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First records of spiders (Araneae) *Baryphyma gowerense* (Locket, 1965) (Linyphiidae), *Entelecara flavipes* (Blackwall, 1834) (Linyphiidae) and *Rugathodes instabilis* (O. P.-Cambridge, 1871) (Theridiidae) in Finland

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Baryphyma gowerense (Locket, 1965), *Entelecara flavipes* (Blackwall, 1834) and *Rugathodes instabilis* (O. P.-Cambridge, 1871) are reported for the first time in Finland. The first species was found by pitfall trapping on a wide aapa mire in Lapland and the two others by sweep netting on hemiboreal meadows on the Finnish south coast. The spider assemblages of the sites are described.

Introduction

The Finnish spider fauna is relatively well known (Marusik & Koponen 2002). The number of species listed in the national checklist increased by less than 10% in the last four decades, from 598 to 645 between the years 1977 and 2013 (Koponen & Fritzén 2013). Detections of new species are thus fairly rare events, little more than one per year on average. Our recent collections in some poorly studied areas and habitats have resulted in three spider species new to Finland and are here described.

Study areas, material and methods

Spiders were collected from three areas by R. A. Väisänen.

Mantovaaranaapa is a mesotrophic aapa mire in the main aapa mire zone (Laitinen et al. 2007). Mantovaaranaapa is about 5 km east from the center of Sodankylä and north of the main road running to Pelkosenniemi. A forestry road branches off the main road through the mire. The open area of the mire extends for about 2 × 0.4 km. Pitfall traps were set up in a 50 × 50 m area (Finnish uniform grid coordinates 7479220:3488900) between the road and the easternmost ponds of the northern margin of Mantovaaranaapa. The trapping period was 3–28 June 2008. Ten plastic cups were on hummocks and ten in flarks (Fig. 1). The cups contained propanol (concentration 50 %) to preserve the animals, some detergent to decrease surface tension, had plastic shelters and were emptied only once at the end of the period. Total catch was 371 spiders, 94 % of which could be determined to species level and are here reported.

The meadow of Vuosaari (”Vuosaarenhuippu”, Hill Peak of Vuosaari) is a recreational area of about 60 ha in Helsinki, bordering a large harbor. Starting in the 1990s, the meadow was found on an old dumping ground of limestone industry and municipal wastes. The area was ventilated by

Fig. 1. Cover of a pitfall trap on a hummock (A) and in a flark (B) at mire Mantovaaranaapa in Sodankylä. Sparse trees are pines, green plants of flarks are sedges (*Carex* spp.) and horsetails (*Equisetum* spp.). Photo: R. A. Väisänen 28 June 2008.

wells, pipelines and a pumping station and covered by filling earth received mainly from the harbor area. Landmasses and plants were placed to resemble the biotopes of the outer islands of the Finnish archipelago, the open slopes of hills and traditionally grazed meadows (Toivonen 2015). Diversity of plant life has been improved with volunteer work by multiple people. Growth of bushes and tall perennials has been reduced annually. Spiders were collected by sweep netting from low (< 50 cm) herbs and grasses in a southern (6680860:3398230) and a northern part of

Fig. 2. Meadows in Helsinki: Vuosaari south (A) and Vuosaari north (B) in midsummer and Herttoniemi (C) at autumn. Photo: Kaarina Väisänen 19.7.2015 (A–B), R. A. Väisänen 19.10.2015 (C).

the meadow (6681370:3398260) (Fig. 2, A–B). The southern site was sampled on 14.7.2014, 17.8.2014 and 26.5.2015 and the northern site on 10.6.2015 and 18.7.2015. Each sample lasted two hours, including sweeping and picking of spiders into alcohol by hand from an inverted white umbrella, which helped to detect numerous dark and small spiders. Total catch of these five samples resulted in 595 individuals (including one harvestman). Only 49% of these could be determined to species level.

The meadow of Herttoniemi (6677910: 3390690) is also in Helsinki, 30 m from the eastern shore of Saunalahti, which belongs to the Nature Sanctuary of Viikki-Vanhankaupunginlahti. The size of the meadow is only about 0.5 ha. It contains several wet sites. Herbs and grasses are tall and luxuriant. In late summer the meadow is managed by cutting hey by scythe and harvesting (Fig. 2C). Maples, birches and aspens dominate in forest edges. No part of the meadow is farther off than 20 m from the trees.

Spiders were collected by sweep netting from herbs and grasses. Samples were made 11.6.2015 and 5.7.2015. The total catch of these two samples resulted in 327 individuals (including 19 harvestmen), 90 % of which could be determined to species level.

All identifications were made by T. Pajunen. Samples were stored in the collections of the Finnish Museum of Natural History, University of Helsinki (MZH).

Results

Baryphyma gowerense (Locket, 1965)

We got two *B. gowerense* males (Fig. 3) from Mantovaaranaapa in Sodankylä, about 1000 km north of its nearest occurrences in Upland in Sweden and in Estonia (Kronestedt 1979, Vilbaste 1987). Its global distribution is holarctic (World Spider Catalog 2015) but scattered. In Europe it is known only in Britain and Ireland, Poland, Estonia, Sweden and now in Finland. The species has also been found in Siberia, Russia and in Canada.

B. gowerense males were collected from two flark traps (Fig. 1B), 40 m apart. The most frequent species in these samples were common spiders of north boreal bogs (Table 1), where lycosids like *Pardosa sphagnicola* (Dahl, 1908) and linyphiids like *Oryphantes angulatus* (O. P.-Cambridge, 1881) often are dominating (Koponen 2002). Flarks of aapa mires are flooded in spring when the snow melts. Wet habitats are typical for *B. gowerense* also in Britain (saltmarsh

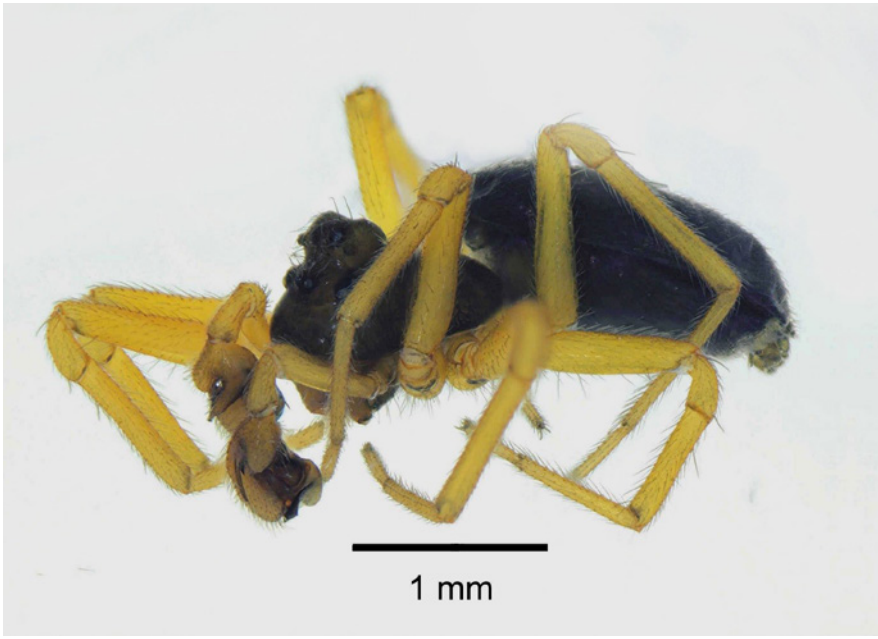

Fig. 3. *Baryphyma gowerense* male from Mantovaaranaapa, Sodankylä. Photo: T. Pajunen.

and fens; SRS 2015) and in Sweden (seasonally flooded meadow of a eutrophic lake; Kronestedt 1979). In Poland, the species was found at a sedge-moss marsh in Biebrza National Park (Kupryjanowicz 1997).

Entelecara flavipes (Blackwall, 1834)
Three *E. flavipes* females were captured in 14.7.2014 (Fig. 4) and two in 18.7.2015 in Vuosaari. The first sample was from the southern and the second from the northern study site of the meadow. Since these are 500 m apart and the samples are from two years, the population seems to have spread over the area. Males were not found, however. One possibility is that they prefer higher and thorny vegetation that was not swept or merely that the mating season was either over or still to come. Our scarce data fits well with the British description of the habitat and ecology of this species (SRS 2015): "Calcareous grassland and woodland. *E. flavipes* is mainly found on calcareous grassland and by beating bushes and vegetation in woodland. It is adult in the summer, our data indicating a peak in June."

E. flavipes has an European distribution (Nentwig et al. 2015). In the north it has been reported in Estonia and Norway. In Sweden, Tullgren (1955) described specimen found in Västmanland as a new species *E. forsslundi* 1955, but Wunderlich (2011) synonymized these two species.

Rugathodes instabilis (O. P.-Cambridge, 1871)
One *Rugathodes instabilis* female (Fig. 5) was captured in the meadow of Herttoniemi on 5.7.2015. This is the second record of this species from Fennoscandia. The first was a female

Fig. 4. *Entelecara flavipes* female from Vuosaari, Helsinki. Photo: Pekka Malinen, edited by T. Pajunen.

Fig. 5. *Rugathodes instabilis* female from Herttoniemi, Helsinki. Photo: T. Pajunen.

Table 1. Ten most numerous spider species from pitfall traps at mire Mantovaaranaapa in Sodankylä in June 2008. Ten traps were on hummocks and ten in flarks (Fig. 1). The species belong to the sheet weavers family (Linyphiidae), except the wolf spider *Pardosa sphagnicola* (Lycosiidae) and the dwarf sheet spider *Antistea elegans* (Hahniidae).

Species	Hummock traps	Flark traps
Pardosa sphagnicola (Dahl, 1908)	82	61
Agyneta decora (O. P.-Cambridge, 1871)	29	6
Centromerus levitarsis (Simon, 1884)	25	10
Agyneta olivacea (Emerton, 1882)	21	-
Antistea elegans (Blackwall, 1841)	-	14
Walckenaeria antica (Wider, 1834)	14	1
W. kochi (O. P.-Cambridge, 1872)	9	5
Oryphantes angulatus (O. P.-Cambridge, 1881)	8	4
Agyneta cauta (O. P.-Cambridge, 1902)	-	7
A. mossica (Schikora, 1993)	4	3
Number of species	28	14
Individuals	250	121

found at an eutrophic pool in Stockholm, Sweden (Kronestedt 1993). In the UK, *R. instabilis* builds its webs on low vegetation in wetland habitats (SRS 2015), but might also live in high vegetation of humid forests and meadows in Europe (Nentwig et al. 2015). Thus the Finnish individual was probably swept from wet parts of the meadow. Nearby there are more wet habitats with rich vegetation, for example black alder (*Alnus glutinosa*) forests. These might support the existence of sedentary population of *R. instabilis*.

The most abundant spiders in each of the two meadows sampled in Helsinki are shown in Table 2. There is little faunal overlap between the samples. Species typical of dry and sunny meadows were common in Vuosaari (e.g. *Dictyna arundinacea* (Linnaeus, 1758), *Heliophanus flavipes* (Hahn, 1832)), and those of damp places, bushes and trees dominated in Herttoniemi (e.g. *Gongylidium rufipes* (Linnaeus, 1758), *Tetragnatha dearmata* Thorell, 1873) (Nentwig et al. 2015).

Table 2. The most abundant spider species (>10 individuals) sweep netted from grass and herb layer on two meadows Vuosaari and Herttoniemi in Helsinki.

Species	Family	Vuosaari	Herttoniemi
Enoplognatha ovata (Clerck, 1757)	Theridiidae	23	62
Gongylidium rufipes (Linnaeus, 1758)	Linyphiidae	-	40
Phylloneta impressa (L. Koch, 1881)	Theridiidae	29	-
Paidiscura pallens (Blackwall, 1834)	Theridiidae	10	18
Dictyna arundinacea (Linnaeus, 1758)	Dictynidae	24	-
Neottiura bimaculata (Linnaeus, 1767)	Theridiidae	22	2
Singa hamata (Clerck, 1757)	Araneidae	24	-
Heliophanus flavipes (Hahn, 1832)	Salticidae	22	-
Porrhomma pygmaeum (Blackwall, 1834)	Linyphiidae	-	22
Araneus quadratus Clerck, 1757	Araneidae	16	-
Hypsosinga pygmaea (Sundevall, 1831)	Araneidae	16	-
Tetragnatha dearmata Thorell, 1873	Tetragnathidae	-	15
Tibellus oblongus (Walckenaer, 1802)	Philodromidae	15	-
Tetragnatha pinicola L. Koch, 1870	Tetragnathidae	5	8
Neriene clathrata (Sundevall, 1830)	Linyphiidae	-	11
Savignia frontata Blackwall, 1833	Linyphiidae	1	10
Number of species		53	42
Individuals		595	327

Discussion

Both *Entelecara flavipes* and *Rugathodes instabilis* might be currently expanding northwards, as is the case of other recently detected spider species (see Fritzén, Koponen & Pajunen, in this volume). Both live in grassy habitats and are probably capable to balloon, i.e. to move air-borne carried by the silk threads from place to place. We did find in Vuosaari another notable spider species, *Agalenatea redii* (Scopoli, 1763) (Araneidae). This species has also been expanding from the southwest in the 2000s. Two juveniles from the southern site of the hill in 17.8.2014 are the most eastern observations of that species in Finland. We also found two juveniles of another araneid, *Aculepeira ceropegia* (Walckenaer, 1802), a very rare species in Finland, assessed as vulnerable in Red List of Finnish Species (Rassi et al. 2010), being almost solely found on bogs and mires in the country. In Southern Europe it prefers open terrain with grass and bushes (Nentwig et al. 2015). The thomisid spider *Diaea dorsata* (Fabricius, 1777), which lives only near the southern coast has become more frequent around Helsinki. Female and juvenile were caught from grasses at Vuosaari north in 10.6.2015, although the species is mainly living on bushes and trees. Finally, *Agyneta saxatilis* (Blackwall, 1844) (Linyphiidae) must be mentioned from Herttoniemi, where a female was caught in 5.7.2015. This species seems to be quite rare in Finland. Most verified observations are from Helsinki region.

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