

## 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

Anna A. Nekhaeva  
Анна А. Нехаева

A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Leninsky prospect 33, Moscow 119071, Russia. E-mail: adrealinea@gmail.com

Институт проблем экологии и эволюции им. А.Н. Северцова РАН, Ленинский пр., 33, Москва, 119071, Россия. E-mail: adrealinea@gmail.com

KEY WORDS: biotopic distribution, species list, tundra, Low Arctic, distribution.

КЛЮЧЕВЫЕ СЛОВА: биотопическое распределение, список видов, тундра, низкая Арктика, распространение.

**ABSTRACT.** The first faunistic data on spiders occurring in the Kanin Peninsula and Kolguev Island, whence only three species were earlier known with certainty, are provided. Species lists consist of 75 and 25 species, respectively. Yet data on habitat preferences of the recorded species are given. A total of 86 species are currently known from the Kanin Peninsula and Kolguev Island. The diversity and activity of spiders in the studied communities are briefly discussed.

How to cite this article: Nekhaeva A.A. 2020. On the spider fauna (Arachnida: Aranei) of the Kanin Peninsula and Kolguev Island, Nenets Autonomous Okrug, Russia // Arthropoda Selecta. Vol.29. No.3. P.387–398. doi: 10.15298/arthscl. 29.3.12

**РЕЗЮМЕ.** Приведены первые фаунистические данные о пауках полуострова Канин и острова Колгуев, откуда ранее достоверно были известны только три вида. Приведены списки, включающие, соответственно, 75 и 25 видов, а также данные об их биотопическом распределении. Всего с полуострова Канин и острова Колгуев в настоящее время известно 86 видов. Кратко обсуждается разнообразие и активность пауков в исследованных сообществах.

### 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, Eshyunin, 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 westernmost 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 km<sup>2</sup> [Sergienko, 1986]. Spiders were collected from the vicinity of Shoyna (Шойна) 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



Fig. 1. Map (A) and a view of the studied area (B). The location of Shoyna village is indicated with a circle.  
Рис. 1. Карта (A) и обзор изученного района (B). Расположение поселка Шойна отмечено кругом.

February (the coldest month) is about  $-12.1^{\circ}\text{C}$ , that of July (the warmest month) reaches  $+9.7^{\circ}\text{C}$  [Sergienko, 1986]. The vegetation season, i.e., the period of the mean daily temperatures exceeding  $+5^{\circ}\text{C}$ , 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 speci-

mens 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 km<sup>2</sup>. 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  $-2.7^{\circ}\text{C}$ . The mean temperature in July reaches  $+7.6^{\circ}\text{C}$ . 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.  $69.164304^{\circ}\text{N}$ ,  $48.925823^{\circ}\text{E}$ ). 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).

Table 1. Description of the studied habitat types in the vicinities of Shoyna 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)	<i>Carex subspathacea</i> , <i>Puccinellia phryganodes</i> , <i>Plantago</i> sp.	PT (380), HC
Willow thicket	<i>Salix</i> sp.	PT (100), HC
Sandy banks of streams	<i>Carex</i> spp.	PT (100), HC <sup>1</sup>
Sedge brakes on boggy places	<i>Carex</i> spp., <i>Betula nana</i> , <i>Salix</i> sp., green mosses	PT (100), Sif
Sphagnous cushions	<i>Sphagnum</i> sp.	Sif
Shrub tundra	<i>Salix</i> sp., <i>Betula ?czerepanovii</i>	Sif, Sw
Crowberry tundra	<i>Empetrum hermaphroditum</i> , <i>Betula nana</i> , <i>Vaccinium vitis-idaea</i> , <i>Arctous alpina</i> , fruticose lichens, green mosses	PT (60)
Birch thicket	<i>Betula ?czerepanovii</i> , <i>Salix</i> sp., <i>Geranium</i> sp., <i>Myosotis</i> sp., <i>Polygonatum</i> sp., <i>Equisetum</i> sp., <i>Trientalis</i> sp.	PT (60), Sif, Sw
Sandy beaches, dunes	<i>Leymus arenarius</i>	PT (240), HC <sup>2</sup>
Zonal tundra (dwarf shrub tundra)	<i>B. nana</i> , <i>Salix</i> sp., <i>Cassiope tetragona</i> , <i>Vaccinium myrtillus</i> , <i>Geranium</i> sp., <i>Caltha</i> sp., green mosses, <i>Carex</i> spp., <i>Sphagnum</i> sp.	PT (150), HC, Sif, Sw
Willow-birch shrub tundra	<i>Salix</i> sp., <i>Vaccinium myrtillus</i> , <i>Empetrum hermaphroditum</i> , <i>Vaccinium vitis-idaea</i> , <i>Vaccinium uliginosum</i> , <i>B. nana</i> , <i>Chamaepericlymenum suecicum</i> , <i>Trientalis</i> sp., <i>Arctostaphylos alpina</i> , <i>Dicranum</i> sp.	Sif, Sw
Snow bed	<i>Empetrum hermaphroditum</i> , <i>Salix</i> sp., green mosses	PT (100)

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. <sup>1</sup> — under snags and in sedge brakes; <sup>2</sup> — under stones and snags in dunes.

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, Khruleva, 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 UP-GMA 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 pre-

sented 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),



Table 2 (continued).  
Таблица 2 (продолжение).

	SM	Wil	Du	ZT	SB	B	BF	ImT	Sp	Car	ShT	Sum total
<i>Bathypantes setiger</i> F.O. Pickard-Cambridge, 1894 *						1						1
<i>Bohyphantes luteolus</i> (Blackwall, 1833) *											1	1
<i>Centromerus arcanus</i> (O. Pickard-Cambridge, 1873)				3			4					7
<i>Drepanotylus borealis</i> Holm, 1945	1	1	2									4
<i>Drepanotylus uncutus</i> (O. Pickard-Cambridge, 1873) *									1			1
<i>Erigone arctica</i> (White, 1852)	9	64	58		40	100					1	272
<i>Erigone atra</i> Blackwall, 1833 ^					3					1		4
<i>Erigone dentigera</i> O. Pickard-Cambridge, 1874	3	1										4
<i>Erigone longipalpis</i> (Sundevall, 1830)	298	6	5									309
<i>Erigone psychrophila</i> Thorell, 1871					2							2
<i>Gongyliditellum latebricola</i> (O. Pickard-Cambridge, 1871)				1					8			9
<i>Hilaira incondita</i> (L. Koch, 1879)	11		1									12
<i>Hilaira nubigena</i> Hull, 1911 *	1								5			6
<i>Hilaira pervicax</i> Hull, 1908 *				1					14			15
<i>Hypomma bituberculatum</i> (Wider, 1834)		1	3	1	6					2	7	20
<i>Kaestneria pullata</i> (O. Pickard-Cambridge, 1863)				4			1			3		8
<i>Leptorhoptrum robustum</i> (Westring, 1851)							3					3
<i>Macrargus multesimus</i> (O. Pickard-Cambridge, 1875)*							1	1				2
<i>Maro minutus</i> O. Pickard-Cambridge, 1907 *									2	1		3
<i>Maro sublestus</i> Falconer, 1915 *									1	1		2
<i>Mecynargus morulus</i> (O. Pickard-Cambridge, 1873) *											3	3
<i>Mecynargus paetulus</i> (O. Pickard-Cambridge, 1875)		8	16		1	2						27
<i>Mecynargus sphagnicola</i> (Holm, 1939)				1	2							3

Table 2 (continued).  
Таблица 2 (продолжение).

	SM	Wil	Du	ZT	SB	B	BF	ImT	Sp	Car	ShT	Sum total
<i>Oedothorax retusus</i> (Westring, 1851)	109	51	1									161
? <i>Oreoneta sinuosa</i> (Tullgren, 1955) *											1	1
<i>Oreoneta uralensis</i> Saaristo et Marusik, 2004							4		2			6
<i>Oryphantes angulatus</i> (O. Pickard-Cambridge, 1881)				4			6					10
<i>Pelecopsis mengei</i> (Simon, 1884)	1	31		25					1		1	59
<i>Praestigia pini</i> (Holm, 1950)	22				1							23
<i>Pseudocyba miracula</i> Tanasevitch, 1984										5	5	10
<i>Scandichrestus tenuis</i> (Holm, 1943)										4	2	6
<i>Gibothorax tchernovi</i> Eskov, 1989 *	1											1
<i>Semijicola caliginosus</i> (Falconer, 1910) *	1											1
<i>Semijicola faustus</i> (O. Pickard-Cambridge, 1901) *				3					2			5
<i>Silometopoides sphagnicola</i> Eskov et Marusik, 1992 *				1								1
<i>Silometopus ambiguus</i> (O. Pickard-Cambridge, 1906) *	5											5
<i>Pocadicnemis pumila</i> (Blackwall, 1841)	1											1
<i>Tenuiphantes alacris</i> (Blackwall, 1853)							3					3
<i>Tiso aestivus</i> (L. Koch, 1872)										17	45	62
<i>Tmeticus affinis</i> (Blackwall, 1855)			1				1					2
<i>Troxochrus scabriculus</i> (Westring, 1851)			1								42	43
<i>Walckenaeria cuspidata</i> Blackwall, 1833 *									1			1
<i>Walckenaeria kochi</i> (O. Pickard-Cambridge, 1873) *	5		1									6
<i>Walckenaeria nodosa</i> O. Pickard-Cambridge, 1873 *			1									1
<i>Walckenaeria nudipalpis</i> (Westring, 1851) *				1					1			2
<i>Zornella cultrigera</i> (L. Koch, 1879) *							8					8

Table 2 (continued).  
Таблица 2 (продолжение).

	SM	Wil	Du	ZT	SB	B	BF	ImT	Sp	Car	ShT	Sum total
<b>Fam. Lycosidae</b>												
<i>Arctosa alpigena</i> (Doleschall, 1852)		2			1							3
<i>Pardosa agricola</i> (Thorell, 1856)	608	313	1		2	1						925
<i>Pardosa atrata</i> (Thorell, 1873)	6	1		6	2					2		17
<i>Pardosa hyperborea</i> (Thorell, 1872)				9								9
<i>Pardosa palustris</i> (Linnaeus, 1758) ^					2			27				29
<i>Pardosa sphagnicola</i> (Dahl, 1908)				1								1
<i>Pirata piraticus</i> (Clerck, 1757)	1			3								4
<b>Fam. Philodromidae</b>												
<i>Rhysodromus fallax</i> (Sundevall, 1833) *	1		2			1						4
<b>Fam. Salticidae</b>												
<i>Attulus floricola</i> (C.L. Koch, 1837)	2	2								1		5
<b>Fam. Thomisidae</b>												
<i>Ozyptila trux</i> (Blackwall, 1846)		2		20	3			1	2	1	3	32
<i>Xysticus cristatus</i> (Clerck, 1757)								3				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 Parusnoe Lake [Pokrowsky, 1904: 305] (Table 2). Another species, which was also collected by the 1902 Kanin expedition — *Pardosa albatula* (Roewer, 1951) [Pokrowsky, 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;

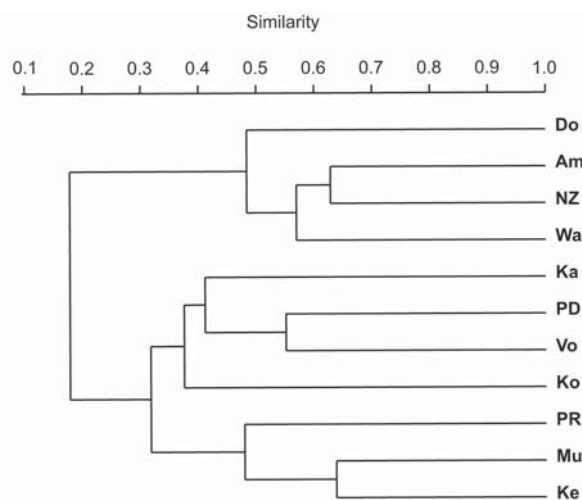


Fig. 2. Dendrogram comparing local spider faunas of northeast Europe. Abbreviations: Amderma Vil. vicinities, Yugorsky Peninsula (Am); Dolgiy Island (Do); vicinity of Shoina Vil., Kanin Peninsula (Ka); Kevo Subarctic Research Station, Finland (Ke); Kolguev Island (Ko); Murmansk vicinity, Kola Peninsula (Mu); Novaya Zemlya (NZ); Pechora Delta (PD); Pinezhskiy Nature Reserve, Arkhangelsk region (PR); Vorkura vicinity, Komi Republic (Vo); Waigach Island (Wa).

Рис. 2. Дендрограмма сходства локальных фаун пауков северо-восточной Европы. Сокращения: окрестности пос. Амдерма, Югорский полуостров (Am); о. Долгий (Do); окрестности пос. Шойна, полуостров Канин (Ka); окрестности Субарктической научной станции Кево, Финляндия (Ke); о. Колгуев (Ko); окрестности г. Мурманск, Кольский полуострова (Mu); Новая Земля (NZ); дельта р. Печора (PD); заповедник «Пинежский», Архангельская область (PR); окрестности г. Воркута, Республика Коми (Vo); о. Вайгач (Wa).

it is a Siberian arcto-boreal species, occurring from Doldiy 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 Pinezhskiy 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.

*Bathypantes humilis* (L. Koch, 1879). This Siberian hypoarcto-nemoral species is known from the north-east part of Russian Plain to the Russian Far East [Eskov, 1994; Tanasevitch, 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, Eskov, 2009]. The present finding in 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 Palaearctic 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 Palaearctic groups were most abundant, accounting for 35%



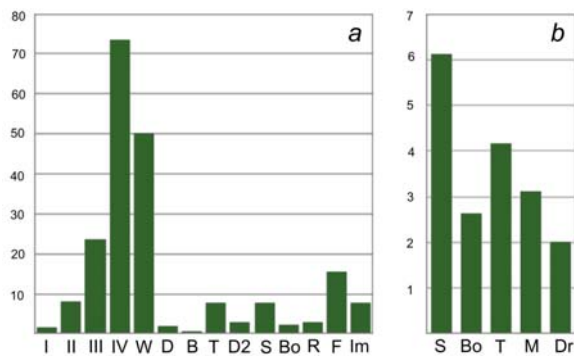


Fig. 3. Spider activity (ind./10 trap-days) in the studied biotopes of the Kanin Peninsula (a) and Kolguev Island (b). All collected specimens are taken into account; notice the discrepancy in figure scales. Abbreviations: I–IV — sea marsh levels (from low to high, i.e. the most distant from water), B — sandy beach, Bo — sedge bog, D — dunes, D2 — sandy area among the tundra, Dr — *Dryas* tundra, F — birch thickets, Im — crowberry tundra, M — meadow, R — sandy bank of the stream, S — snow bed, T — zonal tundra, W — willow shrubs thicket.

Рис. 3. Активность пауков (экз./10 лов.-сут.) в обследованных биотопах полуострова Канин (а) и о. Колгуев (б). Учтены все собранные экземпляры; обратите внимание на несовпадение в шкале рисунков. Сокращения: I–IV — уровни маршей (от низкого к высокому и наиболее удаленному от воды), В — песчаный пляж, Во — осоковое болото, D — дюны, D2 — песчаный участок среди тундры, Dr — дриадник, F — заросли березы, Im — воронично-березковая тундра, M — луг, R — песчаный берег ручья, S — снежник, T — зональная тундра, W — ивняк вдоль берега моря.

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 north-east 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 spe-

cies) 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 (*Pardosa septentrionalis*, *Agyneta nigripes*, *A. ripariensis*, *Collinsia holmgreni*, *Gonatum rubens*, *Horcotes strandi*, *Mecynargus borealis*, *Semljicola angulatus*, *Walckenaeria 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], 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 Dolgiy 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
<b>Fam. Linyphiidae</b>						
<i>Agyneta gulosa</i> (L. Koch, 1869)				2		2
<i>Agyneta nigripes</i> (Simon, 1884)					5	5
<i>Agyneta ripariensis</i> Tanasevitch, 1984			1		1	2
<i>Araeoncus vorkutensis</i> Tanasevitch, 1984	4					4
<i>Collinsia holmgreni</i> (Thorell, 1871)	10					10
<i>Erigone atra</i> Blackwall, 1833	16	3		1		20
<i>Erigone psychrophila</i> Thorell, 1871 *		1				1
<i>Gonatium rubens</i> (Blackwall, 1833) *			1		1	2
<i>Hilaira nubigena</i> Hull, 1911 ^		4				4
<i>Horcotes strandi</i> (Sytshevskaja, 1935)			2		2	4
<i>Leptorhoptrum robustum</i> (Westring, 1851)				3		3
<i>Mecynargus borealis</i> (Jackson, 1930)			2			2
<i>Mecynargus paetulus</i> (O. Pickard-Cambridge, 1875)	1					1
<i>Mecynargus sphagnicola</i> (Holm, 1939)	1	7				8
<i>Mecynargus monticola</i> (Holm, 1943) *			1			1
<i>Oreoneta uralensis</i> Saaristo et Marusik, 2004	4					4
<i>Pelecopsis mengei</i> (Simon, 1884) *				3		3
<i>Semljicola angulatus</i> (Holm, 1963)	3	1				4
<i>Tiso aestivus</i> (L. Koch, 1872)	1			15		16
<i>Walckenaeria clavicornis</i> (Emerton, 1882) *					2	2
<i>Walckenaeria cuspidata</i> Blackwall, 1833 *		1				1
<b>Fam. Lycosidae</b>						
<i>Pardosa palustris</i> (Linnaeus, 1758)			1			1
<i>Pardosa septentrionalis</i> (Westring, 1861)			6			6
<b>Fam. Thomisidae</b>						
<i>Xysticus canadensis</i> 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 [Tanasevitch, Koponen, 2007; Bolotov, 2011; Tatarinov, 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*, *Bathyphantes 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 araneofaunas 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 [Tanasevitch, Koponen, 2007], 42% in Dolgiy Island [Marusik *et al.*, 2016], and 54% in the vicinity of Amderma [Tanasevitch, 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*, *Pocadicnemis 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*, *H. incondita*, *Oedothorax 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 *Masikia*, *Oedothorax*, 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 bog). A similar pattern was observed both in Western Siberia [Nekhaeva, 2018b] and northern Chukotka (unpublished data).

**Acknowledgements.** I am very grateful to my colleague Anatoly Babenko (Moscow, Russia) for the help in collecting and processing the material from the Kanin Peninsula. I also wish to express my gratitude to the administration of Shoyna Village for providing comfortable living and working conditions. I am very grateful to Olga Makarova (Moscow, Russia), by whose initiative spiders from Kolguev Island were collected. Special thanks go to A.V. Kondratyev (Magadan, Russia) and P.M. Glazov (Moscow, Russia) for collecting spiders on the island. I thank Kirill Mikhailov (ZMMU, Moscow, Russia) for providing me access to spider collections. I am grateful to Yuri Marusik (Magadan, Russia) for useful comments on the manuscript. The English of the final draft was edited by D.V. Logunov (Manchester, UK). The study was supported by the Russian Foundation for Basic Research, Project # 17-04-01603.

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*Responsible editor D.V. Logunov*