

***Meioneta mossica* sp.n., a new spider close to *M. saxatilis* (Blackwall) from northern and central Europe (Araneae: Linyphiidae)**

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Summary

A new and previously overlooked species of *Meioneta* Hull (Araneae: Linyphiidae), closely resembling *M. saxatilis* (Blackwall), is described from southern Sweden: *M. mossica* n.sp. The spider is compared with related species, and notes are given on distribution, maturity period, habitat, microhabitat, and population densities.

Introduction

In 1990 the spider fauna of pristine ombrogenous, i.e. extremely nutrient-poor, bog biotopes was investigated in the course of a comparative ecological study in southern Sweden. During the investigations, 172 males and females of the genus *Meioneta* Hull, 1920 were caught, which closely resembled *M. saxatilis* (Blackwall, 1844), but which could not be definitely regarded as conspecific. Results of detailed examinations revealed that the Swedish specimens most probably belong to a close and previously overlooked relative of *M. saxatilis*: *Meioneta mossica* n.sp. The *Aprolagus saxatilis* part of the taxonomic analysis of Saaristo (1973) is actually based on the new species described here. Apart from the description of *M. mossica* n.sp., it was felt necessary to include a short morphological analysis of *Meioneta saxatilis*. Many of the descriptions or figures concerning this spider are not detailed enough in the light of the present work. All measurements, if not otherwise indicated, are in mm.

Abbreviations: AME = anterior median eyes, ATA (PTA) = anterior (posterior) terminal apophysis, CHBS = author's collection, EG = epigyne, LC = lamella characteristic, OGB = ombrogenous bog, OSB = ombrosoligenous bog, PC = paracymbium, PSE = posterior substructure of embolus, RC = receptacula.

***Meioneta mossica* sp.n.** (Figs. 1–2, 5–6, 9–12, 17–19, 23–24)

Types

Holotype ♂ and allotype ♀, southern Sweden, provinces of Västergötland/Småland, nature reserve Komosse c. 20 km south-east of Ulricehamn (57°42'N, 13°43'E), pitfall traps, 28 May–11 June 1990, coll. Schikora, deposited in Swedish Museum of Natural History, Stockholm.

Paratypes: Locality as above, pitfall traps: 34♂, 1♀, 30 April–14 May, 16♂, 4♀, 14–28 May, 15♂, 7♀, 28 May–11 June, 4♂, 4♀, 11–25 June, 3♀, 25 June–9 July, 1♀, 23 July–7 Aug., 1♂, 3–17 Sept., 1♂, 16–29 Oct. 1990. D-Vac suction samples: 6♂, 12♀, 4 May, 2♂, 12♀, 16 May, 1♂, 12♀, 30 May, 2♂, 14♀, 13 June, 2♀, 11 July 1990. Sweep net samples: 1♀, 4 May, 1♀, 16 May 1990. Southern Sweden, province of Småland, Store Mosse National Park c. 18 km

north-west of Värnamo (57°20'N, 14°58'E), pitfall traps: 1♂, 1♀, 5–15 May, 2♂, 15–29 May, 7♂, 29 May–12 June, 1♀, 12–26 June, 1♀, 26 June–10 July, 1♂, 4–18 Sept. 1990. All paratypes coll. Schikora and temporarily retained in author's collection.

Etymology

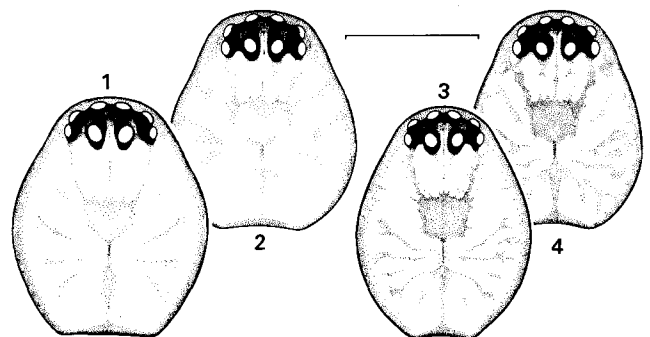
Swedish: *mosse* (neuter noun) = bog; Latin: *-icus, -a, -um* (adjectival suffix) = relationship to a locality, occurrence. The specific epithet alludes to the species' preference for bog habitats and to the names of the Swedish type localities.

Diagnosis

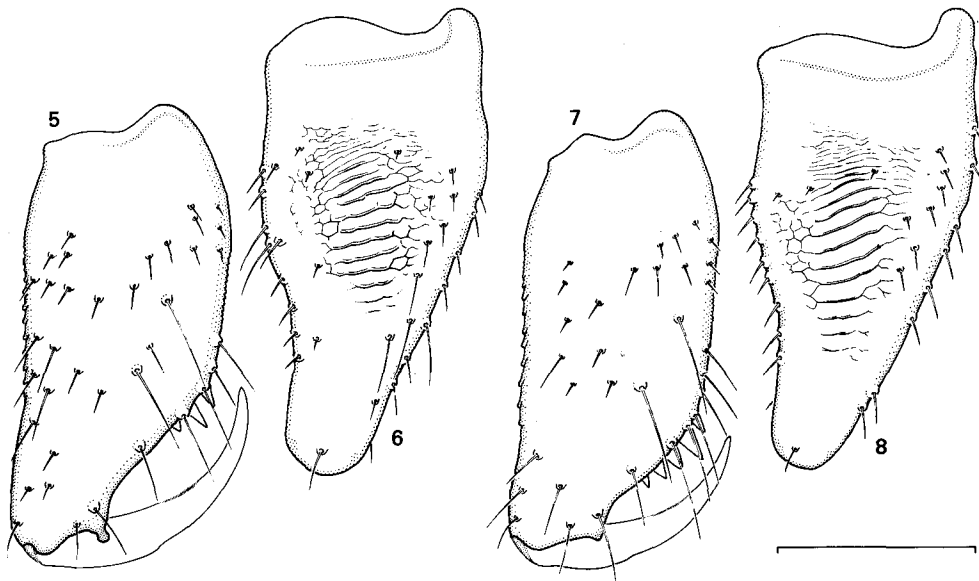
Distinguished from the very similar *Meioneta saxatilis* by following characters (see also discussion): PC of male palp with only a single well-defined tooth, marking the posterior paracymbial pocket (Fig. 9 cf. 13). LC distally pointed and elongated, somewhat resembling a heron's head; viewed obliquely from below, LC bent at about a right angle, distal part pointing to PTA (Figs. 9, 11, 24 cf. 13, 15, 26). Male chelicerae distally tapering, only 3 teeth visible from in front (Figs. 5, 23 cf. 7, 25). EG/vulva with oblique RC, of about their length from posterior margin (Fig. 17 cf. 20). Anterior-running part of copulatory ducts curved outwards from longitudinal axis (Fig. 19 cf. 22).

Male holotype

Total length 1.88. Carapace (Fig. 1) greyish yellow with a reddish tinge, 0.9 long, 0.73 wide. Margin darkened, faint striae and minute bristles radiating from fovea. Eye region with 8 forward-directed hairs, eyes unequal in size, surrounded with black. Sternum with scattered bristles, reddish yellow-grey suffused with black. Chelicerae with strong conical process anteriorly and posteriorly of fang joint, 4 teeth on outer and 3 on inner row; teeth unequal in size, distal ones reduced; only 3 teeth visible from in front (Fig. 5). Stridulatory ridges well developed, occupying about half cheliceral length (Fig. 6). Clypeus width 1.04 times width of AME. Legs 1423, coloration of coxae and femora as carapace, tibiae, metatarsi and tarsi somewhat darkened. Tibiae I–IV with two dorsal spines, tibiae I and II additionally with one retrolateral spine. Length of basal



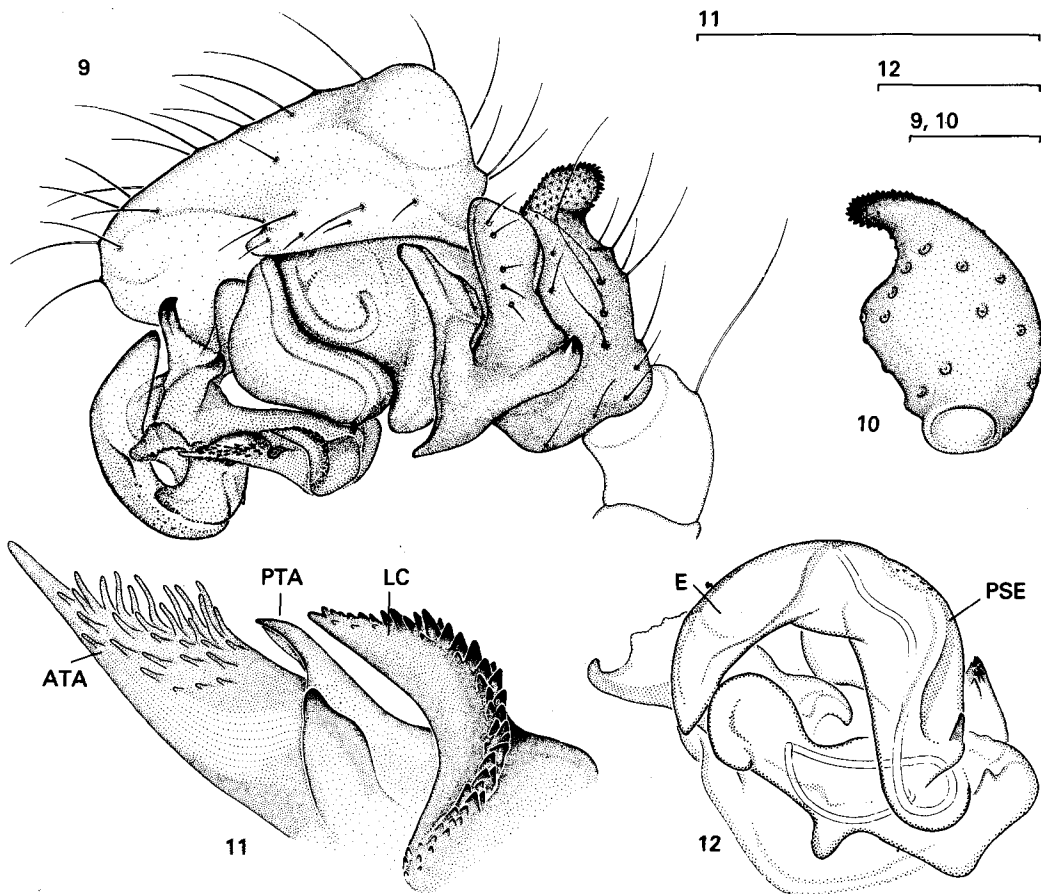
Figs. 1–4: 1, 2 *Meioneta mossica* n.sp. 1 Male carapace; 2 Female carapace. 3, 4 *Meioneta saxatilis* (Blackwall). 3 Male carapace; 4 Female carapace, dorsal view. Hairs omitted. Scale line = 0.5 mm.



Figs. 5–8: **5, 6** *Meioneta mossica* n.sp. **5** Right male chelicera, frontal view; **6** Ditto, retrolateral view. **7, 8** *Meioneta saxatilis* (Blackwall). **7** Right male chelicera, frontal view; **8** Ditto, retrolateral view. Scale line = 0.2 mm.

tibia I spine 1.8 diam. of tibia. Metatarsi I (0.24) to III (0.25) with trichobothrium, tarsi I–III (IV) 0.74–0.72 (0.63) times length of respective metatarsi. Tibia I 7.6 times longer than wide. Palpal cymbium blackish grey-green with bulbous reddish brown. PC with one tooth marking posterior pocket (Fig. 9). Tibial apophysis simi-

lar to *M. saxatilis*, but less curved (Fig. 10). LC-complex tripartite; viewed obliquely from below, LC bent at almost a right angle (80°), distal part pointing to PTA; outer edge of LC with coarse teeth extending down to basal part (Figs. 9, 11, 24). Embolus as in Fig. 12. Abdomen dorsally grey-green with scattered dark



Figs. 9–12: *Meioneta mossica* n.sp. **9** Left male palpus, slightly expanded; retrolateral view, obliquely from below; **10** Palpal tibia, dorsal view, hairs omitted; **11** Lamella characteristica and terminal apophysis of another specimen, lateral view, obliquely from in front and below; **12** Embolic division and supratragular apophysis, KOH-treated and cleared, frontal view. Abbreviations: ATA = anterior, posterior terminal apophysis, LC = lamella characteristica, E = embolus, PSE = posterior substructure of embolus. Scale lines = 0.1 mm.

bristles, ventrally darkened. Branchial opercula yellow-brown.

Female allotype

Total length 1.95. Carapace (Fig. 2) 0.92 long, 0.70 wide, coloration more intense than in male. Sternum darker than in male, blackish orange-brown with scattered dark bristles. Chelicerae with 5 teeth on outer and 4 on inner row, the former all visible from in front. Stridulatory ridges developed. Clypeus width 1.05 times width of AME. Legs 1423, coloration and tibial spines as in male. Length of basal tibia I spine 2.1 diam. of tibia. Metatarsi I (0.22) to III (0.23) with trichobothrium, tarsi I–III (IV) 0.73–0.68 (0.58) times length of respective metatarsi. Tibia I 7.6 times longer than wide. Tibia and last segment of palp darkened. Abdomen greyish, covered with scattered dark bristles, ventrally dark grey-green. EG reddish brown with a shallow semicircular indentation of posterior margin, when viewed obliquely from in front. Epigynal depression with distinct anterior marking (Fig. 17). Vulva (Fig. 18) with copulatory ducts running anteriorly curved outwards from longitudinal axis; RC oblique, of about their length from posterior margin. Basal part of scapus parallel-sided (Fig. 19).

Variation

Samples of *M. mossica* n.sp. were examined from Sweden, England and Germany (b-m; see Distribution).

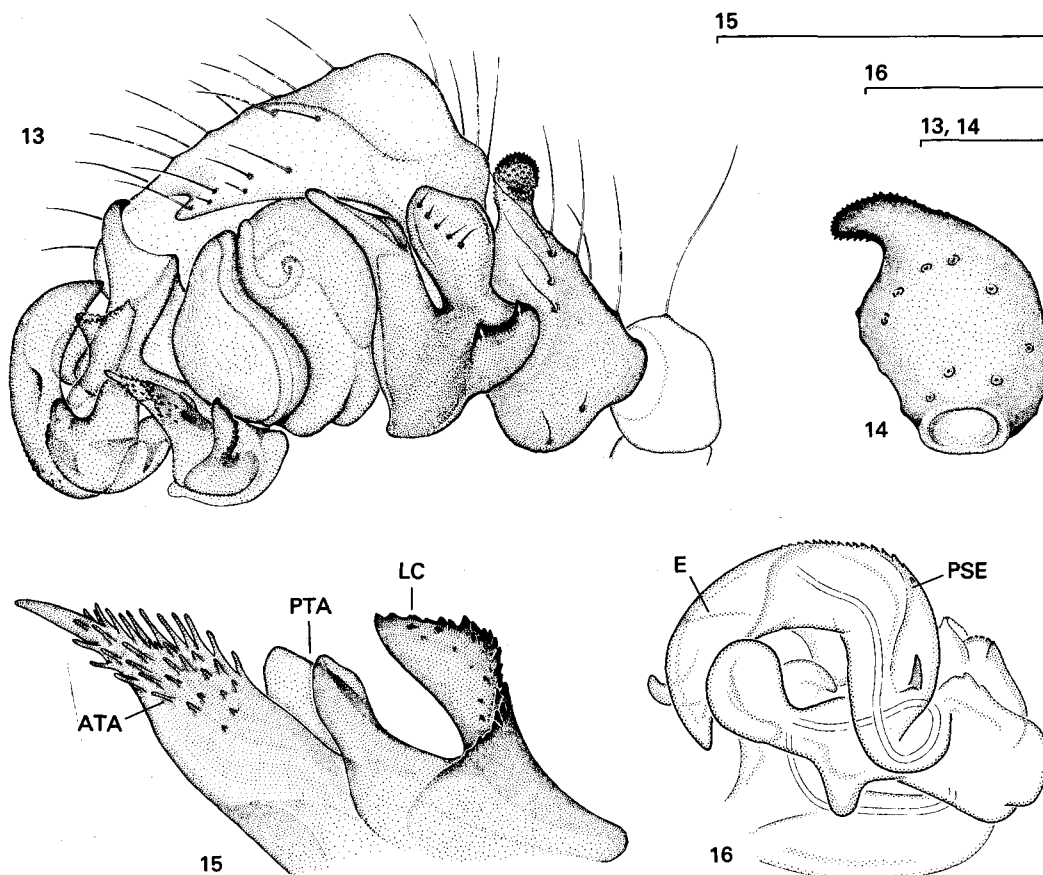
Males: Total length 1.75–2.02, carapace length/width: 0.83–0.94/0.66–0.74 (Komosse; $n = 25$). Carapace occasionally darkened, with postocular patch and striae more evident. Shape of chelicerae in all cases corresponding with Figs. 5 and 23. Cheliceral teeth sometimes reduced, then at best two teeth of outer row visible from in front (Fig. 23). PC outline variable; occasionally, a rather small additional tooth on basal third of ascending PC branch (Komosse: about 5% of males; in one case, only left palp affected). Variability of LC and PC will be shown in detail in a further paper.

Females: Total length 1.70–2.00, carapace length/width: 0.75–0.92/0.59–0.70 (Komosse; $n = 25$). Markedness and shape of posterior EG notch rather variable from place to place, sometimes very similar to *M. saxatilis*. Occasionally, RC not very oblique (see Fig. 18). In young reproductive females RC tend to be more than their length away from posterior EG margin.

Ecology and habitat

Pitfall trap results ($n = 107$ specimens) from Komosse and Store Mosse indicate a maturity period for *M. mossica* sp.n. between mid-April and the end of June, with males/females reaching maximum activity in mid-May/beginning of June. Single adult specimens were found irregularly up to the last study interval at the end of October 1990 (see "Types").

According to sampling along a habitat gradient in the Komosse area, the spider was found mainly within the



Figs. 13–16: *Meioneta saxatilis* (Blackwall). **13** Left male palpus, slightly expanded; retrolateral view, obliquely from below; **14** Palpal tibia, dorsal view, hairs omitted; **15** Lamella characteristica and terminal apophysis, lateral view, obliquely from in front and below; **16** Embolic division and suprategular apophysis, KOH-treated and cleared, frontal view. Abbreviations: see Figs. 9–12. Scale lines = 0.1 mm.

exclusive fen plants limit ("Mineralbodenwasserzeigergrenze": Du Rietz, 1954; Overbeck, 1975), which distinctly separates ombrotrophic bog areas (i.e. fed by precipitation only) from their minerotrophic surroundings. Typical features of the central treeless bog plain like hummock-/hollow-structures and soaks (Swedish: drågar, German: Rüllen) proved to be the most important habitats. 1.4/0.58 adults per m² were found respectively for hummock-/hollow-associations during the maturity period between 4 May and 13 June 1990 ($n=24/24$ D-Vac suction samples of 1 m² each). Just outside the ombrotrophic area, *M. mossica* n.sp. was found in a moist and open acidic meadow which had lain fallow for about 20 years (0.75 adults/m²; $n=9$ D-Vac samples). Two specimens were found on open mats of peatmosses (*Sphagnum*) in a poor fen. The spider seems mainly epigeic, as indicated by only two captures from sweep-net samples ($n=325$ of 50/100 sweeps each; 1 May–1 November 1990).

Open *Sphagnum*-expanses and -hummocks subject to changing moisture conditions, sparsely overgrown with dwarf shrubs, are suspected as being significant microhabitats. These sites are frequently exposed to considerable daily temperature fluctuations. Floating or very wet *Sphagnum*-mats are obviously of less importance, and wooded areas seem to be avoided by the species.

Distribution (and other material examined)

M. mossica n.sp. has hitherto been found in south-west Finland (a), Sweden (b–f), northern England (g) and Germany (h–m; see Fig. 28). Sites b–d and h–m refer to spider catches from former bog-beetle studies using pitfall traps.

a. Previous captures of "*M. saxatilis*" from SW Finland have been shown to be exclusively conspecific with *M. mossica* n.sp. (S. Koponen & M.I. Saaristo, in litt.); b. Norrbotten: Stordalsmyren (subarctic mixed-mire),

Torne Lappmark; c. Uppland: Ryggmossen/Uppsala (OGB); d. Västermanland: Kulflyten/Västerås (OGB) (b–d: leg. Främbs, 1986; CHBS); e–f. Västergötland and Småland: e. Komosse (OGB), f. Store Mosse (OGB) (type localities; leg. HBS 1990); g. Northumberland: Kielder Forest (boggy *Sphagnum* areas) near border with Scotland (Coll. Merrett); h. NW Lower Saxony: Esterweger Dose/Papenburg (OGB; site now destroyed by peat extraction); i–j. SE Lower Saxony: i. Torfhäuser Moor/Torfhäuser (OSB), j. Sonnenberger Moor/St. Andreasberg (OSB), Harz; k–l. SE Bavaria: k. Rottauer Filz (OGB), Lake of Chiem, l. Mettenhammer Filz/Marquartstein (OGB); m. S Bavaria: Sindelsbach Filz/Benediktbeuern (OGB) (h–m: leg. Mossakowski, 1967–70; CHBS).

Meioneta saxatilis (Blackwall, 1844) (Figs. 3–4, 7–8, 13–16, 20–22, 25–26)

Material examined

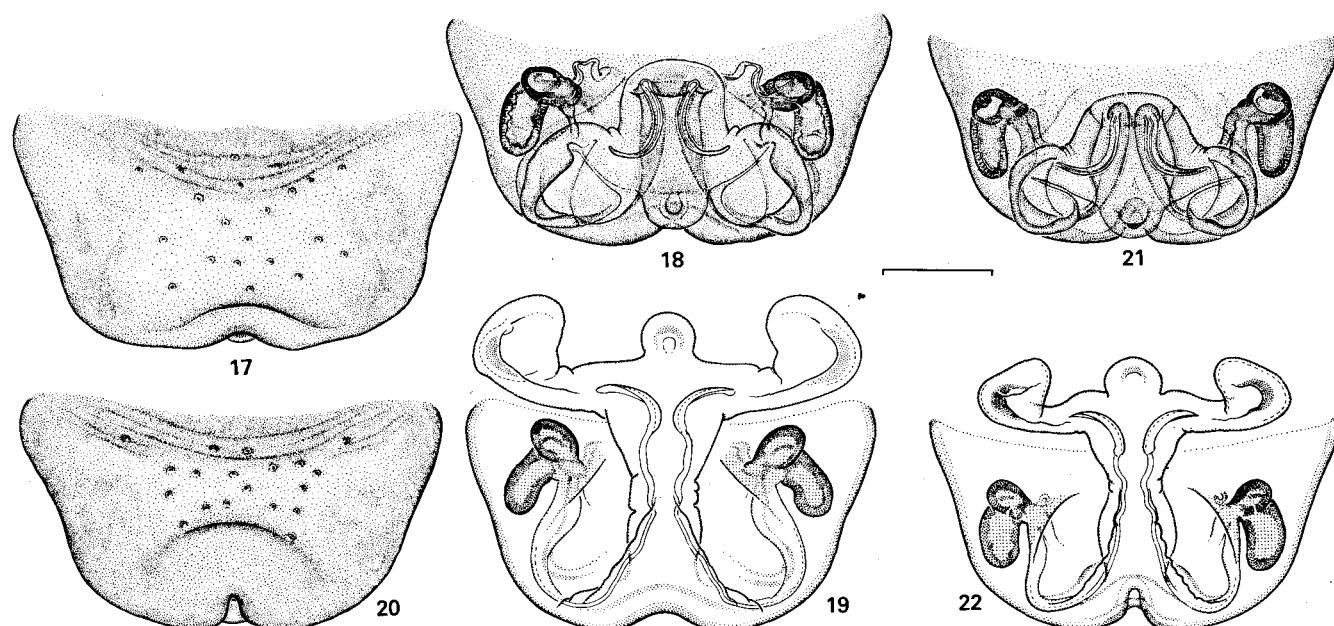
North-west Germany, west coastal region of Schleswig-Holstein, bog relict Weisses Moor c. 6 km north-west of Heide (see Schikora, 1993), pitfall traps, 1♂, 9 June–15 July 1965 (leg. Mossakowski), 2♂, 30 May–30 June, 1♂, 30 June–30 July, 1♀, 30 July–30 Aug., 1♀, 29 Nov. 1986–28 Feb. 1987 (leg. HBS).

Identification

Jackson (1912; *Micryphantès saxatilis*), Locket & Millidge (1953), Wiehle (1956), Palmgren (1975), Roberts (1987), Heimer & Nentwig (1991).

Male

Total length 1.90. Carapace (Fig. 3) with a blackish tinge, distinctly darker than in *M. mossica* sp.n., 0.91 long, 0.69 wide. Chelicerae with 5 teeth (all visible from in front)



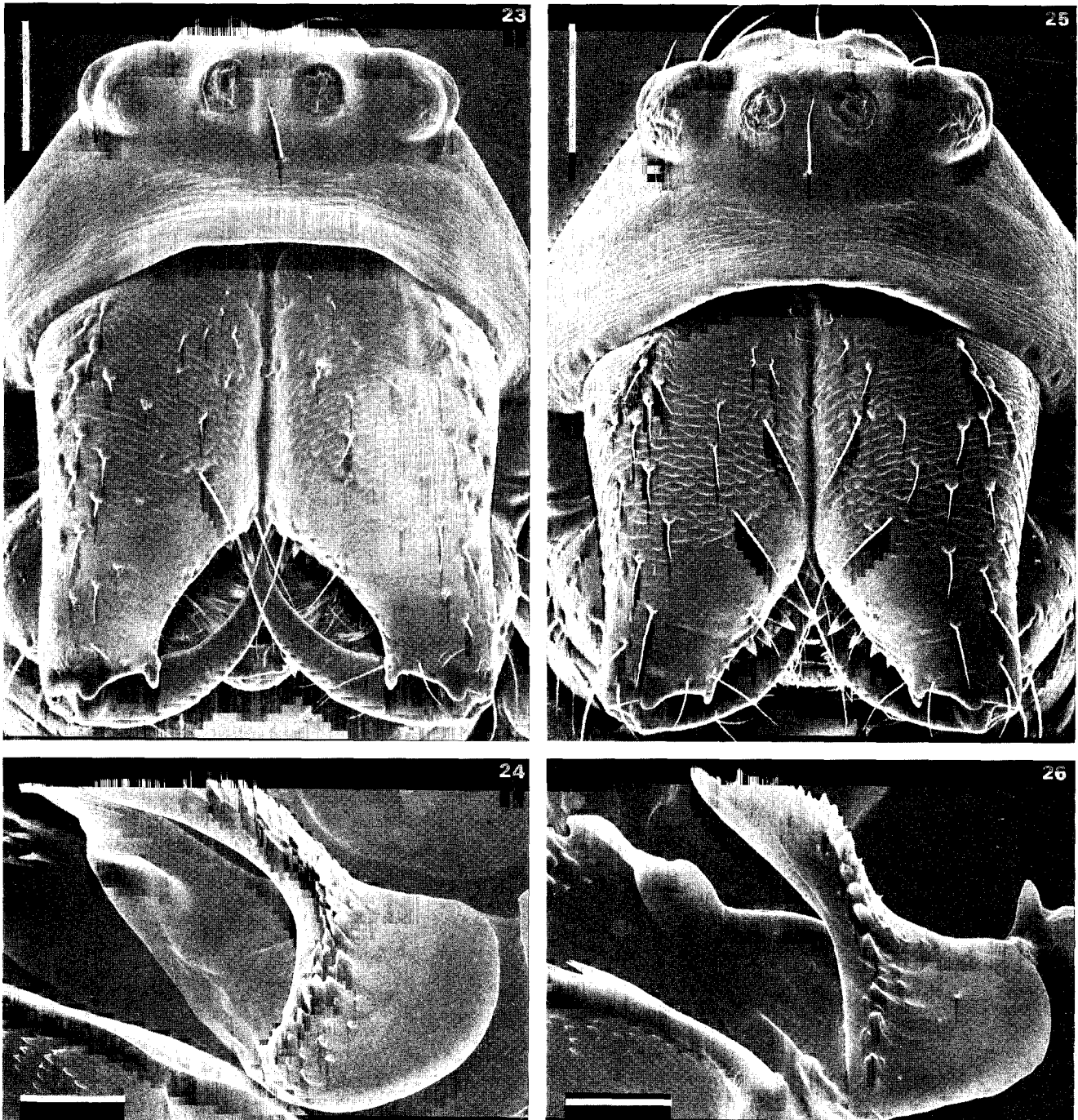
Figs. 17–22: 17–19 *Meioneta mossica* n.sp. 20–22 *Meioneta saxatilis* (Blackwall). 17, 20 Epigyne, ventrally and obliquely from in front, lateral lobes just out of visibility, hairs omitted; 18, 21 Vulva, dorsal view; 19, 22 Vulva after folding down scapus to the front; KOH-treated and cleared. 19 shows a different specimen from 17, 18. Scale line = 0.1 mm.

on outer and 4 on inner row (Fig. 7). Stridulatory ridges well developed, comparatively more curved and widely spaced, occupying about three-quarters cheliceral length (Fig. 8). Clypeus width 1.05 times width of AME. Legs 1423, femora yellowish, tibiae I–IV with two dorsal spines, tibiae I and II additionally with one retrolateral spine. Length of basal tibia I spine, 1.6 diam. of tibia. Metatarsi I (0.22) to III (0.23) with trichobothrium, tarsi I–III (IV) 0.72–0.78 (0.63) times length of respective metatarsi. Tibia I 7.9 times longer than wide. PC with two neighbouring teeth marking posterior pocket (Fig. 13). Palpal tibia with apophysis more curved than in *M. mossica* n.sp. (Fig. 14). LC-complex tripartite; viewed

obliquely from below, LC curved at less of an angle (c. 60°), distal part shovel-shaped and not elongated, running almost parallel to PTA; outer edge of LC with coarse teeth only on distal half (Figs. 13, 15, 26). Embolus with rather stout basal part, PSE with minute dorsal denticles (Fig. 16). Abdomen dark grey.

Female

Total length 1.83. Carapace (Fig. 4) 0.85 long, 0.65 wide, coloration much as in male. Chelicerae with 5 teeth on outer (all visible from in front) and 4 on inner row. Stridulatory ridges developed. Clypeus width equal to



Figs. 23–26: Scanning electron micrographs. 23–24 *Meioneta mossica* n.sp. 25–26 *Meioneta saxatilis* (Blackwall). 23, 25 Male prosoma, general anterior view; hairs partly lost by preparation; 24, 26 Lamella characteristic and posterior terminal apophysis, lateral view, somewhat from in front and below. Origin of specimens: 23, 24: site e; 25, 26: site 9, Selb/Rehau (see text). Scale lines = 0.1 mm (23, 25); 0.02 mm (24, 26).

width of AME. Legs 1423, tibial spines as in male. Length of basal tibia I spine 1.6 diam. of tibia. Metatarsi I (0.26) to III (0.27) with trichobothrium, tarsi I–III (IV) 0.74–0.71 (0.63) times length of respective metatarsi. Tibia I 7.4 times longer than wide. When viewed obliquely from in front, EG posteriorly notched. EG depression with shallow anterior marking (Fig. 20). Vulva (Fig. 21) with copulatory ducts running anteriorly more or less straight; RC vertically orientated, about half (or less) of their length from posterior EG margin. Basal part of scapus distinctly bulbous (Fig. 22).

Other material examined and variation

Samples of *M. saxatilis* were examined from Scotland (1), England (2–3), Germany (4–10) and Switzerland (11):

1. Tentsmuir, Fife; 2. New Forest, Hampshire; 3. Felbridge, Surrey (1–3: Coll. Merrett); 4. Schleswig-Holstein: Weisses Moor/Heide (former OGB; CHBS); 5. SE Lower Saxony: vicinity of Göttingen; 6. NE Hesse: vicinity of Kassel (5–6: Coll. Stippich); 7. E Hesse: Schwarzes Moor (OGB), Rhön; 8. SE Baden-Württemberg: Wur-zacher Ried/Bad Wurzach (OGB) (7–8: leg. Mossakowski; CHBS); 9. Bavaria: vicinity of Heroldsberg, Hilsbach, Landshut, Pegnitz, Rezelsdorf, Selb/Rehau (Coll. Bauchhenss); 10. SE Bavaria: Bavarian Forest (Coll. Weiss); 11. Canton of Bern: Lörmoos/Bern (former OGB; Coll. Hänggi).

Males ($n = 65$): Prosoma usually rather dark, only a few specimens pale greyish yellow. Shape of chelicerae in all cases corresponding with Figs. 7 and 25. PC outline rather variable; always two neighbouring PC teeth present,

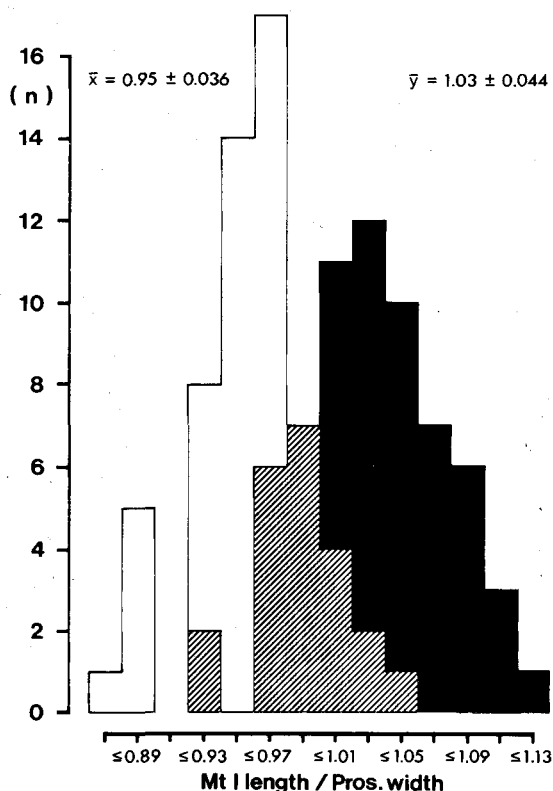


Fig. 27: Biometrical comparison (males) of *Meioneta mossica* n.sp. ($n = 59$; white) and *M. saxatilis* (Blw.) ($n = 65$; black). Length of metatarsus I/width of prosoma. Overlap hatched. For further information see text.

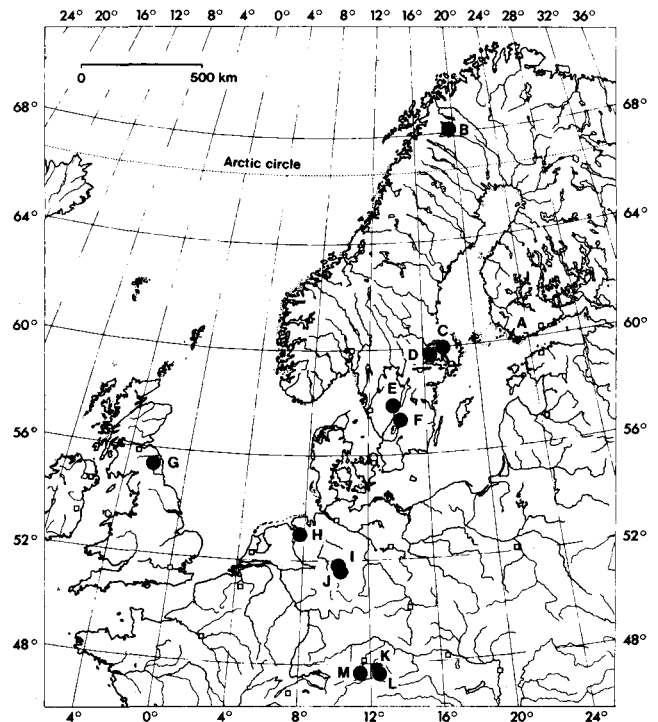


Fig. 28: Present known distribution of *Meioneta mossica* n.sp. For detailed information see text.

markedness as well as distance between them subject to some variation. Variability of LC and PC will be shown in a further paper.

Females ($n = 25$): Posterior EG notch frequently wider than shown in Fig. 20, thus leading to a certain similarity with females of *M. mossica* n.sp. Orientation and position of RC proved to be much more reliable characters for identification.

Biometrical comparison

The ratio metatarsus I length/prosoma width of 65 *M. saxatilis* males (origin: 1–2, 4–11; see above) was compared with that of 59 males of *M. mossica* n.sp. (origin: c–f, g–i; see Distribution). The results are shown in Fig. 27. On average, prosoma width of *M. mossica* n.sp. is 5% greater than metatarsus I length (mean = 0.95; s.d. = 0.036). In *M. saxatilis* prosoma width was 3% smaller than metatarsus I length (mean = 1.03; s.d. = 0.044). The comparatively few females of both species which could be measured, showed a similar tendency as in the males, though variation and overlap seemed to be larger.

Postscript: seven males of *M. mossica* n.sp. (South Germany: k–m) were found shortly before going to press and are not considered above (mean = 0.94; s.d. = 0.030).

Discussion

Meioneta mossica n.sp. closely resembles *M. saxatilis*, but has to be regarded as a separate taxon, since it shows distinct and rather constant morphological characters at all places where it has hitherto been found (see Distribution). Indications of biometrical differences were found (Fig. 27). Differences in pattern of the male stridulatory ridges (Fig. 6 cf. 8) are possibly consistent with ethological

separation, thus indicating *M. mossica* n.sp. as a bio-species. Different ranges of ecological tolerance have to be taken into account. As indicated by the samples which were available for examination, *M. saxatilis* seems to be found in a great variety of habitats, bogs and peatlands included. Records of *M. mossica* n.sp. at present refer only to bogs and related sites. Cases of syntopy are not yet known.

The distribution of both *M. mossica* n.sp. and *M. saxatilis* is at present uncertain, because previous records of "*M. saxatilis*" might possibly refer to either species. *M. mossica* n.sp. was found north to a latitude of 68°20' (Torne Lappmark, NW Sweden), and at present the southernmost finds are from SE Bavaria, Germany (Fig. 28). The northern distribution of *M. saxatilis* certainly reaches a latitude of about 59°30' (vicinity of Stockholm/Södermanland; T. Kronstedt, in litt.).

With regard to male characters (curved palpal tibial apophysis, multi-partite LC-complex), three further species close to the West Palaearctic species *M. saxatilis* (see Roewer, 1942) could be ascertained. Eastern Palaearctic: (1) *Meioneta mongolica* Loksa (1965; Central Aimak: Ulan-Baator, Mongolia; only male known) and (2) *Agyneta (Aprolagus) pseudosaxatilis* Tanasevitch (1984; Nizhnyaya Tunguska, Siberia). Nearctic: (3) a hitherto undescribed species from Northeast Canada (S. Koponen, in litt.; C.D. Dondale, in litt.). Regarding the latter, it seems to be closer to *M. saxatilis* than to *M. mossica* n.sp. (Dondale, in litt.). The male of *M. mongolica* is clearly distinguished from *M. mossica* n.sp. by the short and very stout tibial apophysis, by the paracymbial tooth located on the ascending branch of the paracymbium, and by the LC-complex lacking a PTA (Loksa, 1965: 5–6; figs. 5–8). The male palps of *M. pseudosaxatilis* and *M. mossica* n.sp. appear much more similar. The former is characterised by the curved tibial apophysis being extended into a hook-like tip and by the LC being rounded and blunt (Tanasevitch, 1984: 48; plate 1). However, the rather schematic drawings allow no definite assessment of the female. It should be noted, that the palpal characters of the "*Agyneta saxatilis*" male (1984: *ibid*) shown by Tanasevitch, most probably refer to *M. mossica*.

Acknowledgements

I gratefully acknowledge the following persons and institutions: Dr Bengt Gunnarsson (Gothenburg) for facilitating my research stay in Sweden and helping in various ways, Prof. Dr Dietrich Mossakowski (Bremen) for kind support and many discussions, Dr Konrad

Thaler (Innsbruck) for comments on the manuscript and providing literature, Drs Seppo Koponen, Michael I. Saaristo (Turku), Dr Torbjörn Kronstedt (Stockholm) and Dr Peter Merrett (Swanage) for commenting on the new species and for much valuable information, Drs Charles D. Dondale and James H. Redner (Ottawa) for checking nearctic members of *Meioneta* and useful comments, Katrin Goralczyk (Bremen) for assistance with SEM, Gabriele Pflumm (Leipzig/Hamburg) for translations from the Russian, Dr Michael G. Vicker (Bremen) for revising the English text. For the loan of spider catches from pitfall traps: Herbert Främbs (Bremen), Prof. Dr Dietrich Mossakowski (Bremen). For the loan of *Meioneta* specimens: Dr Elisabeth Bauchhenss (Schweinfurt), Dr Ambros Hänggi (Basel), Dr Peter Merrett (Swanage), Dr Gabriele Stippich (Göttingen) and Dr Ingmar Weiss (St. Oswald). My research stay in Sweden was made possible by grants from The Swedish Institute (Stockholm) and the A. & G. Vidfelts Fond (Gothenburg). The studies in protected areas were permitted by the local and national authorities in Vänersborg (Komosse Nature Reserve) and Solna (Store Mosse National Park), Sweden.

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