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Article

A new genus and two new species of Tarsonemidae (Acari: Heterostigmata) from Chilean Patagonia

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ABSTRACT
A new genus and species, *Maculanemus chilensis* **gen. nov., sp. nov.** (Acari: Tarsonemidae: Tarsoneminae) and a new species *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** are described based on females collected in mosses in Chilean Patagonia. The genus *Steneotarsonemus* is recorded in Chile for the first time. The taxonomic position of the genus *Maculanemus* **gen. nov.** and unusual character states of new species are discussed.

KEYWORDS: Heterostigmatina, Neotropical Region, systematics, Tarsoneminae, Tarsonemoidea.

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INTRODUCTION

The family Tarsonemidae is one of the largest groups in the mite cohort Heterostigmata (Acari: Trombidiformes) and currently includes 50 genera (including new genus described herein) and more than 600 species (Lin and Zhang 2002; Magowski 2002; Lofego and Feres 2006; Zhang *et al*. 2011; Lofego *et al*. 2015, 2016, 2019; Khaustov and Abramov 2017; Seeman *et al.* 2018; Khaustov *et al.* 2021, 2022; Mondal and Karmakar 2021; Magowski *et al.* 2025). Members of the family are phytophagous, mycophagous, parasites and parasitoids of insects, and predators of mite eggs (Lindquist 1986). Tarsonemid mites inhabit soils and litter, various plants, bracket fungi, subcortical galleries of insects, etc. and many species utilize insects for phoretic dispersal (Lindquist 1986).

Almost nothing is known about tarsonemid mites of Chile. At present only three species of Tarsonemidae have been reported from this country, namely: *Acarapis woodi* (Rennie, 1921), *Tarsonemus cryptocephalus* (Ewing, 1939), and *T. lindquisti* Peredo & Casanueva, 1992 (Lin and Zhang 2002).

During the study of arthropods inhabiting mosses in the Chilean part of Patagonia, a new genus and two new species of Tarsonemidae were found. The main goal of this paper is to describe these new taxa.

MATERIALS AND METHODS

Mites were collected from samples of mosses using Berlese funnels and mounted on slides in Hoyer's

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medium. The terminology follows that of Lindquist (1986), except the ventral subcapitular seta is labeled as *m* (Grandjean 1944). All measurements are given in micrometers (μm) for the holotype and paratypes (in parentheses). Legs were measured from the base of femur to the tip of tarsus without pretarsus. For leg chaetotaxy the number of solenidia is given in parentheses. Mite morphology was studied using Carl Zeiss AxioImager A2 compound microscope with phase contrast and differential-interference contrast (DIC) optical systems. Photomicrographs were taken with an AxioCam ICc5 digital camera.

Abbreviations – ap1-ap4—apodemes 1-4, appr—prosternal apodeme, appo—poststernal apodeme, apsej—sejugal apodeme, Tr—trochanter, Fe—femur, Ge—genu, Ti—tibia, Ta—tarsus, TiTa—tibiotarsus.

RESULTS

Family Tarsonemidae Canestrini and Fanzago, 1877

Genus *Maculanemus* gen. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:2E19DBE6-89D3-4FE1-9311-38166821A7A8

Type species: *Maculanemus chilensis* **sp. nov.**

Diagnosis

Female. Gnathosomal capsule subtriangular in dorsoventral aspect, with a pair of strongly sclerotized pigmented spots ventrally; not covered by prodorsal shield; palpi very short; pharynx narrow, with well sclerotized walls and without glandular bodies; postpalpal setae absent. Dorsal setae not modified; bothridia and setae *sc1* completely absent. Stigmata not covered by prodorsal shield. Sejugal and poststernal apodemes absent. Femur I with three setae (*l''* absent); solenidion *φ2* absent; seta *s* of tibiotarsus I and *u'* of tarsi II and III spiniform and hooked distally.

Definition (based on adult female)

Idiosoma – Prodorsal shield not expanded laterally (Fig. 5A). Stigmata small, round, not covered by prodorsal shield and located anterolaterad setae *v1*; trachea long and narrow, without sclerotized atrium. Bothridia and setae *sc1* completely absent. Alveolar pits *v2* located posterolaterad bases of setae *v1*. Dorsal setae not modified. Ventral shielding with apodemes 1 forming Y-shaped juncture with prosternal apodeme; apodemes 2 not fused with prosternal apodeme; sejugal apodeme not developed (Fig. 4B); apodemes 3 not extending laterad trochanters III, nor mesad setae *3a*; apodemes 4 long, extending posterolaterad setae *3b*; poststernal apodeme absent (Fig. 5D). Anterior margin of posterior coxisternal plate nearly straight. Bases of legs IV well-spaced, separated by interval of nearly two times the width of trochanter IV; tegula short and wide, rounded posteriorly (Fig. 5D). Pseudanal setae present.

Gnathosoma – Gnathosomal capsule short and wide, almost triangular dorsoventrally, not covered by prodorsal shield. Postpalpal (palpcoxal) setae absent. Palpi very short, with distinct rod-like dorsal and ventrolateral setiform structures, ventrally with poorly developed structures. Cheliceral stylets narrow, nearly half as long as gnathosomal width; cheliceral levers poorly developed, about half as long as cheliceral stylets. Pharynx narrow, about 0.15 as wide as gnathosomal capsule, with smooth-walled musculature without glandular bodies and well sclerotized walls (Fig. 6). Ventral face of gnathosoma with a pair of unusual strongly sclerotized pigmented spots (Fig. 4B).

Legs – Claw of leg I simple, hooked, situated on well-developed pretarsus, ambulacra of legs II and III with empodium and well-developed, symmetrically paired, simple hooked claws. Femur I without apophysis; femur II without ventral flange. Legs I and II of moderate length, with none of

segments unusually elongated. Setae (*u*) of tarsus I and *u"* of tarsi II and III not evident. Seta *pl"* on tarsus II spine-like, situated in basal part of tarsus. Seta *s* of tibiotarsus I and *u'* of tarsi II and III spine-like and hooked distally. Femur I with three setae (*l"* absent); solenidion *φ2* absent. Trochanter III elongate, plate-like, longer than femorogenu III. Leg IV elongate-cylindrical, slightly shorter than leg III, with femorogenu about 2 times as long as tibiotarsus; trochanter no longer than tibiotarsus. Number of setae and solenidia on femur, genu, tibia, and tarsus, respectively: leg I: 3 (*d, l', v"*)-4 (*l', l", v', v"*)-6(1)(*d, l', l", v', v", k, φ1*) + 8(l) (*tc', tc", p', p", pl", s, pv', pv", ω*); leg II: 3 (*d, l', v"*)-3 (*l', l", v'*)-4 (*d, l', v', v"*)-6(l) (*pl", tc', tc", u', pv', pv", ω*); leg III: 1 (*v'*)+3 (*l', l", v'*)-4 (*d, l', v', v"*)-5 (*tc', tc", u', pv', pv"*); Leg IV: 1+1 (*v'Fe, v'Ge*)-1+1 (*v'Ti, tc"*).

Male and *larva* unknown.

Species included

The genus *Maculanemus* is monotypic, with one species, *M. chilensis* **sp. nov.**

Distribution and habitat

Maculanemus chilensis **sp. nov.** inhabits mosses in southern Chile.

Etymology

The name of the new genus is a combination of Latin *macula* meaning *spot*, and *nemus*, the ending of *Tarsonemus*, the type genus of the family Tarsonemidae, and refers to the presence of remarkable well-sclerotized spots on ventral face of gnathosoma.

Differential diagnosis

The female of new genus is most similar to those of two genera, *Dendroptus* Kramer, 1876 and *Acaronemus* Lindquist & Smiley, 1978 of the tribe Steneotarsonemini in having femur I with three setae (*l"* absent), solenidion *φ2* absent, and sejugal apodeme reduced or absent. The new genus differs from both genera by the complete absence of bothridia and setae *sc1* (present in *Dendroptus* and *Acaronemus*) and in having strongly sclerotized pigmented spots on ventral face of gnathosoma (absent in *Dendroptus* and *Acaronemus*). Female of the new genus differs from that of *Acaronemus* in having three setae on femora I and II (usually two on femur I and two on femur II in *Acaronemus*); legs IV separated by interval of nearly two times the width of trochanter IV (legs IV separated by interval of nearly four times the width of trochanter IV in *Acaronemus*); setae *u'* of tarsi II and III spiniform and hooked distally (usually setiform in *Acaronemus*). Female of the new genus is most similar to monotypic subgenus *Dendroptus* (*Hemidendroptus*) Magowski, 2012 by the absence of sejugal apodeme and postpalpal setae. In addition to the characters mentioned above, female of the new genus differs from that of *D.* (*Hemidendroptus*) by complete absence of poststernal apodeme (reduced but present in *Hemidendroptus*); stigmata located out of prodorsal shield (stigmata located on prodorsal shield in *Hemidendroptus*); seta *pl"* of tarsus II present (seta *pl"* of tarsus II absent in *Hemidendroptus*); and anterior margin of posterior coxisternal plate straight (anterior margin of posterior coxisternal plate with median elongation in *Hemidendroptus*).

***Maculanemus chilensis* sp. nov. (Figs. 1–6)**

http://zoobank.org/urn:lsid:zoobank.org:act:190522A7-219E-4DFF-830A-A7854E5048C6

Description (female)

Length of idiosoma 242 (208–254), width 167 (155–177).

Idiosomal dorsum (Figs. 1A, 4A, 5A, C, E) – Idiosoma elongated oval in outline. All dorsal shields with uniform small round puncta (Figs. 5A, C, E). Posterior parts of prodorsal shield and tergites C, D, and EF with delicate striae. Prodorsal shield and tergite C weakly concave posteriorly.

Setae *sc2*, *c1* and *c2* smooth and pointed, in some specimens setae *c1* weakly blunt-tipped; other dorsal setae blunt-tipped and weakly barbed. Lengths of dorsal setae: *v1* 29 (28–32), *sc2* 85 (80–87), *c1* 13 (13–17), *c2* 23 (21–23), *d* 14 (13–14), *e* 10 (10–11), *f* 13 (13–14), *h* 11 (10–12). Distances between setae: *v1–v1* 25 (23–25), *v2–v2* 35 (34–40), *sc2–sc2* 36 (36–41), *c1–c1* 69 (69–72), *c2–c2* 104 (104–109), *c1–c2* 30 (26–30), *d–d* 59 (58–66), *e–e* 75 (73–78), *e–f* 21 (19–22), *f–f* 35 (32–40), *h–h* 32 (32–35).

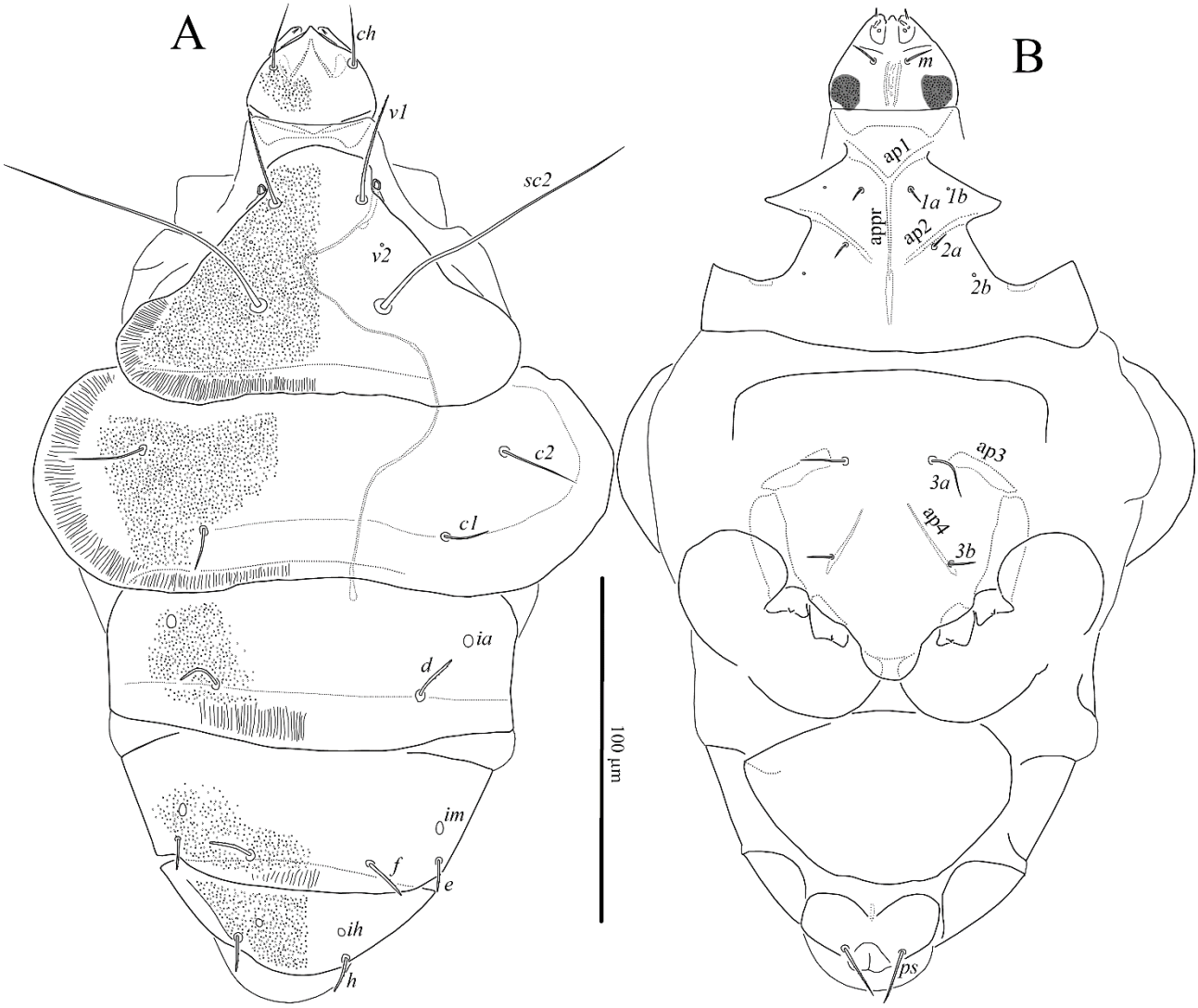

Figure 1. *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – **A.** Dorsum of body; **B.** Venter of body. Legs omitted.

Idiosomal venter (Figs. 1B, 4B, 5B, D, F) – Ventral plates with very small and hardly visible puncta (Figs. 5B, D, F). Setae *ps* weakly barbed, other ventral setae smooth; all ventral setae weakly blunt-tipped. Pits *1b* and *2b* small, round. Setae *1a* located well posteriad apodemes 1; setae *2a* located just posteriad middle part of apodemes 2, in one specimen left seta *2a* asymmetrically absent (Fig. 5B). Tegula length 10 (10–11), maximum width 17 (17–19). Lengths of ventral setae: *1a* 5 (4–5), *2a* 5 (5–6), *3a* 16 (13–16), *3b* 8 (8), *ps* 16 (16–17).

Gnathosoma (Figs. 5B, 6) – Length of gnathosomal capsule 35 (35–37), width 37 (37–38). Dorsomedian apodeme not evident. Gnathosoma with dorsal pair of setae *ch* 18 (17–18) distinctly

longer than subcapitular setae *m* 8 (7–8); both setae smooth; setae *m* weakly blunt-tipped, *ch* pointed. Dorsal face of gnathosomal capsule and ventral pigmented spots with tiny puncta.

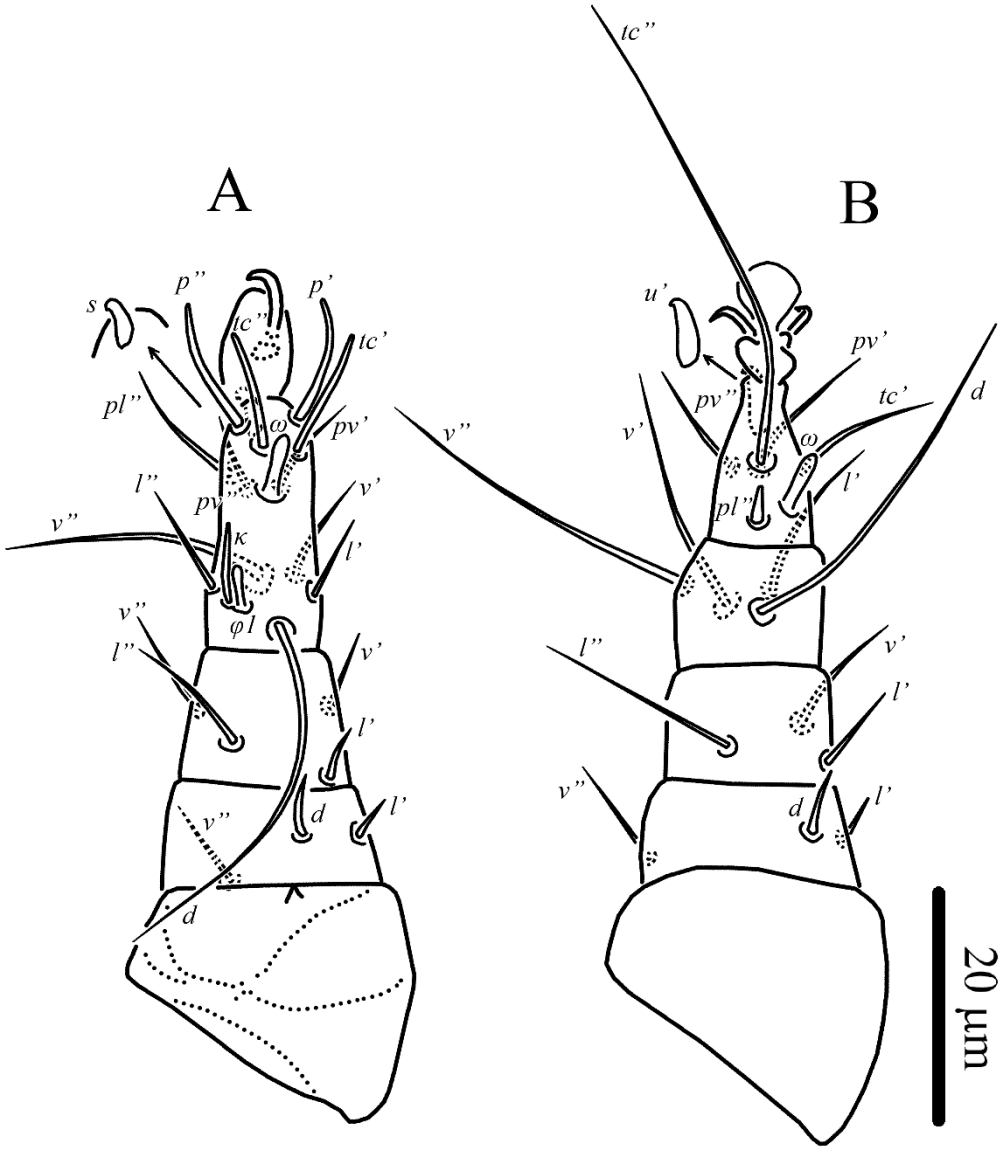

Figure 2. *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – **A.** Left leg I, dorsal aspect; **B.** Left leg II, dorsal aspect.

Legs (Figs. 2, 3) – Lengths of legs: I 54 (49–55), II 52 (51–54), III 52 (51–53), IV 46 (45–47). Leg I (Fig. 2A). Solenidion *ω* slightly clavate, *φ1* slightly capitate; seta *k* 7 (6–7) rod-shaped. Lengths of solenidia: *ω* 4 (5), *φ1* 3 (3–4). Setae (*tc*) and (*p*) of tibiotarsus smooth, blunt-tipped, eupathid-like, subequal in length; setae *d*, *l'* of femur and *l'* of genu blunt-tipped, other leg setae pointed; all leg setae smooth. Seta *d* of tibiotarsus distinctly longer than other leg setae. One specimen lacks both tibial solenidia *φ1* and *φ2* on both legs. Leg II (Fig. 2B). Solenidion *ω* 6 (5–6) weakly clavate. All setae smooth; seta *pl"* of tarsus spiniform and located posterolaterad solenidion *ω*; Setae *d* and *l'* of femur weakly blunt-tipped, other leg setae pointed. Leg III (Fig. 3A). All setae smooth; setae *v'* of femur weakly blunt-tipped, other leg setae pointed. Leg IV (Fig. 3B). Setae *v'Ti* weakly barbed, other leg setae smooth; seta *tc"* pointed, other leg setae blunt-tipped; seta *tc"* of tibiotarsus long, whip-like.

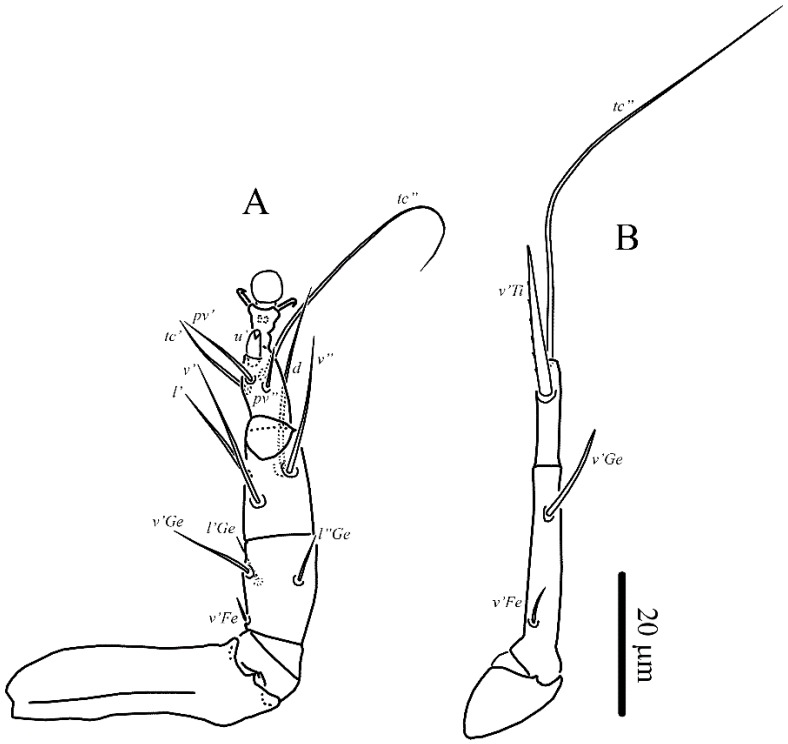

Figure 3. *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – **A.** Right leg III, ventral aspect; **B.** Right leg IV, ventral aspect.

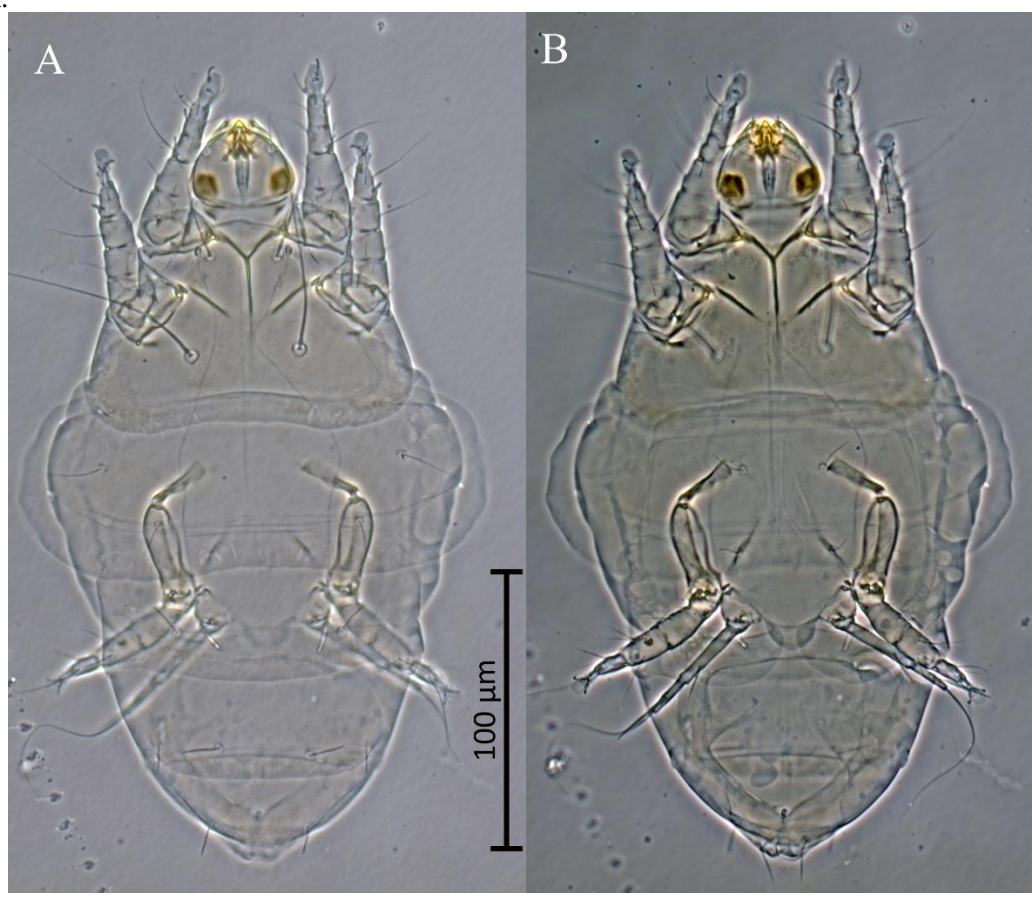

Figure 4. Phase-contrast micrographs of *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – **A.** General view dorsally; **B.** General view ventrally.

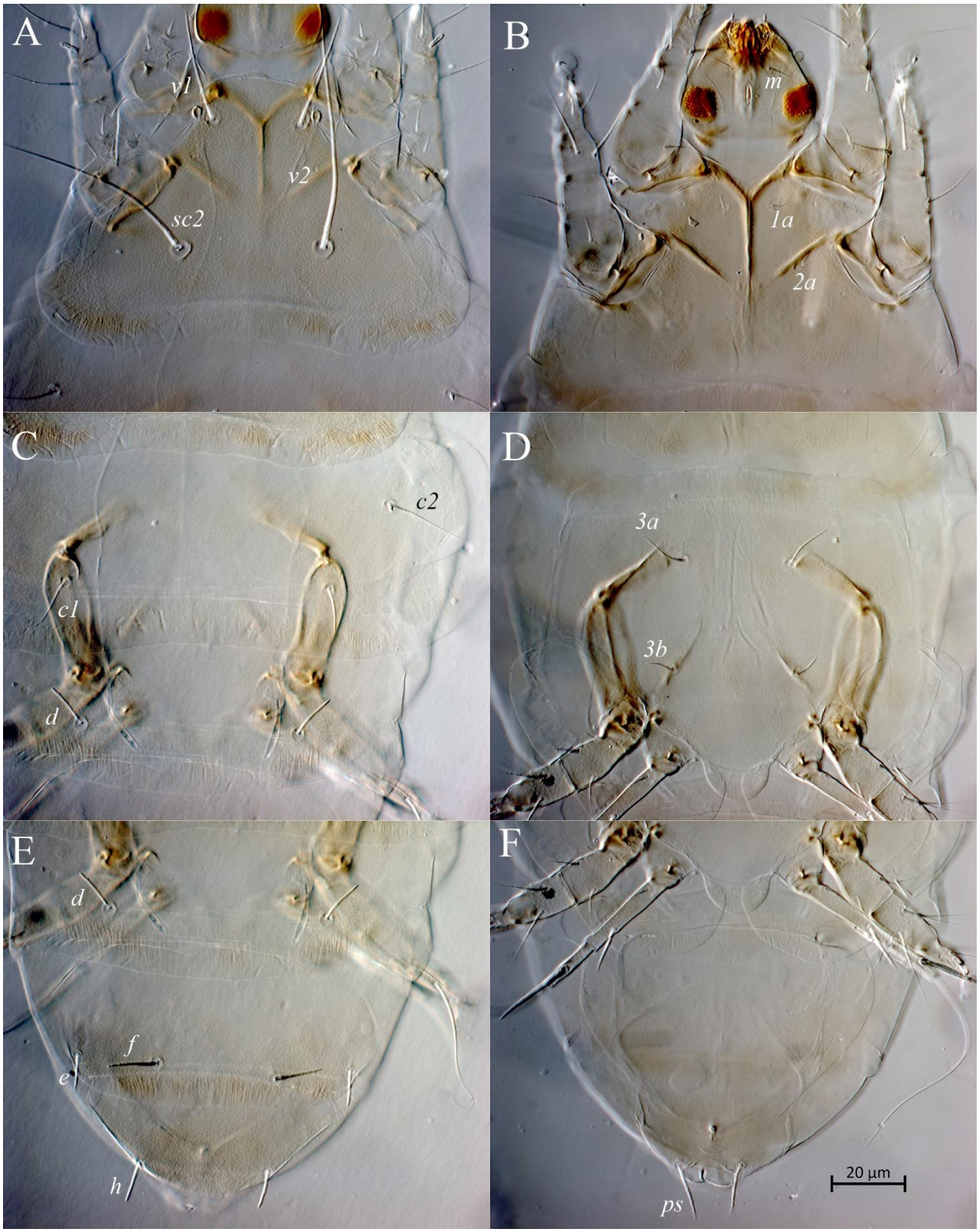

Figure 5. DIC micrographs of *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – **A.** Prodorsum; **B.** Proterosoma, ventral aspect; **C.** Tergites C and D; **D.** Posterior coxisternal plate; **E.** Opisthosomal dorsum; **F.** Opisthosomal venter.

Figure 6. DIC micrographs of *Maculanemus chilensis* **gen. nov., sp. nov.** (female) – Pharynx.

Type material

Holotype: female, slide ZISP T-Tar-004, Chile, The Region of Magallanes, *Nothofagus* forest, moss on soil, 53° 41' 08.8" S, 70° 58' 24.2" W, 26 January 2015, coll. A.V. Tolstikov. Paratypes: 22 females, same data.

Type deposition

The holotype and nine paratype are deposited in the collection of the Zoological Institute of RAS, Saint Petersburg, Russia; other paratypes are deposited in the mite collection of the Museum of Zoology, University of Tyumen, Tyumen, Russia.

Etymology

The specific epithet of the new species refers to geographical distribution in Chile.

Genus *Steneotarsonemus* Beer, 1954
Subgenus *Steneotarsonemus* (*Neosteneotarsonemus*) Tseng & Lo, 1980

Type species: *Neosteneotarsonemus mirabilis* Tseng & Lo, 1980, by original designation

***Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* sp. nov. (Figs. 7–12)**

http://zoobank.org/urn:lsid:zoobank.org:act:EE316BED-28AB-4729-83B8-10EB7C86303B

Description (female)

Length of idiosoma 303 (292–305), width 184 (170–185).

Idiosomal dorsum (Figs. 7A, 10A, 11A, C, E) – Idiosoma elongated in outline. All dorsal shields with uniform small round puncta (Figs. 11A, C, E). Posterior parts of prodorsal shield and tergites C, D, and EF with delicate striae. Anterior margin of prodorsal shield straight. Stigmata and associated tracheae not evident. All dorsal setae smooth; setae *v1*, *sc2*, and *c2* pointed, other dorsal setae blunt-tipped; setae *sc1* setiform. Setae *sc2* situated in anterior half of prodorsal shield, slightly posteromesad *sc1* (Fig. 11A); setae *c1* and *c2* situated on imaginary line connecting bases of setae *c2* (Fig. 10A). Lengths of dorsal setae: *v1* 20 (18–20), *sc1* 10 (10), *sc2* 70 (57–60), *c1* 12 (11–12), *c2* 19 (17–19), *d* 11 (8–11), *e* 7 (7), *f* 9 (9), *h* 10 (9–10). Distances between setae: *v1–v1* 37 (36–37), *v2–v2* 38 (35–40), *sc1–sc1* 76 (74–76), *sc2–sc2* 65 (65–70), *c1–c1* 48 (44–48), *c2–c2* 125 (115–125), *c1–c2* 38 (36–40), *d–d* 81 (73–75), *e–e* 83 (83–84), *e–f* 21 (21–23), *f–f* 42 (38–40), *h–h* 38 (44–47).

Idiosomal venter (Figs. 7B, 10B, 11B, D, F) – Ventral plates with very small and hardly visible puncta (Figs. 11B, D, F). All ventral setae smooth; setae *3a* pointed, other ventral setae blunt-tipped. Pits *1b* and *2b* small, round. Setae *1a* located on or near anterior margin of apodemes 1; setae *2a* located well posteriad middle part of apodemes 2. Apodemes 1 fused with prosternal apodeme; apodemes 2 fused with prosternal apodeme (Fig. 11B) or in some specimens median ends diffuse near prosternal apodeme; sejugal apodeme represented by small reniform sclerites; apodemes 3 without anterior projections; apodemes 4 thin and long; poststernal apodeme strongly reduced and poorly visible (Fig. 11D), in some specimens not visible. Tegula length 11 (10–11), maximum width 28 (26–28). Anterior margin of posterior sternal plate and posterior margins of lateral and aggenital plates with delicate striae. Lengths of ventral setae: *1a* 5 (5), *2a* 6 (6–7), *3a* 25 (22–25), *3b* 7 (7–8), *ps* 8 (7–8).

Gnathosoma (Fig. 12) – Gnathosomal capsule trapezoidal in outline. Length of gnathosomal capsule 42 (42–44), width 43 (43–47). Dorsomedian apodeme well developed and divided posteriorly. Gnathosoma with dorsal pair of setae *ch* 26 (25–26) distinctly longer than subcapitular setae *m* 10 (10–11); both setae pointed; setae *ch* weakly barbed, *m* pointed; postpalpal setae needle-like, situated lateroventrally. Cheliceral levers well developed, nearly 2/3 the length of cheliceral stylets. Palpi very short, with at least one pair of setiform structures distally and three pairs of tiny projections ventrally. Pharynx poorly sclerotized, thin-walled, almost horseshoe-shaped (Fig. 12A). A pair of very thin, long and hardly visible tracheae comes from posterodorsal part of gnathosoma into propodosoma (Fig. 12B).

Legs (Figs. 8, 9) – Lengths of legs: I 60 (58–61), II 53 (50–54), III 56 (51–55), IV 54 (45–48). Setae (*u*) of tarsus I and *u”* of tarsi II and III not evident. Number of setae and solenidia on femur, genu, tibia, and tarsus, respectively: leg I: 4 (*d*, *l’*, *l”*, *v”*)-4 (*l’*, *l”*, *v’*, *v”*)-6(2)(*d*, *l’*, *l”*, *v’*, *v”*, *k*, *φ1*, *φ2*) + 8(l) (*tc’*, *tc”*, *p’*, *p”*, *pl”*, *s*, *pv’*, *pv”*, *ω*); leg II: 3 (*d*, *l’*, *v”*)-3 (*l’*, *l”*, *v’*)-4 (*d*, *l’*, *v’*, *v”*)-6(l) (*pl”*, *tc’*, *tc”*, *u’*, *pv’*, *pv”*, *ω*); leg III: 1 (*v’*)+3 (*l’*, *l”*, *v’*)-4 (*d*, *l’*, *v’*, *v”*)-5 (*tc’*, *tc”*, *u’*, *pv’*, *pv”*); Leg IV: 1+1 (*v’Fe*, *v’Ge*)-1+1 (*v’Ti*, *tc”*). Leg I (Fig. 8A). Tarsal claw small, hooked. Solenidion *ω* digitiform, *φ1* and *φ2* slightly capitate; seta *k* 5 (5) rod-shaped. Lengths of solenidia: *ω* 7 (7), *φ1* 6 (6–7), *φ2* 4 (4). Setae (*tc*) and (*p*) of tibiotarsus smooth, blunt-tipped, eupathid-like; *tc”* situated between *p’* and *p”*; setae (*tc*) shorter than (*p*). Seta *s* of tibiotarsus truncated distally, sometimes slightly bifid (Fig. 8A’); setae *d*, *l’*, *l”* of femur, *v’*, *v”* of genu, and *pv”* of tibiotarsus blunt-tipped, other leg setae pointed; at least setae *l”* of femur, *v’* and *v”* of genu weakly barbed, other setae smooth. Seta *d* of tibiotarsus distinctly longer than other leg setae. Leg II (Fig. 8B). Solenidion *ω* 5 (5) digitiform. Seta *u’* truncated distally (Fig. 8b’); setae *d*, *l’* of femur, *pl”* and *pv”* of tarsus spiniform;

seta *v'* of genu weakly blunt-tipped, other setae pointed; at least setae *l"* of genu, *d*, *l'* of tibia and *tc"* of tarsus weakly barbed, other setae smooth. Empodium striated dorsally. Leg III (Fig. 9A). Empodium and setae *u'* and *pv"* as on tarsus II. All setae smooth; setae *v'* of femur, *l'*, *v'* of genu, and *l'* of tibia weakly blunt-tipped, other setae pointed. Leg IV (Fig. 9B). All setae smooth; seta *tc"* pointed, other leg setae blunt-tipped; seta *tc"* of tibiotarsus long, whip-like.

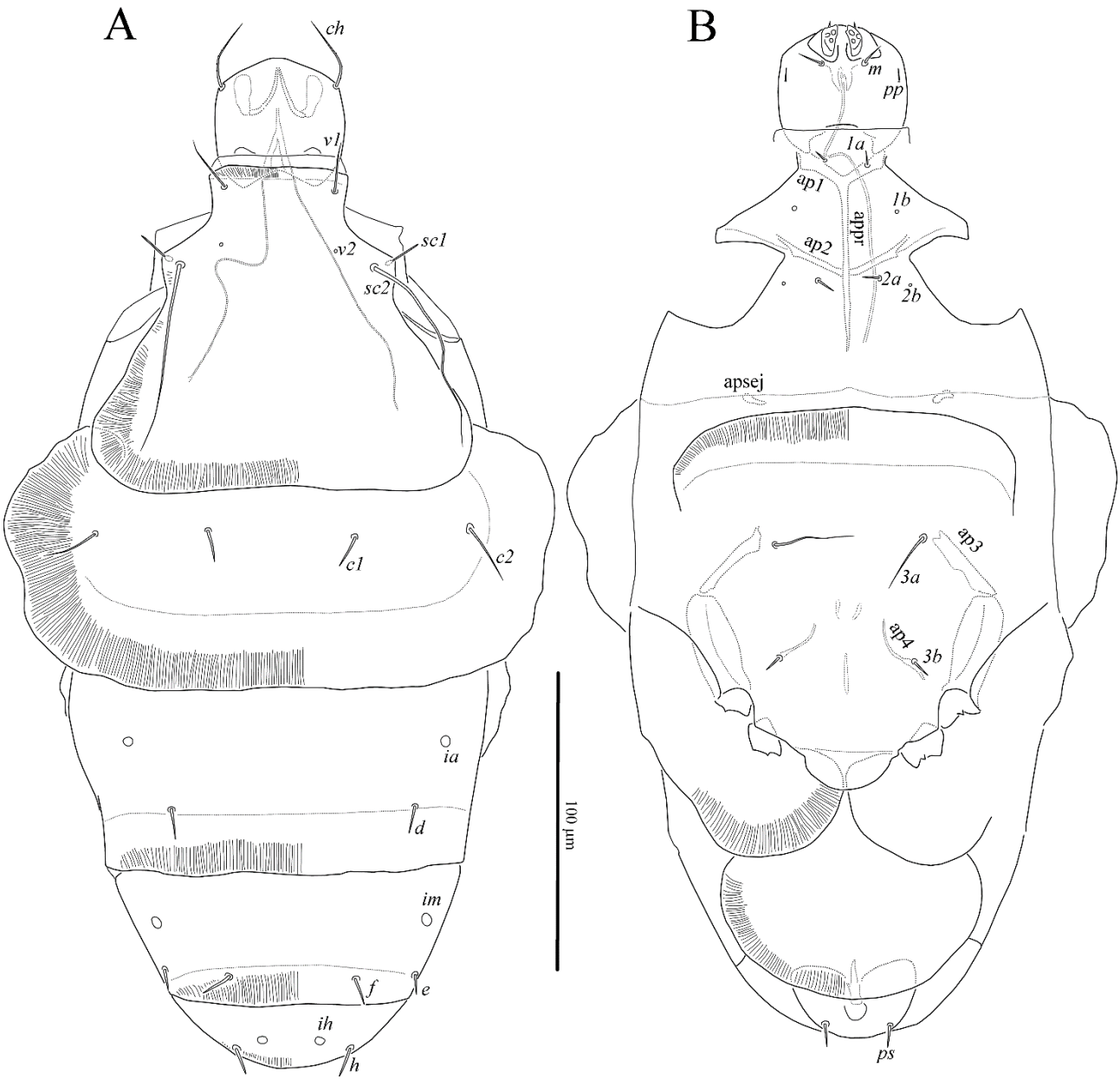

Figure 7. *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** Dorsum of body; **B.** Venter of body. Legs omitted.

Type material

Holotype: female, slide ZISP T-Tar-005, Chile, vicinity of Punta Arenas, swamp, in *Sphagnum* sp., 53° 38′ 02.8″ S, 65° 31′ 01.6″ W, 18 November 2014, coll. V.A. Stolbov; paratypes: 3 females, Chile, Patagonia, Tierra del Fuego island, 54° 29′ 550″ S, 068° 43′ 103″ W, from *Sphagnum* sp. in the swamp, 3 November 2015, coll. A.A. Khaustov.

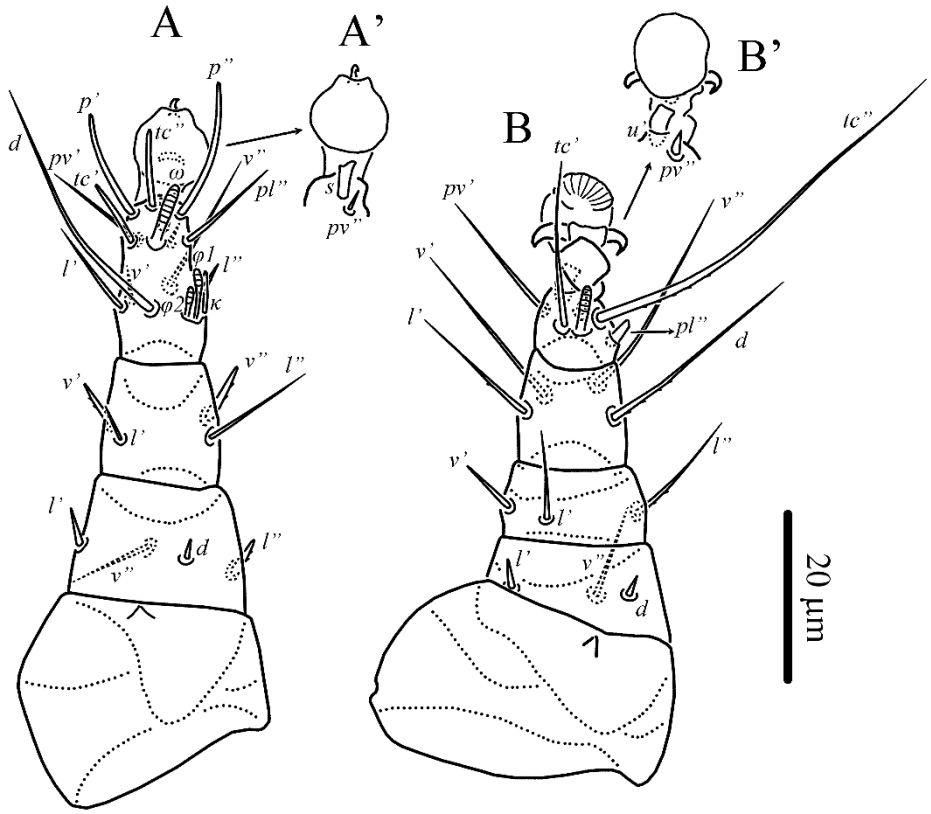

Figure 8. *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** Right leg I, dorsal aspect; **B.** Right leg II, dorsal aspect.

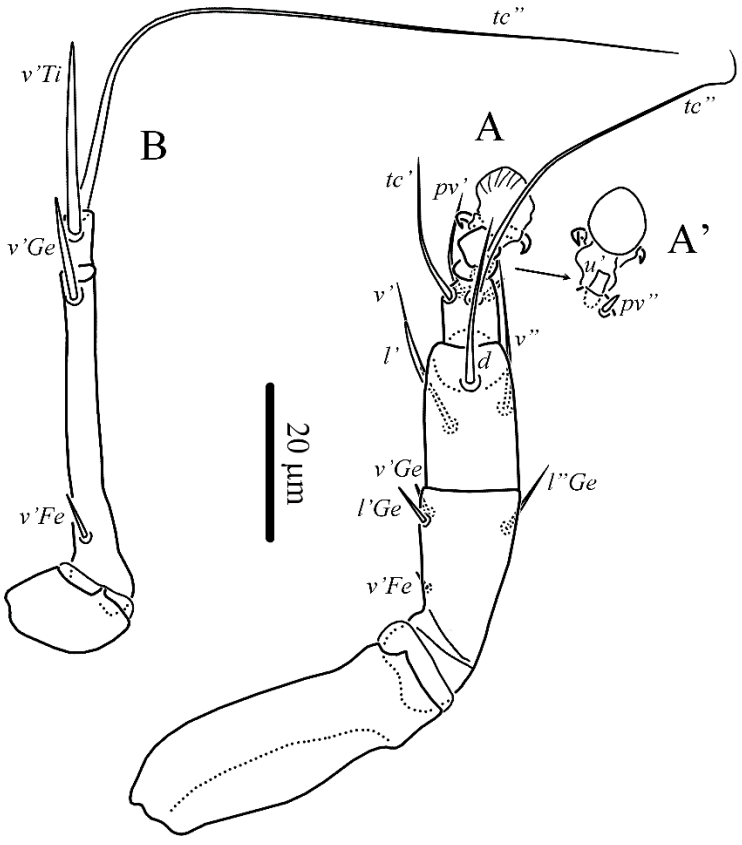

Figure 9. *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** right leg III, dorsal aspect; **B.** Right leg IV, ventral aspect.

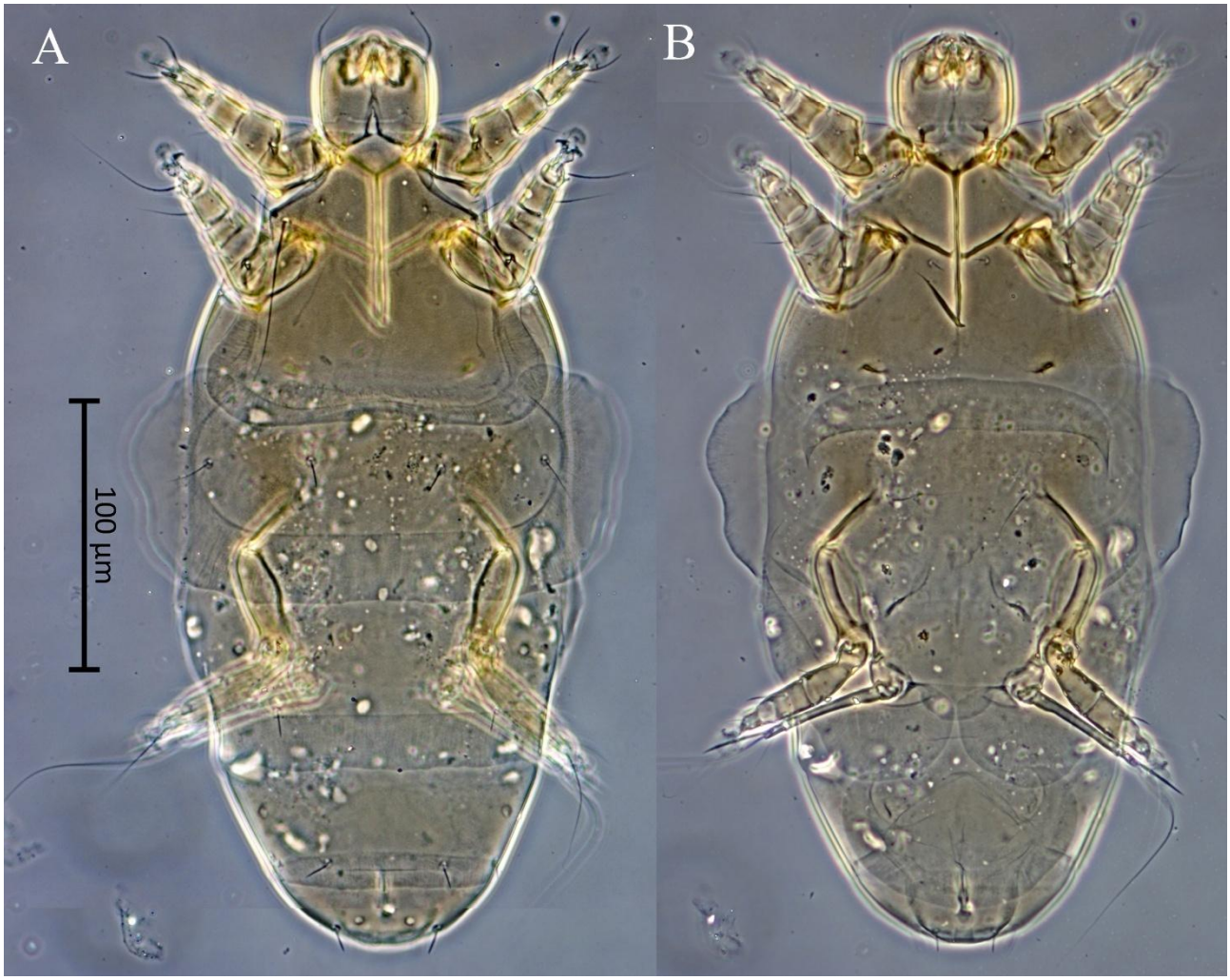

Figure 10. Phase-contrast micrographs of *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** General view dorsally; **B.** General view ventrally.

Type deposition

The holotype is deposited in the collection of the Zoological Institute of RAS, Saint Petersburg, Russia; other paratypes are deposited in the mite collection of the Museum of Zoology, University of Tyumen, Tyumen, Russia.

Etymology

The specific epithet of the new species refers to geographical distribution in Patagonia.

Differential diagnosis

Based on the key to species of the subgenus *Neosteneotarsonemus* provided by Lin & Zhang (2005), female of the new species is most similar to *S*. (*N*). *ramus* Lin & Zhang, 2005 in having setae *c2* longer than *c1* and setae *2a* situated well posteriad apodemes 2. The new species differs from *S*. (*N*). *ramus* in having setae *c1* and *c2* located on imaginary transverse line connecting bases of setae *c2* (setae *c1* located well posteriad imaginary transverse line connecting bases of setae *c2* in *S*. (*N*). *ramus*); apodemes 2 fused with prosternal apodeme (apodemes 2 not fused with prosternal apodeme in *S*. (*N*). *ramus*); setae *v1* pointed (setae *v1* blunt-tipped in *S*. (*N*). *ramus*); and in having four setae on femur I (three setae on femur I in *S*. (*N*). *ramus*). Female of the new species also similar to *S*. (*N*.) *kerguelenensis* (Fain, 1976) in having apodemes 2 fused with prosternal apodeme. The new species

differs from *S*. (*N*.) *kerguelenensis* in having setae *2a* located well posteriad apodemes 2 (setae *2a* located near posterior margin of apodemes 2 in *S*. (*N*.) *kerguelenensis*); setae *c1* and *c2* located on imaginary transverse line connecting bases of setae *c2* (setae *c1* located well posteriad imaginary transverse line connecting bases of setae *c2* in *S*. (*N*.) *kerguelenensis*); and setae *v1* distinctly longer than *sc1* (setae *v1* and *sc1* subequal in length in *S*. (*N*.) *kerguelenensis*).

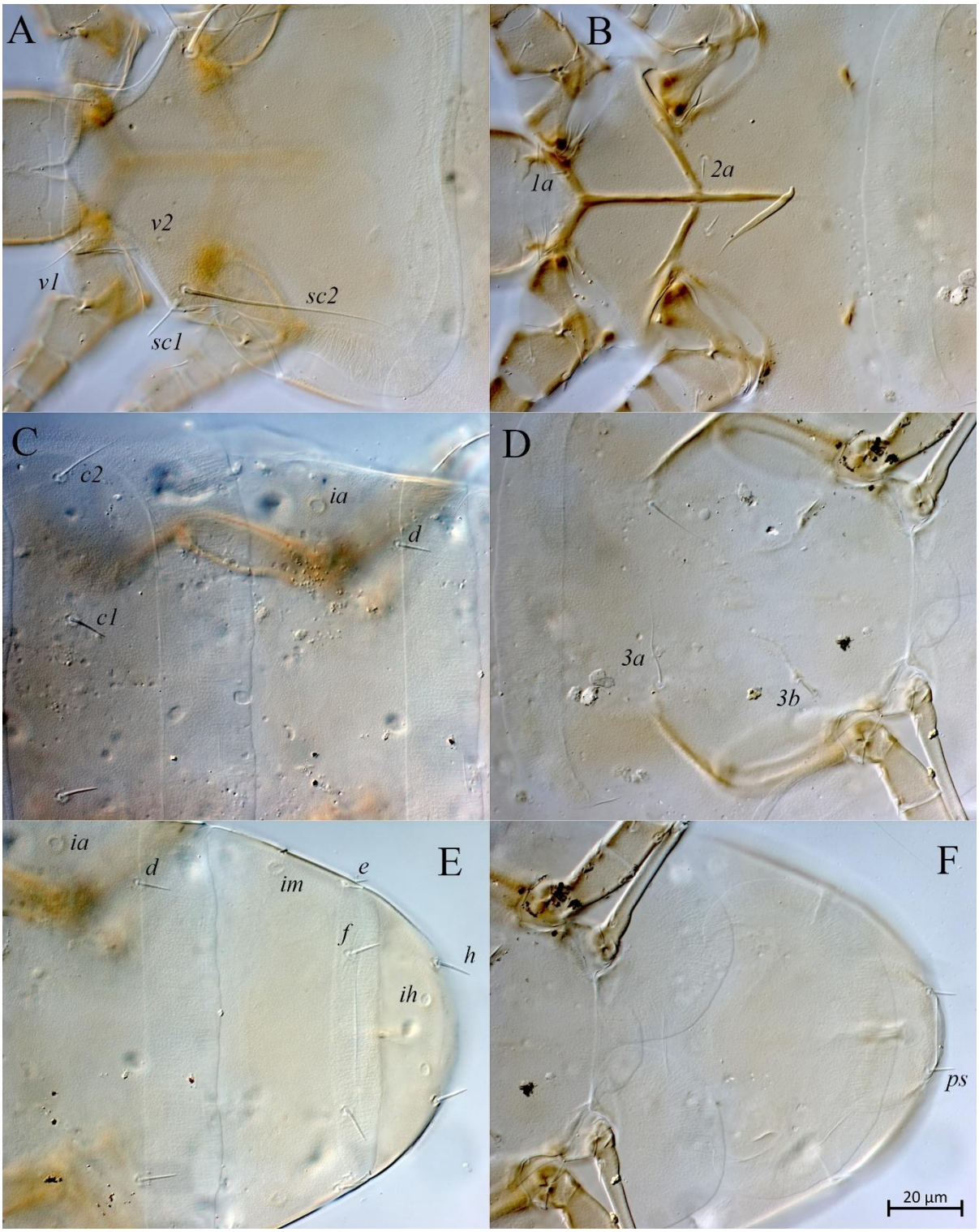

Figure 11. DIC micrographs of *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** Prodorsum; **B.** Anterior coxisternal plate; **C.** Tergites C and D; **D.** Posterior coxisternal plate; **E.** Opisthosomal dorsum; **F.** Opisthosomal venter.

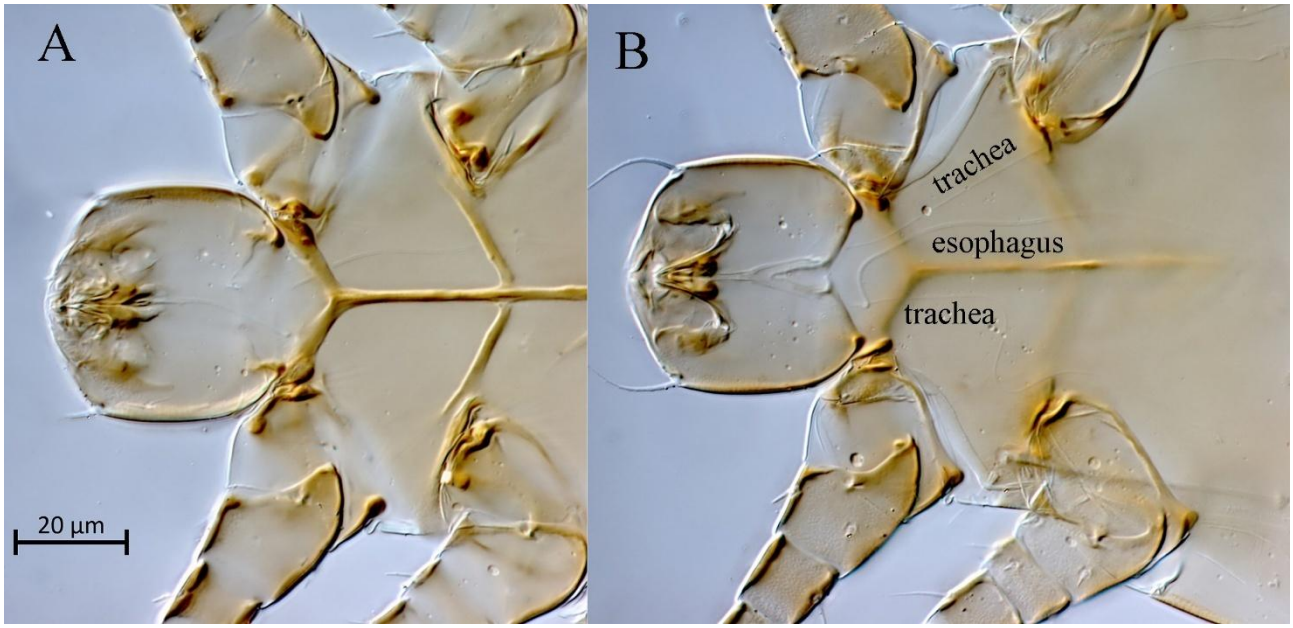

Figure 12. DIC micrographs of *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** (female) – **A.** Pharynx; **B.** Tracheae.

Remark

The genus *Steneotarsonemus* is recorded from Chile for the first time.

DISCUSSION

Morphology

The most remarkable character state in *Maculanemus chilensis* **gen. nov., sp. nov.** is the presence of a pair of strongly sclerotized round pigmented spots on ventral face of gnathosomal capsule (Fig. 5B). A similar morphological structure is known only in *Steneotarsonemus* (*Neosteneotarsonemus*) *arcticus* Lindquist, 1986. However, in *S. arcticus* these pigmented spots located ventrolaterally and not so strongly pigmented (Fig. 235 in Lindquist 1986). It is not clear whether these structures are homologous in *M. chilensis* and *S. arcticus*. The function of these pigmented spots is not clear. Similar structures are absent in other described Tarsonemidae or other heterostigmatic mites.

The study of morphology of female of *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** revealed unusual absence of stigmata and associated trachea. At least these structures are not visible in available specimens in light microscope. However, there is a pair of long and very thin (in comparison to normal tracheae of other Tarsonemidae) trachea coming from gnathosomal capsule (Fig. 12B). A similar structures unknown in other Tarsonemidae. Probably homologous gnathosomal tracheae were found in the genus *Petalomium* Cross, 1969 (Pygmephoroidea: Neopygmephoridae) and in fossil *Nasutiacarus perplexus* Sidorchuk & Lindquist, 2016 (Nasutiacaridae) (Silva *et al*. 2017).

Systematic relationships

The new genus *Maculanemus* is undoubtedly belongs to the subfamily Tarsoneminae based on the following character states of female: 1) metapodosomal venter with two pairs of setae, 2) leg I with membranous ambulacrum bearing a usually moderately small or reduced claw, 3) cheliceral stylets short or if long, then usually strongly curved basally, and when protracted not extruding far anteriad out of gnathosomal capsule (Lindquist 1986). Based on the key to tribes provided by Lin and Zhang (2002) *Maculanemus* belongs to the tribe Steneotarsonemini. The most closely related genera

Dendroptus and *Acaronemus* are also belong to Steneotarsonemini (Lindquist 1986). However, synapomorphies for *Maculanemus*, *Dendroptus* and *Acaronemus* (absence of seta *l''* on femur I and solenidion *φ2* on tibiotarsus I of female) could be a result of homoplasy. The genus *Maculanemus* also shares synapomorphic absence of setae *sc1* and bothridia with females of *Eotarsonemus* De Leon, 1966 and *Flechtmannus* Moraes, Lindquist & Lofego, 2022, which also could be a result of homoplasy. However, *Maculanemus* shares with *Flechtmannus* also the synapomorphic complete reduction of sejugal apodeme in females. At the same time, female of *Flechtmannus* retains both seta *l''* on femur I and solenidion *φ2* on tibiotarsus I (Moraes *et al.* 2022).

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یک جنس جدید و دو گونه جدید از Tarsonemidae (Acari: Heterostigmata) از پاتاگونیا شیلی

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چکیده

یک جنس و گونهٔ جدید، *Maculanemus chilensis* **gen. nov., sp. nov.** (Acari: Tarsonemidae: Tarsoneminae) و یک گونهٔ جدید *Steneotarsonemus* (*Neosteneotarsonemus*) *patagoniensis* **sp. nov.** بر اساس ماده‌های جمع‌آوری شده در خزه‌ها در پاتاگونیای شیلی توصیف می‌شود. جنس *Steneotarsonemus* برای نخستین بار از شیلی گزارش می‌شود. موقعیت آرایه‌شناسی جنس *Maculanemus* **gen. nov.** و حالات صفات غیر معمول گونه‌های جدید مورد بحث قرار گرفته است.

واژگان کلیدی: هتروستیگماتینا، ناحیهٔ نئوتروپیکال، رده‌بندی، زیرخانوادهٔ Tarsoneminae، بالاخانوادهٔ Tarsonemoidea.

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