

**A NEW GENUS OF CAELOSTOMINI (COLEOPTERA: CARABIDAE)  
FROM PAPUA NEW GUINEA**

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**Abstract**

The ground beetle (Coleoptera: Carabidae: Caelostomini) *Stegazopteryx ivimkaensis* **new genus and species**, is described from Ivimka Research Station, New Guinea. Its highly modified elytral form separates this species from all others in the tribe. Only *Diachipteryx* Straneo from Africa has somewhat similarly modified elytra.

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While sorting pterostichine-like material in the Bohart Museum of Entomology collection, University of California, Davis, I encountered a unique specimen of a caelostomine ground beetle, which is divergent in form from all other described genera in the tribe. Subsequently a second specimen was discovered in the California Academy of Science, San Francisco collection. By virtue of its modified elytral apex this species represents a remarkable element in the carabid fauna of New Guinea.

Taxa included in Caelostomini (Lorenz 1998; Liebherr 1986) are distributed from northern Australia, north to southern Japan, west across the Oriental region, Madagascar, Sub-Saharan Africa, the West Indies and Central America. Most species are described from Africa and tropical Asia.

Like the new species described here, the majority of species include small to medium sized beetles (4–14 mm) that are concolorous piceus to brown, more or less shiny and generally iridescent. Most are convex and compactly built, with prominent eyes and porrect mandibles. Straneo (1938, 1942) detailed the characteristics and variation of the included taxa.

The reversed position of the aedeagus, relative to most Carabidae (Straneo 1938), is considered a significant synapomorphy for a clade including most taxa in Caelostomini. Though these taxa seem to be part of a separate lineage, authors have frequently treated Caelostomini as a group within Pterostichini *auct.* (Bousquet and Laroche 1993; Straneo 1938; Liebherr 1986). No synapomorphies are known for Pterostichini as presently conceived, however, and it contains several distinctive lineages, *e.g.*, Loxandriini, Abacetini and Caelostomini. None of these share any clear synapomorphies with taxa included in Pterostichina (Will 2000). No general treatment of the relationships for the genera included in Caelostomini exists. However, Straneo (1942) and Liebherr (1986) provided a good starting point and some ideas of relationships among included taxa.

**Materials and Methods**

All methods and terms follow procedures and usage outlined by Will (2002). I have studied in detail, including dissections or cursory examination, exemplars of nearly all genera of Caelostomini. Material was obtained through loans from or visits to the institutions listed below. Additional comparative material was collected during fieldwork in Malaysia, Madagascar and South Africa. Sources of material: Museo de Civico, Milano, Italy (including Straneo Collection) [MCHN], Maritzio Pavazi; Museum of Comparative Zoology, Harvard University, Cambridge Mass., [MCZ.],

Phil Perkins; Essig Museum of Entomology, University of California, Berkeley, Ca. [EMEC], Cheryl Barr; Bohart Museum of Entomology, University of California, Davis, Ca. [UCDC] Lynn Kimsey and Steve Heydon; Carnegie Museum of Natural History, Pittsburgh, Pa. [CMNH], Robert Davidson; California Academy of Sciences, San Francisco, Ca. [CASC], David Kavanaugh and Roberta Brett; Musee Royal de l'Afrique Centrale, Tervuren, Belgium [MRAC]; Parc Botanique et Zoologique de Tsimbazaza, Madagascar, Antananarivo [PBZT], Balsama Rajemison.

### Taxonomy

#### *Stegazopteryx* new genus

**Type-species.** *Stegazopteryx ivimkaensis* Will, new species.

**Description.** As this is a monotypic genus, the description of the type species is sufficient as the description for the genus.

#### *Stegazopteryx ivimkaensis* Will, new species

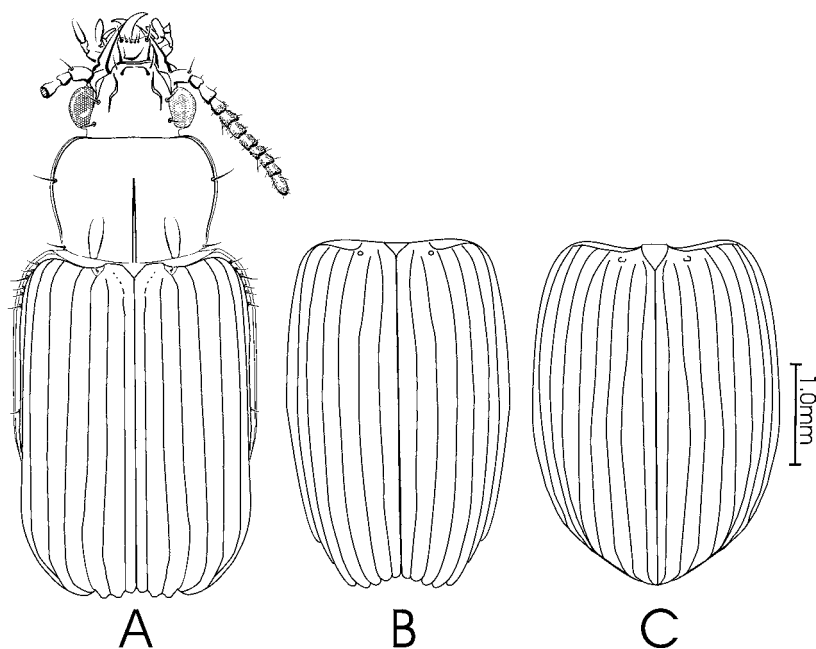
**Type Material.** Holotype; female; deposited UCDC. Labeled: "PAPUA NEW GUINEA GULF; Ivimka Res. Station, Lakekamu Basin 120 m 7°44'S 146°30'E 24.XI.1999 S.L. Heydon Hg-vapor light"/"Holotype *Stegazopteryx ivimkaensis* Will 2003 [red label]". Type has damaged right palpi, broken left antenna (three basal segments remain), left hind leg is glued to point. PARATYPE; female; deposited CASC. "Maffin Bay, Dutch N. Guinea, IX-44, E.S. Ross Coll./ Caelostomus subsinuatusC [sic] det. Darl. 60." [approximate location—1°56'S 138°50'E]

**Diagnosis.** The form of the apex of the elytra (Fig. 1) separates this genus and species from all other Caelostomini.

**Description.** Small size, overall length 5.2 mm. Deep brown color, shiny and iridescent throughout body, dorsally and ventrally. Palpi, labrum, antennae and legs, except femora, paler and more ferruginous than venter. Mandibles concolorous with body.

**Head.** Ocular ratio (width over eyes/width between eyes at level of anterior supraorbital setae) 1.67. Eyes prominent and hemispherical. Two pair supraorbital setae. Microsculpture on disc and clypeus lightly impressed reticulate microlines. Frontal impressions sharp, divergently sinuate turning parallel just before front supraorbital setae. Mentum clearly broader than long, anterior margin deeply emarginate; epilobes broadly bordered; mentum tooth apex simple, rounded; paramedial pits moderately deep; one paramedial pair of setae subtends mentum tooth. Submental suture present. Submentum with 2 pairs of lateral setae. Maxillae each with seta in middle of palpifer, stipes with one subapical seta; galae fusiform; lacinia heavily built with few, large spines; penultimate palpomere small, about 2 length of terminal palpomere. Palpomerites fusiform, glabrous except for two setae on penultimate labial palpomere. One pair of long apical setae on ligular glossal sclerite, apical edge bluntly truncate. Paraglossae free, long and glabrous. Labrum with 6 setae on slightly emarginate apical margin. Clypeus truncate, with one seta at each apical corner. Mandibles relatively long, moderately curved. Antennae rather short, just reaching base of pronotum; antennomeres 1–3 and base of 4 glabrous except for one long, apical seta on 1–2, three setae on 3 and three longer and a field of sparse smaller setae on the apical 1/3 of 4, antennomeres 5–11, clearly broader than long, laterally densely pubescent, medially nearly glabrous and shiny.

**Thorax.** Pronotum clearly broader than head; two pairs of lateral setae, one pair slightly forward of middle set in narrow marginal groove, one pair at terminus of lateral bead at hind angles. Lateral marginal bead evenly narrow throughout; lateral margins sinuate to hind angles; hind angles nearly right-angled and minutely denticulate; apical angles not produced. Basal margin convex medially. Microsculpture scarcely visible, transversely stretched, more effaced on disc and near apical margin; surface shiny iridescent. Basal impressions deep, broad, slightly convergent and reaching more than 1/3 the length of the pronotum. Elytra elongate, rectangular, bluntly truncate at apex; microsculpture as on pronotum. Striae well impressed, shallowly punctate. Parascutellar stria present, connected to stria 1. Base of stria 1 absent. Stria 2 ends short of basal margin. Basal



**Fig. 1.** Line drawings of Coelostomini. **A)** Type specimen, habitus of *Stegazopteryx ivimkaensis*; **B)** Elytra of *Diachipteryx paradoxus* Alluaud (based on figure in Straneo 1942); **C)** same of *Caelostomus picipes* MacLeay. B and C with setation omitted.

margin entire. Setigerous puncture at end of stria 3. Intervals slightly convex, 7 and 5 prominently carinate apicolaterally. Umbilicate series "type b" of Straneo (1942), with a group of five punctures near humeri, a small gap and one puncture, a large gap then four punctures, small gap and three punctures, and a single setigerous puncture facing ventrally at apex of carinate interval 7. No dorsal setigerous puncture on elytral disc. Thoracic sterna not punctate. Metepisternum elongate. Metepimeron long and rounded at apex. All trochanters with one seta each. Profemur one seta on posterior face. Protibial antennal cleaning organ well developed, with 2 clip setae; cleaner setal row extending dorsally, ending at slightly larger medial seta; ventral ctenidia well developed; both proximal and distal spurs simple. Protarsomeres in female short, compact, symmetrical shaped, 1 subequal to length of 2 + 3, 1 - 4 with two rows ventral setae; tarsomere 5 glabrous ventrally, two dorsolateral setae. Tarsal claws on all legs smooth. Mesocoxa with one lateral and one medial seta. Mesofemur anterior face with 5 setae; dorsal face with row of 8 setae. Mesotibia with four rows of setae along length; well developed ctenidium. Mesotarsomeres compact, without external sulci, scattered ventral setae mesoapically. Metacoxae with single medial seta each; anterior sulcus complete, straight, appressed to anterior margin. Metatrochanter short, less than half length of femur. Metafemur dorsal face with 2 seta near apex, 2 setae on anterior face. Metatibia with four rows of fine setae. Metatarsomeres compact, nearly globose form, ventrally with scattered mesoapical setae.

**Abdomen.** All visible sterna sparsely and shallowly punctate laterally, 4-6 entirely punctate. Sterna V-VI with shallow basal crenulation. Sterna IV-V with one pair paramedial setae; female with 2 pair, rather deep, subfoviate paramedial setae on 6. Sternum I. Male genitalia unknown, Female genitalia, reproductive tract and defensive gland not dissected.

**Etymology.** The genus name is female gender, formed from Greek *stegazo*, awning and *pteryx* [or *pteryx*], wing, calling attention to the apicolaterally expanded portion of the elytron. The specific epithet is based on the type locality, Ivimka Research Station.

### Systematics

Straneo (1942) and to a lesser degree, Jeannel (1948), made significant contributions to understanding the tribe as a whole. However, the group clearly needs modern revision and the Austral-Asian taxa have never been properly treated taxonomically.

Based on these studies, a combination of characters are found to be typical in Caelostomini; basal puncture of elytron at base of stria 3, angular base of stria 1 absent, setae of palpifer positioned well forward of base and male median lobe oriented to right when in repose (Straneo 1938, 1942 in part). However, one or more of these is not present in some taxa attributed to Caelostomini (*sensu* Straneo 1942 and extended by Liebherr 1986 and Lorenze 1998). These divergent taxa may form a basal grade in the tribe (*e.g.*, likely for *Diceromerus* Chaudoir) or be only distantly related and mistakenly placed in Caelostomini based on general body form (*e.g.*, *Brachidius* Chaudoir, *Cratocerus* Dejean and *Oxyglychus* Straneo). Males are not known for *Stegazopteryx* but the type specimen has all the other characteristics of Caelostomini as listed above.

Given the present state of systematics for the group, the relationship of *Stegazopteryx* to other caelostomine taxa is unclear. In small details, like punctuation and head form, *Stegazopteryx* is similar to *Caelostomus albertisi* Straneo, and it may prove to be closely related to New Guinea species. In addition to the general modification of the elytral apex, *Diachipteryx* and *Stegazopteryx* also share similarly moniliform antennomeres 5–11, otherwise unknown in the tribe, but found in several other carabid taxa, *e.g.*, Morionini.

Identification of specimens is relatively simple. In Darlington's (1962:499) key to New Guinea Pterostichini, *S. ivimkaensis* will run to couplet 3 together with *Caelostomus*. It is readily separated from that genus by the truncate elytral apex.

In Straneo's key to Caelostomini genera and subgenera (1942:41) *S. ivimkaensis* will run to couplet 24(13) with *Diachipteryx*. The modified elytral apex in *Diachipteryx* and *Stegazopteryx* separates them from all other Caelostomine genera, including all genera in Straneo's key, as well as *Caecocaelus* Straneo, *Dromistomus* Jeannel, *Abacaelostus* Straneo, *Leleuporites* Straneo, *Madapelmus* Dajoz, *Pachycaecus* Straneo, *Hannaphota* Landin<sup>1</sup>, *Cyrtolaus* Bates and *Barylaus* Liebherr, caelostomine genera not covered in Straneo's key.

The following will separate *Diachipteryx* and *Stegazopteryx*:

- a. Apex of elytra bluntly truncate not emarginate (Fig. 1A), elytron with interval 7 forming a shelf-like carina apicolaterally; pronotum with mediolateral and basolateral pairs of setae. (New Guinea) ..... *Stegazopteryx ivimkaensis* new species
- a'. Apex of elytra medially emarginate (Fig. 1B), elytron convex apicolaterally, interval seven not pronouncedly carinate; pronotum with only basolateral pair of setae. (Africa) ..... *Diachipteryx paradoxus* Alluaud

### Life History/Habitat

In general, Caelostomini are most frequently collected under the bark of rotten logs (my observations in Malaysia and Madagascar; and Darlington in New Guinea (1962:509)) or in debris that collects in plants well above the forest floor (*e.g.*, in

<sup>1</sup> *H. distincta* is listed by Lorenze (1998) as a member of Caelostomini, however, based on the holotype, it is almost certainly a member of Platynini.

*Pandanus* spp in Madagascar). The peculiar body form of *S. ivimkaensis* suggest it may have a life history unlike other caelostomine ground beetles. The female type was collected at mercury vapor light, so no further details are known for this species. According to Steve Heydon (UCDC), the collector of the type specimen, the light was set up on the front porch of the research station, at the top of a small hill overlooking the basin where there was nothing but virgin lowland tropical rain forest as far as the eye could see. Other pterostichite species associated in samples from the area, that are also thought to be inhabit rotting wood and debris, include *Cosmodiscus rubripictus* Sloane, *Cosmodiscus brunneus* Darlington, *Caelostomus picipes* Macleay, *C. albertisi* and *Brachidius crassicornis* Chaudoir.

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