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Revision of *Neodeuterus* Schaufuss and description of a new allied genus from Borneo (Coleoptera: Staphylinidae: Pselaphinae)

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Abstract

The Sumatran genus *Neodeuterus* is revised, and the two included species are synonymized (i.e., *N. admirandus* = *N. alter* **syn. n.**). In addition, *Borneodeuterus* **gen. n.** is erected to accommodate *B. sannio* **sp. n.** from Borneo.

Key words: Coleoptera, Staphylinidae, Pselaphinae, Proterini, *Neodeuterus*, *Borneodeuterus*, taxonomy, Asia.

Introduction

In this paper we continue our study of Proterini *sensu stricto* (Cuccodoro & Kurbatov 2006; Kurbatov & Cuccodoro 2009). Here we revise the genus *Neodeuterus* Schaufuss, 1887, and define a closely related new genus. These two genera share with *Euparops* Kurbatov & Cuccodoro, 2009, *Exoterus* Cuccodoro & Kurbatov, 2006, *Imtempus* Reitter, 1882, *Mechanicus* Schaufuss, 1887, *Pareuplectops* Jeannel, 1957, *Phthartomicrus* Schaufuss, 1887, and *Proterus* Raffray, 1897 the genal area with a marked and smooth depression to repose the maxillary palp, the posterior edge of female abdominal sternite 6 notched as that in male, and the female abdominal sternite 7 modified into a genital plate covering the genital opening, a condition similar to that in male. They differ, however, from the above-mentioned genera notably by the antennae consisting of ten antennomeres and the presence of a closed pentagonal subhumeral cell on the elytra.

Neodeuterus was erected by Schaufuss (1887) to accommodate two new species described in the same paper, one represented by two males and the other by one female (*N. admirandus* Schaufuss, 1887, and *N. alter* Schaufuss, 1887, respectively), both from Sumatra. The genus was never recorded again since then.

After examination of the Schaufuss' types we concluded that they were apparently collected in the same habitat and represent in fact each a different sex of the same species.

Among recently collected material of Oriental Pselaphinae housed in MHNG, we were not able to find any additional specimen of *Neodeuterus*. However, we discovered instead one male specimen of Proterini *sensu stricto* from Borneo that shares with *Neodeuterus* the ten-segmented antennae, and presence of an elytral pentagonal subhumeral cell, but differing significantly by several other characters pertaining to the conformation of maxillary palpi, antennae, head and pronotum. This led us to erect a new genus (i.e. *Borneodeuterus* **gen. n.**) for this new species, which are both described below.

Materials and methods

The label data of the type material are reproduced literally between « », with slash (/) as a separator between each individual label, and additional information pertaining to labels in square brackets.

The material treated in the present study is housed in DEI (Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany), MHNG (Muséum d'histoire naturelle, Geneva, Switzerland) and MNHN (Muséum national d'histoire naturelle, Paris, France).

Measurements are defined as follows: the body length was measured from the anterior margin of labrum to the

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posterior margin of abdomen; head width (HW) was measured just behind eyes; maximum head width (HWmax) was measured across eyes; head length (HL) was measured from the anterior margin of frons to the posterior margin of occiput; pronotal length (PL) was measured along midline, from anterior to posterior pronotal margin; pronotal width (PW) is the maximum distance between lateral pronotal margins; elytral length (EL) was measured along suture; elytral width (EW) is combined maximum width.

The abdominal tergites and sternites are numbered according to Chandler (2001) in Arabic (starting from the first visible segment) and Roman (reflecting true morphological position) numerals. They are counted from tergite 1 (= IV) and sternite 1 (= III). The aedeagi and other body parts illustrated in the present study were mounted in Canada balsam on cellulose acetate slides and drawn using a drawing tube mounted on a compound microscope. Habitus photographs are composite images taken with a Leica DFC 425 camera mounted onto a Leica M205 stereoscopic microscope and layers subsequently stacked in Zerene Stacker (Zerene Systems LLC, USA).

As both genera treated here are represented in collections by four type specimens only, we refrained from disarticulating the specimens. Therefore, some features, such as the foveal structure of tergite 1 (IV) of *Neodeuterus admirandus*, remain unstudied.

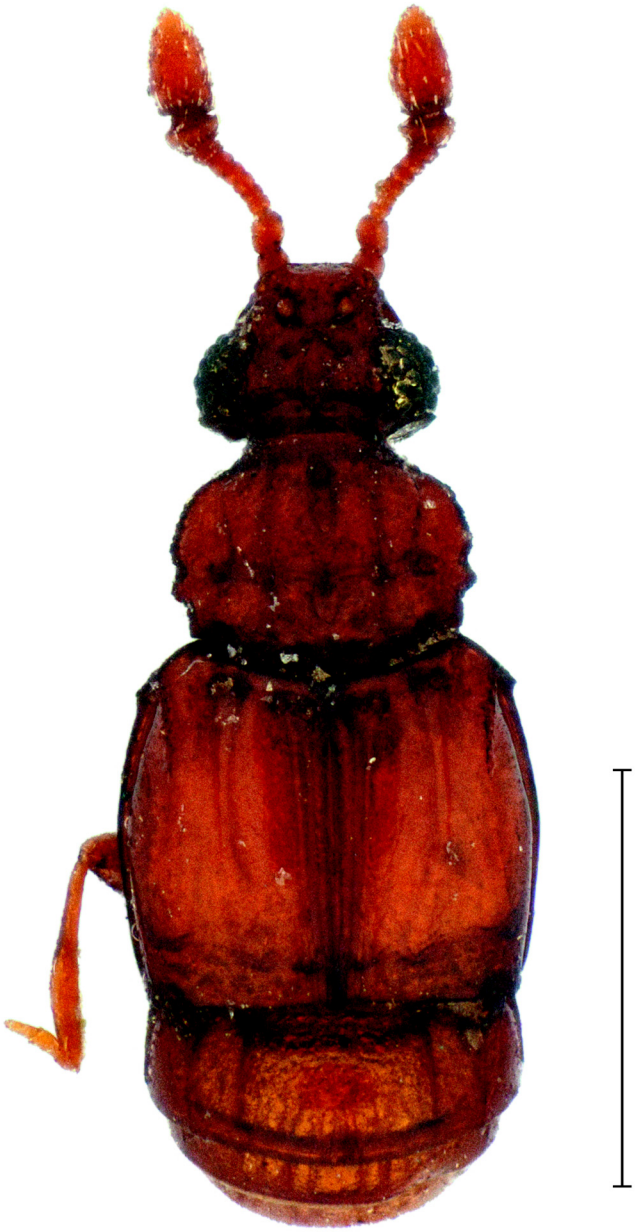


FIGURE 1. Habitus of *Neodeuterus admirandus* Schaufuss. Scale bar = 0.5 mm.

Neodeuterus Schaufuss, 1887

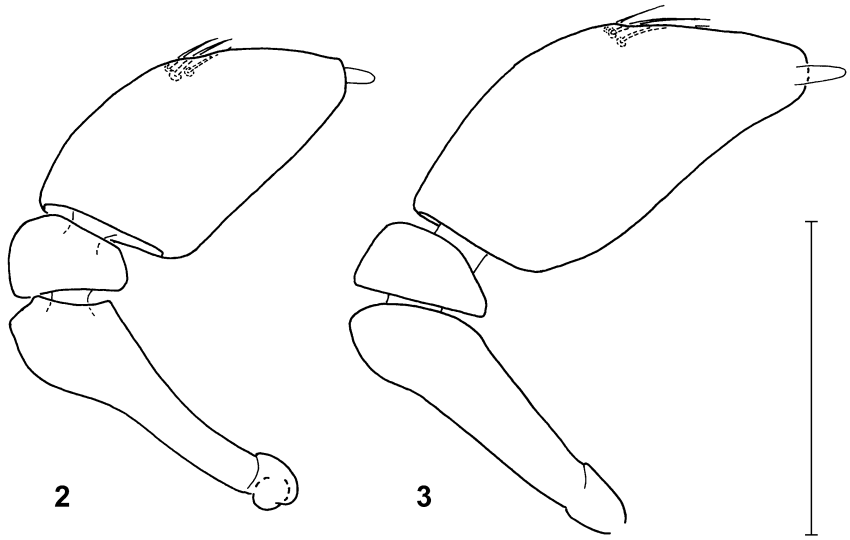
Neodeuterus Schaufuss, 1887: 151; type species: *Neodeuterus admirandus* Schaufuss, 1887 (designation by Lucas, 1920: 435).

Redescription. Body (Fig. 1) 1.05–1.15 mm long, elongate and moderately convex; integuments shiny, mostly covered with punctation very fine and very sparse (distances between punctures several times wider than their diameters) or evanescent. Pigmentation fairly uniform, reddish-brown. Pubescence fairly short, recumbent, setae on medioapical portion of elytra converging posteriorly. Head in dorsal view subtriangular, with anterior margin rounded. Dorsal part of head with anteromedial area deeply depressed, that depression extending posteriorly to pair of large and deep tentorial foveae. Lateral edges of frons with deep and narrow postantennal notches (i.e., cuticular invaginations of lateral frontal edges) reaching anterior angles of vertexal depression to form additional pair of foveae. Genal areas each with marked and smooth depression to receive maxillary palp. Posterior edge of head forming ridge, except median part bearing small rhomboidal occipital depression. Posterior constriction of head dorsally with one median and pair of lateral longitudinal carinae; median carina anteriorly bifurcate, with anterior arms forming posterior edges of occipital depression. Antennal tubercles indistinct. Eyes well-developed, very prominent in both sexes. Temples obsolete. Maxillary palpi (Fig. 2) with palpomere II abruptly enlarged subapically. Antennae composed of 10 antennomeres, distinctly divided into large scape and pedicel, 6 small and compact antennomeres of funicle, and more (male, Fig. 4) or less (female, Fig. 5) conspicuous club composed of two antennomeres; scape markedly notched apically revealing basal stalk of pedicel. Pronotum with slightly biarcuate antebasal sulcus connecting median fovea with pair of lateral antebasal foveae; antebasal sulcus interrupted by two narrow irregular longitudinal ridges almost reaching anterior pronotal edge; additionally pronotum with three longitudinal sulci, short median one not connected with median antebasal fovea, and lateral ones connected with lateral antebasal foveae. Lateral pronotal margin near lateral fovea with distinct lateral tooth; posterior pronotal angles each with an acute tip, resembling lateral tooth; basal margin with small median cariniform convexity and with row of six shallow depressions. Prosternum with pair of lateral procoxal foveae and pair of anteroprosternal foveae; medial carina well-marked, angular in lateral view; paranotal carina present. Each elytron with 4 basal foveae grouped in pairs in two basal depressions; internal depression connected to sutural stria entire and external depression connected to shortened discal stria; subhumeral fovea connected to marginal carina extending along entire elytral length; lateral elytral margin near subhumeral fovea with small sharp tooth; area in front of subhumeral fovea forming closed pentagonal subhumeral cell defined by elytral margin and carinae extended behind sharp humeral callus. Mesoventrite with pair of lateral foveae; median longitudinal carina absent. Mesocoxal cavities separated. Metaventrite with pair of lateral mesocoxal foveae; pair of longitudinal carinae present, extending from posterior edge of mesocoxal cavities to posterior metaventral margin. Paratergal-tergal suture distinct only on tergite 1 (IV), less distinct and slightly shortened on tergites 2–3 (V–VI); connection between tergites 1–3 and corresponding sternites 2–4 (IV–VI) carinate. Tergite 1 about as long as tergites 2–3 combined, with pair of long longitudinal basal carinae separated by deep mediobasal depression (presence/absence of mediobasal foveae not studied). Tergites 2–3 each with pair of less distinct and more narrowed basal carinae. Sternite 2 with pair of basilateral foveae. Posterior edge of sternite 6 notched in both sexes. Sternite 7 modified as genital plate covering genital opening (its structure slightly different between male and female).

Male secondary sexual characters: antennomere X about as broad as XI (in female intermediate between IX and XI); antennomere XI more elongate than that in female; protrochanter and protibia toothed. Aedeagus with thin-walled median lobe and two asymmetrical parameres.

Comparative diagnosis. *Neodeuterus* possesses the structure of the genal area and the shape of the female abdominal sternites 6 and 7 of Proterini *sensu stricto* (Cuccodoro & Kurbatov 2006; Kurbatov & Cuccodoro 2009), but it is the only genus of this group with antennae composed of 10 antennomeres as well as a pair of long longitudinal ridges on the pronotum. Besides, it differs from already treated genera *Proterus*, *Exoterus*, *Pareuplectops*, and *Euparops* in the antennal club composed of two antennomeres, and in the presence of a closed pentagonal subhumeral elytral cell (open in *Proterus* and *Exoterus*, and absent in *Euparops* and *Pareuplectops*). In addition, *Neodeuterus* differs from *Proterus* and *Exoterus* in the presence of the pronotal antebasal sulcus, paranotal carinae, and a pair of longitudinal metaventral carinae.

Distribution. Sumatra.



FIGURES 2–3. Right maxillary palpus in dorsal view of *Neodeuterus admirandus* Schaufuss (2) and *Borneodeuterus sannio* sp. n. (3). Scale bar = 0.1 mm.

Neodeuterus admirandus Schaufuss, 1887

Neodeuterus admirandus Schaufuss, 1887: 152.
Neodeuterus alter Schaufuss, 1887: 153 (**syn. n.**).

Type material (2 males, 1 female)**.** *Neodeuterus admirandus* Schaufuss: lectotype male labelled «Sumatra / Muséum Paris 1917 Coll. A. Raffray / TYPE [red label] / *N. admirandus* A. Raffray det.», in MNHN, by present designation; paralectotype male labelled «Sumatra tabacs / Syntypus [red label] / *Neodeuterus admirandus* m. Surin. / "Surinam" ist wohl ein Schreibfehler [="Surinam" is probably a typo] / C. Schaufuss 1930 / Coll. D.E.I. Eberswalde / *Neodeuterus admirandus* Schf.», in DEI; *Neodeuterus alter* Schaufuss : Lectotype female labelled «Tabak Su / *Neodeuterus alter* m. / C. Schaufuss 1930 / Coll. D.E.I. Eberswalde / *Neodeuterus alter* Schf.», in DEI, by present designation.

Redescription. Body (Fig. 1) 1.05–1.15 mm long, reddish-brown, covered with pubescence at most 0.02 mm long. Dorsal part of head sparsely covered with very fine or evanescent punctation, except occipital area and both sides of vertexal depression, which are densely covered with large punctation (distances between punctures much shorter than their diameters). Narrow and rhomboidal occipital depression anteriorly reaching level of tentorial pits, its posterior cariniform margins posteriorly connected to mediodorsal ridge of gular constriction. Tentorial foveae large and deep; distance between them wider than that between each fovea and nearest edge of eye. Antenna with pedicel markedly (male) or slightly (female) longer that wide: antennomeres 3–8 transverse and subequal in width, markedly narrower than pedicel; antennomeres 9 and 10 modified in male, 9 slightly asymmetrical in both sexes. Pronotum with punctation very fine in middle between longitudinal ridges; median sulcus reaching neither antebasal fovea nor anterior pronotal margin. Elytra impunctate, each with one dorsal stria extending posteriorly slightly behind middle of disc. Metaventrite impunctate. Abdomen with punctation on tergites similar to that on central part of pronotum. Tergite 1 with basal carinae well-marked, somewhat curved, nearly reaching posterior tergal margin; maximum distance between carinae subequal to half of width of segment 1. Tergites 2 and 3 with basal carinae less obvious than those on tergite 1, straight, nearly reaching corresponding posterior tergal margin; distance between carinae subequal to one fourth of width of corresponding segment.

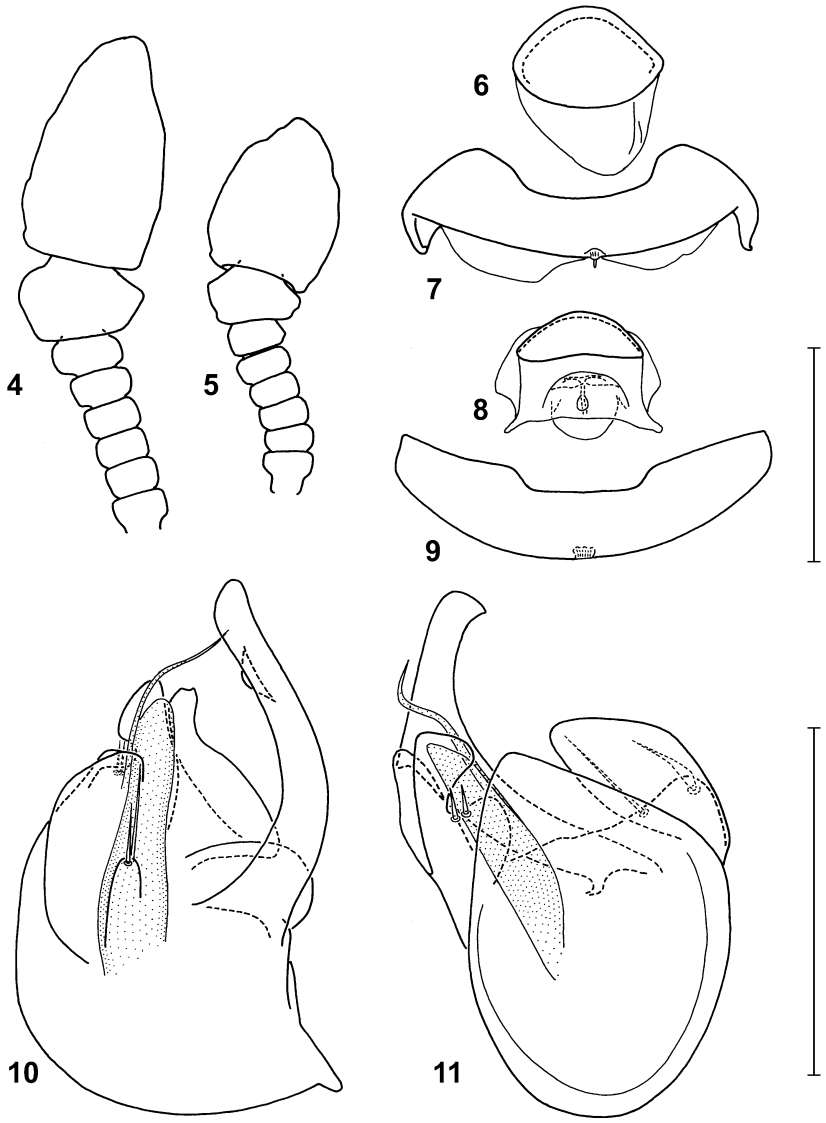
Male. Eyes slightly longer than half of head length in lateral view, each with more than 35 facets. Antennae (Fig. 4) with antennomere 9 approximately twice as wide as antennomere 8 and as wide as antennomere 10, its external margin 1.5 times as long as internal one and twice as long as antennomere 8; antennomere 10 about twice as long as wide. Protrochanters with long pointed and slightly curved projection. Protibiae bearing small internal

subapical tooth. Last abdominal tergite as in Fig. 8. Abdominal sternite 7 and 8 as in Figs 8 and 9, respectively. Aedeagus (Figs 10–11) 0.155 mm long in both known specimens.

Female. Eyes slightly shorter than half of head length in lateral view, with less than 30 facets (partially depigmented). Antennae (Fig. 5) with antennomere 9 approximately 1.5 times as wide as antennomere 8 and one fourth narrower than antennomere 10, its external margin at most 1.5 times as long as internal one and as antennomere 8; antennomere 10 less than 1.5 times as long as wide. Protrochanters and protibiae unmodified. Abdominal sternite 7 and 8 as in Figs 6 and 7, respectively.

Measurements: HL = 0.18–0.20 mm; HW = 0.18–0.19 mm; HWmax = 0.25–0.29 mm; PL = 0.23–0.30 mm; PW = 0.32–0.36 mm; EL = 0.33–0.40 mm; EW = 0.42–0.50 mm.

Comparative diagnosis. After careful examination of the type specimens of *Neodeuterus admirandus* (two males) and *N. alter* (one female), we concluded that essential differences between the two species are features pertaining to usual sexual dimorphism in this group of Pselaphinae. Additionally it seems that both species were caught in the same conditions (ie. in tobacco balls from Sumatra). Therefore we consider these two names as synonyms.



FIGURES 4–11. *Neodeuterus admirandus* Schaufuss; antenna of male (4) and female (5); female abdominal sternite 7 (6) and 8 (7); male abdominal sternite 7 (8) and 8 (9); aedeagus in lateral (10) and dorsal (11) views. Scale bars = 0.1 mm; up = 4–9; down = 10–11.

***Borneodeuterus* gen. n.**
Type species: *Borneodeuterus sannio* **sp. n.**, here designated.

FIGURE 12. Habitus of *Borneodeuterus sannio* sp. n. Scale bar = 0.5 mm.

Description. Body (Fig. 12) 1.20 mm long, more oval in comparison with *Neodeuterus*; integument shiny, with very fine and very sparse punctation on abdomen (distances between punctures several times wider than their diameters), punctures on pronotum fine and sparse (distances between punctures wider than their diameters) and on pronotum well-marked and denser (distances between punctures subequal to their diameters). Pigmentation uniform, yellowish-brown. Pubescence fairly long, suberect to erect, setae on medioapical portion of elytra parallel to sutural margin. Head in dorsal view subtriangular, with anterior margin rounded. Dorsal part of head with deep and broad square depression; tentorial foveae located at bottom of this depression. Lateral edges of front with deep and narrow postantennal notches (i.e., cuticular invaginations of lateral frontal edges) reaching anterior angles of vertexal depression to form additional pair of foveae. Each genal area with marked and smooth depression for reception of maxillary palpi. Posterior edge of head blunt, not forming ridge and lacking occipital depression. Posterior constriction of head dorsally with one median and pair of lateral longitudinal carinae; median carina simple and anteriorly not reaching vertexal depression. Antennal tubercles indistinct. Eyes well-developed, very prominent. Temples obsolete. Maxillary palpi (Fig. 3) with palpomere II fairly regularly enlarged toward apex. Antennae composed of 10 antennomeres, distinctly divided into large scape and pedicel, 5 small and compact antennomeres of funicle, and conspicuously long club composed of three antennomeres (male); scape indistinctly notched apically. Pronotum with slightly biarcuate antebasal sulcus connecting median fovea with pair of lateral antebasal foveae; antebasal sulcus interrupted by two broad longitudinal ridges not reaching anteriorly middle of pronotal disc; additionally pronotum with three longitudinal sulci, short median one not connected to median antebasal fovea, and lateral ones connected to lateral antebasal foveae. Lateral pronotal margin evenly rounded, lacking tooth; basal margin with small median cariniform convexity and with row of six shallow depressions.

Prosternum with pair of lateral procoxal foveae and pair of anteroprosternal foveae; median carina well-marked, angular in lateral view; paranotal carina present. Each elytron with 4 basal equidistant foveae, located in two basal depressions, foveae 2 and 3 separated from each other by short longitudinal carina; internal depression connected to sutural stria entire and external depression connected to shortened discal stria; subhumeral fovea connected to marginal carina extending along entire elytral length; lateral elytral margins near subhumeral fovea with small sharp tooth; area in front of subhumeral fovea forming closed pentagonal subhumeral cell defined by elytral margin and carinae extending behind sharp humeral callus. Mesoventrite with pair of lateral foveae; median longitudinal carina absent. Mesocoxal cavities separated. Metaventrite with pair of lateral fovea and pair of lateral mesocoxal foveae; pair of longitudinal carinae present, extending from posterior edge of mesocoxal cavities to posterior metaventral margin. Paratergal-tergal suture distinct only on tergite 1 (IV); connection between tergite 1 and corresponding sternite 2 (IV) carinate; tergites 2–3 (V–VI) and corresponding sternites 3–4 (V–VI) fused. Tergite 1 shorter than tergites 2–3 combined, with pair of long longitudinal basal carinae separated by shallow mediobasal depression, and with pair of small mediobasal foveae. Tergites 2–3 each with pair of less distinct and more narrowed basal carinae. Sternite 2 with pair of basilateral foveae. Posterior edge of sternite 6 notched. Sternite 7 modified as genital plate covering genital opening.

Aedeagus with membranous median lobe and two asymmetrical parameres.

Female unknown.

Comparative diagnosis. *Borneodeuterus* possesses the structure of the genal area of Proterini *sensu stricto*, and within this group of genera uniquely shares with *Neodeuterus* the antennae composed of 10 antennomeres and the presence of a pentagonal subhumeral cell on each elytron. However it differs notably from *Neodeuterus* by the following characters :1) maxillary palpomeres 2 regularly enlarged toward apex, 2) antennae with long club composed of three antennomeres, 3) absence a small occipital depression, 4)pronotum lacking two irregular longitudinal ridges, and 5) pronotum lacking a lateral tooth. The conformation of protrochanter and of antennal club are most likely sexually dimorphic.

Distribution, Borneo.

Etymology. Combination of «Borneo» and «Neodeuterus» to underline the similarity between *Borneodeuterus* and *Neodeuterus* and the occurrence in Borneo. Gender masculine.

Borneodeuterus sannio **sp. n.**

Type material. Holotype male labelled «Borneo, SO Sarawak, Bario, 1300m, litter, 6.X.2001, S. Kurbatov», in MHNG.

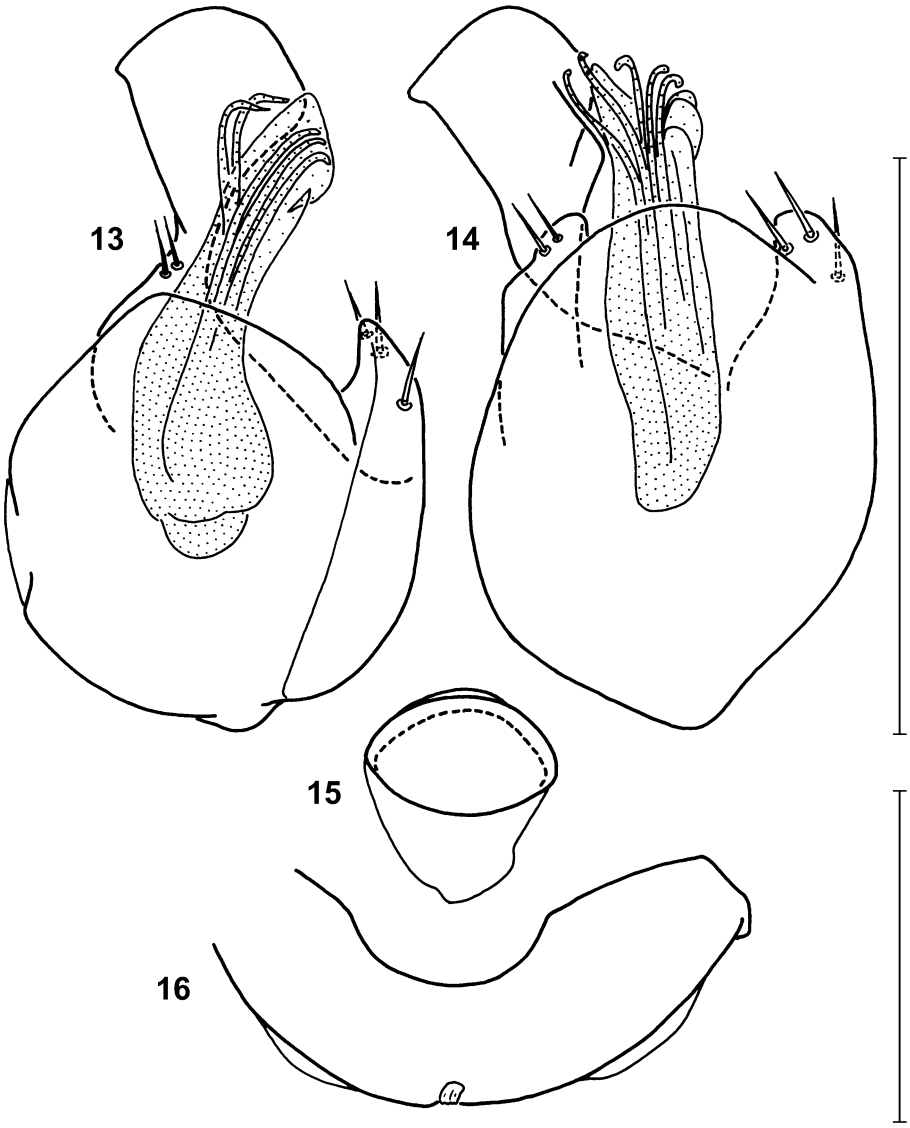
Description. Body 1,20 mm long, yellowish-brown, with pubescence about 0.05–0.06 mm long. Dorsal part of head sparsely covered with very fine or evanescent punctation, except occipital area and both sides of vertexal depression, which are densely covered with large punctation (distances between punctures much shorter than their diameters). Tentorial foveae narrow and deep; distance between them slightly wider than that between each fovea and nearest edge of eye. Eyes slightly longer that half of head length in lateral view, each with more than 40 facets. Antenna with pedicel slightly longer that wide; antennomeres 3−7 subequal in width and markedly narrower than pedicel; antennomere 3 elongate; antennomere 4 as long as wide; antennomeres 5−7 slightly transverse; antennomere 8 elongate, almost 2 times as long as wide, as wide as pedicel; antennomere 9 elongate, less than twice as long as wide, wider and slightly longer than antennomere 8; antennomere 10 more than twice as long as wide, wider than antennomere 9 and as long as 8 and 9 combined.

Pronotal disc densely covered with large punctures (distances between punctures much smaller than their diameters); median sulcus reaching neither antebasal fovea nor anterior pronotal margin. Elytral disc covered with punctures sparser and finer than those on pronotum, becoming slightly coarser near posterior margin; dorsal stria short and extending posteriorly at most to basal third of elytra. Metaventrite punctate. Abdomen finely punctate, except tergite 1 almost impunctate.

Tergite 1 with basal carinae well-marked, curved, nearly reaching posterior tergal margin; maximum distance between carinae about half of width of segment 1. Tergites 2 and 3 with basal carinae less obvious than those on tergite 1, straight, nearly reaching corresponding posterior tergal margin; distance between carinae about one third of width of corresponding segment. Protrochanters with long pointed and slightly curved projection. Abdominal sternite 7 and 8 as in Figs 15 and 16, respectively. Aedeagus (Figs 13–14) 0.130 mm long.

Measurements: HL = 0.23 mm; HW = 0.18 mm; HWmax = 0.33 mm; PL = 0.30 mm; PW = 0.36 mm; EL = 0.47 mm; EW = 0.58 mm.

Etymology. The epithet means «clown» in Latin.



FIGURES 13−16. *Borneodeuterus sannio* sp. n.; aedeagus in lateral (13) and dorsal (14) views; male abdominal sternite 7 (15) and 8 (16). Scale bars = 0.1 mm; 13−14 = up; 15−16 = down.

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