First record of *Diphya wulingensis* Yu, Zhang et Omelko, 2014 (Aranei: Tetragnathidae) in Russia

**ABSTRACT.** A previous record of *Diphya* sp. from the Russian Far East is found to refer to *Diphya wulingensis* Yu, Zhang et Omelko, 2014, the northernmost species of the genus. The species is redescribed and illustrated, and its copulatory organs are described in detail. Distribution records of the species are provided on a map, and the taxonomic position of *Diphya* and its relationships to other species are briefly discussed.

**Material and methods**

Specimens were photographed with a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope and with a SEM JEOL JSM-5200 scanning microscope at the Zoological Museum, University of Turku, Finland. Digital images were montaged using CombineZP image stacking software. The epigyne was cleared in a KOH/water solution until the soft tissues were dissolved. Photographs were taken of the specimens in dishes with cotton paraffin on the bottom to hold them in position. All specimens will be deposited in the Zoological Museum of Moscow State University. All measurements are in mm.

**Taxonomy**

*Diphya Nicolet, 1849*

*Diphya macrophthalmalma* Nicolet, 1849 from Southern Chile. Although the species was de-
Figs 1–12. Diphya wulingensis: 1–2 — male habitus, dorsal; 3, 6 — male and female prosoma, frontal; 4 — male prosoma, ventral-caudal, showing sternum and mouthparts; 5 — female habitus, dorsal; 7 — male metatarsus I, dorsal; 8 — male metatarsus and tarsus I, dorsal; 9 — male palp, retrolateral; 10 — dissected epigyne, ventral; 11 — intact epigyne with mating plug, ventral; 12 — macerated epigyne, dorsal. Scale = 0.2 mm unless otherwise indicated.

Abbreviations. Cp — copulatory openings, Mp — mating plug.

Рис. 1–12. Diphya wulingensis: 1–2 — внешний вид самца, дорзально; 3, 6 — самец и самка головогрудь, спереди; 4 — самец головогрудь, вентро-каудально, показаны стернум и ротовой аппарат; 5 — внешний вид самки, дорзально; 7 — предлапка I самца, дорзально; 8 — предлапка и лапка I самца, дорзально; 9 — пальца самца, ретролатерально; 10 — отделённая эпигина, вентрально; 11 — эпигина с затычкой, вентрально; 12 — макерированная эпигина, дорзально. Масштаб 0,2 мм, если не указано иное.

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Figs 13–18. Male palp and epigyne of *Diphya wulingensis*: 13 — male palp, dorso-prolateral; 14 — same, retrolateral; 15 — same, prolateral; 16 — same, ventral; 17 — same, anterior; 18 — epigyne, dorsal, photographed at higher magnification. Scale = 0.2 mm unless otherwise indicated.


Рис. 13–18. Пальпа самца и эпигина *Diphya wulingensis*: 13 — пальпа самца, дорзо-пROLATерально; 14 — тоже самое, ретролатерально; 15 — тоже самое, пролатерально; 16 — тоже самое, вентрально; 17 — тоже самое, спереди; 18 — эпигина, дорзально, снята на большем увеличении. Масштаб 0,2 мм.

scribed based on both sexes, the male has never been illustrated.

**Diagnosis.** *Diphyya* is well differentiated from all other tetragnathids by having enlarged lateral and posterior median eyes, much larger than the anterior median eyes (Figs 1–3, 5–6), widely spaced lateral eyes (the character is also known in a few *Tetragnatha* species) and a prolateral row of stiff setae on the tibia-tarsus of legs I and II (Figs 7–8).

**Description.** The genus is well described in Tanikawa [1995] and Álvarez-Padilla & Hormiga [2011].

**Relationships.** Although Simon [1894] placed *Diphyya* in Diphyeae Simon, 1894, more recent analyses subsequently placed it in Tetragnathinae [Álvarez-Padilla, 2007] and then in Metinae [Álvarez-Padilla et al., 2009]. The most recent analysis leaves it unplaced [Álvarez-Padilla, Hormiga, 2011]; however, for reasons unknown, Diphyeae as a separate group was not considered or even mentioned in these three most recent analyses. However, in this study we found *Diphyya* to be well separated from all currently recognized sub-families of Tetragnathidae: Leucauginae, Metainae, Nanometinae and Tetragnathinae based on both somatic morphology and characters of the copulatory organs.

Based on the shape of the male palp, African [Marusik, 2017], Asian and South Neotropical species of *Diphyya* are distantly related and may be considered separate genera in the future. Males of two species from Chile (found in the same region as *D. macrophthalm-a*, but the male is not properly described), *D. spinifera* Tullgren, 1902 and *D. limbata* Simon, 1896 (see figs 23–26 in Tanikawa [1995]) have a palpal tibial apophysis, a character lacking in Asian species and known only in one Tetragnathidae genus, *Homalometa* Simon, 1898.

**Note.** Simon’s name Diphyinae is already preoccupied in Cnidaria by Diphyinae Quoy et Gaimard, 1827, and we are applying to the International Commission on Zoological Nomenclature to change Simon’s name to Diphyainae.
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**Fig. 24. Distribution records of *Diphya wulingensis*.**

Рис. 24. Находки *Diphya wulingensis*.

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Figs 1–24.

*Diphya* sp.: Marusik, Kovblyuk, 2011: 235, f. 34.6–9 ($\odot$).

*Diphya wulingensis* Yu, Zhang, Omelko, 2014: 31, f. 1–13 ($\odot$).

**Material examined:** RUSSIA, Maritime Prov.: 1 ♀ (ZMMU), Khanka Lake, S Shore, Luzanova Sopka River valley, forest opening, among herbs, 19.08.1981 (T.I. Oliger); 1 ♀ (ZMMU), Lazovski Reserve, Syaukhe (=Sokolovka) River valley, forest opening, 16–17.07.1998 (Yu.M. Marusik); 1 ♀ 1 ♂ (ZMMU), Lazovski Reserve, Sopka (=Sokolovka) River valley, forest opening, among herbs, 6–9.08.1998 (Yu.M. Marusik); 2 ♀ Khasanskiy Dist., Kruglaya Bay near Nerpa Vill., ca. 8 km S of Slavyanka Vill., 7.08.1998 (E.V. Mikhaljova).

**Diagnosis.** *Diphya wulingensis* well differs from all Asian species by colour pattern, shape of copulatory organs and microstructure of the carapace. Unlike *D. albula* (Paik, 1983) it has no fine pits on carapace. Males of *D. wulingensis* have darkened anterior half of carapace (character lacking in other species). Male palp with complex paracymbium having 4 processes (other species have simple unbranched paracymbium and cymbial process). Epigyne in *D. wulingensis* is lacking fovea, which is present in all Asian species, and in addition receptacles in *D. wulingensis* are spaced by more than one diameter vs. spaced by less than half diameter in other Asian species.

**Description.** For a description of somatic characters, see Yu et al. [2014]. The carapace pattern in the male is variable; some specimens have a sublateral dark band (Fig. 2) and some do not (Fig. 1). The male palp is as in Figs 9, 13–17, 19–23: femur as long as patella + tibia, tibia longer than wide; paracymbium complex, with 4 processes, ventral process (Ip) large, with 2 macrosetae on the tip, ventral intermediate process (In) small, digitiform, dorsal intermediate process (Dp) with sclerotized tip; cymbium concave prolaterally (Fig. 19); subtegulum (St) large, obscuring tegulum in retrolateral view; tegulum (Te) circular, conductor (Co) laminar, twisted around axis, bifid in terminal part (Figs 17, 22); embolus (Em) short, twisted together with conductor, sperm duct opening (So) small (Fig. 23).

Epigyne as in Figs 10–12, 18, epigynal plate about 2 times wider than long, fovea absent, median plate wide (0.5 of the plate width), 2 times wider than long; copulatory openings (Cp) indistinct; receptacles (Re) globular, separated by 4 diameters, mesal part with long glandular cilia (Gc) or accesorial glands sensu Álvarez-Padilla & Hormiga [2011]), fertilization ducts (Fd) longer than copulatory duct (Cd).

**Note.** We were unable to distinguish an epigynal septum as shown on the line drawing of the paratype of *D. wulingensis* (fig. 8 in Yu et al. [2014]). The septum is lacking on the photograph (figs 3–4 in Yu et al. [2014]). The figures of the endogyne in this paper (Figs 12, 18) and in Yu et al. [2014: fig. 9] slightly differ because of the angle in which they were illustrated. One female examined here has a mating plug in the epigyne (Fig. 11). This plug consists of part of the conductor.

**Distribution.** *Diphya wulingensis* is known from the northeastern part of Hebei Province and in southern part of Maritime Province of Russia (Fig. 24). The record from Khanka Lake is the northernmost of the entire genus.

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References


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