Reassessment of the genus *Maro* O. Pickard-Cambridge, 1907, with the description of a new genus (Aranei: Linyphiidae)

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ABSTRACT. The species composition of the micrinespine spider genus *Maro* O. Pickard-Cambridge, 1907 is reconsidered, the diversity being restricted to 13 species. The diagnosis of the genus is clarified and extended. A new monotypic genus, *Boreomaro* gen.n., is established for *Maro borealis* Eskov, 1991. In addition, further two species of *Maro* are preliminary transferred to *Oreonetides* Strand, 1901, i.e. *Oreonetides amplus* (Dondale et Buckle, 2001), comb.n. and *O. bulbosus* (Zhao et Li, 2014), comb.n.


Introduction

The genus *Maro* was established by Pickard-Cambridge [1907] for *Maro minutus* O. Pickard-Cambridge, 1907, one of the smallest linyphiid species in the European spider fauna. Saaristo [1971] revised the genus, restricted its diversity to six species, including two he described as new: *M. flavescens* (O. Pickard-Cambridge, 1873), *M. jehtineni* Saaristo, 1971, *M. lepidus* Casemir, 1961, *M. minutus* O. Pickard-Cambridge, 1907, *M. sublestus* Falconer, 1915, and *M. thaleri* Saaristo, 1971. The latter species, which was known from a female holotype only, was subsequently transferred to *Pseudocarorita* Wunderlich, 1980 [Wunderlich, 1980]. In the revision of *Maro*, Saaristo [1971] described and illustrated in due detail the structure of the secondary genital organs of both sexes, as well as introduced a few new terms to the genital morphological nomenclature, e.g., column, embolus proper, and suprategulum [Saaristo, 1971].


A new detailed morphological analysis of the genitalia of both sexes of *Maro* species shows the genus to be fairly homogeneous, with the exception of three species, *M. amplus, M. borealis* and *M. bulbosus*. Their status is discussed below.

The objective of the present study is to provide an updated taxonomic account of the genus *Maro*, also refining its species composition.

Material and methods

The specimens used in this study have been borrowed from the following museums: Zoological Museum, Turku University, Turku, Finland (MTU), National Science Museu-
Table. Some somatic characters of _Maro_ species, based on the literature data and measurements of available specimens from museums and personal collections.

Таблица. Некоторые соматические признаки пауков рода _Maro_ по результатам промеров экземпляров из музеев и частных коллекций, а также по литературным источникам.

<table>
<thead>
<tr>
<th>Species</th>
<th>Tibial dorsal spines</th>
<th>Tml</th>
<th>Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <em>Maro bureensis</em> Tanasevitch, 2006</td>
<td>2222</td>
<td>0.36–0.55</td>
<td>1.58–1.80</td>
</tr>
<tr>
<td>2. <em>M. flavescens</em> (O. Pickard-Cambridge, 1873)</td>
<td>2222</td>
<td>0.40</td>
<td>1.20–1.50</td>
</tr>
<tr>
<td>3. <em>M. khabarum</em> Tanasevitch, 2006</td>
<td>2221</td>
<td>0.32–0.36</td>
<td>1.48–1.58</td>
</tr>
<tr>
<td>4. <em>M. lehtineni</em> Saaristo, 1971</td>
<td>2222</td>
<td>0.36–0.40</td>
<td>0.90–1.30</td>
</tr>
<tr>
<td>5. <em>M. lepidus</em> Saito, 1984</td>
<td>2222</td>
<td>0.40–0.49</td>
<td>1.40–1.80</td>
</tr>
<tr>
<td>6. <em>M. minutus</em> O. Pickard-Cambridge, 1907</td>
<td>2222</td>
<td>0.30–0.49</td>
<td>1.10–1.40</td>
</tr>
<tr>
<td>7. <em>M. nearecticus</em> Dondale et Buckle, 2001</td>
<td>2221</td>
<td>0.50–0.56</td>
<td>1.25–1.64</td>
</tr>
<tr>
<td>8. <em>M. pansibiricus</em> Tanasevitch, 2006</td>
<td>2221</td>
<td>0.38–0.43</td>
<td>1.35–1.65</td>
</tr>
<tr>
<td>9. <em>M. perpusillus</em> Saito, 1984</td>
<td>2221</td>
<td>0.33–0.42</td>
<td>1.40–1.80</td>
</tr>
<tr>
<td>10. <em>M. saaristoi</em> Eskov, 1980</td>
<td>2221</td>
<td>0.48–0.51</td>
<td>1.70–2.05</td>
</tr>
<tr>
<td>11. <em>M. sibiricus</em> Eskov, 1980</td>
<td>2221</td>
<td>0.49–0.53</td>
<td>1.60–1.85</td>
</tr>
<tr>
<td>12. <em>M. sublestus</em> Falconer, 1915</td>
<td>2222</td>
<td>0.40–0.49</td>
<td>1.10–1.60</td>
</tr>
<tr>
<td>13. <em>M. ussuricus</em> Tanasevitch, 2006</td>
<td>2221</td>
<td>0.35–0.52</td>
<td>1.26–1.60</td>
</tr>
</tbody>
</table>

**Taxonomy**

Class Arachnida Cuvier, 1812  
Order Araneae Clerck, 1757  
Family Linyphiidae Blackwall, 1859  
Subfamily Micronetinae Hull, 1920  
Genus _Maro_ O. Pickard-Cambridge, 1907

Type species _Maro minutus_ O. Pickard-Cambridge, 1907, by monotypy.

**DIAGNOSIS.** The genus was well diagnosed and described by Saaristo [1971], but as the diagnosis at that time was only based on six European species, it requires clarification and extension.

The genus contains very small to medium-sized (total length 0.90 to 2.05), pale micrometines characterized by the following combination of somatic and genitalic characters:

1. Carapace and chelicerae unmodified in both sexes, a mastidion absent.

2. Abdomen white to grey, sometimes with blackish reticulation, a distinct pattern absent.

3. Dorsal tibial spines 2.2.2.2 or 2.2.2.1. Metatarsi I–III each with a trichobothrium. Tml 0.30–0.56. For details of somatic traits, see Table.

4. Male palp. Patella and tibia unmodified, cymbium without posterodorsal outgrowth(s). A posterior pocket of paracymbium (see Saaristo & Tanasevitch [1996]) transformed into a large ridge (Figs 11, 12, 14). Embolic division well-developed, complex. Radix boat-shaped (Fig. 10), Fickert’s gland absent, lamella characteristic large (Figs 9, 10), terminal apophysis present, embolus usually peculiar in shape (Figs 9, 10, 18, 19).

5. Epigyne short to well protruded, aperture usually closed either by expanded lateral walls of epigyne (Figs 1, 2, 4–6) or by lateral lobes in distal part of scapula (Figs 3, 8). Proximal and median parts of scapus reduced, either only lateral lobes and a stretcher or only a stretcher present.
The genus *Maro* seems to be particularly close to *Oreonetides* Strand, 1901, which was well justified by Saaristo [1972], van Helsdingen [1981] and Eskov [1991]. I shall mention here only the main features of similarity: same pattern of leg chaetotaxy and trichobothriotaxy; similar structure of the complex embolic division, namely, the peculiar shape of the embolus; similar structure of the protruded epigyne with somewhat reduced parts of the scape. In turn, *Maro* differs by the boat-shaped radix, vs V-shaped in *Oreonetides* (vs usually well-modified in *Oreonetides*) in the male (see van Helsdingen [1981]). The differences in the structure of the epigyne of both genera are still vague.


Based on the structure of the genital organs, the remaining formal species, *Maro amplus* Dondale et Buckle, 2001, *M. borealis* Eskov, 1991, and *M. bulbosus* Zhao et Li, 2014, do not belong to *Maro* and are to be transferred to other genera (see below).

**HABITAT.** Unfortunately, we still know very little about the habitat of *Maro* representatives, and we can only say that these spiders prefer moist mossy sod and litter from the forests mainly of the boreal belt of Eurasia.

**DISTRIBUTION.** The Holarctic, mainly Euro-Siberian [Eskov, 1991; Tanasevitch, 2006a]; one species, *M. perpusillus*, is known from Japan [Saito 1984], one more, *M. nearcticus*, from the Nearctic [Dondale, Buckle, 2001]. For details see World Spider Catalog [2022].
Reassessment of the genus *Maro*

Figs 10–19. *Maro nearcticus* Dondale et Buckle, 2001, ♂ paratype from Lac Barette, Québec, Canada (MTU) (10–13); *M. perpusillus* Saito, 1984, ♂ and ♀ paratypes from Mt. Akagi, Gunma Prefecture, Japan (14–17); *M. bureensis* Tanasevitch, 2006 (18); *M. khabarum* Tanasevitch, 2006, both specimens from Norsky NR, Amur Area, Russia (ZMMU) (19). 10 — embolic division, ventral view; 11, 12 — paracymbium, different aspects; 13 — lamella characteristic, ventrolateral view; 14 — ♂ palp, retrolateral view; 15 — embolus proper, mesal view; 16, 17 — epigyne, ventral and dorsal views, respectively; 18, 19 — embolus, mesal view. Figure 15 not to scale.

Maro nearcticus Dondale et Buckle, 2001
Figs 10–13.

2001 Maro nearcticus. — Dondale, Buckle: 10, figs 1–6 (♂, ♀), ♂♂ examined.

TYPE MATERIAL EXAMINED. Paratype ♂ (MTU), CANADA, Québec, Parc Jacques-Cartier, Lac Barette, 1 VI–10 VII.1985, leg. S. Koponen.

TAXONOMIC REMARKS. Maro nearcticus is very similar to the Siberian M. sibiricus, but differs by the shape of the upper branch of the lamella characteristica (cf. Fig. 13 and fig. 1 in Eskov [1980]).

REMARKS. The species has been described from eastern Canada and the northeastern U.S.A. [Dondale, Buckle, 2001]. According to the picture presented by Gómez-Rodriguez et al. [2014], their record of M. nearcticus from Mexico is a misidentification, and probably refers to Meromessus sp.

DISTRIBUTION. Québec, Ontario, New Brunswick and Newfoundland (Canada), Maine and New Hampshire (U.S.A.) [Dondale, Buckle, 2001].

Maro perpusillus Saito, 1984
Figs 14–17.

1984 Maro perpusillus. — Saito: 4, figs 3, 4 (♂, ♀), examined.

REMARKS. The species has been described from both sexes from the Gunma Prefecture, Honshu Island, Japan [Saito, 1984].

TYPE MATERIAL EXAMINED. Paratypes: 2 ♂♂, 2 ♀♀ (NSMT-Ar. 860), JAPAN, Gunma Prefecture, Konuma, Mt. Akagi, 16 VI.1979, leg. H. Saito.

TAXONOMIC REMARKS. The male palp of Maro perpusillus resembles that of M. pansibiricus, but differs by the shape of the lamella characteristica (cf. Fig. 14 and figs 1, 3–5 in Tanasevitch [2006a]). The epigyne is similar to that of M. flavescens, but is distinguished by its non-concave posterior edge (cf. Fig. 16 and fig. 35 in Tanasevitch [2006a]).

DISTRIBUTION. So far known from Honshu, Japan [Saito, 1984].

Oreonetides amplus (Dondale et Buckle, 2001), comb.n.

2001 Maro amplus Dondale, Buckle: 13, figs 10–14 (♂♂), examined.

COMPARATIVE MATERIAL EXAMINED. 2 ♂♂ (CDB), CANADA, Alberta, 20 km NW Dixonville, aspen forest, 15 VI.2000, leg. D. Shorthouse; 1 ♂ (CDB); same locality; 13 VI.2020, leg. D. Shorthouse.

TAXONOMIC REMARKS. The Nearctic M. amplus was originally described from males alone. Its large size (up to 2.01 mm), the high-value TmI (0.80–0.85), and the presence of a mastidion on the chelicera have long raised certain doubts as to the assignment of amplus to Maro [Dondale, Buckle, 2001]. A detailed study of the palpal structure of males of M. amplus from Alberta, Canada (CDB) shows that neither the palpal tibia nor the paracymbium, nor the structure of the embolic division agrees with those in Maro. The species, besides the somatic differences mentioned above, has a slightly modified palpal tibia bearing several outgrowths, the paracymbium totally lacking a posterior pocket, and the structure of the embolic division being rather similar to those in the genus Oreonetides, seemingly especially similar to O. kolymensis Eskov, 1991. Hence, this species is preliminary to be transferred: Oreonetides amplus (Dondale et Buckle, 2001) comb.n. Discovering a conspecific female may put an end to the riddle concerning the generic identity of this species, since probably this species belongs neither to Maro nor to Oreonetides.

DISTRIBUTION. Throughout Canada; Alaska, Maine and Vermont (U.S.A.) [Dondale, Buckle, 2001; Paquin et al., 2010].

Oreonetides bulbosus (Zhao et Li, 2014), comb.n.

2014 Maro bulbosus Zhao, Li: 30, figs 56A–F, 57A–B (♀), not seen.

TAXONOMIC REMARKS. The species was originally described from females alone, all from the extreme south of the Yunnan Province, People’s Republic of China. This region is situated near the borders with Laos and Myanmar, virtually a territory in the northern part of the Oriental Region. Based on detailed figures and photographs presented in Zhao & Li [2014], the epigyne of Maro bulbosus seems to strongly resemble to that in some Oreonetides, e.g., the Far Eastern O. badzhalensis Eskov, 1991 or O. minus Ta-nasevitch, 2017. The similarity is based on the somewhat protruding semi-circular epigyne with wide, ansiform entrance ducts. Hence, I dare preliminary transfer this species to Oreonetides Strand, 1901: Oreonetides bulbosus (Zhao et Li, 2014), comb.n. Only the discovery of the conspecific male is to clarify the taxonomic position of the species within linyphiids.

DISTRIBUTION. Known only from the Yunnan Province, People’s Republic of China [Zhao, Li 2014].

Boreomaro gen.n.

Type species Maro borealis Eskov, 1991, by monotypy. The type material (ZMMU) of both sexes examined.

NAME. The generic name is a combination of “boreal” and “Maro”. The gender is masculine.

DIAGNOSIS. The genus contains medium-sized microne-tines (total length 1.40–1.90) characterized by the following combination of somatic and genitalic characters:

(1) Carapace and chelicerae unmodified in both sexes, a mastidion absent.

(2) Abdomen white to grey, a distinct pattern absent.

(3) Chaetotaxy 2.2.2.2; TmI 0.53–0.56; metatarsi IV without trichobothrium.

(4) Male palp. Paracymbium highly modified (Figs 20, 22); embolic division large and complex, consisting of highly modified sclerites. (Figs 24, 25); radix with several radical apophyses; lamella characteristica, terminal apophysis and Fickert’s gland absent. Embolus with a stem, embolus proper exceptionally long (Fig. 26). NOTE: It is possible that the radical apophysis(es) at the place where the lamella characteristica is usually located is(are) a strongly transformed lamella characteristica.

(5) Epigyne short, proximal and median parts of scape reduced, lateral lobes absent, receptacles very large, sub-spherical (Figs 27–29, 32, 33).

TAXONOMIC REMARKS. Boreomaro gen.n. resembles Maro by the structure of the epigyne alone, while the male palp, in particular the embolic division, strongly differs, except for the embolus which has a stem. Unlike Maro, the radix in the new genus is not boat-shaped, with long apophyses conducting and protecting the extended embolus proper. Unlike Maro, a lamella characteristica and a termi-
Figs 20–29. Boreomaro borealis (Eskov, 1991), comb.n., specimens from Norsky NR, Amur Area, Russia (ZMMU). 20 — palp, retrolateral view; 21 — palpal tibia, dorsal view; 22 — paracymbium, lateral view; 23 — suprategulum and pit-hook, lateral view; 24, 25 — embolic division, ventrolateral and ventro-retrolateral views, respectively; 26 — embolus, ventrolateral view; 27–29 — epigyne, ventral, lateral and dorsal views, respectively.

embolus. Embolus with a long and thin stem, divided distally into a long embolus proper and its well-protruding lateral extension. Epigyne (Figs 27–29, 32, 33) slightly protruded, aperture covered with lateral walls. Scape represented by its distal part only, lateral lobes present, small, stretcher short and thick. Copulatory ducts thick, well-visible through integument of anterior wall of Epigyne, receptacles very large, subspherical.

**SPECIES INCLUDED.** Only the type species, *Boreomaro borealis* (Eskov, 1991), **comb.n.**

**DISTRIBUTION.** Siberia, Russia: from Yenisey River east to the Kolyma River basin, Amurskaya and Khabarovsk provinces, Sakhalin Island (Eskov [1991], Tanasevitch & Trilikauskas [2004], Tanasevitch [2006b], Trilikauskas & Tanasevitch [2006]).

**Discussion**

The first revision of the genus *Maro* was released by Saaristo [1971] based on only six species known at that time, five of which treated as European. Since the
beginning of the 1980s, an intensive study of the spiders of Siberia and the Russian Far East started, associated with the emergence of a new pleiad of Soviet and Russian arachnologists (see Mikhailov [2016]). This allowed for not only the knowledge of the distribution areas of the six known *Maro* to be expanded, but also seven additional new species to be discovered in Asia.

The question arose concerning the homogeneity of the genus. I tried to answer this question based on a comparative analysis of the genital structures. This analysis became possible only thanks to M.I. Saaristo [1971, 1972, 1973, etc.], who provided a detailed study of the structure of the genitalia of both sexes, not only of *Maro*, but also of many other micronetine groups. This time-consuming study ensured subsequent substantial progress in the taxonomy of the subfamily Micronetinae sensu Saaristo & Tanasevitch [1996]. Especially valuable was Saaristo’s atlas showing the embolus division of various micronetines, in which homologous structures were presented using the same colour.

Unfortunately, this atlas was published only posthumously by Marusik & Koponen [2007]. The comparative morphological approach used in that paper has revealed two species as not belonging to *Maro*, both being transferred to *Oreonetides*, as well as a new genus established for one marginal species.

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**References**


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