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Investigation Fauna and Density of Population of Spiders in the Desert and Pomegranate Orchards in Tehran and Semnan Provinces

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Abstract: The present study was carried out to consideration the spider's fauna and abundance of spiders in the desert and pomegranate orchards in Tehran and Semnan provinces, during 2007. Specimens were collected from desert and pomegranate orchards by pitfall trap, shaking tree, pans, bottle and aspirator and were taken to the laboratory after labeling. A total of 1231 specimens were classified in 45 species and 36 genera belonged to 17 families. Among them 4 spider species were new for Iranian spider fauna. The families Lycosidae, Linyphiidae, Gnaphosidae and Theridiidae had height population in the study areas. Specimens were immature in the winter and spring and they were adult in the summer. The dominant species in all of study regions was *Pardosa agrestis* (Westring).

Key words: Iran, desert, pomegranate orchard, predator, abundance, fauna, spiders

INTRODUCTION

Spiders have a wide insect host range and thus can act as biological control agents of insect pests in agro-ecosystems. Thirty five thousand species of spiders have been identified in the world and a total of 244 species of spiders are known in Iran (Ghavami, 2006a, 2007a). 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, in this study, twenty seven species of spiders were reported (Mozaffarian *et al.*, 2000). Spiders were one of the most abundant predators in these fields (Ghavami, 2004). Forty five species and 59 genera belonging to 19 families were recorded on the cotton fields. Twenty eight species, 15 genera and 1 family of spiders were reported as a first record of Iran. Through regular weekly visiting dominant species were also determined with following species *Cheiracanthium pennyi*, *Aulonia albimana*, *Neoscona adianta* and *Thanatus formicinus* in Ardebil, Fars, Gholestan and Tehran, respectively. Host preference and effects of the spider on major cotton insect pests were also studied on the laboratory condition for the first time in Iran in 2004. Results indicated that maximum predation occurred *T. imperialis*, *O. salticus*, *T. formicinus* and *C. pennyi* on *Empoasca decipiens* in Tehran and Ardebil provinces and *A. albimana* on *Bemisia tabaci* in Fars province (Ghavami *et al.*, 2004, 2007b, 2008; Ghavami, 2007b). Forty species and 34 genera of spiders were reported from citrus orchards. Six species of spiders were recorded for the first time from Iran (Ghavami, 2006c;

Ghavami and Ghanadamooz, 2008). The most abundant of spider species belonged to Linyphiidae and Araneidae families in these orchards, respectively (Ghavami and Ghanadamooz, 2008). Forty five species and 47 genera belonging to 18 families classified in the olive orchards. Twenty-five species, 9 genera and 2 families were reported for the first time from Iran, (Ghavami *et al.*, 2007a; Ghavami, 2006b, 2007b). Also, many studies have been done on spider fauna, abundance and their role in pest control in many countries. In a study, *Oecobius annulipes* was one of the important predators in the pomegranate orchards in California (Carrol, 2005). *Latrodectus Hesperus* collected from pomegranate orchards in San Joaquin in California, too (Hernandez, 2007). *Icius hamatus* was found in a silk retreat inside top of pomegranate tree. It was first record of this species in Poland (Tomasiewicz and Wesolowski, 2006). The aim of present study was investigation spider fauna of desert and pomegranate orchards in the central part of Iran (Tehran and Semnan provinces) during 2007.

MATERIALS AND METHODS

Study area: Study areas situated in the part of central region of Iran and included Tehran and Semnan provinces. Tehran, placed in the South of Mazandaran and Alborz Mountains, East of Semnan, North of Qum and Markazi and West of Ghazvin. North of Tehran surrounding by mountains but South of that is plain and desert (Dasht e Kavir). Latitude, Longitude and height of Tehran are 17' 51°- 33' 51° and 37' 35°- 47' 35°

and 1100-1500 m, respectively. Semnan located in the east of Tehran, South of Alborz Mountains, Mazandaran and Golestan, West of Khorasan and North of Esfahan provinces. The most areas of Semnan are placed in the desert (Dasht e Kavir) and salt lake is located in the South East of Semnan. Latitude, Longitude and height of Semnan are included 23', 53°, 34', 35° and 1132 m, respectively. We considered pomegranate orchards were situated in the Dasht e Kvir and pomegranate orchards were adjoining of that. Because, a part of Tehran (Varamin) and Semnan (Gamsar) provinces situated in the Dasht e Kvir. In order to specimen collection, one site of each province choosed as a study area and 5 places selected in the desert and 5 places in the arable fields (pomegranate orchards) randomly. Places situated between different landscapes.

Sampling method: Spider fauna will determined by pitfall trap, hand catch, aspirator and stocking to the branches of trees every 15 days. Specimens transferred to the lab and classified by spider identification keys (Anonymous, 2002; Barrion and Litsinger, 1995; Borrer *et al.*, 1989; Kaston, 1970; Roberts, 1985).

Dispersal and dominant species assessed by pitfall trap. In order to day and night activity, diurnal and nocturnal species, population of species in day and night, migrated species of surrounding landscape, migrated species by ballooning and dispersal pattern. Specimens collected by put 3 pitfall traps in the each place. Pitfalls have diameter 4 cm and were refilled with a formaldehyde, water and soap solution. Data of population of species determined by calculated mean and percentage (Bonte and Mailfait, 2001).

RESULTS AND DISCUSSION

In this study, true results revealed that there were a total of 1231 specimens' 45 species and 36 genera were identified. Among them 4 spider species were new for Iranian spider fauna. The number of identified spider species in Tehran and Semnan provinces was 32 and 37, respectively. Most species were collected from Semnan and the fewest were collected from Tehran desert. Characters of identified species, materials examined and their distribution were shown in the Table 1.

Spiders had high population in the pomegranate orchards. The population of them considered in three seasons (winter, spring and summer). The highest population of spiders were in the spring and summer seasons. The population of spiders was less in the desert (Dasht e Kavir) and many of species didn't find in this area. Most spider species were belonged to Lycosidae, Linyphiidae and Theridiidae families in the pomegranate

Table 1: The spider species that collected from the study areas and distribution of them in the sites of collection

Family/Species	Taxa		
	Desert	Tehran	Semnan
Araneidae			
<i>Argiope lobata</i> (Pallas, 1772)		+	
<i>Mongora acalypha</i> (Walckenaer, 1802)		+	+
<i>Hypsosinga albobittata</i> (Westring, 1851)		+	
Clubionidae			
<i>Clubiona</i> sp.	+	+	
Dictynidae			
<i>Argenna patula</i> (Simon, 1874)		+	
<i>Dictyna</i> sp.		+	
Eresidae			
<i>Eresus</i> sp.		+	
Eusparassidae			
<i>Micrommata vireceus</i> (Clerck, 1757)		+	
Gnaphosidae			
<i>Drassodes cupreus</i> (Blackwall, 1834)*	+	+	+
<i>Haplochrassus dalmateusis</i> L. (Koch, 1866)*	+	+	
<i>Micaria</i> sp.	+	+	+
<i>Scotophaea blackwalli</i> (Thorell, 1873)*	+	+	+
<i>Zelotes</i> sp.		+	+
Linyphiidae	+		
<i>Erigon vagans</i> (Audouin, 1826)		+	
<i>Erigon dentipalpis</i> (Wider, 1826)		+	+
<i>Linyphia</i> sp.		+	+
<i>Microlinyphia</i> sp.		+	
Lycosidae			
<i>Pardosa amentata</i> (Clerck, 1757)	+	+	+
<i>Pardosa agrestis</i> (Westring, 1861)	+	+	+
<i>Alopecosa</i> sp.			+
<i>Arctosa</i> sp.	+	+	+
<i>Aulonia albimana</i> (Walckenaer, 1805)		+	+
<i>Hogna radiata</i> (Latreille, 1817)		+	
<i>Trochosa</i> sp. (Simon, 1987)	+	+	+
Miturgidae			
<i>Cheiracanthium pennyi</i> O.P. (Cambridge, 1873)		+	+
<i>Cheiracanthium mildei</i> L. (Koch, 1864)		+	
Oxyopidae			
<i>Oxyopes heterophthalmus</i> (Latreille, 1804)		+	+
Philodromidae			
<i>Philodromus cespitum</i> (Walckenaer, 1802)		+	+
<i>Thanatus formicinus</i> (Clerck, 1757)		+	
<i>Tibellus oblongus</i> (Walckenaer, 1802)		+	+
Salticidae			
<i>Heliophanus</i> sp.		+	+
<i>Salticus</i> sp.		+	
<i>Thyene imperialis</i> (Rossi, 1846)		+	+
Sparassidae			
<i>Micrommata vireceus</i> (Clerck, 1757)		+	
Theridiidae			
<i>Steatoda paykullina</i> (Fabricius, 1775)	+	+	+
<i>Theridion impressum</i> L. (Koch, 1881)		+	
<i>Theridion simil</i> (C.L. Koch, 1836)		+	
<i>Dipoena</i> sp.		+	+
Thomisidae			
<i>Misumena vatia</i> (Clerck, 1757)		+	+
<i>Misumenops</i> sp.		+	
<i>Temorus</i> sp.		+	+
<i>Thomisus onastus</i> (Walckenaer, 1806)		+	+
<i>Xysticus cristatus</i> (Clerck, 1757)	+	+	+
Zodariidae			
<i>Zodariion</i> sp.		+	

*: Species were new for Iranian spider fauna. +: Site of distribution of species and genera

Table 2: Monthly dispersion spider's species in Tehran pomegranate orchards in 2007

Family/species	Taxa															
	February		March		April		May		June		July		August		September	
	T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%
Araneidae																
<i>Argiope lobata</i> (Pallas, 1772)											3	0.42	2	0.28		
<i>Mongora acalypha</i> (Walckenaer, 1802)									2	0.28	3	0.42	3	0.42	2	0.28
<i>Hypsosinga albovittata</i> (Westring, 1851)											2	0.28	3	0.42		
Clubionidae																
<i>Clubiona</i> sp.									2	0.28	3	0.42	3	0.42	2	0.28
Dictynidae																
<i>Argenna patula</i> (Simon, 1874)			2	0.28	3	0.42	4	0.56	3	0.42	2	0.28	1	0.14		
<i>Dictyna</i> sp.	1	0.14	2	0.28	2	0.28	3	0.42	4	0.56	3	0.42	3	0.42	2	0.28
Eresidae																
<i>Eresus</i> sp.									1	0.14	2	0.28	2	0.28		
Eusparassidae																
<i>Micrommata vireceus</i> (Clerck, 1757)									1	0.14	2	0.28	2	0.28		
Gnaphosidae																
<i>Drassodes cupreus</i> (Blackwall, 1834)*			1	0.14	1	0.14	2	0.28	2	0.28	2	0.28	1	0.14	1	0.14
<i>Scotophaeus blackwallii</i> (Thorell, 1873)*	1	0.14	1	0.14	2	0.28	2	0.28	3	0.42	2	0.28	3	0.42	1	0.14
<i>Haplochrassus dalmateusis</i> L. (Koch, 1866)*							2	0.28	2	0.28	1	0.14				
<i>Micaria</i> sp.	1	0.14	2	0.28	3	0.42	4	0.28	4	0.56	5	0.71	4	0.28	2	0.28
<i>Zelotes</i> sp.	1	0.14	3	0.42	4	0.28	5	0.71	4	0.56	6	0.85	5	0.71	2	0.28
Linyphiidae																
<i>Erigon vagans</i> (Audouin, 1826)	1	0.14	2	0.28	3	0.42	5	0.71	6	0.85	5	0.71	3	0.42	1	0.14
<i>Erigon dentipalpis</i> (Wider, 1826)	2	0.28	4	0.28	5	0.71	3	0.42	3	0.42	2	0.28	1	0.14		
<i>Linyphia</i> sp.					2	0.28	3	0.42	4	0.56	5	0.71	6	0.85	2	0.28
<i>Microlinyphia</i> sp.			1	0.14	2	0.28	3	0.42	3	0.42	2	0.28	2	0.28	2	0.28
Lycosidae																
<i>Pardosa amentata</i> (Clerck, 1757)	1	0.14	2	0.28	3	0.42	5	0.71	3	0.42	1	0.14				
<i>Pardosa agrestis</i> (Westring, 1861)	3	0.42	5	0.71	7	0.99	10	1.42	8	1.13	6	0.85	4	0.56	4	0.56
<i>Alopecosa</i> sp.	1	0.14	2	0.28	4	0.56	5	0.71	3	0.42	2	0.28	1	0.14	1	0.14
<i>Aulonia albimana</i> (Walckenaer, 1805)	3	0.42	5	0.71	7	0.99	9	1.28	8	1.13	7	0.99	4	0.56	3	0.42
<i>Honga radiata</i> (Latreille, 1817)			2	0.28	3	0.42	1	0.14								
<i>Trochosa robusta</i> (Simon, 1876)*	1	0.14	2	0.28	3	0.42	4	0.56	2	0.28	2	0.28	1	0.14	1	0.14
Miturgidae																
<i>Cheiracanthium pennyi</i> O.P. (Cambridge, 1873)					1	0.14	4	0.56	5	0.71	2	0.28	2	0.28	2	0.28
<i>Cheiracanthium mildei</i> L. (Koch, 1864)					1	0.14	2	0.28	3	0.42	2	0.28	1	0.14	1	0.14
Oxyopida																
<i>Oxyopes heterophthalmus</i> (Latreille, 1804)					1	0.14	2	0.28	3	0.42	4	0.56	1	0.14	1	0.14
Philodromidae																
<i>Philodromus cespitum</i> (Walckenaer, 1802)					2	0.28	2	0.28	5	0.71	4	0.56	3	0.42	2	0.28
<i>Thanatus formicinus</i> (Clerck, 1757)			1	0.14	2	0.28	3	0.42	4	0.56	3	0.42	2	0.28	1	0.14
<i>Tibellus oblongus</i> (Walckenaer, 1802)					2	0.28	3	0.42	4	0.56	2	0.28				
Salticidae																
<i>Heliophanus</i> sp.					2	0.28	4	0.56	6	0.85	4	0.56	2	0.28	1	0.14
<i>Salticus</i> sp.			1	0.14	1	0.14	2	0.28	3	0.42	4	0.56	2	0.28		
<i>Thyene imperialis</i> (Rossi, 1846)					2	0.28	2	0.28	3	0.42	4	0.56	2	0.28	3	0.42
Theridiidae																
<i>Steatoda paykullina</i> (Fabricius, 1775)	1	0.14	2	0.28	3	0.56	5	0.71	4	0.56	3	0.56	2	0.28	1	0.14
<i>Theridion impressum</i> L. (Koch, 1881)	2	0.28	2	0.28	3	0.56	5	0.71	7	0.99	4	0.56	2	0.28	1	0.14
<i>Theridion simile</i> (C.L. Koch, 1836)			1	0.14	2	0.28	4	0.56	5	0.71	6	0.85	5	0.71	1	0.14
<i>Dipoena</i> sp.						1	0.14	2	0.28	2	0.28					
Thomisidae																
<i>Misumena vatia</i> (Clerck, 1757)					1	0.14	2	0.28	5	0.71	4	0.56	3	0.42	2	0.28
<i>Misumenops</i> sp.					1	0.14	2	0.28	3	0.42	4	0.56	1	0.14	1	0.14
<i>Temarus</i> sp.					1	0.14	2	0.28	3	0.42	4	0.56	2	0.28		
<i>Thomisus onastus</i> (Walckenaer, 1806)					1	0.14	3	0.42	4	0.56	2	0.28	1	0.14		
<i>Xysticus cristatus</i> (Clerck, 1757)			1	0.14	3	0.42	5	0.71	4	0.56	3	0.42	2	0.28	1	0.14
Zodariidae																
<i>Zodariion</i> sp.							1	0.14	2	0.28	2	0.28				

orchards and desert. Dominant species was *Pardosa agrestis* (Westring) in all of study areas. The monthly population of spiders has shown in the Table 2-5.

The most population of spider's species belonged to Lycosidae, Theridiidae and Gnaphosidae families in Tehran pomegranate orchards, respectively. Most of

Table 3: Monthly dispersion spider's species in Semnan pomegranate orchards in 2007

Family/species	Taxa															
	February		March		April		May		June		July		August		September	
	T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%
Araneidae																
<i>Argiope lobata</i> (Pallas, 1772)									1	0.23	2	0.47	3	0.70		
Clubionidae																
<i>Clubiona</i> sp.							1	0.23	2	0.47	2	0.47	3	0.70	2	0.47
Dictynidae																
<i>Argema patula</i> (Simon, 1874)							1	0.23	2	0.47	3	0.70	4	0.94	2	0.47
<i>Dictyna</i> sp.			1	0.23	2	0.47	3	0.70	6	1.41	1	0.23				
Gnaphosidae																
<i>Drassodes cupreus</i> (Blackwall, 1834)*			1	0.23	2	0.47	3	0.70	4	0.94	3	0.70	2	0.47		
<i>Scotophaeus blackwallii</i> (Thorell, 1873)*			2	0.47	2	0.47	3	0.70	5	1.18	6	1.41	4	0.94		
<i>Haplodrassus dalmatensis</i> L. (Koch, 1866)*					2	0.47	3	0.70	2	0.47						
<i>Micaria</i> sp.			1	0.23	2	0.47	3	0.70	4	0.94	6	1.41	1	0.23		
<i>Zelotes</i> sp.			2	0.47	3	0.70	4	0.94	5	1.18	6	1.41	4	0.94		
Linyphiidae																
<i>Erigon vagans</i> (Audouin, 1826)			1	0.23	2	0.47	2	0.47								
<i>Microlinyphia</i> sp.					2	0.47	3	0.70	4	0.94	3	0.70				
Lycosidae																
<i>Pardosa amentata</i> (Clerck, 1757)					1	0.23	2	0.47	3	0.70	4	0.94	6	1.41	1	0.23
<i>Pardosa agrestis</i> (Westring, 1861)	2	0.47	4	0.94	5	1.18	7	1.65	10	2.36	12	2.83	5	1.18	1	0.23
<i>Aulonia albimana</i> (Walckenaer, 1805)	2	0.47	4	0.94	6	1.41	5	1.18	4	0.94	3	0.70	2	0.47		
<i>Arctosa</i> sp.			1	0.23	3	0.70	4	0.94	5	1.18	6	1.41	4	0.94		
<i>Hogna radiata</i> (Latreille, 1817)			1	0.23	2	0.47	3	0.70	4	0.94	5	1.18	2	0.47		
<i>Trochosa robusta</i> (Simon, 1876)*			2	0.47	3	0.70	4	0.94	2	0.47	2	0.47				
Miturgidae																
<i>Cheiracanthium pennyi</i> O.P. (Cambridge, 1873)							2	0.47	3	0.70	3	0.70	2	0.47		
<i>Cheiracanthium mildei</i> L. (Koch, 1864)							1	0.23	2	0.47	3	0.70	1	0.23		
Oxyopidae																
<i>Oxyopes heterophthalmus</i> (Latreille, 1804)							1	0.23	2	0.47	3	0.70	1	0.23		
Philodromidae																
<i>Philodromus cespitum</i> (Walckenaer, 1802)											3	0.70	2	0.47	1	0.23
Salticidae																
<i>Heliophanus</i> sp.	1	0.23	2	0.47	2	0.47	2	0.47	3	0.70	2	0.47	3	0.70		
<i>Thyene imperialis</i> (Rossi, 1846)			1	0.23	2	0.47	3		3	0.70	2	0.47	1	0.23		
Theridiidae																
<i>Steatoda paykullina</i> (Fabricius, 1775)	1	0.23	2	0.47	3	0.70	4	0.94	4	0.94	5	1.18	4	0.94	2	0.47
<i>Theridion impressum</i> L. (Koch, 1881)					1	0.23	3	0.70	5	1.18	2	0.47	2	0.47	1	0.23
<i>Theridion simile</i> (C.L. Koch, 1836)							1	0.23	2	0.47	3	0.70	1	0.23		
<i>Dipoena</i> sp.											1	0.23	1	0.23		
Thomisidae																
<i>Misumena vatia</i> (Clerck, 1757)											3	0.70	1	0.23	1	0.23
<i>Thomisus onastus</i> (Walckenaer, 1806) <i>zyuzini</i>									1	0.23	2	0.47	3	0.70	1	0.23
<i>Xysticus cristatus</i> (Clerk, 1757)			1	0.23	2	0.47	3	0.70	4	0.94	3	0.70	2	0.47		

density of population of spiders in the winter was belonged to Lycosidae and Theridiidae families. The highest population in the spring was belonged to Lycosidae and Theridiidae families and most population in the summer season were belonged to Gnaphosidae family (Table 2).

The highest population of spider's species was belonged to Lycosidae, Theridiidae and Gnaphosidae families in Semnan pomegranate orchards, respectively. Most of density of population of spiders in the winter was belonged to Lycosidae and Salticidae families. Lycosidae and Gnaphosidae families had highest population in the spring and Lycosidae, Theridiidae and Gnaphosidae families had most population in the summer season in these pomegranate orchards (Table 3).

A part of Tehran province located in the Dasht e Kavir. The most of pomegranate orchards of Tehran situated in the Varamin. Some of pomegranate orchards of Varamin are located in the Dasht e Kavir. Spider species belonged to Lycosidae, Gnaphosidae and Theridiidae families had most population in this region. The most spider species belonged to Lycosidae and Linyphiidae families had highest population in the winter and species belonged to Lycosidae, Linyphiidae and Theridiidae families had most density of population in the spring. Also, Species belonged to Theridiidae and Linyphiidae families had highest population in the summer in this area (Table 4).

The desert of Semnan province is wider than desert of Tehran province. The most pomegranate

Table 4: Monthly dispersion of spider's species in Tehran Desert in 2007

Family/species	Taxa																
	February		March		April		May		June		July		August		September		
	T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%	
Gnaphosidae																	
<i>Scotophaeus blackwalli</i> (Thorell, 1873)*											3	4	2	2.66			
<i>Micaria</i> sp.							1	1.33	2	2.66	3	4	2	2.66	2	2.66	
<i>Zelotes</i> sp.							1	1.33	2	2.66	3	4	2	2.66	1	1.33	
Linyphiidae																	
<i>Erigon vagans</i> (Audouin, 1826)											2	2.66	2	2.66			
<i>Erigon dentipalpis</i> (Wider, 1826)											2	2.66					
<i>Linyphia robusta</i> (Simon, 1876)*											2	2.66	3	4	5.33		
Lycosidae																	
<i>Pardosa agrestis</i> (Westring, 1861)	1	1.33	2	2.66	3	4	4	5.33	3	4	2	2.66	1	1.33	1	1.33	
<i>Arctosa</i> sp.			3		2	2.66											
<i>Trochosa</i> sp.	1	1.33	2	2.66	3	4	4	5.33	2	2.66	1	1.33					
Salticidae																	
<i>Heliophanus</i> sp.											2	2.66					
Theridiidae																	
<i>Steatoda paykullina</i> (Fabricius, 1775)	1	1.33	2	2.66	2	2.66	3	4	2.66	2	2.66	1	1.33	1	1.33		
<i>Theridion impressum</i> L. (Koch, 1881)											2	2.66					
<i>Theridion simile</i> (C.L. Koch, 1836)													1	1.33			
Zodariidae																	
<i>Zodarion</i> sp.			2	2.66													

Table 5: Monthly dispersion of spider's species in Semnan desert in 2007

Family/species	Taxa															
	February		March		April		May		June		July		August		September	
	T	%	T	%	T	%	T	%	T	%	T	%	T	%	T	%
Araneidae																
<i>Mongora acalypha</i> (Walckenaer, 1802)									3	2.60	2	1.73	1	0.86		
Clubionidae																
<i>Clubiona</i> sp.							1	0.86	2	1.73	2	1.73	1	0.86		
Dictynidae																
<i>Dictyna</i> sp.											2	1.73				
Gnaphosidae																
<i>Drassodes cupreus</i> (Blackwall, 1834)*											2	1.73				
<i>Scotophaeus blackwalli</i> (Thorell, 1873)*	1	0.86	2	1.73	3	2.60	2	1.73								
<i>Zelotes</i> sp.	1	0.86	2	1.73	3	2.60	2	1.73	1	0.86						
Linyphiidae																
<i>Erigon vagans</i> (Audouin, 1826)			1	0.86	2	1.73										
<i>Linyphia</i> sp.					2	1.73										
<i>Microlinyphia</i> sp.									1	0.86	2	1.73	2	1.73		
Lycosidae																
<i>Pardosa amenata</i> (Clerck, 1757) <i>luctinosa</i>	1	0.86	2	1.73	4	3.47	3	2.60	1	0.86						
<i>Pardosa agrestis</i> (Westring, 1861)	2	1.73	3	2.60	4	3.47	7	6.08	5	4.34	4	3.47	2	1.73	1	0.86
<i>Arctosa</i> sp.									2	1.73	1	0.86				
<i>Alopecosa</i> sp.									2	1.73						
<i>Aulonia albimana</i> (Walckenaer, 1805)			1	0.86	2	1.73	3		4	3.47	5	4.34	3	2.60	2	1.73
<i>Trochosa robusta</i> (Simon, 1876)*							3	2.60	2	1.73						
Salticidae																
<i>Heliophanus</i> sp.							2	1.73	3	2.60	1	0.86				
Theridiidae																
<i>Steatoda paykullina</i> (Fabricius, 1775)					1	0.86	2	1.73	3	2.60	4	3.47	1	0.86		
<i>Theridion impressum</i> L. (Koch, 1881)											2	1.73	2	1.73		
<i>Theridion simile</i> (C.L. Koch, 1836)													1	0.86		
Thomisidae																
<i>Xysticus cristatus</i> (Clerk, 1757)													3	2.60	3	2.60
Zodariidae																
<i>Zodarion</i> sp.													2	1.73	2	1.73

orchards of Semnan province situated in the Garmsar. The most parts of Garmsar located in the Dasht e kavir. Most of spider's species in this area were belonged to Lycosidae, Theridiidae and Gnaphosidae families,

respectively. The highest population in the winter and spring were belonged to Lycosidae family and the most population in the summer was belonged to Lycosidae and Thomisidae families (Table 5).

Many of spider species are common in pomegranate orchards and other crops in the study areas, such as cotton fields. Some species belonged to Lycosidae, Theridiidae, Gnaphosidae and Araneidae families were found in the cotton fields in Tehran province, too (Ghavami *et al.*, 2007b; Ghavami, 2007b). The species belonged to Theridiidae family had high population in the pomegranate orchards in the study areas. Also, *Latrodectus hesperus* collected from pomegranate orchards in California and had high population in these orchards (Hernandez, 2007). Species belonged to Salticidae family were found in the pomegranate orchards in the study areas. They had high population in these orchards and had an important role in pest control. *Icius hamatus* was found on pomegranate trees in Poland, too (Tomasiewicz and Wesolowski, 2006).

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