On the spider fauna (Arachnida: Aranei) of the Kanin Peninsula and Kolguev Island, Nenets Autonomous Okrug, Russia

О фауне пауков (Arachnida: Aranei) полуострова Канин и острова Колгуев, Ненецкий Автономный округ, Россия

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Introduction

The spider fauna of the tundra zone of Russia has been studied extremely unevenly [Marusik, Eskov, 2009]. The European sector seems to be the best studied [Mazura, 2000; Mazura, Esyunin, 2001; Tanasevitch, Koponen, 2007]. The southern tundra of the north-east of Russian Plain comprises at least 216 species [Tanasevitch, Koponen, 2007], which is comparable to the spider diversity of the Siberian tundra accounting for about 230 species [Marusik, Eskov, 2009]. Nevertheless, even here, in a relatively accessible territory, some territories remain absolutely unexplored, for instance, the Kanin Peninsula in Nenets Autonomous Okrug. The only data on spiders from this large terrain available to date were generated by the 1902 Kanin expedition organized by Imperial Russian Geographical Society [Zhitkov, 1904]. The expedition explored the southern part of the Kanin Peninsula from mid-June to mid-August, and the collected spider materials were studied by S.V. Pokrovskiy. Most spiders were taken from the coast of Mezen Bay and only two species originated from the Kanin tundra [Pokrovskiy, 1904]; according to Sergienko [1986], the terrain from where spiders were collected is now considered the south forest-tundra. Since 1902, there have been no further special studies of spiders in the region at hand.

The same holds true for Kolguev Island, from where the only species, *Hilaira nubigena* Hull, 1911, was recorded by Tanasevitch [2017a], despite regular visits of field workers.

The present paper presents results of the first special survey of spider fauna of the Kanin Peninsula and Kolguev Island. Habitat preferences of the recorded species are also included.

Materials and methods

**Studied area**

The *Kanin Peninsula* is located in the western-most part of the East European tundra and surrounded by waters of White and Barents Seas. It extends by 292 km from the south to the north, and its total area is about 18 000 km² [Sergienko, 1986]. Spiders were collected from the vicinity of Shoina (ІІоііна) Village (c. 67.878254°N, 44.150705°E) (Fig.1). The climate in the region at hand is subarctic, with the annual mean air temperature reaching –1.6°C. The mean temperature of
February (the coldest month) is about −12.1°C, that of July (the warmest month) reaches +9.7°C [Sergienko, 1986]. The vegetation season, i.e., the period of the mean daily temperatures exceeding +5°C, lasts about 106 days [Filippov, Shuvalov, 2006]. The permafrost has no continuous distribution, and its area occupies about 5–25% of the peninsula; it is absent from river valleys and warmed slopes [Sergienko, 1986, 2013]. The vegetation of the Kanin Peninsula is typical of the tundra zone. In the study area, the bushy tundra (with Betula spp. or willow shrubs) and frost mound bogs predominate. Sand dunes with the typical vegetation occur along seashores. Marshes occur at river mouths and can be temporarily flooded by seawater at high tides [Sergienko, 1986; Filippov, Shuvalov, 2006]. The landscapes near the village are strongly transformed by human activities [Filippov, Shuvalov, 2006], with large areas being covered with sands without vegetation.

Spiders were collected from different biotopes (Table 1), from 12 to 26 July, 2017. The following collecting methods were used: sifting moss and litter, pitfall trapping, sweeping, and hand collecting. The pitfall traps were made of 200 ml plastic cups, 100 mm high with an opening of 65 mm in diameter, filled in by one third with water (in sea marshes and dunes) or 4–8% formalin solution (in other habitats). The traps on the seashore were checked every three days, and those in other sites weekly. The material was sorted out during the fieldwork and preserved in 98% ethanol. Then it was transported to the laboratory and identified under a stereomicroscope. The total material accounted for 1290 trap-days; 2985 spider specimens were collected, of which 2335 adults were identified to species.

The Kolguev Island is situated to the north-east part of the Kanin Peninsula (Fig. 1). Its total area is about 5030 km². The island is a bogged plain raised in its central part. There is a cluster of low hills (25–50 m a.s.l.) with flat tops and gentle slopes in the middle of the island. The average annual air temperature is about −2.7 °C. The mean temperature in July reaches +7.6°C. The duration of vegetation season is about 72 days. The island is situated in the typical tundra subzone of the tundra belt [Makarova, 2012; Lavrinenko, Lavrinenko, 2018].

In 12–28 July 2019, the spider material was collected by pitfall traps from the central part of Kolguev Island (c. 69.164304°N, 48.925823°E). The traps were similar to those used in the Kanin Peninsula but with a 2% formalin solution as a preservative. They were set up in five different habitats: the zonal tundra, a sedge bog in a river valley, snow bed in the dry northern moss-lichen slope, meadow in a dry southern slope, the Dryas tundra. The material was sorted out and identified in the laboratory. The total material accounted for 368 trap-days; 131 spider specimens were collected, of which 108 adults were identified to species.

Museum materials

In addition to the spiders collected in the field, museum materials from the Kanin Peninsula and Kolguev Island deposited in the Zoological Museum of the Moscow University (ZMMU; Moscow, Russia) were examined (a total of three adult specimens).
Spiders of the Kanin Peninsula and Kolguev Island

Table 1. Description of the studied habitat types in the vicinities of Shoina village, Kanin Peninsula. Таблица 1. Описание изученных местообитаний в окрестностях села Шойна, п-ов Канин.

| Habitat                        | Dominant plant species                                                                 | Collecting method |
|--------------------------------|---------------------------------------------------------------------------------------|-------------------|
| Sea marshes I–IV (from lowest to upper level) | Carex subspathacea, Puccinellia phryganodes, Plantago sp. | PT (380), HC |
| Willow thicket                 | Salix sp.                                                                              | PT (100), HC     |
| Sandy banks of streams         | Carex spp.                                                                             | PT (100), HC1    |
| Sedge brakes on boggy places   | Carex spp., Betula nana, Salix sp., green mosses                                       | PT (100), Sif    |
| Sphagnous cushions             | Sphagnum sp.                                                                          | Sif              |
| Shrub tundra                   | Salix sp., Betula czerepanovii                                                         | Sif, Sw          |
| Crowberry tundra               | Empetrum hermaphroditum, Betula nana, Vaccinium vitisidaea, Arctous alpina, fruticose lichens, green mosses | PT (60)          |
| Birch thicket                  | Betula czerepanovii, Salix sp., Geranium sp., Myosotis sp., Polygonatum sp., Equisetum sp., Tristentis sp. | PT (60), Sif, Sw |
| Sandy beaches, dunes           | Leymus arenarius                                                                      | PT (240), HC2    |
| Zonal tundra (dwarf shrub tundra) | B. nana, Salix sp., Cassiope tetragona, Vaccinium myrillus, Geranium sp., Caltha sp., green mosses, Carex spp., Sphennum sp. | PT (150), HC, Sif, Sw |
| Willow-birch shrub tundra      | Salix sp., Vaccinium myrillus, Empetrum hermaphroditum, Vaccinium vitisidaea, Vaccinium uliginosum, B. nana, Chamaefericlymenum suecicum, Tristentis sp., Arctostaphylos alpina, Dicranum sp. | Sif, Sw          |
| Snow bed                       | Empetrum hermaphroditum, Salix sp., green mosses                                       | PT (100)         |

The nomenclature follows WSC [2020]. All the studied material will be deposited in the ZMMU.

Data analysis
To assess a degree of faunal similarity between different regions of north-eastern Europe, literature-derived data on local spider faunas has been used [Koponen, 1984, with changes; Mazura, 2000, with changes; Tanasevitch, Koponen, 2007; Tanasevitch, Nekhaeva, 2014; Marusik et al., 2016; Tanasevitch, 2017a,b, 2018; Tanasevitch, Khruileva, 2017, with additions; Nekhaeva, 2018a]. A faunistic similarity between local faunas was estimated by using the Kulczyński index for qualitative data in PAST 3.25 [Hammer et al., 2001]. The resemblance matrix was visualized using the UPGMA algorithm. In the calculation of spider activity, all collected individuals were taken into account.

Species list
Lists of the spiders collected from the Kanin Peninsula (Table 2) and Kolguev Island (Table 3) are presented below. Abbreviations used in the tables are as follows: B — sandy stream banks; BF — birch thickets; Bo — sedge bog; Car — sedge thickets in boggy plots; Du — sandy beaches, dunes; DT — Dryas tundra; ImT — crowberry tundra; M — meadow; SB — snow bed; ShT — willow-birch shrubby tundra; SM — sea marshes (I–IV levels); Sp — Sphagnum cushions; Wil — willow thicket; ZT — dwarf shrubby tundra (zonal tundra). Species marked with an asterisk (*) were represented by females only; the species hitherto reported from the region are marked with (^).

Results
Fauna characteristics
A total of 86 spider species have been identified, of which 75 were found from the Kanin Peninsula and 24 from Kolguev Island. The species belong to nine families, as follows: Linyphiidae (57 from the Kanin Peninsula; 21 from Kolguev Island), Lycosidae (7; 2), Clubionidae (3; 0), Thomisidae (2; 1), Dictynidae (2; 0),

Abbreviations: HC — hand collecting, PT — pitfall traps, Sif — sifting moss and litter, Sw — sweeping. A number of trap-days for pitfalls is given in parenthesis. 1 — under snags and in sedge brakes; 2 — under stones and snags in dunes.
| Taxa / Habitat | SM | Wil | Du | ZT | SB | B | BF | ImT | Sp | Car | ShT | Sum total |
|----------------|----|-----|----|----|----|---|----|-----|----|-----|-----|-----------|
| **Fam. Araneidae** |    |     |    |    |    |   |    |     |    |     |     |           |
| Larinioides cornutus (Clerck, 1757) * | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| **Fam. Clubionidae** |    |     |    |    |    |   |    |     |    |     |     |           |
| Clubiona norvegica Strand, 1900 | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| Clubiona stagnatilis Kulczyński, 1897 | 2 |     |    |    |    |   |    |     |    |     |     | 2         |
| Clubiona trivialis C.L. Koch, 1843 | 2 |     |    |    |    |   |    |     |    |     |     | 2         |
| **Fam. Dictynidae** |    |     |    |    |    |   |    |     |    |     |     |           |
| Dictyna major Menge, 1869 | 1 |     |    |    |    |   |    |     |    |     |     | 13        |
| Dictyna uncinata Thorell, 1856 | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| **Fam. Gnaphosidae** |    |     |    |    |    |   |    |     |    |     |     |           |
| Micaria alpina L. Koch, 1872 | 6 |     |    |    |    |   |    |     |    |     |     | 6         |
| **Fam. Linyphiidae** |    |     |    |    |    |   |    |     |    |     |     |           |
| Aphileta misera (O. Pickard-Cambridge, 1882) | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| Agyneta conigera (O. Pickard-Cambridge, 1863) | 2 | 1 |    |    |    |   |    |     |    |     |     | 5         |
| Agyneta decora (O. Pickard-Cambridge, 1871) | 7 | 8 | 5 | 1 |    |   |    |     |    |     |     | 21        |
| Agyneta galosa (L. Koch, 1869) | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| Agyneta mossica (Schikora, 1993) | 4 | 2 | 7 | 7 |    |   |    |     |    |     |     | 13        |
| Agyneta subtilis (O. Pickard-Cambridge, 1863) | 1 | 14 | 5 | 55 | 55 |   |    |     |    |     |     | 75        |
| Araeonecus vorkutensis Tanasevitch, 1984 | 2 |     |    |    |    |   |    |     |    |     |     | 2         |
| Baryphyma governoense (Locket, 1965) | 1 | 5 | 1 | 2 |    |   |    |     |    |     |     | 9         |
| Baryphyma trifrons (O. Pickard-Cambridge, 1863) * | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
| Bathyphantes gracilis (Blackwall, 1841) | 1 | 1 | 3 | 2 | 2 |   |    |     |    |     |     | 7         |
| Bathyphantes humilis (L. Koch, 1879) | 1 |     |    |    |    |   |    |     |    |     |     | 1         |
|                      | SM | Wil | Du | ZT | SB | B  | BF | ImT | Sp | Car | ShT | Sum total |
|----------------------|----|-----|----|----|----|----|----|-----|----|-----|-----|-----------|
| Bathyphantes setiger F.O. Pickard-Cambridge, 1894 * | | | | | | | | | | | | 1 |
| Bolyphantes lateolus (Blackwall, 1833) * | | | | | | | | | | | | 1 |
| Centromerus arcanus (O. Pickard-Cambridge, 1873) | 3 | 4 | | | | | | | | | | 7 |
| Drepanotylus borealis Holm, 1945 | 1 | 2 | | | | | | | | | | 4 |
| Drepanotylus uncatus (O. Pickard-Cambridge, 1873) * | | | | | | | | | | | | 1 |
| Erigone arctica (White, 1852) | 9 | 64 | 58 | 40 | 100 | | | | | | | 1 |
| Erigone atra Blackwall, 1833 ^ | | | | | | | | | | | | 4 |
| Erigone dentigera O. Pickard-Cambridge, 1874 | 3 | 1 | | | | | | | | | | 4 |
| Erigone longipalpis (Sundevall, 1830) | 298 | 6 | 5 | | | | | | | | | 309 |
| Erigone psychrophiila Thorell, 1871 | | | | | | | | | | | | 2 |
| Gongylidiellum latebricola (O. Pickard-Cambridge, 1871) | | | | | | | | | | | | 1 |
| Hilaira incondita (L. Koch, 1879) | 11 | 1 | | | | | | | | | | 12 |
| Hilaira nubigena Hull, 1911 * | 1 | | | | | | | | | | | 6 |
| Hilaira persicae Hull, 1908 * | | | | | | | | | | | | 15 |
| Hypomma bituberculatum (Wider, 1834) | 1 | 3 | 1 | 6 | | | | | | | | 20 |
| Kaestneria pullata (O. Pickard-Cambridge, 1863) | 4 | | | | | | | | | | | 8 |
| Leptomolgopus robustum (Westring, 1851) | | | | | | | | | | | | 3 |
| Macrargus multesimus (O. Pickard-Cambridge, 1875)* | | | | | | | | | | | | 2 |
| Maro minutus O. Pickard-Cambridge, 1907 * | | | | | | | | | | | | 3 |
| Maro sublestus Falconer, 1915 * | | | | | | | | | | | | 2 |
| Mecynargus morulus (O. Pickard-Cambridge, 1873) * | | | | | | | | | | | | 3 |
| Mecynargus paetulus (O. Pickard-Cambridge, 1875) | 8 | 16 | | 1 | 2 | | | | | | | 27 |
| Mecynargus sphagnicola (Holm, 1939) | | | | | | | | | | | | 3 |
Table 2 (continued).
Таблица 2 (продолжение).

| Species                                    | SM  | Wil | Du | ZT | SB | B  | BF | ImT | Sp | Car | ShT | Sum total |
|--------------------------------------------|-----|-----|----|----|----|----|----|-----|----|-----|-----|-----------|
| *Oedothorax retusus* (Westring, 1851)       | 109 | 51  | 1  |    |    |    |    |     |    |     |     | 161       |
| *Oreoneta sinuosa* (Tullgren, 1955)         | 1   |     |    |    |    |    |    |     |    |     |     | 1         |
| *Oreoneta uralensis* Saaristo et Marusik, 2004 |     |     |    |    |    |    |    |     |    |     |     | 6         |
| *Oryphantes angulatus* (O. Pickard-Cambridge, 1881) | 4   | 6   |    |    | 10 |    |     |     |    |     |     | 10        |
| *Pelecopsis mengel* (Simon, 1884)           | 1   | 31  | 25 | 1  |    | 59 |    |     | 23 |     |     |           |
| *Pseudocyba miracula* Tanasevitch, 1984     | 22  | 1   |    |    | 5  |    |    | 10  |     |     |     |           |
| *Scandichrestus tenuis* (Holm, 1943)        | 4   | 2   |    |    |    |    |     | 6   |     |     |     |           |
| *Gibothorax tchernovi* Eskov, 1989 *        | 1   |     |    |    |    |    |     | 1   |     |     |     |           |
| *Semljicola caliginosus* (Falconer, 1910) * | 1   |     |    |    |    |    |     | 1   |     |     |     |           |
| *Semljicola faustus* (O. Pickard-Cambridge, 1901) * | 3   | 2   |    |    | 5  |    |     |     |     |     |     |           |
| *Silometopoides sphagnicola* Eskov et Manusik, 1992 * | 1   |     |    |    |    |    |     | 1   |     |     |     |           |
| *Silometopus ambigus* (O. Pickard-Cambridge, 1906) * | 5   |     |    |    | 5  |    |     |     |     |     |     |           |
| *Pocadinemis pumila* (Blackwall, 1841)      | 1   |     |    |    |    |    |     | 1   |     |     |     |           |
| *Tenuiphantes alacris* (Blackwall, 1853)    |     | 3   |    |    |    |    |     | 3   |     |     |     |           |
| *Tiso aestivus* (L. Koch, 1872)             |     |     |    | 17 | 45 | 62 |     |     |     |     |     |           |
| *Tmeticus affinis* (Blackwall, 1855)        | 1   |     |    | 1  |    |    |     | 2   |     |     |     |           |
| *Troxochrus scabriculus* (Westring, 1851)   |     |     |    |    |    | 42 | 43  |     |     |     |     |           |
| *Walckenaeria cuspidata* Blackwall, 1833 *  |     |     |    |    |    |    |     | 1   |     |     |     |           |
| *Walckenaeria kochi* (O. Pickard-Cambridge, 1873) * | 5   | 1   |    |    | 6  |    |     |     |     |     |     |           |
| *Walckenaeria nodosa* O. Pickard-Cambridge, 1873 * | 1   |     |    |    |    |    |     | 1   |     |     |     |           |
| *Walckenaeria nudipalpis* (Westring, 1851) * | 1   |     |    |    | 2  |    |     |     |     |     |     |           |
| *Zornella cultrigera* (L. Koch, 1879) *     |     | 8   |    |    |    |    |     | 8   |     |     |     |           |
| SM | Wil | Du | ZT | SB | B | BF | ImT | Sp | Car | ShT | Sum total |
|----|-----|----|----|----|---|----|-----|----|-----|-----|-----------|
|    |     |    |    |    |   |    |      |    |     |     |           |
| **Fam. Lycosidae** |     |     |     |     |   |    |      |    |     |     |           |
| *Arctosa alpigena* (Doleschall, 1852) | 2   |     | 1   |    |   |    |      |    |     |     | 3          |
| *Pardosa agricola* (Thorell, 1856) | 608 | 313 | 1   | 2  | 1 |    |      |    |     |     | 925        |
| *Pardosa atrata* (Thorell, 1873) | 6   | 1   | 6   | 2  |   |    |      |    |     |     | 17         |
| *Pardosa hyperborea* (Thorell, 1872) | 9   |     |     |    |   |    |      |    |     |     | 9          |
| *Pardosa palustris* (Linnaeus, 1758) | 2   |     |     |    |   |    |      | 27 |     |     | 29         |
| *Pardosa sphagnicola* (Dahl, 1908) | 1   |     |     |    |   |    |      |    |     |     | 1          |
| *Pirata piraticus* (Clerck, 1757) | 1   | 3   |     |    |   |    |      |    |     |     | 4          |
| **Fam. Philodromidae** |     |     |     |     |   |    |      |    |     |     |           |
| *Rhysodromus fallax* (Sundevall, 1833) | 1   | 2   |     |    |   |    |      |    |     |     | 4          |
| **Fam. Salticidae** |     |     |     |     |   |    |      |    |     |     |           |
| *Attulus floricola* (C.L. Koch, 1837) | 2   | 2   |     |    |   |    |      |    |     |     | 5          |
| **Fam. Thomisidae** |     |     |     |     |   |    |      |    |     |     |           |
| *Ozyptila trux* (Blackwall, 1846) | 2   | 20  | 3   |    |   |    |      | 1  | 2   | 3   | 32         |
| *Xysticus cristatus* (Clerck, 1757) |     |     |     |    |   |    |      |    |     |     | 3          |
| Total adult/juvenile | 1101/58 | 499/3 | 104/53 | 116/19 | 74/3 | 105/37 | 93/41 | 40/6 | 42/58 | 45/115 | 116/257 | 2335/650 |
| Total species | 24 | 17 | 15 | 25 | 16 | 5 | 13 | 7 | 13 | 15 | 14 | 75 |
Philodromidae (1; 0), Salticidae (1; 0), Gnaphosidae (1; 0), Araneidae (1; 0).

Among the collected species, only *Erigone atra* Blackwall, 1833 (1♀, ZMMU Ta-3593) was previously reported from Parsunoe Lake [Pokrovsky, 1904: 305] (Table 2). Another species, which was also collected by the 1902 Kanin expedition — *Pardosa albatula* (Roewer, 1951) [Pokrovsky, 1904: 306, sub *Lycosa albata*] — was not found in the ZMMU collection. Only three females of the latter species were collected in 1902, and therefore it is likely that they could have been misidentified and seemed to belong to *Pardosa palustris* (Linnaeus, 1758).

The only spider species known from Kolguev Island before the present study was *Hilaira nubigena* [Tanasevitch, 2017a: 80]. Yet, two specimens of *Erigone arctica* (White, 1852) collected from there at the beginning of the last century were found in the ZMMU collection (Table 3). Along with the latter species, all the remaining species (see Tables) have been reported from the Kanin Peninsula and Kolguev Island for the first time. Comments on distribution of some of them are provided below.

**Linyphiidae**

Agyneta ripariensis Tanasevitch, 1984. Described from the Bolshezemelskaya tundra and the Polar Urals; it is a Siberian arcto-boreal species, occurring from Dolgiy Island to Chukotka, southward to the upper Kolyma River [Eskov, 1994; Marusik et al., 2016]. The present finding in Kolguev Island lies at the westernmost limit of the species range.

Araeoncus vorkutensis Tanasevitch, 1984 was described and repeatedly recorded from the southern tundra of Russian Plain [Tanasevitch, Koponen, 2007]. The Pinezhsky Nature Reserve (Arkhangelsk Area) represents the westernmost limit of its range [Tanasevitch, Nekhaeva, 2014], whereas Kolguev Island is the north-westernmost locality of this Siberian species.

Bathyphantes humilis (L. Koch, 1879). This Siberian hypoarctic-nemoral species is known from the northeast part of Russian Plain to the Russian Far East [Eskov, 1994; Tanasevich, Koponen, 2007; Marusik, Eskov, 2009; Tanasevitch, Khruleva, 2017]. The White Sea coast of the Kanin Peninsula represents the westernmost locality of the species.

Gibothorax tchernovi Eskov, 1989. This species was previously known from Dolgiy Island to Chukotka [Eskov, 1994; Marusik et al., 2016; Tanasevitch, Khruleva, 2017]. One female was collected from sea marshes of the Kanin Peninsula, representing the westernmost record of the species.

Hilaira incondita (L. Koch, 1879). The White Sea coast of the Kanin Peninsula is the westernmost locality of this Siberian-Nearctic species [Marusik, Nekhaeva, 2020].

Pseudocyba miracula Tanasevitch, 1984. This species was described from the south-east part of the Bolshezemelskaya tundra. It has a trans-Siberian range [Eskov, 1994; Marusik et al., 2016]. The White Sea coast of the Kanin Peninsula represents its westernmost record.

Silometopoides sphagnicola Eskov et Marusik, 1992. A single female was collected. This Siberian species was recently found in the Yugorsky Peninsula [Tanasevitch, Khruleva, 2017; own unpublished data]. Hence, the White Sea coast of the Kanin Peninsula represents the westernmost locality of the species.

Silometopus ambiguus (O. Pickard-Cambridge, 1906). This species has a European range [Tanasevitch, Koponen, 2007; Marusik, Eskov, 2009], with the Kanin Peninsula lying at its northernmost limit.

Troxochrus scabriculus (Westring, 1851). A Euro-Yenisei boreo-nemoral species [Eskov, 1994; Marusik et al., 2000]; the present record from the Kanin Peninsula lies at the northernmost limit of the species range.

Philodromidae

Rhysodromus fallax (Sundevall, 1833). This species has a Palaeartic range [Marusik et al., 2000]. The White Sea coast of the Kanin Peninsula is the northernmost locality for the species.

The spider faunas of both studied terrains mainly consist of widespread species. The Holarctic and Palaeartic groups were most abundant, accounting for 35%
and 37% for the Kanin Peninsula, and 48% and 20% for Kolguev Island. Species with the Siberian range made up only 8% and 12% respectively. No species with the European range were found in Kolguev Island, while they account for 15% of the spider fauna of the Kanin Peninsula.

According to a latitudinal component, species that are widespread across the forest zone were most numerous: in the Kanin Peninsula, 48% and 39% of spiders were of boreo-nemoral and boreal distribution; in Kolguev Island, 20% and 44% correspondingly. Only 5% of the spider species from the mainland have an arctic or arcto-boreal distribution. In Kolguev Island, such species accounted for 28%.

Comparison with neighbouring areas

By the spider fauna composition, the Kanin Peninsula and Kolguev Island are similar to that of the northeast tundra of Russian Plain. Together with local faunas of Fennoscandia, they form a cluster separated from the less diverse but more specific fauna of extreme northwest Siberia (Fig. 2).

Spider diversity and abundance in studied communities

A species number in each habitat varied from 5 to 25 in the Kanin Peninsula, and only 5 to 8 (almost equal) in Kolguev Island. In the former site, the least diversity was found along stream sandy banks (5 species) and in the crowberry tundra (7), as compared to sea marshes and dwarf shrubby tundra (24 and 25, respectively) (Table 2).

The studied biotopes cannot be correctly compared by the number of collected specimens due to different sampling efforts and technique. However, the activity (number of individuals per 10 trap-days) can be used for that purpose. In the mainland, it ranged from 2 to 74 ind./10 trap-days in sea marshes, reaching its maximum at the farthest levels from the water (Fig. 3a). A high spider activity (50 ind./10 trap-days) was also detected in willow shrub thickets surrounding marshes by a narrow strip. Its minimum values were in contrasting habitats such as sandy beach or dunes and sandy stream bank and bog (0.5–3 ind./10 trap-days). In the rest of habitats, spider activity varied from 8 to 16 ind./10 trap-days. The minimum activity in Kolguev Island was also recorded in the *Dryas* tundra and the bog (2–3 ind./10 trap-days), i.e. both in the driest and in wettest communities (Fig. 3b).

Discussion

Based on both new and literature-derived data, the spider faunas of the Kanin Peninsula and Kolguev Island consist of 75 and 25 species respectively, of which 73 and 24 species have been reported from these regions for the first time. Obviously, the species lists are incomplete. Ten species found in Kolguev Island (*Paradosa septentrionalis*, *Agyneta nigripes*, *A. ripariensis*, *Collinsia holmgreni*, *Gonatium rubens*, *Horcotes strandi*, *Mecynargus borealis*, *Seml icola angulatus*, *Wallkenaeria clavicornis*, *Xysticus canadensis*) were not found in the Kanin Peninsula. Yet, all of them have been previously reported from other islands of Barents Sea or from the mainland (*Mazura, 2000; Mazura, Esunin, 2001; Tanasevitch, Koponen, 2007; Marusik et al., 2016; Tanasevitch, 2017a,b; etc.*). The number of spider species in some Low Arctic local faunas is higher than that of the Kanin Peninsula. For instance, 163 species are known from the Kevo Subarctic Research Station, the forest-tundra belt of Finland (*Koponen, 1984, with changes*), 141 — from the vicinity of Murmansk, the forest-tundra belt (*Nekhaeva, 2018a, 2018b*), 110 — from Pechora Delta and the adjacent tundra (*Mazura, 2000, with changes*), 123 — from the vicinity of Vorkuta, the tundra belt (*Tanasevitch, Koponen, 2007,* etc. Based on the faunal similarities of these territories (Fig. 2), the spider fauna of the Kanin Peninsula should be at least 1.5 times more diverse. Among the explored islands of Barents Sea, Kolguev Island is the second most spider-diverse following Dogly Island that comprises 52 recorded species (*Marusik et al., 2016*). Taking into account the island size and its proximity to the mainland, the known species number is likely to increase after a more detailed survey.

The spider fauna, as well as those of other arthropods (ground beetles, lepidopterans), of the northeast European region is known to have a migratory charac-
Table 3. Spiders species collected on the Kolguev Island and its number in different habitats (for abbreviations see Material and methods).
Таблица 3. Виды пауков, собранные на о. Колгуев, и их численность в различных местообитаниях (сокращения см. в разделе Материалы и методы).

| Taxa                                      | SB | Bo | ZT | M | DT | Sum total |
|-------------------------------------------|----|----|----|---|----|-----------|
| **Fam. Linyphiidae**                      |    |    |    |   |    |           |
| Agyneta gulosa (L. Koch, 1869)            | 2  |    | 2  |   |    |           |
| Agyneta nigripes (Simon, 1884)            | 5  |    | 5  |   |    |           |
| Agyneta ripariensis Tanasevitch, 1984     | 1  | 1  | 1  | 2 |    | 1         |
| Araeoncus vorkutensis Tanasevitch, 1984   | 4  |    |    | 4 |    |           |
| Collinsia holmgreni (Thorell, 1871)       | 10 |    |    |   |    | 10        |
| *Erigone atra* Blackwall, 1833            | 16 | 3  | 1  | 20|    |           |
| *Erigone psychrophila* Thorell, 1871      | 1  |    | 1  |   |    | 1         |
| *Gonatium rubens* (Blackwall, 1833)       | 1  | 1  | 2  |   |    | 2         |
| Hilaira nubigena Hull, 1911 ^             | 4  |    |    | 4 |    |           |
| Horcotes strandi (Sytshevskaja, 1935)     | 2  | 2  | 4  |   |    | 4         |
| Leptorhoptrum robustum (Westring, 1851)   | 3  |    | 3  |   |    |           |
| Mecynargus borealis (Jackson, 1930)       | 2  |    | 2  |   |    |           |
| Mecynargus paetus (O. Pickard-Cambridge, 1875) | 1  |    | 1  |   |    | 1         |
| Mecynargus sphagnicola (Holm, 1939)       | 1  | 7  | 8  |   |    |           |
| Mecynargus monticola (Holm, 1943) *       | 1  | 1  |    |   |    | 1         |
| Oreoneta uralensis Saaristo et Marusik, 2004 | 4  |    |    | 4 |    |           |
| *Pelecopsis mengei* (Simon, 1884) *       | 3  |    | 3  |   |    | 3         |
| Semljicola angulatus (Holm, 1963)         | 3  | 1  | 4  |   |    | 4         |
| Tiso aestivus (L. Koch, 1872)             | 1  | 15 | 16 |   |    |           |
| Walckenaeria clavicorns (Emerton, 1882) * | 2  |    | 2  |   |    |           |
| Walckenaeria cuspidata Blackwall, 1833 *  | 1  |    | 1  |   |    | 1         |

| **Fam. Lycosidae**                        |    |    |    |   |    |           |
| Pardosa palustris (Linnaeus, 1758)        | 1  |    | 1  |   |    |           |
| Pardosa septentrionalis (Westring, 1861)  | 6  |    | 6  |   |    |           |

| **Fam. Thomisidae**                       |    |    |    |   |    |           |
| Xysticus canadensis Gertsch, 1934         | 2  |    | 2  |   |    |           |
| Total adult/juvenile                      | 40/9 | 17/4 | 16/4 | 24/1 | 11/5 | 108/23   |
| Total species                             | 8   | 6   | 8   | 5  | 5  | 24        |

N.B. *Erigone arctica* (White, 1852) found in the ZMMU collections is not included in the table. Material: 1 ♂, ZMMU Ta-1669, Kolguev Isl., Bugrino Vil., 3.09.1902, leg. S.A. Buturlin (det. as *Erigone dentipalpis*); 1 ♀, ZMMU Ta-1771, Kolguev Isl., estuary of Vas’kina R., 3.08.1902, leg. S.A. Buturlin (det. as *Erigone atra*).
ter. It is formed and continues to be formed by the species penetrating it both from the west and from the east [Tanasievitch, Koponen, 2007; Bolotov, 2011; Tararinov, 2016; Kolesnikova et al., 2017]. The same holds true to the studied terrains where widespread species with boreo-nemoral and boreal distribution predominate. New findings expand the known distributional ranges of A. ripariensis, Bathypantes humilis, Gibothorax tchernovi, Hilaira incondita, Pseudocyba miracula and Silometopoides sphagnicola westwards. However, compared to the territories lying to the east of the studied region, the proportion of species with Siberian ranges is minimal. It was only 8 and 12% in the arameoafanas of the Kanin Peninsula and Kolguev Island respectively, whereas such species account for 18% of the spider fauna of Pechora Delta [Mazura, 2000], 37% in the vicinity of Vorkuta [Tanasievitch, Koponen, 2007], 42% in Dolgiy Island [Marusik et al., 2016], and 54% in the vicinity of Amderna [Tanasievitch, Khruleva, 2017].

The spider diversity and abundance in the studied habitats of Kolguev Island are low and are not further discussed here. The species number found in the Kanin sea marshes (24) was comparable to that in the zonal tundra (25), and their share in the local fauna was 32% (Table 2). Many of these species were not found outside the marshes (Clubiona stagnatilis, G. tchernovi, Pocadinemis pumila, Semljicola caliginosus, Silometopus ambiguus). Other species were also abundant in the surrounding willow thickets but rare or absent from other habitats (Erigone dentigera, E. longipalpis, Oehdothorax retusus, Pardosa agricola, Praestigia pini, Walckenaeria kochi), or they also inhabited moist biotopes such as bogs, stream banks, etc. (Erigone arctica, but notice that on beaches it was restricted to seaweed clusters). Nevertheless, to date, no spider species restricted exclusively to the coast have been known from the (Sub)Arctic. There are only few specific forms occurring in a variety of over-moistened habitats; on sea marshes, they are particularly common. For example, E. longipalpis and E. remota L. Koch, 1869, which substitutes for the former species in the east, are especially abundant in these communities [Marusik et al., 2019]. In other habitats, both of them are scarce. This seems to also be true of other representatives of the genus Erigone, as well as of Mastika, Oedoothorax, some Hilaira and Pardosa.

One of the features of coastal habitats is an increased spider activity as compared to other biotopes [Palmgren, 1972; Nekhaeva, 2018a]. On the coastal profile of the Kanin Peninsula, spider activity increased following a change in the hypsometric level (Fig. 3a). Its values at the highest level were at least 1.5 times greater than in other biotopes (cf. 74 ind./10 trap-days here vs. 50 and 2 ind./10 trap-days respectively in willow shrub thickets and sedge bogs). A similar pattern was observed both in Western Siberia [Nekhaeva, 2018b] and northern Chukotka (unpublished data).

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