

Redescription of a poorly known troglophile spider, *Meta manchurica* Marusik & Koponen 1992 (Aranei: Tetragnathidae)

Alexander A. Fomichev^{1,2} & Mikhail M. Omelko^{3,4}

¹Altai State University, Lenina Pr., 61, Barnaul, RF-656049, Russia. E-mail: a.fomichev@mail.ru

²Tomsk State University, Lenina Pr., 36, Tomsk, RF-634050, Russia.

³Federal Scientific Center of East Asia Terrestrial Biodiversity, Far Eastern Branch, Russian Academy of Sciences, Vladivostok 690022, Russia. E-mail: omelkom@gmail.com

⁴Far Eastern Federal University, Laboratory of ecology and evolutionary biology of aquatic organisms (LEEBAO), Institute of World Ocean, Vladivostok 690091, Russia. E-mail: omelkom@gmail.com

Abstract — A poorly known troglophile spider species of the genus *Meta* C. L. Koch 1835 (Tetragnathidae) from the Russian Far East is redescribed based on newly collected material.

Key words — Araneae, biodiversity, caves, long-jawed spiders, Russian Far East.

Introduction

Tetragnathidae Menge 1866 is a large family with a worldwide distribution, comprised of 983 extant species in 45 genera (World Spider Catalog 2022). Seven genera of Tetragnathidae are recorded in the Far East of Russia: *Dipha* Nicolet 1849; *Leucauge* White 1841; *Meta* C.L. Koch 1835; *Metellina* Chamberlin & Ivie 1941; *Metleucauge* Levi 1980; *Pachygnatha* Sundevall 1823 and *Tetragnatha* Latreille 1804 (Marusik & Kovblyuk 2011). Most of these genera, including *Meta*, are restricted to the Maritime Territory, the southernmost part of the Russian Far East (Marusik & Kovblyuk 2011). *Meta* is a medium-sized genus with 33 species (World Spider Catalog 2022). The genus has an almost worldwide distribution, although it is absent in Siberia, Central Asia and South America (WSC 2022). The greatest diversity of *Meta* occurs in south-western China, from where many new species have been described in recent years (Wang et al. 2020; 2022). Only one species, *M. manchurica* Marusik & Koponen, 1992, was described from the southern Russian Far East (Marusik & Koponen 1992). In addition to the Far East of Russia, this species was found in the neighboring Korean peninsula. Paik et al. (1969) provided records of *M. menardi* (Latreille 1804) from the caves in southern part of South Korea. Later, it was shown that in fact these records belong to *M. manchurica* (Namkung 2002). While studying the material collected in caves at southernmost area of the Maritime Territory, on the border with North Korea, we found several specimens of both sexes belonging to this species. Considering the fact that the original description of *M. manchurica* is overly concise and contains a small number of figures, and particularly that the internal structures of

the epigyne are not illustrated, we decided to provide a redescription for this species.

Material and methods

Specimens were photographed using a Nikon DSRi2 camera attached to a Nikon SMZ25 stereomicroscope at the Far Eastern Federal University (Vladivostok, Russia), and an Olympus DP74 camera attached to an Olympus SZX16 stereomicroscope at the Altai State University (Barnaul, Russia), and a Fujifilm X-T10 camera with Zeiss touit 50 mm f/2.8 macro camera lens. Photographs were taken in dishes filled with alcohol, with soft white paper or cotton at the bottom. Live specimen and habitat were photographed using a Canon PowerShot SX620 HS. Digital images were montaged using Zerene Stacker (<https://zerenesystems.com/cms/stacker>) and Helicon Focus software packages. Epigynes were cleared in a boiling KOH/water solution. Distribution map was produced using SimpleMappr (Shorthouse 2010). All measurements are in millimeters. Length of leg segments were measured on the prolateral side, and are shown as: femur, patella, tibia, metatarsus, tarsus (total length). All examined material are deposited in the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU; curator K.G. Mikhailov), the Institute of Systematics and Ecology of Animals SB RAS, Novosibirsk, Russia (ISEA; curator G.N. Azarkina) and Far Eastern Federal University (FEFU; curator M.M. Omelko). Abbreviations used in text and the format of description follow Wang et al. (2022), with some modifications.

Eyes: ALE – anterior lateral eye, AME – anterior median eye, MOA – median ocular area, PLE – posterior lateral eye, PME – posterior median eye.



Figs. 1–4. Habitus of *Meta manchurica*, male (1–2) and female (3–4). 1, 3 dorsal; 2, 4 ventral. Scale bar: 5 mm.

Leg segments: Fe – femur, Mt – metatarsus, Pa – patella, Ti – tibia.

Spination: d – dorsal, p – prolateral, r – retrolateral, v – ventral.

Copulatory organs: Cb – cymbial bulge, Cd – denticles of conductor, Cp – cymbial process, Co – conductor, Cr – retrolateral cymbial projection, Cs – cymbial spines, Da – dorsal arm of embolic apophysis, Ea – embolic apophysis, Em – embolus, Lm – lateral margins of the median plate, Pa – paracymbium, Re – receptacle, Tc – tip of conductor, Tg – tegulum, Va – ventral arm of embolic apophysis.

Taxonomy

Meta manchurica Marusik & Koponen 1992

Figs. 1–24.

Meta menardi: Paik, Yaginuma & Namkung 1969: 823, figs 50–51(♀, misidentified).

M. manchurica Marusik & Koponen 1992: 138, figs 5–9, 15 (♂♀).

M. manchurica: Namkung 2002: 228, figs 18.15a–d (♂♀).

M. manchurica: Kim & Lee 2013: 44, figs 27A–C (♂♀).

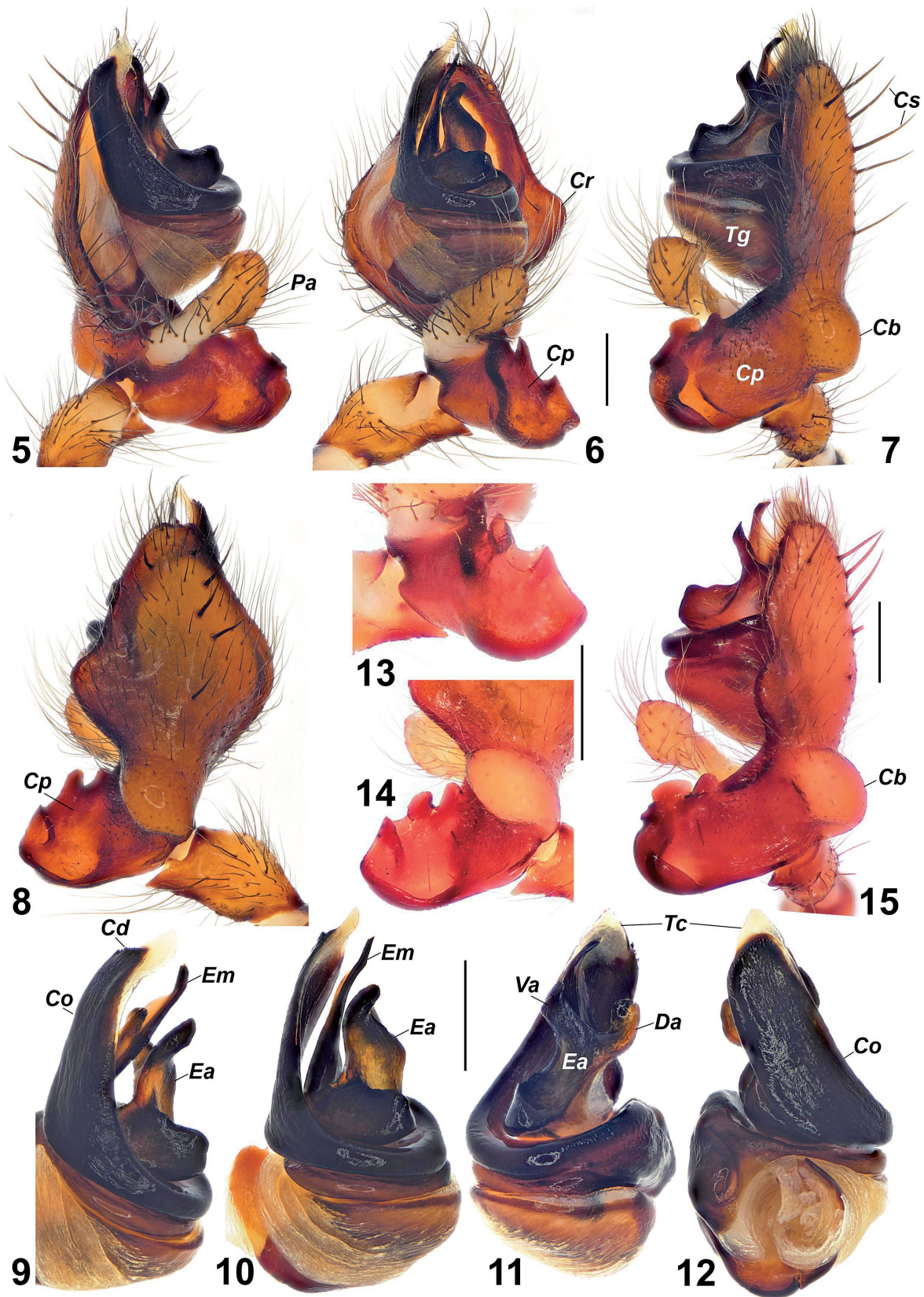
Type material (examined). Holotype ♂ (ZMMU), RUSSIA: Maritime Territory, Partizansky District, Partizansk Town, entrance of a cave; 2 May 1978, A.S. Lelei; 2♀ paratypes (ZMMU), Khasansky District, Nerpichya Bay, cave, 3 September 1978, B.P. Zakharov.

Other material. RUSSIA: Maritime Territory: 2♀ (ISEA,

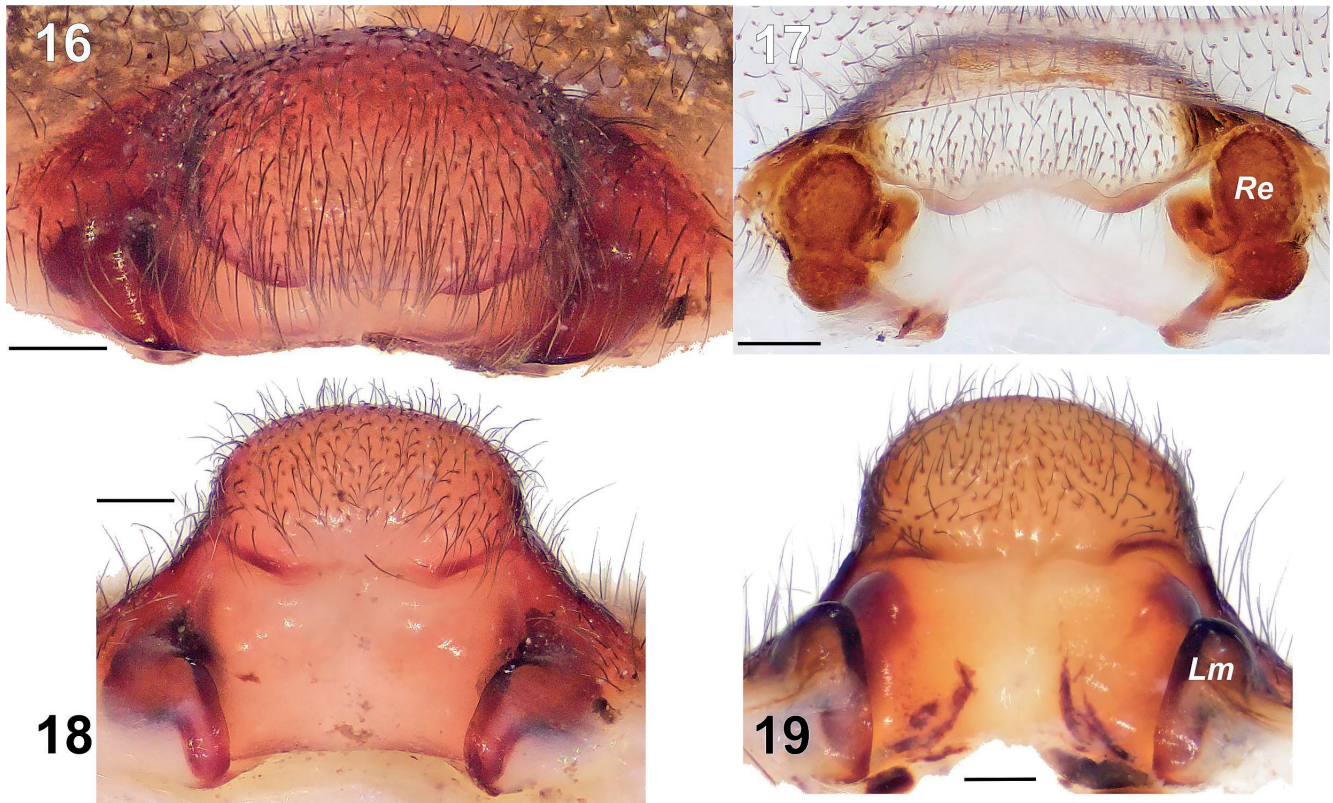
001.8982), Ussuriysky District, 2 km WNW of Gornot-ayozhnoe Village, Ovrazhnaya Mountain (43°42.329'N, 132°07.270'E), large-block scree in the oak forest, 200 m, 7 July 2022, A.A. Fomichev; 1♂ 1♀ (ISEA, 001.8983), Khasansky District, 9 km E of Khasan Village, Golubinyi Utes Mountain (42°24.767'N, 130°45.362'E), in a cave, 20 m, 15 July 2022, A.A. Fomichev, M.M. Omelko; 1♂ (FEFU), same place and collectors.

Description. Male (from the Golubinyi Utes Mountain). Total length 10.5. Carapace: 5.3 long, 4.3 wide. Abdomen: 6.5 long, 4.0 wide. Coloration. Carapace yellowish brown. Chelicerae, sternum and labium brown. Endites light brown. Coxae yellow. Palps yellow, cymbium brown. Legs yellow, with brown annulations. Abdomen dark gray, with yellow herringbone pattern dorsally. Venter of abdomen with two yellow longitudinal stripes. Spinnerets light brown. Eye sizes and interdistances: AME 0.29, ALE 0.29, PME 0.2, PLE 0.21, AME–AME 0.17, AME–ALE 0.27, PME–PME 0.21, PME–PLE 0.31, ALE–PLE 0.04. MOA 0.61 long, anterior width 0.66, posterior width 0.73. Clypeus height 0.26. Leg measurements: I: 8.5, 2.5, 8.7, 8.7, 2.9 (31.3). II: 7.5, 2.4, 6.7, 7.1, 2.3 (26.0). III: 6.0, 1.8, 4.0, 4.6, 1.9 (18.3). IV: 7.0, 1.9, 5.4, 6.0, 1.9 (22.2). Leg spination: I: Fe d4 p6 r4; Pa d1; Ti d2 p4 r5 v7; Mt d1 p2 r1 v1. II: Fe d4 p3 r5; Pa d1; Ti d2 p4 r3 v8; Mt d1 p2 r1 v1. III: Fe d4 p3 r3; Pa d1; Ti d1 p2 r1 v5; Mt d1 p3 v1. IV: Fe d5 p3 r3 v2; Pa d1; Ti d2 p2 r2 v6; Mt d1 p2 v1.

Palp as in Figs. 5–15. Cymbium with rounded retrolateral



Figs. 5–15. Male of *Meta manchurica*. 5 palp, prolateral; 6 same, ventral; 7, 15 same, retrolateral; 8 same, dorsal; 9 bulb, prolateral; 10 same, ventral; 11 same, retrolateral; 12 same, dorsal; 13 cymbial process, ventral; 14 same, dorsal. 5–12 specimen from Golubinyi Utes Mountain, Russia; 13–15 holotype. Scale bars: 0.5 mm. Abbreviations: Cd denticles of conductor, Co conductor, Cp cymbial process, Cr retrolateral cymbial projection, Cs cymbial spines, Cb cymbial bulge, Da dorsal arm of embolic apophysis, Ea embolic apophysis, Em embolus, Pa paracymbium, Tg tegulum, Va ventral arm of embolic apophysis, Tc tip of conductor.



Figs. 16–19. Female of *Meta manchurica*. 16 epigyne, ventral; 17 same, dorsal; 18, 19 same, posterior. 16–18 specimen from Ovrazhnaya Mountain, Russia; 19 specimen from Golubinyi Utes, Russia. Scale bars: 0.2 mm. Abbreviations: *Lm* lateral margin of the median plate, *Re* receptacle.



Figs. 20–23. Natural habitats (20–22) and live specimen (23) of *Meta manchurica*. 20–21 stony habitat in the Ovrazhnaya Mountain; 22 cave in the Golubinyi Utes Mountain; 23 a male in a cave in the Golubinyi Utes Mountain.

projection (*Cr*), bulge (*Cb*) basally, baso-retrolateral large complex process (*Cp*) and long, finger-like paracymbium (*Pa*). Dorsal side of cymbium with 6 thick spines (*Cs*). Conductor (*Co*) large, wide and flattened with membranous tip (*Tc*) and numerous tiny denticles (*Cd*) near the tip. Embolus (*Em*) long, flattened, slightly curved, pointed. Embolus with large apoph-

ysis (*Ea*) subdivided in two arms: ventral apophysis (*Va*) with pointed tip and shorter dorsal apophysis (*Da*) with rounded tip.

Female (from the Golubinyi Utes Mountain). Total length 13.5. Carapace: 5.5 long, 4.3 wide. Abdomen: 9.0 long, 7.4 wide. Coloration. Carapace light brown, cephalic part darker. Chelicerae, labium, sternum and endites brown. Coxae



Fig. 24. Distributional records of *Meta manchurica*. Blue circles indicate the type locality.

yellowish brown. Palps brown, darker distally. Legs yellowish brown, with vague brown annulations. Abdomen dark gray, with yellow herringbone pattern dorsally. Venter of abdomen with two yellow longitudinal stripes. Spinnerets light brown. Eye sizes and interdistances: AME 0.23, ALE 0.29, PME 0.24, PLE 0.26, AME–AME 0.16, AME–ALE 0.21, PME–PME 0.23, PME–PLE 0.27, ALE–PLE 0.03. MOA 0.56 long, anterior width 0.61, posterior width 0.71. Clypeus height 0.36. Leg measurements: I: 8.0, 2.6, 8.1, 8.1, 2.8 (29.6). II: 7.1, 2.4, 6.5, 6.7, 2.2 (24.9). III: 5.7, 1.8, 4.0, 4.4, 1.8 (17.7). IV: 7.2, 2.0, 5.7, 6.1, 1.9 (22.9). Leg spination: I: Fe d2 p4 r5; Pa d1; Ti d2 p4 r4 v7; Mt d1 p3 r1 v1. II: Fe d5 p4 r5; Pa d1; Ti d2 p4 r2 v7; Mt d1 p2 r1 v1. III: Fe d4 p3 r3; Pa d1; Ti d1 p3 r1 v6; Mt d1 p4 v1. IV: Fe d4 p3 r3; Pa d1; Ti d2 p3 r2 v7; Mt d1 p3 v1.

Epiygine as in Figs. 16–19, bulged, covered with short setae anteriorly, hairless posteriorly, with 2 hook-like lateral margins of the median plate (*Lm*) basally. Median plate almost square. Receptacles (*Re*) somewhat rounded, spaced by 2 of their diameters.

Notes. Considering the lifestyle, *M. manchurica* is a troglophile species that can live in both the entrance parts of caves and between stones in screes. It is important to note that there are slight differences in the structure of the copulatory organs of the newly collected male and that of the holotype. This is especially noticeable in the structure of the cymbial process (cf. Figs. 6 and 13). Initially, these differences led us to believe that our newly collected specimens represent a new species. However, since the remaining parts of the palp are completely identical to those of the holotype, we believe that this is an intraspecific variability. The epiygyes of the studied females also slightly differ from each other in the proportions and shape of the lateral margins of the median plate (*Lm*) (cf. Figs. 18 and 19). The newly found locality of the species in the Ovrazhnaya Mountain is the northernmost point in its known range.

Distribution. South Korea, Russia (south of Far East).

Acknowledgements

We wish to thank M.M. Omelko Sr. (Gornotaezhnoe, Russia) for his help with organizing the fieldworks during which the material presented here was collected. Special thanks go to Y.V. Dyachkov (Barnaul, Russia) for being a great help during fieldwork and collecting. We are also grateful to S.V. Reshetnikov (Novosibirsk, Russia) for his help with taking digital photographs. We thank Alireza Zamani (Turku, Finland) for commenting on the early draft and editing the English. The work of Mikhail M. Omelko was carried out within the state assignment of Ministry of Science and Higher Education of the Russian Federation (theme No. 121031000120-9) using equipment of Laboratory of ecology and evolutionary biology of aquatic organisms (Far Eastern Federal University).

References

- Kim, S. T. & Lee, S. Y. 2013. Arthropoda: Arachnida: Araneae: Mimetidae, Uloboridae, Theridiosomatidae, Tetragnathidae, Nephilidae, Pisauridae, Gnaphosidae. Spiders. Invertebrate Fauna of Korea, 21: 1–183.
- Marusik, Y. M. & Koponen, S. 1992. A review of *Meta* (Araneae, Tetragnathidae), with description of two new species. J. Arachnol., 20: 137–143.
- Marusik, Y. M. & Kovblyuk, M. M. 2011. Spiders (Arachnida, Aranei) of Siberia and Russian Far East. KMK Scientific Press, Moscow, 344 pp.
- Namkung, J. 2002. The spiders of Korea. Kyo-Hak Publishing Co., Seoul, 648 pp.
- Paik, K. Y., Yaginuma, T. & Namkung, J. 1969. Results of the speleological survey in South Korea 1966 XIX. Cave-dwelling spiders from the southern part of Korea. Bull. Natn. Sci. Mus. Tokyo, 12: 795–844.
- Wang, L. Y., Zhou, G. C., Irfan, M., Yang, S. F. & Peng, X. J. 2020. Five new species of *Meta* Koch, 1836 (Araneae: Tetragnathidae) from Gaoligong Mountains, China. Eur. J. Taxon., 624: 1–25. doi:10.5852/ejt.2020.624
- World Spider Catalog 2022. World Spider Catalog. Version 23.5. Natural History Museum Bern, online at <http://wsc.nmbe.ch> (accessed in August 2022). doi: 10.24436/2

Received December 5, 2022 / Accepted March 23, 2023