

**MATERIALS TO THE SPIDER FAUNA (ARANEI) OF THE BYKOVA SHEYA SITE OF THE
“GALICH’YA GORA” NATURE RESERVE (LIPETSK REGION, RUSSIA)**

Polchaninova N.Yu.

V.N. Karazin Kharkiv National University

Email: polchaninova@mail.ru

A total of 73 spider species from 15 families were recorded from the Bykova Sheya site of the “Galich’ya Gora” Nature Reserve (Lipetsk Region, Russia) in April – August 2011–2012. The material was collected thorough pitfall-trapping and sweep-netting. Four habitats were investigated: abandoned field on the upper interfluves (31 spider species), stony slope with the typical vegetation of calcareous grasslands (28 species), slope with shrub and fob-bunchgrass vegetation (35 species), and a floodplain meadow (38 species). Hand collecting in a forest shelterbelt and on the riverbank added eight species to the list. Two families, Gnaphosidae (15 species) and Lycosidae (13 species) were the most species-rich. Four registered species are regionally rare (*Gnaphosa taurica*, *Berlandina cinerea*, *Eresus kollari* and *Alopecosa solitaria*); the latter two can be considered as specific species of the ‘Bykova Sheya’ site. An annotated checklist and a brief description of the spider assemblages of different habitats are given.

Key words: Aranei, “Galich’ya Gora” Reserve, Lipetsk Region, fauna, spider assemblages, steppe habitats

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INTRODUCTION

Arachnological studies in the “Galich’ya Gora” Nature Reserve were launched by N.Yu. Panteleeva (Voronezh State University, Russia) in late 1970s. Two sites, Morozova Gora and Galich’ya Gora, were investigated, and a list of 130 species was published (Panteleeva, 1981; 1982). After a 30-year gap, we have renewed the research and partly published the data on spider assemblages of the Galich’ya Gora (Polchaninova & Tsurikov, 2014, Polchaninova & al., 2016) and Bykova Sheya (Tsurikov & Polchaninova, 2015) sites. We distinguished prospective species for listing in the Red Data Book of Lipetsk Region (Polchaninova, 2011), compiled a list and analyzed spider assemblages of the Plyushchan’ site (Polchaninova, 2014), and studied the post-fire recovery of the cursorial spiders and beetles at the Morozova Gora site (Polchaninova & al., 2016).

The previous paper about the arthropods of the Bykova Sheya (Tsurikov & Polchaninova, 2015) was focused on the spider and beetle short-term responses to a summer fire of 2010. The aim of the present paper is to give a full checklist of species and characterize spider assemblages of the study site.

MATERIAL AND METHODS

The total area of the Bykova Sheya is 30.83 ha. It is located in the valley of Sukhaya Lubna River (a tributary of the River Don) in Lipetsk Region, Russia (coordinates of the site centre 52°45’58.89”N, 39°3’41.99”E). The basic research was conducted in the steppe and meadow habitats: (1) 30-year old abandoned field on the upper interfluves, (2) south facing stony slope covered with the sparse vegetation of limestone outcrops, (3) southwest facing slope covered with shrub thickets (*Amigdalus nana* L., *Spiraea* spp.) and frob-bunchgrass vegetation (further in the text as “grassy slope”), and (4) floodplain meadow in the gully bottom.

At each studied plot, we established a line of 10 pitfall traps inserted at 10 m intervals (250 ml plastic caps with 4% solution of formalin as a fixative). The traps were emptied approximately once a month during 25 May – 1 August 2011 and 28 April – 5 August 2012. The material comprised 1175 spider specimens. The hand collecting was conducted in the same dates. Sweep-net samples were taken in May, June and August

2012. In addition, we investigated a birch shelterbelt on the top slope and arboreal and shrub vegetation on the riverbank.

In the annotated checklist, each species is provided with a number of males and/or females, habitat, date, and a collecting method. We used the following abbreviations: m – male, f – female, abandoned f. – abandoned field, stony sl. – stony slope, grassy sl. – slope with forb-bunchgrass and shrub vegetation, pt. – pitfall-trapping, sn. – sweep-netting, hc. – hand collecting. The families and species are listed alphabetically according to the World Spider Catalogue (WSC, 2016).

When comparing the alpha-diversity of spider assemblages, diversity indices were calculated in the program PAST with the use of bootstrap method for assessing statistical significance of their differences (Hammer & al., 2001); dominance rank of the species is given after Tischler (1949), the dominant complexes include superdominant (more than 10% of collected individuals) and dominant (5–10%) species.

ANNOTATED LIST OF SPECIES

Family AGELENIDAE

1. *Agelena labyrinthica* (Clerck, 1757): 1m, stony sl., 29.06–5.08.2012, pt.

Family ARANEIDAE

2. *Agalenatea redii* (Scopoli, 1763): 2m1f, abandoned f., 28.04.2012, hc.; 1f, same place, 27.05.2012, sn.; 1m, stony sl., 28.04.2012, hc.; 2f, grassy sl., 27.05.2012, sn.; 1m1f, meadow, 28.04.2012, hc.; 1f, same place, 27.05.2012, sn.
3. *Araneus diadematus* Clerck, 1757: 3m, birch shelterbelt, 5.08.2012, hc.
4. *Araneus quadratus* Clerck, 1757: 1m, meadow, 5.08.2012, hc.
5. *Argiope bruennichi* (Scopoli, 1772): 1m, grassy sl., 29.06.2012, hc.; 1f, meadow, 5.08.2012, hc.
6. *Cyclosa conica* (Pallas, 1772): 1f, birch shelterbelt, 27.05.2012, hc.
7. *Hypsosinga sanguinea* (C. L. Koch, 1844): 1m, abandoned f., 25.05–22.06.2011, pt.; 1f, 27.05.2012, same place, sn.
8. *Larinioides patagiatus* (Clerck, 1757): 1f, shrubs on the riverbank, 22.06.2011, hc.
9. *Mangora acalypha* (Walckenaer, 1802): 2f, abandoned f., 27.05.2012, sn.; 1m1f, stony sl., 27.05.2012, hc.; 1f, grassy sl., 27.05.2012, sn.; 3m7f, meadow, 27.05.2012, sn.; 2f, birch shelterbelt, 22.06.2011, hc.
10. *Neoscona adianta* (Walckenaer, 1802): 2f, abandoned f., 5.08.2012, sn.; 1m, stony sl., 29.06.2012, sn.; 1m1f, grassy sl., 29.06.2012, sn.
11. *Singa hamata* (Clerck, 1757) 1f, grassy sl., 27.05.2012, sn.

Family ATYPIDAE

12. *Atypus muralis* Bertkau, 1890: 1m, abandoned f., 25.05–22.06.2011, 1m, same place, 27.05–29.06.2012; 1m, stony sl., 25.05–22.06.2011; 1m, same place, 22.06–1.08.2011; 7m, same place, 27.05–29.06.2012; 1m, same place, 29.06–5.08.2012; 1m, grassy sl., 22.06–1.08.2011, all specimen through pt.

Family DICTYNIDAE

13. *Dictyna arundinacea* (Linnaeus, 1758): 2m2f, abandoned f., 28.04.2012, hc.; 3f, same place, 27.05.2012, sn.; 5f, stony sl., 28.04.2012, hc.; 1m3f, grassy sl., 28.04.2012, hc.; 3f, same place, 27.05.2012, sn.; 4f, meadow, 27.05.2012, sn.

Family ERESIDAE

14. *Eresus kollari* Rossi, 1846: 1m juv., stony sl., 25.05–22.06.2011, pt.; 4m juv., grassy sl., 25.05–22.06.2011, pt.

Family EUTRICHURIDAE

15. *Cheiracanthium virescens* (Sundevall, 1832): 1f, stony sl., 28.04–27.05.2012, pt.

Family GNAPHOSIDAE

16. *Berlandina cinerea* (Menge, 1872): 13m3f, stony sl., 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012; 1f, same place, 29.06–5.08.2012; 1m, grassy sl., 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012, all specimens through pt.
17. *Callilepis nocturna* (Linnaeus, 1758): 1m, abandoned f., 25.05–22.06.2011, pt.
18. *Drassodes pubescens* (Thorell, 1856): 1m, meadow, 25.05–22.06.2011, pt.
19. *Drassyllus praeficus* (L. Koch, 1866): 1m1f, meadow, 25.05–22.06.2011, pt.; 1m, same place, 22.06–1.08.2011, pt.; 1f, same place, 29.06–5.08.2012, pt.
20. *Drassyllus pusillus* (C. L. Koch, 1833): 1m1f, abandoned f., 25.05–22.06.2011, pt.; 3m, meadow, 28.04–27.05.2012, pt.; 1m1f, same place, 27.05–29.06.2012, pt.
21. *Gnaphosa lucifuga* (Walckenaer, 1802): 1m, grassy sl., 22.06–1.08.2011, pt.
22. *Gnaphosa lugubris* (C. L. Koch, 1839): 3m, meadow, 28.04–27.05.2012, pt.
23. *Gnaphosa taurica* Thorell, 1875: 1m, abandoned f., 25.05–22.06.2011; 1f, stony sl., 27.05–29.06.2012; 1f, grassy sl., 25.05–22.06.2011, 1f, same place, 22.06–1.08.2011; 1m, same place, 28.04–27.05.2012; 2f, same place, 27.05–29.06.2012, all specimens through pt.
24. *Haplodrassus kulczynskii* Lohmander, 1942: 2m, abandoned f., 25.05–22.06.2011; 3m, stony sl., 28.04–27.05.2012; 2f, grassy sl., 25.05–22.06.2011; 4m2f, meadow, 28.04–27.05.2012, all specimens through pt.
25. *Haplodrassus signifer* (C. L. Koch, 1839): 5m, abandoned f., 25.05–22.06.2011; 4m2f, same place, 27.05–29.06.2012; 2m1f, stony sl., 25.05–22.06.2011; 12m2f, same place, 28.04–27.05.2012; 2m2f, same place, 27.05–29.06.2012; 2m2f, grassy sl., 25.05–22.06.2011; 1f, same place, 28.04–27.05.2012; 2m, same place, 27.05–29.06.2012; 5m2f, meadow, 25.05–22.06.2011, 2m, same place, 28.04–27.05.2012, 1m, same place, 27.05–29.06.2012, all specimens through pt.
26. *Micaria formicaria* (Sundevall, 1831): 1f, abandoned f., 29.06–5.08.2012, pt.; 1m, grassy sl., 29.06–5.08.2012, pt.; 2m1f, meadow, 29.06–5.08.2012, pt.; 1f, same place, 29.06.2012, sn.
27. *Micaria fulgens* (Walckenaer, 1802): 6m1f, meadow, 22.06–1.08.2011, pt.; 1m, same place, 27.05–29.06.2012, pt.
28. *Zelotes aeneus* (Simon, 1878): 2m, meadow, 22.06–1.08.2011, pt.
29. *Zelotes longipes* (L. Koch, 1866): 3f, abandoned f., 25.05–22.06.2011; 1f, same place, 22.06–1.08.2011; 1f, stony sl., 25.05–22.06.2011; 2f, same place, 27.05–29.06.2012; 2m3f, same place, 29.06–5.08.2012; 5f, grassy sl., 25.05–22.06.2011; 1f, same place, 22.06–1.08.2011; 1f, same place, 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012; 3m1f, same place, 29.06–5.08.2012, all specimens through pt.
30. *Zelotes petrensis* (C. L. Koch, 1839): 1m2f, grassy sl., 22.06–1.08.2011, pt.; 2m, same place, 22.06–1.08.2011, pt.

Family LINYPHIIDAE

31. *Linyphia triangularis* (Clerck, 1757): 3m5f, birch shelterbelt, 5.08.2012, hc.; 3m3f, 5.08.2012, shrubs on the riverbank, hc.
32. *Microlinyphia pusilla* (Sundevall, 1830): 1f, meadow, 29.06–5.08.2012, pt.

Family LIOCRANIDAE

33. *Agroeca cuprea* Menge, 1873: 1f, abandoned f., 28.04–27.05.2012, pt.; 2f, same place, 27.05–29.06.2012, pt.
34. *Agroeca lusatica* (L. Koch, 1875): 1f, meadow, 28.04–27.05.2012, pt.

Family LYCOSIDAE

35. *Alopecosa accentuata* (Latreille, 1817): 14f, abandoned f., 25.05–22.06.2011; 47m8f, same place, 28.04–27.05.2012; 7f, same place, 27.05–29.06.2012; 1f, same place, 29.06–5.08.2012; 11f, stony sl., 25.05–22.06.2011; 1m6f, same place, 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012; 10f,

- grassy sl., 25.05–22.06.2011; 22m3f, same place, 28.04–27.05.2012; 4f, same place, 27.05–29.06.2012; 1f, same place, 29.06–5.08.2012; 1m12f, meadow, 25.05–22.06.2011; 1m3f, same place, 28.04–27.05.2012; 3f, same place, 27.05–29.06.2012; 1f, same place, 29.06–5.08.2012, all specimens through pt.
36. *Alopecosa cuneata* (Clerck, 1757): 3m, abandoned f., 28.04–27.05.2012; 1m, stony sl., 28.04–27.05.2012; 4m, grassy sl., 28.04–27.05.2012, 2f, same place, 27.05–29.06.2012; 3f, meadow, 25.05–22.06.2011; 10m, same place, 28.04–27.05.2012; 1f, same place, 29.06–5.08.2012, all specimens through pt.
37. *Alopecosa pulverulenta* (Clerck, 1757): 1m, abandoned f., 28.04–27.05.2012, pt.; 1m3f, meadow, 28.04–27.05.2012, pt.
38. *Alopecosa solitaria* (Herman, 1879) 2f, abandoned f., 25.05–22.06.2011; 2f, same place, 27.05–29.06.2012; 6f, stony sl., 25.05–22.06.2011; 1m, same place, 28.04–27.05.2012; 3f, same place, 27.05–29.06.2012; 2f, same place, 29.06–5.08.2012; 13f, grassy sl., 25.05–22.06.2011; 2m1f, same place, 28.04–27.05.2012; 2f, same place, 29.06–5.08.2012; 3f, meadow, 25.05–22.06.2011, all specimens through pt.
39. *Alopecosa sulzeri* (Pavesi, 1873): 2f, grassy sl., 22.06–1.08.2011, pt.
40. *Alopecosa taeniopus* (Kulczynski, 1895): 1f, abandoned f., 22.06–1.08.2011; 1m, same place, 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012; 1f, grassy sl., 27.05–29.06.2012; 7f, meadow, 25.05–22.06.2011; 1m, same place, 28.04–27.05.2012, all specimens through pt.
41. *Alopecosa trabalis* (Clerck, 1757): 3m1f, abandoned f., 25.05–22.06.2011; 2m, stony sl., 25.05–22.06.2011; 1f, same place, 28.04–27.05.2012; 1m, grassy sl., 25.05–22.06.2011; 2f, same place, 27.05–29.06.2012; 10m13f, meadow 25.05–22.06.2011; 2f, same place, 22.06–1.08.2011, 1m, same place, 28.04–27.05.2012, 1m1f, same place, 27.05–29.06.2012, all specimens through pt.
42. *Pardosa agrestis* (Westring, 1861): 1m, abandoned f., 25.05–22.06.2011, pt.
43. *Pardosa alacris* (C.L. Koch, 1833): 2m, meadow, 28.04–27.05.2012, pt.
44. *Pardosa paludicola* (Clerck, 1757): 1m, grassy sl., 28.04–27.05.2012, pt.; 2m1f, meadow, 28.04–27.05.2012, pt.
45. *Trochosa robusta* (Simon, 1876): 1m, grassy sl., 25.05–22.06.2011, pt.; 2m, same place, 28.04–27.05.2012, pt.
46. *Trochosa terricola* Thorell, 1856: 1m, grassy sl., 28.04–27.05.2012, pt.; 1f, meadow, 25.05–22.06.2011, pt.; 1m, same place, 28.04–27.05.2012, pt.
47. *Xerolycosa miniata* (C.L. Koch, 1834): 4m1f, abandoned f., 25.05–22.06.2011; 2m2f, same place, 22.06–1.08.2011; 1m1f, same place, 27.05–29.06.2012; 3m, grassy sl., 25.05–22.06.2011; 2m, same place, 22.06–1.08.2011; 10m2f, meadow, 25.05–22.06.2011; 15m6f, same place, 22.06–1.08.2011; 3m1f, same place, 27.05–29.06.2012; 3m2f, same place, 29.06–5.08.2012, all specimens through pt.

Family PHILODROMIDAE

48. *Philodromus cespitum* (Walckenaer, 1802): 1f, bich shelterbelt, 27.05.2012, hc.
49. *Thanatus arenarius* L. Koch, 1872: 1m, abandoned f., 25.05–22.06.2011; 3m, same place, 28.04–27.05.2012; 4m, same place, 27.05–29.06.2012; 1m, stony sl., 25.05–22.06.2011; 8m2f, same place, 28.04–27.05.2012; 2m, same place, 27.05–29.06.2012; 1f, same place, 29.06–5.08.2012; 10m2f, grassy sl., 25.05–22.06.2011; 3m, same place, 28.04–27.05.2012; 5m, same place, 27.05–29.06.2012; 1m, same place, 29.06–5.08.2012; 3m, meadow, 28.04–27.05.2012, 1m, same place, 27.05–29.06.2012, all specimens through pt.
50. *Thanatus formicinus* (Clerck, 1757): 1m, abandoned f., 28.04–27.05.2012, pt.
51. *Thanatus striatus* C. L. Koch, 1845: 1m, stony sl., 28.04–27.05.2012, pt.
52. *Tibellus oblongus* (Walckenaer, 1802): 1f, abandoned f., 29.06.2012, sn.; 1m1f, meadow, 29.06.2012, sn.

Family PHRUROLITHIDAE

53. *Phrurolithus festivus* (C. L. Koch, 1835): 1m, meadow, 25.05–22.06.2011, pt.
54. *Phrurolithus pullatus* Kulczyn'ski, 1897: 1f, abandoned f., 25.05–22.06.2011, pt.

Family SALTICIDAE

55. *Aelurillus v-insignitus* (Clerck, 1757): 1f, abandoned f., 28.04–27.05.2012; 1m, stony sl., 25.05–22.06.2011; 3m1f, grassy sl., 25.05–22.06.2011; 5m1f, meadow, 25.05–22.06.2011; 3m1f, same place, 22.06–1.08.2011, 1m, same place, 28.04–27.05.2012, 2m, same place, 27.05–29.06.2012, 1f, same place, 29.06–5.08.2012, all specimens through pt.
56. *Asianellus festivus* (C. L. Koch, 1834): 5m2f, abandoned f., 25.05–22.06.2011, 1m, same place, 28.04–27.05.2012, pt.; 2m, same place, 25.05–22.06.2011; 1f, stony sl., 22.06–1.08.2011, 11m3f, same place, 28.04–27.05.2012, 1f, same place, 29.06–5.08.2012; 5m2f, grassy sl., 25.05–22.06.2011; 1m, same place, 22.06–1.08.2011; 3m, same place, 28.04–27.05.2012; 1f, same place, 27.05–29.06.2012; 2f, same place, 29.06–5.08.2012; 2m1f, meadow, 25.05–22.06.2011, 2m, same place, 28.04–27.05.2012, 1f, same place, 27.05–29.06.2012, all specimens through pt.
57. *Evarcha arcuata* (Clerck, 1757): 1m1f, meadow, 5.08.2012, sn.
58. *Evarcha laetabunda* (C. L. Koch, 1846): 1m, meadow, 28.04–27.05.2012, pt.
59. *Heliophanus flavipes* (Hahn, 1832): 1f, abandoned f., 29.06–5.08.2012, pt.; 1f, grassy sl., 29.06.2012, sn.
60. *Phlegra fasciata* (Hahn, 1826): 1m, stony sl., 29.06–5.08.2012, pt.; 1m, meadow, 27.05–29.06.2012, pt.; 1m, same place, 29.06–5.08.2012, pt.
61. *Sitticus zimmermanni* (Simon, 1877): 1m, stony sl., 29.06.2012, hc.

Family THERIDIDAE

62. *Neottiura bimaculata* (Linnaeus, 1767): 1f, meadow, 22.06.2011, hc.
63. *Phylloneta impressa* (L. Koch, 1881): 1f, abandoned f., 1.08.2011, hc; 3m2f, same place, 29.06.2012, sn.; 1f, stony sl., 05.08.2012, hc.; 2m, grassy sl., 29.06.2012, sn.
64. *Theridion mystaceum* L. Koch, 1870: 1f, birch shelterbelt, 22.06.2011, hc.

Family THOMISIDAE

65. *Ebrechtella tricuspidata* (Fabricius, 1775): 1m, birch shelterbelt, 27.05.2012, hc.
66. *Misumena vatia* (Clerck, 1757): 1f, herbaceous vegetation near the river, 29.06.2012, hc.
67. *Ozyptila claveata* (Walckenaer, 1937): 1m, meadow, 28.04–27.05.2012, pt.
68. *Ozyptila scabricula* (Westring, 1851): 2m2f, grassy sl., 28.04–27.05.2012, pt.; 1m, meadow, 25.05–22.06.2011, pt.; 1f, same place, 29.06–5.08.2012, pt.
69. *Thomisus onustus* Walckenaer, 1805: 1f, stony sl., 29.06.2012, sn.
70. *Xysticus cristatus* (Clerck, 1758): 1m, abandoned f., 28.04–27.05.2012, pt.; 1m, same place, 27.05–29.06.2012, pt.; 1m1f, same place, 29.06.2012, sn.; 2m, stony sl., 28.04–27.05.2012, pt.; 2m2f, grassy sl., 28.04–27.05.2012, pt.; 1f, same place, 27.05–29.06.2012, pt.; 1f, same place, 29.06.2012, sn.; 1f, meadow, 22.06–1.08.2011, pt.; 3m, same place, 28.04–27.05.2012, pt.; 1m, same place, 29.06.2012, hc.
71. *Xysticus kochi* Thorell, 1872: 1m, grassy sl., 28.04–27.05.2012, pt.
72. *Xysticus luctator* L. Koch, 1870: 1m, stony sl., 28.04–27.05.2012, pt.
73. *Xysticus striatipes* L. Koch, 1870: 1f, stony sl., 27.05–29.06.2012, pt.; 2f, grassy sl., 27.05–29.06.2012, pt.; 1m, same place, 5.08.2012, hc.

RESULTS AND DISCUSSION

During the two collecting years, 73 spider species from 15 families were recorded from the Bykova Sheya site. As the material was collected mainly through pitfall-trapping, cursorial spiders from the families Gnaphosidae and Lycosidae were best presented (15 and 13 species, respectively, Table 1). According to our data, Gnaphosidae was the most species-rich family at all the sites of the “Galich’ya Gora” Reserve, while Lycosidae was often less speciose than Araneidae. The spider assemblage of the driest south facing stony slope was the poorest – 28 species. In the other habitats, species richness increased as follows: abandoned field (31 species), southwest facing grassy slope (35 species), and floodplain meadow (38 species). Gnaphosidae and Lycosidae (22.6–28.6%) dominated in the latter three habitats, while the stony slope had no dominant families (Table 1).

Table 1. Species composition of spider families in different habitats of the “Bykova Sheya” Number of species (% out of total species in the habitat).

Families	Habitats						total
	abandoned field	stony slope	grassy slope	meadow	other		
Agelenidae	–	1 (3.6)	–	–	–	–	1 (1.4)
Araneidae	4 (12.9)	3 (10.7)	5 (14.3)	4 (10.5)	4	–	10 (13.7)
Atypidae	1 (3.2)	1 (3.6)	–	–	–	–	1 (1.4)
Dictynidae	1 (3.2)	1 (3.6)	1 (2.9)	1 (2.6)	–	–	1 (1.4)
Eresidae	–	1 (3.6)	1 (2.9)	–	–	–	1 (1.4)
Eutrichuridae	–	1 (3.6)	–	–	–	–	1 (1.4)
Gnaphosidae	7 (22.6)	5 (17.9)	8 (22.9)	10 (26.3)	–	–	15 (20.5)
Linyphiidae	–	–	–	1 (2.6)	1	–	2 (2.7)
Liocranidae	1 (3.2)	–	–	1 (2.6)	–	–	2 (2.7)
Lycosidae	8 (25.8)	4 (14.3)	10 (28.6)	10 (26.3)	–	–	13 (17.8)
Philodromidae	3 (9.7)	2 (7.1)	1 (2.9)	2 (5.3)	1	–	5 (6.8)
Phrurolitidae	1 (3.2)	–	–	1 (2.6)	–	–	2 (2.7)
Salticidae	3 (9.7)	4 (14.3)	4 (11.4)	4 (10.5)	–	–	7 (9.6)
Theridiidae	1 (3.2)	1 (3.6)	1 (2.9)	1 (2.6)	1	–	3 (4.1)
Thomisidae	1 (3.2)	4 (14.3)	4 (11.4)	3 (7.9)	2	–	9 (12.3)
Total	31 (100)	28 (100)	35 (100)	38 (100)	9	–	73 (100)

Four regionally rare species were registered in the study site (*Eresus kollari*, *Gnaphosa taurica*, *Berlandina cinerea*, and *Alopecosa solitaria*). The former two were recommended to be listed in the Red Data Book of Lipetsk Region (Polchaninova, 2011). In the forest-steppe zone, *G. taurica* is a habitat specialist of limestone and chalk grasslands, *B. cinerea* prefers sandy, calcareous, and/or clayey soils with a sparse vegetation while *E. kollari* and *A. solitaria* occur on the dry steppe slopes with high insolation.

Juveniles of Lycosidae dominated in all the studied habitats (Table 2). *Alopecosa accentuata* was the most abundant species at the adult stage and comprised 30% of individuals in the abandoned field. Its proportion diminished in the other habitats and decreased to 6% in the meadow. The other six species of the dominant complexes were less numerous (5.1–11.8%).

The cursorial spider assemblages were the most abundant in the terms of species and individuals in the floodplain meadow. The least number of species was collected from the stony slope while the lowest activity density was fixed in the abandoned field (Table 2).

Table 2. Dominant complexes and alpha-diversity of cursorial spiders in different habitats of the “Bykova Sheya” (pulled data of 2011–2012).

Species	Habitats			
	abandoned field	stony slope	grassy slope	meadow
<i>Alopecosa accentuata</i>	<u>30.0%</u>	<u>19.7%</u>	<u>13.7%</u>	<u>6.0%</u>
<i>A. solitaria</i>	1.6%	2.6%	<u>7.0%</u>	0.9%
<i>A. trabalis</i>	1.6%	0.4%	1.1%	<u>7.5%</u>
<i>Xerolycosa miniata</i>	4.3%	–	1.8%	<u>11.8%</u>
Lycosidae juv.	<u>35.4%</u>	<u>27.7%</u>	<u>31.3%</u>	<u>36.5%</u>
<i>Haplodrassus signifer</i>	3.9%	<u>7.7%</u>	2.5%	2.9%
Gnaphosidae juv.	2.7%	<u>10.9%</u>	<u>9.5%</u>	3.2%
<i>Thanatus arenarius</i>	3.1%	<u>5.1%</u>	<u>7.0%</u>	1.1%
<i>Asianellus festivus</i>	3.1%	<u>6.2%</u>	4.9%	1.7%
Number of species	25	19	27	31
Activity density (individuals/100 trap-days)	15.5	21.0	18.3	24.8
Shannon index	2.11	2.30	2.53	2.53
Pielu index	0.28	0.44	0.40	0.37

Shannon and Pielu indices show the lowest alpha-diversity of spiders in the abandoned field that can be explained by the extremely uneven distribution of their individual numbers: juvenile lycosids and adult specimens of *A. accentuata* made up 75.4% of collected spiders (Table 2). On both slopes, the dominant complexes were comprised from 5–6 components, and the Pielu indices were significantly higher ($p < 0.05$) than in the abandoned field but not higher than in the meadow. Species diversity (Shannon indices) was the highest on the grassy slope and in the meadow but differed insignificantly ($p < 0.05$) from that of the stony slope.

Seven spider species can be considered as habitat generalists of the study site. Meanwhile, all of them showed a certain habitat preference: *Alopecosa accentuata* was the most numerous in the abandoned field, *Haplodrassus signifer* and *Asianellus festivus* on the stony slope, *Alopecosa solitaria* and *Thanatus arenarius* on the grassy slope, and *Alopecosa trabalis*, *Zelotes kulczynski*, and *Aelurillus v-insignitus* in the meadow. Five species were recorded in three habitats: *Xerolycosa miniata*, *Alopecosa cuneata*, *A. taeniopus*, *Zelotes longipes*, and *Gnaphosa taurica*. Except the single finds (up to three individuals during the two years), only one species (*Micaria fulgens*) can be referred to local specialist of floodplain meadows.

In general, the spider fauna of the Bykova Sheya site (73 species) was the poorest in the “Galich’ya Gora” Reserve. Thus, 115 spider species were registered at the Plushchan site (Polchaninova, 2014), 127 species at the Morozova Gora, 109 species at the Galich’ya Gora, and 119 species in the nearest protected area Lipovskaya Gora. A poor spider species composition of the Bykova Sheya can be explained by the absence of forest habitats. According to our studies, the spider fauna is usually richer in the forests than in the neighbouring dry grasslands (Polchaninova, 2008). Nevertheless, when comparing the spider species composition in the steppe parts of the three sites (Bykova Sheya, Galich’ya Gora and Morozova Gora) we see quite comparable numbers: 52, 53, and 60 species, respectively.

The only common feature of the three steppe sites was the dominance of *Alopecosa accentuata* on the upper interfluves, but at the Morozova Gora and Galich’ya Gora this species was not the first-rank dominant. At these sites, *Alopecosa trabalis* was the most abundant species during both studying years; and *Xerolycosa miniata* dominated at the Morozova Gora in 2011 (the first post-fire year). At the Bykova Sheya these two species reached high numbers only in the meadow. Other abundant species also varied in their habitat preferences at various sites. For instance, *Haplodrassus signifer* occurred in all the habitats of the Bykova Sheya while at the Galich’ya Gora it inhabited only one plot on the upper interfluves. *Gnaphosa taurica* was numerous on the grassy slope of the Bykova Sheya, only one specimen being collected on the stony slope. At the Galich’ya Gora, in contrast, it was the most abundant species of the limestone slope and very rare on the upper interfluves.

Eight spider species were recorded from the Bykova Sheya only. Six of them were found in a single specimen, the other two, *Eresus kollari* and *Alopecosa solitaria*, can be considered as indicator species for this site.

CONCLUSIONS

When analyzing spider species composition and their habitat distribution of the Bykova Sheya, we need to take into consideration that our research was conducted after a large-scale summer fire, which affected the entire protected site and its vicinity. Therefore, the collected material reflects recovery of spider assemblages after the fire event (Tsurikov & Polchaninova, 2015), and in the future, the habitat distribution and species abundance can change. Nevertheless, the general traits of the spider assemblages (higher species and individual abundance in the gully bottom, poor species composition on the stony slope and lower number of individuals in the abandoned field) coincide with the data obtained in other steppe reserves of European Russia and Ukraine (Polchaninova, 2012, 2015).

Despite the relatively low species richness, spider fauna and assemblages of the Bykova Sheya have specific traits and complement the reserve’s fauna with rare species.

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