COMMON GROUND-LIVING SPIDERS IN OLD TAIGA FORESTS OF FINLAND

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ABSTRACT. Spiders living on the forest floor in six old taiga forests were studied using pitfall traps in 1994 (in Suomussalmi) and 1995 (in Puolanka), central-eastern Finland, ca. 65° N. Seventy-seven species belonging to eleven families were caught. Linyphiidae (s. lat.) dominated both in species and individual numbers. The most common species were *Lepthyphantes alacris*, *Agyneta ramosa*, *Lepthyphantes antroniensis*, *Centromerus arcanus* and *Agyneta subtilis*. The fauna found is, in general, typical of old Finnish boreal forests.

The spider fauna of the boreal (taiga) forests in Finland has been studied by many authors. Basic studies were carried out by Huhta (1965, 1971). Investigations on spiders in old, primeval forests of Finland include, e.g., papers by Palmgren & Biström (1979), Biström & Väisänen (1988), Väisänen & Biström (1990), Niemelä et al. (1994) and Pajunen et al. (1995). These are all from more southern areas of Finland.

The spiders of taiga forests in central-eastern Finland have not been studied. The aim of this brief paper is to present the abundant species (of the early-midsummer period) on the floor in six old taiga forests. Some comparisons with previous studies will also be made.

These old forests are in the interests of the pulp and paper industry, and, on the other hand, there are plans to protect these areas. This study was supported by the Kainuu Park Area of the Finnish Forest and Park Service in order to provide some basic data for planning the use of these old forests. The data from the research in Suomussalmi have been partly published (Koponen 1995).

<table>
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<tr>
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<td>71.2</td>
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<td>Puolanka:</td>
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<td></td>
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<td>Kuirivaara</td>
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<td>Siikavaara</td>
<td>84.1</td>
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</table>

Figure 1.—The study areas in central-eastern Finland. 1, Suomussalmi; 2, Puolanka.
### Table 2.—Percentage of the ten most abundant species at Suomussalmi sites, 1994.

<table>
<thead>
<tr>
<th>Site</th>
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<th>Percent</th>
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<tr>
<td>Luolakangas</td>
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<td><em>L. antroniensis</em> Schenkel 1933</td>
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<tr>
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<td><em>Diplocentria bidentata</em> (Emerton 1882)</td>
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<td></td>
<td><em>Agyneta ramosa</em> Jackson 1912</td>
<td>5.3</td>
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<tr>
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<tr>
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<tr>
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<td><em>Robertus lividus</em> (Blackwall 1836)</td>
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<tr>
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<td><em>Agyneta conigera</em> (O.P.-Cambridge 1863)</td>
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<td><em>Agyneta ramosa</em> Jackson 1912</td>
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<td><em>Diplocentria bidentata</em> (Emerton 1882)</td>
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<td></td>
<td><em>Hilaira herniosa</em> (Thorell 1875)</td>
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### STUDY AREA AND METHODS

The study areas are old, more or less natural primeval forests, surrounded by cutting areas and by young planted tree formations. The majority of large pines (*Pinus sylvestris*) and spruces (*Picea abies*) have a diameter of 35-45 cm. Dead standing and ground-lying trees are not very common. Field layer is mainly dominated by *Vaccinium vitis-idaea* and *V. myrtillus*, and the ground layer by the mosses of genera *Pleurozium*, *Dicranum*, and *Hylocomium*. Elevation of the study sites varies between 160 and 270 m.

There were three study forests situating in the northern boreal forest zone (northern taiga) in Suomussalmi (1994) and three in Puolanka (1995), as follows (Fig. 1): *Suomussalmi* (64°45′N, 29°40′E): - Luolakangas: spruce-dominated, mosaic type (diversified) forest; - Likoaho: relatively dry, pine-dominated forest; - Heina Èvaara: pine-dominated, more moist than the two previous sites; *Puolanka* (65°N, 28°E): - Paljakka: spruce-dominated forest; - Kuirivaara: spruce-dominated, more moist than the two other sites in Puolanka; - Siikavaara: dry, pine-dominated mixed forest.

Pitfall trapping periods were 13 June–21 July 1994 in Suomussalmi and 14 June–2 August 1995 in Puolanka. The traps were plastic cups (mouth diameter 65 mm). Ethylene glycol with detergent was used as the preservation liquid, and the traps were provided with covers against rain and litter. Altogether, about 5600 identifiable spider specimens were collected. The material has been deposited in the Zoological Museum, University of Turku.

The usefulness of pitfall technique in spider studies has been discussed by many authors (e.g., Lowrie 1985). As pitfall data are not in-
indicating real population densities, percentages
(not individual numbers) are used here when
comparing the sites.

RESULTS

Altogether 77 species were collected. Linyphiidae (s. lat.) clearly dominated in terms of both species and individual numbers (Table 1). This is typical of old, closed and shady forests. Other marked families were Lycosidae, Theridiidae and Gnaphosidae.

The ten most abundant species at each site are shown in Tables 2 and 3. These lists include 14 and 15 species at Suomussalmi and Puolanka sites, respectively. The dominant species in all forests in Puolanka was Linyphiodes alacris, in Suomussalmi the dominants included L. alacris, L. antroniensis, Agyneta ramosa and A. subtilis. Non-linyphiids among the abundant species were Pardosa lugubris, Robertus lividus, Alopecosa pinetorum and Cryphoea silvicola.

In Suomussalmi, three Linyphiodes (L. antroniensis, L. alacris, L. tenebricula) and three Agyneta (A. ramosa, A. subtilis, A. convigera) species accounted for 65% of the total material. In Puolanka, Linyphiodes alacris, Centromerus arcanus, Agyneta subtilis and A. ramosa formed 68% of the total material.

Only 14 of the 77 species caught were found in all studied six forests (Table 4). The most common (and evenly occurring) of these linyphiid species were Linyphiodes alacris, Agyneta ramosa, Linyphiodes antroniensis, Centromerus arcanus and Agyneta subtilis. Also the following species were found at all sites but in smaller numbers: Macrargus rufus, Walckenaeria nudipalpis, Diplocentria bidentata, Tapinocyba pallens (O.P.-Cambridge 1872), Linyphiodes tenebricula, Porphyra-

<table>
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<th>Species</th>
<th>Percent</th>
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<tr>
<td></td>
<td>Macrargus rufus (Wider 1834)</td>
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<td>Agyneta ramosa Jackson 1912</td>
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Table 4.—Species found at all six forest sites; average rank = mean of species’ abundance rank (e.g., *Lepthyphantes alacris*: 1st, 5th, 5th, 1st, 1st, 1st = 2.3).

<table>
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<td><em>Centromerus arcanus</em></td>
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<td><em>Agyneta subtilis</em></td>
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ACKNOWLEDGMENTS

I am grateful to Anja Finne, Director of the Kainuu Park Area of the Finnish Forest and Park Service, for help and support in organizing this work.

LITERATURE CITED


