

On linyphiid spiders (Aranei: Linyphiidae) from Moscow Area, Russia

О пауках-линифидах (Aranei: Linyphiidae) из Московской области, Россия

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KEY WORDS: Aranei, Araneae, Arachnida, fauna, spiders, new records, Moscow Area, Middle Russia, Prioksko-Terrasnyi Nature Reserve, synonym.

КЛЮЧЕВЫЕ СЛОВА: Aranei, Araneae, Arachnida, фауна, пауки, новые находки, Московская область, Средняя полоса России, Приокско-Террасный заповедник, синоним.

ABSTRACT. 12 spider species of fam. Linyphiidae are reported as the first records in Moscow Area (Russia), one of which is new also for the fauna of Middle Russia (*Improphantes complicatus*). Comments with species distribution and early records from the country, as well as taxonomical and biological notes are attached to the list. New synonym is proposed: *Incestophantes australis* (Gnelitsa, 2009) = *Incestophantes crucifer* (Menge, 1866), syn.n. (valid name on the right).

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РЕЗЮМЕ. Приведены 12 видов пауков сем. Linyphiidae, впервые отмеченные в Московской области (Россия), один из которых новый также и для фауны средней полосы России (*Improphantes complicatus*). Список снабжен комментариями о распространении видов и их находках в стране, заметками по таксономии и биологии. Установлен новый синоним: *Incestophantes australis* (Gnelitsa, 2009) = *Incestophantes crucifer* (Menge, 1866), syn.n. (валидное название справа).

Introduction

Linyphiidae are considered to be a typical group for the northern temperate zone, where they constitute the largest portion of the spider species richness and numbers (e.g. Miller, Hormiga, 2004). The small size and complicity of genitalia make difficulties in their sampling and taxonomic expertise. As a result, linyphiids are underestimated in the world spider fauna. For example, at least 60% of Afrotropical linyphiid species remain unknown to science [Seyfulina, 2010]. In Russia, new species are found mostly in northern and south-

ern regions of the European part, in Urals, Siberia, and in the Far East. Such region as Middle Russia is quite well-studied in this context, about 250 linyphiid species are registered here [Seyfulina, Kartsev, 2011; Nentwig *et al.*, 2019]. Any unknown to science species are found extremely rare (e.g. Tanasevitch, Eyunin, 2013), and new taxonomic material concerns mainly the contribution to regional fauna. In current study, a number of species are reported for the first for Middle Russia, as well as for one part of this territory, namely Moscow Area. Up to date, the local checklist includes 164 linyphiid species. The bulk of them (142 sp.) were published in the Spider catalogue of the Moscow Region [Mikhailov, 1983], another 17 species were added to the list by Tanasevitch [2008a] and Seyfulina [2008]. Recently, the database was widened after our inventory work in the Prioksko-Terrasny Nature Reserve [Seyfulina, 2017], further results of which are presented here.

Material and Methods

Linyphiidae specimens were collected by the author during inventory study of the Prioksko-Terrasny State Biosphere Reserve, initiated in 2014. The Reserve is located in the south of Moscow Area on the left side of Oka river (N 54°52' E 37°36', Fig. 1). It covers the territory about 50 sq. kilometers and contains different types of forest, dry and lowland meadows, steppe patches, small lakes, rivers, and sphagnum bogs. Material for this paper was gathered by using pitfall traps and sifter in four type of forests, in two different meadows, as well as on the water sides. Specimens listed below are verified by Dr A.V. Tanasevitch and kept in the Reserve (PTSBR).

Abbreviations of the names of palp and epigyne are following: DPs — the distal part of the scape; LCh — lamella characteristic. Other abbreviations: p.t. — pitfall traps; s.l. — same locality.



Fig. 1. Map of Moscow Area and situation of study site (marked by a square).

Рис. 1. Карта Московской области и расположение места исследования (отмечено квадратом).

Description of sampling sites

The **steppe meadow** is located in 1.2 km distance from Oka river (the second terrace) in the highly protected area named the Doly Tract. Vegetation is represented by feather-grass *Stipa pennata* L., fescue *Festuca valesiaca* Schleich. ex Gaud., purple-stem catstail *Phleum phleoides* (L.) H. Karst., Russian fritillaria *Fritillaria ruthenica* Wickstr. and other steppe flora. It is totally surrounded with the green moss pine forest. The **upland (dry) meadow** is located in 4.5 km distance from the river bank (the fourth terrace) and in 5 km from the steppe site. This plot is occupied by graminaceous and motley grass. Mixed birch and spruce forest joins to the grassland from two directions.

The **deciduous forest**, as the small-leaved one, is essentially a mixed wood with some number of the conifers. We investigated the forest with an oak prevalence (*Quercus robur* L.). The **small-leaved forest** is dominated by birch (*Betula* spp.) and partly linden (*Tilia cordata* Mill.). In the **mixed forest**, oaks and a variety of small-leaved species grow; pine (*Pinus sylvestris* L.) prevails among the conifers. In opposite, the green moss **pine forest** was quite monotypic, with 160-year old pine trees and a very weak undergrowth.

On the **sphagnum bog**, the samples were taken in sphagnum moss in the border between bog and adjacent coniferous forest. The sampling plot on the side of **small lake** named Protokskoe was covered by different sedges (*Carex* spp.), as well as by horsetail (*Equisetum fluviatile* L.) with presence of some trees and shrubs (mostly *Betula* spp. and *Pinus sylvestris*). The lake was totally surrounded by the green moss pine forest. The plot on the side of narrow **Todenka river** was occupied by shortish motley grass and sedges (*Carex* spp.).

Results and discussion

In total, 114 species of Linyphiidae were found in the Prioksko-Terrasnyi Nature Reserve during recent

inventory study, 59 of which were considered as new to this territory. At the same time, 17 species proved to be new for the fauna of Moscow Area. Five species have been reported [Seyfulina, 2017], twelve are listed below. One of them is reported also for the first in the Middle Russia.

List of species

Aphileta misera (O. Pickard-Cambridge, 1882)

Hillhousia m.: Palmgren, 1975: 92, f. 23.3–4.

A. m.: Heimer, Nentwig, 1991: 114, f. 327.

MATERIAL EXAMINED. 1 ♂ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 3 block, sphagnum bog, N 54°54.850' E 37°36.100', p.t., 10–20.07.2014 (R.R. Seyfulina); 1 ♀ (PTSBR), s.l., sifting, 2.07.2016 (R.R. Seyfulina).

BIOLOGICAL NOTES. Hydrophilic and psychrophilic species with all-year activity, typical for humid sphagnum in temperate zone [Oliger, 2003; Nentwig *et al.*, 2019]. We observed this species in usual for it situation (in sphagnum).

COMMENTS. The first record in Moscow Area. Distributed in Holarctic. Reported from different territories of West and Middle Siberia, Cisokhotia, Urals (e.g. Eskov, Marusik, 1993; Tanasevitch, 2005), as well as from North and Centre of European Russia (e.g. Leningrad Area: Oliger, 2003, 2004).

Centromerus levitarsis (Simon, 1884)

C. l.: Palmgren, 1975: 15, f. 2.19–22.

C. laevitarsis: Heimer, Nentwig, 1991: 130, f. 365.

MATERIAL EXAMINED. 1 ♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 19A block, Todenka river side, N 54°89.430' E 37°64.603', sifting, 25.09.2016 (R.R. Seyfulina).

BIOLOGICAL NOTES. Rare species inhabited well-humid moss in forests [Nentwig *et al.*, 2019]. Was found near the water in the litter.

COMMENTS. The first record in Moscow Area and the second in Middle Russia after Oliger [2016], reported this species from Leningrad Area. Distributed from Europe to Middle Siberia. Registered also in Karelia [Uzenbaev, 1984, 1986], Urals [Esyunin *et al.*, 1995, 1999], West Siberia [Tanasevitch, 2005], Irkutsk Area [Tanasevitch, 2008b], Krasnoyarsk Province [Eskov, 1988].

Centromerus semiater (L. Koch, 1879)

C. alnicola: Palmgren, 1975: 129, f. 12.

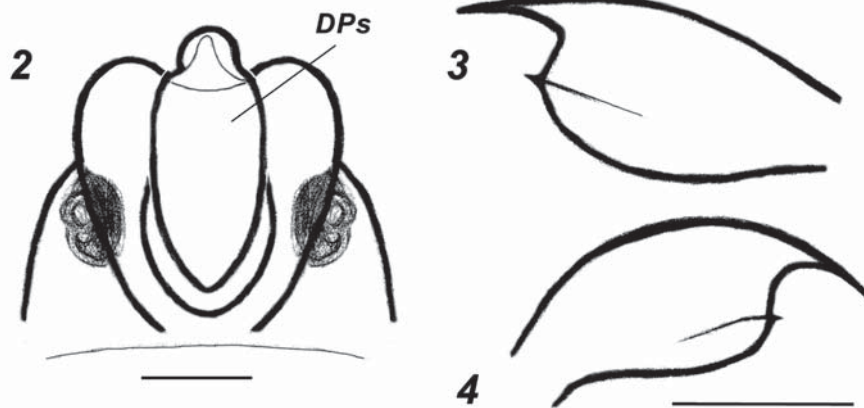
C. incultus: Heimer, Nentwig, 1991: 128, f. 363.

C. s.: Eskov, Marusik, 1992: 39.

MATERIAL EXAMINED. 2 ♂♂ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 3 block, sphagnum bog, N 54°54.850' E 37°36.100', p.t., 11–21.05.2014, 21–31.05.2014 (R.R. Seyfulina); 3 ♂♂ (PTSBR), s.l., 34 block, Lake Protokskoe side, N 54°51.541' E 37°35.712', p.t., 11–21.05.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Rare species occurred in very humid moss, mostly near the water [Nentwig *et al.*, 2019]. Found in the typical habitat (moss on the lake or bog shore).

COMMENTS. The first record in Moscow Area and the second in Middle Russia (previously registered in Chuvashia: Krasnobae, 2004). Distributed from Europe to Yenisei River. Reported also from Karelia [Mikhailov, 2013], Orenburg Area [Kozminykh, 2016], Urals [Pakhorukov,



Figs 2–4. Genitalia of *Incestophantes crucifer*: 2 — epigyne, dorsal view; 3 — lamella characteristic, left male palp; 4 — the same, right male palp. Scale bars = 0.1 mm.

Рис. 2–4. Гениталии *Incestophantes crucifer*: 2 — эпигина, вид снизу; 3 — lamella characteristic, левая пальпа самца; 4 — то же, правая пальпа самца. Масштаб 0,1 мм.

1981], West Siberia [Tanasevitch, 2005], Krasnoyarsk Province [Eskov, Marusik, 1993], Evenk Autonomus Region [Eskov, Marusik, 1992].

Ceratinella scabrosa (O. Pickard-Cambridge, 1871)

C. s.: Palmgren, 1976: 45, f. 3.20–22.

C. s.: Heimer, Nentwig, 1991: 134, f. 378.

MATERIAL EXAMINED. 4 ♂♂ 2 ♀♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 5 block, small-leaved forest, N 54°54.418' E 37°34.367', p.t., 21–31.05.2014 (R.R. Seyfulina); 3 ♂♂ (PTSBR), s.l., 31.05–10.06.2014 (R.R. Seyfulina); 1 ♂ 1 ♀ (PTSBR), s.l., block 10, mixed forest, N 54°53.655' E 37°38.602', 21–31.05.2014 (R.R. Seyfulina); 2 ♂♂ (PTSBR), s.l., 31.05–10.06.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Quite rare species inhabited litter layer of damp woodland [Nentwig *et al.*, 2019]. We found it in moderately moist deciduous and mixed forest.

COMMENTS. The first record in Moscow Area. Distributed in Palearctic. Recorded in many localities throughout Russia, in particular in Leningrad Area [Oliger, 2016], Kirov Area [Esyunin *et al.*, 2011], Kursk Area [Polchaninova, 2009], Belgorod Area [Polchaninova, 2003], Samara Area [Krasnobaev, 2004], Voronezh Area [Esjunin *et al.*, 1993], Rostov Area [Ponomarev, Lebedeva, 2014], Orenburg Area [Kozminykh, 2016], Urals [Esyunin *et al.*, 1995], Caucasus, Tyumen Area, Altai Mts, Khabarovsk Province [Tanasevitch, 1990, 2005]. The Kola Peninsula is considered to be the northernmost locality [Tanasevitch, Rybalov, 2010].

Gongyliidium latebricola (O. Pickard-Cambridge, 1871)

G. l.: Palmgren, 1976: 72, f. 14.15–17.

G. l.: Heimer, Nentwig, 1991: 164, f. 445.

G. l.: Tanasevitch, 1990: 111, f. 22.29, 24.40.

MATERIAL EXAMINED. 2 ♂♂ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 34 block, Lake Protokskoe side, N 54°51.560' E 37°35.650', p.t., 11–21.05.2014, 31.05–10.06.2014 (R.R. Seyfulina); 1 ♀ (PTSBR), s.l., 34 block, steppe meadow, N 54°51.32' E 37°36.25', sifting, 2.07.2016 (R.R. Seyfulina).

BIOLOGICAL NOTES. Normally found in humid moss and litter layer of forests [Nentwig *et al.*, 2019]. Apart from typical habitat (lake shore with moss and some birches), found it in the leaf litter of dry steppe site under the single tree. In European Russia, widespread but locally distributed, quite strict in habitat requirements. Rather rare, although been considered by the last authors as a very frequent species.

COMMENTS. The first record in Moscow Area. Distributed in Europe. In Russia, registered in Karelia [Kamayevev, 2012], Leningrad Area [Oliger, 2016], Kursk Area [Polchaninova, 2009], Mordovia [Mikhailov, Trushina, 2013], Mari El, Samara Area [Krasnobaev, 2004], Voronezh Area [Esjunin *et al.*, 1993], Orenburg Area [Kozminykh, 2016], Urals [Esyunin *et al.*, 1995], Penza Area [Polchaninova, 2008], Caucasus [Tanasevitch, 1990], Altai Mts [Trilikauskas, 2013].

Improphantes complicatus (Emerton, 1882)

Lepthyphantes c.: Palmgren, 1975: 63, f. 13.15–18.

Lepthyphantes c.: Heimer, Nentwig, 1991: 196, f. 536.

I. c.: Marusik, 2015: 688, f. 14 K–M.

MATERIAL EXAMINED. 1 ♀ (PTSBR), **RUSSIA**: Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 19 block, upland (dry) meadow, N 54°53.673' E 37°38.646', p.t., 10–20.07.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Rare species occurred in grass heathland and in mountain region [Nentwig *et al.*, 2019]. Found in typical conditions.

COMMENTS. The first record in Moscow Area and Middle Russia. Distributed in Holarctic. Known from Kola Peninsula [Tanasevitch, Kamayevev, 2011], North and Middle Urals [Pakhorukov, 1981; Esyunin, Ermakov, 2012], West Siberia [Tanasevitch, 2005], Altai Mts [Trilikauskas, 2013], Kamchatka Peninsula [Tanasevitch, 2008b].

Incestophantes crucifer (Menge, 1866)

Figs 2–4.

Incestophantes australis Gnelitsa, 2009: 310 (♂ & ♀), types not seen, **syn.n.**

Bolyphantes c.: Palmgren, 1975: 63, f. 13.15–18.

B. c.: Heimer, Nentwig, 1991: 196, f. 536.

Lepthyphantes c.: Thaler *et al.*, 1994: 121, f. 30-39.

Incestophantes c.: Saaristo, Tanasevitch, 2000: 257.

MATERIAL EXAMINED. 1 ♂ 1 ♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasnyi Nat. Res., 34 block, pine forest, N 54°51.440' E 37°36.240', p.t., 11–21.05.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Rare species inhabited dry heathland and open pine forests [Nentwig *et al.*, 2019]. Found in typical habitat, dry and clear green moss pine forest on alluvial sands with no undergrowth.

COMMENTS. The first record in Moscow Area. Distributed from Europe to West Siberia. Registered in many localities of Urals: from Komi Republic in the north to Bashkortostan in the south (e.g. Esyunin *et al.*, 1995), in Udmurtiya [Sozontov, Shirobokova, 2014], Samara Area [Krasnobaev, 2004], Leningrad Area [Oliger, 2016], Voronezh Area [Pichka, 1983], Crimea, West Siberia [Tanasevitch, 2005].

TAXONOMIC REMARKS. Transferred from *Bolyphantes* by Saaristo & Tanasevitch [2000]. *I. australis* was first described from Crimea as a species very close to *I. crucifer*, differing in some minor structural details of the paracymbium, lamella characteristica (LCh), terminal apophysis, and the distal part of the scape (DPs) with the notes on high variability of the other characters of female genitalia [Gnelitsa, 2009]. When compared with the drawings in this description, we found out that the specimens examined are similar with *I. australis* in many diagnostic features, although they apparently belong to *I. crucifer*. Thus, the only diagnostic character in females is DPs, which should be narrower and elongated in *I. australis*, and its outline seems to be more similar to one given for the last species than to *I. crucifer* (compare Fig. 2, orig. and Fig. 3 c, g in Gnelitsa, 2009: 314). On the other hand, the shape of scape in *I. crucifer* in Thaler *et al.* [1994] is identical to our specimen. The first diagnostic character in males is the shape of LCh, which takes rather intermediate position in our specimen. In accordance with *I. australis* diagnosis, LCh has to possess a wide, rounded keel beneath the distal spire, lacking in *I. crucifer*. As one can see from Fig. 3, 4, LCh of specimen examined are obviously equipped with a keel, but less pronounced than in the description of *I. australis* [Gnelitsa, 2009: 313, Fig. 2 b]. It should be noted, that the right and left palps slightly differs in the keel shape, as well as in some other small details of palpal structure. At the same time, the typical appendices situated on paracymbium and terminal apophysis are more pointed than it indicated in *I. australis* diagnosis. However, adjuncts of this kind are normally variable in shape in *Incestophantes* male palp according to A.V. Tanasevitch (pers. comm.). On his expert opinion, the diagnostic characters of *I. australis* are actually individual variations in *I. crucifer*. In view of aforesaid, *Incestophantes australis* Gnelitsa, 2009 is being considered as a junior synonym of *Incestophantes crucifer* (Menge, 1866), **syn.n.**

Notioscopus sarcinatus (O. Pickard-Cambridge, 1873)

N. s.: Palmgren, 1976: 85, f. 16.1-4.

N. s.: Heimer, Nentwig, 1991: 222, f. 600.

N. s.: Tanasevitch, 2007: 144, f. 8, 22–25.

MATERIAL EXAMINED. 1 ♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 3 block, sphagnum bog, N 54°54.850' E 37°36.100', p.t., 21–31.05.2014 (R.R. Seyfulina); 1 ♂ 1 ♀ (PTSBR), s.l., sifting, 2.07.2016 (R.R. Seyfulina).

BIOLOGICAL NOTES. Rare species preferred humid conditions, mainly in sphagnum [Nentwig *et al.*, 2019]. Found in typical habitat.

COMMENTS. The first record in Moscow Area. Distributed from Europe to Yenisei River. Reported from Karelia [Kamayev, 2012], Leningrad Area [Oliger, 2016], Mari El [Kamayev, 2009], Chuvashia, Samara Area [Krasnobaev, 2004], Urals [Esyunin *et al.*, 1995], West Siberia [Tanasevitch, 2005], Krasnoyarsk Province [Marusik *et al.*, 2006].

Silometopus incurvatus (O. Pickard-Cambridge, 1873)

S. i.: Palmgren, 1976: 99, f. 20.11–14.

S. i.: Heimer, Nentwig, 1991: 246, f. 662.

MATERIAL EXAMINED. 1 ♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 34 block, steppe meadow, N 54°51.316' E 37°36.247', p.t., 20-30.06.2014 (R.R. Seyfulina); 1 ♀ (PTSBR), s.l., the second terrace lowland meadow, N 54°51.287' E 37°39.125', p.t., 10–20.06.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Very rare epigeic species. Lives in litter [Martynovchenko, Mikhailov, 2014]. Often found in coastal regions and sandy grasslands and heathlands [Breitling *et al.*, 2015]. Might be collected in pine forest [Woźny, 1983; Fiszer, 1988; Oliger, 2016] or steppe meadows [Polchaninova, Prokopenko, 2017]. We observed it in grasslands in photo- and thermophilic conditions. Probably prefers sunny habitats.

COMMENTS. The first record in Moscow Area. Distributed from Europe to Middle Asia. In Middle Russia, found in Leningrad Area [Oliger, 2016] and Samara Area [Krasnobaev, 2004]. Also registered in Orenburg Area [Kozminykh, 2016], in Urals: from Polar to South [Esyunin *et al.*, 1995], Caucasus [Tanasevitch, 2011].

Tapinocyba insecta (L. Koch, 1869)

T. i.: Palmgren, 1976: 101, f. 19.14–15.

T. i.: Heimer, Nentwig, 1991: 252, f. 674.

MATERIAL EXAMINED. 2 ♂♂ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 41 block, oak forest, N 54°51.280' E 37°40.237', p.t., 11–21.05.2014, 21–31.05.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Occurs mainly in moss and litter of forests [Nentwig *et al.*, 2019]. Very frequent in West Europe [Nentwig *et al.*, 2019]. In European Russia: more common in the north, rare in centre, absented from the south [Sozontov, Shirobokova, 2014; Oliger, 2016]. Rare in PTSBR, collected from typical habitat.

COMMENTS. The first record in Moscow Area. Distributed from Europe to West Siberia. Reported from Leningrad Area [Oliger, 2016], Mari El [Krasnobaev, 2004], Mordovia [Mikhailov, Trushina, 2013], Belgorod Area [Esyunin *et al.*, 1993], Udmurtia [Sozontov, Shirobokova, 2014], Urals [Esyunin *et al.*, 1995], West Siberia [Tanasevitch, 2005].

Troxochrota scabra Kulczyński, 1894

Ceratinops pectinata: Palmgren, 1976: 46, f. 17.4–7.

MATERIAL EXAMINED. 1 ♂ 2 ♀♀ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 34 block, pine forest, N 54°51.440' E 37°36.240', p.t., 11–21.05.2014 (R.R. Seyfulina); 1 ♀ (PTSBR), s.l., p.t., 31.05–10.06.2014 (R.R. Seyfulina); 1 ♂ (PTSBR), s.l., 34 block, Lake Protokskoe side, N 54°51.541' E 37°35.712', p.t., 11–21.05.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Very rare species found mostly in dry moss forests (e.g. Palmgren, 1976). In Russia, collected from similar habitats, green moss pine forests (orig.; Oligier, 2016; Esyunin, 2007), as well as from slope steppe meadows [Sozontov, 2018].

COMMENTS. The first record in Moscow Area and the second in Middle Russia (previously registered in Leningrad Area: Oligier, 2016). Distributed in Europe. Reported also from Cisuralia (Udmurtia, Perm Province) [Esyunin, 2007; Hänggi, Stäubli, 2012; Sozontov, 2018]. On some opinion, this species has disjunctive area of distribution including Fennoscandia, Central Europe Mountains (Swiss, Romania), and Cisuralia [Esyunin, Marusik, 2011; Nentwig, 2019]. In view of *Troxochrota scabra* populations established in the south of Moscow Area, this statement seems to be rather a result of scarce data than the real situation.

Walckenaeria mitrata (Menge, 1868)

W. m.: Palmgren, 1976: 114, f. 22.11–14.

W. m.: Heimer, Nentwig, 1991: 168, f. 713.

MATERIAL EXAMINED. 1 ♂ (PTSBR), **RUSSIA**, Moscow Area, Serpukhov Distr., Prioksko-Terrasny Nat. Res., 3 block, sphagnum bog, N 54°54.861' E 37°36.083', p.t., 11–21.05.2014 (R.R. Seyfulina); 1 ♀ (PTSBR), s.l., mixed forest, N 54°53.807' E 37°34.355', p.t., 21–31.05.2014 (R.R. Seyfulina).

BIOLOGICAL NOTES. Quite rare species occurred in moss and litter layer of moderately humid forests [Nentwig *et al.*, 2019]. Found in mixed forest and in ecotone of sphagnum bog and mixed forest.

COMMENTS. The first record in Moscow Area. Distributed from Europe to Middle Siberia. Reported from Kola Peninsula [Tanasevitch, Kamayev, 2011], Leningrad Area [Oligier, 2016], Kirov Area [Esyunin *et al.*, 2011], Mari El [Kamayev, 2009], Samara Area [Krasnobaev, 2004], Udmurtia [Sozontov, Esyunin, 2012], Urals [Esyunin *et al.*, 1995, 1999]. The northernmost locality in Kola Peninsula [Tanasevitch, Rybalov, 2010].

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