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Spiders in Mangalavanam, an ecosensitive mangrove forest in Cochin, Kerala, India (Araneae)

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Abstract: A preliminary study was conducted to document the spider fauna in Mangalavanam, an ecosensitive and threatened mangrove forest located in the heart of Cochin City in Kerala state, India. Mangalavanam is popularly known as the Green Lung of Cochin City. The faunistic survey yielded 51 species of spiders belonging to 40 genera and 16 families. This represents 27% of the total families reported from India. Araneidae was the most dominant family recording 12 species belonging to 8 genera. On species level, *Pisaura gitae* Tikader, 1970 was the dominant species. Guild structure analysis revealed seven feeding guilds, namely orb weavers, stalkers, ground hunters, foliage runners, sheet web builders, scattered line weavers and ambushers. Orb weavers and stalkers were the dominant feeding guilds representing 33% and 29% respectively of the total collection. The genus *Tapponia* is reported for the first time from India.

Key words: Mangalavanam, diversity, urban forest, spiders, *Tapponia*

Introduction

Urban areas in India are faced with excessive population along with the pressure of unplanned economic development, industrialization, and vehicular emissions. In this paper, we present the results of a faunistic survey conducted to document the spider diversity in Mangalavanam, an ecologically threatened urban forest located in the heart of Cochin City in Kerala state, India.

Materials and Methods

Cochin (Kochi) city, acclaimed as the commercial capital of Kerala, Queen of the Arabian Sea, Gateway of South India, etc., is located on the west coast of India at a latitude of 9° 58' N and longitude of 76° 14' E. Lying at sea level, this port city receives an annual rainfall of 343 cm with 139 rainy days. Temperature ranges from 20°C to 35°C. Mangalavanam, popularly known as the Green Lung of Cochin City, is a mangrove forest located in the north-west area of the city. This green belt, with an area of 2.4 ha, also supports many varieties of rare and endemic mangrove vegetation. *Acanthus ilicifolius* Linnaeus, *Avicennia officinalis* Linnaeus, *Bruguiera gymnorrhiza* (Linnaeus) Lamarck, *Kandelia candel* (Linnaeus) Druce, *Rhizophora apiculata* Blume and *Excoecaria agallocha* Linnaeus are a few among them (Ramachandran, Mohanan 1989). Mangalavanam was in the limelight recently owing to a series of protests by environmentalists to protect this area from being turned into a parking zone for vehicles coming to the High Court of Kerala State.

Spiders were collected from Mangalavanam in February 2005. Collections were made by a visual searching method following a line transect. Each plant along the transect was carefully

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searched for spiders. Smaller spiders were collected by leading them into tubes containing alcohol with the help of a brush dipped in alcohol. Sedentary spiders found on the leaf blades, tree trunks and those on the webs were caught in the jar by holding it open beneath them and by tapping the spiders into it with the lid. Running and vagabond species such as lycosids were caught by throwing a kerchief over them and carefully holding them with the hand in the folds, then transferring them to the jars. The collected spiders were preserved in 70% alcohol. Adult males and females were identified up to species level with the help of available literature (Tikader 1970, 1977, 1980, 1982, 1987, Barrion, Litsinger 1995, Murphy, Murphy 2000). Immature spiders were identified up to generic level. The scientific names of spiders and their classification follow Platnick (2005). Voucher specimens were deposited in the reference collection housed with the Arachnology Division, Department of Zoology, Sacred Heart College, Cochin, Kerala, India.

Table 1. Total number of families, genera, species composition and functional guilds of spiders sampled from Mangalavanam urban forest, India.

No.	Family	No. of genera	No. of species	Guild
1.	Araneidae	8	12	Orb web weavers
2.	Clubionidae	1	1	Foliage hunters
3.	Corinnidae	1	1	Ground runners
4.	Hersiliidae	1	1	Foliage hunters
5.	Linyphiidae	1	1	Sheet web builders
6.	Lycosidae	2	2	Ground runners
7.	Miturgidae	1	1	Foliage hunters
8.	Oxyopidae	2	4	Stalkers
9.	Pisauridae	1	1	Foliage hunters
10.	Salticidae	10	11	Stalkers
11.	Scytodidae	1	2	Foliage hunters
12.	Sparassidae	1	1	Foliage hunters
13.	Tetragnathidae	3	4	Orb web weavers
14.	Theridiidae	3	4	Scattered line weavers
15.	Thomisidae	3	4	Ambushers
16.	Uloboridae	1	1	Orb web weavers
	Total	**40**	**51**	

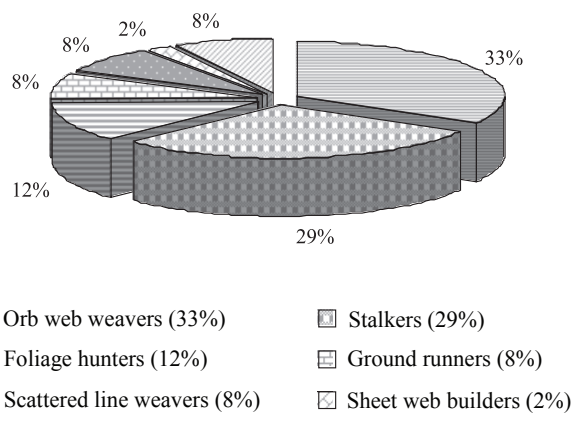

Fig. 1. Guild structure of spiders collected from Mangalavanam urban forest, India.

Results and Discussion

Spiders representing 16 families, 40 genera and 51 species were recorded from Mangalavanam during the study (Tables 1, 2). This represents 27% of the total families reported from India (Siliwal *et al*. 2005). Araneidae was the dominant family constituting 12 species from 8 genera. The Salticidae was represented by 11 species from 10 genera. On species level, *Pisaura gitae* Tikader, 1970 was the dominant species. Guild structure analysis revealed seven feeding guilds (Uetz *et al*. 1999). These are orb web weavers, stalkers, ground runners, foliage hunters, sheet web builders, scattered line weavers and ambushers (Table 1). Orb web weavers constituted the dominant feeding guild representing 33% of the total collection (Fig. 1). They are followed by stalkers and foliage hunters constituting 29% and 12% respectively of the total catch.

Table 2. Checklist of spiders collected from Mangalavanam urban forest, India. * - species endemic to India.

Family	Genus/ Species
Scytodiidae	*Scytodes thoracica* (Latreille, 1802)
	Scytodes sp.
Hersiliidae	*Hersilia savignyi* Lucas, 1836
Uloboridae	*Uloborus* sp.
Theridiidae	*Achaearanea mundula* (L. Koch, 1872)
	A. tepidariorum (C.L. Koch, 1841)
	Theridion sp.
	Theridula angula Tikader, 1970*
Linyphiidae	*Erigone* sp.
Tetragnathidae	*Leucauge celebesiana* (Walckenaer, 1842)
	L. pondae Tikader, 1970*
	Opadometa sp.
	Tetragnatha mandibulata Walckenaer, 1842
Araneidae	*Araneus mitificus* (Simon, 1886)
	A. nympha (Simon, 1889)
	Argiope aemula (Walckenaer, 1842)
	A. pulchella Thorell, 1881
	Cyclosa confraga (Thorell, 1892)
	Cyclosa quinqueguttata (Thorell, 1881)
	Cyrtarachne sp.
	Cyrtophora citricola (Forskål, 1775)
	Eriovixia laglaizei (Simon, 1877)
	Gasteracantha geminata (Fabricius, 1798)
	Neoscona mukerjei Tikader, 1980*
	N. vigilans (Blackwall, 1865)
Lycosidae	*Lycosa* sp.
	Pardosa sumatrana (Thorell, 1890)
Pisauridae	*Pisaura gitae* Tikader, 1970*
Oxyopidae	*Oxyopes birmanicus* Thorell, 1887
	O. quadridentatus Thorell, 1895
	O. sunandae Tikader, 1970*
	Tapponia sp.
Miturgidae	*Cheiracanthium* sp.
Clubionidae	*Clubiona* sp.
Corinniidae	*Castianeira* sp.
Sparassidae	*Heteropoda* sp.
Thomisidae	*Amyciaea forticeps* (O. P.-Cambridge, 1873)
	Thomisus lobosus Tikader, 1965*
	T. pugilis Stoliczka, 1869*
	Xysticus sp.
Salticidae	*Asemonea tenuipes* (O. P.- Cambridge, 1869)
	Bavia sp.
	Carhottus sp.
	Cyrba sp.
	Hyllus sp.
	Menemerus bivittatus (Dufour, 1831)
	Myrmarachne orientales Tikader, 1973
	M. plataleoides (O. P.-Cambridge, 1869)
	Phintella vittata (C.L. Koch, 1846)
	Plexippus petersi (Karsch, 1878)
	Telamonia dimidiata (Simon, 1899)

The genus *Tapponia* has been discovered for the first time from India. Also, 7 species collected from Mangalavanam are endemic to the Indian region (Table 2).

This study brought out the fact that Mangalavanam, the urban forest in Kochi city which is on the verge of destruction due to rapid urbanization, is an abode of spiders in addition to the multitude of migratory birds nesting in this mangrove forest. This rich diversity of spiders is also indicative of the overall biodiversity of this urban forest since spiders are considered to be useful indicators of the species richness and health of terrestrial ecosystems (Noss 1990) and amply emphasizes the need for preserving this forest patch intact from a biodiversity conservation perspective.

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Паяци (Araneae) в Мангалаванам – уязвима мангрова гора в Кохин (Керала, Индия)

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(Резюме)

Проведено е пионерно проучване на аранеофауната на уязвимата мангрова гора "Мангалаванам", намираща се в центъра на град Кохин, щата Керала в Индия. Установени са 51 вида паяци, принадлежащи към 40 рода и 16 семейства, което представлява 27 % от всички семейства, срещащи се в Индия. Най-богато на видове е семейство Araneidae (12 вида от 8 рода). Преобладаващият в изследвания район вид е *Pisaura gitae* Tikader, 1970. Родът *Tapponia* се регистрира за първи път в Индия. На поведенческа основа са разграничени няколко екологични типа паяци-тъкачи на кълбовидни мрежи, наземни ловци, ловци в подстилката, тъкачи на пеленовидни мрежи, ловци от засада и др. Видовете, изграждащи кълбовидни мрежи и тези, които дебнат жертвите си от засада, доминират в изследвания район със съответно 33% и 29% представеност в цялата колекция.