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A CHECKLIST OF THE SPIDERS OF CHOLISTAN AND NEIGHBOURING AREAS

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The survey was conducted on the spider fauna of Cholistan desert in Pakistan during 2001-2003. Spiders were collected by hand-picking and jarring method. Identification of faunal species was made on the basis of morphological characteristics. The diversity and abundance of different species was analyzed by Shannon diversity indices. Spiders collected during study period from different localities of Cholistan, belonged to 10 families, 32 genera and 62 species. Family Lycosidae with 68% of spider fauna was considered to be the dominant. Such information about these predators will be critical for different evaluation programs of integrated pest management (IPM).
Keywords: Spiders, predators, taxonomy, Cholistan desert

INTRODUCTION

The climate of Cholistan desert (27°42' and 29°45' North latitude and 69°52' and 75°24' East longitude) is harsh, hyper arid with extremes of temperature, dry spells, low rains, low humidity, high evaporation rates, especially during summer when extremely hot and winds of high velocity blow across the desert, (Arshad 2000). The biodiversity of invertebrate communities on agricultural land is important both in terms of pest control and conservation.

Pakistan is rich in spider fauna, but no serious efforts have been made to explore it especially in desert areas. Some important information about their taxonomy, distribution and abundance in agro-ecosystem is reported from the different parts of Pakistan (Butt and Beg, 2000, 2001; Ghafoor and Beg, 2002; Mukhtar and Mushtaq, 2005; Hennawy, 2009; Ursani and Soomro, 2010; Tahir *et al*., 2011). Many spider species can also be integrated with other methods to control insect pests (Butt and Beg, 2001). Spiders are among the most abundant insectivorous predators of terrestrial ecosystems (Wise, 1993). Spiders act as important predators not only in their adult stages but also at egg, larval and nymphal stage for crop pests (Harwood and Obrycki, 2006). The objective of the study was to record the spider fauna of Cholistan desert for developing integrated pest management strategies.

MATERIALS AND METHODS

Spider fauna was collected from various habitats of Cholistan Desert, and its neighboring areas. Sampling was made from 14 different localities as Chah Suleh Wala, Taraway Wala Toba, Fort Derawar, Fort Dingarh, Sallu Wali, Rasool Sar, Fort Bhagla, main university, date palm farm**,** library site, old CIDS (Cholistan Institute of Desert Studies) site, CIDS field site, Shiekh Wali, Dakwali Khui, during January 2001-December 2003. Two methods, jarring and direct hand picking were employed for the collection of spiders (Mukhtar and Mushtaq, 2005). Collected specimens were washed with xylene and each specimen was preserved in a separate vial in 70% ethyl alcohol, glycerin and glacial acetic acid (50 ml + 1 ml + 5 ml). Identification basis were the morphometric characters of various body parts of the specimens. The support was mainly taken from the keys and catalogues provided by Dyal (1935), Kaston (1978), Tikader (1980), Tikader and Biswas (1981), Tikader (l982), Brignoli (1983), Biswas and Biswas (1992), Barrion and Litsinger (1995), Yin *et al*. (1997), Biswas and Biswas (2003), Nentwig *et al*. (2003), Platnick (2004). There were also some immature specimens that could not be identified up to specific level. Shannon Diversity Index was employed to get various inferences.

RESULTS AND DISCUSSION

The survey of the foliage and dominant bushes and wild plants for spider fauna was carried out from 2001 to 2003. A total 3007 spiders were collected from fourteen selected localities, belonging to 10 families, 31 genera and 66 species (Fig. 1). The family Lycosidae with 68% spider fauna was dominant with 6 genera (*Flanona, Evippa, Aractosa, Hippasa, Ocyale, Lycosa)* and 16 species, of which 11 species were already known from the area *(Evippa shivagi, Flanona puellula, Evippa sohani, Aractosa mulani, Hippasa madrasptana, Hippasa partita, Ocyale Atlanta, Lycosa poonaensis, Evippa Rajasthanicus, Evippa praelongipes* and

Evippa rubiginosa). The remaining 5 species were recorded for the first time from this area (*Evippa dellaii, Evippa rosii, Evippa shakilaii, Hippasa azhari* and *Evippa lanii*). Family Gnaphosidae with 14% spider fauna consisted of 9 genera and 15 species. Out of which five species were known (*Gnaphosa poonaensis, Cllilepis rajasthanicus, Scotophinus maind, Sosticus sundar and Eilica poonaensis*) and 10 species were recorded for the first time (*Scotophinus phogii, Poecilochroa sabaii, Callilepis desertiensis, Callilepis cholistanicus, Callilepis sheikhii, Callilepis malaikii, Drassylus romishii, Drassodes mohnii, Gnaphosa pakistaniensis, Scotophaeus bahawalpurii*).

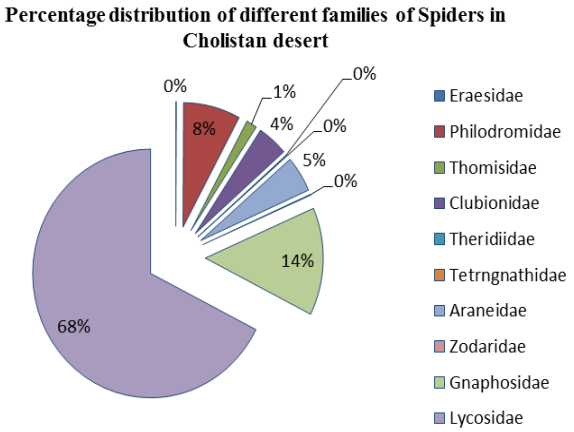

Figure 1. Percent distribution of spider families in Cholistan desert.

Family Philobromidae with 8% spider fauna consisted of 3 genera (*Tibellus, Thantus, Philodromus)* and 19 species. Out of which three were known (*Tibellus pashanensis, Thantus dhakuricus and Philodromus decorates*) while 16 species were recorded for the first time (*Philodromus eucalyptus, Philodromus delightus, Philodromus juliensis, Philodromus jundae, Philodromus delliensis, Philodromus terrestris, Philodromus bughdadii, Philodromus pynus, Philodromus citrus, Philodromus cornito, Philodromus pigmentus, Philodromus prominentus, Philodromus capparis, Philodromus sullewaliensis, Tibellus peperus*). Family Araneidae with 5% of spider fauna consisted of 3 genera (*Cyrtophora, Araneus, Neoscona)* and four species. Out of which three species were known (*Cyrtophora feae, Araneus bitubercula and Neoscona theisi*) while one species (*Neoscona movita*) was recorded for the first time. Family Clubionidae with 4% spider fauna consisted of 2 genera (*Clubiona*, Castianeir) and three species (*Clubiona pashabhai, Clubiona filicata and Castianeir tinae*), all were known. Family Thomisidae with 1% spider fauna consisted of 4 genera (*Oxyptila, Dieae, Xysticus, Ebo)* and five species. The following two species were already recorded (*Oxyptila reenae, Dieae kapuri*,) while remaining 3 were recorded for the first time (*Xysticus promptus, Ebo emo and Ebo somathaii*). Rest of the families as Eresidae with single species (*Stegodyphus sorghum*) Tetragnathedae, Theridiidae and Zodaridae each with a single new species (*Leucauge sandii*), (*Latrodectus brooklynus*) and (*Asceua yesmanii*), respectively, all were recorded for the first time (Table 1 and 2). The species composition of above four families was also restricted to specific environment. Families like Lycosidae and Gnaphosidae were cosmopolitan in distribution. Most of the spider species have been described in various studies (Butt and Beg, 2000, 2001; Ghafoor and Beg, 2002; Mukhtar and Mushtaq, 2005; Hennawy, 2009; Ursani and Soomro, 2010; Tahir *et al*., 2011). The occurrence of different spider families in the desert is in agreement by Khan (2009). The abundance data was analyzed by Shannon Diversity Index. H' (diversity index) was calculated 2.607, E (evenness) value was 0.622 while D (dominance) value was 0.378.

***Conclusions*:** A total of 62 spider species belonged to 32 genera and 10 families were reported from Cholistan and adjoining areas. The results indicated that a great diversity of these predators reside in the desert. Proper attention should be given to their presence in desert as they are efficient against many insect pests and highly resistant members of arthropods. In this regard various integrated pest management strategies could be implemented to stabilize our ecosystem.

Table 1. The Spider families, genera and species recorded in Colistan desert and neighboring areas

Sr.#	Families	No. of specimens	No. of genera	No. of species
1	Eraesidae	2	1	1
2	Philodromidae	230	3	19
3	Thomisidae	44	4	5
4	Clubionidae	126	2	3
5	Theridiidae	2	1	1
6	Tetrngnathidae	2	1	1
7	Araneidae	141	3	4
8	Zodaridae	3	1	1
9	Gnaphosidae	421	9	15
10	Lycosidae	2031	6	16

Table2. The spider families and species recorded in Colistan desert and neighboring areas

Sr #	Families	Species	Sub total	Sr #	Families	Species	Sub total
1	Lycosidae	*Evippa shivagi*	70	34	Gnaphosidae	*Poecilochroa sabaii*	4
2		*Flanona puellula*	56	35		*Callilepis desertiensis*	2
3		*Evippa sohani*	56	36		*Callilepis cholistanicus*	1
4		*Aractosa mulani*	28	37		*Callilepis sheikhii*	12
5		*Hippasa madrasptana*	14	38		*Callilepis malaikii*	1
6		*Hippasa partita*	70	39		*Drassylus romishii*	2
7		*Ocyale atlanta*	28	40		*Drassodes mohnii*	1
8		*Lycosa poonaensis*	14	41		*Gnaphosa pakistaniensis*	3
9		*Evippa Rajasthanicus*	14	42		*Scotophaeus bahawalpurii*	1
10		*Evippa praelongipes*	840	43	Thomisidae	*Oxyptila reenae*	14
11		*Evippa rubiginosa*	812	44		*Dieae kapuri*	14
12		*Evippa dellaii*	20	45		*Xysticus promptus*	3
13		*Evippa rosii*	2	46		*Ebo emo*	12
14		*Evippa shakilaii*	5	47		*Ebo somathaii*	1
15		*Hippasa azhari*	1	48	Philobromidae	*Tibellus pashanensis*	28
16		*Evippa lanii*	1	49		*Thantus dhakuricus*	42
17	Araneidae	*Cyrtophora feae*	42	50		*Philodromus decoratus*	28
18		*Araneus bitubercula*	56	51		*Philodromus eucalyptus*	19
19		*Neoscona theis*	42	52		*Philodromus delightus*	10
20		*Neoscona movita*	1	53		*Philodromus juliensis*	23
21	Tetragnathidae	*Leucauge sandii*	2	54		*Philodromus jundae*	4
22	Eresidae	*Stegodyphus sorghum*	2	55		*Philodromus delliensis*	4
23	Theridiidae	*Latrodectus brooklynus*	2	56		*Philodromus terrestris*	31
24	Zodaridae	*Asceua yesmanii*	3	57		*Philodromus bughdadii*	15
25	Clubionidae	*Clubiona pashabhai*	56	58		*Philodromus pynus*	4
26		*Clubiona filicata*	42	59		*Philodromus citrus*	4
27		*Castianeir tinae*	28	60		*Philodromus cornito*	1
28	Gnaphosidae	*Gnaphosa poonaensis*	168	61		*Philodromus pigmentus*	2
29		*Cllilepis rajasthanicus*	154	62		*Philodromus prominentus*	5
30		*Scotophinus maind*	42	63		*Philodromus capparis*	3
31		*Sosticus sundar*	14	64		*Philodromus sullewaliensis*	1
32		*Eilica poonaensis*	14	65		*Tibellus peperus*	6
33		*Scotophinus phogii*	2	66		*Tibellus libraryensis*	5

Total no. of specimen = 3007

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