

## On several new or poorly-known Oriental Paradoxosomatidae (Diplopoda: Polydesmida), XV

### О нескольких новых или плохоизученных ориентальных Paradoxosomatidae (Diplopoda: Polydesmida), XV

S.I. Golovatch  
С.И. Головач

Institute for Problems of Ecology and Evolution, Russian Academy of Sciences, Leninsky prospekt 33, Moscow 119071 Russia.  
E-mail: sgolovatch@yandex.ru

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

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КЛЮЧЕВЫЕ СЛОВА: Diplopoda, Polydesmida, Paradoxosomatidae, таксономия, новые находки, новые виды, Китай.

ABSTRACT. This contribution is devoted to new records of a few known, and to descriptions of the following eight new, species from China: *Sigipinius spiniger* sp.n., *Hirtodrepanum chinense* sp.n., *Tylopus kabaki* sp.n. and *T. similis* sp.n., all four from Yunnan, *Gonobelus belousovi* sp.n., *Kronopolites davidiani* sp.n. and *Hedinomorpha martensi* sp.n., all three from Sichuan, and *H. affinis* sp.n., from Gansu. *Hirtodrepanum* Golovatch, 1994, comb.n. ex Alogolykini, Alogolykinae in Sulciferini, Paradoxosomatinae, is new to the fauna of China.

РЕЗЮМЕ. Данное сообщение посвящено находкам нескольких известных, а также описаниям следующих восьми новых видов из Китая: *Sigipinius spiniger* sp.n., *Hirtodrepanum chinense* sp.n., *Tylopus kabaki* sp.n. и *T. similis* sp.n., все четыре из Юннани, *Gonobelus belousovi* sp.n., *Kronopolites davidiani* sp.n. и *Hedinomorpha martensi* sp.n., все три из Сычуани, а также *H. affinis* sp.n., из Ганьсу. *Hirtodrepanum* Golovatch, 1994, comb.n. ex Alogolykini, Alogolykinae in Sulciferini, Paradoxosomatinae, – новый для фауны Китая род.

### Introduction

This paper is devoted to new records of a few known, as well as to descriptions of eight new, species of paradoxosomatid millipedes from China. The material, chiefly collected by several Russian entomologists, has largely been deposited in the collection of the Zoological Museum, Moscow State University, Russia (ZMUM), with a few samples housed in the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZISP), Russia. A few additional samples, taken by and received from a German scientist, have been deposited in the Natur-Museum Senckenberg (SMF), Frankfurt a.M., Germany, as indicated below.

### Taxonomic part

#### *Oxidus gracilis* (C.L. Koch, 1847)

MATERIAL. 1 ♂ (ZMUM p2292), China, Sichuan Prov., NE of Shimian, Xiangshuigou River, Tianpingzi, 995 m a.s.l., lower part of forest belt, mostly subtropical shrubs and deciduous forest, 29°15'35"N, 102°22'26"E, 15.07.2013, leg. I.A. Belousov & I.I. Kabak.

REMARKS. This subcosmopolitan, definitely anthropochore species is very common all over China [e.g. Golovatch, 2012, 2013a, b].

#### *Sellanucheza typica* Golovatch, 2013 Figs 1 & 2.

MATERIAL. 2 ♂♂ (ZMUM p2291), China, Sichuan Prov., NE of Shimian, Xiangshuigou River, Tianpingzi, 995 m a.s.l., lower part of forest belt, mostly subtropical shrubs and deciduous forest, 29°15'35"N, 102°22'26"E, 15.07.2013, leg. I.A. Belousov & I.I. Kabak.

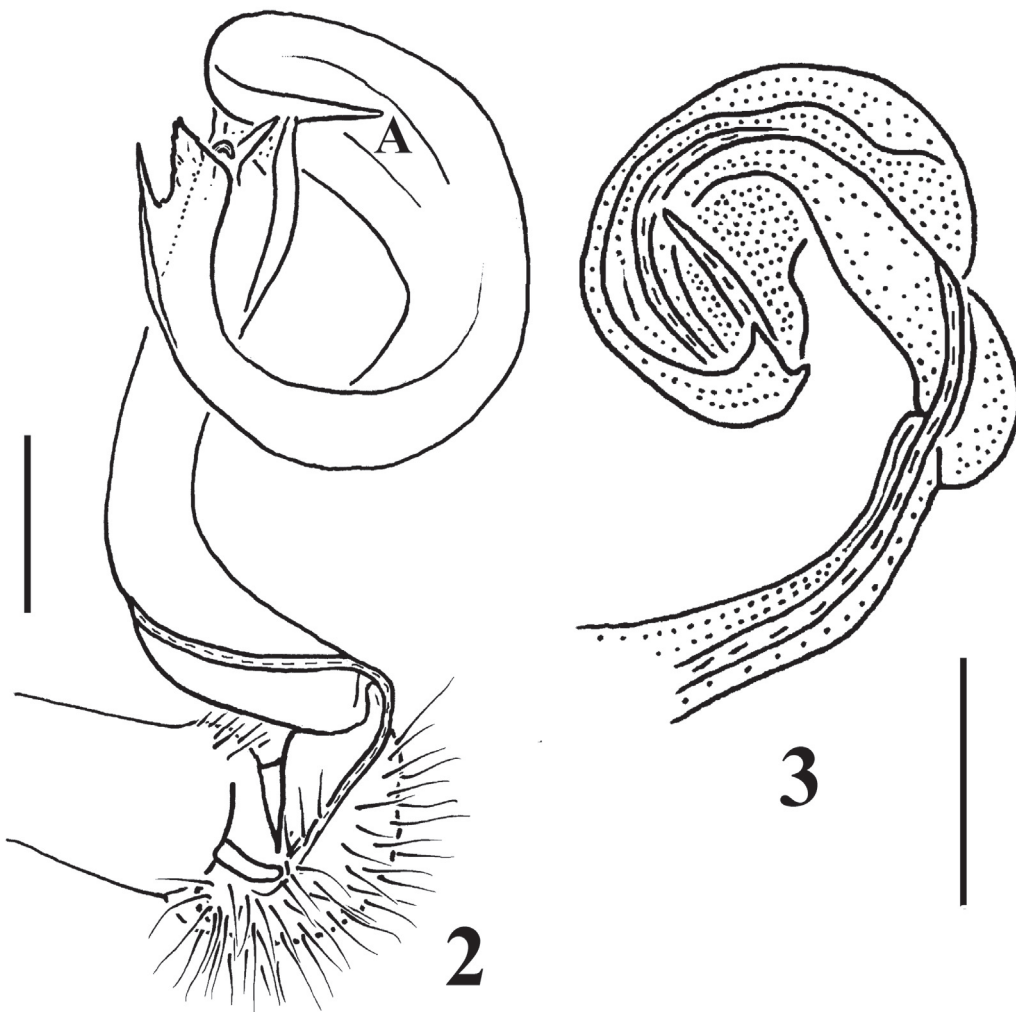
REMARKS. This species has been described from Sichuan Prov., Maoxian County, SE of Shangxin-zhen, taken at 3155 m a.s.l., 31°31'04"N, 103°47'41"E [Golovatch, 2013b]. The above near-topotypes are similarly large (40–42 mm long, 3.7–3.8 and 3.9–4.0 mm wide on pro- and metazona, respectively), but considerably darker, mostly dark brown with brown pinkish legs and antennae (Fig. 1) while the gonopod differs in a slightly shorter process A of the solenophore (Fig. 2).

#### *Sigipinius simplex* Golovatch, 2013 Fig. 3.

MATERIAL. 1 ♂, 1 ♀ (ZMUM p2289), China, Sichuan Prov., Kangding NNE of Yalaxiang, Shuangyanwo, 3980 m a.s.l., subalpine meadows near timber-line, 30°14'20"N, 102°01'21"E, 8.07.2013; 2 ♂♂ (ZMUM p2290), same locality and habitat, 3915 m a.s.l., 30°14'22"N, 102°00'48"E, 8.07.2013, leg. I.A. Belousov & I.I. Kabak.

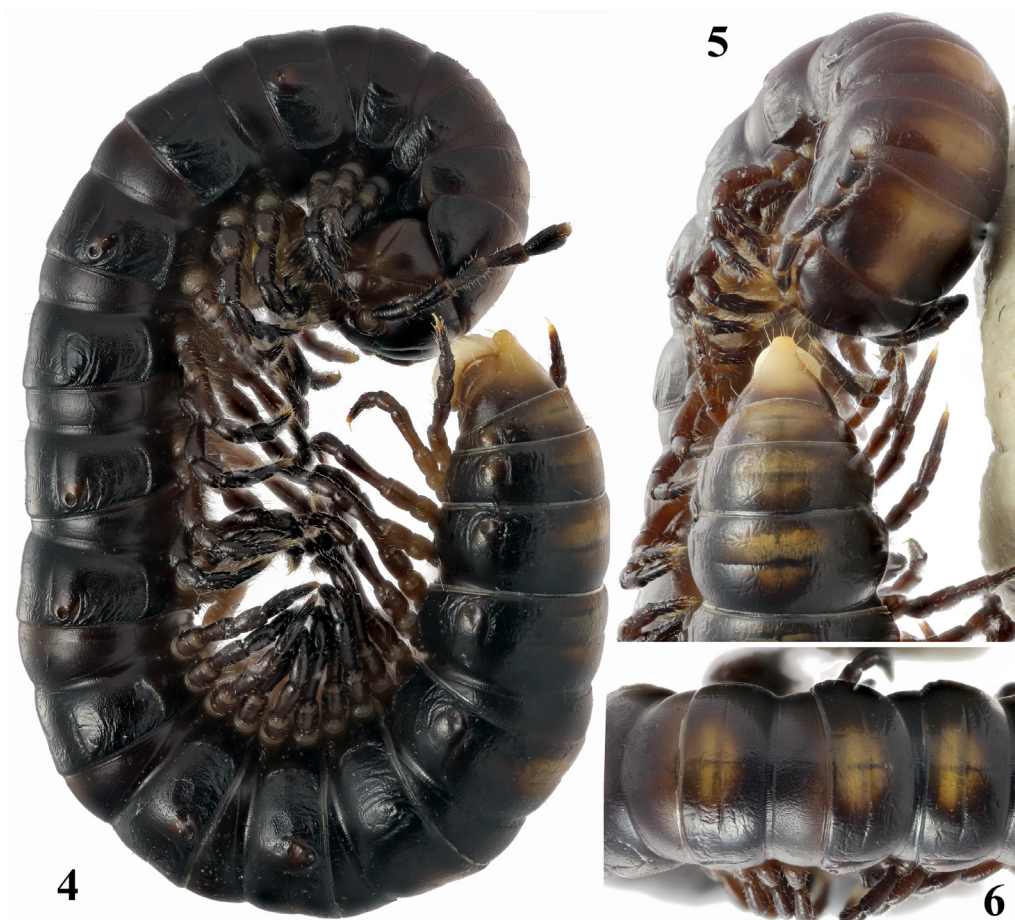


Figs 1. Habitus of *Sellanucheza typica* Golovatch, 2013, ♂ from Tianpingzi, lateral view. Photo taken by K. Makarov, not to scale.  
Рис. 1. Внешний вид *Sellanucheza typica* Golovatch, 2013, ♂ из Tianpingzi, сбоку. Фото сделано К. Макаровым, без масштаба.



Figs 2 & 3. Left gonopod of *Sellanucheza typica* Golovatch, 2013, ♂ from Tianpingzi, and telopodite of right gonopod of *Sigipinius simplex* Golovatch, 2013, ♂ from Shuangyanwo, mesal views. Scale bars: 0.5 mm.

Рис. 2 и 3. Левый гонопод *Sellanucheza typica* Golovatch, 2013, ♂ из Tianpingzi, и телоподит правого гонопода *Sigipinius simplex* Golovatch, 2013, ♂ из Shuangyanwo, изнутри. Масштаб 0,5 мм.



Figs 4–6. *Sigipinius spiniger* sp.n., holotype: 4 — habitus, lateral view; 5 — anterior and posterior body parts, dorsal view; 6 — midbody segments, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 4–6. *Sigipinius spiniger* sp.n., голотип: 4 — общий вид, сбоку; 5 — передняя и задняя части тела, сверху; 6 — среднетеловишние сегменты, сверху. Фото сделаны К. Макаровым, без масштаба.

**REMARKS.** This species has been described from Sichuan Prov., Jiulong County, SW of Wulaxixiang, taken at 4050 m a.s.l., 28°34'40"N, 101°35'33"E, and at 4195 m a.s.l., 28°32'49"N, 101°34'13"E [Golovatch, 2013b]. The new samples thus represent near-topotypes. A gonopod drawing (Fig. 3) is provided to document the new record.

*Sigipinius spiniger* sp.n.

Figs 4–13.

**HOLOTYPE** ♂ (ZMUM p2274), China, Yunnan Prov., from Lijiang to Shangrila, 214 Natn. Road, WSW of Edi, 3960 m a.s.l., upper part of forest belt, coniferous forest (*Abies*-like trees) with bamboo and *Rhododendron*, 27°19'31"N, 99°51'27"E, 1.06.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

**PARATYPES:** 4 ♂♂ (ZMUM p2275, 2276), same locality, together with holotype; 1 ♂ (ZISP), same locality, 3690 m a.s.l., 27°20'35"N, 99°51'58"E, 31.05.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

**NAME.** To emphasize a very distinct spine (*i*) near the base of the solenophore. Noun in apposition.

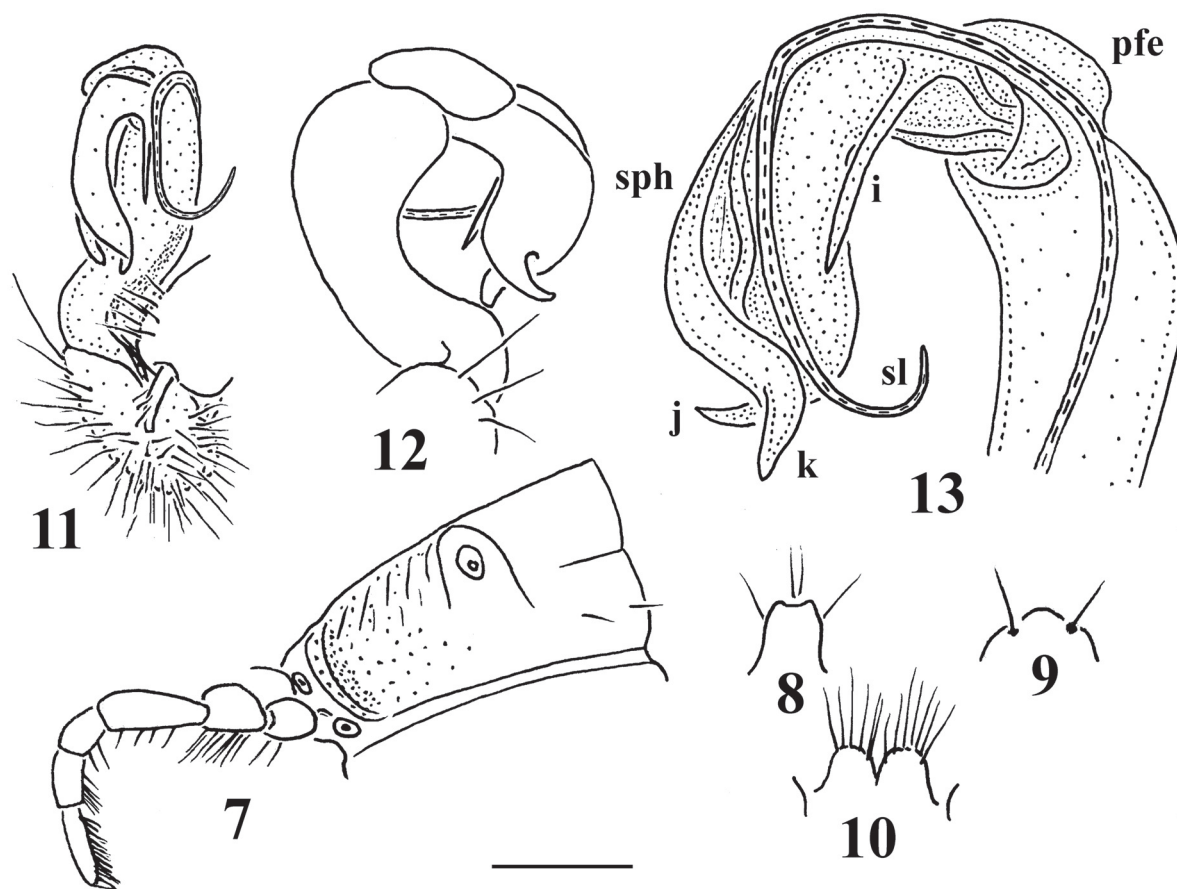
**DIAGNOSIS.** Differs from all six hitherto known congeners (see review and key in Golovatch [2013b])

by a distinctly bifid tip of the solenophore, coupled with a long and spiniform process (*i*) lying near the latter's base (Figs 11–13).

**DESCRIPTION.** Length ca 20–23 mm, width of midbody pro- and metazonae 2.2–2.7 and 2.5–3.0 mm, respectively (♂). Holotype ca 21 mm long, 2.2 and 2.5 mm wide on pro- and metazonae, respectively. General coloration in alcohol dark brown to blackish brown, with a genus-characteristic pattern of yellowish axial spots on collum and following metaterga, a yellowish epiproct, and often reddish to yellowish ozopore regions (Figs 4–6); tips of antennae whitish.

In width, head < collum < segments 2 & 3 < 4 < 5–16; thereafter body gradually tapering. Clypeolabral region sparsely setose, vertigial region with a few setae only. Antennae rather short, only slightly extending back behind collum when stretched dorsally (♂); subequal antennomeres 2 & 3 slightly longer than subequal antennomeres 4–6. Paraterga very poorly developed (Figs 4–7), a small ventrolateral lobule in collum, very small, thick, invariably rounded bulges never produced caudad behind tergal margin in following seg-





Figs 7–13. *Sigipinius spiniger* sp.n., ♂ paratype from WSW of Edi, 3960 m a.s.l.: 7 — body segment 10, lateral view; 8 — epiproct tip, dorsal; 9 — hypoproct, ventral; 10 — sternal cones between coxae 4, caudoventral view; 11 & 12 — right gonopod, mesal and lateral views, respectively; 13 — distal half of right gonopod, submesal view. Scale bars: 1.0 (7–10), 1.0 (11 & 12) and 0.5 mm (13).

Рис. 7–13. *Sigipinius spiniger* sp.n., паратип ♂, ЗЮЗ от Edi, 3960 м н.у.м.: 7 — сегмент 10, сбоку; 8 — кончик эпипрокта, сверху; 9 — гипопрокт, снизу; 10 — стеральные конусы между тазиками 4, вид одновременно сзади и снизу; 11 и 12 — правый гонопод, соответственно изнутри и сбоку; 13 — дистальная половина правого гонопода, почти изнутри. Масштаб: 1,0 (7–10), 1,0 (11 и 12) и 0,5 мм (13).

ments 2–19, set low, mostly lying at about half of midbody height; calluses very poorly developed, but high/thick, until about midway delimited by a rather deep sulcus both dorsally and ventrally. Ozopores lateral, invisible from above, lying inside an ovoid pit slightly in front of caudal margin (Figs 4 & 7). Body surface shining and mostly smooth throughout, below paraterga somewhat rugose to rugulose, often also microgranulate. Axial line traceable on collum and following metaterga (Figs 5 & 6). Transverse metatergal sulcus very poorly developed and incomplete in segments 5–18, absent from 19<sup>th</sup>. Tergal setae short (ca 1/5<sup>th</sup> of metatergal length), mostly abraded, arranged in a single transverse row of 3+3 in front of sulcus, setation pattern barely traceable due to vague insertion points (Figs 4–7). Stricture dividing pro- and metazonae rather narrow and deep, finely striolate dorsally and dorso-laterally. Pleurosternal carinae distinct, arcuate, micropapillate ridges (Figs 4 & 7), in segments 6 & 7 these drawn caudally into a rounded tooth gradually disappearing towards segment 18, totally wanting on 19<sup>th</sup>.

Epiproct (Figs 5 & 8) barely concave, subapical lateral papillae very small. Hypoproct (Fig. 9) nearly semi-circular, caudal 1+1 setae clearly separated, not borne on knobs.

Sternites without modifications, densely setose; cross-impressions modest, axial ones especially weak; a paramedian pair of rather high, linguiform, medially nearly contiguous, setose lobes between coxae 4 (Fig. 10). Legs rather short, obviously slightly incrassate (♂), ca 1.1–1.2 times as long as midbody height (♂) (Figs 4, 5 & 7), prefemora only faintly swollen laterally and beset brush-like with longer setae ventrally; adenostyles absent; brushes present until about midbody legs on tarsi and in distal halves of tibiae, thereafter gradually thinning out first on tibiae and then on tarsi until legs of segment 17 (♂).

Gonopods (Figs 11–13) fairly complex; coxite rather short, subcylindrical, setose distoventrally; prefemoral part as usual, densely setose, relatively short, about 1/3 the length of acropodite and only slightly shorter than femorite; the latter simple, curved laterad, devoid of





Figs 14–17. *Gonobelus belousovi* sp.n., holotype: 14 — habitus, lateral view; 15 — anterior part of body, ventral view; 16 — midbody segments, dorsal view; 17 — posterior part of body, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 14–17. *Gonobelus belousovi* sp.n., голотип: 14 — общий вид, сбоку; 15 — передняя часть тела, снизу; 16 — среднетеловишние сегменты, сверху; 17 — задняя часть тела, сверху. Фото сделаны К. Макаровым, без масштаба.

outgrowths; postfemoral region (**pfe**) short, subcylindrical, simple, demarcated by a distinct sulcus each from femorite basally and from solenophore (**sph**) apically; **sph** strongly curved, directed mesad, very large, unifoliate, represented solely by a lamina lateralis, deeply bifurcate in distal half (unciform branches **k** & **j**), not sheathing a long, flagelliform solenomere (**sl**) which is neatly attached to mesal face of **sph**. The latter at base supplied with a long, spiniform, ventral process (**i**).

*Gonobelus belousovi* sp.n.

Figs 14–25.

HOLOTYPE ♂ (ZMUM ρ2272), China, Sichuan Prov., NE of Shimian, Xiangshuigou River, Tianpingzi, 995 m a.s.l., lower part of deciduous forest belt strongly affected by human activities, 29°15'35"N, 102°22'26"E, 15.07.2013, leg. I.A. Belousov & I.I. Kabak.

PARATYPE ♀ (ZMUM ρ2273), same locality, together with holotype.

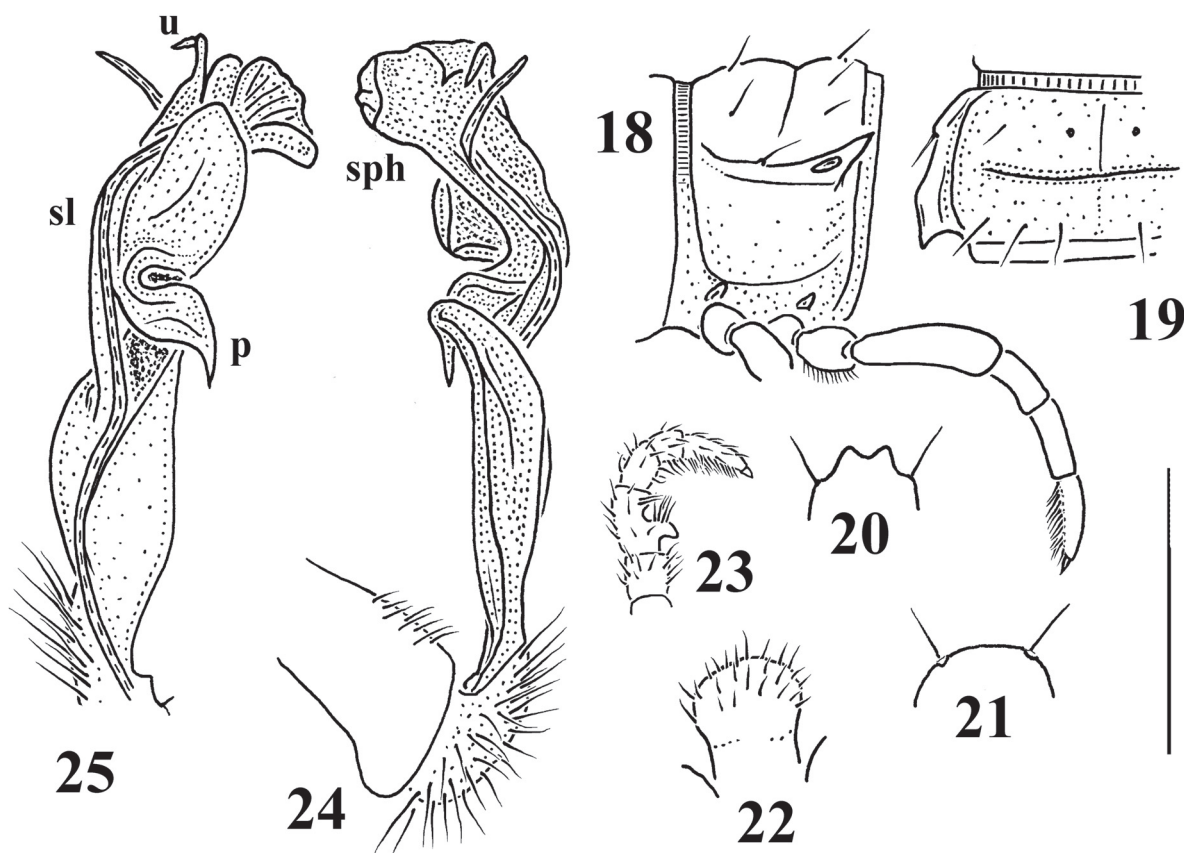
NAME. Honours Igor Belousov, one of the principal collectors of this material.

DIAGNOSIS. Differs from all three hitherto known congeners, *G. sinensis* Attems, 1936, from Yunnan, *G. martensi* Golovatch, 2013, from Shaanxi, and *G. pentaspinus* Golovatch, 2013, from Sichuan, China [Attems, 1936; Golovatch, 2013a, b], by the medium body size (width 2.5 mm, ♂), coupled with the absence of

sternal cones, by distofemoral process **p** at the base of a rather poorly coiled and short solenophore being directed basad, not distad (Figs 24 & 25), and by the adenosyle on ♂ femur 1 remarkably prominent (Fig. 23).

DESCRIPTION. Length ca 23 (holotype) or 21 mm (paratype), width of midbody pro- and metazonae both in holo- and paratype ca 2.0 and 2.5 mm, respectively. General coloration in alcohol brown to dark brown (Figs 14–17), up to blackish (♀); prozonae infuscate while central parts of metaterga a little lighter, with two paramedian, indistinct, light brown, poorly separated stripes, thus forming a somewhat cingulate pattern. Tips of antennae whitish.

Body submoniliform. In width, head < collum < segments 3 & 4 < 2 < 5=16; thereafter body gradually tapering towards telson. Clypeolabral region densely setose, vertigial region with a few setae only (Fig. 15). Antennae long and slender, reaching behind body segment 3 (♂) or 2 (♀) when stretched dorsally; antennomere 3 > subequal 2–5 > 6. Paraterga modest (Figs 14–19), a small, rounded, ventrolateral lobule with a small midway denticulation in collum, a small, thin, also rounded, arcuate, caudally slightly produced ridge bearing three small denticulations in segment 2; caudal corner spiniform, but never drawn behind tergal margin in following segments 3–19; paraterga set low, mostly lying at about upper 1/3 of midbody height, also



Figs 18–25. *Gonobelus belousovi* sp.n., holotype: 18 & 19 — body segment 10, lateral and dorsal views, respectively; 20 — epiproct tip, dorsal view; 21 — hypoproct, ventral view; 22 — sternal lobe between coxae 4, caudoventral view; 23 — leg 1, lateral view; 24 & 25 — right gonopod, lateral and mesal views, respectively. Scale bars: 2.0 (18–23) and 1.0 mm (24–25).

Рис. 18–25. *Gonobelus belousovi* sp.n., голотип: 18 и 19 — сегмент 10, соответственно сбоку и сверху; 20 — эпипрокт, сверху; 21 — гипопрокт, снизу; 22 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 23 — нога 1, сбоку; 24 и 25 — правый гонопод, соответственно сбоку и изнутри. Масштаб 2,0 (18–23) и 1,0 мм (24–25).

arcuate, slightly thinner and smaller in poreless segments compared to pore-bearing ones, especially clearly so in ♀ compared to ♂; calluses thin, delimited by a deep and arcuate sulcus not only dorsally, but also by a somewhat more vague sulcus ventrally (Fig. 18); lateral edge of paraterga 2–19 with a distinct setigerous denticle at about front 1/3, with a second, smaller denticle usually traceable above ozopore in pore-bearing segments. Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Fig. 18). Body surface generally smooth and shining, at most very faintly rugulose in places, especially so below paraterga. Axial line fine, visible only on metaterga, a little more evident in their front halves. Transverse metatergal sulcus very evident, deep, clear in segments 5–18, sometimes slightly beaded at bottom, normally reaching bases of paraterga (Figs 14, 16–19), incomplete (♀) or complete (♂) in 18<sup>th</sup>, absent from 19<sup>th</sup>. Tergal setae rather long (ca 1/4–1/3 of metatergal length), mostly abraded, but pattern usually traceable as insertion points if setae broken off; collum with three transverse rows of 3+3, 2+2 and 3+3 setae, following metaterga with only two transverse rows:

2+2 in front of and 3+3 setae behind sulcus (Figs 16–19). Stricture dividing pro- and metazona rather broad, deep, finely ribbed dorsally (Figs 16–19). Pleurosternal carinae small, but evident arcuate ridges bearing a small caudal tooth/knob in segments 2–8, a little smaller in ♀ compared to ♂. Epiproct (Figs 17 & 20) rather short, flattened dorsoventrally, faintly concave at tip, subapical lateral papillae evident. Hypoproct (Fig. 21) semi-circular, caudal 1+1 setae clearly separated, not borne on knobs.

Sternites without modifications, sparsely setose, cross-impressions modest, axial ones especially weak; a high, rounded, linguiform, setose lamina between ♂ coxae 4 (Fig. 22). Legs rather long and slender (Figs 14–18), slenderer and shorter in ♀ compared to ♂, ca 1.4–1.5 versus 1.0–1.1 times as long as midbody height in ♂ and ♀, respectively; ♂ femur 1 with a particularly prominent ventral adenostyle/hook (Fig. 23); all ♂ prefemora beset brush-like with longer setae ventrally, ♂ tarsal brushes present until legs of segment 18 (Figs 15 & 18).

Gonopods (Figs 24 & 25) fairly complex; coxite rather short, subcylindrical, setose distoventrally;





Figs 26–30. *Hirtodrepanum chinense* sp.n., holotype: 26 — habitus, lateral view; 27 — anterior part of body, ventral view; 28 — midbody segments, dorsal view; 29 — posterior part of body, dorsal view; 30 — left gonopod, submesal view. Photos taken by K. Makarov, not to scale.

Рис. 26–30. *Hirtodrepanum chinense* sp.n., голотип: 26 — общий вид, сбоку; 27 — передняя часть тела, снизу; 28 — среднетуловищные сегменты, сверху; 29 — задняя часть тела, сверху; 30 — левый гонопод, почти изнутри. Фото сделаны К. Макаровым, без масштаба.

prefemoral part as usual, densely setose, relatively short, ca 1/4 the length of acropodite; femorite long and slender, nearly as long as solenophore (**sph**); the latter complex, lamelliform, only poorly coiled and only about as long as a flagelliform, ribbon-shaped solenomere (**sl**); **sph** rather short, crowned by a few lobes, folds, ribs and an unciform process (**u**); apex of femorite dorsally at **sph** base with a distinct, dentiform, ventral process (**p**) directed proximally, not distally; seminal groove running entirely on mesal face of femorite, **sl** branching off before **p**.

**REMARKS.** The above new species is not a very typical *Gonobelus* Attems, 1936, chiefly because of its indistinctly coiled solenophore and the solenomere branching off clearly proximal to the end of the gonofemorite [cf. Golovatch, 2012, 2013a, b], but the presence of adenostyles on ♂ femur 1, as well as of a distofemoral process at the base of the solenophore

still warrant the above assignment. *Gonobelus* remains in the tribe Sulciferini, being especially close to several other Asian genera, including *Hirtodrepanum* Golovatch, 1994, comb.n. (see also Remarks immediately below), with more or less strongly coiled solenophores, but usually has adenostyles on ♂ femora 1 [Golovatch, 2012].

*Hirtodrepanum chinense* sp.n.

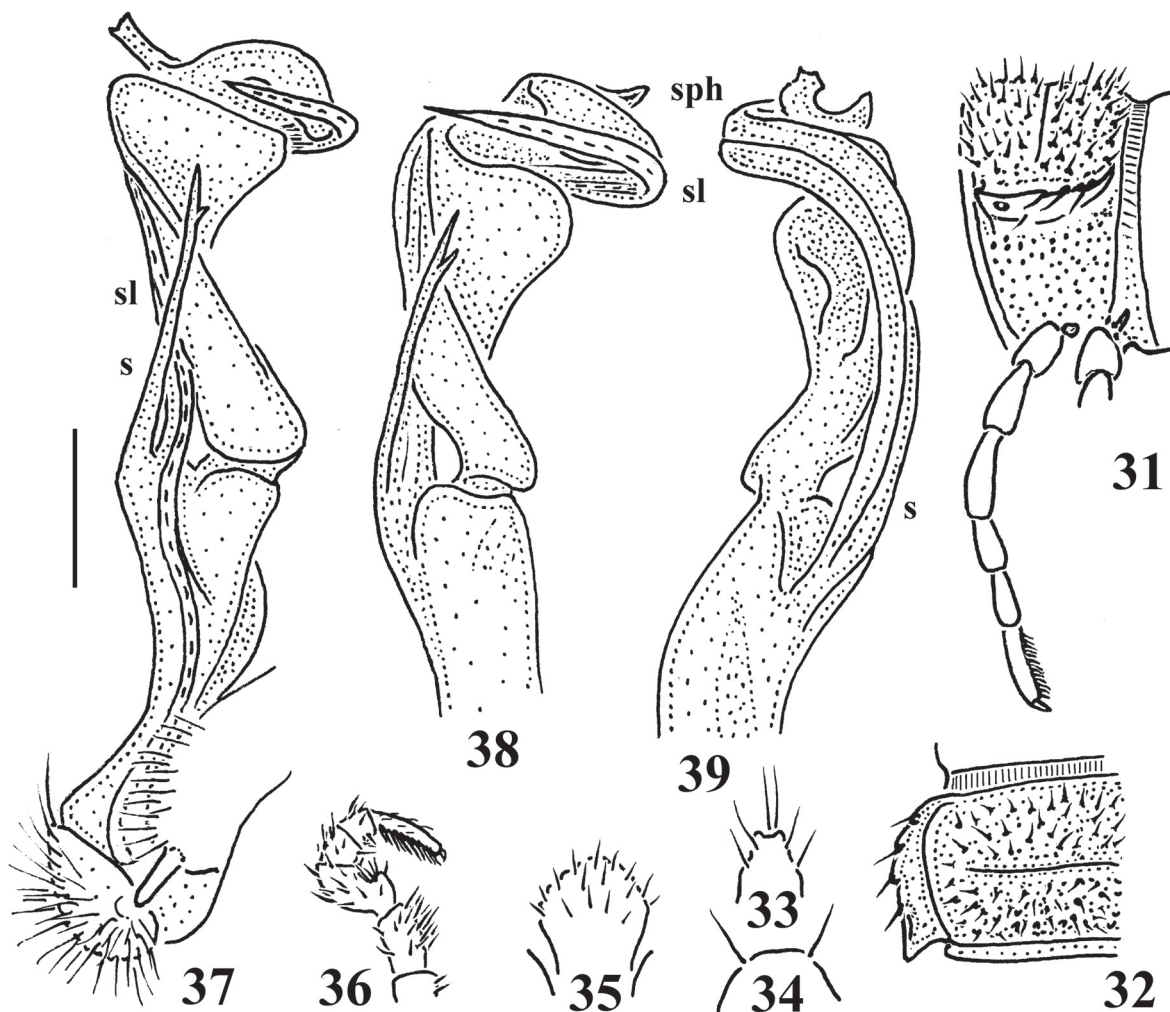
Figs 26–39.

**HOLOTYPE** ♂ (ZMUM p2278), China, Yunnan Prov., De-qen, Dewei Line, E of Aqiku, 2015 m a.s.l., middle part of forest belt, rather sparse coniferous forest with meadows, 27°34'03"N, 99°05'33"E, 15.06.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

**PARATYPE** ♀ (ZMUM p2279), same locality, together with holotype.

**NAME.** To emphasize the provenance from China. Adjective.





Figs 31–39. *Hirtodrepanum chinense* sp.n., holotype: 31 & 32 — body segment 10, lateral and dorsal views, respectively; 33 — epiproct tip, dorsal view; 34 — hypoproct, ventral view; 35 — sternal lobe between coxae 4, caudoventral view; 36 — leg 1, lateral view; 37–39 — right gonopod, mesal, dorsal and lateral views, respectively. Scale bars: 2.0 (31–36) and 1.0 mm (37–39).

Рис. 31–39. *Hirtodrepanum chinense* sp.n., голотип: 31 и 32 — сегмент 10, соответственно сбоку и сверху; 33 — эпипрокт, сверху; 34 — гипопрокт, снизу; 35 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 36 — нога 1, сбоку; 37–39 — правый гонопод, соответственно сбоку и изнутри. Масштаб 2,0 (31–36) и 1,0 мм (37–39).

**DIAGNOSIS.** Differs from the sole hitherto known congener, the type species *H. latigonopum* Golovatch, 1994, from Nepal, by the much larger size (ca 23 mm long and 2.1–2.7 mm wide versus 9–12 mm long and 1.3–1.9 mm wide), the presence of a transverse sulcus on metaterga 4–18 (versus 3–18), of the caudal corner of paraterga drawn behind the rear tergal margin in segments 14(15)–19 (versus both segments 18 and 19), of a branching solenomere (versus simple), and of a coiled, not so much curved and expanded, solenophore [Golovatch, 1994].

**DESCRIPTION.** Length ca 23 mm (both holo- and paratype), width of midbody pro- and metazonae 1.6 and 2.1 in holotype, ca 2.2 and 2.7 mm in paratype, respectively. General coloration in alcohol rather uniformly dark brown to blackish (Figs 26–29); only

paraterga and legs clearly lighter, light yellow to yellow-brown; tips of antennae whitish.

Body submoniliform. In width, head < collum < segments 3 & 4 < 2 < 5=17; thereafter body gradually tapering towards telson. Clypeolabral region very densely, vertigial region less densely, setose (Fig. 27). Antennae long and slender, reaching behind body segment 3 (♂) or 2 (♀) when stretched dorsally; antennomeres 2–5 subequal in length, each > 6. Paraterga modest (Figs 26–29 & 31), a small, rounded, ventrolateral lobule with 2–3 very small denticulations in collum, a small, thin, rounded, caudally slightly produced ridge in segment 2; caudal corner dentiform, mostly narrowly rounded to nearly pointed, but never extended behind tergal margin in segments 3–13(14), pointed and somewhat drawn behind the margin in following



Figs 40–44. *Kronopolites davidiani* sp.n., holotype: 40 — habitus, lateral view; 41 — anterior part of body, ventral view; 42 — midbody segments, dorsal view; 43 — telson, dorsal view; 44 — right gonopod, ventral view. Photos taken by K. Makarov, not to scale.

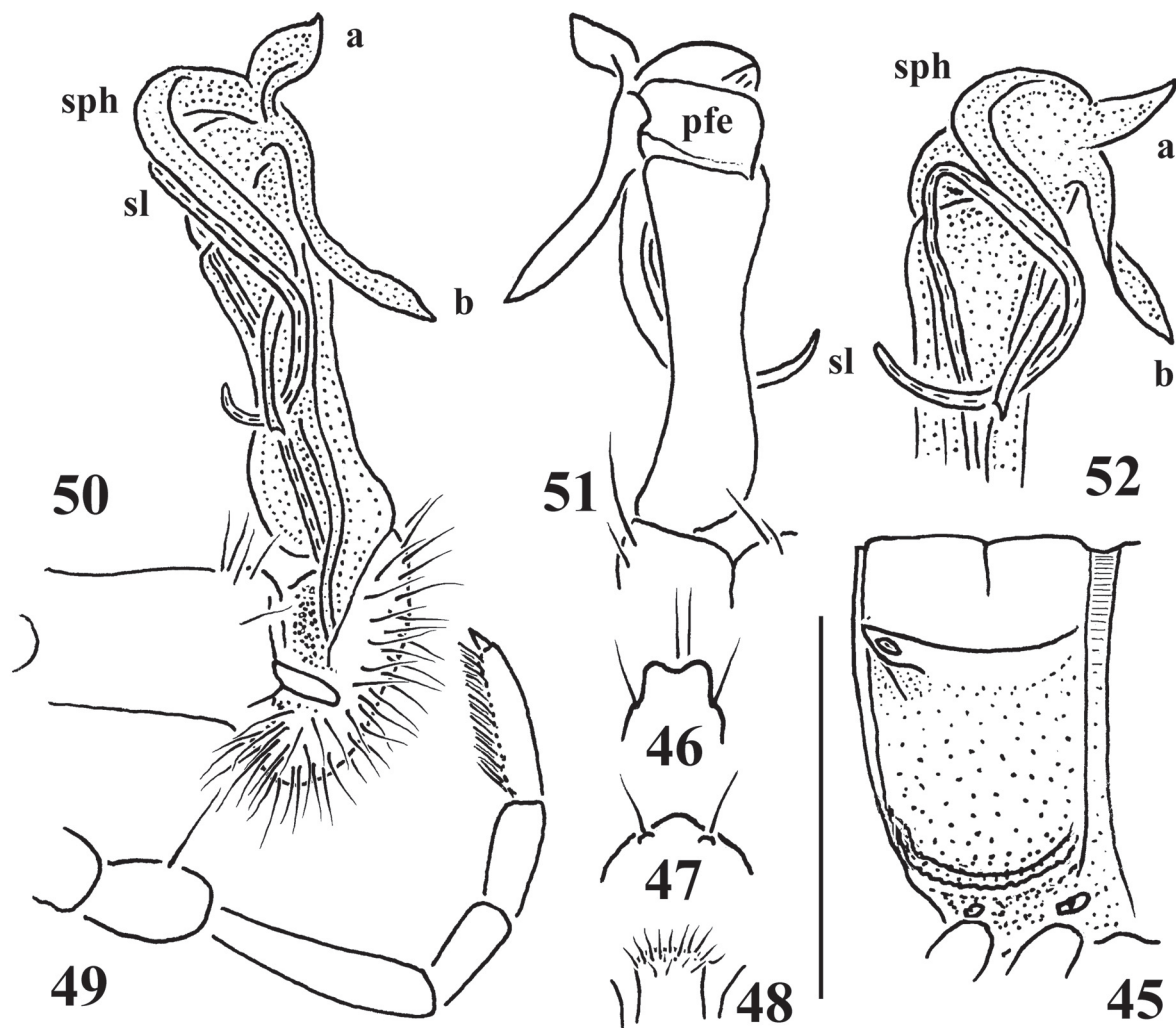
Рис. 40–44. *Kronopolites davidiani* sp.n., голотип: 40 — общий вид, сбоку; 41 — передняя часть тела, снизу; 42 — среднетеловишние сегменты, сверху; 43 — тельсон, сверху; 44 — правый гонопод, снизу. Фото сделаны К. Макаровым, без масштаба.

segments; paraterga set low, mostly lying at about half of midbody height, arcuate, slightly thinner and smaller in poreless segments compared to pore-bearing ones, especially clearly so in ♀ compared to ♂; calluses thin, delimited by a deep and arcuate sulcus dorsally, by a somewhat more vague sulcus ventrally as well (Figs 31 & 32); lateral edge of postcollum paraterga with 4–5 distinct setigerous denticles (Figs 28, 29, 31 & 32). Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Fig. 31). Body surface generally dull to poorly shining, metaterga very densely microgranulate and setose, metazonae similarly microgranulate below paraterga as well. Axial line nearly wanting, barely visible only on some metaterga. Transverse metatergal sulcus evident, rather deep, clear in segments 4–18, nearly reaching bases of paraterga (Figs 28, 29, 31 & 32), absent from 19<sup>th</sup>. Tergal setae short (ca 1/5–1/6 of metatergal length), abundant, mostly retained, irregular. Stricture dividing pro- and metazonae rather broad, deep, finely ribbed

dorsally (Figs 26, 28, 29, 31 & 32). Pleurosternal carinae absent. Epiproct (Figs 29 & 33) rather long, flattened dorsoventrally, modestly concave at tip, subapical lateral papillae small. Hypoproct (Fig. 34) semi-circular to roundly subtrapeziform, caudal 1+1 setae clearly separated, not borne on knobs.

Sternites without modifications, densely setose, cross-impressions modest, axial ones especially weak; a high, roundly subpentagonal, setose lamina between ♂ coxae 4 (Fig. 35). Legs very long and slender (Figs 26–29 & 31), slenderer and shorter in ♀ compared to ♂, ca 2.0–2.1 versus 1.5–1.6 times as long as midbody height in ♂ and ♀, respectively; ♂ femur 1 with a prominent ventral adenostyle/tubercle (Fig. 36); each of following ♂ femora but last two pairs with a small, but visible, ventral, parbasal, setose tubercle, ♂ tarsal brushes present until legs of segment 13 (Figs 27 & 31).

Gonopods (Figs 27, 30, 37–39) fairly complex; coxite long, subcylindrical, setose distoventrally; prefemoral part as usual, densely setose, short, only ca 1/6 the



Figs 45–52. *Kronopolites davidiani* sp.n., holotype: 45 — body segment 10, lateral view; 46 — epiproct tip, dorsal view; 47 — hypoproct, ventral view; 48 — sternal lobe between coxae 4, caudoventral view; 49 — leg 7, lateral view; 50–52 — left gonopod, mesal, lateral and dorsal views, respectively. Scale bars: 1.0 (45–49) and 0.5 mm (50–52).

Рис. 45–52. *Kronopolites davidiani* sp.n., голотип: 45 — сегмент 10, сбоку; 46 — эпипрокт, сверху; 47 — гипопрокт, снизу; 48 — стерральная пластина между тазиками 4, вид одновременно снизу и сзади; 49 — нога 7, сбоку; 50–52 — левый гонопод, соответственно изнутри, сбоку и сверху. Масштаб 1,0 (45–49) и 0,5 мм (50–52).

length of acropodite; femorite moderately long and slender, nearly as long as solenophore (**sph**); the latter complex, lamellate, distinctly coiled and somewhat shorter than a flagelliform, ribbon-shaped solenomere (**sl**) showing a long parabasal spine (**s**) and a subterminal spinule; **sl** branching off a little before apex of femorite, seminal groove running entirely on the latter's mesal face.

**REMARKS.** Considering the recent brief redefinition of the subfamily Alogolykinae, and of both of its tribes, Alogolykini and Polydrepanini [Likhitrakarn et al., 2013], *Hirtodrepanum* Golovatch, 1994 can no longer be considered as an alogolykine [Golovatch, 1994]. Instead, it closely resembles *Gonobelus* (see just above) and several other Asian genera of Sulciferini in which typically the solenophore is clearly coiled to support a long, flagelliform, not rod-shaped, solenomere [Golovatch, 2012]. Both *Gonobelus* and *Hir-*

*todrepanum* seem to be especially similar in showing a submoniliform body, modest paraterga, long antennae and legs, a slender and elongate gonopod femorite, largely evident adenostyles on ♂ femora 1, and no pleurosternal carinae. Within that group of sulciferine genera, adenostyles are known to occasionally be present also in *Inversispina* Zhang, in Zhang, Wang & Zhang, 1997 [Golovatch, 2012, 2013a, b].

Above is the first record of *Hirtodrepanum* in China, also a comb.n. ex Alogolykini, Alogolykinae in Sulciferini, Paradoxosomatinae.

*Kronopolites davidiani* sp.n.

Figs 40–52.

HOLOTYPE ♂ (ZMUM p2277), China, Sichuan Prov., Wenchian City, 214 Natn. Road, WSW of Edi, 3365 m a.s.l., upper





Figs 53–56. *Tylopus kabaki* sp.n., ♂ paratype (4025 m a.s.l.): 53 — habitus, lateral view; 54 — anterior part of body, ventral view; 55 — midbody segments, dorsal view; 56 — posterior part of body, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 53–56. *Tylopus kabaki* sp.n., паратип ♂ (4025 м н.у.м.): 53 — общий вид, сбоку; 54 — передняя часть тела, снизу; 55 — среднетеловишние сегменты, сверху; 56 — задняя часть тела, сверху. Фото сделаны К. Макаровым, без масштаба.

limit of forest belt near timber-line, shrubs, 27°20'35"N, 99°52'34"E, 30.05.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

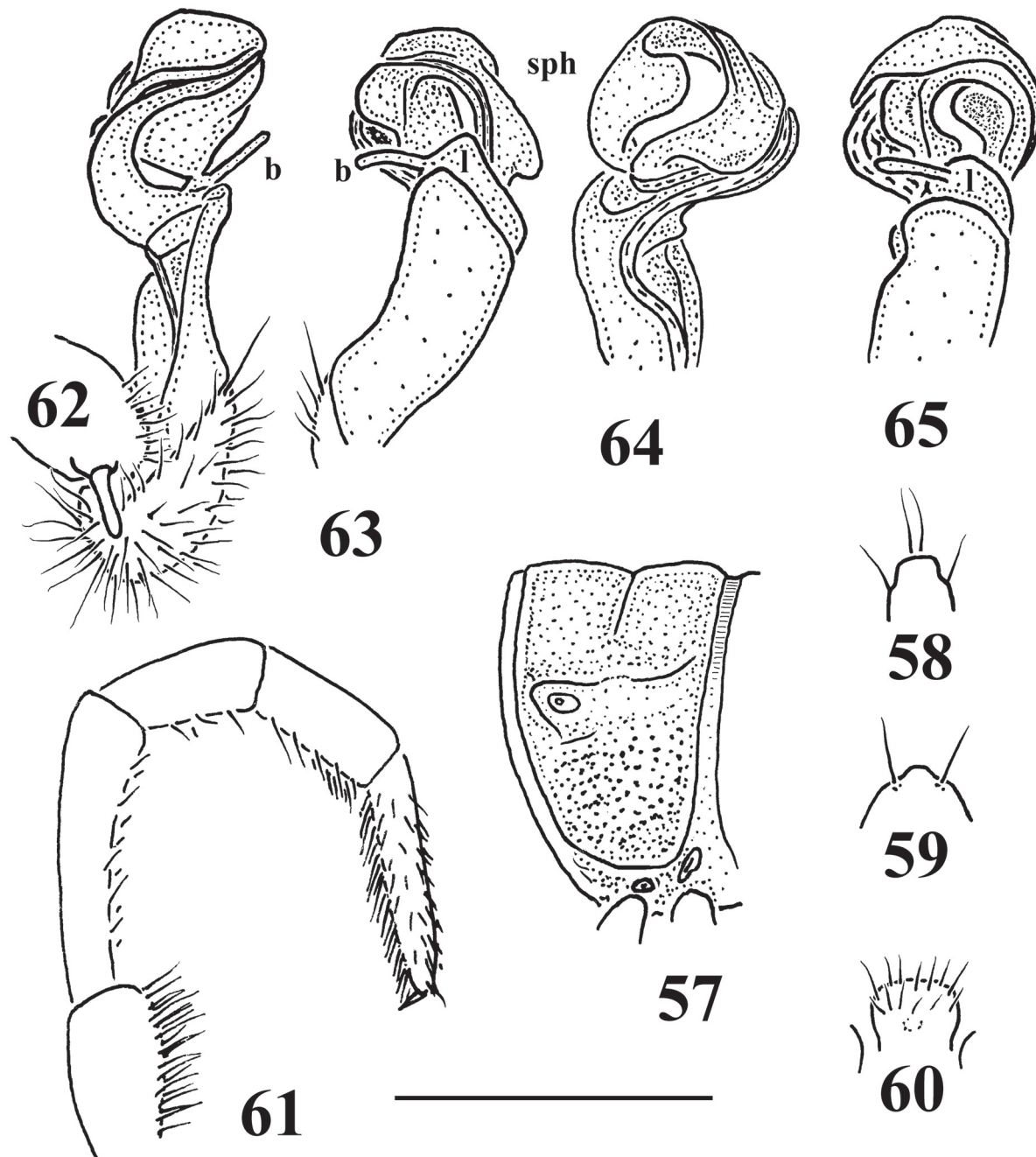
NAME. Honours Genrikh Davidian, one of the principal collectors of this material.

DIAGNOSIS. Differs from all nine currently known congeners [see Golovatch, 2009, 2013a, b] by a uniformly dark coloration, coupled with modest paraterga, a smooth tegument of metaterga, a simple and subacuminate distal part of the solenophore, and a short, phyllod process *a* (see also key in Golovatch [2009]).

DESCRIPTION. Length ca 23 mm, width of midbody pro- and metazonae in holotype 2.5 and 3.0 mm, respectively (♂). General coloration in alcohol rather uniformly dark brown with a light, grey-yellowish epiproct, and light grey-yellow-brown legs and antennomeres 2–6 (Figs 40–44); tip of antennae whitish.

In width, head < collum = segments 3 & 4 < 2 < 5=17; thereafter body gradually tapering towards telson. Clypeolabral region densely, vertigial region poorly, setose (Fig. 27). Antennae rather long and slender, nearly reaching behind body segment 3 (♂) when stretched dorsally; antennomere 2 = 3 > subequal 4–6. Paraterga modest (Figs 40–42 & 45), a small, regularly rounded, ventrolateral lobe in collum, a rather thin,

arcuate, low ridge well rounded and clearly produced caudally beyond rear tergal contour in segment 2, only slightly drawn caudally and narrowly rounded in segments 3, 4, 18 and 19, in all other segments likewise dentiform and narrowly rounded caudally, but only reaching caudal tergal margin; paraterga set low, mostly lying at about upper 1/3 of midbody height, slightly thinner and smaller in poreless segments compared to pore-bearing ones; calluses thin, delimited by a deep and arcuate sulcus only dorsally, devoid of marginal indentations (Figs 42 & 45). Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Fig. 45). Body surface generally smooth and shining, metazonae clearly microgranulate only below paraterga. Axial line wanting. Transverse metatergal sulcus evident, rather superficial, clear in segments 5–18, incomplete, not reaching bases of paraterga (Figs 42 & 45), absent from 19<sup>th</sup>. Tergal setae fully abraded, setation pattern apparently 2+2 in a front, presulcus row. Stricture dividing pro- and metazonae rather thin, deep, finely and densely striolate dorsally (Figs 42 & 45). Pleurosternal carinae clearly arcuate and papillate ridges traceable until segment 17 (Fig. 45), with a small, rounded, caudal tooth visible until



Figs 57–65. *Tylopus kabaki* sp.n., ♂ paratype (4025 m a.s.l.): 57 — body segment 10, lateral view; 58 — epiproct tip, dorsal view; 59 — hypoproct, ventral view; 60 — sternal lobe between coxae 4, caudoventral view; 61 — leg 7, lateral view; 62–65 — left gonopod, mesal, lateral, dorsal and ventral views, respectively. Scale bars: 2.0 (57–61) and 1.0 mm (62–65).

Рис. 57–65. *Tylopus kabaki* sp.n., паратип ♂ (4025 м н.у.м.): 57 — сегмент 10, сбоку; 58 — эпипрокт, сверху; 59 — гипопрокт, снизу; 60 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 61 — нога 7, сбоку; 62–65 — левый гонопод, соответственно изнутри, сбоку, сверху и снизу. Масштаб 2,0 (57–61) и 1,0 мм (62–65).

segment 8 (♂). Epiproct (Figs 43 & 46) rather long, flattened dorsoventrally, modestly concave at tip, sub-apical lateral papillae small. Hypoproct (Fig. 47) roundly subtriangular, caudal 1+1 setae clearly separated, borne on minute knobs.

Sternites without modifications, sparsely setose, cross-impressions modest, axial ones especially weak; a high, rounded, subquadrate, setose lamina between ♂ coxae 4 (Fig. 48). Legs very long and slender (Figs 40, 41 & 49), ca 2.0–2.1 times as long as midbody

height ( $\sigma$ ); adenostyles missing; prefemora only faintly bulging laterally, tarsal brushes present until legs of segment 17 (Figs 41 & 49).

Gonopods (Figs 44 & 50–52) rather simple; coxite long, subcylindrical, slightly setose distoventrally; prefemoral part as usual, densely setose, rather prominent; femorite moderately long and slender, nearly as long as solenophore (**sph**), with a clear groove/impression on mesal side and a distinct lateral sulcus demarcating a postfemoral region (**pfe**); **sph** curved and directed mesad, simple, subacuminate, about as long as a flagelliform solenomere (**sl**), with a short, phylloid, apical (**a**) and a longer, spiniform, basal (**b**) process.

*Tylopus kabaki* **sp.n.**

Figs 53–65.

HOLOTYPE  $\sigma$  (ZMUM p2282), China, Yunnan Prov., Deqen, Tuoxia Highway, mountain range between Xiaruolisuzuxiang & Yezhizhen, 4025 m a.s.l., upper limit of forest belt near timberline, shrubs, 27°42'50"N, 99°11'27"E, 11.06.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

PARATYPES: 1  $\sigma$ , 1  $\varphi$  (ZMUM p2283), same locality, together with holotype; 1  $\sigma$ , 2  $\varphi\varphi$  (ZISP), same locality, Tuoxia Highway, river valley S of Geduoluo, between Xiaruolisuzuxiang & Yezhizhen, 3575 m a.s.l., upper part of forest belt, 27°43'35"N, 99°11'19"E, 10.06.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

NAME. Honours Ilya Kabak, one of the principal collectors of this material.

DIAGNOSIS. Differs from all four congeners currently known from China (see review and key in Golovatch [2013a]) by modest and low-lying paraterga, a uniformly dark body, nearly not bulging  $\sigma$  prefemora and smooth metaterga, coupled with the lack of process **h** and the presence on lobe **I** of a bacilliform process **b** on the solenophore.

DESCRIPTION. Length ca 21–23 mm, width of midbody pro- and metazonae 1.9–2.3 and 2.6–2.9 mm ( $\sigma$ ) or 2.6 and 3.0 mm ( $\varphi$ ), respectively. Holotype ca 21 mm long, 1.9 and 2.6 mm wide on pro- and metazonae, respectively. General coloration in alcohol rather uniformly dark to blackish brown (Figs 53–56), legs and epiproct mainly red-brown to dark red-brown; tips of antennae whitish.

In width, head < collum = segments 3 & 4 < 2 < 5=17; thereafter body gradually tapering towards telson. Clypeolabral region densely, vertigial region poorly, setose (Fig. 54). Antennae rather long and slender, slightly clavate, nearly reaching behind body segment 3 ( $\sigma$ ) or 2 ( $\varphi$ ) when stretched dorsally; antennomere 3 > subequal 2, 4 & 5 > 6. Paraterga modest (Figs 53, 55–57), a small, regularly rounded, ventrolateral lobe in collum, a rather thin, arcuate, low ridge well rounded and slightly produced behind rear tergal contour in segment 2, caudal corner increasingly narrowly rounded and dentiform, but always lying within rear tergal contour in following segments (Figs 55 & 56); paraterga set low, mostly lying at about half of midbody height (Figs 53 & 57), slightly thinner and smaller in poreless segments compared to pore-bearing ones, especially poorly developed in  $\varphi$ ; calluses thin, delimited

by a deep and arcuate sulcus only dorsally, devoid of marginal indentations (Figs 55–57). Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Figs 53 & 57). Body surface generally smooth and shining, metazonae clearly microgranulate and rugulose only below paraterga, metaterga only in places faintly rugulose at most. Axial line wanting. Transverse metatergal sulcus evident, rather deep, clear in segments 5–17, nearly complete, only slightly failing to reach bases of paraterga, especially superficial on 18<sup>th</sup>, absent from 19<sup>th</sup> (Figs 53, 55–57). Tergal setae mostly abraded, short (ca 1/4–1/5 as long as metatergum), on postcollum metaterga setation pattern 2+2 in a front, presulcus row. Stricture dividing pro- and metazonae rather thin, deep, finely and densely striolate dorsally and dorsolaterally (Figs 55 & 57). Pleurosternal carinae clearly arcuate and papillate ridges traceable until segment 7 ( $\sigma$ ) or 5 ( $\varphi$ ), with an increasingly strongly developed, but rounded caudal tooth (Fig. 53); faint bulges in a few following segments. Epiproct (Figs 56 & 58) rather long, flattened dorsoventrally, subtruncate at tip, subapical lateral papillae small. Hypoproct (Fig. 59) roundly subtriangular, caudal 1+1 setae clearly separated, not borne on knobs.

Sternites without modifications, sparsely setose, cross-impressions modest, axial ones especially weak; a high, rounded, subquadrate, setose lamina between  $\sigma$  coxae 4 (Figs 54 & 60). Legs long and slender (Figs 53 & 61), ca 1.3–1.4 ( $\sigma$ ) or 0.9–1.1 ( $\varphi$ ) times as long as midbody height; adenostyles missing;  $\sigma$  prefemora only very faintly bulging, beset brush-like with longer setae ventrally;  $\sigma$  tarsal and distotibial brushes present until two last leg-pairs (Figs 53, 54 & 61).

Gonopods (Figs 62–65) rather simple; coxite rather long, subcylindrical, setose distoventrally; prefemoral part as usual, densely setose, rather prominent, about as long as femorite; the latter rather slender, somewhat shorter than a coiled solenophore (**sph**), with a clear groove/impression on mesal side and a distinct subapical lateral sulcus demarcating a short lobe **I** supplied with a small finger-shaped rod (**b**).

*Tylopus similis* **sp.n.**

Figs 66–77.

HOLOTYPE  $\sigma$  (ZMUM p2284), China, Yunnan Prov., from Lijiang to Shangrila, E of Guojie Luocun, 1670 m a.s.l., steep sun-warmed slope with rather thermophilous grasses and bushes, 31°28'45"N, 103°37'36"E, 30.06.2013, leg. I.A. Belousov, I.I. Kabak & G.E. Davidian.

NAME. To emphasize the similarity to *T. kabaki* sp.n.; adjective.

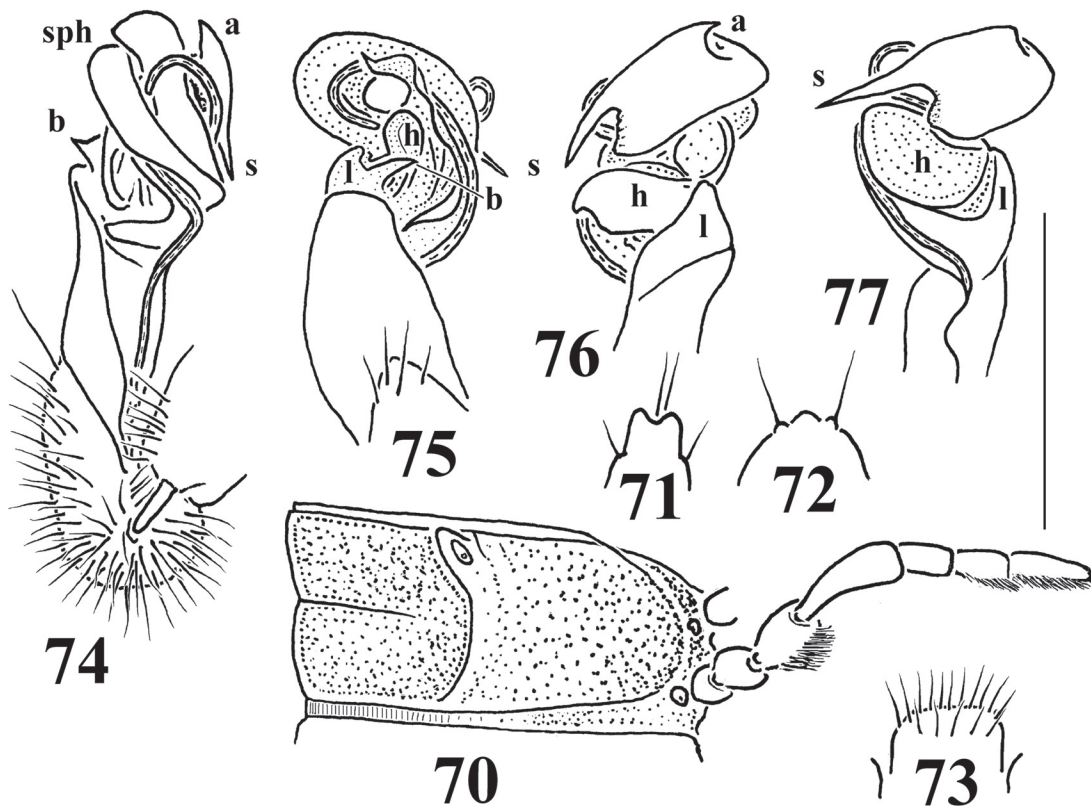
DIAGNOSIS. Differs from the especially similar *T. kabaki* sp.n. by a larger body, an emarginate epiproct tip, clearly bulging  $\sigma$  prefemora and a peculiar solenophore structure, from all congeners currently known from China (see Golovatch [2013a] and just above) by modest and low-lying paraterga, a uniformly dark body, and smooth metaterga, coupled with a large and disc-shaped process **h**, and a rather high lobe **I** supplied with





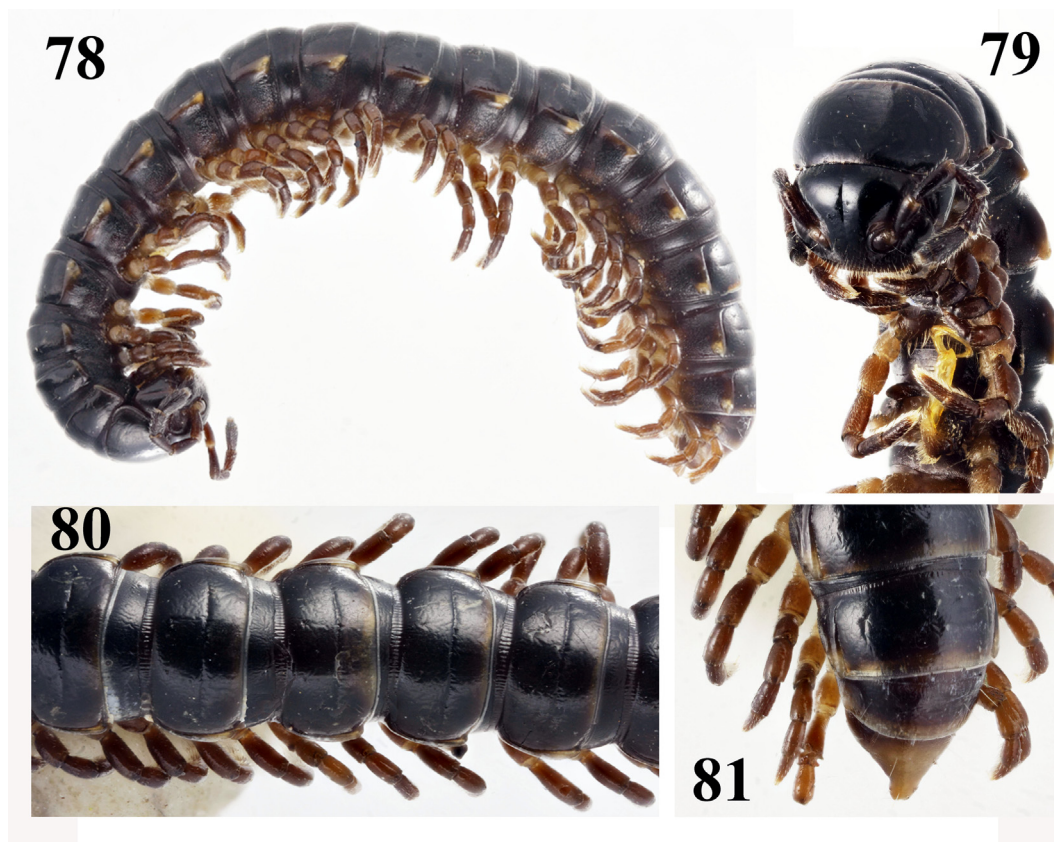
Figs 66–69. *Tylopus similis* sp.n., holotype: 66 — habitus, lateral view; 67 — anterior part of body, ventral view; 68 — midbody segments, dorsal view; 69 — posterior part of body, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 66–69. *Tylopus similis* sp.n., голотип: 66 — общий вид, сбоку; 67 — передняя часть тела, снизу; 68 — среднетуловищные сегменты, сверху; 69 — задняя часть тела, сверху. Фото сделаны К. Макаровым, без масштаба.



Figs 70–77. *Tylopus similis* sp.n., holotype: 70 — body segment 10, lateral view; 71 — epiproct tip, dorsal view; 72 — hypoproct, ventral view; 73 — sternal lobe between coxae 4, caudoventral view; 74–77 — right gonopod, mesal, ventral, dorsal and lateral views, respectively. Scale bars: 2.0 (70–73) and 1.0 mm (74–77).

Рис. 70–77. *Tylopus similis* sp.n., голотип: 70 — сегмент 10, сбоку; 71 — эпипрокт, сверху; 72 — гипопрокт, снизу; 73 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 74–77 — правый гонопод, соответственно изнутри, снизу, сверху и сбоку. Масштаб 2,0 (57–61) и 1,0 мм (62–65).



Figs 78–81. *Hedinomorpha martensi* sp.n., holotype: 78 — habitus, lateral view; 79 — anterior part of body, ventral view; 80 — midbody segments, dorsal view; 81 — posterior part of body, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 78–81. *Hedinomorpha martensi* sp.n., голотип: 78 — общий вид, сбоку; 79 — передняя часть тела, снизу; 80 — среднетеловишние сегменты, сверху; 81 — задняя часть тела, сверху. Фото сделаны К. Макаровым, без масштаба.

a sharp tooth **b**, whereas the remaining solenophore (**sph**) shows two characteristic distal spines (**s** and **a**).

**DESCRIPTION.** Length ca 30 mm, width of midbody pro- and metazonae in holotype 2.9 and 3.5 mm, respectively (♂). General coloration in alcohol rather uniformly blackish brown with dark brown antennae, legs, ozopore regions, epi-, para- and hypoproct (Figs 66–69); tips of antennae whitish.

All characters as in *T. kabaki* sp.n., except as follows.

Vertigial region bare (Fig. 67). Paraterga a little narrower and thinner even in pore-bearing segments (Figs 66–70). Surface smooth and shining, only below paraterga faintly rugulose and slightly microgranulate (Figs 66–70). Tergal setae fully abraded, setation pattern untraceable. Transverse metatergal sulcus present in segments 5–17, missing on both 18<sup>th</sup> and 19<sup>th</sup>. Pleurosternal carinae clearly arcuate and poorly papillate ridges traceable until segment 7 (♂), faint bulges in a few following segments, with a strongly developed, but rounded caudal tooth only in segment 7 (Fig. 66). Epiproct (Figs 69 & 71) emarginate at tip. Hypoproct (Fig. 72) roundly subtriangular, caudal 1+1 setae clearly separated, borne on small knobs.

Sternites without modifications; a rather low, rounded, subquadrate, setose lamina between ♂ coxae 4

(Fig. 73). Legs long and slender (Figs 66–70), ca 1.3–1.4 times as long as midbody height (♂); prefemora clearly bulging laterally, beset brush-like with longer setae ventrally; tarsal and tibial brushes present until two last leg-pairs (Fig. 70).

Gonopods (Figs 74–77) rather complex; postfemoral portion as usual, delimited by a lateral sulcus and represented by a rather high lobe **l** supplied with a distinct sharp tooth **b**; solenophore (**sph**) distinctly coiled, with a prominent, basal, rather disc-shaped process **h** and two characteristic distal spines (**a** and **s**).

#### *Hedinomorpha martensi* sp.n.

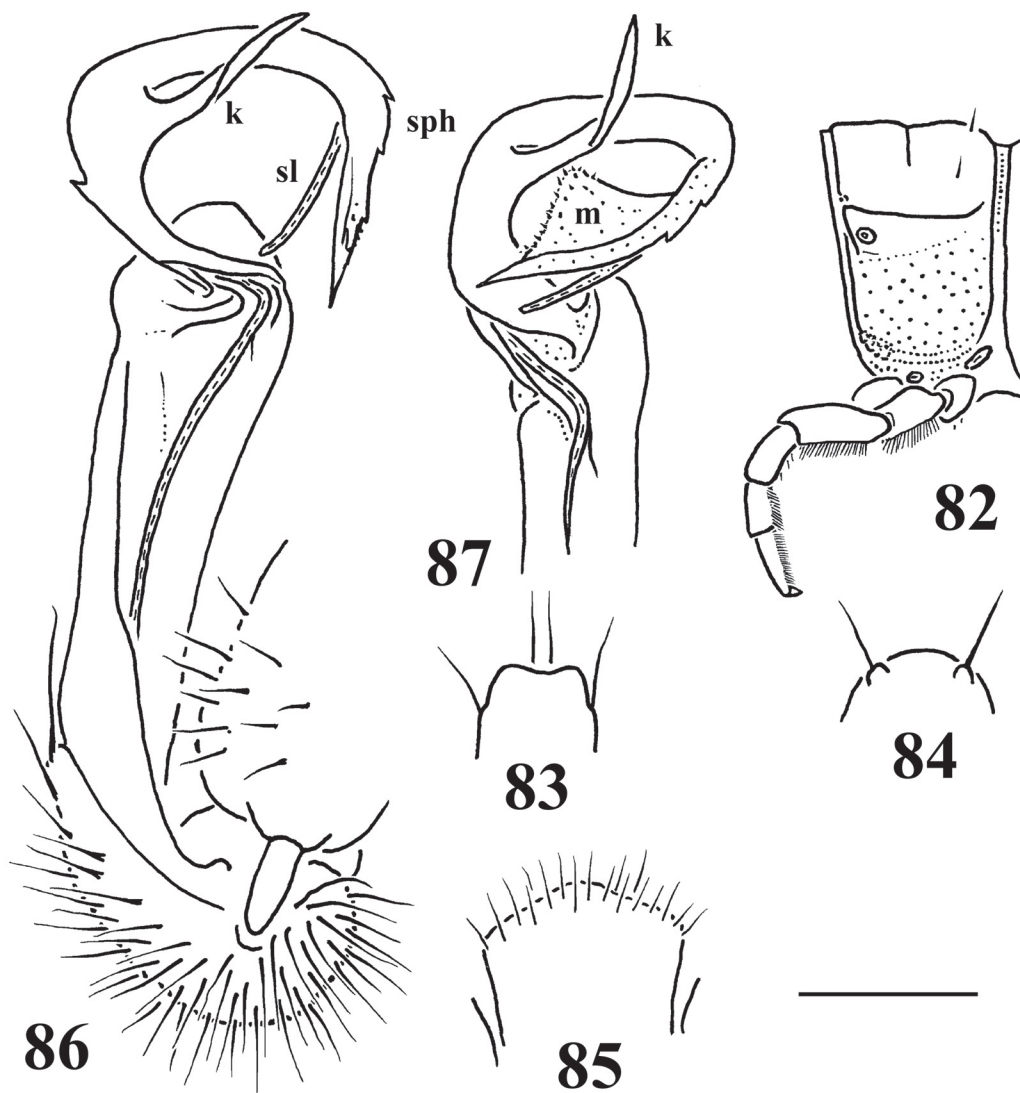
Figs 78–87.

**HOLOTYPE** ♂ (SMF), China, Sichuan Prov., Langmusi, 3510 m a.s.l., remnants of a moist *Abies* forest above town, 34.0763°N, 102.6331°E, 3.07.2013, leg. J. Martens.

**PARATYPE** ♂ (incomplete, with missing segments 15–20) (SMF), same locality, together with holotype.

**NAME.** Honours Jochen Martens, the collector.

**DIAGNOSIS.** Differs from all eight currently known congeners (see Golovatch [2009, 2013a, b] and just below) by a quite uniformly dark coloration, coupled with an unmodified epiproct, modest paraterga, smooth metaterga, an acuminate solenophore (**sph**) with a long



Figs 82–87. *Hedinomorpha martensi* sp.n., holotype: 82 — body segment 10, lateral view; 83 — epiproct tip, dorsal view; 84 — hypoproct, ventral view; 85 — sternal lobe between coxae 4, caudoventral view; 86 & 87 — right gonopod, mesal and dorsal views, respectively. Scale bars: 1.0 (82), 0.5 (83–85) and 0.25 mm (86 & 87).

Рис. 82–87. *Hedinomorpha martensi* sp.n., голотип: 82 — сегмент 10, сбоку; 83 — эпипрокт, сверху; 84 — гипопрокт, снизу; 85 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 86 и 87 — правый гонопод, соответственно изнутри и сверху. Масштаб 1,0 (82), 0,5 (83–85) и 0,25 мм (86 и 87).

helicoid spine (**k**) at about basal 1/3 and a conspicuous, subtriangular, subapical, microspiculate membrane (**m**) (see also key in Golovatch [2013b]).

**DESCRIPTION.** Length ca 16 mm, width of mid-body pro- and metazonae 1.7 and 2.0 mm, respectively (both holo- and paratype). General coloration in alcohol rather uniformly blackish brown with light, grey-yellowish ozopore regions and epiproct, and slightly lighter, red-brown legs (Figs 78–81); tips of antennae whitish.

In width, head < collum < segments 3 & 4 < 2 < 5=17; thereafter body gradually tapering towards telson. Clypeolabral region densely setose, vertigial region with a few setae only (Fig. 79). Antennae rather

short and clavate, nearly reaching behind body segment 2 (♂) when stretched dorsally; antennomere 3 > subequal 2 & 4–6. Paraterga modest (Figs 78–82), a small, regularly rounded, ventrolateral lobe in collum, a rather thin, arcuate, low ridge well rounded and slightly produced caudally beyond rear tergal margin in segment 2, always lying with the margin and narrowly rounded in all following segments; paraterga set low, mostly lying at about upper 1/3 to half of midbody height, slightly thinner and smaller in poreless segments compared to pore-bearing ones; calluses thin in dorsal view, but rather high/thick in lateral one, delimited by a deep and arcuate sulcus only dorsally, pore-bearing paraterga faintly delimited also caudally and





Figs 88–90. *Hedinomorpha affinis* sp.n., ♂ paratype: 88 — habitus, lateral view; 89 — anterior part of body, ventral view; 90 — posterior part of body, dorsal view. Photos taken by K. Makarov, not to scale.

Рис. 88–90. *Hedinomorpha affinis* sp.n., паратип ♂: 88 — общий вид, сбоку; 89 — передняя часть тела, снизу; 90 — среднетелувищные сегменты, сверху; 90 — задняя часть тела, сверху. Фото сделаны К. Макаровым, без масштаба.

ventrocaudally, but all devoid of marginal indentations (Figs 78–82). Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Figs 78, 80 & 82). Body surface generally smooth and shining, in places faintly rugulose at most, metazonae clearly microgranulate only below paraterga. Axial line wanting. Transverse metatergal sulcus evident, clear in segments 5–18, incomplete, not reaching bases of paraterga, very faint in 18<sup>th</sup>, absent from 19<sup>th</sup> (Figs 78, 80–82). Tergal setae mostly abraded, short, ca 1/4–1/5 as long as metergum, setation pattern 2+2 in a front, presulcus row. Stricture dividing pro- and metazonae rather thin, deep, densely striolate dorsally (Figs 80–82). Pleurosternal carinae clearly arcuate and papillate ridges with an increasingly well-developed, albeit rounded, caudal tooth until segment 7, traceable only as swellings until segment 10 (♂) (Figs 78 & 82). Epiproct (Figs 81 & 83) faintly concave at tip, subapical lateral papillae small. Hypoproct (Fig. 84) semi-circular, caudal 1+1 setae clearly separated, borne on small knobs.

Sternites without modifications, sparsely setose, cross-impressions modest, axial ones especially weak; a high, roundly pentagonal, setose lamina between ♂ coxae 4 (Fig. 85). Legs very long and slender (Figs 78–82), ca 1.3–1.4 times as long as midbody height (♂); adenostyles missing; prefemora clearly bulging laterally, prefemoral and tarsal brushes present on all legs,

tibial ones until penultimate legs; femora can also be with ventral brushes, most at least densely setose (Figs 78, 70 & 82).

Gonopods (Figs 79, 86 & 87) rather simple; coxite long, subcylindrical, setose distoventrally; prefemoral part as usual, densely setose, rather prominent, but clearly shorter than femorite; the latter with a mesal groove/impression, about as long as a strongly coiled, subcircular, acuminate solenophore (**sph**); **sph** slightly serrate at outer edge, with a strong, spiniform, helicoid process (**k**) in about basal third and a conspicuous, microspiculate, subtriangular, subapical membrane (**m**).

#### *Hedinomorpha affinis* sp.n.

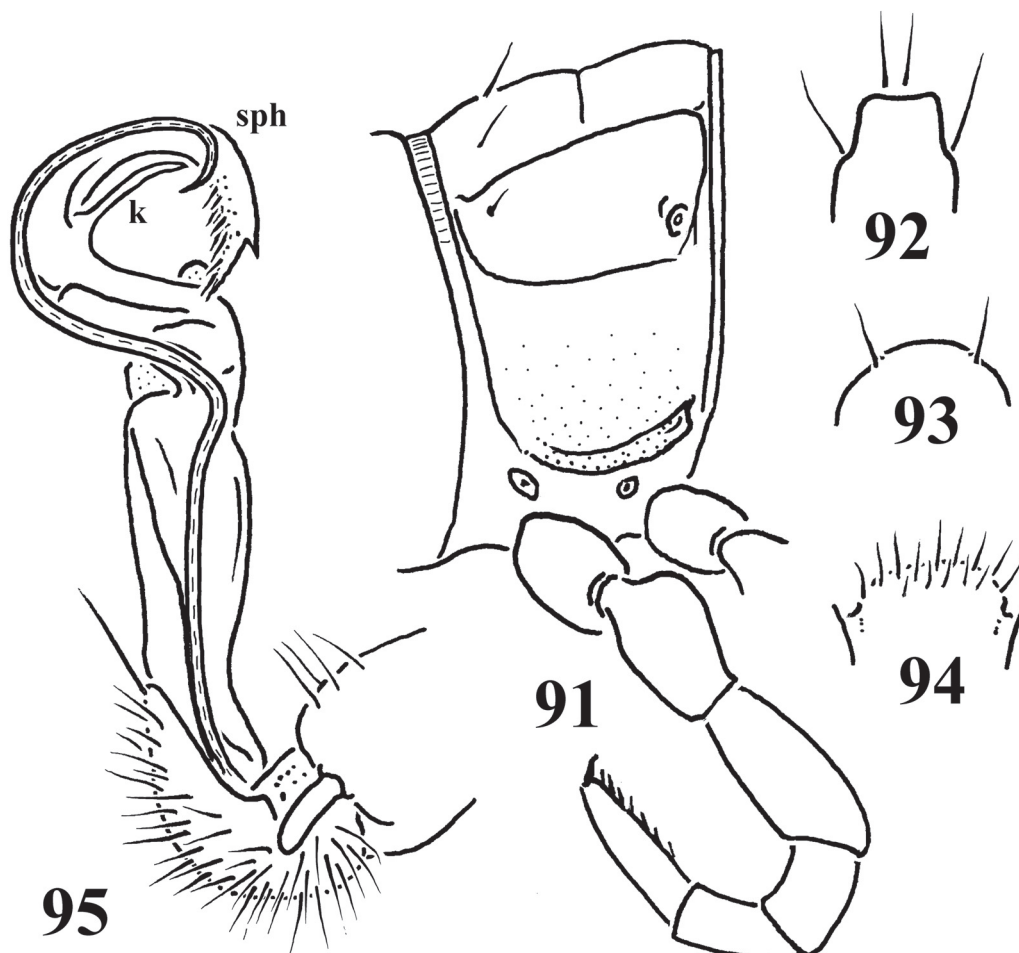
Figs 88–95.

HOLOTYPE ♂ (SMF), China, Gansu Prov., Lianhua Shan Mts, 2870 m a.s.l., cool *Picea/Abies* forest with *Betula* & *Salix*, 34.925°N, 103.730°E, 13.06.2013, leg. J. Martens.

PARATYPES: 1 ♂, 1 ♀ (SMF), same locality, together with holotype.

NAME. To emphasize the similarity to *H. martensi* sp.n.; adjective.

DIAGNOSIS. Differs from all eight currently known congeners (see Golovatch [2009, 2013a, b] and above) by the unusually high, thick and bright yellowish callosities on modest paraterga, coupled with an unmodified epiproct, a low sternal lobe between ♂ coxae 4, and a simple and acuminate solenophore carrying a slender



Figs 91–95. *Hedinomorpha affinis* sp.n., ♂ paratype: 91 — body segment 10, lateral view; 92 — epiproct tip, dorsal view; 93 — hypoproct, ventral view; 94 — sternal lobe between coxae 4, caudoventral view; 95 — right gonopod, mesal view. Scale bars: 1.0 (91–94) and 0.5 mm (95).

Рис. 91–95. *Hedinomorpha affinis* sp.n., паратип ♂: 91 — сегмент 10, сбоку; 92 — эпипрокт, сверху; 93 — гипопрокт, снизу; 94 — стеральная пластина между тазиками 4, вид одновременно снизу и сзади; 95 — правый гонопод, изнутри. Масштаб 1,0 (91–94) и 0,5 мм (95).

spiniform process at about its halfway (see also key in Golovatch [2013b]).

**DESCRIPTION.** Length ca 14–15 mm, width of midbody pro- and metazonae 1.6 and 2.0 (♂♂) or 1.5 and 1.8 mm (♀♀), respectively. General coloration in alcohol either rather uniformly dark (♂ paratype, Figs 88–90) or light brown (holotype and ♀ paratype), in the latter case with a cross-shaped pattern of infusate sulcus and axial stripe on metaterga; tip of epiproct and calluses of paraterga invariably grey-yellow, legs red-brown; antennae clearly infusate distally, tips whitish.

All characters as in *H. martensi* sp.n., except as follows.

In width, collum < head = segments 3 & 4 < 2 < 5=16; thereafter body gradually tapering towards telson. Antennae rather short and clavate, nearly reaching caudally midway of segment 2 (♂) or posterior end of collum (♀) when stretched dorsally. Paraterga modest (Figs 88–91), devoid of marginal indentations, but set

higher (at upper 1/4–1/3 of midbody height), delimited by sulci both dorsally and ventrally, with calluses unusually thick and high, carrying a lateral seta near front edge while caudal corners, albeit always rounded, slightly drawn back behind rear tergal margin in segments 2 and 14–19. Ozopores lateral, invisible from above, lying inside an ovoid groove slightly in front of caudal margin (Figs 88 & 91). Body surface generally smooth and shining, metazonae very delicately microgranulate only below paraterga. Transverse metatergal sulcus evident, clear in segments 5–17, almost complete, nearly reaching bases of paraterga (Figs 90 & 91), absent from both 18<sup>th</sup> and 19<sup>th</sup>. Tergal setae mostly retained, usually ca 1/3 as long as metatergum, setation pattern 2+2 in a front, presulcus row. Pleurosternal carinae clearly arcuate and papillate ridges traceable until segment 12 or 13 (♂) (Figs 88 & 91) or 7 (♀), with a small, rounded, caudal tooth best developed in segment 7. Epiproct (Figs 90 & 92) subtruncate, subapical lateral papillae small. Hypo-

proct (Fig. 93) semi-circular, caudal 1+1 setae clearly separated, not borne on knobs.

A low, rounded, setose lamina between ♂ coxae 4 (Fig. 94). Legs long and slender (Figs 88 & 91), clearly longer and more incrassate in ♂ compared to ♀, ca 1.3–1.4 (♂) or 0.9–1.1 (♀) times as long as midbody height; prefemora also clearly bulging laterally; tibial brushes present only in a few anterior ♂ legs, tarsal brushes until ♂ legs 9, thereafter thinning out (Figs 89 & 91).

Gonopod (Fig. 95) solenophore (**sph**) subcircular, ribbon-shaped, acuminate, about midway with a long, slender, spiniform process (**k**) and a subapically strongly serrate/spinulate and unequally bifid tip.

REMARKS. Using the latest key to *Hedinomorpha* [Golovatch, 2013b], both *H. martensi* sp.n. and *H. affinis* sp.n. would key out as *H. circofera* Golovatch, 2013, from Qinghai Province, west-central China [Golovatch, 2013a], but these new species show an acuminate process **k** of a distally far more elaborate solenophore. Indeed, **sph** has either a peculiar, subtriangular, subapical membrane (**m** in *H. martensi* sp.n., Figs 86 & 87) or a strongly serrate/spiculate and unevenly bifid tip (*H. affinis* sp.n., Fig. 95).

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