

Four new species of *Desmopachria* Babington from Peru (Coleoptera: Dytiscidae)

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Abstract

Four new species in the genus *Desmopachria* Babington are described from Madre de Dios, Peru: *D. pilosa* Miller, **n. sp.** (*D. convexa* species group), *D. balionota* Miller, **n. sp.** (*D. nitida* species group), *D. annae* Miller, **n. sp.** (*D. nitida* species group), and *D. tambopatensis* Miller, **n. sp.** (ungrouped). Diagnostic characters, including habitus and male genitalia, are described and illustrated.

Key words: Neotropical, diving beetle, phylogeny, rain forest

Introduction

The genus *Desmopachria* Babington is one of the largest New World genera of diving beetles with 92 known species known prior to this paper (Nilsson 2001). Because of work by Young and Miller, known species of *Desmopachria* are identifiable and new species can be recognized and described within the context of standardized character systems, illustrations and diagnoses (see Miller (2001) and references therein). The species were historically organized into subgenera, but Miller (2001) revised the group by synonymizing the subgenera and erecting informal species-group names because of evident paraphyly of some of the subgenera and uncertain subgeneric assignment of a large number of species. The species groups are identifiable using a combination of external features and those of male genitalia, but species within each group are identifiable primarily using characters of the male genitalia. Dissections of males of these diminutive organisms are difficult, but necessary for most identifications.

Species of *Desmopachria* are common members of the Neotropical and southern Nearctic faunas, and they occur in a variety of habitats including ponds, streams, forest pools, bromeliads, and tree hole pools. Specimens regularly come to black lights and

mercury vapor lamps, often in large numbers. New species are regularly encountered, and it seems likely that the true number of species is significantly higher than currently known. These four species were collected in dense tropical forest at mercury vapor lamps. Numerous habitats were sampled in the Tambopata area, but relatively few *Desmopachria* were collected, and they were species already described. It seems likely that these small animals are relatively cryptic, but that their tendency to disperse makes light trapping an effective way to collect them.

Materials and Methods

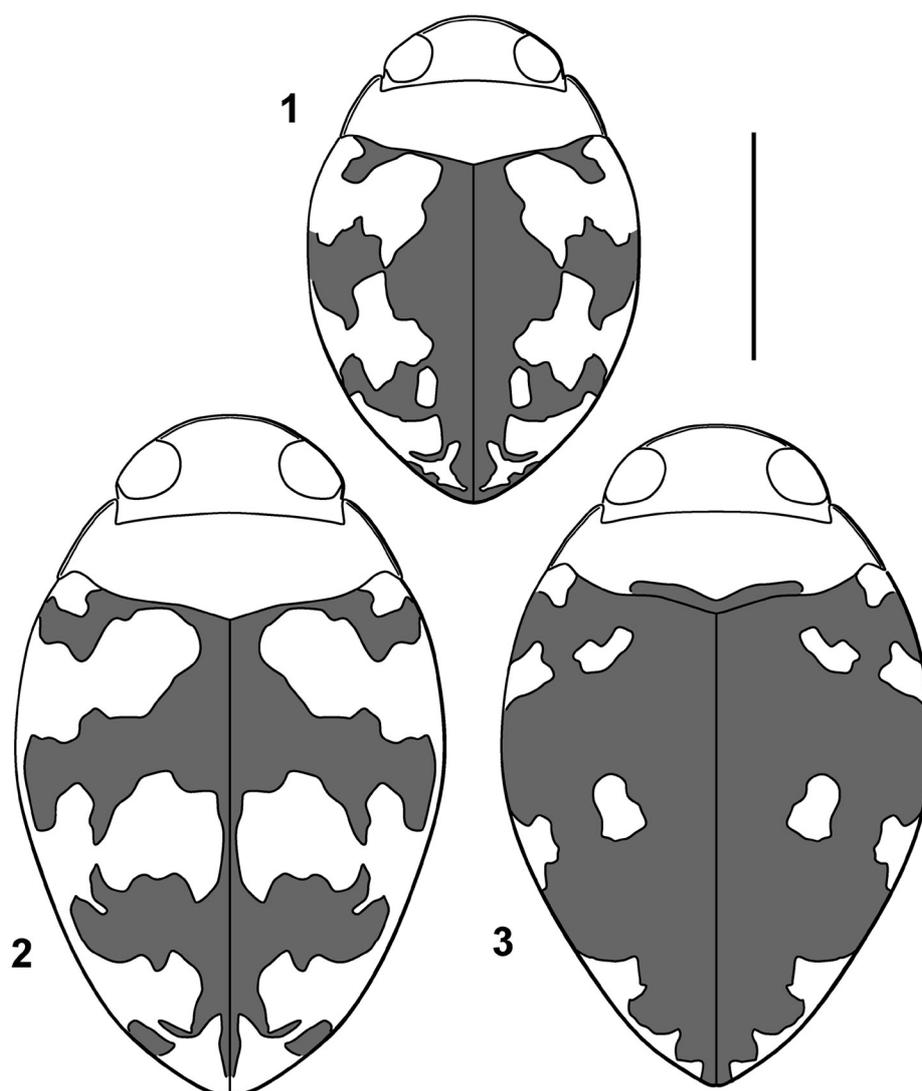
Measurements were obtained using an ocular scale on a Wild M3C dissecting microscope. Only intact specimens were measured. The total length (TL) and greatest width (GW) of specimens are provided, including the range and mean. The ratio TL/GW is provided to give an indication of shape.

This project is based on the study of specimens collected in Tambopata, Madre de Dios, Peru. Holotypes and paratypes are deposited in the United States National Museum, Smithsonian Institution, Washington, DC, USA (curator, T. Erwin). Paratypes are also deposited at the Museo de Historia Natural, Universidad Mayor de San Marcos, Lima, Peru and in the author's collection. At this time, only males of *Desmopachria* can be identified with certainty since females of most species are not described. For this reason, these descriptions emphasize males which can be identified through dissection of genitalia.

Desmopachria pilosa Miller, new species

(Figs. 1, 4, 5)

Diagnosis. This species is a member of the *D. convexa* group since it possesses a small, articlable process subapically on the lateral lobe (Figs. 4, 5). It can be distinguished from other species in the genus by the following combination of characters: 1) exceptionally small size (TL = 1.12–1.15mm, Fig.1), 2) elytron light brown with distinctive, characteristic yellow maculae (Fig. 1), 3) abdominal ventrite VI thickly beset with long, pale setae, and 4) male genitalia distinctive with median lobe short and apically sharply pointed and lateral lobe apically broad and with a small, articlable process subapically (Figs. 4, 5).



FIGURES 1–3. *Desmopachria* species, habiti: 1—*D. pilosa*; 2—*D. balionota*; 3—*D. annae*. Scale bar = 1 mm.

Description. *Measurements.* TL = 1.12–1.15 mm; GW = 0.75–0.78 mm; TL/GW = 1.46–1.51. *Habitus.* Size extremely small; body robust, broadly rounded laterally, not attenuate posteriorly; greatest width medially; slightly dorsoventrally flattened. *Coloration.* Head and pronotum yellow; elytron light brown with prominent, irregular yellow maculae anteriorly, near humeral angle, medially and near apex (Fig.1). Antennae, palpi, sterna and legs yellow. *Sculpture and structure.* Head with very fine, scattered punctures; anterior clypeal margin dorsoventrally compressed and distinctly beaded across entire margin between eyes; antennae moderately short, scape and pedicel enlarged, antennomeres VI–X short and broadly expanded. Pronotum short, broad, very finely and

inconspicuously punctate; without basal striae; lateral pronotal margins rounded; lateral bead very narrow. Elytron very finely and obscurely punctate; epipleuron not punctate. Prosternum very short, with small posteromedial tubercle. Prosternal process moderately broad medially, broadly angulate apically. Metasternum, metacoxae and abdomen with few, scattered, fine punctures. Posteromedial margins of abdominal sterna IV–V with long setae, surface of abdominal sterna VI densely beset with long, pale setae. Legs not modified. *Male genitalia* (Figs. 4, 5). Median lobe in dorsal aspect short, membranous, straight, unmodified (Fig. 4); in lateral aspect straight, apically narrowly rounded, unmodified. Lateral lobe in dorsal aspect moderately broad in basal half, gradually narrowed in apical half, elongate, straight, apex slightly expanded laterally, truncate, with small articable process subapically on ventral surface (Fig. 4), in lateral aspect broad in basal two-thirds, apical one-third narrowed, apex narrowly rounded, slightly flexed dorsad (Fig. 5).

Etymology. The specific epithet is Latin adjective *pilosus*, *-a*, *-um*, meaning “hairy” or “shaggy,” referring to the prominent pilosity on the surface of abdominal ventrite VI.

Discussion. This species is part of the large *D. convexa* species group which now includes 17 species. The group is characterized by a small, articable process on the male lateral lobes (e.g. Figs. 4, 5). The species were revised by Young (1981) and species can be identified using his revision and the review of *Desmopachria* by Miller (2001).

Material Examined. *Holotype*: ♂ labeled, “PERU: Rio Tambopata Explorer’s Inn – jct. Rio Tower 12°50’12”S 069°17’36”W 10 Dec 2003 K.B. Miller /HOLOTYPE *Desmopachria pilosa* K.B. Miller, 2004 [red label with double black line border].” *Paratypes*: 6, same data as holotype except “.../ PARATYPE *Desmopachria pilosa* K.B. Miller, 2004 [blue label with black line border].”

***Desmopachria balionota* Miller, new species**
(Figs. 2, 6–9)

Diagnosis. This species is a member of the *D. nitida* group since it has the male lateral lobes very robust and with a deep emargination (Figs. 8, 9). It can be distinguished from others by the prominently maculate elytra (Fig. 2) and the male genitalia (Figs. 6–9). The median lobe in lateral aspect is very distinctive with an elongate, slender basal portion, a medial angulate expansion where the median lobe abruptly bends dorsad, and a terminal elongate, very slender, finely pointed apex (Fig. 7).

Description. *Measurements.* TL = 1.46–1.53 mm; GW = 0.96–0.99 mm; TL/GW = 1.52–1.58. *Habitus.* Size relatively small; body robust, broadly rounded laterally, slightly attenuate posteriorly; greatest width medially. *Coloration.* Head and pronotum yellow; elytron light brown with prominent, irregular yellow maculae anteriorly, near humeral angle, medially and apically (Fig. 2). Antennae, palpi, sterna and legs yellow. *Sculpture and structure.* Head with very fine, scattered punctures; anterior clypeal margin

dorsoventrally compressed and distinctly beaded across entire margin between eyes; antennae moderately short, scape and pedicel enlarged, antennomeres VI–X short and broadly expanded. Pronotum moderately short, broad, very finely and inconspicuously punctate, slightly more coarsely punctate along posterior margins; without basal striae; lateral pronotal margins rounded; lateral bead narrow. Elytron very finely and obscurely punctate; epipleuron not punctate. Prosternum very short, with very small posteromedial tubercle. Prosternal process moderately broad, broadly angulate apically. Metasternum, metacoxae and abdomen with few, scattered, fine punctures. Posteromedial surface of abdominal ventrite IV with a distinct subapical crease or groove. Legs not modified. *Male genitalia* (Figs.6–9). Median lobe in dorsal aspect elongate, subapically expanded, apically narrowed to very elongate, sharp point (Fig. 6); in lateral aspect straight and very slender in basal half, abruptly expanded medially with prominently angulate ventral margin, abruptly curved dorsad, apically narrowed to very elongate, sharp point (Fig.7). Lateral lobe in dorsal aspect robust, medially narrowed along medial margin, apically expanded, apex divided into two broad processes, ventral process apically broadly rounded and bearing setae (Fig.8), in lateral aspect very broad basally, medially abruptly curved dorsad, apex robust, broad, terminating in two broad lobes, ventral lobe elongate, parallel-sided, apically broadly rounded (Fig.9).

Etymology. The specific epithet is a Latinized adjective composed of the Greek adjective *balios*, meaning “spotted” or “dappled,” and the noun *notum* or *notus*, meaning “back,” and refers to the maculation on the elytra of this species.

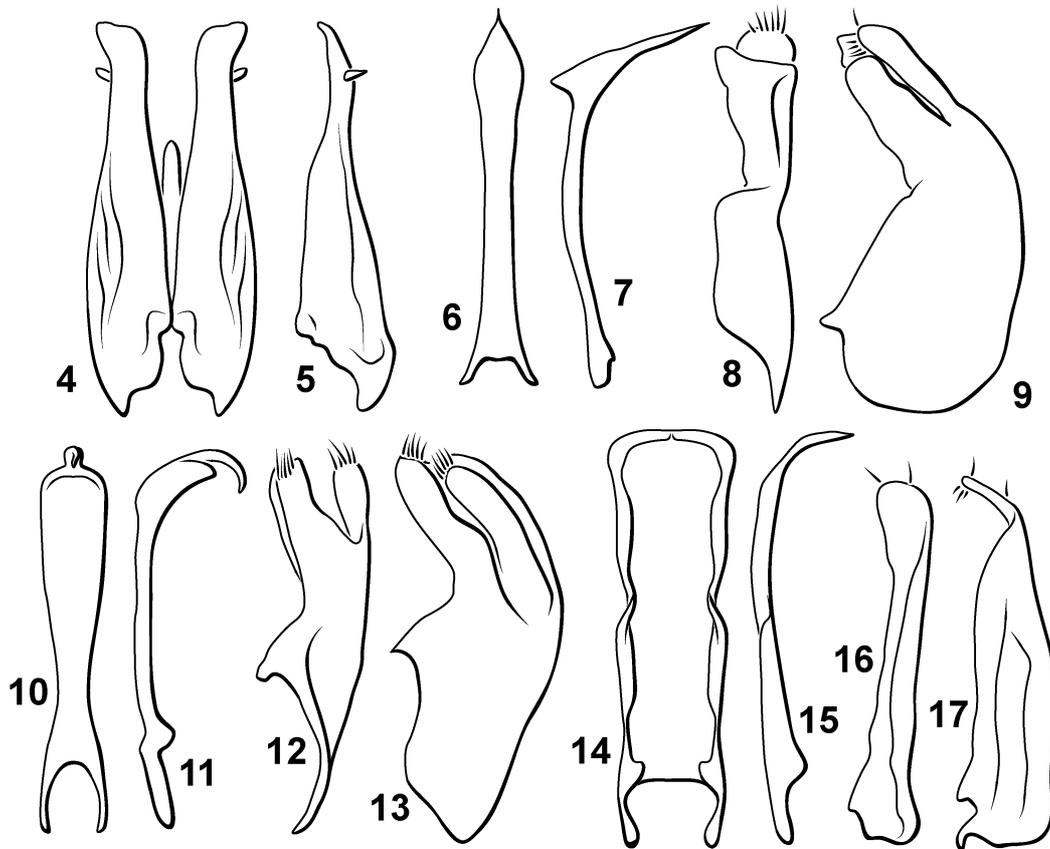
Discussion. This and the following species belong to the *D. nitida* species group, an assemblage of species characterized by deeply bifid male lateral lobes. There are now 15 species in this group. Species can be identified using the revision of the group by Young (1986) and the synopsis of *Desmopachria* by Miller (2001).

Material Examined. *Holotype*: ♂ labeled, “PERU: Rio Tambopata Explorer’s Inn – jct. Rio Tower 12°50’12”S 069°17’36”W 10 Dec 2003 K.B. Miller /HOLOTYPE *Desmopachria balionota* K.B. Miller, 2004 [red label with double black line border].” *Paratypes*: 4, same data as holotype except “.../ PARATYPE *Desmopachria balionota* K.B. Miller, 2004 [blue label with black line border].”

***Desmopachria annae* Miller, new species**

(Figs. 3, 10–13)

Diagnosis. This species is a member of the *D. nitida* group since it has the male lateral lobes very robust and with a deep emargination (Fig. 12). The species can be distinguished from others by the characteristically maculate elytra (Fig.3) and the male genitalia. The median lobe is very slender basally, subapically strongly expanded and abruptly hooked dorsad (Figs.10, 11). The apex is comprised of a dorsally hooked, slender, slightly asymmetrical process (Fig. 10).



FIGURES 4–17. *Desmopachria* species, male genitalia: 4–5—*D. pilosa*; 4—aedeagus, dorsal aspect; 5—right lateral lobe, right lateral aspect. 6–9—*D. balionota*; 6—median lobe, dorsal aspect; 7—median lobe, right lateral aspect; 8—right lateral lobe, dorsal aspect; 9—right lateral lobe, right lateral aspect. 10–13—*D. annae*; 10—median lobe, dorsal aspect; 11—median lobe, right lateral aspect; 12—right lateral lobe, dorsal aspect; 13—right lateral lobe, right lateral aspect. 14–17—*D. tambopatensis*; 14—median lobe, dorsal aspect; 15—median lobe, right lateral aspect; 16—right lateral lobe, dorsal aspect; 17—right lateral lobe, right lateral aspect.

Description. *Measurements.* TL = 1.39–1.55 mm; GW = 0.92–0.97 mm; TL/GW = 1.51–1.60. *Habitus.* Size relatively small; body robust, broadly rounded laterally, somewhat attenuate posteriorly; greatest width medially. *Coloration.* Head and pronotum yellow, pronotum with narrow brown margin posteromedially; elytron light brown with prominent, irregular yellow maculae anteriorly, near humeral angle, medially, subapically and apically (Fig.3). Antennae, palpi, sterna and legs yellow. *Sculpture and structure.* Head with very fine, scattered punctures; anterior clypeal margin dorsoventrally compressed and distinctly beaded across entire margin between eyes; antennae short, scape and pedicel enlarged, antennomeres VI–X short and broadly expanded. Pronotum moderately long, broad, very finely and inconspicuously punctate, slightly more coarsely punctate along posterior margins; without basal striae; lateral pronotal margins rounded;

lateral bead fine. Elytron very finely and obscurely punctate; epipleuron not punctate. Prosternum very short, with very low posteromedial tubercle. Prosternal process moderately broad, broadly angulate apically. Metasternum, metacoxae and abdomen with few, scattered, fine punctures. Posteromedial surface of abdominal ventrite IV with a distinct subapical crease or groove. Legs not modified. *Male genitalia* (Figs.10–13). Median lobe in dorsal aspect elongate, basally very narrow, apically expanded, abruptly narrowed subapically, apex sharply pointed, slightly asymmetrical and directed anterad (Fig.10); in lateral aspect slender and straight in basal half, abruptly expanded submedially with dorsally-directed lobe, apex strongly hooked dorsad, slender and sharply pointed (Fig.11). Lateral lobe in dorsal aspect robust, apex divided into broad, apically rounded processes, apices bearing distinct setae (Fig.12), in lateral aspect very broad, medially abruptly curved dorsad, apex robust, broad, multifid with two prominent lobes (Fig.13).

Etymology. Patronymic. This species is named *D. annae* in honor of my daughter, Annie Miller.

Discussion. See under the Discussion for *D. balionota*.

Material Examined. *Holotype*: ♂ labeled, “PERU: Rio Tambopata Explorer’s Inn – jct. Rio Tower 12°50’12”S 069°17’36”W 10 Dec 2003 K.B. Miller /HOLOTYPE *Desmopachria annae* K.B. Miller, 2004 [red label with double black line border].” *Paratypes*: 11, same data as holotype except “.../ PARATYPE *Desmopachria annae* K.B. Miller, 2004 [blue label with black line border].”

***Desmopachria tambopatensis* Miller, new species**

(Figs.14–17)

Diagnosis. This species cannot be readily assigned to any species group of *Desmopachria*. The dorsal surface is immaculate. The male genitalia are diagnostic (Figs. 14–17). The male median lobe is very broad, apically truncate and strongly curved dorsad apically (Figs.14, 15). In lateral aspect it is very slender (Fig. 15). The lateral lobe is relatively broad in ventral and lateral aspects with the apex flattened, truncate and bent dorsad (Figs.16, 17).

Description. *Measurements.* TL = 1.68–1.76 mm; GW = 1.09–1.16 mm; TL/GW = 1.52–1.54. *Habitus.* Size relatively small; body robust, broadly rounded laterally, somewhat attenuate posteriorly; greatest width medially. *Coloration.* Head and pronotum yellow; elytron light yellow-brown. Antennae, palpi, sterna and legs yellow. *Sculpture and structure.* Head with very fine, scattered punctures; anterior clypeal margin dorsoventrally compressed and distinctly beaded across entire margin between eyes; antennae short, scape and pedicel enlarged, antennomeres V–X short and anteriorly lobed. Pronotum moderately long, broad, very finely and inconspicuously punctate, slightly more coarsely punctate along posterior margins; without basal striae; lateral pronotal margins

rounded, more rounded anteriorly; lateral bead fine. Elytron very finely and obscurely punctate, with slight sutural stria anteromedially; epipleuron not punctate. Prosternum very short, with low posteromedial tubercle. Prosternal process moderately broad, broadly angulate apically. Metasternum, metacoxae and abdomen with few, scattered, fine punctures. Posteromedial surface of abdominal ventrite IV with a distinct subapical crease or groove. Legs not modified. *Male genitalia* (Figs.14–17). Median lobe in dorsal aspect elongate, broad, apically gradually expanded and broadly truncate, hyaline, membranous, especially basally, laterally with a medial emargination (Fig.14); in lateral aspect very slender and straight in basal two-thirds, slender and strongly curved dorsad apically (Fig.15). Lateral lobe in dorsal aspect moderately broad, with parallel lateral margins, apex broadly truncate (Fig.16), in lateral aspect broad at based, gradually narrowed apically, apex slender, parallel-sided, directed obliquely dorsad, with several distinct setae on dorsal and ventral margins (Fig. 17).

Etymology. The specific epithet is a Latinized adjective *tambopatensis* derived from the name of the type locality of this species.

Discussion. Many of the species of *Desmopachria* are assignable to several species groups primarily based on characters of the male genitalia, but also certain external characters in some cases. Several species of *Desmopachria* (currently 14), however, are not assignable to any of the currently recognized species groups. This is the case with *D. tambopatensis* which does not have any obvious affinities with any other species in the genus. The species of *Desmopachria* not assigned to a species group can be identified using the synopsis by Miller (2001).

Material Examined. *Holotype:* ♂ labeled, “PERU: Rio Tambopata Explorer’s Inn – jct. Rio Tower 12°50’12”S 069°17’36”W 10 Dec 2003 K.B. Miller /HOLOTYPE *Desmopachria tambopatensis* K.B. Miller, 2004 [red label with double black line border].” *Paratypes:* 5, same data as holotype except “.../ PARATYPE *Desmopachria tambopatensis* K.B. Miller, 2004 [blue label with black line border].”

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