



Research Article

Spider Diversity on Herbaceous Plants in Samsun Province, Türkiye

✉ Muhammed Gökhan ÇELİMLİ, ✉ Adile AKPINAR*, ✉ Derya ARSLAN TALAPOV

Gaziantep University, Science and Art Faculty, Department of Biology, 27310, Gaziantep, Türkiye

*Corresponding author e-mail: aozdemir@gantep.edu.tr

Abstract: In this study, spider diversity on herbaceous plants of Samsun province was investigated. Spider specimens were collected between 2015 and 2018 by using sweeping net, aspirators, and tweezer methods, and stored at -20 °C and in 96% ethyl alcohol. Most spiders were found on and around the Asteraceae family. Morphological descriptions are based on the spiders of the Palearctic region and nomenclature is based on the world spider catalog. As a result of the identification, from 397 spider samples belonging to 10 families, 12 genera and 15 species were determined. These are; *Phylloneta impressa* (L. Koch, 1881), *Enoplognatha ovata* (Clerck, 1757), *Heterotheridion nigrovariegatum* (Simon, 1873), *Oxyopes lineatus* Latreille, 1806, *Tetragnatha montana* Simon, 1874, *Tetragnatha extensa* (Linnaeus, 1758), *Pulchellodromus pulchellus* (Lucas, 1846), *Evarcha arcuata* (Clerck, 1757), *Misumena vatia* (Clerck, 1757), *Runcinia grammica* (C. L. Koch, 1837), *Argiope bruennichi* (Scopoli, 1772), *Argiope lobata* (Pallas, 1772), *Neoscona adianta* (Walckenaer, 1802), *Neoscona byzanthina* (Pavesi, 1876), *Araneus quadratus* Clerck, 1757. In the study, findings represent the first detailed spider records from herbaceous plants in the Samsun province.

Keywords: Araneae, Astaraceae, Samsun

Samsun (Türkiye) İli Otsu Bitkiler Üzerindeki Örümcek Çeşitliliği

Öz: Bu çalışma da, Samsun ili otsu bitkileri üzerinde bulunan örümcek çeşitliliği araştırılmıştır. Örümcek örnekleri 2015-2018 yılları arasında atrap, aspiratör ve pens yardımı ile toplanarak -20 °C de ve %96'lık etil alkolde muhafaza edilmiştir. Örümcekler çoğunlukla Astaraceae familyası üzerinden ve etrafından toplanmıştır. Morfolojik tanımlamalar Palearktık bölge örümcekleri temel alınarak tanımlanmış ve isimlendirmeler dünya örümcek kataloğuna göre düzenlenmiştir. Teşhisler sonucunda, araştırma bölgesinden toplanan 397 adet örümcek örneğinden 10 familyaya ait 12 cins ve 15 tür tespit edilmiştir. Tespit edilen türler şu şekildedir; *Phylloneta impressa* (L. Koch, 1881), *Enoplognatha ovata* (Clerck, 1757), *Heterotheridion nigrovariegatum* (Simon, 1873), *Oxyopes lineatus* Latreille, 1806, *Tetragnatha montana* Simon, 1874, *Tetragnatha extensa* (Linnaeus, 1758), *Pulchellodromus pulchellus* (Lucas, 1846), *Evarcha arcuata* (Clerck, 1757), *Misumena vatia* (Clerck, 1757), *Runcinia grammica* (C. L. Koch, 1837), *Argiope bruennichi* (Scopoli, 1772), *Argiope lobata* (Pallas, 1772), *Neoscona adianta* (Walckenaer, 1802), *Neoscona byzanthina* (Pavesi, 1876), *Araneus quadratus* Clerck, 1757. Çalışmada elde edilen bulgular Samsun iline ait otsu bitkilerden tespit edilen ilk detaylı örümcek kayıtlarıdır.

Anahtar Kelimeler: Araneae, Otsu bitkiler, Samsun

1. Introduction

Spiders are distributed all over the world and are among the most adaptable animals in nature. Spiders, which mostly live in terrestrial environments, can be found on stony areas, on the soil surface or in the soil, in rocky areas, on herbaceous or woody plants, as well as on leaves or under leaves (Foelix, 2011). Spiders are carnivorous animals, and most of their diet consists of insects. Because of this feature,

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they are also known as biocontrol agents. In many agricultural areas, the predatory properties of spiders are utilised and used in biocontrol studies (Akpinar & Varol, 2019). Research on spiders in the world and in Türkiye continues. Although mostly faunistic studies are carried out, web structure of spiders, venom gland, chitin structure and phylogenetic studies are also available (Kaya et al., 2014; Akpinar & Mammadova, 2020; Hameed et al., 2022; Seyyar & Demir, 2023). There are 51996 species belonging to 135 spider families described so far in worldwide (World Spider Catalog, 2024). In Türkiye, 577 families, 371 genera and 1282 species have been identified (Topçu et al., 2005; Demir & Seyyar, 2017; Danışman et al., 2024).

The aim of the study was to determine the diversity of spiders on herbaceous plants and in herbaceous plant areas in Samsun province. These species, which were previously described in our country, were supported by adding new localities.

2. Material and Methods

The spiders were collected specimens using by aspiratory, sweeping net and with hand from Samsun province of Türkiye on May-August between 2015-2018. Most of the specimens collected by sweeping nets from herbaceous plants (Especially Asteraceae family). Field work was carried out during day and night hours, and the collected spiders (Table 1) were preserved in sample tubes containing 90% ethyl alcohol. Morphological species determinations were made using different references based on the Palearctic region (Oger, 2023; Nentwig et al., 2024; World Spider Catalog, 2024). All species are preserved in the Zoological Museum, Department of Biology, Gaziantep University (GAUNZM).

Table 1. Sampling localities in Samsun province

Sampling dates	Coordinate				
	District/Locality		North	East	Altitude (m)
29.06.2015	Havza	Yenice Village	40°59'	35°45'	680
29.06.2015	Ladik	Center	40°55'	35°50'	925
30.06.2015	Kavak	Kavak Lake	41°03'	35°58'	640
30.06.2015	Atakum	Değirmendüzü	41°15'	36°10'	190
30.06.2015	Atakum	Çakıryalı	41°23'	36°11'	30
30.06.2015	Ondokuzmayıs	Yörükler	41°31'	36°05'	2
30.06.2015	Bafra	Yakıntaş	41°33'	35°57'	25
30.06.2015	Bafra	Dedeli	41°32'	35°51'	50
30.06.2015	Alaçam	Zeytin	41°36'	35°41'	60
30.06.2015	Alaçam	Etyemez	41°37'	35°35'	15
29.07.2015	Ladik	Sarıgazel	40°53'	35°46'	985
29.07.2015	Kavak	Çakallı	41°09'	36°06'	710
29.07.2015	Canik	Avluca	41°10'	36°16'	415
30.07.2015	Alaçam	Taşkelik	41°33'	35°40'	310
30.07.2015	Yakakent	Yeşilköy	41°37'	35°27'	265
31.07.2015	Vezirköprü	Yağınözü	41°10'	35°23'	591
02.05.2016	Havza	Bekdiğin	40°59'	35°46'	675
02.05.2016	Bafra	Doğanca	41°39'	36°00'	10
02.05.2016	Ondokuzmayıs	Emirhasan	41°13'	36°06'	645
02.05.2016	Havza	Taşkaracaören	40°54'	35°38'	682
29.05.2016	Kavak	Kuzalan	41°03'	35°58'	747

Table 1. Sampling localities in Samsun province (continued)

Sampling dates	Coordinate				
	District/Locality		North	East	Altitude (m)
30.05.2016	Çarşamba	Esençay	41°06'	36°35'	115
30.05.2016	Çarşamba	Dikbıyık	41°13'	36°36'	10
30.05.2016	Ondokuzmayıs	Karakavuk	41°22'	36°08'	149
30.05.2016	Bafra	Kolay	41°22'	35°48'	59
31.05.2016	Alaçam	İncirli	41°35'	35°36'	202
31.05.2016	Alaçam	Acem	41°29'	35°34'	921
29.06.2016	Tekkeköy	Hamzalı	41°20'	36°53'	18
29.06.2016	Çarşamba	Arım Köseli	41°21'	36°79'	29
19.05.2017	Terme	Center	41°12'	36°51'	12
14.06.2017	Vezirköprü	Kocakaya	41°18'	35°08'	275
15.06.2017	Vezirköprü	Bakla	41°08'	35°14'	576
17.06.2017	Havza	Çayırözü	40°58'	35°36'	727
17.06.2017	Ladik	Center	40°54'	35°54'	896
17.06.2017	Kavak	Ahırlı	41°04'	35°58'	630
17.06.2017	Tekkeköy	Taşdemir	41°12'	36°34'	9
18.06.2017	Terme	Evcı	41°09'	37°03'	5
28.07.2017	Vezirköprü	Türkmen	41°13'	35°26'	275
28.07.2017	Alaçam	Kapaklı	41°30'	35°35'	801
29.07.2017	Bafra	Esençay	41°20'	35°50'	115
29.07.2017	Bafra	Esençay	41°18'	35°50'	223
29.07.2017	Vezirköprü	Göldere	41°17'	35°55'	630
29.07.2017	Havza	Boyalı	41°13'	35°52'	770
29.07.2017	Havza	Çelikalan	41°12'	35°51'	639
29.07.2017	Havza	Dereköy	41°06'	35°42'	564
30.07.2017	Ladik	İbi	40°58'	35°54'	779
30.07.2017	Ladik	Center	40°54'	35°54'	894
18.08.2017	Bafra	Kabaçukur	41°19'	35°50'	123
18.08.2017	Kavak	Akbelen	41°09'	35°53'	910
18.08.2017	Tekkeköy	Ovabaşı	41°12'	36°30'	3
18.08.2017	Çarşamba	Değincek	41°04'	36°38'	120
18.08.2017	Ayvacicık	Çamlıkale	40°55'	36°29'	1005
21.06.2018	Vezirköprü	Şentepe	41°14'	35°14'	283
21.06.2018	Vezirköprü	Köprübaşı	41°08'	35°27'	677
21.06.2018	Havza	Ortaklar	41°00'	35°34'	830

3. Results

The spider diversity on herbaceous plants and on the ground in Samsun province in the Central Black Sea region was determined. 398 spider specimens belonging to 10 families were collected from 55 localities (Table 2).

Table 2. Spiders families in the research area

Familya	Female (♀)	Male (♂)	Subadult	Total	%
Araneidae	161	63	71	295	74.12
Thomisidae	8	6	54	68	17.08
Tetragnathidae	2	6	5	13	3.2
Oxyopidae	4	-	-	4	1.00
Salticidae	1	2	2	5	1.25
Theridiidae	2	-	1	3	0.75
Clubionidae	1	-	4	5	1.25
Linyphidae	1	-	1	2	0.50
Zoridae	1	-	-	1	0.25
Philodromidae	1	-	1	1	0.25
Total	182	77	138	397	99.5

As a result of the identification of the adult specimens at species level, 12 genera and 15 species were determined (Table 3).

Tablo 3. Spider species of Samsun province

Familya	Cins	Tür
Araneidae	<i>Neoscona</i>	<i>adiana</i> (Walckenaer, 1802)
		<i>byzantina</i> (Pavesi, 1876)
	<i>Araneus</i>	<i>quadratus</i> Clerck, 1757
	<i>Argiope</i>	<i>bruennichi</i> (Scopoli, 1772)
		<i>lobata</i> (Pallas, 1772)
Theridiidae	<i>Enoplognatha</i>	<i>ovata</i> (Clerck, 1757)
	<i>Phylloneta</i>	<i>impressa</i> (L. Koch, 1881)
	<i>Heterotheridion</i>	<i>nigrovariegatum</i> (Simon, 1873)
Philodromidae	<i>Pulchellodromus</i>	<i>pulchellus</i> (Lucas, 1846)
Thomisidae	<i>Runcinia</i>	<i>grammica</i> (C. L. Koch, 1837)
	<i>Misumena</i>	<i>vatia</i> (Clerck, 1757)
Tetragnathidae	<i>Tetragnatha</i>	<i>montana</i> Simon, 1874
		<i>extensa</i> (Linnaeus, 1758)
Oxyopidae	<i>Oxyopes</i>	<i>Lineatus</i> Latreille, 1806
Salticidae	<i>Evarcha</i>	<i>arcuata</i> (Clerck, 1757)

Identified species in this study were examined in the below.

Family: ARANEIDAE Clerck, 1757

Araneus quadratus Clerck, 1757

Examined material: ♂; Samsun, Kavak, Akbelen, 910 m, 18.08.2017.

Neoscona adianta (Walckenaer, 1802)

Examined material: ♂, ♀; Samsun, Havza, Boyalı, 770 m, 29.07.2017; Bafra, Esiñay, 115 m, 29.07.2017; Kavak, Akbelen, 910 m, 18.08.2018; Havza, Dereköy, 564 m, 29.07.2017.

Neoscona byzanthina (Pavesi, 1876)

Examined material: ♂, ♀; Samsun, Havza, Boyalı, 770 m, 29.07.2017; Havza, Dereköy, 564 m, 29.07.2017; Samsun, Vezirköprü, Güldere, 630 m, 29.07.2017; Samsun, Kavak, Akbelen, 910 m, 18.08.2017; Çarşamba, Esiñay, 115 m, 30.05.2016.

Argiope bruennichi (Scopoli, 1772)

Examined material: ♂; Samsun, Çarşamba, Esiñay, 115 m, 30.05.2016; Havza, Boyalı, 770 m, 29.07.2017.

Argiope lobata (Pallas, 1772)

Examined material: ♂; Samsun, Kavak, Kuzalan, 747 m, 29.05.2016.

Family: OXYOPIDAE Thorell, 1870

Oxyopes lineatus Latreille, 1806

Examined material: ♀; Samsun, Yakakent, Yeşilköy, 265 m, 30.07.2015.

Family: PHILODROMIDAE Thorell, 1870

Pulchellodromus pulchellus (Lucas, 1846)

Examined material: ♀; Samsun, Havza, Ortaklar, 830 m, 21.06.2018.

Family: SALTICIDAE Blackwall, 1841

Evarcha arcuata (Clerck, 1757)

Examined material: ♂; Samsun, Bafra, Kabaçukur, 123 m, 18.08.2017.

Family: TETRAGNATHIDAE Menge, 1866

Tetragnatha extensa (Linnaeus, 1758)

Examined material: ♂, ♀; Samsun, Bafra, Kabaçukur, 123 m, 18.08.2017; Samsun, Havza, Dereköy, 564 m, 29.07.2017.

Tetragnatha montana Simon, 1874

Examined material: ♂; Samsun, Bafra, Kabaçukur, 123 m, 18.08.2017; Samsun, Havza, Dereköy, 564 m, 29.07.2017.

Family: THERIDIIDAE Sundevall, 1833

Enoplognatha ovata Clerck, 1757

Examined material: ♂; Samsun, Çarşamba, Arım Köseli, 29 m, 28.06.2016; Havza, Çelikalın, 639 m, 29.07.2017.

Phylloneta impressa (L. Koch, 1881)

Examined material: ♂, ♀; Samsun, Havza, Ortaklar, 830 m, 21.06.2018; 576 m, Vezirköprü, Bakla, 15.06.2017.

Heterotheridion nigrovariegatum (Simon, 1873)

Examined material: ♂; Samsun, Havza, Ortaklar, 830m, 21.06.2018.

Family: THOMISIDAE Sundevall, 1833

Runcinia grammica (C. L. Koch, 1837)

Examined material: ♀, ♂; Samsun, Alaçam, Kapaklı, 801 m, 28.07.2017; Samsun, Havza, Ortaklar, 830 m, 21.06.2018.

Misumena vatia (Clerck, 1757)

Examined material: ♂; Samsun, Havza, Çelikalın, 639 m, 29.07.2017.

4. Discussion and Conclusion

In the study, 397 samples were collected, including 259 adults and 138 juveniles. The adult subadult (juvenile) ratio was calculated as 1:1.86 and the male-female ratio 1:2.36. The ratio of subadult per adult being 0.54 indicates that the subadult in the population mostly become adults. Spiders were generally caught on herbaceous plants, which can be annual or perennial (Asteraceae: *Achillea* spp., *Carduus* spp., *Carthamus* spp., *Centaurea* spp., *Cirsium* spp., *Crepis* spp., *Echinops* spp., *Inula* spp.). Within the scope of the research, spider specimens were mostly caught between June and August, which are the adulting periods. This situation is also observed in the research data; the number of adult specimens was higher than that of juvenile specimens. Since the spiders were generally caught with insect net in the study, many web-building spider specimens (Araneidae, Theridiidae, Tetragnathidae) could be obtained. Samples were also collected from the herbaceous plant ground, and hunting species (Thomisidae and Philodromidae) were obtained. The species identified in the study are similar to the results of previous studies conducted in the Black Sea region (Akpinar et al., 2022).

Spiders are cannibalistic animals, and most of their diet consists of insects. They catch their prey mostly in ambush and waiting in their webs. They also have strong mimicry abilities. The fact that spiders live in all kinds of habitats and ecosystems in terrestrial environments increases the possibility of being found and captured. In addition, different families can be detected due to habitat diversity.

The study captured from vegetation in natural areas. Spraying agricultural areas reduces the number and diversity of insects, making it difficult to catch the spiders that feed on these animals.

No study on spider diversity on herbaceous plants has been found in Samsun before. This study determined the spider diversity of Samsun province for the first time. More studies are needed to contribute to the spider diversity of our country.

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