

Spider (Order Araneae) Fauna of Citrus Orchards in Northern Part of Iran

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Abstract

Spiders are carnivorous and most of them feed on insects. Therefore, they play an important role in insect population reduction. The present investigation was carried out to identify the spider's fauna in citrus orchards of Guilan, Mazandaran and Golestan provinces, during 2004-2005. Specimens were collected from tree canopy, soil and vegetation of selected citrus grooves and were taken to laboratory after labeling. True results revealed that there were a total of 1310 specimens 34 species belonging to 32 genera and 13 Families identified, among which 4 species were new for Iran fauna, as follows: *Larinioides cornutus* (Clerck, 1757), *Singa hamata* (Clerck, 1757), *Pardosa monticola* (Clerck, 1757) and *Tetragnatha nigrita* Lendl, 1886.

Key words: Iran, Citrus orchards, Predator, Fauna, Spiders.

INTRODUCTION

Spiders are one of the most abundant predatory groups in the terrestrial ecosystems. They are feed on insects and some other arthropods. Therefore, they can play important roles in pest's control. 35.000 species of spiders have been identified in the world and a total of 244 species of spiders are known in Iran [1]. Most of investigations on spiders are in agricultural ecosystems in Iran. For instance, some researches were performed on spider fauna and abundance of rice fields [2, 3], cotton [4, 5] citrus orchards [6] and olive orchards [7,8].

Very little is known about the spider fauna of citrus orchards in Iran but many studies have been done on spider fauna, abundance and their role in pest control in citrus orchards in many countries. 147 species of spiders belonged to 22 families classified in citrus orchards in Florida [9]. The spider's species *Anelosimus rupununi*, *A. atudiosus*, *A. jucundus*, *A. eximus* and *A. analyticus* collected on citrus orchards in Venezuela [10]. 89 species of spiders belonged to 17 families collected from 4 regions of citrus orchards in Italy. The highest population of collected specimens was belonged to Salticidae, Theridiidae, Thomisidae and Araneidae families and the lowest population was belonged to Clubionidae family. *Theridion varians* and *Anelosimus aulicus* have the most population among other species [11]. *Cheiracanthium mildei* and *Theridion* sp. and species belonged to Gnaphosidae and Lycosidae families reduced population of *Ceroplastes floridensis* in citrus orchards in Israel [12]. The spiders reduced (52-66%) population of black fly in citrus orchards in Florida [13]. In the course of complining list of the spider fauna of Kansas five species in the family Gnaphosidae are reported for Kansas for the first time (14).

The aim of present study is investigation spider fauna of citrus orchards in Iran (Mazandaran, Golestan and Guilan provinces) during 2004-2005.

MATERIAL AND METHOD

In order to establish the spider fauna of the citrus orchards, spider specimens were collected every month in spring, summer and autumn during 2004-2005. Localities of collections were, **Guilan:** Lahijan, Langrood, Soomehsara and Roodsar, **Mazandaran:** Amol, Babol, Tonekabon, Ramsar, Sari, Ghaemshahr, Behshar, Noshahr, Noor and Chaloos, **Golestan:** Raamian, Tooskaostan, Hashem Abad, Kordkooy, Bandar Gaz, Azad Shahr, Zarrin gol, Zanghian, Galoogah.

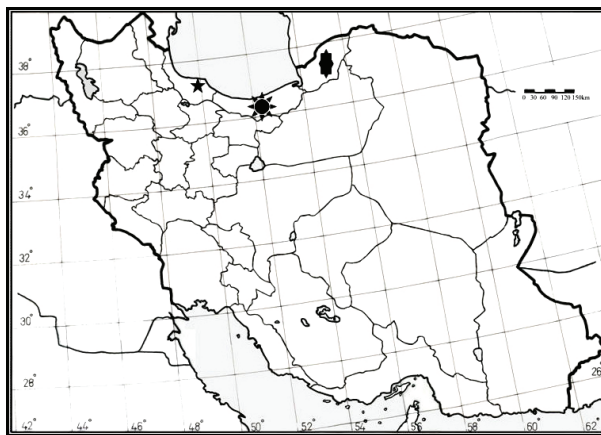


Figure 1. Sites of investigation spider fauna of citrus orchards in Iran

Spiders were collected from branches, leaves, flowers, on the ground and under the stones and grasses by STEINER & BAJOLINI method, insect net, pitfall trap, bottle, aspirator and pans. The keys of Anonymous [15], Barrion & Litsingerm [16], Borrer et al [17], Kaston [18] and Roberts [19] were used for the species classification. The specimens were preserved in the Zoology Research Laboratory of Iranian Research Institute of plant protection.

Table 1. The spider species that collected from the Iran citrus orchards and distribution of them in sites of collection

TAXA Family/species	LOCALITIES		
	Guilan	Mazandaran	Golestan
Agelenidae			
<i>Agelena labyrinthica</i> (Clerck,1757)	+	+	+
<i>Cicurina</i> sp.	-	-	+
Araneidae			
<i>Araneus diadematus</i> Clerck,1757	+	+	-
<i>Araniella cucurbitina</i> (Clerck, 1757)	+	+	+
<i>Argiope bruennichi</i> (Scopoli, 1772)	-	+	+
<i>Cercidia</i> sp.	+	-	-
<i>Cyclosa conica</i> (Pallas,1772)	-	+	+
<i>Hypsosinga sanguinea</i> (C.L.Koch,1845)	-	+	-
<i>Mangora acalypha</i> (Walckenaer, 1802)	+	+	-
<i>Neoscona adianta</i> (Walckenaer, 1802)	+	+	+
<i>Larinioides cornutus</i> (Clerck, 1757)*	-	-	+
<i>Singa hamata</i> (Clerck, 1757)*	+	-	-
Clubionidae			
<i>Clubiona</i> sp.	+	+	+
Dictynidae			
<i>Dictyna</i> sp.	-	-	+
Gnaphosidae			
<i>Zelotes</i> sp.	-	-	+
Linyphiidae			
<i>Frontinella frutetorum</i> (C.L.Koch, 1981)	+	+	+
Lycosidae			
<i>Pardosa amentata</i> (Clerck, 1757)	-	-	+
<i>Pardosa agrestis</i> (Westring, 1861)	+	-	-
<i>Pardosa monticola</i> (Clerck, 1757)*	-	-	+
Oxyopidae			
<i>Oxyopes lineatus</i> (Latreille, 1806)	-	-	+
Philodromidae			
<i>Philodromus cespitum</i> (Walckenaer, 1802)	-	+	+
<i>Philodromus rufus</i> (Walckenaer, 1825)	-	+	-
<i>Tibellus oblongus</i> (Walckenaer, 1802)	-	+	+
Salticidae			
<i>Bianor albimaculatus</i> (Lucas, 1846)	-	-	+
<i>Euphrys</i> sp.	+	-	-
<i>Heliophanus cupreus</i> (Walckenaer, 1802)	-	+	+
<i>Heliophanus flavipes</i> (Hahn,1831)	-	+	+
<i>Salticus scenicus</i> (Clerck,1957)	+	-	-
<i>Thyene imperialis</i> (Rossi, 1846)	+	+	+
Tetragnathidae			
<i>Tetragnatha javana</i> (Thorell,1890)	+	+	+
<i>Tetragnatha montana</i> (Simon, 1874)	+	-	-
<i>Tetragnatha nigrita</i> Lendl, 1886*	-	-	+
<i>Tetragnatha extensa</i> (Linnaeus, 1785)	+	+	+
Theridiidae			
<i>Steatoda albomaculata</i> (Degeer,1778)	+	+	+
<i>Steatoda paykullina</i> (Fabricius, 1775)	-	-	+
<i>Theridion simile</i> C.L.Koch,1836	-	-	+
Thomisidae			
<i>Misumena vatia</i> (Clerck, 1757)	+	+	+
<i>Synaema globosum</i> (Fabricius, 1775)	+	+	+
<i>Thomisus onastus</i> (Walckenaer, 1806)	-	+	+
<i>Xysticus cristatus</i> (Clerck, 1757)	+	-	-

RESULTS AND DISCUSSION

In this study, 34 species and 32 genera are identified. Most species belonged to Araneidae and Salticidae families and the fewest species were belonged to Agelenidae, Linyphiidae and Oxyopidae families. The number of identified spider species in

Guilan, Mazandaran and Golestan provinces were 17, 21 and 25 and the new spider species in these provinces were 1, 0 and 3 respectively. Most species were collected from Golestan (25) and the fewest were collected from Guilan (17). Characters of identified species, materials examined and their distribution have shown in the table 1 and 2.

Table 2. The spider families that collected from the Iran citrus orchards, sex and immature number of each families (A=Adult, I= Immature), total individual numbers (TIN) of the spider families and their frequency (%)

Family	A♀	A♂	I	TIN	%
Agelenidae	15	5	5	25	1.90
Araneidae	170	100	10	280	21.37
Clubionidae	-	-	5	5	0.38
Dictynidae	-	-	5	5	0.38
Gnaphosidae	-	-	5	5	0.38
Linyphiidae	180	150	20	350	26.71
Lycosidae	14	6	-	20	1.52
Oxyopidae	7	3	-	10	0.76
Philodromidae	20	8	2	30	2.29
Salticidae	45	17	13	75	5.72
Tetragnathidae	14.2	90	18	250	19.08
Theridiidae	23	15	7	45	3.43
Thomisidae	128	40	42	210	16.3

Among identified species, the most population of species was belonged to Linyphiidae, Araneidae and Tetragnathidae species, respectively. The highest population of collected specimens was belonged to Salticidae, Theridiidae, Thomisidae and Araneidae families and the lowest population was belonged to Clubionidae family in citrus orchards in Italy (11). *Cheiracanthium mildei* and *Theridion* sp. and species belonged to Gnaphosidae and Lycosidae families reduced population of *Ceroplastes floridensis* in citrus orchards in Israel (12). Species belonged to Linyphiidae, Araneidae and Tetragnathidae families reduced citrus pests in the northern part of Iran. Also, spiders reduced (52-66%) population of black fly in citrus orchards in Florida (13). Spider species diversity was little (34 species belonging to 32 genera and 13 Families) in citrus orchards in the northern part of Iran but the spider species variety were more in the citrus orchards in another countries such as, in Italy, 89 species of spiders belonged to 17 families (11) and 147 species of spiders belonged to 22 families classified in the citrus orchards in Florida (9).

Population of spiders was very low in these orchards. The main reason is used of harmful insecticides against citrus pests.

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Figure 1. *T. onustus* (Original figure, Ghavami, 2004)



Figure 2. *S. globosum* (Original figure, Ghavami, 2004)



Figure 3. *Javana T.* (Original figure, Ghavami, 2004)



Figure 4. *T. extensa* (Original figure, Ghavami, 2005)



Figure 5. *N. adianta* (Original figure, Ghavami, 2005)