

## Spider (Order Araneae) Fauna of Cotton Fields in Iran

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### Abstract

The current study investigates the spider fauna of cotton fields in Iran during 2003-2004. Spider samples were collected from different cotton field localities by pitfall trap and insect net. A total of 632 specimens were classified in 45 species and 59 genera belonged to 19 families. *Cheiracanthium pennyi* O.P. Cambridge, 1873, *Neoscona adianta* (Walckenaer, 1802), *Aulonia albimana* (Walckenaer, 1805) and *Thanatus formicinus* (Clerck, 1757) were the most abundant species in cotton fields, respectively. Most species belonged to Thomisidae and Araneidae families and the fewest species were belonged to Gnaphosidae, Linyphiidae and Pisauridae families. 26 species, 15 genera and 1 family are new records for the Iran spider fauna.

**Key words:** Iran, Cotton field, Predator, Fauna, Spiders.

### INTRODUCTION

Spiders are one of the most abundant predatory groups in the terrestrial ecosystems. They feed on insects and some other arthropods. Therefore, they can play important roles in pests 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], citrus orchards [4, 5] and olive orchards [6, 7]

Very little is known about the spider fauna of cotton fields in Iran but many studies have been done on spider fauna, abundance and their role in pest control in cotton fields in many countries. 25 and 120 species of spiders were recorded of cotton fields in Norway [8, 9]. 17 species of spiders belonged to Clubionidae, Lycosidae, Theridiidae, Thomisidae, Heteropodidae, Araneidae, Oxyopidae and Filistatidae [10] and 101 species and 21 genera belonged to Araneidae and 89 species and 21 genera belonged to Gnaphosidae of spiders were identified of cotton fields in India [11]. 25 species, 19 genera belonged to 10 families of spiders were classified in unsprayed cotton grown in 2 regions of south-eastern Queensland. Of these, *Cheiracanthium mordax* L. Koch, *Achaearanea veruculata* (Urquhart) and *Theridion* sp. made up 80-86 % (3).

The aim of present study is investigation spider fauna of cotton fields in Iran (Ardebil, Fars, Golestan and Tehran provinces) during 2003-2004.

### MATERIAL AND METHOD

In order to establish the spider fauna of the cotton fields, spider specimens were collected every week in spring, summer and autumn during 2003-2004. Spiders were collected from

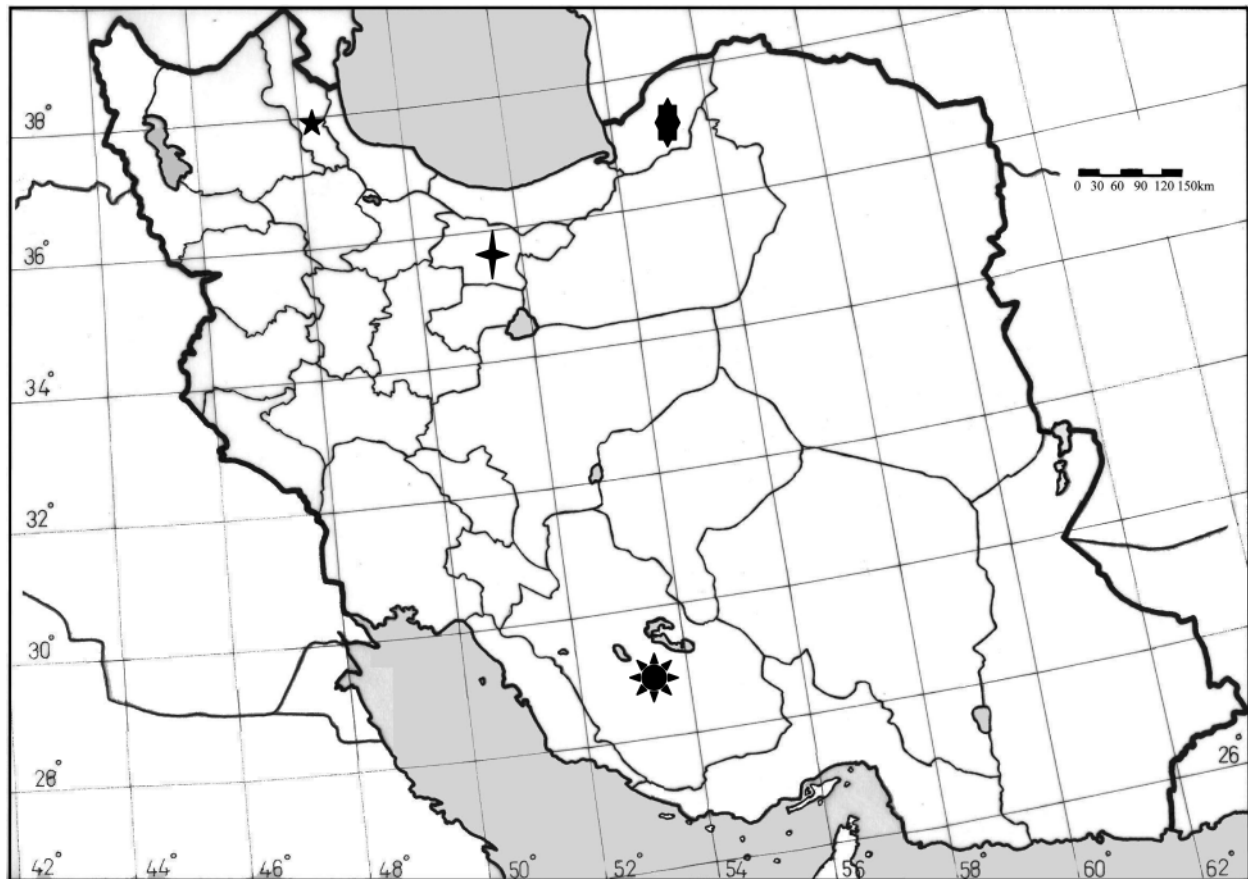
branches, leaves, flowers, on the ground and under the stones and grasses of cotton fields by strocking, insect net, pitfall trap, bottle, aspirator and pans. Localities of collections were Aghdam, Oltan, Majid Abad and Moghan in Ardebil province, Estahbanat, Darab, Fasa, Jahrom and Neyriz in Fars province, Filestan, Goltapeh, Jafar Abad, Pak Dasht, Pishva, Taghi Abad and Varamin in Tehran province and Gonbad, Bailar, Hivechi, Ghareghaj, Kordkooy and Hashem Abad in Golestan province (Fig.1).

The specimens were put into alcohol 70 percent, labeled and carried to the Araneology Research Laboratory of Plant Protection Research Institute of Iran. The keys of Anonymous [12], Barrion & Litsinger [13], Borrer, et al. [14], Kaston [15] and Roberts [16] were used for the species classification.

### RESULTS AND DISCUSSION

In this study, 632 specimens were collected from cotton fields. 45 species and 59 genera belonged to 19 families were identified. Among the specimens 298 individuals were adult (50.32%) and 316 individuals were immature (49.68%). Female/male (271/47) ratio was 5.76. The number of identified spider species in Ardebil, Fars, Golestan and Tehran provinces were 17, 16, 25 and 15 and the new spider species in these provinces were 9, 8, 14 and 10 respectively. Most species were collected from Golestan and the fewest were collected from Tehran [2] and most new species were recorded in Golestan (14) and the fewest were in [5] provinces. Identified species and their distribution were shown in Table 1 and sex ratio, adult and immature numbers, total individual numbers and their frequency (%) of each family were shown in Table 2.

As a result, the most abundant species were *Cheiracanthium pennyi* O.P. Cambridge, 1873, *Neoscona*



† (Tehran), ★ (Ardebil), ✳ (Fars) and ⚡ (Golestan) have shown sites of study.

**Figure 1.** Sites of investigation spider fauna of cotton fields in Iran

*adianta* (Walckenaer, 1802), *Aulonia albimana* (Walckenaer, 1805) and *Thanatus formicinus* (Clerck, 1757) with 70, 50, 40 and 35 individuals, respectively. Therefore, the most abundant families were Clubionidae, Philodromidae, Thomisidae, Lycosidae and Araneidae, respectively. In a faunistical investigation in the Indian cotton fields, the most abundant species were belonged to Clubionidae, Lycosidae, Theridiidae, Thomisidae, Heteropodidae, Araneidae, Oxyopidae and Filistatidae families too [17]. Also, *Cheiracanthium mordax* L. Koch and *Theridion* sp. were most abundant species in unsprayed cotton grown in 2 regions of south-eastern Queens land [18]. In our studies, *Cheiracanthium pennyi* O.P. Cambridge was founded as a most abundant species, too.

In this research, field studies were realized entirely at day and night. Because, spiders were activated in day and night in cotton fields.

As above mentioned, the arable areas were separated two zones. On the each zone in which take part different spider groups. While spiders of Lycosidae, Gnaphosidae, Clubionidae,

Thomisidae and Philodromidae are prefer the ground zone, web-weavers as Araneidae, Tetragnatidae, Theridiidae and Linyphiidae prefer the vegetation zone. Also in Europe, same results were determined, for instance, Thomisidae, Philodromidae, Pisauridae, Salticidae and Oxyopidae families in maize, cotton and sugar beet fields were seen in the ground zone [17, 19, 20].

According to this study, spiders had high population in Iranian cotton fields. The most population of spiders were in September and October. They were one of the important predators in these fields and they play an important role in cotton pest's control.

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**Table 1.** The spider species that collected from the Iran cotton fields and distribution of them in sites of collection.

TAXA	LOCALITIES			
	Ardebil	Fars	Golestan	Tehran
<b>Agelenidae</b>				
<i>Agelena labyrinthica</i> (Clerck,1757)*	+			
<i>Cicurina</i> sp. *			+	
<b>Araneidae</b>				
<i>Agalenatea redii</i> (Scopoli, 1763)*			+	
<i>Araneus</i> sp.			+	
<i>Argiope lobata</i> (Pallas, 1772)	+			
<i>Argiope bruennichi</i> (Scopoli, 1772)			+	
<i>Hypsosinga sanguinea</i> (C.L.Koch,1845)			+	
<i>Hypsosinga albovittata</i> (Westring,1851)*				+
<i>Neoscona adianta</i> (Walckenaer, 1802)	+		+	
<i>Mongora acalypha</i> (Walckenaer, 1802)		+	+	
<i>Singa</i> sp.			+	
<b>Clubionidae</b>				
<i>Cheiracanthium erraticum</i> (Walckenaer, 1802)*	+			+
<i>Cheiracanthium pennyi</i> O.P. Cambridge,1873*	+	+	+	+
<i>Cheiracanthium mildei</i> L.Koch,1864				+
<i>Clubiona neglecta</i> O.P.Cambridge,1862*			+	
<b>Dictynidae</b>				
<i>Argenna patula</i> (Simon,1874) *				+
<i>Dictyna latens</i> (Fabricius, 1775)*			+	
<b>Eresidae</b>				
<i>Eresus</i> sp.				+
<b>Eusparassidae</b>				
<i>Micrommata virecens</i> (Clerck, 1757)*	+			+
<b>Gnaphosidae</b>				
<i>Drassodes</i> sp.	+	+		
<i>Gnaphosa</i> sp.		+		
<i>Haplodrassus</i> sp.*		+		
<i>Micaria</i> sp.*		+		+
<i>Zelotes</i> sp.		+		
<b>Hahniidae</b>				
<i>Antistea</i> sp.*		+		
<b>Linyphiidae</b>				
<i>Linyphia</i> sp.			+	
<i>Lepthyphantes Zimmermanni</i> Bertkau,1890*				+
<i>Microlinyphia</i> sp.				+
<b>Lycosidae</b>				
<i>Pardosa amentata</i> (Clerck, 1757)*	+			
<i>Pardosa agrestis</i> (Westring, 1861)	+			+
<i>Alopecosa pulverulenta</i> (Clerck,1757)*		+		
<i>Arctosa</i> sp.		+		
<i>Aulonia albimana</i> (Walckenaer, 1805)*		+		
<i>Hongia</i> sp.	+			

<b>Metidae*</b>				
<i>Zygiella x-notata</i> (Clerck,1757)*			+	
<b>Oecobiidae</b>				
<i>Oceobius</i> sp.*	+			
<b>Oxyopidae</b>				
<i>Oxyopes salticus</i> (Hentx,1802)*	+	+	+	+
<i>Peucetia</i> sp.*		+		
<b>Philodromidae</b>				
<i>Philodromus cespitum</i> (Walckenaer, 1802)*			+	+
<i>Thanatus formicinus</i> (Clerck, 1757)*		+	+	+
<i>Thanatus striatus</i> C. L.Koch,1845*		+	+	+
<i>Tibellus oblongus</i> (Walckenaer, 1802)	+		+	+
<b>Pisauridae</b>				
<i>Pisaura mirabilis</i> (Clerck,1757)	+			
<b>Salticidae</b>				
<i>Bianor</i> sp.	+			
<i>Euphrys frontalis</i> (Walckenaer, 1802)*		+		
<i>Evarcha</i> sp.		+		
<i>Heliophanus cupreus</i> (Walckenaer, 1802)		+		
<i>Heliophanus flavipes</i> (Hahn,1831)			+	
<i>Pellenes</i> sp.		+		
<i>Phelegra</i> sp.		+		
<i>Philaseus</i> sp.*	+			
<i>Salticus scenicus</i> (Clerck,1957)*			+	
<i>Thyene imperialis</i> (Rossi, 1846)	+	+	+	+
<b>Tetragnathidae</b>				
<i>Tetragnatha montana</i> (Simon, 1874)*			+	
<i>Tetragnatha javana</i> (Thorell,1890)*			+	
<i>Tetragnatha extensa</i> (Linnaeus,1785)			+	
<b>Theridiidae</b>				
<i>Steatoda paykullina</i> (Fabricius, 1775)	+	+	+	
<i>Theridion impressum</i> L.Koch,1881 *			+	
<i>Enoplognatha</i> sp.	+			
<b>Thomisidae</b>				
<i>Diaea dorsata</i> (Fabricius,1777)		+		
<i>Ozyptilla</i> sp.		+		
<i>Misumena vatia</i> (Clerck, 1757)*	+		+	+
<i>Misumenops</i> sp.				+
<i>Monaesis aciculus</i> (Simon,1903)*	+			
<i>Synaema globosum</i> (Fabricius, 1775)		+	+	
<i>Temarus</i> sp.*				+
<i>Thomisus onastus</i> (Walckenaer, 1806)	+	+	+	+
<i>Xysticus cristatus</i> (Clerck, 1757)	+	+		+
<i>Xysticus lanio</i> C.L.Koch, 1824			+	
<i>Xysticus luctuosus</i> (Blackwall, 1836)*		+		

\* Families, genera and species marked by asterisks are reported for the first time from Iran

**Table 2.** The spider families that collected from the Iran cotton fields, 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	2	0	2	4	0.63
Araneidae	60	10	10	80	1.26
Clubionidae	30	10	50	90	14.24
Dictynidae	4	0	0	4	0.63
Eresidae	2	0	1	3	0.47
Eusparassidae	2	0	1	3	0.47
Gnaphosidae	-	-	50	50	7.91
Hahniidae	-	-	2	2	0.31
Linyphiidae	2	-	15	17	2.68
Lycosidae	40	10	20	70	11.07
Metidae	3	0	2	5	0.79
Oecobiidae	1	-	4	5	0.79
Oxyopidae	10	5	40	55	8.70
Philodromidae	15	5	40	60	9.49
Pisauridae	5	-	2	7	1.10
Salticidae	30	-	25	55	8.70
Tetragnathidae	20	2	5	27	4.27
Theridiidae	15	5	30	50	7.91
Thomisidae	30	-	15	45	7.12

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