SHORT COMMUNICATION

PRELIMINARY CHECKLIST OF SPIDER FAUNA (ARANEAE: ARACHNIDA) OF CHANDRANATH HILL, GOA, INDIA

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Preliminary checklist of spider fauna (Araneae: Arachnida) of Chandranath Hill, Goa, India

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Abstract: The present investigation is a very first attempt to generate the checklist of spiders from Chandranath Hill, Paroda, Quepem, Goa. A preliminary study was conducted from June 2018 to March 2020 to document the spider diversity from the region. In all, 125 species of spiders belonging to 102 genera from 19 families were identified. The dominant families were Salticidae followed by Araneidae. Guild structure analysis revealed six feeding guilds, namely, orb weavers, foliage runners, ground runners, stalkers, space-web builders and ambushers. This study has not only highlighted the need for conservation of this ecosystem due to the significant species diversity and endemic species but has also filled the lacuna of spider study in Goa to form the foundation for further investigation. Extensive research on the spiders from Chandranath Hill in the future can certainly expect further new discoveries.

Keywords: Chandreshwar, diversity, guild structure, Salticidae, spiders.

Currently, the world list of spiders comprises over 48,000 species belonging to more than 4,000 genera and 128 families (World Spider Catalog 2020), of which, 1,843 species from 472 genera and 60 families are reported from India (Caleb & Sankaran 2020). In Goa, a total of 11 families belonging to 28 genera and 39 species have been documented till date (Bastawade & Borkar 2008).

The present study aims to generate a primary report documenting the spider diversity of Chandranath Hill, thereby highlighting the ecological aspect of this ecosystem.

Materials and Methods

Study area

The Chandranath Hill (15.213°N & 74.037°E) situated in Paroda, Quepem Taluka of South Goa District stands at a height of approximately 350m. Commonly known as Chandreshwar, this Hill has an area of approximately 2km². This heavily wooded hill commands a panoramic view and its surroundings are enchanting accompanied with thick vegetation with riparian patches. The speciality of this hill is that it is geographically not connected to the Western Ghats yet it is rich in biodiversity. Despite this, no study on spiders has been carried out in this area till date, thus making it an important reason for conducting this exploration which will in-turn generate primary data with the help of this documentation. The study was conducted for a period of 22 months, from June 2018 till March 2020, covering all the seasons.

Climate and vegetation

The study area being close to the Arabian Sea...
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experiences warm and humid climate for most of the year with atmospheric temperatures ranging from 21° to 36°C. The humidity ranges from 71 to 89%.

Teak is a common occurrence which is found in association with Macaranga peltata (Chandada), Mangifera indica (Wild mango), Garcinia (Kokum). Shrubs like Mussaenda frondosa (Dhobi tree), Ivora coccinea (Jungle geranium) are common along with orchids like Eria and climbers like Begonia spp. Seasonal wild balsams (Impatiens sp.), Sida rhombifolia (Arrow Leaf Sida), Sonerila rheedii (Rheed’s Sonerila) and Melastoma malabathricum (Malabar Melastome) are abundant. As one moves to a higher elevation through dense foliage and small streams of cascading water, breath-taking glimpses of the vegetation and the landscape can be witnessed.

Methods

Spiders were visually searched in their microhabitats such as ground, litter, bushes, flowers, leaves, branches, in cracks and crevices. Webs and web lines were traced to locate the spiders. Logs and stones after being upturned to search for spiders were placed back in their original position. Spiders were photographed in their natural habitat itself as soon as they were sighted using Canon EOS 500D DSLR mounted with 18–55 mm lens attached with Raynox DCR-250 magnifying lens.

Random active search was employed to capture spiders. Whenever possible, the spiders were handpicked. The lid-container method was used to trap the spiders. Vegetation beating was done using a wooden stick with an inverted umbrella placed below the vegetation to collect the spiders that were out of reach. Sweep net method was used to collect spiders that dwell in the foliage. The collected specimens were preserved in 70% alcohol. Spiders were examined under a stereo-zoom microscope (Weswox STM-80) and identified with the help of taxonomic keys and illustrations provided by Gajbe (2007, 2008), Gravely (1921a,b, 1924, 1931) Pocock (1900, 1901), Tikader (1960, 1963, 1970, 1971, 1980, 1981, 1982a,b), Tikader & Bal (1981), Tikader & Malhotra (1980), Sethi & Tikader (1988), Proszynski (1992) and other relevant literature. Nomenclature and taxonomy is according to the World Spider Catalog (2020). All the specimens were identified up to family and generic level and some to specific level. Spiders that could not be identified are not included in the checklist.

RESULTS AND DISCUSSION

The study at Chandranath Hill, Goa from June 2018 to March 2020 resulted in the documentation of 125 species belonging to 102 genera of 19 families (Table 1). Spiders from family Salticidae proved to be the most dominant constituting 26.40% of the total species (33). Further, 22.40% of the species (28) belonged to Araneidae making it the second dominant family. The families with least number of species (01) were Cheiracanthiidae, Ctenidae, Gnaphosidae, Hersiliidae, Philodromidae and Scytodidae.

Guild structure

Six feeding guilds, namely, orb weavers, foliage runners, ground runners, stalkers, space-web builders, and ambushers were identified based on the foraging behaviour (Uetz et al. 1999).

The most dominant guild was of the stalkers with 40 species followed by orb weavers (39), ambushers (16), space-web builders (14), ground runners (10) and foliage runners (06).

Vegetation architecture plays a major role in the species composition found within a habitat (Greenstone
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Figure 1. Comparative distribution of genera and species in different families.

Figure 2. Percentage distribution of spider families of Chandranath Hill, Goa.

Figure 3. Guild structure of spiders at Chandranath Hill, Goa.
Table 1. Checklist of spider species recorded at Chandranath Hill, Goa.

| Family          | Species | Guild          |
|-----------------|---------|----------------|
| Araneidae       | 1       | Anepsion maritatum (O. Pickard-Cambridge, 1877)* (Image 2) |
|                 | 2       | Arachnura angura Tikader, 1970* |
|                 | 3       | Araneus mithicus (Simon, 1886)* |
|                 | 4       | Araneus viridisomus Gravely, 1921* (Image 3) |
|                 | 5       | Argiope aemula (Walckenaer, 1841) |
|                 | 6       | Argiope anasuja Thorell, 1887* |
|                 | 7       | Argiope pulchella Thorell, 1881 |
|                 | 8       | Choriopes sp* |
|                 | 9       | Cyclosa bifida (Doleschall, 1859)* |
|                 | 10      | Cyclosa spirifera (Simon, 1889)* |
|                 | 11      | Cyrtophora cicatrosa (Stoliczka, 1869) |
|                 | 12      | Cyrtophora unicolor (Doleschall, 1857)* (Image 4) |
|                 | 13      | Erioixia sp. 1* |
|                 | 14      | Erioixia sp. 2* |
|                 | 15      | Gasteracantha geminata (Fabricius, 1798) (Image 5) |
|                 | 16      | Gasteracantha hasselti C.L.Koch, 1837 |
|                 | 17      | Gasteracantha kuhli C.L.Koch, 1837* |
|                 | 18      | Gae spinipes C.L.Koch, 1843* (Image 6) |
|                 | 19      | Herennia multipuncta (Doleschall, 1859) |
|                 | 20      | Larinia sp.* |
|                 | 21      | Neoscona bengalensis Tikader & Bal, 1981 |
|                 | 22      | Neoscona mukerjei Tikader, 1980 |
|                 | 23      | Neoscona theisi (Walckenaer, 1841)* |
|                 | 24      | Nephila kuhli (Doleschall, 1859)* |
|                 | 25      | Nephila pilipes (Fabricius, 1793) |
|                 | 26      | Parawixia dehaani (Doleschall, 1859) (Image 7) |
|                 | 27      | Polysis sp.* (Image 8) |
|                 | 28      | Thelacantha brevispina (Doleschall, 1857)* |
| Cheiracanthiidae*| 29      | Cheiracanthium sp* |
| Corinnidae*     | 30      | Castanenra zetes Simon, 1897* |
| Ctenidae         | 32      | Ctenus sp. |
| Gnaphosidae     | 33      | Zelotes sp.* |
| Hersiliidae     | 34      | Hersilia savignyi Lucas, 1836 |
| Lycosidae       | 35      | Hippasa pisaurina Pocock, 1900* |
|                 | 36      | Hippasa agelenoides (Simon, 1884) |
|                 | 37      | Hippasa greenalliae (Blackwall, 1867)* |
|                 | 38      | Pardosa sp. |
| Oxyopidae*      | 39      | Hamadruas sp.* (Image 10) |
|                 | 40      | Hamataliwa sp.* |
|                 | 41      | Oxyopes birmanicus Thorell, 1887* |
|                 | 42      | Oxyopes shweta Tikader, 1970* |
|                 | 43      | Oxyopes javanus Thorell, 1887* |
|                 | 44      | Oxyopes sp.* |
| Philodromidae*  | 45      | Peucetia viridana (Stoliczka, 1869)* (Image 11) |
|                 | 46      | Tibellus elongatus Tikader, 1960* (Image 12) |

*Image numbers correspond to the figures in the publication.
| Family      | Species                                      | Guild          |
|------------|----------------------------------------------|----------------|
| Pholcidae  | 47 *Artema atlanta* Walckenaer, 1837         |                |
|            | 48 *Craspandria lyoni* (Blackwall, 1867)³⁷ |                |
|            | 49 *Leptopholcus sp.*                         |                |
|            | 50 *Pholcus sp.*                              |                |
|            | 51 *Dendrolycosa gitae* (Tikader, 1970)⁴⁰    |                |
|            | 52 *Hygropha m club* sp.*                     |                |
|            | 53 *Nilus sp.*                                | Ambushers      |
|            | 54 *Polypheo sp.*                             |                |
| Pisauridae | 55 *Aseneonea tenueps* (O. Pickard-Cambridge, 1869)¹⁄² (Image 15) |                |
|            | 56 *Bianor sp.*                              |                |
|            | 57 *Brettus cingulatus* Thorell, 1895²⁹ (Image 16) |                |
|            | 58 *Bristowia sp.*                            |                |
|            | 59 *Carrhotus viridus* (C.L.Koch, 1846)⁴⁰   |                |
|            | 60 *Chrysilla xoloppe* (Karsch, 1879)³⁰      |                |
|            | 61 *Cyra occlata* (Kroneberg, 1875)²⁹       |                |
|            | 62 *Epeus indicus* Prössyński, 1992²⁹ (Image 18) |                |
|            | 63 *Harmochirius brachiatus* (Thorell, 1877)³⁰ |                |
|            | 64 *Hasarius adansonii* (Audouin, 1826)²⁹   |                |
|            | 65 *Hylus seminipetus* (Simon, 1885)²⁹ (Image 19) |                |
|            | 66 *Icici virkombatsari* Prajapati, Malamel, Sudhikumar & Sebastian, 2018²⁹ (Image 20) |                |
| Salticidae | 67 *Indopadilla insularis* (Malamel, Sankaran & Sebastian, 2015)²⁹ (Image 21) | Stalkers       |
|            | 68 *Langona sp.*                             |                |
|            | 69 *Marengo sp.*                             |                |
|            | 70 *Menemerus bivittatus* Dufour, 1831²⁹     |                |
|            | 71 *Menemerus sp.*                            |                |
|            | 72 *Myrmaphio platanoides* (O. Pickard-Cambridge, 1869) (Image 23) |                |
|            | 73 *Myrmarachne melanopetra* MacLeay, 1839²⁹ |                |
|            | 74 *Myrmarachne prava* Karsch, 1880²⁹        |                |
|            | 75 *Phaeocius sp.*                            |                |
|            | 76 *Phanuelus sp.*                            |                |
|            | 77 *Phintella vittata* (C.L.Koch, 1846)²⁹    |                |
|            | 78 *Piranthus sp.*                            |                |
|            | 79 *Plexippus paykulli* Audouin, 1826²⁹      |                |
|            | 80 *Plexippus petersi* Karsch, 1878²⁹        |                |
|            | 81 *Plexippus sp.*                            |                |
|            | 82 *Portia albimana* Simon, 1900²⁹ (Image 24) |                |
|            | 83 *Rhene flavicans* Simon, 1902²⁹           |                |
|            | 84 *Stenaelurillus sp.* (Image 25)            |                |
|            | 85 *Telamonia dimidiata* Simon, 1899²⁹ (Image 26) |                |
|            | 86 *Thiania bhamoensis* Thorell, 1887²⁹ (Image 27) |                |
|            | 87 *Vallinia sp.*                             |                |
| Scytodidae*| 88 *Scytodes sp.*                            | Foliage runners|
| Sparassidae| 89 *Heterospoda sp.*                          |                |
|            | 90 *Olios millet* (Pocock, 1901)²⁹           |                |
|            | 91 *Palystes sp.*                             |                |
|            | 92 *Pandercetes sp.*                          |                |
1984; Scheidler 1990; Sudhikumar et al. 2005) and vegetation which is structurally more complex can sustain higher abundance and diversity of spiders (Hatley & Macmahon 1980; Sudhikumar et al. 2005). Additionally, good vegetation along with floral diversity houses a number of insect species, this in turn results in hosting a high diversity of spiders as insects happen to be their main prey (Chetia & Kalita 2012).

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Image 2. *Anepson maritatum*

Image 3. *Araneus viridisomus*

Image 4. *Cyrtophora unicolor*

Image 5. *Gasteracantha geminata*

Image 6. *Gea spinipes*

Image 7. *Parawixia dehaani*

Image 8. *Poltys* sp.

Image 9. *Echinax panache*

Image 10. *Hamadruas* sp.

Image 11. *Peucetia viridana*

Image 12. *Tibellus elongatus*

Image 13. *Hygropoda* sp.
Image 14. Polyboea sp.  

Image 15. Asemonea tenuipes  

Image 16. Indopadilla insularis  

Image 17. Brettus cingulatus  

Image 18. Bristowia sp.  

Image 19. Epeus indicus  

Image 20. Hyllus semicupreus  

Image 21. Icius vikrambatrai  

Image 22. Marengo sp.  

Image 23. Myrmaplata plataeoides  

Image 24. Portia albimana  

Image 25. Stenaelurillus sp.
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Image 26. *Telamonia dimidiata*

Image 27. *Thania bhamoensis*

Image 28. *Polystes sp.*

Image 29. *Opadometa fastigata*

Image 30. *Tylorida striata*

Image 31. *Argyrodessa flavescens*

Image 32. *Chikunia nigra*

Image 33. *Chrysso angula*

Image 34. *Chrysso urbasae*

Image 35. *Colesoma blandum*

Image 36. *Propostira ranii*

Image 37. *Amyciaea forticeps*
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