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A check-list and zoogeographic analysis of the spider fauna (Arachnida: Aranei) of Novosibirsk Area (West Siberia, Russia)

Список и зоогеографический анализ фауны пауков (Arachnida: Aranei) Новосибирской области (Западная Сибирь, Россия)

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КЛЮЧЕВЫЕ СЛОВА: Araneae, ареалы, пауки, природные комплексы, разнообразие, жужелицы.

ABSTRACT. A check-list of the spiders (Arachnida, Aranei) recorded from Novosibirsk Area (364 species in 157 genera and 26 families) is provided, with the references to exact collection localities, administrative units, natual complexes, and latitudinal & longitudinal components of their ranges. Of the reported spiders, 164 species, 53 genera and three families, including two new species that are being currently described, have been recorded from the Area for the first time. A large number of the species having the northernmost or morth-easternmost limits of their distribution in Novosibirsk Area is indicative of the importance of the latitudinal boundary occurring on its territory and also of the similarity of spider faunas between the south part of Novosibirsk Area and Kazakhstan. It is also possible that the penetration of southern species northward during the latest decades is related to the warming and aridization of climate in West Siberia, as shown for other invertebrate groups. Based on the Shimkevich-Simpson Similarity Index, the spider faunas of six provinsional units (natural complexes) of Novosibirsk Area are grouped in two clusters: those of left and right banks of Ob' River. The faunas of the left bank forest and forest-steppe (Baraba) subzones are close and distinct from those of the right bank faunas. In the right bank cluster, an anticipated similarity of Priobsky faunas is observed, with the araneofauna of the Salair Ridge standing apart. The subdivision and zoogeographic regioning of local ground-beetle faunas of Novosibirsk Area is approximately the same as those revealed for spiders.

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РЕЗЮМЕ. Дан список пауков, зарегистрированных в Новосибирской области (364 вида из 157 родов и 26 семейств), с указанием локалитетов, привязкой к границам административных районов и природных комплексов и указанием широтной и долготной компоненты ареала. На территории области мы впервые отмечаем 164 вида, 53 рода и три семейства пауков, в том числе два вида — новые для науки и находятся сейчас в процессе описания. Большое число видов пауков, имеющих в Новосибирской области северную или северо-восточную границу распространения, показывает значимость широтного рубежа, проходящего по ее территории, и говорит о высокой общности фаун пауков юга Новосибирской области и Казахстана. Возможно также продвижение южных видов на север, связанное с потеплением и аридизацией климата в Западной Сибири в последние десятилетия, как это наблюдается в других группах беспозвоночных. Фауны пауков шести провинциальных выделов (природных комплексов) Новосибирской области по своему сходству (коэффициент Шимкевича-Симпсона) разделились на две части — левобережную и правобережную. Фауны левобережных лесной и Барабинской лесостепной областей достаточно близки и хорошо отделяются от фаун правобережной части. В ней наблюдается ожидаемое тесное сходство Приобских фаун, особняком от них стоит фауна Салаирских предгорий. Примерно так же,

как у пауков, выглядит и зоогеографическое районирование, проведенное по локальным фаунам жуков-жужелиц для Новосибирской области.

Introduction

Novosibirsk Area (Oblast'), zoogeographically, is a model region in whole West Siberia. Its central geographic position, plain relief and a combination of virtually flat, closed (undrained) regions with large rivers facilitate deep interpenetration and mixing up of western and eastern, northern and southern faunas on this territory. The study of the araneofauna of Novosibirsk Area helps us to better understand the patterns of zoogeographic and landscape distribution of regional biota, and the faunistic (inter)connections between spiders of the Urals, western and eastern Siberia, the Altai and Central Asia.

Novosibirsk Area is situated in the south-eastern part of West Siberian Plain, the largest one in Eurasia, with the area of about 178,200 square km, being almost equal to the territories of such countries as Cambodia (181,040 km^2) or Syria (185,180 km^2). The territory of Novosibirsk Area is extended for over 600 km from the west to the east, and for over 400 km from the north to the south. Its relief is predominantly flat, with absolute heights ranging from 100 to 200 m a.s.l., except for the Salair Ridge with heights up to 500 m a.s.l., which is situated in the south-eastern part of Novosibirsk Area and represents the north-western outpost of the mountains of South Siberia. The territory of Novosibirsk Area includes the forest (southern taiga and sub-taiga), forest-steppe and steppe natural zones. Yet, there are vast territories of intrazonal landscapes, such as extensive Vasyugan raised moors in the north, the wide valley of Ob' River with a complex mosaic of inundated forests, meadows and bogs, the salt marshes near the undrained Lake Chany (largest in West Siberia). Large rivers run not only in the meridional direction, as Ob' River, but also in the zonal direction, as rivers Tara, Tartas, Om', Kargat, Chulym, Karasuk, Inya and Berd'.

Although the spider fauna of Novosibirsk Area is studied less thoroughly than those of Altai Territory, the Republic of Altai or Tuva [cf. Azarkina, Trilikauskas, 2012, 2013a,b, Marusik *et al*., 2000], its current state of knowledge is good enough in order to assess its diversity and to undertake a zoogeographic analysis for the first time. The relatively good state of knowledge of the spider fauna at hand could be explained by the presence of a large academic centre in the region and a long standing entomological collecting in its vicinity (City of Novosibirsk and Novosibirsk District). Long-term studies of spider fauna were also carried out in the ISEA field stations 'Karasuksky' (Karasuk Distr., steppe zone; 2007–2008 and following years) and 'Chanovsky' (Zdvinsk Distr., central forest-steppe; 2009–2010).

The aims of the present study are (1) to inventory the spider fauna of Novosibirsk Area, and (2) to carry out its zoogeographic analysis.

Study area, material and methods

The present study is based on the spider collections deposited in the Institute of Systematics and Ecology of Animals SB RAS (ISEA). These collections have been assembled by many researchers from 113 localities of Novosibirsk Area in 1976–2017 (see Map).

Besides examining museum collections, the authors also carried out own fieldworks. Spiders were primarily collected by pitfall traps and also sorted out from soil samples from the vicinities of 'Karasuksky' and 'Chanovsky' field stations: the localities Troitskoe (Map: 106) and Shirokaya Kur'ya (Map: 86) correspondingly. In many other localities the authors hand-collected spiders as well.

Novosibirsk Area consists of the City of Novosibirsk and 30 administrative units, of which borders are shown on the Map. Each mapped locality is named by its closest settlement and numbered continuously.

We have used the physiogeographic subdivision of Novosibirsk Area in four provinces, which are further subdivided in nine landscape subzones (=natural complexes) [Atlas…, 2002: map 'Natural complexes' on p. 31]. The Forest Province is subdivided in Vasyugan taiga-swampy (Map: I), Priobsky south taiga (II), North Baraba sub-taiga (III), and Priobsky birch-aspen forest (IV) subzones. The Forest-Steppe Province is subdivided in Baraba (V) and Priobsky (VI) subzones. The Steppe Province (VII) is not subdivided. The Kuznetsk-Salair Province is subdivided in Salair forest (VIII) and Kuznetsk hollow forest-steppe (IX) subzones. Borders of these landscape zones are shown on the Map.

Species collected from the localities situated near borders of the landscape subzones are listed in both

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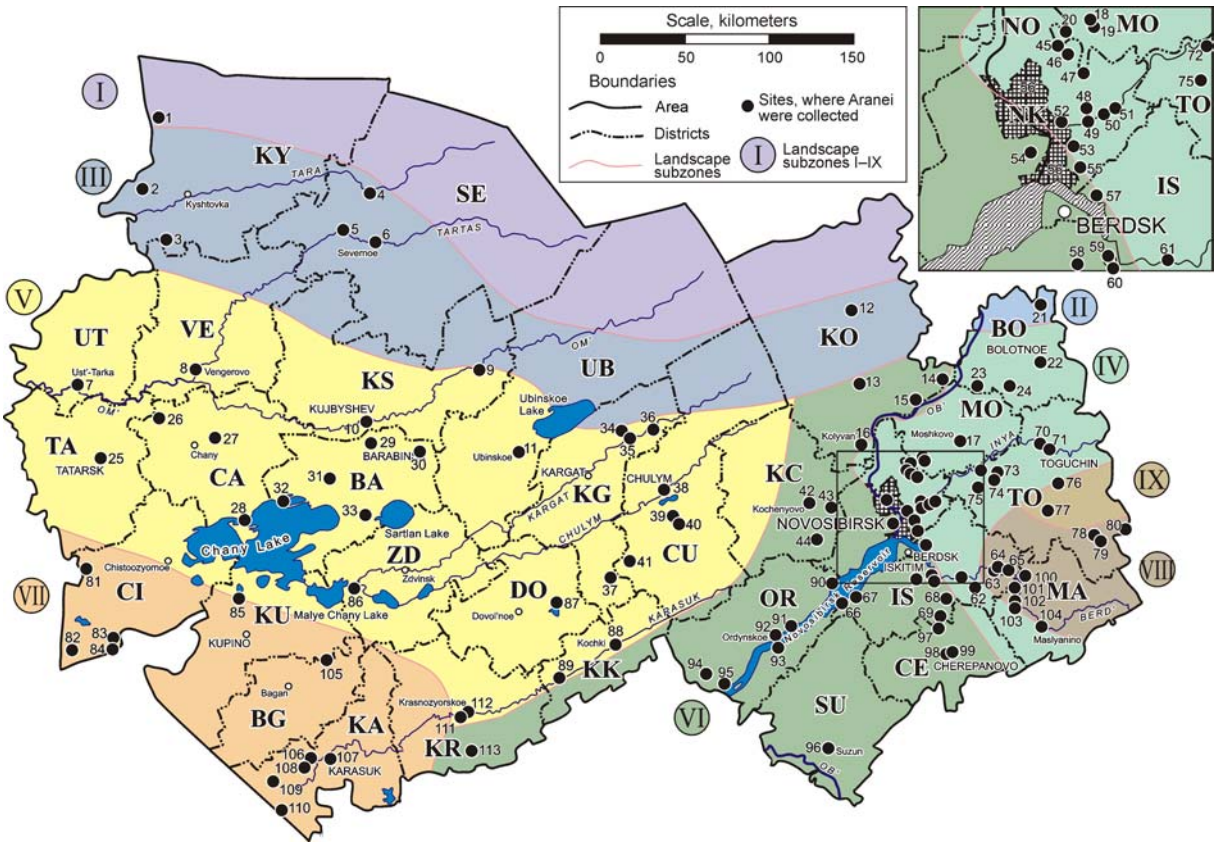
Новосибирск: 56 — Новосибирск; **IS — Искитимский район**: 57 — Морозово, 58 — Александровка, 59 — Искитим, 60 — Шипуново, 61 — Харино, 62 — Белово, 63 — Легостаево, 64 — Малиновка, 65 — Новососедово, 66 — Завьялово, 67 — Быстровка, 68 — Евсино, 69 — Койниха; **TO — Тогучинский район**: 70 — Гутовский, 71 — Тогучин, 72 — Буготак, 73 — Горный, 74 — Буготакские сопки, 75 — Карпысак, 76 — Вассино, 77 — Лебедево, 78 — Мирный, 79 — Которово, 80 — оз. Танаево; **CI — Чистоозёрный район**: 81 — оз. Большое Горькое, 82 — оз. Кулмакан, 83 — оз. Солёное (Новокрасное), 84 — Золотая грива (Новокрасное); **KU — Купинский район**: 85 — Сибирский; **ZD — Здвинский район**: 86 — Широкая Курья; **DO — Доволенский район**: 87 — Индерь; **KK — Кочковский район**: 88 — Кочки, 89 — Черновка; **OR — Ордынский район**: 90 — Верх-Ирмень, 91 — Новый Шарап, 92 — Ордынское, 93 — Нижнекаменка, 94 — Верх-Алеус, 95 — Усть-Алеус; **SU — Сузунский район**: 96 — Сузун; **CE — Черепановский район**: 97 — Дорогино, 98 — Черепаново, 99 — Бочкарёво; **MA — Маслянинский район**: 100 — Верх-Ики, 101 — Берёзово, 102 — Кинтереп, 103 — Никоново, 104 — Маслянино; **BG — Баганский район**: 105 — Новоключи; **KA — Карасукский район**: 106 — Троицкое, 107 — Карасук, 108 — Астродым, 109 — Студёное, 110 — оз. Чаган; **KR — Краснозёрский район**: 111 — Кайгородский, 112 — Краснозёрское, 113 — Половинное.

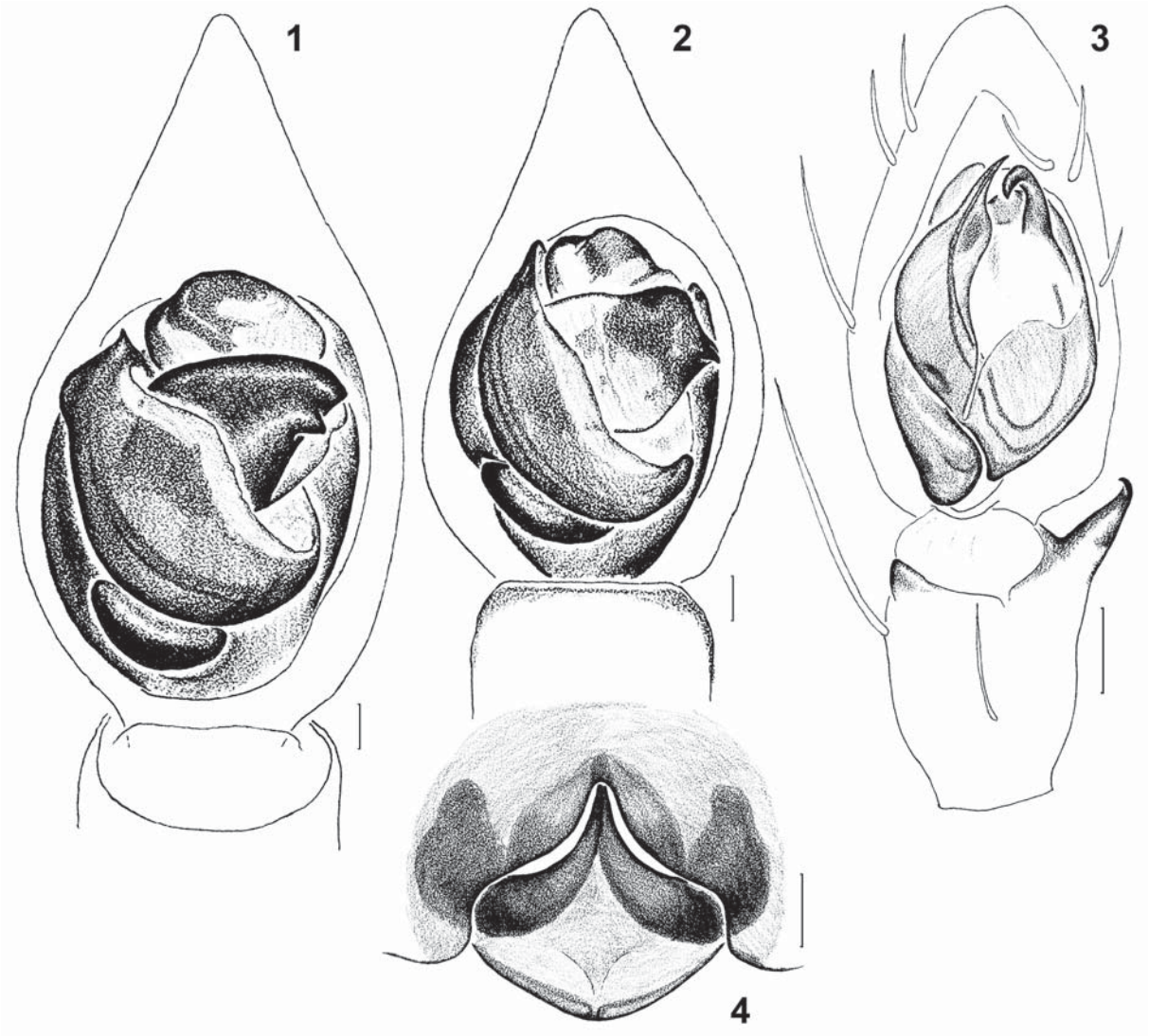


Map. Collecting localities of spiders across administrative districts (rajons) of Novosibirsk Area.

KY — Kyshtovka District: 1 — Orlovka, 2 — Bol'sherech'e, 3 — Usmanka; **SE — Severnoe District**: 4 — Biaza, 5 — Malinovka, 6 — Severnoe; **UT — Ust'-Tarka District**: 7 — Ust'-Tarka; **VE — Vengerovo District**: 8 — Vengerovo; **KS — Kujbyshev District**: 9 — Zonovo, 10 — Kujbyshev; **UB — Ubinskoe District**: 11 — Ubinskoe; **KO — Kolyvan' District**: 12 — Pikhtovka, 13 — Boyarka, 14 — Umna, 15 — Chyornyi Mys, 16 — Kolyvan'; **MO — Moshkovo District**: 17 — Moshkovo; 18 — Sokur, 19 — Smolenka, 20 — Oktyabr'skii; **BO — Bolotnoe District**: 21 — Bol'shaya Chyornaya, 22 — Bolotnoe, 23 — Oyash, 24 — Chebula; **TA — Tatarsk District**: 25 — Tatarsk; **CA — Chany District**: 26 — Uzungul', 27 — Karachi, 28 — Chany Lake; **BA — Barabinsk District**: 29 — Barabinsk, 30 — Penzino, 31 — Tandovo Lake, 32 — Chany Lake, 33 — Kozhevnikovo; **KG — Kargat District**: 34 — Rovenskoe, 35 — Verkh-Kargat, 36 — Makar'evskii, 37 — Alabuga; **CU — Chulym District**: 38 — Chulym, 39 — Sherstobitovo, 40 — Filimonovo, 41 — Sarykamyshka; **KC — Kochenyovo District**: 42 — Kochenyovo, 43 — Chik, 44 — Antonovka; **NO — Novosibirsk District**: 45 — Mochishche, 46 — Leninskii, 47 — Zherebtsovo, 48 — Uchebnyi, 49 — Izdrevaya, 50 — Sovkhoznaya, 51 — Shelkovichikha, 52 — Novolugovskoe, 53 — Kol'tsovo, 54 — Krasnoobsk, 55 — Shadrikha; **NK — Novosibirsk city**: 56 — Novosibirsk; **IS — Iskitim District**: 57 — Morozovo, 58 — Aleksandrovka, 59 — Iskitim, 60 — Shipunovo, 61 — Kharino, 62 — Belovo, 63 — Legostaevo, 64 — Malinovka, 65 — Novososedovo, 66 — Zav'yalovo, 67 — Bystrovka, 68 — Evsino, 69 — Koynikha; **TO — Toguchin District**: 70 — Gutovskii, 71 — Toguchin, 72 — Bugotak, 73 — Gornyi, 74 — Bugotakskie sopki, 75 — Karpysak, 76 — Vassino, 77 — Lebedevo, 78 — Mirnyi, 79 — Kotorovo, 80 — Tanaevo Lake; **CI — Chistoozyornoe District**: 81 — Bol'shoe Gor'koe Lake, 82 — Kulmakan Lake, 83 — Solyonoe Lake (Novokrasnoe), 84 — Zolotaya griva (Novokrasnoe); **KU — Kupino District**: 85 — Sibirskii; **ZD — Zdvinsk District**: 86 — Shirokaya Kur'ya; **DO — Dovol'noe District**: 87 — Inder'; **KK — Kochki District**: 88 — Kochki, 89 — Chernovka; **OR — Ordynskoe District**: 90 — Verkh-Irmen', 91 — Novyi Sharap, 92 — Ordynskoe, 93 — Nizhnekamenka, 94 — Verkh-Aleus, 95 — Ust'-Aleus; **SU — Suzun District**: 96 — Suzun; **CE — Cherepanovo District**: 97 — Dorogino, 98 — Cherepanovo, 99 — Bochkaryovo; **MA — Maslyanino District**: 100 — Verkh-Iki, 101 — Beryozovo, 102 — Kinterep, 103 — Nikonovo, 104 — Maslyanino; **BG — Bagan District**: 105 — Novoklyuchi; **KA — Karasuk District**: 106 — Troitskoe, 107 — Karasuk, 108 — Astrodym, 109 — Studyonoe, 110 — Chagan Lake; **KR — Krasnozyorskoe District**: 111 — Kajgorodskii, 112 — Krasnozyorskoe, 113 — Polovinnoe.

Карта. Точки сборов пауков по административным районам Новосибирской области.

KY — Кыштовский район: 1 — Орловка, 2 — Большеречье, 3 — Усманка; **SE — Северный район**: 4 — Биаза, 5 — Малиновка, 6 — Северное; **UT — Усть-Тарский раойн**: 7 — Усть-Тарка; **VE — Венгеровский район**: 8 — Венгерово; **KS — Куйбышевский район**: 9 — Зоново, 10 — Куйбышев; **UB — Убинский район**: 11 — Убинское; **KO — Колыванский район**: 12 — Пихтовка, 13 — Боярка, 14 — Умна, 15 — Чёрный мыс, 16 — Колывань; **MO — Мошковский район**: 17 — Мошково; 18 — Сокур, 19 — Смоленка, 20 — Октябрьский; **BO — Болотнинский район**: 21 — Большая Чёрная, 22 — Болотное, 23 — Ояш, 24 — Чебула; **TA — Татарский район**: 25 — Татарск; **CA — Чановский район**: 26 — Узунгуль, 27 — Карачи, 28 — оз. Чаны; **BA — Барабинский район**: 29 — Барабинск, 30 — Пензино, 31 — оз. Тандово, 32 — оз. Чаны, 33 — Кожевниково; **KG — Каргатский район**: 34 — Ровенское, 35 — Верх-Каргат, 36 — Макарьевский, 37 — Алабуга; **CU — Чулымский район**: 38 — Чулым, 39 — Шерстобитово, 40 — Филимоново, 41 — Сарыкамышка; **KC — Коченёвский район**: 42 — Коченёво, 43 — Чик, 44 — Антоновка; **NO — Новосибирский район**: 45 — Мочище, 46 — Ленинский, 47 — Жеребцово, 48 — Учебный, 49 — Издревая, 50 — Совхозная, 51 — Шелковичиха, 52 — Новолуговское, 53 — Кольцово, 54 — Краснообск, 55 — Шадриха; **NK —**



Figs 1–4. Copulatory organs, ventral view: 1 — *Alopecosa taeniopus* (Kulczyński, 1895), palp; 2 — *A. kovblyuki* Nadolny et Ponomarev, 2012, palp; 3 — *Gnaphosa ukrainica* Ovtsharenko, Platnick et Song, 1992, palp; 4 — *A. taeniopus*, epigyne. Scale bars = 0.1 mm.

Рис. 1–4. Копулятивные органы, вид снизу: 1 — *Alopecosa taeniopus* (Kulczyński, 1895), пальпа; 2 — *A. kovblyuki* Nadolny et Ponomarev, 2012, пальпа; 3 — *Gnaphosa ukrainica* Ovtsharenko, Platnick et Song, 1992, пальпа; 4 — *A. taeniopus*, эпигина. Масштаб 0,1 мм.

neighbouring faunas. For instance, the fauna of Novosibirsk (site 56) is included in those of both Priobsky forest-steppe (VI) and Priobsky birch-aspen forest (IV) subzones.

A range analysis of the araneofauna of Novosibirsk Area has also been carried out; it is based on the range typology elaborated for the ground beetles (Coleoptera, Carabidae) [Dudko, Lyubechanskii, 2002; Bespalov *et al*., 2010] that has been adopted for spiders [Mordkovich *et al.*, 2015; Trilikauskas, Dudko, 2016; Lyubechanskii, Azarkina, 2017]. Latitudinal and longitudinal components of each species range are considered separately.

With regard to latitudinal components, the following four groups have been considered: boreal, subboreal humid, subarid and polyzonal. The northern limit of the boreal group lies in the zone of tundra/forest-tundra; in the south, boreal species can reach the steppe zone in the central sector of Palaearctic Region or to the zone of broad-leaved forests in its western and eastern sectors. Boreomontane species, which can occur southerly in the mountains, are also considered in the same group. The subboreal-humid group includes species that are not found north of the subzone of the middle taiga in central sector of Palaearctic Region; the southern limit of these species lies in the steppe zone. The subarid group includes species that are limited in the north by the forest-steppe zone. The distribution of polyzonal species in the north is similar to that of boreal species; in the south, they can reach the zone of semi-deserts or even southerly.

With respect to longitudinal components, we have grouped species ranges based on their relation to the boundaries of pan-Atlantic, continental or pan-Pacific sectors of the Palaearctic Region [*sensu* Emelyanov, 1974]. Spider species have been considered in five latitudinal groups: trans-Holarctic (i.e., occurring in all sectors of the Palaearctics and Nearctics), trans-Palaearctic (i.e., occurring in all three sectors of the Palaearctics), west-Palaearctic (i.e., occurring in pan-Atlantic and continental sectors of the Palaearctics), central-Palaearctic (i.e., occurring in the continental sector only), and east-Palaearctic (i.e., occurring in the continental, pan-Pacific and Nearctic sectors).

Some spider species with poorly known distribution have been formally considered endemics: viz., *Asianellus kazakhstanicus* Logunov et Heçiak, 1996, *Evippa* sp. and *Xysticus* sp. (see Table 1). Two synantropic species, *Pholcus opilionoides* (Schrank, 1871) and *Steatoda grossa* (C.L. Koch, 1838), are given in the Table as polyzonal west- and trans-Holarctic ones coresponsingly. The natural range of *P. opilionoides* seems to be restricted by the Caucasus [Huber, 2011], whereas *S. grossa* seems to have a south-Palaearctic origin, being currently widespread in North and South Americas [Levi, 1967; World Spider Catalog, 2017].

The spider taxonomy follows World Spider Catalog [2017], except for *Allohogna singoriensis* (Laxmann, 1770) and *Styloctetor stativus* Simon, 1881; distribution patterns are primarily based on Mikhailov [2013] and World Spider Catalog [2017].

Since in the boundaries of provinces and natural complexes occurring in the territory Novosibirsk Area are mostly latitudinal, in the following zoogeographic analysis a more attention is paid to the latitudinal components of spider ranges. An analysis of the longitudinal components will be of interest in a larger-scale study while comparing Novosibirsk Area with neighbouring territories.

A similarity of the studied faunas has been assessed by the Szymkiewicz-Simpson index (ISzS) and then ordinated by the multidimensional scaling (MDS) in the programme PAST 2.17 [Hammer *et al*., 2001].

Results and discussion

History of arachnological studies in Novosibirsk Area

The investigations of spiders of the territory that would later be included in present-day Novosibirsk Area (founded on 1937) started from the work by Chugunov & Chugunov [1902] in which the authors reported on *Allohogna singoriensis* (Laxmann, 1770) (sub: *Lycosa latreili*) from Tatarsk. Two following works published 20 years later also dealt with records of the same species from Karachi Lake [Lavrova, 1923: sub *Trochosa s.*; Ruzski, 1924: sub. *Trochosa syngoriensis*]. A year later, Ruzski [1925] already mentioned two spider species from the vicinity of Lake Karachi: i.e., *A. singoriensis* (sub: *Trochosa syngoriensis*) and *Argyroneta aquatica* (Clerck, 1758), from the families Lycosidae and Cybaeidae correspondingly. Three years later, two papers devoted to spiders of Lake Karachi were published: Ruzski [1928] who mentioned *A. singoriensis* once more, and Ermolaev [1928] who reported on 14 species of 12 genera in eight families. One species of the latter work, *Alopecosa mariae* (F. Dahl, 1908), is excluded from the current species list of Novosibirsk Area, as the original identification was based on a single female and is likely to actually belong to *Alopecosa taeniopus* (Kulczyński, 1895), a common spider species in forest-steppe habitats. The remaining taxa recorded by Ermolaev [1928], except for *A. singoriensis* (sub: *Hogna singoriensis*), were new to the Region — 12 species in 11 genera and seven families. In two followings papers [Ermolaev, 1930; Ruzski, 1946], only a few additional records *A. singoriensis* were provided.

The next arachnological paper devoted to spiders of Novosibirsk Area was published 31 years later [Lobanova, 1976], dealing with new records of wolf-spiders. The latter paper provides data on 31 species in seven genera, of which several species are to be excluded from the current species list. Part of the records of *Pardosa calida* Blackwall, 1875 (from Moshkovo) are to be referred to *P. bifasciata* C.L. Koch, 1836.) — nowadays, the name *P. calida* is not valid [WSC, 2017]. *Pardosa monticola* (Clerck, 1758) seemed to be identified incorrectly and its records are to be referred to *P. agrestis* (Westring, 1861), *P. palustris* (Linnaeus, 1758) or *P. plumipes* (Thorell, 1875); yet, this species is temporarily retained as a valid record for Novosibirsk Area (Table 1). The record of *Alopecosa solitaria* (Herman, 1879) from Barabinsk seems to be that of either *A. sulzeri* (Pavesi, 1873) or *A. taeniopus* [Esyunin, pers. comm.]. The identification of *Alopecosa accentuata* (Latreille, 1817) (in Lobanova [1976] and Lyubechanskii & Azarkina [2017]) is to be referred to *A. farinosa* (Herman, 1879). Thus, Lobanova [1976] recorded 28 species in five genera of wolf-spiders from Novosibirsk Area for the first time. In the following series of papers [Lobanova, 1980, Lobanova, Ryabikova, 1980, Ryabikova, Lobanova, 1980], 29 spider species of 14 genera in three families were mentioned, of which 15 species in 14 genera and three families (Araneidae, Linyphiidae and Lycosidae) were recorded from the Area for the first time. In two papers by Ryabikova [1985, 1989] devoted to the Araneidae, ten species in six genera were first reported for the Area. The locality Maletino given for *Araneus diadematus* (Clerck, 1758) (sub: Malitino in Ryabikova [1985]) is to be excluded, for it is situated in Altai Territory. The locality Larino [Ryabikova, Lobanova, 1980] was misspelled and is to be read as Kharino [Ryabikova, pers. comm.]. Thus, for the almost 90-year period (1902–1989), 67 spider species (excluding *Alopecosa mariae* and *A. solitaria*) in 32 genera and ten families have been recorded from Novosibirsk Area.

From 1990 to 1999 the number of spider species found in Novosibirsk Area had been significantly increased. Representatives of the families Clubionidae (one genus and four species; Mikhailov [1992]) and Salticidae (26 species in 16 genera [Logunov, 1992a, 1999; Danilov, Logunov, 1994; Logunov, Heçiak, 1996; Logunov, Kronestedt, 1997; Logunov, Marusik, 1994, 1999; Logunov, Rakov, 1996; Logunov, Wesołowska, 1995; Logunov *et al*., 1993; Marusik, Logunov, 1998; Mikhailov, 1996; Rakov, 1999]) were recorded for the first time. In three families the number of recorded species was also increased: Gnaphosidae — by one genus and species [Ovtsharenko *et al*., 1992], Philodromidae — by one genus and six species [Logunov, 1996], and Thomisidae — by one genus and two species [Logunov, 1992b; Logunov, Marusik, 1998]. Eskov & Marusik [1992, 1994] reported on 15 species in 14 genera of the family Linyphiidae, of which 14 species in 13 genera were new to the Area. Of the orb-weavers (Araneidae), *Larinia jeskovi* Marusik, 1986 was first found in the area at hand [Logunov, 1990]. Thus, during less than a ten-year period the number of recorded species and genera had been almost doubled and reached 120 species in 66 genera. The number of recorded families had been increased from ten to 12.

In the latest period (2000–2017), 86 additional spider species in 44 genera and 11 families have been recorded from the Area by various authors [Azarkina, Logunov, 2001; Azarkina *et al*., 2015; Fyodorov, Trilikauskas, 2013; Logunov, Marusik, 2000a,b; Marusik *et al*., 2007; Marusik, Omelko, 2014; Mikhailov, 2003; Szita, Logunov, 2008; Tanasevitch, 2000; Trilikauskas, Dudko, 2016; Lyubechanskii, Azarkina, 2017; Lyubechanskii *et al*., 2017]. The record of *Heliophanus dubius* C.L. Koch, 1835 by Litvinchuk [1980] for Kulunda steppe was made without referring to an exact locality; it was listed as that from Novosibirsk Area by Logunov & Marusik [2000b], but actually belongs to Altai Territory and is thus excluded from the present account. Four literature salticid records — *Evarcha arcuata* (Clerck, 1758), *Heliophanus flavipes* (Hahn, 1832), *Marpissa radiata* (Grube, 1859) and *Sitticus floricola* (C.L. Koch, 1837) — were mentioned by Logunov & Marusik [2000b] as being made from the vicinity of Karachi, but in the original paper [Ermolaev, 1928] they were actually referred to Kuznetsk Hollow which lies outside present day Novosibirsk Area. Two species identified as *Alopecosa osa* Marusik, Hippa and Koponen, 1996 and *Gnaphosa species* [Fyodorov, Trilikauskas, 2013; Mordkovich *et al*., 2015] are to be referred to *Alopecosa kovblyuki* Nadolny et Ponomarev, 2012 (see Fig. 2) and *Gnaphosa ukrainica* Ovtsharenko, Platnick et Song, 1992 (see Fig. 3). The record of *Xysticus idolothytus* Logunov, 1995 [Fyodorov, Trilikauskas, 2013; Mordkovich *et al*., 2015] belongs to a new species that is indicated in Table 1 as *Xysticus* sp. Thus the names *Alopecosa osa* and *Xysticus idolothytus* have been excluded from the current check-list. The record of *Alopecosa solitaria* by Lyubechaskii & Azarkina [2017] is actually that of *A. taeniopus* (see Figs 1, 4).

In the present work, 164 species in 53 genera and three families have been recorded from Novosibirsk Area for the first time. By this means, a total of 364 spider species in 157 genera and 26 families has been registered from the studied area to date. Of them, two species are new to science and their descriptions are currently under preparation. A complete check-list of the registered species with all their records according to districts (see Map) and with comments on latitudinal and longitudinal components of their ranges are given in Table 1.

Clarification of spider ranges within the scope of West Siberia

In the present work, 48 species in 33 genera and five families have been recorded from West Siberia (the physiographic region 'M' *sensu* Mikhailov [2013]; i.e., except for the mountains of South Siberia) for the first time. On the territory of Novosibirsk Area the records of nine species represent the northernmost limits of their ranges: *Alopecosa azsheganovae* Esyunin, 1996, *Argyope lobata* (Pallas, 1772), *Chalcoscirtus nigritus* (Thorell, 1875), *Heriaeus horridus* Tyschchenko, 1965, *Oxyopes xinjiangensis* Hu et Wu, 1989, *Pellenes epularis* (O. Pickard-Cambridge, 1872), *Sauron fissocornis* Eskov in Eskov et Marusik, 1995, *Xysticus pseudocristatus* Azarkina et Logunov, 2001 and *Walckenaerianus esyunini* Tanasevitch, 2004. The northeasternmost records have been made for the following seven species: *Alopecosa kasakhstanica* Savelyeva, 1972, *A. kovblyuki* Nadolny et Ponomarev, 2012, *Chalcoscirtus brevicymbialis* Wunderlich, 1980, *Gnaphosa jucunda* Thorell, 1875, *G. ukrainica* Ovtsharenko, Platnick et Song, 1992, *Urozelotes trifidus* Tuneva, 2003 and *Uralophantes troitskensis* Esyunin, 1992. The easternmost records have been made for eight species: *Agroeca dentigera* Kulczyński, 1913, *Archaraeoncus prospiciens* (Thorell, 1875), *Archaeodictyna ammophila* (Menge, 1871), *Centromerita bicolor* (Blackwall, 1833), *Dicymbium tibiale* (Blackwall, 1836), *Haplodrassus minor* (O. Pickard-Cambridge, 1879), *Moebelia penicillata* (Westring, 1851) and *Robertus heydemanni* Wiehle, 1965. The north-westernmost localities have been registered for *Dictyna ubsunurica* Marusik et Koponen, 1998 and *Gnaphosa tuvinica* Marusik et Logunov, 1992. The westernmost record has been made for *Philodromus utotchkini* Marusik, 1991.

Thus, the majority of new spider records extend the known ranges of corresponding species north-, east- or north-eastward (25 of 28 species in total). Two records extend the ranges in a north-westward direction (from Central Asia to West Siberia), and one westward (from the eastern Palaearctics to West Siberia). Such results are partly due to the poor state of knowledge of spiders in some Siberian regions. Nevertheless, a significant

Table 1. Check-list of spiders of Novosibirsk Area.
Таблица 1. Список видов пауков Новосибирской области.

Species	LAT	LON	Records in Novosibirsk Area
AGELENIDAE — 2 genera, 2 species			
Agelena labyrinthica (Clerck, 1758)	P	TP	106
Tegenaria domestica** (Clerck, 1758)	P	TH	56
ARANEIDAE – 14 genera, 30 species			
Aculepeira packardi (Thorell, 1875)	P	TH	106
*Araneus alsine** (Walckenaer, 1802)	P	TP	56
Araneus angulatus Clerck, 1758	P	TP	8, 38, 51, 56, 59, 66, 62, 94, 91, 93, 96, 98, 104, 106
Araneus diadematus Clerck, 1758	P	TH	2, 8, 17, 19, 25, 44, 51, 56, 71, 70, 86, 93, 96, 97, 106
Araneus grossus (C.L. Koch, 1844)	SH	WP	61
Araneus marmoreus Clerck, 1758	P	TH	3, 8, 13, 19, 25, 44, 52, 51, 53, 56, 59, 64, 67, 62, 71, 76, 86, 94, 91, 96, 106
*Araneus nordmanni** (Thorell, 1870)	P	TH	56
Araneus quadratus Clerck, 1758	P	TP	2, 3, 19, 36, 64, 68
*Araneus sturmi** (Hahn, 1831)	P	TP	56
Araniella displicata (Hentz, 1847)	P	TH	106
*Araniella proxima** (Kulczyński, 1885)	B	TH	13
Argiope bruennichi (Scopoli, 1772)	P	TP	86, 106, 108
Argiope lobata,* [M] (Pallas, 1772)	P	WP	106
Cercidia prominens (Westring, 1851)	P	TH	40, 56, 86
Cyclosa conica (Pallas, 1772)	P	TH	8, 14, 56, 86, 94, 93, 106
Cyclosa oculata (Walckenaer, 1802)	P	TP	25
Gibbaranea bituberculata (Walckenaer, 1802)	P	TP	56, 59
*Hypsosinga albovittata** (Westring, 1851)	P	TP	86, 106
Hypsosinga heri (Hahn, 1831)	P	WP	86
Hypsosinga pygmaea (Sundevall, 1831)	P	TH	20, 33, 56, 86, 106
Hypsosynga sanguinea (C.L. Koch, 1844)	P	TP	1, 19
Larinia jeskovi Marusik, 1986	SH	TP	35, 40, 108
Larinioides cornutus (Clerck, 1758)	P	TH	25, 33, 56, 86, 106
Larinioides ixobolus (Thorell, 1873)	SA	WP	19, 25, 56, 59, 62, 86, 106
Larinioides patagiatus (Clerck, 1758)	P	TH	3, 8, 20, 25, 29, 51, 56, 59, 66, 86, 106
*Larinioides suspicax** (O. Pickard-Cambridge, 1876)	P	WP	56, 59, 84, 86, 106
Neoscona adianta (Walckenaer, 1802)	P	TP	86, 106, 109
Nuctenea silvicultrix (C.L. Koch, 1835)	SH	TP	14, 59
Singa hamata (Clerck, 1758)	P	TP	19, 20, 25, 33, 53, 56, 59, 86
Singa nitidula C.L. Koch, 1844	P	TP	19, 20, 48, 56, 59
CLUBIONIDAE — 1 genus, 12 species			
Clubiona bashkirica Mikhailov, 1992	SH	CP	9
Clubiona caerulescens L. Koch, 1867	SH	TP	56, 113
Clubiona diversa O. Pickard-Cambridge, 1862	B	TP	53, 79
Clubiona frisia Wunderlich et Schuett, 1995	SH	WP	56
Clubiona germanica Thorell, 1871	SH	TP	13
*Clubiona interjecta** L. Koch, 1879	B	EP	56
*Clubiona lutescens** Westring, 1851	SH	TH	106
*Clubiona neglecta** O. Pickard-Cambridge, 1862	SH	TP	86
Clubiona pallidula (Clerck, 1758)	SH	TH	53

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
CLUBIONIDAE			
*Clubiona phragmitis** C.L. Koch, 1843	P	TP	56, 80
*Clubiona stagnatilis** Kulczyński, 1897	P	WP	36
Clubiona subtilis L. Koch, 1867	SH	WP	36
CYBAEIDAE — 1 genus, 1 species			
Argyroneta aquatica (Clerck, 1758)	SH	TP	27, 86
DICTYNIDAE — 7 genera, 13 species			
Archaeodictyna ammophila*, M* (Menge, 1871)	P	WP	106
Archaeodictyna consecuta*, M* (O. Pickard-Cambridge, 1872)	P	WP	106
Argenna patula (Simon, 1874)	SH	WP	106
Argenna subnigra (O. Pickard-Cambridge, 1861)	SH	WP	106
Brigittea latens*, M* (Fabricius, 1775)	SH	WP	106
Devade tenella (Tyschchenko, 1965)	SA	WP	106
Dictyna arundinacea (Linnaeus, 1758)	P	TH	33, 106
Dictyna major (Menge, 1868)	P	TH	106
*Dictyna pusilla** Thorell, 1856	B	TP	106
*Dictyna ubsunurica** Marusik et Koponen, 1998	SA	CP	106
*Dictyna uncinata** Thorell, 1856	P	TP	56
Hackmania prominula*, M* (Tullgren, 1948)	B	TH	56, 106
Mastigusa macrophthalma*, M* (Kulczyński, 1897)	SH	WP	86
ERESIDAE — 1 genus, 1 species			
Eresus kollari Rossi, 1846	SH	TP	26, 59, 86, 106
EUTICHURIDAE — 1 genus, 4 species			
Cheiracanthium erraticum** (Walckenaer, 1802)	P	TP	106
Cheiracanthium oncognathum*, M* Thorell, 1871	P	WP	106
Cheiracanthium pennyi** O. Pickard-Cambridge, 1873	SH	WP	106
Cheiracanthium punctorium*, M* (Villers, 1789)	SH	WP	106
GNAPHOSIDAE — 12 genera, 45 species			
Berlandina cinerea (Menge, 1868)	SA	WP	106
Callilepis nocturna** (Linnaeus, 1758)	P	TP	73, 84, 106
Civizelotes pygmaeus** Miller, 1943	SA	WP	86, 106
Drassodes pubescens** (Thorell, 1856)	SH	TP	73, 86, 106
Drassodes villosus** (Thorell, 1856)	SH	TP	56
Drassylus lutetianus** (L. Koch, 1866)	SH	WP	86, 106
Drassylus pusillus** (C.L. Koch, 1833)	SH	TP	86, 106, 113
Gnaphosa inconspecta, M* Simon, 1878	P	TP	106
Gnaphosa jucunda, M* Thorell, 1875	SA	WP	86
Gnaphosa leporina (L. Koch, 1866)	P	WP	27, 86, 106, 108
Gnaphosa licenti, M* Schenkel, 1953	SA	EP	113
Gnaphosa lucifuga (Walckenaer, 1802)	P	WP	73
Gnaphosa montana (L. Koch, 1866)	P	WP	15, 73, 98, 105
*Gnaphosa muscorum** (L. Koch, 1866)	P	TH	106

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
GNAPHOSIDAE			
Gnaphosa saurica Ovtsharenko, Platnick et Song, 1992	SA	WP	105, 106
Gnaphosa tuvinica Marusik et Logunov, 1992	SA	CP	106
*Gnaphosa ukrainica**, M Ovtsharenko, Platnick et Song, 1992	SA	WP	26, 106
*Haplodrassus cognatus** (Westring, 1861)	SH	TP	86
*Haplodrassus minor**, M (O. Pickard-Cambridge, 1879)	P	WP	86
*Haplodrassus moderatus** (Kulczyński, 1897	SH	TP	86
*Haplodrassus pseudosignifer** Marusik, Hippa et Koponen, 1996	SH	WP	106, 113
Haplodrassus signifer (C.L. Koch, 1839)	P	TH	49, 73, 86, 106, 113
*Haplodrassus soerenseni** (Strand, 1900)	SH	TP	106
*Haplodrassus umbratilis**, M (L. Koch, 1866)	SH	WP	73
Micaria dives (Lucas, 1846)	P	TP	106
*Micaria formicaria** (Sundevall, 1831)	SH	TP	86, 106
*Micaria fulgens**, M (Walckenaer, 1802)	SH	WP	106
*Micaria pulicaria** (Sundevall, 1831)	P	TH	86, 106
Micaria rossica Thorell, 1975	P	TH	106
*Micaria silesiaca** L. Koch, 1875	P	WP	86
*Phaeocedus** *braccatus**, M (L. Koch, 1866)	SH	TP	86
Poecilochroa variana (C.L. Koch, 1839)	P	WP	106
*Urozelotes** *trifidus**, M Tuneva, 2003	SA	CP	106
*Zelotes apricorum** (L. Koch, 1876)	SH	WP	86, 106
*Zelotes azsheganovae** Esyunin et Efimik, 1992	SH	WP	86
*Zelotes clivicola** (L. Koch, 1870)	SH	WP	86, 106
*Zelotes electus**, M (C.L. Koch, 1839)	SH	WP	86, 106
*Zelotes fratris**, M Chamberlin, 1920	P	EP	86
*Zelotes gallicus**, M Simon, 1914	SH	WP	106
*Zelotes latreillei** (Simon, 1878)	SH	WP	53, 80, 86
Zelotes longipes (L. Koch, 1866)	P	TP	80, 86, 106
Zelotes mundus (Kulczyński, 1897)	SA	WP	86, 106, 113
*Zelotes petrensis** (C.L. Koch, 1839)	P	WP	71
*Zelotes puritanus**, M Chamberlin, 1922	P	TH	74
Zelotes subterraneus (C.L. Koch, 1833)	SH	TP	106
HAHNIIDAE — 2 genera, 4 species			
Antistea elegans (Blackwall, 1841)	SH	TP	56, 106
*Hahnia nava** (Blackwall, 1841)	SH	TP	106
Hahnia ononidum Simon, 1875	SH	TH	106
*Hahnia pusilla** C.L. Koch, 1841	SH	WP	86
LINYPHIIDAE — 50 genera, 82 species			
*Abacoproeces** *saltuum** (L. Koch, 1872)	SH	WP	86
*Agyneta gulosa**, M (L. Koch, 1869)	SH	WP	98, 105
Agyneta mollis (O. Pickard-Cambridge, 1871)	B	TP	21
Agyneta ramosa Jackson, 1912	SH	WP	53, 56
*Agyneta rurestris** (C.L. Koch, 1836)	P	WP	56, 86, 106
Agyneta saaristoi Tanasevitch, 2000	B	CP	78

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
LINYPHIIDAE			
Agyneta similis (Kulczyński, 1926)	B	TP	78, 112
*Agyneta simplicitarsis** (Simon, 1884)	SH	WP	86
Agyneta subtilis (O. Pickard-Cambridge, 1863)	B	TP	21
*Allomengea dentisetis**, M (Grube, 1861)	P	EP	53
*Allomengea scopigera** (Grube, 1859)	P	TH	53, 56
Allomengea vidua (L. Koch, 1879)	SH	TH	56, 86
Anguliphantes cerinus (L. Koch, 1879)	B	CP	21, 56, 79
Araeoncus crassipes (Westring, 1861)	SH	WP	106
Araeoncus vorkutensis Tanasevitch, 1984	B	CP	79
Archaraeoncus prospiciens**, M (Thorell, 1875)	SH	WP	79
Bathyphantes eumenis (L. Koch, 1879)	B	TH	21
Bathyphantes gracilis (Blackwall, 1841)	P	TH	56
Bathyphantes nigrinus (Westring, 1851)	SH	WP	56
Bathyphantes parvulus (Westring, 1851)	B	TP	35, 56, 86
Bolyphantes alticeps (Sundevall, 1833)	SH	TP	53, 56
Centromerita bicolor**, M (Blackwall, 1833)	SH	TH	53
Centromerus arcanus (O. Pickard-Cambridge, 1873)	B	WP	21
Centromerus clarus (L. Koch, 1879)	B	TP	21, 53, 56
Centromerus incilium (L. Koch, 1881)	B	WP	21
Centromerus sylvaticus (Blackwall, 1841)	P	TH	56, 64
Ceratinella brevis (Wider, 1834)	P	TP	21, 106
Decipiphantes decipiens (L. Koch, 1879)	B	WP	21
Dicymbium nigrum (Blackwall, 1834)	P	WP	56
*Dicymbium tibiale**, M (Blackwall, 1836)	P	WP	53
Diplostyla concolor (Wider, 1834)	B	TH	21, 50, 53, 56, 86
Drapetisca socialis (Sundevall, 1833)	P	TP	51, 56
Erigone atra** Blackwall, 1833	P	TH	106
Erigone dentipalpis** (Wider, 1834)	P	TP	98, 105, 106
Erigonoplus globipes**, M (L. Koch, 1872)	SA	WP	106
Erigonoplus spinifemuralis**, M Dimitrov, 2003	SA	WP	106
Floronia bucculenta (Clerck, 1758)	P	TP	51, 52, 64
Gnathonarium dentatum (Wider, 1834)	P	TP	106
Gonatium rubellum (Blackwall, 1841)	B	TP	21, 86
*Gonatium rubens** (Blackwall, 1833)	P	TP	86
Gongylidium rufipes (Linnaeus, 1758)	P	WP	56, 86
Helophora insignis (Blackwall, 1841)	P	TH	51, 56, 64
Lasiargus hirsutus**, M (Menge, 1869)	SH	TP	86
Leptorhoptrum robustum** (Westring, 1851)	SH	TH	86
*Linyphia hortensis** Sundevall, 1830	P	TP	40, 64
Linyphia triangularis (Clerck, 1758)	P	TH	51, 53, 56, 59, 100
Lophomma punctatum (Blackwall, 1842)	SH	WP	86
Macrargus multesimus (O. Pickard-Cambridge, 1875)	B	TH	21
Micrargus herbigradus** (Blackwall, 1854)	P	TP	53
Microlinyphia pusilla** (Sundevall, 1830)	P	TH	86, 106
Microneta viaria (Blackwall, 1841)	P	TH	56
Moebelia penicillata**, M (Westring, 1851)	P	WP	57

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
LINYPHIIDAE			
*Neriene clathrata** (Sundevall, 1830)	SH	TH	86
Neriene emphana (Walckenaer, 1841)	SH	TP	56, 59, 79
*Neriene montana** (Clerck, 1758)	SH	TP	13, 56, 86
*Neriene peltata** (Wider, 1834)	P	WP	86
*Neriene radiata** (Walckenaer, 1841)	SH	TH	56, 106
*Oedothorax** *apicatus** (Blackwall, 1850)	SA	WP	98, 105, 106
Oryphantes geminus (Tanasevitch, 1982)	B	WP	21
Panamomops dybowskii (O. Pickard-Cambridge, 1873)	B	CP	21, 79
*Pocadicnemis** *pumila** (Blackwall, 1841)	P	TH	53
*Sauron** *fissocornis**, M Eskov in Eskov et Marusik, 1995	SH	CP	86
Semljicola angulatus (Holm, 1963)	B	TP	79
*Silometopus** *ambiguus** (O. Pickard-Cambridge, 1906)	SH	WP	106
*Silometopus** *reussi** (Thorell, 1871)	SH	TP	106
*Stemonyphantes** *lineatus** (Linnaeus, 1758)	SH	WP	86, 106
*Stemonyphantes** *taiganus** (Ermolajev, 1834)	B	CP	79, 78
*Styloctetor stativus** (Simon, 1881)	SH	TH	86
Tapinocyba ? *pallens* (O. Pickard-Cambridge, 1873)	SH	WP	106
Tenuiphantes nigriventris (L. Koch, 1879)	B	TP	53, 79
Tenuiphantes tenebricola (Wider, 1834)	SH	WP	56
Thyreosthenius parasiticus (Westring, 1851)	P	TH	56
Trichoncus vasconicus Denis, 1944	SH	WP	86, 106
*Trichopterna** *cito** (O. Pickard-Cambridge, 1872)	SA	WP	86, 106
*Uralophantes** *troitskensis**, M Esyunin, 1992	SA	CP	86
Walckenaeria antica (Wider, 1834)	B	WP	21, 53
*Walckenaeria atrotibialis** O. Pickard-Cambridge, 1878	P	TH	53, 86
*Walckenaeria kochi** (O. Pickard-Cambridge, 1873)	SH	TH	56
*Walckenaeria nudipalpis** (Westring, 1851)	P	TP	53
*Walckenaeria unicornis** O. Pickard-Cambridge, 1861	P	WP	53
Walckenaerianus esyunini Tanasevitch, 2004	SA	WP	106
Zornella cultrigera (L. Koch, 1879)	B	TP	21, 106
LIOCRANIDAE — 1 genus, 6 species			
Agroeca brunnea (Blackwall, 1833)	P	TP	56
Agroeca cuprea Menge, 1873	SH	WP	56
*Agroeca dentigera**, M Kulczyński, 1913	SH	WP	86, 106
*Agroeca lusatica** (L. Koch, 1875)	SH	WP	86
*Agroeca maculata** L. Koch, 1879	SH	TP	86
*Agroeca ornata**, M Banks, 1892	SH	EP	56
LYCOSIDAE — 12 genera, 52 species			
Acantholycosa lignaria (Clerck, 1758)	SH	TP	58
Acantholycosa norvegica (L. Koch, 1875)	B	TP	21, 58
Allohogna singoriensis (Laxman, 1770)	SA	WP	11, 25, 27, 28, 29, 34, 49, 84, 86, 89, 92, 106, 111

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
LYCOSIDAE			
Alopecosa cf. *albostriata*	SH	EP	106
Alopecosa azsheganovae Esyunin, 1996	SH	CP	86
Alopecosa cuneata (Clerck, 1758)	SH	TP	17, 18, 50, 86, 106, 113
Alopecosa cursor (Hahn, 1831)	P	WP	56, 88, 98, 106
Alopecosa fabrilis (Clerck, 1758)	SH	TP	18, 29, 56
Alopecosa farinosa (Herman, 1879)	SH	TP	17, 49, 86, 106, 113
*Alopecosa kasakhstanica** Savelyeva, 1972	SH	CP	56, 65, 69,
*Alopecosa kovblyuki**, M Nadolny et Ponomarev, 2012	SA	WP	106
Alopecosa pinetorum Thorell, 1856	SH	WP	56
Alopecosa pulverulenta (Clerck, 1758)	SH	TP	18, 29, 49, 46, 56, 71, 86, 99
Alopecosa schmidti (Hahn, 1835)	SH	WP	7, 86, 106, 113
Alopecosa sulzeri (Pavesi, 1863)	SA	WP	86, 106
Alopecosa taeniata (C.L. Koch, 1835)	SH	WP	106
Alopecosa taeniopus (Kulczyński, 1895)	SA	WP	106
*Arctosa** *alpigena** (Doleschall, 1852)	P	TH	106
*Arctosa** *leopardus** (Sundevall, 1833)	SH	WP	106
*Arctosa** *stigmosa** (Thorell, 1875)	P	TP	49
Evippa sp.	E	E	106
*Hygrolycosa** *rubrofasciata** (Ohlert, 1865)	B	WP	14
Mustelicosa dimidiata (Thorell, 1875)	SA	WP	106
Pardosa agrestis (Westring, 1861)	SH	TP	17, 18, 29, 56, 86, 106, 111, 113
Pardosa agricola (Thorell, 1856)	SH	WP	18, 45, 46, 56, 99, 111
Pardosa amentata (Clerck, 1758)	P	WP	56, 79
Pardosa bifasciata (C.L. Koch, 1836)	SH	WP	17, 86, 106, 113
*Pardosa eiseni** (Thorell, 1875)	B	TP	86
Pardosa fulvipes (Collett, 1875)	SH	WP	6, 18, 75, 86, 106
Pardosa italica Tongiorgi, 1966	P	WP	106
*Pardosa luctinosa** Simon, 1876	SA	WP	106
Pardosa lugubris (Walckenaer, 1802)	SH	WP	18, 23, 21, 45, 46, 56, 86, 99, 106, 111
*Pardosa maisa** Hippa et Mannila, 1982	SH	WP	86
*Pardosa masurae**, M Esyunin et Efimik, 1998	SH	CP	86
? *Pardosa monticola* (Clerck, 1758)	SH	WP	17, 18, 56, 88, 99, 111
Pardosa paludicola (Clerck, 1758)	SH	TP	45, 56, 86, 106
Pardosa palustris (Linnaeus, 1758)	P	TH	6, 17, 18, 22, 23, 29, 45, 50, 46, 56, 99, 111
Pardosa plumipes (Thorell, 1875)	SH	TP	6, 7, 17, 18, 29, 45, 46, 56, 58, 86, 88, 98, 99, 105, 106, 111
Pardosa prativaga (L. Koch, 1870)	SH	WP	6, 17, 18, 46, 56, 99
Pardosa proxima (C.L. Koch, 1847)	SH	TP	29, 30, 107
Pardosa pullata (Clerck, 1758)	SH	WP	17, 75
Pardosa riparia (C.L. Koch, 1847)	SH	TP	17
*Pardosa schenkeli** Lessert, 1904	SH	TP	86, 106
Pirata piraticus (Clerck, 1758)	SH	TH	13, 29, 56, 86, 106
Piratula hygrophila (Thorell, 1872)	P	TP	49, 56, 79
Piratula uliginosa (Thorell, 1856)	SH	WP	86
Trochosa robusta (Simon, 1876)	P	TP	86, 106
Trochosa ruricola (De Geer, 1778)	SH	TH	10, 17, 27, 49, 46, 56, 86, 99, 106
Trochosa spinipalpis (F.O. Pickard-Cambridge, 1895)	B	TP	11, 21, 56, 86

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
LYCOSIDAE			
Trochosa terricola Thorell, 1856	P	TH	6, 21, 49, 56, 66, 86, 106
Xerolycosa miniata (C.L. Koch, 1834)	SH	WP	29, 49, 46, 56, 86, 99, 105, 106, 111
Xerolycosa nemoralis (Westring, 1861)	SH	TP	6, 29, 46, 56, 98, 99, 106, 111
MIMETIDAE — 1 genus, 2 species			
*Ero cambridgei**, M Kulczyński, 1911	B	TP	86
Ero furcata Villers, 1789)	SH	TP	56
MITURGIDAE — 1 genus, 3 species			
*Zora armillata**, M Simon, 1878	SH	WP	86
*Zora nemoralis** (Blackwall, 1861)	SH	TP	86
Zora spinimana (Dufour, 1820)	SH	TP	56, 86, 106
OXYOPIDAE — 1 genus, 1 species			
Oxyopes xinjiangensis Hu et Wu, 1989	SA	CP	106
PHILODROMIDAE — 4 genera, 15 species			
*Philodromus aureolus** (Clerck, 1758)	P	TP	108
*Philodromus cespitum** (Walckenaer, 1802)	P	TH	74, 86, 106
Philodromus utotchkini Marusik, 1991	B	EP	21
Rhysodromus fallax (Sundevall, 1833)	P	TP	106, 108
Rhysodromus histrio (Latreille, 1819)	SH	TH	28, 36, 43, 81, 82, 83, 84, 86, 106, 110
Thanatus arenarius L. Koch, 1872	SA	WP	43, 56, 74, 84, 86, 106, 108
Thanatus atratus Simon, 1875	SH	WP	84, 86, 106
Thanatus formicinus (Clerck, 1758)	SH	TH	39, 53, 86
*Thanatus mikhailovi** Logunov, 1996	SA	CP	106
Thanatus pictus L. Koch, 1881	SH	WP	106
Thanatus sabulosus (Menge, 1875)	SH	TP	56
Thanatus striatus C.L. Koch, 1845	P	TH	86
*Tibellus macellus** Simon, 1875	SH	TP	86
Tibellus maritimus (Menge, 1875)	P	TH	4, 33, 56, 86, 113
Tibellus oblongus (Walckenaer, 1802)	P	TH	4, 39, 56, 86, 106, 108
PHOLCIDAE* — 1 genus, 1 species			
*Pholcus** *opilionoides**, M (Schrank, 1871)	P	WP	56
PHRUROLITHIDAE — 1 genus, 1 species			
Phrurolithus festivus (C.L. Koch, 1835)	SH	TP	56
PISAURIDAE — 2 genera, 2 species			
Dolomedes plantarius (Clerck, 1758)	SH	WP	56
*Pisaura** *mirabilis** (Clerck, 1758)	SH	WP	86, 106
SALTICIDAE — 19 genera, 36 species			
Aelurillus v-insignitus (Clerck, 1758)	P	TP	86, 98, 105, 106
Asianellus festivus (C.L. Koch, 1834)	SH	TP	43, 56, 77, 86, 103, 101, 106
Asianellus kazakhstanicus Logunov et Heçiak, 1996	E	E	106
*Attulus** *distinguendus** (Simon, 1868)	P	TP	106
*Attulus** *saltator* (O. Pickard-Cambridge, 1868)	SA	WP	86, 106
Chalcoscirtus brevicymbialis Wunderlich, 1980	SH	WP	106
Chalcoscirtus nigritus (Thorell, 1875)	SH	WP	106
Euophrys frontalis (Walckenaer, 1802)	P	TP	56, 78, 106
Evarcha arcuata (Clerck, 1758)	P	TP	4, 31, 32, 39, 47, 56, 86, 87, 103, 106, 108, 112
Evarcha falcata (Clerck, 1758)	P	WP	6, 5, 4, 16, 15, 14, 22, 31, 32, 39, 40, 43, 47, 56, 71, 86, 95, 102, 100, 106, 108, 112

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
SALTICIDAE			
Evarcha laetabunda (C.L. Koch, 1846)	P	TP	47, 86, 106, 112
Evarcha michailovi Logunov, 1992	SH	WP	42, 68, 73, 86, 92, 90, 106, 112
Heliophanus auratus C.L. Koch, 1835	P	WP	16, 42, 56, 57, 86, 87, 106, 112
*Heliophanus dubius** C.L. Koch, 1835	P	TP	56
Heliophanus flavipes (Hahn, 1832)	P	TP	16, 32, 42, 43, 56, 73, 86, 106
Heliophanus patagiatus Thorell, 1875	P	TP	56
Heliophanus ussuricus Kulczyński, 1895	SH	EP	73
Marpissa pomatia (Walckenaer, 1802)	P	TP	4, 31, 39, 40, 56, 57, 77, 87, 100, 112
Marpissa radiata (Grube, 1859)	P	WP	4, 12, 36, 39, 56, 86, 106
*Neon** *rayi**, M (Simon, 1875)	SH	WP	106
Pellenes albopilosus (Tyschchenko, 1965)	SA	CP	106
*Pellenes epularis** (O. Pickard-Cambridge, 1872)	SH	WP	106
Pellenes sibiricus Logunov et Marusik, 1994	SH	EP	106
Phlegra fasciata (Hahn, 1826)	P	TP	73, 86, 106
Pseudeuophrys erratica (Walckenaer, 1826)	P	TP	53, 56, 79
Pseudeuophrys obsoleta (Simon, 1868)	SH	TP	102
Salticus cingulatus (Panzer, 1797)	P	TP	106
Sibianor aurocinctus (Ohlert, 1865)	P	WP	4
Sibianor larae Logunov, 2001	P	EP	86
*Sitticus terebratus** (Clerck, 1758)	P	TP	56
*Sittiflor** *inexpectus* Logunov et Kronestedt, 1997	SH	WP	32, 56
*Sittiflor** *floricola* (C.L. Koch, 1837)	P	TP	39, 56
*Sittiflor** *zimmermanni**, M (Simon, 1877)	SH	WP	106
*Sittisax** *ranieri**, M (Peckham et Peckham, 1909)	B	TH	86
Synageles venator (Lucas, 1836)	P	TH	4, 16, 47
Talavera aperta (Miller, 1971)	SH	WP	112
SPARASSIDAE* — 1 genus, 1 species			
*Micrommata** *virescens** (Clerck, 1758)	SH	TP	56, 106
TETRAGNATHIDAE — 3 genera, 9 species			
*Metellina** *mengei** (Blackwall, 1869)	SH	WP	56
Pachygnatha clercki Sundevall, 1823	P	TH	26, 40, 56, 86, 106
*Pachygnatha degeeri** Sundevall, 1830	SH	TP	86, 106
Pachygnatha listeri Sundevall, 1830	B	TP	21, 40, 56, 86, 106
*Tetragnatha** *dearmata** Thorell, 1873	SH	TH	56
*Tetragnatha** *extensa** (Linnaeus, 1758)	P	TH	86
*Tetragnatha** *montana** Simon, 1874	SH	TP	56
*Tetragnatha** *obtusa** C.L. Koch, 1837	SH	TP	86
*Tetragnatha** *pinicola** L. Koch, 1870	SH	TP	56, 106
THERIDIIDAE — 11 genera, 16 species			
*Asagena** *phalerata** (Panzer, 1801)	SH	TP	86, 106
*Cryptachaea** *riparia** (Blackwall, 1834)	SH	TP	56
*Enoplognatha** *ovata**, M (Clerck, 1758)	SH	WP	56
*Euryopis** *flavomaculata** (C.L. Koch, 1836)	SH	TP	86, 106
*Lasaeola** *tristis** (Hahn, 1833)	SH	WP	106
*Neottiura** *bimaculata** (Linnaeus, 1767)	SH	TH	56, 86, 112
*Parasteatoda** *tepidariorum** (C.L. Koch, 1841)	P	TH	100

Table 1 (continued).
Таблица 1 (продолжение).

Species	LAT	LON	Records in Novosibirsk Area
THERIDIIDAE			
Phylloneta impressa** L. Koch, 1881	P	TH	112
*Robertus arundineti** (O. Pickard-Cambridge, 1871)	P	WP	113
Robertus heydemanni Wiehle, 1965	SH	WP	36, 54
Steatoda albomaculata (De Geer, 1778)	P	TH	106
*Steatoda bipunctata** (Linnaeus, 1758)	SH	TH	14, 56, 106, 108
Steatoda castanea, M* (Clerck, 1758)	P	TH	56
*Steatoda grossa** (C.L. Koch, 1838)	P	TH	16, 56
Theridion innocuum*, M* Thorell, 1875	SH	CP	106, 110, 112
Theridion varians** Hahn, 1833	SH	TH	56, 106
THOMISIDAE — 6 genera, 21 species			
Coriarachne depressa** (C.L. Koch, 1837)	SH	TP	66
Heriaeus horridus Tyschchenko, 1965	SA	WP	106
*Heriaeus mellotteei** Simon, 1886	SH	EP	86, 106
Misumena vatia** (Clerck, 1758)	P	TH	56, 60
Ozyptila praticola (C.L. Koch, 1837)	P	TP	21, 56, 86
*Ozyptila rauda** Simon, 1875	SH	WP	106
Ozyptila scabricula (Westring, 1851)	SH	TP	86, 106
Ozyptila trux (Blackwall, 1846)	SH	TH	56, 86, 106
Tmarus piger (Walckenaer, 1802)	SH	TP	56
Xysticus audax (Schrank, 1803)	SH	TP	15, 39, 63
Xysticus cristatus (Clerck, 1758)	SH	WP	24, 28, 41, 42, 43, 53, 47, 56, 72, 84, 86, 92, 95, 106, 108, 112, 113
*Xysticus lanio** C.L. Koch, 1835	SH	WP	53
*Xysticus luctuosus** (Blackwall, 1846)	SH	TH	4, 39, 53, 56
*Xysticus ninnii** Thorell, 1872	SH	WP	4, 10, 32, 43, 56, 85, 86, 98, 105, 106, 109
Xysticus pseudocristatus Azarkina et Logunov, 2001	SA	CP	54
*Xysticus robustus** (Hahn, 1832)	SH	WP	86, 106
Xysticus sabulosus, M* (Hahn, 1832)	SH	WP	86
*Xysticus striatipes** L. Koch, 1870	SH	WP	33, 43, 86, 106
Xysticus sp.	E	E	106
*Xysticus ulmi** (Hahn, 1831)	SH	WP	56, 86
Xysticus viduus Kulczyński, 1898	SH	WP	10, 28, 37, 86, 106
TITANOECIDAE — 1 genus, 3 species			
Titanoeca nivalis*, M* Simon, 1874	B	TH	106
Titanoeca quadriguttata*, M* Hahn, 1833	SH	WP	86, 106
Titanoeca schineri** L. Koch, 1872	P	WP	86, 106
ULOBORIDAE* — 1 genus, 1 species			
Uloborus walckenaerius** Latreille, 1806	SH	TP	106

Abbreviations: * — the first record for Novisibirsk Area; M — the first record for West Siberian Plain (area 'M' in [Mikhailov, 2013]). LAT — latitudinal components of the range: B — boreal species, SH — subboreal humid species, SA — subarid species, P — polyzonal species, E — endemic; LON — latitudinal components of the range: TH — trans-Holarctic species, TP — trans-Palaearctic species, WP — west-Palaearctic species, CP — central-Palaearctic species, EP — east-Palaearctic species. 1–113 — collecting localities, for their decoding see Map.

Обозначения: * — таксон впервые приводится для Новосибирской области; M — вид впервые приводится для равнинной части Западной Сибири (регион M по: [Михайлов, 2013]). LAT — широтная компонента ареала: B — бореальный вид, SH — суббореальный гумидный, SA — субаридный, P — полизональный, E — эндемик; LON — долготная компонента ареала: TH — трансголарктический, TP — транспалеарктический, WP — западнопалеарктический, CP — центральнопалеарктический, EP — восточнопалеарктический. 1–113 — точки сбора: расшифровку см. в подписи к Карте.

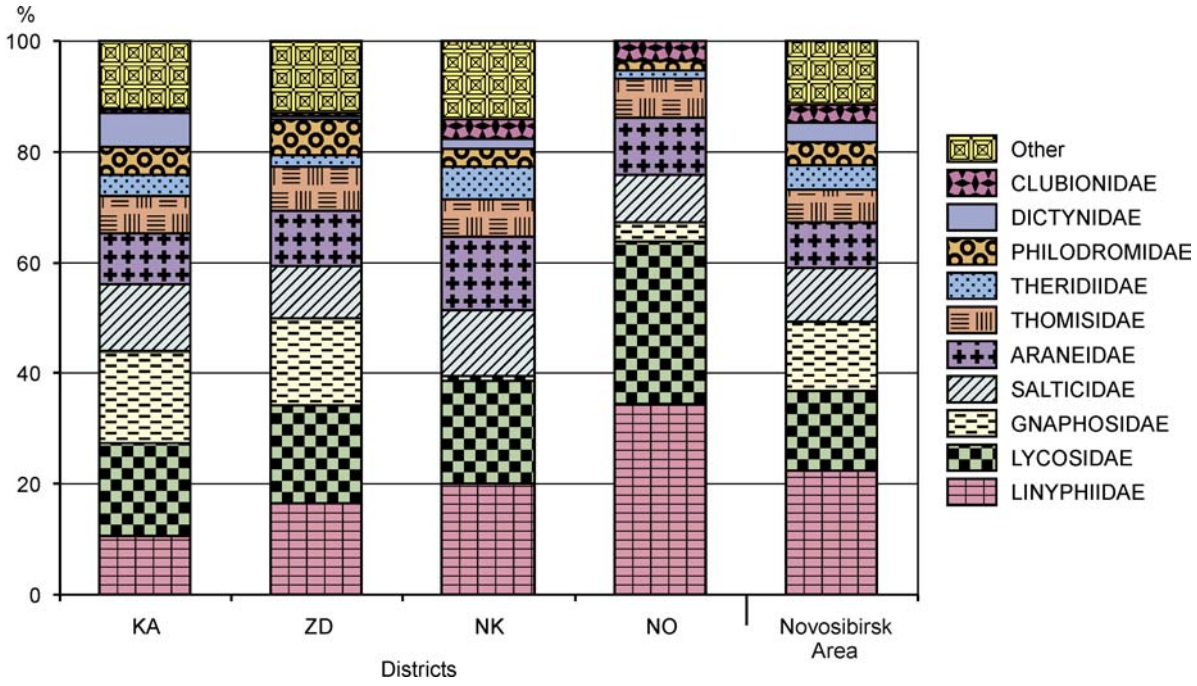


Fig. 5. Relative species diversity of spider families in Novosibirsk Area. Abbreviations: see Map.
Рис. 5. Соотношение видового богатства семейств пауков в Новосибирской области. Сокращения: см. Карту.

number of species having north- or north-easternmost limits of their distribution in Novosibirsk Area show the importance of the latitudinal (=zonal) zoogeographic barrier occurring in its territory; yet, it is also indicative of a similarity between the spider faunas of the southern part of Novosibirsk Area and Kazakhstan. It is also possible that the penetration of southern species northwards could be related to the impact of global warming and aridization of the climate, as was shown for other invertebrate groups [Bespalov *et al*., 2010]. New records of the spider species described from Tuvan steppe hollows having the westernmost limits of their distribution in Novosibirsk Area (e.g., *Dictyna ubsunurica* Marusik et Koponen, 1998 and *Gnaphosa tuvinica* Marusik et Logunov, 1992) are of great interest from the zoogeographic viewpoint, for West-Siberian steppes are much more humid than the sharp-continental dry steppes of South Siberia; furthermore, at present they have no direct physical connections.

Taxonomic diversity of spider families

According to the present data, the family Linyphiidae is richest in Novosibirsk Area (82 species, 22,3%), as in all regions beyond the latitude of 50°. Further arachnological studies may result in a markedly higher proportion of the linyphiids (30–40%, or higher), but even the current number is evidence of a rather good state of knowledge of the regional spider fauna. Representatives of this family are renowned for their secluded and sedentary lifestyle, requiring special collecting methods.

The second most diverse family is Lycosidae (52 species, 14,3%). Since the majority of contemporary collecting was carried out by means of pitfall traps, which is the most productive collecting method for the lycosids, this family seems to have been best inventoried. For the same reason, the Gnaphosidae are the third most diverse (=best studied) spider group in the Region (45 species, 12,3%). As shown by long-term studies for many Siberian araneofaunas, the Lycosidae usually represent 7–10% of a total local diversity [Marusik, 2007]. Based on such proportion, it can be speculated that the total spider diversity of Novosibirsk Area is likely to be 500–750 species.

Ten spider families are represented by more than ten species. Besides the aforementioned families, seven others are as follows (in descending order of their regional diversity): Salticidae, Araneidae, Thomisidae, Theridiidae, Philodromidae, Dictynidae and Clubionidae (see Table 1). The latter order is virtually identical to that based on cumulative data on spiders of Asian Russia, Central Europe or the Nearctics [Marusik, 2007]. Proportions of spider families in the regional araneofauna are shown in Fig. 5.

Despite spider collecting has been undertaken in all 30 administrative units of Novosibirsk Area (see Map), its territory remains inventoried unevenly. Only 14 districts are known to have 16 or more spider species registered to date, and only in four of them more than 40 species: Karasuk Distr. — 178, Zdvinsk Distr. — 140, City of Novosibirsk — 119, and Novosibirsk Distr. — 58. The araneofauna of Novosibirsk Distr. is least studied, which is also evident from a less number

Table 2. Representation of spider species with various range types in the araneofauna of Novosibirsk Area. Abbreviations as in Table 1.
Таблица 2. Представленность видов пауков с разными типами ареалов в аранеофауне Новосибирской области. Обозначения как в таблице 1.

	TH	TP	WP	CP	EP	Total
B	7	16	6	5	2	36
SH	19	57	78	5	5	164
SA	0	0	22	9	1	32
P	44	52	30	0	3	129
Total	72	125	134	19	11	361

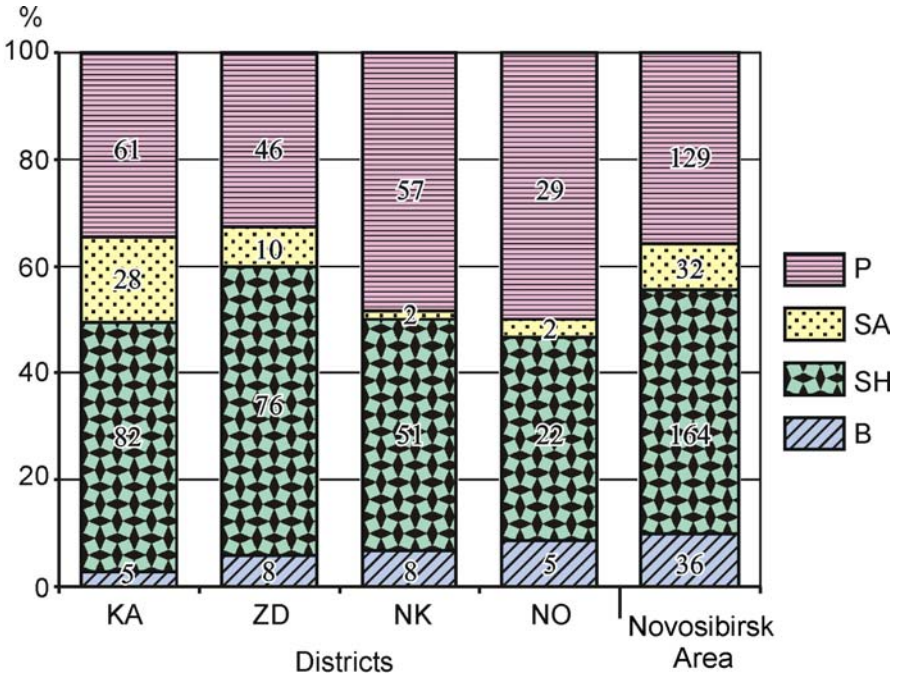


Fig. 6. Proportions of spider species with various latitudinal components in large faunas of Novosibirsk Area. Abbreviations: see Map.
Рис. 6. Доля видов пауков с разной широтной составляющей ареала в крупных фаунах Новосибирской области. Сокращения: см. Карту.

of the registered spider families. In the arid Karasuk Distr. the higher proportion of Salticidae, Gnaphosidae and Dictynidae has been registered, and the markedly smaller one of Linyphiidae. Contrary to that, the araneofaunas of City of Novosibirsk and Novosibirsk Distr. are deprived of the gnaphosids (1–2 species), with over 60% being represented by the linyphiids and lycosids. In City of Novosibirsk, a relatively high proportion of families with 1–2 species, including synathropic species, has been recorded (Fig. 5).

Zoogeographic analysis of local faunas

Latitudinally, the majority of spiders recorded from Novosibirsk Area belong to the subboreal humid (45%) or polyzonal (36%) groups (see Table 2), which can be explained by the predominance of forest-steppes on the territory at hand. These latitudinal groups basically consist of west-Palaearctic and trans-Palaearctic widespread species. A significant share is also made up by boreal and subarid species (9–10%) of which the majority have been collected from intrazonal landscapes of the Ob' River basin and Salair Ridge; boreal species were also recorded from the northern part of the studied region, while subarid ones from the steppe zone (see Map). Over a half of the boreal species belongs to the trans-Palaearctic and trans-Holarctic longitidinal groups, whereas all the subarid species are represented by west- and central-Palaearctic species.

Longitudinaly, west-Palaearctic spider species predominate (37%), probably because West Siberian Plain lies in the eastern periphery of the West Palaearctics.

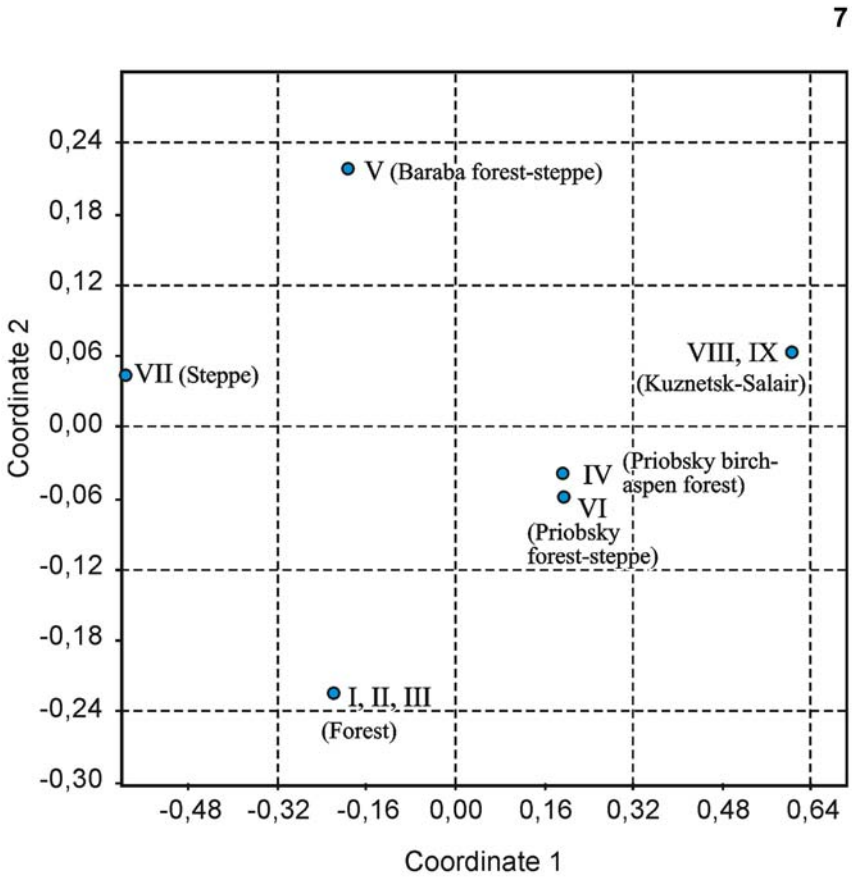


Fig. 7. Similarity of some landscape zones of Novosibirsk Area based on the spider fauna. Szymkiewicz -Simpson's similarity index, multidimensional scaling (MDS).

Рис. 7. Сходство некоторых ландшафтных районов Новосибирской области по фауне пауков. Коэффициент сходства Шимкевича-Симпсона, многомерное шкалирование (MDS).

Yet, a significant share is made up by trans-Palaearctic (34%) and trans-Holarctic (19%) species. The share of east-Palaearctic species is low (5%), suggesting that the westward penetration of eastern species has taken place to a much smaller degree than the eastward one (western species to the east).

If the range compositon of ground beetles [see Dudko & Lyubechanskii, 2002: Table 3] and spiders are compared, the main difference seems to be a much larger share of polyzonal species in spiders (36% *vs.* 12% in the carabids), which is achieved by reducing the number of boreal and subarid species. If longitudinal components are considered, spiders differ from the Carabidae in having much larger shares of trans-Holarctic (19% *vs.* 5,6%) and trans-Palaearctic (34% *vs.* 20%) species. The share of east-Palaearctic species is about the same in both groups (5% *vs*. 8%). Such differences in the range compositon of Aranei and Carabidae are likely to be explained by the history of their fauna formations during the last few thousands of years [Clarke *et al*., 2001].

As seen in Fig. 6, of the four better studied local araneofaunas, those of south-western districts of Karasuk and Zdvinsk are characterized by the larger share of subarid species. Yet, the share of such species is markedly higher in Karasuk than in Zdvinsk. This is expected, for Karasuk Distr. lies to the south of Zdvinsk (Map), already in the steppe zone rather than in the forest-steppe. In the meadow Zdvinsk Distr., the highest proportion goes to subboreal humid species, even exceeding those in the faunas of Novisibirsk Distr. and City of Novosibirsk. In two last districts polyzonal species predominate, with the share of boreal species being also visible. The entire araneofauna of Novosibirsk Area is characterized by almost equal shares of subarid and boreal species, as well as those of subboreal humid and polyzonal species, thus somewhat resembling the graph of Zdvinsk Distr.

Based on an analysis of longitudinal components, west-Palaearcrtic species predominate in the entire arachnofauna of Novosibirsk Area, accounting for almost a third of the species diversity (120 species in total). Such observation is consistent with the trend revealed for other invertebrate groups of Novosibirsk Area, for instance, the ground beetles of which about a

half display a west-Palaearcrtic distributional pattern [Dudko, Lyubechanskii, 2002].

Araneo-complexes of Novosibirsk Area

Not all the landscape subzones have been inventoried equally from the araneological viewpoint. Only four of them contain 156 or more registered spider species: viz., Priobsky birch-aspen forest (IV), Baraba forest-steppe (V), Priobsky forest-steppe (VI), and Steppe Province (VII) (see Map). The Baraba forest-steppe and Steppe Provinces have the comparatively well-studied araneofaunas (Zdvinsk and Karasuk districts correspondingly), whereas others show a large number of common species. Having united the Vasyugan taiga-swampy (I), Priobsky south taiga (II) and North Baraba sub-taiga (III) subzones, we have resulted in the 'integrated forest subzone' from which only 55 spider species have been registered to date. The Kuznetsk-Salair Province (VIII and XI) represents a small sector of the studied territory, with its araneofauna remaining practically unknown to date (only 32 species).

Despite the incompletness of our knowledge, the accepted physiogeographic subdivision of Novosibirsk Area (see Map) seems to be adequate for analyzing the studied spider fauna. Based on the MDS ordination (Fig. 7), the six landscape subzones are grouped in two clusters: one consists of the territories being situated on the left bank of Ob' River, whereas the other includes subzones lying on its right bank. Yet, the araneofaunas of Baraba forest-steppe (V) and the 'integrated forest subzone' (I, II and III) are similar by the first axis, while are clearly distinct by the second axis. In the right bank cluster, an anticipated similarity of Priobsky faunas is observed, except for the standing apart araneofauna of the Salair Ridge.

The zoogeographic regioning of Novosbirsk Area based on local faunas of the ground-beetles (Carabidae) [Dudko, Lyubechanskii, 2002] looks very similar to that based on spiders. Their fauna is clearly divided along Ob' River into the eastern and western clusters; the steppe province is also distinct in the western cluster. As with spiders, the fauna of ground-beetles of Ob' region is monolithic. Thus, the factors affecting biogeographical distribution of these two taxonomically unrelated groups of terrestrial predatory arthropods are likely to be very similar.

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