

The dragon millipedes in Vietnam (Polydesmida: Paradoxosomatidae, genus *Desmoxytes* Chamberlin, 1923)

Диплоподы-драконы во Вьетнаме (Polydesmida: Paradoxosomatidae, род *Desmoxytes* Chamberlin, 1923)

Nguyen Duc Anh¹, Sergei I. Golovatch², Alexander E. Anichkin³
Нгуен Дык Ань¹, С.И. Головач², А.Е. Аничкин³

¹Institute of Ecology and Biological Resources, Caugiay Hanoi Vietnam. email: ndanh006@iebr.vast.ac.vn
Институт экологии и биологических ресурсов, Каужай Ханой Вьетнам

²Institute for Problems of Ecology and Evolution, Russian Academy of Sciences, Leninsky pr. 33, Moscow 119071 Russia. Email: sgol@orc.ru

Институт проблем экологии и эволюции РАН, Ленинский пр., 33, Москва 119071 Россия.

³Joint Russian-Vietnamese Science and Technological Tropical Centre, Southern Branch Ho Chi Minh Vietnam. E-mail: repetty@yandex.ru

KEY WORDS: Diplopoda, *Desmoxytes*, new species, taxonomy, Vietnam.

КЛЮЧЕВЫЕ СЛОВА: Diplopoda, *Desmoxytes*, новые виды, таксономия, Вьетнам.

ABSTRACT. The millipede genus *Desmoxytes* is reviewed in the scope of the fauna of Vietnam, with four species described as new: *D. proxima* sp.n., *D. cattienensis* sp.n., *D. specialis* sp.n. and *D. enghoffi* sp.n., while *D. spectabilis* (Attems, 1937) is redescribed from new material. A key to all ten species of *Desmoxytes* currently or potentially present in Vietnam is compiled.

РЕЗЮМЕ. Дан обзор диплопод рода *Desmoxytes* в объеме фауны Вьетнама; четыре вида описаны в качестве новых (*D. proxima* sp.n., *D. cattienensis* sp.n., *D. specialis* sp.n. and *D. enghoffi* sp.n.), а вид *D. spectabilis* (Attems, 1937) переописан по новому материалу. Составлен ключ для всех десяти видов *Desmoxytes*, уже известных или потенциально живущих во Вьетнаме.

Introduction

The dragon millipedes form a large genus, *Desmoxytes* Chamberlin, 1923, which currently comprises 19 species, most of which occur in Southeast Asia and southern China [Golovatch & Enghoff, 1994]. Only one species, *D. planata* (Pocock, 1895), has attained a nearly pantropical distribution due to anthropochory; yet it has not been formally recorded in Vietnam.

Species of the genus are characterized by extremely conspicuous, high, antler-, spine- or wing-shaped paraterga, coupled with a more or less derived orthomorphine gonopod structure, in which the postfemoral region is often strongly condensed [Golovatch & Enghoff, 1994]. It is the unusually strongly developed and peculiar paraterga that account for the above vernacular name of the genus.

Although Vietnam is known as a country supporting a highly diverse fauna of Diplopoda [Enghoff et al., 2004], only five species of *Desmoxytes* have hitherto been reported from there. Four were described (in *Centrodesmus* Pocock, 1894) by Attems [1937, 1938, 1953], and one more added more recently [Golovatch & Enghoff, 1994]. These species are *Desmoxytes aspera* (Attems, 1937), *D. pilosa* (Attems, 1937), *D. spectabilis* (Attems, 1937), *D. cervaria* (Attems, 1953) and *D. hostilis* Golovatch & Enghoff, 1994.

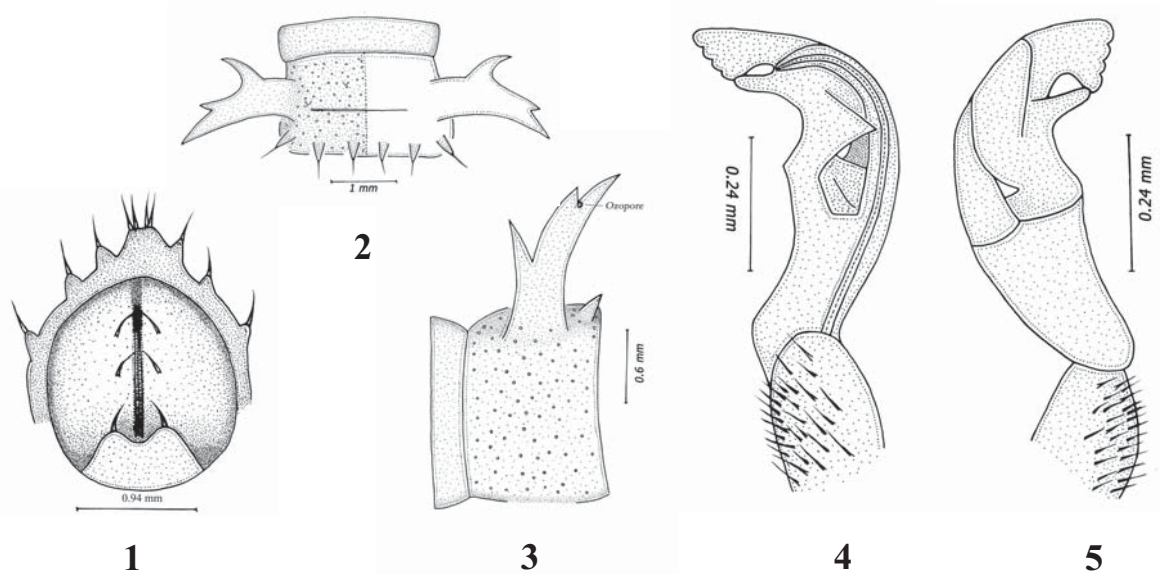
Some additional samples coming from various parts of Vietnam, partly collected by us jointly, have recently become available for study. As a result, we describe here four new congeners, we redescribe another one to extend and rectify its original description, we record still another species from a new locality, and we compile a key to all ten species of *Desmoxytes* currently known from or potentially present (*D. planata*) in Vietnam. Most of the new material, including the holotypes, is housed in the Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam, with a few paratypes shared with the collection of the Zoological Museum of the State University of Moscow (ZMUM), Russia.

TAXONOMIC PART

Desmoxytes pilosa (Attems, 1937)

MATERIAL. 1 ♀ (IEBR), Vietnam, Dongnai Prov., CatTien National Park, forest, decaying wood, 26.10.2004; 1 ♂ (IEBR), same locality and habitat, 25.10.2004; 2 ♂♂, 1 ♀, 1 juv. (IEBR), same locality and habitat, 24.10.2004, all leg. Nguyen Duc Anh, S.I. Golovatch & A.E. Anichkin.

REMARKS. This material is in complete accordance with the available descriptions or descriptive notes [Attems,



Figs 1–5. *Desmoxytes proxima* sp.n., ♂ holotype: 1 — telson, ventral; 2, 3 — segment 10, dorsal (2) and lateral (3); 4, 5 — right gonopod, mesal (4) and lateral (5).

Рис. 1–5. *Desmoxytes proxima* sp.n., голотип ♂: 1 — тельсон, снизу; 2, 3 — 10-й сегмент, сверху (2) и сбоку (3); 4, 5 — правый гонопод, изнутри (4) и сбоку (5).

1937, 1938; Golovatch & Enghoff, 1994]. This species seems to be widely distributed in the southern part of Vietnam [see also Golovatch & Enghoff, 1994].

Desmoxytes proxima sp.n.

Figs 1–5.

MATERIAL. Holotype ♂ (IEBR), Vietnam, Laocai Prov., Vanban Distr., Namxay County, bamboo forest, 1,000 m a.s.l., decaying bamboo debris, 08.04.2005, leg. Nguyen Duc Anh. Paratypes: 2 ♀♀ (IEBR), same locality, together with holotype. 1 ♀ (ZMUM), same locality, secondary forest, 850 m a.s.l., pitfall trapping, 12.04.2005; 1 ♀ (IEBR), same place and habitat, 03.04.2005, all leg. Nguyen Duc Anh.

DIAGNOSIS. This new species differs from the closest congener, *D. jeekeli* Golovatch & Enghoff, 1994, from Thailand, in the smaller size, the axial line being evident, both ♂ femora 5 and 6 humped ventrally, and the transverse sulcus starting from metatergum 2. In addition, the epiproct and the tip of the solenophore are somewhat different in structure.

DESCRIPTION. Length ca 13 mm (♂), 15 mm (♀); width of pro- and metazona 0.8 and 1.8 mm (♂), 1.2 and 2.0 mm (♀), respectively.

Coloration of metaterga, including paraterga, generally castaneous brown, but lateral edges of paraterga and caudal parts of metaterga dark brown to piceous. Axial line dark, contrasting to lighter metaterga.

Head a little narrower than collum, sparsely setose. Epicranial suture very distinct.

Antennae very long and slender, reaching the end of segment 4. Length of antennomere 5 subequal to that of antennomere 3 or 4, each a little longer than antennomere 6 and much longer than antennomeres 2 and 1.

Body parallel-sided on segments 5–17, thereafter abruptly tapering. Metaterga 2–4 with two rows of spines: 2+2 and 2+2; segments 5–17 also with two rows of spines: 2+2

anterior and 3+3 posterior of metatergal sulcus (Figs 2, 3). Posterior metatergal spines/tubercles well-developed, conspicuous. Paraterga very well-developed, antler-shaped with three branches, elevated above dorsum, mainly directed dorsolaterad on segments 2–17, directed increasingly caudad on segments 18 and 19. Surface of prozona smooth, shagreened; metazona granular both dorsally and laterally. Sterna delicately microgranular. Stricture between pro- and metazona evident, relatively deep. Axial line evident, quite deep on metaterga. Transverse sulcus on metaterga evident on segments 2–18, missing on segment 19. Pleurosternal carinae absent. Ozopores invisible from above, lying at base of last incision of paraterga (Fig. 3). Epiproct modified, with several prominent setigerous knobs near tip. Subanal scale subsemicircular, with 1+1 setae on knobs and a deep emargination in-between (Fig. 1).

Sterna sparsely setose, with a strong bilobed protuberance between ♂ coxae 4, like in *D. jeekeli*. Legs relatively long and slender. ♂ femora 5 and 6 each with a strong ventral hump.

Gonopods (Figs 4, 5) with telopodite subfalcate, solenomere relatively long, tip of lamina medialis serrulate; postfemoral part not condensed.

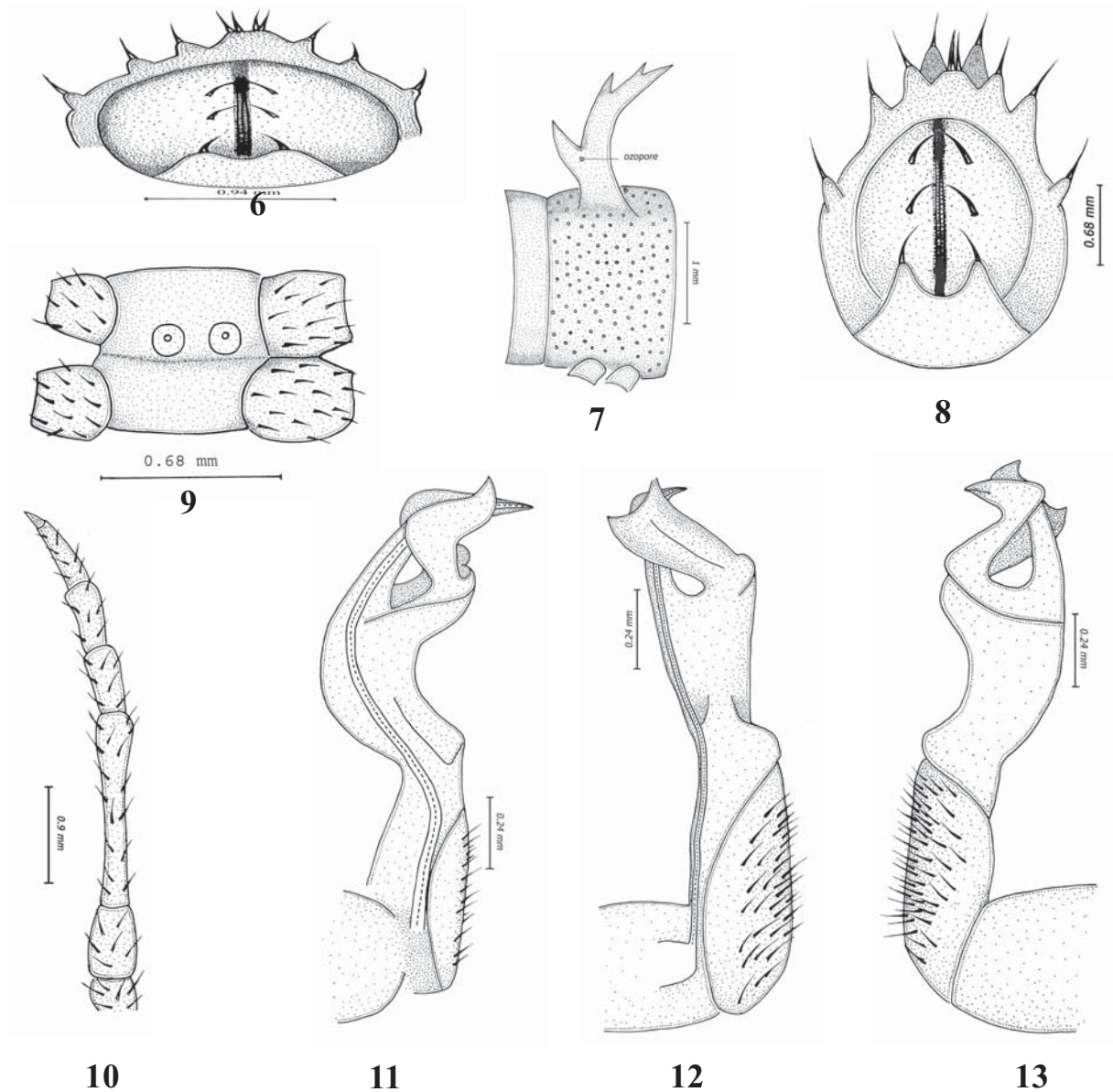
ETYMOLOGY. To emphasize the similarities shown with *D. jeekeli*.

Desmoxytes cattienensis sp.n.

Figs 6–13.

MATERIAL. Holotype ♂ (IEBR), Vietnam, Dongnai Prov., CatTien National Park, forest, plot 2, 23.09.2004, leg. Nguyen Duc Anh, S.I. Golovatch & A.E. Anichkin. Paratypes: 1 ♂, 1 ♀ (IEBR), same place and habitat, plot 3, 24.09.2004, leg. Nguyen Duc Anh, S.I. Golovatch & A.E. Anichkin.

DIAGNOSIS. Differs in the following combination of characters: coloration pink to reddish, size relatively large, paraterga antler-shaped, metaterga with a row of 1+1 small setae; ♂ femora unmodified; epiproct modified, with sever-



Figs 6–13. *Desmoxytes cattienensis* sp.n. ♂ holotype: 6, 7 — segment 10, dorsal (6) and lateral (7); 8 — telson, ventral; 9 — sternal lamina between coxae 4, ventral; 10 — leg 6; 11–13 — right gonopod, ventromesal (11), mesal (12) and lateral (13).

Рис. 6–13. *Desmoxytes cattienensis* sp.n., голотип ♂: 6, 7 — 10-й сегмент, сверху (6) и сбоку (7); 8 — тельсон, снизу; 9 — стеральная пластина между тазиками 4, снизу; 10 — 6-я нога; 11–13 — правый гонопод, вентромедиально (11), изнутри (12) и сбоку (13).

al setigerous knobs; gonopod suberect, with femorite, solenomere and solenophore subequal in length; postfemoral part of gonopod not condensed, tip of solenophoral lamina medialis pointed.

DESCRIPTION. Size large, length ca 33–35 mm (♂), 36–40 mm (♀). Width of pro- and metazona 1.8 and 2.3 mm (♂), 3.1 and 3.7 mm (♀), respectively.

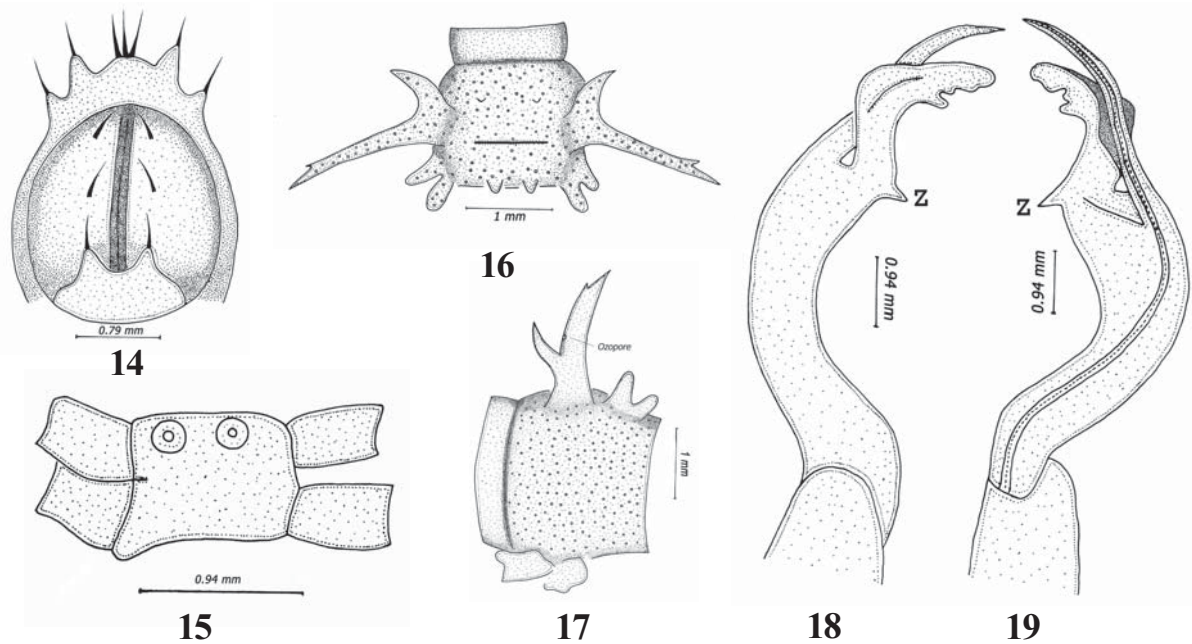
Male generally light, including paraterga, base of paraterga even lighter, lateral edges of metaterga and antennae darker, contrasting against surrounding parts. Female reddish-pink. Lateral side of metaterga, pleurites and antennae dark red. Legs pallid.

Head a little narrower than collum, densely setose. Epicranial suture distinct.

Antennae relatively long and slender. Most of antennomere 7 dark. Antennomere 6 claviform.

Collum a little narrower than segments 2 and 4, with two transverse rows of spines/setae: 3+3 well-developed spines near anterior edge and 1+1 poor setae near posterior edge. Body parallel-sided on segments 5–17, thereafter abruptly tapering. Metaterga with a row of 1+1 poor/vague setae near caudal edge on segments 2–19. Paraterga very well elevated above dorsum, antler-shaped with 3 or 4 branches. Paraterga very long; mainly directed dorsolaterad on segments 2–17, directed increasingly caudad on segments 18 and 19 (Figs 6, 7).

Surface of prozona smooth and shagreened, metazona with vague microgranulation. Lateral surface of prozona also smooth, shagreened, but that of metazona clearly mi-



Figs 14–19. *Desmoxytes specialis* sp.n., ♂ holotype: 14 — telson, ventral; 15 — sternal lamina between coxae 4, ventral; 16, 17 — segment 10, dorsal (16) and lateral (17); 18, 19 — right gonopod, lateral (18) and mesal (19).

Рис. 14–19. *Desmoxytes specialis* sp.n., голотип ♂: 14 — тельсон, снизу; 15 — стерральная пластина между тазиками 4, снизу; 16, 17 — 10-й сегмент, сверху (16) и сбоку (17); 18 и 19 — правый гонопода, сбоку (18) и изнутри (19).

crogranular. Axial line light, inconspicuous, lighter than surrounding surface, deeper on metaterga. Stricture between pro- and metazona evident, quite deep. Sulcus on metaterga evident on segments 2–18, missing on segment 19. Ozopores invisible from above, lying at base of proximal spine of paraterga (Fig. 7). Pleurosternal carinae absent. Epiproct modified (Fig. 8), with several strong setigerous knobs near tip. Subanal scale subsemicircular, with 1+1 setae on knobs and a deep emargination in-between.

Sterna densely setose, two independent cones between ♂ coxae 4 (Fig. 9). Legs not very long but slender. ♂ femora unmodified (Fig. 10).

Gonopods (Figs 11–13) suberect; femorite, solenomere and solenophore subequal in length. Postfemoral part not very condensed. Tip of solenophoral lamina medialis pointed.

ETYMOLOGY. Named after the type locality.

Desmoxytes specialis sp.n.

Figs 14–19.

MATERIAL. Holotype ♂ (IEBR), Vietnam, Kontum Prov., Mt. Ngoclinh, 15°04'25" N; 107°57'37" E, ca 400 km north of Dalat; 2,000 m a.s.l., primary forest, on tree trunk, 25.03.2004, leg. Nguyen Duc Anh. Paratype ♀ (IEBR), same locality, secondary forest, 1,800 m a.s.l., 11.04.2004, leg. Nguyen Duc Anh.

DIAGNOSIS. Differs in the following combination of characters: coloration generally dark brown; antennae long; metaterga with two transverse rows of spines; paraterga long and increasingly pointed with two spines at base caudolaterally; gonopod with both solenophore and solenomere very long, spine Z modest, femorite slightly curved.

DESCRIPTION. Length ca 33–35 mm (♂), 37–40 mm (♀); width of pro- and metazona 1.4 and 5.0 mm (♂), 1.8 and 5.7 mm (♀), respectively.

Male generally dark brown, especially so antennae, sides of metaterga, pleurites, sterna and surface below paraterga. Paraterga and middle parts of metaterga castaneous brown. Venter yellowish. Proximal podomeres castaneous brown, distal ones yellowish. Female dark brown to piceous, except for generally castaneous brown legs, antennae and paraterga.

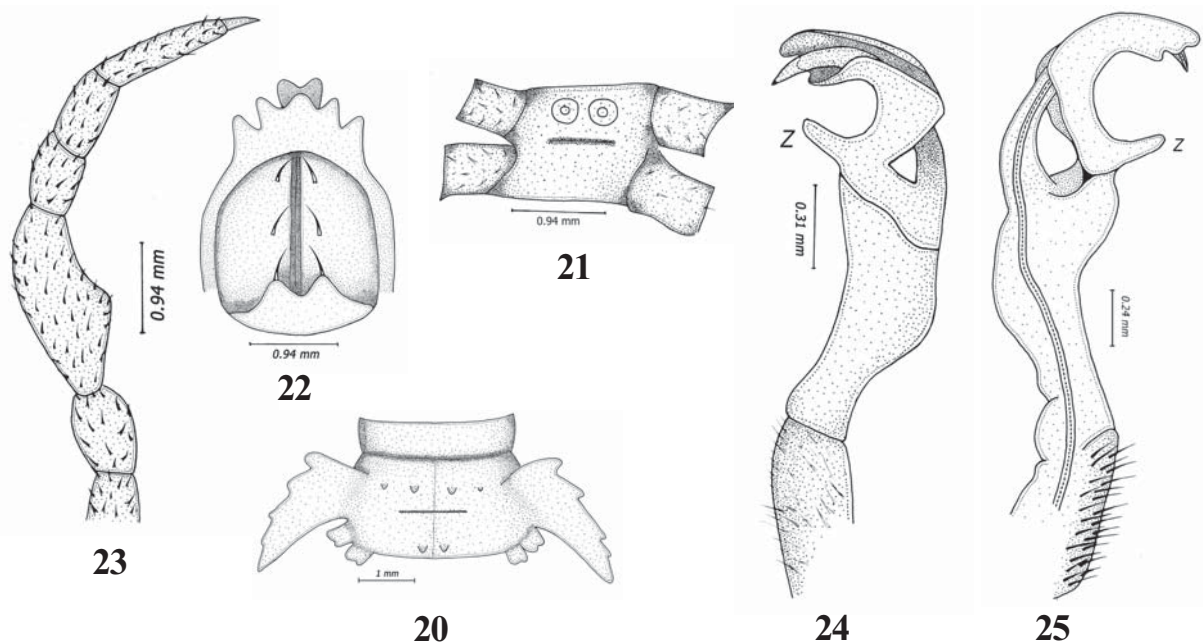
Head modestly setose, considerably narrower than collum and subequal in width to segment 2. Epicranial suture distinct, deep.

Antennae of holotype broken off, but obviously extremely long and slender. Female antennae reaching in length up to segment 5.

Collum with three transverse rows of setigerous spines: 3+3 well-developed spines, 1+1 and 2+2 small, poorly developed ones. Axial line traceable. Sulcus vague. Paraterga spiniform, directed dorsolaterad.

Body parallel-sided on segments 5–17, thereafter gradually tapering. Metaterga with two transverse rows of setigerous spines posterior and anterior of sulcus: 2+2 small, rather poorly visible spines, 2+2 medium-sized spines on segments 2–4; 1+1 and 1+1 obvious spines on segments 5–18; 2+2 similar spines on segment 19. Paraterga spine/antler-shaped, well-elevated above dorsum, directed mainly laterad on segments 2–12, directed increasingly caudad on segments 12–19. Each with a long large spine and an incision at front edge, two smaller spines at caudal base (Fig. 16).

Surface rough. Prozona smooth, finely shagreened. Metazona, sides below paraterga and pleurites with microgranulation like at base of paraterga. Surface of paraterga more delicately microgranular (except for tip). Suture between pro- and metazona evident and deep. Sulcus on metaterga distinct, rather deep on segments 2–17, superficial on segment 18, missing on segment 19. Ozopores invisible from above, lying laterally (Fig. 17). Pleurosternal carinae absent.



Figs 20–25. *Desmoxytes spectabilis* (Attems, 1937), ♂ from summit of Mt. Bana, Danang Prov., Vietnam: 20 — segment 10, dorsal; 21 — sternum between coxae 4, ventral; 22 — telson, ventral; 23 — leg 7; 24, 25 — right gonopod, mesal (24) and lateral (25).

Рис. 20–25. *Desmoxytes spectabilis* (Attems, 1937), ♂ с вершины горы Бана (пров. Дананг, Вьетнам): 20 — 10-й сегмент, сверху; 21 — стернит между тазиками 4, снизу; 22 — тельсон, снизу; 23 — 7-я нога; 24, 25 — правый гонопод, изнутри (24) и сбоку (25).

Epiproct (Fig. 14) modified, with 2+2 large setigerous knobs near tip. Subanal scale subsemicircular, with 1+1 setae on knobs and a deep emargination in-between.

Sterna rather densely setose, with two small and independent tubercles between ♂ coxae 4 (Fig. 15). Legs relatively long and slender. ♂ femora unmodified.

Gonopod (Figs 18, 19) with both solenophore and solenomere long and subfalcate. Postfemoral part not condensed, spine Z modest. Femorite slightly curved. Tip of solenophoral lamina medialis serrate.

ETYMOLOGY. To emphasize its special combination of characters.

REMARKS. This species joins the relatively small group of congeners characterized by a relatively loose, non-condensed postfemoral region of the gonopod. By the shape of the caudolateral base of paraterga, the new species seems to be especially close to *D. spectabilis* (Attems, 1937), but differs by its coloration being dark brown, the paraterga spine-shaped, both para- and metaterga showing granulation, and the metaterga are only with two transverse rows of spines. Both solenophore and solenomere are rather long and subfalcate, spine Z is modest, and the femorite is slightly curved.

For comparative purposes, a redescription of *D. spectabilis* is provided just below.

Desmoxytes spectabilis (Attems, 1937)

Figs 20–25.

MATERIAL. 1 ♂ (IEBR), Vietnam, Danang Prov., summit of Mt. Bana, 1,500 m a.s.l., forest, 23.04.2002, leg. Quynh Lich.; 1 ♀, 4 juv. (IEBR), 1 ♀ (ZMUM), Vietnam, Kontum Prov., Loxo

Pass ca 80 km north of Kontum: 15°15'02" N; 107°44'15" E, 840 m a.s.l., secondary forest, 17.04.2004, leg. Nguyen Duc Anh.

DIAGNOSIS. Differs by the following combination of characters: body large; paraterga wing-shaped; midbody metaterga with two transverse rows of spines/setae: 2+2 rather well developed spines, 1+1 well-developed spines; epiproct unusual, with 2+2 non-setigerous knobs near tip; only ♂ femur 7 inflated; solenomere of gonopod subfalcate, both solenomere and solenophore long, tip of solenophoral lamina medialis with two apical lobules, spine Z prominent, postfemoral part not condensed.

DESCRIPTION. Length ca 30 mm, width of midbody pro- and metazona 2.7 mm and 6.1 mm, respectively.

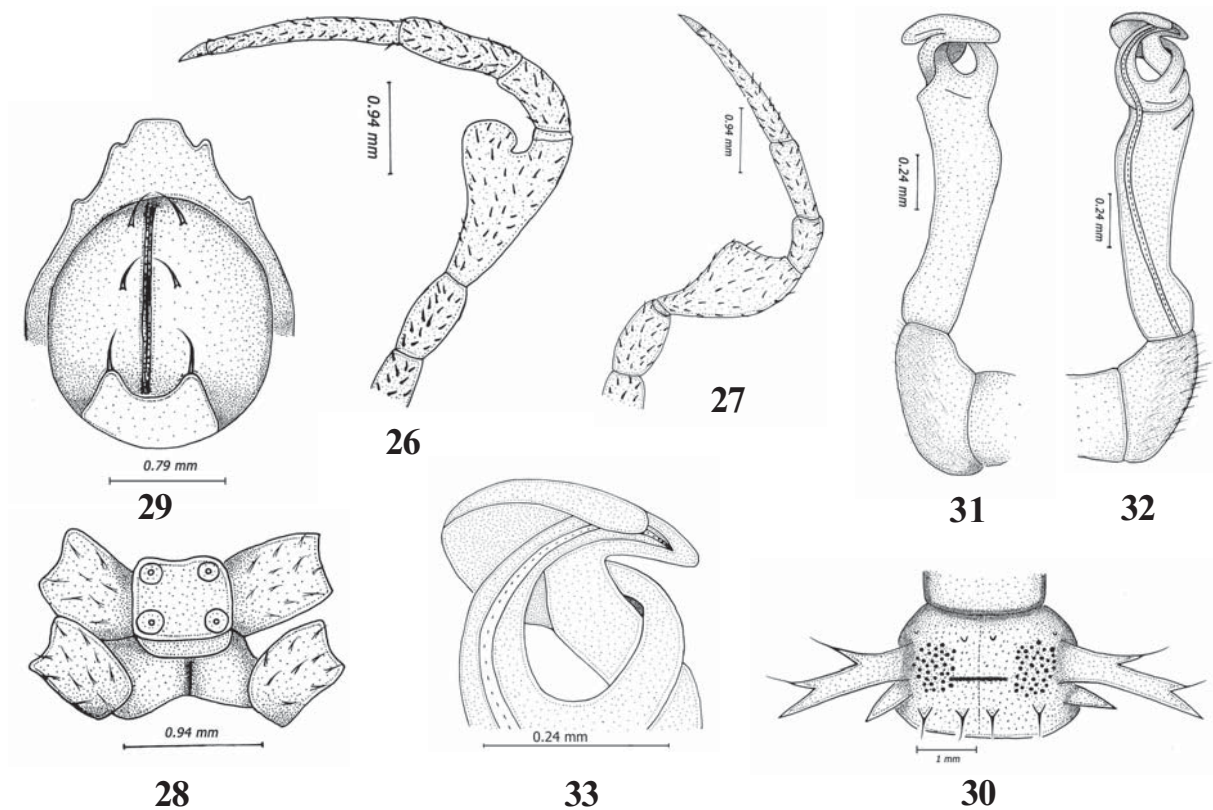
Coloration in general brown, including metazona and paraterga, surface below paraterga and pleurites castaneous brown. Prozona lighter. Most of antennomere 7 dark brown, remaining antennomeres, as well as legs yellowish. Sterna light, with a dark stripe along axis.

Head sparsely setose, a little narrower than collum. Epicranial suture distinct.

Antennae rather short and stout, reaching the end of segment 3. Length of antennomere 2 subequal to that of antennomere 3, 4 or 5. Antennomere 6 shorter and claviform.

Collum with three transverse rows of spines: 2+2 anterior, 2+2 middle and 2+2 posterior. Surface dull, microgranular. Paraterga relatively small, wing-shaped, directed caudolaterad.

Body parallel-sided on segments 5–17, thereafter gradually tapering. Metaterga with two transverse rows of spines/setae: 2+2 well-developed spines, 1+1 small spines on segments 2–18. Paraterga wing-shaped, rather well elevated



Figs 26–33. *Desmoxytes enghoffi* sp.n., ♂ holotype: 26, 27 — leg 6 (26) and leg 7 (27); 28 — sternal lamina between coxae 4, ventral; 29 — telson, ventral; 30 — segment 7, dorsal; 31, 32 — right gonopod, mesal (31) and lateral (32); 33 — distal part of gonopod, mesal.

Рис. 26–33. *Desmoxytes enghoffi* sp.n., голотип ♂: 26, 27 — 6-я нога (26) и 7-я нога (27); 28 — стеральная пластина между тазиками 4, снизу; 29 — тельсон, снизу; 30 — 7-й сегмент, сверху; 31, 32 — правый гонопод, изнутри (31) и сбоку (32); 33 — дистальная часть гонопода, изнутри.

above dorsum, directed caudolaterad on segments 2–17; shorter and directed increasingly caudad on segments 18 and 19. Caudal base of paraterga with two lobes near caudolateral edge of metaterga (Fig. 20). Each paratergum with four distinct incisions/teeth along front edge. Surface generally rough, but prozona smooth. Metazona dull, delicately microgranular, including base of paraterga. Lateral sides of metaterga and pleurites clothed with very delicate microgranulation. Sterna microgranular. Axial line virtually missing; if present, lighter and contrasting to metatergal coloration. Metatergal sulcus rather deep, distinct on segments 2–18, missing on segment 19. Stricture dividing pro- and metazona evident and deep. Pleurosternal carinae absent.

Epipect unusual, with 3+3 non-setigerous knobs near tip. Paraprocts rather convex. Subanal scale subsemicircular, with 1+1 setae on knobs and a distinct emargination in-between (Fig. 22).

Sterna with rather modest and short setation, with two independent round tubercles between ♂ coxae 4 (Fig. 21). Legs not too long but slender. Only ♂ femur 7 inflated, with a ventral hump (Fig. 23).

Gonopod simple (Figs 24, 25), solenomere subfalcate, both solenomere and solenophore long, tip of solenophoral lamina medialis with three apical lobules. Spine Z prominent. Postfemoral part not condensed.

REMARKS. The above redescription augments and rectifies the earlier descriptions given by Attems [1937, 1938].

Desmoxytes enghoffi sp.n.

Figs 26–33.

MATERIAL. Holotype ♂ (IEBR), Vietnam, Quangbinh Prov., Phongnha, secondary forest, on stone, 07.2003, leg. Pham Duc Tien. Paratype: 1 ♀ (IEBR), same data, together with holotype.

DIAGNOSIS. Differs in the following combination of characters: paraterga spiniform or antler-shaped, antennae extremely long and slender; metaterga with two transverse rows of setigerous spines, each row with 2+2 spines; sternal lamina between ♂ coxae 4 rectangular, with a rounded tubercle at each corner; ♂ femora 6 and 7 each with a ventral hump; gonopod postfemoral part strongly condensed, solenophore and solenomere very short, femorite rather long; solenophoral tip with two apical lobes.

ETYMOLOGY. Honours Henrik Enghoff, a prominent Danish specialist in Diplopoda.

DESCRIPTION. Length ca 30–31 mm (♂), 33–35 mm (♀). Width of pro- and metazona 1.8 and 2.1 mm (♂), 3.3 and 3.7 mm (♀), respectively.

Coloration in alcohol pink to yellow, especially so base of paraterga and metaterga near paraterga, surrounding parts

pale yellow. Axial line dark. Surface below paraterga dark red, paraterga yellowish. Pink parts of metaterga with numerous black spots. Venter of metazona pale yellow, of prozona castaneous brown. Legs yellow.

Head sparsely setose, a little narrower than or subequal to collum. Epicranial suture very distinct.

Antennae extremely long and slender, reaching the middle of segment 7. Most of antennomere 7 dark brown, distal part of antennomere 6 castaneous brown, other antennomeres yellowish.

Collum with three transverse rows of obvious setigerous spines: 3(4)+3(4), 1+1 and 2+2.

Body parallel-sided on segments 5–17, thereafter gradually tapering. Metaterga with two transverse rows of evident setigerous spines in front of and behind sulcus: 2+2 and 2+2 (regardless of a pair of extremely long spines lying near caudolateral base of paraterga) on segments 5–17; 2+2 and 1+1 on segments 2 and 3; 2+2 and 2+1 on segment 4. Median spines of anterior row very obvious on segments 2–17, while paramedian spines evident only on segments 2–4, vague on segments 5–17. Paraterga spine/antler-shaped, well-elevated above dorsum (less so in female), mainly directed laterad on segments 7–17, directed increasingly caudad on segments 17–19 (Fig. 30). Each with 2–3 setigerous spines at front edge, and a long and large spine at caudal base.

Surface generally rough. Prozona smooth both dorsally and laterally. Metazona with very delicate micropilosity. Lateral sides of metazona, plus pleurites delicately setose. Axial line traceable on metaterga. Stricture between pro- and metazona evident, deep. Transverse sulcus on metaterga very clear, rather deep on segments 2–18, missing on segment 19. Pleurosternal carinae absent. Ozopores invisible from above, lying laterally near base of ultimate spine of paraterga.

Epiproct normal, unmodified (Fig. 29). Subanal scale subsemicircular, with 1+1 setae on knobs and a clear emargination in-between (Fig. 29).

Sterna sparsely setose, with an elevated rectangular lamina between ♂ coxae 4, this lamina carrying a rounded tubercle at each corner (Fig. 28). Legs long and slender. ♂ femora 6 and 7 each with a strong ventral hump (Figs 26, 27).

Gonopod (Figs 31–33) suberect, solenophore and solenomere very short, femorite rather long. Tip of solenophoral lamina medialis with two apical lobes. Postfemoral part strongly condensed.

KEY TO SPECIES OF *DESMOXYTES* KNOWN OR POTENTIALLY PRESENT IN VIETNAM

1. Paraterga wing-shaped (Fig. 19) 2
— Paraterga antler- or spine-shaped (Figs 2, 3, 6, 7, 16, 17, 30) 3
2. Body large, ca 35 mm in length. Metaterga with two transverse rows of 2+2 anterior and 1+1 posterior well-developed spines (Fig. 20). Sternum between ♂ coxae 4 with two independent, round tubercles (Fig. 21)
..... *D. spectabilis*
— Body smaller. Metaterga with two transverse rows of 2+2 anterior and 2+2 posterior spines. Sternum between ♂ coxae 4 with a prominent, rounded, caudal protuberance
..... *D. planata*
3. Paraterga antler-shaped (Figs 2, 3, 6, 7, 30) 4
— Paraterga spine-shaped (Figs 16, 17) 9

4. Epiproct normal, without conspicuous setigerous knobs near tip (Fig. 29) 5
— Epiproct modified, with several evident setigerous knobs near tip (Figs 1, 8, 14) 7
5. Metaterga smooth, more or less shining. ♂ femora unmodified *D. aspera*
— Metaterga rough, dull, granular. At least some ♂ femora modified, inflated (Figs 26, 27) 6
6. Midbody metaterga with 3+3 posterior setigerous spines. ♂ femora 6, 7 and 9 humped ventrally *D. cervaria*
— Midbody metaterga with 2+2 posterior spines (Fig. 30). ♂ femora 6 and 7 modified, each with a large hump on ventral side (Figs 26, 27). Four round tubercles on a prominent, elevated, rectangular lamina between ♂ coxae 4 (Fig. 28) *D. enghoffi*
7. At least 3+3 posterior metatergal spines on midbody metaterga 8
— Colour pallid or pink. Only 1+1 posterior, poorly developed setae on midbody metaterga (Fig. 6). Epiproct with 3+3 evident setigerous knobs near tip (Fig. 8). Gonopod suberect. Solenomere short (Figs 11–13)
..... *D. cattienensis*
8. Colour pink to red. Metaterga beset with numerous microsetae. 4+4 posterior spines on midbody metaterga
..... *D. pilosa*
— Colour dark to castaneous brown. Metaterga only microgranular. 3+3 posterior spines on midbody metaterga (Fig. 2) *D. proxima*
9. Colour dark. 1+1 posterior obvious spines on midbody metaterga (Fig. 16). Antennae relatively long and slender. Gonopod subfalcate, femorite slightly curved. Solenomere long (Figs 18, 19) *D. specialis*
— Colour pink. 2+2 posterior tubercles/spines on midbody metaterga. Antennae relatively short and stout. Gonopod solenophore pointed terminally *D. hostilis*

ACKNOWLEDGEMENTS. We are most grateful to Dr. Phan Luong, Director, Mr. Nguyen Huu Thuc and other colleagues in the Joint Vietnamese-Russian Tropical Centre for allowing us to join their expeditions over Vietnam. The first author would like to thank Prof. Thai Tran Bai, Hanoi Pedagogical University, for his kindly providing, and to Mr. Pham Duc Tien (IEBR) for his help in collecting, material. Thanks also go to the Department of Parasitology (IEBR) for logistic help. Prof. Henrik Enghoff, Copenhagen, Denmark, helped with literature supply. Special thanks are also addressed to Dr. Huynh Thi Kim Hoi (IEBR) for helping the first author in his studies of soil animals.

References

- Attems C. 1937. Myriopoda 3. Polydesmoidea I. Fam. Strongylosomidae // Das Tierreich. Lfg.68. S.1–300.
- Attems C. 1938. Die von Dr. C. Dawydoff in Französisch Indochina gesammelten Myriopoden // Mém. Mus. natn. Hist. nat., N.S. T.6. Fasc.2. P.187–321.
- Attems C. 1953. Myriopoden von Indochina. Expedition von C. Dawydoff (1938–1939) // Ibid. T.5. Fasc.3. P.133–230.
- Enghoff H., Golovatch S.I., Nguyen Duc Anh. 2004. A review of the millipede fauna of Vietnam (Diplopoda) // Arthropoda Selecta. Vol.13. Nos 1–2. P.29–43.
- Golovatch S.I., Enghoff H. 1994. Review of the dragon millipedes, genus *Desmoxytes* Chamberlin, 1923 (Diplopoda, Polydesmida, Paradoxosomatidae) // Steenstrupia. Vol.20. P.45–71.