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New *Leptogamasus* mite species (Parasitiformes: Parasitidae) from Europe. IV. Austria

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Original research

ABSTRACT

Three new species of Parasitidae are described from Austria, namely *Leptogamasus* (*Leptogamasus*) *chelatus* n. sp., *Leptogamasus* (L.) *coronarius* n. sp. and *Leptogamasus* (L.) *trispinus* n. sp.

Keywords *Leptogamasus* subgenus; mite taxonomy; new species; Lower Austria; Styria; Austrian fauna

Zoobank <http://zoobank.org/AB1B4888-90B6-4AF7-8233-F97E95C29D74>

Introduction

Mites in the genus *Leptogamasus* Trägårdh, 1936, and subgenus *Leptogamasus* s. str., are commonly encountered in forest litter across Europe. Their general features have been outlined in previous papers (Witaliński, 2019; Witaliński, 2020). Nine new species originating from northern and central Italy (Witaliński, 2021a,b) were recently described. In the present study, three *Leptogamasus* (*Leptogamasus*) species from Lower Austria and Styria are described.

Materials and Methods

The research methods applied in the present study were described in detail in the previous paper in this series (Witaliński, 2020). Since the structure of the podonotum in these species is very uniform, it is not described in depth for every species. The material under study was originally collected by the author.

Systematics

Family Parasitidae

Genus *Leptogamasus* Trägårdh, 1936 sensu Juvara-Balș, 1981

Type species *Leptogamasus suecicus* Trägårdh, 1936: 227.

Some taxonomic remarks on the genus and its subgenera were recently published (Witaliński, 2021a).

Leptogamasus (*Leptogamasus*) Trägårdh, 1936

Type species *Leptogamasus suecicus* Trägårdh, 1936: 227.

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***Leptogamasus (Leptogamasus) chelatus* n. sp.**

Zoobank: 78BC7FB9-86DA-4900-9AE1-EB2D95173AAF

(Figures 1–5)

Diagnosis

Female and male — Gnathotectum trispinate with pointed prongs, the central one somewhat longer, the lateral ones slightly divergent; gland pore *gv1* present; podonotum with 21 pairs of setae, opisthonotum with 24 pairs of setae plus either one supplementary pair or to seven supplementary setae; Tr IV without tubercle.

Female — All three prongs of gnathotectum similarly narrow; presternal plates subtriangular, with an irregular posterior margin; anterior margin of the sternal shield slightly concave; gland pores *gv1* located far from one to another, occasionally in an asymmetric arrangement; epigynial shield without teeth on the internal (dorsal) surface, anterior margins nearly straight, a lenticular unpigmented area located subapically; spherules of the endogynium subspherical, well discernible anterior walls of the endogynial sac featuring several small teeth directed axially, stipule usually made up of two parts, the anterior one minute, the posterior one larger and tooth-like, usually curved.

Male — Gnathotectum prongs wider and shorter than in the female; genital lamina with rounded anterior corners and lateral margins running backward convergently; presternal plates subtriangular with small anterior protrusion and posterior margin more or less regularly arcuate; corniculi slim but the adaxial margin partly more sclerotised and sinuous when flattened; cheliceral fixed digit wavy in ventral perspective, in the lateral one narrow and sigmoidal with obliquely cut apex, either edentate or with small tooth between apex and pilus dentilis; laterally, leg II femoral main spur straight and axillary process half-moon shaped, genual and tibial spurs conical, in ventral perspective, the tip of genual spur located closer to the article distal margin than the tibial one.

Description

Female (Figures 1–3)

Idiosoma — Well sclerotised, 540–570 x 295–315 (length x width, n=5), holotype 568 x 314. **Podonotum** — 21 pairs of setae, setae length: 28–31 (*j1*), 27–32 (*j2*), 35–39 (*j3*), 34–38 (*j4*), 30–34 (*j5*), 26–29 (*j6*), 69–73 (*r3*), in holotype 29 (*j1*), 33 (*j2*), 38 (*j3*), 39 (*j4*), 33 (*j5*), 30 (*j6*), 76 (*r3*). **Opisthonotum** (Fig. 1) — 24 pairs of setae, plus one pair of supplementary setae (Fig. 1A), or to seven such setae (Fig. 1B). Setae relatively short, length from ca. 24 to 34, holotype 24–32. Dorsal setae simple, reticulation of the podonotum not discernible, opisthonotum with a scale-like reticulation. **Peritreme** length (including stigma) 123–128, (holotype 127), anterior tip located in the midregion of the opening for Co II, at the level of the podonotal setae *r2*.

Ventral idiosoma — Setae length: 34–39 (*st1*), 38–43 (*st2*), 38–40 (*st3*), 33–35 (*st4*), 31–35 (*st5*), 39–46 (*JVI*), 24–30 (*ZVI*), other opisthogastral setae ca. 19–37, in holotype 47 (*st1*), 42 (*st2*), 38 (*st3*), 37 (*st4*), 33 (*st5*), 38 (*JVI*), 26 (*ZVI*), other opisthogastral setae ca. 24–39. Ventral setae simple, reticulation of the sternum and opisthogaster scale-like. Anterior margin of the sternal shield slightly concave (Fig. 2), the area between the presternal plates and the sternum margin with transverse lines or scale-like reticulation. Presternal plates subtriangular, with irregular posterior margin. The pores *gv1* located far from one another, sometimes in asymmetric arrangement (Figs 2, 3B). Paragynial shields (Figs 2, 3B) metagynial sclerites narrow and arcuate, the internal (dorsal) surface of epigynial shield (Figs 2, 3A) without teeth. The anterior epigynial margins nearly straight, and posterior margin straight, the posterolateral margins short and convex (Figs 2, 3A). Epigynium with subapical unpigmented lenticular area (Fig. 3A). Endogynium (Figs 2, 3C) with subspherical spherules and well discernible anterior walls of endogynial sac featuring several small teeth directed axially (Fig. 3C). Stipule usually made up of two parts, the anterior one minute, the posterior one larger, tooth-like and curved,

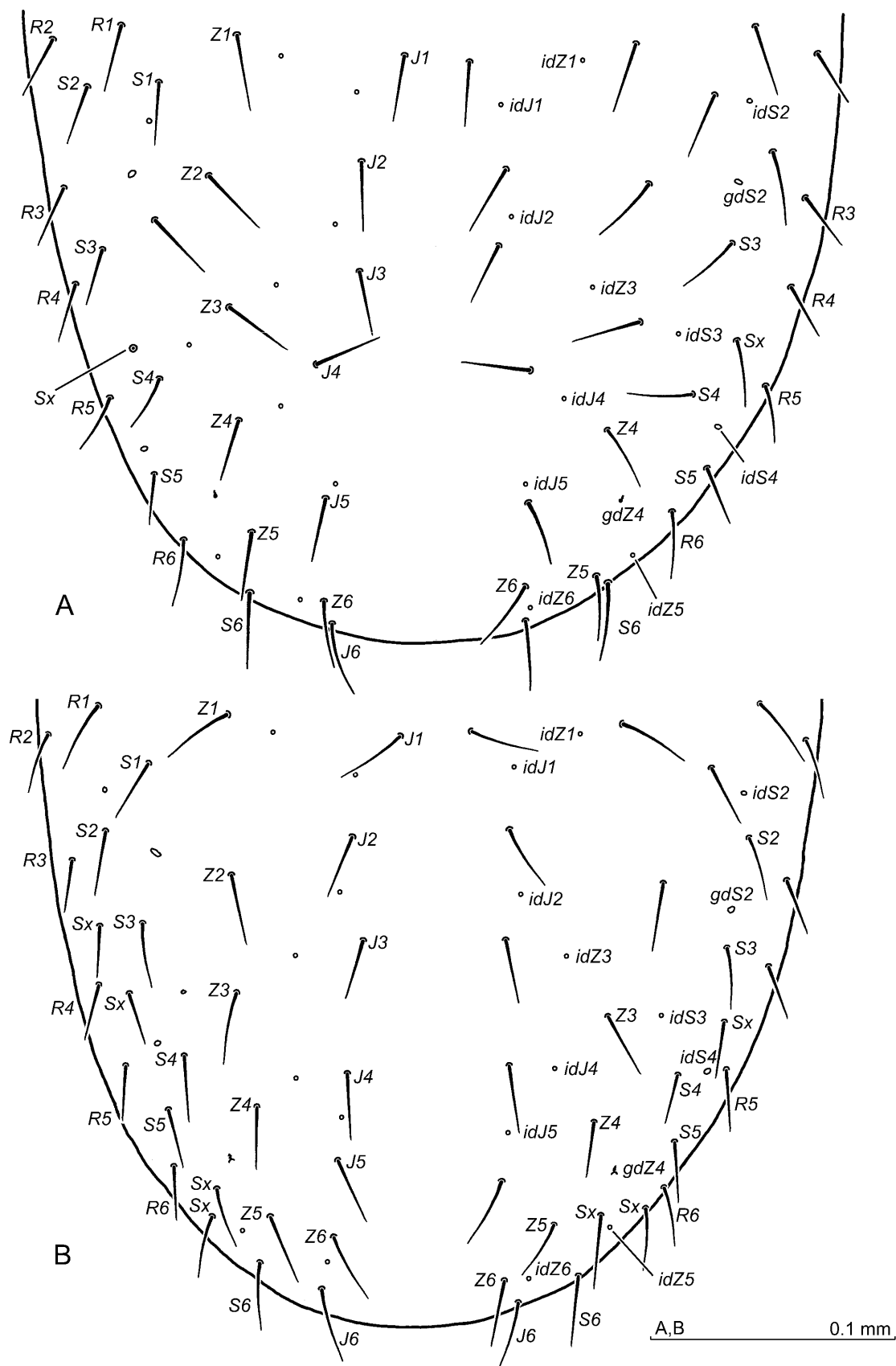


Figure 1 *Leptogamasus (L.) chelatus* n. sp., opisthonotum of the female, two aspects (A – holotype, B – paratype). Regular setae (J, Z, S, R), supplementary setae Sx, pores (idJ, idZ, idS), and gland openings (gdS, gdZ) are marked. Note supplementary Sx setae (two in A and seven in B).

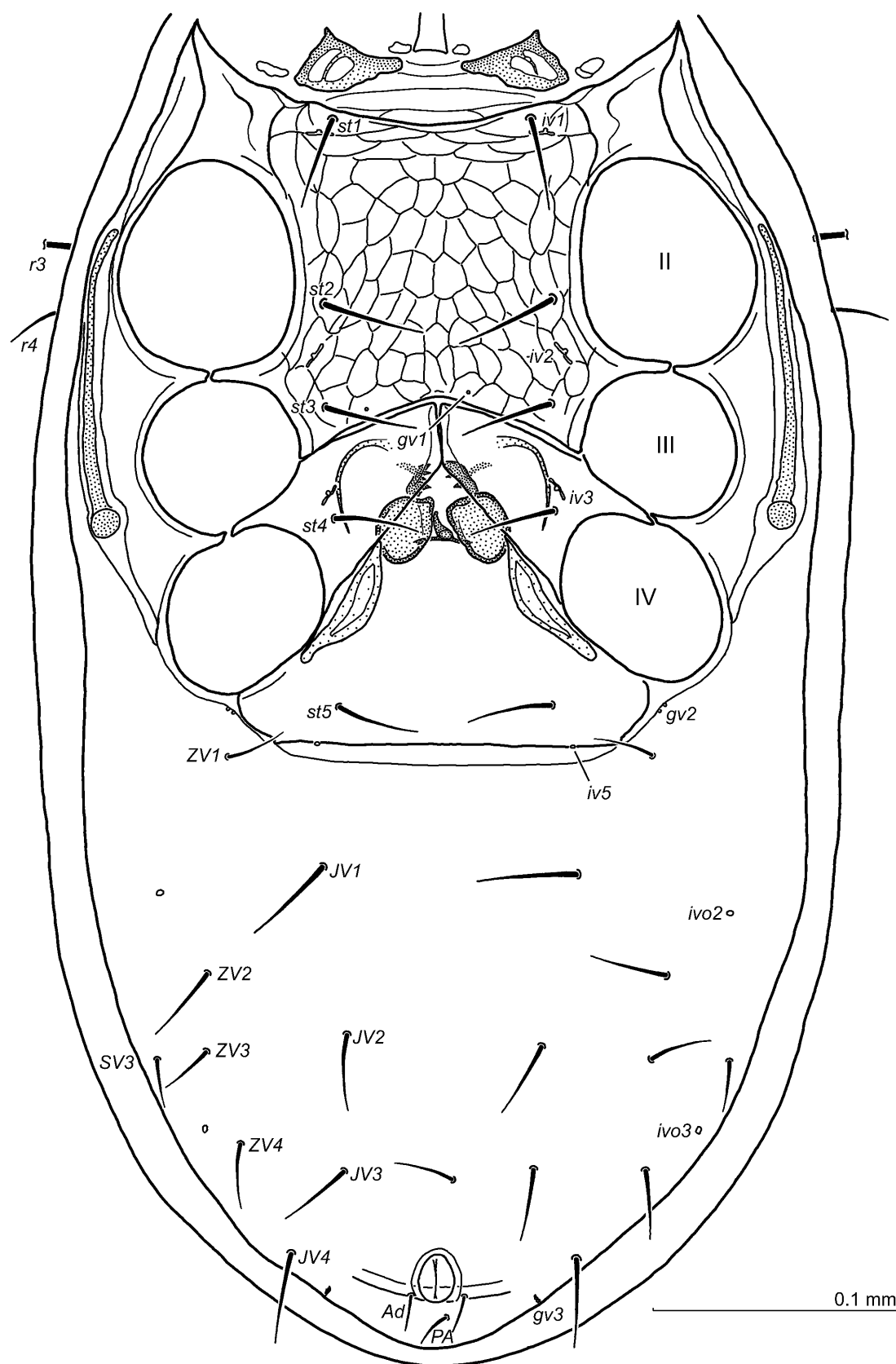


Figure 2 *Leptogamasus (L.) chelatus* n. sp., ventral side of the female idiosoma (holotype). Reticulation of the sternum is shown. Abbreviations: II–IV the openings for coxae II to IV; *Ad* and *PA* adanal and postanal setae, respectively; *gv1*–*gv3* gland openings; *st1*–*st5* sternal setae; *r3*, *r4* podonotal setae; *JV*, *ZV* and *SV* series of opisthogastral setae; *iv1*–*iv3*, *iv5*, *ivo2*, *ivo3* pore openings.

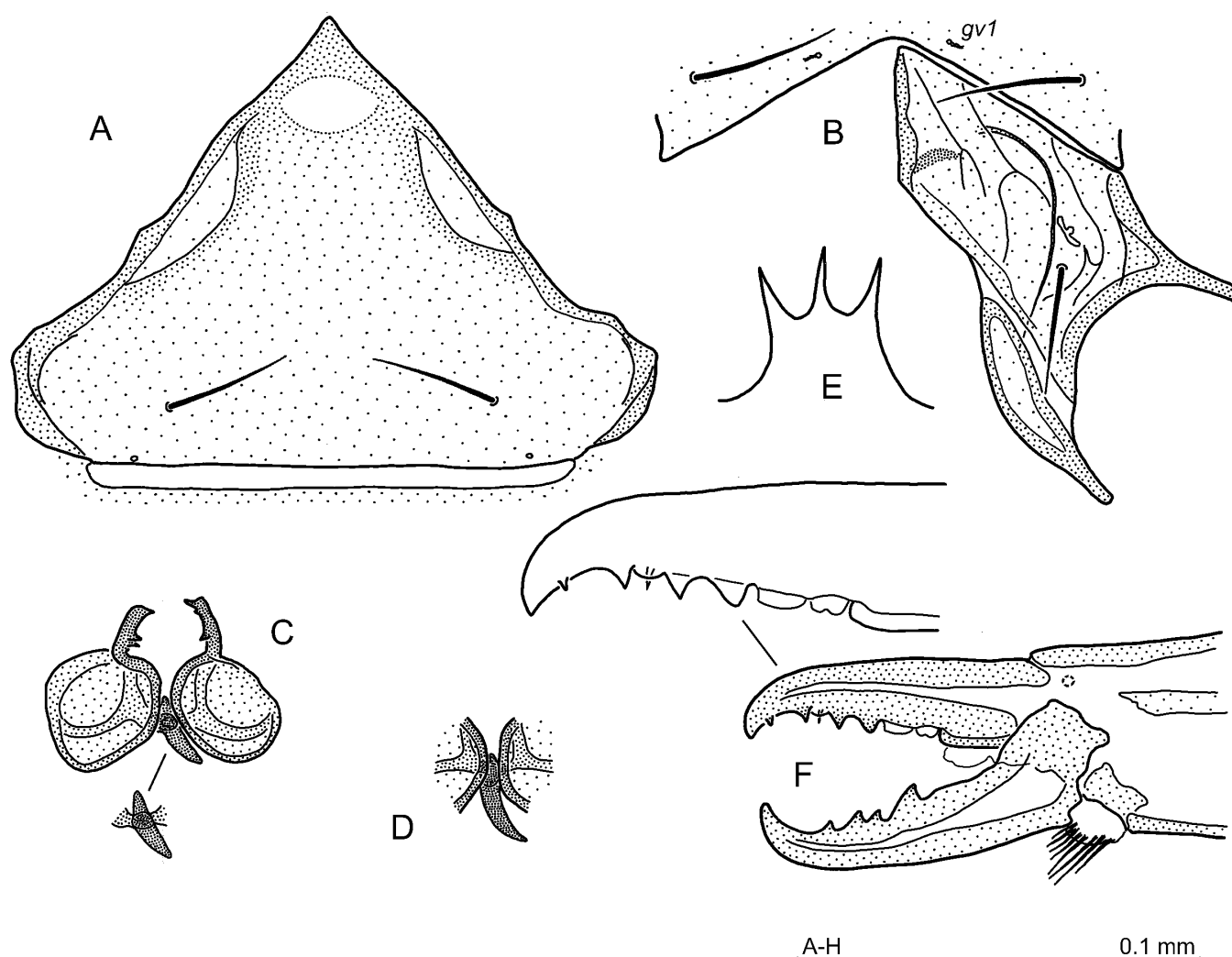


Figure 3 *Leptogamasus (L.) chelatus* n. sp., female: A – epigynum; B – paragynium and sternal posterior margin, note gland openings *gv1*; C – endogynium; D – stipule, another aspect; E – gnathotectum; F – chelicera, adaxially.

usually directed posteriorly (Fig. 3C,D), but sometimes the stipule anterior part is absent (Fig. 2). Gland pores *gv2* with a double opening; *iv5*, *ivo2*, *ivo3* and *gv3* well discernible.

Gnathosoma — Gnathotectum (Fig. 3E) trispinate, with pointed, similarly narrow and moderately long prongs. Corniculi conical, hypostome with 11 rows of denticles, hypostomal and palpcoxal setae simple. Palptrochanter *v1* seta simple, *v2* barbed. Chelicera (Fig. 3F) – movable digit with four teeth, the proximal one larger. Fixed digit with two distant teeth in front of pilus dentilis, and two behind it, followed by two lamellar and one solid edge projections.

Legs — Setae *al1*, *al2* on Fe II short and thick, whereas the anteroventral seta enlarged and barbed. Ti II with thickened and finely barbed ventral setae. Leg IV: posterodorsal and posterolateral setae on the femur thick and short, antero- and posteroventral setae on the tibia thickened, the latter finely barbed. Some ventral and posterolateral setae on the tarsus, as well as the posterolateral seta on the basitarsus thickened and terminally barbed. Tr IV without the dorsal tubercle. Other aspects of legs I–IV unremarkable.

Male (Figures 4, 5)

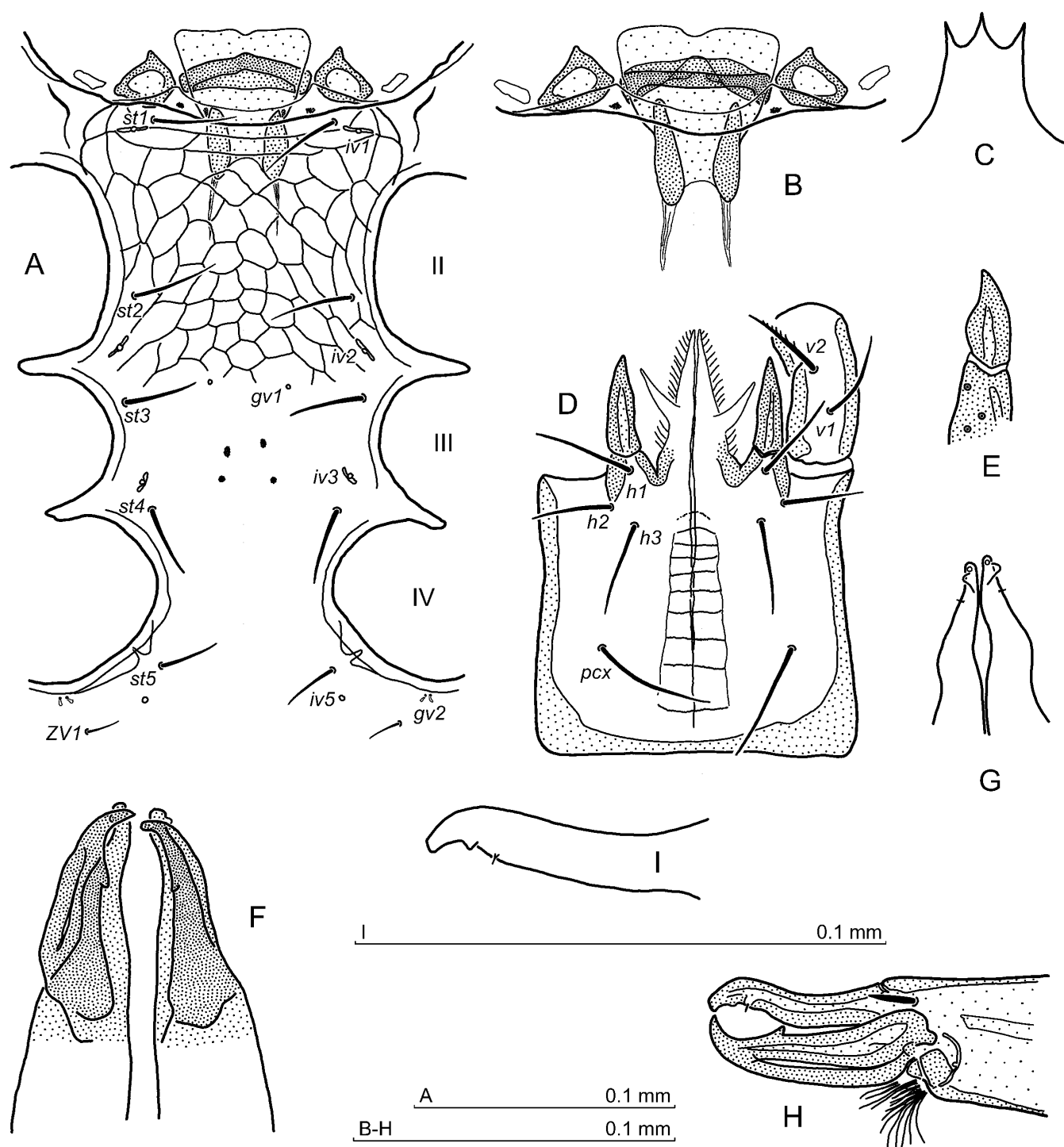


Figure 4 *Leptogamasus (L.) chelatus* n. sp., male: A – presternal plates, genital lamina and sternogenital shield; B – presternal plates and genital lamina; C – gnathotectum; D – gnathosoma, ventrally; E – corniculus, ventrally; F – chelicerae, ventrally; G – cheliceral fixed digits in ventral perspective; H – chelicera, antiaxially; I – fixed digit, another aspect. Abbreviations as in Figure 2, *h1*–*h3* and *pcx* – hypostomatic and palpcoxal setae, respectively, *v1* and *v2* – palp trochanter setae.

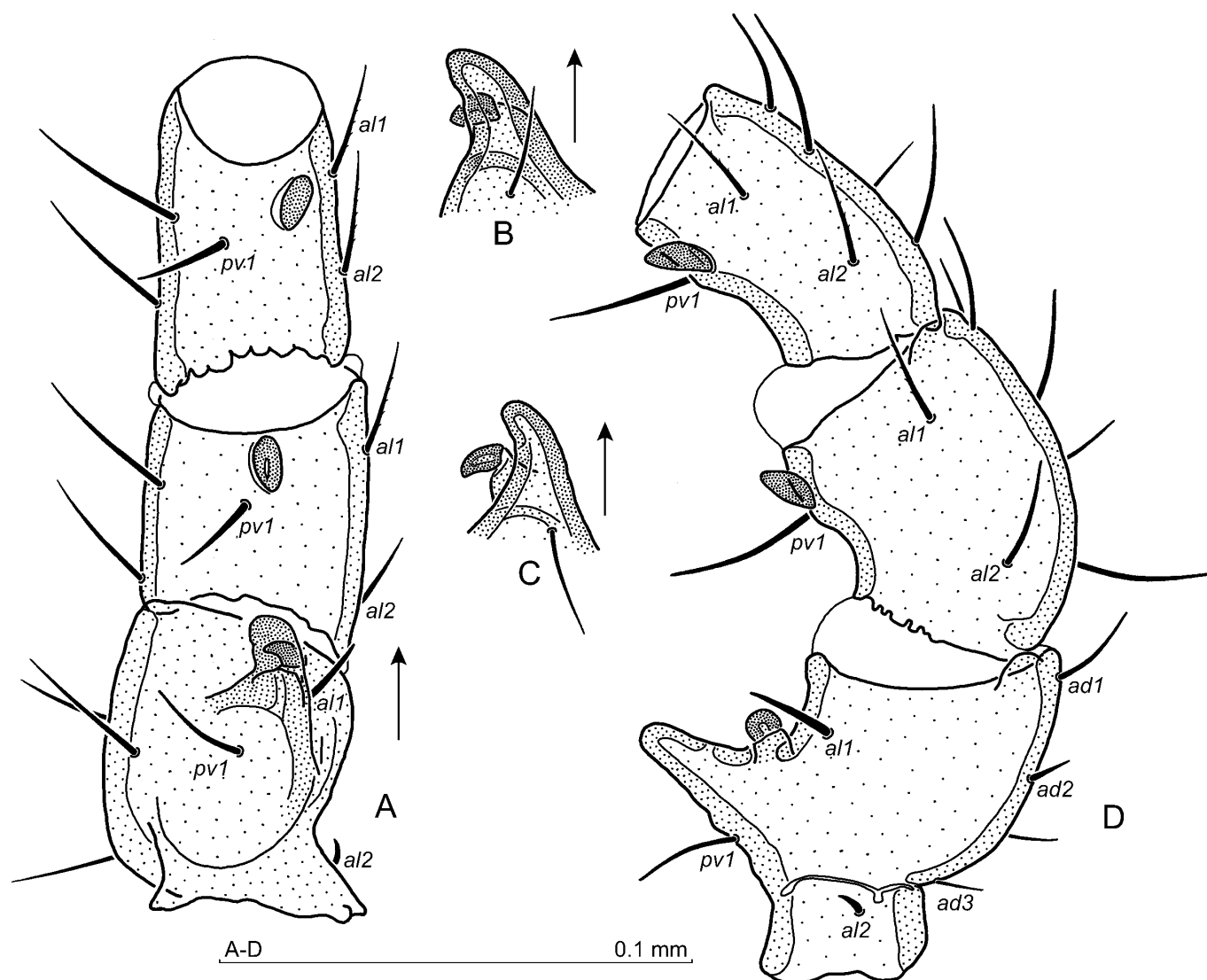


Figure 5 *Leptogamasus (L.) chelatus* n. sp., male: A – Fe II, Ge II and Ti II, ventrally; B, C – two aspects of femoral main spur and axillary process, ventrally; D – Fe II, Ge II and Ti II in the anterolateral perspective. Some setae are marked, arrows at the anterolateral side.

Idiosoma — Sclerotised as in the female, 505–525 x 270–290 μ m (length x width, n=5). **Podonotum** — the length of setae: 22–25 (*j1*), 26–29 (*j2*), 33–38 (*j3*), 33–37 (*j4*), 29–33 (*j5*), 23–25 (*j6*), 65–73 (*r3*). **Opisthonotum** setae length from ca. 22 to 31. **Peritreme** including stigma 114–124 long, ending anteriorly as in the females. Dorsal setae simple, reticulation pattern as in the female.

Ventral idiosoma — Setae length: 29–34 (*st1*), 31–35 (*st2*), 28–32 (*st3*), 26–31 (*st4*), 24–26 (*st5*), 31–35 (*JVI*), 15–20 (*ZVI*), other opisthogastral setae ca. 22–35. Ventral setae simple. **Sternal region** (Fig. 4A) — genital lamina (Fig. 4A,B) with rounded anterior corners, anterior margin straight with small axial concavity and straight to arcuate lateral sides running posteriorly and convergent. Presternal plates subtriangular, with small anterior protrusion and posterior margin more or less regularly arcuate. Sternum (Fig. 4A) with gland pores *gv1* at the *st3* setae level or slightly anterior, followed by two pairs of distinct but small thickenings of the sternal cuticle, the latter located somewhat laterally at the level between *iv3* sternal pores.

Pores *gv2* with a double, hardly discernible opening, pores *iv5* equally distant from setae *st5* and *ZVI*, or slightly shifted toward *st5* setae. Sternum and opisthogaster reticulation scale-like.

Gnathosoma — Gnathotectum (Fig. 4C) prongs shorter than in the female, the lateral ones slightly divergent. Corniculi (Fig. 4D) slim, adaxial margin partly more sclerotised, but when flattened showing a protrusion of the adaxial margin (Fig. 4E). Hypostome with 11 rows of denticles, hypostomatic setae simple, palpcoxal setae simple or finely barbed and somewhat longer than hypostomatics. Palptrochanter *v1* seta simple, *v2* seta barbed. Chelicera (Fig. 4F–I) – in ventral perspective, the movable digits (Fig. 4F) terminally axially curved whereas the fixed digits wavy (Fig. 4F,G). In lateral view (Fig. 4H), the movable digit with one tooth followed by a straight edge, fixed digit narrow and sigmoidal with obliquely cut apex, either edentate or with a small tooth between the apex and pilus dentilis (Fig. 4H,I).

Legs — Ventral seta *v1* of Tr I simple, seta *v2* barbed. Leg II is spurred as follows: when observed from the ventral side (Fig. 5A–C), femoral main spur is finger-shaped and slightly curved posterolaterally, axillary process hooked and pointed posterolaterally, genual and tibial spurs are conical and rounded apically. The genual spur is oriented along the leg axis, whereas the tibial spur is slightly obliquely oriented. Moreover, the latter is more distant from the distal article margin than the genual one. When viewed from the lateral side, leg II (Fig. 5D) shows straight femoral main spur, axillary process half-moon shaped, and spurs on the genu and tibia similarly conical, with somewhat rounded tips. Genual spur apex terminating at the article margin level, whereas the tibial one ends at some distance from the margin level. Most of the setae on leg II are simple, but setae *al1* and *al2* on tibia and *al1* on genu can be finely barbed. Setae *al1*, *al2* and *ad2* on the femur shorter and thicker, whereas *ad3* - needle-like. Anterolateral setae on basitarsus and tarsus thickened and barbed. Leg IV setation as in the female. Tubercle on Tr IV absent. Other aspects of legs I–IV unremarkable.

Material examined

Holotype — Female (slide no. 1910), Waidhofen a.d. Thaya, Lower Austria, 48.8196°N, 15.3583°E, alt. ca. 630 m a.s.l., 12 Nov. 2004, moss under old larches in the spruce forest.

Paratypes – 7 females, 9 males (slides no. 1892 A, 1893 A–C), *ibid*.

Type deposition — The types are deposited in the Zoological Division of the Nature Education Centre, Jagiellonian University, Kraków, Poland.

Etymology

The specific name *chelatus* refers to the peculiar chelicerae with fixed digits, wavy in a ventral view.

Leptogamasus (Leptogamasus) coronarius n. sp.

Zoobank: 5D470E14-341E-41C1-B8C6-C8FDFED60636

(Figures 6–10)

Diagnosis

Female and male — Gnathotectum trispinate with pointed prongs, the central one somewhat longer; gland pore *gv1* present; podonotum with 21 pairs of setae, opisthonotum with 24 pairs of setae plus two pairs of supplementary setae, in holotype female one seta *S5* is missing; Tr IV without tubercle.

Female — Gnathotectum prongs narrow; presternal plates subtriangular, with convex posterior margin; anterior margin of the sternal shield slightly concave; gland pores *gv1* located axially not far from one another; epigynial shield bears two small teeth on the internal (dorsal) surface, anterior margins almost straight; spherules elongated, V-like oriented, stipule crown-shaped, with many teeth.

Male — Gnathotectum prongs short, triangular; genital lamina with the anterior margin concave, and the lateral ones convex, the anterior corners rounded; presternal plates subrect-

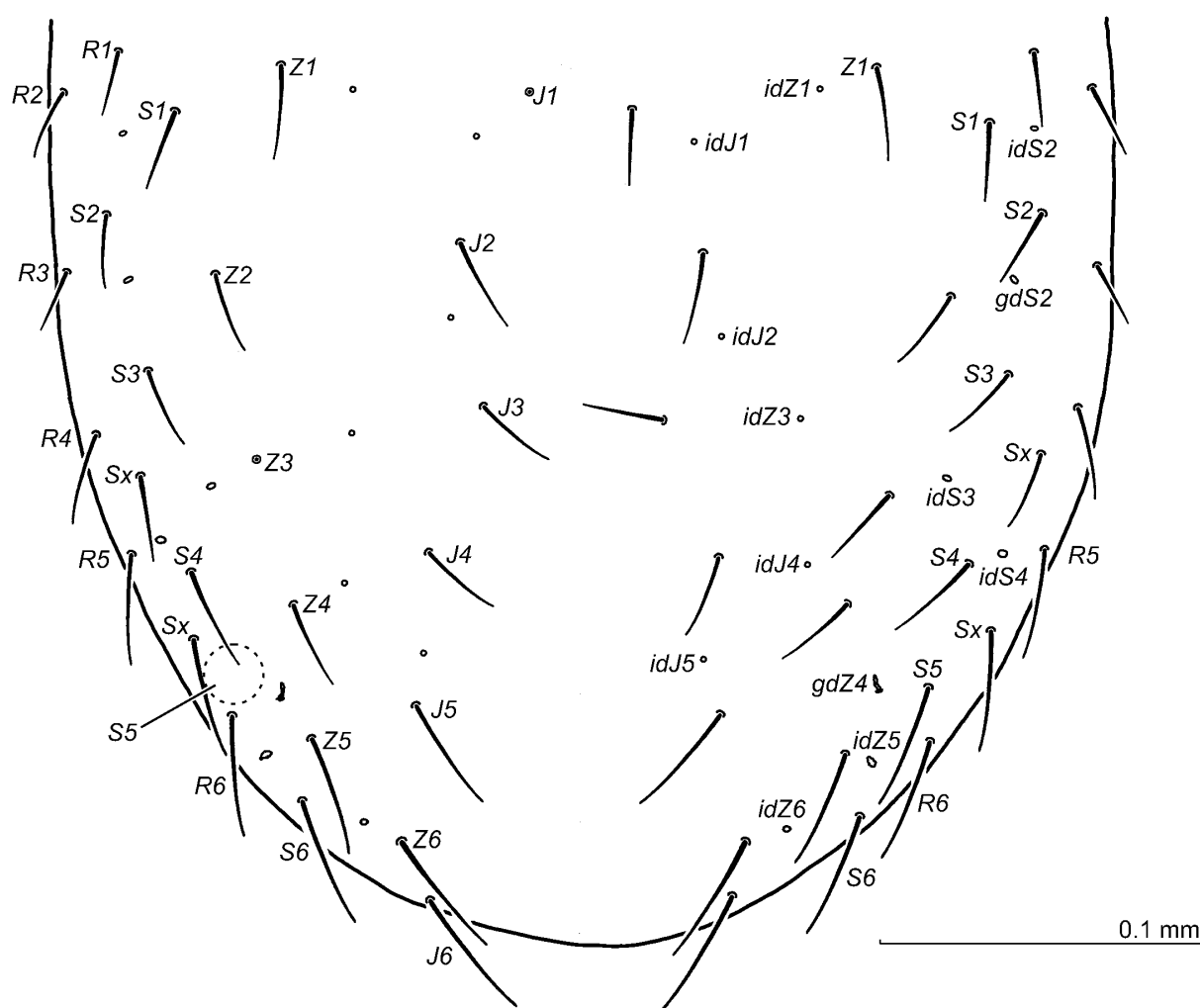


Figure 6 *Leptogamasus (L.) coronarius* n. sp., opisthonotum of the female (holotype). Note: two pairs of *Sx* setae present and one seta *S5* missing.

angular, anterior protrusions large and divergent; corniculi slim, the adaxial margin slightly sinuous; cheliceral fixed digits straight in ventral perspective, with subapical small protrusion antiaxially, in the lateral view narrow and straight, with a small elevation between apex and pilus dentilis, and a row of ca. eight minute denticles behind pilus dentilis; leg II ventrally: femoral main spur short and rounded apically, genual spur located closer to the distal article margin than the tibial spur, in lateral view, the main femoral spur rather short and slightly tapered, the axillary process half-moon to finger-shaped, the genual and tibial spurs with slightly concave margin and rounded distal apex.

Description

Female (Figures 6–8)

Idiosoma — Moderately to well sclerotised, 575–595 x 312–320 (length x width, n=3), holotype 597 x 322. **Podonotum** – 21 pairs of regular setae, setae length in paratype: 26–30 (*j1*), 27–31 (*j2*), 32–37 (*j3*), 39–43 (*j4*), 34–38 (*j5*), 28–31 (*j6*), 78–82 (*r3*), in holotype 26 (*j1*), 27 (*j2*), 33 (*j3*), 41 (*j4*), 33 (*j5*), 26 (*j6*), 75 (*r3*). **Opisthonotum** (Fig. 6) – 24 pairs of setae and two supplementary pairs located marginally. In the holotype (Fig. 6) one seta *S5* is missing.



Figure 7 *Leptogamasus* (*L.*) *coronarius* n. sp., ventral side of the female idiosoma. Abbreviations as in Figure 2.

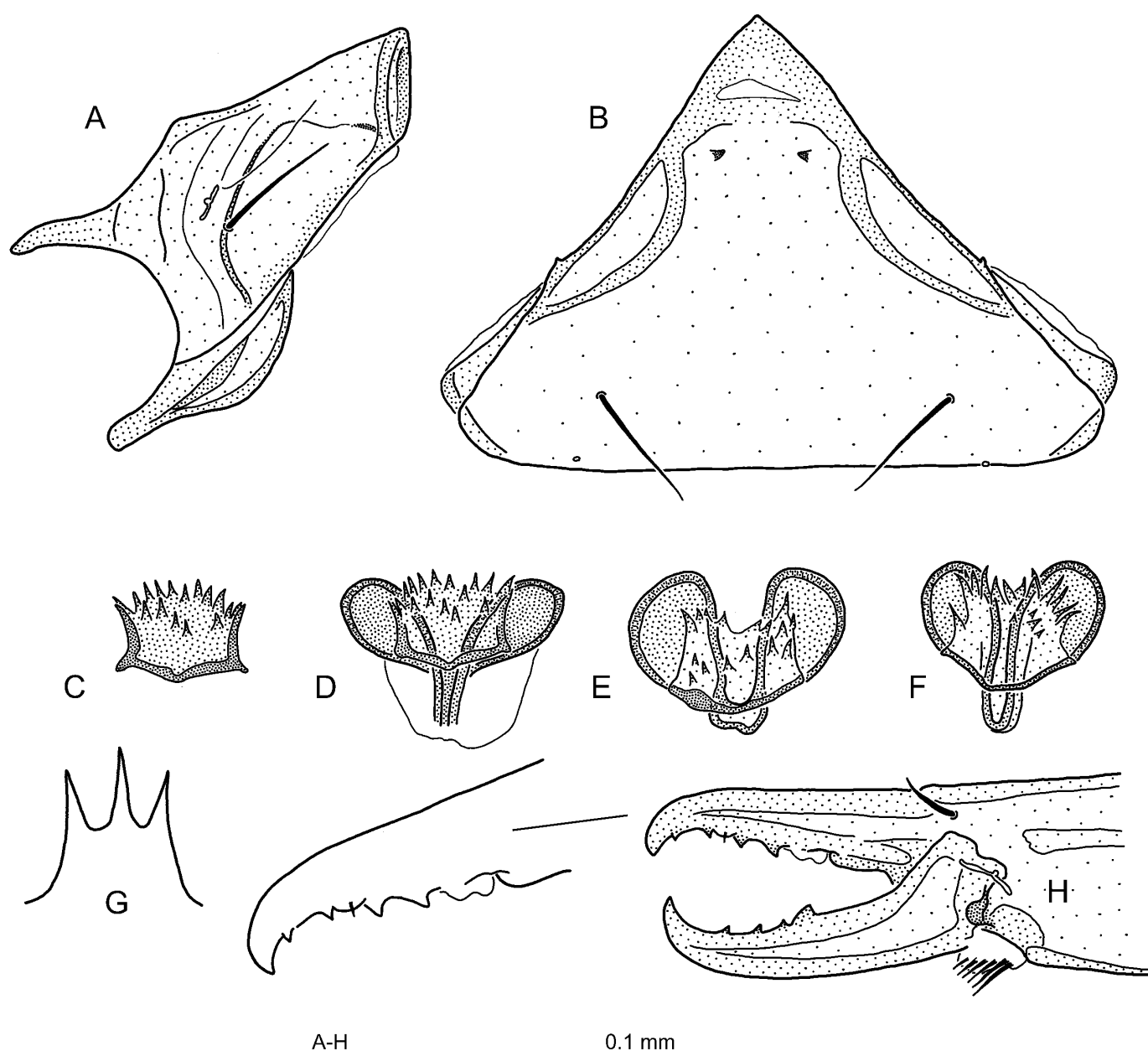


Figure 8 *Leptogamasus (L.) coronarius* n. sp., female: A – paragynium; B – epigynum; C – stipule; D–F – endogynium (E – holotype), different aspects; G – gnathotectum; H – chelicera, antiaxially.

Setae length from ca. 22 to 44 (*J6*). Dorsal setae simple, reticulation of podonotum absent, opisthonotum with a scale-like reticulation. **Peritreme** (Fig. 7) – length (including stigma) in paratypes 136–138, in holotype 140, ending anteriorly at the level of the podonotal setae *r2*.

Ventral idiosoma (Fig. 7). Setae length in paratypes: 34–38 (*st1*), 36–44 (*st2*), 37–44 (*st3*), 38–42 (*st4*), 35–42 (*st5*), 39–43 (*JVI*), 24–30 (*ZVI*), other opisthogastral setae ca. 27–46. In holotype 35 (*st1*), 39 (*st2*), 44 (*st3*), 39 (*st4*), 33 (*st5*), 38 (*JVI*), 24 (*ZVI*). Ventral setae simple, reticulation of the opisthogaster scale-like. Anterior margin of the sternal shield concave, presternal plates subtriangular with convex posterior margin, the area between the presternal plates and the sternum margin with horizontal lines. The pores *gv1* located axially

and not far from the posterior margin of the sternum. Paragynial shields (Figs 7, 8A) with thin metagynial sclerite. Epigynial shield (Figs 7, 8B), the anterior margins nearly straight, the posterolateral ones convex, and the posterior margin straight. On the internal (dorsal) surface of the epigynium, two small teeth are present. Endogynium (Figs 7, 8D–F) with the elongated spherules arranged in a V-shaped manner. Stipule (Fig. 8C–F) crown-shaped and bears many teeth. Gland pores *gv2* with poorly visible double opening; *iv5*, *ivo2*, *ivo3*, and *gv3* well discernible.

Gnathosoma — Gnathotectum (Fig. 8G) trispinate, all prongs similar, narrow and acute, the central one somewhat longer. Corniculi conical, hypostome with 10–11 rows of denticles, hypostomatic and palpcoxal setae simple. Palptrochanter *v1* seta simple, *v2* barbed. Chelicera (Fig. 8H) – movable digit with four teeth, the proximalmost evidently largest. Fixed digit with two teeth in front, and two behind pilus dentilis, followed by a lamellar edge concave in midregion and a more solid edge proximally.

Legs — Seta *v1* on Co I simple, *v2* finely barbed, setae *ad* on Tr I and *ad2* on Fe I short and somewhat thickened. Fe II anteroventral seta larger and finely barbed, setae *al1* and *al2* short and thick. Seta *al* on Ti II finely barbed. Leg IV: posterodorsal and posterolateral setae on the femur shorter and thicker, posteroventral seta on the genu finely barbed, posteroventral seta on the tibia enlarged and barbed. Some setae on the tarsi barbed. Tr IV without tooth or tubercle. Other aspects of legs I–IV unremarkable.

Male (Figures 9, 10)

Idiosoma — Sclerotised and reticulated as in the female, 537–545 x 243–255 (length x width, *n*=2), body oval in outline. **Podonotum** setae length: 31–37 (*j1*), 26–30 (*j2*), 31–35 (*j3*), 34–38 (*j4*), 29–31 (*j5*), 22–26 (*j6*), 65–71 (*r3*). **Opisthonotum** setae length from ca. 24 to 36. Dorsal setae simple. **Peritreme** length (including stigma) 120–130, ending anteriorly as in the female.

Ventral idiosoma — Setae length: 26–29 (*st1*), 29–33 (*st2*), 24–27 (*st3*), 25–27 (*st4*), 24–27 (*st5*), 30–33 (*JV1*), 21–25 (*ZV1*), other opisthogastral setae ca. 24–35. Ventral setae simple. **Sternal region** (Fig. 9A) – the anterior margin of genital lamina concave, the lateral margins convex and the anterior corners rounded. Presternal plates subrectangular, anterior protrusions large and divergent. Gland pores *gv1* slightly anteriorly to the *st3* setae level, followed by two pairs of thickenings of the sternal cuticle. The anterior thickenings are quite fine, the posterior ones rounded and distinct. Pores *gv2* with two openings, pore *iv5* halfway between *st5* and *ZV1* setae, *ivo2*, *ivo3*, and *gv3* distinct.

Gnathosoma — Gnathotectum (Fig. 9B) with similar triangular prongs. Corniculi (Fig. 9C,D) narrow, the adaxial side slightly sigmoidal, when pressed with adaxial low elevation (Fig. 9D). Hypostome (Fig. 9C) with 11 rows of denticles and thickenings between corniculi at the base of the internal malae. Hypostomal and palpcoxal setae simple. Palptrochanter anterolateral side with a fine thickening ending between setae *v1* and *v2*, *v1* seta simple, *v2* thicker and barbed. Chelicera (Fig. 9E,F) – ventrally, fixed digits straight, with subapically located small elevation directed antiaxially, the movable digits curved adaxially. Laterally, the movable digit with one tooth followed by an arcuate edge, the fixed digit narrow and straight, with small lamellar elevation between apex and pilus dentilis and a row of ca. eight minute denticles behind pilus dentilis.

Legs — Leg II (Fig. 10) spurred as follows: when viewed from the ventral side (Fig. 10A), the femoral main spur short and curved posterolaterally, the axillary process pointed also posterolaterally. From the lateral perspective (Fig. 10B), the main femoral spur relatively short and slightly tapered, the axillary process half-moon to finger-shaped. The genual and tibial spurs with slightly concave margin and rounded distal apex, the genual spur located closer to distal article margin than tibial one. Setae on leg II simple except anterolateral setae on genu and tibia which barbed, femoral setae *al1* thicker, *al2* and *ad2* thicker and shorter, whereas *ad3* needle-shaped. Leg IV: trochanter without tooth or tubercle, posterodorsal and posterolateral setae on the femur shorter and thicker, posteroventral seta on the genu and tibia thickened and barbed. Other aspects of legs I–IV unremarkable.

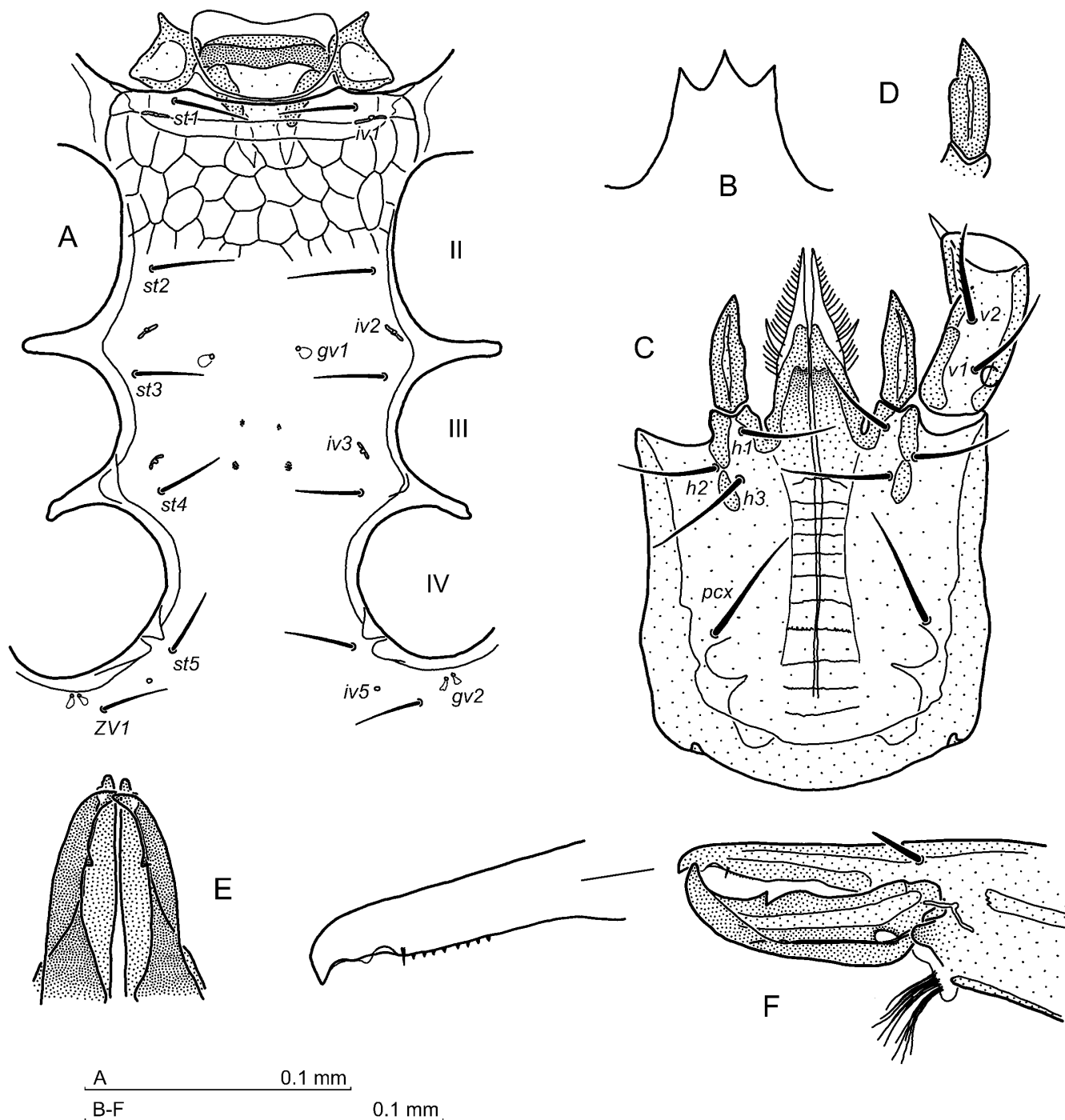


Figure 9 *Leptogamasus (L.) coronarius* n. sp., male: A – presternal plates, genital lamina and sternogenital shield; B – gnathotectum; C – gnathosoma, ventrally, note the thickenings at the base of the internal malae; D – corniculus, ventrally; E – chelicerae, ventrally; F – chelicera, antiaxially. Abbreviations as in Figure 4.

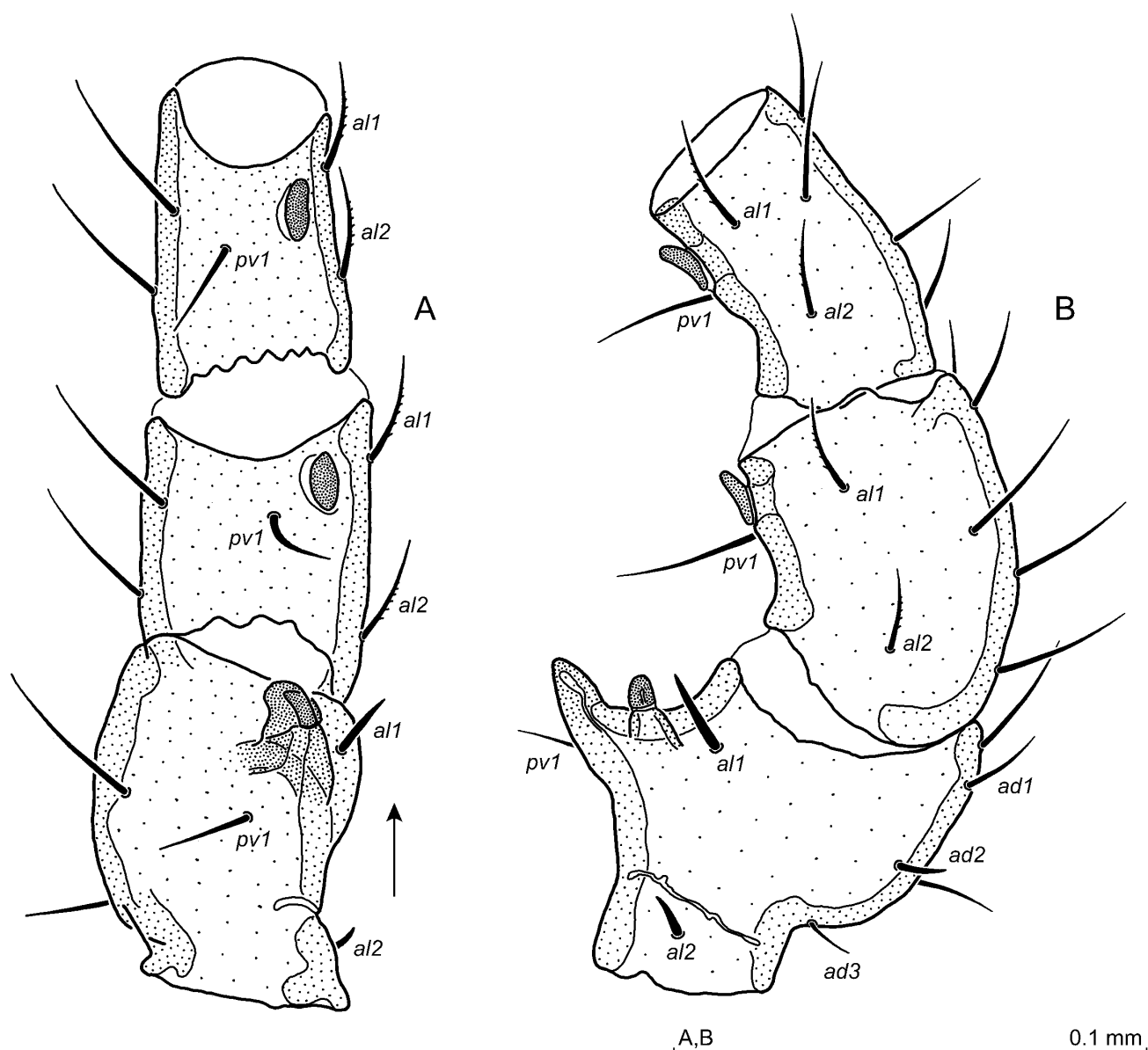


Figure 10 *Leptogamasus (L.) coronarius* n. sp., male: A – Fe II, Ge II and Ti II, ventrally; B – Fe II, Ge II and Ti II in the anterolateral perspective. Some setae are marked. Arrow at the anterolateral side.

Material examined

Holotype — Female (slide no. 1898 A), Leopoldsdorf im Marchfelde, Lower Austria, 48.2483°N, 16.6926°E, alt. ca. 150 m a.s.l., 13 Nov. 2004, leaves under small walnut tree.

Paratypes – 3 females, 2 males (slides no. 1898 B–F), ibid.

Type deposition — Types are deposited in the Zoological Division of the Nature Education Centre, Jagiellonian University, Kraków, Poland.

Etymology

The specific name *coronarius* (lat. *corona* means wreath or crown) refers to the crown-like outline of the endogynial stipule.

***Leptogamasus (Leptogamasus) trispinus* n. sp.**Zoobank: [1BB380AA-241F-4623-A5CB-B98CFB035AC7](https://zoobank.org/1BB380AA-241F-4623-A5CB-B98CFB035AC7)

(Figures 11–15)

Diagnosis

Female and male — Idiosoma weakly to moderately sclerotised; gland pore *gvI* present; podonotum with 21 pairs of setae, opisthonotum with variable number of setae: from 23 pairs to 24 pairs and four supplementary setae located marginally; Tr IV with distally located low arcuate elevation.

Female — Gnathotectum vary, one-prong type (holotype) or three-prong type (paratype); presternal plates with long adaxial protrusions; the sternal shield anterior margin with shallow concavity; the anterior margins of the epigynial shield nearly straight or slightly wavy, posterolateral ones short and convex, the transverse band of less pigmented cuticle is located subapically, the internal (dorsal) surface of the epigynium without teeth; endogynial spherules bean-shaped and convergent anteriorly, in front of the spherules, a U-shaped structure with a pair of adaxially directed thorns present, thorn-shaped stipule (?) is located between the spherules.

Male — Gnathotectum trispinate with similar triangular prongs; genital lamina with the anterior margin concave and anterior corners rounded; presternal plates subrectangular, with the short anterior protrusions and rounded posterior margins; corniculi slim but with adaxial elevation; cheliceral fixed digit straight and narrow, its apex cut obliquely, apical part separate dorsally by an incision from the rest of the digit, between the apex and the pilus dentilis a lamellar protrusion followed by denticle is visible, behind the pilus dentilis the row of ca. 8 minute denticles is present; leg II femoral main spur and the axillary process finger-shaped, genual and tibial spurs conical, the former one somewhat smaller and located closer to the distal article margin.

Description

Female (Figures 11–13, 15 C)

Idiosoma — Weakly sclerotised, 521 x 319 (length x width, n=1), holotype 524 x 275. The paratype is slightly flattened, which results in its enlarged width. **Podonotum** – 21 pairs of setae, setae length in paratype: 34 (*j1*), 41 (*j2*), 44 (*j3*), 38 (*j4*), 41 (*j5*), 35 (*j6*), 75 (*r3*), in holotype 33 (*j1*), 42 (*j2*), 46 (*j3*), 39 (*j4*), 44 (*j5*), 39 (*j6*), 76 (*r3*). **Opisthonotum** (Fig. 11 A, B) – setation variable, in holotype (Fig. 11 A) there are 23 pairs of setae, since *S6* setae are missing, whereas in paratype (Fig. 11 B) one seta *S6* as well as four supplementary setae (*Sx*) located in the marginal regions are present. Setae relatively long, from ca. 34 (*R2*, *R3*) to 47 (*Z1*, *Z2*). Dorsal setae simple, podonotum not reticulated, opisthonotum with a scale-like reticulation. **Peritreme** length (including stigma) 127 in paratype and 123 in holotype, ending anteriorly in the midregion of the opening for Co II, at the level of the podonotal setae *r2*.

Ventral idiosoma (Fig. 12). Setae length in paratype: 32 (*st1*), 41 (*st2*), 43 (*st3*), 30 (*st4*), 31 (*st5*), 35 (*JV1*), 20 (*ZV1*), other opisthogastral setae ca. 21–35, in holotype 31 (*st1*), 44 (*st2*), 44 (*st3*), 28 (*st4*), 30 (*st5*), 37 (*JV1*), 18 (*ZV1*). Ventral setae simple, reticulation of the opisthogastral scale-like. The anterior margin of the sternal shield with a shallow concavity, the area between the presternal plates and the sternum margin with a weak lines. Presternal plates form long, narrow adaxial protrusions and small anterior protrusions. The pores *gvI* located behind setae *st3*. Paragynial shields (Figs 12, 13A) with narrow and arcuate metagynial sclerites. Epigynial shield with the anterior margins nearly straight (Fig. 12) or slightly wavy (Fig. 13B), posterolateral ones short and convex. Less pigmented band of cuticle is located subapically. The internal (dorsal) surface of the epigynium devoid of any teeth. Spherules of the endogynium (Figs 12, 13C) bean-shaped and convergent anteriorly. A distinct thorn located between spherules apparently represents a stipule. In front of the spherules, two distinct, axially directed thorns on the walls of a U-shaped structure are present (Fig. 12), the structure posterior

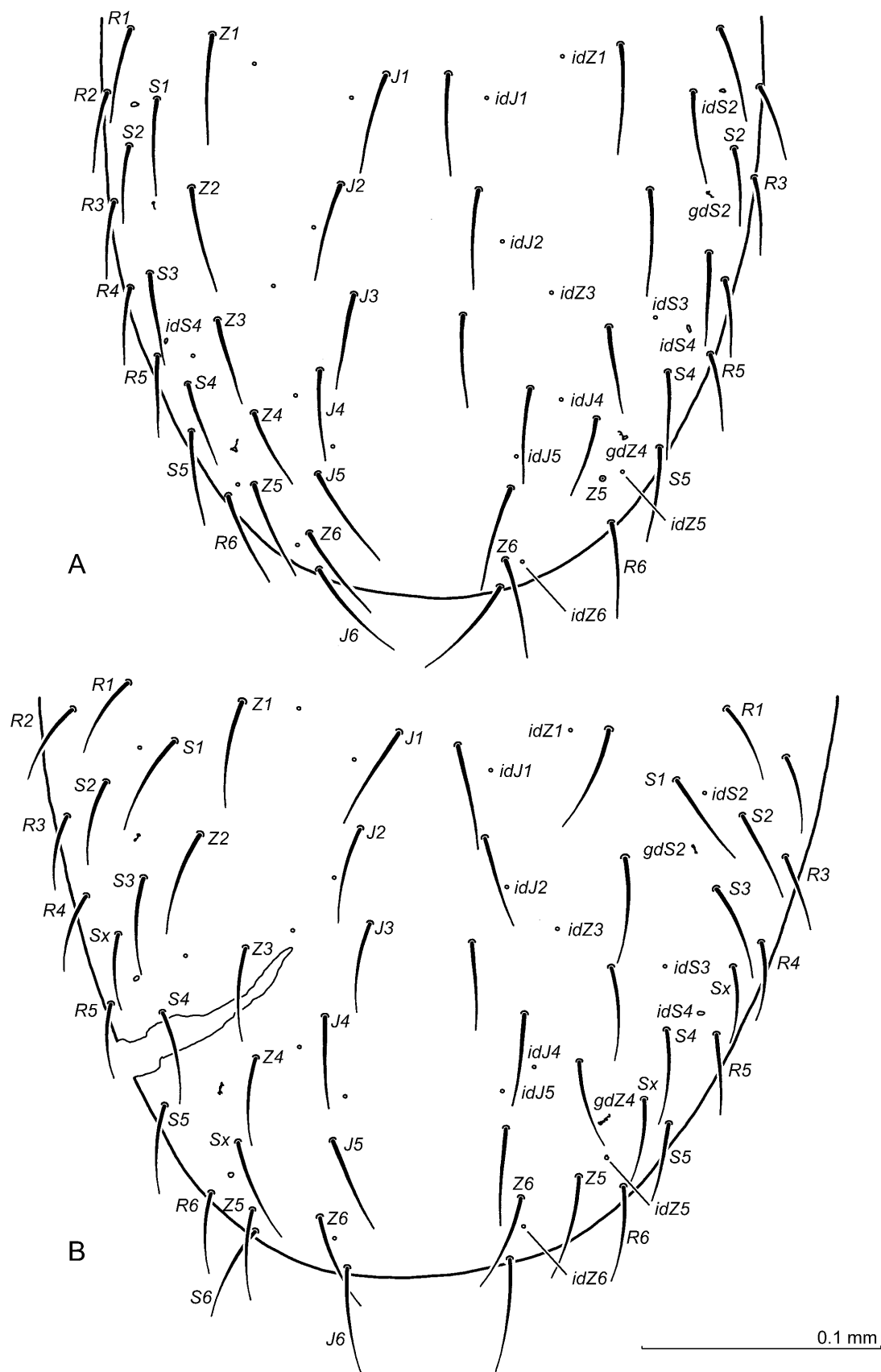


Figure 11 *Leptogamasus (L.) trispinus* n. sp., opisthonotum of the female, two aspects (A – holotype, B – paratype). In A – S6 setae are missing, in B – one seta S6 is lacking and four setae Sx are present.

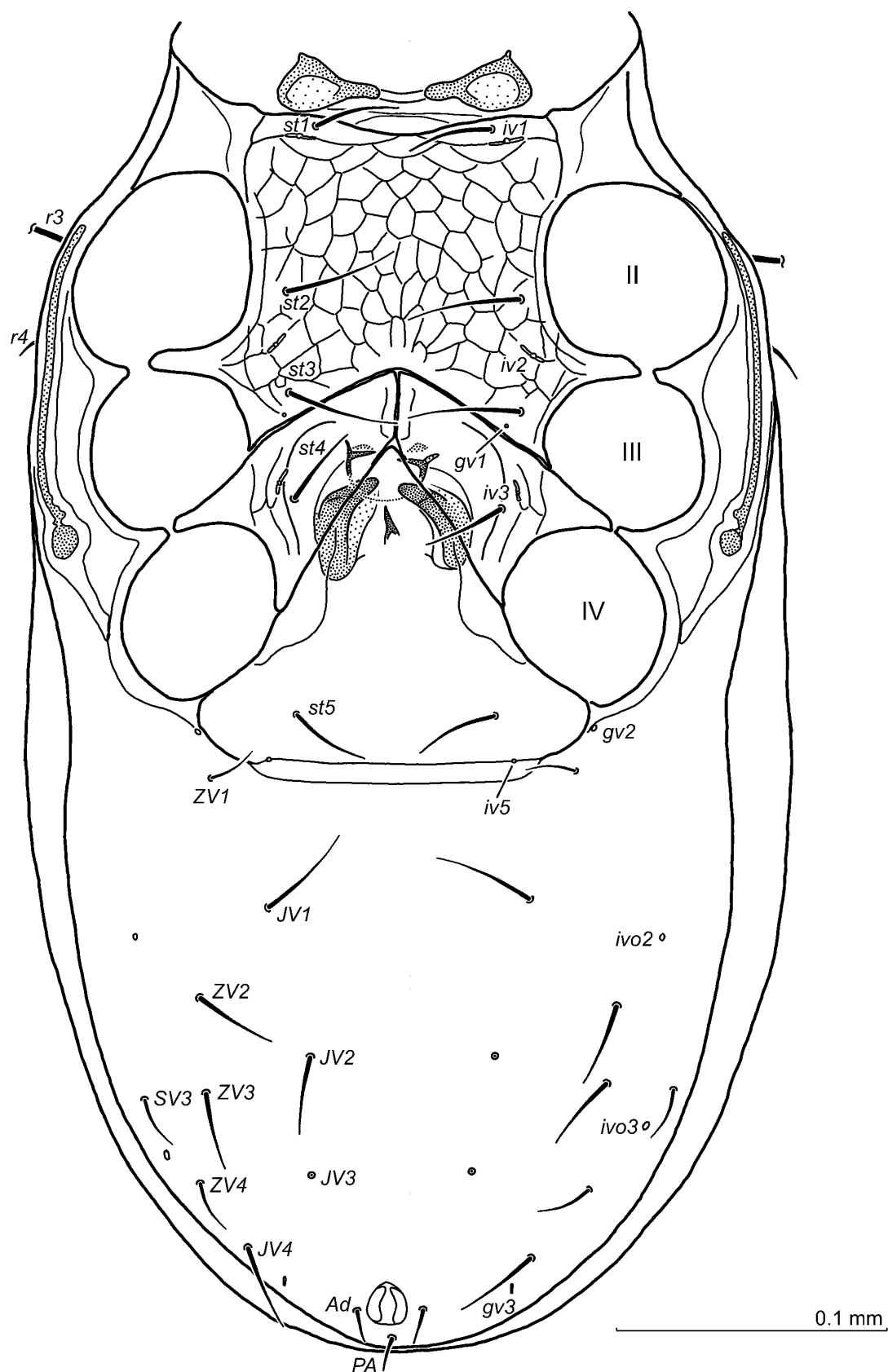


Figure 12 *Leptogamasus (L.) trispinus* n. sp., ventral side of the female idiosoma (holotype). Abbreviations as in Figure 2.

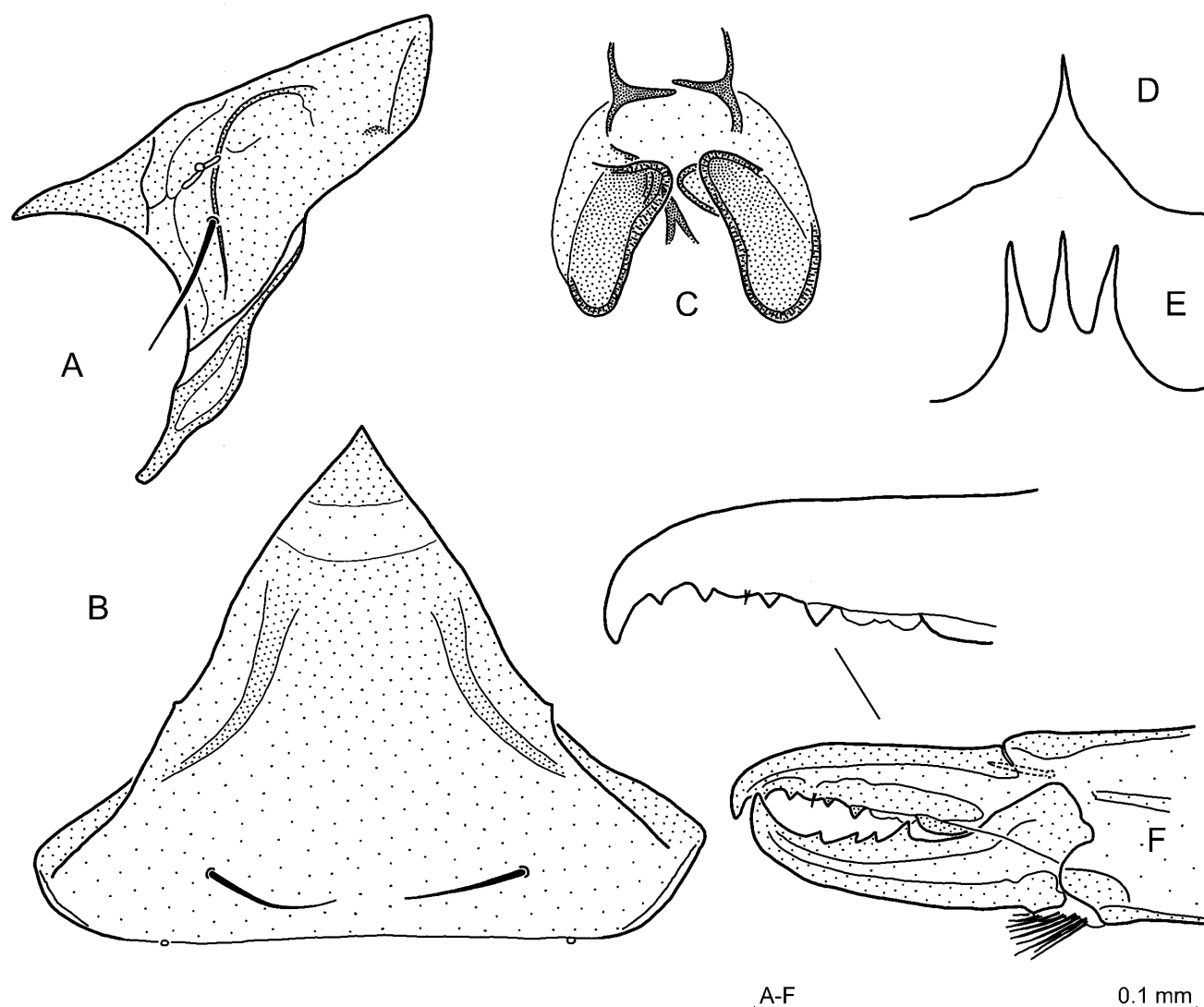


Figure 13 *Leptogamasus (L.) trispinus* n. sp., female: A – paragnathium; B – epigynum; C – endogynium; D, E – gnathotectum, two aspects (D – holotype, E – paratype); F – chelicera, adaxially.

part may occasionally be invisible (Fig. 13C). Gland pores *gv2* with one opening, *iv5*, *ivo2*, *ivo3*, and *gv3* well discernible.

Gnathosoma — Gnathotectum (Fig. 13D,E) variable in shape, in the paratype female is trispinate (Fig. 13E), all prongs similar, narrow and acute, in holotype it culminates aberrantly into a single prong (Fig. 13D). Corniculi conical, hypostome with 10 rows of denticles, hypostomatic and palpcoxal setae simple. Palptrochanter *v1* seta simple, *v2* barbed. Chelicera (Fig. 13F) – movable digit with four teeth, the proximal one much larger, fixed digit with two distant teeth in front of the pilus dentilis, two teeth behind the pilus dentilis, followed by an undulate lamella and a more solid edge proximally.

Legs — Setae *ad* on Tr I somewhat shorter and thicker. Leg II: anterolateral setae *all*, *al2* on Fe II shorter and thicker, anteroventral setae on Fe II and Ti II larger and barbed. Leg IV: posterolateral setae on the femur thick and short, posteroventral seta on the tibia and posterolateral setae on basitarsus and tarsus thickened and terminally barbed. Tr IV with a low, arcuate elevation located distally on the article dorsal side (Fig. 15C). Other aspects of legs

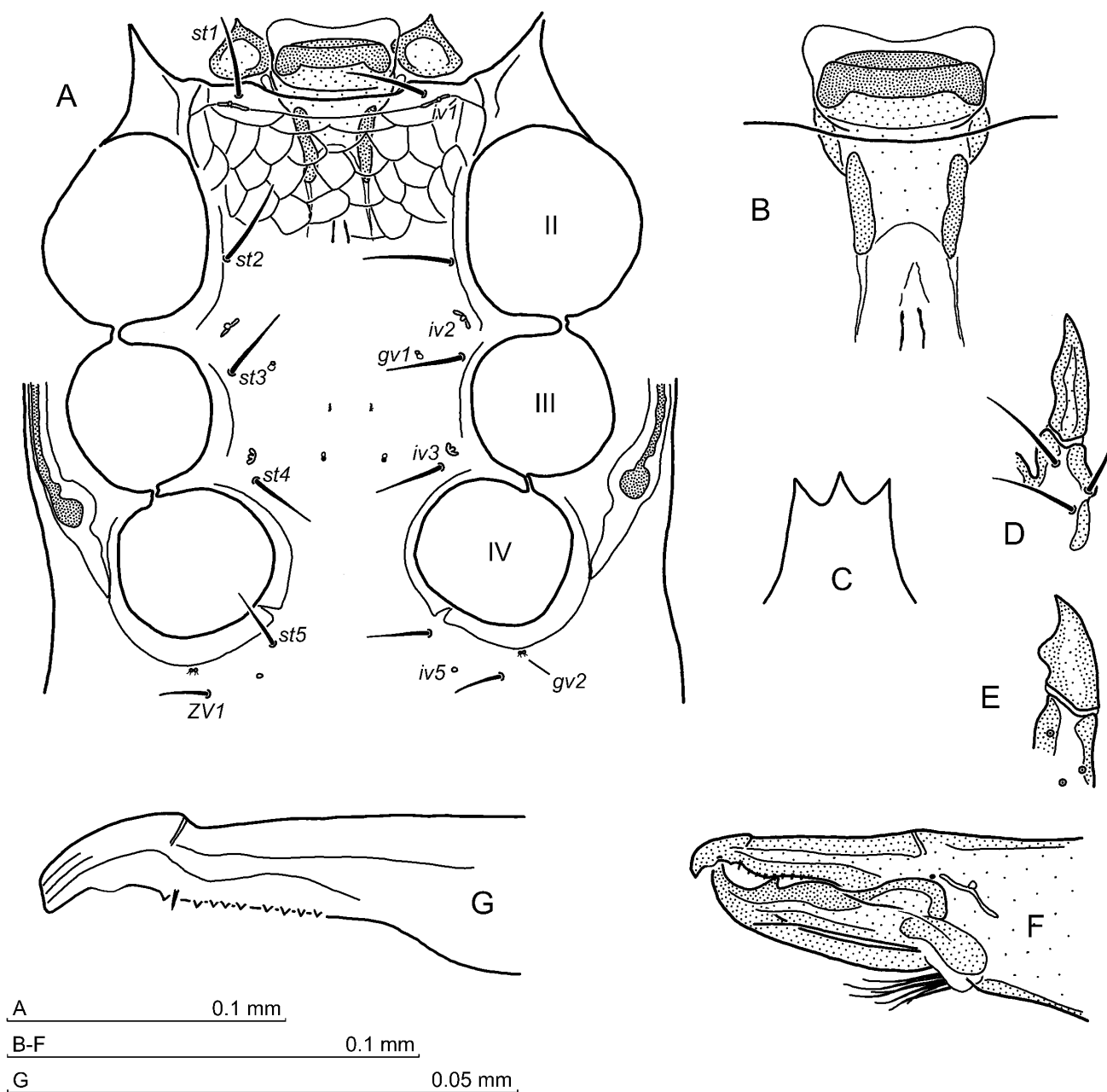


Figure 14 *Leptogamasus (L.) trispinus* n. sp., male: A – presternal plates, genital lamina and sternogenital shield; B – genital lamina; C – gnathotectum; D – corniculus, ventrally; E – corniculus, slightly squashed; F – chelicera, antiaxially; G – cheliceral fixed digit. Abbreviations as in Figure 2.

I–IV unremarkable.

Male (Figures 14, 15 A, B, D)

Idiosoma — Weakly to moderately sclerotised, 475–485 x 235–260 (length x width, n=3), body oval. **Podonotum** setae length: 25–29 (*j1*), 34–38 (*j2*), 37–39 (*j3*), 37–39 (*j4*), 26–29 (*j5*), 25–30 (*j6*), 64–67 (*r3*). **Opisthonotum** setae length from ca. 29 to 35. Dorsal setae simple. Reticulation of the podonotum non-discernible, opisthonotum with a scale-like reticulation.

Peritreme length (including stigma) 116–123, ending anteriorly as in the females.

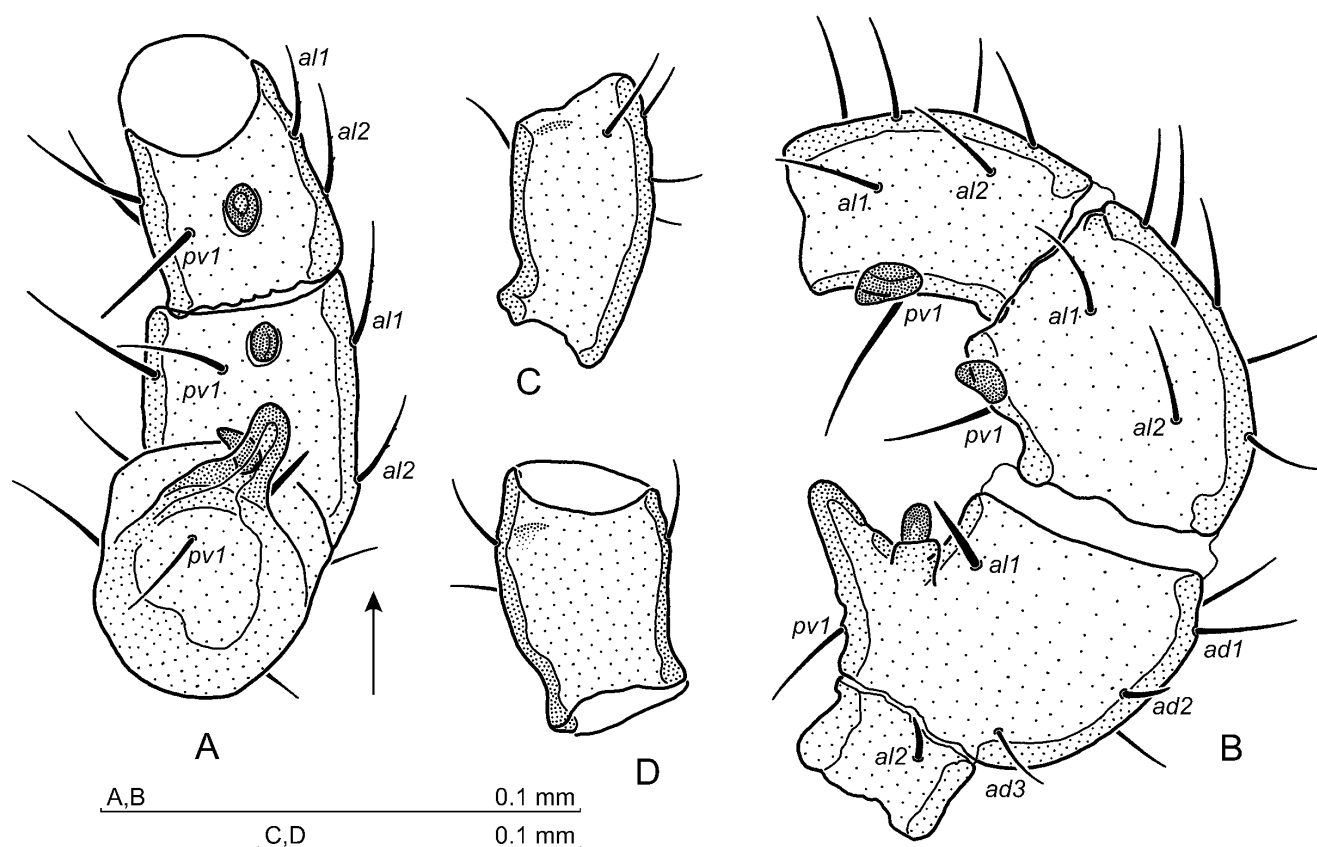


Figure 15 *Leptogamasus (L.) trispinus* n. sp., male (A, B, D) and female (C): A – Fe II, Ge II and Ti II, ventrally; B – Fe II, Ge II and Ti II in the anterolateral perspective. C, D – Tr IV dorsally (C – holotype). Some setae are marked. Arrow at the anterolateral side.

Ventral idiosoma — Setae length: 26–34 (*st1*), 29–34 (*st2*), 26–31 (*st3*), 23–25 (*st4*), 22–24 (*st5*), 26–31 (*JVI*), 16–18 (*ZVI*), other opisthogastral setae ca. 22–35. Ventral setae simple. **Sternal region** (Fig. 14A) – the anterior margin of genital lamina concave, the lateral ones slightly concave and the anterior corners rounded (Fig. 14A,B). Presternal plates with short anterior protrusions and posterior margins more or less rounded. Sternum with gland pores *gv1* close to *st3* setae level and relatively close to these setae bases, followed by two pairs of moderately visible thickenings of the sternal cuticle. Pore *gv2* with two closely located openings, pores *iv5* ca. halfway between *st5* and *ZVI* setae, *ivo2*, *ivo3*, and *gv3* well discernible.

Gnathosoma — Gnathotectum (Fig. 14C) trispinate with all prongs similar and triangular. Corniculi (Fig. 14D,E) with arcuate elevation on the adaxial margin, hypostome with nine rows of denticles, hypostomatic and palpcoxal setae simple. Palptrochanter *v1* seta simple, *v2* finely barbed. Chelicera – when observed from the ventral side, mobile digits slightly curved adaxially, the fixed ones straight. Laterally (Fig. 14F,G), mobile digit with one tooth followed by an arcuate edge proximally, fixed digit straight and narrow with obliquely cut apex and dorsal incision at pilus dentilis level. The arcuate lamellar protrusion between the apex and the pilus dentilis followed by a denticle is present, with a row of ca. eight denticles located behind the pilus dentilis (Fig. 14G).

Legs — Leg II (Fig. 15A,B) spurred as follows: when viewed from the ventral side (Fig. 15A), the femoral main spur short, finger-shaped and nearly straight, the axillary process pointed posterolaterally, genual spur lenticular to roundish, the tibial one lenticular. The genual spur located closer to the article margin than the tibial one. From a lateral perspective (Fig.

15B), the femoral main spur and the axillary process finger-shaped and straight. Genua and tibial spurs conical, the second one slightly larger. Setae on leg II simple, except genual and tibial anterolateral setae (*al1*, *al2*) which can be finely barbed, femoral seta *al1* thicker, *al2* and *ad2* thicker and shorter, whereas *ad3* needle-like. Leg IV: trochanter with a weakly pronounced dorsal arcuate elevation in distal part of the article (Fig. 15D). Posterolateral setae on the femur thickened and short, posteroventral seta on tibia thickened and barbed terminally, some setae on basitarsus and tarsus thickened. Other aspects of legs I–IV unremarkable.

Material examined

Holotype — Female (slide no. 734 A), surroundings of Graz, south-eastern Austria, 5 July 1975, litter in beech forest with pines and hazels. **Paratypes**. 1 male (slide no. 734 B), 1 female, 4 males (slides no. 740 A–D, 812), *ibid*.

Type deposition — Types are deposited in the Zoological Division of the Nature Education Centre, Jagiellonian University, Kraków, Poland.

Etymology

The specific name *trispinus* refers to prominent three spines in the female genital region.

Taxonomic remarks

The examined material for *Leptogamasus trispinus* **n. sp.** is rather modest, since only two females (the holotype and one paratype) are available. The holotype female shows some unusual characters as compared with the paratype, i.e. lacking of podonotal setae *R6* and the gnathotectum one-prong type. Both characters in the paratype female are typical for the genus. However, the holotype female was selected as the holotype since the other features are available and typical, especially all legs, which are incomplete in the female paratype.

Differential taxonomy

The *Leptogamasus* (*Leptogamasus*) new species currently described are more or less similar to several previously acknowledged species. As far as the females are concerned, *L. (L.) chelatus* **n. sp.** is somewhat similar to *Leptogamasus* (*Leptogamasus*) *termitatus* (Athias-Henriot, 1967) since both species share the following characteristics: internal (dorsal) surface of epigynum smooth, i.e. without teeth, the spherules subspherical and the endogynial stipule made up of two parts, i.e. anterior and posterior. However, the most distinct difference consists in the actual size and shape of the stipule. In *L. (L.) termitatus* posterior part of the stipule is very large and furcate, whereas in *L. (L.) chelatus* **n. sp.** is small and tooth-shaped. The males are also different, i.e. leg II spurs in both species are similar with regard to the femur and the tibia, to some extent, but genual spur in *L. (L.) chelatus* **n. sp.** is conical, whereas in *L. (L.) termitatus* is low and elongated axially. Chelicerae offer more distinct characteristics since the cheliceral fixed digit in *L. (L.) chelatus* **n. sp.** bears one tooth in front of the pilus dentilis, followed by edentate edge behind the pilus dentilis, whereas in *L. (L.) termitatus* fixed digit bears ca. two teeth in front and several fine teeth behind the pilus dentilis. Unfortunately, the fixed digit in a newly described species shows a conspicuous undulation when observed in the ventral perspective, even though this particular property is not encountered in *L. (L.) termitatus*.

Leptogamasus (*L.*) *coronarius* **n. sp.** and the most similar *Leptogamasus* (*Leptogamasus*) *bidentoides* (Athias-Henriot, 1967) females share some of the following characteristics: internal (dorsal) surface of epigynum with two teeth, the wall of endogynial sac without teeth and stipule of similar length and width, richly dentated on the surface and the anterior margin, Tr IV without tubercle or a tooth. These two species can be easily distinguished, owing to the shape of spherules, which are in *L. (L.) coronarius* **n. sp.** regularly rounded anteriorly and in *L. (L.) bidentoides* possess several tooth-like protrusions. The male in *L. (L.) coronarius* **n. sp.** cannot be compared with *L. (L.) bidentoides* male which is unknown, even though it is acknowledged to share some similarities with *L. (L.) belligerens* Witaliński, 1973 male with the armature of

leg II somewhat similar. In the latter species, the cheliceral fixed digit features several fine teeth in front and behind of the pilus dentilis, whereas in *L. (L.) coronarius* **n. sp.** minute teeth are present behind the pilus dentilis only, in contrast to the anterior digit part bearing a single low tooth only.

Females of *L. (L.) trispinus* **n. sp.** can be compared with the females of *L. (L.) renogynialis* Witaliński, 2020 and *L. (L.) paracarpaticus* Juvara-Bals, 1981. The commonly shared characteristics are as follows: the internal (dorsal) surface of the epigynum without teeth, Tr IV with tubercle (*L. (L.) trispinus* **n. sp.** and *L. (L.) paracarpaticus*) or tooth (*L. (L.) renogynialis*), and the shape of the spherules, kidney-like (*L. (L.) trispinus* **n. sp.** and *L. (L.) renogynialis*) and oval but somewhat curved (*L. (L.) paracarpaticus*). On the other hand, the endogynial sac in *L. (L.) trispinus* **n. sp.** shows two prominent thorns directed adaxially, whereas in *L. (L.) paracarpaticus* there are two rather small teeth located on sac wall, and in *L. (L.) renogynialis* no teeth or thorns in the sac are present. Moreover, the stipule in the newly described species is thorn-shaped, but in *L. (L.) renogynialis* it is bacillary and in *L. (L.) paracarpaticus* lamellar, and much wider.

The male of *L. (L.) trispinus* **n. sp.** possesses a characteristic chelicera, with fixed digit showing many minute denticles behind the pilus dentilis, and an incision in the external (dorsal) margin at the pilus dentilis level. In four other species: *L. (L.) falsivatus* (Athias-Henriot, 1967) (only male known), *L. (L.) sinuforceps* (Athias-Henriot, 1967) and *L. (L.) cortinis* Witaliński, 2021b as well as *L. (L.) renogynialis* cheliceral fixed digit features the incision on the dorsal margin. Other features are different, though. In *L. (L.) falsivatus* a row of denticles behind the pilus dentilis is absent and Ti II spur is L-shaped, whereas in *L. (L.) sinuforceps* fixed digit bears denticles but spurs on Ge II and Ti II are baton-shaped rather than conical as in *L. (L.) trispinus* **n. sp.** In *L. (L.) cortinis* a shallow incision of fixed digit is located some distance behind the pilus dentilis level, and digit dorsal margin bears a tubercle more apically. Moreover, the corniculi bear a distinct tubercle on the ventral side. In *L. (L.) renogynialis* cheliceral fixed digit differs from *L. (L.) trispinus* **n. sp.** since in the former species the dorsal incision is smaller and located between the pilus dentilis and the digit apex. Some similarities of females in *L. (L.) trispinus* **n. sp.** and *L. (L.) paracarpaticus* might suggest a comparison of the males. However, in the latter species, the cheliceral fixed digit does not show both the dorsal incision and the denticles behind the pilus dentilis.

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