

# DIVERSITY AND DISTRIBUTION OF SPIDER FAUNA IN AND AROUND THE TAJ MAHAL AND TAJ PROTECTED FOREST, AGRA (UP), INDIA

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**Abstract**—A study on the diversity and distribution of spider fauna in and around the Taj Mahal and Taj protected forest, Agra (U.P.), India, was conducted during August 2013 to July 2014. The Taj Mahal (situated at 27.1750<sup>0</sup> N, 78.0419<sup>0</sup> E) is located on the right bank of the Yamuna River in a vast Mughal that encompasses nearly 17 hectares, in the Agra district in Uttar Pradesh. An immense mausoleum of white marble, built in Agra between 1631 and 1648 by order of the Mughal Emperor Shah Jahan in memory of his wife Mumtaz Mahal, the Taj Mahal is the jewel of Muslim art in India and one of the universally admired masterpieces of the world's heritage. A total of 47 species of spiders belonging to 24 genera under 13 families were recorded. Reports on the spiders of this region are very scanty; therefore, the present study was carried out. Araneidae (Orb web weavers) and Salticidae (Ground Runners) families dominated in this region. Thus, the present study reveals a rich biodiversity of spider fauna in Taj Mahal region and it can be possibly utilized in agricultural sector in integrated pest management (IPM) as bio-control agent.

**Keywords:** Taj Mahal region, Spider (Araneae), Diversity and distribution.

## 1. INTRODUCTION

Taj Mahal region falls under semi-arid habitat (situated at 27.1750<sup>0</sup> N, 78.0419<sup>0</sup> E) in the southwest of the State of Uttar Pradesh and forms a part of upper Gangetic plains of North India. The soil is chiefly alluvial besides residual soils which consist of rocks fragments, pebbles, boulders and sand. The climate is markedly periodic due to marked diurnal differences in temperature, high saturation deficit and moderately low rainfall. Mean annual temperature is about 23<sup>0</sup>65C and annual precipitation is 760.4 mm (Singh and Islam, 2010). Arthropods comprise of more than 900,000 described insect species and about 43,678 described spiders in the world belong to the order Araneae of class Arachnida (Platnick, 2013). In India, according to Siliwal et al. (2005) about 1442 valid species of spiders are known from India and according to Keswani et al. (2012), the known spider species from India are 1686. Spiders are one of the diverse and functionally important predators regulating the terrestrial arthropods and possess a unique

ability to spin web. Spider catches a special attention of the naturalists because of their different types of web architecture to trap different insects for food (Codington and Levi, 1991). Most preferred food of spiders is found to be ants, followed by houseflies, mosquitoes, beetles, butterflies, honeybees, etc. Despite their fundamental role in natural ecosystem they have largely been ignored in conservational studies. Since information on spiders of this region is lacking this study aims to provide base line information on spiders of Taj Mahal Region for further studies.

## 2. MATERIAL AND METHODS

**1. STUDYAREA:** Selection of habitat is from the flood plains of Yamuna River because it provides humid condition for spider and also from Crop, non crop and forest habitat. This study area covered 33 km and the collection sites included protected forest area around Taj Mahal and all on the banks of river Yamuna crop. Owing to its proximity to the sandy desert of Rajasthan on the west, it witnesses extremes of temperature, which ranges from 45<sup>0</sup>C in summers to as low as 2<sup>0</sup>C in winters.

**2. METHODOLOGY-** Line transect method was used to search the spiders in different sampling sites like crop, non-crop and forest areas during the period of August 2013 to July. Transects were chosen randomly. Spiders were visually searched under the holes of tree and under rocks ground search were done under leaf litter or fallen herbs and shrubs. Spiders were collected with the help of specimen preservation boxes. The samples were preserved in 70% Ethanol for further identification.

All samples of spiders were identified by following the keys and catalogues of Tikader (1987), Pocock (1900), Platnick (2010), and through expert identification comments on spiders.

### 3. RESULTS AND DISCUSSION

Taj Mahal region provides divers habitat to diverse spider genera belonging to different families. Most species of spiders found were from Salticidae and Araneidae families. Salticidae are hunting spiders mainly prey upon insects. This probably the region of dominance of Salticidae spider in the area. *Plexippus paykulli*, *Oxyopes javanus*, *Argiope pulchella*, *Argiope aemula* were found to be the most abundant species in this region. A total of 47 species belonging to 13 families under 24 genera were recorded. The spiders belongs to eight

guild based on their foraging behavior in the field. The orb web weavers comprised of 14 species of spiders. Family Araneida, Tetragnethadae, Nephilidae fall under this category. Foliage runners were dominant guild in the study area, comprising of 15 species, ground runners 7 species, irregular web weaver 4 species, funnel web weavers 1 species, sheet web weavers 1 species, Dome shape horizontal web weavers 1 species, no species was found from single web weaver guild, ambushers 2 species (Table- 2). 13 families were reported that represent 25% of the total family recorded from India.

**Table I: Spider species recorded from Taj Mahal region, India.**

Family	Species	Guild	Sp. Count
Agelenidae	(i) <i>Agelendia sp.</i>	Funnel Web builders	12
Araneidae	(i) <i>Argiope aemula</i>	Orb web weavers	19
	(ii) <i>Argiope anasuja</i>	Orb web weavers	13
	(iii) <i>Argiope pulchella</i>	Orb web weavers	11
	(iv) <i>Cyclosa sp.</i>	Orb web weavers	5
	(v) <i>Cyrtophora cicatrosa</i>	Orb web weavers	8
	(vi) <i>Cyrtophora citricola</i>	Orb web weavers	14
	(vii) <i>Cyrtophora faei</i>	Orb web weavers	5
	(viii) <i>Cyrtophora molucensis</i>	Orb web weavers	1
	(ix) <i>Leucauge decorata</i>	Orb web weavers	1
Gnaphosidae	(i) <i>Callilepis lambai</i>	Ground runner	8
	(ii) <i>Callilepis rukminiae</i>	Ground runner	5
	(iii) <i>Drassodes sp.</i>	Ground runner	2
Hersiliidae	(i) <i>Hersilia savignyi</i>	Foliage runner	15
Linyphiidae	(i) <i>Linyphia sp.</i>	Sheet web weavers	5
Lycosidae	(i) <i>Lycosa mackenziei</i>	Ground runner	1
	(ii) <i>Lycosa pictula</i>	Ground runner	5
	(iii) <i>Pardosa birmanica</i>	Ground runner	3
	(iv) <i>Perdosa sp.</i>	Ground runner	9
Nephilidae	(i) <i>Nephila sp.</i>	Orb web weavers	7
	(ii) <i>Nephila kuhlli</i>	Orb web weavers	2
	(iii) <i>Nephila pilipes</i>	Orb web weavers	5
Oxyopidae	(i) <i>Oxyopes assamesis</i>	Foliage runner	3
	(ii) <i>Oxyopes biramanicus</i>	Foliage runner	16
	(iii) <i>Oxyopes javanus</i>	Foliage runner	12
	(iv) <i>Oxyopes ratanae</i>	Foliage runner	11
	(v) <i>Oxyopes shweta</i>	Foliage runner	17
	(vi) <i>Oxyopes sp.</i>	Foliage runner	3
	(vii) <i>Oxyopes pankaji</i>	Foliage runner	22
Pholcidae	(i) <i>Artema atlanta</i>	Irregular web weavers	19
	(ii) <i>Crosspriza lyoni</i>	Irregular web weavers	7
	(iii) <i>Pholcus phalangiodes</i>	Irregular web weavers	2
	(iv) <i>Pholcus sp.</i>	Irregular web weavers	3
Salticidae	(i) <i>Plexippus paykuli male</i>	Foliage runner	27
	(ii) <i>Plexippus paykuli female</i>	Foliage runner	11
	(iii) <i>Phidippus pateli</i>	Foliage runner	9
	(iv) <i>Phidippus yashdharae</i>	Foliage runner	8
	(v) <i>Salticus runjitus</i>	Foliage runner	14
	(vi) <i>Phidippus indicus</i>	Foliage runner	19
	(vii) <i>Portia assamensis</i>	Foliage runner	7
	(viii) <i>Portia sp.</i>	Foliage runner	5
Tetragnathidae	(i) <i>Leucauge decorata</i>	Orb web weavers	4
	(ii) <i>Leucauge sp.</i>	Orb web weavers	3
Thomisidae	(i) <i>Thomisus lobosus</i>	Ambusher	2

	(ii) <i>Thomisus projectus</i>	Ambusher	7
Uloboridae	(i) <i>Uloborus donolius</i>	Dome shape horizontal web	1

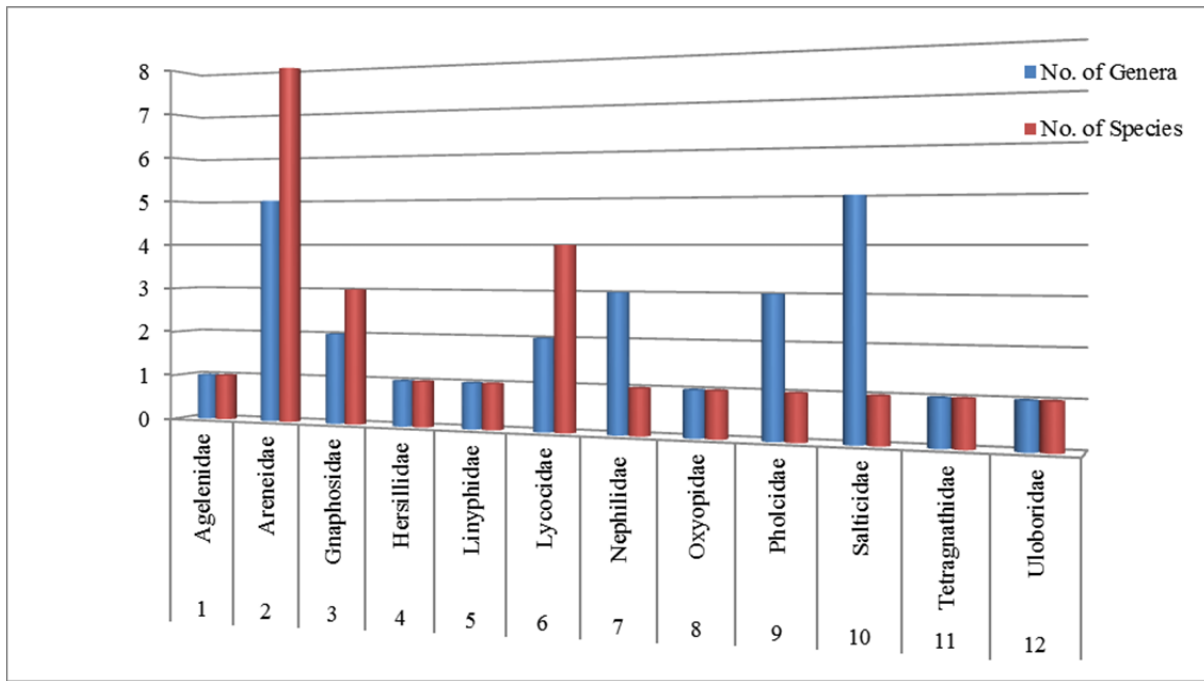


Fig.1: Graph of spider's genera and species recorded during the study

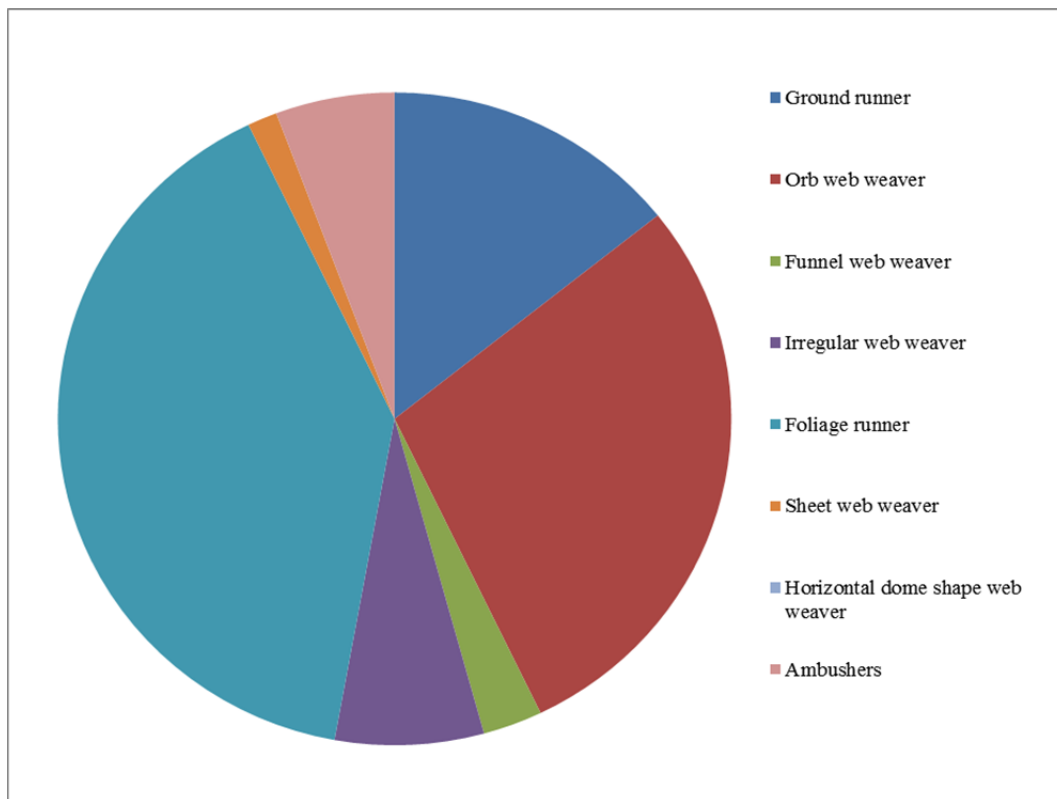


Fig. 2: Comparative Guild density (percentage) of spiders recorded during the study

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