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Orijinal araştırma (Original article)

Spider fauna of pomegranate and olive orchards in the Eastern Mediterranean Region of Turkey

Türkiye'nin Doğu Akdeniz Bölgesi nar ve zeytin bahçeleri örümcek faunası

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Summary

This research was carried out in pomegranate (*Punicae granatum* L.) and olive (*Olea europaea* L.) orchards in the Eastern Mediterranean (Adana, Mersin and Osmaniye provinces) in 2008-2010 in order to determine the spider fauna. In this study, among the 402 individuals (male, female, nimf) collected, 59 species belonging to 51 genera and 17 families were reported at 16 different localities with more spiders in the pomegranate and olive orchards in these regions. Among this species, *Aphantaulax cincta* (L. Koch, 1866) and *Platnickina nigropunctata* (Lucas, 1846) are new records for the araneo-fauna of Turkey. This study was the first on spider fauna in pomegranate and olive orchards in Turkey.

Key words: Pomegranate, olive, spider, Araneae, fauna, Turkey

Özet

Bu çalışma; 2008-2010 yıllarında Doğu Akdeniz Bölgesi (Adana, Mersin ve Osmaniye İlleri) nar (*Punicae granatum* L.) ve zeytin (*Olea europaea* L.) bahçelerindeki mevcut örümcek faunasını belirlemek için yürütülmüştür. Çalışmada; Doğu Akdeniz Bölgesi nar ve zeytin bahçelerine ait 16 farklı lokasyondan 17 familya, 51 cins ve 59 türe ait 402 birey (erkek, dişi, nimf) toplanmıştır. Bu türlerden, *Aphantaulax cincta* (L. Koch, 1866) ve *Platnickina nigropunctata* (Lucas, 1846)'nın Türkiye örümcek faunası için yeni kayıt niteliğinde oldukları saptanmıştır. Bu çalışma, Türkiye nar ve zeytin bahçelerindeki örümcek faunası üzerinde yapılmış ilk çalışmadır.

Anahtar sözcükler: Nar, zeytin, örümcek, Araneae, fauna, Türkiye

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Introduction

The spiders are belonging to order Aranae, which is one of the grasping animal group (Riechert & Lockley, 1984). Spiders can inhabit all types of the habitats and ecosystems. They have a large area of distribution, from the poles to the centers of the continents and from the sea level to 5000 m elevations (Foelix, 1982). However, most spiders live in terrestrial ecosystems. Spider inhabits on the ground, underground tunnels systems, under stones and near water but habitually it like moist place. Some spiders live on the seaside where they are sunken into the sea twice a day (Perveen & Jamal, 2012).

Spider always represents the hateful and injurious animal (Davey, 1994). In fact, they help us to protect crops from the pests (Fabre, 1999) as a biological control agent (Platnick, 1995; Bolu et al., 2008). Spiders that live in continental ecosystems are defined as effective predators of insects and other arthropods. Ecological and faunistic investigations on spiders demonstrated that spiders can control insects and their larvae in terrestrial ecosystems (Riechart & Lockley, 1984; Nyffeler & Benz, 1987; 1989; Laub & Luna, 1992; Maloney et al., 2003; Bolu et al., 2008).

Many research was carried out on spider fauna of vineyard and fruit orchards (Bajwa & Aliniazee, 2001; Göven et al., 2002; Bolduc et al., 2005; Ghavami et al., 2007; Tavares, 2007; Bolu et al., 2008; Ghavami, 2008; Benhadi-Marin et al., 2011; Khan, 2011) in the world different countries.

This study identifies the spiders collected from several pomegranate and olive orchards of Adana, Mersin and Osmaniye provinces during three year period (2008-2010). The aim of the present study was to document the spider fauna of the pomegranate and olive orchards in the Eastern Mediterranean Region, and contribute some records to the spider fauna of Turkey.

Material and Methods

The sampling period occurred between February and December of 2008-2010. Spiders were collected by beating technique and hand aspirator. The fallen cracked pomegranate fruits and the debris under trees were checked at 16 different localities.

Locality descriptions are as given below;

Adana province

Yüreğir district; [Alihocalı (36°55'59.78"N, 35°23'59.60"E at altitude of about 44 m)], Sarıçam district; [Balcalı (37° 3'3.51"N, 35°21'43.37"E at altitude of about 115 m)], Ceyhan district; [Soysallı (37° 7'21.04"N, 35°38'0.74"E at altitude of about 106 m)] and Kozan district; [Center (37°27'24.51"N, 35°49'1.42"E at altitude of about 144 m), Kuyuluk (37°22'54.48"N, 35°51'55.12"E at altitude of about 83 m), Pekmezci (37°21'46.89"N, 35°51'45.94"E at altitude of about 57 m), Kayhan (37°22'42.22"N, 35°49'48.40"E at altitude of about 70 m)].

Mersin province

Tarsus district; [Akarsu (36°51'8.82"N, 34°58'7.94"E at altitude of about 5 m), Alifakı (36°53'9.87"N, 34°59'47.25"E at altitude of about 10 m), Yenice (36°58'47.72"N, 35° 3'32.47"E at altitude of about 29 m)] and Erdemli district; [Alata (36°37'54.71"N, 34°20'39.55"E at altitude of about 7 m)].

Osmaniye province

Center district; [Kırmıtlı (37° 9'9.05"N, 36° 7'3.76"E at altitude of about 47 m.)].

Each sample was collected by the beating five branches per tree, in per orchard over a Japanese umbrella between 09.00 and 15.00 hours. In each sampling period, samples were collected from 20 randomly selected trees. Collected spiders were immediately transferred to a box with ice to diminish their activity. Then, the specimens collected were put into 70% ethanol, labeled, and taken to the laboratory for identification. All of the species was identified according to Locket & Millidge (1953), Tyschchenko (1971), Heimer & Nentwig (1991), Roberts (1995) and Almquist (2005 & 2006). The specimens were identified at

species level using a binocular stereomicroscope, and they were deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM).

Results and Discussion

A total of 402 specimens were collected from the pomegranate and olive orchards in Adana, Mersin and Osmaniye, and 59 species belonging to 51 genera in 17 families were reported. Among the specimens 68 were males, 58 were females, and 276 were nimf. *Aphantaulax cincta* (L. Koch, 1866) and *Platnickina nigropunctata* (Lucas, 1846) are new records for the araneo-fauna of Turkey (Bayram et al., 2012). However, 27 of these species couldn't identified into species. Their genera (sp.) were recorded. The spider species determined are given in Table 1.

Table 1. List of the spider species collected from the pomegranate and olive orchards in Eastern Mediterranean Region of Turkey

Family	Species	Male	Female	Nimf	Total
Agelenidae	[1]*Allagelena gracilens* C.L. Koch, 1841	-	1	-	1
	[1]*Tegenaria* sp.	-	-	2	2
Anyphaenidae	[2]*Anyphaena pontica* Weiss, 1988	-	1	-	1
Araneidae	[2]*Araneus* sp.	-	1	-	1
	[1,2]*Atea sturmi* (Hahn, 1831)	4	5	2	11
	[2]*Gibbaranea bituberculata* (Walckenaer, 1802)	1	-	-	1
Clubionidae	[2]*Clubiona* sp.	-	-	2	2
Gnaphosidae	**Aphantaulax cincta* (L. Koch, 1866)	3	6	-	9
	[1]*Aphantaulax seminigra* (Simon, 1878)	1	-	1	2
	[1]*Drassodes* sp.	-	-	1	1
	[1]*Gnaphosa* sp.	-	-	2	2
	[1]*Haplodrassus* sp.	-	-	1	1
	[1]*Micaria* sp.	-	2	6	8
	[1]*Scotophaeus scutulatus* (L. Koch, 1866)	-	3	-	3
	[1,2]*Zelotes* sp.	-	-	8	8
Linyphiidae	[1]*Erigone dentipalpis* (Wider, 1834)	-	3	-	3
	[1]*Neriene* sp.	1	-	-	1
Liocranidae	[1]*Agroeca* sp.	-	-	3	3
	[1]*Liocranum* sp.	-	-	2	2
	[1]*Scotina* sp.	-	-	1	1
Lycosidae	[1]*Aulonia* sp.	-	-	3	3
	[1]*Pardosa* sp.	-	-	21	21
	[1]*Trochosa* sp.	-	-	5	5
Mimetidae	[1]*Ero aphana* (Walckenaer, 1802)	1	-	2	3
Miturgidae	[1]*Cheiracanthium* sp.	-	-	18	18
	[1,2]*Cheiracanthium mildei* C.L. Koch, 1839	23	7	130	160
Philodromidae	[1,2]*Philodromus cespitum* (Walckenaer, 1802)	2	3	6	11
Salticidae	[1]*Aelurillus v-insignatus* (Clerk, 1757)	-	1	1	2
	[1]*Bianor* sp.	1	1	1	3
	[1]*Euophrys* sp.	-	-	2	2
	[1]*Habrocestum* sp.	1	-	-	1
	[1]*Hasarius adansoni* (Audouin, 1827)	2	-	1	3
	[1]*Heliophanillus* sp.	1	-	-	1
	[1]*Leptorchestes berolinensis* (C.L. Koch, 1846)	-	1	-	1
	[1]*Macaroeris* sp.	-	-	1	1

Table 1 continued

	[1]*Neon* sp.	-	-	4	4
	[1]*Pellenes* sp.	4	2	4	10
	[1]*Plexippus paykulli* (Audouin, 1826)	1	-	3	4
	[1]*Pseudeuophrys lanigera* (Simon, 1871)	1	-	-	1
	[2]*Salticus cingulatus* (Panzer, 1797)	-	2	-	2
	[2]*Salticus zebraneus* (C.L. Koch, 1837)	-	1	-	1
	[1]*Synageles* sp.	1	-	1	2
	[1]*Thyene imperialis* (Rossi, 1846)	3	-	3	6
Tetragnathidae	[1,2]*Tetragnatha montana* Simon, 1874	5	1	2	8
Theridiidae	[2]*Anelosimus vittatus* (C. L. Koch, 1836)	1	1	-	2
	[1]*Euryopis* sp.	-	1	3	4
	**Platnickia nigropunctata* (Lucas, 1846)	2	4	-	6
	[1]*Steatoda albomaculata* (De Geer, 1778)	-	1	1	2
	[1]*Steatoda paykulliana* (Walckenaer, 1806)	2	3	-	5
	[1]*Steatoda triangulosa* (Walckenaer, 1802)	-	1	-	1
	[1]*Theridion hannoniae* Denis, 1944	-	1	5	6
	[1]*Theridion hemerobium* Simon, 1914	2	-	11	13
	[1]*Theridion melanurum* Hahn, 1831	1	3	12	16
Thomisidae	[1]*Runcinia* sp.	-	-	1	1
	[2]*Tmarus piochardi* (Simon, 1866)	1	1	-	2
	[1]*Xysticus* sp.	1	1	1	3
Titanoecidae	[1]*Nurscia albomaculata* (Lucas, 1846)	2	1	2	5
	[1]*Nurscia albosignata* Simon, 1874	-	2	1	3
Zodariidae	[1]*Pax islamita* (Simon, 1873)	-	1	-	1
Total	Total of species = 59	68	58	276	402

*New record for spider fauna of Turkey. [1]Collected from the pomegranate orchards [2]Collected from the olive orchards

Family: Gnaphosidae

Aphantaulax cincta (L. Koch, 1866) (Fig. 1, 2).

Material examined: Kuyuluk (11.II.2009) 2♀, 1♂, Kırmıtlı (13.VIII.2009) 3♀, Kozan-Center (15.IV.2010) 1♀, 2♂

Recorded host: Pomegranate

General distribution: Europe, North Africa, Israel (Platnick, 2012).

Distribution in Turkey: Eastern Mediterranean Region

Family: Theridiidae

Platnickina nigropunctata (Lucas, 1846) (Fig 3-5).

Material examined: Alata (18.II.2009) 1♀, 2♂, Alihocalı (27.IV.2009) 1♀, Kozan-Center (15.V.2010) 2♀.

Recorded host: Pomegranate

General distribution: Mediterranean (Platnick, 2012).

Distribution in Turkey: Eastern Mediterranean Region

This research is the first on pomegranate and olive orchards in Eastern Mediterranean Region of Turkey. Further studies in other regions are needed to allow a comparison of the pomegranate and olive spider fauna. Recently many pomegranate and olive orchards have been planted especially in the Mediterranean Regions of Turkey owing to increasing export demands.

Figure 1. *Aphantaulax cincta,* female

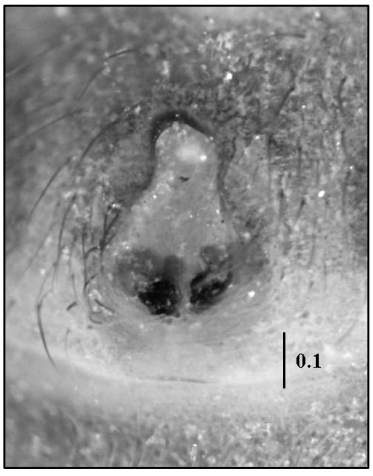

Figure 2. *Aphantaulax cincta,* epigyne

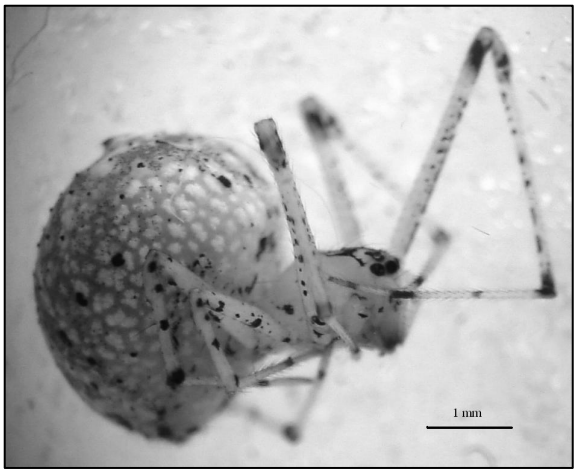

Figure 3. *Platnickina nigropunctata,* female

Figure 4. *Platnickina nigropunctata,* male pedipalp

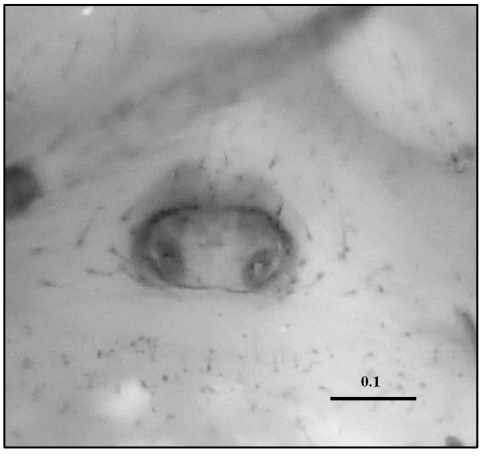

Figure 5. *Platnickina nigropunctata,* epigyne

In this research, field studies were performed in the daytime. However, most orb-weavers are nocturnal. In addition, nocturnal species spend the daytime under shelters. Therefore, the lack of night studies was compensated for by collecting spider specimens also from this kind of habitat. Furthermore, spider abundance in orchards depends on habitat type and collecting methods, because spiders prefer different habitats. For example, a collecting umbrella is an effective method. However, it was not possible to use one in the present study.

In this study, a total 402 individuals, 276 species were nimf (Table 1), the others were adults (68 males, 58 females). Only adult individuals were identified and evaluated. Among the families, Salticidae and Theridiidae contained the highest number of species collected. The families were Agelenidae, Linyphiidae, Mimetidae, Miturgidae, Tetragnathidae, Thomisidae and Zodariidae each with 1 species, Araneidae with 2 species, Gnaphosidae and Titanoecidae with 2 species and Salticidae and Theridiidae with 8 species. Moreover, 27 specimens could not be identified because of inadequacy and immaturity of the specimens. They may be new records. The ratio for nimf 70.76%, for adults 29.23%, among the adults for males 56.14%, for females 43.85% was found.

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