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MAPPING THE SPIDER FAUNA (ARANEAE) OF FINLAND

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Abstract — The history of research on the spider fauna of Finland is briefly dealt with. The first list of spiders from Finland was published by Nordmann in 1863 and included 140 species; the well-known list of Palmgren (1977) included 595 species and the present (internet) checklist contains ca. 640 species. A recent study project on Finnish spiders and their distribution patterns ("The Spider Fauna of Finland") is also discussed.

Key words: Araneae, spiders, fauna, distribution, research history, threatened species, Finland

INTRODUCTION

The area of Finland is about 338000 km^2, and the country is situated between 60° and 70° N latitude. Most of Finland belongs to the boreal coniferous forest (taiga) zone, the southwestern corner to the hemiboreal zone, and the northernmost parts to the sub-arctic zone. About 80% of Finland can be classified as lowland, lying below 200 m. The highest point of the country is situated in Lapland: Halti, 1328 m a.s.l., in the northwesternmost corner of Finland.

The known spider fauna of Finland consists of about 640 species (Koponen, 2007). For comparison, the number of spiders reported from neighboring countries, Sweden (Almquist, 2006) and Norway (Artsdatabanken, 2006), is 716 and 562, respectively. These figures are similar when compared to area of the countries: 1.9 species/1000 km^2 in Finland and 1.7 in Sweden and Norway (see also Koponen, 1993). The history of study of the spider fauna in Finland is dealt with here, from the first pioneers of arachnology to the present situation.

BEGINNINGS OF ARACHNOLOGY IN FINLAND

In the time of C. Linnaeus (or Carl von Linné), 250 years ago, Finland was part of Sweden, and many Finnish naturalists had good contacts with Linnaeus. This applies to the two Finnish-born explorers introduced below.

In 1770 Eric Laxmann (Erik Laxman) (1737-96) described and gave drawings of *Aranea singoriensis* (now *Lycosa* or *Allohogna s.)* from the Ust-Kamenogorsk area, presently in northeastern Kazahkstan (Laxmann, 1770). It is probably the first spider

species described from Siberia. Laxmann spent most of his active life in Russia, especially in Siberia and in St. Petersburg.

Petrus Forskål (Petter Forsskål) (1732-63) died on an expedition organized by the Danes to Yemen, Arabia, when he was only 31 years old. He collected all kinds of natural specimens (including spiders) in both Egypt and Arabia. His travelling companion C. Niebuhr edited and published Forskål's descriptions in 1775 and figures in 1776 (Forskål, 1775). He described five spider species (placed nowadays in the families Araneidae, Filistatidae, and Pholcidae), four of whose names are still valid.

RESEARCH ON THE FINNISH SPIDER FAUNA

Early scholars

The first list of spiders in Finland (including Lapland) was compiled by Alexander von Nordmann (1803-66) in 1863. Including 140 species, it was based on specimens collected by himself and by his co-workers and identified mainly by the well-known Swedish arachnologist T. Thorell (Nordmann, 1863). An additional 30 species new to Finland reported by Fredrik Wilhelm Mäklin (1821-83) were also identified by Thorell (Mäklin, 1874). Karl Evald Odenwall (1873-1965) and Toivo Henrik Järvi (1877-1960) reported 71 species new to Finland in 1901 (Odenwall and Järvi, 1901). At that time, about 240 species of spiders were known from Finland. This is almost 40% of the presently known fauna (Koponen, 2007; see also Table 1).

Last century

Several arachnologists reported species new for the fauna of Finland in the 20th century, especially Pontus Palmgren (1907-93), Walter Hackman (1916-2001), and Pekka T. Lehtinen. In addition, Heikki Hippa, Veikko Huhta, Aarno Kleemola, Seppo Koponen, and Michael I. Saaristo (1938-2008) contributed to knowledge of the Finnish fauna already before Palmgren's (1977) checklist, after whose publication contributions were also made by Timo Pajunen and Juhani Terhivuo. This activity produced a great number of additions to the Finnish fauna: 95 new species over ca. 45 years (1906-1950) and as many as 245 during the next ca. 25 years (1951-1977, see Table 1). The work by P. Palmgren must be acknowledged in particular (see also Koponen, 1994). Altogether, 595 species of spiders were included in the checklist by Palmgren (1977).

Project "The Spider Fauna of Finland"

The Ministry of the Environment of Finland financed an extensive program entitled "Program of Research on Deficiently Known and Threatened Forest Species (PUTTE)" during 2003-2007 (Juslén et al., 2008). This program consisted of 40 projects, one of which was "The Spider Fauna of Finland" (2004-2007), led by S. Koponen. The main goal of these 40 projects was to collect information on poorly known species in order to assess their status and support conservation planning

Table 1. Approximate number of spider species known from Finland.

year	species	additions /year	source
1863	140	-	Nordmann (1863)
1874	170	2.7	Mäklin (1874)
1901	240	2.7	Odenwall and Järvi (1901)
1906	255	2.8	Järvi (1906)
1950	350	2.2	Koponen (unpubl.)
1977	595	9.1	Palmgren (1977)
2007	640	1.5	Koponen (2007)

and decision-making. Another important aim of the projects was to make information about threatened species more easily accessible to the authorities in charge of land use. This information will also be used in compiling the next Finnish Red Data Book.

The main aims of the project "The Spider Fauna of Finland" were: 1) to update the checklist of Finnish spiders and present it on the internet; and 2) to compile a database of information about Finnish spiders, drawing on museum collections and literature. This database on the distribution and ecological requirements of Finnish spiders will be used in compiling the next list of threatened spiders in Finland.

Checklist of spiders in Finland

The checklist of spiders in Finland previously published by Palmgren (1977) included 595 species from Finland. The latest checklist of Finnish spiders (Koponen, 2007) has been updated and is now available on the internet. The nomenclature has been updated, mainly according to Norman I. Platnick's internet catalog (Platnick, 2008). The nomenclature used by Palmgren (1977) is given, and publications treating new species that appeared after Palmgren's list are mentioned (see Table 2). Up to now, 636 species have been reported from Finland. In addition, there are three species from Karelia (which now belongs to Russia) and three greenhouse species. About 55 species have been added to the list of Palmgren (1977) and about 10 deleted. The taxonomic status of some species in the checklist is still under consideration. Several species found in Finland but not yet published will be added to the next version of checklist. Plans call for the checklist to be updated on a regular basis.

Database (distribution and ecology of Finnish spiders)

Collecting of data on the distribution of spiders in Finland is still under way. From a database of about 75000 observations, distribution maps (10 x 10 km) can be printed and the observation periods (before 1975, 1975-1999, after 1999) shown. Ecological data from observations (label information) are also included in the database. This database covers most material from the Zoological Museum, University of Turku, and a significant part of collections of the Finnish Museum of Natural History, the University of Helsinki, and Oulu University's Zoological Museum. Most published data treating the spider fauna of Finland are also included. The database of infor-

Table 2. Extract from the Checklist of Spiders in Finland (Koponen, 2007) treating species from the family Linyphiidae. Species published after Palmgren (1977) are indicated, with the reference. The nomenclature used by Palmgren is between //…./, if it differs from the one used presently.

Oedothorax retusus (Westring, 1851)
Oreoneta fennica Saaristo & Marusik, 2004 - Saaristo and Marusik, 2004
Oreoneta punctata (Tullgren, 1955) //*Hilaira tatrica*//
Oreoneta sinuosa (Tullgren, 1955) //*Hilaira frigida*//
Oreonetides vaginatus (Thorell, 1872)
Oryphantes angulatus (O. P.-Cambridge, 1881) //*Lepthyphantes*//
Ostearius melanopygius (O. P.-Cambridge, 1879) – Huhta et al., 1979
Palliduphantes antroniensis (Schenkel, 1933) //*Lepthyphantes*//
Palliduphantes ericaeus (Blackwall, 1853) //*Lepthyphantes*//
Palliduphantes insignis (O. P.-Cambridge, 1913) – Koponen et al., 2004
Palliduphantes pallidus (O. P.-Cambridge, 1871) //*Lepthyphantes*//
Panamomops mengei Simon, 1926
Pelecopsis elongata (Wider, 1834)
Pelecopsis mengei (Simon, 1884) //*Trichopterna*//
Pelecopsis parallela (Wider, 1834)
Peponocranium ludicrum (O.P.-Cambridge, 1861)
Peponocranium praeceps Miller, 1943
Pityohyphantes phrygianus (C. L. Koch, 1836)
Pocadicnemis pumila (Blackwall, 1841)
Poeciloneta variegata (Blackwall, 1841) //*globosa*//

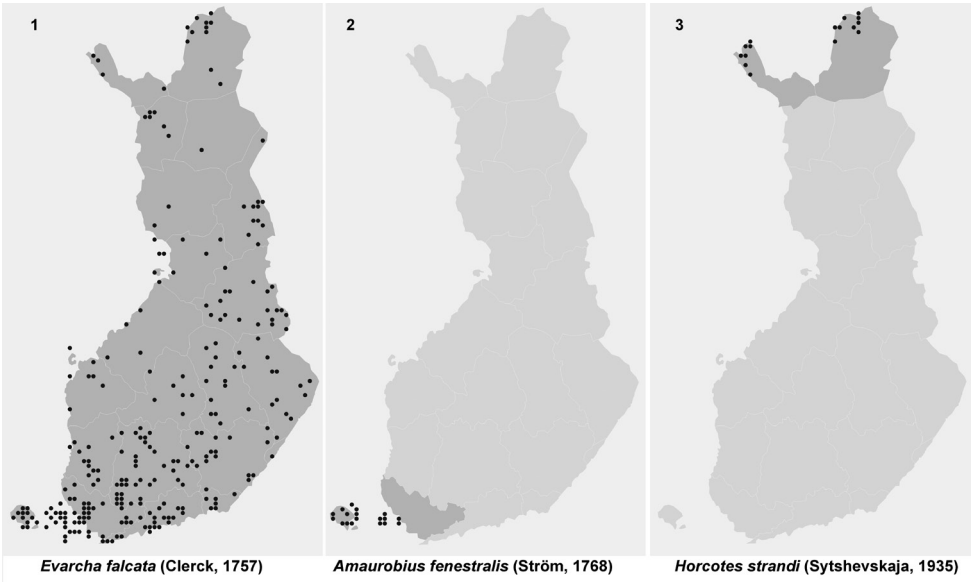
mation about the distribution and ecological requirements of Finnish spiders will be used in compiling the next list of threatened spiders in Finland. Examples of distribution maps are shown in Figs. 1-3.

Future plans

The (internet) checklist of Finnish spiders will be updated, normally on yearly basis, and the Finnish spider database will also be updated. In the future, the distribution maps will hopefully be available on the internet, and the database will be placed at the disposal of the main zoological museums of Finland and environmental officers for their joint use.

The main aim of the project "The Spider Fauna of Finland" was to produce data on the spider fauna, its distribution, and ecological features for purposes of nature protection (especially for the new Red Data Book of Finland). Today, only 6% of Finnish spider species are included in the Red Data Book of Finland (Rassi et al., 2001), whereas 9, 14, and 17% of all spider species are in the Red Data Books of Sweden (Gärdenfors, 2000), Great Britain (Bratton, 1991), and Norway (Artsdatabanken, 2006), respectively. The reasons for these different figures (lack of information?) are open to discussion.

The next list of threatened species in Finland will be finished in 2010, and after that the list will be updated at 10-year intervals. The work will mainly be done by



Figs. 1-3. 1 – *Evarcha falcata* (Salticidae) is a common and widely-distributed species in Finland. Each dot represents a 10 x 10 km square; 2 – *Amaurobius fenestralis* (Amaurobiidae) occurs only in the southwest Finnish archipelago. Each dot represents a 10 x 10 km square, and the biogeographical provinces where the species is found are shaded; 3 – *Horcotes strandi* (Linyphiidae) is found in northernmost Lapland. Each dot represents a 10 x 10 km square, and the biogeographical provinces where the species is found are shaded.

specialist groups nominated by the Ministry of the Environment. The present specialist group for arachnids and myriapods consists of eight persons.

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