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A third species of the Oriental ground beetle genus *Chydaeus* Chaudoir from New Guinea

(Insecta, Coleoptera, Carabidae, Harpalinae)

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Chydaeus darlingtoni, spec. nov. is described from central western New Guinea (Papua, former Irian Jaya). Apart from other morphological differences, the new species differs from both described New Guinean species of *Chydaeus* by the presence of well developed flying wings.

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Introduction

Within a sample of carabid beetles collected by A. Weigel (Pössneck) in central Western New Guinea some years ago, a small series of a hitherto unknown species of the Oriental harpaline genus *Chydaeus* Chaudoir was detected which differs in certain respects from both species described from New Guinea (Darlington 1968, 1971), as well as from several Oriental species (e.g. Kataev & Schmidt 2001) and from the single known Australian species (Baehr 2004).

The genus *Chydaeus* belongs to the anisodactyl-line lineage within the carabid subfamily Harpalinae which is mainly characterized by the usually remarkable width of the three basal tarsomeres of protarsus and mesotarsus and their dense, uniform and not biseriate squamosity underneath. Within anisodactylines, *Chydaeus* is characterized by the absence of any setiferous punctures on the disk of the elytra, rather compact built, and the cordiform prothorax bearing a more or less extended basal punctation.

The genus includes about 25 species, most of which occur on the Asiatic mainland from the Nepalese Himalayas in the west to mountains in eastern China and in Japan in the east. Some species inhabit the Indonesian and Philippine islands, one species was recently described from North Queens-

land, Australia, and two species so far were recorded from New Guinea. Almost all species are mountain-living and many occur at very high altitudes, even above tree-line. Many species, therefore, have lost their wings, but those species that still are winged and are able to fly demonstrate that the genus probably has achieved its wide range chiefly by mountain or island hopping of originally winged species which, once arrived at their present range, subsequently became wingless. This applies for both recorded New Guinean species that have lost their wings and possess only scale-like remnants, but not for the single Australian species and the herein described new species which still possess wings that are not or but slightly shortened.

Methods

For the taxonomic treatment standard methods are used. The male genitalia and female stylomeres were removed, after the specimen was soaked for a night in a jar under wet atmosphere, then cleaned for a short while in hot KOH.

Measurements were taken using a stereo microscope with an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Lengths, therefore, may slightly differ from those



Fig. 1. *Chydaeus darlingtoni*, spec. nov. Habitus. Length: 9.8 mm.

taken by other authors. Length of pronotum was measured along midline, width of apex of pronotum at the most projecting part of the apical angles, width of base of pronotum at the extreme tips of the basal angles.

The habitus photograph was obtained by a digital camera using ProgRes Capture Basic and AutoMontage and subsequently was worked with Corel Photo Paint 11.

The types are shared with the collection A. Weigel, Pössneck (CWP) and the working collection of the author in Zoologische Staatssammlung, München (CBM).

***Chydaeus darlingtoni*, spec. nov.**

Figs 1-3

Types. Holotype: ♂, INDONESIA Irian Jaya Wamena, E Habbema Lake / 04°07'S, 138°40'E, 3300 m 20.I.1999 leg. A. Weigel (CBM). – Paratypes: 3♂♂, 4♀♀, same data (CBM, CWP).

Diagnosis. Distinguished from both New Guinean species *Chydaeus papua* Darlington and *C. hinnus* Darlington by presence of well developed flying wings; moreover from *C. papua* by black legs and

antenna and more cordate pronotum; and from *C. hinnus* by longer elytra, wider pronotum with coarse basal margin and coarser and denser basal punctuation.

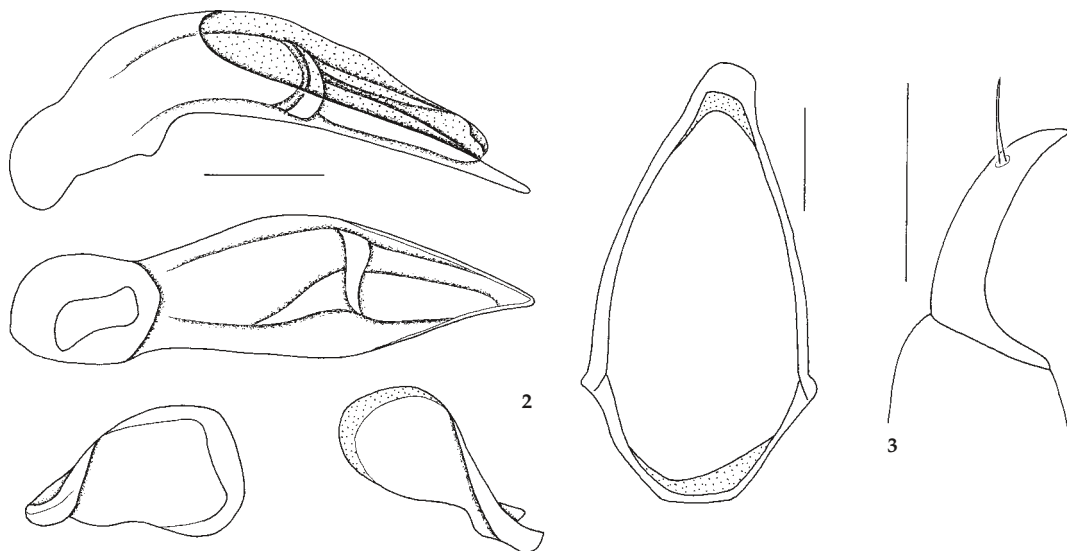
Description

Measurements. Length: 9.3-10.2 mm, width: 3.7-4.0 mm. Ratios. Width/length of pronotum: 1.43-1.50; width of base/width of apex of pronotum: 1.11-1.17; width of pronotum/width of head: 1.30-1.33; length/width of elytra: 1.52-1.56; width of elytra/width of pronotum: 1.24-1.29.

Colour. Upper and lower surfaces including labrum, mandibles, antennae, and legs uniformly black, only palpi reddish.

Head. Of average size. Eyes small, laterally moderately projecting, orbits short, oblique. Clypeus wide and short, bisetose, with a shallow transverse impression shortly behind apex. Mandibles very stout, apex wide, obtuse. Glossa elongate, narrow, bisetose, paraglossae free, surpassing glossa. Mentum with triangular tooth, bisetose behind the tooth. Gula bisetose, setae very elongate. Antenna attaining base of pronotum, pilose from middle of 3rd antennomere. Frons laterally near fronto-clypeal suture with a shallow, circular impression on either side, frontal furrows barely visible. Supraorbital seta somewhat removed from eye to frons. Surface of head rather densely and coarsely punctate-rugulose, apparently without microreticulation, moderately glossy, punctuation becoming weaker and sparser towards neck.

Prothorax. Wide, heart-shaped, widest slightly in front of middle, disk rather convex, somewhat uneven. Apex almost straight, anterior angles barely protruding. Lateral margin in anterior two thirds very convex, in posterior third concave. Base almost straight, laterally slightly oblique, basal angles almost rectangular though faintly obtuse at tip. Apex not margined, base with coarse margin throughout. Lateral border prominent, raised throughout, marginal channel anteriorly narrow, explanate towards apex. Median line shallow, linear, not attaining base. Anterior transverse sulcus shallow though wide, basal transverse sulcus in middle very gently indicated. Basal grooves irregularly linear, merged with the wide latero-basal depressions. Posterior marginal seta absent, anterior marginal pore and seta situated at widest part of pronotum, well removed from lateral margin. Disk sparsely punctate, with several transverse striae. Anterior transverse sulcus, marginal channel, and base with dense and coarse punctuation which is especially rugose in the basal explanations. Surface almost devoid of microreticulation, fairly glossy.



Figs 2,3. *Chydaeus darlingtoni*, spec. nov. **2.** Male genitalia: aedeagus, parameres, genital ring. **3.** Right female stylomere 2 and base of stylomere 1, lateral view. Scales: 0.5 mm.

Elytra. Of average size, laterally little convex, but gently widened towards apical third, dorsally rather convex. Humeri wide, subdentate. Marginal channel narrow. Apex barely sinuate, rounded at the very tip. Striae well impressed, impunctate, becoming shallower towards apex, intervals gently convex. Scutellar stria elongate, posteriorly more or less united with the incurved sutural stria. Scutellar pore and seta present, at base of scutellar stria. No discal setae present. Marginal series consisting of 8 anterior and 10 posterior setae that are barely separated in middle. Intervals with rather sparse, irregular, moderately fine punctures, apparently without any traces of microreticulation. Surface quite glossy. Wings fully developed.

Lower surface. Lower parts of thorax almost impunctate, but densely microreticulate, apparently also impilose. Prosternal process with few short setae at apex. Abdomen impunctate and impilose, except for the very base that is sparsely setose. Metepisternum elongate, almost twice as long as wide. Sternum VII quadrisetose in both sexes.

Legs. Of average size. In males four basal tarsomeres of anterior leg but moderately widened, though covered with dense squamosity. Tarsomeres of median leg comparatively narrow and with very sparse squamosity.

Male genitalia (Fig. 2). Genital ring oval shaped, slightly asymmetric, with elongate, convex basal part. Aedeagus moderately elongate, dorso-ventrally depressed, straight. Lower surface wide, markedly widened towards middle, depressed,

straight, lateral margins distinctly angulate. Apex very slightly asymmetric, triangular, but slightly obtuse at the very tip. Orificium large, very elongate, situated almost completely on upper surface. Internal sac without any sclerotized pieces, with simple folding. Both parameres large and wide, right one almost as large as left one, both with wide, rounded apex and with a wide, hyaline margin around apex, aetose.

Female stylomeres (Fig. 3). Stylomere 2 narrow and elongate, slightly curved, with two elongate, attached dorsal nematiform setae arising from a groove near apex, but without any dorso-median and ventro-lateral ensiform setae. Stylomere 1 narrow, without any spines or setae at apical margin.

Variation. Very slight variation noted in relative shape of pronotum and elytra and in density of the basal pronotal punctation.

Distribution. Central Papua (former Irian Jaya), western New Guinea. Known only from type locality.

Collecting circumstances. Collected on the ground at high altitude of about 3300 m.

Etymology. The name is a patronym in honour of the late P. J. Darlington Jr., the unequalled authority of New Guinean carabid beetles.

Remarks. Because no phylogenetic study of the genus *Chydaeus* is available, the relationships of the new species are difficult to determine, the more,

because in this genus the majority of the species is highly similar in external shape and structure. Even when the male genitalia of both described New Guinean species unfortunately are unknown so far, the new species yet differs considerably in certain external characters from both, and moreover it is different in being still fully winged. However, like its New Guinean congeners it has been so far sampled only at high altitude, probably on montane meadows above tree line. Why this species – in spite of its alpine habits – did not yet have lost its flying ability, or at least, its functional flying wings, is obscure. It shares the well developed flying wings with the single known Australian species but according to external morphological characters probably is not very closely related to the latter.

It has been suggested by Darlington (1968) that the genus *Chydaeus* has gained its wide range that covers almost the whole Oriental Region and the tropical parts of the Papuan-Australian Region, by means of island- and/or mountain hopping range extension which, however, is only possible if beetles still capable of flight are involved. It seems then, that the many flightless species should have lost rapidly their flying abilities soon after having reached the mountain tops where they now live. Detection of a fully winged species high up on mountains in Irian Jaya hence could suggest a rather recent arrival of this species at its present range. With respect to *D. darlingtoni*, however, which occurs right in the centre of Irian Jaya, this would mean a rather wide step from the nearest possible relatives on the Lesser Sunda Islands or the Moluccas. For this rea-

son it would be very interesting to search for additional *Chydaeus* species in the high mountains of far western New Guinea, e.g. in the Nassau Range or even further west on Vogelkop Peninsula.

Acknowledgement

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