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Discovery of the pseudoscorpion *Larca lata* (Garypoidea, Larcidae) in Britain

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Summary

Larca lata (Hansen), a predominantly northern/central-European pseudoscorpion, is recorded in Britain for the first time. Males and a protonymph have been collected from an oak tree-hole in Windsor Forest (Berkshire), England. The previously unknown protonymph is described; noteworthy features of this stage include the undivided tarsi and the well-developed epistome of the carapace. Based on a review of its ecology, *L. lata* is suggested to be one of the rarest and most vulnerable of the British pseudoscorpions.

Introduction

The British pseudoscorpion fauna is probably the best known in the world, thanks in large part to the efforts of amateur collectors for over a century. This is reflected in the fact that only three species — *Neobisium carpenteri* (Kew), *Chthonius (C.) halberti* Kew and *Chthonius (E.) kewi* Gabbutt — have been added during the period between Kew's (1916) list and that of Legg & Jones (1988).

The purpose of this note is to record the presence in Britain of *Larca lata* (Hansen), which has been collected from Windsor Great Forest, Berkshire. The material was originally misidentified and recorded as *Chelifer cancroides* (Linnaeus) by Legg & Jones (1988). The addition of *L. lata* to the list of British pseudoscorpions raises the number of species to 26, and the number of families to seven.

Although widespread, *L. lata* is one of the rarest and most enigmatic members of the European pseudoscorpion fauna. It was first found in Denmark (Hansen, 1884) and has since been reported from Sweden (Lohmander, 1939), Poland (Beier, 1939; Rafalski, 1953, 1967), Austria (Beier, 1956), Rumania (Dumitresco & Orghidan, 1964), the Czech Republic (Ducháč, 1993a) and Germany (Drogla & Lippold, 1994). The *Larca* sp. recorded from a cave in southern France (Gard) by Leclerc (1979) (also cited by Heurtault, 1986) is of uncertain affinities.

The presence of a protonymph in the collection provides an opportunity to describe this previously unknown stage of *L. lata*, the other stages having been described by Dumitresco & Orghidan (1964).

Larca lata (Hansen) (Figs. 1–10)

Garypus latus Hansen, 1884: 550–551; Hansen, 1885: 115, pl. 7 figs. 5, 5a–b.

Larca lata (Hansen): Chamberlin, 1930: 616, fig. 2K; Lohmander, 1944: 95–98, unnumbered fig. (p. 98); Rafalski, 1953: 228–229, 246–248, figs. 160–161; Meinertz, 1962: 57–59, figs. 4D, 10, 34–35; Ressl, 1963: 115–119; Gärdenfors & Wilander, 1992: 29, fig. 4d; Ducháč, 1993a: 36, figs. 1A, 2; Ducháč, 1993b: 66–69, fig. 2; Drogla & Lippold, 1994: 76, Gärdenfors & Wilander, 1995: 28–30.

Chelifer cancroides (not Linnaeus): Legg & Jones, 1988: 138, fig. 35A (in part: misidentification); Gärdenfors & Wilander, 1992: fig. 3d (after Legg & Jones, 1988).

(See Harvey, 1991: 243, for other references.)

British material examined

3♂, 1 protonymph, England, Berkshire, Windsor Great Forest, Cranbourne Forest area, leg. D. Porter and G. Legg, 2 June 1982, from dry frass in rot-hole of a decaying oak lying on ground (2♂ and protonymph deposited in Booth Museum of Natural History, Brighton; 1♂ in The Natural History Museum, London, reg. no. 1995.8.2.1). A single female of *Chthonius (C.) tenuis* L. Koch (Chthoniidae) was also present in the tube.

The protonymph is fragmented, the palps (with coxae), dorsum and venter of the body having separated. The terminal segments of some of the legs are lost, and the carapace and chelae are broken.

Protonymph

General features: light brown in colour; without evident ectoderm; setae curved, simple, but some dorsal setae of palps and carapace covered by secretion; granulation generally scaly; posterior tergites with denticles.

Carapace (Fig. 1) with a strong, acute epistome at anterior margin (Fig. 2); eyes with large, but relatively flat, lenses, posterior pair raised on a tubercle; median furrow broad, shallow, about halfway along carapace; posterior furrow only vaguely indicated, roughly 0.15 from posterior border; chaetotaxy 4: 5: 3: 2 (14), distribution asymmetrical between left and right (see Fig. 1); one median seta of anterior margin partially covered by secretion (Fig. 2); two pairs of lyrifissures present, one near anterior eyes, other in posterior furrow; granulation scaly, becoming more rounded medially; granules of lateral parts of median furrow interspersed with tiny granules.

Tergal chaetotaxy I–II 2 (lateral setae absent): III–IX 4: X T2T: XI 4: XII 2; lateral (trichobothrial) setae on tergite X long (0.22 mm) (Fig. 3); setae without secretion; tergites undivided, although V–VIII have granulation coalesced medially; IX–XI with denticulation; tergites II–VIII with a pair of median lyrifissures and VI–X with a pair of posterolateral lyrifissures; one pair of gland pores ("microlyrifissures") present on each tergite (anterolateral on I–II and sublateral on III–X). Pleural membrane irregularly plicate.

Coxae of palps with strong granulation anteriorly and laterally, those of legs almost smooth; each with one

medial), plus two pairs of setae flanking median notch of anterior margin; chaetotaxy of remaining sternites: 5–8: 9–10: 8–10: 7: 8: 8: 8: 6–7: 2; sternites with 3–4 antero-lateral gland pores on each side. Division between basi- and telotarsi weak on anterior legs (almost obliterated ventrally); as in protonymph, tibiae III–IV have a single gland pore on posterior face.

Measurements: Body 1.8–2.1; carapace 0.51–0.56 × 0.63–0.66 (b/l 1.2). Palp: femur 0.74–0.78 × 0.145–0.155 (5.0–5.2); patella 0.62–0.64 × 0.16–0.17 (3.8–4.0); chela length (+pedicel) 0.94–0.98 (4.6–4.8); hand (+pedicel) 0.54–0.56 × 0.20–0.21 (2.6–2.8); movable finger 0.45–0.46 (1.2 × hand).

Remarks

The development of the tarsi, which are fused in the protonymph and only later become divided (albeit weakly in legs I–II) into a basi- and telotarsus, is similar to that found in some members of the Syarinidae (Vachon, 1954), Bochicidae (Muchmore, 1973) and Garypidae (Harvey, 1987). Given this rather sporadic distribution, it is possible that this type of tarsal development is more widespread than currently realised, particularly in the Garypoidea.

Dumitresco & Orghidan (1964) described and figured an epistome in the deutonymph of *L. lata*, which they found to be lacking in the tritonymph and adults. Examination of the protonymph (unavailable to Dumitresco and Orghidan) shows that a distinct epistome is also present in this stage. The presence of an epistome in the protonymph and deutonymph, but not in later stages, is at present unique within the order.

Identification and systematic position

Larca lata is easily distinguished from all other British species by the long arolia of the legs, which are clearly longer than the tarsal claws in both nymphs and adults, and by having a roughly triangular ("garypoid") carapace with two pairs of eyes. The adults are also distinctive in having only two trichobothria on the movable finger whilst retaining the normal complement of eight on the fixed chelal finger.

Couplet 8 of Legg & Jones' key (1988: 48) to adults of the British species can be modified as follows to accommodate *L. lata*:

8. Arolia of legs shorter than claws; movable finger of chela with 4 trichobothria; cuticle smooth and shiny (Neobisiidae) 8b
— Arolia of legs longer than claws; movable finger of chela with 2 trichobothria; cuticle granular, dull (Larcidae) .....*Larca lata*

8b. Two pairs of eyes present 9
— One pair of eyes present.....11

Larca Chamberlin, along with the closely-related North American genus *Archeolarca* Hoff & Clawson,

Fig. 10: Known distributions of *Larca* spp. in Europe. Circles=*Larca lata* (open circles indicate approximate (regional) localities); square=*L. italica*; triangles=*L. spelaea*; question-mark=*Larca* sp.

was long considered to be a member of the family Garypidae (Garypinae). However, Harvey (1992) has recently shown that these two genera differ from the other Garypidae in several important respects, leading him to erect the family Larcidae.

A key to the seven species currently included in *Larca* (three of which are European) can be found in Gardini (1983). *L. lata* is distinctive in having the combination of four setae along the posterior margin of the carapace and five setae on the hand of the chelicera. Although they lie at the lower end of the size range of *L. lata*, the males from England generally agree with previous descriptions of this species, and they are similar to material (2♂ 1♀) seen from near Třeboň, Czech Republic (Ducháč, 1993a). There is considerable overlap between the size and proportions of the palps of *L. lata* and the Spanish species, *L. spelaea* Beier, if one ignores Beier's (1963) apparently anomalous measurements of *L. lata*, based on one female. Gardini (1983) separated *L. lata* from *L. spelaea* using the number of setae on the cheliceral hand: 5 in *lata* and 6 in *spelaea*. It remains to be seen whether this surprising number of setae is characteristic of *L. spelaea*, though it was also recorded in its synonym, *L. hispanica* Beier (Beier, 1939).

Natural history

Ressl & Beier (1958) recorded nymphs of *L. lata* as occurring from May to June in Austria; Dumitresco & Orghidan (1964) found deuto- and tritonymphs in April. The collection of the protonymph early in June indicates that development in Britain might be slightly delayed in relation to more southern European populations.

All *Larca* species are xerophilic, being restricted to dry, dusty habitats. *L. lata* is the only epigean species in Europe, the other two species having been found in caves in Spain and Italy (Fig. 10). Most records of *L. lata* are from tree holes in old, living trees, particularly oak. Rafalski (1953) stated that, in Poland, it is "markedly stenotopic", occurring "exclusively in holes inside the oldest mouldering oak-trees, among the mould and dry leaves". Elsewhere, it has also been found in an old elm (Lohmander, 1939); debris under an old (over 100 years) ivy (Beier, 1956); debris of an old wasps' nest (*Vespa*) in a thousand-year-old oak (Hansen, 1884); debris in an abandoned ants' nest at the base of an old oak and under hard bark (Drogla & Lippold, 1994); bat guano in a cave (Dumitresco & Orghidan, 1964); and in fissures of a calcareous rock-face (Dumitresco & Orghidan, 1964).

It has also been found in association with the nests of mice and birds (Ressl, 1963), especially those of black redstarts (*Phoenicurus ochruros*). Ressl (1965) suggested that this may be the result of phoresy on parasitic insects, and recorded a female *L. lata* caught on a mosquito (near a bird's nest) in Austria. A North American species, *L. chamberlini* Benedict & Malcolm, has been found both phoretic on a mosquito and in association with roosting mosquitoes (Benedict & Malcolm, 1977). It seems that *Larca* species may be predominantly, or even exclusively, phoretic on mosquitoes. Such a specialisation, if confirmed, would be very interesting, particularly since the Larcidae are relatively primitive in comparison with other phoretic pseudoscorpions (e.g. Chernetidae).

It is notable that all of the northern records of this species are from old/ancient trees, whereas its habitat preferences are wider in central and southern Europe. The common factor seems to be a requirement for a dry habitat, and it may be that other (natural) niches, such as caves, are too damp in northerly latitudes. A similar argument has been made by Jones (1980b) for *Dendrochernes cyrneus* (L. Koch), which is restricted to old oaks in Britain. However, it is curious that *L. lata* has not been found synanthropically in Britain, particularly from farm buildings, despite relatively intensive sampling of such habitats. Ressl (1965) suggested that it has been undergoing an expansion of its range, in association with that of the black redstart, since the turn of the century, whereas Beier (1970) regarded it as relictual in distribution. Given the rarity of *L. lata* and our limited knowledge of its ecology, it is hard to decide which — if either — of these hypotheses is correct.

In view of its restricted niche preferences (at least in northern Europe) and the fact that it is known from only a single locality, *L. lata* is probably one of the rarest and most vulnerable of British pseudoscorpions. Its presence in Windsor Great Park, along with the rare or uncommon *D. cyrneus, Allochernes wideri* (C. L. Koch) and *Chernes cimicoides* (Fabricius) (Jones, 1980a), again emphasises the importance of ancient woodlands — particularly old oaks — for conservation (cf. Gärdenfors & Wilander, 1995).

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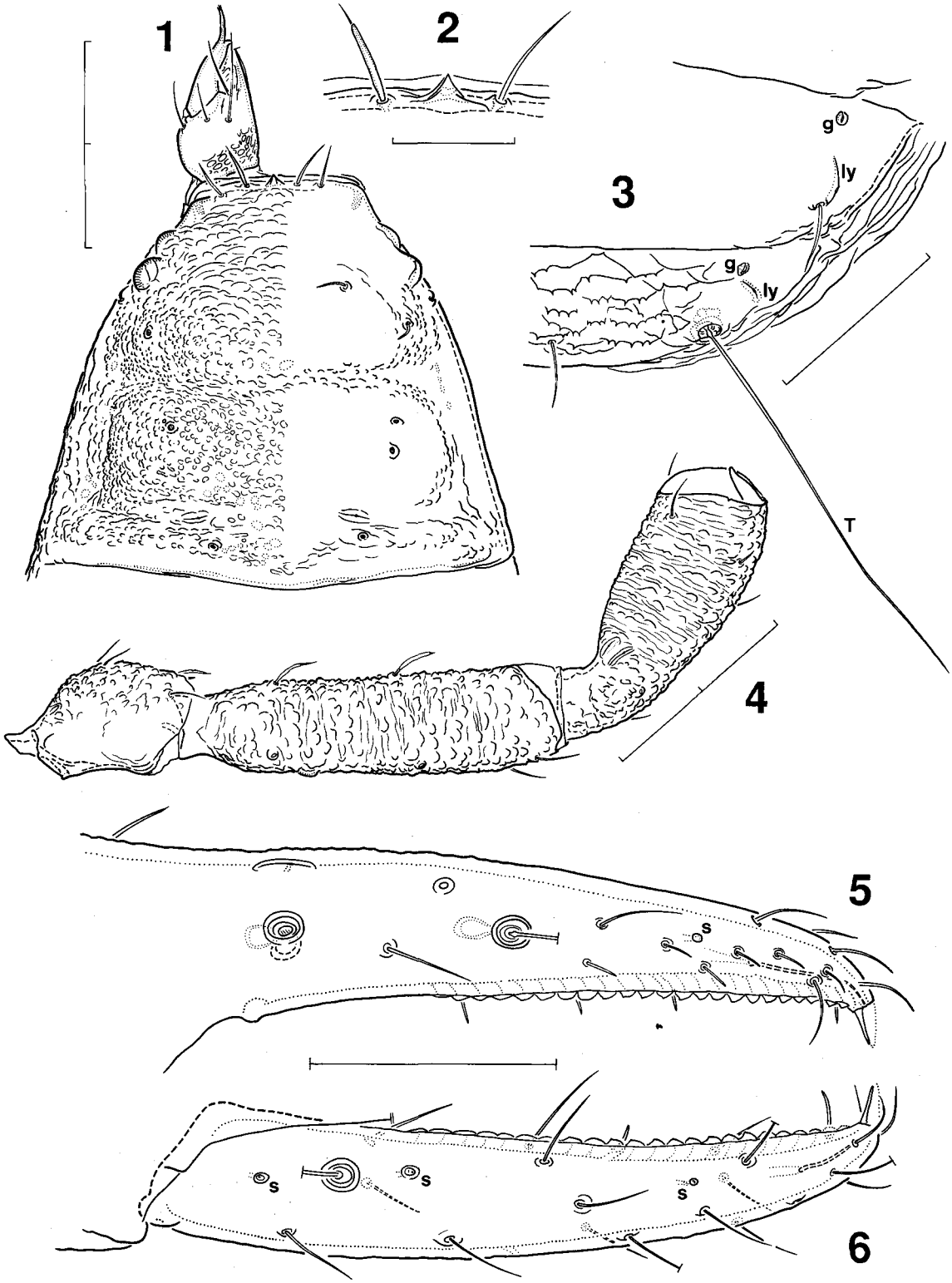
posterolateral lyrifissure; palp coxa with 5–6 setae (3–4 of which on manducatory process: "sensory seta" doubled on left coxa); pedal coxae each with a single, fairly long, median seta; breadth across coxae increases only slightly, posteriorly.

Sternites undivided; with only weak granulation, denticulate on IX (weak)–XI; gland pores absent; chaetotaxy II 0: III–VIII 2 (lateral setae absent): IX–XI 4: XII 2; sternites II–VIII with a median pair of lyrifissures, VI–X with posterolateral lyrifissure; tracheae short and small in diameter.

Chelicera (Fig. 1): hand with 4 setae (*sb* absent); 2 lyrifissures, one near setae *is* and *ls*, other just below flagellum; serrula interior with a spiniform apical blade,



Figs. 1–6: *Larca lata*, protonymph. **1** Carapace (slightly distorted) and left chelicera; **2** Epistome and adjacent setae (note exudate on left seta); **3** Tergites X and XI (right half), showing trichobothrium (*T*), lyrifissures (*ly*) and glandular pores (*g*) (granulation only shown in part); **4** Dorsal view of right palp, minus chela; **5** Fixed finger of right chela; **6** Movable finger of right chela (both foreshortened distally, due to curvature of fingers) (*s*=sensilla). Scale lines=0.2 mm (Figs. 1, 3), 0.05 mm (Fig. 2), 0.1 mm (Figs. 4–6).

followed by 4 small, denticulate blades, and 4 broad, rounded blades basally; serrula exterior with 9 blades, basal blade longer and broader than others; lamina exterior thin; flagellum four-bladed, anterior blade with 5 well-spaced spinules, others smooth, last blade small; movable finger without seta *gs*; spinneret long, with three rami (distally bifid, with a subapical ramus); each finger with about 4 indistinct teeth.

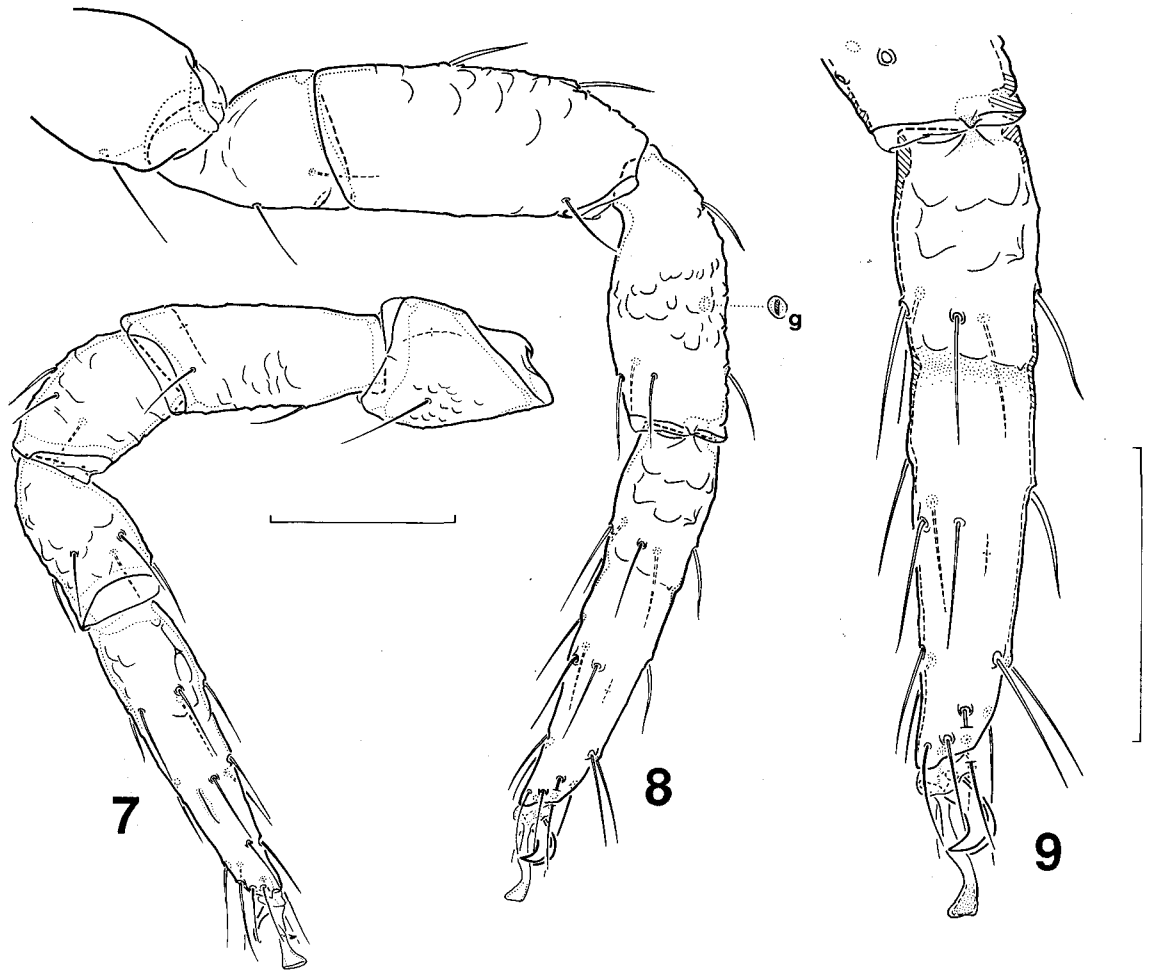
Palp (Figs. 4–6): strongly granulated; femur with a sub-basal, proximal lyrifissure, set on a tubercle; some (anterior) setae of trochanter and femur with secretion; patella with two, dorsal lyrifissures near pedicel; each finger of chela with about 23 teeth; several chemosensory setae present distally on fixed finger; movable finger with three sensilla — 1 subapical, 1 in front and 1 behind trichobothrium *t*.

Legs (Figs. 7–9) with scaly granulation; basi- and telotarsi fused, but position of joint on posterior legs shows a weak constriction (vestige of division) about 0.4 from base (Fig. 9); tarsus I with a moderate torsion (looking distad from base of right leg, it is increasingly twisted anticlockwise); tibiae III and IV with a raised gland-pore on posterior face, about one-third from distal end; arolia nearly twice as long as claws, setae without secretion, slightly recurved at tip; chaetotaxy: leg I (trochanter to tarsus) — 1: 2: 3: 5: 5+12 (17); leg IV — 1: 2: 3: 5: 5+15 (20).

Measurements (in mm; standard ratios in parentheses): Total length 1.3; carapace 0.41 × 0.48 (b/l 1.2). Palp: femur 0.37 × 0.10 (3.8); patella 0.31 × 0.21 (1.5); hand (including pedicel) 0.30 × *c.* 0.14 (*c.* 2.1); movable finger 0.30 (m.f./hand 1.0); chela 0.57 (*c.* 4.1). Leg I: femur 0.14 × 0.06 (2.3); patella 0.08 × 0.06 (1.3); tibia 0.10 × 0.055 (1.8); tarsus 0.18 × 0.05 (3.6). Leg IV: femur 0.12 × 0.08 (1.5); patella 0.18 × 0.08 (2.3); tibia 0.16 × 0.07 (2.5); tarsus 0.22 × 0.05 (4.4) (vestigial division between basi- and telotarsus 0.38 from base).

Brief description of male

Carapace chaetotaxy 20–24: 7–8: 4 (31–36), anterior margin with 8–9, posterior margin with 4 setae. Cheliceral hand with 5 setae; spinneret of movable finger with vestiges of 3 rami. Tergal chaetotaxy 4–6: 6–7: 8–10: 9–12: 10–12: 10–11: 10–11: 9–10: 8–9: T(4–6)T: 10–12: 2. Fingers of chela each with 31–33 teeth. Coxal setae P 3+9–10 (1 lateral), I 6–8 (1 lateral), II 6–7 (1 lateral), III 8–12, IV 14–17. Anterior genital operculum with 20–22 small setae (most grouped medially) and about 8 small lyrifissures; posterior operculum with 21–27 setae (most



Figs. 7–9: *Larca lata*, protonymph, legs (granulation only shown in part). **7** Right leg I; **8** Left leg IV (trochanter incomplete), with detail (slightly enlarged) of tibial gland-pore (*g*); **9** Fused tarsi of left leg IV (constriction between basi- and telotarsus emphasised by stippling). Scale lines=0.1 mm.