A revision of the African Ochodaeidae (Coleoptera: Scarabaeoidea)

by

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Four genera of Ochodaeidae occur in Africa, Ochodaeus Serville, Chaetocanthus Péringuey, Namibiotalpa gen. nov. and Synochodaeus Kolbe. Eight new species of Ochodaeus, one of Chaetocanthus, one of Namibiotalpa and two of Synochodaeus are described. They are O. alius, O. corniger, O. femoratus, O. quadridentatus, O. rectus, O. singularis, O. stridulatus, O. unicornis, C. arenarius, N. fossiliis, S. costatus and S. cucullus. Keys are provided to the genera and species and all species are described and their distribution mapped.

INTRODUCTION

The species of the African genera of the Ochodaeidae (Crowson’s 1981 family classification was followed) have not been revised and the most recent descriptions of species were published in the 1920’s. The genera have not been well defined and no key to them exists. Consequently, and because of the availability of a considerable amount of museum material, it was considered worthwhile revising the genera.

Four genera of Ochodaeidae occur in Africa. The virtually cosmopolitan genus Ochodaeus Serville is widespread in Africa, occurring throughout the continent, Chaetocanthus Péringuey is restricted to Africa south of the equator, Synochodaeus Kolbe has a smaller area of distribution, being limited to south-western Africa, and the new genus, Namibiotalpa, occurs only in areas of deep sand in the Namib Desert. Ochodaeus is represented in Africa by 13 known species, Chaetocanthus by three, Synochodaeus by three and Namibiotalpa by one.

Very little is known about the biology of the Ochodaeidae. Adults are attracted to light and have occasionally been taken in traps baited with cattle dung and carrion but also in unbaited traps so it seems likely they may have fallen into the traps by chance.

The supposed larva of Pseudochodaeus striatus (Schaeffer) from the western United States of America was described by Carlson & Ritcher (1974). They also dissected adults and found spores of Basidiomycete fungi in the mid- and hindgut.

Nothing is known about immature stages of African species.

Abbreviations for museums containing material studied and the curators responsible for loans are as follows:

BMNH – British Museum (Natural History), London. M. E. Bacchus, L. Jessop.
HAHC – H & A Howden Collection, Carleton University, Ottawa. H. F. Howden.
SYSTEMATICS

The African Ochodaeidae can be characterized by the following characters: clypeus and labrum large, mandibles visible from above; antennae 9- or 10-segmented, basal club segment more or less cupuliform; eyes not divided by the genal canthus; longer mesotibial spur crenulate or pectinate; male genitalia consist of divided basal piece, symmetrical parameres, partially sclerotized membranous median lobe and large internal sac.

The species can usually be distinguished by clypeal, labral and mandibular characters, striation and punctation on the pronotum and elytra and various characters on the legs. The internal sac is useful for species identification in fresh (live) specimens in which it can be everted but is practically useless in dry material.

Figs 1-6. Ochodaeidae, diagnostic characters (schematic); 1. Chaetocanthus insuetus, pectinate spur (arrow). 2. C. insuetus, metafemur and -tibia, illustrating complete subapical carina and dentiform process (arrows). 3. Namibiotalpa fossilita, metafemur and -tibia, illustrating two subapical carinacae (arrow) and absence of dentiform process. 4. Synochodaeus modestus, crenulate spur (arrow). 5. Synochodaeus species, metafemur and -tibia, illustrating carinae on tibia (arrows); (a) S. modestus, (b) S. cucullus. 6. Ochodaeus gigas, metafemur and -tibia, illustrating absence of carinae on latter.
Key to the genera of African Ochodaeidae

1 Antennae 9-segmented; protibiae bidentate; mesotibial spurs pectinate (Fig. 1); metatibial spur with complete (or nearly so) subapical carina (Figs 2 & 3) ...................................................... 2
   — Antennae 10-segmented; protibiae tri- or quadridentate (basal tooth sometimes weakly developed, rarely absent); mesotibial spurs crenulate (Fig. 4); metatibia without complete subapical carina (Figs 5 & 6) .............................................................. 3

2 Metatibia with one complete subapical carina; metatibial dentiform process (Fig. 2) present; tarsal segments cylindrical; head and pronotum granulate; tarsal claws present .......................................................... Chae
canthus Périn.
ye.
   — Metatibia with two complete subapical carinae; metatibial dentiform process absent (Fig. 3); tarsal segments transverse, flattened; head and pronotum punc
tate; tarsal claws absent ............................................. Namibiotelpa gen. nov.
3 Metatibia with median or subapical, spine carina (Fig. 5); meso- and metatibia with cren
ulate spur; body shape elongate ...................................... Synochodaeus Kolbe
   — Metatibia without carina (Fig. 6); only mesotibia with crenulate spur; body shape globose .................................................. Ochodaeus Serville.

Genus Ochodaeus Serville, Figs 7, 8

Type-species: Scarabaeus chrysomeloides Schrank.

Body robust, convex, pale testaceous to dark brown, 3.5–7.0 mm long; head, pronotum and elytra granulate or punctate, setose.

Head transverse; mandibles, which are alike in the sexes in most species, and labrum visible from above; labrum transverse with anterior margin straight to deeply emarginate, setose; clypeus transverse, anterior margin straight, irregular or rounded; clypeal surface with or without horn; fronto-clypeal suture distinct to obsolete; antennae 10-segmented, scape expanded, triangular, setose; segments 8 & 9 cupuliform but not receiving segment 10.

Pronotum subquadrate, evenly convex, surface granulate or punctate, setose.

Elytra with 6 punctate striae between suture and base of humeral callus; inter-
striae punctate or granulate, setose; wings well developed.

Abdomen: Propygidium modified to accept elytra or not; pygidium and six visible sternites setose, sternites free; fifth sternite with or without dorso-lateral stridula
tory peg.

Legs: Protibia tri- or quadridentate, basal tooth always smaller than the others; mesotibia with longest spur crenulate.

Male genitalia with symmetrical parameres, large basal piece and very large, membranous internal sac with species-specific armature (Fig. 8).

Remarks: There is considerable confusion in the existing literature about the validity of the name Ochodaeus, as it is antedated by several names which are enigmatically listed as junior synonyms of the former in all catalogues (see Woodruff 1973). Consequently, only the literature pertaining to the African species is listed here and the problem of the validity of the different names is being investigated in a separate study of the phylogeny of the genera in the family (in preparation).

The genus Ochodaeus is widespread, occurring mainly in arid and semi-arid re
gions of the New World, Africa, Madagascar and the Palaeartic and Oriental Regions. It is absent from Australia. In Africa, members of the genus are known from as far south as Cape Town and as far north as the mediterranean coast of Tunisia. Most species, however, have relatively small areas of distribution.
Fig. 7. *Ochodorus congoensis*, habitus. Scale line = 1 mm.
Key to species of *Ochodaeus*

1 Clypeus with horn .......................................................... 5
   — Clypeus without horn .................................................... 2
2 Clypeus entire .................................................................................. 3
   — Clypeus emarginate or with interrupted ridge .......................... 4
3 Fronto-clypeal suture a distinct, thin line; central African ....... stridulatus sp. nov.
   — Fronto-clypeal suture obsolete; South African ...................... capicola Péringuey.
   — Fronto-clypeal region deeply depressed; West African .......... alius sp. nov.
4 Clypeus emarginate; metafemur with broad triangular plate; metatibia explanate; propygidium and elytral apex without interlocking hooks; south-west African ... adesqua Kolbe.
   — Clypeus with interrupted ridge; metafemur without broad plate; metatibia normal; propygidium and elytral apex with corresponding interlocking hooks; north-east African .......
   5 Protibia quadridentate; abdominal sternites membranous, without distinct dorso-lateral margin against which elytra close; stridulatory peg absent; southern African ............... 6
   — Protibia tridentate; abdominal sternites sclerotized, with distinct dorso-lateral margin; stridulatory peg present; mostly central to north African ............................. 9
6 Labrum straight .................................................................................. 7
   — Labrum emarginate .................................................................................. 8
7 Right mandible as in Fig. 16 .......................................................... rectus sp. nov.
   — Right mandible as in Fig. 17 ....................................................... corniger sp. nov.
8 Right mandible as in Fig. 18 .......................................................... unicornis sp. nov.
   — Right mandible as in Fig. 19 ........................................................... quadridentatus sp. nov.
9 Fronto-clypeal suture visible as a line or depression ................. 11
   — Fronto-clypeal suture obscured by base of clypeal horn ............ 10
10 In lateral view clypeal horn forms a ridge with anterior clypeal margin; north African .......... gigas Marseul.
   — In lateral view clypeal horn does not form a ridge with anterior clypeal margin; east African ................................................................. singularis sp. nov. 
11 Restricted to southern Africa; stridulatory peg very small, lightly sclerotized ................................. femoratus sp. nov.
   — Restricted to central and west Africa; stridulatory peg distinct ...................................................................... congoensis Benderitter.

*Ochodaeus stridulatus* sp. nov., Figs 12, 23, 31.

**Description**: 6 mm long, rufo-brunneous. *Head* with labrum slightly emarginate; mandibles as in Fig. 12; clypeal margin entire; fronto-clypeal suture distinct, visible as a thin dark line; surface of head coarsely granulate, setigerous. *Prothorax* surface coarsely granulate, setigerous. *Elytra* with large humeral calli; striae with distinct, large deep punctures; interstriae with small setigerous tubercles. *Abdomen* with sternites strongly sclerotized and distinct dorso-lateral margin with distinct processes; stridulatory peg very large, recurved (Fig. 23). *Legs*: Protibia tridentate, basal tooth smaller than others; femora with small projecting lateral plate. *Distribution*. Fig. 31.


This new species is similar to *O. capicola* Péringuey and to *O. alius* sp. nov. However, it can be distinguished from both by the unique, large curved stridulatory peg. The peg is smaller and less curved in the other two species. Furthermore, the fronto-clypeal suture varies between the species; it is obsolete in *O. capicola*, a thin dark line in *O. stridulatus* and the clypeo-frontal area is depressed in *O. alius*. The species are geographically widely separated; *O. capicola* occurs in South Africa, *O. stridulatus* in central Africa and *O. alius* in West Africa.

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Scholtz & Evans: revision of *Ochodaeidae* 403
Ochodaeus capicola Peringuey, Figs 13, 24, 30.

Ochodaeus capicola Peringuey, 1900: 505; Arrow 1912: 21.

Description: 4.5–6.0 mm long, pale testaceous to dark rufo-brunneous. Head with labrum emarginate, ridged, setose; mandibles as in Fig. 13; clypeus triangular, anterior margin entire; fronto-clypeal suture obsolete; surface of head coarsely granulate, setigerous. Pronotum surface coarsely granulate, setigerous, occasionally with a shallow median longitudinal impression. Elytra with large humeral calli; surface with small setigerous tubercles. Abdomen with stridulatory peg present (Fig. 24). Legs: Protibia tridentate, basal tooth smaller than others; metatrochanter small; pro-, meso- and metafemur with projecting lateral plate. Distribution. Fig. 30.

Material examined: Holotype, without data (SAM). CAPE PROVINCE. Algeria Forest Reserve, Cederberg (2 TM); Algoa Bay [Port Elizabeth] (1 TM); Assegalaisbosch (1 BMNH); Camps Bay (2 TM); Cederberg (1 TM); Citrusdal (1 TM); Devils Kloof, Cedarberg (1 TM); Rondebosch (2 SAM); Stellenbosch (2 TM); Zeekoei Vlei (1 SAM). Specimens have been collected throughout summer.

Ochodaeus capicola is most similar to O. aliussp. nov. and to O. stridulatus sp. nov. but can easily be distinguished from both by the absence of a distinct fronto-clypeal suture.

Ochodaeus aliussp. nov., Figs 25, 31.

Description: 4.5 mm long, rufo-brunneous. Head with labrum emarginate, ridged, setose; clypeal margin entire; fronto-clypeal region deeply depressed; surface of head coarsely granulate, setigerous. Pronotum surface granulate, setigerous. Elytra with humeral calli barely raised; surface with very small setigerous tubercles. Abdomen with stridulatory peg present (Fig. 25). Legs: Protibia tridentate, basal tooth very small; pro-, meso- and metafemur with projecting lateral plate. Distribution. Fig. 31.

Material examined. Holotype: Ivory Coast, Bouaké, 350 m, 7.41 N 5.02 W, 7–28.V.80, O. Kukal, u.v. light (HARC).

This new species is similar to O. capicola and O. stridulatus but has the fronto-clypeal region deeply depressed: the fronto-clypeal suture is obsolete in O. capicola and visible as a thin dark line in O. stridulatus.

Ochodaeus adsequa Kolbe, Figs 14, 26, 30.

Ochodaeus adsequa Kolbe, 1907: 28; Peringuey 1908: 649.

Description: 3.5–6.0 mm long, rufo-brunneous. Head with labrum emarginate, ridged, setose; mandibles as in Fig. 14; clypeus emarginate; fronto-clypeal suture visible as transverse depression; surface of head coarsely granulate, setigerous. Pronotum surface coarsely granulate, setigerous. Elytra with large humeral calli; surface with small setigerous tubercles. Abdomen with stridulatory peg present (Fig. 26). Legs: Protibia tridentate, basal tooth smaller than others; metafemur with large, projecting triangular plate; metatibia broad and flat. Distribution. Fig. 30.
Material examined. Holotype. D.S.W-Afrika, Gobabis am ... [illegible], Nosob Fluss, Ende III–IV.02, Geltz, S. G. 97730 (ZMB). BOTSWANA. Boro River (1 TM). SWA/NAMIBIA. Grootefontein, 12 mls N, (3 BMNH). Naukluft (1 SAM); Okahandja (3 SM, 2 TM); Okaukuejo (1 SM); Otavi, 18 mls SW (4 BMNH); Tsumkwe, Kungveld (2 TM); Windhoek (1 SAM, 5 TM). Specimens have been collected in January, March, April, May, August and November.

Ochodaeus adsequa can easily be distinguished from any other species by the emarginate clypeus and the large, projecting triangular plate on the metafemur.

Ochodaeus carinatus Benderitter, Figs 15, 31.

Ochodaeus carinatus Benderitter, 1913: 359.
Ochodaeus ciliatus Benderitter, 1921: 113. syn. nov.
Ochodaeus minutus Benderitter, 1923: 5. syn. nov.

Description: 3.5–6.0 mm long, pale testaceous to dark rufo-brunneous. Head with labrum emarginate, ridged, setose; mandibles as in Fig. 15; clypeus with interrupted ridge; fronto-clypeal suture faint; surface of head granulate, setigerous. Pronotum surface punctate, setigerous. Elytra with humeral calli barely raised; surface with small setigerous tubercles; apex with hooks that interlock with corresponding hooks on propygidium. Abdomen without stridulatory peg. Distribution. Fig. 31.

Material examined. Holotype, carinatus: Obock, Coll. Pic (MNHN); holotype, ciliatus: Ethiopie: Erythee ex coll. J. Gillet (IRSN), paratype no data (MNHN); holotype, minutus: Abesynia, ex coll. J. Gillet (IRSN); ‘types’, castaneus: B.E.A. Campi Simba, 3/7.VI.1913, Dr Bayer (1 MNHN); B.E.A. Tsavo R. 4/21.V.1913, Dr Bayer (2 MNHN). DJIBOUTI. Djibuti (IRSN); Obok (MNHN). ETHIOPIA. Awash Park, Shoa Prov., (11 MRAC); Awash station (4 MRAC); Dire-Dawa (4 MNHN, 4 MRAC); Erer (1 MRAC); Ghed-do, Siro Wells (1 MRAC); Hawash Station (1 BMNH); Negrilli, 52 km E (5 MRAC); Nura (1 MRAC). Without data, 7. Specimens have only been collected between May and September.

Ochodaeus carinatus is rather variable but is easy to distinguish from any other species by the very characteristic hooks on the elytral apices and corresponding hooks on the propygidium as well as by the absence of a stridulatory peg. It is the only African species with the abovementioned features.

The two Benderitter species, O. ciliatus and O. minutus, are indistinguishable from O. carinatus. Both occur within the distribution range of O. carinatus and have the characteristic elytral locking mechanism and the absence of a stridulatory peg. Consequently we regard them as synonymous with O. carinatus.

The “types” of another Benderitter species, O. castaneus, are housed in the MNHN but no publication in which this species was described could be traced so it seems likely that the “species” was never described, with the result that the name is merely a manuscript name. However, the three specimens labelled “types” are merely dark forms of O. carinatus and in the event of the species having been described in an obscure publication it would be synonymous with O. carinatus.

Ochodaeus rectus sp. nov., Figs 16, 32.

Description: 6.0–7.0 mm long, testaceous. Head with labrum straight, setose; mandibles as in Fig. 16; clypeus with distinct horn, margin straight; fronto-clypeal

suture visible laterally; surface of head punctate, setigerous. *Pronotum* surface punctate, setigerous. *Elytra* with large humeral calli; surface punctate, setigerous. *Abdomen* with membranous sternites, without distinct dorso-lateral margin; stridulatory peg absent. *Legs*: Protibia quadridentate, basal tooth very small, metafemur broad, parallel-sided; metatibia stout, flared, not distinctly ridged. *Distribution*. Fig. 32.


This new species is most similar to *O. corniger* sp. nov. It can most easily be distinguished from the latter by the differences in size and shape of the right mandible (Figs 16 & 17).
Ochodaeus corniger sp. nov., Figs 17, 32.

Description: 5.0 mm long, testaceous. Head with labrum straight, setose; mandibles as in Fig. 17; clypeus with distinct horn, margin straight; fronto-clypeal suture visible laterally; surface of head densely setigerous. Pronotum surface punctate, densely setigerous. Elytra with large humeral calli; surface punctate, densely setigerous. Abdomen with membranous sternites, without distinct, dorso-lateral margin; stridulatory peg absent. Legs: Protibia quadridentate, basal tooth very small; metafemur broad, parallel-sided; metatibia slender, distinctly ridged. Distribution. Fig. 32.

Material examined. Holotype. Kuruman N.W. Cape, RSA SE 2723 Ad. 21–22 Feb. 1980. S. Louw, M-L. Penrith (SM). This new species is similar to O. rectus and O. unicorns. It can be distinguished from both by the size and shape of the right mandible (Figs 16, 17 & 18) and from O. unicorns by the emarginate labral margin in the latter; O. corniger has it straight.

Ochodaeus unicornis sp. nov., Figs 18, 32.

Description: 6.0 mm long, testaceous. Head with labrum emarginate, setose; mandibles as in Fig. 18; clypeus with distinct horn, margin straight; fronto-clypeal suture visible laterally; surface of head punctate, densely setigerous. Pronotum surface punctate, setigerous. Elytra with large humeral calli; surface with large, sparsely setigerous punctures. Abdomen with membranous sternites, without distinct dorso-lateral margin; stridulatory peg absent. Legs: Protibia quadridentate, basal tooth very small; metafemur attenuated distad; hind tibia slender, with spinose ridges. Distribution. Fig. 32.

Material examined. Holotype. Ovita [Okahandja] 6.4.53 (SM). This new species is similar to O. corniger (see above) and O. quadridentatus sp. nov. It can be distinguished from O. corniger as discussed above and from O. quadridentatus mainly by the differences in shape of the right mandible (Figs 18 & 19).

Ochodaeus quadridentatus sp. nov., Figs 19, 32.

Description: 5.5–6.0 mm long, testaceous. Head with labrum emarginate, setose; mandibles as in Fig. 19; clypeus with distinct horn, margin straight; fronto-clypeal suture visible laterally; surface of head punctate, densely setigerous. Pronotum surface punctate, densely setigerous. Elytra with large humeral calli; surface with large, setigerous punctures. Abdomen with membranous sternites, without distinct dorso-lateral margin; stridulatory peg absent. Legs: Protibia quadridentate, basal tooth very small. Distribution. Fig. 32.


This new species is externally very similar to O. unicorns but can be distinguished from the latter by the very different shape of the right mandible (Figs 18 & 19).
Ochodaeus gigas Marseul, Figs 20, 27, 34.

Ochodaeus gigas Marseul, 1878: 58; Arrow 1912: 21.

**Description:** 4.0–7.0 mm long, testaceous to rufo-brunneous. **Head** with labrum deeply emarginate, setose; mandibles as in Fig. 20; clypeus wide, with large horn which forms a ridge between it and anterior clypeal margin; margin slightly irregular; fronto-clypeal suture obscured by base of clypeal horn; surface of head faintly punctate, setigerous. **Pronotum** surface faintly punctate, setigerous. **Elytra** with large humeral calli; striae with distinct, small punctures; interstriae with short setae. **Abdomen** with sclerotized sternites, with distinct dorso-lateral margin; stridulatory peg present (Fig. 27). **Legs:** Protibia tridentate, basal tooth smaller than others; metafemur with small projecting triangular plate; metatibia slender, with median row of spines. **Distribution.** Fig. 34.

**Material examined.** TUNISIA. Bou-Medma (5 MNHN); Gafsa (1 MNHN); Maknassy (2 MHMN); Ouargla, El Goléa Ghardala (2 MNHN); Sfax (1 MNHN); Tozeur (2 MNHN). Without data, 9.

This species, the type of which could not be traced, is very distinctive and not easily confused with any other. The most distinctive character is the large clypeal horn which forms a distinct ridge with the anterior margin of the clypeus and which appears triangular in profile.

Ochodaeus singularis sp. nov., Figs 21, 28, 33.

**Description:** 5.0 mm long, rufo-brunneous. **Head** with labrum emarginate, setose; mandibles as in Fig. 21; clypeus narrow, with distinct horn, margin arcuate; fronto-clypeal suture visible as a dark line; surface of head faintly punctate, setigerous. **Pronotum** surface faintly punctate, densely setigerous. **Elytra** with large humeral calli; striae with distinct, large punctures; interstriae setigerous. **Abdomen** with sclerotized sternites, with distinct dorso-lateral margin; stridulatory peg present (Fig. 28). **Legs:** Protibia with two large teeth and basally one, very much smaller; metafemur with large, projecting triangular plate; metatibia very broad. **Distribution.** Fig. 33.

**Material examined: Holotype.** Kenya Colony, Northern Frontier District, Juba River, 1922. Dr. J. O. Beven (BMNH).

This new species is very distinctive and not easily confused with any other. The shape of both mandibles is unique (Fig. 21) as is the shape of the metafemur and metatibia.

Ochodaeus femoratus sp. nov., Fig. 32.

**Description:** 5.5 mm long, pale testaceous. **Head** with labrum deeply emarginate, setose; clypeus wide, with small horn, margin irregular; fronto-clypeal margin visible as a deep, wide depression; surface of head faintly punctate, setigerous. **Pronotum** surface faintly punctate, setigerous. **Elytra** with large humeral calli; striae with distinct, large punctures; interstriae with short setae. **Abdomen** with sclerotized sternites, with

distinct dorso-lateral margin; stridulatory peg present but very small and lightly sclerotized. Legs: Protibia tridentate, basal tooth much smaller than others; pro-, meso- and metafemur with broad, projecting triangular plate; metatibia gradually widening apically, with lateral, widely spaced spines. Distribution. Fig. 32.


This new species is very similar to *O. congoensis* Benderitter but can most reliably be distinguished from the latter by the considerably smaller clypeal horn, the different shapes of the stridulatory pegs and by their wide geographic separation.

*Ochodaeus congoensis* Benderitter, Figs 7, 22, 29, 33.

Ochodaeus congoensis* Benderitter, 1913: 359.

Description: 4.0-6.0 mm long, testaceous. Head with labrum deeply emarginate, setose; mandibles sexually dimorphic, as in Fig. 22; clypeus with distinct horn, margin slightly irregular; fronto-clypeal suture visible as deep depression; surface of head setigerous, without distinct punctures. Pronotum surface setigerous, without distinct punctures. Elytra with large calli; striae with distinct, large punctures; interstriae setigerous. Abdomen with sclerotized sternites, with distinct dorso-lateral margin; stridulatory peg present (Fig. 29). Legs: Protibia with two large teeth and third basal one much smaller; pro-, meso- and metafemur parallel-sided to having projecting triangular plates; metatibia flared, with median row of spines. Distribution. Fig. 33.

Material examined. Holotype, Fort Crampel, Congo-Francais (MNHN). BURKINA FASO. Bobo-Dioulasso (2 MRAC). CENTRAL AFRICAN REPUBLIC. Fort Sibut (1 MNHN). IVORY COAST. Lamto (Toumodi) (1 MNHN). MALI. M’Pesoba (1 MRAC). TANZANIA. Kilimandjaro (2 MNHN). ZAIRE. Haut-Uelle, Yebo Moto (2 MRAC); Mayidi (2 MRAC); Parc National Garamba (4 MRAC); Upper Uelle River, Dunga (BMNH). ZAMBIA. Kashitu, N of Broken Hill (1 BMNH); Mwenga (1 BMNH, 1 HAHC).

Ochodaeus congoensis is most similar to *O. femoratus* sp. nov. (see above).

Incertae sedis

*Ochodaeus rufus* Guérin-Méneville, 1844: 83.

This species, described from Senegal, could not be identified from the description, neither could the type be traced. It is consequently placed incertae sedis.

Genus *Synochodaeus* Kolbe, Figs 9, 35, 36.


Type-species: *Synochodaeus modeslus* Kolbe, by monotypy.

Description: Body oblong, somewhat convex; head, pronotum, and elytra densely setose; ventral surfaces and legs with long dense setae.
Head transverse, mandibles (Fig. 36) and labrum visible from above; labrum transverse, impunctate, glabrous, with anterior margin slightly rounded, setose; clypeus transverse, quadrate; anterior clypeal margin shallowly reflexed; clypeal suture sulcate mediately; antennae 10-segmented, the first segment greatly expanded, pyriform, densely setose; second segment subequal to segments 3–7 combined; eighth segment cupuliform, receiving segments 9 and 10.

Pronotum subquadrate, broadest mediately; evenly convex, anterior margin shallowly and evenly emarginate with a broad membranous border; posterior margin slightly sinuate before middle; marginal bead complete.

Scutellum punctured, apex narrowly rounded.

Elytra long; abdominal segments not visible from above; humeral angles distinct, not raised; elytral declivity not sharply defined; posterior angles simple, not produced or serrate; metathoracic wings fully developed.

Abdomen: Propygidium not modified to accept elytra; pygidium and six visible sternites setose, sternites free; fifth sternite lacking stridulatory peg.

Legs: Protibia tridentate, basal tooth weakly developed, spur distinctly shorter than apical tooth; protibial spurs simple or setose; larger meso- and metatibial spurs crenulate or setose; metatrochanter spinose, not produced beyond posterior edge of metafemora; corbulae of metatibiae with dentiform processes possessing apical spines and associated sockets; all claws long, slender, distinct.

Male genitalia with symmetrical parameres, large basal piece and large, armed internal sac (Fig. 9).

Key to the species of Synochodaeus

1 Dorsal surface with short recumbent setae; membranous border of anterior pronotal margin narrow; pronotal punctures separated by 1–2 times their own diameter; elytral intervals with occasional minute tubercles .......................................................... modestus Kolbe
   — Dorsal surface glabrous or nearly so; membranous border of anterior pronotal margin broad; pronotal punctures separated by 2–3 times their own diameter; elytral intervals never with tubercles ........................................................................................................... 2

2 Pronotum with broad triangular impression with a darkened callosity; elytra with three punctostriae; lateral margins of elytra and venter densely pilose; species larger (6,0–8,0 mm long) .......................................................... costatus sp. nov.
   — Pronotum broadly impressed (occasionally with only a shallow linear impression), without callosity; elytra with 3–5 punctostriae; lateral margins of elytra and venter moderately pilose; species smaller (4,0–6,0 mm long) .......................................................... cucullus sp. nov.

Synochodaeus modestus Kolbe, Figs 35, 39.

Synochodaeus modestus Kolbe, 1907: 27.

Description: 4,0–5,5 mm long, testaceous. Head with a few small scattered tubercles; frons scabrous; vertex with transverse medial impunctate spot, fine shallow punctures laterally. Pronotum with large deep setigerous punctures separated by 1–2 times their own width; setae short, pale, recumbent. Elytra with 2–5 shallow punctostriae; interstriae with scattered setigerous tubercles, setae short, pale, recumbent; lateral margins with semierect flavous setae. Distribution: Fig. 39.

Material examined. Holotype. D.S.W.–Afrika, Langheld, S. (ZMB). SOUTH AFRICA: CAPE. Goodhouse, 11 km S (1 SM). SWA/NAMIBIA. Asab (1 SM); Gobabeb (4 HAHC); Karibib, Bloemhof 109 (5 SM); Karibib, Vlakplaas 110 (10 SM); Keetmanshoop, Koës 20 (1 SM); Klein Spitzkoppe (6 TM); Lüderitz, Ka-
Fig. 35. *Synochodaenus modestus*, habitus. Scale line = 1 mm.
naän 104 (2 SM); Munitum R., Kaokoveld (1 TM); Namaland, Mukorob 14 (1 SM); Obib Mts (1 SM); Sesriem Plain (16 TM); Windhoek Distr., Valencia Ranch 42 (1 TM). Specimens have been collected in April, May, June, September, October and December.

*Synochodaeus modestus* is rather variable with regard to the degree of punctostriation, ranging from 2 to 5 shallow striae. This species may be distinguished from its congeners by its small size, pronotal and elytral sculpturing, and pilosity. The vertex is not covered by the membranous anterior margin of the pronotum.

**Synochodaeus cucullus** sp. nov., Fig. 40.

*Description:* 6.0–8.0 mm long, dark testaceous to rufo-testaceous. *Head* with clypeus impunctate; frons scabrous with scattered minute granules, shallowly impressed medially; vertex covered by broad membranous border of anterior pronotal margin. *Pronotum* with a triangular anteromedian impression and a median darkened callosity; disc sparsely, shallowly punctate; lateral area with fine shallow punctures separated by 2–3 times their own diameter. *Elytra* with three distinct punctostriae between suture and humerus, remaining surface with large shallow punctures separated by 2–3 times their own diameter, glabrous; lateral margins with dense erect flavous setae. Distribution. Fig. 40.

**Material examined:** Holotype male. SWA/NAMIBIA, W Guiniasibberg, SE 25.15 Ad2, 6.vii.1976 (TM); 5 paratypes, same data as holotype (UP); 1 paratype, N-Awasib, SE 25.15Bc3, 4.vii.1976 (UP); 1 paratype, Gobabeb, 70 mi. S. Walvis Bay, southern Namib Desert, sand dunes (UP); 1 paratype, dunes W. Sossusvlei, SE 24.15Cc, Luderitz, 13/14.ix.1971 (TM); 4 paratypes, N. Uri Hauchab, SE 25.15 Ac, Luderitz, 6.vii.1976, S. Louw (SM).

This species may be distinguished from its congeners by the broad membranous border of the anterior pronotal margin covering the vertex, impressed pronotum with a medial darkened callosity, three distinct punctostriae, and the long erect flavous setae on the lateral margins.

**Synochodaeus costatus** sp. nov.; Fig. 41.

*Description:* 4.0–6.0 mm long; testaceous. *Head* with clypeus impunctate, occasionally with minute scattered granules; frons scabrous, punctures large, deep, separated by their own diameter; vertex with transverse impunctate spot, finely punctate laterally. *Pronotum* occasionally shallowly impressed anteromedially; discal punctures separated by 2–3 times their own diameter; surface glabrous; lateral areas with fine pale recumbent setae. *Elytra* with 3–5 distinct punctostriae between suture and humerus; interstriae sometimes slightly raised with scattered punctures; disc glabrous; lateral areas sparsely clothed with recumbent or semierect setae; lateral margins with erect setae. Distribution. Fig. 41.

**Material examined:** Holotype male. SWA/NAMIBIA, Klinghardt Mts., 27.18 S–15.42 E, 29.viii.1981, E-Y: 1810, single at night, Endrödy-Younga (TM); 4 paratypes, same data as holotype (TM); 5 paratypes, same data as holotype except 29/30.vii.1981, M-L. Penrith (SM); 1 paratype, Namib, Thomas Mt., 70 km E, 8.v.1972, Schulze & Prozesky (TM); 1 paratype, Grasplatz dunes, 26.41 S–15.17 E, Luderitz, 31.vii/1.viii.1981, M-L. Penrith (SM); 5 paratypes, Sossusvlei, Namib Desert...
Figs 36–38. Ochodaeidae, mandible types in various genera; 36. Synochodaeus. 37. Chaetuchus. 38. Namibiotalpa. Scale line = 0.25 mm.


Synochodaeus costatus is quite variable. Additional material may prove this species to be a complex of closely related taxa. The distinctly punctostriate elytra will distinguish this species from all others in the genus. The possession of a glabrous elytral disc will serve to distinguish this species from S. modestus.

Genus Chaetocanthus Péringuey, Figs 10, 37, 42.

Chaetocanthus Péringuey, 1900: 495; Péringuey 1908: 649; Arrow 1912: 24; Petrovitz 1968: 252.

Type-species: Chaetocanthus insuetus Péringuey, by monotypy.

Description: Body elongate, convex; head, pronotum, and elytra densely setose; ventral surfaces and legs with long setae.

Head transverse; mandibles (Fig. 37) and labrum visible from above; labrum transverse, impunctate, glabrous, with anterior margin straight, tuberculate, setose; clypeus transverse, quadrate, margins not reflexed; anterior clypeal margin straight, tuberculate; clypeal suture obscured medially; antennae 9-segmented, the first segment greatly expanded, flattened, pyriform, densely setose; second segment subequal in length to segments 3–6 combined; seventh segment slightly cupuliform, not receiving segments 8 and 9.

Pronotum subquadrate, broadest basally, evenly convex; anterior margin shallowly and evenly emarginate with a broad membranous border; posterior margin slightly sinuate before middle; marginal bead entire.

Scutellum setose, rounded apically.

Elytra long, abdominal segments not visible from above; humeral angles distinct, not raised; elytral declivity not sharply defined; apical angles simple, not serrate or produced; metathoracic wings fully developed.
Fig. 42. *Chaetocanthus insuetus*, habitus. Scale line = 2.5 mm.
Abdomen: Propygidium not modified to accept elytra; pygidium with six visible sternites setose; sternites free; fifth sternite without stridulatory peg.

Legs: Protitibae bidentate, teeth well developed, spur subequal to length of apical tooth; tibial spurs pectinate; metatrochanter with broad spine produced slightly beyond posterior edge of metamemora; corbulae of metatibiae with dentiform processes without apical spines or sockets; all claws long, slender, distinct.

Male genitalia with symmetrical parameres, large basal piece and large, unarmed internal sac (Fig. 10).

Key to the species of Chaetocanthus

1 Pronotum usually with a median longitudinal impression, occupying posterior third .......................................................... Chaetocanthus insuetus Péringuey.
   — Pronotum always with a median longitudinal impression occupying more than posterior half .......................................................... 2

2 Rufo-testaceous; small species (5.0-8.0 mm long); elytral tuberculation fine, tubercles separated by twice their own diameter .......................................................... Chaetocanthus bechuanus Péringuey.
   — Rufo-brunneous; larger species (8.0-9.0 mm long); elytral tuberculation coarse, tubercles separated by four times their own diameter .......................................................... Chaetocanthus arenarius sp. nov.

Chaetocanthus insuetus Péringuey, Figs 42, 43.

Chaetocanthus insuetus Péringuey, 1900: 496; Arrow 1912: 21.
Chaetocanthus suspectus Kolbe, 1908: 124, syn. nov.
Chaetocanthus congoanus Petrovitz, 1968: 252, syn. nov.

Description: 7.0-9.0 mm long, rufo-brunneous to rufo-picaceous. Head with clypeus coarsely granulate, setigerous; frons more finely granulate, setigerous; vertex finely, rugosely punctate. Pronotal surface coarsely granulate, setigerous, occasionally with a shallow longitudinal impression posteriorly. Elytral surface finely colliculate, setigerous, with scattered minute tubercles. Distribution. Fig. 43.

Material examined: Lectotype female (new designation), insuetus: Fraserburg, 1883 (SAM); paralecotype, Van Wyksvlei, 1892 (SAM); holotype, suspectus: S.W.Africa, Roobank, V.05, L. Schultz S. (ZMB); holotype, congoanus: Bas Congo Kimwenza i-iV.1956 leg. R. P. van Eyen (MRAC); paratype, Lulaba, Kolwezi, 25.xi.1953, L. Gilbert (MRAC). ANGOLA: Baio Tigres (1 TM); Porto Alexandre (4 TM), Santa Cruz (1 NCI). BOTSWANA: Kabululaba, Chobe (1 TM); Kai-Kai, 15 mi. SE (1 TM); Kgorwe Pan (1 BMNH); Makarikari, N’Kate (1 TM); Maun (1 TM); Moremi Reserve (2 BMNH) Ngamiland, Drotsky’s Cave (1 TM); Ngiame Lake, 12 mi. NE Schitwa (1 BMNH); Ngami Lake (1 TM); Savuti (1 UP). SOUTH AFRICA: CAPE. Achab (1 SM); Aggeney (2 TM); Auob Riv. (8 TM); Auob-Nossob Juct. (1 TM); Benoni (1 NMB); Bingap 184 (5 NMB); Brulsand (3 SM); Chulon Farm, Kalahari (20 TM); Goodhouse, 11-17 km S (1 SM); Mata-Mata (5 TM), Tweerivieren (20 TM; 1 UP); Witsands 250, HAY (9 NMB); Witsands (1 TM). TRANSVAAL. Nylsvley, Nylstroom Dist. (1 NCI); Punda Maria (1 HAHC); Roodeplaat (1 TM). SWA/NAMIBIA. Bethanien, Sandveraar 80 (2 SM); Bogenfels (1 SM); Cape Cross (1 TM); Elizabethbucht (1 SM); Gobabis, Alkmar 512 (4 SM); Gobabis, Vaalbank 319 (3 SM); Gobabeb (1 HAHC, 1 TM); Hereroland East, Resis Farm (3 SM); Karasburg, Höhadün 277 (17 SM) Keetmanshoop, Donkermodder 60 (6 SM); Keetmans-
Scholtz & Evans: revision of Ochodaeidae
hoop, Rotegab (1 SM); Keetmanshoop, Wildheim Ost 384 (41 SM); Khomashochland, Farm Hochemheim (1 TM); Kuungveld (29 SM); Mariental, Namb Ost (3 SM); Namies Noord (3 SM); Okahandja (MRAC); Oshikango (1 TM); Ojigenu Farm, Hereroland (1 TM); Outjo, Bethanis 514 (1 SM); Popa Falls (3 SM); Rehoboth, Ots Rust 192 (2 SM); Swakopmund (1 UP); Talismanis 860, Hereroland East (1 SM); Talismanis (1 TM); Tsotsara, 18 km W (1 SM); Welwitschia, 50 m W (1 TM); Windhoek, Goche­

Chaetocanthus insuetus is quite variable in appearance. Colour ranges from brown to nearly piceous. The tuberculation of the head and pronotum are fairly constant in size and density. A short medial longitudinal impression may be found at the base of the pronotum. The greatest amount of variation is seen in the elytral sculpturing. Specimens may have sparse, scattered punctures or are distinctly punctostriate. In the latter group, the interstriae are often impunctate, with a few scattered setigerous punctures and are never distinctly raised. Although some populations exhibit a greater tendency towards one or the other elytral sculpturing, all conditions are encountered. The colliculate sculpturing of the head and pronotum is usually found only at the elytral bases, but may extend to cover the basal third.

Chaetocanthus bechuanus Péringuey, Fig. 44.

**Chaetocanthus bechuanus** Péringuey, 1908: 649.

Description: 5,0–8,0 mm long, pale brown. Head with clypeus slightly wider than labrum; clypeus and frons equally, coarsely granulate, setigerous; vertex finely, rugosely punctured. Pronotal surface setigerously granulate; disc with shallow, longitudinal medial impression. Elytral surface alutaceous with setigerous tubercles separated by twice their own diameter; punctostriae evident, sometimes vaguely so, 6 striae between suture and humerus, lateral striae absent. Distribution. Fig. 44.

Material examined: Lectotype (new designation) and paralectotype, Vryburg Dist., 1907 (SAM). BOTSWANA: Kwia, 15 km S Kaikai (2 TM); Kuku Pan (1 TM). SWA/NAMIBIA: Popa Falls (1 SM); Richthofen 126, Windhoek (10 SM); Goche­

Chaetocanthus arenarius sp. nov., Fig. 44.

**Chaetocanthus arenarius** sp. nov., 1908: 649.

Description: 8,0–9,0 mm long; rufo-brunneous to brunneous. Head with clypeus slightly wider than labrum; clypeal granules larger than frontal granules; vertex deeply punctuate. Pronotal surface setigerously granulate; disc with shallow, longitudinal medial impression. Elytral surface alutaceous with scattered setigerous tubercles separated by 3–4 times their own diameter; 6 punctostriae between suture and humerus, lateral striae absent. Distribution. Fig. 44.

Material examined: Holotype, Kungveld/Bo­

This species is most similar to *C. arenarius*, but may be readily distinguished by its smaller size, denser elytral tuberculation, and shallower elytral punctures.

This species and *C. bechuanus* may be separated from other members of the genus by their pale colour and elongate appearance resulting from the parallel elytral margins. *C. arenarius* may be distinguished from *C. bechuanus* by its larger size and less dense elytral tuberculation.

Genus *Namibiotalpa* gen. nov., Figs 11, 38, 45.

Type-species: *Namibiotalpafossilis* sp. nov.

Description: Body elongate, convex; head, pronotum, and elytra nearly glabrous; ventral surfaces densely setose.

Head transverse; mandibles (Fig. 38) and labrum visible from above; labrum transverse, impunctate, glabrous, with anterior margin straight, densely setose; clypeus transverse, quadrate, margins not reflexed; anterior clypeal margin straight, sparsely setose; clypeal suture obscured medially; antennae 9-segmented, scape greatly expanded, flattened, triangular, densely setose; pedicel subequal in length to segments 3–6 combined; seventh segment cupuliform, not receiving segments 8 and 9.

Pronotum subquadrate, broadest basally, evenly convex; anterior margin shallowly and evenly emarginate with a broad membranous border; posterior margin straight before middle; marginal bead entire.

Scutellum coarsely punctured, rounded apically.

Elytra long; abdominal segments not visible from above; humeral angles distinct, not raised; elytral declivity not sharply defined; apical angles produced; metathoracic wings fully developed.

Abdomen: Propygidium not modified to accept elytra; pygidium and six visible sternites setose; sternites free; fifth sternite lacking stridulatory peg.

Legs: Protibiae bidentate, teeth well developed, spur subequal to length of apical tooth; all tibial spurs pectinate; metatrochanter with broad spine not produced beyond posterior edge of metafemora; corbulae of metatibiae obliterated, without dentiform processes; claws not readily distinguishable from apical tarsal spines.

Male genitalia with symmetrical parameres, large basal piece and large, unarmed internal sac (Fig. 11).

Remarks. This new genus is most similar to *Chaetocanthus* Péringuey but is much more derived than the latter, particularly in leg structure and shape and punctuation of the head and pronotum. The name *Namibiotalpa* is based on Namib (after the Desert) and talpa, Latin for mole. The gender is feminine.

*Namibiotalpafossilis* sp. nov., Figs 45, 46.

Description: 5.0–7.0 mm long, pale to dark rufo-brunneous, shining. Head with clypeal punctures large, deep, separated by 3–4 times their own diameter; frons and vertex with fine shallow punctures, separated by 3–5 times their own diameter. Pronotal disc with short longitudinal impression; punctures fine, shallow, separated by 3–5 times their own diameter; glabrous; lateral areas somewhat granulate, sparsely setose. Elytral disc punctostriate along suture, remaining surface confusedly punctate, punctures large, separated by 1–2 times their own diameter; lateral surfaces with scattered granules, sparsely setose. Distribution. Fig. 46.
Fig. 45. *Namibiotalpa fossilis*, habitus. Scale line = 2 mm.
**MATERIAL EXAMINED:** Holotype male. SWA/NAMIBIA, Kaokoveld, Kunene R., W. Hartmbg., 17.12 S−12.10 E, 7−iv−1984, E-Y: 2098, at light, leg. Endrödy-Younga (TM); 2 paratypes, same data as holotype; 1 paratype, S. Namib, Oranjemund, 28.33 S−16.31 E, 27−vii−1981, E-Y: 1803, on dunes, day, leg. Endrödy-Younga (TM); 1 paratype, Namib, Natab, dune no. 3, 23.38 S−15.05 E, 10−x−1978, on dunes, leg. M. Seeley (TM); 1 paratype, Gobabeb, 20/26−iii−1979, B. Wharton (HAHC); 1 paratype, Namib, Gobabeb, dune no. 5, 23.35 S−14.46 E, 21−x−1978, on dunes, leg. M. Seeley (TM); 1 paratype, N-Uri-Hauchab, SE 25.15 Ac 2, 6−vii−1976 (UP); 1 paratype, Gobabeb Game Reserve No. 3, v−1959 (TM); 2 paratypes, Namib Expedition, SE 25.15 Cd 2, 1−1977, Holm, Kirsten, Scholtz (UP); 1 paratype, Sandwich Harbour, Walvisbaai, SE 23.14 Ad, 5/14−ix−1974 (SM); 1 paratype, Kuiseb Delta, SE 23.14 Ba, 6/16−viii−1976, S. Louw, M-L. Penrith (SM); 4 paratypes, 30 km N Lüderitz, SE 26.15 Ac, Holm & Scholtz (UP); 1 paratype, Koichab Pan, SE 26.15 Ba 3, vii−1978, E. Holm (UP).

**Fig. 46.** Distribution of *Namibiotalpa fossilis*.

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