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THE NEW REPORT OF THE SPIDER FAUNA IN FARS PROVINCE, IRAN

(ARACHNIDA: ARANEAE)

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ABSTRACT

Integrated pest management is a critical component of sustainable agriculture that offers biological control against pests. Spiders with wide insect host range can act important role in biological control against pests. The objective of this study was identification of spider fauna in two large forests in southern of Iran. During 2012-2013, research region was divided to 8 subdivision and was sampling every month. A total of 620 specimens were collected from branch, leaves, on the ground and under stones by bottle, aspirator, pitfall trap and insect net. The collected specimens were classified in 19 family according to taxonomic characters in lab and 7 family of them, were new record in research region (Fars Province) according to frequently as follows: Linyphiidae, Agenelidae, Pisauridae, Tetragnathidae, Amaurobiidae, Atypidae, Thomisidae.

Keywords: Fars Province, Iran, Arachnida: Araneae

INTRODUCTION

Spiders (order Araneae) are air-breathing arthropods and the largest order of arachnids and rank seventh in total species diversity among all animal [1]. Although a herbivorous species (*Bagheera kiplingi*) was described [2] but all other known species are predators, and preying on

insects that some are Agriculture's pest. So participating in the biological control agent [3]. Over than 43,000 species was described [1] that more than 240 species of 35 family are in Iran [4].

In some part of Iran, especially in the northern part extensive research in order to

identify spiders and their role in biological control [4-12] is carried out but little information is about spider's fauna in Fars Province [4]. The objective of this study is to provide information and accurate identification of spider fauna in forest of this region.

Fars province (**Figure 1**) is Southern Iran in $50^{\circ} 36' - 55^{\circ} 35' E$ and $27^{\circ} 03' - 31^{\circ} 40' N$ (**Figure 1**), have 4 climate include cold and dry, temperate and humid, hot and semi-humid, warm and dry [13]. It has wide forests (2.250.000 ha) and dominant vegetation oak (*Quercus brantii*), (*mutica Pistacia*, *Ziziphus spina*).

MATERIAL AND METHODS

The study area were two forests (Firoz Abad & Noudan) in Fars province that situated on the southern of Iran (**Table 1**).

These area were divided to 8 substations. Spider specimens were collected from branch, leaves, on the ground and under stones by bottle, aspirator, Shaking the tree, pitfall trap and insect net two times per month. The specimens were preserved in alcohol (70%) and transformed to lab. Then they were identified according to taxonomic features (dichotomous key) and [14-16].

Pitfall traps were plastic cans (12 cm high, 10 cm diameter) were placed under the tree and on the ground.

The characteristics as number and arrangement of eyes, shape of chelicerae

and fang, epigastric furrow, epyginum and genitalia in female, palp in male, embolus cribellum, claw tuft number and shape of spinneret, shape and size of abdomen, cephalothorax and appendages (femur, patella, tibia, metatarsus, tarsus) were studied by stereomicroscope.

All measurements are given in millimeters by caliper, except for eye diameters and interdistances which are given in microscope scale units (measured at 100×). Photographs were taken either using a Canon 500D digital camera with a 100 mm Canon macro lens stereomicroscope.

RESULT

A total of 620 specimens were captured during the 2012-2013, 19 family of spider were classified which 7 families of them were reported for first time in Fars province (**Figure 1**) as follows:

Linyphiidae, Ageneliidae, Amaurobiidae, Pisauridae, Tetragnathidae, Atypidae, Thomisidae Many differences have been seen in every family that related to lower taxons (genus or species). In this research, spiders classified in family level so these difference were titled as type (**Table 2**).

According to the present results, the highest population of spider was in June to September and fewest were in winter but family Linyphiidae with high numbers and types, also had been seen in autumn and winter. Some families reported from Fars

province [9], and 7 families were reported for first time in this study. These families were described with taxonomic features as follow. It is noteworthy that features dependent to different types of a family.

Family Linyphiidae

Diagnosis: They are small (female: 5 mm male 3.2 mm), 8 eyes are arranged in 2 rows. Chelicerae are short and legs are equal. Spinneret is small but no cibellum (**Photo 1-1**). They have highest diversity and population in this region (dominates the spider fauna).

Broad embolus, with the pointed part covered with conductor are in male palp (palp with a spine-like claw). Legs are slender, equal and provided with spines. The number of spines on the legs is an important character for species identification (using the stereomicroscope). Often the abdomen is bigger than cephalothorax and have color variation. They occupy a very wide array of habitats (**Photo 1-2**).

Family Pisauridae (Nursery-web Spiders)

Diagnosis: They are large spiders (20 mm in female) and body is elongate, abdomen is spindle and long legs approximately are equal long leg (**Photo 2-1**). They have 8 eyes arranged in three rows, with the first row composed of four eyes and a pointed hair tuft in front of them (**Photo 2-2**). Spinnerets are slender and long. They were collected on grass.

Family Agenelidae (Funnel web Weavers)

Diagnosis: They have six spinnerets in three rows and posterior spinnerets are long and segmented. Tarsal trichobothria, which are arranged in a single row and increases in length toward the distal end and eyes are equal sized and arranged in 2 rows of 4 (**Photo 3-1**). They have long slender spinose legs, abdomen is oval shape and all body are covered by dense hairs (**Photo 3-2**). Epigyne is large and male palp shapes are different and have a tibial apophysis. They were collected on tree, ground and grass.

Family Tetragnathidae (Long jawed)

Diagnosis: They have 8 eyes in two rows (4 median and 4 lateral) (**Photo 4-1**). Their chelicerae are large, dentate and divergent from base (longer than cephalothorax) and large fang is arcuated (**Photo 4-2**). Their fangs are horizontal. Presence of conspicuous trichobothria on the fourth leg femur and long separation between the spinnerets. They were collected from ground and grass.

Family Amaurobiidae (Hackledmesh Weavers)

Diagnosis: The 8 eyes are usually pale and arranged in 2 rows of 4. The carapace is narrow and abdomen is bigger than it. The chelicerae are often strong and the abdomen is very dark. The tarsi and metatarsi are furnished with trichobothria arranged in rows, cribellum is present anterior to the

spinners and the epigyne divided into two lobes is formed as a central plate separated from lateral parts by sutures (**Photo 5**). tarsal claws, strong chelicerae, parallel endites with brushes of hairs, long legs with trichobothria are taxonomic key for their identification.

Family Atypidae

Diagnosis: Body is slenderic (10 mm length), having long Spinnerets which the posterior pair is composed of three segments. 8 eye arranged 2 rows that lateral eyes are in triangular arrangement (**Photo 6**). They have large forward projecting chelicerae (over length of carapace) with long fangs and having stout legs and with light brown cephalothorax and dark abdomen.

Family Thomisidae (crab Spider, Flower Spider)

Diagnosis: They are crab-shaped, small (7 mm length) and legs I & II much longer than III & IV (**Photo 7-1**). Their abdomen is white and larger than gray cephalothorax and both are hairless. They have 8 eye that (**Photo 7-2**) lateral eyes (4) are on tubercles (taxonomic character). Chelicerae are big and fangs are overlap. 6 spinnerets are 3 rows and suited above Colulus present. They were found under leaves and stone even near the river.

DISCUSSION

Linyphiidae and Agenelidae were represented for most of the months,

although the highest population of Linyphiidae were in autumn to winter but Agenelidae had highest population in May to August. According to previous findings in similar areas, Linyphiidae, a characteristic family of cold temperate climates and being active only during the colder and moister season [17], probably due to low differences of temperature in almost months (May to January) in the study area.

In two stations apporeximadly were similar although Firoz Abad have Richness and diversity of spider even family Thomisidae was seen in station (**Figure 2**). This phenomenon is probably related to regional floristic whereas Firoz Abad not only have more diversity in plants but also have diversity in topography and climate. Although Thomisidae is large family with more than 2000 Known species [18], but was rare in this study.

For protection of ecosystem, similar specimens were not collected, so distribution and abundance of them not determinate exactly.

In overall view, considerable variation in spider populations at both stations showed a relatively warm and wet weather has created the conditions for the existence of spiders. This time is matching with their breeding season [6]. This finding showed that this

region with high diversity and population is appropriate habitat for spider.

CONCLUSION

Our findings suggest that Fars province with four climate [13], is suitable habitat for spider and many of them haven't been known yet. The role of spiders in ecosystem can't ignore, so identification them are very useful for protection of agricultural product and forests.

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Figure 1: Map of Fars Province and Sub Situation (Firoz Abad & Nodan), Iran

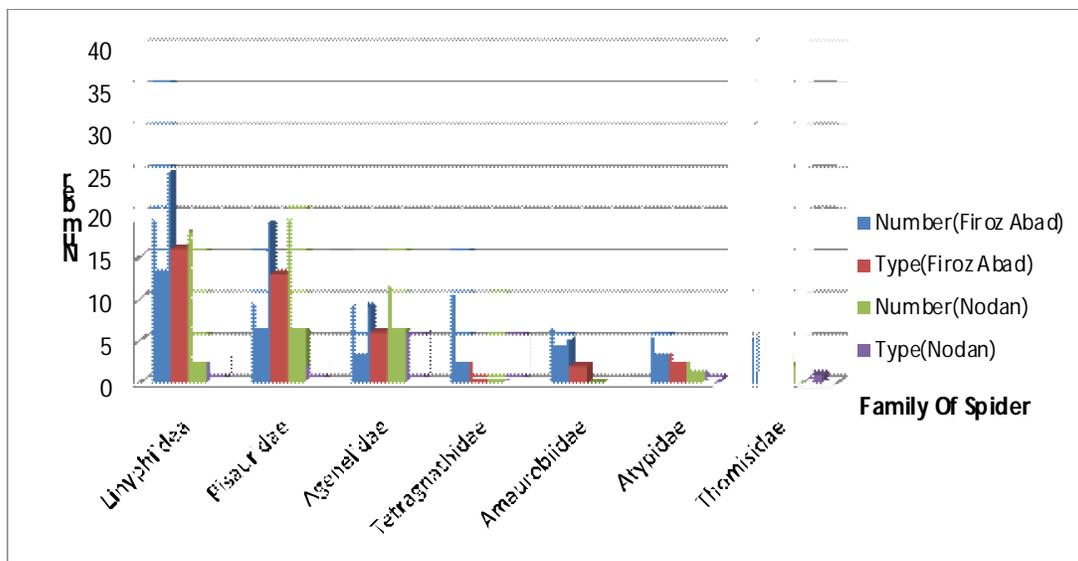


Figure 2: Frequency of Spider's Family in Fars Province (Southern of Iran)



Photo 1-1. Family Linyphiidae



Photo 2-1. Family Pisauridae



Photo 3-1. Family Agelenida



Photo 1-2. Family Linyphiidae (eye)



Photo 2-2. Family Pisauridae (eye)



Photo 3-2. Family Agelenida



Photo 4-1. Family Tetragnathidae



Photo 5. Family Amaurobiidae



Photo 6. Family Atypidae



Photo 4-2. Family Tetragnathidae (chelicerae)



Photo 7-1. Family Thomisidae (eye)



Photo 7-2. Family Thomisidae (eye)

Table 1: Geographical location of research station in Fars Province in 2012-2013

Latitude (N)	Longitude(E)	Highte(m)	Extent (ha)	Dominant Vegetation	localites
29 ° - 29° 15'	52 ° 30' -52° 40'	1700-2345	12000	<i>Mutica Pistacia</i> <i>Ziziphus spina</i>	Firoz Abad
29 °30' - 29° 60'	51° 30' -52 °	840-2941	3000	<i>Quercus brantii</i>	Noudan

Table 2: New Reported of Spider Family in Fars Province (Iran) in 2012-2013

Total Type	Total Specimen	Firoz Abad Nu (Type)	Nodan Nu (Type)	Sampling Time	Family
19	58	40 (16)	18 (3)	Over year	Linyphiidae
15	44	19 (13)	25(2)	March to Septamber	Pisauridae
12	28	9 (6)	19(6)	Over year	Agenelidae
9	30	19 (3)	11(6)	March to Septamber	Tetragnathidae
2	10	10 (2)	0(0)	June to October	Amaurobiidae
6	11	6 (4)	5(2)	June to October	Atypidae
4	7	5 (3)	2(1)	June to October	Thomisidae