



Three new species of *Neoscirula* (Prostigmata: Cunaxidae) from a Tropical dry forest in Jalisco, Mexico

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Abstract

Three new species of cunaxid mites are described and illustrated: *Neoscirula aliciae* **sp. nov.**, *Neoscirula baloghi* **sp. nov.** and *Neoscirula hoffmannae* **sp. nov.** from a tropical dry forest at Chamela Biological Station, Jalisco, Mexico. A key for the species of *Neoscirula* of the world is included.

Key words: Bdelloidea, taxonomy, predatory mites, identification key

Introduction

Members of the family Cunaxidae are free-living predatory mites that are prevalent natural enemies in most agroecosystems, and are especially important in food chains of edaphic systems. Although common in soil, cunaxid mites also live on higher plants, moss, leaf litter, decomposing bark and organic debris, as well as in stored products (Kethley 1982, 1990; May 2001; Muma 1960; Schruft 1971). Their prey consists of small arthropods, mainly Acari and Collembola (Walter & Kaplan 1991).

At present 16 species of *Neoscirula* are known, from China, Ethiopia, Malaysia, New Zealand, Philippines, South Africa and the United States of America: *Neoscirula abraensis*, *N. aspirasi*, *N. bidens*, *N. delareyi*, *N. imperata*, *N. kenworthyi*, *N. luxtoni*, *N. makilingica*, *N. miaofengensis*, *N. natalensis*, *N. ogawai*, *N. proctorae*, *N. putinglupa*, *N. saitoi*, *N. sevidi* and *N. theroni* (Corpuz-Raros 1996; Den Heyer 1977, 1980; Lin & Zhang 1998, 2002; Smiley 1992).

Few taxonomical studies on Mexican cunaxids have been done (Baker & Hoffmann 1948; Smiley 1992) and this is the first taxonomic contribution on Mexican *Neoscirula*.

Materials and Methods

Cunaxid mites were collected from Chamela Biological Station, located at the coast of Jalisco State, Mexico (19° 29' N latitude and 105° 29' W longitude). The climate is warm and subhumid with marked seasonality. The main kind of vegetation (dominant species belong to genera *Lonchocarpus*, *Caesalpinia*, *Croton*, *Jatropha* and *Cordia*) is a tropical dry forest (Bullock 1988; Lott & Atkinson 2002). Monthly samples of litter and soil were taken over a period of one year (July 1991 – June 1992) from two small watersheds. Specimens were extracted from soil and litter using Berlese-Tullgren funnels and mounted in Hoyer's solution. A total of 4,634 cunaxid mites were obtained, belonging to 4 subfamilies, 10 genera and 43 species, from which 31 are new to science. In this paper we deal with the members of *Neoscirula* and describe three new species.

All measurements are from the holotypes and given in micrometers (μm). Dorsal setal designation follows Kethley (1990), because the chaetotaxic system of Grandjean has been adopted in many families in the Prostigmata and it is appropriately applied in the family Cunaxidae (Swift 1996). The following abbreviations are used: Attenuate solenidion (ats); blunt-pointed rod-like solenidion (bsl); small blunt-pointed rod-like solenidion (sbsl); long blunt-pointed rod-like solenidion (lbsl); candle-flame solenidion (cfs); simple tactile setae (sts); microsetae (mst) and attenuate solenidion (ats); hollow dorsoterminal duplex setae (dt); depression tarsi I (dep); trichobothrium (T); peg-like seta (pe); terminal solenidion (tsl) (Fig. 1). All specimens are deposited at Lab. Ecología y Sistemática de Microartrópodos, Departamento de Ecología y Recursos Naturales, Facultad de Ciencias, UNAM.

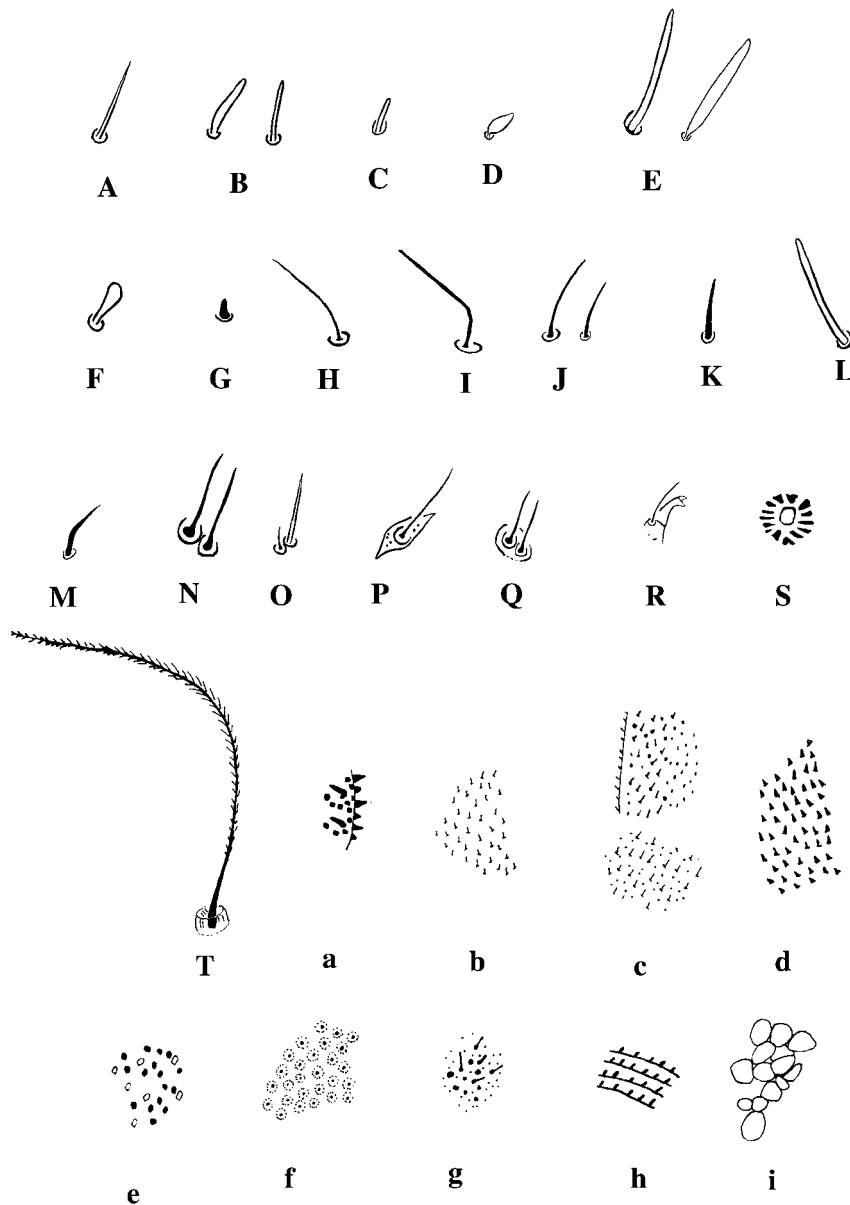


FIGURE 1. A–T & a–i Types of setae and tegument ornamentations A, attenuate solenidion (ats); B, blunt rod-like solenidion (bsl); C, small blunt rod-like solenidion (sbsl); D, candle-flame solenidion (cfs); E, long blunt rod-like solenidion (lbsl); F, thick solenidion; G, thin tubercle; H, simple tactile setae (sts); I, simple tactile bent setae; J, spinelike setae; K, blunt spinelike setae; L, blunt setae; M, spinelike setae with bent appearance; N, setae duplex; O, setae duplex [microsetae (mst) and attenuate solenidium (ats)]; P, simple tactile setae on sclerotized plates with granulate tegument; Q, hollow dorsoterminal duplex setae (dt); R, tibiotarsal claw with two teeth on mesal margin, with bifid appearance; S, depression on tarsus I (dep); T, setose sensillae in cup-shaped pseudostigma. a–g, types of ornamentations: a, stout papillae; b, papillae; c, granulations and fine papillae; d, stout papillae; e, granulate and verrucate; f, small granulations in circular form and stout granulation central; g, finely papillate and granulate; h, papillae-bearing striations; i, subcuticular cells.

Genus *NEOSCIRULA* Den Heyer, 1977

Neoscirula Den Heyer, 1977: 74

Type species: *N. theroni* Den Heyer, 1977: 75

Diagnosis

Dorsum with a weakly-sclerotized propodosomal plate not clearly demarcated by edges, the surface with papillae or granulation, sometimes subcuticular reticulations. Hysterosomal plate sometimes present in males. Integument lateral to the propodosomal plate and dorsal hysterosoma with papillae-bearing striations. One pair of dorsal cupules (*im*) near to f_1, f_2 ; one pair of ventral cupules (*ip*) near h_1 , anal valves, and one pair of cupules (*ih*) at genital valves. Coxal plates I–II may be separate as laterocoxal plates or fused; coxal plates III–IV, are confined to the coxal bases. Medial region of coxae I–II with or without subcuticular cells. Two pairs of anal setae and one pair of paranal setae. Hypognathum is cone-shaped distally and papillate. Four pairs of hypognathal setae, hg_{1-4} , hg_1 is longest and stoutly bent or sometimes thickly elongated. Entomalae with two pairs of small adoral setae. Palps five segmented, ending in claw, and projecting slightly beyond the apex of the hypostome. Trochanter lacks setae; basifemora and telofemora fused but with distinctive suture, dorsally with a simple or spine-like setae on each of these segments. Genua has four simple setae of which the dorsal one is very long, one apophysis may be present. Tibiotarsi have six setae, 2 long dorsal setae, 1 proximiventral and lateral, 2 subterminal ventral, on inner margin simple seta or tubercle-like seta is present. All segments with papillae. Claw with or without a tooth on its mesal margin. Chelicera three segmented and thin at distal part and broad proximally, dorsal cheliceral seta close to chela.

Neoscirula aliciae sp. nov. (Figs. 2–3)

Type-specimens. Holotype (female) and 14 paratypes (females) under slides. 13.X.1991, ex. soil. Watershed 1. A. Rodríguez Palafox and J. A. Gómez Anaya Colls.

Type-locality. MÉXICO: Jalisco, Estación de Biología de Chamela.

Diagnosis. Adults can be distinguished from other members of the genus by the rounded propodosomal plate with verrucate integument, and also by leg chaetotaxy as follows: genua I with 4 ats and 4 sts; tibiae I with 2 bsl and 4 sts; tarsi I with 4 solenidia (2 ats, 2 bsl), 1 depression and 20 sts; tarsi IV with 20 sts.

Description

Female. Body including gnathosoma 325 (n= 15; range 217–424) long and 158 wide

Gnathosoma. *Hypognathum* (Fig. 2A–B) 97 long; distal hypostome funnel-shaped, short and thickly conical and subrectangular in shape basally with membrane or plate on distal portion of hypostome (entomalae) (Fig. 2A); adoral setae lacking. Coxal hypostome, ventral region with papillae (Fig. 1c) and dorsal surface smooth, dorsolateral area with stout papillae (Fig. 1d); 4 pair hypostomal setae (hg_{1-4}), seta hg_1 20, stout bent, hg_{2-4} simple (length 12, 16, 7, respectively); hg_3 on hypostomal shoulder. *Palp* (Figs. 2A–B) with 5 segments, length of palp 61, with papillae ornamentation. Chaetotaxy of segments as follows: Trochanter none; basifemora with 1 dorsolateral spinelike seta; telofemora with 1 dorsolateral bent long and stout spinelike seta; genua with 2 dorsal simple setae and 2 ventral simple setae; tibiotarsi with 2 long and 1 short simple tactile seta ventrally, 1 long and 1 short setae dorsally, 1 tiny tubercle apically on inner margin. Tibiotarsal claw with 2 teeth on mesal margin, of bifid appearance. *Chelicera* (Fig. 2C) 76 long, thin at distal and broad at proximal part; dorsal integument smooth and venter densely covered with fine papillae; cheliceral seta very short, at dorsal region of chela.

Dorsum (Fig. 3H). Propodosoma with round shield and verrucate integument (Fig. 1e), without subcuticular cells; dorsal hysterosoma with papillae-bearing striations. Dorsum of propodosoma with two setose sensillae *vi* and *sci*, 94 and 84 long, respectively; two simple setae *ve* (22) longer than *sce*, stout and simple (13).

Hysterosoma with 7 pairs of simple dorsal setae, c_1 , d_1 and e_1 of equal length (13); f_1 , 21, h_1 , 24 and h_2 and c_2 20. Cupule *im* located laterally and between setae e_1 and f_1 (Fig. 3H).

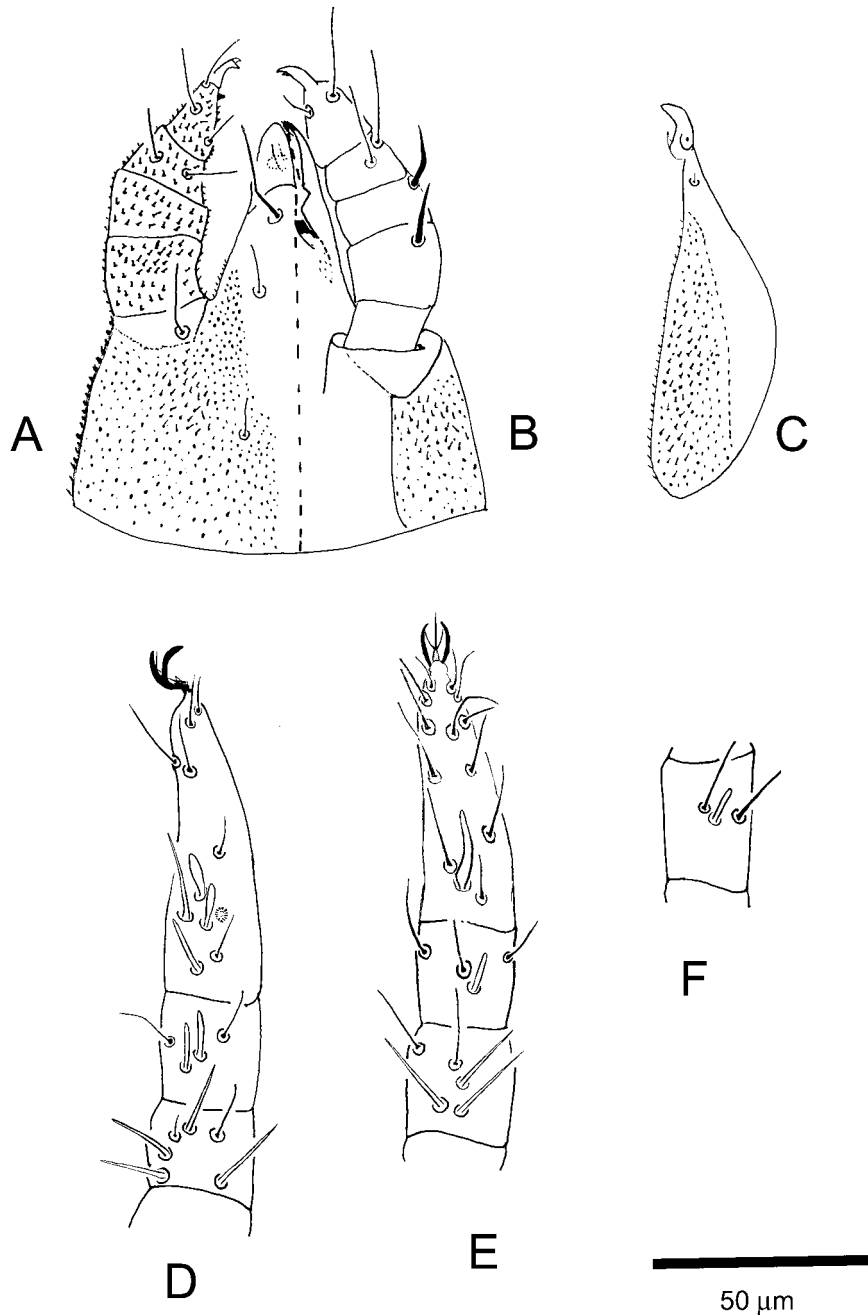


FIGURE 2. *Neoscirula aliciae* sp. nov. female. A, hypostoma ventral view; B, hypostoma dorsal view; C, chelicera; D, genua, tibia and tarsus of left leg I; E, genua, tibia and tarsus of left leg II, dorsal view; F, tibia of leg III, dorsal view.

Venter (Fig. 3G). Coxae I–II and coxae III–IV widely separated, not fused medially, coxae shields weakly sclerotized, with finely granulate rows; papillae-bearing striations between coxae I–II and III–IV and venter (Fig. 1h); 7 pairs of setae located between coxae III–IV. Genital plate with two weakly sclerotized valves and finely granulate rows with four pairs of simple genital setae, g_1 – g_2 arranged longitudinally, internally and g_3 – g_4 laterally, lengths: g_1 – g_2 7, g_3 9, g_4 13. Anal valves weakly demarcated, one pair of paranal setae and two pairs of anal setae 7 (a_1 – a_2). Cupule *ih* is laterally between anal and genital shields.

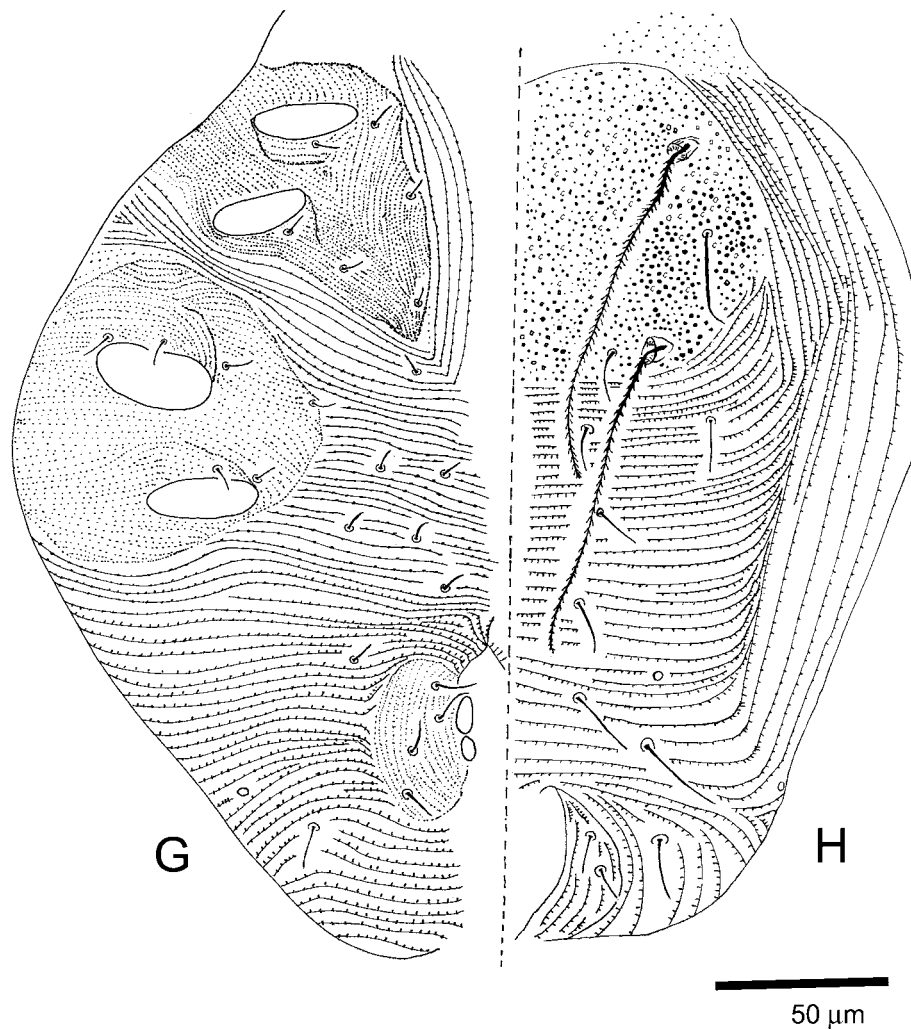


FIGURE 3. *Neoscirula aliciae* sp. nov. female. G, body ventral view; H, body dorsal view.

Legs (Figs. 2D–F). Legs shorter than idiosoma. Length of legs I–IV: 168, 148, 168, 197, all segments with papillae and granulate (Fig. 1c). Tarsi taper gradually, ambulacra borne terminally with two claws and a three-rayed empodium between them (Figs. 2D–F). Chaetotaxy as follows: coxae 3-3-3-3 sts; trochanters 1-1-2-1 sts; basifemora 4-5-3-1 sts; telofemora 5-5-4-3 sts; genua I, 4 ats + 1 mst + 4 sts (Fig. 2D); genua II, 3 ats + 5 sts (Fig. 2E); genua III, 1 ats + 5 sts; genua IV, 2 ats + 5 sts; tibiae I, 2 bsl + 5 sts (Fig. 2D); tibiae II, 1 bsl + 5 sts (Fig. 2E); tibiae III, 1 bsl + 5 sts (Fig. 2F); tibiae IV, 1 T + 4 sts; tarsi I, 4 (2 ats + 2 bsl) + 1 dep + 20 sts (Fig. 2D); tarsi II, 1 long bsl + 20 sts (Fig. 2E); tarsi III, 16 sts; tarsi IV, 20 sts.

Male. Unknown

Etymology. This species is dedicated in memory of M. Sc. Alicia Rodríguez Palafox.

Discussion. This species resembles *Neoscirula sevidi* (Den Heyer, 1977) by having several characters in common: a funnel-shaped hypostome that is short and thick and the coxal region subrectangular in shape; the hypostomal setae hg_1 stout and bent; palpal basifemora with spine-like setae; dorsal cheliceral setae very short; dorsal hysterosoma with setae h_2 present; ventrally with 7 pairs of simple setae between coxae III–IV; and coxal plates I–II widely separated, not fused medially, without subcuticular cells and with papillae-bearing, striated integument. *N. aliciae* sp. nov. can be separated from *N. sevidi* by: propodosomal plate with verrucate integument (the propodosomal plate bears randomly distributed papillae in *N. sevidi*), palpal tibiotarsal claw with a tooth on mesal margin claw (simple claw in *N. sevidi*), the distal hypostomal region covered dor-

solaterally with a membrane (Fig. 2A) (without membrane in *N. sevidi*), palpal telofemora with 1 thick spine-like and bent setae (normal in *N. sevidi*), and chaetotaxy of genua IV and tarsi II (2 ats, 5 sts; 1 ats, 20 sts, respectively), but in *N. sevidi* there are 1 ats, 5 sts in genua IV and 1 bsl, 1 dt, 1 tsl, 21sts in tarsi II.

***Neoscirula baloghi* sp. nov. (Figs. 4–6)**

Type-specimens: Holotype (female) and 7 paratypes (4 females/ 3 males) under slides. 22.IX.1991, ex. soil. Watershed 4. A. Rodríguez Palafox and J. A. Gómez Anaya Colls.

Type-locality: MÉXICO, Jalisco, Estación de Biología de Chamela.

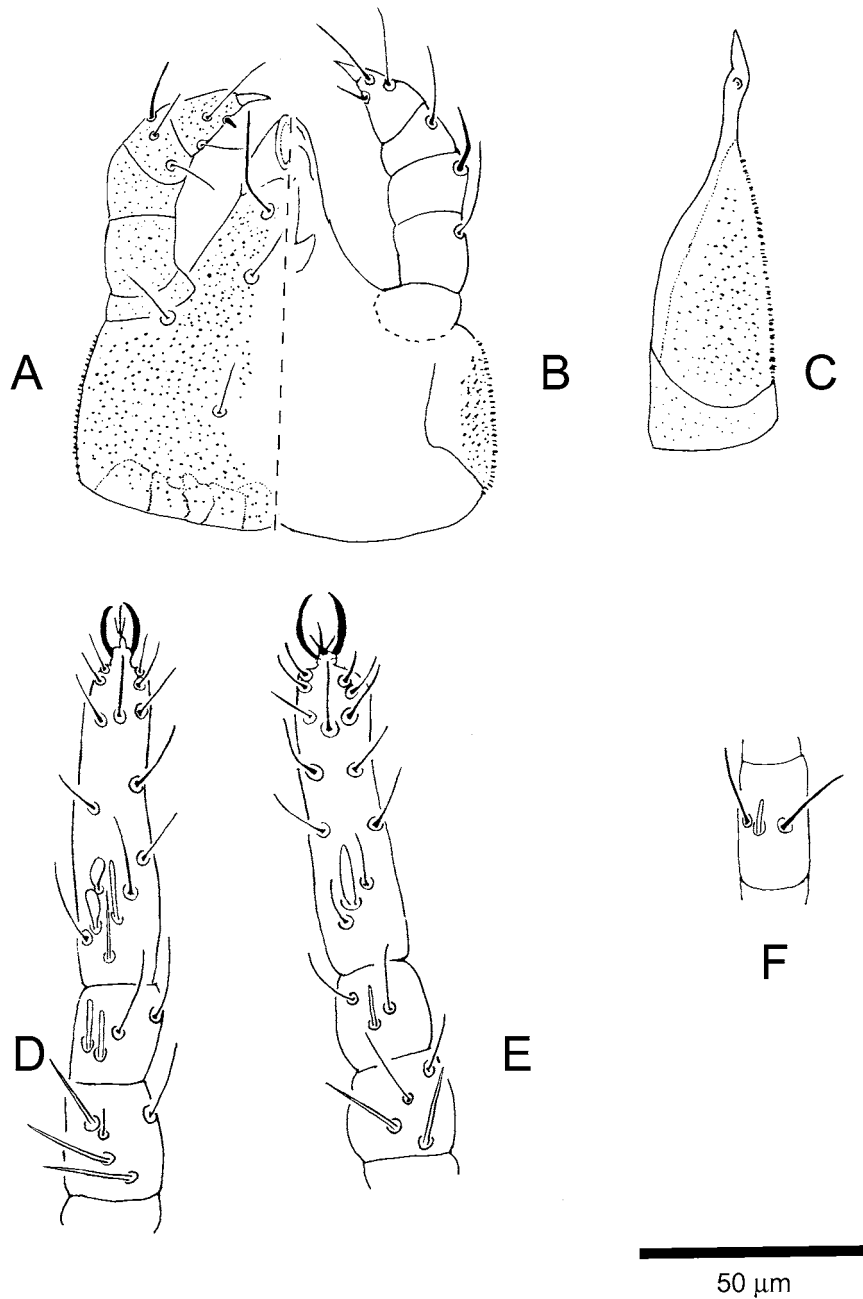


FIGURE 4. *Neoscirula baloghi* sp. nov. female. A, hypostoma ventral view; B, hypostoma dorsal view; C, chelicera; D, genua, tibia and tarsus of left leg I, dorsal view; E, genua, tibia and tarsus of left leg II, dorsal view; F, tibia of left leg III, dorsal view.

Diagnosis

Neoscirula baloghi sp. nov. is distinctive by the lack of cheliceral setae. The oval propodosomal plate is densely covered with granulations and fine papillae (Fig. 1c). The dorsal setae c_1 , c_2 , d_1 , e_1 , f_1 and h_1 on sclerotized plates with granulate integument. Chaetotaxy of taxonomically important leg-segments: coxae I–IV 3-4-3-3 sts; genua I, 3 ats + 4 sts + 1 mst; genua II, 2 ats + 4 sts; genua IV, 1 ats + 4 sts; tibiae I, 2 bsl + 5 sts; tarsi I, 4 s (1 ats + 3 bsl).

Description

Female. Body including gnathosoma 355 (n= 5; range 385–316) long and 197 wide

Gnathosoma. *Hypognathum* 91 long; distal hypostome funnel-shaped, short and conical, coxal region subrectangular in shape, basally with one row of subcuticular reticulations. Hypostome with membrane on distal portion (entomalae) (Fig. 4A); Adoral setae lacking. Coxal hypostome, ventral region with granulae (Fig. 1e), dorsal surface smooth and dorsolateral area with stout papillae (Figs. 1a, 4B); 4 pair hypostomal setae (hg_{1-4}), seta hg_1 (21), longer and bent setae; hg_{2-4} simple (length 11, 10, 9 respectively); hg_3 on hypostomal shoulder (Fig. 4A). *Palp* (Figs. 4A–B) with 5 segments, length of palp 55, with granulated and papillated ornamentation. Chaetotaxy of segments as follows: Trochanter none; basifemora with 1 dorsolateral simple long seta, telofemora with 1 dorsolateral large stout spinelike seta with bent appearance; genua with 1 dorsolateral long simple seta and 3 ventral simple setae; tibiotarsi with 1 long and 1 short simple tactile seta ventrally, 2 long and 1 short setae dorsally, 1 tiny tubercle apically on inner margin. Tibiotarsi with a stout large claw. *Chelicerae* (Fig. 4C) 79 long, thin at distal end and proximally broad; integument dorsally smooth and ventrally densely covered with granulae and fine papillae; the cheliceral setae absent.

Dorsum. Propodosoma with oval shield; with granulae and fine papillae (Fig. 1c) and without subcuticular cells. Dorsal hysterosoma with papillae-bearing striations. The dorsum of propodosoma has two setose sensillae vi and sci (103 and 96 long, respectively); two simple setae, ve (29) longer than sce simple setae (16). Hysterosoma with 6 pairs of simple dorsal setae, c_1 , d_1 and e_1 of equal length (14); c_2 , 16; f_1 , 22 and h_1 , 25. Those setae are on sclerotized plates with granulate integument. Cupules im located laterally to seta e_1 (Fig. 5G).

Venter (Fig. 5H). Coxae I–II forming strong sternal shield with posteromedially portion rounded, coxal shields weakly sclerotized with subcuticular cells (Fig. 1i) and finely granulate; between III–IV and venter with papillae-bearing striations (Fig. 1h) and 4 pairs of setae located between coxae III–IV. Genital region with two weakly sclerotized valves finely granulated; each with four pairs of simple genital setae in a row; g_1 – g_3 9, g_4 8 long. Anal valves weakly demarcated, 1 pair of paranal setae, 2 pairs of anal setae 12 (a_1 – a_2). Cupules ip are laterally between anal and genital shields. Cupules ih terminally and laterally to anal valves.

Legs. Shorter than idiosoma. Length of legs I–IV: 185, 160, 170, 193. All segments with fine papillae and granulated (Fig. 1g). Tarsi blunt apically, ambulacra borne terminally with two claws and a three-rayed empodium between them. Chaetotaxy of the legs is as follows: coxae 3-4-3-3 sts; trochanters 1-1-2-1 sts; basifemora 4-4-3-1 sts; telofemora 5-5-4-3 sts; genua I, 3 ats + 1 mst + 4 sts (Fig. 4D); genua II, 2 ats + 4 sts (Fig. 4E); genua III, 1 ats + 4 sts; genua IV, 1 ats + 4 sts; tibiae I, 2 bsl + 5 sts (Fig. 4D); tibiae II, 1 bsl + 5 sts (Fig. 4E); tibiae III, 1 bsl + 5 sts (Fig. 4F); tibiae IV, 1 T + 4 sts; tarsi I, 4 (1 ats + 3 bsl) + 1 dep + 20 sts (Fig. 4D); tarsi II, 1 bsl + 20 sts (Fig. 4E); tarsi III, 20 sts; tarsi IV, 18 sts.

Male (Figs. 6I–M). Body length 245 (n= 3; range 246–245) long and 138 wide

Gnathosoma identical to female except for the following: smaller hypognathum, pedipals and chelicerae 77, 43, 64 long respectively. Dorsum with idiosomal shield, dorsal tegument with fine papillae (Fig. 1b); idiosomal plate with 9 pairs simple dorsal setae, ve , sce , c_1 , c_2 , d_1 , e_1 , f_1 and two setose sensillae vi and sci ; cupules ip located on dorsal shield laterally to setae f_1 into the dorsal plate (Fig. 6I).

Venter (Fig. 6J) coxae I–IV with papillae-bearing striations; with subcuticular cells nearly coxae I–IV; between III–IV 4 pairs of setae. Round genital valves adjacent to anal shields (Fig. 6J).

Legs (Figs. 6K–M). Length of legs I–IV: 131, 126, 131, 137. Chaetotaxy differs from females as follows: basifemora 2-2-1-0 sts; telofemora 4-5-4-3 sts; genua IV, 1 ats + 4 sts; tarsi I 4 (1 ats + 1 cfsl + 1 bsl + 1 lbsl) with 2 pairs dt (Figs. 1Q; 6K); tarsi II, 1 lbsl (Fig. 6L); and tarsi II–IV with only 18-16-14 sts. Tarsi I with two pairs of hollow dorsoterminal duplex setae (dt) (Fig. 6K).

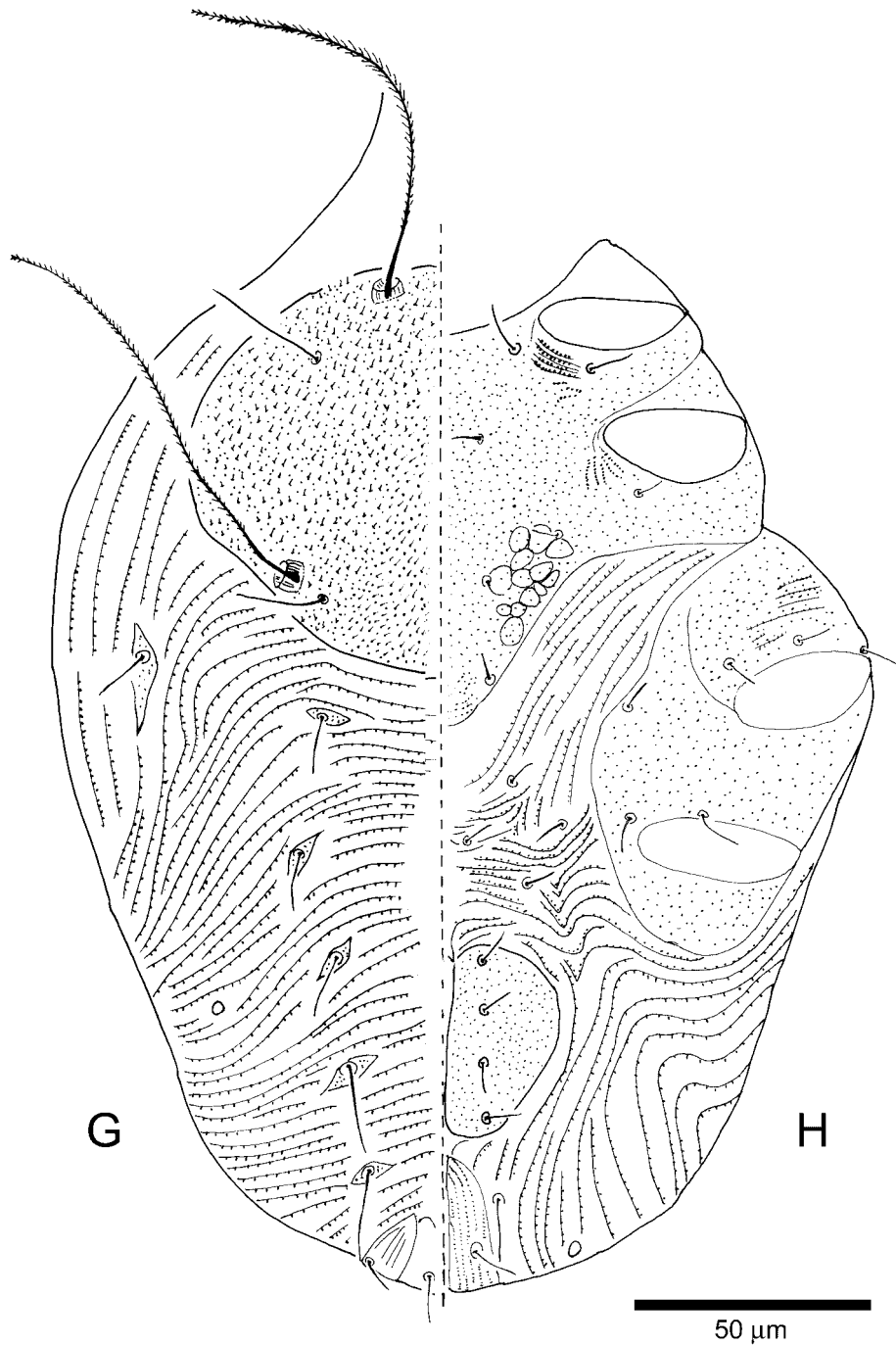


FIGURE 5. *Neoscirula baloghi* sp. nov. female. G, body dorsal view; H, body ventral view.

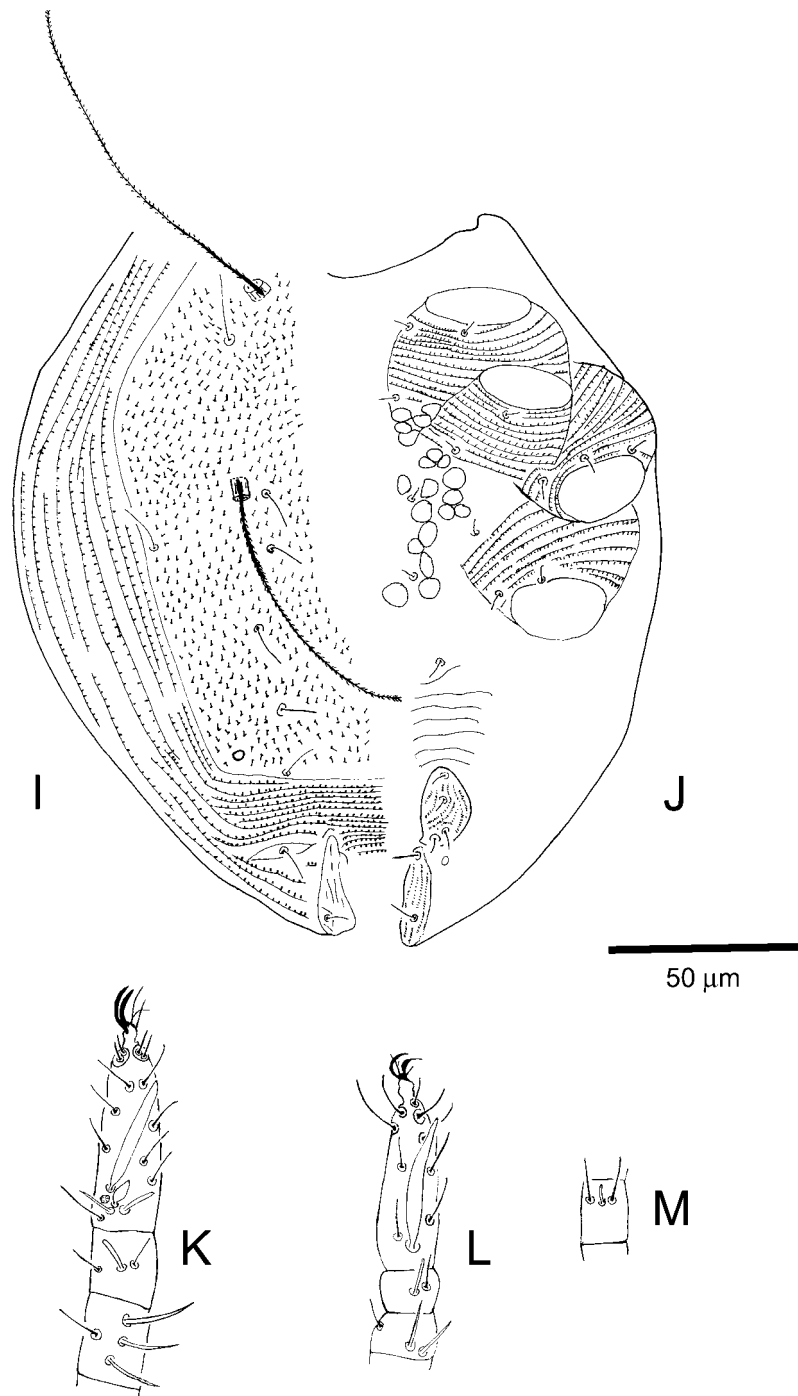


FIGURE 6. *Neoscirula baloghi* sp. nov. male. I, body dorsal view; J, body ventral view; K, genua, tibia and tarsus of left leg I, dorsal view; L, genua, tibia and tarsus of left leg II, dorsal view; M, tibia of left leg III, dorsal view.

Etymology. This species is dedicated to the Hungarian acarologist János Balogh for his contribution to the taxonomy of the oribatid mites of the world.

Discussion. *N. baloghi* sp. nov. resembles *N. delareyi* (Den Heyer, 1980) by the short conical funnel-shaped hypostome; coxal region being subrectangular; tibiotarsi with a stout large claw. tibiotarsi with 2 simple ventral setae and one apical tubercle at inner margin. palpal telofemora with 1 dorsolateral long stout and bent spinelike seta; propodosoma with oval shield without subcuticular cells and the chaetotaxy of leg seg-

ments (trochanter I–IV, with 1-1-2-1 sts; basifemora I–IV with 4-4-3-1 sts; tibiae II with 1 sts and 5sts). *N. baloghi* **sp. nov.** is distinguished from *N. delareyi* by the hypostome with membrane on distal portion (entomalae) and the ventral hypognathum with granulae and stout papillae; dorsal surface smooth and dorso-lateral area with granulae and stout papillae. Setae hg_1 long and clearly bent. Cheliceral setae lacking in *N. baloghi* **sp. nov.** but present in *N. delareyi* Coxae I–II forming strong sternal shield with posteromedial portion rounded; venter with papillae-bearing striations and 4 pairs of setae located between coxae III–IV whereas in *N. delareyi* coxal plates I–II widely separated, not fused medially, with 6 pairs of setae between coxae III–IV.

The male differs from the female in having one dorsal plate which includes the propodosoma and metapodosoma, it lacks the sternal plate and the genital plate is small and located close to the anal plate.

Neoscirula hoffmannae **sp. nov.** (Figs. 7–8)

Type-specimens: Holotype (male) and 2 paratypes (males) under slides. 12.I.1992, ex. soil. Watershed 1. A. Rodríguez Palafox and J. A. Gómez Anaya Colls.

Type-locality: MÉXICO: Jalisco, Estación de Biología de Chamela.

Diagnosis. *Neoscirula hoffmannae* **sp. nov.** is distinguished from other species by the blunt cheliceral seta; hypognathum with granulate integument and fine papillae and with striae medially between hg_3 and hg_4 setae; hypostome base round; venter with 3 pairs of simple setae between coxae II–IV. Some leg segments differ in chaetotaxy as follows: telofemora I–IV with 5-5-5-3 sts; tarsi II with 1bsl and 19 sts.

Description

Male. Body including gnathosoma 325 (n= 3; range 315–305) long and 158 wide

Gnathosoma. *Hypognathum* (Fig. 7A–B) 95 long; distal hypostome funnel-shaped short and thickly conical and coxal region basally round in shape, with membrane on distal portion (entomalae) (Fig. 7B); adoral setae lacking. Ventral and dorsal hypostome with granulations and fine papillae; 4 pairs of hypostomal setae (hg_{1-4}), seta hg_1 20, thickly bent; hg_{2-4} simple (12, 16, 7 long); hg_3 bent, on hypostomal shoulder (Fig. 7B). *Palp* (Figs. 7A–B) with 5 segments, length of palp 66, with papillate ornamentation. Chaetotaxy as follows: Trochanter none; basifemora with 1 dorsolateral spine-like seta; telofemora with 1 dorsolateral spine-like seta; genua with 2 dorsal spine-like setae and 2 ventral simple setae; tibiotarsi with 1 dorsal apical long thick spine-like seta, 1 dorsolateral long simple setae, 2 ventral setae (1 stout spine-like seta and 1 basal long simple seta), 2 simple setae apical on inner margin. Tibiotarsi with stout large claw. *Chelicera* (Fig. 7C) 82 long, thin at distal and broad at proximal part; dorsal integument smooth and venter densely covered with fine papillae; chelicera with 1 long blunt setae (Fig. 7C).

Dorsum. *Propodosoma* (Figs. 8G) with rounded shield, small circular granulations and stout central granulations (Fig. 1f); integument without subcuticular cells and dorsal hysterosoma with papillae-bearing striations. Dorsum of propodosoma with two setose sensillae *vi* and *sci* (97 and 87 long respectively); two simple setae *ve* (21) longer than *sce* stout simple setae (15). Hysterosoma with 8 pairs simple dorsal setae, c_1 , d_1 , e_1 and c_2 , h_2 of equal length (10); f_1 and f_2 , 16 and h_1 , 20. Cupules *im* located laterally between setae *e* and *f* (Fig. 8G). Hysterosomal setae on sclerotized plates with smooth tegument.

Venter (Fig. 8H). Coxae I–II not fused medially and III–IV widely separated, coxal shields weakly sclerotized and with papillae-bearing striations; between coxae III–IV and venter papillae-bearing striations; 3 pairs of setae located between coxae III–IV. Genital region with two valves, weakly sclerotized with small granulations in circular form and stout granulation centrally, four pairs of simple genital setae in a line, g_1 - g_2 5, g_3 - g_4 8 long. Anal valves weakly demarcated, one pair of paranal setae and two pairs of anal setae 10 (a_1 - a_2). Cupules *ih* are located terminally between anal and genital valves.

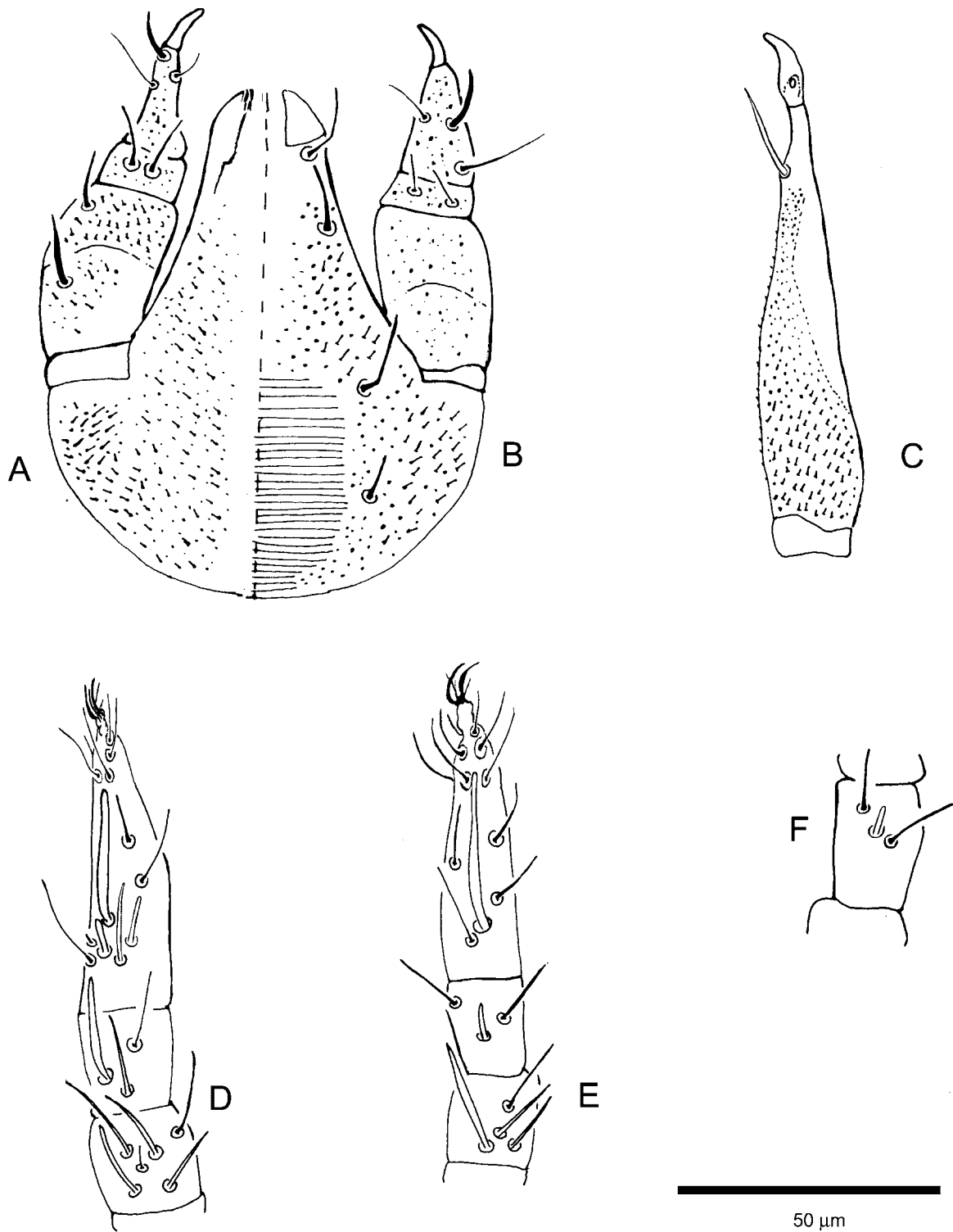


FIGURE 7. A–H. *Neoscirula hoffmannae* sp. nov. male. A, hypostoma dorsal view; B, hypostoma ventral view; C, chelicera; D, genua, tibia and tarsus of left leg I, dorsal view; E, genua, tibia and tarsus of left leg II, dorsal view; F, tibia of left leg III, dorsal view.

Legs. Legs shorter than idiosoma. Length of legs I–IV: 134, 124, 136, 139, all segments with granulations and fine papillae. Tarsi taper gradually, ambulacra borne terminally with two claws and a three-rayed empodium between them. Chaetotaxy as follows: coxae 3-3-3-3 sts; trochanters 1-1-2-1 sts; basifemora 2-2-1-0 sts;

telofemora 5-5-5-3 sts; genua I, 4 ats (3 ats, 1bsl) 1 mst + 4 sts (Fig. 7D); genua II, 3 (2 ats, 1 bsl) + 5 sts (Fig. 7E); genua III, 1 ats + 5 sts; genua IV, 1 ats + 5 sts; tibiae I, 2 (1 ats, 1 bsl) + 5 sts (Fig. 7D); tibiae II, 1 sbsl + 5 sts (Fig. 7E); tibiae III, 1 sbsl + 5 sts (Fig. 7F); tibiae IV, 1 T + 4 sts; tarsi I, 4 (1 ats + 2 bsl, 1 lbsl) + 1 mst + 20 sts (Fig. 7D); tarsi II, 1 lbsl + 19 sts (Fig. 7E); tarsi III, 16 sts; tarsi IV, 14 sts.

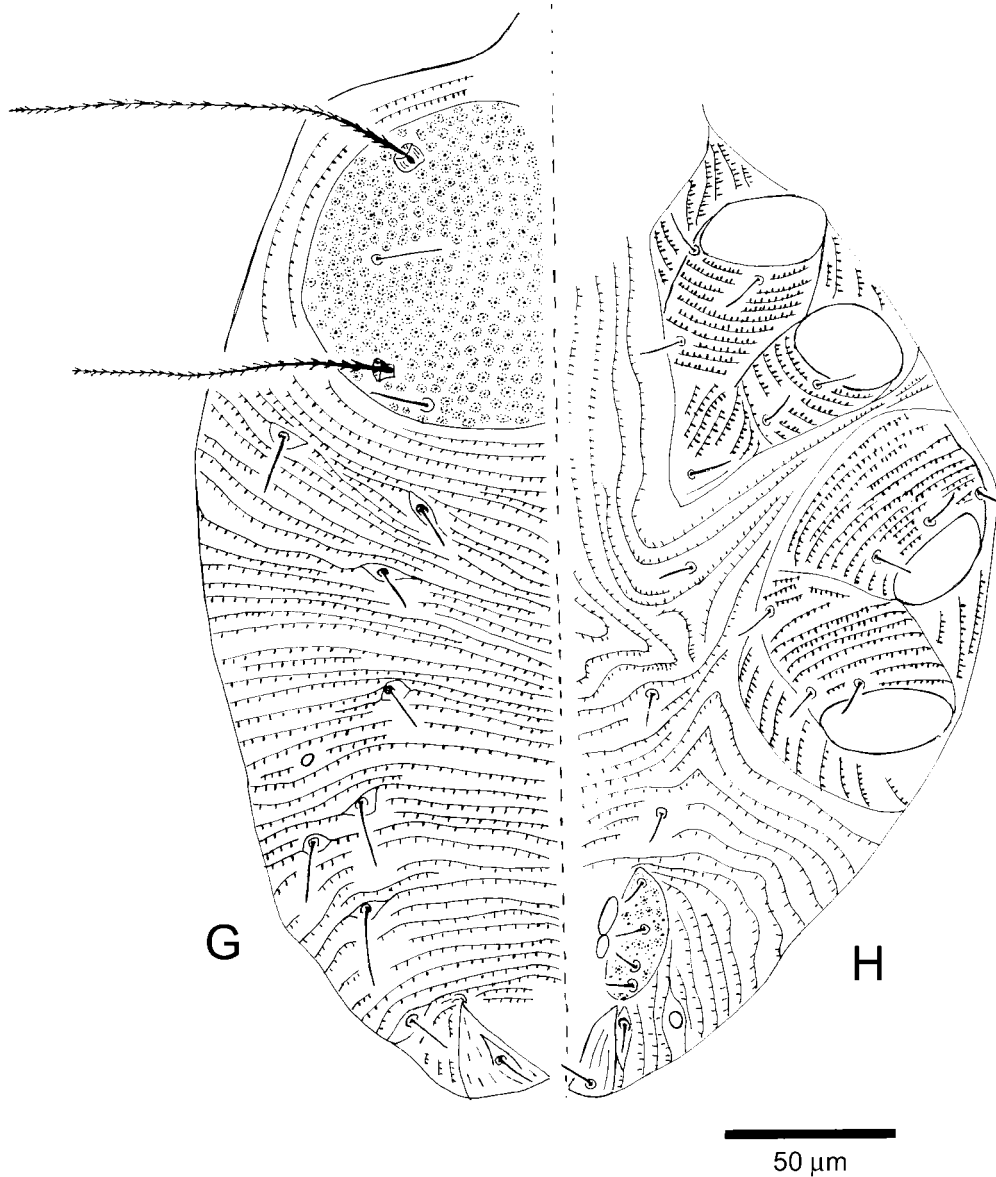


FIGURE 8. *Neoscirula hoffmannae* sp. nov. male. G, body dorsal view; H, body ventral view.

Female. Unknown

Etymology. This species is dedicated to Dr. Anita Hoffmann for her contribution to Mexican Acarology.

Discussion. *N. hoffmannae* sp. nov. resembles *N. sevidi* (Den Heyer 1977) and *N. delareyi* (Den Heyer 1980) by the palpal tibiotarsi possessing a stout large claw; palpal basifemora stout spine-like seta; all dorsal hysterosomal setae on sclerotized plates; subcuticular cells on propodosomal shield absent; coxal plates I–II widely separated. The leg chaetotaxy is similar because they present: genua III–IV with 1 ats + 5 sts; tibiae I with 2 ats + 5 sts; tibiae II with 1ats + 5 sts. The new species is distinguished from *N. sevidi* and *N. delareyi* by

the coxal region of the hypognathum basally rounded (versus subrectangular in the other two species). In *N. hoffmannae* **sp. nov.** the chelicerae have 1 long blunt setae but in *N. sevidi* the cheliceral seta is very short and simple and in *N. delareyi* it is longer and thin. The propodosomal plate in *N. hoffmannae* **sp. nov.** is rounded with small circular granulations and central ornamentation and the venter has 3 pairs of setae located between coxae III–IV, in contrast in *N. delareyi* the propodosomal plate is rectangular with papillae and finely granulate integument and the venter has 6 pairs of setae between coxae III–IV, and in *N. sevidi*, the propodosomal plate is oval and with randomly distributed papillae. The diagnostic chaetotaxy of legs in *N. hoffmannae* **sp. nov.** is as follows: basifemora I–IV with 2-2-1-0; telofemora III, 5; genua I with 4 ats (3 ats, 1bsl) 1 mst, 4 sts; tarsi II with 1 lbsl, 19 sts and tarsi IV with 14 sts (versus basifemora I–IV with 4-4-3-1; telofemora III–IV, 4; genua I with 3 ats, 1bsl, 1 mst, 5 sts; tarsi II with 1 lbsl, 12 sts and the tarsi IV with 16 sts in *N. delareyi* and basifemora I–IV with 3-4-3-1; telofemora III, 4; genua I with 4 ats, 5 sts; tarsi II with 1 lbsl, 1 dt, 1 tsl, 21 sts and tarsi IV with 17 sts in *N. sevidi*).

Key to the species of *Neoscirula* from the world

- 1 Coxal plates I–II fused medially in one sternal plate.....2
- Coxal plates I–II widely separated, not fused medially.....5
- 2 Dorsal propodosomal plate oval surface with granulate and fine papillae; cheliceral setae absent; coxae II with 4 setae *N. baloghi* **sp. nov.**
- Dorsal propodosomal plate not oval surface finely or roughly granulate; cheliceral setae present; coxae II with 3 setae3
- 3 Dorsal seta of palpal basifemora thick pine-like; propodosomal plate subcircular..... *N. makilingica*
- Dorsal seta of palpal basifemora simple; dorsum with propodosomal plate ovular or trapezoidal.....4
- 4 Apical seta on inner margin of palpal tibiotarsi claw-like; propodosomal plate ovular and without subcuticular cells; coxal plates I–II fused medially to form one sternal plate with posteromedial portion rounded; ventrally with 4 pairs of simple setae between coxae III–IV *N. ogawai*
- Apical seta on inner margin of palp tibiotarsi simple; propodosomal plate trapezoidal with subcuticular cells; coxal plates I–II fused medially to form one sternal plate with posteromedial portion V-shaped; ventrally with 6 pairs of simple setae between coxae III–IV *N. aspirasi*
- 5 Palpal genua with hooklike apophysis..... *N. natalensis*
- Palpal genua without hooklike apophysis.....6
- 6 Palpal tibiotarsi claw with a tooth on mesal margin, of bifid appearance7
- Palpal tibiotarsi claw without a tooth on mesal margin, simple9
- 7 Funnel-shaped hypostome short and thickly conical; palpal tibiotarsi with 1 simple setae; propodosomal plate round and with verrucate integument; cheliceral setae very short..... *N. aliciae* **sp. nov.**
- Funnel-shaped hypostome short and narrowly conical; palp tibiotarsi with 1 clawlike setae; propodosomal plate trapezoidal and with finely granulate integument; cheliceral setae long8
- 8 Setae *c*₁ shorter (0.25) than *d* and *e*; basifemora II with 6 setae; telofemora I–II 5-5 simple setae; tarsi I with 23 simple setae *N. bidens*
- Setae *c*₁ subequal to *d* and *e*; basifemora II with 4 setae; telofemora I–II 4-4 setae; tarsi I with 24 simple setae *N. luxtoni*
- 9 Palp basifemora with dorsomedial seta thick, spine-like.....10
- Palp basifemora with dorsomedial seta simple.....13
- 10 Hypostome, apical plate-like process present; chelicera with a long, blunt seta. Known from male only
- *N. hoffmannae* **sp. nov.**
- Hypostome, apical plate-like process absent; chelicera with a simple seta 11

- 11 Distal funnel-shaped hypostome long and narrowly conical; telofemora I–II with 4–4 setae.. *N. proctorae*
 - Distal funnel-shaped hypostome short and stoutly conical; telofemora I–II with 5–5 setae.....12
- 12 Propodosomal plate with 6 subcuticular cells on each row..... *N. saitoi*
 - Propodosomal plate without subcuticular cells*N. sevidi*
- 13 Coxal plates I–II without subcuticular cells14
 - Coxal plates I–II with subcuticular cells..... 16
- 14 Propodosomal plate without subcuticular cells *N. imperata*
 - Propodosomal plate with subcuticular cells15
- 15 Hypostome with basal reticulations; ventrally with 7 pairs of simple setae between coxae III–IV
*N. theroni*
 - Hypostoma without basal reticulations, ventrally with 6 pairs of simple setae between coxae III–IV
 *N. abraensis*
- 16 Propodosomal plate with rows of subcuticular cells17
 - Propodosomal plate without rows of subcuticular cells18
- 17 Propodosomal plate with 6 subcuticular cells on each row; setae h_1 absent; setae hg_1 bent; distal hypostome long and narrowly..... *N. kenworthyi*
 - Propodosomal plate with 7 subcuticular cells on each row; setae h_1 present; seta hg_1 not bent; distal hypostome short and stoutly.....*N. puntinglupa*
18. Hypostome setae hg_1 no more than two times as long as setae hg_{2-4} ; coxae II with 3 setae, telofemora I–II with 4–4 setae.....*N. delareyi*
 - Hypostome setae hg_1 more than two times as long as setae hg_{2-4} ; coxae II with 4 setae, telofemora I–II with 5–5 setae..... *N. miaofengensis*

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