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SPIDERS (ARANEAE) OF THE OAK FORESTS OF KHARKIV REGION (NORTHEASTERN UKRAINE)

Полчанінова, Н. Ю., Гончаров, Р. І. Павуки (Araneae) нагірних дібров Харківської області (Північно-Східна Україна). *Вісті Харківського ентомологічного товариства*. 2023. Т. XXXI, вип. 2. С. 49–60. DOI: 10.36016/KhESG-2023-31-2-5.
У нагірних дібровах Харківської області у 10 локалітетах було зареєстровано 210 видів павуків з 24 родин. Найбагатшою за видовим складом є родина Linyphiidae (25 % фауни); Gnaphodsidae, Araneidae та Theridiidae становлять по 10 %. Під наметом лісу частка Linyphiidae збільшується до 30 %, Gnaphodsidae зменшується до 6 %, а Araneidae та Theridiidae суттєво не змінюється. У трьох локалітетах, де проведені стаціонарні дослідження, 28 видів павуків (14 % фауни) траплялися в усіх типах дібров (суха, свіжа, волога), а також на узліссях і зрубах, 46 видів (24 %) були відсутні під пологом лісу, 12 видів (6 %) уникали вологої діброви, а 4 види (2 %) знайдені тільки у вологій та свіжій дібровах. Видове багатство павуків було найнижчим (43–49 видів) і найбільш подібним у вологих дібровах, а найбагатшим (71–99 видів) і найрізноманітнішим на зрубах і в сухій діброві. Угруповання павуків Старицького лісництва проаналізовано вперше. Аналіз підтвердив загальні риси аранеокомплексів нагірних дібров — домінування *Linyphia triangularis* (Clerck, 1757), *Helophora insignis* (Blackwall, 1841), *Metellina segmentate* (Clerck, 1757) й *Enoplognatha ovata* (Clerck, 1757) у хортобії, *Abacoproeces saltuum* (L. Koch, 1872), *Trochosa terricola* Thorell, 1856 й *Ozyptila praticola* (C. L. Koch, 1837) — у герпетобії, особливо у зволожених затінених місцях, а також наддомінування *Pardosa alacris* (C. L. Koch, 1833) і *P. lugubris* (Walckenaer, 1802) у сухій діброві та на узліссях і зрубах. Співвідношення домінуючих видів, видове та кількісне багатство угруповань павуків залежить від типу діброви. 3 рис., 3 табл., 33 назв.
Ключові слова: фауна, структура угруповань, біотопічний розподіл, лісостеп.

Polchaninova, N. Yu., Honcharov, R. I. Spiders (Araneae) of the oak forests of Kharkiv Region (Northeastern Ukraine). *The Kharkov Entomological Society Gazette*. 2023. Vol. XXXI, iss. 2. P. 49–60. DOI: 10.36016/KhESG-2023-31-2-5.
A total of 210 spider species of 24 families were recorded from 10 localities in the oak forests of Kharkiv Region. The richest is the family Linyphiidae (25% of the fauna), while Gnaphodsidae, Araneidae, and Theridiidae make up 10% each. Under the forest canopy, the share of Linyphiidae increases to 30%, Gnaphodsidae decreases to 6%, and those of Araneidae and Theridiidae do not change significantly. In three sites of stationary research, 28 spider species (14% of the fauna) were found in all types of oak forests (dry, mesic, moist), as well as on the edges and clearings, 46 species (24%) were absent under the forest canopy, 12 species (6%) avoided moist forests, 4 species (2%) were found only in moist and mesic forests. Spider species richness was the lowest (43–49 species) and most similar in the moist oak forests, and the richest (71–99 species) and most diverse in clearings and dry oak forests. Spider assemblages of the Stariytskyi forest were analyzed for the first time. The analysis confirmed general features of the spider assemblages of oak forests: dominance of *Linyphia triangularis* (Clerck, 1757), *Helophora insignis* (Blackwall, 1841), *Metellina segmentate* (Clerck, 1757), and *Enoplognatha ovata* (Clerck, 1757) in the herbage, *Abacoproeces saltuum* (L. Koch, 1872), *Trochosa terricola* Thorell, 1856, and *Ozyptila praticola* (C. L. Koch, 1837) in the litter, especially in mesic and moist forests, and overdominance of *Pardosa alacris* (C. L. Koch, 1833) and *P. lugubris* (Walckenaer, 1802) in the dry oak forest, clearings, and on the edges. The ratio of dominant species, spider species richness and individual abundance are dependent on the type of oak forest. 3 figs, 3 tabs, 33 refs
Keywords: fauna, assemblage structure, habitat distribution, forest-steppe.

Полчанинова, Н. Ю., Гончаров, Р. И. Пауки (Araneae) нагорных дубрав Харьковской области (Северо-Восточная Украина). *Известия Харьковского энтомологического общества*. 2023. Т. XXXI, вып. 2. С. 49–60. DOI: 10.36016/KhESG-2023-31-2-5.
В нагорных дубравах Харьковской области в 10 локалитетах было зарегистрировано 210 видов пауков из 24 семейств. Самым богатым является семейство Linyphiidae (25 % фауны); Gnaphodsidae, Araneidae, Theridiidae составляют по 10 %. Под пологом леса доля Linyphiidae увеличивается до 30 %, Gnaphodsidae уменьшается до 6 %, а Araneidae и Theridiidae существенно не меняется. В трёх локалитетах, где проведены стационарные исследования, 28 видов пауков (14 % фауны) встречались во всех типах дубрав (сухая, свежая, влажная), а также на опушках и вырубках, 46 видов (24 %) отсутствовали под пологом леса, 12 видов (6 %) избегали влажной дубравы, 4 вида (2 %) найдены только во влажной и свежей дубравах. Видовое богатство пауков было самым низким (43–49 видов) и наиболее схожим во влажных дубравах, а самым богатым (71–99 видов) и самыми разнообразным на вырубках, опушках и в сухой дубраве. Изучение пауков Старицкого лесничества было проведено впервые. Анализ подтвердил общие черты аранеокомплексов нагорных дубрав — доминирование *Linyphia triangularis* (Clerck, 1757), *Helophora insignis* (Blackwall, 1841), *Metellina segmentate* (Clerck, 1757) и *Enoplognatha ovata* (Clerck, 1757) в хортобии, *Abacoproeces saltuum* (L. Koch, 1872), *Trochosa terricola* Thorell, 1856 и *Ozyptila praticola* (C. L. Koch, 1837) — в герпетобии, особенно в увлажнённых затенённых биотопах, а также сверхдоминирование *Pardosa alacris* (C. L. Koch, 1833) и *P. lugubris* (Walckenaer, 1802) в сухой дубраве, на опушках и вырубках. Соотношение доминантов, видовое богатство и численность видов зависят от типа дубравы. 3 рис., 3 табл., 33 назв.
Ключевые слова: фауна, структура сообществ, биотопическое распределение, лесостепь.

I n t r o d u c t i o n . The southern broadleaved forests that extend from the foothills of the Carpathians to the western slopes of the Urals support a rich flora and fauna, including a number of rare species with

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discontinuous ranges. In the East European Plain, *Quercus robur* Linnaeus, 1753 forms the climax communities, corresponding to the macroclimate of the regional nemoral biome. In the south of the forest-steppe, zonal oak forests cover flat interfluves, while their intrazonal variants occupy ravines and high, right river banks. Despite long-term commercial use and continuous deforestation, large forests have remained in the north-east of Ukraine, some of which are protected in national nature parks (Hetmanskyi, Slobozhanskyi, Dvorichanskyi, Homilshanski Lisy). The study of different taxonomic groups of the forest biota contributes to the understanding of the general processes of its formation and the specificity of local faunas.

We chose spiders as a model group for investigation because they are widespread and abundant in all layers of the forest and are sensitive to changes in microclimatic conditions and prey availability, arising under natural or anthropogenic disturbances. Thus, spiders can be used as a model group to study the dependence of animal communities on the forest type and stand complexity (Buddle, Spence, Langor, 2000; Willet, 2001; Pearce, Venier, 2006; Magura, Horváth, Tóthmérész, 2010).

The first spiders in the forests of Kharkiv Region were collected by O. V. Astakhova at the Biological Station of V. N. Karazin Kharkiv National University (further — KhNU) near the village of Haidary. Most of the collection has been lost, and only four species from this locality are preserved in the funds of the Museum of Nature of KhNU. Further studies in the same locality were carried out by A. V. Prisniy (Prisniy, 1993), five species from his collection were found in the oakery near the biological station (Polchaninova, Prokopenko, 2013). Spiders of the oak forests of the East European Plain were studied by S. Yu. Esjunin (Esjunin, Golovatch, Penev, 1993), who recorded 18 species from the vicinity of Haidary. A study of the diet of white-necked flycatcher nestlings in five oakeries of the region revealed 23 spider species (Polchaninova, Prisada, 1994; Lezhenina *et al.*, 2011). Collection material from the National Nature Park 'Homilshaski Lisy' was included in the analysis of *Zelotes aszheganovae* (Gnaphosidae) distribution in the East European Plain (Evtushenko, Polchaninova, Esyunin, 2015).

Targeted research on the spider fauna and assemblages in the oak forests of the region was started in 1996 at the biological station of KhNU. Since 2004, this area has been included in the National Natural Park 'Homilshanski Lisy'. The research goal was to determine the structure and seasonal dynamics of spider assemblages in the oakeries of different types (Polchaninova, 2003). A retrospective analysis of the summer aspect of spider assemblages in moist and dry oak forests (Khudich, Chvikov, 2018) revealed the stability of dominant complexes despite significant fluctuations in the total number of individuals in different years. In total, 133 spider species were recorded from the oak forests near the biological station.

Another forest massif of Kharkiv Region was investigated in 2001 and 2002 in the Starytskyi forest of Kupiansk District. Spider assemblages of this oakery have not been analyzed, although the species were included in the checklist of spiders of Kharkiv Region (Polchaninova, 2009a) and the catalog of spiders of Left-Bank Ukraine (Polchaninova, Prokopenko, 2013). This forest is located near the border with Russia and currently suffers from constant shelling. The available data on the spider assemblages can be used in the future to assess the impact of hostilities on the forest biota.

In 2021, we investigated the territory in the southwest of the Kharkiv City aiming at creating the Regional Landscape Park 'Smarahdove Dzherelo'. This area represents the typical landscape of Sloboda Ukraine, and hosts oak forests, floodplain forests and meadows, pine plantations, and dry grasslands. Eighty-six species of spiders were recorded from oak forests, and their habitat distribution, occurrence of rare species, and dominant structure were discussed in the publication (Atemasova *et al.*, 2021).

In the neighboring areas, spiders of oak forests were studied in Sumy (Gnelitsa, 1998; Polchaninova, 2013; Polchaninova, Prokopenko, 2017) and Donetsk (Polchaninova, Prokopenko, 2007(2008)) regions of Ukraine and in Belgorod Region of Russia (Ponomarev, Polchaninova, 2006; Polchaninova, 2011).

The present paper aims to compile a list of spider species known from the oak forests of Kharkiv region, to analyze the assemblage structure of the spiders of the Starytskyi forest, which have not been considered so far, and to characterize general patterns of species distribution within the oak forests of the area in question.

Materials and methods. Study area and sampling sites. Kharkiv Region is situated in the north-east of Ukraine within the forest-steppe and steppe natural zones. Its total area is 31,400 km^2. Zonal oak forests are widespread in the forest-steppe part of the region, where they cover the southwestern foothills of the Central Russian Upland. According to the biogeographical zoning, the study area is located in the East European province of the Forest-Steppe zone of the European-Ob sub-region of the European-Siberian region of the Palearctic (Udra, 1997). In forest classification, oak forests belong to category D and are divided into four types: dry, mesic, moist, and wet depending on the hydration conditions (Oleksiiv-Pohrebniak Grid, Pogrebniak, 1955). The first three types are presented in the study area.

The material was collected in ten localities (geographical coordinates show the approximate center of the study site):

(1) Okhrymivka village, Kupiansk distr., 50.3361 N 37.2075 E, May 1986.
(2) Buhrovatka village, Kupiansk distr., 50.2681 N 36.8424 E, May–September 2001, May–August 2002. Starytskyi forest.
(3) Krasne Pershe village, Kupiansk distr., 49.9156 N, 37.7541 E, June–September 2021. National Nature Park 'Dvorichanskyi'.
(4) Haidary village, Biological Station, Chuhuiv distr., 49.6224 N 36.3242 E, May–July 1977, 1978; May–September 1996–1998; July 2003, 2006; June–July 2018. National Nature Park 'Homilshanski Lisy'.
(5) West outskirts of the Kharkiv City, 50.0356 N 36.1567 E, May, 1981, 1982.
(6) Pokotylivka village, Kharkiv distr., 49.9063 N 36.1780 E, May, 1976.
(7) Berezivka village, Kharkiv distr. 49.9056 N, 36.0622 E, May–July 2004.
(8) Verkhnia and Nyzhnia Ozeriana villages, Kharkiv distr., 49.8633 N, 36.0197 E, May–July, 2021.
(9) Yakovlivka village, Kharkiv distr., 49.8250 N, 36.0992 E, May–July, 2021.
(10) Chornyi Lis, Kharkiv distr., 49.8347 N, 36.1881 E, May–July 2021. 8–10 — projected Regional Landscape Park 'Smarahdove Dzherelo'.

Stationary research was carried out in the Starytskyi forest (further Starytsia), National Nature Park 'Homilshanski Lisy' near Haidary village (further Haidary), and Regional Landscape Park 'Smarahdove Dzherelo' (further Sm. Dzh.). The study habitats were as follows:

(1) Moist oakery in the ravine bottom dominated by the ground elder (*Aegopodium podagraria* Linnaeus, 1753) (Starytsia, further in the diagram — 1S, Haidary — 1H).
(2) Mesic oakery:
  (2a) on the flat interfluves dominated by the ground elder and/or ground elder + hairy sedge (*Carex pilosa* Scopolli, 1772) (Starytsia — 2aS);
  (2b) on the flat interfluve dominated by the hairy sedge (Haidary — 2bH);
  (2c) without grass layer or with sparse herbaceous vegetation on the flat interfluve and ravine slopes (Sm. Dzh. — 2cD, Haidary — 2cH).
(3) Dry oakery on the south-facing slope dominated by the hairy sedge and forbs (Starytsia — 3S).
(4) Open dry oakery on the flat interfluves dominated by mesophilic forbs and grasses (Haidary — 4H).
(5) Forest edges, glades, and clear cuttings (Starytsia — 5S, Sm. Dzh. — 5D).

In each habitat, a plot that reflected its most typical characteristics was selected for quantitative samples. Spiders were collected using a standard procedure of sweep netting, pitfall trapping, quadrate sampling, and hand collecting. At the sites of stationary monitoring, we took samples in each habitat once a month from May to September. Herb-dwelling spiders were counted by sweep netting, five samples of 100 sweeps each month. Ground-dwelling spiders were collected with pitfall traps: we set a line of 10 traps at a 10 m distance with 4% formalin for preservation. The traps were checked three times during the sampling period. In the quadrate method, we sieved the litter from 25×25 cm plots, 4 plots — near the tree stems, and 12 — between the trees and among the shrubs. Thus, 16 plots made up one sample in each studied habitat each month. Over 14,000 individuals of spiders were collected; the material is deposited in N. Polchaninova's private collection.

D a t a a n a l y s i s . The species list follows the nomenclature of the World Spider Catalog (WSC, 2023) and is based mainly on adult individuals. When estimating spider abundance in each habitat/month, we counted both adults and juveniles. Species dominance rating was defined using the Tischler scale (Tischler, 1949); we consider eudominants ($n \geq 10\%$ of collected individuals) + dominants ($5 \leq n < 10\%$) as a dominant complex.

A comparison of the spider species composition of different forest types/sites was performed in the program PAST (Hammer, Harper, Ryan, 2001), using the procedure of non-metric multidimensional scaling (NMDS) and Euclidian distance as a similarity measure. We used data on the two-year collection in Haidary (1997, 1998) and Starytsia (2001, 2002), and, in addition, the one-year sampling in Smarahdove Dzherelo. Spiders' alpha diversity was estimated by Shannon, Margalef, and evenness indices that are widely used in ecological studies, thus, enabling comparison of the results. To characterize spider assemblages of the oakeries of Kharkiv Region, we took into account the results of previous studies in Ukraine: Sumy Region, National Nature Park 'Hetmanskyi', Trostianetskyi forest (Polchaninova, 2013); and Russia: Kursk Region, Tsentralno-Chermozemnyi Nature Reserve, Dubroshino forest (Polchaninova, 2009b), Belgorod Region, Belogorye Nature Reserve, 'Les na Vorskle' segment (Polchaninova, 2011), and Voronezh Region, Shypov forest (Polchaninova, 2014).

R e s u l t s a n d d i s c u s s i o n s . S p i d e r f a u n a . According to literature and personal data, 210 spider species of 24 families were recorded in the oak forests of Kharkiv Region (Table 1). Five species are

known only from literature (*Brigittea vicina*, *Walckenaeria antica*, *Paidiscura pallens* — Esjunin, Golovatch, Penev, 1993; *Nuctenea umbratica*, *Salticus zebraneus* — Lezhenina *et al.*, 2011); the others are presented in our collection. Seven main families comprise 77% of the fauna. Their species richness is ranked as follows: Linyphiidae (53 species, 24.6% of the fauna), Gnaphosidae, Araneidae, Theridiidae (22 species, 10.4% each), Lycosidae (16 species, 7.6%), Salticidae (15 species, 7.1%), and Thomisidae (13 species, 6.2%) (Fig. 1A). Linyphiidae, the richest spider family of the Palearctic fauna, dominates in all deciduous forests, except their driest variants (cf. Esjunin, Golovatch, Penev, 1993; Polchaninova, 2014). A relatively high number of Gnaphosidae and Lycosidae is explained by investigation of the open parts of the forests, namely glades, edges, and clearings. Under the canopy, the share of these families decreased significantly, while that of Linyphiidae increases; the shares of other families increases by 1% or did not change (Fig. 1B).

Table 1. List of spider species and their distribution in the oak forests of Kharkiv Region (for abbreviations, see Material and Methods)

No	Species	Sites/habitats:										
		Starytsia				Haidary				Sm. Dzh.		Others
		1	2a	3	5	1	2b	2c	4	2c	5	
	Agelenidae											
1	*Agelena labyrinthica* (Clerck, 1757)	–	–	–	+	–	–	–	+	–	–	+
2	*Allagelena gracilens* (C. L. Koch, 1841)	–	–	–	+	–	–	–	–	–	–	–
3	*Agelenopsis potteri* (Blackwall, 1846)	–	–	–	–	–	–	–	–	–	–	+
4	*Eratigena agestis* (Walckenaer, 1802	–	–	–	–	–	–	–	–	–	–	+
5	*Tegenaria lapicidinarum* Spassky, 1934	–	–	–	+	–	+	–	–	–	–	+
	Anyphaenidae											
6	*Anyphaena accentuata* (Walckenaer, 1802)	+	+	+	+	+	+	+	+	–	+	+
	Araneidae											
7	*Agalenatea redii* (Scopoli, 1763)	–	–	–	+	–	–	–	–	–	–	–
8	*Araneus alsine* (Walckenaer, 1802)	–	–	–	+	–	–	–	–	–	–	–
9	*A. angulatus* Clerck, 1757	–	–	+	–	–	–	+	+	+	+	+
10	*A. diadematus* Clerck, 1757	+	+	+	+	+	+	+	+	+	+	+
11	*A. marmoreus* Clerck 1757	+	–	+	–	–	–	–	–	–	–	–
12	*A. quadratus* Clerck, 1757	–	–	–	+	–	–	–	–	–	+	–
13	*A. sturmi* (Hahn, 1831)	–	–	–	–	–	–	–	–	–	–	+
14	*A. triguttatus* (Fabricius, 1793)	–	–	–	–	–	–	–	–	–	–	+
15	*Araniella cucurbitina* (Clerck, 1757	+	+	+	+	+	+	+	+	–	–	+
16	*A. displicata* (Hentz, 1847	–	–	–	–	–	–	–	–	–	–	–
17	*Argiope bruennichi* (Scopoli, 1772)	–	–	–	+	–	–	–	–	–	+	–
18	*Cercidia prominans* (Westring, 1851)	–	–	+	+	–	–	–	–	–	–	+
19	*Cyclosa conica* (Pallas, 1772)	+	+	+	+	+	+	+	+	+	+	+
20	*Gibbaranea bituberculata* (Walckenaer, 1802)	–	–	–	+	–	+	+	+		+	+
21	*Hypsosinga sanguinea* (C. L. Koch, 1841)	–	–	–	+	–	–	–	–	–	+	+
22	*Larinioides ixobolus* (Thorell, 1873)	–	+	–	–	–	–	–	–	–	–	–
23	*L. patagiatus* (Clerck, 1757)	–	–	–	+	–	–	–	–	–	–	–
24	*Mangora acalypha* (Walckenaer, 1802)	–	–	+	+	–	+	+	+	+	+	+
25	*Neoscona adianta* (Walckenaer, 1802)	–	–	–	–	–	–	–	–	–	+	–
26	*Nuctenea umbratica* (Clerck, 1757)	–	–	–	–	–	–	–	–	–	–	+
27	*Singa hamata* (Clerck, 1757)	–	–	+	+	–	–	–	–	–	–	–
28	*Zilla diodia* (Walckenaer, 1802)	–	–	+	–	+	+	–	–	+	+	+
	Atypidae											
29	*Atypus muralis* Bertkau, 1890	–	–	–	–	–	–	–	–	–	–	+
30	*A. piceus* (Sulzer, 1776)	–	–	+	–	–	–	–	+	+	+	–
	Cheiracanthidae											
31	*Cheiracanthium elegans* Thorell, 1875	–	–	–	–	–	+	+	–	–	–	+
32	*Ch. erraticum* (Walckenaer, 1802)	–	–	–	+	–	–	–	–	–	–	–
	Clubionidae											
33	*Clubiona caerulescens* L. Koch, 1867	+	+	+	+	+	+	+	+	+	+	+
34	*C. marmorata* L. Koch, 1866	–	+	–	–	–	–	–	–	–	–	+
35	*C. pallidula* (Clerck, 1757)	–	–	–	–	+	+	–	–	–	–	+
	Dictynidae											
36	*Brigittea vicina* (Simon, 1873)	–	–	–	–	–	–	–	–	–	–	+
37	*Dictyna arundinacea* (Linnaeus, 1758)	–	–	+	+	–	+	+	+	+	+	+
38	*D. pusilla* Thorell, 1856	–	–	–	–	–	–	–	–	–	–	+
39	*D. uncinata* Thorell, 1856	+	+	+	+	+	+	+	+	+	–	+
40	*Lathys humilis* (Blackwall, 1855)	–	+	–	–	–	–	+	–	–	–	–

Continuation of Table 1

No	Species	Sites/habitats:										
		Starytsia				Haidary				Sm. Dzh.		Others
		1	2a	3	5	1	2b	2c	4	2c	5	
41	*Nigma flavescens* (Walckenaer, 1830)	–	+	+	+	–	–	–	–	–	–	–
	Dysderidae											
42	*Harpactea rubicunda* (C. L. Koch, 1838)	–	–	–	–	–	+	+	–	+	–	–
	Gnaphosidae											
43	*Callilepis nocturna* (Linnaeus, 1758)	–	–	–	–	–	–	–	–	–	+	+
44	*Drassodes pubescens* (Thorell, 1856)	–	–	–	+	–	–	–	–	–	+	+
45	*Drassyllus lutetianus* (L. Koch, 1866)	–	–	–	–	–	–	–	–	–	+	–
46	*D. praeficus* (L. Koch, 1866	–	–	–	–	–	–	–	–	–	+	–
47	*D. pusillus* (C. L. Koch, 1833)	–	–	+	+	–	+	–	+	–	+	+
48	*D. villicus* (Thorell, 1975)	–	–	–	–	–	–	–	–	+	+	–
49	*Gnaphosa licenti* Schenkel, 1953	–	–	–	–	–	–	–	–	–	+	–
50	*Haplodrassus cognatus* (Westring, 1861)	–	–	–	+	–	–	–	–	–	–	–
51	*H. signifer* (C. L. Koch, 1839)	–	–	+	+	–	–	–	+	+	+	+
52	*H. silvestris* (Blackwall, 1833)	–	+	+	+	–	+	–	+	+	–	+
53	*H. soerenseni* (Strand, 1900)	–	–	–	+	–	–	–	–	–	–	–
54	*H. umbratilis* (L. Koch, 1866)	–	–	–	–	–	–	–	–	+	+	–
55	*Marinarozelotes malkini* Platnik et Murphy, 1984	–	–	–	–	–	–	–	–	–	+	–
56	*Micaria formicaria* (Sundevall, 1831)	–	–	–	+	–	–	–	–	–	–	–
57	*M. fulgens* (Walckenaer, 1802)	–	–	–	+	–	–	–	–	–	+	–
58	*M. pulicaria* (Sundevall, 1831)	–	–	–	–	–	–	–	–	–	+	–
59	*Scotophaeus quadripunctatus* (Linnaeus, 1758)	–	–	–	–	–	–	–	–	+	–	+
60	*Trachyzelotes pedestris* (C. L. Koch, 1837)	–	–	–	–	–	–	–	–	–	+	–
61	*Zelotes azsheganovae* Esyunin, Efimik, 1992	–	–	–	–	–	+	–	+	–	–	+
62	*Z. electus* (C. L. Koch, 1839)	–	–	–	–	–	–	–	–	–	+	+
63	*Z. fuscus* (Thoresll, 1975)	–	+	+	+	–	+	+	+	+	+	+
64	*Z. latreillei* (Simon, 1878)	–	+	+	+	–	+	–	–	–	+	–
	Hahniidae											
65	*Hahnia ononidum* Simon, 1875	+	+	+	+	–	+	+	+	+	–	+
	Linyphiidae											
66	*Abacoproeces saltuum* (L. Koch, 1872)	+	+	+	+	+	+	+	+	+	–	+
67	*Agyneta conigera* (O. Pickard-Cambridge, 1863)	–	–	–	–	–	–	–	–	–	–	+
68	*A. rurestris* (C. L. Koch, 1836)	–	–	+	+	–	–	+	+	–	–	+
69	*Anguliphantes angulipalpis* (Westring, 1851)	+	+	+	–	+	+	+	+	–	–	+
70	*Bathyphantes nigrinus* (Westring, 1851)	+	+	–	–	–	–	–	–	–	–	–
71	*Bolyphantes alticeps* (Sundevall, 1833)	+	+	+	–	–	–	+	–	–	–	–
72	*Centromerus sylvaticus* (Blackwall, 1841)	–	–	–	–	+	+	+	–	–	–	–
73	*Ceratinella brevis* (Wider, 1834)	–	–	+	–	–	+	+	–	–	+	+
74	*C. scabrosa* (O. Pickard-Cambridge, 1871)	+	+	+	+	–	+	+	–	–	+	–
75	*Dicymbium nigrum* (Blackwall, 1834)	–	–	–	+	–	+	+	–	–	–	+
76	*Diplocephalus picinus* (Blackwall, 1841)	+	+	+	+	+	+	+	+	–	–	–
77	*Diplostyla concolor* (Wider, 1834)	+	+	–	–	+	+	–	–	–	–	–
78	*Drapetisca socialis* (Sundewall, 1833)	–	–	–	–	+	–	–	–	–	–	–
79	*Entelecara acuminata* (Wider, 1834)	+	+	+	+	+	+	+	–	–	–	–
80	*E. erythropus* (Westring, 1851)	+	–	–	–	–	–	–	–	–	–	+
81	*Erigone atra* Blackwall, 1833	–	+	–	–	–	–	–	–	–	–	+
82	*Floronia bucculenta* (Wider, 1834)	–	+	+	–	+	+	+	+	–	–	–
83	*Gnathonarium dentatum* (Wider, 1834)	–	–	–	–	–	+	+	–	–	–	–
84	*Gonatium paradoxum* (L. Koch, 1869)	–	–	–	+	–	–	–	–	–	–	–
85	*Gongylidiellum latebricola* (O. Pickard-Cambridge, 1871)	–	–	–	+	–	–	–	–	–	–	–
86	*Gongylidium rufipes* (Linnaeus, 1758)	+	+	+	–	–	–	–	–	–	–	+
87	*Helophora insignis* (Blackwall, 1841)	+	+	+	–	+	+	+	–	+	–	–
88	*Hylyphantes nigritus* (Simon, 1881)	–	–	+	+	–	–	–	–	–	–	–
89	*Hypomma bituberculatum* (Wider, 1834)	–	–	–	–	–	–	+	–	–	–	–
90	*Lepthyphantes minutus* (Blackwall, 1833)	–	–	–	–	–	+	–	–	–	+	–
91	*Linyphia hortensis* Sundevall, 1830	+	+	+	+	+	+	+	+	+	+	+
92	*L. tenuipalpis* Simon, 1884	–	+	+	–	–	–	–	–	–	–	–
93	*L. triangularis* (Clerck, 1757)	+	+	+	+	+	+	+	+	+	+	–
94	*Macrargus rufus* (Wider, 1834)	–	+	–	–	–	+	+	+	–	–	+
95	*Maso sundevalli* (Westring, 1851)	–	+	+	–	+	+	+	+	–	–	–
96	*Megalepthyphantes pseudocollinus* Saaristo, 1997	–	+	–	–	+	+			–	–	+

Continuation of Table 1

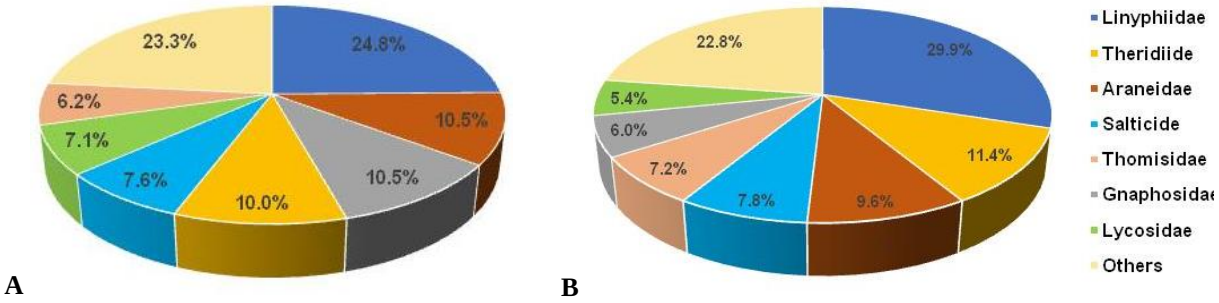
No	Species	Sites/habitats:										
		Starytsia				Haidary				Sm. Dzh.		Others
		1	2a	3	5	1	2b	2c	4	2c	5	
97	*Microctenonyx subitaneus* (O. Pickard-Cambridge, 1875)	–	+	–	–	–	–	–	–	–	–	–
98	*Microneta viaria* (Blackwall, 1841)	+	+	+	–	+	+	+	+	–	–	+
99	*Neriene clathrata* (Sundevall, 1830)	–	+	+	+		+	+	+	+	+	+
100	*N. montana* (Clerk, 1757)	+	+	–	–	+	–	–	–	–	–	+
101	*N. radiata* (Walckenaer, 1842)	+	+	+	+	+	+	+	+	–	–	+
102	*Oedothorax gibbosus* (Blackwall, 1841)	–	–	+	–	–	–	–	–	–	–	–
103	*Pelecopsis mengei* (Simon, 1884)	–	+	+	–	–	+	+	+	–	–	+
104	*Pocadicnemis pumila* (Blackwall, 1841)	–	–	+	–	–	–	–	–	–	–	–
105	*Stemonyphantes lineatus* (Linnaeus, 1758)	–	–	–	–	–	–	–	+	–	–	–
106	*Tapinocyba insecta* (L. Koch, 1869)	–	+	–	–	–	–	–	+	–	–	–
107	*Tapinopa longidens* (Wider, 1834)	–	–	–	–	–	–	+	–	–	–	–
108	*Tenuiphantes flavipes* (Blackwall, 1854)	+	+	+	–	+	+	+	+	+	–	+
109	*Thyreostenius parasiticus* (Westring, 1851)	–	+	–	–	–	–	–	–	–	–	+
110	*Trematocephalus cristatus* (Wider, 1834)	+	+	+	+	+	–	–	–	–	–	–
111	*Trichoncus affinis* Kulczyn'ski 1894	–	–	+	–	–	–	–	–	–	+	–
112	*Walckenaeria alticeps* (Denis, 1952)	+	+	+	+	+	+	+	+	–	–	+
113	*W. antica* (Wider, 1834)	–	–	–	–	–	–	–	–	–	–	+
114	*W. atrotibialis* (O. Pickard-Cambridge, 1878)	+	+	+	+	–	–	+	–	–	–	–
115	*W. nudipalpis* (Westring, 1851)	–	–	–	–	–	+	–	–	–	–	–
116	*W. obtusa* Blackwall, 1836	–	–	+	–	–	–	–	–	–	–	–
117	*W. vigilax* (Blackwall, 1853)	–	+	–	–	–	–	–	–	–	–	–
	Liocranidae											
118	*Agroeca brunnea* (Blackwall, 1833)	+	+	+	+	+	+	+	+	+	+	+
119	*A. cuprea* Menge, 1873	–	–	–	–	–	–	–	–	+	+	+
120	*A. lusatica* (L. Koch, 1875)	–	+	–	–	–	–	–	–	–	–	–
	Lycosidae											
121	*Alopecosa farinosa* (Herman, 1879)	–	–	–	+	–	–	–	–	–	+	–
122	*A. pulverulenta* (Clerck, 1757)	–	+	+	+	–	–	–	+	–	+	+
123	*A. trabalis* (Clerck, 1757)	–	–	+	+	–	–	+	+	–	+	+
124	*Arctosa lutetiana* (Simon, 1876)	–	–	–	+	–	–	+	+	+	–	+
125	*Pardosa agrestis* (Westring, 1861)	–	–	–	+	–	–	–	–	–	–	–
126	*P. alacris* (C. L. Koch, 1833)	+	+	+	+	+	+	+	+	+	+	+
127	*P. fulvipes* (Collet, 1876)	–	–	–	+	–	–	–	–	–	–	–
128	*P. lugubris* (Walckenaer, 1802)	–	–	+	+	–	–	+	+	–	+	+
129	*P. paludicola* (Clerck, 1757)	–	–	–	+	–	–	–	–	–	–	+
130	*P. palustris* (Linnaeus, 1758)	–	–	–	+	–	+	–	–	–	–	–
131	*Piratula hygrophila* (Thorell, 1872)	–	–	–	–	+	–	+	–	–	–	+
132	*Trochosa robusta* (Simon, 1876)	–	–	–	–	–	–	–	–	–	+	–
133	*T. ruricola* (De Geer, 1778)	–	–	+	+	–	–	–	+	–	–	+
134	*T. terricola* Thorell, 1856	+	+	+	+	+	+	+	+	+	+	+
135	*Xerolycosa miniata* (C. L. Koch, 1834)	–	–	–	+	–	–	–	–	–	+	–
	Mimetidae											
136	*Ero aphana* (Walckenaer, 1802)	–	–	–	–	–	–	–	–	–	+	–
137	*E. furcata* (Villers, 1789)	+	+	+	+	–	+	+	–	–	–	–
	Miturgidae											
138	*Zora nemoralis* (Blackwall, 1861)	–	+	+	+	–	+	+	+	+	+	+
139	*Z. silvestris* Kulczyn'ski, 1897	–	–	+	–	–	–	–	+	–	–	+
140	*Z. spinimana* (Sundevall, 1833)	+	+	+	+	–	+	+	+	+	+	+
	Philodrimidae											
141	*Philodromus cespitum* (Walckenaer, 1802)	–	–	–	–	–	+	–	–	–	–	–
142	*Ph. dispar Walckenaer, 1826*	–	+	+	+	–	+	+	+	+	+	+
143	*Ph. rufus* Walckenaer, 1826	+	–	+	–	–	+	–	–	–	–	–
144	*Thanatus formicinus* (Clerck, 1757)	–	–	–	–	–	–	–	+	–	+	–
145	*Th. sabulosus* (Menge, 1875)	–	–	–	–	–	–	–	–	–	+	–
146	*Tibellus oblongus* (Walckenaer, 1802)	–	+	+	+	–	+	+	+	–	–	+
	Phrurolothidae											
147	*Phrurolithus festivus* (C. L. Koch, 1835)	+	+	+	+	+	+	+	–	–	+	+
148	*Ph. minimus* C.L. Koch, 1839	–	1	1	1	–	–	–	–	–	–	–
	Pisauridae											
149	*Pisaura novicia* (L. Koch, 1878)	–	–	+	+	–	+	+	+	+	+	+

Continuation of Table 1

No	Species	Sites/habitats:										
		Starytsia				Haidary				Sm. Dzh.		Others
		1	2a	3	5	1	2b	2c	4	2c	5	
	Salticidae											
150	*Attulus pubescens* (Fabricius, 1775)	–	–	–	–	–	–	–	+	–	–	–
151	*Ballus chalybeius* (Walckenaer, 1802)	+	+	+	–	–	+	+	+	+	–	+
152	*Euophrys frontalis* (Walckenaer, 1802)	–	–	–	–	–	–	–	–	+	+	–
153	*Evarcha arcuata* (Clerck, 1757)	–	+	+	+	–	–	–	–	–	+	–
154	*E. falcata* (Clerck, 1757)	–	+	+	+	–	+	+	+	–	–	+
155	*Heliophanus auratus* C. L. Koch, 1835	–	–	–	+	–	+	–	+	–	–	–
156	*H. cupreus* (Walckenaer, 1802)	+	+	+	+	–	+	+	+	+	+	+
157	*H. dubius* C. L. Koch, 1835	–	–	–	–	–	–	+	–	–	–	–
158	*Marpissa muscosa* (Clerck, 1757)	+	–	–	–	–	–	–	–	–	–	–
159	*Myrmarachne formicaria* (De Geer, 1778)	–	–	–	+	–	–	–	–	–	–	–
160	*Phlegra fasciata* (Hahn, 1826)	–	–	–	+	–	–	–	–	–	+	–
161	*Pseudeuophrys obsoleta* (Simon, 1868)	–	–	+	+	–	+	–	–	–	–	–
162	*Pseudicius encarpatus* (Walckenaer, 1802)	–	–	–	–	–	–	–	–	–	+	+
163	*Salticus scenicus* (Clerck, 1757)	–	–	–	–	–	–	–	+	–	–	–
164	*S. zebraneus* (C. L. Koch, 1837)	–	–	–	–	–	–	–	–	–	–	+
165	*Sibianor aurocinctus* (Ohlert, 1865)	–	–	–	–	–	–	–	–	–	–	+
	Segestriidae											
166	*Segestria senoculata* (Linnaeus, 1758)	–	–	–	–	+	+	–	–	–	–	–
	Sparassidae											
167	*Micrommata virescens* (Clerck, 1757)	–	+	+	+	–	+	+	+	–	–	+
	Tetragnathidae											
168	*Metellina mengei* (Blackwall, 1870)	–	–	–	–	–	–	–	–	–	–	+
169	*M. segmentata* (Clerck, 1757)	+	+	+	–	+	+	+	+	+	–	+
170	*Pachygnatha degeeri* Sundevall, 1830	–	–	–	+	–	–	+	+	–	+	+
171	*P. listeri* Sundevall, 1830	+	+	+	+	+	+	+	+	–	–	+
172	*Tetragnatha extensa* (Linnaeus, 1758)	–	–	–	–	–	–	–	–	–	–	+
173	*T. montana* Simon, 1874	–	+	+		+	+	+	+	–	–	–
174	*T. obtusa* C. L. Koch, 1837	–	+	–	–	–	–	–	–	–	–	–
175	*T. pinicola* L. Koch, 1870	+	+	+	+	+	+	+	+	+	–	+
	Theridiidae											
176	*Asagena meridionalis* (Kulczynski 1894)	–	–	–	–	–	–	–	+	–	–	–
177	*A. phalerata* (Panzer, 1801)	–	–	–	–	–	–	–	+	–	–	–
178	*Crustulina guttata* (Wider, 1834	–	–	–	–	–	–	+	–	–	–	–
179	*Dipoena erythoropus* (Simon, 1881)	–	+	–	–	–	–	+	–	–	–	–
180	*D. melanogaster* (C. L. Koch, 1837)	–	–	+	–	–	–	–	–	–	–	–
181	*Enoplognatha latimana* Hippa et Oksala, 1982	–	–	–	+	–	–	–	–	–	–	–
182	*E. ovata* (Clerck, 1757)	+	+	+	+	+	+	+	+	+	+	+
183	*Episinus angulatus* (Blackwall, 1836)	–	–	+	–	+	–	+	–	–	–	–
184	*Euryopis flavomaculata* (C. L. Koch, 1836)	–	+	–	–	–	+	+	–	–	–	–
185	*Neottiura bimaculata* (Linnaeus, 1767)	+	+	+	+	+	+	+	+	–	–	–
186	*Paidiscura pallens* (Blackwall, 1834)	–	–	–	–	–	–	–	–	–	–	+
187	*Parasteatoda lunata* (Clerck, 1757)	+	+	+	–	+	–	–	–	+	–	–
188	*P. simulans* (Thorell, 1875)	+	+	+	+	+	+	+	–	–	–	–
189	*Phylloneta impressa* (L. Koch, 1881)	–	–	–	+	–	–	–	–	–	–	–
190	*Platnickina tincta* (Walckenaer, 1802)	+	+	+	–	–	–	–	+	–	–	–
191	*Robertus arundineti* (O. Pickard-Cambridge, 1871)	–	–	+	–	–	–	–	+	–	–	–
192	*R. lividus* (Blackvall, 1836)	+	+	+	+	–	+	+	–	–	–	–
193	*Simitidion simile* (C. L. Koch, 1836)	–	–	–	+	–	–	–	–	–	–	–
194	*Steatoda bipunctata* (Linnaeus, 1758)	–	–	–	–	–	–	–	+	+	–	–
195	*Theridion pinastri* L. Koch, 1872	–	–	–	–	–	–	–	–	–	–	+
196	*Th. varians* Hahn, 1833	+	+	+	+	+	+	+	+	+	–	–
	Thomisidae											
197	*Cozyptila blackwalli* Simon, 1875	–	–	–	–	–	+	+	+	–	–	+
198	*Ebrechtella tricuspidata* (Fabricius, 1775)	–	+	+	+	–	+	+	+	+	+	+
199	*Misumena vatia* (Clerck, 1757)	–	–	+	+	–	+	+	+	–	+	+
200	*Ozyptila praticola* (C. L. Koch, 1837)	+	+	+	+	–	+	+	–	+	+	–
201	*Pistius truncatus* (Pallas, 1772)	–	+	–	–	–	+	+	–	–	+	+
202	*Synema globosum* (Fabricius, 1775)	–	–	–	–	–	–	–	+	–	–	+
203	*Tmarus piger* (Walckenaer, 1802)	–	+	+	+	–	+	+	+	+	+	+

Continuation of Table 1

No	Species	Sites/habitats:										
		Starytsia				Haidary				Sm. Dzh.		Others
		1	2a	3	5	1	2b	2c	4	2c	5	
204	*Xysticus cristatus* (Clerck, 1758)	–	–	–	+	–	–	–	–	+	+	–
205	*X. kochi* Thorell, 1872	–	–	–	+	–	–	–	–	–	–	–
206	*X. lanio* C. L. Koch, 1835	–	–	+	+	–	–	+	–	–	–	+
207	*X. luctator* L. Koch, 1870	–	–	+	+	–	+	+	+	+	+	–
208	*X. luctuosus* (Blackwall, 1836)	–	+	+	–	–	–	–	–	–	–	+
209	*X. ulmi* (Hahn, 1831)	–	+	+	+	–	+	+	–	–	–	+
	Titanoecidae											
210	*Titanoeca schineri* L. Koch, 1872	–	–	–	–	–	–	–	–	–	+	+
	Total species	49	82	94	99	43	83	83	76	46	70	101



A **B**

Fig. 1. Relative species richness of dominant spider families in the araneofauna of the oak forests of Kharkiv Region: A — total, B — under the canopy.

Most recorded species are widely distributed within the oak forests of the forest-steppe part of the Central Russian Upland (Esjunin, Golovatch, Penev, 1993; Ponomarev, Polchaninova, 2006; Polchaninova, 2009, 2011, 2014). Nevertheless, we can mention some remarkable records.

Agelenopsis potteri, an invasive species from North America, has recently been found in the east of Kharkiv Region (Polchaninova, 2023). Previously, it has been recorded from nine regions of Ukraine where it inhabited buildings, forests, and forest plantations.

Gnaphosa licenti is typical of dry steppe habitats. Finding it in the forest clearing is quite unexpected. This species was registered in Ukraine in Luhansk Region in 2009 (Polchaninova, Prokopenko, 2013, 2017), and, since then, we have observed its westward spread. Now, its westernmost known locality is Osokorivka village in Kherson Region (Prokopenko, Zhukov, 2018).

Marinarozelotes malckini is also a steppe species. Chornyi Lis in Kharkiv Region is its northernmost locality detached from the main area. It may have been introduced since the investigated forest edge was not far from the highway. The nearest find of this species is chalk grasslands in the north of Donetsk Region (Polchaninova, 2022).

Although *Ero aphana* has been reported from forests and forest edges in Right-Bank Ukraine (Syngayevsky, 2010; Fedoriak, 2015; Polchaninova *et al.*, 2017), this is the only find in the forest habitat of the left bank.

Drassylis villicus was one of the dominants among the ground-dwelling spiders in Smarahdove Dzerelo. Previously it was recorded in the oak forests and forest edges in the south of the forest-steppe zone, but never in high abundance (Polchaninova, 2009a, 2014). Further research will help determine the reason for this peak of abundance (climate change, site-specificity, or natural long-term fluctuations in individual abundance).

In the spider fauna of the three monitoring sites, 28 out of 196 species (14%) were found in most habitats, 46 species (24%) were absent under the canopy, 12 species (6%) avoided moist oakeries, and only 4 species (2%) preferred moist and mesic conditions. The spider species composition was the poorest (43–49 species) and most similar (Fig. 2) in the moist oakeries of the two sites. The low number of species (46) in the mesic forest of Smarahdove Dzherelo reflects the insufficiency of research. Spiders of open habitats are the richest in local faunas (from 71 to 98 species) and highly variable — they do not group in ordination (Fig. 2). Moreover, spiders of the dry oakery of Starytsia (94 species) are closer to those of the mesic forests of Haidary (83 species), but not to the spiders of the neighboring clearings.

The Haidary open oakery hosts fewer spider species (76) and occupies an intermediate position between open habitats and forests under the canopy. Spiders of Smarahdove Dzherelo were most specific both under the canopy and in open places. In general, the similarity of the spider species composition in different forest types depended on habitat characteristics and geographic proximity (Fig. 2). These conclusions are consistent with the results of our previous studies (Polchaninova, 2013, 2014).

Spider assemblages of the Starytskyi forest. The spider fauna of the Starytskyi forest is the richest among the studied oakeries of North-Eastern Ukraine (151 species, Table 1). The two-year studies showed that species richness peaks in June in all habitats. Still, the differences in the species number were highly pronounced in 2001 due to an increase in dry oakery but more uniform in 2002. In May, the number of species was higher in 2022, and then, except in the dry forest, it reached or exceeded the values of 2001. Despite the difference in seasonal dynamics, the spider species richness remained at the same level in both years (106 species in 2001 and 102 — in 2002), and their faunistic similarity was high (Jaccard coefficient: 77.3%).

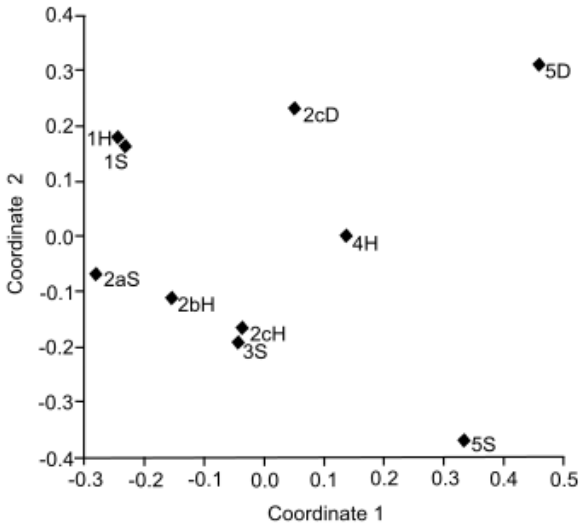


Fig. 2. Ordination of the studied habitats based on spider species composition. Euclidian distance, non-metric multidimensional scaling (NMDS), stress = 0.135 (for abbreviations, see Materials and Methods).

Thirty species (19.9%) occurred in all habitats of the Starytskyi forest. Interestingly, the proportion of local generalists is highly variable in different oakeries: 25.5% in Dubroshino forest (Kursk Region), 23% in 'Les na Vorskle' (Belgorod Region), 8% in Trostianets (Sumy Region), and 7% in Vorontsovka (Voronezh Region) (Polchaninova, 2003, 2009, 2011, 2014). In the latter two oakeries, the mesic and moist habitats had very sparse herbage or a cover of dog's mercury (*Mercurialis perennis* L.). According to our observations, this poisonous plant is rarely visited by insects, which leads to an impoverishment of their assemblages and, consequently, the assemblages of predators. The ground elder, in contrast, is very attractive to pollinators and other insects, and spiders often place their nets among its leaves and stems. As a rule, spider species richness in the moist oakeries is lower than in the other forest habitats, but in the absence of ground elder, it becomes particularly poor. A specific pattern of the Starytskyi forest is the absence of *Pirata hygrophila*, which dominates moist habitats in other oakeries, a relatively high abundance of *Bolyphantes alticeps* and *Neriene radiata*, rare or absent in the oak forests of northeastern Ukraine, and a high number of *Parasteatoda simulans* in the herb layer.

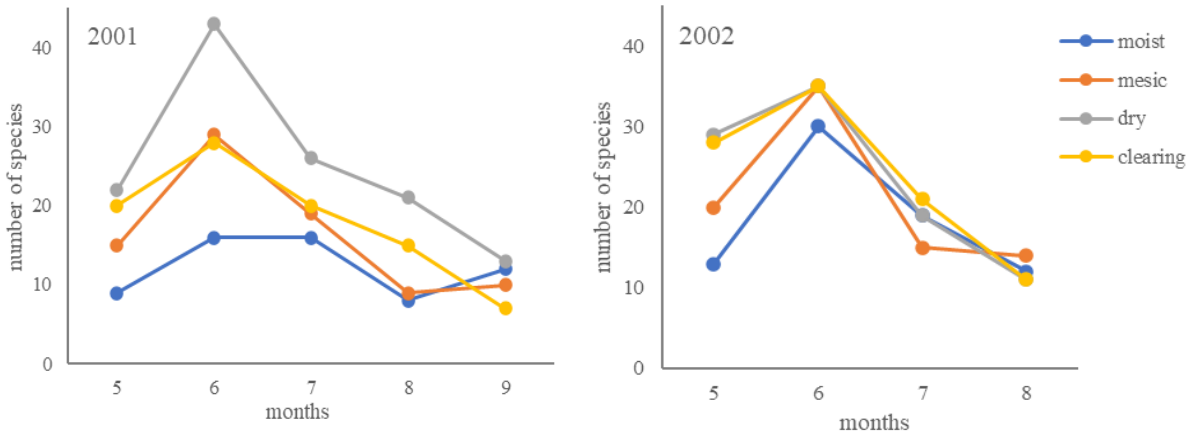


Fig. 3. Seasonal dynamics of the spider species richness in different habitats of the Starytskyi forest. Moist, mesic, and dry indicate the forest type.

We found 69 species of spiders in the herb layer, 60 of which were collected by sweep netting. Spiders were distributed unevenly within the habitats ranging from 30 species in the moist oakery to 42 species in the dry one (Table 2). Spider abundance was the highest in the mesic forest, the lowest in the clearings, and did not vary much under the canopy. Alpha diversity of the spider assemblages depended on humidity and shading: all three diversity indices were higher in the dry oakery and clearings (Table 2). The same patterns of spider assemblages were observed in 'Les na Vorskle' (Polchaninova, 2011).

Dominant complexes of spiders were formed by seven species in the dry oak forest, six species in the mesic forest, five species in the moist forest, and only three species in the clearings (Table 2). *Linyphia triangularis* was present in all complexes; otherwise, the complexes of the clearings differed from those of the forests. The dominant complex comprised half of the individual abundance in the clearings (52%), making up 72.7% to 85.3% under the canopy. Three main dominants of the forest herbage — *Linyphia triangularis*, *Helophora insignis*, and *Metellina segmantata* had the lowest proportions in the assemblage of the dry forest, the proportion of *Enoplognatha ovata* was equal in the dry and mesic forests, while that of *Araneus diadematus* and *Philodrimus dispar* increased in the dry forest (Table 2). The first four species are typical dominants in the herb layer of all the studied oak forests in the Central Russian Upland (Polchanonova, 2011, 2014).

Table 2. Dominant complexes and alpha diversity of the herb-dwelling spider assemblages in different habitats of the Starytskyi forest (sweep netting, % of total individuals in the habitat).

Species	Habitats:			
	forest under the canopy:			clearings
	moist	mesic	dry	
Number of species	30	35	42	37
Average seasonal number (ind./100 sweeps)	39.4	44	38	34
Shannon index	2.355	2.462	2.859	2.805
Evenness	0.351	0.335	0.415	0.447
Margalef index	4.456	4.651	5.985	5.948
Araneus diadematus	3.0	2.4	5.4	1.4
Mangora acalypha	0.0	0.1	2.9	27.8
Dictyna arundinacea	0.0	0.0	0.3	11.1
Bolyphantes alticeps	0.1	6.6	0.4	0.0
Helophora insignis	16.1	18.5	5.4	0.0
Linyphia hortensis	9.2	4.1	7.8	0.2
L. triangularis	14.5	15.0	10.5	7.3
Philodromus dispar	2.2	7.4	15.4	0.2
Metellina segmentata	14.3	12.5	6.1	0.0
Enoplognatha ovata	23.8	18.7	18.4	2.1
Total dominants	83.3	95.7	72.7	50.1

Active ground-dwelling spiders were represented by 77 species, most of which were concentrated in the clearings (Table 3). Seven species in single specimens were found only under the canopy, but they are not forest specialists. The spider assemblages of the moist oakery were the poorest in species and individuals, but they had the highest evenness and relatively high Shannon index. Conversely, in the dry forest, these indices were the lowest due to the extremely high abundance of *Pardosa alacris*. This is the most abundant ground-dwelling species in the studied oak forests, except 'Les na Vorskle', which rarely dominates moist habitats. It is accompanied by a close species, *Pardosa lugubris*, in the clearings and on forest edges. (Polchaninova, 2011, 2013). In the Starytskyi forest, *P. alacris* was presented in the dominant complex even in the moist oakery but in a smaller proportion than *Trochosa terricola* and *Ozyptila praticola* (Table 3). Under the forest canopy, the dominant species belonged to three families — Linyphiidae, Lycosidae, and Thomisidae, while on the clearings, only Lycosidae prevailed.

Hand collecting and quadrate sampling in the forest litter added nine species to the list, mainly Linyphiidae, while 17 species presented in both, quadrat and pitfall samples. Spider density in litter was nearly equal in dry, moist, and mesic oakeries with sedge (18–19 ind./m^2), and slightly higher in the mesic oakery with ground elder (21 ind./m^2). These figures are lower and vary in smaller limits than in 'Les na Vorskle' (17.6–27.5 ind./m^2) and Haidary (20–45 ind./m^2) forests. The number of adult specimens was not sufficient for quantitative analysis, but it can be noted that *Abacoproeces saltuum*, *Microneta viaria*, and *Tenuiphantes flavipes* were more common than other species.

Table 3. Dominant complexes and alpha diversity of the ground-dwelling spider assemblages in different habitats of the Starytskyi forest (pitfall trapping, % of total individuals in the habitat).

Species	Habitats			
	forest under the canopy			clearings
	moist	mesic	dry	
Number of species	17	25	43	68
Average seasonal number (ind./100 trap-days)	9.6	27.6	71.3	66.3
Shannon index	1.980	1.592	1.426	2.158
Evenness	0.426	0.196	0.097	0.127
Margalef index	3.397	4.066	5.946	8.591
Abacoproeces saltuum	6.3	6.0	3.3	1.1
Alopecosa pulverulenta	–	0.3	0.1	5.4
Pardosa alacris	12.6	64.2	71.5	41.8
P. lugubris	–	–	2.7	21.1
Trochosa terricola	37.8	6.0	6.1	6.2
Ozyptila praticola	21.6	5.5	2.3	4.6
Total dominants	78.3	82.0	86.0	80.2

Conclusions. The spider fauna of the oak forests of Kharkiv Region is rich (210 species of 24 families) and displays the typical features of the sylvatic araneofauna of the Central Russian Upland: the highest species richness of the family Linyphiidae (24,8% of the total fauna and 30% under the canopy), the lower species richness in the moist oak forests (43–49 species) compared to the mesic and dry ones (76–94 species), and a seasonal maximum of the number of species in June. In the three well-studied oak woodlands of the region, 62% of the species occurred only under the canopy, while 14% were generalists that also inhabited clearings and glades. The faunistic similarity of spider assemblages depended on the oakery type and geographic proximity. A case study of the spiders in the Starytskyi forest confirmed that the herb-dwelling spiders have the lowest alpha diversity in the moist oakeries and the highest in the dry forests and clearings. The ground-dwelling spiders are also the poorest in species and individuals in the moist oakeries but have there the most even assemblage structure. In the dry forests and clearings, the assemblages are more variable and have the lowest evenness due to the overdominance of *Pardosa alacris*. Spider species composition and dominant complexes depend on the forest type and change dramatically between the clearings and the habitats under the forest canopy.

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