



Biodiversity of spider fauna in Kalabagh of District, Mianwali, Punjab, Pakistan

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Abstract

The paper discuss about the spider collection of Kalabagh, District Mianwali Punjab, Pakistan. The survey was conducted of six months from March 2017 to August 2017. It was preliminary attempt to identify and explored the spider diversity in Kalabagh. Spiders play a vital role in the control of insect population and are important environmental indicators. Different collection methods were used including pit fall trap, hand picking and netting, but most of the collection was done from shaking of trees. Total 7 families, 11 genera and 13 species were investigated. The richest family was family Clubionidae comprising 3 species of single genera and family Lycosidae of 3 species consisting of 3 genera > Salticidae and Araneidae comprising 2 species with 2 genera each > Pholicidae, Sparassidae and Corinnidae consisting of 01 species each respectively. A large scale study is recommended due to favorable geographical distribution, characteristics of habitat and availability of food played important role in the abundance of spider fauna.

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Introduction

Kalabagh is a beautiful town located about 42 km away from the district Mianwali Punjab province. It is located in the West, of province Punjab and at the Western bank of Indus River, which is the longest River in Pakistan as shown in the figure 1. Kalabagh is famous site due to natural scenic outlook of River Indus and its red hilly area of salt range.

The most of the land area of Kalabagh is under cultivation of different crops including wheat, rice, oat, barley, sugarcane and gardens of mangoes and oranges which have variety of invertebrates. Among these invertebrates the spider's community is large and diverse. Furthermore the spider was considered as less important organisms in the past by many researchers Butt and Beg(2001).

The spiders are the dominant and grasping predator's which belong to order Aranae Riechert (1984). The spiders habitually present in grounds, walls, under stones, in wild tree, grassy land and also prefer moist places. The region for some spider is freshwater including *Argyroneta aquatic* (water spiders) Karren(2002). In Carboniferous period (360 to 290 million years) the spider fossil with segmented abdomen were identified. The spider have eight legs

and the body is divided into cephalothorax, abdomen and pedipalps and producing silk Turnbull(1973). Spiders are also known as poisonous arthropods Perveen and Jamal (2012). The spider's origin is not clear, although many scientists thought that the spiders originated in the sea, later on they emerge into two groups, one group with and one without leg extensor muscles Symondson (2002). The importance of spiders increases as the work done on spider fauna in different areas of KPK and Punjab of Pakistan was given by Dyal(1935); Tahir(2009); Butt and Beg(2001); Mushtaq and Qadir(1999); Khatoon(1985-1986); Ghafoor and Beg(2002); Butt *et al.*(2006); Ursani and Soomro(2010); Mukhtar(2004) and Arshad *et al.*(1984). The main objective of the current study was to identify the diversity of spider fauna in Kalabagh of District Mianwali. The aim of current study was to explore the biodiversity of spider fauna in Kalabagh of District, Mianwali, Punjab, Pakistan.

Materials and methods

Study area

Kalabagh is the popular site of proposed Kalabagh Dam and is situated in the West of Punjab province in District Mianwali as shown in the Fig. 1. The present study was carried out from March 2017 to August 2017.

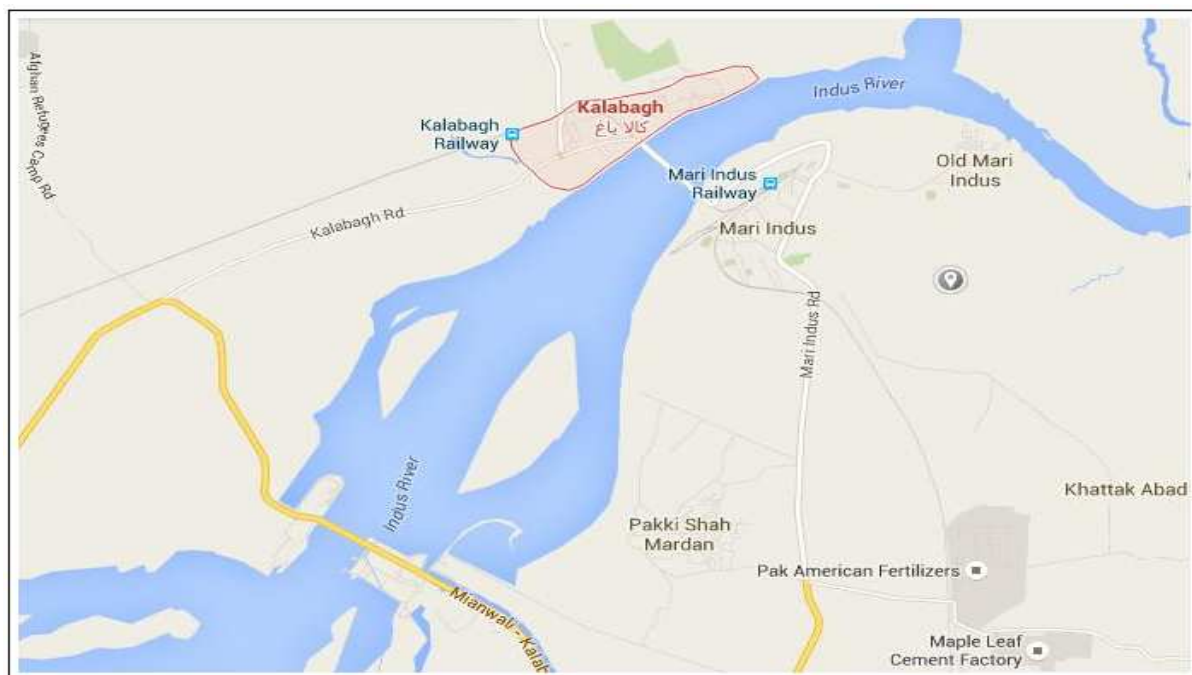


Fig. 1. Map of Kalabagh, District Mianwali Punjab, Pakistan.

Time period

The survey was conducted for the period of 6 months.

Collection

The spider's collection was done from the different fields of crop, wild plants, from the gardens, grassy lands and most of the specimens were collected by shaking the branches of tree on the sheet of white cloth (6m × 6m). Some of the collections were done from the mansion and beautiful gardens of Nawab of Kalabagh (1910-1967), who was famous politician and Governor of West Pakistan.

Preservation

All the surveys were arranged in the morning time between 7:00 am to 2:00 pm. All the spiders after collection were preserved in 70% of alcohol with little amount of about 20% glycerin.

Identification

All the collected specimens were identified on the basis of morphometric characters, and by using the basic taxonomic keys Levi(1975); Sebastian(2009); Biswas(1992) and Zhu *et al.*(2009) respectively. All the specimens were marked with family names.

Results

The current study was conducted in Kalabagh town of District Mianwali Punjab, Pakistan. During the present effort a total of 464 specimens were collected.

They were properly identified up to species level by using taxonomic keys.

The collected specimens of spiders belong to O1 order, O7 families, 11 genera's and 13 species as shown in the table 1.

Table 1. Monitoring of spider fauna of Kalabagh Punjab, Pakistan.

Order	Families	Genera's	Species
Aranae	Salticidae	Marpissa	<i>Tigrina</i>
		Diaea	<i>Evanida</i>
	Lycosidae	Pardosa	<i>Bimanica</i>
		Hippasa	<i>Partita</i>
		Lycosa	<i>Madanensis</i>
	Araneidae	Araneus	<i>Diadematus</i>
		Neoscona	<i>Theis</i>
	Pholcidae	Artema	<i>Atlanta</i>
	Sparassidae	Isopeda	<i>Tuhogniga</i>
	Clubionidae	Clubiona	<i>Drassodes</i>
			<i>Filicata</i>
			<i>Pashabhahi</i>
	Corinnidae	Oedignatha	<i>Poonaensis</i>
Orders 01	Families 07	Genera's 11	Species 13

The Family Clubionidae and Lycosidae were richest families and comprise of 03 species each with total 29.9% and 14.8% respectively as shown in table 2. While the other two families Salticidae and Araneidae comprise of 02 species each of about 8.6% and 21.5% respectively as shown in table 2. Whereas the families Pholcidae, Sparassidae and Corinnidae consisting of 01 species each with total 8.8%, 6.8% and 9.2% as shown in the table 2. The present study shows that the Kalabagh provide good habitat for spider fauna.

Discussion

The spider belong to phylum Arthropoda, sub phylum Chelicerate, class Arachnida, order Aranae. In the current study the families of collected spiders were about 07 families including Salticidae, Lycosidae, Araneidae, Pholcidae, Sparassidae, Clubionidae and Corinnidae. The proper systematic classification of the spiders up to species level is given in the table 1 respectively. During the collection of species the family Clubionidae and family Lycosidae were the

largest families which had 03 species. The current study shows that the spider diversity reported in Kalabagh of district Mianwali Punjab, Pakistan is almost different from Peshawar and FATA by Perveen and Jamal(2012) from Sindh by Ursani and Soomro(2010) and from Karak by Khalid *et al.*(2017). This difference in spider diversity may be that the

spider inhabits a habitat where they can survive well in satisfactory environment. The other reasons might be due to climate variation and the climatic factors much affected the spider diversity.

Also both the biotic and abiotic factors of ecosystem have adverse effect on spider population.

Table 2. Amount and percentage of reported spider fauna of Kalabagh Punjab, Pakistan.

Families/Common names	No. of Species	Abundance	Percentage per specie	Percentage per family
Salticidae/Jumping spider	<i>Marpissa tigrina</i>	21	4.5%	8.6%
	<i>Diaea evanida</i>	19	4.0%	
Lycosidae/Wolf Spider	<i>Pardosa bimanica</i>	22	4.7%	14.8%
	<i>Hippasa partita</i>	16	3.4%	
	<i>Lycosa madanensis</i>	31	6.6%	
Araneidae/Garden spider	<i>Araneus diadematus</i>	45	9.6%	21.5%
	<i>Neoscona theisi</i>	55	11.8%	
Pholcidae/Cellar spider	<i>Artema Atlanta</i>	41	8.8%	8.8%
Sparassidae/Huntsman spider	<i>Isopeda tuhogniga</i>	32	6.8%	6.8%
Clubionidae/Sac spider	<i>Clubiona drassodes</i>	42	9.0%	29.9%
	<i>Clubiona filicata</i>	51	10.9%	
	<i>Clubionapashabhaii</i>	46	9.9%	
Corinnidae /Ant-mimic spider	<i>Oedignatha poonaensis</i>	43	9.2%	9.2%
Total		464		

The somewhat closeness may be due to similar topographical features. Although the hilly areas and the salt range sites of Kalabagh need more extensive study to explore the spider fauna.

It was the preliminary survey in Kalabagh of tehsil Isakhel District Mianwali Punjab, Pakistan.

Family Salticidae (Jumping spider)

Blackwall, 1841.

Distribution in pakistan

Reported from different localities including (Parveen *et al.*, 2007 and 2012) from Peshawar (Khyber Pakhtunkhwa), (Mukhtar *et al.*, 2012) from Sargodha (Punjab), (Bauer *et al.*, 2015) and (Ghazanfar *et al.*, 2016) from Balochistan province and (Jabeen *et al.*, 2010) from Jamshoro, Umerkot (Sindh).

Diversity in world

It is the largest family of spider with about 13% of all

species (Peng *et al.*, 2002) which includes 635 described genera's and 6080 described species (Maddison and Wayne, 2015).

Diversity in kalabagh

From the current result two species of family Salticidae were explored such as *Marpissa tigrina* of 4.5% and *Diaea evanida* of 4.0% richness as shown in the table 2.

Family Lycosidae (Wolf spider)

Sundevall, 1833.

Distribution in pakistan

Explored in different locations including (Mukhtar *et al.*, 2012) from Shorkot, district Jhang (Punjab), (Parveen *et al.*, 2007) from different ecological zones of the Punjab, (Kazim *et al.*, 2015) from Gilgit Baltistan, (Kazim *et al.*, 2014) from Karachi (Sindh), (Parveen *et al.*, 2012) from Frontier Region Peshwar (Khyber Pakhtunkhwa), (Noreen *et al.*, 2017) from

district Charsadda (Khyber Pakhtunkhwa), (Jabeen et al., 2010) from Sindh province.

Diversity in world

The Lycosidae is the family of wolf spider and is the fourth diverse family which includes of about 2393 described species and 120 genera (Platnick, 2013).

Diversity in kalabagh

Three species were reported from the current study including *Pardosa bimanica* of 4.7%, *Hippasa partita* about 3.4% and *Lycosa madanensis* 6.6% respectively.

Family araneidae (Garden spider)
Clerck, 1757.

Distribution in pakistan

Investigate in different areas including (Ghazanfar et al., 2015) study checklist of spider fauna of Pakistan, (Mukhtar et al., 2012) from Sargodha (Punjab), (Parveen et al., 2007) collected data from various habitats in Punjab, (Parveen and Khan, 2015) study spider fauna in Sheringal (Khyber Pakhtunkhwa), (Kazim et al., 2015) from Gilgit Baltistan, (Jabeen et al., 2010) from Sindh province, (Mukhtar et al., 2012) from Shorkot district Jhang (Punjab), (Parveen et al., 2007) from Peshawar (Khyber Pakhtunkhwa).

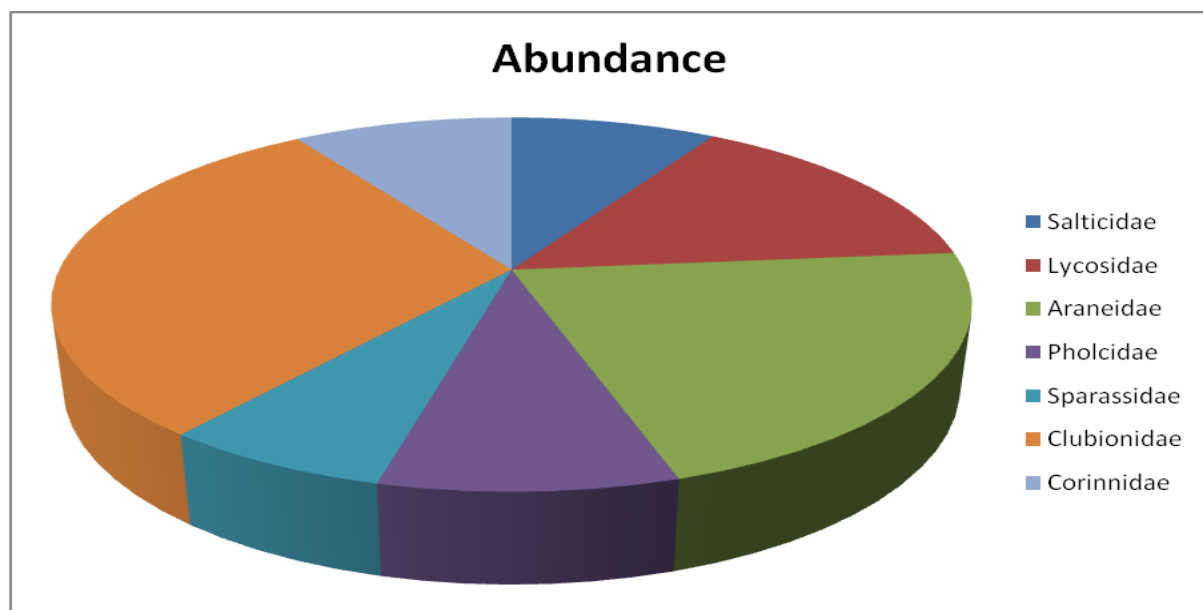


Fig. 2. Graphical representation of Families/ abundance in Kalabagh Punjab, Pakistan.

Diversity in world

Behind Salticidae and Linyphiidae the Aranneidae is the third largest family of spider. Worldwide 3122 species in 172 genera were recorded (Dondale et al., 2003).

Diversity in kalabagh

The two species were recorded in Kalabagh including *Araneus diadematus* about 9.6% and *Neoscona theisi* 11.8% respectively.

Family pholcidae (Cellar spider)

Koch, 1850.

Distribution in pakistan

Found in different cities of Pakistan such as (Mukhtar et al., 2012) from Sargodha (Punjab), (Parveen et al., 2012) from Frontier Region Peshwar (Khyber Pakhtunkhwa), (Jabeen et al., 2010) from Sindh province, (Kazim et al., 2015) from Gilgit Baltistan.

Diversity in world

The World Spider Catalog (2018) showed that the cellar spider includes about 86 genera and 1672 species. In the world Pholcidae is distributed in every continent except Antarctica (Biokids, 2018).

Diversity in kalabagh

Only one specie was observed in the current study which includes *Artema Atlanta* of total 8.8% as shown in the table 2.

Family sparassidae (Huntsman spider)

Bertaku, 1872

Distribution in pakistan

Distributed in different areas of Pakistan such as (khan and zaman, 2014) study spider fauna of Pir Baba in district Buner (Khyber Pakhtunkhwa), (Noreen *et al.*, 2017) explored the spider diversity of district Charsadda (Khyber Pakhtunkhwa), (Parveen *et al.*, 2012) from Frontier Region Peshwar (Khyber Pakhtunkhwa), (Parveen *et al.*, 2007) collected data from various habitats in Punjab, (Mukhtar *et al.*, 2012) from Sargodha (Punjab), (Jabeen *et al.*, 2010) from Sindh province.

Diversity in world

According to the World Spider Catalog (2018) consists of 88 genera and 1243 species. Over a thousand of species are distributed in the world warm temperate to tropical regions (Geoffrey *et al.*, 2003).

Diversity in kalabagh

Only one specie i.e. *Isopeda tuhogniga* of about 6.8% was recorded.

Family clubionidae (Sac spider)

Wagner, 1887.

Distribution in pakistan

Explored in different localities of Pakistan i.e. (Noreen *et al.*, 2017) explored the spider diversity of district Charsadda (Khyber Pakhtunkhwa), (Riaz *et al.*, 2017) study the spider diversity in some common oilfield crops in central Punjab, (Parveen *et al.*, 2007) collected data from various habitats in Punjab, (Jabeen *et al.*, 2010) from Sindh province.

Diversity in world

The Sac spider is widely distributed in North America. In World Spider Catalog (2018) the family Clubionidae consists of 15 genera and 624 described

species.

Diversity in kalabagh

At Kalabagh the described species of family Clubionidae includes *Clubiona drassodes* of 9.0%, *Clubiona filicata* about 10.9% and *Clubionapashabhaii* of about 9.9% respectively.

Family corinnidae (Ant-mimic spider)

Karsch, 1880.

Distribution in pakistan

Distributed in different areas which includes (Kazim *et al.*, 2015) from Gilgit Baltistan, (Noreen *et al.*, 2017) explored the spider diversity of district Charsadda (Khyber Pakhtunkhwa), (Mukhtar *et al.*, 2012) from Sargodha (Punjab), (Jabeen *et al.*, 2010) from Sindh province.

Diversity in world

The family Corinnidae consists of 67 genera and 785 species worldwide (World Spider Catalog, 2018).

Diversity in kalabagh

About one specie *Oedignatha poonaensis* of total 9.2% was recorded.

Conclusion

The outcome of the current study discloses that the Kalabagh of district mianwali provides good habitat for spider fauna. The geographical distribution of habitat is conducive for spiders.

The study revealed that the spider's availability and warm climate were outstanding for the species survival and diversity. Also it is necessary to aware the people about the conservation of insects diversity.

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