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Rapid survey of spider diversity at Piplaidevi forest range, Dangs, Gujarat

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Abstract
Present study documented rapid survey of spider diversity of natural wild mango forest of Chinchali, Pipaladevi forest range of Dangs district, Gujarat, during December 2016. The species were identified using keys of Indian spiders from Tikader, (1987); Tikader (1977); Platnick, (2014). This is a first attempt to record Spider diversity of Natural wild mango forest of Chinchali. Collection method included visual searching, vegetation beating, hand picking during line transects. A total of 31 species belonging to 14 families was reported from the forest area.

Keywords: spiders, dangs, wild mangos, chinchali

Introduction

India has rich flora and fauna with research concentrated on higher faunal species and less number of study on invertebrates and further, study on spider is restricted to few parts of the country. Spiders come under Araneae order which is one of the largest orders in animal kingdom and is one of the most diverse groups of invertebrate organism. Moreover, spiders play significant roles in regulation of insects and other invertebrate populations in most of the ecosystems of the world (Patel *et al*. 2001) [6]. Worldwide 45,557 spider species are described (Uniyal *et al*. 2011) [12], about 1686 species described in India (Keswani *et al*. 2012) [4] and 266 species recorded from Gujarat state (Silwal *et al*. 2003) [5].

Studies on habitat specificity of spiders demonstrated that there is correlation between structural complexity of habitat and species diversity (Hawksworth and Kalin-Arroyo 1995) [3]. Diversity generally increases when a more variety of habitat types are present (Ried and Miller 1989) [8]. Structurally more complex shrubs can support a more diverse spider species (Uetz 1991) [11]. Thus, documentation of spider diversity of ecosystem can provide important information to justify habitat quality and conservation values of ecosystem.

Present study deals with rapid survey of the diversity of spiders at Chinchali, Pipaladevi range forest of Dangs and it is the northern extremity of Western Ghats. Moreover, this forest has good diverse flora and fauna which are the part of the Tropical moist deciduous forest of Dangs district. However, the study on the invertebrate fauna of the district is very limited and scattered and the present study would add value to the existing literature.

Study Area

The present study was carried out at Pipaladevi forest range of Dangs, Gujarat, during December 2016. This forest receives heavy rainfall and classified as South Indian Moist Deciduous Forest (38%) and Southern Dry Deciduous Forest (58%). The Dangs forests fall in the bio geographic zone 5 "Western Ghat", under biotic province 5A "Malabar Coast" and 5B "Western Ghat Mountains"

The study site is situated between 20^0 42'-20^0 45' N and 73^0 48'-73^0 57' E (Fig.1), nearby Chinchali village of Dangs district, Gujarat. The uniqueness of the site is the presence of natural wild Mangoes growing in the slopes of the mountain range. These mangoes are present in a belt of 10 km of total 7 forest compartments (Table-1) from Gadded to Chinchilla village. The Piplaidevi range lies in the southernmost part of the North Dangs. The mountain ranges are rugged and lie in continuation to Sapura mountain range. The climate is tropical with three distinct seasons, monsoon (June to October), winter (October to February) and summer (March to June). The maximum temperature of the area ranges from 340 C to 370 C with minimum temperature varying from 140 C to 180 C. April and May are the hottest month of the year. The rainfall ranges from 1600 to 4700 mm. Surveyed areas are given in table 1.

Table 1: Description of compartments for present study

Compartment Number	Are Ha)	Characteristics
83	219.18	Wild mango trees present along with agricultural fields.
220	203.84	Mango trees dominate the area
221	229.14	Mango trees interspersed with grasslands in some open area.
222	251.39	Mixed forest, mango in the upper strata and herbs in the lower strata.
223	188.42	Mixed forest, mango in the upper strata and herbs in the lower strata
224	281.63	In this compartment, mangoes are growing in patches and intermingled with agricultural fields. The other associated trees included *Terminalia chebula* and *Terminalia behada*.
225	239.16	In this compartment, mangoes are growing in patches and intermingled with agricultural fields. The other associated trees included *Terminalia chebula* and *Terminalia behada*.

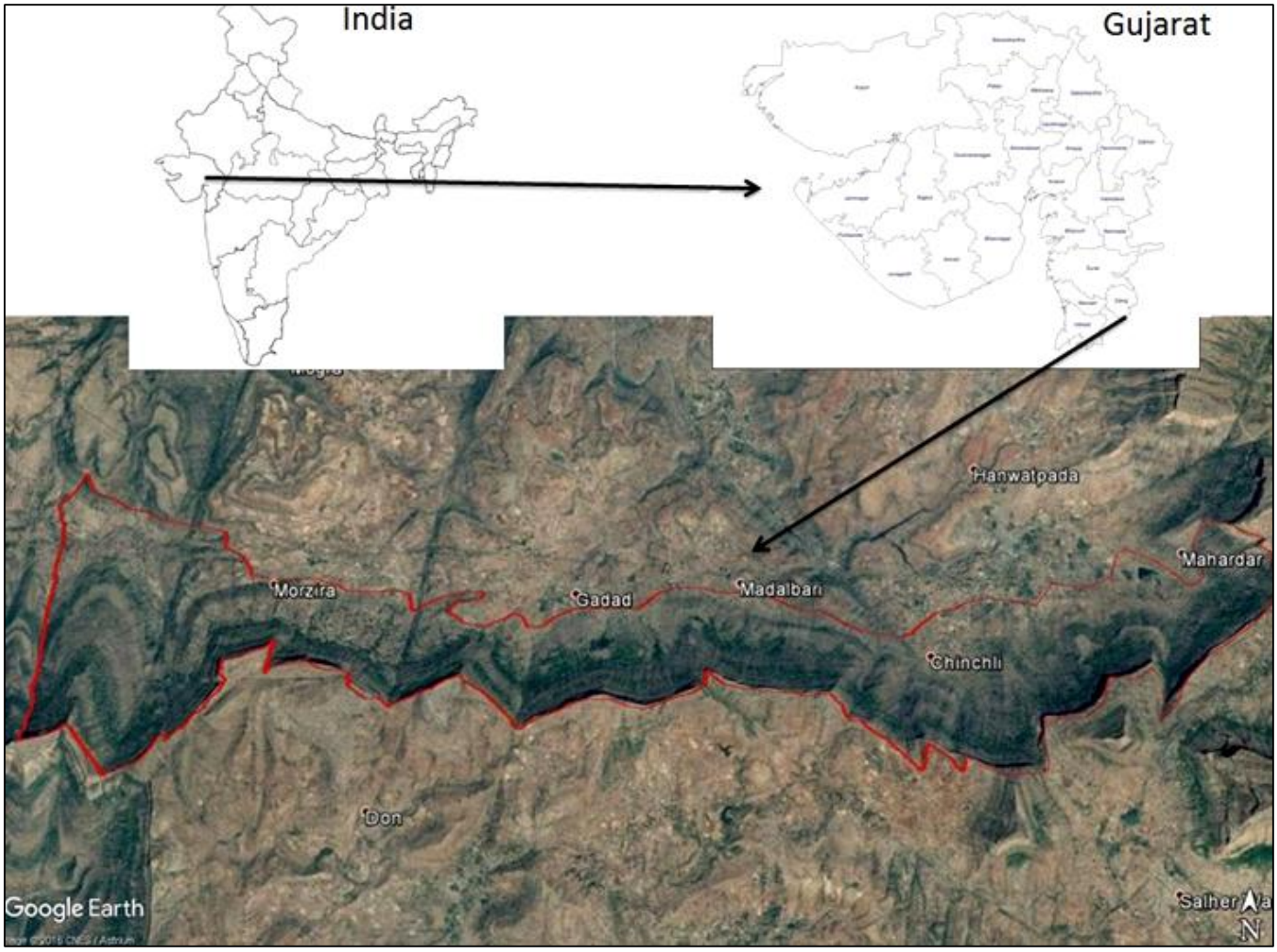

Fig 1: showing the study area

Methodology

All types of habitats mentioned above were surveyed and included dense mango forests patches, teak plantations, grasslands, streams, cultivated fields, fallow lands and human dwellings. A total of 7 sapling sites (one transect in each forest compartment) were selected to lay random line transects (Each of around 1 Km.). One hour was spent in each transect. Spiders were searched thoroughly in all probable microhabitats *e.g.* under stones, dead leaves, bushes, branches of tree, near water bodies, tree and tree trunks during every line transect. Unnecessary collection was avoided by noting down and identifying common spider species in the field. Species, which were difficult to identify in the field were collected in a bottle and preserved in 70% ethyl alcohol and labelled with sample number, date of collection, transect number and other remarks. To avoid contamination, alcohol in all the bottles was changed once in the laboratory. Collected specimens were identified after detailed microanalysis under LAMONED™ CSM2 stereomicroscope with help of standard literature (Tikader, 1987; Tikader 1977; Platnick, 2014) [10, 9, 7].

Result and Discussion

Study areas provide diverse habitat to various spider species. There are total 31 species belonging to 14 families (Table 2) of spiders. The most dominated family was Araneidae 26% (8 species) followed by Lycosidae and Tetragnathidae 13% (3 species), Pholcidae 10% (3 species), Scytodidae and Thomisidae 7% (2 species) and Eresidae, Linyphiidae, Oecobiidae, Oxyopidae, Philodromidae, Pisauridae, Salticidae, and Uloboridae 3% (1 species) (Fig 2). Out of 31 species, type of species of spiders, 61% were foliage weaver, 23% were foliage hunter, 10% were ground hunter and 6% of ground weaver (Fig.3).

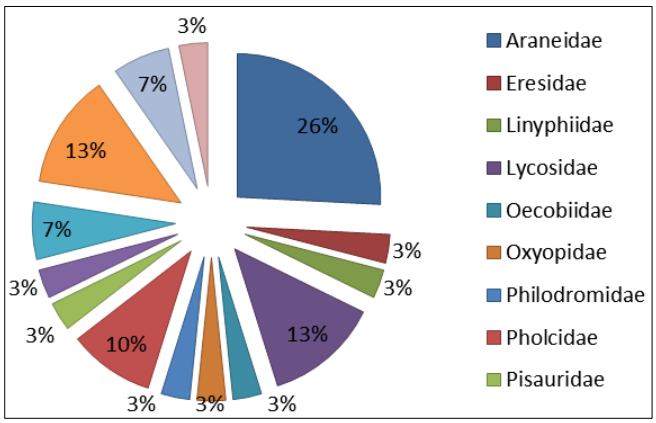

Fig 2: Occurence of Family

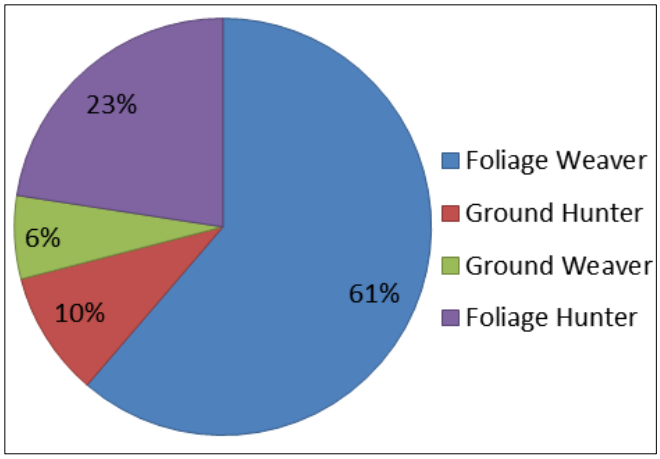

Fig 3: Habit of Spiders

Occurrence of high numbers of Araneids (Orb-weaver) could be due to close spacing of tree individuals, provided congenial habitat to build webs of different sizes to trap food. Second highest numbers of Lycosidae (Wolf spider) family which is ground hunter; known to make funnel type webs on ground to trap its food and protections from predators. The rocky strata and low soil moisture provided the apt habitat for this group of spiders. Third was Tetragnathidae (Long jawed orb weaver) family, members of this family is known to build webs around the streams with vegetation and the same habitat was reported in the present survey. Because of the complex interaction of various climatic factors like rainfall, temperature, availability of water source nearby this area may holds many smaller but diverse environmental niches (Wankhade *et al*., 2012) [13].

The results indicate that the area harnesses rich spider diversity representing varied habitat and more intensive and in depth studies may yield more information about the diversity of spiders in this area.

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Fig 4: Nephila maculata

Fig 5: Nephila pilipes

Fig 6: Lycosa mahabaleshwarensis

Fig 7: Hippasa Sp

Table 2: List of Spiders of Wild mango forest of Chinchali, Dangs

Sr. No	Family	Species	Habit
1	Araneidae	Argiope anasuja (Thorell)	FW
2		Cyclosa Sp.	FW
3		Cytrophora cicatrosa (Stoliczka)	FW
4		Cytrophora citricola (Forskal)	FW
5		Gasteracantha hasseltii (C.L.Koch)	FW
6		Gasteracantha sp.	FW
7		Neoscona mukerjei (Tikader)	FW
8		Neoscona theisi (Walckenaer)	FW
9	Eresidae	Stegodyphus sarasinorum (Karsch)	FW
10	Linyphiidae	Linyphia sikkimensis (Tikader)	FW
11	Lycosidae	Hippasa pisaurina (Pocock)	GW
12		Hippasa sp.	GW
13		Lycosa mahabaleshwarensis (Tikader & Malhotra)	GH
14		Pardosa birmanica (Simon)	GH
15	Oecobiidae	Oecobius putus (Cambridge)	FW
16	Oxyopidae	Oxyopes shweta (Tikader)	FH
17	Philodromidae	Tibellus elongatus (Tikader)	FH
18	Pholcidae	Artema atlanta (Walckenaer)	FW
19		Crossopriza iyoni (Blackwall)	FW
20		Pholcus sp.	FW
21	Pisauridae	Pisaura gitae (Tikader)	FH
22	Salticidae	Plexippus paykullii (Audouin)	GH
23	Scytodidae	scytodes sp.	FH
24		Scytodes thoracica (Latreille)	FH
25	Tetragnathidae	Leucauge decorata (Blackwall)	FW
26		Leucauge tessellata (Thorell)	FW
27		Nephila maculata (Fabricius)	FW
28		Nephila pilipes (Fabricius)	FW
29	Thomisidae	Thomisus cherapunjeus (Tikader)	FH
30		Thomisus sp.	FH
31	Uloboridae	Uloborus khasiensis (Tikader)	FW

FW= Foliage Weaver, FH= Foliage Hunter, GW= Ground Weaver, GH= Ground Hunter

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