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Studies on species of Holarctic *Pardosa* groups (Araneae, Lycosidae). VIII. The Palearctic species of the *Pardosa nigra* group

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Abstract

The eight Palearctic species of the *Pardosa nigra* group are reviewed, illustrated and keyed. Two of them are redescribed: *Pardosa lyrata* (Odenwall, 1901) and *P. paramushirensis* (Nakatsudi, 1937). The former is widespread in Siberia and has also been found in Mongolia while the latter has been recorded from Japan (Honshu and Hokkaido) and Russia: the Kuril Islands (a neotype is designated from topotypic material from Paramushir Island). *Pardosa fomichevi* sp. n. is described from the Maritime Province (Primorye) in Russia, based on both sexes. *Pardosa arctica* (Kulczyński, 1916) is placed as a synonym to *P. eiseni* (Thorell, 1875).

Key words: taxonomy, wolf spiders, new species, Russia

Introduction

Within the speciose wolf spider genus *Pardosa* C.L. Koch, 1847, several species have been assigned into separate, informal species-groups due to shared characteristics of the copulatory organs (e.g. Zyuzin 1979; Dondale & Redner 1990). One of these, the *Pardosa nigra* group, is represented by several species both in the Nearctic and the Palearctic regions. The Nearctic species were revised by Lowrie & Dondale (1981). The Palearctic species were listed by Zyuzin (1979) except for *P. paramushirensis* (Nakatsudi, 1937). Of these, *P. luciae* Tongiorgi, 1966 was later found to be conspecific with the Nearctic *P. uintana* Gertsch, 1933 (Kronstedt 2004). The aim of the present paper is to provide an overview of the Palearctic *Pardosa nigra* group species.

In 1976, the senior author was able to trace some poorly labelled syntypes of *P. lyrata* (Odenwall, 1901) in ZMUH and to find additional material in ZIL (now ZISP). Later, more material became available. As there has been no full description of this species since it was originally described by Odenwall (1901), we provide a redescription below.

Pardosa paramushirensis was originally described from a female collected on Paramushir Island (Northern Kuril Islands). Although the holotype is lost, it has been regarded as conspecific with a species found in Japan and previously reported under different names. Tanaka (1993) redescribed this species from Japanese material under the name *Pardosa paramushirensis* and the redescription below gives additional characteristics of this species. Material recently collected by the second author in Paramushir Island is conspecific with specimens from Japan, confirming the identity of this species.

Material recently collected in the Russian Far East by the third author proved to represent a previously unknown species, which is described below.

Material and methods

The material studied is preserved in the following collections:

GTS	Gornotaezhnaya Station FEB RAS, Gornotaezhnoe Village, Ussuriysky District, Primorsky Krai, Russia
IBPN	Institute for Biological Problems of the North, Magadan, Russia
ISEA	Institute for Systematics and Ecology of Animals, Novosibirsk, Russia
MMUM	Manchester Museum, University of Manchester, Manchester, UK
NHRS	Swedish Museum of Natural History, Stockholm, Sweden
ZISP	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
ZMMU	Zoological Museum, Moscow State University, Moscow, Russia
ZMUH	Zoological Museum, Helsinki University, Helsinki, Finland
ZMUT	Zoological Museum, Turku University, Turku, Finland

Reference to material housed in:

SMF	Senckenberg Naturmuseum, Frankfurt, Germany
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Origin of specimens used for illustrations (additional information under the respective species and in Kronstedt 2004): *Pardosa eiseni*: ♂ Sweden: Torne Lappmark, Abisko (Figs 36, 44–45, 75, 98–99), Kårsovaggejokk (Fig. 114); ♀ Russia: Magadan Oblast, Kulu River (Figs 1, 9, 20, 28, 59, 67, 90), Upper Kolyma (Fig. 121).—*P. fomichevi*: ♂♀ type locality (Figs 2, 10, 17–18, 21, 29, 37, 46–47, 60, 68, 77–78, 91, 100–101).—*P. giebeli*: ♂♀ Austria: Carinthia, Hohtor, Glockner road (Figs 3, 22, 30, 38, 48, 61, 69, 76, 92, 102–103, 115); ♀ Switzerland: Uri, Gemstock (Fig. 122).—*P. lasciva*: ♂ Sweden: Lule Lappmark, Muddus (Figs 49–50); ♂♀ Russia: Krasnoyarsk Krai, Mirnoye Village (Figs 39, 79–80, 104–105, 116, 123).—*P. lyrata*: ♂ lectotype (Fig. 85), ♀ paralectotype (Fig. 86); ♂ Russia: Yakutia, Kochegarovo Village (Figs 5, 13, 24, 32, 40, 63, 71, 81, 117, 124); ♀ Russia: Amur Oblast, River Sivokan (Figs 51–52, 87, 106–107); ♀ Russia: Magadan Oblast, Talon (Fig. 94).—*P. nigra*: ♂♀ Austria: Salzburg, Schafberg (Figs 6, 14, 25, 33, 53–54, 64, 72, 95); ♂♀ Austria: Tirol, Innsbruck (Figs 41, 82, 108–109, 118, 125).—*P. paramushirensis*: ♂♀ Japan: Hokkaido, Mt Daisetsu (Figs 7, 15, 26, 34, 42, 55–56, 65, 73, 83, 88–89, 110–111); ♀ Russia: Paramushir, Ebeko volcano (Fig. 96, 119, 126).—*P. trailli*: ♂♀ Sweden: Dalarna, Mt Stådjan (Figs 8, 16, 27, 35, 66, 74, 97); ♂♀ Sweden: Härjedalen, Mt Hovärken (Figs 19, 43, 57–58, 84, 112–113); ♀ Sweden: Härjedalen, Gråsidan (Fig. 120, 127).

Micrographs were made by the first author using a Hitachi S–4300 scanning electron microscope at the Swedish Museum of Natural History. Digital colour photographs of specimens in ethanol were taken by the third author using an Olympus SZX12 stereomicroscope with an Olympus Camedia C–520 camera at the Zoological Museum in Turku.

Measurements (except for eyes) are in mm and refer to specified individuals. Eyepiece micrometer units (as given for eyes) can be converted to mm by dividing by 80. Eye row distances are measured as in Kronstedt (1975).

Abbreviations. *Eyes*: ALE, anterior lateral; AME, anterior median; PLE, posterior lateral; PME, posterior median. *Legs and palp*: Fe, femur; Pt, patella; Ti, tibia; Mt, metatarsus; Ta, tarsus; Cy, cymbium.

Taxonomy

Family Lycosidae Sundevall, 1833

Genus *Pardosa* C. L. Koch, 1847

The *Pardosa nigra* group. The following 16 species are placed in this group:

Palaearctic	Nearctic
<i>P. eiseni</i> (Thorell, 1875)	<i>P. dorsalis</i> Banks, 1894
<i>P. fomichevi</i> sp. n.	<i>P. dorsuncata</i> Lowrie & Dondale, 1981
<i>P. giebeli</i> (Pavesi, 1873)	<i>P. gothicana</i> Lowrie & Dondale, 1981
<i>P. lasciva</i> L. Koch, 1879	<i>P. hetchi</i> Chamberlin & Ivie, 1942
<i>P. lyrata</i> (Odenwall, 1901)	<i>P. mackenziana</i> (Keyserling, 1877)
<i>P. nigra</i> (C.L. Koch, 1834)	<i>P. rainieriana</i> Lowrie & Dondale, 1981
<i>P. paramushirensis</i> (Nakatsudi, 1937)	<i>P. uintana</i> Gertsch, 1933
<i>P. trailli</i> (O. Pickard-Cambridge, 1873)	<i>P. uncata</i> (Thorell, 1877)

We recognize this group by the following characters, in the male copulatory organs: 1) tegulum strongly protruding ventrad (Figs 1–16), and (2) terminal apophysis prominent, characteristically connected to palea (Figs 59–66, 75–84); and in the epigyne: 3) comparatively long and narrow anterior part with one pocket (hood) in front, followed by wide posterior part with cavities (atrium) more or less filled out by septum (Figs 90–94, 96–97) (exception: *P. nigra*, Fig. 95).

***Pardosa eiseni* (Thorell, 1875)**

Figs 1, 9, 20, 28, 36, 44–45, 59, 67, 75, 90, 98–99, 114, 121, 128–129

Lycosa eiseni Thorell, 1875: 106; Holm 1947: 34, pl. 7 figs 78–79, pl. 10 fig. 42 (♂♀).

Lycosa arctica Kulczyński, 1916: 40–41, pl 2 figs 67, 70 [sic], 71 (♂♀). **Syn. n.**

Pardosa eiseni: Palmgren 1939: 41, figs 42, 59, 73, 88 (♂♀); Tongiorgi 1966: fig. 21 (♂); Kronstedt 2004: figs 3, 9–10, 15, 19, 23–24 (♂♀); Marusik & Logunov 2009: 150, figs 17–21 (♂♀); Almquist 2005: 228 (in part) figs 225a–c (♂).

Type material. *Holotype* ♀ from Sweden: Lapland (F. Björnström) in NHRS, examined.

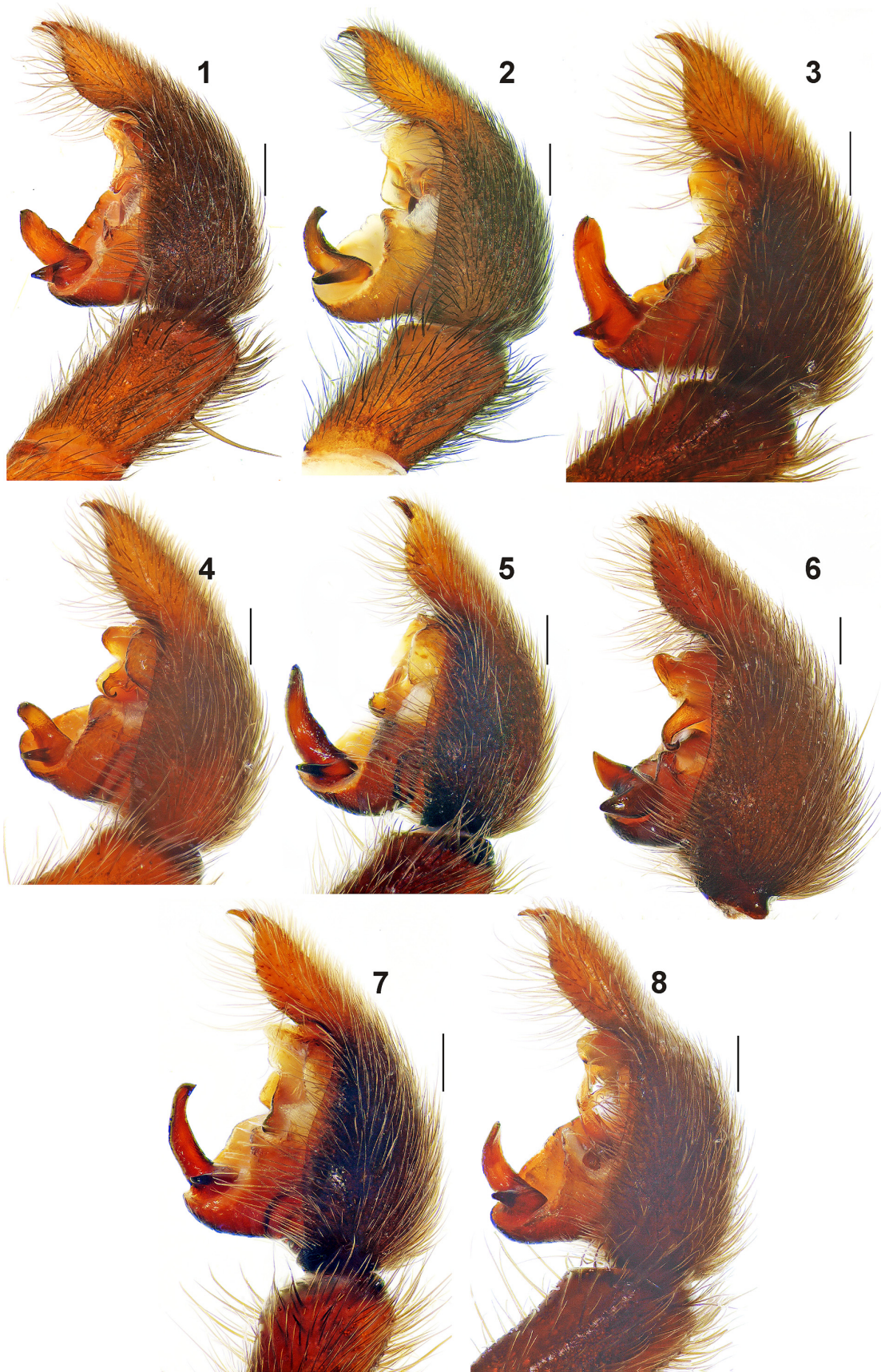
Other material examined. SWEDEN and NORWAY (see Kronstedt 2004). RUSSIA. *Yamalo-Nenets Autonomous Okrug*: Tazovsk District, Messoyakhinski wood reservation, Messo Faktoria 68°01'50"N 78°41'33"E, pitfall traps, 30 June–5 July 2008 (M.A. Khrysanova) 45♂♀. *Krasnoyarsk Krai*: Dudinka, 1–3 September 1875 (A. Stuxberg, NHRS), 2♀; 'Vershininsk' [=Izba Vershininskaya], 5 September 1875 (A. Nordenskiöld & A. Stuxberg, NHRS), 6♀; 'Selivaninskoy' [=Selivanikha now, part of Turukhansk Municipality], 12 September 1875 (A. Stuxberg, NHRS), 1♀; 'Turukhansk Krai', at Yenisey River (K.M. Rychkov, ZISP), 2♀. *Yakutia*: Yana River lower flow, Kular Village environs (70.35°N 134.34°E), July 1996 (N.N. Vinokurov, IBPN), 12♂ 2♀. *Primorsky Krai*: Chuguevskiy District, Oblachnaya Mt., mountain tundra, 1700 m (43°41'21"N 134°11'18"E), August 2003 (M.M. Omelko, GTS), 12♀, June 2008 (M.M. Omelko, GTS), 15♂ 8♀; Krasnoarmeisk District, Ozernoe Plateau, mountain tundra, 1509 m (45°50'58"N 136°38'41"E), June 2011 (M.M. Omelko, GTS), 8♂6♀. *Magadan Oblast*: Kolyma River upper flow, Field Station "Kontakt" (61°40'N 147°30'E), July–August 1987 (S.P. Bukhhalo, IBPN), 3♂; Kulu River upper flow, Kontakt Field Station (61°51'N 147°40'E), summer 1999 (S.P. Bukhhalo, IBPN) 36♂ 3♀; 29 km N of Magadan, Dukcha River valley (59°43'N 151°E), summers 1999–2000 (S.P. Bukhhalo, IBPN), 29♂ 5♀; more material in Kronstedt (2004). Extensive material of this species was examined for, *inter alia*, Logunov & Marusik (1995: Chita Oblast), Koponen *et al.* (1998: Polar Ural), Marusik *et al.* (1992: Magadan Oblast; 1993: Yakutia; 2000: Tuva), Marusik & Logunov (2009: Altai), Marusik (2005: Northern Cisokhotia).

Comments. Kulczyński's (1916) description of *Lycosa arctica* clearly shows that this species is conspecific with *Pardosa eiseni*. His illustrations depict the species specific shape of the embolus (pl. 2 fig. 67) as well as the close position of the proximal parts of the horn-like structures (with fertilization ducts) in the epigyne (pl. 2 fig. 71). However, he seems to have mixed up pl. 2 figs 69 and 70: the former should show *P. giebelsi* and the latter *P. eiseni*. Holm (1950: 126) mentioned *P. arctica* under *P. eiseni*, evidently indicating synonymy (not accepted in Platnick 2014).

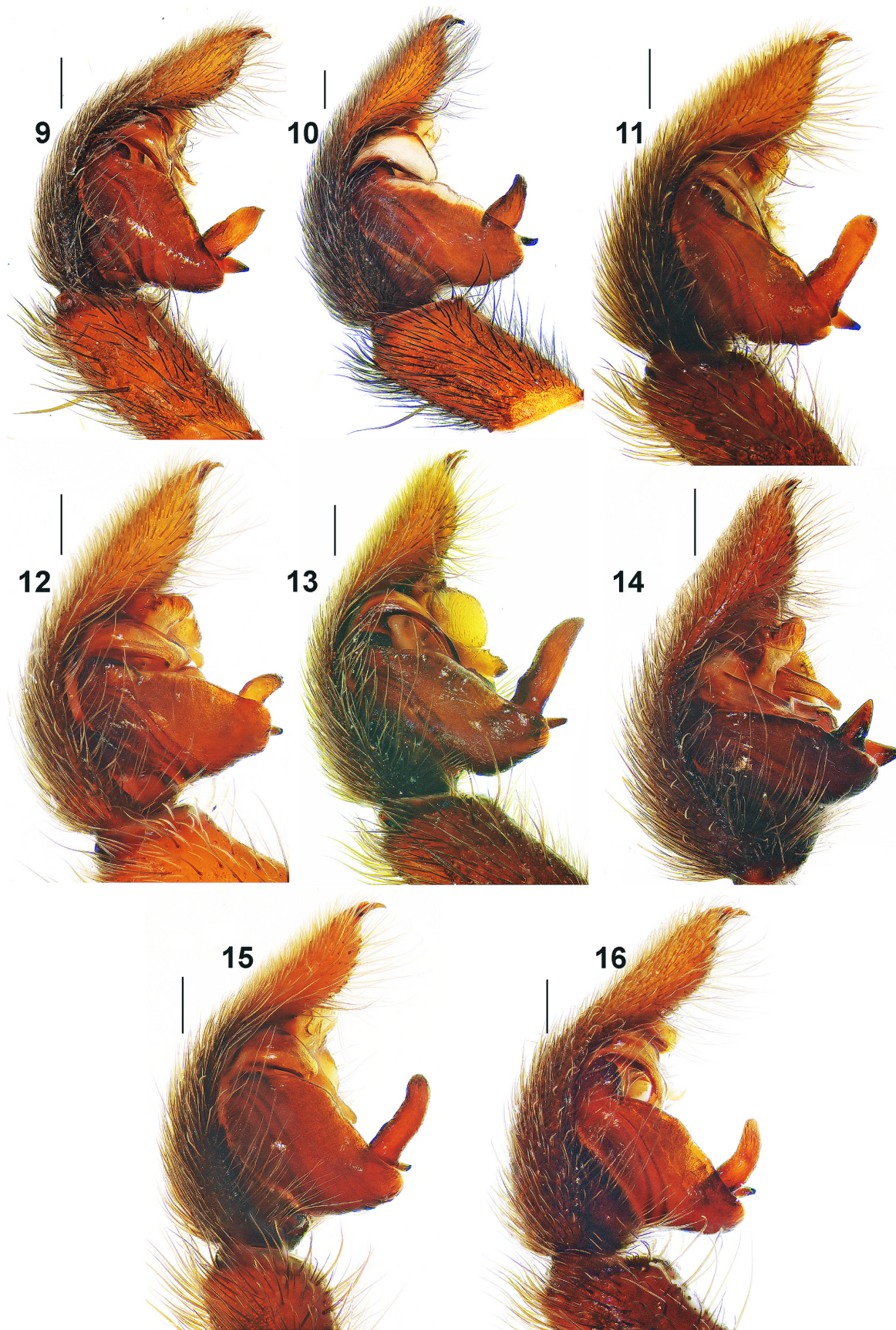
The species was most recently described in Almquist (2005). Regrettably, he seems to have confused *P. eiseni* and *P. trailli*. His figs 225a–e are said to illustrate male and female of *P. eiseni*. While figs 225a–c clearly show a male of *P. eiseni* (specific shape of embolus), fig. 225e evidently shows a dorsal (internal) view of an epigyne of *P. trailli*: the horn-like structures (with fertilization ducts) are far apart in this species compared to the configuration in *P. eiseni*. It is hard to judge which of these two species is represented in his fig. 225d. The map of distribution in Sweden (Almquist 2005: 228) erroneously shows occurrence in the province of Dalarna (instead of *P. trailli*).

Habitat. The species occurs in a variety of habitats, preferably on dry ground, at elevations from 600 to 1400 m (Marusik 1988). In Sokhondo Reserve (Chita Oblast), *P. eiseni* occurs in mountain deciduous and mixed taiga forest and in moss-lichen tundra (including boggy sites) (Logunov & Marusik 1995). (See also under Habitat for *P. lyrata* below.) In Fennoscandia this species is restricted to the north, and inhabits dry sites in subalpine birch forests, *inter alia* in heaps of rocks, as well as in alpine dwarf shrub heaths in the Torneträsk area of northern Lapland (Holm 1950). In northernmost Finland (Utsjoki: Kevo), this species has been found in high numbers from pine forest up to low alpine heath (about 90 to 320 m) (Koponen 1976). In Primorsky Krai it occurs only in alpine tundras (about 1600–1800 m asl).

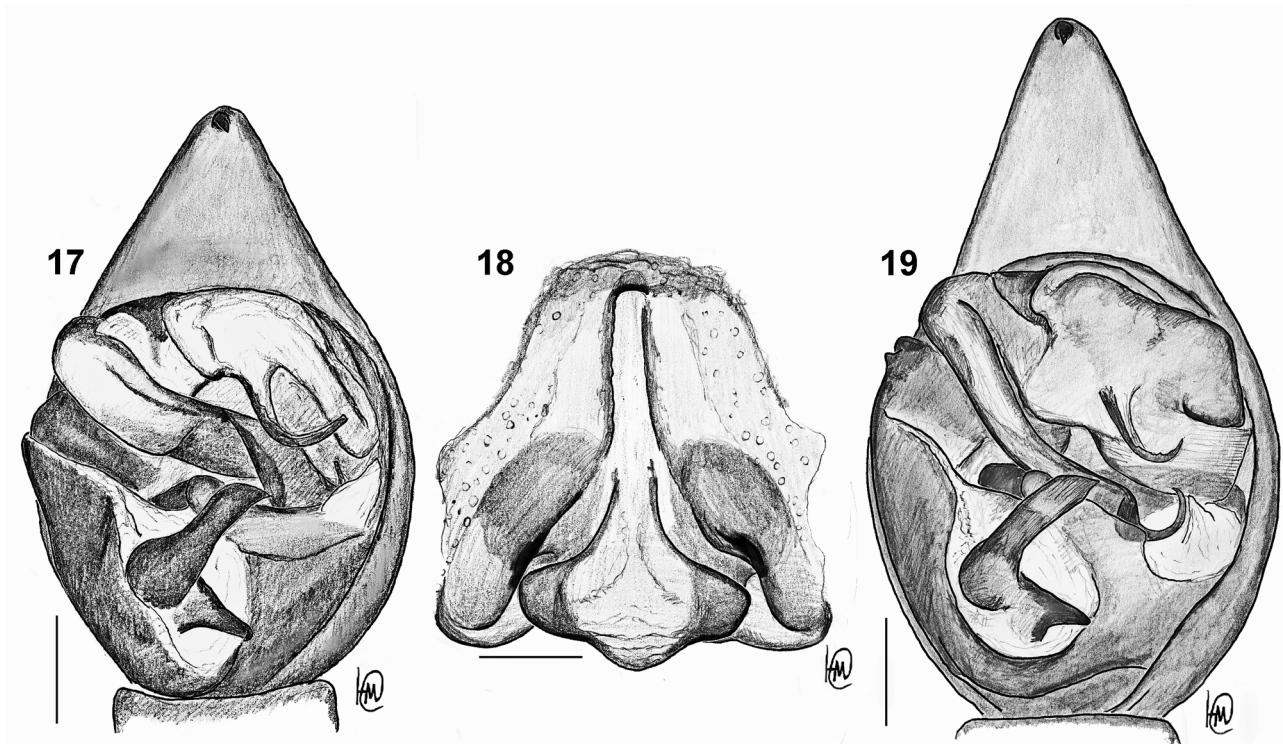
Distribution (Figs 128–129). Wide distribution in the Palearctic, from Norway in the west to Chukotka in the east, southward to Mongolia and Primorsky Krai (Marusik *et al.* 2000: map 148).



FIGURES 1–8. Left male palp, retrolateral. 1, *Pardosa eiseni*. 2, *P. fomichevi* sp. n. 3, *P. giebeli*. 4, *P. lasciva*. 5, *P. lyrata*. 6, *P. nigra*. 7, *P. paramushirensis*. 8, *P. trailli*. Scale lines 0.2 mm.



FIGURES 9–16. Left male palp, prolateral. 9, *Pardosa eiseni*. 10, *P. fomichevi* sp. n. 11, *P. giebeli*. 12, *P. lasciva*. 13, *P. lyrata*. 14, *P. nigra*. 15, *P. paramushirensis*. 16, *P. trailli*. Scale lines 0.2 mm.



FIGURES 17–19. 17–18, *Pardosa fomichevi* sp. n.: left male palp (17), epigyne (18). 19, *P. trailli*: left male palp. Scale lines 0.2 mm.

***Pardosa fomichevi* sp. n.**

Figs 2, 10, 17–18, 21, 29, 37, 46–47, 60, 68, 77–78, 91, 100–101, 129–130

Type material. *Holotype* ♂ and *allotype* ♀ from Russia: Primorsky Krai, Krasnoarmeisk District, slope of Ozernoe Plateau, glades near road, 1359 m (45°50'46"N 136°37'31"E) (M.M. Omelko), in ZMMU.—*Paratypes*. RUSSIA. *Primorsky Krai*: same data as holotype (ISEA, NHRS), 2♂.

Etymology. The specific epithet is a patronym for our colleague Alexander Fomichev from Novosibirsk.

Diagnosis. Males can be distinguished from all other members of this group by the curvature of the embolus (Figs 46–47); females by the lateral elevations in the posterior part of the epigyne being at some distance from the septum and their margins diverging at the rear ends (Fig. 18).

Description. Male (holotype): Total length 6.2. Carapace 3.10 long, 2.35 wide.

Prosoma. Carapace brownish. Median band yellowish, narrowed at cephalic-thoracic junction, wide behind PLEs. Lateral bands indistinct, yellowish brown, narrow, broken. Carapace with dark and adpressed light hairs on thoracic sides, median band with adpressed white hairs. Clypeus light brownish. Chelicerae light brownish with longitudinal darker streaks and yellow inside. Sternum dark greyish brown with narrow light stripe in front, furnished with light hairs.

Eyes. Width of row I (slightly procurved) 48, row II 69, row III 94, row II-III 67. Diameter of AME 10, ALE 9, PME 25, PLE 21. Distance between AME 5, between AME and ALE 3.

Opisthosoma. Dorsum brownish, covered with adpressed light hairs and more erect black hairs. Anterior part and lanceolate stripe with dense light pubescence. Dorsum patterned with black, notably laterally, forming two pairs of black blotches. Venter brown with adpressed light pubescence and numerous scattered short erect hairs. Spinnerets partly sooty with short black hairs.

Legs (Table 1). Yellowish. Femora more or less pseudoannulated (=blotches and incomplete transverse markings) in greyish, Fe I and II with proximal half dark greyish. Ti III and IV with very weak darker annulation. Ti I with 3 pairs of ventral spines and two retrolateral spines.

TABLE 1. Leg I–IV measurements (mm) of *Pardosa fomichevi* sp. n., *P. lyrata* and *P. paramushirensis*.*Pardosa fomichevi*

Male

	Fe	Pt	Ti	Mt	Ta	Total
I	2.55	1.10	2.15	2.40	1.55	9.75
II	2.45	1.05	1.95	2.35	1.40	9.20
III	2.30	1.00	1.80	2.55	1.30	8.95
IV	3.00	1.10	2.40	3.90	1.75	12.15

Female

	Fe	Pt	Ti	Mt	Ta	Total
I	2.80	1.25	2.30	2.30	1.40	10.05
II	2.70	1.20	2.10	2.30	1.35	9.65
III	2.60	1.10	1.95	2.65	1.30	9.60
IV	3.50	1.30	2.85	4.45	1.80	13.90

Pardosa lyrata

Male

	Fe	Pt	Ti	Mt	Ta	Total
I	2.50	1.10	2.40	2.65	1.60	10.25
II	2.40	1.05	2.05	2.50	1.40	9.40
III	2.30	1.00	1.80	2.60	1.30	9.00
IV	3.00	1.10	2.50	4.10	1.75	12.45

Female

	Fe	Pt	Ti	Mt	Ta	Total
I	2.70	1.20	2.30	2.30	1.35	9.85
II	2.60	1.15	2.05	2.25	1.30	9.35
III	2.45	1.05	1.90	2.60	1.25	9.25
IV	3.25	1.20	2.75	4.20	1.70	13.10

Pardosa paramushirensis

Male

	Fe	Pt	Ti	Mt	Ta	Total
I	2.50	1.10	2.05	2.30	1.45	9.40
II	2.35	1.05	1.85	2.20	1.35	8.80
III	2.30	1.00	1.70	2.45	1.30	8.75
IV	3.00	1.10	2.35	3.80	1.75	12.00

Female

	Fe	Pt	Ti	Mt	Ta	Total
I	2.50	1.25	2.10	2.10	1.35	9.30
II	2.50	1.20	1.85	2.10	1.30	8.95
III	2.40	1.10	1.85	2.40	1.25	9.00
IV	3.15	1.25	2.70	3.95	1.70	12.75



FIGURES 20–27. Bulbus of left male palp in ventral view. 20, *Pardosa eiseni*. 21, *P. fomichevi* sp. n. 22, *P. giebeli*. 23, *P. lasciva*. 24, *P. lyrata*. 25, *P. nigra*. 26, *P. paramushirensis*. 27, *P. trailli*. Scale lines 0.2 mm.

Palp (Figs 2, 10, 17, 21, 29). Pt 0.65, Ti 0.60, Cy 1.35. Brownish with darker markings. Longitudinal darker markings on Ti with numerous strong black hairs. Cy blackish, distally light brown to yellowish. Tegular apophysis with $\frac{3}{4}$ of prolaterad rim of anteriorly directed branch very slightly concave (Figs 17, 22, 37). Conductor as in Fig 78, terminal apophysis as in Figs 60, 68 & 77–78. Embolus (Figs 46–47, 60, 68) wide, screw-shaped, apically curved inwards, narrowed, and tapering to pointed tip.



FIGURES 28–35. Bulbus of left male palp in oblique ventral-frontal view. 28, *Pardosa eiseni*. 29, *P. fomichevi* sp. n. 30, *P. giebeli*. 31, *P. lasciva*. 32, *P. lyrata*. 33, *P. nigra*. 34, *P. paramushirensis*. 35, *P. trailli*. Scale lines 0.2 mm.

Female (allotype). Total length 6.8. Carapace 3.40 long, 2.60 wide.

Prosoma and opisthosoma. Carapace similar to that in the male, but with lateral bands more distinct. Opisthosoma patterned as in the male. Venter of opisthosoma brown with adpressed white pubescence.

Eyes. Width of row I (slightly procurved) 54, row II 76, row III 104, row II-III 74. Diameter of AME 11, ALE 10, PME 26, PLE 22. Distance between AME 7, between AME and ALE 4.

Legs (Table 1). Yellowish, clearly annulated in grey (femora) and light brown (patellae-metatarsi). Ti I with two retrolateral spines.

Epigyne (Figs 18, 91). Lateral elevations diverging backwards (45°) from about half the length of the epigyne. Septum only partly filling the cavities in the posterior half. Spermathecae ovoid (Figs 100–101).

Size variation. Carapace length: males 2.95–3.10 (n=3).

Distribution (Figs 129–130). Russia: Primorsky Krai (only known from the type locality).

***Pardosa giebeli* (Pavesi, 1873)**

Figs 3, 11, 22, 30, 38, 48, 61, 69, 76, 92, 102–103, 115, 122, 128

Lycosa giebeli Pavesi, 1873: 164, figs 7–9 (♂♀); Kulczyński 1916: 41 pl. 2 figs 68, 69 [sic], 72 (♂♀).

Pardosa giebeli: Tongiorgi 1966: 290, figs 15–18 (♂♀); Kronstedt 2004: figs 4, 11, 16, 20, 27–28 (♂♀).

Type material. *Syntypes* ♂ and ♀ from Switzerland: Monte Fibbia and Valle di Fortunei (see Tongiorgi 1966) in Museo Civico di Storia Naturale, Genova, Italy, not examined.

Material examined. SWITZERLAND. *Uri*: Gemstock, 5 September 1989 (P.T. Lehtinen, ZMUT), 2♀. For further material see Kronstedt (2004).

Comments. The species was well described by Tongiorgi (1966).

Platnick (2014) cites Koch (1879) with records of *P. giebeli* from Siberia. The Siberian records are, however, based on misidentifications of *P. eiseni* (Holm 1973, Koch's material collected by the Swedish Expedition to Novaya Zemlya and Yenisey in 1875 listed under *P. eiseni* above). *Pardosa giebeli* is endemic to the European Alps (Tongiorgi 1966).

Platnick (2014) erroneously lists '*Lycosa sordidata* Dahl, 1908: 388, 425, f. 86 (♂♀, misidentified)' and '*Lycosa sordidata* Dahl & Dahl 1927: 39, f. 103–104 (♂♀)' under *P. giebeli*. Dahl (1908) only had the holotype of *Pardosa sordidata* (Thorell, 1875), collected in Riesengebirge by H. Zimmermann, at hand as well as a male, which he believed to be conspecific, originating from Ayan in East Siberia. While the illustration of the female shows the epigyne of *P. sordidata*, the male palp belonged to some species in the *Pardosa nigra* group (protruding tegulum) occurring in Siberia, probably *P. eiseni* judging from the size of the tegular apophysis in Dahl's figure (see above).

Habitat. Alpine species occurring at elevations between ca 2200–3400 m asl (Thaler & Buchar 1996). A preferred alpine habitat is *Loiseleuria procumbens* stands with abundant stones (Puntscher 1980; Thaler & Buchar 1996), also grass heaths with rock fragments (Thaler 1997).

Distribution (Fig. 128). This species is restricted to Europe and known from France, Italy, Switzerland, Liechtenstein, Austria and Germany.

***Pardosa lasciva* L. Koch, 1879**

Figs 4, 12, 23, 31, 39, 49–50, 62, 70, 79–80, 93, 104–105, 116, 123, 128–130

Pardosa lasciva L. Koch, 1879: 103, pl. 3 fig. 16 (♀); Holm 1947: 35, pl. 7 figs 76, 77, pl. 10 fig. 43 (♂♀); Holm 1973: 101, figs 92–100 (♂♀); Zhou & Song 1987: 20, figs 5a–d (♀); Hu & Wu 1989: 213, figs 177: 1–2 (♀); Almquist 2005: 229, figs 226a–f (♂♀).

Pardosa guernei Simon, 1887: 457 (♀); Palmgren 1939: 42, figs 40, 74, 89 (♀). Synonymized by Holm (1973).

Type material. *Lectotype* ♀ from Russia: Krasnoyarsk Krai, Selivaninskoy (see Holm 1973) [=Selivanikha now, part of Turukhansk Municipality], in NHRS, examined.

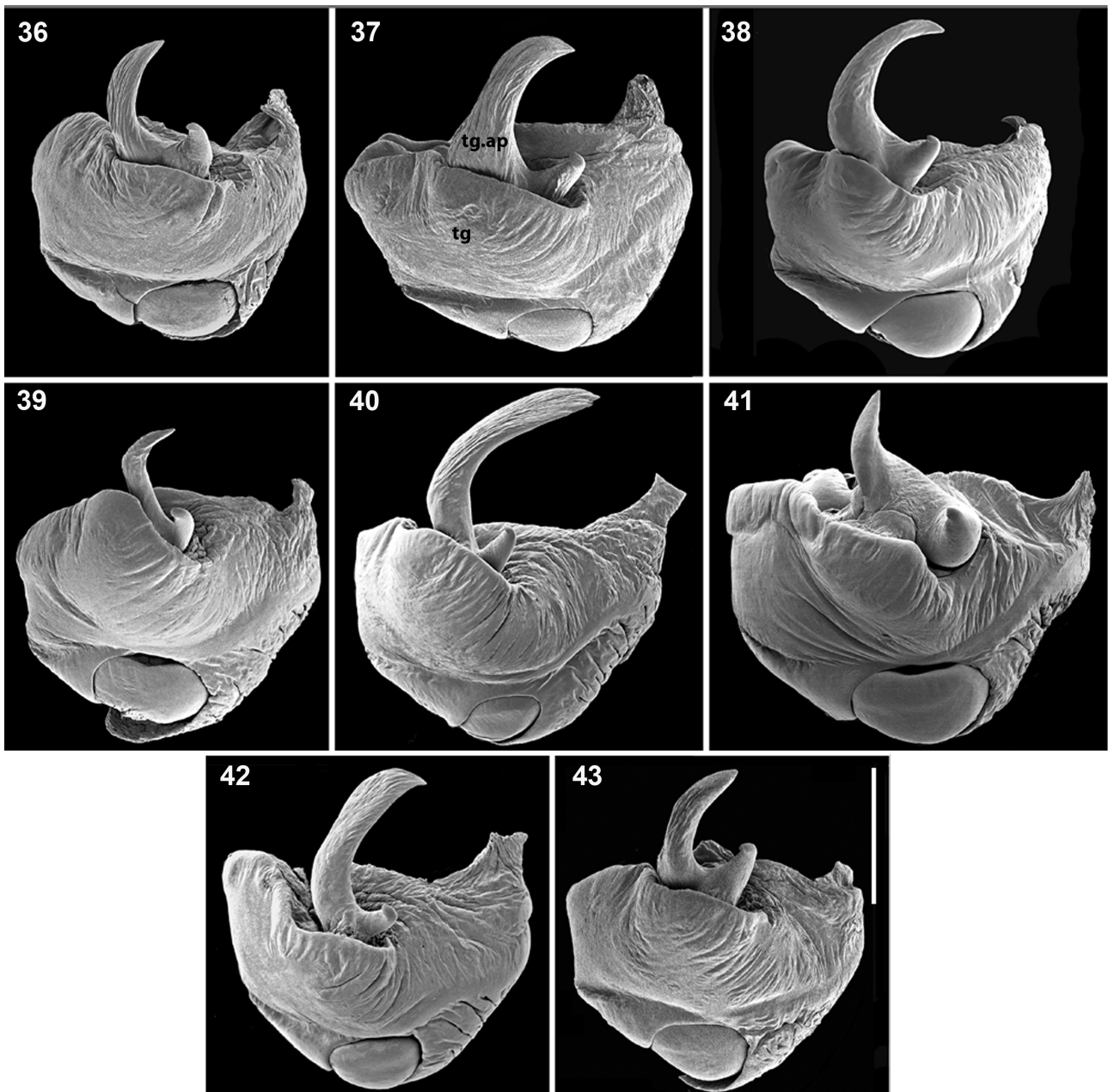
Other material examined. SWEDEN. *Lule Lappmark*: Muddus National Park, marsh in wood with *Betula nana* and *Ledum palustre* on *Sphagnum*, pitfall traps, 21–23 June 1975 (Å. Holm, NHRS), 3♂ 1♀ (Gustafsson & Holm 1980). RUSSIA. *Sverdlovsk Oblast*: Denezhkin Kamen Range, 450 m, conifer forest, July 1982 (L. Simakin, MMUM), 10♂ 1♀. *Krasnoyarsk Krai*: Mirnoye Village (62.46°N 89°E), 1988–89 (L.B. Rybalov, ZMMU, NHRS), 38♂ 4♀; Peredvinsk Village (57°N 93.5°E), June 1995 (L.B. Rybalov, MMUM), 2♂ 2♀. Sayan, 1914 (Sayanskaya Partiya Ekspeditsiya Departamenta Zemledeliya, ZISP), 1♀. Material of this species was examined for Koponen *et*

al. (1998: Polar Ural), Marusik *et al.* (2000: Tuva), Marusik *et al.* (2002: Krasnoyarsk Kray), Koponen & Marusik (1992: Yakutia), Logunov & Marusik (1995: Chita Oblast).

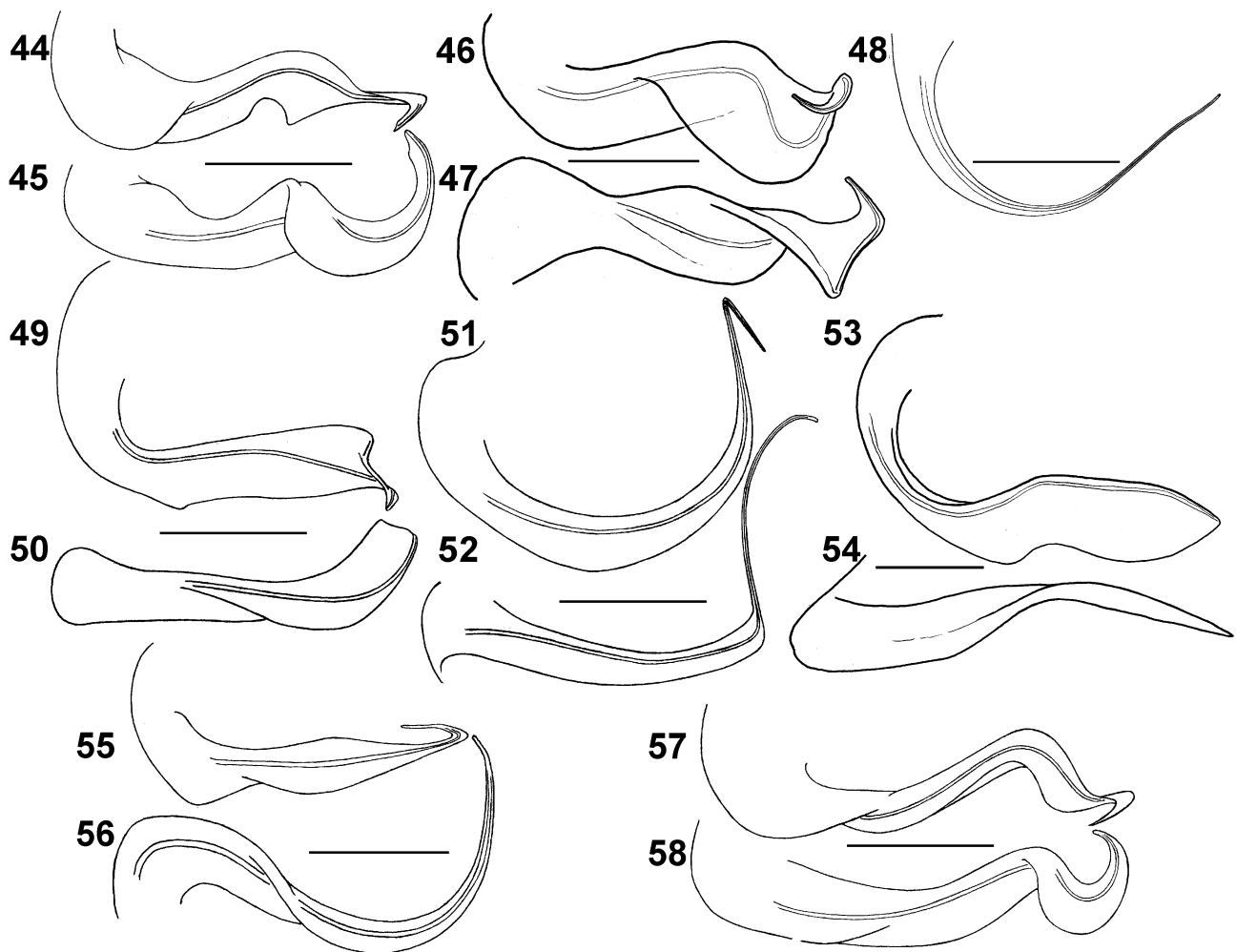
Comments. The species was described by Holm (1947) and Almquist (2005). A detailed description is found in Holm (1973), where a considerable variation in the shape of the epigyne is illustrated.

Habitat. A taiga species found in various habitats in conifer forests (e.g. pine forests with lichens, marshes etc.) (Almquist 2005). In the Sokhondo Reserve (Chita Oblast), this species was found in the same type of habitats as *P. eiseni* and *P. lyrata*, in mountain taiga forests and in deciduous and mixed forests (Logunov & Marusik 1995).

Distribution (Figs 128-130). Wide distribution in the Palearctic, from Sweden to Russia: Khabarovsk Kray (Trilikauskas 2001: Bureinsky Reserve) in the east, and south to China: Altai Mts in Xinjiang (Hu & Wu 1989).



FIGURES 36–43. Left male palp: tegulum with tegular apophysis. 36, *Pardosa eiseni*. 37, *P. fomichevi* sp. n. 38, *P. giebeli*. 39, *P. lasciva*. 40, *P. lyrata*. 41, *P. nigra*. 42, *P. paramushirensis*. 43, *P. trailli*. tg, tegulum; tg.ap, tegular apophysis. Scale line (applies to all) 300 μ m.



FIGURES 44–58. Left male palp: embolus in frontal (44, 46, 48, 49, 51, 53, 55, 57) and ventral (45, 47, 50, 52, 54, 56, 58) view. 44–45, *Pardosa eiseni*. 46–47, *P. fomichevi* sp. n. 48, *P. giebeli*. 49–50, *P. lasciva*. 51–52, *P. lyrata*. 53–54, *P. nigra*. 55–56, *P. paramushirensis*. 57–58, *P. trailli*. Scale lines 0.2 mm.

***Pardosa lyrata* (Odenwall, 1901)**

Figs 5, 13, 24, 32, 40, 51–52, 63, 71, 81, 85–87, 94, 106–107, 117, 124, 129–130

Lycosa lyrata Odenwall, 1901: 270–273, figs 16–19 (♂♀).

Pardosa lyrata: Zyuzin 1979: fig. 8 (♀).

Acantholycosa lignaria: Loksa 1965: 15, fig. 22 (♀) (misidentification).

Type material. *Lectotype* ♂ and *paralectotype* ♂ in tube labelled ‘5. *L. lyrata* Utotschkin’ and *paralectotype* ♀ in tube labelled ‘5’, all regarded as originating from Russia, Buryatia, Utotschkina [vicinity of ‘Verchne Udinsk’ (=Ulan Ude)] (E. Odenwall), in ZMUH, here designated.

Other material examined. RUSSIA. *Krasnoyarsk Krai*: Kansk District, Yeniseyskaya gub., 1914 (Sayanskaya Partiya Ekspeditsiya Departamenta Zemledeliya, ZISP), 1♀. *Amur Oblast*: Without locality, 1914 (V. Dorogostayskiy, ZISP) 1♂ 3♀; River Sivokan, 5 June 1914 (V. Dorogostayskiy, ZISP), 2♂ 4♀. *Yakutia*: Kochegarovo Village (SW of Olekminsk), 21 June 1985 (N.N. Vinokurov, NHRS), 6♂ 5♀, 22 June 1985 (N.N. Vinokurov, IBPN) 12♂. *Magadan Oblast*: Talon (N.E. Dokuchajev, IBPN), 3♂ 3♀; Kolyma River upper reaches, Biological Station ‘‘Kontakt’’ (61°40’N 147°30’E), July–August 1987 (S.P. Bukhhalo, IBPN, NHRS), 24♂ 19♀; Kolyma River upper reaches, near Sibit-Tyellakh, Summer 1987 (Y. M. Marusik, IBPN) 6♂ 3♀. *Chukotka Autonomous Okrug*: 74 km W of Anadyr City, Anadyr River near Omochi R. mouth, 613 m, 64.82°N 175.967°E, July–August 2013 (O.A. Khrulyova, ZMMU), 10♀. *Primorsky Krai*: Sikhote-Alinsky Reserve, kordon Kabany,

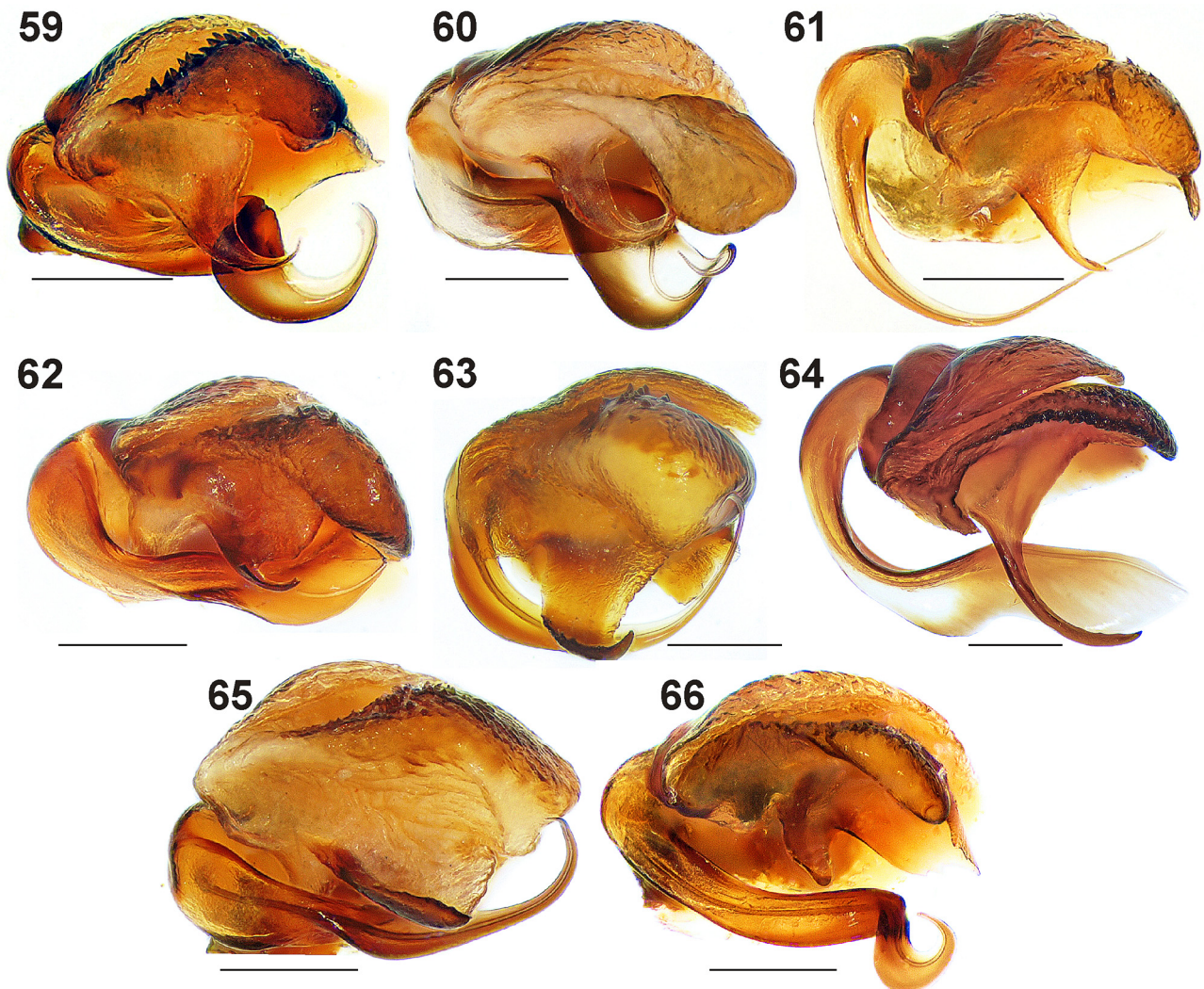
45°08'16"N 135°52'40"E, 650–900 m, taiga, 30 June–4 July 1999 (Y. Sundukov, ZMMU), 1♂. Krasnoarmeisk District, Ozernoe Plateau, 1100–1400 m, 16–17 June 2011 (M.M. Omelko, ZMMU), 1♂; Mt Oblachnaya, road in spruce forest, 1000 m, 22 June 2004 (M.M. Omelko, ZMMU), 1♂, glade in high mountain spruce forest, 1600 m, 24 June 2008 (M.M. Omelko, ZMMU), 5♂, pitfall traps at brook bank in mixed forest, 600 m, 25 June 2008 (M.M. Omelko, ZMMU), 2♂. Chuguyevsk District, Sokolovka River, Upper Ussuri Field Station, 43°50'N 134°10'E, Summer 1991 (collector unknown, ZMMU), 3♀. Material of this species was examined for Marusik *et al.* (2002: Krasnoyarsk Krai), Marusik *et al.* (1993: Yakutia), Logunov & Marusik (1995: Chita Oblast), Marusik *et al.* (1992: Magadan Oblast and Chukotka), Marusik (2005: Northern Cisokhotia), Marusik & Buchar (2004: Mongolia).

Diagnosis. Males are distinguished from all other species in this group by the long anteriorly directed branch of the tegular apophysis (Figs 24, 40) and the shape of the embolus (Figs 51–52); females by the posterior part of the septum projecting into two lateral rounded lobes (Figs 87, 94).

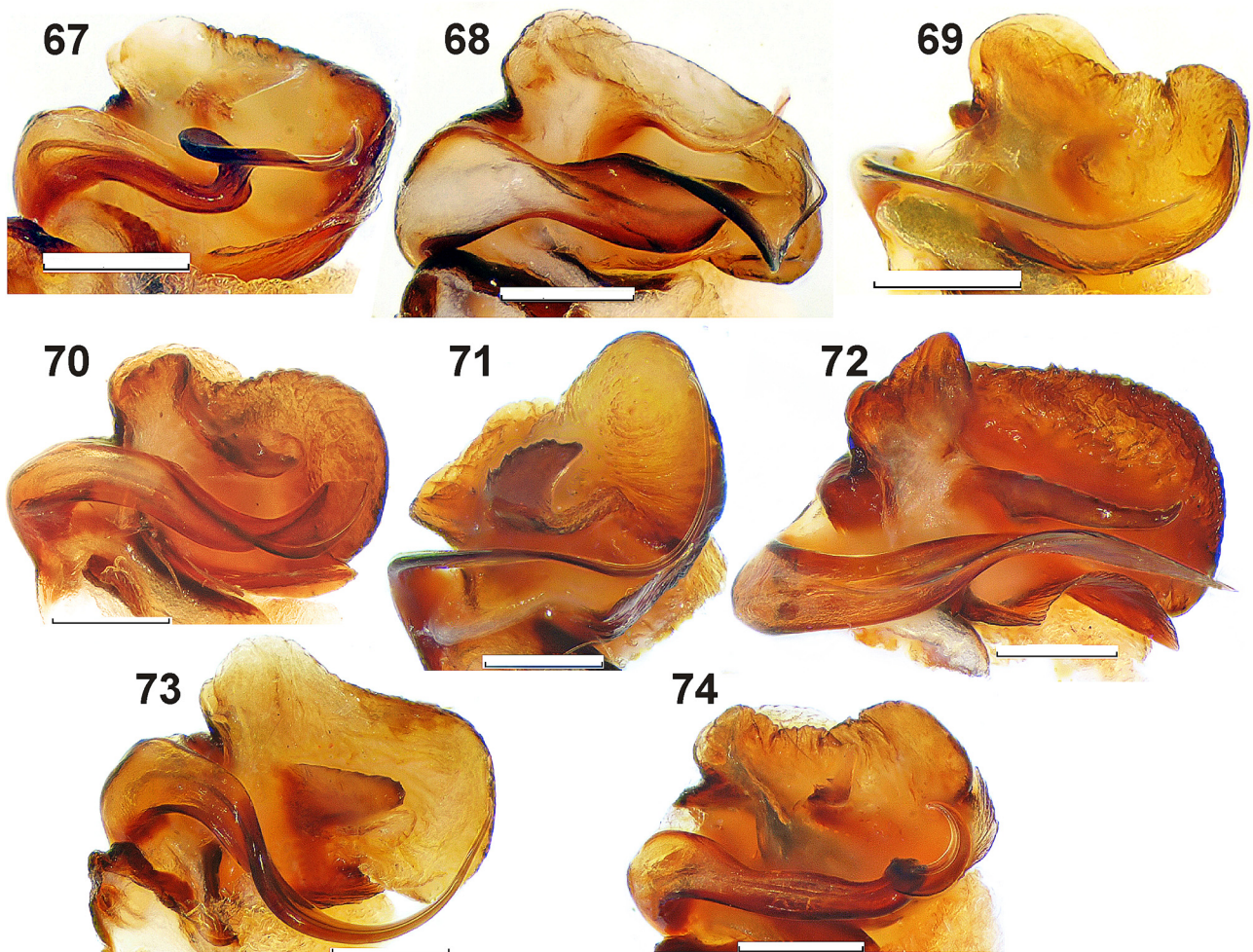
Description. Male (Magadan Oblast): Total length 6.2. Carapace 3.00 long, 2.30 wide.

Prosoma. Carapace brownish. Median band yellowish brown, narrowed at cephalic-thoracic junction, wide behind PLEs. Lateral bands indistinct, broken into spots, light brownish. Thoracic part with short dark hairs, adpressed white hairs in median band and a few in lateral spots. Clypeus and chelicerae light brown, latter with longitudinal darker streaks and yellowish on inside.

Eyes. Width of row I (slightly procurved) 47, row II 70, row III 94, row II–III 70. Diameter of AME 11, ALE 9, PME 26, PLE 22. Distance between AME 6, between AME and ALE 2.



FIGURES 59–66. Left male palp: terminal part oblique ventral-frontal view. 59, *Pardosa eiseni*. 60, *P. fomichevi* sp. n. 61, *P. giebeli*. 62, *P. lasciva*. 63, *P. lyrata*. 64, *P. nigra*. 65, *P. paramushirensis*. 66, *P. trailli*. Scale lines 0.2 mm.



FIGURES 67–74. Left male palp: terminal part ventral view. 67, *Pardosa eiseni*. 68, *P. fomichevi* sp. n. 69, *P. giebeli*. 70, *P. lasciva*. 71, *P. lyrata*. 72, *P. nigra*. 73, *P. paramushirensis*. 74, *P. trailli*. Scale lines 0.2 mm.

Opisthosoma. Dorsum brownish, covered with white adpressed hairs and more erect dark hairs. Lanceolate stripe brownish, dark-bordered. Rest of dorsum patterned with black, posterior to lanceolate stripe formed as transverse black bars with white dots of white hairs at each end. Venter light greyish brown with short adpressed light pubescence and scattered short thin dark hairs (latter hard to discern). Anterior spinnerets dark.

Legs (Table 1). Yellowish brown with faint darker annulation. Front legs comparatively long. Ti I with two retrolateral spines.

Palp (Figs 5, 13, 24, 32). Pt 0.65, Ti 0.60, Cy 1.25. Brownish, Pt lighter, Cy blackish brown, lighter apically. Tegular apophysis with very long anteriorly directed branch evenly bent retrolaterad, basal process comparatively short (Figs 24, 40). Conductor as in Fig. 81, terminal apophysis as in Figs 63, 71 & 81. Embolus long, narrow, distal part evenly curved anteriad, hair-like (Figs 51–52, 63, 71, 81).

Female (Magadan Oblast): Total length 6.5. Carapace 3.20 long, 2.45 wide.

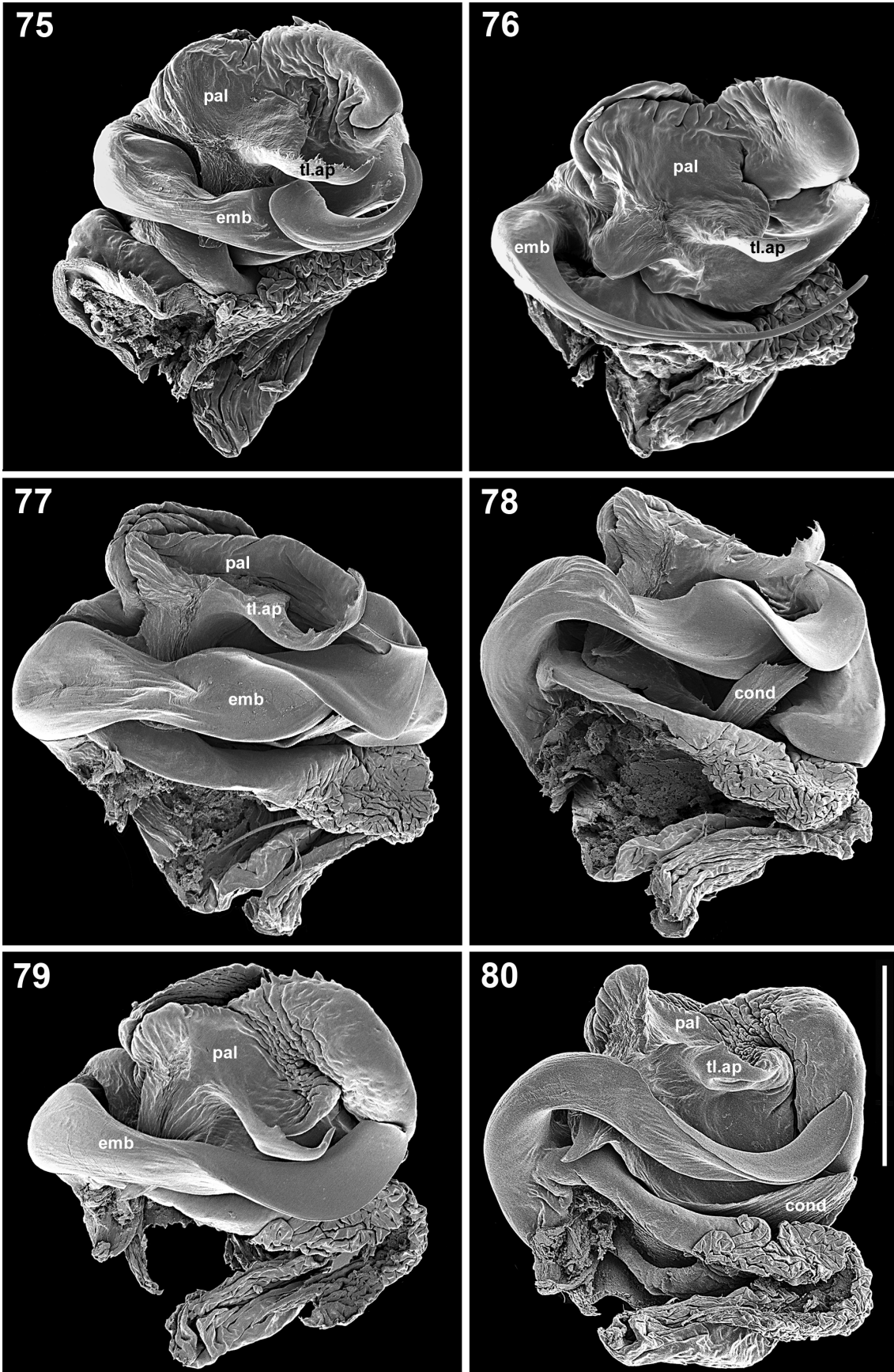
Prosoma and opisthosoma. Similar to male in coloration and pattern. Lateral bands of carapace of yellowish brown spots well separated or more confluent.

Eyes. Width of row I (slightly procurved) 51, row II 74, row III 96, row II-III 72. Diameter of AME 10, ALE 9, PME 27, PLE 22. Distance between AME 7, between AME and ALE 3.

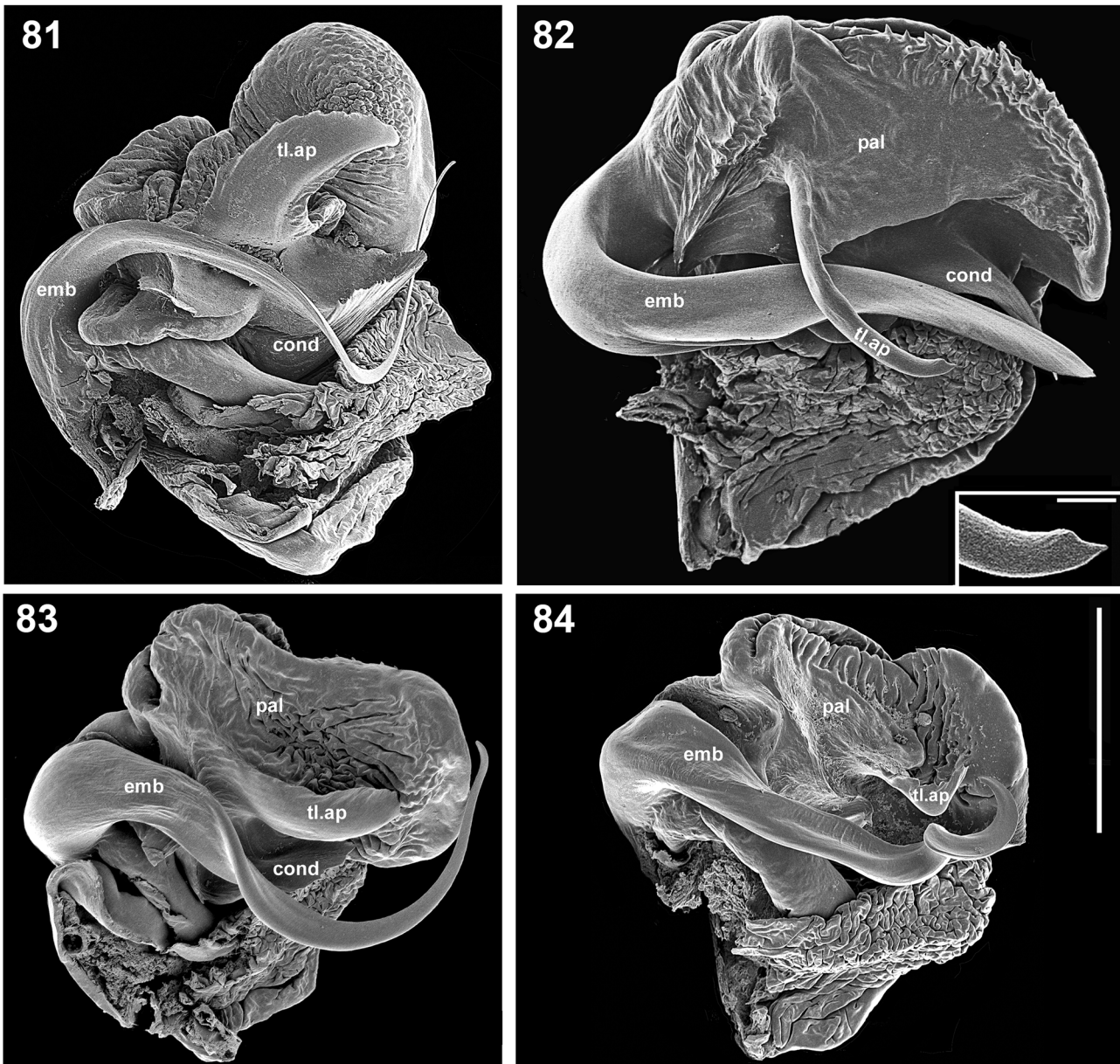
Legs (Table 1). Yellowish brown with distinct dark greyish brown annulation.

Epigyne (Figs 86–87, 94, 117). Lateral elevations diverging backwards (ca 45°) from about half the length of the epigyne. Septum filling the cavities in the posterior half and extending backwards into to lateral lobes. Copulatory tubes twisted (Figs 106–107).

Size variation. Carapace length: males 2.60–3.00 (n=10), females 3.15–3.30 (n=10).



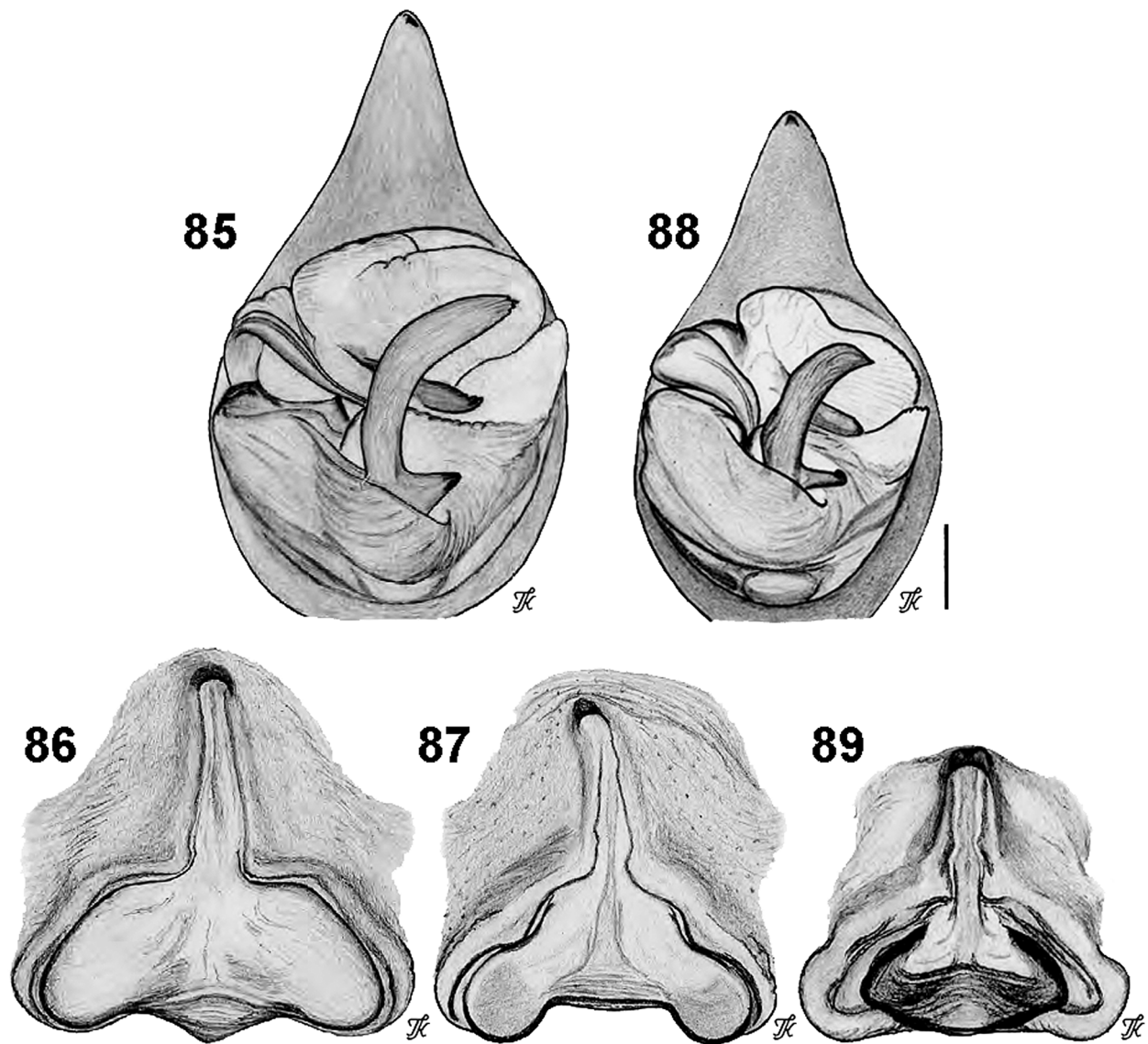
FIGURES 75–80. Left male palpus: terminal part ventral view. 75, *Pardosa eiseni*. 76, *P. giebeli*. 77–78, *P. fomichevi* sp. n. from two oblique angles. 79–80, *P. lasciva* from two oblique angles. *cond*, conductor; *emb*, embolus; *pal*, palea; *tl.ap*, terminal apophysis. Scale line (applies to all) 300 μ m



FIGURES 81–84. Left male palp: terminal part ventral view. 81, *P. lyrata*. 82, *P. nigra*. 83, *P. paramushirensis*. 84, *P. trailli*. *cond*, conductor; *emb*, embolus; *pal*, palea; *tl.ap*, terminal apophysis. Scale line (applies to all) 300 μ m.

Habitat. In the upper reaches of the Kolyma River, the species inhabits a variety of habitats within the forest belt. It is most numerous and common close to creeks and rivers, and may also occur in bogs and on pebbly beaches (Marusik, unpubl.). In three habitats (of 30 studied) in the “Aborigen” field station *P. lyrata* co-occurred with *P. eiseni*. In one very heterogenous habitat (sparse larch boggy forest, with sparse undergrowth on a north exposed slope with soliflucted microrelief, 600 m) *P. eiseni* occurred in considerable numbers (from 2 to 5% of all specimens), while *P. lyrata* was rare. In a thin birch stand on a south exposed slope with *Rosa* and cowberry underneath, broken soil cover and dry litter, 550 m, the situation was the opposite: *P. eiseni* was rare, while *P. lyrata* was more abundant (Marusik 1988). In another field station (“Kontakt”) located in the Kolyma River upper reaches, the two species were not found in the same habitat. In South Siberia (Sokhondo Reserve, Chita Oblast) *P. lyrata* was found together with *P. eiseni* and *P. lasciva* in the same type of habitats in mountain taiga: deciduous and mixed forests (Logunov & Marusik 1995). Besides taiga it was reported from birch-larch forests, inundated (river valley) spruce forests and shrub bogs (low alder thicket) (alder yernik) (Logunov & Marusik 1995).

Distribution (Figs 129–130). This species is known from East Palaearctic only: Siberia east of Yenisey River (Holm 1973) northeast to Chukotka (Marusik *et al.* 1992) and Kamchatka (Mikhailov 2013), southward to Mongolia (Marusik & Buchar 2004).



FIGURES 85–89. 85–87, *Pardosa lyrata*, left male palp (85), epigyne (86–87). 88–89, *P. paramushirensis*, left male palp (88), epigyne (89). Original drawings of 85 and 88 here reversed. Scale line (applies to all) 0.2 mm.

***Pardosa nigra* (C.L. Koch, 1834)**

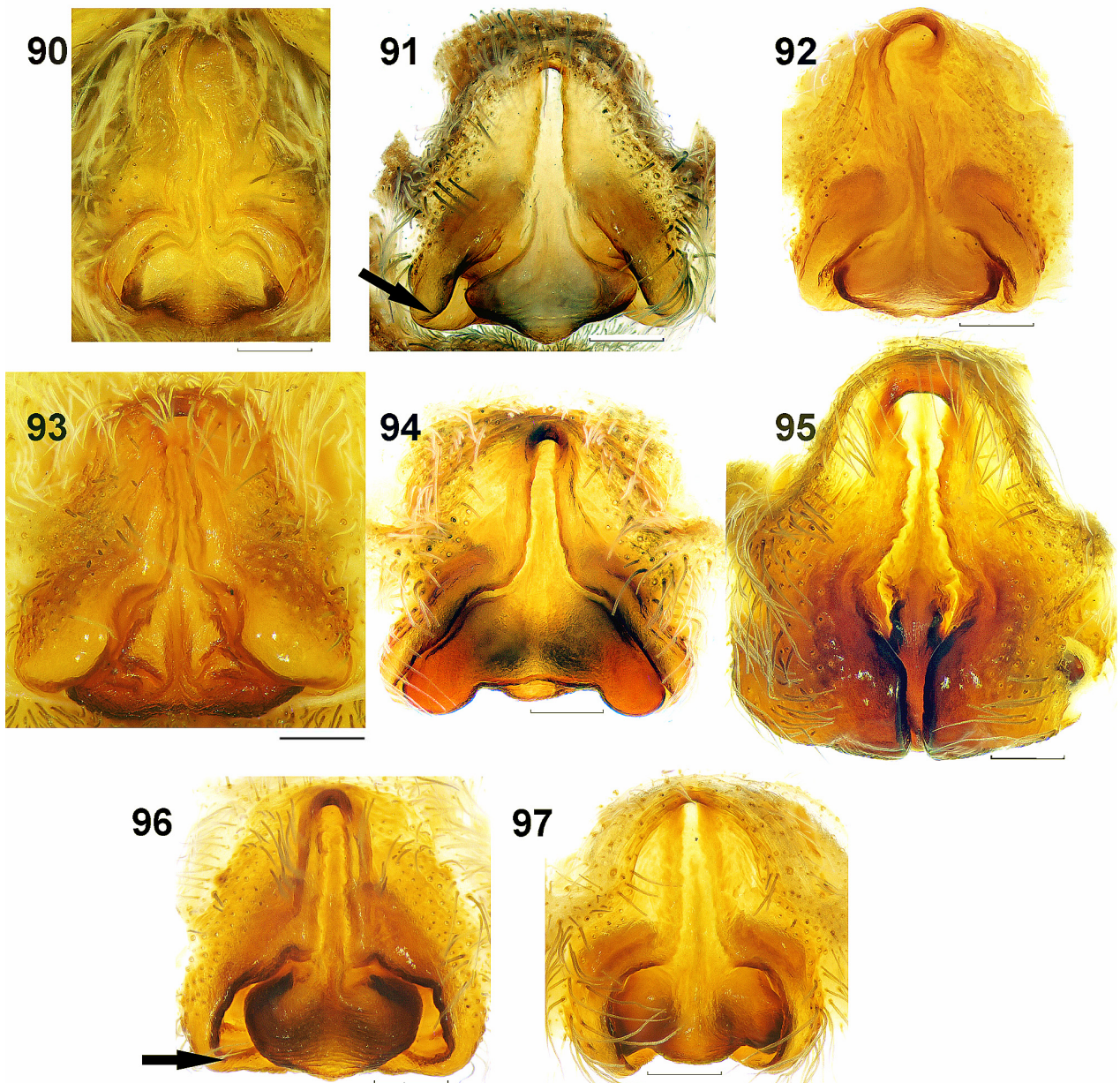
Figs 6, 14, 25, 33, 41, 53–54, 64, 72, 82, 95, 108–109, 118, 125, 128

Lycosa nigra C.L. Koch, 1834: Heft 122, pl. 13–14 (♀).

Pardosa nigra: Tongiorgi 1966: 289, figs 123–125 (♂♀); Fuhn & Niculescu-Burlacu 1971: 109, figs 48a–e (♂♀).

Type material. ♂ and ♀ *syntypes* from Austria: Salzburg, Nassfelder Alps, probably in BMNH (see Tongiorgi 1966), not examined.

Material examined. AUSTRIA. *Salzburg*: without specified locality (donated from Vienna Museum, NHRS: Collectio Thorell No 245/1539c), 1♀; Schafberg, among boulders at the top railway station, 1730 m, 15 July 1980 (T. Kronestedt, NHRS), 1♂ 1♀. *Tirol*: without specified locality (L. Koch, NHRS: Collectio Thorell No 245/1539a), 1♂ 1♀; Innsbruck, Nordkette: Wörgltal, 2000m, 1963 (K. Thaler, NHRS) 4♂ 4♀. POLAND. *Lesser Poland*: Tatra Mts (probably from W. Kulczyński, NHRS: Collectio Thorell No 245/1539b), 2♂ 3♀. SLOVAKIA. *Presov Region*: Skalnaté Pleso, 1750 m, 27 June 2001 (S. Snäll, NHRS), 1♂.

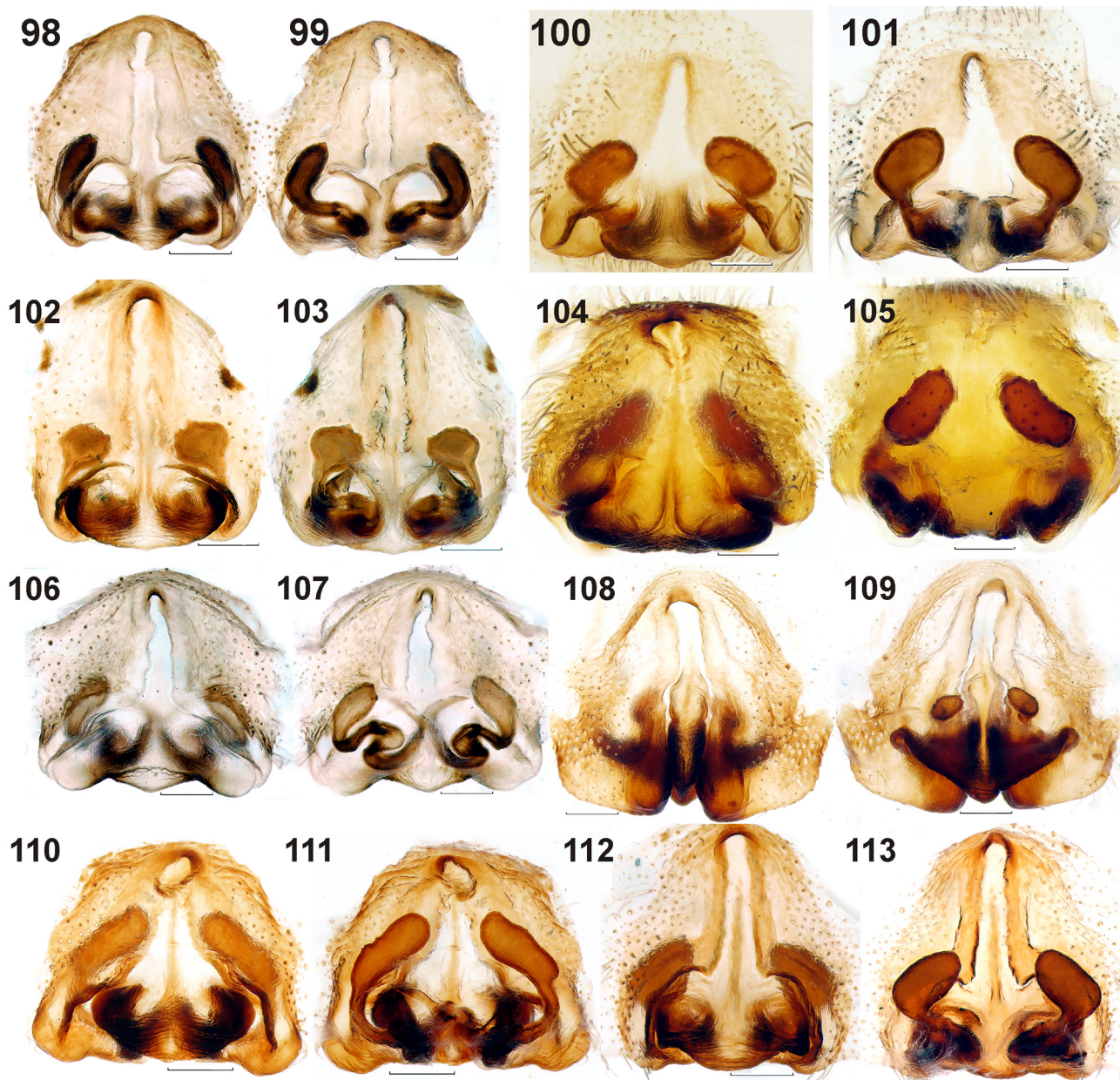


FIGURES 90–97. Epigynes in ventral view. 90, *Pardosa eiseni*. 91, *P. fomichevi* sp. n. 92, *P. giebeli*. 93, *P. lasciva*. 94, *P. lyrata*. 95, *P. nigra*. 96, *P. paramushirensis*. 97, *P. trailli*. Arrows: see text. Scale lines 0.2 mm.

Comments. The species was described in Tongiorgi (1966) and Fuhn & Niculescu-Burlacu (1971). It differs from all other species in the *Pardosa nigra* group by the conformation of the tegular apophysis (anteriorly directed branch shorter than laterally directed branch) and the epigyne (septum rudimentary). Among the Palearctic species of this group, *P. nigra* is the sole species in which there is often an extra pair of ventral spines on the first tibiae.

Habitat. Alpine species found at elevations between 1200 and 3500 m asl (Thaler & Buchar 1996). It is a characteristic species in high alpine scree areas ('Ruhschutthalden') (Puntscher 1980; Thaler & Buchar 1996) and is a pioneer species in Alpine glacier foreland (Kaufmann 2001).

Distribution (Fig. 128). This species is known from Europe only: France, Italy, Switzerland, Liechtenstein, Austria, Germany, Slovakia, Poland, Ukraine (see below), Romania (Retezat National Park: Fuhn & Niculescu-Burlacu 1971; Marele Grohotis: Nitzu *et al.* 2010), Slovenia, Bulgaria (Rila: Deltshv 1995; Pirin: Deltshv & Blagoev 1997) and Macedonia (Shar Planina: Blagoev 1999). The record for Estonia (Mikhailov 2013) is a lapsus. The presence in Ukraine refers to Legotay & Tarasyuk (1964) who reported this species (sub *Pardosa ludovici*) from Lviv and Ivano-Frankivsk oblasts. The material was collected on stony banks along rivers in the forest belt and in mountain meadows. In the latter oblast, the highest peak in Ukraine, Hoverla (2061 m), is situated and this mountain is mentioned in Legotay & Tarasyuk (1964).



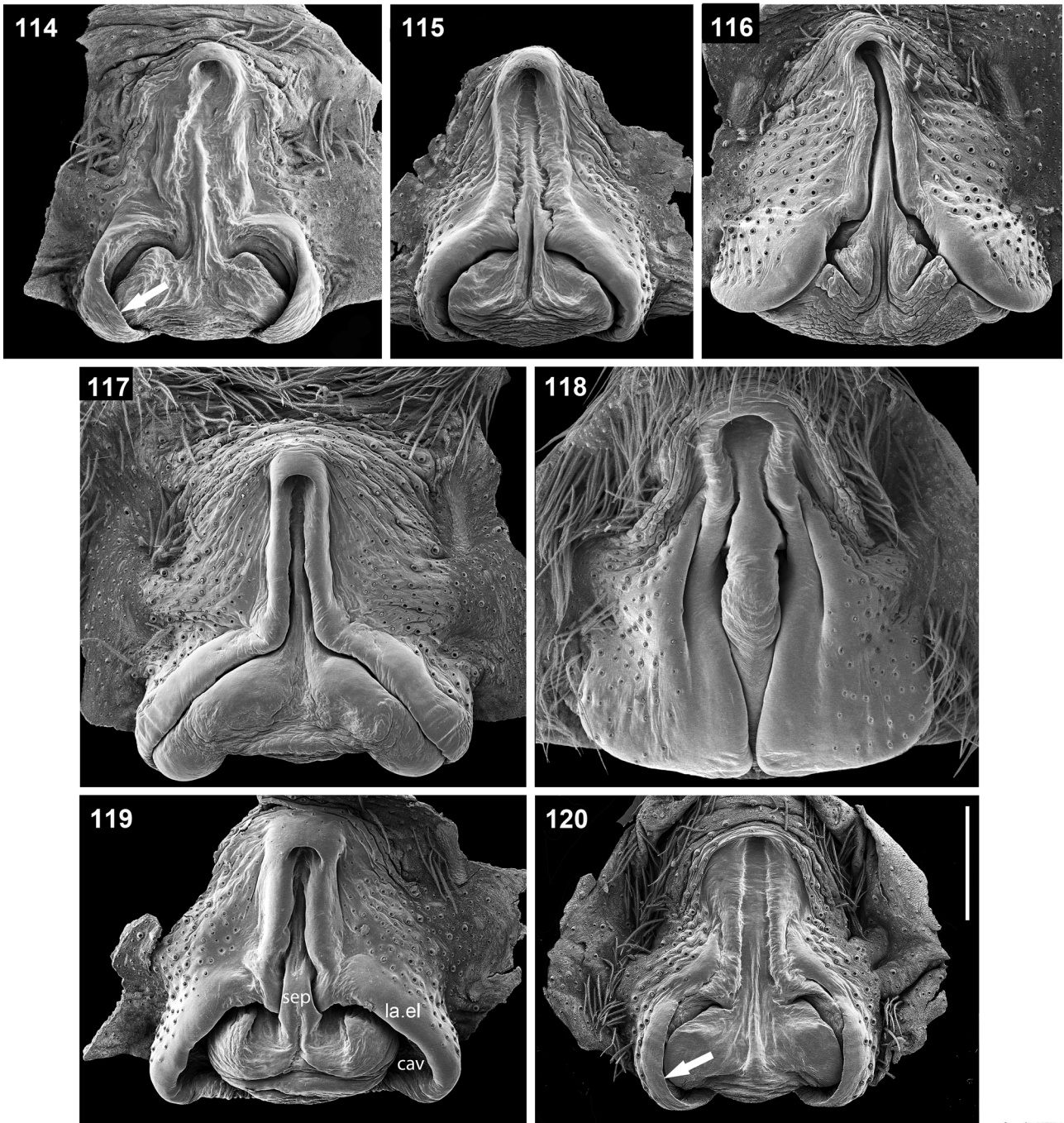
FIGURES 98–113. Epigynes, cleared, in ventral (98, 100, 102, 104, 106, 108, 110, 112) and dorsal (99, 101, 103, 105, 107, 109, 111, 113) view. 98–99, *Pardosa eiseni*. 100–101, *P. fomichevi* **sp. n.** 102–103, *P. giebeli*. 104–105, *P. lasciva*. 106–107, *P. lyrata*. 108–109, *P. nigra*. 110–111, *P. paramushirensis*. 112–113, *P. trailli*. Scale lines 0.2 mm.

A female from Italy: Liguria, Chiavari (in SMF) was collected by C.F. Roewer and identified by P. Tongiorgi (occurrence needs confirmation). A record from Sardinia (Garneri 1902) is plausible as it is stated that the species was collected on Monte di Gennargentu (highest peak 1834 m).

A record from Greece: Crete (Tongiorgi 1966) has been checked (Bosmans *et al.* 2013). It consists of three specimens including one adult male collected by C.F. Roewer in June 1926 in Chania and surroundings (“on thistles”), deposited in SMF. The male is correctly identified but the occurrence in lowland Crete is unlikely and most certainly due to mislabeling. Wrong locality indications in the Roewer arachnid collection are previously known, especially pertaining to material of opilionids and pseudoscorpions collected by himself in Greece and Crete in 1926 (Helversen & Martens 1972).

The occurrence in Turkey (Topçu *et al.* 2005; Bayram *et al.* 2013) could not be verified (K.B. Kunt pers. comm.).

A record of *P. nigra* from China: Xinjiang, Altai Mts (Hu & Wu 1989: 221, figs 183.1–2 (♀)) does not refer to this species as inferred from the illustration of the epigyne.



FIGURES 114–120. Epigynes in ventral view. 114, *Pardosa eiseni*. 115, *P. giebeli*. 116, *P. lasciva*. 117, *P. lyrata*. 118, *P. nigra*. 119, *P. paramushirensis*. 120, *P. trailli*. *cav*, cavity (=atrium) (left part lettered here); *la.el*, lateral elevation; *sep*, septum, *arrow*: see text. Scale line (applies to all) 300 μm .

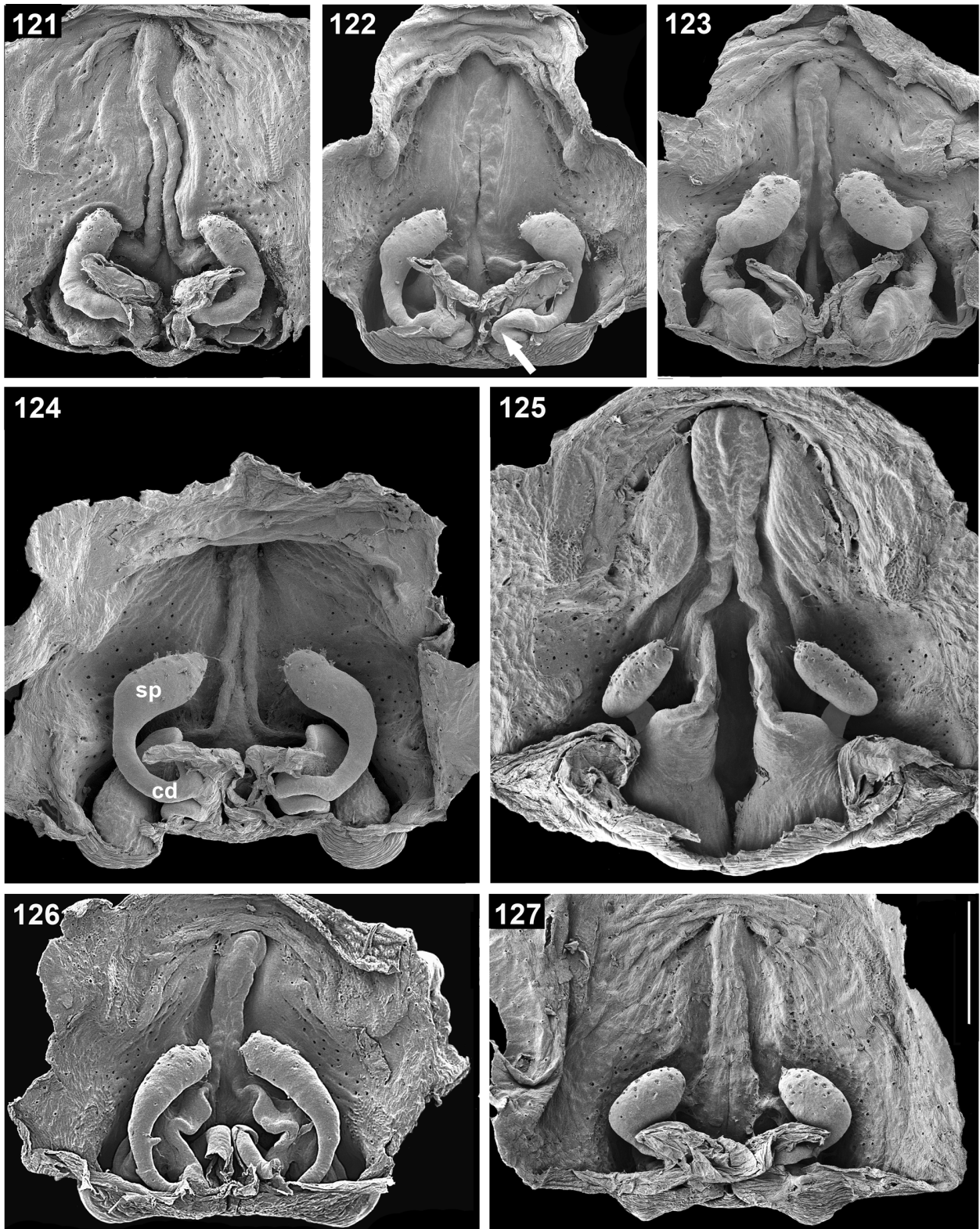
***Pardosa paramushirensis* (Nakatsudi, 1937)**

Figs 7, 15, 26, 34, 42, 55–56, 65, 73, 83, 88–89, 96, 110–111, 119, 126, 129

Lycosa paramushirensis Nakatsudi, 1937: 3, pl. 1, fig. 6 (♀).

Pardosa ferruginea: Yaginuma 1971: 85, fig. 76: 4, 5 (♂♀) and pl. 40: 223 (misidentification).

Pardosa paramushirensis: Yaginuma & Nishikawa 1971: 80 (note); Chikuni 1989: 116, fig. 33 (♂♀); Tanaka 1993: 166–169, figs 9–12 (♂♀); Tanaka 2009: 248, figs 143–144 (♂♀, identical to previous reference).



FIGURES 121–127. Epigynes in dorsal view. 121, *Pardosa eiseni*. 122, *P. giebeli*. 123, *P. lasciva*. 124, *P. lyrata*. 125, *P. nigra*. 126, *P. paramushirensis*. 127, *P. trailli*. *cd*, copulatory duct; *sp*, spermatheca; *arrow* points at loop in copulatory duct. Scale line (applies to all) 300 μ m.

Type material. *Holotype* ♀ of *Pardosa paramushirensis* was destroyed during World War II (Yaginuma in litt. to TK 1976). *Neotype* ♀ from Russia: Sakhalin Oblast: Kuril Islands, Paramushir Island, near Severo-Kurilsk, Ebeko Volcano, 28 August 1996 (Y.M. Marusik), in ZMMU, here designated.

Other material examined. JAPAN. *Hokkaido*: Mt. Daisetsu, July 1970 (T. Yaginuma, NHRS), 2♂ 3♀; same locality, 18 July 1973 (T. Yaginuma, NHRS), 3♂ 3♀. *Honshu*: "Fusijama" (=Mt. Fuji-san), in the "bush region" ("Vega" Expedition, NHRS), 2♀ [evidently collected by the members E. Almqvist and O. Nordqvist during an excursion to the mountain on 25 September–3 October 1879 (Nordenskiöld 1882: 123)]. RUSSIA. *Sakhalin Oblast* (Kuril Islands): Paramushir Island, near Severo-Kurilsk, Ebeko Volcano, 50°41.33'N 156°03.35'E, 500–700 m, 28 August 1996 (Y.M. Marusik, ISEA, ZISP, NHRS), 15♀. Paramushir Island, Taina R., 50°22'N 155°36.67'E, 21 August 1996 (Y.M. Marusik, ZMMU), 1♀. Chirpoi Island, Peshchanaya Bay, 46°32.52'N 150°53.90'E, 23 August 1995 (Y.M. Marusik, ZMMU), 2♀.

Remarks. Tanaka (1993) described this species from Japanese material. As the holotype of *L. paramushirensis* Nakatsudi is no longer available, and the illustration of the epigyne in Nakatsudi's (1937) paper a bit schematic, the new material from Paramushir removed doubts about the identity of this species as no other species in the group is known from the area (cf. Fig. 129).

Diagnosis. Males can be distinguished from all other members of this group by the curvature of the embolus (Figs 55–56); females by the lateral elevations in the posterior part of the epigyne being at some distance from the septum, their margins converging at the rear ends (Figs 89, 96).

Description. Male (from Mt. Daisetsu): Total length 6.0; carapace 3.05 long, 2.35 wide.

Prosoma. Carapace brownish. Median band light brownish to yellowish, narrowed at cephalic-thoracic junction, wide behind PLEs. Lateral bands only present as indistinct lighter spots. Clypeus and chelicerae light brownish to yellowish, latter with longitudinal darker streaks, yellow inside and retromargin with three teeth. Sternum dark greyish brown with narrow yellowish stripe in front.

Eyes. Width of row I (slightly procurved) 48, row II 72, row III 94, row II–III 69. Diameter of AME 10, ALE 10, PME 26, PLE 22. Distance between AME 8, between AME and ALE 2.

Opisthosoma. Dorsum greyish brown more or less patterned in black. Lanceolate stripe light greyish brown, proximally flanked by spots of same colour. Black pattern posterior of lanceolate stripe more or less arranged as transverse bars. Venter light greyish brown with short adpressed light and short thin dark hairs.

Legs (Table 1). Yellowish with dark annulations. Fe I dark in proximal half. Ti, Mt and Ta I yellow without annulation. Mt and Ta IV brownish without annulation. Ti I with two retrolateral spines.

Palp (Figs 7, 15, 26, 34, 88). Pt 0.65, Ti 0.60, Cy 1.30. Light brown to yellowish with dark markings. Cy dark greyish brown, distally yellowish. Tegular apophysis with anteriorly directed branch comparatively long, slightly widening in its distal half, basal process comparatively short (Figs 26, 42). Conductor as in Figs 73 & 83, terminal apophysis as in Figs 65, 73 & 83. Embolus long, evenly curved, sickle-shaped (Figs 56, 65, 73).

Female (neotype). Total length 7.4, carapace 3.40 long, 2.60 wide.

Prosoma and opisthosoma. Similar to male in coloration and pattern.

Eyes. Width of row I (slightly procurved) 52, row II 74, row III 102, row II–III 72. Diameter of AME 11, ALE 10, PME 29, PLE 23. Distance between AME 7, between AME and ALE 3.

Legs (Table 1). All legs distinctly annulated.

Epigyne (Figs 89, 96, 119). Lateral elevations strongly diverging backwards from about half the length of the epigyne. Septum in the posterior half sclerotized laterally and not fully filling the cavities. Spermathecae long, sausage-like (Figs 110–111, 126).

Size variation. Carapace length: males 2.95–3.25 (n=5), females 3.00–3.60 (n=10).

Habitat. On Ebeko Volcano species was collected among stones on elevation about 500 m in place with sparse vegetation. On Chirpoi Island, it was collected at lava fields on elevations about 100–200 m.

Distribution (Fig. 129). Japan (Hokkaido and Honshu), Russia: Kuril Islands.

***Pardosa trailli* (O. Pickard-Cambridge, 1873)**

Figs 8, 16, 19, 27, 35, 43, 57–58, 66, 74, 84, 97, 112–113, 120, 127–129

Lycosa traillii O. Pickard-Cambridge, 1873: 524, pl. 46, fig. 1 (♂♀, only ♀ illustrated).

Pardosa trailli: Roberts 1985: 134, fig. 60a (♂♀); Kronstedt 2004: 283, figs. 2, 7–8, 12, 14, 18, 25–26, 29 (♂♀); Almqvist 2005: 230 (in part) fig. 227a (malformed ♂-palp).

Type material. Lectotype ♂ from Scotland: Grampian, Braemar, in Oxford University Museum of Natural History, Oxford, UK (Kronstedt 2004).

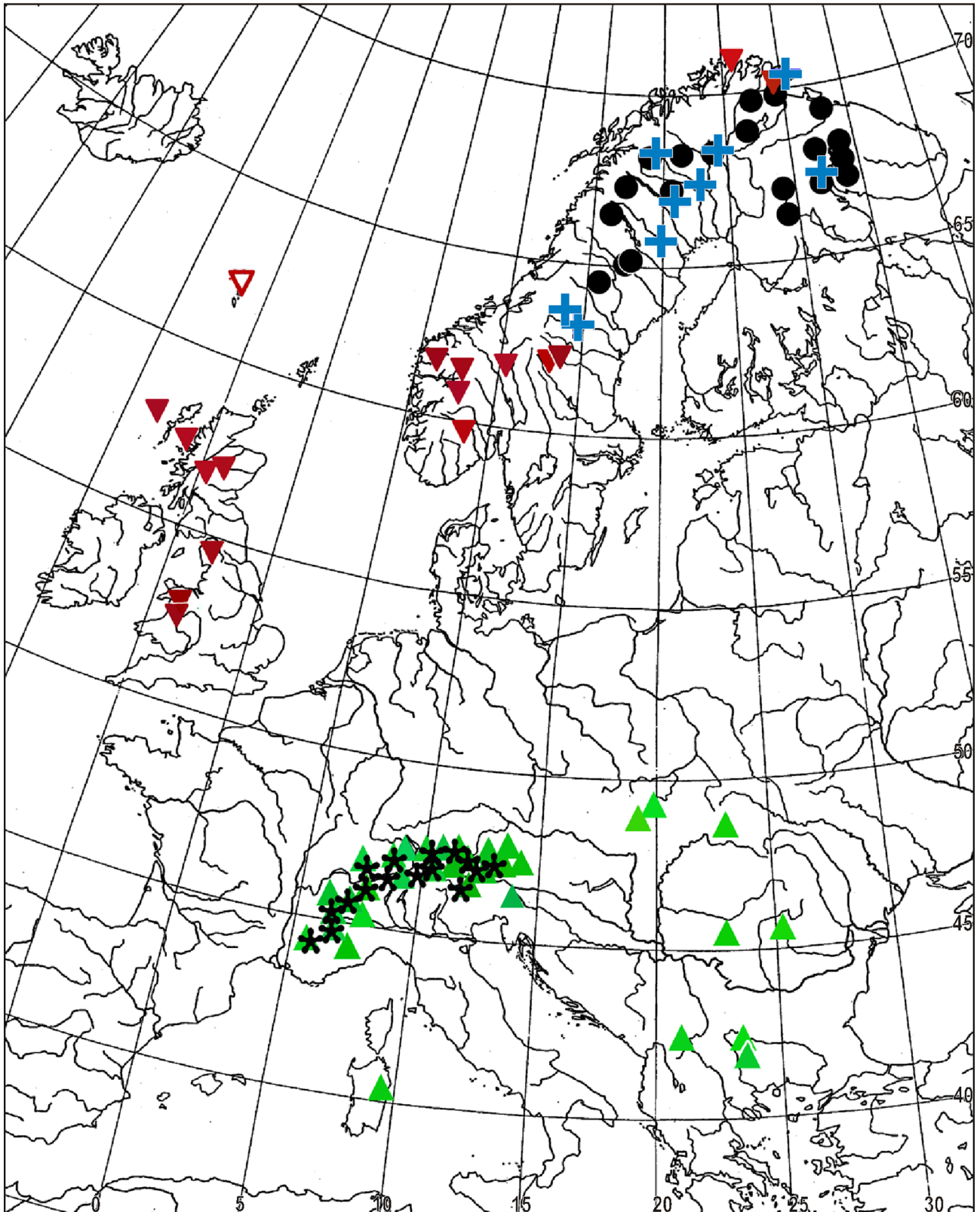


FIGURE 128. Distribution of *Pardosa eiseni* (black circles), *P. giebeli* (black blobs), *P. lasciva* (blue crosses), *P. nigra* (green triangles) and *P. trailli* (red triangles) in Europe. For open red triangle in the Faroe Islands see text under *P. trailli*.

Material examined. See Kronstedt (2004).

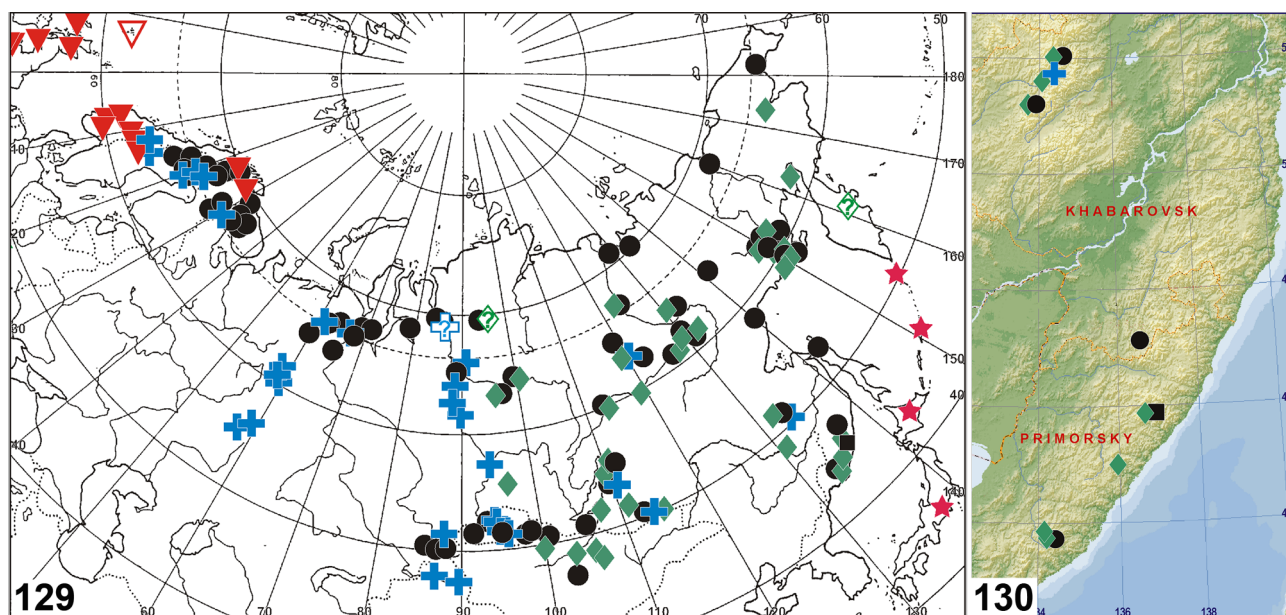
Comments. This species was recently described by Almqvist (2005), where, regrettably, he made a partial confusion with *P. eiseni*. His figs 227a–e is said to illustrate the male and female of *P. trailli*. Figs 227a–b shows a

palp of *P. trailli* but it is malformed (notably distal part of cymbium). A drawing of a normal male is therefore given in this paper (Fig. 19). Fig. 227d in Almquist (2005), however, shows the dorsal (inner) view of an epigyne of *P. eiseni* (in which the horn-like structures containing fertilization ducts are close at midline of epigyne, contrary to the configuration in *P. trailli* (cf. Figs 99 & 113).

This species is restricted to Britain and Scandinavia (Fig. 128). The record from the Faroe Islands (Schenkel 1925) was given as *P. eiseni* but the accompanying illustration most probably shows a female of *P. trailli*. It remains to be investigated whether the disjunct occurrence in Scandinavia (cf. map in Kronstedt 2004) is due to lack of collecting activities.

Habitat. Open stony ground (e.g. scree slopes) in mountains. In Britain, *P. trailli* is recorded from 730-1300 m asl. In Sweden, it is found on high mountains close to or above timberline. In Norway, it is a pioneer species in alpine glacier foreland (Bråten et al. 2012).

Distribution (Fig. 128). This species is known from Britain, ?Faroe Islands (Denmark), Norway and Sweden.



FIGURES 129–130. Distribution of *Pardosa eiseni* (black circles), *P. fomichevi* sp. n. (black square), *P. lasciva* (blue crosses), *P. lyrata* (green diamonds), *P. paramushirensis* (red stars) and *P. trailli* (red triangles) in Eurasia (129) and in Khabarovsk and Primorsky Krays (130). “?” in symbol indicates doubtful record.

Key to the Palearctic species of the *Pardosa nigra* group

Males (based on palpal structures)

1. Tegular apophysis with anteriorly directed branch shorter than laterally directed branch (Figs 25, 41) *nigra*
- Tegular apophysis with anteriorly directed branch longer than laterally directed branch (Figs 20–24, 26–27)..... 2
2. Embolus stout, twisted (Figs 44–47, 49–50, 55–58, 59–60, 62, 65–68, 70, 73–74)..... 3
- Embolus narrow and thin (Figs 48, 51–52, 61, 63, 69, 71) 6
3. Embolus broad to truncated apex (Figs 49–50, 62, 70, 79) *lasciva*
- Embolus apically tapering..... 4
4. Embolus twisted in proximal half, outer part long, curved anteriorly and tapering to narrow tip (Figs 55–56, 73, 83).....
- Embolus twisted at about half its length, apical part narrow and curved first ventrad then inwards (Figs 46–47, 60, 68, 77–78) *paramushirensis*
- Embolus helically twisted in distal half, apical part of embolus curved anteriorly-inwards (Figs 44–45, 57–58) 5
5. Distal part of embolus comparatively long (Figs 44–45, 59, 67, 75) *eiseni*
- Distal part of embolus comparatively short (Figs 57–58, 66, 74, 84) *trailli*
6. Embolus very long, hair-like distal part bent anteriorly (Figs 51–52, 71, 81)..... *lyrata*
- Embolus of moderate length (Figs 48, 61, 69, 76) *giebeli*

Females (based on epigynal structures)

1. Posterior half of epigyne with lateral elevations close (Figs 95, 108–109, 118) *nigra*
- Posterior half of epigyne with lateral elevations diverging widely apart (Figs 90–94, 96–97) 2
2. Posteriormost part of lateral elevations of epigyne with pockets slightly converging backwards (Figs 114: *arrow*, 120: *arrow*)3
- Posteriormost part of lateral elevations of epigyne without distinct pockets 4
3. Anterior narrow part of epigyne somewhat winding (Figs 90, 114), fertilization ducts proximally close to each other (Figs. 99), receptacula elongate (Figs 98–99, 121)..... *eiseni*
- Anterior narrow part of epigyne comparatively straight (Figs 97, 120), fertilization ducts proximally quite apart (Figs 113), receptacula ovoid (Figs 112–113, 127)..... *trailli*
4. Lateral elevations close to septum (Figs 92–94, 97)..... 5
- Lateral elevations at some distance from septum (Figs 91, 96) 7
5. Wide part of septum more or less oval (Figs 92, 115) *giebeli*
- Wide part of septum more or less triangular (Figs 86–87, 93–94, 116–117) 6
6. Posterior part of septum drawn out into two rounded lateral lobes (Figs 86, 87, 94, 117)..... *lyrata*
- Posterior part of septum not so (Figs 93, 116) *lasciva*
7. Rim of lateral elevations diverging posteriorly (Fig. 91: *arrow*) *fomichevi*
- Rim of lateral elevations curved inwards posteriorly (Fig. 96: *arrow*) *paramushirensis*

Final remarks

In a recent paper, Kronstedt (2004) pointed out that a part of the Palearctic species of the *Pardosa nigra* group may be grouped according to the joint possession of certain characteristics in the copulatory organs. The males of *P. eiseni* and *P. trailli* both have a helical configuration in the shape of the distal part of the embolus (Figs 44–45 & 57–58 respectively), a trait shared with the Nearctic *P. uintana* Gertsch (Kronstedt 2004: figs 5–6). These three species also share a trait in the epigyne: the presence of a lateral pocket posteriorly in each lateral elevation (*arrows* in Figs 114, 120 and Kronstedt 2004: figs 17–19). Apparently *P. paramushirensis* may be grouped together with these three species by having an embolic twist reminding of the condition in the abovementioned species though the twist is situated more proximally (Figs 56, 73); the lateral pockets posteriorly in the epigyne are, however, lacking in *P. paramushirensis*.

Another subgroup consists of species in which the males have a narrow and thin embolus and the females have looped copulatory tubes (Lowrie & Dondale 1981: figs 49 & 65; Kronstedt 2004: fig. 28): *P. dorsalis*, *P. giebeli* (Fig. 122: *arrow*), *P. mackenziana*, *P. uncata*. With the corresponding characteristics present in *P. lyrata*, this species can be assigned to this subgroup.

From a morphological perspective, *Pardosa nigra* deviates from all other species in the *Pardosa nigra* group by the configuration of the tegular apophysis as well as the epigyne and therefore cannot be assigned to any of the abovementioned subgroups.

Another group with species sharing some characteristics with the *Pardosa nigra* group is the *Pardosa ferruginea* group (sensu Zyuzin 1979), hitherto comprising *Pardosa beringiana* Dondale & Redner, 1987, *P. cavannae* Simon, 1881 and *P. ferruginea* (L. Koch, 1870). The males in these species have the apophysis termed ‘terminal apophysis’ similarly developed to the species of the *Pardosa nigra* group (Dondale & Redner 1990: fig. 164). It differs, though, from that of most *Pardosa nigra* group species by having a bifid apex (Tongiorgi 1966, figs 34–35 (*P. cavannae*), figs 36–37 (*P. ferruginea*), a condition also indicated at the apex of the terminal apophysis in *P. nigra* (cf. Fig. 82 inset)). The females of *P. cavannae* (Tongiorgi 1968, fig. 2) and *P. ferruginea* (Tongiorgi 1966, fig. 38) have a distinct septum reminding of that found in, e.g., species of the *Pardosa lapponica* group, while in *P. beringiana* (Dondale & Redner 1990, fig. 165) the epigynal atrium with the septum is narrowed and may be compared with the corresponding site in *P. nigra* in which there is a much narrower septum. An additional pair of ventral spines on tibia I is found in species of the *Pardosa nigra* group (*P. nigra*) as well as in the *Pardosa ferruginea* group (*P. beringiana*: Dondale & Redner 1990). It should be further studied whether the two last mentioned species might be grouped together.

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