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Systematic Study of Family Pholcidae (Cellar Spiders) from the District Hyderabad, Sindh, Pakistan

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Abstract

This study was carried out between 2017 and 2018; 150 spider specimens belonging to the family Pholcidae were collected from 04 different locations of District Hyderabad, viz, Talukas, Saddar, Latifabad, and Qasimabad. Taluka Latifabad was found the richest with 38.66% while least samples were collected from Saddar with 16.00%. Among 150 specimens, two genera were sorted out in genus *Artema* and *Crossopriza*. Total number specimen of *Artema* were 90, a new species also reported *Artema hirabadi* was also identified on the basis of taxonomical character, 60 specimen of genus *Crossopriza* and two new species namely *C. tahirae*, *C. hyderabad* were identified to science. Beside this *C. lyoni* reported as new record from District Hyderabad. Most abundant species was *Artema* least found was *Crossopriza*. The spiders were collected from metropolitan city areas habituated in houses, stores, garages, etc. somewhere they form thin web while applying standard collected works proposed by entomologists and Arachnologists. The research work provides preliminary information knowledge about spider's fauna.

Keywords: Systematic; Pholcidae; Aranea; Arachnid; Cellar Spiders; Hyderabad; Sindh.

Introduction

The spiders are the arthropods, famous for predation and irrational fear, due to their morphology and hunting behavior (Ursani *et al.*, 2013, Soomro *et al.*, 2016, Coddington, 2005, Maddison 2015, Russell *et al.*, 1994, Marusik and Koponen 2002, Uetz *et al.*, 1999, Malik *et al.*, 2018). Mean while they plays an important role in agro ecosystem due to their predatory role (Malik *et al.*, 2022, Butt 2000, 2001, Riechert *et al.*, 1984, Ndava *et al.*, 2018, Michalko *et al.*, 2019). Taxonomic and behavioral studies on spider fauna were carried out in the world (Hodge 1999, Tikader 1982, Biswas and Biswas 2003, Sunderland, 1999, Yin *et al.*, 1997, Yoshida 2003). According to a literature survey, there are around about thirteen hundred (1300) explained species and eighty-five (85) genera of the spider fauna of the family Pholcidae that occur worldwide. The family pholcidae is regarded as largest spider group which habitat in houses and found worldwide (Yoshida 2003, Zabka 1997, Nyffeler and Benz 1987 1981). But in respect of biodiversity of this family is mostly found in warmer parts of the globe (tropical and subtropical parts of terrestrial ecosystems) with exception for a small number of species reported from Northern regions where the climate is cold. They are different on the basis of morphological variation and

ecological variation and, there is massive adaptation in this (pholcids) along with the dwell in an ample assortment of microhabitats and this is replicated in their different body forms and colors patterns. Some member's species of this group show adaptation in habitat within the leaf-litter and under substance on the earth have a predisposition to be diminutive and packed together, with brief-legs and instead shadowy color according to (Zabka 1997, Nyffeler and Benz 1987).The member spider species of pholcidae are externally and morphologically different intermediary on the other hand may perhaps accomplish fore and hind leg spans of up to 15 cm (Nyffeler and Benz 1981). Despite the diversity in body length, form, and coloration, pholcids are basically without problems distinguished from other spider households (Platnick 2019). The extraordinary lengthy and skinny legs also suggestion at the loop or circle of relatives; however some pholcids have particularly brief legs, which include an entire subfamily (Ninetinae). The majority of member of pholcids is omnivorous or polyphagous predators and gives food to on an assortment of insect pest of agricultural vegetation. The individuals of the spider family Pholcidae habituated at houses, stores, gardens and homes. These members of the family pholcids formulate their cluttered webs at the edges or corner of a wall and roofs. They possibly will be in

addition habitually to be found within the subterranean vault, ground stores and at the crypt of the homes, as a result living being noted through any other general forename is the cellar spiders. The male members of pholcids spiders have large palps, therefore, they're recognized as Daddy-longlegs spiders. The difference or distinction among the daddy longlegs spiders and the harvestman spiders is that in the harvestman spiders the cephalothorax and the abdomen is dumpy of compound cooperatively which seem to be like one arrangement while in daddy long leg spiders the body part cephalothorax and the abdomen have 2 (two) magnificent occupations related with the aid of a noticeable thin tube which is not like those spiders with all to gather the harvestman spiders does not make webs (Farooq et al., 2018, Nabi et al., 2020, Ursani et al., 2017).

Material and Methods

The research was planned to be conducted at the District Hyderabad (25.3960° N, 68, 3578° E). The four locations from where the specimens were collected included 1) Talukas, 2) Saddar, 3) Latifabad and 4) Qasimabad (Their GPS coordinates are 25.3864° N, 68.3645° E; 25.3669° N, 68.3518° E; 25.3988° N, 68.3399° E simultaneously). 150 specimens were gathered. The period of this research was year 2017 and 2018. Dichotomous keys were followed; for the identifications of spiders given by (Ursani et al., 2013, Coddington 2005, Maddison 2015, Russell et al., 1994, Uetz et al., 1999), to study diversity in spiders the methods followed included these defined by (Russell et al., 1994, Marusik 2002, Uetz et al., 1999, Malik et al., 2018). The Aerial hand and sweep insect net collecting methods were used (Sorensen et al., 2002). All specimens brought to advanced laboratory of Arachnids, Department of Zoology, University of Sindh, Jamshoro, and sorted out into two genera and a few new species and new records. Similarly night survey becomes additionally done as more spiders are lively at night than at some point of day, so night surveys regularly yield greater specimens. The collected individuals were inspected using Stereoscope dissecting binocular microscopes. For genitalia and other morphological characters (Tahira Ursani et al., 2013). The inner female genitalia was inspected using a tri-sided condense misrepresented completed by means of fine tipped dissecting needles crossways the epigynum. The flutter like misrepresented addicted to crease inferior back with medium size insect pins accumulated or mounted in wood made copes. The epigynum gently removed from the specimen with a pair of forceps and placed in a hot boiled reimbursement cleaning agent (10% KOH), shaking for two min/smacked at night in a cold solution in a depression/ dejected of concave microscope slide. If the specimen is large Ultrasonic cleanser was used. The removed or scrutinized epigynum one by one was gently wash or rinse with ethanol and stored vial having 75% ethanol and a few

drop of glycerin and were labeled. Genitalia vial changed into then plugged with cotton and positioned in the large vial containing the specimen of establishment. Subsequent each removed organ was examined under the stereoscopic microscope and all the characters were noted on the paper. While for the observation and examination of the male genitalia, the left pedipalp was removed gently with the help of fine tipper rough smooth forceps and were put into wash glass or china glass some time petridies having 75% Ethanol. To save you the specimens or their ingredients were put in to glass viols and beads turned into placed inside the backside of the dish. After examination, the palpus became positioned in a micro vial, stopper with cotton and saved with the spider in a full-size vial. The dimensions or measurements were taken in millimeter and have been through using different scales, vernier calliper and ocular graph or micrometer. All the diagrams were drawn with the help of ocular graph; camera Lucida and the picture were capture with digital camera. The specimens are sort out with following standard method family bases, genera bases, clinical places, plant on which the spider found could be called host, date of specimen collection, habitat and collector's name. Observations or diagnosed materials like epigynum or males pedipalps were processed and stored according to standard method at advanced Lab of Arachnology and Entomology, Department of Zoology, University of Sindh, Jamshoro. The different metaphors, latest and unidentified species were collected, identified, studied and their descriptions were given.

Results and Discussion

From the collection 150 specimens, 2 genera (*Artema* and *Crossporiza*) (table.2) and 4 new species (*Artema hirabadi*, *Crossporiza tahirae*, *C. hyderabad* identified as a new species to Science and one new record *C. lyoni*). It was observed that District Hyderabad has abundant and affluent number of individual in respect of pholcidae and its male and female ration (Table.1 & Figure 3). This study was carried out 2017 and 2018, 150 spider specimen belonging to family pholcidae were collected from 04 Talukas (Hyderabad itself; Saddar; Latifabad and Qasimabad) of district Hyderabad. Taluka Latifabad was found the richest one in family *Pholcidae* i.e 38.66%. The least samples were collected from Hyderabad Saddar i.e 16.00%. All of the collected 150 specimen, two genera were sorted out in genus *Artema* and *Crossporiza* both genera are described first time from Hyderabad. Total number specimen of *Artema* were 90, a new species also reported *Artema hirabadi* was also identified on the basis of taxonomical character, 60 specimen of genus *Crossporiza* are described, beside this *C. lyoni* reported as new record from District Hyderabad. Most abundant species was *Artema* least found was *Crossporiza*. The spiders were

collected from metropolitan city areas habituated in houses, stores, garages, etc. somewhere they form thin web while applying standard collected works proposed by entomologists and

Arachnologists. This research work will provide basic knowledge about spider's fauna and helpful for the research work, mainly in the field of IPM.

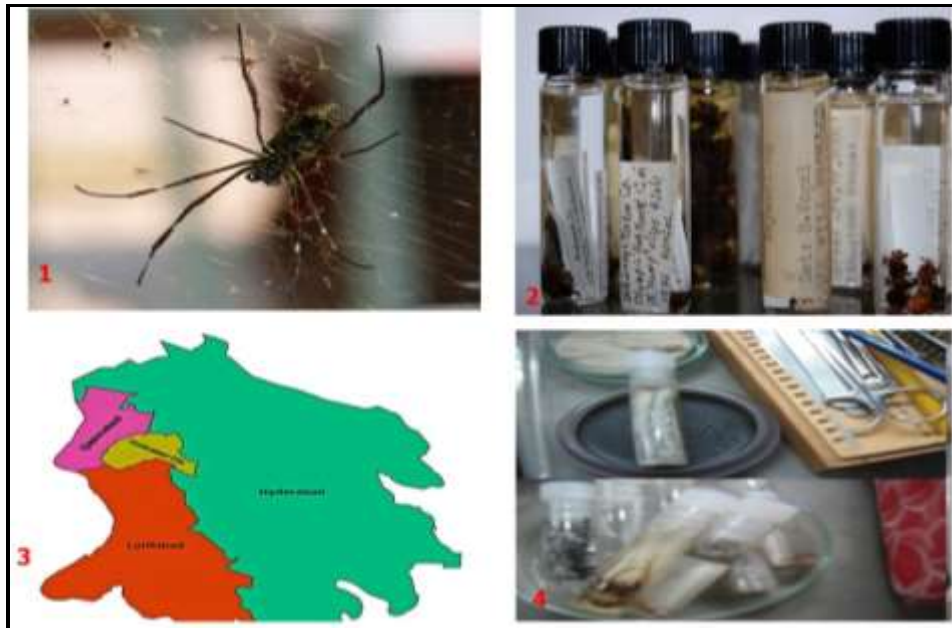


Figure 1-4, 1 Preservation and tagging of diverse members of pholcidae in laboratory. 2. Pholcidae, genus *Artema*, 3. Map of Hyderabad showing collection sites, 4. Specimens preservation tools in the lab.

Genus: *Artema* Walckenaer, 1837

Diagnostic Characters: The genus *Artema* is notable from other members of family pholcidae by its huge body, morphology and strapping legs which ranges 5.50 – 9.50 mm; leg I to IV span up to 15 cm; tibia 1 L/d: 34–42; abdomen with darkish dots and bands and imperceptibly developed ventral pocket by framework of male chelicerae. Eyes six present at the tip of cephalothorax. Abdomen grayish with white patches. Upper-posterior and of Abdomen has a conical projection. Legs are long, covered with

black spots and hairs and with black colored joint (Figure 2).

Distribution: Cosmopolitan and reported first time from Hyderabad

Material Examined:

- 22 ♀♀ 30-XII-17, Qasimabad (Akram); 12, ♂♂, 15-I-18 (Jawad) (Qasimabad)
- 25 ♀♀ 30-XII-17, Latifabad (Amjad); 10, ♂♂, 25-I-18 (Azmat) (Latifabad)
- 7 ♀♀ 30-XII-17, Saddar(Aleema) 12, ♂♂, 28-I-18 (Amina) (Saddar)

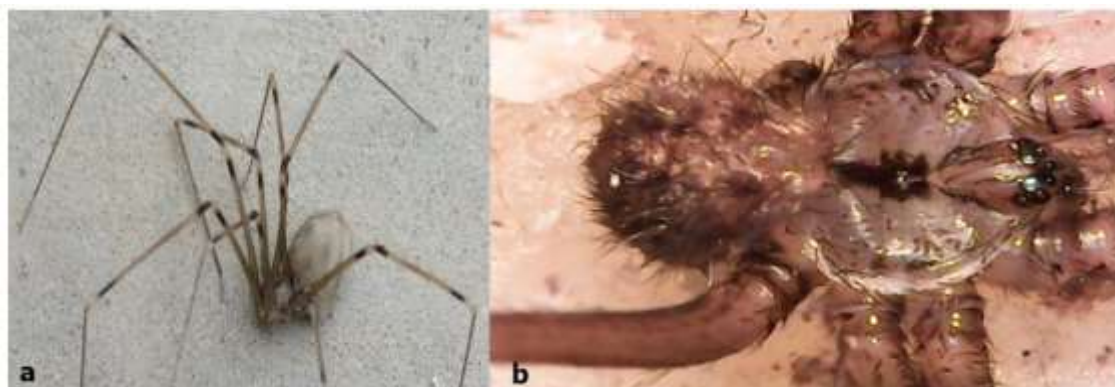


Figure.2 a-b Dorsal view of female *Artema hirabadi new sp.* and epigynum

Table.1 Sites, collection, and its percentage.

Taluka	Specimen	%
Laifabad	58	38.66%
Saddar	38	25.33%
Qasimabad	35	23.33%
Hyderabad	19	12.66%

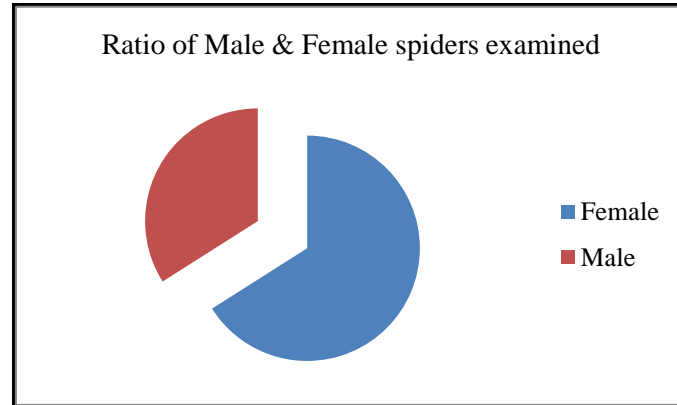


Figure. 3, showing male and female ratio

Table.2 collection of various species form talukas of Hyderabad from (December 2017- April 2018)

S.No	Genus	Latifabad	Qasimbad	Hyd-City	Saddar	Total
1	<i>Artema</i>	35	25	18	12	90
2	<i>Crosspriza</i>	20	15	13	12	60

Table.3 Measurement of legs Genus *Artema* (mm) as per leg formula 1 2 4 3

LEGS	I	II	III	IV
Femur	11	10.5	6	9
Patella + Tibia	10	10	7	8
Metatarsus	13	13	9	11
Tarsus	0.4	0.3	0.3	0.4
Total	34.4	33.8	22.3	28.4

Table.4 Measurement of body of Genus *Artema*

Parameter	Range	Mean	S D	FEMALE n = 5
Total body length	12.5-8	10.1		1.562
Length of abdomen	7-5	6		4.570
Width of abdomen	5-4	4.4		5.721
Length of carapace	5-3	5.2		6.518
Width of carapace	4-3	3.6		35.37

Table.5 Measurement of legs Genus *Crosspriza* (mm) as per leg formula 4 1 2 3

LEGS	I	II	III	IV
Femur	11.8	11.5	11	12
Patella + Tibia	11.3	11.1	10.9	12.5
Metatarsus	11	10.9	10.1	12
Tarsus	0.5	0.4	0.4	0.5
Total	33.6	33.9	32.4	37

Table.6 Measurement of body of Genus *Crosspriza*

Parameter	Range	Mean	S D	FEMALE n = 5
Total body length	11-7	9		1.791
Length of abdomen	6-4	5		5.176
Width of abdomen	6-3	4.8		5.398
Length of carapace	5-3	3.8		2.728
Width of carapace	5-2.5	3.3		6.884

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