

A redescription of *Aculepeira matsudae* (Aranei: Araneidae), a species recently found in Far East Russia

Переописание паука-кругопряда *Aculepeira matsudae* (Aranei: Araneidae), недавно найденного на Дальнем Востоке России

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КЛЮЧЕВЫЕ СЛОВА: Araneae, Дальневосточная Азия, Приморский край, Хабаровский край.

ABSTRACT. *Aculepeira matsudae* Tanikawa, 1994, a species previously known from Central Hokkaido is reported from Far East Russia for the first time. Previously it was recorded in Khabarovsk and Maritime Provinces as *Aculepeira* cf. *matsudae*. The species is redescribed in detail, and an updated diagnosis is provided as well as comparisons with two other species occurring in Far East Russia. The status of species assigned to *Aculepeira* that occur in the Neotropical Realm is briefly discussed.

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РЕЗЮМЕ. *Aculepeira matsudae* Tanikawa, 1994, вид ранее известный из центрального Хоккайдо впервые обнаружен на Дальнем Востоке России. Ранее он указывался из Хабаровского и Приморского края как *Aculepeira* cf. *matsudae*. Вид подробно переописан, приводится дополненный диагноз, а также сравнение с двумя другими видами, обитающими на Дальнем Востоке России. Кратко обсуждается статус и принадлежность к роду *Aculepeira* видов, обитающих в Неотропическом царстве.

Introduction

Aculepeira Chamberlin et Ivie, 1942 is a medium-sized genus with 27 named species distributed in the Holarctic and Neotropical realms [WSC, 2020]. Seven species of this genus are known to occur in Russia [Mikhailov, 2013; WSC, 2020]. *Aculepeira* has the widest zonal distribution in Russia and is known from almost 73°N in Yakutia [Marusik *et al.*, 1993] to the southern part of Primorskii Krai, ca 43°30'N (present data). The southernmost species in Russia was reported as *Aculepeira* cf. *matsudae* [Oligier *et al.*, 2002; Marusik, 2009a,b]. The taxonomic status of this species was unclear because all samples were represented by females. A collection of the male allowed us to identify the species as *A. matsudae* Tanikawa, 1994 with certainty, a species previously known from Central Hokkaido. The goal of this paper is to provide an illustrated redescription of this species, to show variation in the shape of the epigyne, and characteristics of the ventral abdominal pattern compared to two other species known in the region.

Material and methods

Specimens were photographed with a Nikon DS-Ri2 camera attached to a Nikon SMZ25 stereomicroscope at the Far Eastern Federal University (Vladivostok), and a Canon-



Figs 1–5. General appearance of *Aculepeira matsudae*. 1–2 — male, dorsal and ventral; 3–4 — female, dorsal and ventral; 5 — male's tibia II, dorsal. Scale = 2 mm if not otherwise indicated.

Рис. 1–5. Внешний вид *Aculepeira matsudae*. 1–2 — самец, сверху и снизу; 3–4 — самка, сверху и снизу; 5 — голень II самца. Масштаб 2 мм если не указано иначе.



Figs 6–9. Male palp of *Aculepeira matsudae*. 6 — prolateral; 7 — retrolateral; 8 — ventral; 9 — anterior. Scale = 0.5 mm. Abbreviations: Co — conductor, Ct — conductor's tip, Em — embolus, Ma — median apophysis, St — spur of the terminal apophysis, Ta — terminal apophysis.

Рис. 6–9. Пальпа самца *Aculepeira matsudae*. 6 — пролатерально; 7 — ретролатерально; 8 — вентрально; 9 — спереди. Масштаб 0,5 мм. Сокращения: Со — кондуктор, Ст — вершина кондуктора, Em — эмболюс, Ма — срединный вырост, St — отросток терминального выроста, Та — терминальный вырост

7D camera on an Olympus SZX16 stereomicroscope at the University of Turku. To be photographed, the specimens were placed in dishes filled with ethanol with soft white paper at the bottom. Digital images were montaged using Zerene Stacker software (<http://zerenesystems.com/cms/stacker>). All measurements are in millimeters. All examined material will be deposited in the Zoological Museum of Moscow State University, Moscow, Russia.

Abbreviations used in the text and figure plates: *Leg segments*: Fe — femur, Pt — patella, Mt — metatarsus, Ti — tibia, Ta — tarsus.

Taxonomic survey

Aculepeira Chamberlin et Ivie, 1942

Type species: *Epeira packardii* Thorell, 1875 from Labrador.

DIAGNOSIS. The genus differs from other araneid genera occurring in the Palaearctic by the presence of a white median band or longitudinal spot on the venter of abdomen (Figs 2, 4, 19, 20) (*vs.* median band or spot lacking or median band very wide in *Larinia* and related genera), terminal apophysis of the male palp with basal spur, median



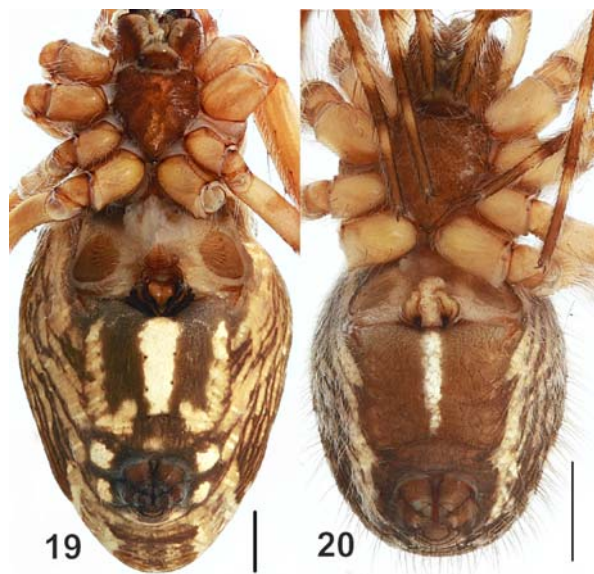
Figs 10–18. Epigyne of *Aculepeira matsudae*. 10, 13 — ventral; 11, 14 — posterior; 12, 15, 18 — ventral with dissected scape; 16, 17 — lateral. Scale = 0.2 mm. Abbreviations: Pd — posterior epigynal depression, Vd — ventral epigynal depression.

Рис. 10–18. Эпигина *Aculepeira matsudae*. 10, 13 — вентрально; 11, 14 — сзади; 12, 15, 18 — вентрально, без скапуса; 16, 17 — латерально. Масштаб 0,2 мм. Сокращения: Pd — заднее вдавление эпигины, Vd — вентральное вдавление эпигины.

apophysis with a pair of thin, roundly bent prolateral processes and a lamellate retrolateral tip; epigyne with a sharply pointed tip of the scape.

COMMENTS. It seems that Neotropical species (most are known by females) are misplaced and represent a sepa-

rate genus or genera. For example, *Aculepeira morenoae* Rubio, Izquierdo et Piacentini, 2013 from Argentina has a different habitus (elongate abdomen) and pattern, the male has an unmodified leg II, but modified femora I (bears strong ventral spines), the median apophysis has retrolateral



Figs 19–20. Female of *Aculepeira packardi* (19) and *A. carbonarioides* (20), ventral. Both specimens from the Kolyma River upper reaches, ca 62°N. Scale = 1 mm.

Рис 19–20. Самка *Aculepeira packardi* (19) и *A. carbonarioides* (20), вентрально. Оба экземпляра из верховой Колымы, примерно 62° с.ш. Масштаб 1 мм.

spines which are lacking in the type species and all other species occurring in the Holarctic; the terminal apophysis is lacking a basal spur (see Rubio *et al.*, 2013). In Holarctic *Aculepeira* species, the male lacks the subterminal apophysis on the palp. The pattern (lacking folium and ventral median white band or spot) and habitus (oval or elongate) in all Neotropical species are different from those of all Holarctic species.

Aculepeira matsudae Tanikawa, 199
Figs 1–18, 19.

Aculepeira matsudae Tanikawa, 1994: 180, f. 1–5 (♂♀).

Aculepeira sp.: Omelko, Marusik, 2014: 313 (♂).

Aculepeira cf. *matsudae*: Oligier *et al.*, 2002: 93 (♀); Marusik, 2009a: 96 (♀); Marusik, 2009b: 381.

MATERIAL EXAMINED: RUSSIA, *Khabarovskiy Kray*: 1 ♂, Ko Mt., 1800 m., scree, 47°07'N 136°33.5'E, 17–27.06.2013 (M.M. Omelko). *Primorskiy Kray*: 1 ♂ 1 ♀, env. of Brovniichi Vill., 43°17'N 133°02'E, 300 m, scree, 12.05.2018 (P.S. Simonov); 1 ♂ 3 ♀♀, Bol'shoy Vorobey Mt Randge, 43°14'N 132°48'E, 1150 m, stony slope, 21.06.2016 (P.S. Simonov); 3 ♀♀, Livadiyskiy Mt. Range, stony slope, 43°04'N 132°46'E, 21.06.2016 (P.S. Simonov).

DIAGNOSIS. *Aculepeira matsudae* is easily differentiated from *A. packardi* (Thorell, 1875) by lacking white lateral stripes and round white spots near the spinnerets on the venter of abdomen in both sexes, as well as a short median white spot (vs. stripes and round spots present, median band long, reaching spinnerets, Fig. 19). The females of *A. matsudae* differ from those of *A. packardi* by having a longer and thinner epigynal scape. Males of *A. matsudae* have a shallower depression on the conductor and a longer tip (*Ct*) (cf. figs 158–160 in Levi [1977]). The pattern of *A. matsudae* is more similar to *A. carbonarioides* (Keyserling, 1892) another species occurring in northern Far East Asia.

The males of the two species differ by tibia II: *A. carbonarioides* has an antero-retrolateral extension bearing a strong spine (fig. 169 in Levi [1977]), whereas in *A. matsudae* such an extension is lacking. Males of *A. matsudae* also have a longer tip of the conductor. Females of the two species differ by the relative length of the scape, which distinctly extends beyond the posterior margin of the epigyne in *A. matsudae* (Figs 10, 13, 16–17), whereas in *A. carbonarioides* the scape does not extend beyond the epigynal posterior margin. Females of *A. carbonarioides* have a longer white median band originating from the epigastral furrow (vs. a short mark in the middle of the postgaster separated from the epigastral fold, cf. Figs 4 and 20).

DESCRIPTION. Male. Total length 5.75 (6.75). Carapace 3.25 (3.20) long, 2.60 (2.70) wide. Carapace dark brown, head region yellowish, covered with long, thin hairs. Chelicerae dark brown with lighter inner sides. Mouth parts and sternum dark brown. Chelicerae with 4 promarginal and 3 retromarginal teeth. Legs light brown with dark brown rings.

Abdomen dorsally blackish with a complex pattern (Fig. 3). Sides of abdomen blackish. Ventrally, abdomen dark gray with short median mark in the middle of the postgaster.

Male palp as in Figs 6–9; general shape like that of congeners, with a relatively stronger spur (*St*) of the terminal apophysis (*Ta*); conductor (*Co*) with very long and broad tip (*Ct*) compared to other species.

Leg lengths (smaller specimen measured):

	Fe	Pa	Ti	Mt	Ta	Total
I	4.10	1.53	3.88	3.63	1.35	14.48
II	3.30	1.28	3.00	2.58	1.10	11.25
III	2.53	0.95	1.63	1.85	0.75	7.70
IV	3.73	1.20	2.88	3.25	1.03	12.08

Female. Total length 8.00 (10.20). Carapace 3.05 (3.40) long, 2.45 (2.70) wide. Coloration as in males, but carapace with more contrasting pattern and spots on dorsal side of abdomen larger.

Leg segment lengths (specimen 9.2 long):

	Fe	Pa	Ti	Mt	Ta	Total
I	4.30	1.55	3.80	3.88	1.43	14.95
II	3.80	1.38	3.25	3.40	1.25	13.08
III	2.78	1.08	1.78	2.00	1.05	8.68
IV	4.00	1.35	3.05	3.38	1.18	12.95

Epigyne as in Figs 10–18. Shape slightly variable. Scape long, more than 4 times longer than wide in ventral view; ventral sides of epigyne parallel or convergent anteriorly (in specimens from Russia; in the paratype female from Japan the sides are divergent). Ventral (*Vd*) and posterior (*Pd*) epigynal depression more than 2 times longer than wide.

NATURAL HISTORY. All specimens from Russia have been collected on scree or in heaths of *Microbiota* in mountain tundra [Simonov, 2019]. The spiders make webs usually between stones, like the similar species *A. carbonarioides*.

DISTRIBUTION. This species is restricted to Far East Asia and known from distant localities: the southern part of Khabarovskiy Kray, the southern part of Primorskiy Kray (from 3 localities near each other), and in Central Hokkaido (from 5 localities near each other: Mt. Higashi-Nupukaushi-Nupuri: 43.252221°N, 143.099002°E, the type locality; Mt. Nishi-Nupukaushi-nupuri: 43.254708°N 143.080609°E; Mt. Haku-unzan, 43.258776°N, 143.115281°E and Mt. Ganseki, 43.255221°N, 143.117566°E, Mt. Yuni-Ishikari-dake, 43.564451°N 143.070314°E).

