

A new species of *Chlaenius* subgen. *Sphodromimus* CASALE, 1984 (Coleoptera: Carabidae) from the Philippines

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Abstract

The ground beetle species *Chlaenius* (*Sphodromimus*) *donabaueri* sp.n. is described and illustrated. The new species was discovered on the slopes of Mount Amuyao in Mountain Province, the same province from where the first Philippine record of the subgenus, *Chlaenius* (*Sphodromimus*) *luzoensis* (BRUNK, 2015), originates. The two species are compared in detail.

Key words: ground beetles, Chlaeniini, *Vachinius*, taxonomy, endemism, Luzon.

Zusammenfassung

Die Laufkäferart *Chlaenius* (*Sphodromimus*) *donabaueri* sp.n. wird beschrieben und abgebildet. Diese neue Spezies wurden an den Hängen des Mount Amuyao in der Mountain Province entdeckt, von der selben Provinz, aus der auch der erste philippinische Nachweis der Untergattung, *Chlaenius* (*Sphodromimus*) *luzoensis* (BRUNK, 2015), stammt. Die beiden Arten werden im Detail verglichen.

Introduction

CASALE (1984) described four new Asian species of the Chlaeniini with Sphodrini-like habitus and erected the new genus *Vachinius* CASALE, 1984 and the new subgenus *Sphodromimus* CASALE, 1984 for them. Following the catalogue by LORENZ (2020), *Vachinius* presently contains twelve species. Eleven species inhabit restricted distributional areas on the Asian mainland from the Himalayas eastwards to south-eastern China and the Tonkin Gulf. A single isolated species was described from Luzon in the Philippines (BRUNK 2015). It can be concluded that flightlessness – all species have reduced hindwings – has caused geographical isolation and considerable regional endemism. However, due to its questionable morphological separation and the rareness of findings, the distribution of *Vachinius* and *Sphodromimus* – and included species as well – is incompletely known. Most species were only recorded from their respective type locality, some are only known by the holotype.

The rank of *Vachinius* as a distinct genus or a subgenus of *Chlaenius* BONELLI, 1810 and the relationship of *Vachinius* and *Sphodromimus* with *Chlaenius* subgenus *Haplochlaenius* LUTSHNIK, 1933 were controversially discussed (see, e.g., CASALE 1984, KIRSCHENHOFER 2012, WRASE 2012, BRUNK 2015, AZADBAKHSH & KIRSCHENHOFER 2019), depending on the weighting of different morphological characters. In the most recent morphological study, AZADBAKHSH & KIRSCHENHOFER (2019) placed both *Vachinius* and *Sphodromimus* as subgenera within *Chlaenius*.

The first record of “*Vachinius*” from the Philippines was published by BRUNK (2015): He described *Vachinius (Sphodromimus) luzoensis* from a single female reportedly collected in the Mountain Province without further locality information. In the present study, I describe a second species of *Sphodromimus*, which originates from the same province, but differs by several characteristics.

Material and methods

The type series consists of three dry-mounted specimens glued on card boards in the author’s collection. The genitalia of the male and of one female were dissected. The genitalia of the female were cleared in lactic acid.

Verbal description, measurements, and character selection for illustrations widely follow BRUNK (2015), who described the most similar species. Measurements are given in millimetres.

Acronyms for measurements and indices (partly deviating from BRUNK 2015):

- BL Overall body length, measured medially from anterior margin of labrum to apex of elytra.
- BW Maximum body width, measured over elytra (= EWM in BRUNK 2015)
- HL Length of head, measured on left side, from base of left mandible to posterior margin of compound eye.
- HW Maximum head width, measured in dorsal view including eyes.
- PL Pronotum length, measured along midline.
- PWm Maximum pronotum width, measured in dorsal view.
- PWb Width of pronotum base, measured in dorsal view.
- EL Elytron length, measured from basal ridge to apex.
- BI Body index: BL / BW
- PI1 Pronotum index 1: PWm / PL
- PI2 Pronotum index 2: PWm / PWb
- EI Elytra index: EL / BW

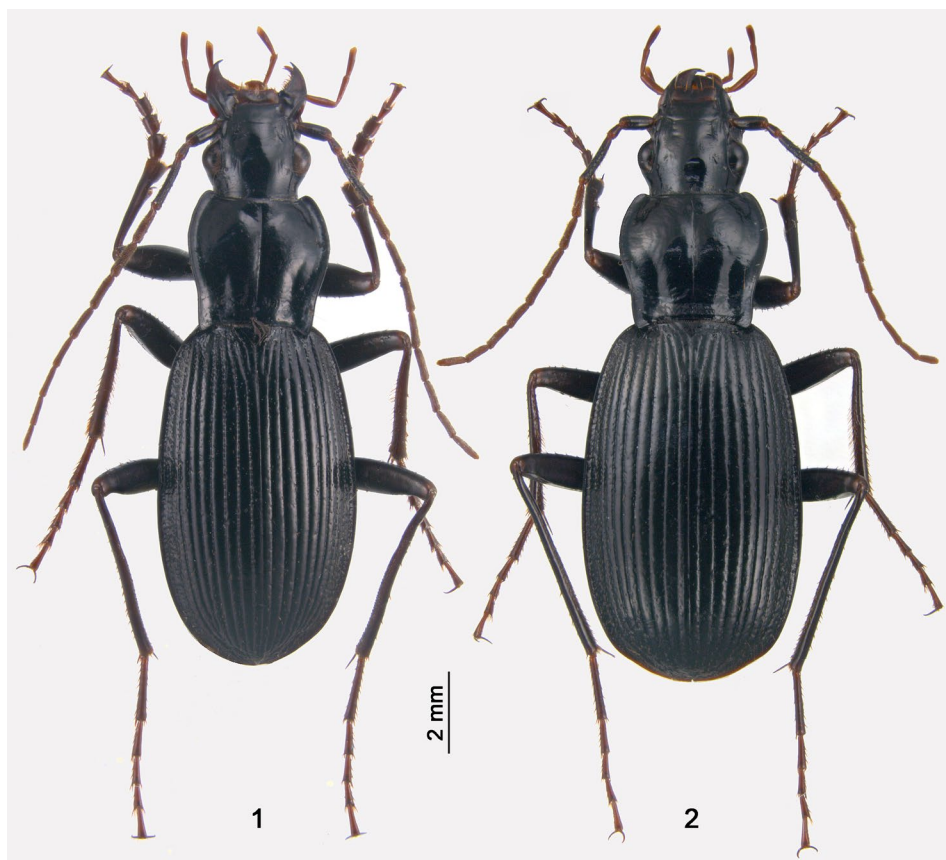
Stacked digital images were taken with a Leica DFC490 camera attached to a Leica Z16 APO zoom microscope, using Leica Application Suite V3. Images were stacked with ZereneStacker 64-bit, and processed with Adobe Photoshop 7.0.

Taxonomy

***Chlaenius (Sphodromimus) donabaueri* sp.n.** (Figs. 1–7)

Type material: Holotype (male) and paratypes (2 females) from Philippines, Luzon Island, Mountain Province, Mt. Amuyao, June 12–14, leg. C. V. Pangantihon, in the author’s collection.

Notes on the type area: Mount Amuyao is part of the Cordillera Central in the north of Luzon Island and is located at the border between Mountain Province and Ifugao. Its peak is 2702 m a.s.l. (elevation of collecting site not recorded).



Figs. 1–2: Habitus, dorsal view, of *Chlaenius (Sphodromimus) donabaueri* sp.n.: (1) holotype, male; (2) paratype, female.

Description of male: Measurements: BL 14.6; BW 5.1; HL 1.5; HW 2.8; PL 3.1; PWm 3.6; PWb 2.9; EL 8.7; BI 2.85; PII 1.17; PI2 1.28; EI 1.70.

Colour: Black; margins of labrum, maxillae, maxillary and labial palpomeres rufous. Antenna rufous brown, except antennomeres 1 to 3 chiefly black. Legs basally black, distally rufous brown; protochanter and mesotrochanter rufotestaceous, strongly contrasting with black femur base.

Structures: Dorsum almost glabrous, with hardly discernible microstructure, shiny; venter smooth and shiny. Head medium-sized; maximum width clearly narrower than pronotum and slightly narrower than pronotum base. Head glabrous, smooth except for some dispersed, minute, hardly visible punctures; at neck the punctures slightly denser, but shallow. One supraorbital seta. Sharp, parallel dorsolateral ridges expanding from mandible base to posterior third of compound eye. Temple short, about one third as long as eye. Frons laterally with a few low wrinkles. Clypeus smooth, with one pair of lateral setae. Labrum with broadly concave anterior margin, dorsally with very fine isodiametric microsculpture and six submarginal setae, ventrally with numerous setae, most of them anterolaterally. Antennomeres: Scapus (excluding condylus) 2.0 times as long as anten-

nomere 2, third antennomere 3.2 times as long as antennomere 2 and 1.55 times as long as antennomere 4. Scapus with a single dorsoapical seta; antennomere 2 with ring of apical setae; antennomere 3 with many scattered setae all over surface (except extreme base); antennomeres 4–11 densely pubescent. Mouthparts (Fig. 3): Mandibles short and stout; basolateral groove deep and wide. Maxillary palpus asetose. Penultimate segment of labial palpus with two setae near middle and ring of five apical setae. Mentum with well developed, bifid tooth, with one pair of setae very close to basal margin of mentum tooth. Submentum with two grooves at base, bisetose. Ligula with one pair of apical setae. Paraglossae membranous, pointed, slightly surpassing apex of ligula.

Pronotum cordiform, strongly narrowed towards base. Anterior corners of pronotum roundly protruding, posterior corners strongly protruding posteriorly. Disc of pronotum weakly convex; median line fine, attaining neither apex nor base, expanding in a Y-shaped impression towards anterior angles. Lateral groove broad and shallow, slightly widened towards base. One lateral seta at posterior fifth of length of side margin; anterior seta lacking. Scattered minute punctures as on head. Sparse setiferous punctures bearing short, light brown setae, present on basal foveae, somewhat expanding towards middle of base.

Elytra slender, almost elliptical, maximum width at mid-length. Shoulders flat and rounded. Apex without subapical concavity. Basal margin reaching medially base of stria 4. Striae as regular grooves, with very fine, inconspicuous, non-setiferous punctures; stria 8 and marginal stria considerably weaker. Scutellar stria well developed, scutellary puncture small, at base of stria 1. Stria 1 not reaching base. Elytral intervals flat, with a fine irregular setiferous puncturation; intervals 1–6 only with very scattered punctures, 7 denser, 8–10 very dense. Setiferous punctures on elytrae larger than on pronotum. Epipleuron not reaching apex. A few sparse, erect setae about as long as width of intervals; a row of longer setae on interval 9.

Hind wings reduced. Legs long and slender. Protibia without sulcus. Protarsomeres 1–3 moderately widened, each approximately 1.4–1.5 times as long as wide. Trochanter simple and rounded, metatrochanter length about one third of metafemur length. Claws simple, crescent-shaped, very slender.

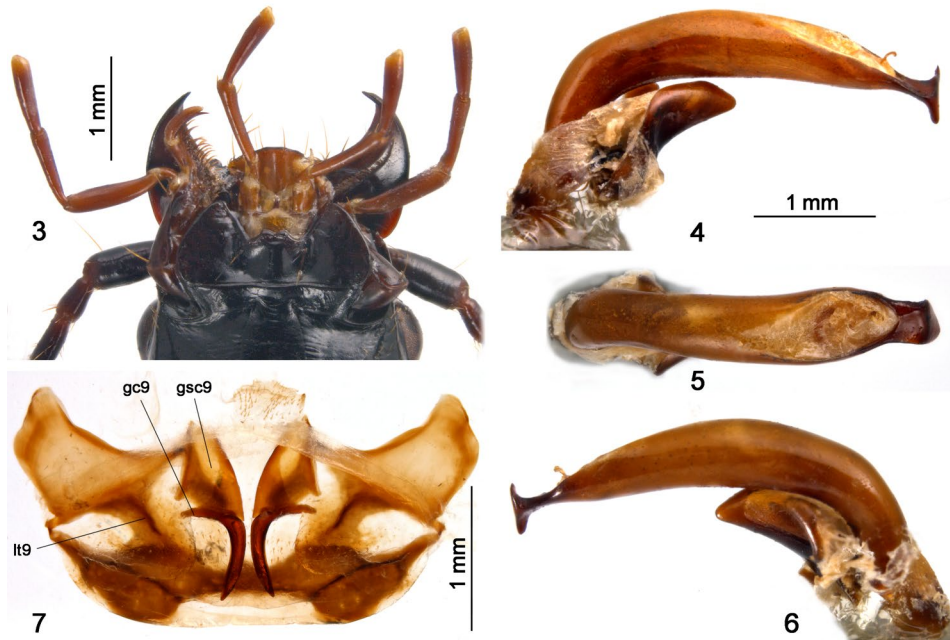
Ventral side: Head and prothorax smooth; mesothorax and metathorax with fine, but rather distinct puncturation; abdominal sterna medially with minute scattered punctures in addition to setiferous pores, but anteriorly and laterally punctures slightly larger and denser. Prosternal process lanceolate, with rounded apex in ventral view; posterior margin straight and bearing short setae in lateral view. sterna bisetose, except last visible sternum quadrisetose.

Genitalia (Figs. 4–6): Median lobe of aedeagus stout, curved at base, then almost straight; apex with transverse plate protruding dorsally and laterally. Parameres approximately semi-ovate, apices rounded; right one shorter and much narrower than left one.

Description of female: Measurements (n = 2; smaller specimen first): BL 15.0, 15.1; BW 5.7, 5.8; HL 1.5, 1.6; HW 2.9, 3.0; PL 3.2, 3.4; PWm 3.8, 3.9; PWb 3.0, 3.1; EL 9.0, 9.1; BI 2.65, 2.62; PII 1.17, 1.14; PI2 1.26, 1.23; EI 1.59, 1.58. Slightly larger than the male, with stouter body, especially stouter elytra.

Colour as in male.

Structures: Habitus slightly stouter than in male; elytra posteriorly slightly wider. Puncturation of head base and pronotum slightly stronger, more distinct than in male, on pronotum



Figs. 3–7: Morphological details of *Chlaenius (Sphodromimus) donabaueri* sp.n.: (3) mouth parts of holotype, ventral view; (4–6) medial lobe of aedeagus and parameres of holotype, in left side view (4), dorsal view (5), and right side view (6); (7) genitalia of female: gonocoxite 9 (gc9), gonosubcoxite 9 (gsc9), laterotergite 9 (lt9).

more extended onto disc. Microsculpture of elytra slightly more distinct than in male, especially posteriorly, but still very shiny. Protarsomeres slender.

Genitalia (Fig. 7): Gonosubcoxite 9 and gonocoxite 9 separated by an articulating membrane. Gonocoxite 9 glabrous, boomerang-shaped in dorsal view; distal part only slightly wider than proximal part (in lateral view appearing wider than in dorsal view); apex evenly narrowed, not bent. Gonosubcoxite 9 sclerotized, glabrous, longer than wide, laterally with tooth. Laterotergite 9 wider than long, only medially sclerotized, laterally membranous; apex with a few small grooves. Terminal tergite strongly sclerotized, posteriorly membranous.

Comparative notes: *Chlaenius donabaueri* sp.n. is placed in the subgenus *Sphodromimus* based on the characteristics of a *Sphodrina*-like habitus, a developed bifid mentum tooth (Fig. 3), absent anterior seta on pronotum, punctured and setose elytral intervals (Figs. 1–2), and modification of the apex of the median lobe of aedeagus (Figs. 4–6; compare CASALE 1984, BRUNK 2015). CASALE (1984) also listed a sulcus on the protibia as a diagnostic character of *Sphodromimus*; this character is missing in both *C. luzoensis* (see BRUNK 2015) and *C. donabaueri* sp.n.

The structures of the pronotum (strongly cordiform, protruded anterior and posterior corners, reduced puncturation) place *C. donabaueri* sp.n. in close vicinity to *C. luzoensis*, a species also described from Luzon Island. Main differences between these two species are found in size (*C. luzoensis*: BL = 19.8; BW = 7.2; PWm = 4.4 etc.), body shape (*C. luzoensis*: BI = 2.75), shape of prosternal process (with short emargination in *C. luzoensis*),

shape of elytra (anteriorly more strongly narrowed than posteriorly and subapically with slight concavity in *C. luzoensis*), puncturation of elytral intervals (more regular in *C. luzoensis*), microsculpture (more distinct in *C. luzoensis*) etc. There are also differences in the shape of the females gonocoxite 9, which is comparatively stout in *C. luzoensis* (comp. Fig. 7 with BRUNK 2015: fig. 4).

The structures of the male's genitalia of *C. donabaueri* sp.n., especially the hooked apex of the median lobe, resemble those of *C. pilosus* (CASALE, 1984) (comp. CASALE 1984: fig. 11), but the median lobe is not sinuate in lateral view, and the right paramere lacks an angle. Very similar configurations are also found in some species of *Chlaenius* (*Haplochlaenius*) (see, e.g., WRASE 2012). The male of *C. luzoensis* is still unknown.

Further notes: The holotype bears some black fungi of Laboulbeniales on the pronotum.

Etymology: This new species is dedicated to my friend Martin Donabauer, an expert for Trechini.

Discussion

It is evident from the more recent publications (e.g., WRASE 2012, BRUNK 2015, AZADBAKHSH & KIRSCHENHOFER 2019) that the relationships of the taxa *Vachinius*, *Sphodromimus*, and *Haplochlaenius* LUTSHNIK, 1933 need further attention, possibly – as suggested by WRASE (2012) – by combining morphological and molecular data. I suspect that the “Sphodrina-like” habitus (slender body, long and slender antennae and legs, cordiform pronotum, flat humeri, etc.) which led to the description of *Vachinius* by CASALE (1984) might be strongly adaptive to a certain (still unknown) mode of life, and that such a habitus may have evolved from *Chlaenius*-like ancestors multiple times independently. If this is true, the inclusion of *Vachinius* in *Chlaenius*, as proposed by AZADBAKHSH & KIRSCHENHOFER (2019), is justified.

With the exception of tiger beetles, ranked as a subfamily of Carabidae by some authors, but as a separate family by others, the Philippine fauna of Carabidae is only fragmentarily known. The Philippines are well-known for their insect endemism, and more research on its ground beetle diversity will certainly lead to the discovery of many endemic species. It is regrettable that no local entomologist finds an interest in this diverse group, although ground beetles are appreciated as excellent indicators for environmental changes in forested and wet habitats in other parts of our planet, and both collecting and analysing methods are well developed.

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