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The first record of *Araneus corticarius* (Emerton, 1884) (Aranei: Araneidae) in the Palaearctic

Первая находка *Araneus corticarius* (Emerton, 1884) (Aranei: Araneidae) в Палеарктике

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KEY WORDS: Araneae, Nearctic, Chukotka, orb-weaving spider, distribution, illustrated redescription.
КЛЮЧЕВЫЕ СЛОВА: Araneae, Неарктика, Чукотка, паук-кругопряд, распространение, переописание.

ABSTRACT: *Araneus corticarius* (Emerton, 1884), a species of orb-weaving spiders previously known from across the Nearctic is reported in the Palaearctic (Northeastern Siberia, Chukotka) for the first time. The species is briefly redescribed and its distribution is mapped. A survey of the northern limits of distribution of the genus *Araneus* Clerck, 1757 in the Holarctic revealed that the northernmost distribution record of the genus lies in the Anabar Plateau, Middle Siberia (71°4'N 103°E).

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РЕЗЮМЕ: *Araneus corticarius* (Emerton, 1884), паук-кругопряд, ранее известный только из Неарктики, был найден на Чукотке. Приведено краткое переописание вида, его распространение закартировано. Анализ северной границы распространения пауков рода *Araneus*, показал, что самая северная находка — северная часть Плато Анабар, Средняя Сибирь (71°4'N 103°E).

Introduction

Araneus Clerck, 1757 is the most speciose genus of the order with over 700 nominal species (560 valid and 141 considered as nomina dubia) [WSC, 2023]. Ten genera are considered as junior synonyms of *Araneus* [WSC, 2023]. For almost 50 years after Clerck [1757] all spider species were classified in this genus, the only one in the whole order. A second genus currently valid was described in 1826, namely *Argiope* Audouin, 1826. Judging from the copulatory organs, most of the species currently placed in *Araneus* are not closely related to the generotype *A. angulatus* Clerck, 1757 and we are convinced that in future this genus will be split to over a dozen genera. *Araneus* s.l. is one of the best studied genera in the Holarctic, due to several revisions of the Nearctic species by Levi [1971, 1973], survey of Araneidae in Japan [Tanikawa, 2007], China [Yin *et al*., 1997], several review in European countries and also regional review of Middle European *Araneus* [Šestáková et al., 2009]. Unlike in all other spider genera, there are no endemic *Araneus* species in the Northern Holarctic (north of 50ºN). Almost all species occurring in the boreal zone have either Circumholarctic (e.g., *A. saevus* Clerck, 1757), Transpalaearctic (*A. quadratus* Clerck, 1757) or Transnearctic (*A. trifolium* (Hentz, 1847)) ranges. The only known exception was *A. yukon* Levi, 1971, a species distributed in Siberia and northwestern Nearctic (Alaska, Yukon Territory and westernmost North-Western Territories) [Dondale *et al*., 2003; Mikhailov, 2013; https://www.gbif.org/species/2160264]. While surveying spiders from Chukotka we identified *A. corticarius* (Emerton, 1884), hitherto known from the Nearctic only. The goal of this paper is to provide illustrations on the newly recorded species in the Palaearctic and discuss it distribution as well northern limit of distribution of *Araneus* s. l.

Material and methods

Photographs of specimens and their copulatory organs were obtained using an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope in the Zoological Museum of the University of Turku. Digital images of different focal planes were stacked with Helicon

Figs 1–4. General appearance of *Araneus corticarius*, male. 1 — dorsal; 2 — ventral; 3 — caudal; 4 — lateral.
Рис. 1–4. Внешний вид самца *Araneus corticarius*. 1 — сверху; 2 — снизу; 3 — сзади; 4 — сбоку.

Focus™ 8.1.1. All measurements are given in millimeters. References are provided for the publications essential for species identification and also for papers with synonyms.

Size variation of both sexes is taken from Levi [1971], Dondale *et al*. [2003] and Paquin & Dupérré [2003].

Taxonomic survey

Araneus corticarius (Emerton, 1884)
Figs 1–13.

Epeira corticaria Emerton, 1884: 300, pl. 33, fig. 14, pl. 35, fig. 9 (♀).

Epeira incestifica Keyserling, 1892: 132, pl. 7, fig. 98 (♀).

Araneus corticarius: Petrunkevitch, 1911: 287.

Aranea denningi Archer, 1951: 30, fig. 81 (♂).

Araneus corticarius: Levi, 1971: 158, figs 114–122 (♂♀).

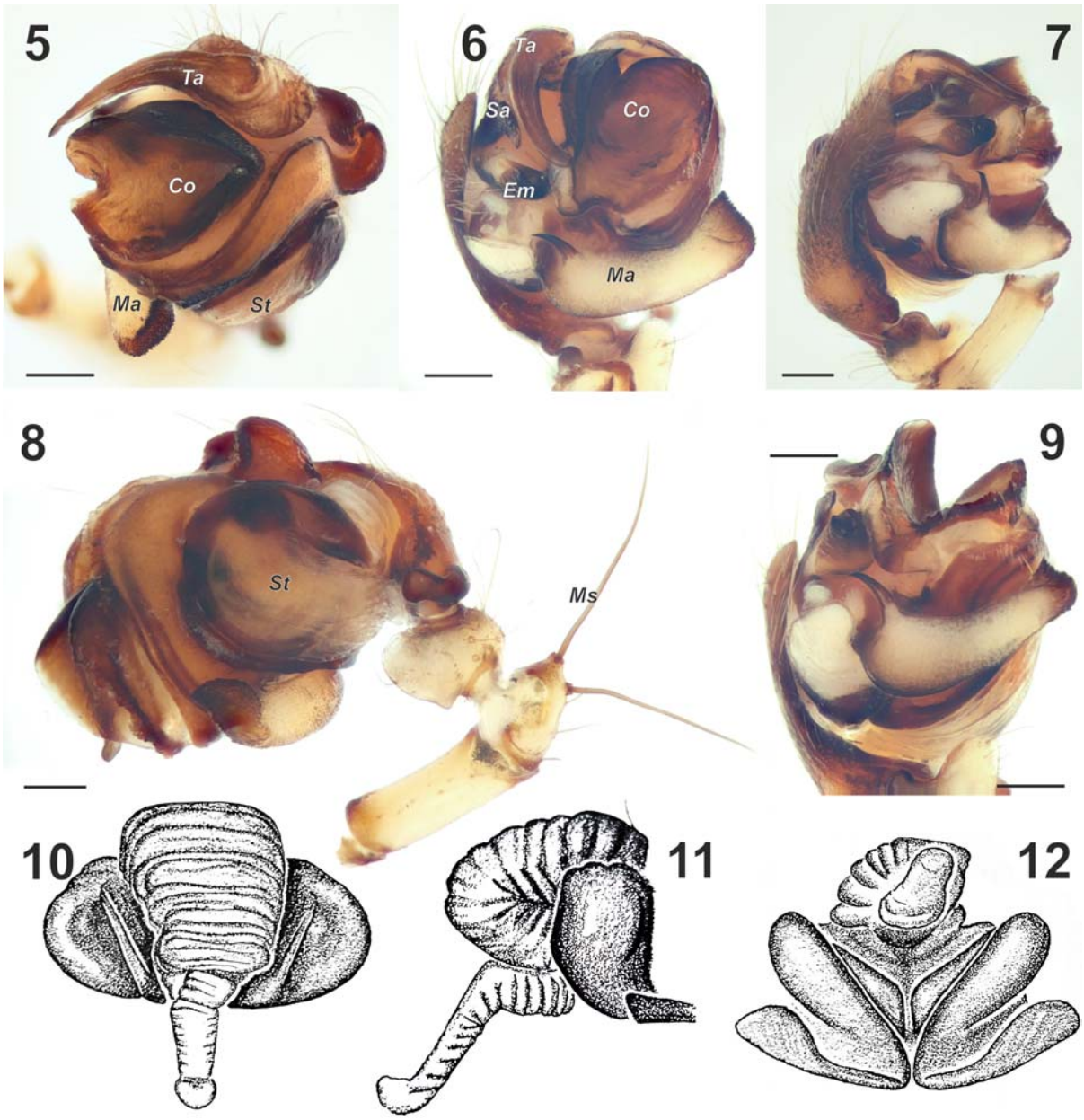
Araneus corticarius: Paquin, Dupérré, 2003: 42, figs 263–265 (♂♀).

Araneus corticarius: Dondale *et al*., 2003: 226, figs 482–488 (♂♀).

For complete list of references see WSC [2023].

MATERIAL EXAMINED: 1♂ (ZMMU), Russia, Chukotka, 92 km W of Anadyr' City, Anadyr' River, near Amochi Mt., 64.82ºN 175. 967ºE, mesophytic floodplain grassy meadow, sweeping, 22.07.2013 (O.A. Khruleva)

DIAGNOSIS. The male of *A. corticarius* differs from those of other *Araneus* species occurring in the Northern



Figs 5–12. Copulatory organs of *Araneus corticarius*: male palp (5–9) and epigyne (10–12). 5 — anterior; 6 — antero-ventral; 7 — ventro-prolateral; 8 — retrolateral; 9 — ventral; 10–12 — ventral, lateral and caudal. 10–12 — reproduced from Levi [1971]. Scale = 0.2 mm. Abbreviations: *Co* — conductor; *Em* — embolus; *Ma* — median apophysis; *Ms* — megaspine; *Sa* — subterminal apophysis; *St* — subtegulum; *Ta* — terminal apophysis.

Рис. 5–12. Копулятивные органы *Araneus corticarius*: пальпа самца (5–9) и эпигина (10–12). 5 — спереди; 6 — спереди-снизу; 7 — снизу-пролатерально; 8 — ретролатерально; 9 — снизу; 10–12 — снизу, сбоку и сзади. 10–12 — по Levi [1971]. Масштаб 0,2 мм. Сокращения: *Co* — кондуктор; *Em* — эмболюс; *Ma* — медиальный отросток; *Ms* — крупный шип; *Sa* — субтерминальный отросток; *St* — субтергулюм; *Ta* — терминальный отросток.

Holarctic by having distinct abdominal humps (vs. lacking), smaller size (4.2–5.2 vs. > 7), and the characteristic abdominal pattern (Figs 1, 3). Median apophysis (*Ma*) of *A. corticarius* is similar to that in *A. diadematus*, but relatively longer. Females of *A. corticarius* also differ from the congeners occurring in the North by having very distinct dorsal abdominal humps (vs. small or absent) and characteristic abdominal pattern. Epigyne of *A. corticarius* is somewhat similar to those in *A. yukon* and *A. quadratus* Clerck, 1757 by having a wide base and gradually tapering scape, but differs by being relatively shorter and having a bent in middle part lacking (Fig. 11) in similar species.

DESCRIPTION. See Dondale *et al*. [2003]. Here we provide short description, with emphasis to the copulatory organs.

Male. Total length 4.2–5.3; carapace 2.3–2.9 long, 1.9–2.5 wide. Specimen from Anadyr 4.5 long, carapace 2.9 long, 2.35 wide. Habitus and pattern as in Figs 1–4.

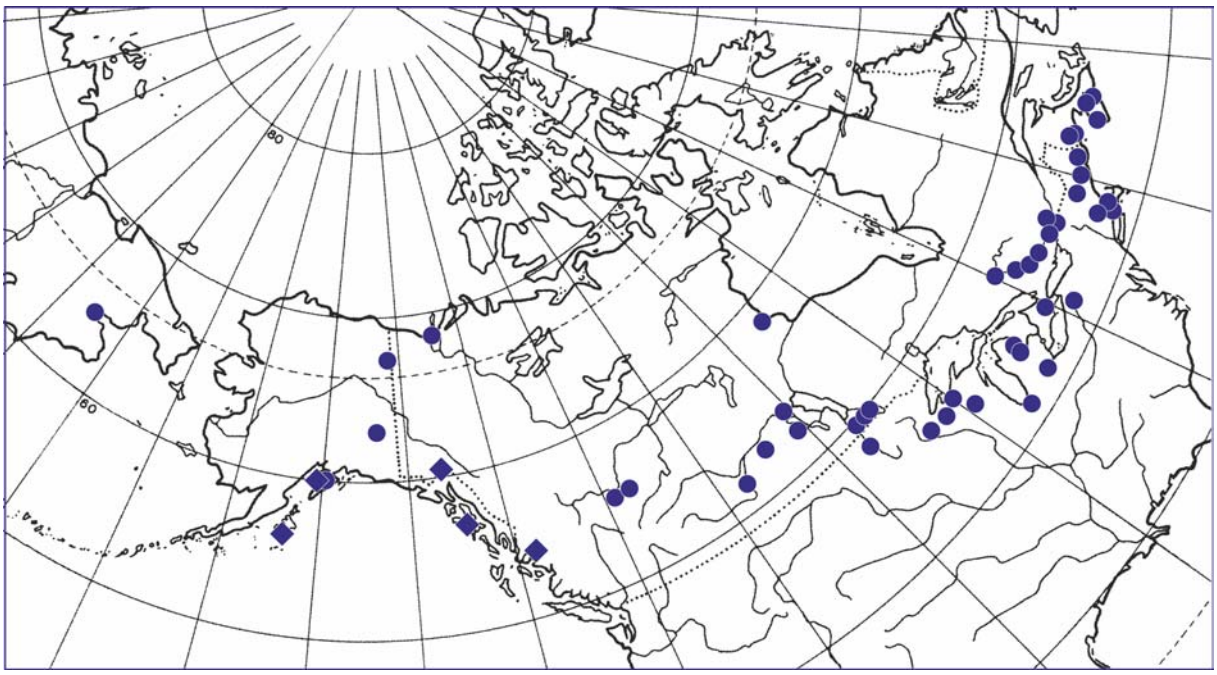


Fig. 13. Distribution records of *Araneus corticarius* based on on the literature and personal data (dot) and GBIF database (romb).
Рис. 13. Точки находок *Araneus corticarius*: литературные и личные данные (кружок), данные GBIF (ромб).

Palp as in Figs 5–9; femur short, 3 times longer than wide, as long as subtegulum (*St*); patella subconical with 2 megaspines (*Ms*); tibia about as long as femur wide, 1.6 times wider than long; median apophysis ca. 4 times longer than wide, with one prolateral spur, cuticle granulated; conductor (*Co*) large, almost as long as median apophysis, ca. 1.2 times longer than wide; terminal apophysis (*Ta*) as long as conductor, slightly roundly bent in anterior view; subterminal apophysis (*Sa*) shorter than terminal; embolus (*Em*) short.

Female. Total length 6.3–8.0. carapace 2.5–3.2 long, 2.2–2.5 wide.

Epigyne with septum broad at base, 4 times wider than terminal part, about twice longer than maximal width in ventral view, actual length 3 times longer than wide due to strong bent in mid part; in posterior view 1.75 times wider than high.

HABITATS. According to Dondale *et al*. [2003] this species dwells in swamps and bogs.

DISTRIBUTION. In the Nearctic this species is known from Alaska to Nova Scotia, south to northeastern North Dakota, southern Michigan, and northern Pennsylvania [Dondale *et al*., 2003]. The majority of the collecting localities of the species lie in the forest biome (taiga and mixed forest zone), and only few lie in the sub-Arctic. According to the map 58 in Dondale *et al*. [2003], the northernmost record of *A. corticarius* lies in Mackenzie Rive delta, ca. 69ºN. In the Palaearctic, it was found in a single locality near Anadyr (64.82ºN) in the elfin wood subzone.

Northern limits of distribution of *Araneus*

In the Nearctic, the northernmost locality of the two *Araneus* species (*A. corticarius* and *A. yukon*) is Mackenzie River mouth, ca 69ºN [Dondale *et al*., 2003]. The northernmost locality of *Araneus* in Europe, belonging to *A. quadratus*, lies in Norway, ca. 70.06ºN. In Eastern Siberia, Yakutia and Chukotka *Araneus* species have not been found north of 68.5ºN [Marusik *et al*., 2002, 2003]. It looks that northernmost latitude where *Araneus* species have been found is the northern part of the Anabar Plateau (Kotui River 114 km from Khatanga Vil., 71.4°N 103°E 205 m, northern taiga subzone), where two species occur: *A. quadratus* (https://www.gbif.org/occurrence/map?taxon_key=2159718) and *A. nordmanni* Thorell, 1875 (https://www.gbif.org/occurrence/map?taxon_key=2159902). Both species were collected by the second author on 23 June 2010 in a sparse larch forest with hypoarctic shrubs in the lower layer. They were represented by subadult specimens with characteristic pattern. Our preliminary identifications were confirmed by barcoding.

Conflict of interests

The authors declare no potential conflict of interest.

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