

Two new species of *Armascirus* (Acariformes: Cunaxidae) from China

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Original research

ABSTRACT

Two new species, *Armascirus apophysis* Chen & Jin **n. sp.** and *Armascirus yulongensis* Chen & Jin **n. sp.** are described and illustrated. *Armascirus apophysis* Chen & Jin **n. sp.** differs from all other *Armascirus* by presence of one apophysis on palp basifemur; *A. yulongensis* Chen & Jin **n. sp.** differs from all other *Armascirus* by presence of five pairs of genital setae.

Keywords predatory mites; taxonomy; Tibet; Yunnan

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Introduction

Members of the family Cunaxidae Thor, 1902 are predatory mites, which can prey on small arthropods such as mites, collembolans, nematodes and fungi, and some are even cannibalistic (Smiley 1992; Skvarla *et al.* 2014; Hernandez *et al.* 2015). Currently, there are more than 400 known species around the world (Skvarla & Dowling 2019).

Den Heyer (1978) erected genus *Armascirus* with the type *Armascirus huyssteeni* Den Heyer, 1978, which belongs to the subfamily Cunaxinae Den Heyer, 1978. Currently, this subfamily contains seven genera (*Cunaxa* Von Heyden, 1826, *Armascirus* Den Heyer, 1978, *Dactyloscirus* Berlese, 1916, *Rubroscirus* Den Heyer, 1979, *Riscus* Den Heyer, 2006, *Allocunaxa* Den Heyer & Castro, 2008, *Cuaxatricha* Castro & Den Heyer, 2008) and 179 known species in the world, of which *Armascirus* contains 49 species (Skvarla *et al.* 2014; Kalúz *et al.* 2014; Rocha *et al.* 2017; Kalúz & Starý 2018; Skvarla & Dowling 2019; Wurlitzer *et al.* 2020). However, there are only three species of the genus recorded in China, *A. taurus* (Kramer, 1881) (Tseng 1980; Liang 1983; Bu & Li 1987; Hu 1997; Lin & Zhang 2000; Lin & Zhang 2010), *A. bison* (Berlese, 1888) (Hu 1997; Lin & Zhang 2010) and *A. jini* Liu, Yi & Guo, 2015 (Liu *et al.* 2015).

In this work, we add two species new to science for the genus *Armascirus*, *A. apophysis* Chen & Jin **n. sp.** from Bomi County, Linzhi City, Tibet Autonomous Region and *A. yulongensis* Chen & Jin **n. sp.** from Yulong Snow Mountain, Lijiang City, Yunnan Province, P. R. China.

Material and methods

Samples of moss on stone were collected from roadside (N29°54'4.35", E95°30'12.10", elevation 2628 m), Bomi County, Linzhi City, Tibet, China and fallen leaves were collected in a forest, Yulong Snow Mountain (N27°00'11", E100°10'45", elevation 3230 m), Lijiang City, Yunnan Province, P. R. China. Samples were placed in a Berlese-Tullgren funnels for 8–12 hours to extract the mites, then they were preserved in 75% alcohol, and mounted in Hoyer's medium on slides (Krantz & Walter 2009). Coordinates and altitudes were obtained by smartphone with GPS. Line drawings were prepared with the aid of a drawing tube attached

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to a phase contrast Nikon Ni E microscope with DIC optics and photographs were taken using a camera (Nikon DS-Ri 2) attached to a Nikon Ni E microscope with DIC optics. All figures were edited with Adobe Photoshop CC 2019. Measurements (given in micrometers, μm) were taken using the software Nikon NIS Elements AR 4.50 with those of the holotype followed by the measurements of paratypes in parentheses. The dorsal and ventral setal notations follow Skvarla *et al.* (2014), and the legs follow Den Heyer (1981).

Abbreviations: *asl*—attenuate solenidion, *at*—anterior trichobothria, *bsl*—blunt rod-like solenidion, *dtsl*—dorsoterminal solenidion, *fam*—famulus (=peg organ), *hg*—hypognathal seta, *hgs*—hystergastral seta, *lps*—lateral proterosomal seta, *mps*—median proterosomal seta, *mst*—microseta, *ppgs*—propodogastral seta, *ps*—pseudanal seta, *pt*—posterior trichobothria, *sts*—simple tactile seta, *T*—trichobothrium, *tsl*—terminal solenidion.

Results

Family Cunaxidae Thor, 1902

Subfamily Cunaxinae Den Heyer, 1978

Armascirus Den Heyer, 1978

Generic diagnosis: see Skvarla *et al.* (2014).

Type species: *Armascirus huyssteeni* Den Heyer, 1978

Armascirus apophysis Chen & Jin n. sp.

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(Figures 1–8)

Diagnosis

The new species can be distinguished from other known species in the genus *Armascirus* by the presence of an apophysis on the palp basifemur, so far, the only species with an apophysis on the palp basifemur in this genus.

Description

Female (one specimen, holotype; Figures 1–5)

Idiosoma long 520, wide 386.

Dorsum (Figures 1A, 2A–C) — Proterosomal shield 144 long, 265 wide, and covered by reticulations; bearing two pairs of trichobothria (*at* and *pt*), two pairs of tactile setae (*lps* and *mps*), *lps* closer to *pt* than *at*. Hysterosomal (median) shield 22 long, 55 wide and with reticulations, one pair of lateral plates 34 long, 12 wide, and also with reticulations; except for median shield and lateral plates, hysterosomal dorsum soft, striated, with six pairs of simple setae (*c1*, *c2*, *d1*, *e1*, *f1*, *h1*) and one pair of lyrifissures (*im*) situated anterolaterally to *f1*. Setal lengths and distances: *at* 290, *pt* ?, *lps* 11, *mps* 8, *c1* 12, *c2* 13, *d1* 16, *e1* 16, *f1* 28, *h1* 39; *at-at* 35, *pt-pt* 265, *lps-lps* 225, *mps-mps* 98, *lps-mps* 80, *at-lps* 126, *pt-mps* 83, *pt-lps* 34, *at-mps* 133, *at-pt* 170, *c1-c1* 140, *c2-c2* 248, *d1-d1* 78, *e1-e1* 104, *f1-f1* 39, *h1-h1* 40, *c1-c2* 78, *c1-d1* 76, *c2-d1* 85, *d1-e1* 97, *e1-f1* 60, *f1-h1* 35. Anal region with two pairs of pseudanal setae (*ps1-ps2*) subequal and 22 in length, one pair of *h2*, 16 in length, and one pair of lyrifissures (*ih*) close to *ps2*.

Venter (Figures 1B, 2D–E) — Ventral area between coxae I and the gnathosoma with transverse striae. Coxae I–II with papillae, but coxae III–IV with reticulations; between coxae I–IV plates centrally with longitudinal striae anterior to *hgs1*; areas between *hgs1* and genital plates with transverse striae. Setal formula of coxal plates I–IV: 3(*1a-c*)-2(*2b-c*)-3(*3a-c*)-3(*4a-c*) *sts*; one pair of propodogastral setae (*ppgs*), 12 in length, and five pairs of hystergastral setae (*hgs1-hgs5*), 28, 43, 43, 43 and 43 in length, respectively. Genital plates with reticulations and

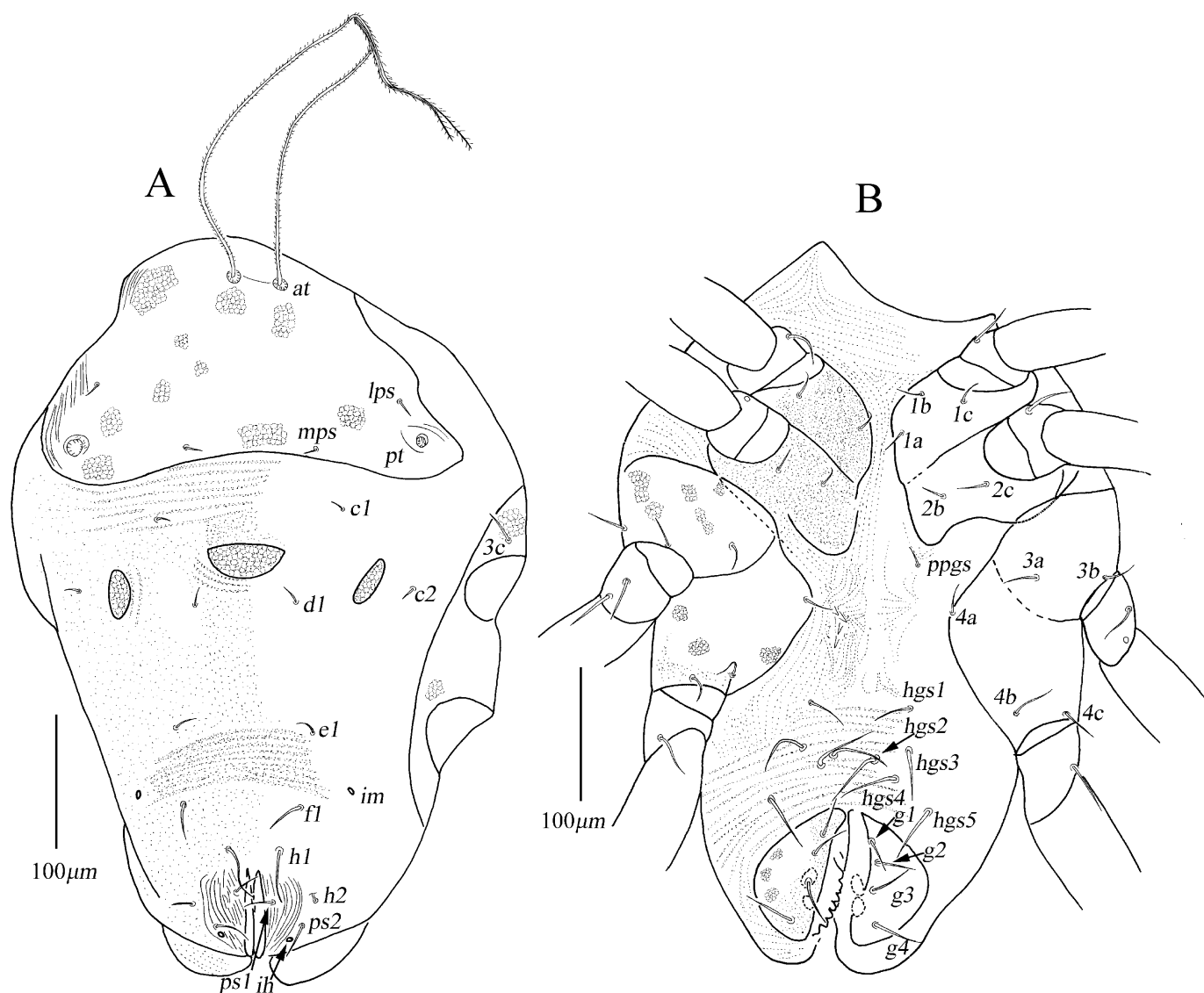


Figure 1 *Armascirus apophysis* Chen & Jin n. sp., female holotype: A, dorsal idiosoma; B, ventral idiosoma.

papillae, two pairs of visible genital papillae and four pairs of genital setae (*g1–g4*) that 26, 29, 31, 38 in length, respectively.

Gnathosoma (Figures 3A–C, 4A–B) — Palp (Figures 3A, 4A–B). Five-segmented, 412 long, all segments with papillae. Palp chaetotaxy: trochanter — none; basifemur — one dorsal simple seta and one pointed apophysis; telofemur — one dorsal spine-like seta, one pointed apophysis and one blunt apophysis; genu — two spine-like setae, two simple setae and one elongate pointed apophysis; tibiotarsus — three simple setae, one spine-like seta and one distal solenidion; claw well-developed. Chelicera (Figure 3B). 255 long, with reticulations and punctations; cheliceral seta 16 in length; chela developed. Subcapitulum (Figure 3C). 304 long, 170 wide and with papillae; two pairs of short adoral setae, *ads1–ads2*, 14 and 5 in length; four pairs of hypostomal setae, *hg1–hg4*, 25, 22, 14 and 69 in length, respectively. Distances of *hg* setae: *hg1–hg1* 10, *hg2–hg2* 26, *hg3–hg3* 53, *hg4–hg4* 124, *hg1–hg2* 42, *hg2–hg3* 129, *hg3–hg4* 48.

Legs (Figures 5A–D) — With reticulations, lengths of leg I–IV: 523, 477, 536, 583; lengths

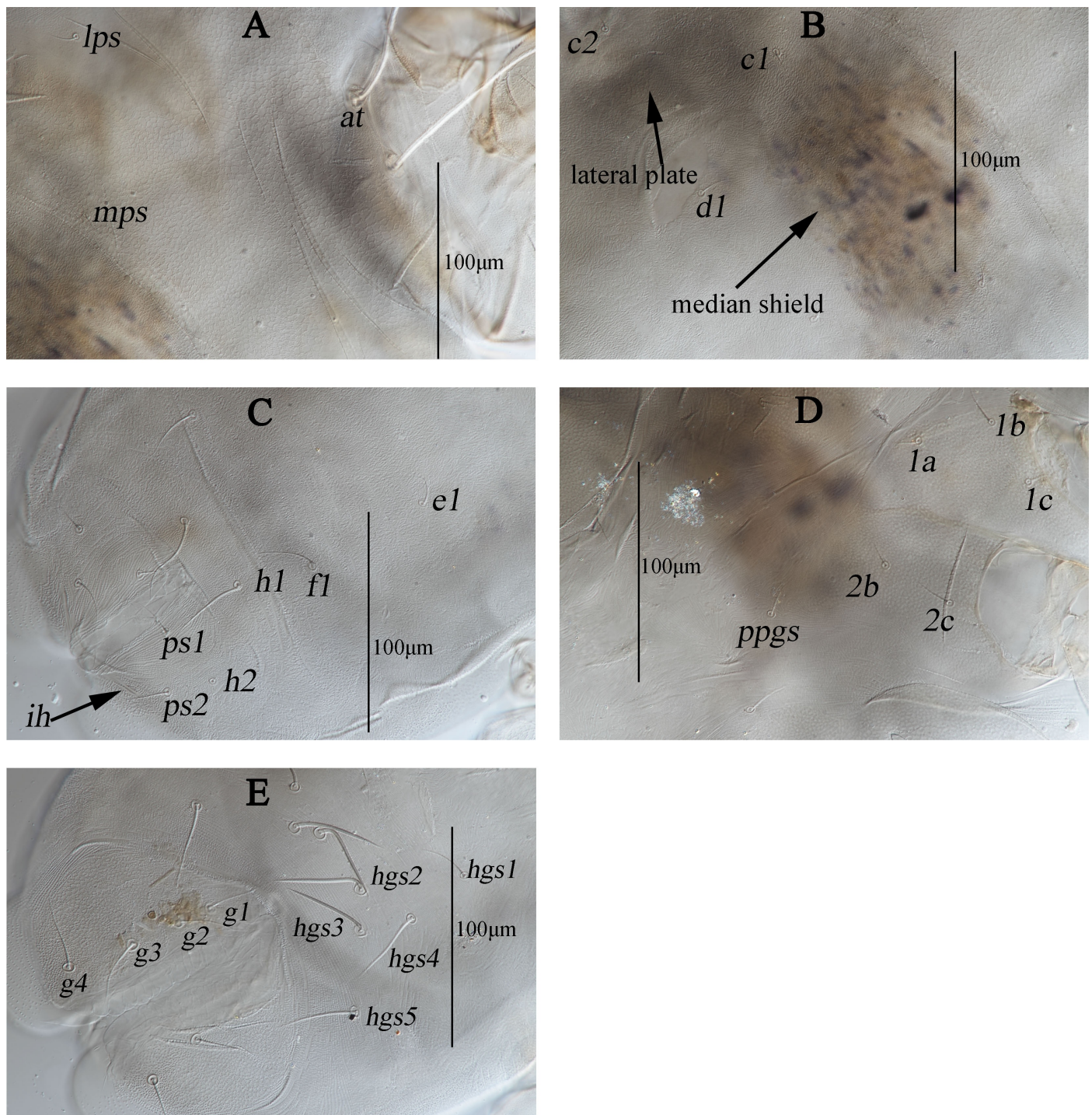


Figure 2 *Armascirus apophysis* Chen & Jin n. sp., female holotype: A–C, dorsal idiosoma (photo); D–E, ventral idiosoma (photo).

of tarsus I–IV: 217, 186, 224, 230. *T* on tibia IV 106 in length. Legs I–IV chaetotaxy: coxae I–IV 3-2-3-3 *sts*; trochanters I–IV 1-1-2-1 *sts*; basifemora I–IV 5-5-4-2 *sts*; telofemora I–IV 4-4-4-4 *sts*. Genu I 3 *asl*, {1 *asl*, 1 *mst*}, 4 *sts*; genu II 2 *asl*, 5 *sts*; genu III 1 *asl*, 5 *sts*; genu IV 2 *asl*, 5 *sts*. Tibia I 1 *asl*, {1 *asl*, 1 *mst*}, 4 *sts*; tibia II 1 *bsl*, 5 *sts*; tibia III 1 *bsl*, 5 *sts*; tibia IV 1 smooth *T*, 4 *sts*. Tarsus I 4 *asl*, 1 *fam*, 1 *dtsl*, 22 *sts*; tarsus II 1 *bsl*, 1 *dtsl*, 22 *sts*; tarsus III 1 *dtsl*, 23 *sts*; tarsus IV 1 *dtsl*, 19 *sts*.

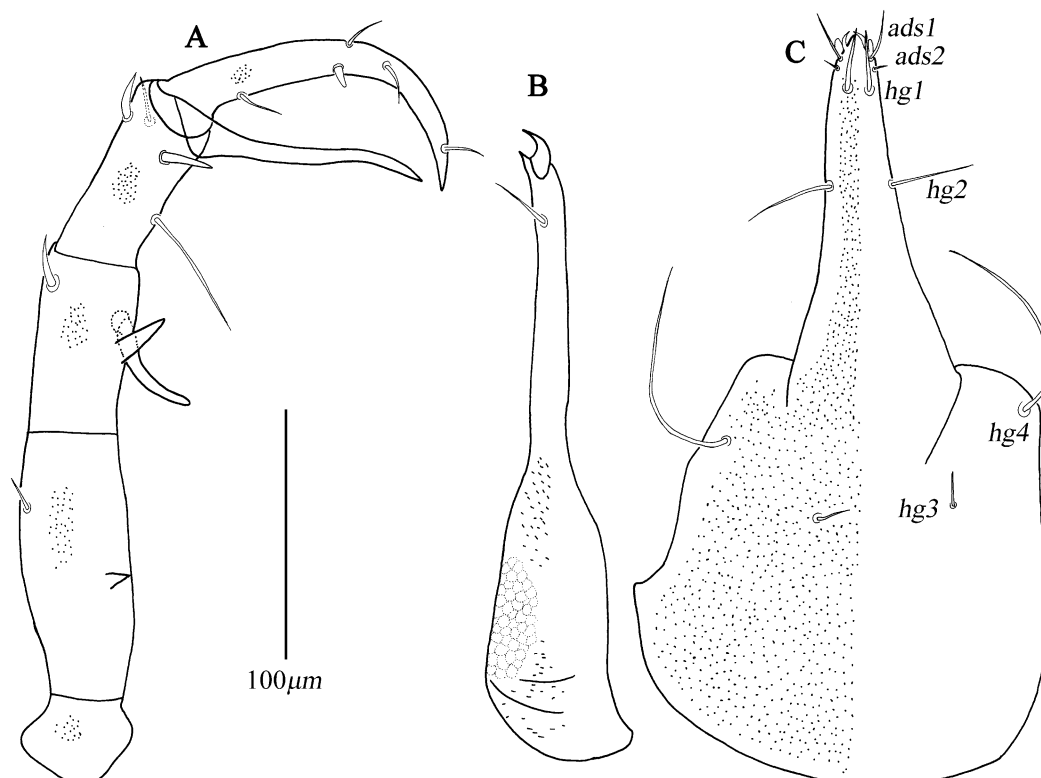


Figure 3 *Armascirus apophysis* Chen & Jin n. sp., female holotype: A, palp; B, chelicerae; C, subcapitulum.

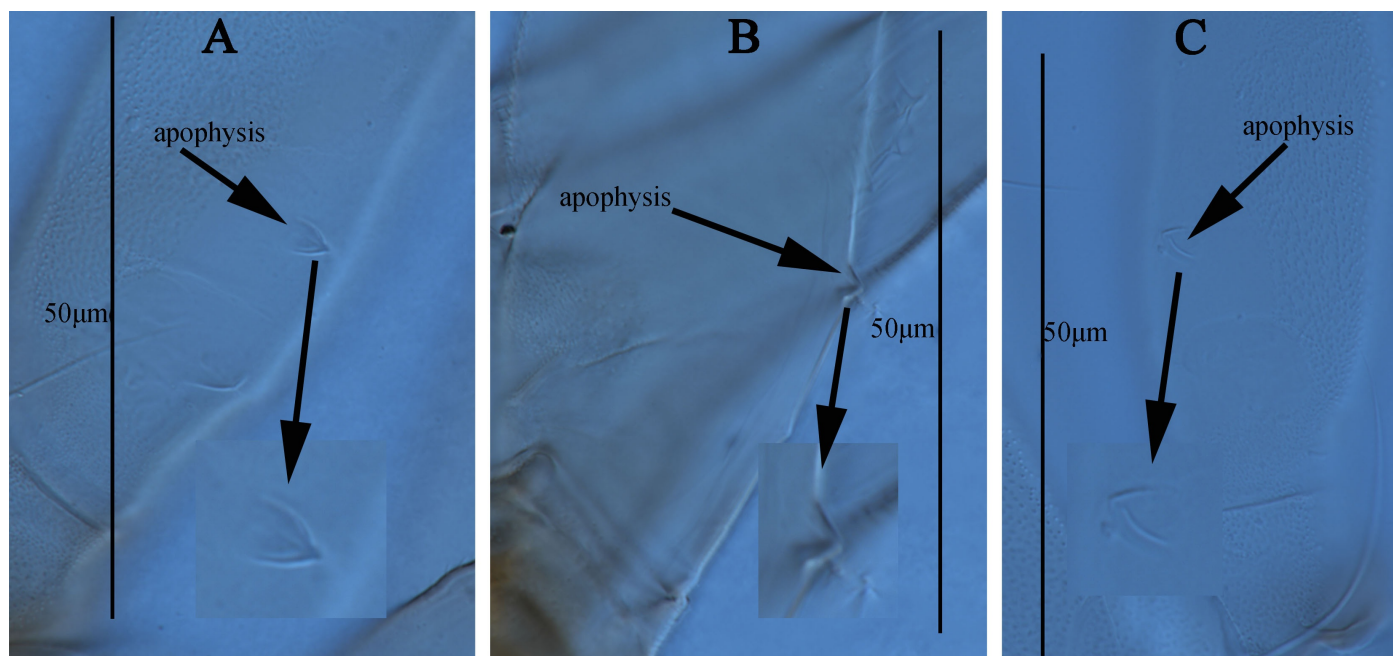


Figure 4 *Armascirus apophysis* Chen & Jin n. sp., female holotype: A–B, an apophysis on palp basifemur; tritonymph paratype: C, an apophysis on palp basifemur.

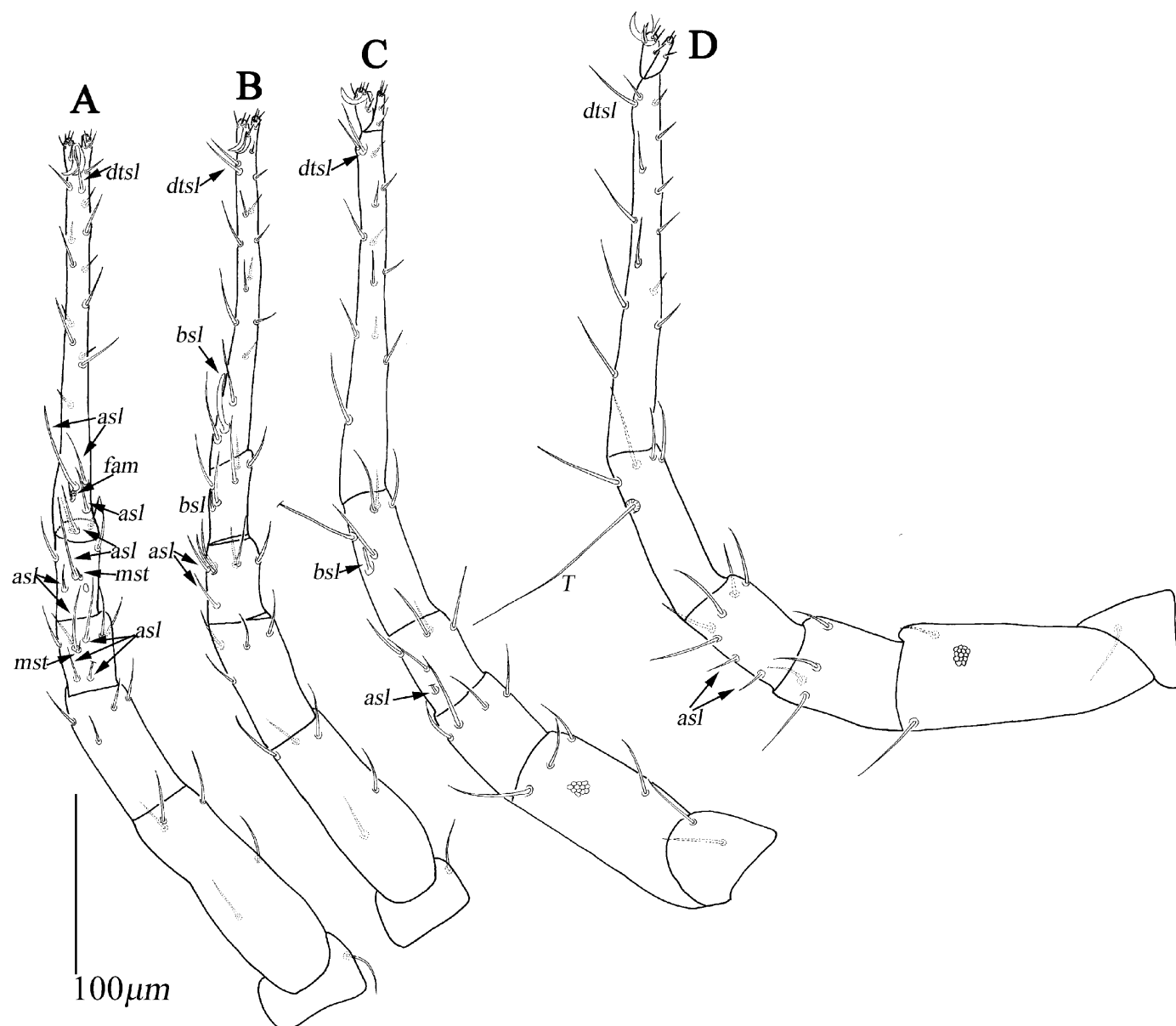


Figure 5 *Armascirus apophysis* Chen & Jin n. sp., female holotype: A–D, leg I–IV, respectively.

Tritonymph (one specimen, paratype; Figures 4C, 6–8).

Idiosoma 412 long, 262 wide.

Dorsum (Figure 6A) — Resembling the female. Proterosomal shield 130 long, 166 wide; hysterosomal (median) shield 33 long, 39 wide and lateral plates 22 long, 8 wide. Setal lengths and distances: *at* 237, *pt* 404, *lps* 9, *mps* 8, *c1* 10, *c2* 10, *d1* 10, *e1* 14, *f1* 19, *h1* 25; *at-at* 32, *pt-pt* 180, *lps-lps* 172, *mps-mps* 60, *lps-mps* 72, *at-lps* 101, *pt-mps* 62, *pt-lps* 32, *at-mps* 110, *at-pt* 126, *c1-c1* 95, *c2-c2* 184, *d1-d1* 50, *e1-e1* 63, *f1-f1* 49, *h1-h1* 30, *c1-c2* 53, *c1-d1* 56, *c2-d1* 70, *d1-e1* 61, *e1-f1* 44, *f1-h1* 36; pseudanal setae (*ps1-ps2*), 11 and 12 in length, *h2* 16 in length.

Venter (Figure 6B) — Resembling the female. Propodogastral setae (*ppgs*), 13 in length, and four pairs of hystergastral setae (*hgs1-hgs4*), 15, 24, 24 and 24 in length; genital setae

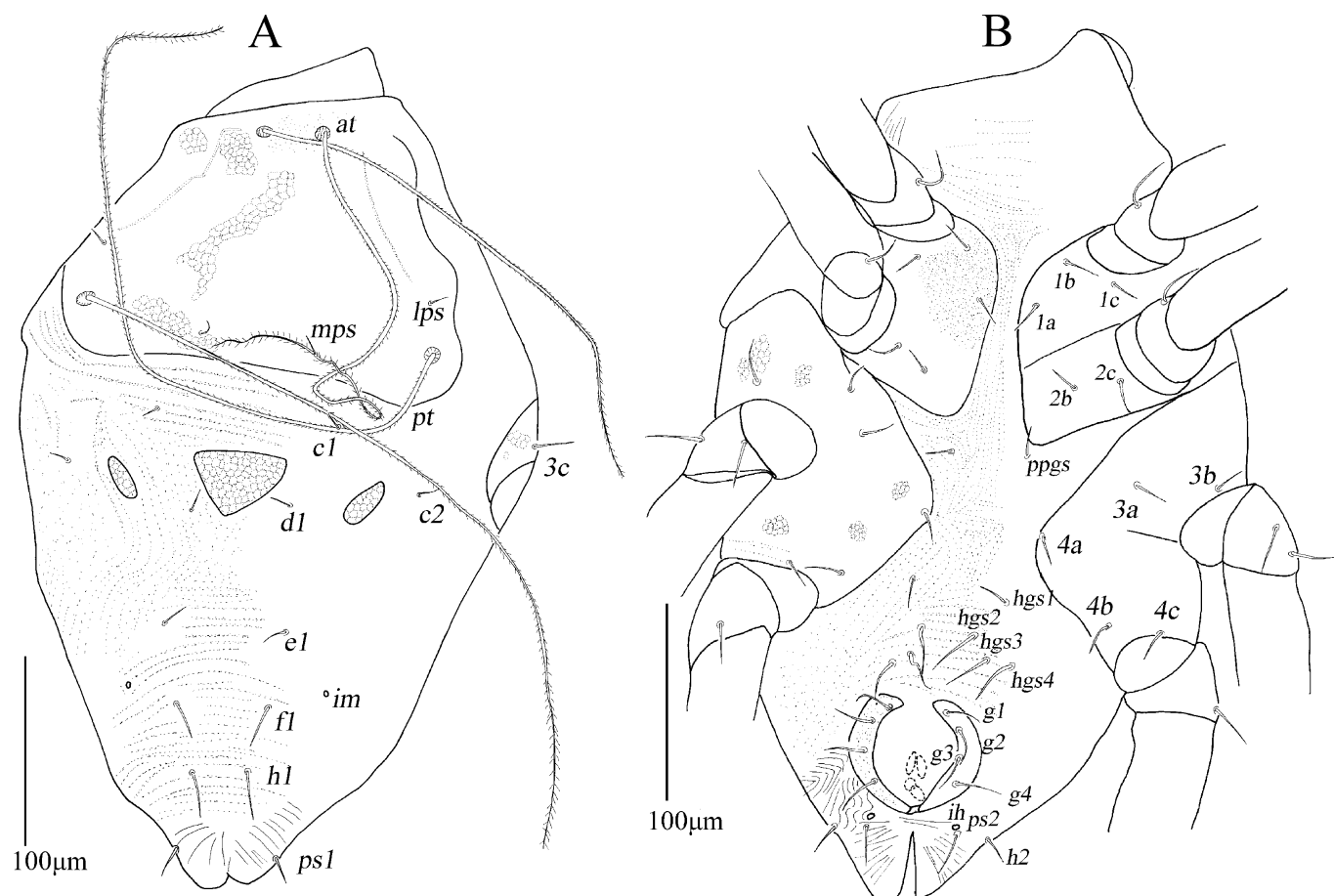


Figure 6 *Armascirus apophysis* Chen & Jin n. sp., tritonymph paratype: A, dorsal idiosoma; B, ventral idiosoma.

(*g1–g4*) that 16, 19, 18, 20 in length, respectively.

Gnathosoma (Figures 4C, 7A–C) — Resembling the female. Palp (Figures 4C, 7A) 290 long. Chelicera (Figure 7B). 195 long, cheliceral seta 18. Subcapitulum (Figure 7C). 221 long, 122 wide; lengths of *ads1–ads2*: 13 and 3; lengths of *hg1–hg4*: 19, 22, 11 and 56. Distances of *hg* setae: *hg1–hg1* 8, *hg2–hg2* 25, *hg3–hg3* 39, *hg4–hg4* 84, *hg1–hg2* 33, *hg2–hg3* 94, *hg3–hg4* 37.

Legs (Figures 8A–D) — Resembling the female; lengths of leg I–IV: 380, 340, 407, 450; lengths of tarsus I–IV: 159, 140, 172, 173. *T* 68 in length; legs I–IV chaetotaxy: coxae I–IV 3-2-3-3 *sts*; trochanters I–IV 1-1-2-1 *sts*; basifemora I–IV 5-5-3-0 *sts*; telofemora I–IV 4-4-4-4 *sts*. Genu I 3 *asl*, {1 *asl*, 1 *mst*}, 4 *sts*; genu II 2 *asl*, 5 *sts*; genu III 1 *asl*, 5 *sts*; genu IV 2 *asl*, 5 *sts*. Tibia I 1 *asl*, {1 *asl*, 1 *mst*}, 4 *sts*; tibia II 1 *bsl*, 5 *sts*; tibia III 1 *bsl*, 5 *sts*; tibia IV 1 smooth *T*, 4 *sts*. Tarsus I 4 *asl*, 1 *fam*, 1 *dtsl*, 18 *sts*; tarsus II 1 *bsl*, 1 *dtsl*, 17 *sts*; tarsus III 1 *dtsl*, 16 *sts*; tarsus IV 1 *dtsl*, 16 *sts*.

Other developmental stages — Unknown.

Etymology

The new species name refers to palp basifemur with one pointed apophysis (*apophysis*).

Remark

The single apophysis on the palp basifemur in the new species, distinguishes it from other species in the genus *Armascirus*. It is close to *A. fendai* Kalúz & Vrabec, 2013 (adult female),

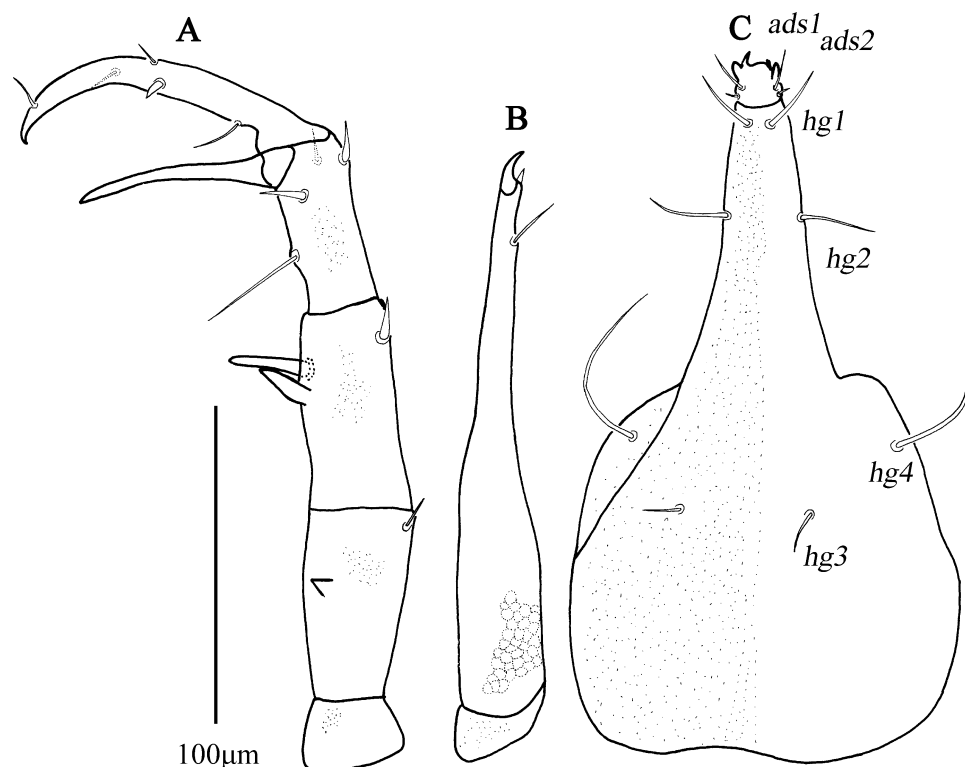


Figure 7 *Armascirus apophysis* Chen & Jin n. sp., tritonymph paratype: A, palp; B, chelicerae; C, subcapitulum.

but differs from it by following characters: (1) palp basifemur with one pointed apophysis (vs. without in *A. fendai*); (2) genu I 3 *asl*, {1 *asl*, 1 *mst*}, 4 *sts* (vs. 1 *asl*, {1 *asl*, 1 *mst*}, 5 *sts* in *A. fendai*); (3) tibia I 1 *asl*, {1 *asl*, 1 *mst*}, 4 *sts* (vs. 1 *asl*, 5 *sts* in *A. fendai*); (4) tarsus I 22 *sts* (vs. 15 *sts* in *A. fendai*); (5) tarsus II 22 *sts* (vs. 12 *sts* in *A. fendai*); (6) tarsus III 23 *sts* (vs. 11 *sts* in *A. fendai*); (7) tarsus IV 19 *sts* (vs. 11 *sts* in *A. fendai*).

Type series

Holotype, female was collected from moss on stone, Bomi County (N29°54'4.35", E95°30'12.10", elevation 2628 m), Linzhi City, Tibet Autonomous Region, P. R. China, on 17 July, 2019, by Jian-Xin Chen, slide No.: XZ-CU-201907171006. One paratype Tritonymph, the same data as for holotype, slide No.: XZ-CU-201907171007. All types are deposited in the Institute of Entomology, Guizhou University, Guiyang, P. R. China (GUGC) (Zhang 2018).

Armascirus yulongensis Chen & Jin n. sp.

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(Figures 9–13)

Diagnosis

The new species can be distinguished from other known species in the genus *Armascirus* by the presence of five pairs of genital setae and by *c2*, *e1*, *f1*, *h1* and *h2* situated on small platelets, so far, the only species with five pairs of genital setae in this genus.

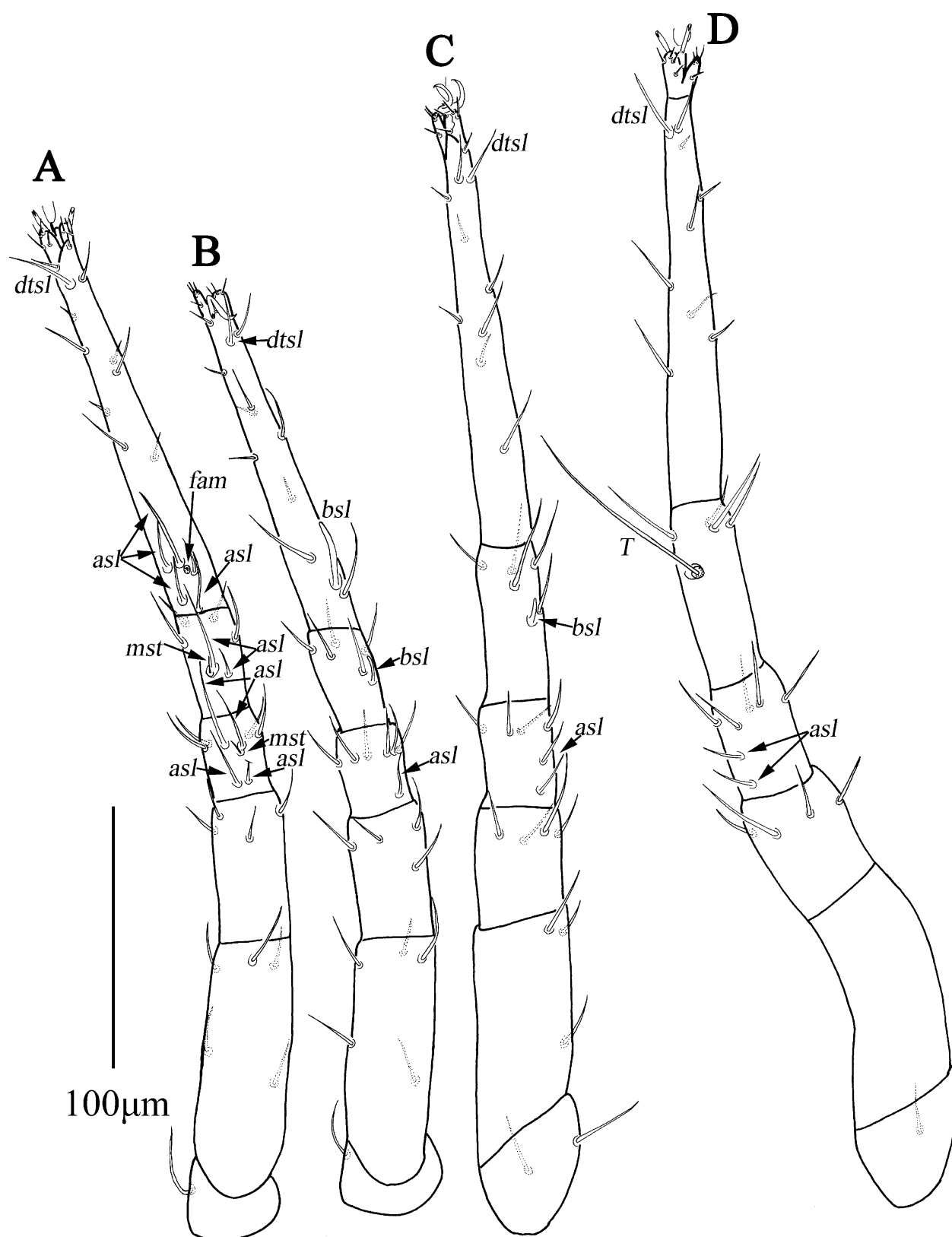


Figure 8 *Armascirus apophysis* Chen & Jin n. sp., tritonymph paratype: A–D, leg I–IV, respectively.

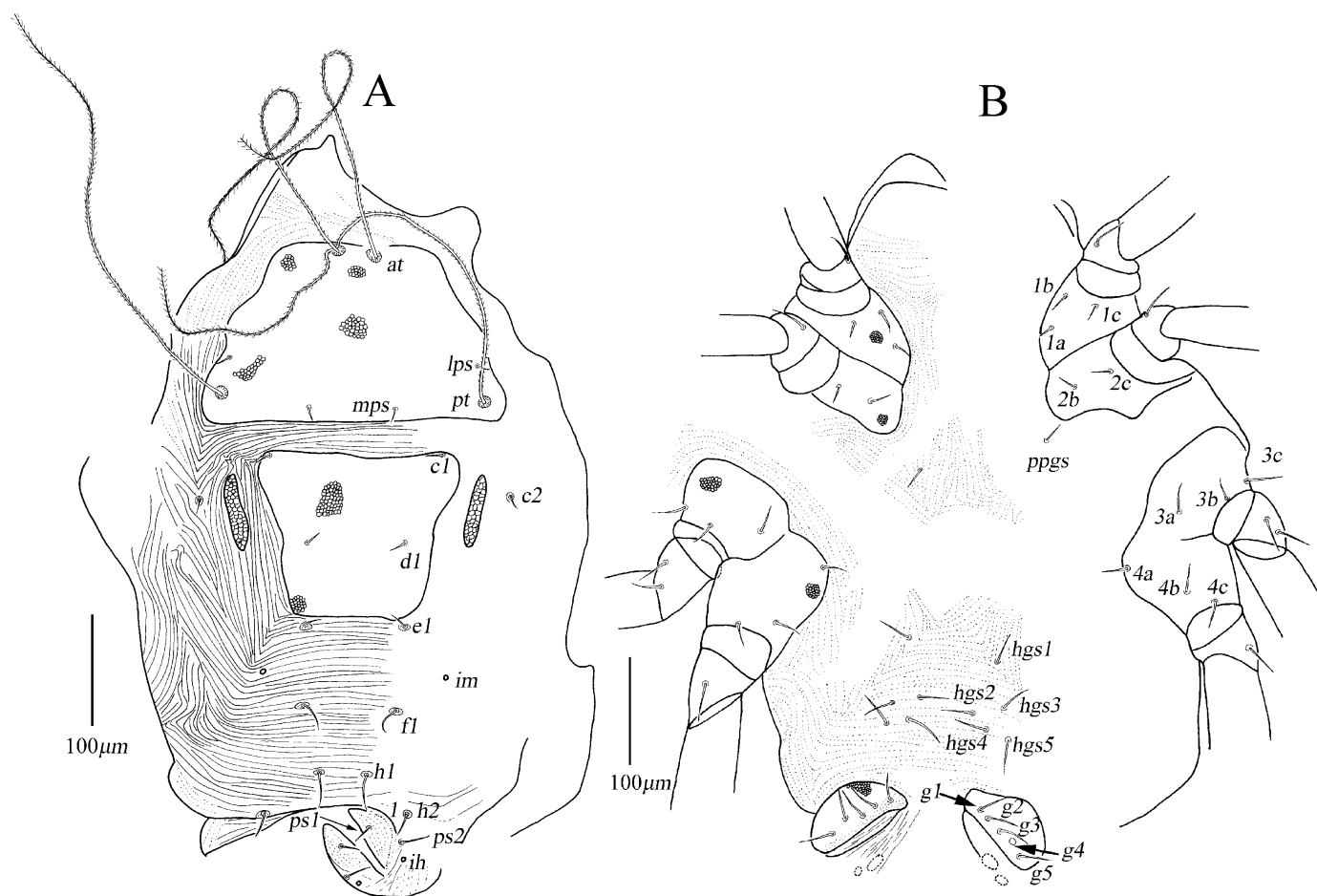


Figure 9 *Armascirus yulongensis* Chen & Jin n. sp., female holotype: A, dorsal idiosoma; B, ventral idiosoma.

Description

Female (two specimens, holotype and paratype; Figures 9–13)

Idiosoma long 667 (521), wide 515 (401).

Dorsum (Figures 9A, 10A–C) — Proterosomal shield 163 (165), long 238 (228) wide, and covered by reticulations, bearing two pairs of trichobothria (*at* and *pt*), two pairs of tactile setae (*lps* and *mps*), *lps* closer to *pt* than *at*. Propodosomal shield laterally flanked by longitudinal striae. Hysterosomal (median) shield inverted trapezoidal, 162 (150) long, 152 (158) wide, and covered by reticulations and with two pairs of simple setae (*c1*, *d1*); one pair of lateral plates 66 (57) long, 11 (13) wide and with reticulations; median shield flanked by longitudinal striae; five pairs of simple setae (*c2*, *e1*, *fl*, *h1*, *h2*) on small platelets, and one pair of lyrifissures (*im*) situated anterolaterally to *fl*. Setal lengths and distances: *at* 357 (356), *pt* 519 (484), *lps* 11 (12), *mps* 12 (10), *c1* 13 (16), *c2* 14 (13), *d1* 16 (14), *e1* 18 (17), *fl* 25 (27), *h1* 32 (32); *at-at* 34 (39), *pt-pt* 242 (213), *lps-lps* 227 (210), *mps-mps* 77 (73), *lps-mps* 88 (81), *at-lps* 141 (130), *pt-mps* 88 (75), *pt-lps* 36 (35), *at-mps* 145 (139), *at-pt* 165 (158), *c1-c1* 158 (152), *c2-c2* 285 (251), *d1-d1* 87 (101), *e1-e1* 91 (80), *fl-fl* 80 (72), *h1-h1* 43 (41), *c1-c2* 77 (55), *c1-d1* 88 (77), *c2-d1* 108 (83), *d1-e1* 78 (77), *e1-fl* 71 (54), *fl-h1* 63 (49). Anal region with two pairs of pseudanal setae (*ps1-ps2*), 18 (13) and 25 (14) in length, and one pair of lyrifissures (*ih*) close to *ps2*.

Venter (Figures 9B, 11A–D) — Ventral area between coxae I and the gnathosoma with transverse striae. Coxae I–IV with reticulations, area between coxae I–II plate groups with

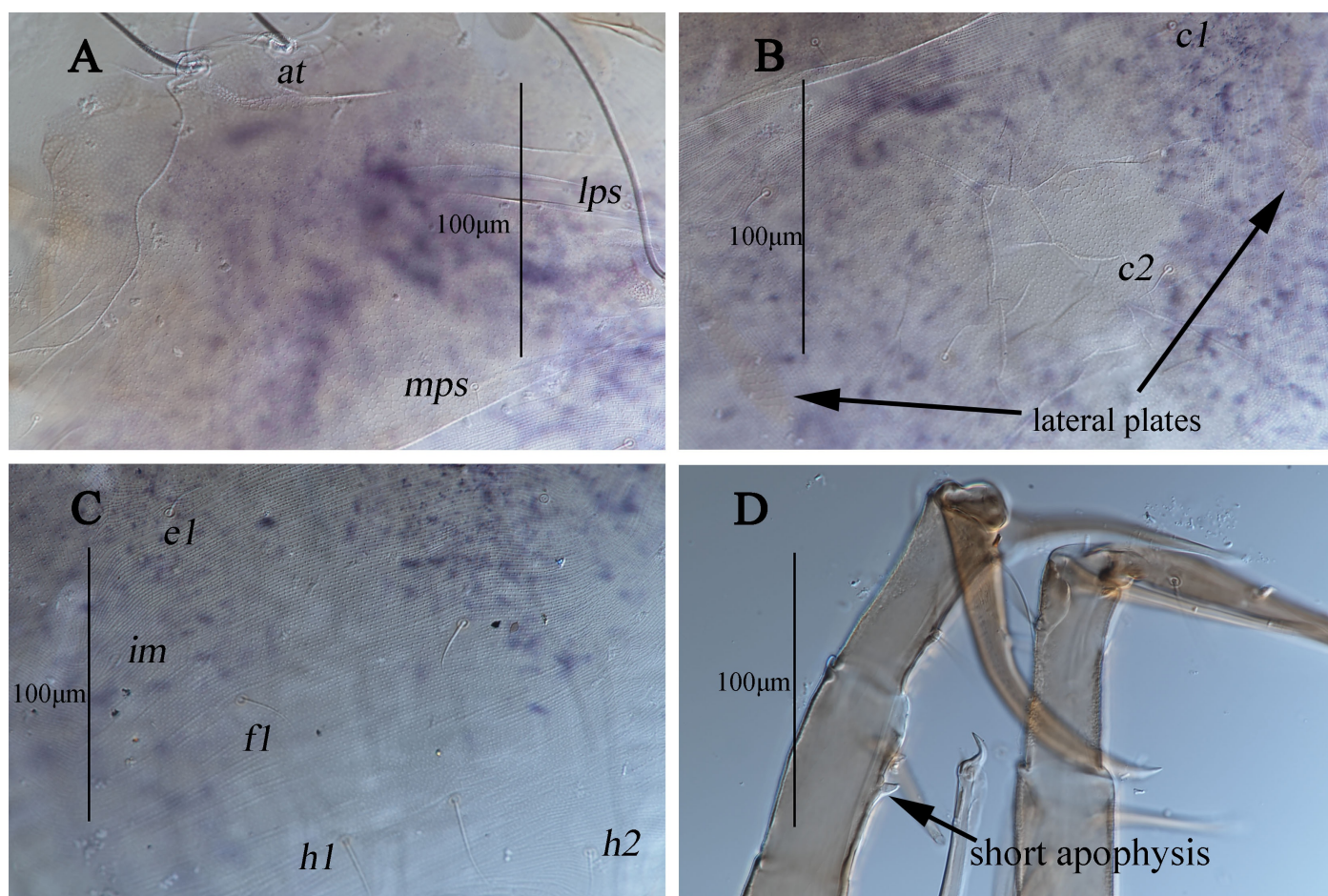


Figure 10 *Armascirus yulongensis* Chen & Jin n. sp., female holotype: A–C, dorsal idiosoma (photo); D, palp (photo).

longitudinal striae; area between *ppgs* and *hgs1* with longitudinal striae; areas between *hgs1* and genital plates with transverse striae. Setal formula of coxal plates I–IV: 3(1a–c)-2(2a, 2c)-3(3a–c)-3(4a–c) *sts*; one pair of propodogastral setae (*ppgs*), 19 (17) in length, and five pairs of hystergastral setae (*hgs1*–*hgs5*), 28 (26), 26 (26), 32 (29), 26 (26) and 32 (30) in length. Genital plates with reticulations and papillae, two pairs of visible genital papillae and five pairs of genital setae (*gl*–*g5*) that 24 (23), 24 (22), 24 (25), 24 (23), 30 (24) in length, respectively.

Gnathosoma (Figures 10D, 12A–C) — Palp (Figures 10D, 12A). Five-segmented, 448 (390) long, all segments with reticulations. Palp chaetotaxy: trochanter — none; basifemur — one dorsal simple seta; telofemur — one dorsal spine-like seta, one short pointed apophysis and one blunt apophysis; genu — two spine-like setae, two simple setae and one elongate pointed apophysis; tibiotarsus — three simple setae, one spine-like seta and one distal solenidium; claw well-developed. Chelicera (Figure 12B). 273 (250) long, with reticulations and papillae; cheliceral seta 18 (18) in length; chela developed. Subcapitulum (Figure 12C). 304 (265) long, 150 (148) wide; two pairs of short adoral setae, *ads1*–*ads2*, 15 (15) and 4 (4) in length; four pairs of hypostome setae, *hg1*–*hg4*, 24 (18), 33 (22), 11 (15) and 70 (60) in length, respectively. Area between *hg1* and *hg2* with papillae, between *hg2* and the base with reticulation and close to the base with papillae. Distances of *hg* setae: *hg1*–*hg1* 9 (10), *hg2*–*hg2* 27 (22), *hg3*–*hg3* 39 (40), *hg4*–*hg4* 129 (113), *hg1*–*hg2* 52 (47), *hg2*–*hg3* 141 (123), *hg3*–*hg4* 57 (54).

Legs (Figures 13A–E) — With reticulations, lengths of leg I–IV: 505 (463), 457 (415), 497

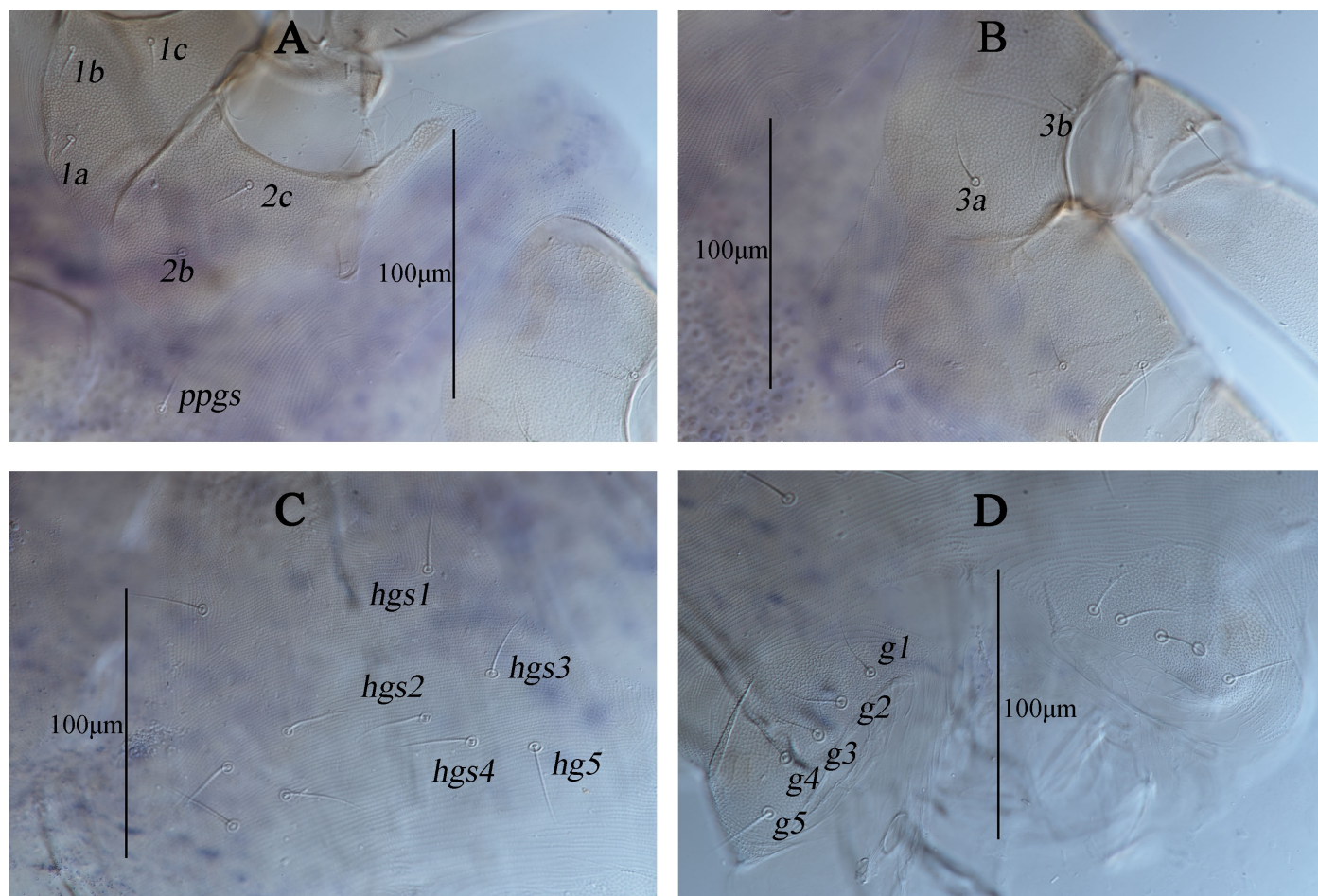


Figure 11 *Armascirus yulongensis* Chen & Jin n. sp., female holotype: A–D, ventral idiosoma (photo).

(477), ? (518); lengths of tarsus I–IV: 200 (185), 167 (151), 187 (180), ? (180). *T* on tibia IV ? (80) in length. Legs I–IV chaetotaxy: Coxae I–IV 3-2-3-3 *sts*; trochanters I–IV 1-1-2-1 *sts*; basifemora I–IV 5-5-4-2 *sts*; telofemora I–IV 4-4-4-4 *sts*. Genu I 1 *asl*, {1 *asl*, 1 *mst*}, {1 *asl*, 1 *mst*}, 4 *sts*; genu II 1 *asl*, 1 *bsl*, 5 *sts*; genu III 1 *asl*, 5 *sts*; genu IV 1 *asl*, 5 *sts*. Tibia I {1 *asl*, 1 *mst*}, 4 *sts*; tibia II 1 *asl*, 5 *sts*; tibia III 1 *bsl*, 5 *sts*; tibia IV 1 smooth *T*, 4 *sts*. Tarsus I 4 *asl*, 1 *fam*, 1 *dtsl*, 23 *sts*; tarsus II 1 *bsl*, 1 *dtsl*, 21 *sts*; tarsus III 19 *sts*; tarsus IV 19 *sts*.

Other developmental stages — Unknown.

Etymology

The new species name is derived from type locality Yulong Snow Mountain, Lijiang City, Yunnan Province, P. R. China.

Remarks

The new species is unique in the genus *Armascirus* with having five pairs of genital setae. It is similar to *A. anastosi* Smiley, 1992, but differs from the latter by the following characters: (1) five pairs of genital setae (vs. four in *A. anastosi*); (2) *c2*, *e1*, *f1*, *h1* and *h2* situated on small platelets (vs. on soft integument in *A. anastosi*); (3) tarsus I 23 *sts* (vs. 16 *sts* in *A. anastosi*); (4) tarsus II 21 *sts* (vs. 19 *sts* in *A. anastosi*); (5) tarsus III 19 *sts* (vs. 14 *sts* in *A. anastosi*); (6) tarsus IV 19 *sts* (vs. 13 *sts* in *A. anastosi*).

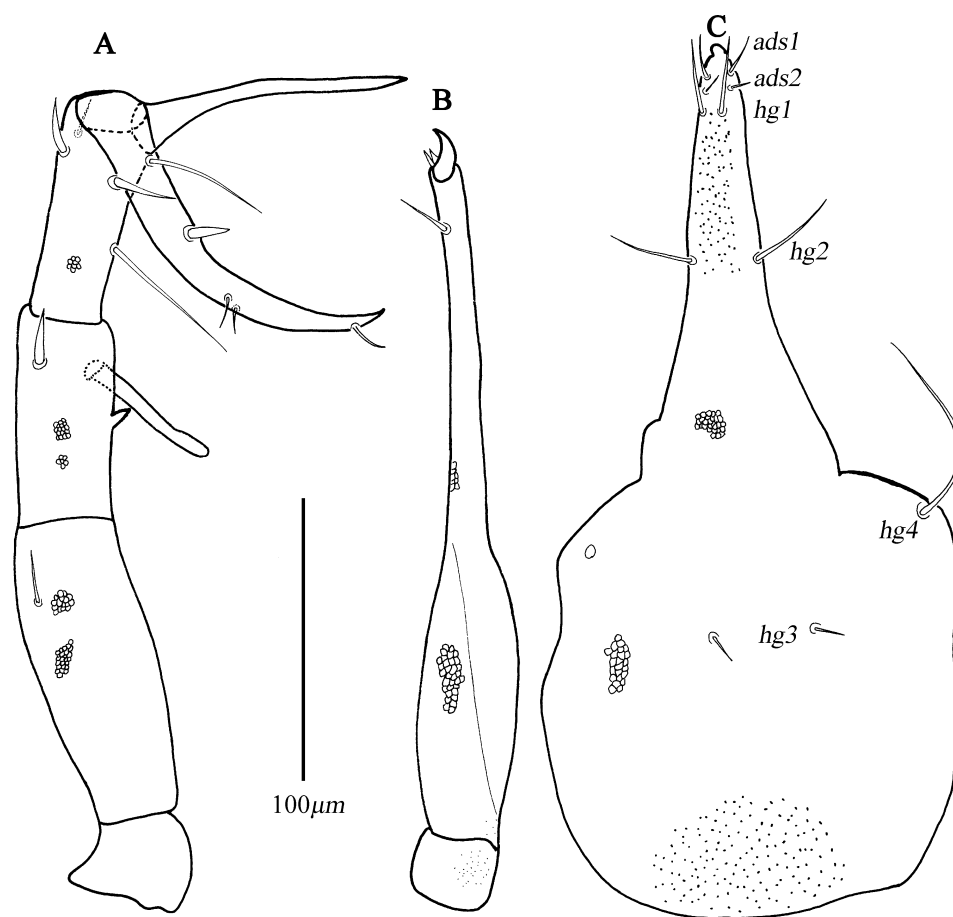


Figure 12 *Armascirus yulongensis* Chen & Jin n. sp., female holotype: A, palp; B, chelicerae; C, subcapitulum.

Type series

Holotype, female was collected from fallen leaves, Yulong Snow Mountain (N27°00'11", E100°10'45", elevation 3230 m), Lijiang City, Yunnan Province, P. R. China, on 1 September, 2018, by Jian-Xin Chen, slide No.: YN-CU-2018090101. One paratype female, the same data as for holotype, slide No.: YN-CU-2018090102. All types are deposited in the Institute of Entomology, Guizhou University, Guiyang, P. R. China (GUGC) (Zhang 2018).

Discussion

Cunaxidae has been found on every continent except Antarctica and the genus *Armascirus* is also widely distributed (Smliey 1992; Skvarla *et al.* 2014) and is known from Guizhou, Sichuan, Shanghai, Fujian, Jiangsu, Beijing and Taiwan in China (Tseng 1980; Liang 1983; Bu & Li 1987; Hu 1997; Lin & Zhang 2000).

Altitudes for most species of this genus are not given. However, those recorded vary between 124 m to 1300 m (Kalúz & Vrabec 2013; Kalúz *et al.* 2014; Kalúz & Starý 2018). *Armascirus apophysis* Chen & Jin n. sp. was found at altitudes 2628 m and *A. yulongensis* Chen & Jin n. sp. at altitude 3230 m. This implies that members of this genus may be adaptable to all altitudes.

The following species and the two new species are only known from their type localities: *A.*

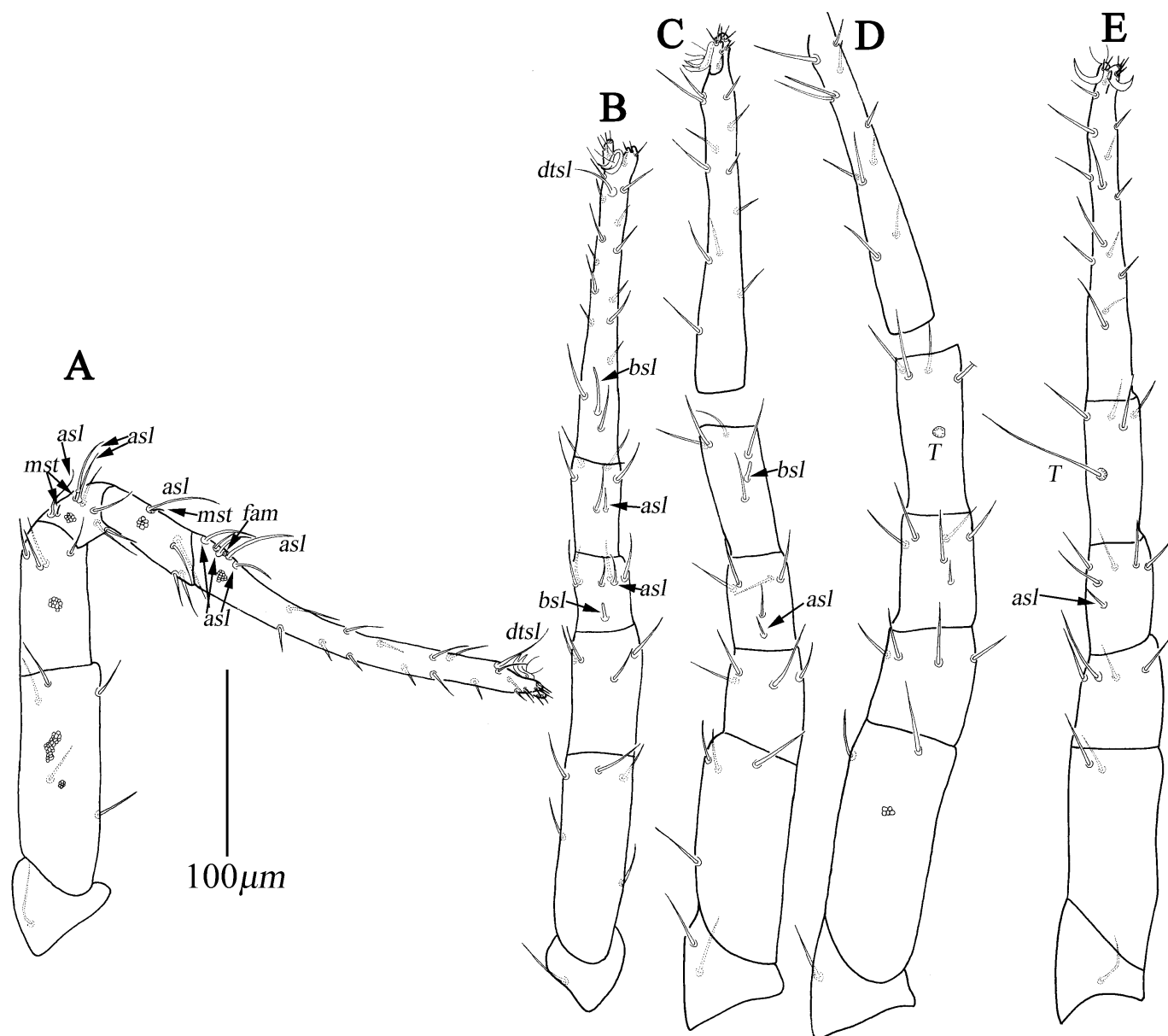


Figure 13 *Armascirus yulongensis* Chen & Jin n. sp., female holotype: A–D, leg I–IV, respectively; female paratype: E, leg IV.

denheyeri Kalúz, Ermilov & Vrabec, 2014, *A. skvarlai* Kalúz & Sary, 2018, *A. raulzito* Rocha, Argolo, Ferla & Oliveira, 2017, *A. amazoriensis* Wurlitzer & Silva, 2020, However, *A. taurus* (Kramer, 1881), *A. fendai* Kalúz & Vrabec, 2013, *A. hastus* Shiba, 1986 and *A. bison* (Berlese, 1888) were reported also from other localities.

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