of homoplastic states among the genera of the tribe are discussed. An additional analysis of the states of several characters of *Pseudeumecops* compared with *Eumecops* Hochhuth, 1851, *Porocleonus* Motschulsky, 1860 and *Calodemus* Faust, 1904 suggests that *Pseudeumecops* is the sister taxon of *Calodemus*.

KEY WORDS: Curculionidae - Cleonini - Systematics - Nomenclature - East Africa - New genus.

ACKNOWLEDGEMENTS

I thank all the friends and colleagues who helped with information, literature and loan of specimens: Michel Brancucci and Eva Sprecher (NHMB); Giuseppe Carpaneto (Roma); Genrikh Davidian (ZIN); James Harrison (TMSA); Marc De Meyer (MRAC); Richard Krause (SMTD); Chris Lyal (BMNH); Otto Merkl (HNHM); Giuseppe Osella (L'Aquila); Hélène Perrin (MNHN); Roberto Poggi (MCSN). I am grateful to Robert S. Anderson (Ottawa) for linguistic corrections.

(Received 15 March 2003 - Accepted 26 June 2003)

INTRODUCTION

The present study was suggested by the examination of several specimens of Cleonini from Somalia and East Africa, all referred to the species *Eumecops lutulentus* (Fairmaire, 1888). The genus *Eumecops* was proposed by Hochhuth (1851) with *E. kittaryi* Hochhuth, 1851 as the type species by original designation. The main diagnostic character is a deep excavation of the prosternum, in which the rostrum rests.

This species was described from the "steppes of the Kirgiz" and is presently known from Northern Caucasus, Crimea, Astrakhan, Kyrgyzstan, Kazakhstan (Sarepta, Karaturgai, Naryn, etc.) (Ter-Minasian, 1988 and specimens in ZIN). Two more species were subsequently assigned to *Eumecops* (cf. Chevrolat, 1873; Faust, 1904): *E. tuberculifer* (Gebler, 1830), from Eastern Kazakhstan, Semipalatinsk (Ter-Minasian, 1988), Uzbekistan and southwestern Siberia (Krasnojarsk, Zajsan) (specimens in ZIN), and *E. fasciculifer* Reitter, 1895 from Northern Mongolia and eastern Russia (Transbaikal) (Ter-Minasian, 1988 and specimens in ZIN). An additional species, described by Chevrolat (1873) as *E. spicatus* from "Siberia", was not cited by Faust (1904). According to the original description, it seems to be very similar to *E. fasciculifer*.

Fairmaire (1888) described *Cleonus (Cossinoderus) lutulentus* (as *Cossinoderus*, lapsus) from Somalia. The genus *Cossinoderus* was established by Chevrolat (1873) for *Lixus candidus* Olivier, 1807, and is a junior synonym of *Porocleonus* Motschulsky, 1860. Faust (1904) included *C. lutulentus* in *Eumecops*, based on the presence of an excavated prosternum. Csiki (1934) listed the following species in the *Cleonus* subgenus *Eumecops* (authors cited without parenthesis as in Csiki, 1934): *C. fasciculifer* Reitter, 1895; *C. kittaryi* Hochhuth, 1851; *C. lutosus* Csiki, 1934 (unnecessary replacement name for *C. lutulentus* Fairmaire, 1888); ?*C. spicatus* Chevrolat, 1873 and *C. tuberculatus* (sic!) Gebler, 1830.

Examination of the specimens from Somalia showed that *C. lutulentus*, together with a related new species, cannot be included in *Eumecops*. The two species belong to a new genus, here named *Pseudeumecops* n. gen., which, although of relatively similar appearance, does not seem to be closely related to *Eumecops* (see remarks).

MATERIALS AND METHODS

Specimens used in this study were obtained from the following museums and private collections: BMNH, The Natural History Museum, London, England; HNHM, Hungarian Natural History Museum, Budapest, Hungary; MCSN, Museo Civico di Storia Naturale, Genova, Italy; MER, coll. Meregalli, Torino, Italy; MNHN, Muséum National d'Histoire Naturelle, Paris, France; MRAC, Musée Royal de l'Afrique Centrale, Tervuren, Belgium; NHMB, Naturhistorisches Museum, Basel, Switzerland; OSL, coll. Osella, L'Aquila, Italy; SMTD, Staatliche Naturhistorische Sammlungen, Dresden, Germany; TMSA, Transvaal Museum, Gauteng, Pretoria, South Africa; ZIN, Russian Academy of Sciences, Zoological Insti-

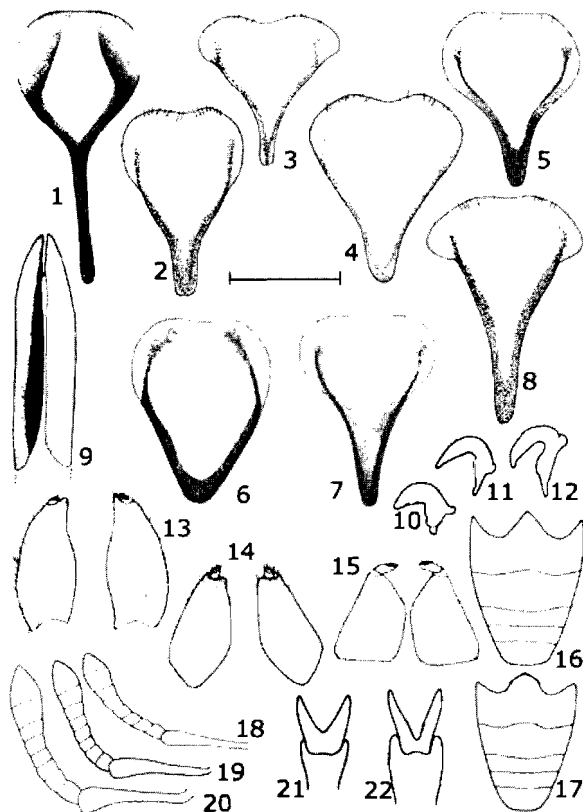
short, transverse, reduced (Fig. 13). Symbiont pouches elongate, showing weakly sclerotized rings. Proventriculus with elongate blades, long and regularly tapering towards apex (Fig. 9).

Etymology

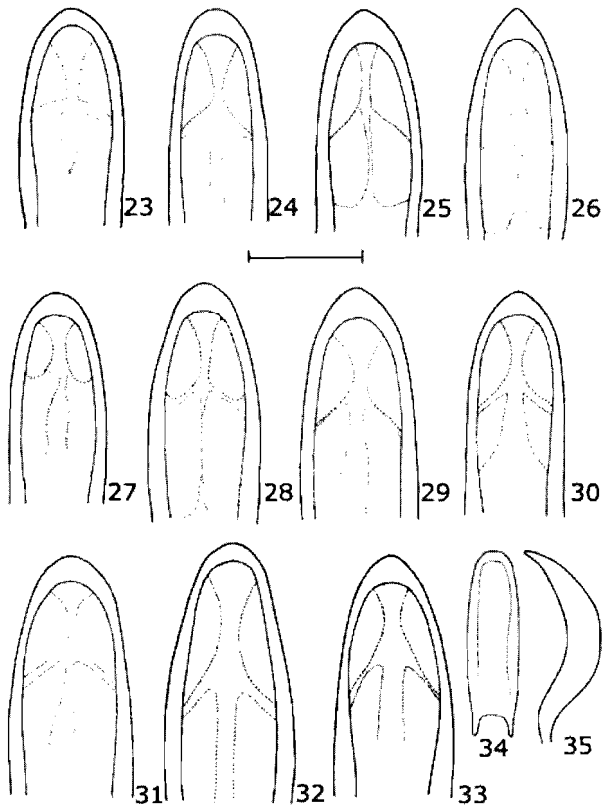
The name refers to the appearance of the type species, *P. lutulentus*, superficially similar to species of *Eumecops*, and to its nomenclatural history.

Ecology

No precise data on ecology and host plants are available. According to G. Carpaneto (personal communication) the specimens found by him were probably collected below low bushes on sandy soil in *Acacia* savan-



Figs 1-22 - Morphological analysis of *P. lutulentus* (Fairmaire, 1888). Sternum VIII of ♀: 2 - Hargeisa; 3 - Galcaio; 4 - Abyssinia; 5 - Kenya, Elgon District. Spermatheca: 10 - Galcaio; 11 - Hargeisa. Ovipositor: 13 - Hargeisa. Ventrites: 17 - Galcaio, ♂. Antenna: 19 - Arabsiyo, ♂; 20 - Galcaio, ♂. Claws: 22 - Galcaio, ♂. Morphological analysis of *P. carpanetoi* n. sp. Sternum VIII of paratype ♀: 7 - Mogadishu; 8 - Belet Amin. Spermatheca: 12 - Belet Amin. Antenna: 18 - Belet Amin. Blade of proventriculus: 9 - Somalia (paralectotype of *P. lutulentus*). Morphological analysis of *Eumecops kittaryi* Hochhuth, 1851, Kyrgyzstan: 1 - Sternum VI-II of ♀; 15 - ovipositor; 16 - Ventrites; 21 - Claws. Morphological analysis of *Calodemus vetustum* Faust 1904, Somalia: 6 - Sternum VIII of ♀; 14 - Ovipositor. Figs 1-8, 13-15, 18-20: bar, 1 mm; Figs 9-12, 21-22: bar, 0.5 mm; Figs 16-17: bar, 10 mm.



Figs 23-35 - Morphological analysis of *P. lutulentus* (Fairmaire, 1888). Aedeagus: 34 - Dorsal view; 35 - Lateral view, 9 km SE Sheikh. Apex of aedeagus: 23 - Lectotype; 24 - Mogadishu; 25 - Galcaio; 26 - Between Caynaba and Laas Canood; 27 - 9 km SE Sheikh; 28 - Arabsiyo; 29, Ali Sabieh; 30 - Chew Bahir; 31 - Rendile; 32 - Lokitang. Morphological analysis of *P. carpanetoi* n. sp., holotype: 33 - Apex of aedeagus. Figs 23-33: bar, 0.5 mm; Figs 34-35: bar, 1 mm.

nah. The main habitat in the colonized area is a steppe with *Acacia-Commiphora* bushland and thickets, and a semidesert (UNESCO/AETFAT/UNSO, 1981) (Fig. 36).

Remarks

The tribe Cleonini is composed by 77 extant genera (Alonso-Zarazaga & Lyal, 1999) (78 with *Pseudeumecops*), mainly based on the old taxonomic monographs by Chevrolat (1873), Faust (1904) and Reitter (1913), and 4 extinct genera, proposed for European and North American Tertiary and Quaternary fossils. Local or regional faunas were treated by several Authors throughout the 20th century (countless citations not detailed here), but Faust's classification was seldom discussed. No phylogenetic analysis of the tribe is available, and only few hints to a more natural arrangement of some genera were given (Aslam, 1963, for the Indo-Pakistan fauna; Anderson, 1988, mainly limited to the North American taxa). Genera were usually based on identification keys, following sets of characters of practical use, which very often show homoplastic states, determined

by adaptation to the habitat or as a consequence of winglessness (cf. Meregalli, 2002). Hence, their applicability to inferring phylogenetic relationships must be carefully weighed (see also remarks by Anderson, 1988: 548). A discussion of the systematic and phylogenetic significance of all the phenotypic traits of Cleonini, with indication of the states in each of the genera, is beyond the scope of the present work and only brief remarks limited to structures useful to suggest relationships of *Pseudeumecops* will be given. States were arbitrarily defined, and their polarity was seldom determined as this would be too weakly based (and subjective) at the present level of knowledge; see Table I for the matrix of the states in some of the genera analysed.

1. Rostrum quadrangular in cross-section. This state depends on the elevation of the dorso-lateral margins; several genera have the rostrum more or less rounded in cross-section, only a few showing high margins. A transition between a rounded and a quadrangular rostrum is not discrete, as progressive variation occurs, sometimes even within a genus. The raised dorso-lateral margins and the wide pregenae may also reflect adaptation to the habitat: in lateral view, the rostrum of *Pseudeumecops* has a striking similarity to unrelated Curculionioidea associated with steppe or desert habitats, such as Rhythirrinini and Brachyceridae. States: 1, rostrum rounded in cross section; 2, rostrum subquadrangular; 3, rostrum distinctly quadrangular.

2. Dorsum of rostrum with deep triangular foveae (Fig. 43). The basal foveae are a relatively uncommon feature, apparently typical of tropical African taxa and not always related to the presence or absence of raised margins. States: 1, rostrum lacking foveae; 2, rostrum with shallow foveae; 3, rostrum with deep foveae.

3. Scaly labium and mandibles; small, square oral opening (Fig. 45). States of oral structures and apical part of rostrum appear to be quite constant within genera, or groups of closely related genera. Labium and

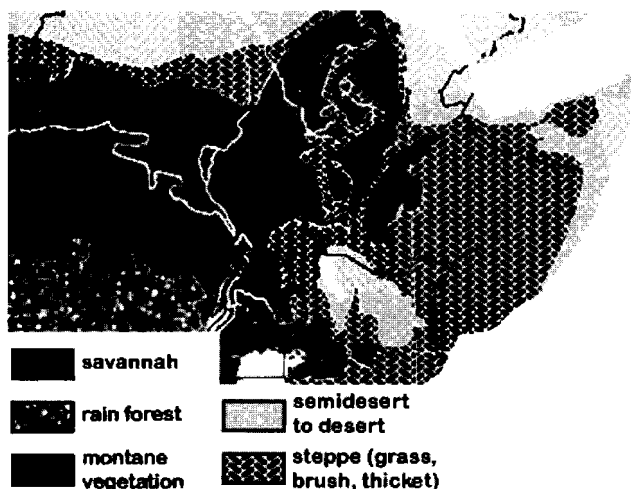


Fig. 36 - Vegetation map of Eastern Africa [from UNESCO/AET-FAT/UNSO (1981) and Texas A&M University, <http://library.tamu.edu/maps/cia/ciaAfricaveg.html> (2000), simplified].

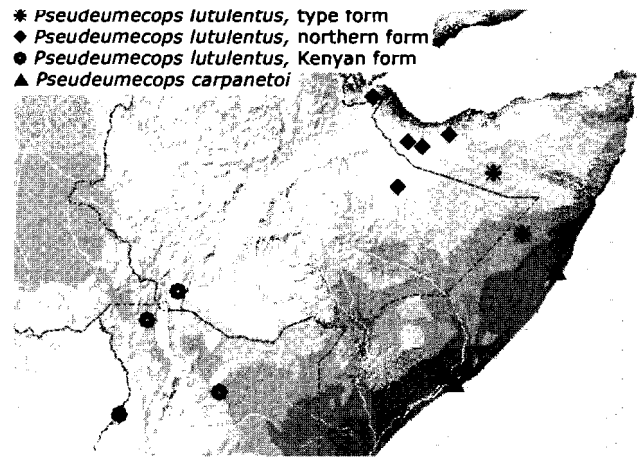


Fig. 37 - Distribution map of *Pseudeumecops* n. gen. Specimens with generic indication "Abyssinia" are not reported.

mandibles are usually glabrous, or with short setae. States: 1, labium and mandibles not scaly; 2, labium and mandibles scaly.

4. Underside of rostrum with prementum reaching lower part of eye, delimited by the scrobes extended basad. This is probably an autapomorphic state, as scrobes and prementum are usually not extended basad below eyes in the other examined genera. States: 1, prementum and scrobes not extended basad; 2, prementum and scrobes extended basad.

5. Rostrum forming a low angle with respect to head (Fig. 47);

6. Prosternal excavation present but shallow. The prosternal excavation may be related to the curvature of rostrum: some genera of Cleonini with rostrum curved at more than 50° with respect to head show a more or less developed prosternal excavation, where rostrum

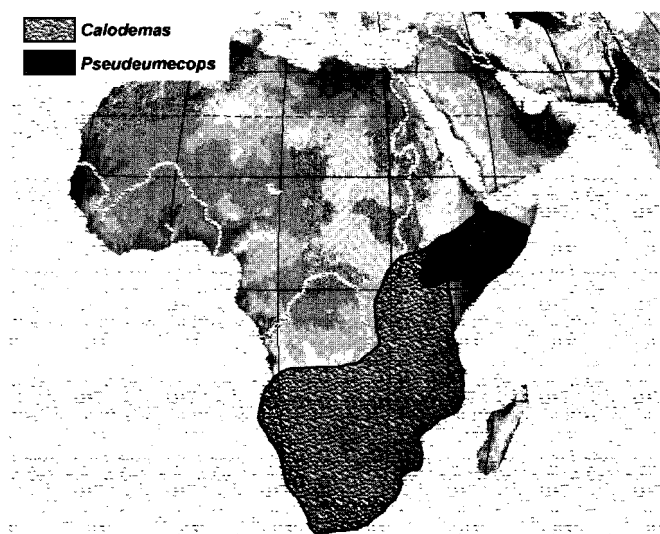


Fig. 38 - Distribution of *Calodemus* Faust 1904, based on literature and unpublished data, and *Pseudeumecops* n. gen. [map from Encarta World Atlas 2000 (Microsoft Corporation), elaborated with Photoshop 7.0 (Adobe Systems Incorporated)].

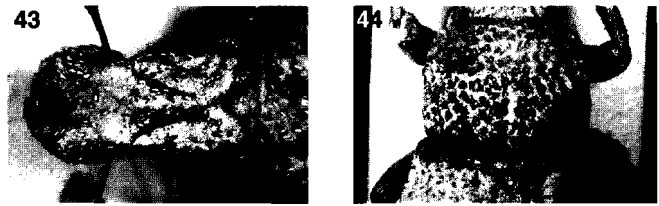
rests during thanatosis; the excavation is very deep in *Eumecops* and reduced to a shallow ridge or a simple tubercle in front of the coxae in other genera; taxa with a low angle between the rostrum and head usually have smooth surface of the prosternum. There is little doubt that these traits show homoplastic states. States: Character 5: 1, angle between rostrum and head $<30^\circ$; 2, angle between rostrum and head $>30^\circ <60^\circ$; 3, angle between rostrum and head $>60^\circ$. Character 6: 1, no prosternal excavation; 2, shallow excavation, often limited to a small tubercle; 3, deep excavation.

7. First two segments of funicle short, of the same length (Figs 18-20). This, or the first segment longer than the second, is the most common, probably plesiomorphic state in Cleonini. States: 1, segment 1 of funicle as long as or longer than segment 2; 2, segment 1 of funicle distinctly shorter than 2 (state 2 not represented in the genera listed in matrix).

8. Segment 7 of funicle fused to club. This appears to be an autapomorphy, as segment 7 is usually quite well distinct from club. States: 1, segment 7 of funicle separate from club; 2, segment 7 partially fused to club; 3, segment 7 completely fused to club.

9. Base of pronotum straight or nearly so (Fig. 44). This state is linked to winglessness. All genera with functional metathoracic wings have the pronotum more or less prominent, sometimes sharply angulate, towards the scutellum, while all genera with a straight base are apterous. Some of the genera with a curved base of the pronotum are in fact wingless, possibly after a secondary reduction of the wings. In the genera with both winged and wingless species, these often have the pronotum with a reduced basal curvature. As winglessness seemingly appeared independently in various groups of Cleonini, this character shows homoplastic states. States: 1, base of pronotum nearly straight; 2, base of pronotum arched towards scutellum; 3, base of pronotum angular.

10. Dorsum of pronotum with brownish key-hole pattern, sides often with a white dot. Although vestiture is



Figs 43-44 - *Pseudeumecops lutulentus*, Arabsiyo: 43 - Rostrum, dorsal view. *Pseudeumecops carpanetoi*: 44 - Paratype, Mogadishu, pronotum.

highly variable in Cleonini, this state is usually seen in African taxa, and may be applied to infer phylogenetic affinities. States: 1, dorsum of pronotum lacking dark pattern; 2, dorsum of pronotum with dark key-hole pattern.

11. Intercostal process of ventrite 1 wide and broadly rounded, not angular (Figs 17, 49). This state is seldom found in Cleonini, which often have narrower, acutely tapering process. Although, theoretically, also this state could be associated with winglessness, because of the increased distance between the hind coxae in apterous taxa, no correlation between morphology of ventrite 1 and presence or absence of wings can be demonstrated. States: 1, intercoxal process of ventrite 1 broadly rounded; 2, intercoxal process of ventrite 1 angular.

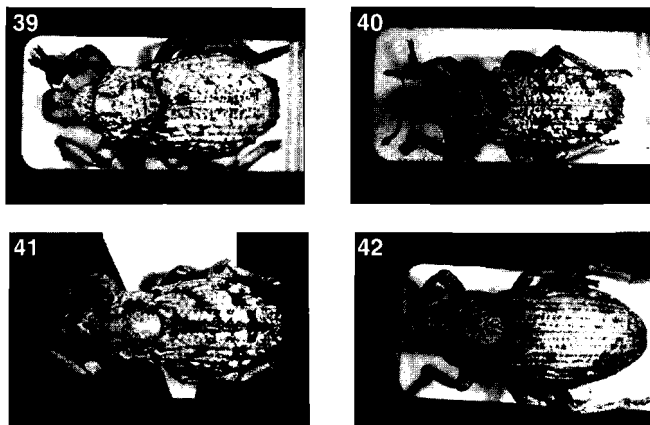
12. Metasternum extremely short, much shorter than diameter of middle coxae. Metasternum is often shortened in wingless taxa, but reduction of the segment reaches an extreme state in *Pseudeumecops*. States: 1, metasternum as long as or longer than diameter of middle coxae; 2, metasternum slightly shorter than diameter of middle coxae; 3, metasternum extremely shortened.

13. Tarsi short, segments 2 and 3 of equal length. The reciprocal length of the first two segments of tarsi varies greatly in the various genera. However, tarsi are either short, with segments more or less as long as wide, or quite elongated and with segment 2 as long as or distinctly longer than 3. States: 1, segments 2 and 3 of tarsi short; 2, segments 2 and 3 elongated (state 2 not represented in the genera listed in matrix).

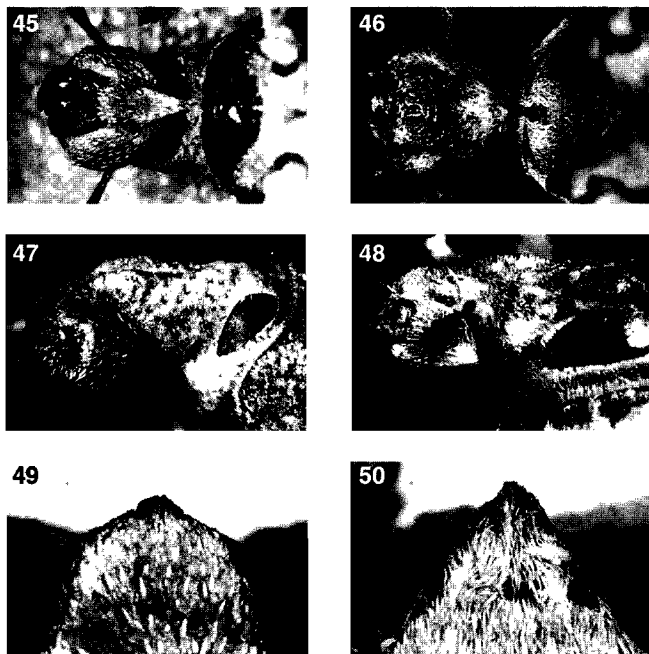
14. Underside of tarsi lacking pilose pads and with short setae. This state seems associated with walking on the ground. In genera with winged and wingless species, the latter often have the adhesive pilose pads reduced or even lacking. States: 1, pilose pads extensive; 2, pilose pads reduced; 3, pilose pads absent or nearly so.

15. Claws connate very near to base (Fig. 22). Morphology of the tarsal claws is a very important character in Cleonini. The large majority of taxa have claws at least connate up to their mid length; in other genera claws are connate very near to their base, or they appear to be free, as the connection point is hidden by the apex of the onychium. States: 1, claws connate at mid length; 2, claws connate near to base; 3, claws apparently free.

16. Arms of sternum VIII of female V-shaped, joined at 1/4 from base and lacking a slender basal strut (Figs 2-5,



Figs 39-42 - Body of *P. lutulentus* (Fairmaire, 1888): 39 - Lectotype; 40 - Arabsiyo; 41 - Kenya, Elgon district. *Pseudeumecops carpanetoi*: 42 - Paratype, Mogadishu.



Figs 45-50 - *Pseudeumecops lutulentus* (Fairmaire, 1888), 9 km SE Sheikh: **45** - Rostrum, underside. *Pseudeumecops carpanetoi* n. sp., paratypus, Mogadishu: **47** - Rostrum, lateral view; **49** - Intercoxal process of ventrite 1. *Eumecops kittaryi* Hochhuth, 1851, Kyrgyzstan: **46** - Rostrum, underside; **48** - Rostrum, lateral view; **50** - Intercoxal process of ventrite 1.

7-8). This state is relatively common in Cleonini. Some genera have a long to very long basal strut, whereas others have the arms joined together basally, without any trace of a strut. States: 1, basal strut long; 2, basal strut reduced; 3, arms of sternum VIII joined basally.

17. Hemisternites short and broad (Fig. 13). Hemisternites are quite wide in Cleoninae; indication of states is complex as small variations in width and general morphology are shown between the genera, and are apparently quite conservative within each genus. States: 1, hemisternites relatively slender; 2, hemisternites shorter, subquadrate.

18. Styli very short, reduced, transverse (Fig. 13). This state is very peculiar and appears only in a very few genera of Cleonini, the usual states being isodiametric or elongate styli. States: 1, styli isodiametric or elongate; 2, styli shortened; 3, styli extremely reduced.

19. Symbiont pouches conspicuous, elongate, annulated. This is a very peculiar structure, first described by Heberdey (1931), Scheinert (1933) and Buchner (1933), apparently unique to Cleoninae in Curculionoidea (Anderson, 1988; Meregalli, unpublished data). It appears in other families of phytophagous Coleoptera, but any homology is questionable. Its morphology is variable in the various genera: in the tribe Lixini the pouches assume different shapes depending on the species (cf. Buchner, 1933: Figs 46, 47), whereas in the tribe Cleonini they are usually rather uniform within a single genus (Meregalli, unpublished data). Often the pouches are small and inconspicuous, membranous, while in some

genera they are large, well developed, occasionally even slightly sclerotized, as in *Koenigiuss* Heyden, 1900. States: 1, pouches inconspicuous; 2, pouches slender, annulate.

20. Proventriculus with blades elongate, tapering at their apex (Fig. 9). Small modifications occurring in some genera have been cited by Aslam (1963); however, the application of this structure in taxonomic and phylogenetic studies has not yet been analysed. States: 1, blades relatively short, slightly tapering; 2, blades elongate, tapering.

The comparative analysis of *Eumecops* and *Pseudeumecops* (see Table I) indicates that the (limited) excavation of the prosternum, which prompted *Cleonus* (*Cossinoderus*) *lutulentus* to be ascribed to *Eumecops*, is a homoplasy. *Eumecops*, in fact, shares the same states only for characters 7 and 13-14; significant differences are shown by traits 2, 3, 4, 5 (Fig. 48), 6, 8, 9, 10, 11 (Figs 16, 50), 15 (Fig. 21), 16 (Fig. 1), 18 (Fig. 15) and 19; other different states are antennae more slender, coxae with an anterior flat plate and fully developed scutellum. *Cleonus* subgenus *Cossinoderus* (= *Porocleonus*) is a presently monotypic genus composed by *P. candidus* (Olivier, 1807). This winged species shares with *Pseudeumecops* states 3, 5, 7, 14 and 19, form of underside of rostrum near oral opening, thick vestiture of round scales and transverse, relatively reduced styli of ovopositor; claws are connate at their base in *Porocleonus* and very near to base in the new genus. However, *Porocleonus* differs in several aspects, not all correlated with flight: the most significant appear to be traits 1, 2, 4, 6, 9, 10, 11, 12, 16 and 20; moreover, rostrum is slightly tapering at apex, with short scrobes and pronotum has regular large punctures. In both the genera the tarsal segments are very short and small, but in *Porocleonus* segment 3 is differently shaped, without trace of lobes. Based on this comparison, it seems unlikely that the two taxa share close phylogenetic relationships, the common states being probably homoplastic, or plesiomorphic.

Pseudeumecops shares states 2 and 10 with the wingless genus *Calodemus* Faust 1904. These states are seldom represented in the tribe, and have probably a high phylogenetic significance. Other characters which link *Calodemus* with *Pseudeumecops* are general aspect of the body and states 11, 12 and 20; prosternum is slightly depressed and with a small tubercle before coxae; apex of hemisternites is similarly shaped; styli are relatively short, although not as short as in *Pseudeumecops* (Fig. 14). *Calodemus* mainly differs for the states 1, 3, 4, 8, 9 and 19. Other states vary according to the species: vestiture is usually not as dense, particularly on appendages; elytra can be smooth or tuberculate; the orange pilose pads on underside of tarsi can be complete or reduced and claws can be connate up to mid-length or only to one third of their length, with the free parts more or less divergent. Sternite VIII of female lacks a basal strut, and has arms nearly horizontally connected, forming an an-

gle of about 150°; in some species, however, the connection angle is not as wide, so that shape of sternum is somewhat intermediate and slightly V-shaped (Fig. 6).

A group of winged African genera, often associated with mesophilous habitats and probably representing a monophyletic lineage, shares some states with *Pseudeumecops* and *Calodemus*, such as the presence of shallow traces of foveae on rostrum, a dark pattern on pronotum and the form of sternum VIII of female: *Neocleonus* Chevrolat, 1873; *Pycnodactylopsis* Voss, 1963 (= *Pycnodactylus* Chevrolat, 1873, sensu AA.); *Whiteheadia* Alonso-Zarazaga & Lyal, 1999 (= *Amblysomus* Faust, 1904 and following Authors, non Pomel, 1848); *Cosmogaster* Faust, 1904, and possibly a few more. However, several different states in these last genera, only partially associated with the presence of functional wings, imply that the possible relationships with *Pseudeumecops* are quite distant.

If the morphological affinities between *Pseudeumecops* and *Calodemus* are indicative of strict phylogenetic relationships, they should be considered as sister taxa, respectively spread in the drylands of eastern and southern Africa, and partially sympatric in Ethiopia (Fig. 38); these two genera, in turn, may be sister to the winged taxa of the *Neocleonus* group. Although further evidence is required to confirm this hypothesis, the phylogenetic reconstruction suggested above is supported by an analysis of the data set of Table I, performed with "PARS", a multistate discrete-characters parsimony method included in the Phylogeny Inference Package PHYLIP 3.6 (alpha3) (Felsenstein, 2002). It is obviously not surprising that the new genus appears to be more closely related to African taxa than to the Palaearctic

genera; lacking a sound phylogenetic knowledge, however, only preliminary notes about biogeographical history, as suggested by the present day chorology and ecology of the new, and related, genera can be anticipated. The tribe is mainly distributed in the old world, with only a few species diffused in North America; fossil taxa, found from lower Oligocene deposits in Europe and North America (Heer, 1847), suggest that Cleonini appeared at least in Lower Tertiary, if not earlier. The apparently close relationships of *Pseudeumecops* with other African genera and the absence of any related taxa in the Arabian region may indicate that the lineage of this genus differentiated in the African continent. Palaeovegetation reconstructions evidence that the tropical forests, widespread in Africa in Eocene, started decreasing during Miocene, with the onset of dryland communities in various parts of the continent, including the southern and eastern regions (Tallis, 1991, and references there cited). These new Middle Tertiary dry habitats may have favoured the differentiation of a phyletic lineage of xerophilous Cleonini, resulting in the sister wingless genera *Calodemus* and *Pseudeumecops*, presumably derived from winged, mesophilous taxa referable to the *Neocleonus* group. The most peculiar characters of *Pseudeumecops*, such as the thick vestiture of short and round scales, the extremely reduced appendages, etc., can be considered as autoapomorphies associated with extreme adaptation to the steppe and desert habitats of Eastern Africa. Significant, in this regard, is the convergence of *P. carpanetoi* with the sympatric *Pachycerus somaliensis* Meregalli, 2002: these homoplastic apomorphies in unrelated taxa indicate a com-

TABLE I - Matrix of character states in some of the examined genera of Cleonini. See text for description; n.d., not determined.

	<i>Pseudeumecops</i>	<i>Eumecops</i>	<i>Porocleonus</i>	<i>Calodemus</i>	<i>Pycnodactylopsis</i>
1. Rostrum, cross-section	3	2	1	2	2
2. Rostrum, foveae	3	1	1	2-3	2
3. Scales on labium	2	1	2	1	1
4. Extension of prementum	2	1	1	1	1
5. Angle rostrum/head	2	3	2	1-2	1-2
6. Excavation of prosternum	2	3	1	1-2	1
7. Segments 1-2 of funicle	1	1	1	1	1
8. Segment 7 of funicle	3	1	2	1	1
9. Base of pronotum	1	3	3	2-3	3
10. Pattern on pronotum	2	1	1	2	2
11. Ventrite 1	1	2	2	1	2
12. Metasternum	3	2	1	2-3	1
13. Segments 2-3 of tarsi	1	1	1	1	1
14. Pilose pads of tarsi	3	3	3	1-2	1
15. Claws	2	1	3	1-2	1
16. Sternite VIII of female	2	1	1	2-3	3
17. Hemisternites	2	2	2	1-2	2
18. Styli	3	1	2	1-2	1-2
19. Symbiont pouches	2	1	2	1	2
20. Proventriculus	2	n.d.	1	2	n.d.

mon response to selective pressure determined by the same environmental demands (Meregalli, 2002).

Key to the species of Pseudeumecops

- Intervals smooth, lacking tubercles, base of elytra regular, lacking elongated tubercles prominent towards prothorax (Fig. 42)
P. carpanetoi n. sp.

Intervals with raised tubercles, base of elytra at level of intervals 2, 4 and 7-8 with elongated tubercles prominent towards prothorax (Figs 39-41)

P. lutulentus (Fairmaire, 1888)

Pseudeumecops lutulentus (Fairmaire, 1888)

Cleonus (*Cossinoderus*) *lutulentus* Fairmaire, 1888: 321 (as *Cossinoderus*, lapsus)

Eumecops lutulentus: Faust, 1904: 207

Cleonus (*Eumecops*) *lutosus* Csiki, 1934: 17 (unnecessary replacement name)

Material examined

Types

In MNHN (coll. Fairmaire) three type specimens are conserved. One of these perfectly corresponds to the description and to the original illustration (Fairmaire, 1888: 321; pl. 3). It is here designated as the lectotype of *Cleonus* (*Cossinoderus*) *lutulentus* Fairmaire 1888. It bears the following labels: 1. *Curculio?* / *lutulentus* / Fair / Somalis. 2. MUSEUM PARIS / Collection Léon Fairmaire / 1906. 3. *Cleonus* (*Cossinoderus*) *lutulentus* / Fairmaire 1888 / Lectotypus / 2002 Meregalli des. (red). 4. *Pseudeumecops lutulentus* / 2002 Meregalli det.

The other two specimens, here designated as the paralectotypes, belong to *Pseudeumecops carpanetoi* n. sp.; one of these was seen by Faust (in litteris). Labels: first specimen: 1. MUSEUM PARIS / Somali / Revoil 1885. 2. *lutulentus* / Fairm. / J. Faust det. 1900. 3. 3856 / 85. 4. *Cleonus* (*Cossinoderus*) *lutulentus* / Fairmaire 1888 / Paralectotypus / 2002 Meregalli des. (red). 5. *Pseudeumecops carpanetoi* / Paratypus / 2002 Meregalli det. (red). Second specimen: 1. *Cossinoderus* / *lutulentus* / Fair / Somalis. 2. Somalis / 3. MUSEUM PARIS / Collection Léon Fairmaire / 1906. 4. *Cleonus* (*Cossinoderus*) *lutulentus* / Fairmaire 1888 / Paralectotypus / 2002 Meregalli des. (red). 5. *Pseudeumecops carpanetoi* / Paratypus / 2002 Meregalli det. (red).

Non-type material

Specimens morphologically referable to the lectotype - Somalia: "Somalia, Mudugh Prov., Galcaio, VIII.1959, C. Koch leg." [06°46' N 47°25' E], 1 ♂ 1 ♀ (♀, NHMB; ♂, MER); "bet. Ainabo & Las Anod, IX.1959, C. Koch leg." [between Caynaba & Laas Caanood, 08°24' N 47°21' E - 08°57' N 46°26' E], 1 ♂ (NHMB). "Somalia, Mogadiscio, Confalonieri" [02°04' N 45°22' E], 1 ♂ (MNHN, coll. Hoffmann).

Northern Somalia form: Somalia - "Somalia, Reg. Togdheer, 9 km SE Sheikh, m 1350, 19.V.1988, M. Bologna legit" [09°56' N 45°11' E], 1 ♂ (MER); "Somalia, Reg. West Galbeed, Arabsiyo, m 1350, 17.V.1988, G. Carpaneto legit", 1 ♂ [09°41' N 43°46' E] (OSL); "Brit. Somaliland, 12 m N of Hargeisa, IX.1959, C. Koch" [09°44' N 44°03' E], 1 ♀ (NHMB); "Hargeisa, VIII.1959, C. Koch" [09°33' N 44°03' E], 1 ♀ (NHMB). Ethiopia: "Ostafr. Exp. 1939, Abessinien, Dagahbur, VI.(19)39, leg. E.v.Saalfeld" [Degeh Bur, 08°13' N 43°34' E], 1 ♀ (ZSMC). Djibouti: "Ali-Sabieh, 90 km de Djibouti, Fevrier 1903, coll. Bonheure", [11°09' N 42°42' E] 1 ♂ (MNHN, coll. Hoffmann)

Kenya form - Kenya: "B.E.A., Elgon District", [approximately 00°57' N 34°37' E] 1 ♀ (MRAC); "Afrique Orient. Angl., Lassamisé, Rendilé, Maurice de Rotschild, Mars 1905, 43", [Laisamis, 01°36' N 37°48' E] 1 ♂ (MNHN; this specimen is portrayed in Aurivillius, 1922, pl. I c²⁹, Figs 5-6); "Kenya, Lokitang, Turkana Nord, m 750, Mission de l'Omo, C. Aranbourg, P.A. Chappuis & R. Jeannel, 1932-33", [04°16' N 35°45' E] 1 ♂ (MNHN). Ethiopia: "Gondaraba, Lago Stefania, 28.V.1939, Miss. E. Zavattari, Sagan-Omo, A.O.I.", [Chew Bahir, 04°58' N 36°49' E] 1 ♂ (MNHN). Unknown country, ?Ethiopia: "Abyssin., 48/64", 1 ♂ 1 ♀ (BMNH); "Abyssin., 61/9", 2 ♀♀ (BMNH) [the numbers 48/64 and 61/9 refer, respectively, to "1848/64 - 513 specimens, Abyssinia" and "1861/9 - 92 specimens Coleoptera Abyssinia", Barclay, personal communication]; "Abyssinia Brit.", 1 ♂ 1 ♀ (SMTD).

Redescription

Body length 10.40 mm. Rostrum: length 2.53 mm, width 1.42 mm. Prothorax: length 3.16 mm, width 3.83 mm (ratio length/width 0.83). Elytra: length 6.60 mm, width 4.60 mm (ratio length/width 1.43) (Lectotype, Fig. 39).

Body of medium size, dorsum flattened. Rostrum stout, wide and thick, in lateral view apex as thick as base; dorsum with elongate foveae, deeper near centre, posterior margin moderately raised, extended to vertex; dorso-lateral margins sub-rectilinear, very scarcely broadened at mid length, flattened in the middle in lateral view; central wide triangular ridge of rostrum broadened apicad and connected to dorso-lateral margins slightly before antennal insertion, at base connected to lateral raised margins to form a semicircular ridge beyond the foveae; epistomal area separated by a furrow from sides and anterior part of the median plate. Rostrum, except the foveae, with sparse barely distinct punctures, deeper on sides. Scrobes as typical of the genus; antennae short and compact. Head separated from rostrum by the raised posterior margin of foveae, with relatively dense isolate punctures and irregular ridges on vertex. Prothorax sub-quadrate, base very weakly arched towards elytra, sides slightly and irregularly broadened from base to apical quarter. Dorsum flat, sculpture formed by dense punctures, partly fused in badly defined irregular rows; dorso-lateral surface

with deeper and denser punctures, forming wide longitudinal depressions usually interrupted at mid length, separated by obtuse irregular ridges. Prosternum with elongated tubercle in front of the fore coxae, extended with a narrow ridge towards the transverse apical line. Scutellum nearly indistinct. Elytra oval, base regularly curved, with three prominent tubercles on base of intervals 2, 4 and 7-8; sides subrectilinearly broadened from base to apical third. Surface with dense sculpture, with irregular, more or less continuous transverse low ridges, crossing even intervals, often with tubercles at this level. Odd intervals irregular, with traces of broad tubercles; interval 1 (suture) flat, lacking tubercles, continuous from base to apex; interval 3 very irregular, extended to apex; interval 5 reaching beginning of declivity; interval 7 continuous from base to apex. Even intervals completely interrupted by ridges and tubercles; intervals 4 and 6 shortly flattened near base and interrupted on declivity and near apex by a depressed broad fovea, with some large, round conical tubercles flattened on top. Striae irregular, with scarcely distinct small punctures, hidden by the transverse ridges; striae 3 and 4 deepened in oblique areas near base, on declivity and near apex. Legs, tarsi and ventrites as typical of the genus. Vestiture: dense coating of small round or oval scales, appressed and completely covering integument, only on bottom of the foveae with slightly lifted acute apex; scales mostly straw-coloured; darker scales limited to the bottom of the punctures and the scarcely distinct, short oblique stripes. Setae curved against integument, short, oval or elliptical, often placed into the punctures, mostly glossy white alternate to some dark brown, more frequent on side of rostrum and pronotum, on suture and legs and scattered on the rest of the surface. Aedeagus: see Figure 23.

Remarks

On the basis of the known material, three apparently vicariant forms can be distinguished (Figs 39-41). Variation within each form is relatively scarce, although both male and female genitalia show a relatively high polymorphism (Figs 2-5, 23-32). The western form is more constantly differentiated. A strict geographical approach could lead these demes, and particularly the westernmost one, to be classified at subspecies rank; however, a detailed chorological analysis cannot be proposed because of the scarcity of field researches in several parts of Eastern Africa and also because all the specimens collected in the 19th century are simply labelled "Abyssinia", without more precise indications. Hence, no infraspecific taxa are here proposed. The three morphologically differentiated forms are characterized as follows:

Eastern and southeastern Somalia

Specimens examined are perfectly referable to the lectotype (Fig. 39). This form has wider elytra, with

sides broadened from base to apical 2/3 and ratio length/width 1.4; oblique dark stripes nearly indistinct, scarcely impressed, only forming deep spots on the striae, intervals at this level narrowed and slightly flattened, not interrupted; scales quite uniform, nearly always light coloured, also on pronotum, only darker on the bottom of the punctures and in the short transverse stripes; disc of the pronotum with dense punctures, often fused in groups of 2-3 punctures to form short irregular rows; base of the pronotum on centre weakly arched towards elytra; scales on ventrites are uniformly light or with vague darker patches. Phenotypic variation mainly regards density of the elytral sculpture, in the lectotype denser, with transverse ridges continuous on the whole surface, in the other specimens more or less limited to the striae between odd intervals. Apex of aedeagus is very variable, ogival or more slender, in one specimen even subacute (Figs 23-26); these variations are not sustained by other morphological differences and are not considered significant taxonomically. Sternum VIII of the only available female of this form is quite different from the apparently typical aspect in the specimens belonging to the other forms (Fig. 3).

Northern Somalia

Specimens from northern Somalia and nearby regions (Fig. 40) have rostrum with deeper and wider basal foveae, whose posterior margin is raised basad to vertex. Dorsum of prothorax with deeper, better distinct round large punctures, converging in groups of two-three punctures to form short very irregular, mainly transverse, curved rows, separated by short obtuse ridges. Elytra narrower, base with longer cylindrical tubercles, base of intervals 7-8 with tubercle slightly outwards produced, sides of elytra distinctly narrowed beyond the tubercle, then scarcely, sub-rectilinearly broadened to half of length, weakly and regularly converging to apex, maximum width after middle, ratio length/width 1.6. Sculpture strong, with a curved basal depressed stripe from base of interval 6 to the first third of interval 4, interrupted by interval 3 and extended to stria 2, limited anteriorly by a raised, irregular ridge with small tubercles; an oblique irregular depressed stripe beyond mid length between intervals 1 and 8, more or less interrupted by the odd intervals; a smaller depression on declivity beyond apex of interval 5. Intervals 3 and 5, out of the depressions, more or less linear, narrow or irregularly lightly broadened, with small traces of granules; intervals 7 and 9 with more distinct traces of tubercles. Even intervals completely fragmented in large, conical, irregularly scattered, high tubercles which usually invade in part or entirely the adjacent striae. Striae extremely irregular, punctures distinct only in the depressions. Scales usually brown in the depressions and on the disc of the prothorax; dark spots on ventrites relatively better distinct. Apex of aedeagus usually rounded (Figs 27-29); sternum VIII: see Figure 2; arms are more V-shaped in the specimen from Degeh Bur.

Kenya and southwestern Ethiopia

The specimens from Kenya (Fig. 41), southwestern Ethiopia and those simply labelled "Abyssinia" have more slender elytra, with scarcely broadened sides; odd intervals very regular, narrow, slightly convex, particularly interval 3 and the first half of interval 5; dark transverse stripes more evident, interrupted by the odd intervals; interval 2 and usually also 4 more flattened at this level; vestiture darker, mainly formed by light brownish scales, dark pattern on centre of pronotum better distinct, sharply delimited; sides of elytra in the first half and basal tract of sides of prothorax often with a white glossy stripe; antennae shorter; punctures on disc of prothorax smaller, shallow, not distinctly fused in rows, interspaces between the punctures as wide as the punctures; ventrites 3-5 with light scales limited to two small dots at base near centre; brown scales distributed on the whole surface, with three darker patches, one at centre and two at basal-lateral margin. Apex of aedeagus more uniform, sub-rounded, very weakly sub-acute in the middle (Figs 30-32). Sternum VIII of female slightly more rounded apically (Figs 4-5). This population is more differentiated with respect to the other two forms, particularly in the more regular and scarcely raised sculpture and the darker colour of the scales.

Distribution (Fig. 37)

Pseudeumecops lutulentus has a relatively wide distribution in Eastern Africa, between Kenya and the Indian Ocean. The type specimen was found in Somalia; the cited locality (Iza) could neither be localized in the examined maps nor found with a research on the Internet. Most of the old material examined only bears the generic indication of Abyssinia, or British Abyssinia.

Pseudeumecops carpanetoi n. sp.

Material examined

Holotype ♂: "Somalia, Umgebg. Mogadiscio, VII.1959, C. Koch legit" 1♂ [02°04' N 45°22' E] (NHMB).

Paratypes: "Somalia, Umgebg. Mogadiscio, VII.1959, C. Koch legit" 1♀ (MER); "Somalia, Mudugh prov., Obbia, C. Koch" [Hoby, 05°21' N 48°32' E], 1♂ (NHMB); "Somalia, Mogadiscio, 7° km (University), 7-9.V.1988, G. Carpaneto legit", 3 exx. (1♂ 1♀: OSL, 1♂: MER); "Somalia, Mogadiscio, 7° km (University), 7-9.V.1988, R. Mourglia legit", 1♀ (MER); "Somalia italiana, Giuba, Belet Amin, VII.1934, Patrizi" [02°16' N 45°14' E] 1♀ (MCSN); "Somalia, Afgoi, Shibeeli River" [02°08' N 45°07' E] 1♂ (BMNH); "*Coscinoderus lutulentus*, Somalis", 1♀ (MNHN; paralectotype of *Cleonus (Cossinoderus) lutulentus*); "*lutulentus* Fairm., Somali, Revoil 1885", 1♀ (MNHN; paralectotype of *Cleonus (Cossinoderus) lutulentus*); "Somalia it., Cesare Lomi, IX-XI. 1995", 1♀ (MNHN).

Type locality

Soomaaliya, Muqdishu (Somalia, Mogadishu), 02°04' N 45°22' E.

Diagnosis

A *Pseudeumecops* with smooth sculpture, intervals on elytra regular, lacking tubercles; base of elytra regularly arched, lacking prominent tubercles on base of intervals 3, 5 and 7-8. (Fig. 42). Aedeagus not significantly differentiated from *P. lutulentus*; sternum VIII of female apparently slightly more slender basad (Figs 7-8).

Description

Body length 10.28 mm. Rostrum: length 2.55 mm, width 1.44 mm. Prothorax: length 2.90 mm, width 3.40 mm (ratio length/width 0.85). Elytra: length 6.67 mm, width 4.48 mm (ratio length/width 1.49) (holotype).

Body of medium size, elongate. Rostrum stout, straight; central foveae narrow, elongate, deeper near centre, shallow towards sides. Central raised area short, sharply interrupted at base, not connected to the raised dorso-lateral margins. These broad, obtuse, rectilinear, extended to apex, slightly lowered at mid length. Epistomal area semicircular, depressed with respect to the raised margins. Punctures spaced, well distinct on base and dorso-lateral margins. Scrobes and antennae as typical of the genus, wider and slightly shorter on underside of rostrum. Vestiture: dense round straw-coloured scales; short oval setae inserted in the punctures. Setae on funiculus broad and long. Head with distinct scattered punctures, surface relatively uniform, with shallow oblique depressions on vertex. Eyes elliptical, lower apex sub-acute. Prothorax transverse, base nearly rectilinear, weakly curved and indistinctly arched towards scutellum; sides subrectilinear from base to apical third, regularly converging to apex. Surface quite even, depressions on dorso-lateral area very weak, scarcely distinct; punctures scattered, small, regularly placed on the whole surface, not confluent in rows. Prosternum with small tubercle in front of fore coxae, lateral ridge weakly raised. Vestiture of small oval scales very dense and uniform, slightly darker at centre. Scutellum small, triangular. Elytra elliptical, flattened on dorsum, base regularly arched with barely appreciated thickness at base of even intervals, lacking distinct tubercles; sides weakly and regularly curved from base, maximum width near mid length. Surface uniform, odd intervals slightly convex, broader than even intervals, regular from base to apex, interval 5 interrupted on declivity; even intervals nearly flat, more or less continuous, slightly depressed before declivity; interval 6 with more evident traces of barely differentiated flat humps; striae narrower than intervals; punctures small, visible, slightly deepened near base and before declivity to delimit a trace of two transverse oblique depressions. Vestiture:

oval to shortly elliptical dense scales, light coloured on the whole surface and dark brown on the irregular oblique depressions; scale-like setae whitish or dark brown, more frequent on suture and odd intervals. Legs as typical of the genus, middle and hind femora with a darker patch of scales on upper side near mid length. Sternites as typical of the genus, surface densely scaly with curved whitish glossy elliptical scale-like setae placed in the punctures. Aedeagus: see Figure 33.

Remarks

Deepness of foveae on the rostrum is variable, as also is the width of the central raised area, more or less triangular, occasionally relatively narrow, scarcely widened apically. The ♀ from Belet Amin has the rostrum with very wide foveae and curved, irregular dorso-lateral margins. The prothorax and elytral sculpture is extremely homogeneous in all specimens. The pattern of dark scales is, as typical of the genus, variable, occasionally indistinct. Sternum VIII of female: see Figures 7-8. This species is easily differentiated from *P. lutulentus* due to the smooth elytral surface and the absence of basal tubercles. *Pachycerus somaliensis* Meregalli, 2002 is sympatric with *Pseudeumecops carpanetoi* and has a similar morphological appearance. It can be distinguished through characters typical of *Pachycerus* Schoenherr, 1823, such as rostrum with regular shallow dorsal furrow, lacking basal foveae, dorso-lateral margin sharply raised, vertex with triangular raised ridges above eye, different shape of scrobes, segment 7 of antennae not fused to club, and completely different genitalia.

Etymology

This species is named after my friend and colleague Giuseppe Carpaneto, who collected some of the specimens during his journeys to Somalia.

Distribution

Specimens examined were found along the coast of south and southeast Somalia (Fig. 37).

REFERENCES

- Alonso-Zarazaga M. A., Lyal C. H. C., 1999 - A world catalogue of families and genera of Curculionoidea (Insecta: Coleoptera) (Excepting Scolytidae and Platypodidae). Entomopraxis, Barcelona.
- Anderson R. S., 1988 - Systematics, phylogeny and biogeography of New World weevils traditionally of the tribe Cleonini (Coleoptera: Curculionidae; Cleoninae). Quaest. Entomol., 23 (1987): 431-709.
- Aslam N. A., 1963 - On the genera of Indo-Pakistan Cleoninae and Hylobiinae (Coleoptera: Curculionidae). Bull. Br. Mus. (Nat. Hist.) Entomol., 13: 47-66.
- Aurivillius C., 1922 - Curculionidae. In: Voyage de M. le Baron Maurice de Rothschild en Éthiopie et en Afrique Orientale Anglaise (1904-1905). Résultats scientifiques. Animaux articulés, deuxième partie. Imprimerie Nationale, Paris, pp. 726-749.
- Buchner P., 1933 - Studien an intracellularen Symbionten. VII. Die symbiontischen Einrichtungen der Rüsselkäfer. Z. Morphol. Ökol. Tiere, 26: 709-777.
- Chevrolat A., 1873 - Mémoire sur les cléonides. Mém. Soc. R. Sci. Liège Collect. 8, 2: 1-118.
- Csiki E., 1934 - Curculionidae: Subfam. Cleoninae. In: S. Schenkling (ed.), Coleopterorum catalogus auspiciis et auxilio W. Junk, vol. 134. Junk, Berlin, pp. 1-152.
- Fairmaire L., 1888 - Coléoptères des voyages de M. G. Revoil chez les Somalis et dans l'intérieur du Zanguebar. [Cont.]. Ann. Soc. Entomol. Fr., 7: 277-368.
- Faust J., 1904 - Revision der Gruppe Cléonides vrais. Dtsch. Entomol. Z., 1904: 177-284.
- Felsenstein J., 2002. - PHYLIP (Phylogeny Inference Package) version 3.6a3. Distributed by the author. Department of Genome Sciences, University of Washington, Seattle.
- Heberdey R. F., 1931 - Zur Entwicklungsgeschichte, vergleichenden Anatomie und Physiologie der Weiblichen Geschlechtsausführwege der Insekten. Z. Morphol. Ökol. Tiere, 22: 416-586.
- Heer O., 1847 - Die Insektenfauna der Tertiärgebilde von Oeningen und von Radaboj in Croatien. Erste Abteilung: Käfer. Neue Denkschr. Allg. Schweiz. Ges. gesamten Naturwiss., 8: 1-229.
- Hochhuth I. H., 1851 - Beiträge zur näheren Kenntniss der Rüsselkäfer Russlands, enthaltend Beschreibung neuer Genera und Arten, nebst Erläuterungen noch nicht hinlänglich bekannter Curculioniden des russischen Reichs. Bull. Soc. Imp. Nat. Moscou, 24: 3-102.
- Meregalli M., 2002. Notes on the genus *Pachycerus* Schoenherr 1823 with description of a new species from Somalia (Coleoptera Curculionidae Lixinae). Trop. Zool., 15: 233-242.
- Reitter E., 1913 - Bestimmungs-Schlüssel der mir bekannten europäischen Gattungen der Curculionidae, mit Einschluss der mir bekannten Gattungen aus dem palaearktischen Gebiete. Verh. Naturforsch. Ver. Brünn, 51 (1912): 1-90.
- Scheinert W., 1933 - Symbiose und Embryonalentwicklung bei Rüsselkäfern. Z. Morphol. Ökol. Tiere, 27: 76-128.
- Tallis, J. H. 1991 - Plant community history. Long-term changes in plant distribution and diversity. Chapman and Hall, London.
- Ter-Minasian M. E., 1988 - Zhuki-dolgonosiki podsemejstva Cleoninae fauna SSSR: kornevae dolgonosiki (Triba Cleonini). Opredeliteli po faune SSSR, izdavaemae Zoologicheskim Institutom Akademii Nauk SSSR, 155, Leningrad, 1-234.
- UNESCO / AETFAT / UNSO, 1981 - Vegetation map of Africa, compiled by F. White. Published by UNESCO, Paris.
- Van den Berg M. C., 1972 - The morphology of *Eremnus cerealis* Marshall (Coleoptera: Curculionidae). Ann. Univ. Stellenbosch Ser. A, 47: 1-58.