

# Description of *Gondraena* gen.n. from South India and Madagascar and *Davidraena* gen.n. from South India (Coleoptera: Hydraenidae)

M.A. JÄCH

## Abstract

Two new genera, *Gondraena* gen.n. (South India, Madagascar) and *Davidraena* gen.n. (South India) and 5 new species, *Gondraena indica* sp.n. (South India), *G. latipalpis* sp.n. (South India), *G. franzi* sp.n. (Madagascar), *Davidraena boukali* sp.n. (South India) and *D. antennalis* sp.n. (South India) are described. The two genera are obviously closely related. They are mainly distinguished by antennal characters and the abdominal vestiture.

Key words: Hydraenidae, taxonomy, new genera, new species, *Gondraena*, *Davidraena*, South India, Madagascar

## Introduction

Between November 1993 and January 1994 D. Boukal and Z. Kejval collected several thousand water beetles, including numerous Hydraenidae, in South India. Besides several new species of *Hydraena* s.l. KUGELANN they found 4 new species of Hydraenidae representing two unknown genera described below as *Gondraena* gen.n. and *Davidraena* gen.n.

One species (also described herein) of *Gondraena* gen.n. had already been collected by Prof. H. Franz in Madagascar in 1969. *Gondraena* gen.n. is thus the first genus of Hydraenidae known to occur exclusively in South India and Madagascar.

I am very much obliged to D. Boukal, Z. Kejval and Prof. H. Franz for giving their material from South India, respectively Madagascar to the NMW. Thanks are due to W. Zelenka and J. Kodada for the habitus illustrations and SEM photographs.

## Abbreviations

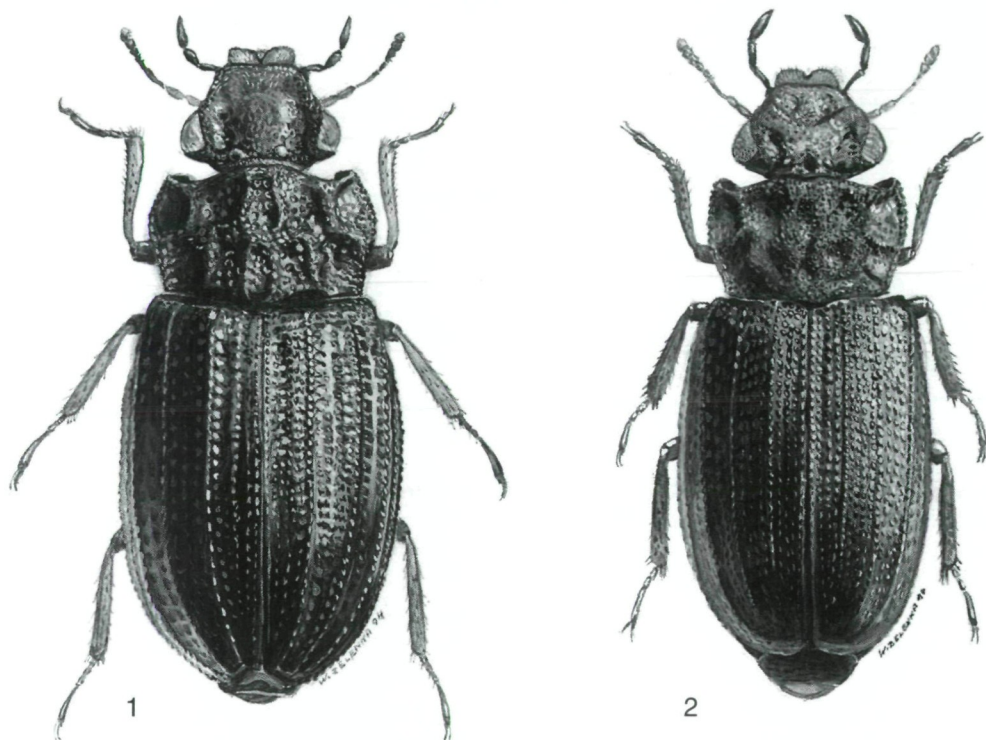
|      |   |     |   |
|------|---|-----|---|
| CAL  | Coll. Balfour-Browne, Coll. Angus, London                     | NMW | Naturhistorisches Museum, Wien  |
| CBB  | Coll. Boukal, Ceske Budejovice                                | SIW | Smithsonian Institution, Washington, D.C.<br>[= National Museum of Natural History] |
| CHD  | Coll. Hebauer, Deggendorf                                     | TMB | Természettudományi Múzeum, Budapest   |
| ISNB | Institut royal des Sciences naturelles de Belgique, Bruxelles | WUN | Women's University, Nagoya  |
| MHNG | Muséum d'Histoire Naturelle, Genève                           | ZMH | Universitetets Zoologiska Museum, Helsingfors                                       |
| MHNP | Muséum national d'Histoire Naturelle, Paris                   |     |   |
| MNS  | Staatliches Museum für Naturkunde, Stuttgart                  |     |   |

## *Gondraena* gen.n.

TYPE SPECIES: *Gondraena indica* sp.n.

DIAGNOSIS: *Gondraena* gen.n. is characterized by the following combination of characters: Maxillary palpi short, distinctly shorter than maximum width of head. Ocelli large. Antennae 11-segmented; 2nd segment only slightly shorter than 1st, without conspicuously long seta; 6th

segment cupuliform; club 5-segmented, terminal segment tightly fused to 10th segment. Pronotum with 6 longitudinal ridges. Antennal pouches deep, ventrally covered by anteriorly prolonged outer hypomera (Figs. 28, 29). Procoxal cavities not closed posteriorly (Fig. 29). Elytra with 10 rows of punctures. Elytral intervals 3, 5, 7 and 9 at least partly elevated. First 4 abdominal ventrites entirely pubescent (Fig. 30). Legs short and robust. Basis of strut of male ventrite IX connected with tergite IX by a thin sclerotized rod (see Figs. 6, 15).



Figs. 1 - 2: Habitus of 1) *Gondraena indica* sp.n. and 2) *G. franzi* sp.n.

Sexual dimorphism: Females statistically larger than males. Sexual dimorphism of terminal abdominal sclerites more or less as in other genera of the family. I could not find any sexual differences in the shape of the elytra or in the morphology of the legs which are found in several other genera of Hydraenidae.

**DIFFERENTIAL DIAGNOSIS:** Only 4 genera of Hydraenidae are so far recorded from the Oriental region (*Hydraena* s.l., *Laeliaena* SAHLBERG, *Limnebius* LEACH and *Ochthebius* s.l. LEACH). *Gondraena* gen.n. is easily distinguished from these 4 genera by the development of conspicuous pronotal and elytral carinae; from *Hydraena*, *Limnebius* and *Laeliaena* it differs also in the presence of distinct ocelli and from *Ochthebius* in the terminal segment of the maxillary palpi being not reduced.

For distinction from *Gondraena* gen.n. to which it seems to be closely related see below, under description of *Gondraena* gen.n.

Nine genera of Hydraenidae are recorded from Africa so far (HANSEN 1991). I have examined all these genera, and in addition I examined three undescribed genera from South Africa and one unknown genus from Madagascar. *Gondraena* gen.n. differs from *Hydraena* s.l., *Ochthebius* s.l. and *Limnebius* in the characters mentioned above; it differs from the remaining African genera

*Parhydraena* ORCHYMONT (incl. subgenus *Pseudhydraena* ORCHYMONT), *Decarthrocerus* ORCHYMONT, *Sicilicula* BALFOUR-BROWNE, *Prosthetops* WATERHOUSE and *Mesoceration* JANSSENS in the development of very deep antennal pouches which are ventrally covered by the anteriorly prolonged outer hypomera, and from *Coelometopon* JANSSENS in the simple frons, in the longer maxillary palpi, in the open procoxal cavities and in the pubescent ventral surface.

The three undescribed South African genera which I have examined are related to *Mesoceration* and the *Decarthrocerus-Parhydraena* lineage and differ from *Gondraena* gen.n. in the absence of very deep antennal pouches. The undescribed genus from Madagascar is related to *Hydraena* and differs from *Gondraena* gen.n. in the absence of ocelli and distinct pronotal and elytral ridges.

**DESCRIPTION:** For details of morphological characters, see below under description of the 3 species.

**ECOLOGY:** All Indian specimens were found in hygropetric habitats (seepage water) near streams; *Gondraena indica* sp.n. was also collected in a small stream with rocky-gravelly bed. The Madagascan species, *Gondraena franzi* sp.n., was collected in a peaty helokrene. All specimens of *Gondraena* gen.n. were collected at elevations between 900 m and 1900 m a.s.l.

**ETYMOLOGY:** "Gond-", from Gondwana, and "-raena", from *Hydraena* (type genus of the family). Referring to the distribution of the genus: South India and Madagascar. Both of these countries are part of the ancient Gondwana continent.

### *Gondraena indica* sp.n.

**TYPE LOCALITY:** Small stream with rocky-gravelly bed, 70°30'E/10°15'N, 1900 m, Pallangi, Kodaikanal, Palni Hills, Kerala, South India.

**TYPE MATERIAL:** **Holotype** ♂ (NMW): "S-INDIEN 20.XII.1993 Kerala Palni hills Kodaikanal, (5) Pallangi, 1900m \ leg. Boukal & Kejval 77°30'E 10°15'N". **Paratypes** (CAL, CBB, NMW, MHNG, SIW): 22 exs., labelled as holotype; 36 exs.: "S-INDIEN 15.XI.1993 Tamil Nadu, Nilgiri hills 15 km SE Kotagiri (3) Kunchappanai, 900m \ 76°56'E 11°22'N"; 4 exs.: "S - INDIEN 20.XII.1993 Kerala, Palni Hills, (Kodaikanal (6) 77°33'E 10°16'N leg. Boukal & Kejval".

**DESCRIPTION:** 1.6 - 1.8 mm long, ca. 0.8 mm wide. Habitus (Fig. 1). Body form oblong, widest near middle of elytra.

Colouration black, ventral surface, legs and mouthparts brown to dark brown.

Labrum (Fig. 5) transverse, movable, angulately connected with clypeus; usually deflexed and not visible from above; anterior margin deeply excised. Maxillary palps (Fig. 4) short, 4-segmented; distinctly shorter than maximum width of head (across frons); first segment minute, segments 2 and 3 approximately equal in length, terminal segment slightly longer than preceding segment. Clypeus transverse, approximately 3 x wider than long, anterior margin more or less straight; densely microreticulate and sparsely covered with very small squamous setae; lateral margin not expanded. Frontoclypeal suture indistinct, hardly apparent, arched. Frons with a deeply impressed longitudinal complete groove on each side halfway between eye and middle; densely microreticulate and sparsely covered with small squamous setae (as on clypeus), microreticulation sometimes partly effaced or even totally obsolete in groove but always well developed on raised parts; ocelli well developed, large and conspicuous. Eyes moderately large, distance between eyes ca. 5.6 x eye width and 2.8 x eye length. Head abruptly narrowed behind eyes; with a deep antennal groove below eyes. Postgenae posteriorly not delimited by a distinct ridge.

Antennae (Fig. 3) 11-segmented; first two segments moderately long; 2nd slightly shorter than 1st; segments 3 - 5 very thin, together slightly longer than 2nd, but shorter than 1st; segments 4 and 5 very short, together only about 0.5 x as long as 3rd; segment 6 cupuliforme, slightly wider than segments 3 - 5; segments 7 - 11 forming a moderately long pubescent club which becomes

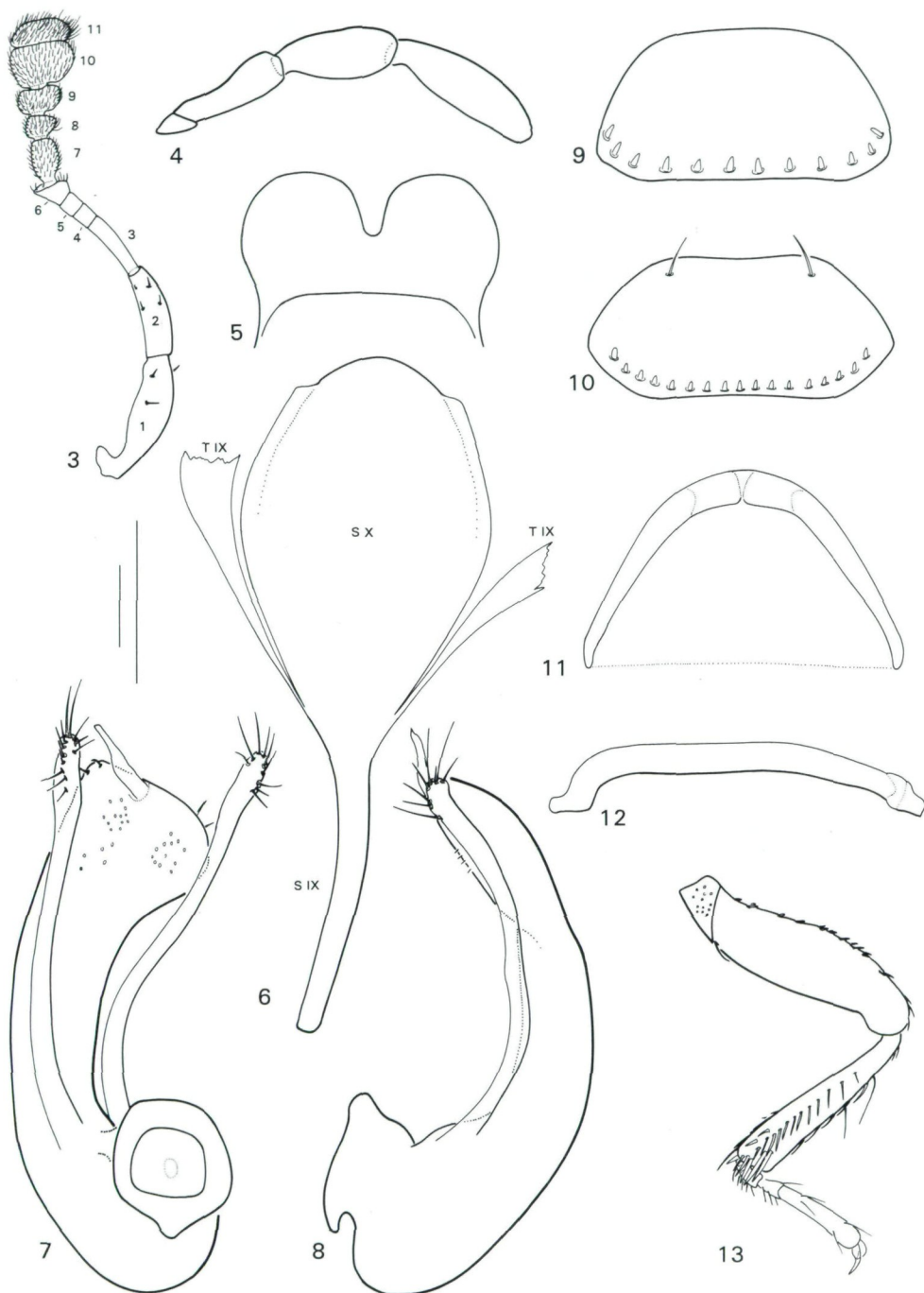
gradually wider towards apex; segments of club rather loosely connected, only segment 11 tightly connected to segment 10; club ca. 0.5 x as long as segments 1 - 6 together.

Pronotum wide, ca. 1.7 x as wide as long, widest near middle; anterior margin sinuous, distinctly emarginate behind eyes; posterior margin sinuous; lateral margin finely denticulate, evenly arcuate in anterior 0.6, then slightly emarginate; posterior angles rectangular, anterior angles acute. Surface of pronotum with several longitudinal and transverse ridges, dividing the pronotum into 10 separate cells: one pair of admedian complete ridges, a second pair of ridges on outer edge of disc extending from basis (where it is more or less effaced) to middle of pronotum and a third pair of longitudinal ridges at about the level of the eyes (emargination of pronotal front margin) extending from anterior margin to approximately anterior 0.3. A complete transverse ridge runs from the middle of the pronotal lateral margin to the rear end of 3rd longitudinal ridge, then to anterior end of 2nd longitudinal ridge and crosses admedian ridges at about posterior 0.3. Entire surface of pronotum rather densely punctate, punctures of depressions larger than those on ridges; short squamose setae emerge from all punctures. Deep antennal pouches developed. Outer hypomera wide, slightly oblique, microreticulate, not pubescent. Prosternum well developed, densely pubescent. Procoxal process narrow, more or less parallel-sided. Inner hypomera not reaching prosternal process, thus not closing procoxal cavities posteriorly; densely pubescent. Mesosternum with 4 longitudinal ridges; densely pubescent. Metasternum with longitudinally impressed discal area and with a very short ridge between mesocoxae.

Elytra ca. 1.4 x as long as wide, suboval; shoulders prominent; apices separately rounded, slightly retracted at sutural apex, thus tergite X entirely and tergite IX partly exposed; sides very finely denticulate and more or less evenly arched, but slightly more parallel-sided in anterior half; cross section highly convex; explanate margin present, but very narrow, ending near posterior 0.3; with 10 rows of punctures (striae), scutellary stria absent, duplicate punctures occur between stria 5 and 6 near basis; striae 1 - 3 and 7 end on declivity, stria 8 ends before declivity, remaining striae more or less complete, but their apical punctures distinctly smaller than anterior ones; stria punctures moderately large, deeply impressed and densely arranged; a short and very thin hair emerges from each elytral puncture; stria intervals 2, 4, 6, 8 and 10 flat, smooth and glabrous, without any microreticulation, punctuation or pubescence; interval 1 (= sutural interval) flat or hardly noticeably elevated, with a series of very small punctures, each with one short hair; interval 3 gently raised from basis to declivity, interval 5 gently raised over entire length, raised part of interval 7 slightly longer than elevated part of interval 3 and raised part of interval 9 slightly shorter than elevated part of interval 3; all raised parts of intervals with one straight row of short and inconspicuous setae. Pseudepipyleura not very wide, oblique, not pubescent; becoming progressively narrower towards apex, ending near apical 0.1. Epipleura very narrow, ca. 0.5 x as wide as pseudepipyleura, ending before middle of elytra; densely pubescent. Scutellum very small, subtriangular.

Hind wings of staphylinoid type, venation essentially as in *Davidraena boukali* sp.n. (see Fig. 34).

Intercoxal abdominal segment very small, triangular. First ventrite with a pair of complete admedian inconspicuous, longitudinal carinae. First four ventrites entirely pubescent; pubescence of ventrite 5 confined to anterior 0.3 - 0.5 in both sexes. Ventrite 6 short and transverse in male (ca. 3 x wider than long), its apical margin strongly emarginate; distinctly longer in female (ca. 2 x wider than long), covering remaining ventrites, with apical margin strongly arched. Male abdominal sternites IX and X as in Fig. 6. Male tergite IX laterally strongly prolonged to ventral side and rather firmly connected to sternite IX by a sclerotized rod. Male tergite X (Fig. 9) and female tergite X (Fig. 10) very similar, but male tergite X slightly more transverse and apically slightly more emarginate. Female sternite IX and spermatheca as in Figs. 11, 12. Since the homology of the terminal sclerites (especially female sternite IX and male sternites IX and X) are still insufficiently understood I refrain from a more detailed verbal description. Middle of tergite IX with a large triangular impression in both sexes.



Figs. 3 - 13: *Gondraena indica* sp.n., 3) antenna, 4) maxillary palpus, 5) labrum, 6) male sternite IX/X, 7) aedeagus, ventral aspect, 8) aedeagus, lateral aspect, 9) male tergite X, 10) female tergite X, 11) female sternite IX, 12) spermatheca, 13) front leg, inner side. Short scale = Fig. 13; long scale = Figs. 1 - 12; all scales represent 100  $\mu$ m.

Legs (Fig. 13) comparatively short and robust. All coxae pubescent; pro- and metacoxa transverse, mesocoxa round. Trochanters smooth, with micropores, but without any hairs; femora smooth, with only a few hairs and a few rows of blunt short setae. Tibiae with few hairs and rows of various spine-like and blunt setae, especially in distal half. Tarsi with few simple hairs; 5-segmented, but first 3 segments very small and tightly fused to each other, thus tarsi appearing 3-segmented; segment 4 approximately as long as segments 1 - 3 together, segment 5 distinctly longer than segments 1 - 4. Claws moderately long.

Aedeagus (Figs. 7, 8): ca. 320  $\mu\text{m}$  long. Phallobasis large, more or less symmetrical, forming a closed ring. Main piece stout, moderately wide, dorso-ventrally flattened; subapically and dorsally with a few rows of short setae; ventro-apically with several micropores. Distal lobe short and thin, more or less straight, inserted near middle of apex of main piece, directed towards left side. Parameres slightly longer than main piece, thin, symmetrically developed; apically with a group of moderately long setae.

DISTRIBUTION: South India: Nilgiri Hills (Tamil Nadu) and Palni Hills (Kerala).

ETYMOLOGY: Referring to the geographical distribution. This species seems to be rather widespread.

### *Gondraena latipalpis* sp.n.

TYPE LOCALITY: Seepage water, 77°15'E/10°08'N, 1900 m, Top Station, 30 km E Munnar, Palni Hills, Kerala, South India.

TYPE MATERIAL: **Holotype** ♂ (NMW): "S-INDIEN 2.-3.XII.93 Kerala, Palni hills (4) 30km E Munnar, 1900m \ 77°15'E 10°08'N". **Paratypes** (NMW): 14 exs. labelled as holotype.

DIAGNOSIS: 1.55 - 1.70 mm long. General appearance (body form, colouration) more or less as in the type species, but dorsal surface more smooth.

*Gondraena latipalpis* sp.n. differs from *G. indica* sp.n. in the following characters:

Maxillary palpi (Fig. 16), especially segments 3 and 4, distinctly dilated. Clypeus moderately densely punctate, but smooth between punctures, not microreticulate. Middle of frons smooth between punctures, not microreticulate.

Antennae (Fig. 14) essentially as in the type species, first 2 segments slightly wider than in *Gondraena indica* sp.n.

Position of pronotal ridges as in the type species but less prominent, especially transverse ridge more or less effaced. Metasternum with 3 longitudinal ridges.

Elytra with 13 rows of punctures (at least in anterior half): 3 rows between suture and 2nd ridge, 3 rows between 2nd and 3rd ridge, 3 rows between 3rd and 4th ridge, 2 rows between 4th and 5th ridge and 2 rows between 5th ridge and lateral elytral margin. Elytral apices not distinctly retraced at sutural apex. Epipleura and pseudopipleura fused, nowhere pubescent.

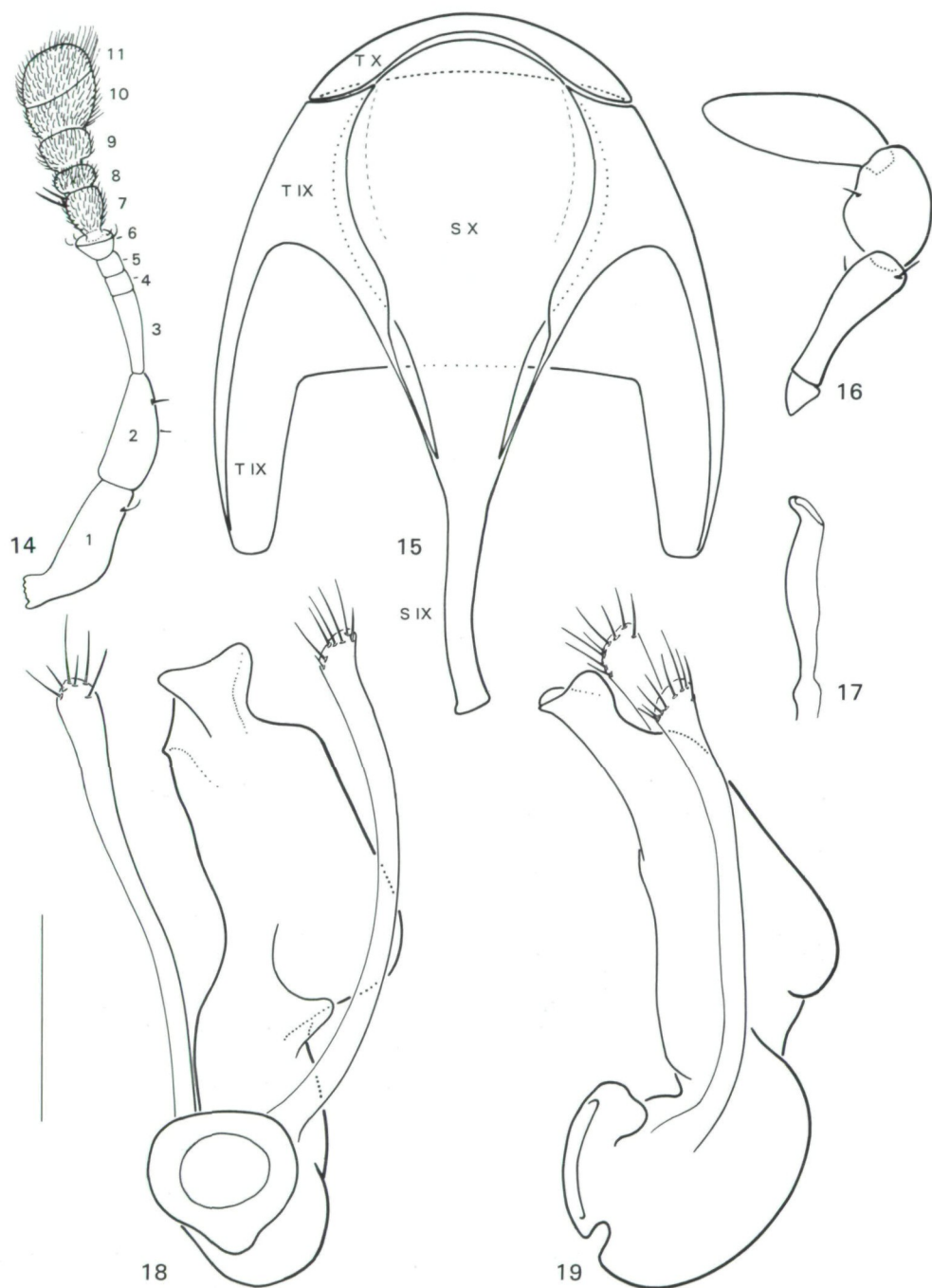
Middle of tergite IX without large triangular impression in both sexes. Female sternite IX similar to that of *Gondraena indica* sp.n. Male tergite X longer than female tergite X, the latter strongly transverse. Spermatheca (Fig. 17) considerably shorter than that of *G. indica* sp.n.

Aedeagus (Fig. 18, 19): ca. 300  $\mu\text{m}$  long. Phallobasis large, more or less symmetrical, forming a closed ring. Main piece stout, irregularly shaped, moderately wide, without rows of short setae. Distal lobe absent. Parameres approximately as long as main piece, thin, symmetrical; apically with a group of moderately long setae.

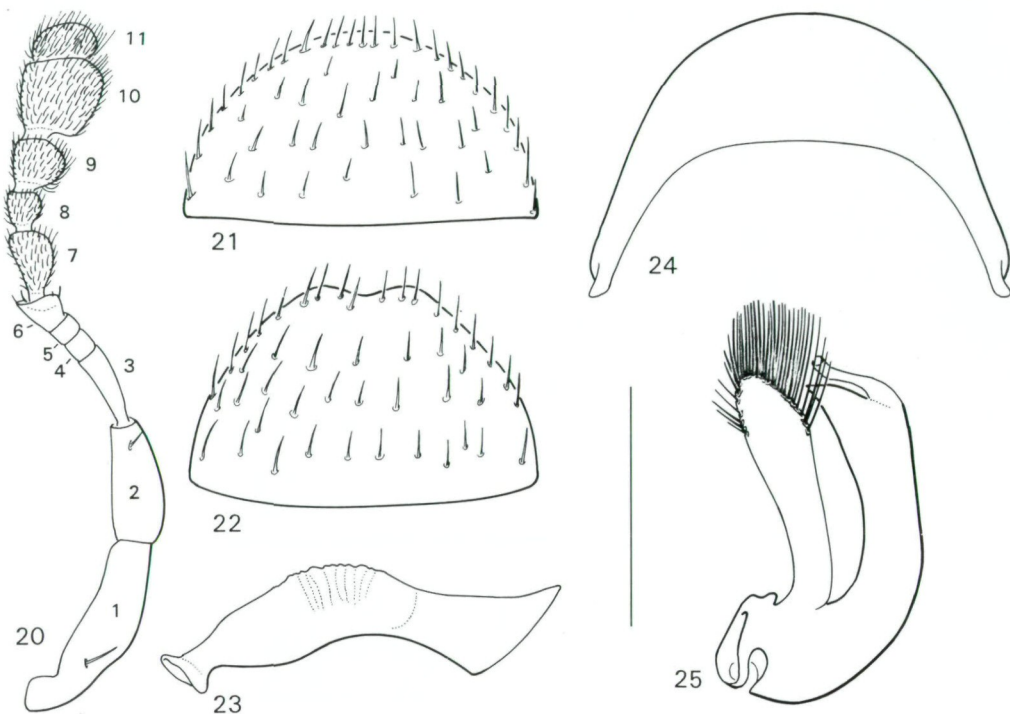
DISTRIBUTION: So far known only from the type locality.

ETYMOLOGY: In reference to the wide palpi.





Figs. 14 - 19: *Gondraena latipalpis* sp.n., 14) antenna, 15) apical abdominal sclerites, ventral aspect, 16) maxillary palpus, 17) spermatheca, 18) aedeagus, ventral aspect, 19) aedeagus, lateral aspect. Scale represents 100  $\mu$ m.



Figs. 20 - 25: *Gondraena franzi* sp.n., 20) antenna, 21) female tergite X, 22) male tergite X, 23) spermatheca, 24) female sternite IX, 25) aedeagus, lateral view. Scale represents 100  $\mu$ m.

### *Gondraena franzi* sp.n.

**TYPE LOCALITY:** *Sphagnum* swamp, Ambohitriangy, Tampoketsa Plateau, ca. 120 km NNW Tananarive, central Madagascar.

**TYPE MATERIAL:** **Holotype** ♂ (NMW): "Madagascar, Plateau du Tampoketsa lg.H.Franz [11.IV.] 1969" [upperside of label] \ "Mg 2" [underside of same label, handwriting of H. Franz]. **Paratypes** (ISNB, MHNG, MHNP, MNS, NMW, SIW, ZMH): 35 specimens, labelled as holotype.

**DIAGNOSIS:** 1.7 - 2.0 mm long. Habitus (Fig. 2). Body form and colouration more or less as in the type species, but dorsal surface more dull.

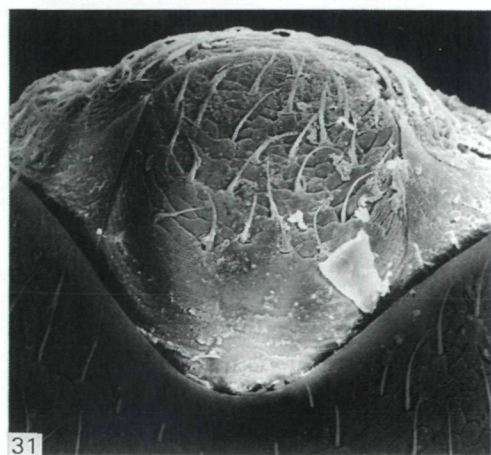
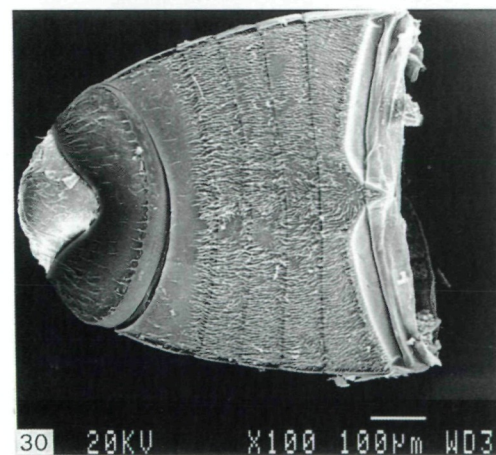
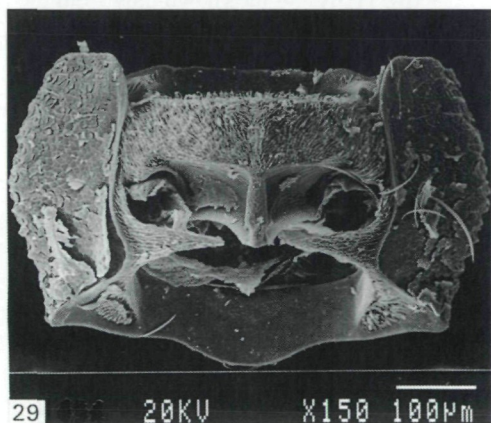
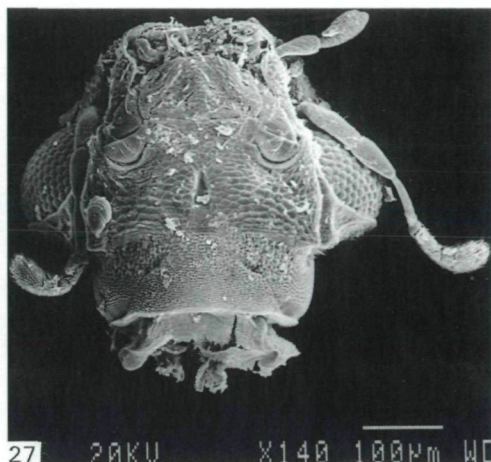
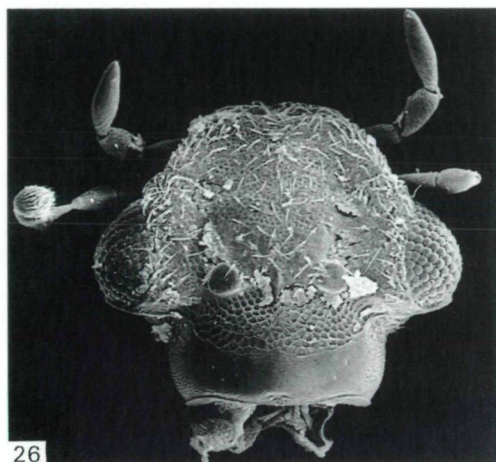
*Gondraena franzi* sp.n. differs from *G. indica* sp.n. in the following characters:

Clypeus and frons only superficially shagreened, densely or sparsely punctate; raised median portion of frons distinctly impressed between ocelli.

Antennae (Fig. 20) more or less identical with those of the type species, but terminal segment slightly smaller than in *G. indica* sp.n.

Pronotal ridges slightly less prominent than in *G. indica* sp.n. Surface of pronotum moderately densely (sides) or densely (discal area) covered with granuli; microreticulate between granuli; dull; a short squamose seta emerges right behind each granulum; pronotal surface very slightly impressed behind each granulum.





Figs. 26 - 31: *Gondraena indica* sp.n., SEM photographs, 26) head, dorsal aspect, 27) head, ventral aspect, 28) pronotum, 29) prothorax, ventral aspect, 30) male abdomen, ventral aspect, 31) abdominal apex of male.

Elytra without regular rows of punctures, but with rather irregular rows of densely arranged granuli; elytral ridges also composed of densely arranged granuli; all elytral ridges end before apex. Elytral apices truncately rounded, not distinctly retracted at sutural apex; tergites IX and X entirely and sometimes tergite VIII partly exposed and visible from above. Pseudepipleuron narrower than in *G. indica* sp.n.

Male ventrite 6 less strongly emarginate and female ventrite 6 less strongly arched apically. Middle of tergite IX without impression. Sclerotized rod connecting male abdominal tergite IX with sternite IX present, but very thin and weakly sclerotized. Female sternite IX (Fig. 24) as illustrated. Male tergite X (Fig. 22) apically slightly emarginate, slightly longer than female tergite X (Fig. 21). Spermatheca (Fig. 23) moderately long, blunt.

Aedeagus (Fig. 24): Very short, only about 140  $\mu\text{m}$  long. Phallobasis symmetrical, forming a closed ring which is not sclerotized dorsally. Main piece stout, more or less cylindrical; apically truncate (lateral aspect); without any conspicuous setae. Distal lobe short and simple, slightly sinuous. Parameres rather broad, symmetrically developed, approximately as long as main piece; apically densely covered with moderately long setae.

DISTRIBUTION: So far known only from the type locality.

ECOLOGY: The species was collected on a swampy mountain slope (helokrene) with *Sphagnum* sp., *Drosera* sp. and *Lycopodium* sp.

ETYMOLOGY: Dedicated to Prof. H. Franz (Mödling).

### *Davidraena* gen.n.

TYPE SPECIES: *Davidraena boukali* sp.n.

DIAGNOSIS: *Davidraena* gen.n. is characterized by the following combination of characters: Head remarkably wide, sides of clypeus and frons explanate and upturned, thus eyes widely separated (Fig. 50). Maxillary palpi short, distinctly shorter than maximum width of head. Ocelli present. Eyes small. Antennae 11-segmented; 1st antennal segment more than 2 x as long as 2nd segment, the latter with a conspicuously long seta; segments 4 and 5 very small; 6th segment not cupuliform; club loosely 5-segmented and long. Pronotum very wide, sides widely explanate. Pronotal disc with 3 pairs of longitudinal ridges. Antennal pouches well developed and deep, ventrally covered by anteriorly prolonged outer hypomera (Figs. 52, 53). Procoxal cavities not closed posteriorly (Fig. 53). Elytra convex in cross section, with 10 or 15 striae; with 5 distinct longitudinal ridges. Only first two abdominal ventrites covered with plastron, remaining ventrites almost entirely smooth and shining (Fig. 55). Connection between strut of male sternite IX and tergite IX not sclerotized. Legs short and robust. Aedeagus simple, with or without distal lobe; parameres symmetrical.



32

Fig. 32: Habitus of *Davidraena boukali* sp.n.



Sexual dimorphism: Females statistically larger than males. Sexual dimorphism of terminal abdominal sclerites more or less as in other genera of the family (see above). I could not find any sexual differences in the shape of the elytra or in the structure of the legs, present in several other genera.

**DIFFERENTIAL DIAGNOSIS:** *Davidraena* gen.n. is obviously closely related to *Gondraena* gen.n. described above. It can be distinguished from *Gondraena* gen.n. by the following characters: Clypeus and frons laterally prolonged and upturned; frontoclypeal suture distinct; eyes small; terminal antennal segment not closely fused to preterminal segment; 1st antennal segment more than 2 x as long as 2nd segment, the latter with a conspicuously long seta; 6th antennal segment not cupuliform; antennae distinctly longer in relation to maxillary palpi; only two ventrites entirely pubescent.

*Davidraena* gen.n. can be distinguished from the 4 remaining Oriental genera of Hydraenidae by the development of conspicuous pronotal and elytral carinae and by the reduced abdominal pubescence which is confined to the first 2 ventrites; in addition, it can be distinguished from *Hydraena*, *Limnebius* and *Laeliaena* by the presence of distinct ocelli and from *Ochthebius* by the terminal segment of the maxillary palpi being not reduced.

The African genus *Coelometopon* which superficially resembles *Davidraena* gen.n. in the head morphology differs from *Davidraena* gen.n. - among other characters - in its closed procoxal cavities.

**DESCRIPTION:** For details of morphological characters and sexual dimorphism, see description of the type species and *G. antennalis* sp.n.

**ECOLOGY:** All specimens were collected in seepage water, at elevations between 900 m and 1900 m a.s.l.

**ETYMOLOGY:** "David-", after David S. Boukal who collected the type material, and "-raena", from *Hydraena* (type species of the family).

### *Davidraena boukali* sp.n.

**TYPE LOCALITY:** Seepage water, 76°56'E/11°22'N, 900 m, Kunchappanai, 15 km SE Kotagiri, Nilgiri Hills, Tamil Nadu, South India.

**TYPE MATERIAL:** Holotype ♂ (NMW): "S-INDIEN 15.XI.1993 Tamil Nadu, Nilgiri hills 15 km SE Kotagiri (3) Kunchappanai, 900m \ 76°56'E 11°22'N". Paratypes (CAL, CBB, CHD, ISNB, MHNG, MHNP, MNS, NMW, SIW, TMB, WUN, ZMH): ca. 250 exs., labelled as holotype.

**DESCRIPTION:** 1.7 - 2.0 mm long, ca. 0.9 mm wide. Habitus (Fig. 32). Body form oblong, widest near middle of elytra.

Colouration brown to dark brown; explanate margin of pronotum, legs, mouthparts, underside of head, outer hypomera, epipleura (except inner margin), abdominal segments and sometimes explanate margin of elytra paler brown.

Labrum (Fig. 35) strongly transverse, angulately connected with clypeus, movable; usually deflexed and not visible from above; anterior margin less deeply emarginate than in *Gondraena indica* sp.n. Maxillary palps (Fig. 36) short, distinctly shorter than maximum width of head (across frons); first segment minute, remaining segments approximately equal in length; in repose entirely concealed under lateral clypeal expansions. Clypeus transverse, approximately 3 x wider than long, anterior margin slightly emarginate; moderately densely covered with short stiff semi-erect setae; lateral margin expanded and distinctly upturned. Frontoclypeal suture arched, deeply impressed. Frons strongly transverse, with one deeply impressed fovea on each side between eyes and middle; middle of frons distinctly raised to form a median ridge; this ridge is deeply

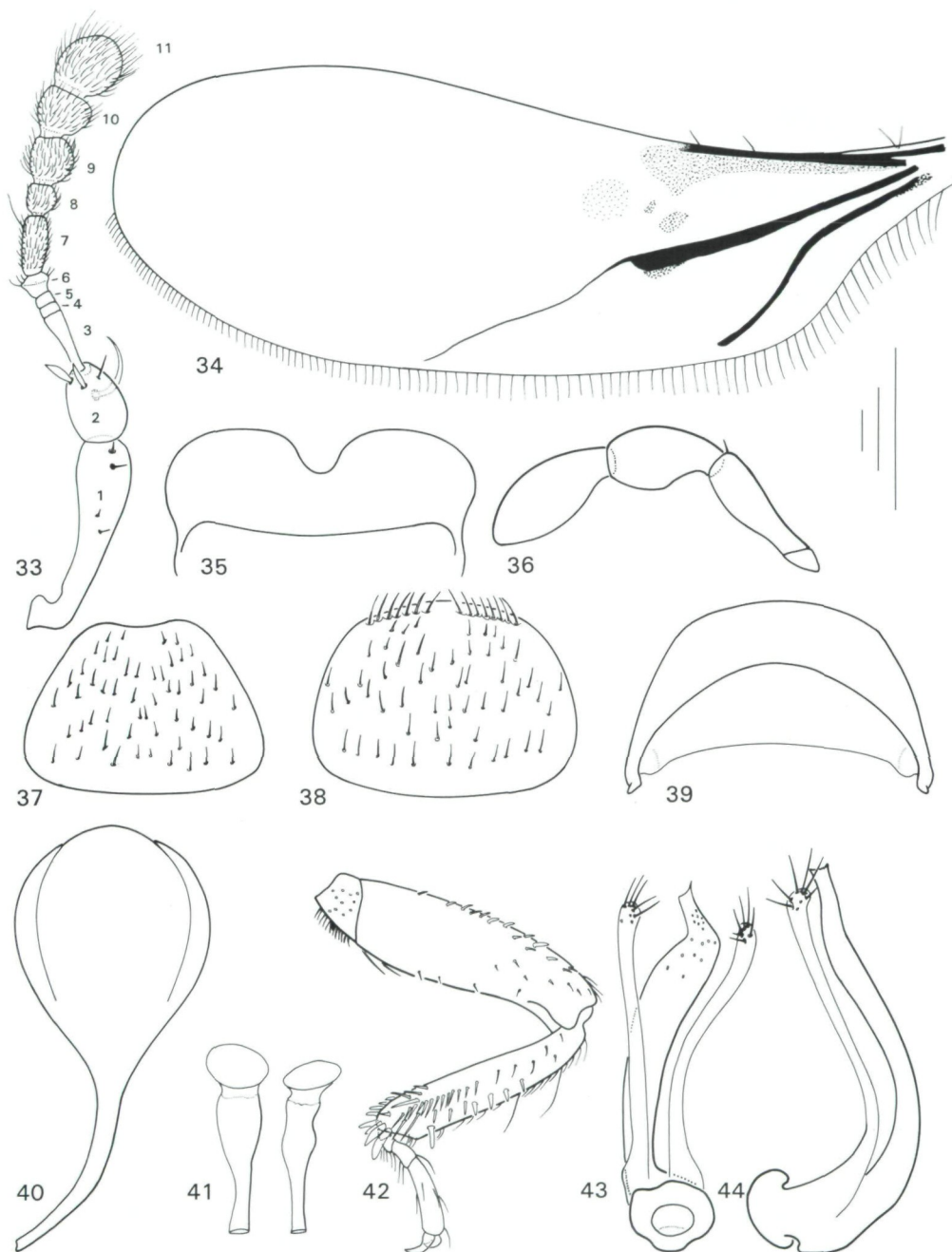
impressed in the occipital region and thus replaced by a pair of parallel narrow ridges (Fig. 50); ocelli moderately large; lateral margin of frons distinctly upturned; middle of median ridge and lateral parts of frons rugulosely punctate (resp. microsculptured) and covered with short setae (as on clypeus), remainder smooth and without setae. Eyes small, slightly protruding, distance between eyes ca. 6 x eye width and 3.6 x eye length. Head abruptly narrowed behind eyes; with a deep antennal groove below eyes. Postgenae posteriorly delimited by a distinct ridge (Fig. 51).

Antennae (Fig. 33) 11-segmented; first segment long; 2nd short and round, ca. 0.4 x as long as 1st, with several setae one of which is conspicuously long; segments 3 - 5 very thin, together approximately as long as 2nd; segments 4 and 5 very short, together only 0.37 x as long as 3rd; segment 6 slightly wider than segments 3 - 5 and approximately as long as segments 4 and 5 together, not cupuliform; segments 7 - 11 forming a long and loose pubescent club which becomes gradually wider towards apex; club ca. 0.7 x as long as segments 1 - 6 together.

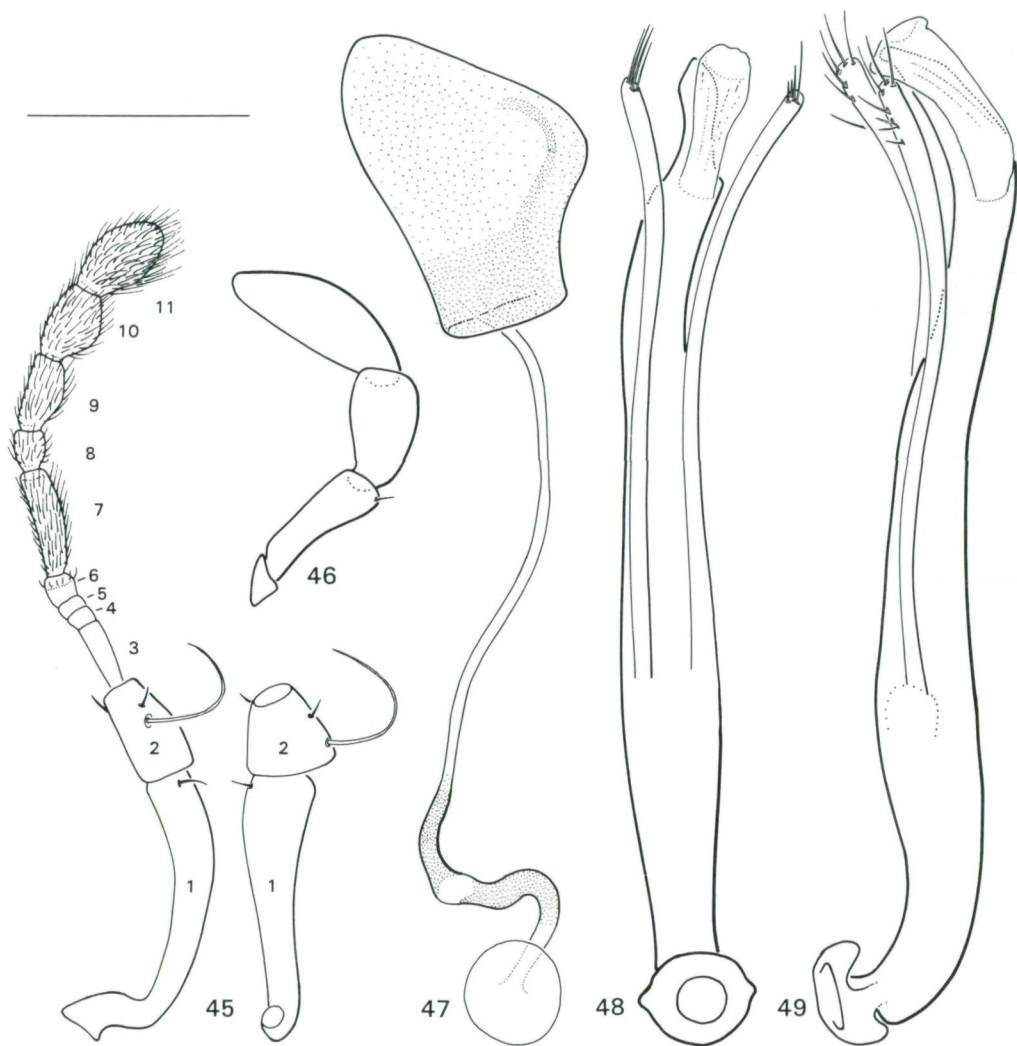
Pronotum very wide, ca. 2 x wider than long, widest near middle; anterior margin sinuous, distinctly emarginate behind eyes; posterior margin sinuous; lateral margin of pronotum widely explanate, evenly arched and finely denticulate in anterior 0.7, then abruptly and deeply excavate, excision filled with a fringe of densely arranged long thin hairs extending along posterior pronotal margin just until second pronotal ridge; anterior angles of pronotum acute; surface of pronotal disc rather uneven, with 3 pairs of longitudinal ridges: one pair of admedian complete ridges delimiting a median groove, a second pair of ridges halfway between admedian ridge and lateral margin of disc extending from basis to anterior 0.3 and the third pair of ridges delimiting the lateral margin of the pronotal disc and extending from anterior margin to approximately anterior 0.3. Area between ridges and median half of explanate pronotal margin more or less smooth and glabrous, with a few rows of thin hairs and few punctures; pronotal ridges and lateral margin with short setae (as on clypeus); lateral half of explanate margin with very small setigerous granuli. Deep antennal pouches developed. Outer hypomera wide, slightly oblique, superficially microreticulate, not pubescent; anteriorly strongly prolonged, covering antennal pouches ventrally; anterior margin with a fringe of setae. Prosternum well developed, pubescent. Procoxal process narrow, almost parallel-sided becoming slightly wider posteriorly. Inner hypomera not reaching prosternal process, thus not closing procoxal cavities; pubescent. Mesosternum with 4 longitudinal ridges, anteriorly connected with each other; entirely pubescent. Metasternum more or less evenly convex, flattened discally, with a shallow median groove in apical half; entirely pubescent.

Elytra ca. 1.3 x longer than wide, suboval, shoulders prominent; apices truncately obliquely rounded, thus last tergite usually seen from above; sides finely denticulate, first denticle on shoulder prominent and tooth-like, remaining denticles becoming progressively smaller towards apex, each denticle (except first one) bears a short recurved seta; sides more or less evenly arched, but slightly more parallel-sided in anterior half; cross section highly convex; explanate margin present, but narrow, ending near posterior 0.1; with 10 rows of punctures (striae), scutellary stria absent, duplicate punctures can be occasionally found; striae 1 + 2 and striae 9 + 10 fuse near declivity, remaining striae complete; striae punctures moderately large, deeply impressed and densely arranged; a short inconspicuous hair emerges from each elytral puncture; striae intervals 2, 4, 6, 8 and 10 flat, smooth and glabrous, without any microreticulation, punctuation or pubescence; striae intervals 1 (= sutural interval), 3, 5, 7 and 9 strongly raised to form distinct ridges; ridges of intervals 1, 5 and 7 complete, ridge of interval 3 ending near posterior 0.1 and ridge of interval 9 ending near posterior 0.4; all ridges with one straight row of short stiff semi-erect setae (as on pronotum). Epipleura and pseudopipleura inseparably fused, moderately wide, not pubescent, with a series of short transverse ridges in anterior half near inner margin; becoming progressively narrower towards apex, ending near apical 0.1. Scutellum very small, subtriangular.

Hind wings (Fig. 34) of staphylinoid type.



Figs. 33 - 44: *Davidraena boukali* sp.n., 33) antenna, 34) hind wing, 35) labrum, 36) maxillary palpus, 37) male tergite X, 38) female tergite X, 39) female sternite IX, 40) male sternite IX/IX, 41) spermatheca, different aspects, 42) front leg, inner side, 43) aedeagus, ventral aspect, 44) aedeagus lateral aspect. Short scale = Fig. 34; intermediate scale = Fig. 42; long scale = Figs. 33, 35 - 41, 43, 44; all scales represent 100  $\mu$ m.



Figs. 45 - 49: *Davidraena antennalis* sp.n., 45) antenna, 46) maxillary palpus, 47) spermatheca, 48) aedeagus, ventral aspect, 49) aedeagus, lateral aspect. Scale represents 100  $\mu$ m.

Intercoxal abdominal segment very small, triangular. First two ventrites entirely dull, pubescent. Ventrites 3 and 4 smooth and glabrous, only very superficially and sparsely punctate; their apical margins concave, with a fringe of short hairs. Ventrite 5 as ventrites 3 and 4, but posterior margin less concave and without fringe of setae. Ventrite 6 more distinctly and more densely punctate than preceding ventrites; short and transverse in male (ca. 3 x wider than long), with apical margin strongly emarginate; distinctly longer in female (ca. 2 x wider than long), covering remaining ventrites, with apical margin strongly arched. Male abdominal sternites IX and X as in Fig. 40. Male tergite IX laterally strongly prolonged to ventral side; rod connecting tergite IX and sternite IX not sclerotized. Male tergite X, female sternite IX, female tergite X and spermatheca as in Figs. 37 - 39, 41.



Legs (Fig. 42) comparatively short and robust. All coxae pubescent; pro- and metacoxa transverse, mesocoxa round. Trochanters smooth, with a small group of hairs and with several micropores; femora smooth, only very sparsely covered with hairs and few blunt setae. Tibiae with few hairs and rows of various spine-like and blunt setae; these blunt apical spines are larger and more apparent than in *G. indica* sp.n. Tarsi with few simple hairs; 5-segmented, but first 3 segments very small and tightly fused to each other, thus tarsi appearing 3-segmented; segment 4 approximately as long as segments 1 - 3 together, segment 5 distinctly longer than segments 1 - 4, but shorter than in *G. indica* sp.n. Claws moderately long.

Aedeagus (Figs. 43, 44): Primitive and very small (240  $\mu$ m long) in comparison to body length. Phallobasis symmetrical, forming a closed ring. Main piece simple, strongly curved in lateral aspect and somewhat sinuous in ventral aspect. Distal lobe absent. Parameres symmetrical, slender, slightly shorter than main piece, slightly sinuate; apex rounded, with approximately 6 moderately long setae.

DISTRIBUTION: So far known only from the type locality.

ETYMOLOGY: Dedicated to David S. Boukal.

### *Davidraena antennalis* sp.n.

TYPE LOCALITY: Seepage water, 77°15'E/10°08'N, 1900 m, Top Station, 30 km E Munnar, Palni Hills, Kerala, South India.

TYPE MATERIAL: **Holotype** ♂ (NMW): "S-INDIEN 2.-3.XII.93 Kerala, Palni hills (4) 30km E Munnar, 1900m \ 77°15'E 10°08'N". **Paratypes** (NMW): 3 ♀♀, labelled as holotype.

DIAGNOSIS: 1.6 - 1.8 mm long. General appearance (body form, colouration) as in *Davidraena boukali* sp.n.

*Davidraena antennalis* sp.n. differs from *D. boukali* sp.n. in the following characters:

Lateral margins of clypeus and frons less widely explanate and slightly less strongly upturned; front margin of clypeus arcuate instead of emarginate. Postgenae not delimited by distinct ridges.

Antennae (Fig. 45) essentially as in *Davidraena boukali* sp.n., with long loose club; basis of 2nd segment expanded posteriorly.

Pronotum only very shallowly excised posteriorly; excision not filled with setae; lateral discal ridge extending towards anterior angle of pronotal excision; pronotal disc less distinctly convex; areas between pronotal ridges more strongly punctate, less glabrous. Metasternum with 3 longitudinal ridges in anterior half.

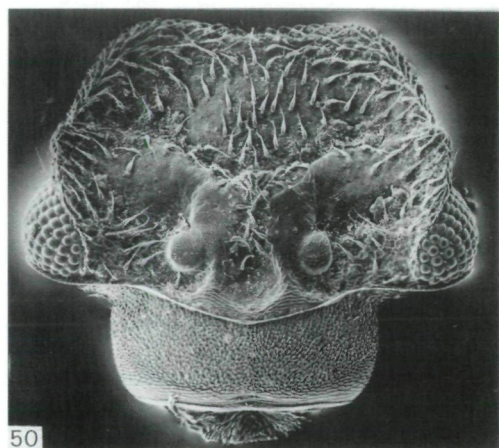
Elytra with 15 rows of punctures (3 rows between each ridge); third elytral ridge not complete, effaced before apex. Anterior angle of elytra without prominent tooth.

Male abdominal sternites IX and X as in *D. boukali* sp.n. Tergite X of male and female rather similar to each other, both with an apical fringe of setae. Spermatheca (Fig. 47) connected with a very conspicuous sclerotized plate.

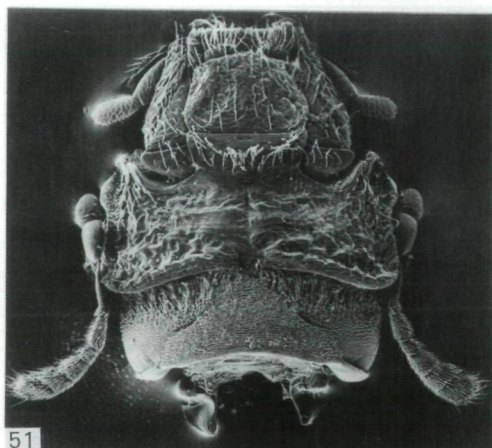
Aedeagus (Figs. 48, 49): 460  $\mu$ m long; Phallobasis symmetrical, forming a closed ring. Main piece elongate and very slender, straight. Distal lobe entirely hyaline, short, straight. Parameres symmetrical, slender, inserted near basal 0.35, reaching apex of main piece; apices rounded, with approximately 5 - 10 moderately long setae.

DISTRIBUTION: So far known only from the type locality.

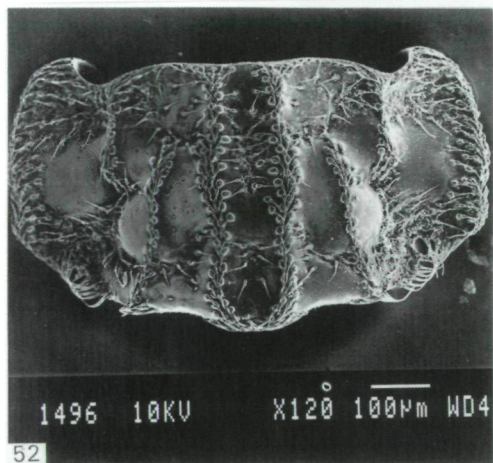
ETYMOLOGY: Named in reference to the peculiar antennal morphology.



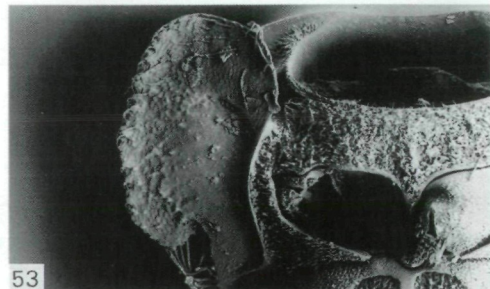
50



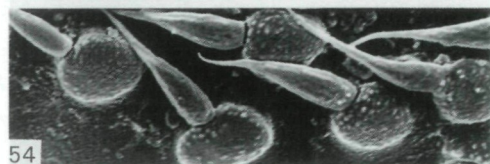
51



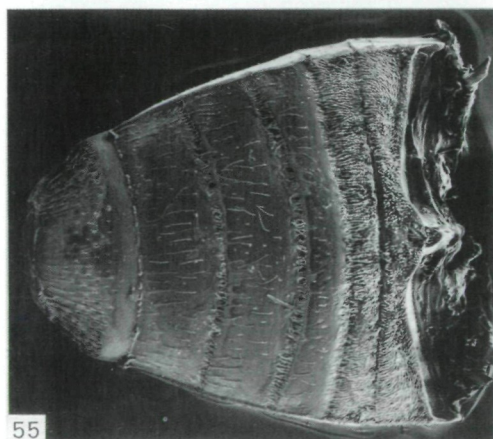
52



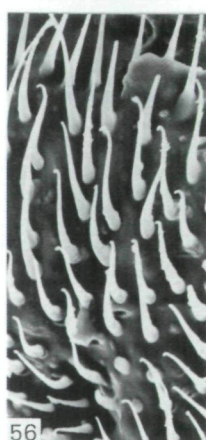
53



54



55



56



57

Figs. 50 - 57: *Davidraena boukali* sp.n. SEM photographs, 50) head, dorsal aspect, 51) head, ventral aspect, 52) pronotum, 53) prothorax, ventral aspect, 54) pronotal setae, 55) female abdomen, 56) setae on first abdominal ventrite, 57) abdominal apex of male.

## Discussion

The new genera are clearly denoted as members of the Hydraeninae (sensu PERKINS 1980) by the shape of the labial palpi. I have not made any further attempt to assign *Gondraena* gen.n. and *Davidraena* gen.n. to any of the two tribes (*Hydraenini*, *Hydraenidini*) proposed by PERKINS (1980). The phylogeny of the family is still insufficiently understood (see HANSEN 1991).

Possible autapomorphies for *Davidraena* gen.n. and *Gondraena* gen.n.: development of characteristic ridges on pronotum and elytra

Similarities between *Davidraena* gen.n. and the African genus *Coelometopon* (short palps, small eyes, morphology of frons, development of elytral carinae, reduction of pubescence on ventral surface) could be due to habitat adaptation; both genera are hygropetric.

The sclerotized connection between the strut of the male sternite IX and the tergite IX (see Figs. 6, 15) in *Gondraena* gen.n. seems to support the theory proposed by PERKINS (1980) according to which only this rod-like strut (which is joined to the aedeagus by muscles) is the true sternite IX, whereas the oval sclerite connected posteriorly to the strut represents in fact the sternite X. There is also a possibility that the true sternite IX is inseparably fused to the so-called strut which would then belong to sternite X.

## Key to the Indian species of *Gondraena* gen.n. and *Davidraena* gen.n.

- 1 Clypeus and frons widely explanate, their lateral margins upturned (Figs. 32, 50); frontoclypeal suture deeply impressed (Fig. 50); 1st antennal segment more than 2 x as long as second segment, the latter with a conspicuously long seta (Figs. 33, 45); 6th antennal segment not cupuliform (Figs. 33, 45); 11th antennal segment not tightly fused to 10th (Figs. 33, 45). Only first 2 abdominal ventrites entirely pubescent (Fig. 55). Lateral margin of pronotum angulately excised (Figs. 32, 53, 53) (*Davidraena* gen.n.) .....2
- Clypeus and frons not widely explanate (Figs. 1, 2, 26); frontoclypeal suture hardly apparent (Fig. 26); 1st antennal segment less than 2 x as long as second segment, the latter with only short setae (Figs. 3, 14, 20); 6th antennal segment cupuliform (Figs. 3, 14, 20); 11th antennal segment tightly fused to 10th (Figs. 3, 14, 20). First 4 abdominal ventrites entirely pubescent (Fig. 30). Lateral margin of pronotum arcuately emarginate (Figs. 1, 2, 28, 29) (*Gondraena* gen.n.) .....3
- 2 Base of 2nd segment not expanded posteriorly (Fig. 33). Sides of pronotum strongly excised posteriorly (Figs. 32, 52, 53). Elytra with 10 rows of punctures (two between each elytral ridge); 3rd elytral ridge complete, reaching elytral apex. Aedeagus only 240  $\mu$ m long; parameres inserted near base (Figs. 43, 44). ..... *D. boukali* sp.n.
- Base of 2nd segment expanded posteriorly (Fig. 45). Sides of pronotum only weakly excised posteriorly. Elytra with 15 rows of punctures (three between each elytral ridge); 3rd elytral ridge not complete, not reaching elytral apex. Aedeagus 460  $\mu$ m long; parameres inserted at about basal 0.35 (Figs. 48, 49). ..... *D. antennalis* sp.n.
- 3 Maxillary palpi slender (Fig. 4). Clypeus distinctly microreticulate, mat (Fig. 26). Pronotal ridges very prominent. Elytra with 10 rows of punctures (in anterior half); epipleura pubescent. Aedeagus with distal lobe (Figs. 7, 8). Spermatheca very long (Fig. 12). ..... *G. indica* sp.n.
- Maxillary palpi dilated (see Fig. 16). Clypeus punctate, smooth and glabrous between punctures. Pronotal ridges not prominent, partly effaced. Elytra with 13 rows of punctures (in anterior half); epipleura fused to pseudopipleura, nowhere pubescent. Aedeagus (Figs. 18, 19) without distal lobe. Spermatheca short. ..... *G. latipalpis* sp.n.

### Zusammenfassung

Zwei neue Gattungen, *Gondraena* gen.n. (Südindien, Madagaskar) und *Davidraena* gen.n. (Südindien) und 5 neue Arten, *Gondraena indica* sp.n. (Südindien), *G. latipalpis* sp.n. (Südindien), *G. franzi* sp.n. (Madagaskar), *Davidraena boukali* sp.n. (Südindien) und *D. antennalis* sp.n. (Südindien) werden beschrieben. Die beiden Gattungen sind nahe miteinander verwandt und sind besonders durch die Antennen und durch die unterschiedliche Pubeszenz der Abdominalsternite zu unterscheiden.

### References

- HANSEN, M., 1991: A review of the genera of the beetle family Hydraenidae (Coleoptera). - *Steenstrupia* 17(1): 1-52.
- PERKINS, P.D., 1980: Aquatic beetles of the family Hydraenidae in the Western Hemisphere: Classification, Biogeography and inferred phylogeny (Insecta: Coleoptera). - *Quaestiones Entomologicae* 16: 3-554.

Dr. Manfred A. JÄCH  
*Naturhistorisches Museum, Burgring 7, A - 1014 Wien, Austria*

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Koleopterologische Rundschau](#)

Jahr/Year: 1994

Band/Volume: [64\\_1994](#)

Autor(en)/Author(s): Jäch Manfred A.

Artikel/Article: [Description of Gondraena gen.n. from South India and Madagascar and Davidraena gen.n. from South India \(Hydraenidae\). 85-102](#)