Russian Entomol. J. 34(1): 136–139

A new record and the first meaningful iconography of the millipede, *Amplinus convexus* (Carl, 1902) from Costa Rica (Diplopoda: Polydesmida: Aphelidesmidae: Amplininae)

Новая находка и настоящая иконография многоножки-диплоподы *Amplinus convexus* (Carl, 1902) из Коста-Рики (Diplopoda: Polydesmida: Aphelidesmidae: Amplininae)

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KEY WORDS: taxonomy, distribution, Neotropics.
КЛЮЧЕВЫЕ СЛОВА: таксономия, распространение, Неотропики.

ABSTRACT. The millipede, *Amplinus convexus* (Carl, 1902), previously unequivocally reported only from Costa Rica's Prov. Limón, is recorded from Prov. Heredia for the first time. The species is fully redescribed and illustrated based on new material.

РЕЗЮМЕ. Многоножка-диплопода *Amplinus convexus* (Carl, 1902), прежде известная лишь из провинции Лимон Коста-Рики, впервые отмечена в провинции Эредиа. На основе нового материала вид полностью переописан и снабжен иллюстрациями.

Introduction

The rather small millipede family Aphelidesmidae is one of the most species-rich and widespread among the Neotropical Polydesmida [Enghoff *et al*., 2015]. The family presently contains 18 genera and 130+ species [Almeida *et al*., 2018, 2021], some among the largest members (up to 8 cm long) of the order, being divided into two subfamilies that differ in gonopodal conformation [Vohland, 1998]. *Amplinus* Attems, 1898 is a rather large and purely Central American genus of Aphelidesmidae, subfamily Amplininae, presently known to comprise 28 recognized species ranging from southern Mexico in the north to Costa Rica in the south [Hoffman, 1999; Enghoff *et al*., 2015]. This genus differs from superficially the most similar and large (26 species), but mostly northern South American *Pycnotropis* Carl, 1914 only in the shape of the hypoproct: concave to truncate, *vs* clearly convex, respectively [Vohland, 1998; Golovatch *et al*., 1998]. The gonopods of both these genera are virtually identical, albeit the prefemorite in *Amplinus* is largely only poorly delimited from the acropodite [Vohland, 1998].

The Amplininae represents a group that encompasses further 13 genera (mostly mono- to oligospecific) and ranges from Mexico in the north down to Peru and Brazil in the south. Most of aphelidesmid diversity is confined to the northern Andes, but *Pycnotropis* species are especially characteristic of the Amazonian parts of Peru and Brazil, down to Amazônas, Amapá and Pará states in the east, being actually the only Aphelidesmidae to be encountered there [Vohland, 1998]. Only one species of *Pycnotropis*, *P. latzeli* Attems, 1931, has so far been described from Panama [Attems, 1931], a Central American outlier whose provenance has repeatedly been questioned almost ever since [Golovatch *et al*., 1998; Vohland, 1998; Hoffman, 1999].

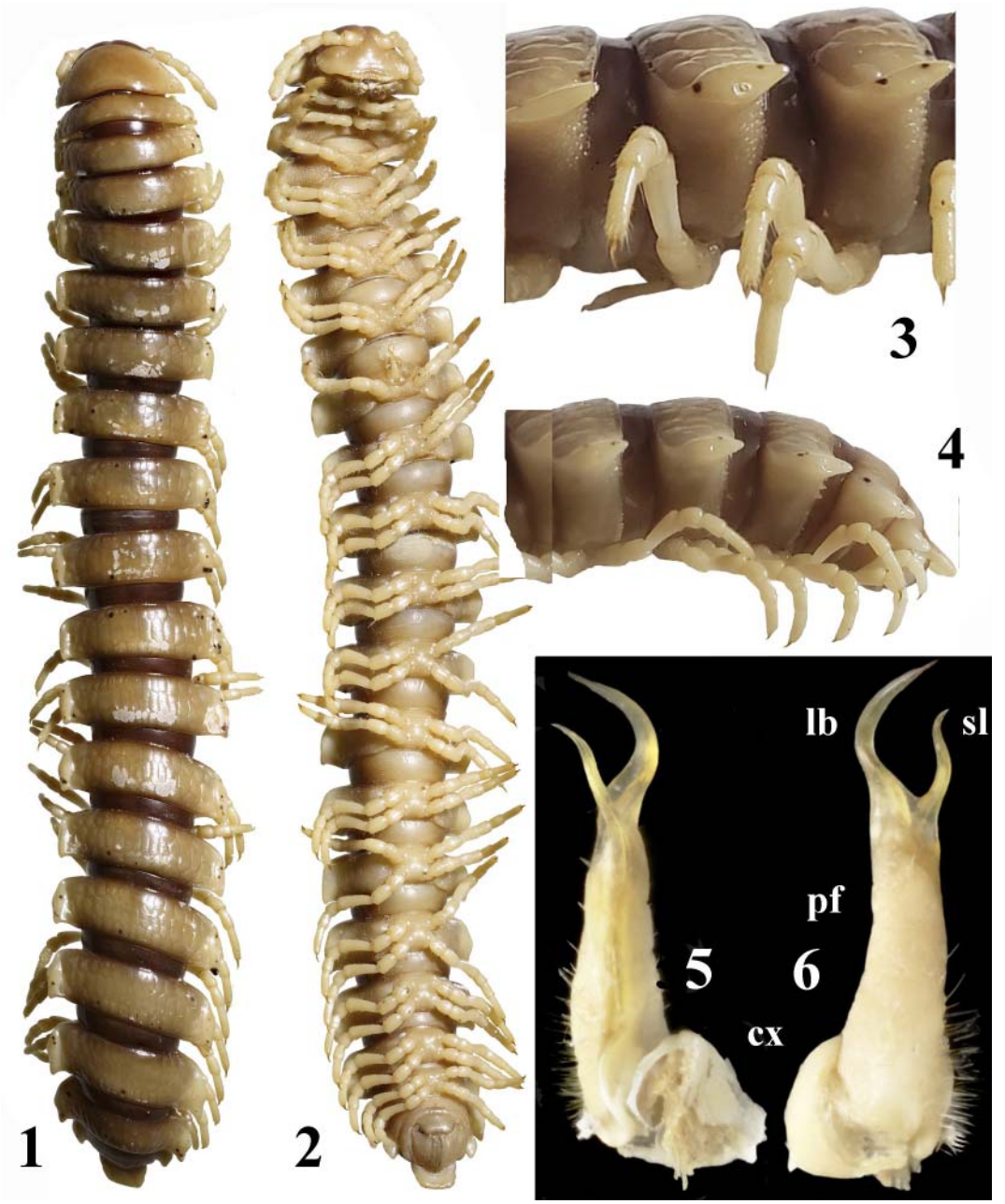
The present note has been prompted by the discovery in Costa Rica of the previously poorly-known millipede, *Amplinus convexus* (Carl, 1902). Originally, Carl [1902] described the species in due detail, but he only depicted the acropodite of a gonopod that clearly showed a longer, regularly curved, unciform and apically sharp lateral branch (formerly "tibiotarsus") and a slightly sigmoid, shorter and similarly sharpened solenomere. Both the fairly detailed verbal description and the depicted gonopodal acropodite fully match the material in our hands. Pocock [1909] briefly repeated Carl's [1902] original verbal de-

How to cite this article: Korotaeva A.M., Golovatch S.I. 2025. A new record and the first meaningful iconography of the millipede, *Amplinus convexus* (Carl, 1902) from Costa Rica (Diplopoda: Polydesmida: Aphelidesmidae: Amplininae) // Russian Entomol. J. Vol.34. No.1. P.136–139. doi: 10.15298/rusentj.34.1.17

scription of *A. convexus*, Chamberlin [1933] recorded a specimen from Parismina, and Loomis [1972] further material from Cairo and Guapiles, all in Prov. Limón, Costa Rica. As our samples originate from Prov. Heredia, the known distribution of the species is only slightly extended along the Atlantic coast. This new material allows for not only a new record, but also the first meaningful iconography of *A. convexus* to be presented.

Material and methods

The samples are deposited in the collection of the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZISP), Russia. The pictures were taken with a Canon EOS 5D digital camera and stacked using Zerene Stacker software. Final image processing was performed with Adobe Photoshop CC.



Figs. 1–6. *Amplinus convexus* (Carl, 1902), ♂ from La Selva Biological Station. 1, 2 — habitus, dorsal and ventral views, respectively; 3 — body rings 6–8, lateral view; 4 — caudal part of body, lateral view; 5, 6 — right gonopod, dorsal and venral views, respectively. Photographs taken not to scale.

Рис. 1–6. *Amplinus convexus* (Carl, 1902), ♂ из биологической станции La Selva Biological Station. 1, 2 — общий вид, соответственно сверху и снизу; 3 — туловищные сегменты 6–8, сбоку; 4 — задняя часть тела, сбоку; 5, 6 — правый гонопод, соответственно сверху и снизу. Фотографии сняты без масштаба.

In the catalogue section below, D stands for a description or redescription, R for a record or records, and L for merely listing.

Taxonomy

Amplinus convexus (Carl, 1902)

Figs 1–6.

Pachyurus convexus Carl, 1902: 633, plate 11, fig. 57.

Amplinus convexus — Pocock, 1909: 150 (D); Chamberlin, 1933: 18 (R); Hoffman, 1999: 369 (R, L).

Pseudamplinus convexus — Hoffman, 1954: 51 (L); Loomis, 1972: 200 (R).

MATERIAL. 2 ♂♂, 2 ♀♀ (ZISP MYR_DIP_0000197 & MYR_DIP_0000200), Costa Rica, Heredia Prov., La Selva Biological Station, 10°25′58.9″N, 84°00′24.4″W, 20–26. VI.2023, D.V. Logunov leg.

DESCRIPTION. Length *ca* 62 mm or *ca* 69 mm, width on midbody pro- and metazona 7.0 and 12.0 mm, and 7 and 10 mm, respectively (♂), or length *ca* 65 mm and *ca* 62 mm, width on midbody pro- and metazona 9.0 and 8.9 mm, and 13.9 and 11.6 mm, respectively (♀).

General coloration light brown with contrasting brown prozona and vertex, yellowish paraterga, legs and antennae, and beige venter and epiproct (Figs 1, 2). Smaller ♂ lighter, light brown with contrasting brownish to red-brown prozona. ♀♀ slightly darker than ♂♂.

Tegument shining, metaterga with weak polygonal areations, venter smooth and shining (Fig. 1). Clypeolabral region and vertex bare, epicranial suture evident. Interantennal isthmus 1.2 times as broad as diameter of antennal socket. Antennae short, *in situ* not completely extending past ring 2 dorsally (♂), or shorter, extending only past 2/3 collum (♀). In length, antennomeres 4-6>3>2>1>7. Metazona below paraterga densely granulate to spinulate, increasingly strongly spinose, but poorly granulate towards telson (Figs 3, 4).

In width, rings 4–15 > 1=3 > collum > head, trunk increasingly attenuated caudad on rings 16–20. Paraterga set at about ½ midbody height, well-developed, a little thicker and higher on pore-bearing rings than on poreless ones (Figs 3, 4). Paraterga delimited by distinct sulci dorsally and faint sulci ventrally, all sulci being complete. Lateral calluses, or peritremata, and caudal corners of paraterga slightly more strongly developed in ♂ than in ♀. Anterior corners of paraterga invariably broadly rounded, caudal corners sharp in collum, always rounded thereafter, mostly not produced past rear tergal margin, only in rings 17–18 increasingly drawn past rear tergal margin. Ozopores lateral, invisible from above, lying at about half poriferous peritremata. Collum nearly entirely smooth, only laterally next to callus very faintly areolate. Following metaterga poorly, but visibly areolate, polygonal setigerous areations being arranged in three transverse rows across dorsum. Tergal and sternal setae fully abraded, but their insertion points visible. Pleurosternal carinae low, irregular, poorly visible on rings 2–18 (♂) or rings 4–16 (♀). Axial line and transverse middorsal sulci absent. Strictures between pro- and metazona faint and thin, very slightly striolate. Epiproct prominent, flattened dorsoventrally, shovel-shaped and roundly subtruncate, with three tufts of setae at caudal margin. Hypoproct roundly subtrapeziform, slightly excavate at caudal margin between round paramedian papillae, each located near caudal margin and each with a tuft of setae. Limbus entire, thin, without peculiarities.

Sternum between ♂ legs 1 very narrow, coxae being very short and subcontiguous. Sternum between ♂ legs 2 similarly very small, but coxae much larger, nearly normal, a little bulged ventrad and each with an inconspicuous gonopore. Sterna between ♂ legs 3–7 increasingly, but gradually broadened, sterna between ♂ coxae 4–7 each with two small setigerous papillae. Sternum between coxae 7 excavate and broad. Sternum between ♂ coxae 9 almost flat, broad and with 1+1 small setigerous papillae near each coxa. Sterna between following ♂ coxae with weak cross-impressions, each divided transversely in into two and bearing a small setigerous papilla near each coxa, transverse impressions being slightly deeper than axial ones (Fig. 2).

Legs of ♂♂ mostly *ca* 1.3–1.4, of ♀♀ *ca* 0.8–0.9 times as long as midbody height. In length, femur > tarsus > prefemur > coxa > postfemur = tibia. Claw light brown, clearly curved ventrad, about third as long as tarsus.

Gonopodal aperture regularly subvoid. 1.5 times as broad as long. Lateral margins clearly, caudal margins slightly, elevated, all margins being granulated, not shifted onto prozonum 7. Aperture taking up most of metazonum 7, only a little broader than sternum 9.

Gonopods (Figs 5, 6) simple, typical of the genus. Coxite very short, about third as long as telopodite, subcylindrical and bare. Prefemorite about 2 times as long as acropodite, as usual densely setose, not very distinctly demarcated from acropodite by an oblique ventral sulcus. Acropodite as usual bipartite, solenomere (**sl**) being a shorter, slightly sigmoid, mesal branch, *vs* a longer, curved and similarly acuminate lateral branch (**lb**). Seminal groove (**sg**) as usual, running entirely on mesal side of telopodite before moving onto solenomere.

REMARKS. Size variations are considerable, but they seem to be quite natural for *A. convexus*, one of the largest congeners so far known: body length 70–75 mm, width 7–11 mm (♂), or 80–85 mm, 10–13 mm (♀), respectively [Carl, 1902], *vs* length *ca* 62–69 mm, width 10–12 mm (♂) or length *ca* 62–65 mm, width 11.6–13.9 mm, respectively (♀) (our samples). Variations in coloration are likewise considerable, but also quite natural, basically from yellowish to brown, sometimes with a pattern of darker brown cingulations on prozona (Figs 1, 2).

The only other congener hitherto recorded from Costa Rica is *A. niteus* Chamberlin, 1922, from the "basin of San Juan River", either Alajuela or Heredia Province [Hoffman, 1999], a similarly large species (♂ length 65 mm, width 10 mm), but differing readily in polygonal areations on metaterga missing mid-dorsally [Chamberlin, 1922].

Competing interests. The authors declare no competing interests.

Acknowledgement. We are most grateful to Dmitry V. Logunov (ZISP) who rendered us his material for treatment.

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