

## MESOSTIGMATIC MITES OF THE FAMILY PODOCINIDAE BERLESE (ACARI, GAMASINA) FROM SIBERIA AND THE FAR EAST OF RUSSIA

## МЕЗОСТИГМАТИЧЕСКИЕ КЛЕЩИ СЕМЕЙСТВА PODOCINIDAE BERLESE (ACARI, GAMASINA) СИБИРИ И ДАЛЬНЕГО ВОСТОКА РОССИИ

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Ключевые слова: Mesostigmata, Gamasina, Podocinidae, *Podocinum sibiricum* sp.n., Сибирь, Алтай, Дальний Восток

### ABSTRACT

The mites of the family Podocinidae are first recorded from Siberia and the Russian Far East, with North Altai (51°30'N) being the northernmost locality for the family. A new species, *Podocinum sibiricum* sp.n., is described. The species *Podocinum aokii* Ishikawa, 1970 is recorded in Russia for the first time. New data on distribution of *Podocinum catenum* Ishikawa, 1970 are obtained. Maps of all localities and notes on the geographic and habitat distribution are given as well.

### РЕЗЮМЕ

Впервые на исследуемой территории указываются клещи семейства Podocinidae. *Podocinum sibiricum* sp.n. описан как новый для науки, достигает самой северной точки распространения данного семейства в мире (Северный Алтай 51°30' с.ш.). *Podocinum aokii* Ishikawa, 1970 впервые отмечен в России. Получены новые данные по распространению *Podocinum catenum* Ishikawa, 1970. Дается карта нахождения всех видов на исследуемой территории, приводятся данные по географическому распространению и биотопической приуроченности.

### INTRODUCTION

The family Podocinidae Berlese (s.str.) is by most part represented by tropical species. Two species of the genus *Podocinum*: *P. pacificum* Berlese, 1895 and *P. catenum* Ishikawa, 1970 were hitherto recorded in Russia. In Russia, *P. pacificum* has been recorded in the environs of Saratov — 51° N (the northernmost locality of the species) [Bregotova, 1977]. Until now, *P. pacificum* has been considered the only species of the Podocinidae distributed far away from the tropics and subtropics to the north [Bregotova, 1977; Blaszak, Alberty, 1985; Lindquist, Wu, 1987]. *P. catenum* Ishikawa, 1970 was described from Japan and was reported in Russia from the southern part of Kamchatka [Bregotova, 1977] (no precise localities were given).

During the survey of the Podocinidae from Siberia and the Russian Far East, three species have been found: *P. catenum* Ishikawa, 1970, *P. aokii* Ishikawa, 1970 and *P. sibiricum* sp.n. *P. pacificum* is unknown from the area at hand, but it was recorded from Japan (no localities in Hokkaido) [Ishikawa, 1970].

A new species *P. sibiricum* seems to display a disjunctive range, as it was recorded from the North Altai and Southern regions of the Russian Far East. Such distribution ranges are known for some insects, e.g. the Lepidoptera [Dubatolov & Zolotarev, 1995], and usually explained as being connected with the relict nemoral vegetation in North Altai. Recent palinologic data [e.g. Archipov & Volkova, 1994] have demonstrated the occurrence of continuous zone of forest with considerable share of broad-leaved trees in Siberia: *Ulm*, *Quercus*, *Tilia* in climatic optima of late Pleistocene (Kazantsevo time, 100–120 thousands y.a.) and Holocene (Atlantic time, 4–6 thousands y.a.).

### MATERIALS AND METHODS

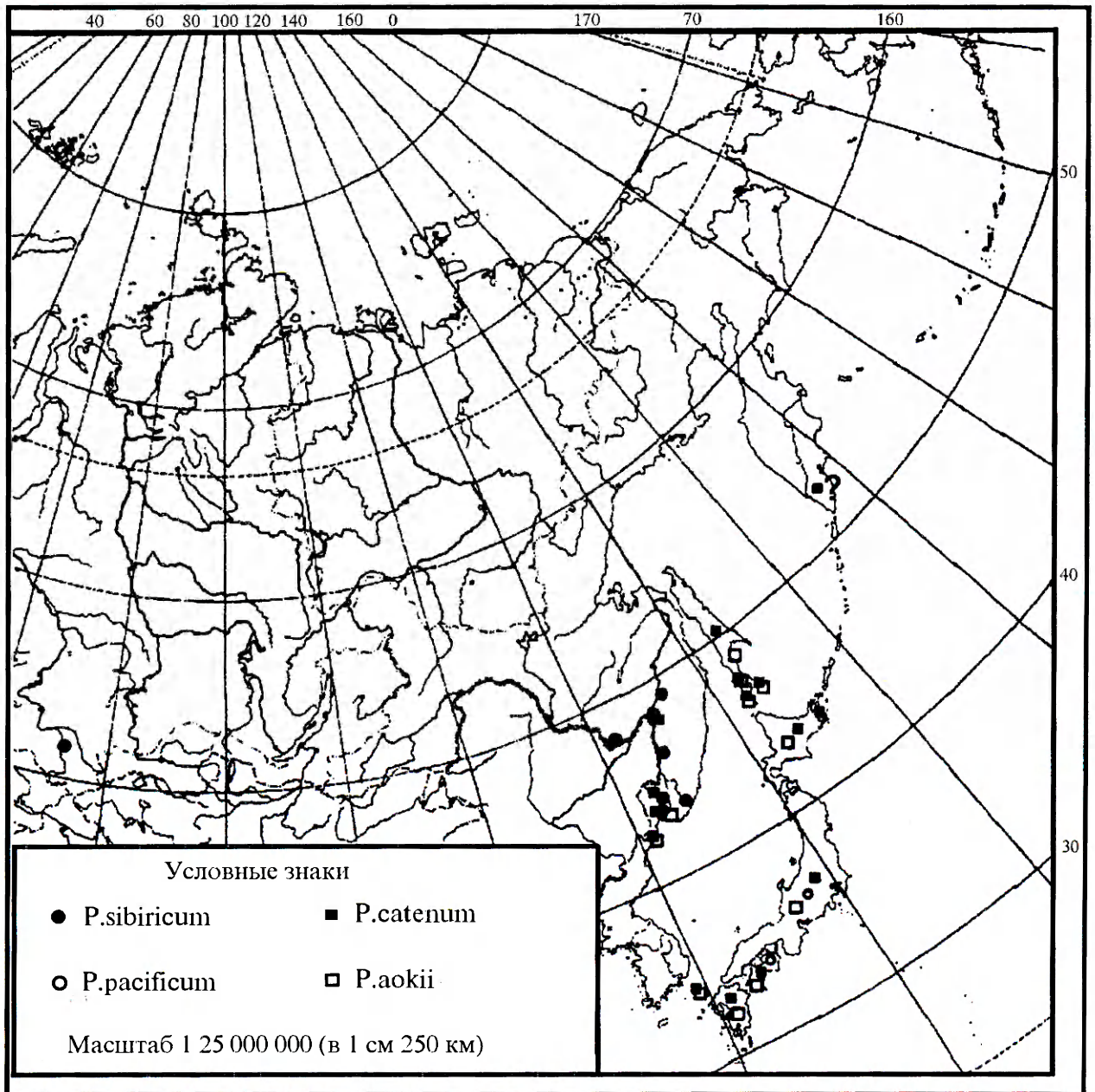
All material is deposited in the collections of Zoological Museum of the Institute for Systematics and Ecology of Animals, Novosibirsk.

Abbreviations accepted in the text are as follows: I.I.Volonikhina — I.V., V.V.Nikolskii (Novosibirsk) — V.N., G.V.Dudareva (Novosibirsk) — G.D., L.G. Grishina (Novosibirsk) — L.G., V.D.Bakurov (Novosibirsk) — V.B., A.M. Basarukin (Yuzhno-Sakhalinsk) — A.B., N.A.Ryabinin (Khabarovsk) — N.R.

### *Podocinum aokii* Ishikawa, 1970

#### Map 1.

**Material.** SAKHALIN: 2♀♀, Aniva distr., Khvostovka, in litter, 5.07.93 (coll. A.B.); 2♀♀, Aniva distr., environs of Novo-Alexandrovsk, in litter, 12.05.93 (coll. A.B.); 1♀, Aniva distr., Kirillovo, *sphagnum* bog, 25.06.90; 1♀, same place, *Alnus*, in litter, 16.06.90 (coll. I.V.); 2♀♀, environs of Yuzhno-



Map 1. Distribution of the family Podocinidae in Siberia and in the Far East.  
Карта 1. Распространение семейства Podocinidae в Сибири и на Дальнем Востоке.

Sakhalinsk, Chekhov mountains, *Betula* forest with bamboo, in litter, 9.08.90 (coll. I.V.); 1♀, Dolinsk distr., valley of Anna river, in litter, 12.10.93 (coll. A.B.); 1♀, environs of Tunaicha lake, floodland forest of *Alnus*, *Salix*, in litter, 6.07.90 (coll. I.V.); 10♀♀, environs of Nevelsk, broad-leaved forest, in litter, 31.07.90 (coll. I.V.); 1♀, Makarov distr., Zaozernoe, in litter, 24.08.93 (coll. A.B.). PRIMORYE: 12♀♀, Shkotovsk distr., Ussuriysk reserve, coniferous-deciduous forest, in litter, 19.08.78 (coll. G.D.); 4♀♀, Khasan distr., coniferous-deciduous forest, in litter, 21.08.78 (coll. V.N.).

**Distribution.** Primorye, Sakhalin, Japan Islands: Hokkaido, Honshu, Kyushu, Tsushima, Shikoku.

*Podocinum catenum* Ishikawa, 1970  
Map 1.

**Material.** SAKHALIN: 10♀♀, environs of Nevelsk, broad-leaved forest, in litter, 31.07.90 (coll. I.V.); 3♀♀, environs of Tunaicha lake, coniferous-deciduous forest and floodland *Alnus*, *Salix* forest, in litter, 9.07.90 (coll. I.V.); 7♀♀, Aniva distr., Kirillovo, valley of Urum river, *Alnus*, *Salix* forest, in litter, 19.06.90 (coll. I.V.); 8♀♀, Kholmsk distr., Slepikovskii Cape, coniferous-deciduous forest, in litter, 10.08.90 (coll. I.V.); 1♀, Tymovsk distr., Uskovo, in litter, 1.07.93 (coll. A.B.). KUNASHIR: 1♀, Ivanovskii Cape, coniferous-deciduous forest, in soil, 9.07.89 (coll. I.V.). PRIMORYE: 13

♀♀, Shkotovsk distr., Ussuriysk reserve, coniferous-deciduous forest, in litter, 31.07.78, 13.09.78, 16.09.78, 12.08.88 (coll. V.N. & L.G.); 5♀♀, Khasan distr., coniferous-deciduous forest, in litter, 21.08.78 (coll. V.N.); 4♀♀, Anuchinsk distr., coniferous-deciduous forest, 12.03.78, 15.09.78, 20.07.79 (coll. V.B.). Khabarovsk Province: 6♀♀, Khekhtsir mountains, broad-leaved forest with *Pinus coraiensis*, in litter, 29.08.91 (coll. I.V.); 10♀♀, Bikin distr., Boitsovo, broad-leaved forest with *Pinus coraiensis*, in litter, 4.09.91 (coll. I.V.).

**Distribution.** South of Khabarovsk Province, Primorye, Southern Kamchatka, Sakhalin, Kunashir, Japan Islands: Hokkaido, Honshu, Kyushu, Tsushima, Shikoku.

*Podocinum sibiricum* sp.n.

Figs. 1–4, Map 1.

**Type material.** Holotype female, Altai mountains, Chermal distr., 45 km from Ust-Sema village, valley of Katun river, coniferous-deciduous forest

with *Betula* and *Pinus sylvestris*, in litter, 19.08.97 (coll. I.V.). Paratypes: 5♀♀, same data as holotype; female, Altai, Chermal distr., environs of Askat village, valley of Katun river, *Pinus sylvestris* with *Caragana* bush, in litter, 22.08.96 (coll. I.V.); 5♀♀, Primorye, Schkotovsk distr., Ussuriysk reserve, coniferous-deciduous forest, in litter, 26.08.78, 18.09.78 (coll. G.D. & V.N.); 5♀♀, Khabarovsk Province, Nanaiski distr., environs of Troitskoe, Amur river island, *Quercus mongolica*, in litter, 25.08.91, 28.08.91 (coll. I.V.).

**Other material.** ALTAI: 1♀, Chermal distr., environs of Elanda village, valley of Katun river, *Pinus sylvestris* with *Caragana* bush, in litter, 19.08.97 (coll. I.V.); 1♀ Shebalino distr., environs of Cherga village, *Betula*, *Pinus sylvestris* forest, 12.07.97 (coll. I.V.), in litter. PRIMORYE: 23♀♀, Schkotovsk distr., Ussuriysk reserve, broad-leaved forest with *Pinus coraiensis*, in litter, 12.08.78, 17.08.78 (coll. G.D.); 22♀♀, Anuchinsk distr., broad-leaved forest with *Pinus coraiensis*, in litter, 22.08.78, 12.09.78

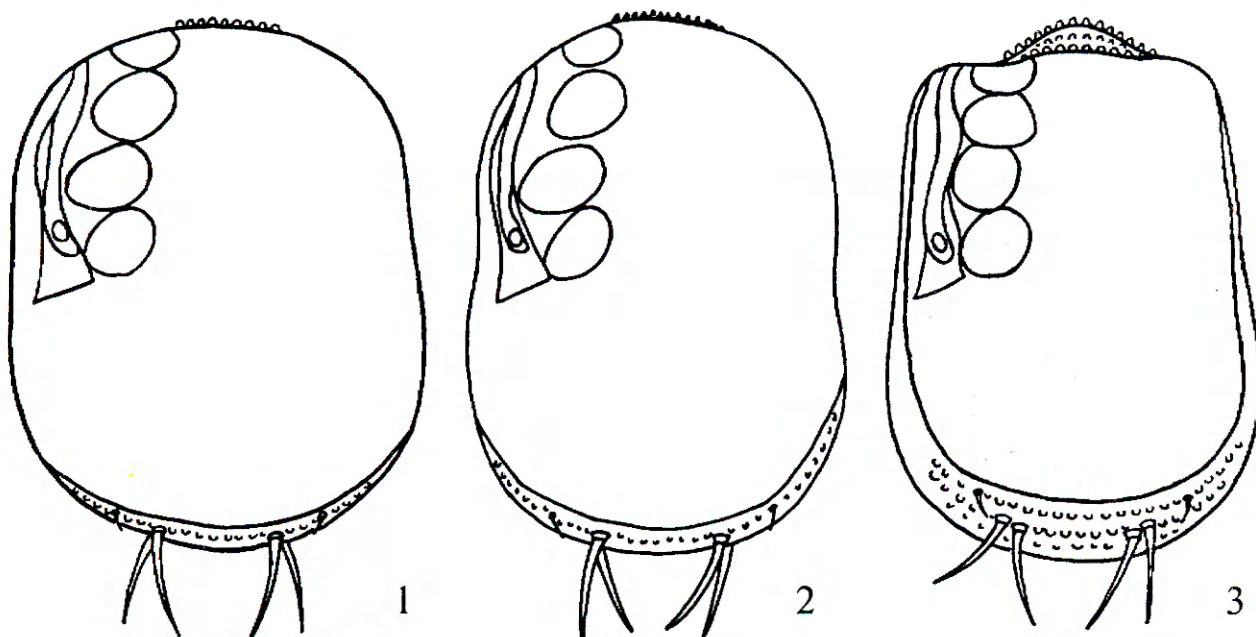


Fig 1. The variation of body shape of *Podocinum sibiricum* sp.n., females (ventral view): 1 — oval; 2 — pear-shaped; 3 — broad-shouldered.

Рис. 1. Форма тела самки *Podocinum sibiricum* sp.n. (вид снизу): а — овальная, 2 — грушевидная, 3 — “широкоплечая”.

Table I. Geographic distribution of examined specimens of *Podocinum sibiricum* sp.n. with different body shape.

Таблица. Распределение клещей *Podocinum sibiricum* sp.n. с различной формой тела по регионам.

Body shape	Region	Altai	Primorye	Khabarovsk Province
oval		+	+	
pear-shaped			+	
broad-shouldered			+	+

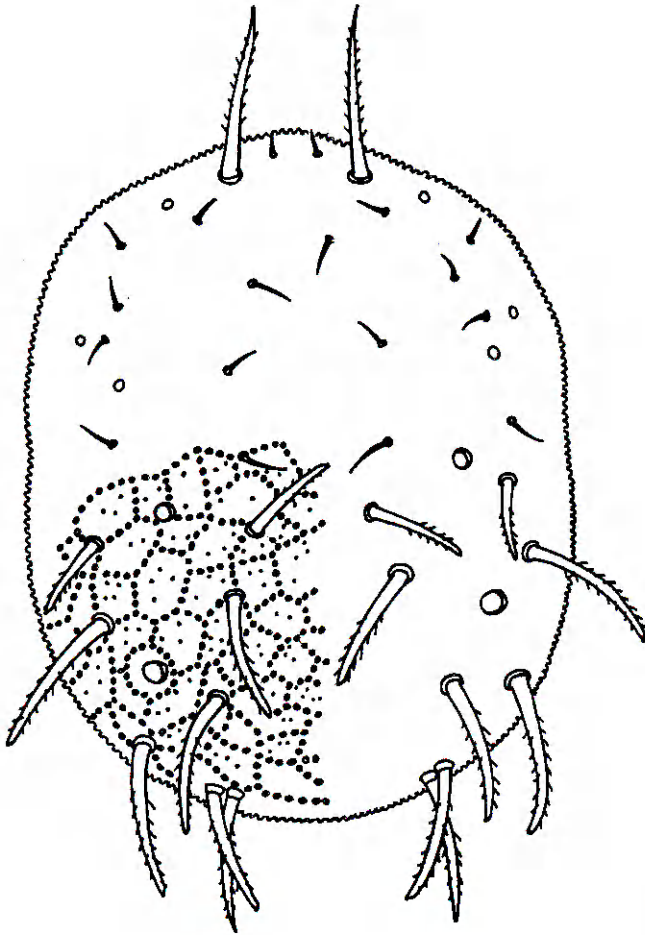


Fig 2. *Podocinum sibiricum* sp.n., female, dorsal view.  
Рис. 2. *Podocinum sibiricum* sp.n., самка, дорсально.

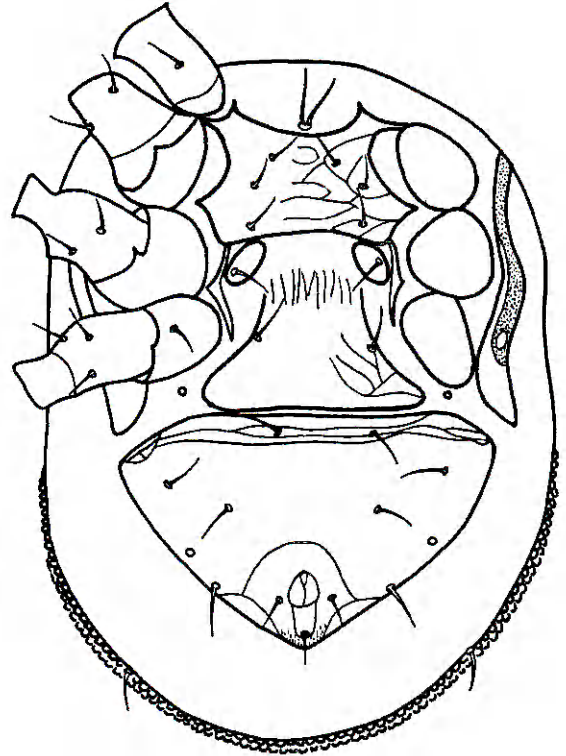


Fig 3. *Podocinum sibiricum* sp.n., female, ventral view.  
Рис. 3. *Podocinum sibiricum* sp.n., самка, вентрально.

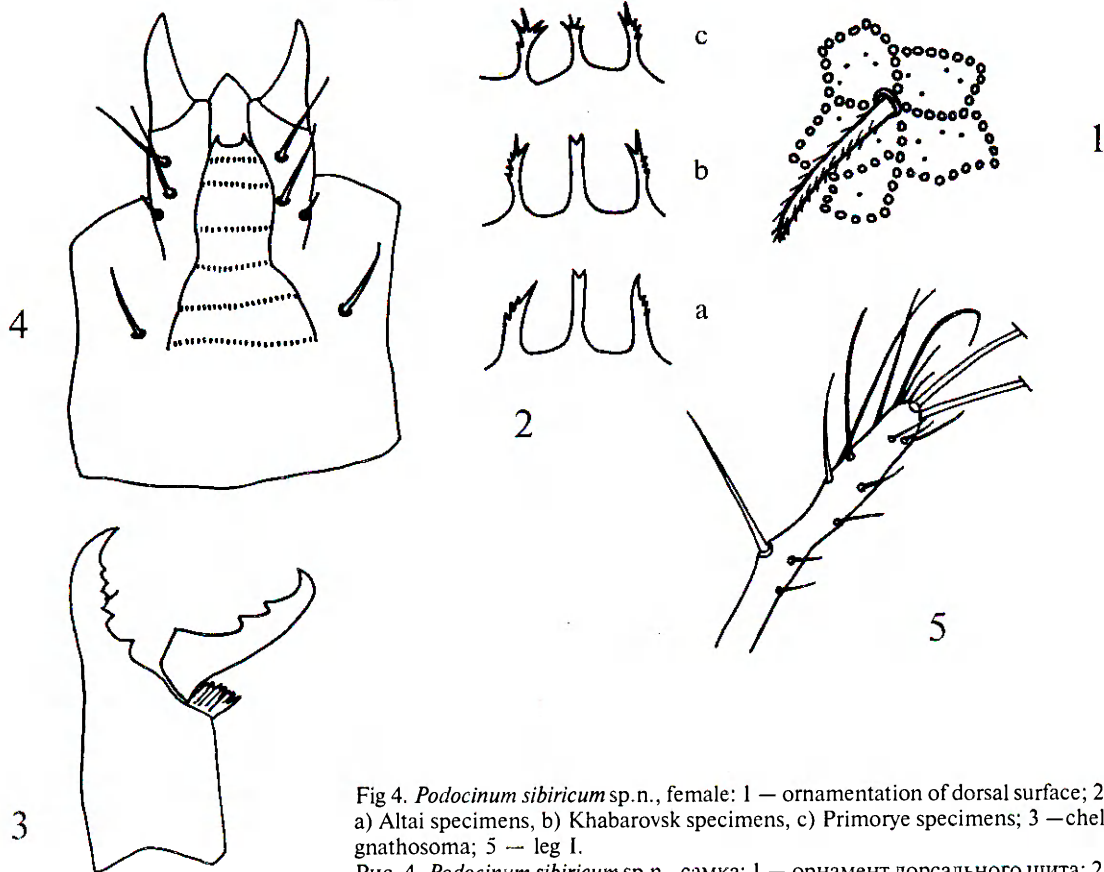


Fig 4. *Podocinum sibiricum* sp.n., female: 1 — ornamentation of dorsal surface; 2 — tectum: a) Altai specimens, b) Khabarovsk specimens, c) Primorye specimens; 3 — chelicera; 4 — gnathosoma; 5 — leg I.  
Рис. 4. *Podocinum sibiricum* sp.n., самка: 1 — орнамент дорсального щита; 2 — тектум у экземпляров: а) с Алтая; б) из Хабаровского края; с) из Приморского края; 3 — хелицера; 4 — гнатосома; 5 — нога I.

(coll. V.B.). KHABAROVSK PROVINCE: 2♀♀, Khekhtsir mountains, 20 km S of Khabarovsk, broad-leaved forest with *Pinus coraiensis*, in litter, 29.08.91 (coll. I.V.); 9♀♀, Bikin distr., Boitsovo, broad-leaved forest with *Pinus coraiensis*, in litter, 4.09.91 (coll. I.V.); 13♀♀, Nanaiski distr., environs of Troitskoe, broad-leaved forest with *Pinus coraiensis* and Amur river island, *Quercus mongolica*, in litter, 25.08.91 (coll. I.V.). BIROBIDZHAN DISTRICT: 1♀, Amurzet, valley of Amur river, in soil, 20.06.88 (coll. N.R.).

### DESCRIPTION

**Female.** Length of idiosoma 392–440 μ; width at the level of coxae IV 280–340 μ. The body shape of the examined specimens from different regions varies (Fig.1): oval, pear-shaped and broad-shouldered. Distribution of the body shapes by the regions is shown in Tabl.I.

**Dorsum.** Dorsal shield entire, covered with small nodules forming a polygonal network. The polygonal areas enclosing smaller nodules (Fig.4.1). The shield bears 19 pairs of setae and 5 pairs of pores (Fig.2). The length between vertical setae ( $D_1-D_1$ ) consists of two individual lengths of  $D_1$  seta. 10 setae:  $D_1, D_3, D_4, D_5, D_6$  and  $L_1, L_2, L_3, L_4, L_7$  simple. Other setae  $D_2, D_7-D_{10}, L_5, L_6, L_8, L_9$  stout and pilose. Setae  $D_1$  11 μ,  $D_2$  105 μ,  $D_3$  8 μ,  $D_4$  21 μ,  $D_5$  13 μ,  $D_6$  17 μ,  $D_7$  50 μ,  $D_8$  75 μ,  $D_9$  85 μ,  $D_{10}$  72 μ in length. Setae  $L_1$  8 μ,  $L_2$  8 μ,  $L_3$  8 μ,  $L_4$  15 μ,  $L_5$  40 μ,  $L_6$  85 μ,  $L_7$  15 μ,  $L_8$  75 μ,  $L_9$  60 μ in length. Specimens with broad-shoulder shape of the body have dorsum shield turning down posteriorly onto ventral surface at a large distance (Fig.1.3). Specimens with oval and pear-shaped body have dorsum shield turning down onto ventral surface as the narrow strip (Fig. 1.1, 1.2).

**Venter.** Tritosternum with two smooth laciniae, its base is very short. Sternal shield reticulated (55×120μ) and bearing 3 pairs of smooth setae (Fig.3). Metasternal shield free, with a pair of simple setae. Genital shield having a pair of smooth setae, truncate posteriorly. Ventrianal shield (140×240μ) much wider than long, all setae smooth, with a pair of pores. Anterior margin reticulated. Ventrianal shield with 4 pairs of preanal and 3 pairs para-anal setae. A pair of stigmata situated beyond coxae IV.

**Gnathosoma.** Tectum trispinate, varies in specimens from other regions. Tectum of specimens from Altai (Fig.4.2a) have the median projection subdivided distally into 2 teeth and the lateral ones denticulated externally. Tectum of specimens from Khabarovsk Province (Fig.4.2b) have the median projection of similar shape as specimens from Altai and the lateral projections denticulated distally and externally. Tectum of specimens from Primorye (Fig.4.2c) have the median projection subdivided

distally on 4 teeth and the lateral ones denticulated distally and externally. Pedipalp 5 segmented; specialized seta on palpal tarsus with 3 tines. Chelicera dentate, movable digit 56 μ in length with 2 teeth (Fig.4.3). Fixed digit of chelicera with 2 large, 3 small teeth and a pilus dentilis. Corniculus 28 μ in length. Hypostome with 6 transverse rows of minute teeth (Fig.4.4). Gnathocoxae with 4 pairs of setae, the exterior gnathocoxal seta very short.

**Legs.** Tarsus I without ambulacrum, with a pair of long terminal whip-like setae, 320–340μ and 240–320μ in length, respectively. The longest subterminal seta 40–48μ in length, equals 4/5 distance between the base of this seta and the apex of tarsus I (Fig.4.5). Leg I: tarsus 192–244 μ, tibia 120–160 μ, genu 180–220 μ, femur 220–260 μ, trochanter 48 μ, coxa 60 μ in length. Leg I 820–992 μ, leg II 520–536 μ, leg III 488–492 μ, leg IV 520–560 μ.

### DIFFERENTIAL DIAGNOSIS

*Podocinum sibiricum* sp.n. is similar to *P.tsushimanum* Ishikawa, 1970, but differs in the following characters: setae of series D (except  $D_1$ )  $D_3, D_4, D_5, D_6$  and setae of series L— $L_2, L_3$  are smooth; seta  $D_7$  are longer, extending at over the base of seta  $D_8$ ; the longest subapical seta is shorter and does not reach the apex of tarsus I.

**Distribution.** Northern Altai, south-east of Khabarovsk Province, Primorye.

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