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Study of spider species in and Around Lohara village, district Chandrapur (M.S.) India

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Abstract
Spiders are a group of most diverse organism. There hasn't been any research done on the spider fauna in Lohara Village, district Chandrapur, despite the fact that spiders are a group of the most diversified organisms and can play a very important role in regulation of insect population in any ecosystem. A survey was carried out during January 2022 to December 2022at three different sites in Lohara village near District Chandrapur. A total of 21 spider species belongs to 16 genera of 10 families were collected. The spider survey is useful to know the spider population in the given habitat and generating baseline data of these least studied groups of arthropods i.e. spiders. They also act as effective bio-control agents due to their non-specific feeding habits and hence are beneficial to crops and the economy of the region. This data can serve as the foundational documentation for upcoming Maharashtra research project.

Keywords: Chandrapur, Diversity, Fauna, Lohara, spider

Introduction

Spiders are one of the most adapted creatures on the planet; it's at the top of food web in any ecosystem and inhabiting almost all the habitat and flourishing in a wide range of environments from deserts and evergreen rain forests to our homes too. Along with its population in the forest, the availability in urban areas need to be examined. As spider feed on insects they maintain the number of insects and play a role of bio-control agents. (Bhattacharya *et al.,* 2017) [1]. Spiders have been suggested to be an ideal group for predicting extinction debt due to habitat destruction. They are the good indicators of the fluctuating weather condition and changes in their diversity (Lee, 1966) [8]

Spider survey provides an effective means of measuring the impact of habitat degradation. Spiders evolved 350 million years ago during Devonian Period belong to phylum Arthropoda, the largest phylum in terms of the number of species Kaston, (1978) [6]. Phylum Arthropoda is divided into three subphyla *viz*. Crustacea, Tracheata, and Chelicerata. While crustaceans include crabs, lobsters, etc., Tracheata includes all the insects and myriapods. Subphylum Chelicerata further contains two classes Xiphosura (horseshoe crabs) and Arachnida. Class Arachnida comprises of order Araneae (Spiders) along with other orders *viz*. Acari, Amblypygi, Opiliones, Palpigradi, Pseudoscorpions, Ricinulei, Schizomida, Scorpions, Solifugae and Thelyphonida (formerly Uropygida).

Some researchers done their work on spider, Chetia and Kalita (2012) [2], Dhali *et al.*, (2016) [4], Palem, *et al.,* (2016) [11]. Sebastian and Peter (2017) [12], Shirbhate and Shirbhate (2017) [14], Halarnkar and Pai (2018) [5].

Arthropods like spiders have populated terrestrial environments. They face three main issues:

(i) Terrestrial condition shows huge deviation in temperature, rainfall and humidity. habitats have large fluctuations in temperature and humidity; (ii) Spiders constantly lose water because their internal water content is higher than their external surroundings and (iii) Due to seat and wait predatory technique spider metabolic rate is lower than others. Their body temperature fluctuate. All metabolic activities are temperature dependent. (Magare, 2017) [9].

The spiders uncontrolled reproductive rate, dangerous unpredictable and vulnerable behaviours was shown to be a significant contributing component in the dread of spiders. (De and Palita, 2018) [3]. Population of spiders is directly and indirectly depends on availability of food and climatic conditions. (Namkung, 2003) [10].

Therefore due to lack of proper biodiversity studies on the spiders of the region, there was a need for intensive and extensive surveys for such studies in Chandrapur district. The present study would help in generating baseline data of these least studied groups of arthropods i.e. spiders. This would also help in the conservation of spiders. They also act as effective bio-control agents due to their non-specific feeding habits and hence are beneficial to crops and the economy of the region. Considering the poor documentation, the present study is planned with the following objectives.

Study Area

A tropical dry deciduous forest is a Lohara forest. It is situated at 19.57°N latitude and 79.18°E longitude in the eastern region of Maharashtra state, Central India. Its elevation is 189.90 m above mean sea level. The city's area is around 162.41 km, north – south length distance is 15.90 km, and its east to west distance is 10.90 km. The Lohara is a village in Chandrapur district of Maharashtra state. It is located 5 km towards East from district head quarters Chandrapur. The studies are located at 20002'04.17" N, 79029'39.59". The Climate is generally hot and Dry, whereas in the rainy season it is humid and the rain fall is quite heavy. The temperature in summer is >45°C and drops down to 10°C. Annual rainfall ranges between 800 mm to 1300 mm.

Material and Methods

Collection Methods

Spider collection done by following methods:

Visual Searching and handpicking b) **Sweep Net** c) **Aspiration** d) **Pitfall trap**
Kerchief method.

The spiders were observed, photographs captured with the help of mobile and Nikon Camera, studied, identified and released them back.

Plan of Work

The field survey on spiders was conducted three times in week for one year in the study area. Spiders were access and observed during day time in different seasons and vegetation in three selected sites of Lohara village.

Sampling site

The Lohara village area is almost surrounded by dense forest with varieties of plants and farms while some of its area can be categorised as moderately dense and minimal dense region.

Sampling site 1- Dense populated plantation.

Sampling site 2 -Moderate populated plantation, nearby Lohara lake.

Sampling site 3-Minimal populated plantation.

Identification: All above work done with the standard literature under reference of Kaston (1978) [6], Preston and Preston (1984), Sethi and Tikader. (1988) [13], Song *et al.*, (1999), Rao and Rao (2007), Sebastian and Peter (2017) [12], Kamble *et al.*, (2018), Talwar *et al.*, (2018). The book "Spiders of India" by PA Sebastian and KV Peter. And other scientific papers were helped for identification.

Results and Discussion

The total 21 spider species were observed which consist of 16 genera at Lohara area which belonged to 10 families, represented in table No.1 The families observed in the study area was Family Salticidae with 6 species followed by Lycosidae with four species fallowed by Families Oxyopidae with three species, Families Tetragnathidae with two species, one each of the following Families Aranidae, Corinnidea, Ctenidae, Hersiliidae, Nephilidae and Pholcidae were identified. Similar study was note by Kumari and Shet (2019) [7] and Talwar, *et al.*, (2018), Sethi, and Tikader, (1988) [12], Shirbhate and Shirbhate (2017) [14] was identified a total of 11 genus and 26 species of family Araenidae were spotted in Akola. Population of spiders are directly and indirectly depends on availability of food and climatic conditions. Diversity in plant structure and habitat could increase spider density. Higher species diversity is an indicator of better conditions for spider to sustain. The humidity in Chandrapur ranges from 50-90% and variation in temperature (8°C in December - 48°C in May) shows adaptive ability of spiders. Therefore due to lack of proper biodiversity studies on the spiders of the region, there was a need for intensive and extensive surveys for such studies in Chandrapur district. The temperature of Chandrapur is generally high in summer and as spiders are sensitive to temperature they show drastic variation in their numbers. Some species are adapted to summer and polluted conditions and increase breeding. Unpredictable climatic condition like cloudburst affected the web appearance of spiders.

The chandrapur district is riched in flora and fauna and covered by deciduous forest and agricultural land but very less amount of information of spider diversity is gathered and studied. The diversity of spider was studied in agricultural, forest and residential area near by Lohara in Chandrapur district. Spiders were found in houses, on trees, under tree trunk, on web and underneath the leaves of trees. Nephila pilipes (Giant Wood Spider) are mostly seen in early winter and in late rainy season on web at height of 30feets in between tree trunk in green background. The webs are large in size and it shows the great predator strategies of spider to catch the prey.

Table 1: Diversity of Spider species in and around Lohara area district- Chandrapur.

Sr. No.	Family	Genus	Species
1	Aranidae	*Neoscona*	*crucifera*
2	Corinnidea	*Castianeira*	*zetes*
3	Ctenidae	*Ctenus*	*cochinensis*
4	Hersiliidae	*Hersilia*	*savignyi*
5	Lycosidae	*Lycosa*	*mackenziei*
6	Lycosidae	*Lycosa*	*tista*
7	Lycosidae	*Pardosa*	*pseudoannulata*
8	Lycosidae	*Pardosa*	*birmanica*
9	Nephilidae	*Nephila*	*pilipes*
10	Oxyopidae	*Peucetia*	*viridans*
11	Oxyopidae	*Oxyopes*	*javanus*
12	Oxyopidae	*Oxyopes*	*lineatipes*
13	Pholcidae	*Smeringopus*	*pallidus*
14	Salticidae	*Hasarius*	*adansoni*
15	Salticidae	*Menemerus*	*bivittatus*
16	Salticidae	*Myrmarachne*	*orientales*
17	Salticidae	*Plexippus*	*paykulli*
18	Salticidae	*Rhene*	*flavigera*
19	Salticidae	*Myrmarachne*	*plataleoides*
20	Tetragnathidae	*Leucauge*	*decorata*
21	Tetragnathidae	*Opadometa*	*fastigata*

Table 2: Minimum and Maximum Temperature (°C) From January To December 2022

Months	Minimum Temperature	Maximum Temperature	Average Temperature
January	16	29	22
February	19	33	26
March	24	40	32
April	29	44	36
May	31	43	37
June	29	38	33
July	24	29	26
August	24	30	26
September	24	30	26
October	21	30	25
November	16	31	23
December	17	31	24

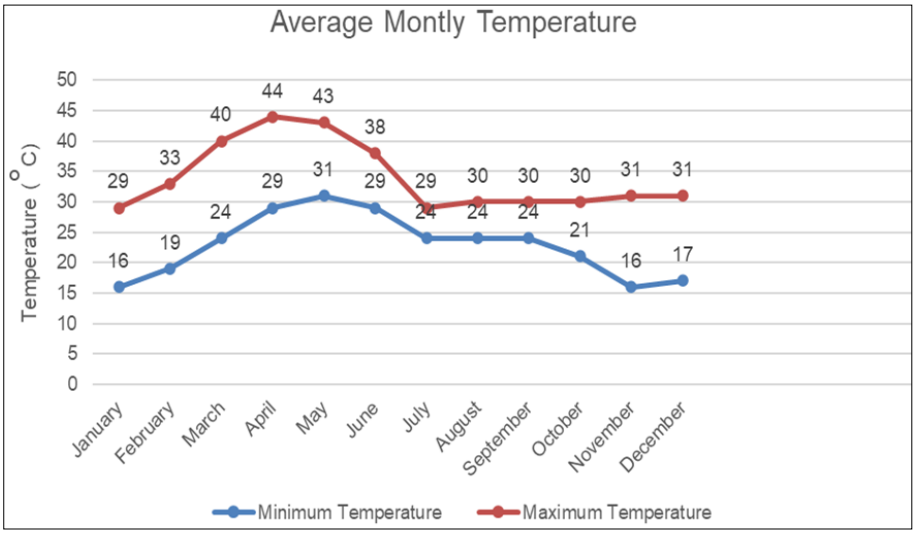


Fig 1

India – Maharashtra – Vidarbha – Chandrapur

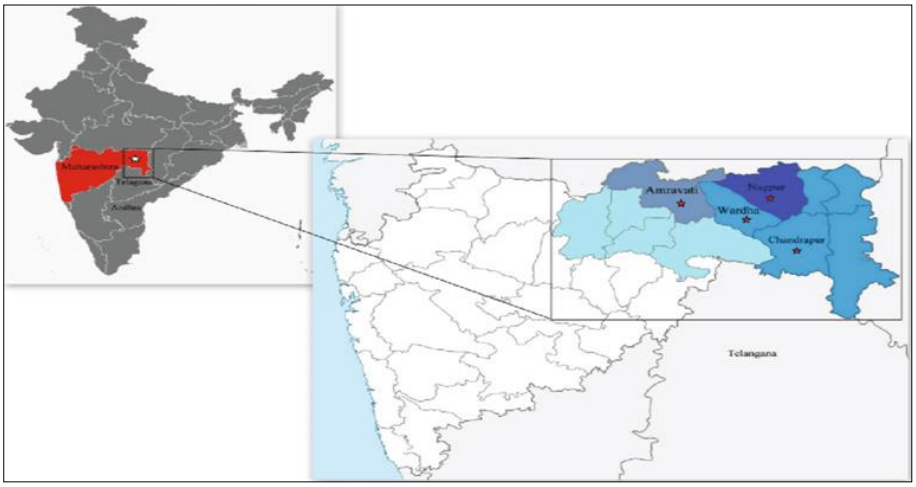
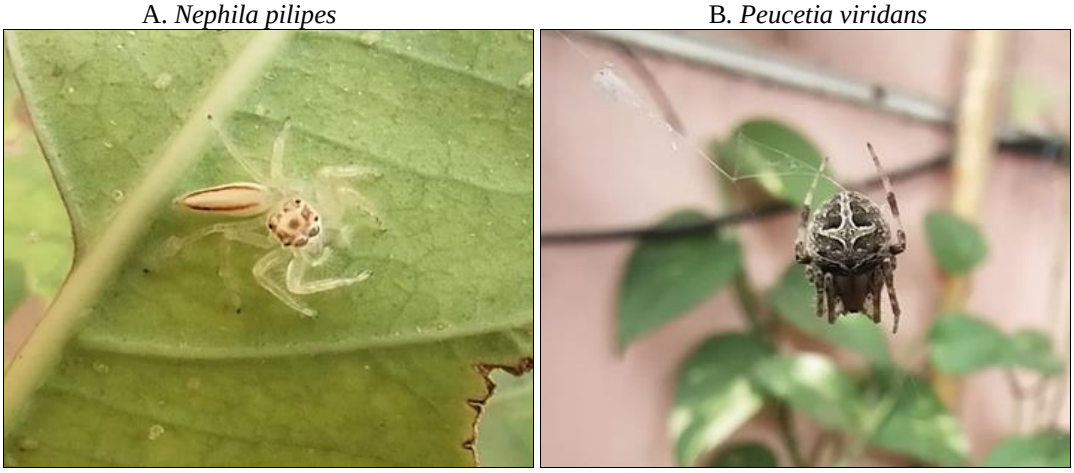


Fig 2

Fig 3

A. *Nephila pilipes* B. *Peucetia viridans*



C. *Neoscona crucifera* D. *Telamonia dimidiate*

Fig 4: Photographs of some Spiders species in Lohara, Chandrapur.

Conclusion

The present study would help in generating baseline data of these least studied groups of arthropods. A survey was carried out during January 2022 to December 2022 at three different sites in Lohara village near District Chandrapur. As the study was done in different seasons of the year in one year could verified the physiological and behavioral adaptations of spiders for survival in different climate. This would also help in the conservation of spiders. They also act as effective bio-control agents due to their non-specific feeding habits and hence are beneficial to crops and the economy of the region. And therefore spider consider as farmer's friend. Human had greatest impacts on spiders. The spider survey is useful to know the spider population in the given habitat. This information may serve as the baseline documentation for future studies in Maharashtra.

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