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## **FIRST REPORT OF WHIP SPIDER *PHRYNICUS PHIPSONI* POCOCK FROM THE HUMAN HABITATIONS AND PROTECTED AREAS OF GOA STATE, INDIA; WITH NOTES ON ITS HABITS AND HABITAT**

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### **INTRODUCTION**

Arachnids have not received the attention that they deserve from taxonomists, despite the fact that the Indian subcontinent supports a rich Arachno-faunal diversity. In absence of recent exploratory surveys, the monumental work of the early workers continues to retain its importance as exemplified by Pocock's classic work, dating back to last century. Comprising the largest of the Chelicerate classes, arachnids are generally not so easily understood and appreciated. Further, forms such as the whip spiders continue to be seen with awe, due to their strange look, habits and secretive habitats. Pocock's bifurcation of the whip spiders and whip scorpions into orders Amblypygi and Uropygi respectively was unified under a single order Pedipalpida by Werner (1935). As for this order, there is a paucity of updated information at least for the Indian region. Presented here is the range extension, only a fifth record since *Fauna of British India* (Pocock, 1900) and the first definitive record of the whip spider, *Phrynicus phipsoni* from the state of Goa. Interestingly, it is also the first case on record, of their presence from human habitations in India.

### **METHODOLOGY**

The data presented here is a part of the long-term fieldwork on Arachno-faunal diversity of Goa, largely focused on 2 of its talukas, viz. Salcete and Sanguem. Though both these differ in geography; the former having a coastline and the latter being in the hinterland, the specific locations of sightings in the two places share common latitude. Pre-surveyed localities were visited at

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fortnightly intervals all throughout the year for gross evaluation of habits and habitat of the pedipalps under study. Careful observations were recorded on the hygro-thermal character of microhabitat, nature of substratum, associated flora and fauna and behaviour. Sightings were supported with geographical positioning system (Etrex Garmin 12 Channel GPS). A single specimen was collected from the human habitations for examination of meristic and spination characters, to confirm the species identity. Similarly, the epigyne was dissected out, cleared in 50% lactic acid and examined under stereomicroscope (Model CZSMX). The meristic characters are as given in Table 1.

**Table 1. :** Meristic character in the collected species of *Phrynicus phipsoni*.

Parts of appendages	Pedipalps (mm)	1 <sup>st</sup> leg (mm)	2 <sup>nd</sup> leg (mm)	3 <sup>rd</sup> leg (mm)	4 <sup>th</sup> leg (mm)
Trochanter	06.75	5.00	4.00	4.50	5.00
Femur	32.50	26.00	16.50	16.75	15.00
Patella	40.40	02.10	02.75	02.25	02.25
Tibia	07.50	40.25 (32 digits)	–	–	–
Basitibia L.	–	–	16.50	17.00	16.00
Distitibia L.	–	–	08.00	08.25	09.00
Metatarsus	–	–	04.25 (Ex.)	04.75 (Ex.)	04.75 (Ex.)
Tarsus +	05.00	44.75 (65 digits)	04.00 (Int.)	04.25 (Int.)	04.25 (Int.)
Protarsus (Interior)	08.75	–	–	–	–
Protarsus (Exterior)	07.00	–	–	–	–
<b>Total length</b>	<b>107.90</b>	<b>118.10</b>	<b>56.00</b>	<b>57.75</b>	<b>56.25</b>

### OBSERVATIONS AND DISCUSSION

There has been no serious attempt made so far to inventory the terrestrial invertebrates of the state of Goa and hence a comprehensive list of any of these groups is not available. This limitation had been cited in the report on Goa state biodiversity strategy and action plan (GBSAP, 2002). Against this background, there was a complete paucity of information on Arachno-faunal composition of this state until recently. Borkar *et al.*, (2000) presented their preliminary observations on the spider fauna of one taluka of the state. In course of these observations range extensions were also reported; and in some cases, first reports of interesting Arachnids were made. A case in

point is that of Amblypygid *Phrynicus* species, whose range until then had not been reported beyond Maharashtra, in Western India in the north and Kerala and Karnataka in south. Three years after the genus *Phrynicus* was reported by Borkar *et al.*, (2000) from Salcete taluka of Goa, a habitat supporting small population of affiliated species of this genus was located from the protected areas of the state. Species level taxonomy of the individuals from both these places confirmed these individuals to be *P. phipsoni*.

Amblypygids are elusive arachnids with mysterious habits and habitat that have largely escaped the attention of even keen field biologists. Commonly known as whip spiders, they are generally confined to dense and humid forest patches, living their secret lives either in rock crevices, beneath tree trunk, termite mounds, or tree stumps, beneath the peeling bark, subject to availability of moisture. Their sightings become progressively difficult with the cessation of rains. Though perusal of literature does not throw any light on their preferred periods of activity, they are nocturnal and a peak of intense activity can be witnessed at late hours past midnight. They are relatively solitary in existence, though in some cases we have observed even up to 15–20 individuals of fairly uniform size assembled on a single tree trunk; a sight so commonly witnessed during the early monsoons in some dense forested areas of Goa, where the hygro-thermal profiles encourage these strange creatures to move in a relative openness of their microhabitat.

Difficult to notice at the first sight, the whip spiders camouflage very well on the surface of rough moss infested wet tree trunks on which they remain still. Even when they share the common microhabitat such as a single tree trunk or the incavings of mud embankment, the conspecifics maintain disciplined distance from each other and have a common orientation along the vertical axis. Individuals are normally seen with retracted pedipalps that move in horizontal plane, folded at joints. The first pair of antenniform legs that measure a little less than thrice the length of carapace is fully extended; and sometimes moved in front and side ways probably as feelers. When alarmed, individuals straighten out the pedipalpi and maneuver their associated spines in clapping motion. It has been our observation that in case of extreme intimidation, the animal raises itself above the substratum and makes a sudden dash sideways in a very erratic fashion to confuse the intruders.

Barring the western ghat stretch, where vegetation is tropical evergreen, the rest of the state holds a cover of moist deciduous vegetation. The species has adapted itself to both these vegetation types.

Hitherto there had been no reports from any part of India where, *P. phipsoni* has been an associate of human habitation, however whip spiders have been sighted by us and at times collected from the mud-plastered walls of old and abandoned houses in Goa. Reliable individuals in such areas vouch for having witnessed their domestic cat playing with these strange “spiders without silk” Gravelly (1915) records similar observations on *Phrynicus lunatus* met within the human habitation in Sri Lanka. In the protected areas of Goa, molts of these animals are commonly seen

within, and in the vicinity of forest cottages. In some instances, the specimens were sighted in moist tree hollows. In such places as well, they tend to be less secretive and come out in the open during the monsoon. Excessive moisture during the rains drives them out of the hiding places, and probably this explains their occurrence in human habitat in this season.

On 20<sup>th</sup> Oct. 2002, in course of our routine nocturnal surveys for Amblypygids in the protected areas of Molem range, we encountered seven large specimens on a single surface totaling about 12–13 mts<sup>2</sup> with an average height of 3 mts above the ground level. The location was in cavings of an embankment along the forest path 50 mts from a flowing stream (Fig. 1). The GPS reading was N 15°23'58.8" lat and E 74°15'37.7" The embankment comprised of Red loam with interspersed basalt sand stone. The humidity was over 92% with a temp range of 27–30°C. The soil also had very high moisture content. The specimens settled at an average height of 94 cms from the ground level (see Fig. 2). The arboreal flora in this region comprised of *Macaranga peltata* (Roxb.) Muell-Arg., *pentagyna* (Roxb.), *Bambusa arundinacea* (Retz.) Roxb., *Careya* Roxb., *Terminalia crenulata* Roth, *Terminalia paniculata* Roth. Similarly, the shrubs comprised of *Leea indica* (Burm. F.) Merr., *Calcopteris floribunda* (Roxb.) Poir, *Carvia callosa* (Ness.) Bremek., *Ixora coccinea* L., *Helicteres isora* L., *Calamus pseudotenuis* Becc. Ex Hook f. Herbs and climbers are represented by *Adiantum* sp, *Selaginella* sp, *Cissus discolor* B1., *Desmodium triangulare* (Retz.) Merr.

These embankments are also shared by relatively interesting fauna such as anuran *Ramnella* sp. (Fig. 3) and banded rock Gecko *Cyrtodactylus dekkansensis* (see Fig. 4). Interestingly, *Ramnella montana* is also an associate of *Heterometrus* species of scorpions in Canacona taluka of Goa (Unpublished data). Such associations may lead one to speculate on the possibility of trophic relationship; as for instance *Pocelotherus regalis* actually feeds on Geckos (personal communication). Incidentally, we observed one adult whip spider in possession of a tiny frog on the floor of a human dwelling. It had sunk its chelicerae into the trunk of the frog, its left pedipalp holding the head whereas the right one having firmly seized the left leg of the frog. However, we could not make further observation as the whip spider quickly moved to the safety of its seclusion in a crevice. Further, it may be pertinent to put on record that one of our night trails in protected areas of Molem range in the month of January, we came across whip spider nibbling at the molt of a rat snake. The feeding habits of the whip spiders are indeed an area of investigation requiring more inputs.

We have also observed thelyphonids on these embankments and these are being separately reported. Whether these associates have any ecological relationships with whip spider, or that it is an assemblage promoted by similar requirements of microhabitat warrants detailed investigations. A recent study conducted by Lamabam and Samant (2003) has brought on record a rich spectrum of Arachno-fauna from the Bhagwan Mahavir Sanctuary and Molem National park of Goa. Rough estimates reveal the presence of at least 28 families of order Araneae in this region; detailed work is in progress.

The collected specimen tallies very well with gross morphometric characters recorded for *Phrynicus phipsoni* by Bastawade (1995). The identification of the present specimen was confirmed by detailed stereomicroscopic examination of morphology and epigyne character. Stereomicroscopic examination of internal genitalia revealed a pair of somewhat rounded and distally invaginated gonopods riddled with few minute pores and striations. Also, a distinct ridge runs along the anterolateral edge of each gonopore. Further, each gonopore is laterally flanked by a somewhat triangular plate (see Fig 5). Recently Harvey and West (1998) have revised the genus *Charon*; with emphasis on structure of the genitalia, which they opine is of extreme importance in taxonomy of amblypygids.

The specimen observed by us collected from Goa only differed in respect of their size when compared with those reported by Bastawade (1995). The matured female examined measured 28 mm in its total length; with cephalothorax 9.50 mm in length and 18 mm in width and the abdomen 19 mm long. The measurements of the appendages are given in Table 1. The molts of these specimens were collected in large numbers in late July. The empty exoskeleton on closer examination revealed that molting is facilitated by precise splitting of carapace all along its circular margin, which then opens up and remains attached like a lid only at innermost point of posterior concavity in the pars thoracic region. The abdominal tergal shield was lacking in all of the molts. The freshly molted specimen is milky white in colour. One such specimen was observed to display change in colour from milky white to grayish green until it stabilized on greenish brown shade, very close to that adorned by adult. Efforts are being made to record the reproductive behavior under natural as well as laboratory conditions.

Currently the oriental species of Amblypygids are classified under two distinct families, on the basis of differences in dimension of their sternal plates and presence and absence of pulvillus on the posterior tarsal segment of legs. Perusal of literature reveals that not much has been written on Amblypygids after the monumental work of Pocock (1900), who is credited with the earliest record of Amblypygids from the Bombay region. Thereafter the only collections on record are from Sanjay Gandhi National Park Borivli, Mumbai and North Arcot district of Tamil Nadu. Bastawade (1995) has reported the recent collections from the Western Ghats of Sindhudurg district, Maharashtra. These specimens have been redescribed and identified to be females of *Phrynicus phipsoni* (Pocock). Many workers (Gravely, 1915; Mulenex, 1975 and Quintero, 1381) have recognized oversimplification of species level taxonomy in this group. In the light of the prevailing confusions, revisionary work is imminent in taxonomy of Indian forms.

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