MONOGRAPH

Litter and ground dwelling spiders (Araneae: Arachnida) of reserve forests of Dooars, West Bengal

Dinendra Raychaudhuri
Sumana Saha

2017
ABSTRACT

Litter, one of the forest habitats includes the layer of dead plant materials present on soil surface, comprising the surface litter (L-layer), the partially decomposing layer beneath it (F-layer) and the humus layer (H-layer). It plays a major role in the transfer of energy and nutrients in the forest ecosystem; litter fall data is often used to predict the productivity of ecosystem. The natural forest litter, surface and associated ground with its floral diversity and specialized micro niches support a variety of macro and micro arthropods including spiders through variations in moisture, cover materials, litter depth and structure. A strong correlation between species diversity of ground dwelling spiders and litter habitat is thought to exist because habitat affects spiders through prey availability, temperature fluctuation, moisture content and harborage. Ecological importance of spiders is undeniable as they are abundant predators of other forest litter arthropods. Globally people are laying emphasis on the studies of litter and ground dwelling spiders while India is yet to jump into. It is believed that the monograph is the first comprehensive study on the forest litter and ground dwelling spiders of the reserve forests of Dooars, West Bengal, India.

Keywords: Litter & Ground dwelling Spiders; Taxonomy; Distribution; Reserve Forests Dooars; West Bengal; India
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1.0. PREFACE

Spiders are among the oldest, most omnipresent and numerous predators in both agricultural and natural ecosystems. They are easily characterized by two main body parts, viz. cephalothorax and abdomen, joined by a narrow pedicel, 4 pairs of jointed legs, 6-8 simple eyes and 4-6 spinnerets.

Spiders have established themselves as a model organism in biochemical (for silk and venom proteins), behavioural (for sexual and web building) and ecological (for foraging, prey-predator interaction and IPM) research. They are also utilized as ecological indicators in many terrestrial communities.

Appreciating the bioresource value of spiders, the present work is first of its kind to deal with the litter and ground dwelling spiders of Gorumara National Park (GNP), Chapramari Wild Life Sanctuary (CWLS), Jaldapara Wild Life Sanctuary (JWLS) and Buxa Tiger Reserve (BTR), West Bengal, India. The work embodies taxonomic account and distribution of the species recorded from different ranges of these reserve forests.

The monograph starts with an Introductory section where the importance of the litter and ground dwelling spiders and the area of study are discussed. The next section deals with the Collection and Preservation procedures, Identification of spiders, their General Morphology and Terminology and Abbreviations used.

Taxonomic part includes the detailed account of the diagnostic characters and keys for the families, genera, and species. However, the well known species have not been redescribed but have been suitably illustrated and keyed. Additionally as a suffix to each family a note on the biology is also given. This is followed by Distributional Pattern of the spider taxa, Discussion, Summary and Literature cited.

A total of 89 species under 38 genera and 13 families are dealt with. Of these one species is new to the world, one from the country while 7 from the state. Thirty eight species are reported as endemic to India.
2.0. INTRODUCTION

One of the major terrestrial ecosystems is forest, which may be characterized by wild flora and fauna, with natural soil conditions and they are not associated with agricultural practices (Speight and Wylie, 2001). Forests account for almost 30% of the earth’s total land areas. India has 2% of the Worlds’ forests, but supports 15% of world population (Sharma, 1992).

Litter is one of the habitats of forest that includes the layer of dead plant materials present on soil surface, comprising the surface litter (L-layer), the partially decomposing layer beneath it (F-layer) and the humus layer (H-layer) (Ananthakrishnan, 1996). It plays a major role in the transfer of energy and nutrients in the forest ecosystem; litter fall data is often used to predict the productivity of ecosystem (Tokya and Singh, 1983).

The natural forest litter, surface and associated ground with its floral diversity and specialized micro niches support a variety of macro and micro arthropods including spiders through variations in moisture, cover materials, litter depth and structure. A strong correlation between species diversity of ground dwelling spiders and litter habitat is thought to exist because habitat affects spiders through prey availability, temperature fluctuation, moisture content and harborage (Uetz, 1975: Satpathi, 2004). Despite their size, ecological importance of spiders is undeniable as they are abundant predators of other forest litter arthropods (Platnick, 1995; Ananthakrishnan, 2010; Foelix, 2011).

2.1. Litter and Ground dwelling spiders

Arthropods include spiders within the order Araneae under the class Arachnida. They are characterized by two main body parts viz. cephalothorax and abdomen, joined by a narrow pedicel, 4 pairs of jointed legs, 6-8 simple eyes and 4-6 spinnerets. The spiders (Araneae) are divided into two suborders –

(i) Mesothelae includes the only family Liphistiidae, which can be distinguished from more evolved spiders by the presence of abdominal plate; and

(ii) Opisthothelae divided into two infraorders – (a) Mygalomorphae and (b) Araneomorphae (Platnick, 1995). They are separated by the direction of their fangs open. Mygalomorphs’ fangs open forward, whereas Araneomorphs’ fangs open to the side.

Dondale (1979) estimated that around 1, 20, 000 species of spiders occur world-wide, out of which World Spider Catalog (2016) by Natural History Museum Bern listed 46,381 species belonging to 4027 genera under 113 families i.e. nearly $1/3$ of the total fauna has so far been named. Compared to the global scenario, India appears to be rich in spider biodiversity as nearly $1/2$ of the higher taxa and $1/25$ of the lower taxa are known to occur (Siliwal et al., 2005; Sebastian and Peter, 2009; Keswani et al., 2012).

There is also evidence that density, behaviour and population dynamics of spiders act to stabilize terrestrial arthropod populations (Turnball, 1973). Beside these, their products such as silk and venom are of immense value. Current research in spider silk involves its potential use to replace Kevlar and to make various items like bullet proof clothings, light weight clothings, parachutes, surgical threads etc. (Hinman et al., 2003). Spider venom is now being
used as pesticides (King et al., 2002); its active protein component is also used as drugs that prevent atrial fibrillation during cardiac failure (Bode et al., 2002).

They enjoy a wide variety of habitats within a terrestrial ecosystem viz. on ground, nests in ground, trees, holes under stones, barks, litter, from low land to higher mountains. Some like Dolomedes sp. may even remain under water for some time (Kumar et al., 1999).

Mostly, studies on spiders throughout the World are done on agricultural and forest ecosystems. Recent studies (Dorris et al., 1995; Fassbender, 2002; Joseph and Christopher, 2010; Jung et al., 2008; Larrivee et al., 2008; Oxbrough et al., 2007; Pajumen et al., 2006) indicate that globally people are laying emphasis on litter and ground dwelling spiders. Contrarily, studies in India conducted so far did not address forest litter and ground dwelling spiders.

Spiders generally have humidity and temperature preferences that limit them to areas within the range of their “physiological tolerances” which make them ideal candidates for land conservation studies (Reichert, 1974).

Therefore, documenting spider diversity patterns in reserve forests of Dooars can provide important information to justify conservation of relict stands of those ecosystems.

It focuses on the little-studied forest types and provides data about species that are present. It also emphasizes the need for conservation of forest remnants by characterizing species diversity and highlighting rare and endemic species in the reserve forests.

It is believed that the programme envisaged is the first comprehensive study on the forest litter and ground dwelling spiders of the Indian reserve forests.

2.2. Area (Pls. I-VIII):

‘Dooars’ lying along the foothills of the Himalayas in the North Bengal, stretches from the river Teesta on the west to the river Sankosh on the east. ‘Dooars’ is derived from ‘Doors’ (doors to Bhutan). This region also forms the gateway to the hill station of West Bengal, Sikkim, Bhutan and North-Eastern States of India. Major part of Dooars is in the district Jalpaiguri and rest in Coachbehar district. It is characterized by 181 tea gardens (spread over 1, 18,701.6 hec.), alpine landscape, transparent rivers and 4 reserve forests (spread over 1, 73,103 hec.) [Anonymous, 1394 (1987)]. It is limited between 26°16’ - 27°00’ (North) latitude and 88°04’ - 89°53’ (East) longitude. All the reserve forests fall under the biogeographic province 7B Lower Gangetic Plain (Rodgers and Panwar, 1988). The 4 reserve forests of the area are:

Gorumara National Park (GNP) (Pl. II) - It is situated in the submontane terai belt of the Eastern Himalayas. The park is on the floodplains of Murti and Jaldhaka rivers of Jalpaiguri. The forest is between the latitudes 26°42’N & 26°7’N and longitudes of 88°48’E & 88°8’E, with an area of 79.99 sq. km. It includes 2 ranges namely South Range and North Range. The floral assemblages are terai grassland, interspersed with riverine forests, dry mixed forests, wet mixed forests, sal forests and tall riperian grassland of Phragmitis, Alpinia, Typha, etc. Highland contain almost pure sal crop with a mixture of bahera, odal, jaman, lali etc. whereas lowland riverine forests contain simul, siris, khair etc. The forest is equally rich in orchids. The forest has nearly 50 species of mammals, 193 species of birds, 22 species of reptiles, 7 species of fishes and other macro and micro fauna. These include Indian one horned rhinoceros, Indian elephant, gaur (Indian bison), leopard, Malayan giant squirrel, wild
pig, sambar, barking deer, pigmy hog, hog deer etc. The park also harbours rich plethora of arthropods (Anonymous, 1996; Anonymous, 2005).

**Chapramari Wild Life Sanctuary (CWLS)** (Pl. III)- The Sanctuary is located just north to Gorumara National Park with a forest area of 9.6 sq. km., bounded by the river Neora on one hand and on the other Bamni and Murti rivers. The floral assemblages are terai grassland, interspersed with riverine forests, dry mixed forests, wet mixed forests and sal forests. Common species are *Aphanamixis*, *Polystachia*, *Pomifera*, *Terminalia belerica*, *Malattus* spp., etc. Major fauna of the Sanctuary are Indian one horned rhinoceros, Indian elephant, gaur, leopard, wild pig, sambar, barking deer, rhesus macaque etc. There is large concentration of birds and arthropods (Anonymous, 1996).

**Jaldapara Wild Life Sanctuary (JWLS)** (Pls. IV-V)- The sanctuary situated in the Alipurduar subdivision of Jalpaiguri, between the latitudes 25°58'N & 27°45’N and longitudes 89°08’E & 89°55’E with an area of 216.51 sq. km.. The forest tract is more or less flat with a gentle slope from north to south and is bathed with number of perennial streams. The average altitude of the area is 76 meters above mean sea level. The rivers Malangi and Torsa flank the east and west of the sanctuary respectively. It includes 7 ranges namely East, West, North, South, Chilapata, Kodalbasti and Nilpara, each having its respective beats. Major part of the sanctuary bears riverine forests interspersed with an extensive belt of tall grasses of about 20 species (Anonymous, 1997). It also contains mixed deciduous forests with following trees mainly khair, siso, simul, sidha, bahera, gamar, sal etc. Major fauna of the forest include the Indian one horned rhinoceros, gaur, elephant, crested eagle, fishing eagle, swamp deer, hog deer, spotted deer, barking deer, leopard, pig etc. It is also very rich in varied population of reptiles, birds, fishes.

**Buxa Tiger Reserve (BTR)** (Pls. VI-VIII)- Buxa Tiger Reserve lies in Alipurduar subdivision of Jalpaiguri in between the longitudes 89°25’E & 89°55’E and latitudes 23°30’N & 23°50’N with a huge forest area of 760.87 sq. km. (Anonymous, 2002). Its northern boundary runs along the international border with Bhutan. The Sinchula hill range lies all along the northern side of BTR and the eastern boundary touches that of Assam. National Highway No. 31C roughly runs along its southern boundary. It is the eastern most extension of extreme bio-diverse area of the state and represents highly endemic Indo-Malayan region. The Phipsu Wild Life Sanctuary of Bhutan is contiguous to north of BTR and Manas Tiger Reserve lies on its east. Thus, it serves as international corridor for elephant migration between India and Bhutan. The forest is divided into 2 divisions namely East and West. Each division has 7 ranges with respective beats. Important rivers are Rydak and Sankosh and their innumerable tributaries have passed through this virgin forest.

The fragile "Terai Eco-System" constitutes a part of this Reserve and encompasses as many as eight forest types such as i) Riverine forest, ii) Dry mixed forest, iii) Wet mixed forest, iv) Evergreen forest, v) Malate forest, vi) Plateau forest, vii) Hill forest and viii) Savannah (now replaced by Sal plantation). More than 300 species of trees, 250 species of shrubs, 400 species of herbs, 9 species of cane, 10 species of bamboo, 150 species of orchids, 100 species of grass and 130 species of aquatic flora including more than 70 sedges (Cyperaceae) have been identified so far. The major flora of the area includes sal, teak, champa, chilauini, gamar, toon, siso, simul, khair, haritaki, bahera, mallotus, lampate, bamboo etc.
390 species of birds, 73 species of mammals, 76 species of snakes, 5 species of amphibians are so far been recorded. The major animals include the Royal Bengal Tiger, gaur, wild elephant, leopard, sloth bear, Himalayan black bear, wild pig, pigmy hog, hog deer, spotted deer, pangolin etc.

Attributes of the reserve forests are presented in the under mentioned table.

**Table 1.** Synoptic attributes of Gorumara National Park, Chapramari Wild Life Sanctuary, Jaldapara Wild Life Sanctuary and Buxa Tiger Reserve.

<table>
<thead>
<tr>
<th>Reserve Forests</th>
<th>Divisions</th>
<th>Ranges</th>
<th>Beats</th>
<th>Climate</th>
<th>Water Resources</th>
<th>Forest Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaldapara Wild Life Sanctuary</td>
<td>--------</td>
<td>East</td>
<td>Jaldapara, Malangi, Sissamara, Daidaighat</td>
<td>Temperature: Pre Monsoon-24-27 °C, Monsoon-27-37 °C, Post Monsoon-10-21 °C; Humidity: 75-95%; Rain fall</td>
<td>Malangi, Torsa</td>
<td>Riverine forests, Sal forests, Wet mixed forests, Semi-evergreen forest, Evergreen forest,</td>
</tr>
<tr>
<td>Region</td>
<td>Districts</td>
<td>(Annual):</td>
<td>Climate</td>
<td>Flora and Habitat</td>
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<tr>
<td>North</td>
<td>NWC, NEC, Siltorsa, 50 ft</td>
<td>382 cm.</td>
<td>Pre Monsoon: 22-27 °C; Monsoon: 23-30 °C; Post Monsoon: 6-19 °C; Humidity: 75-95%; Rainfall: 500 cm.</td>
<td>Savannah forest</td>
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<td>South</td>
<td>Salkumari</td>
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<td>Chilapata</td>
<td>Chilapata, CCLine, Mendabari</td>
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<tr>
<td>Kodalbasti</td>
<td>Hasimara (East), Hasimara (West)</td>
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<tr>
<td>Nilpara</td>
<td>Lankapara, Hollapara, Dalsingpara</td>
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<td>Bholka</td>
<td>Balapara, Barobhisha, Changmari, Ghoramara</td>
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<td>Buxaduar</td>
<td>Buxaduar, Buxaduar Road, Chunabhati, Santrabari</td>
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<td>Hatipota</td>
<td>Chunia jhora, Hatipota</td>
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<td>Jayanti</td>
<td>Bhutia Basti, Jayanti North, Jayanti South, Phaskhawa</td>
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<td>Kumaragram</td>
<td>Kumargram, Newlands, Sankosh</td>
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<td>North Rydak</td>
<td>Kartick, Lokenathpur, Moinabari, Rahimabad, Teamari</td>
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<td>South Rydak</td>
<td>Chipra, Marakhata, South Rydak, Uttar Rampur</td>
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<tr>
<td>West</td>
<td>East Damanpur</td>
<td>Cheko, DPO, Gadadhar</td>
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<tr>
<td>West Damanpur</td>
<td>Garam East, Garam West, Poro</td>
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<td>Hamilton-ganj</td>
<td>Barnabari, Bhutri, Godambari, Rangamati</td>
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<tr>
<td>Nimati</td>
<td>Nimati East, Nimati West, Poro West</td>
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<td>Pana</td>
<td>Adma, Gangutia, Pana, Raimatang</td>
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<td>East Rajabhat-khawa</td>
<td>Panbari North, Panbari South, Rajabhat-khawa South,</td>
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<tr>
<td>West Rajabhat-khawa</td>
<td>Rajabhat-khawa Central, Rajabhat-khawa North, Rajabhat-khawa West, Dima</td>
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</tbody>
</table>
3.0. MATERIALS AND METHODS

3.1. Collection and Preservation of spider samples (Pl. IX)

A sustained survey was conducted for the litter and ground dwellers spiders, during the period of May 2008 to September 2011 in different ranges of Gorumara National Park, Chapramari Wild Life Sanctuary, Jaldapara Wild Life Sanctuary and Buxa Tiger Reserve. Field visit was made in every month of any calendar year except from June 15 to September 15 when the forests remain closed for rejuvenation. While compiling the data, earlier contributions [made since 1993 by the senior colleagues of the laboratory] are also taken into account. Sampling was done by visual search, hand picking, Berlese funnel extraction (Wheeler and McHugh, 1987), aspirator, pitfall trap, leaf litter extraction, etc. Aspirator was used to collect small spiders. Berlese funnel extraction was used to separate spiders from litter and soil samples. For catching ground dwelling spiders, pitfall trap was applied.

Samples were killed and preserved as per recommendation of Tikader (1987), Barrion & Litsinger (1995) and Alfred and Ramakrishna (2004). The collected specimens were killed and preserved temporarily in 70% alcohol in a number of glass tubes, each with a definite sample number. Necessary field data for each of the samples were noted in the field note book. The spiders for relaxation of their body muscles were transferred to a petridish filled with 70% alcohol and kept in this way for about 2-3 hours, after covering the petridish with another. Stretching of the body parts viz. legs, pedipalps etc. was the next step of approach using fine brush, forceps, needles etc. The spiders were then permanently preserved in the specimen vial containing Audeman's preservative [70% alcohol (87 part): Glycerin (5 part): Glacial acetic acid (8 part)]. The specimen vials were labeled properly by giving details about locality, habitat, date of collection, name of collector and any other relevant information.

3.2. Material Deposition

Materials are in the collection of Entomolgy Laboratory, Department of Agricultural Biotechnology, IRDM Faculty Centre, Ramakrishna Mission Vivekananda University, Narendrapur, Kolkata, India.

3.3. Identification of the collected spider samples

The materials were studied using Stereo Zoom Binocular Microscope, model Zeiss SV-11 and Olympus SZX-7. All measurements are in millimeters, made with an eye piece graticule. Drawing and photographs were made with the aid of necessary accessories attached to the binocular microscope. Leg measurements are shown as: total length (femur, patella, tibia, metatarsus, tarsus); spination pattern are shown as: dorsal-ventral-prolateral-retrolateral. The illustrations are arranged in the following order: for Mygalomorphae: General habitus, dorsal view; Chelicerae, ventral view and dorsal view; Maxillae, labium and sternum, ventral view. Internal genitalia, dorsal view, Male palp: dorsal view, Spinnerets, ventral view; Tarsal claws, lateral view and for Araneomorphae: General habitus, dorsal view; Chelicerae, ventral view; Maxillae, labium and sternum, ventral view. Epigynum, ventral view; Internal genitalia, dorsal view, Male palp: dorsal view, ventral view or lateral view.
The internal genitalia of the female was dissected out under the microscope with the help of very sharp scalpel or triangular needle. After dissection it was cleared in clove oil for overnight. The male pedipalp was removed from the body and boiled in 10% KOH for 5-10 minutes till the bulb expanded (Tikader, 1987). After study, both the female genitalia and the male palp were preserved in a micro vial along with the adult specimen within the same tube containing Oudeman's preservative.

4.0. GENERAL MORPHOLOGY AND TERMINOLOGY
(Pls. X-XV)

The body of a spider consists of 2 main parts, anterior prosoma or cephalothorax and posterior opisthosoma or abdomen, joined by a narrow pedicel.

4.1. Cephalothorax (fig. A) - is dorsally covered by a hard sclerotised shield, the ‘carapace’ and ventrally by the sternum. The carapace is usually comprised of 2 distinct regions ‘cephalic’ and ‘thoracic’, which are delineated by the narrow grooves, the ‘cervical furrows’. The thoracic region is often marked with a narrow median groove, the ‘thoracic groove’ or ‘fovea’ and also with other radiating striae, the ‘thoracic radii’.

Eyes (figs. A- B & I-N) – Cephalic region includes 6-8 simple eyes, their size and arrangement are variable and frequently of use in taxonomy. These eyes are generally of 2 kinds viz. black or diurnal and white or nocturnal. When only one type of eye is present, the condition is described as ‘homogeneous’ in contrast to ‘heterogeneous’, when both the types present. They are usually arranged in 2 rows (some times in 3 or 4 rows) – an anterior row with anteromedian (AME) and anterolateral eyes (ALE) and a posterior row with posteromedian (PMED) and posterolateral eyes (PLE). Such rows may be straight or curved either ‘procurred’ or ‘recurred’. The row is said to be procurred when the median eyes are further backward than the laterals and it is recurved when the median eyes are further forward than the laterals. The region occupied by the eyes is referred to as ‘ocular region’ and the area margined by the 4 median eyes is the ‘ocular quad’. The area between the anterior eyes and the anterior edge of carapace is the ‘clypeus’.

Cephalothoracic appendages – Cephalothorax bears 6 pairs of appendages which include a pair of ‘chelicerae’, a pair of ‘pedipalp’ and 4 pairs of walking ‘legs’.

Chelicerae (figs. E & O-P) - are attached below the anterior margin of the carapace, each consisting of a large basal portion and the curved ‘fang’. The fang articulates with the basal portion and folds into groove on its medial aspect, the borders of which are often equipped with rows of teeth, middle sometimes bears a single tooth like process known as ‘cusp’. The outer margin of this groove is termed as ‘promargin’ while the inner margin as ‘retromargin’. Promargin is often with long, stout hairs to constitute the so called ‘scopulae’. The size and shape of the chelicerae vary considerably in different species; some have a swollen ‘boss’ or ‘lateral condyle’ and others may with a series of horizontal ridges laterally – the ‘stridulating ridges’.

‘Rastellum’ is a rake like structure at the extremity of chelicerae in Mygalomorphae, often reduced to a few strong spines.

Pedipalp (fig. D) - consists of 6 segments: coxa, trochanter, femur, patella, tibia, and tarsus. Morphologically the maxillae are the enlarged modified coxa of the palp. The tarsus of female palp is often with a claw distally. Male spiders have the palpal tarsi greatly modified as secondary sex organ, the copulatory organ.

Legs (figs. C & T-X) – 4 pairs of legs are referred as I, II, III and IV being numbered from the front. Each leg consists of 7 segments – coxa, trochanter, femur, patella, tibia, metatarsus and tarsus. In majority of the spider families, the legs are ‘prograde’ where the anterior 2 pairs of legs are positioned forward and the posterior 2 pairs are positioned backward. But in spider family (Sparassidae), the anterior 2 pairs of legs are directed more or less laterally giving them a crab like appearance. These legs are termed as ‘laterigrade’. The
distal end of tarsi are provided with 2 or 3 claws, upper pairs known as ‘superior claws’ and lower small one ‘inferior claw’. In addition, there may be hairs which are greatly modified to form ‘auxiliary foot claws’. Many hunting spiders and others which do not spin webs have only 2 foot claws, the small claw being replaced by a tuft of hairs ‘claw tuft’. In some species, there is also a ventral brush of thickened hairs running longitudinally along the length of the tarsus and metatarsus, the ‘scopulae’. The legs are often furnished with spines, in addition to the normal hairs. These spines may be prolateral or retrolateral (on the side, directed forward or backward respectively) or dorsal or ventral (on upper or lower surfaces respectively). Legs are often covered with very fine and smooth micro hairs, the ‘trichobothria’, which rest perpendicular to the surface.

Sternum (figs. a-b) - may be variously shaped, usually indented, opposite to the coxa of each leg. The anterior margin of sternum articulates movably with ‘labium’. With few exceptions, there is a deep transverse groove between the sternum and the labium.

Labium and Maxillae (figs. E & Q-S) – Labium is also called lower lip underneath the head region in front of the sternum. It varies in shape among species, being more or less oval or conical and reordered. On each side of the labium are the maxillae, broad and cushion shaped paired lobes. Apical margins of labium and maxillae are often scopulate. In Mygalomorphae maxillae and labium often with small, spiny warts known as ‘cuspules’.

4.2. Abdomen (figs. A, E, Y-Z, d-e & f-i) - varies in shape, colour, markings and hair clothing in different species. Variable no. of sigilla (muscular apodemes) often present in abdominal dorsum. Abdominal venter with 1 or 2 pairs of ‘book lungs’ situated above the epigastric furrow on either side of epigynum. At the posterior end, the alimentary canal opens from a more or less distinct ‘anal tubercle’. Below the anal tubercle, there are 3 pairs finger like spinnerets (may be 2 pairs or even can be reduced to a single pair), which extrude the silk strands through tiny spigots. These 3 pairs are arranged as anterior, median and posterior pairs. Anterior to spinnerets, there is some times a small tube known as ‘colulus’ that lies at the base of anterior spinnerets. The female genital organ the ‘epigynum’ is placed just anterior to a transverse fold, the ‘epigastric fold’. It is the most important single character for the final identification of most of the adult female spiders.

4.3. Genital organs - Male Palp (fig. D) - Based on the complexity of the palp male spiders are classified as ‘haplogyne’ and ‘entelegyne’.

Haplogyne spiders have a simple palp. The tarsus of the palp, referred to as ‘cymbium’, bears an extension in the form of a pear shaped ‘bulb’, the palpal organ. This bulb contains a duct, which spirals through it and opens at the farthest end where it leads to outside. The narrow portion of the tip of the bulb is called the ‘embolous’.

In entelegyne spiders the palp is much more complicated. Patella bears variable no. of spines at its apex. Tibia is very short and often with dorsal and/or ventral apophysis. The tarsus consists of 2 parts, the ‘cymbium and ‘paracymbium’. The cymbium is the spoon-shaped base of tarsus. The cymbial cavity at base is known as ‘alveolus’. The cymbium also contain a coiled tube, ‘receptaculum seminis’, the distal end of which is slender and extends like a coil; the terminal portion is termed as ‘embolous’. The whole coiled structure is bulb like in appearance. The bulb is often divided into ‘tegulum’ and ‘subtegulum’. Bulb also bears prominent apophyses (terminal, median apophyses etc.). The palp also possesses a distensible balloon of elastic connective tissue, the ‘haematodocha’.
Female genital organs - Epigynum (figs. F-G) – It is the ventral view of genital organs. In most species it is more or less complex chitinous plate like structure. In some species, the epigynum is a simple opening with sclerotised margins; in others a median septum may be present; some have a tongue like process or scape in the midline. Internal genitalia (fig. H) – It is the dorsal view of genital organs. It comprises usually 1 or 2 pairs of ‘spermathecae’, the function of which is to store the sperm introduced by the male through a pair of ducts, the ‘copulatory ducts’ which have external openings known as ‘copulatory openings’. Issuing from the spermathecae are the ‘fertilization ducts’ through which sperm is eventually passed during egg laying. Critical examination of male palpal structures and female epigynum – internal genitalia are essential for identification of spider taxa at generic and species level.
5.0. ABBREVIATIONS USED

Abbreviations:

AL = Abdominal length
AW = Abdominal width
CL = Cephalothoracic length
CW = Cephalothoracic width
TL = Total length

ALE = anterior lateral eyes
AME = anterior median eyes
M = Monsoon
PLE = posterior lateral eyes
PME = posterior median eyes
PrM = Pre-monsoon
PsM = Post monsoon

AS = Australian Realm
ET = Ethiopian Realm
NA = Nearctic Realm
NT = Neotropical Realm
OR = Oriental Realm
PL = Palaearctic Realm

GNP - Gorumara National Park
CWLS - Chapramari Wild Life Sanctuary
JWLS - Jaldapara Wild Life Sanctuary
BTR - Buxa Tiger Reserve
6.0. TAXONOMY

ORDER: ARANEAE


SUBORDER: MYGALOMORPHAE

Diagnosis: Cheliceral fangs paraxial i.e. parallel to each other. Book lung 2 pairs. Spinnerets 2 pairs, lacking median pair. Cribellum (or colulus) usually absent. Sternum often bearing sigillae.

SUBORDER: ARANEOMORPHAE

Diagnosis: Cheliceral fangs diaxial i.e. opposing each other. Book lungs 1 pair. Spinnerets 3 pairs. Cribellum (modified median spinnerets) and coluls (transformed Cribellum) usually present. Sternum without any sigilla.

Key to the families of the recorded litter and ground dwelling spiders

1. Cheliceral fangs paraxial, book lung 2 pairs, spinnerets 2 pairs
   ------------------------------------------Theraphosidae Thorell
   Cheliceral fangs diaxial, book lung 1 pairs, spinnerets 3 pairs.
   ---------------------------------------------------------------2

2. Tarsus with 2 claws
   ---------------------------------------------------------------3
   Tarsus with 3 claws
   ---------------------------------------------------------------9

3. Eyes in 3 rows or 4 rows
   ---------------------------------------------------------------4
   Eyes in 2 rows (4.4)
   ---------------------------------------------------------------5

4. Eyes arranged in 4.2.2 or 2.2.2.2 configuration, anterior row always forwardly directed and anteromedians largest-------------------------Salticidae Blackwall
   Eyes arranged in 2.4.2 configuration, anterior row upwardly directed and anteromedians smaller than anterolaterals-----------------------Ctenidae Keyserling

5. Legs laterigrade, directed towards side or forwards, apical end of metatarsi with a soft trilobite membrane
   ------------------------------------------Sparassidae Bertkau
   Legs prograde, I and II directed forwards, III and IV backwards, apical end of metatarsi without any soft trilobite membrane-----------------------6

6. Heterogeneous eyes, anterior spinnerets large, parallel, cylindrical, usually well separated, anterior lateral spinnerets with enlarged pyriform gland spigots
   ------------------------------------------Gnaphosidae Pocock
   Homogeneous eyes, anterior spinnerets small, unparallel, not cylindrical, usually much closer, anterior lateral spinnerets without enlarged pyriform gland spigots
   ---------------------------------------------------------------7
7. 1\textsuperscript{st} pair of legs noticeably longer than 4\textsuperscript{th} pair, posterior spinnerets 2 segmented, distal one long, with cone shaped spinning area

\begin{center}
\textbf{Eutichuridae Lehtinen}
\end{center}

1\textsuperscript{st} pair of legs not longer than 4\textsuperscript{th} pair, posterior spinnerets otherwise----------------------8

8. Male palp pear shaped with short distal embolous, without median apophysis; females with square shaped epigynum with spherical spermathecae and entrance ducts shining through integument, median spinnerets with 3 and posterior with 2 cylindrical gland spigots.

\begin{center}
\textbf{Corinnidae Karsch}
\end{center}

Male palp with variable retrolateral apophysis; embolous usually arise prolaterodistally on tegulum; cymbium usually with basal spur; median spinnerets of females without gland spigots

\begin{center}
\textbf{Clubionidae Wagner}
\end{center}

9. Eyes grouped in a hexagon

\begin{center}
\textbf{Oxyopidae Thorell}
\end{center}

Eyes grouped otherwise

\begin{center}
\textbf{Lycosidae Sundevall}
\end{center}

10. Eyes in 3 rows, with 4.2.2 configuration

\begin{center}
\textbf{Pisauridae Simon}
\end{center}

Eyes in 2 rows, with 4.4 configuration

\begin{center}
\textbf{Zodariidae Thorell}
\end{center}

Eyes usually on tubercles and ringed with black base

\begin{center}
\textbf{Clawithidae Simon}
\end{center}

Eyes not on tubercles and without black ring at base

\begin{center}
\textbf{Agelenidae Koch}
\end{center}

11. Eyes in 3 rows, with 4.2.2 configuration

\begin{center}
\textbf{Lycosidae Sundevall}
\end{center}

Eyes in 2 rows, with 4.4 configuration

\begin{center}
\textbf{Zodariidae Thorell}
\end{center}

Eyes usually on tubercles and ringed with black base

\begin{center}
\textbf{Pisauridae Simon}
\end{center}

Eyes not on tubercles and without black ring at base

\begin{center}
\textbf{Agelenidae Koch}
\end{center}

12. Cephalothorax domed; anterior spinnerets large; fang short, stout, ant-eaters

\begin{center}
\textbf{Zodariidae Thorell}
\end{center}

Cephalothorax oval, attenuated in front; posterior spinnerets very long and slender; fang moderate

\begin{center}
\textbf{Agelenidae Koch}
\end{center}

\begin{center}
\textbf{FAMILY: THERAPHOSIDAE THORELL}
\end{center}

(Tarantulas)


\textbf{Diagnosis:} Medium to very large spiders. Eyes 8, in 2 rows, each on a distinct tubercle. Apical segment of posterior spinnerets cylindrical and at least as long as the second. Rastellum weak or absent. Legs scopulate, with 2 claws and claw tufts; tarsi with clavate trichobothria along its length. Cheliceral promargin hirsute, densely scopulate, with stridulating organs. Maxillae and labium with dense scopulae. Book lungs 4.
Distribution:

Biology: Most of these are fossorial and live on the ground in a silk lined burrow or retreat of various shapes, but they never close the aperture of the burrow with a movable lid. Other species are found under stones, in hollow trees or sheltering in any natural crevices.

Genus: *Chilobrachys* Karsch


Diagnosis: Mostly dull spiders. Carapace nearly flat; fovea crescentically procurred; anterior eye row practically straight. Cheliceral promargin with 3-4 rows of mixed modified setae on its basal corner and retromargin with tapering, medium to long, straight setae. Prolateral face of maxillae with 2-3 rows of horizontal, bacilliform setae and outer face with large, paddle shaped setae. Legs with narrow scopulae and spines at the top of protarsi. Spermathecae with twin seminal receptacles, with apex roundly lobed and base wide. Male palp with long, stout embolus and tapering with tegular keel.

Type species: *Chilobrachys nitelinus* Karsch, 1891.

**Distribution**: Oriental (WSC, 2016).

**Key to species:**

1. Sternum with 4 sigilla; each tarsal claw with 4 denticles; spermathecaetriangular, basally broad  
   ---------------------------------------- *khasiensis* (Tikader)
   -Sternum with 6 sigilla; each tarsal claw with 3 denticles excepting tarsi IV; spermathecae basally broad, medially narrowed, apically clubbed  
   ------------------------------------------------------------- *hardwickei* (Pocock)

**Chilobrachys khasiensis** (Tikader)

(Figs. 1-6: Pl. XVI)

Measurements: Female
Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.10, ALE-ALE- 1.25, PME-PME- 0.85, PLE-PME- 0.08, PLE-PLE- 1.30, AME-PME- 0.12, and ALE-PLE- 0.24.
Leg measurements: I 27.78 (7.21, 2.80, 7.22, 6.55, 4.0); II 26.29 (7.0, 3.22, 7.4, 5.4, 3.27); III 23.64 (5.77, 2.77, 6.0, 5.22, 3.88); IV 30.56 (7.44, 3.33, 8.22, 7.33, 4.24).
Leg formula 4123.
Distribution: India: Meghalaya, West Bengal (Siliwal, 2009; Sebastian & Peter, 2009; Sen et al., 2012; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

Chilobrachys hardwickei (Pocock)
(Figs. 7-14: Pl. XVI)

- Chilobrachys hardwickei (Pocock, 1895); The World Spider Catalog, Version 17.5, 2016, [http://www.wsc.nmbe.ch]

Measurements: Female
Inter ocular distance: AME–AME=0.17, ALE–AME=0.10, ALE–ALE=1.25, PME–PME=0.85, PLE–PME=0.08, PLE–PLE=1.32, AME–PME=0.10 and ALE–PLE=0.25.
Leg measurements: I 30.42 (9.66, 3.33, 8.22, 5.33, 3.88); II 26.70 (7.77, 3.22, 7.0, 5.44, 3.27); III 23.53 (5.66, 2.77, 6.22, 5.0, 3.88); IV 29.31 (7.44, 2.88, 8.22, 6.55, 4.22).
Leg formula 1423.
Distribution: India: Andhra Pradesh, Chhattisgarh, Kerala, Maharashtra, West Bengal (Pocock, 1900; Rao et al. 2005; Sebastian & Peter, 2009; Sen et al., 2012; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

FAMILY: SALTICIDAE BLACKWALL
(Jumping Spiders)

Diagnosis: Very small to large, ecribellate, entelegyne spiders, iridescent, sometimes with bright, attractive colouration, consisting of bands, stripes or speckles, clothed with numerous setae. Eyes 8, arranged in 3 or 4 rows, occupying entire cephalic area; 1st, 2nd and 3rd row with 4, 2 and 2 eyes respectively or each of 1st, 2nd, 3rd and 4th row with 2 eyes; anterior row always forwardly directed; eye diameter AME > ALE ≥ PLE > PME. Legs with 2 claws and claw tuft.
Distribution:

**Biology:** They are diurnal, non-weaver and move by walking, running, jumping or leaping. They use all these movements for prey capture by stalking, chasing or leaping over it. They are abundant in a wide variety of habitats such as in grasses, bushes, small and tall trees, tree barks and rocks, under stones, litter and around human dwellings.

**Key to genera:**

1. Retromargin of chelicerae with a single tooth -------------------------------2
   - Retromargin of chelicerae with more than a tooth --------------------------13
2. Retromarginal tooth pointed
   - Retromarginal tooth compressed or carina divided by a notch, or serrate
   -----------------------------------------------3
3. Patella plus tibia of leg III longer than those of leg IV -------------------4
   - Patella plus tibia of leg III shorter than those of leg IV ------------------6
4. Sternum not strongly attenuated in front; epigynal plate semicircular; internal genitalia with long transparent tubules arranged in complex loops
   -----------------------------------------------Epeus Peckham and Peckham
   - Sternum strongly attenuated in front; epigynal plate otherwise; internal genitalia with short sclerotized tubules arranged in simple loops -------------------------------5
5. Females dull sandy yellow while males dark brown to brownish black; leg III shortest; epigynum with a transverse base and a median upward canal
   -----------------------------------------------Plexippus C. L. Koch
   - Females uniformly mottled sandy brown while males black, sometimes with a pattern; leg III longest; epigynum with flaps and compact spermathecae
   -----------------------------------------------Aelurillus Simon
6. Sternum strongly attenuated in front ----------------------------------------7
   - Sternum not attenuated in front ------------------------------------------9
7. Females with a pair of “horns” (made up of protruding bristles) near first row of eyes; clypeus vertical, covered with white scales; internal genitalia with strongly sclerotized multi-chambered receptacles -----------------------------------Evarcha Simon
-Females without any "horns" near first row of eyes; clypeus vertical but never covered with scales; strong sclerotized multi-chambered receptacle absent

8. Cephalothorax flat and strongly hairy; abdomen flat; females with sclerotized entrance bowls and with distinctive accessory glands; tibia and metatarsi I and II without 2 and 3 ventral spines respectively ———— _Menemerus_ Simon
-Cephalothorax convex and less hairy; abdomen convex; females with sclerotized entrance bowls but without accessory gland; tibia and metatarsi I and II with 2 and 3 ventral spines respectively ———— _Marpissa_ C. L. Koch

9. Cephalothorax oval, thorax sloping steadily to the posterior margin, widest at posterior eyes; eye field trapezoid; leg I strongly swollen and robust
- Cephalothorax not oval, thorax strongly sloped posteriorly, lateral margins nearly parallel; eye field not trapezoid; leg I slightly swollen and normal

10. Internal canals of genitalia often with accessory glands; abdomen brightly coloured and patterned ———— _Euophrys_ C. L. Koch
- Internal canals of genitalia without accessory gland; abdomen with light mosaic pattern on dark grey background ———— _Phintella_ Strand

11. Abdomen often with transverse light and dark streaks or pale yellow gray indistinct linear patterns, anteriorly divided by a shallow furrow; epigynum simple, depressed weakly, sclerotized; spermathecae spherical ———— _Thiania_ C. L. Koch
- Abdomen with variable colour and pattern, elongate, round at front and converging steadily to the spinnerets; epigynum large, with 2 depressions divided by a median ridge, spermathecae not spherical ———— _Harmochirus_ Simon

12. Cephalothorax cube shaped; ocular quad broad and almost spreading over entire cephalic region; legs generally small and thin excepting very robust leg I, with flat femur, patella and tibia, both patella and tibia ventrally with rows of fringe hairs and with long and slightly curved spines; abdomen circular or oval, entirely covered by dark brown setae ———— _Brettus_ Thorell
- Cephalothorax circular or U-shaped; ocular quadsapreding over the half of cephalic region; legs long, slender excepting robust leg I, femur, patella and tibia not flat, only tibia I with dense fringes of black hairs; abdomen elongate or oval, widest at rear half, truncate anteriorly, with soft hairs or lustrous setae ———— _Siler_ Simon

13. Ant mimicking; cephalothorax long and narrow; sternum lanceolate and about three times as long as broad, apical end truncate and posterior end sharply pointed ———— _Myrmarchne_ Macleay
- Not ant mimicking; cephalothorax not long and not narrow; sternum otherwise

14. 1st leg robust with fringe of hairs on ventral margin, tibia sharply spined; abdomen spherical and dorsally covered with lustrous flat setae, ventrally with soft hairs; male palp with spherical bulbous and epigynum anchor like and with tubular spermathecae ———— _Brettus_ Thorell
- Legs with moderately strong spines; femur, patella and tibia hairy while metatarsi and tarsi slender and bare; abdomen oval, with tufts of long, erect, orange white hairs on
dorsum; male palp with oval bulbous and epigynum not anchor like and with large
globular spermathecae

Genus: Portia Karsch

Genus: Epeus Peckham & Peckham


Diagnosis: Size moderate. Cephalothorax swollen, longer than wide, round and elevated; males with a tuft of backwardly directed stiff hairs on ocular quad; anterior eye row highly recurved, making 4 rows. Chelicerae with 2 promarginal and 1 retromarginal teeth. Abdomen pale green, slender and pointed. Male palp broad, triangular; outer margin of cymbium with a downward outgrowth. Epigynum with semicircular plates, internally with long transparent tubules arranged in complex loops.

Type species: Evenus tenera Simon, 1877.

Distribution: Oriental (Sebastian & Peter, 2009; Keswani et al., 2012; Metzner, 2016; WSC, 2016).

Epeus indicus Prószyński

(Figs. 15-19: Pl. XVI)


Measurements: Female

CL- 2.14, CW- 2.00, AL- 3.50, AW- 1.64, TL- 6.00.

Inter ocular distance: AME-AME- 0.64, ALE-AME- 0.57, ALE-ALE- 1.50, PME-PME- 1.43, PLE-PME- 0.43, PLE-PLE- 1.53, AME-PME-0.86, and ALE-PLE- 0.86.

Leg measurements: I 6.42(1.72, 0.71,2.14,1.00, 0.86); II 5.99(1.71,0.71,1.86,1.00, 0.71); III 6.13(1.71,0.71,1.86,1.14, 0.71); IV 6.00(1.57,0.57,1.71, 1.29, 0.86).

Leg formula- 1342.


Distribution: India: Assam, Kerala, Orissa, West Bengal (New record); Nepal (Sebastian & Peter, 2009; Chetia & Kalita, 2012; Keswani et al., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Metzner, 2016; WSC, 2016).

Genus: Plexippus C. L. Koch


Diagnosis: Medium size active spiders. Females’ dull sandy yellow while males dark brown to brownish black. Cephalothorax oblong, longer than wide, truncate posteriorly, curved upward towards front row eyes; males usually with a white or dull white dorsomedian band from lower margin of ocular quad to posterior end, females without such band. Ocular quad wider than long, dark brown. Abdomen roughly oval, broadest at middle, midlongitudinally with a broad white band, 2 pairs of conspicuous white spots close to median band. Leg III shortest, legs I and II nearly similar, tibia I with 3 pairs of ventral spines. Labium longer than wide. Male palp dark brown, thick and sclerotised, bulbous rectangular, embolus sharply pointed, slightly curved and originating from upper corner of bulbous; tibia with a tuft of long
hairs; apophysis short, broad, sharp, slightly curved inward; cymbium broad, flat and hairy. Epigynum with a transverse base and a median upward canal.

**Type species:** *Attus paykullii* Audouin, 1826.

**Distribution:** Cosmopolitan (Keswani et al., 2012; Proszynski, 2015; Metzner 2016; WSC, 2016).

**Key to species:**

1. Abdominal dorsum without any sigilla; epigynal plate basket like; spermathecae single lobed

   -------- paykulli (Audouin)

2. Abdominal dorsum with 2 pairs of sigilla; epigynal plate semicircular; spermathecae bilobed

   ----------- pseudopaykulli Sen et al.

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**Plexippus paykulli** (Audouin)

(Figs. 20-27: Pl. XVIII)


**Measurements:** Female

CL- 3.43, CW- 2.78, AL- 3.48, AW- 2.04, TL- 7.08.

**Inter ocular distance:** AME-AME- 0.87, ALE-AME- 0.65, ALE-ALE- 1.96, PME-PME- 1.57, PLE-PME- 0.65, PLE-PLE- 1078, AME-PME- 0.83, and ALE-PLE- 1.13.

**Leg measurements:** I 5.34(1.33, 1.00, 1.27, 0.93, 0.83); II 4.61(1.07, 1.00, 1.07, 0.87, 0.80); III 5.27(1.27, 0.93, 1.47, 0.80, 0.80); IV 5.66(1.33, 0.87, 1.40, 1.33, 0.73).

Leg formula- 4132.

**Measurements:** Male

CL- 3.43, CW- 2.78, AL- 3.48, AW- 2.04, TL- 7.08.

**Inter ocular distance:** AME-AME- 0.87, ALE-AME- 0.65, ALE-ALE- 1.96, PME-PME- 1.57, PLE-PME- 0.65, PLE-PLE- 1078, AME-PME- 0.83, and ALE-PLE- 1.13.

**Leg measurements:** I 5.34(1.33, 1.00, 1.27, 0.93, 0.83); II 4.61(1.07, 1.00, 1.07, 0.87, 0.80); III 5.27(1.27, 0.93, 1.47, 0.80, 0.80); IV 5.66(1.33, 0.87, 1.40, 1.33, 0.73).

Leg formula- 4132.

**Remarks:** Morphological features of male are similar to female, excepting palp. So, only drawings of male palp are given here.


**Distribution:** India: Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Manipur, Orissa, West Bengal; Afghanistan, Algeria, American Samoa, Australia, Bermuda, Brazil, Canary Islands, Celebes, China, Costa Rica, Crete, Cuba, Egypt, Ethiopia, Fiji, France, Galapagos Islands, Gambia, Greece, Hawaii, Hispaniola Island, Indochina, Iran, Italy, Japan, Java, Kenya, Krakatau, Lao, Libya, Malaysia, Malta, Marquesas Islands, Marshall Islands, Nepal, New Hebrides, Palmyra Atoll, Panama, Papua New Guinea, Paraguay, Philippines, Saudi
Arabia, Senegal, Singapore, Society Islands, South Korea, Sri Lanka, Sudan, Suriname, Taiwan, Tonga, Trinidad, Tuamotu Islands, Tunisia, United Arab Emirates, USA, Venezuela, Vietnam, Yemen (Tikader, 1967; Tikader, 1974; Tikader & Biswas, 1981; Barrion & Litsinger, 1995; Biswas & Biswas, 1992, 2004, ’06; Majumder, 2005; Sebastian & Peter, 2009; Dhali et al., 2010a; Chetia & Kalita, 2012; Keswani et al., 2012; Saha & Raychaudhuri, 2015; Sen et al., 2015; Proszynski, 2015; Metzner, 2016; WSC, 2016).

Plexippus pseudo paykulli Sen et al.
(Figs. 28-32: Pl. XVIII)


Measurements: Female

Inter ocular distance: AME-AME- 0.83, ALE-AME-0.65, ALE-ALE- 1.82, PME-PME-1.82, PLE-PME- 0.57, PLE-PLE- 1.82, AME-PME- 1.00, and ALE-PME- 1.13.

Leg measurements: I 5.24(1.29, 1.12, 1.53, 0.71, 0.59); II 5.11(1.47, 1.06, 1.29, 0.76, 0.53); III 6.00(1.47, 0.88, 1.53, 1.24, 0.88); IV 5.81(1.29, 0.82, 1.47, 1.35, 0.88).

Leg formula- 3412.


Distribution: India: West Bengal (Sen et al., 2015; WSC, 2016).

Genus: Aelurillus Simon


Diagnosis: Male black, sometimes with a pattern and with pale, annulated legs, whilst the female often a uniformly mottled sandy brown. Chelicerae with 2 promarginal and 1 retromarginal teeth. Male palp with single tibial apophysis, embolus divided, with embolic membrane and fossae. Epigynum with flaps and compact spermatahecae.

Type species: Araneus v insignitus Clerck, 1757.

Distribution: Widespread in the Palaearctic, Ethiopian and Oriental (Azarkina, 2002; Sebastian & Peter, 2009; Keswani et al., 2012; Metzner, 2016; WSC, 2016).

Aelurillus improvisus Azarkina
(Figs. 33-37: Pl. XVI)


Measurements: Female
CL- 2.54, CW- 1.84, AL- 3.27, AW- 2.32, TL- 5.81.

Inter ocular distance: AME-AME- 0.43, ALE-AME- 0.41, ALE-ALE- 0.97, PME-PME-1.08, PLE-PME- 0.27, PLE-PLE- 1.11, AME-PME- 0.54, and ALE-PLE- 0.59.
Leg measurements: I 3.06(1.12,0.65,0.71, 0.29, 0.29); II 3.18(1.12,0.71,0.65,0.35, 0.35); III 4.82(1.76,0.88,0.94,0.65, 59); IV 4.2 4(1.47,0.71,0.94, 0.59, 0.53).

Leg formula: 3421.


Distribution: India: Himachal Pradesh, West Bengal (Azarkina, 2002; Sebastian & Peter, 2009; Keswani et al., 2012; Prószyński, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

Genus: Evarcha


Diagnosis: Medium size. Cephalothorax light yellow to dark brown, longer than broad, females usually with a pair of "horns" (made up of protruding bristles) near first row of eyes; ocular quad broader than long, usually darker than carapace. Clypeus vertical usually covered with white scales. Chelicerae with 1 promarginal and 2 retromarginal teeth. Male palp mostly with single tibial apophysis, a rounded bulb with a small posterior lobe, and stiletto-like embolus bent towards the bulb. Female with strongly sclerotized multi-chambered receptacles.

Type species: *Araneus falcatus* Clerck, 1757.

Distribution: Afrotropical (Haddad & Wesolowska, 2011; Prószyński 2015; Metzner, 2016; WSC, 2016).

*Evarcha flavocincta* (C. L. Koch) (Figs. 38-42: Pl. XVII)


Measurements: Female


Inter ocular distance: AME-AME- 0.71, ALE-AME- 0.5, ALE-ALE- 1.71, PME-PME- 1.57, PLE-PME- 0.57, PLE-PLE- 1.71, AME-PME- 0.86, and ALE-PLE- 1.07.

Leg measurements: I 5.27(1.45,0.82,1.55, 1.00, 0.45); II 5.55(1.73,1.00,1.27,0.91, 0.64); III 5.91(1.73,0.82,1.45,1.09, 0.82); IV 5.73(1.36,0.73,1.055, 1.27, 0.82).

Leg formula: 3421.


Distribution: India: West Bengal; Bintan Island, China, Indonesia, Java, Lombok, Malaysia, Singapore, Vietnam (Roy et al. 2014; Sen et al., 2015; Prószyński, 2015; Metzner, 2016; WSC, 2016).

Genus: Menemerus


Diagnosis: Medium to big spiders. Cephalothorax flat, anteriorly truncate, curved posteriorly and strongly hairy. Carapace in majority of species with white lateral margin. Legs short, moderately thick, dark brown, with light brown patches. Abdomen generally light brown, mid
dorsally with a broad dark brown band, flat, broadest at middle and pointed posteriorly. Male with a very long tegular furrow and tegular protuberance; female with sclerotized entrance bowls and distinctive accessory glands.

**Type species:** *Attus semilimbatus* Hahn, 1827.

**Distribution:** Warm climate world-wide (Metzner, 2016; WSC, 2016).

*Menemerus bivittatus* (Dufour)

(Figs. 43-47: Pl. XVII)


**Description:** Female


**Inter ocular distance:** AME-AME- 0.54, ALE-AME- 0.45, ALE-ALE- 1.45, PME-PME- 1.45, PLE-PME- 0.36, PLE-PLE- 1.54, AME-PME- 0.82, and ALE-PLE- 1.00.

**Leg measurements:** I 4.15(1.00,0.86,0.93, 0.93, 0.43); II 3.58(1.14,0.86,0.93,0.36, 0.29); III 3.86(1.00,0.64,0.93,0.79, 0.50); IV 5.06(1.42,0.93,1.35, 0.86, 0.50).

Leg formula- 4132.


**Distribution:** India: Assam, Kerala, West Bengal; Aitutaki, American Samoa, Argentina, Australia, Bermuda, Bintan Island, Brazil, Burundi, Canary Islands, Cape Verde, Caroline Islands, China, Congo, Cook Islands, Costa Rica, Cuba, Djibouti, Dominican Republic, El Salvador, Ethiopia, Fiji, France, Galapagos Islands, Gambia, Ghana, Haiti, Hawaii, Hispaniola Island, Italy, Jamaica, Java, Kenya, Krakatau, Lao, Laysan, Liberia, Madagascar, Mariana Islands, Marquesas Islands, Marshall Islands, Mauritius, Mexico, Midway Atoll, Nepal, New Hebrides, Nigeria, Niue, Palmyra Atoll, Panama, Portugal, Reunion, Saint Helena, Senegal, Sierra Leone, Singapore, Society Islands, South Africa, Tanzania, Tonga, Trinidad, Tuamotu Islands, USA, Venezuela, Vietnam, Zimbabwe (Sebastian & Peter, 2009; Chetia & Kalita, 2012; Kewswan *et al*., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Sen *et al*., 2015; Metzner, 2016; WSC, 2016).

**Genus: Marpissa C. L. Koch**


**Diagnosis:** Cephalothorax oval, widest behind dorsal eyes, tapering gradually to the truncated front. Ocular area occupying nearly 1/3 of cephalothorax. Chelicerae with 1 retromarginal and 2 promarginal teeth. Sternum narrowing in front. Leg formula usually 1423 in male and 4132 in female. Tibia and metatarsi I and II with 2 and 3 ventral spines respectively. Abdomen elongate oval and pointed posteriorly.

**Type species:** *Araneus muscosus* Clerck, 1757.

**Distribution:** Cosmopolitan (Metzner, 2016; WSC, 2016).
Marpissa decorata Tikader
(Figs. 48-52: Pl. XVII)


**Measurements:** Female
CL- 3.82, CW- 3.00, AL- 5.62, AW- 4.00, TL- 9.44.

**Inter ocular distance:** AME-AME- 0.82, ALE-AME- 0.64, ALE-ALE- 2.27, PME-PME- 2.18, PLE-PME- 0.64, PLE-PLE- 2.27, AME-PME- 1.09, and ALE-PLE- 1.18.

**Leg measurements:** I 5.28(1.29,1.00,1.57, 0.71, 0.71); II 4.71(1.14,0.86,1.43,0.57, 0.71); III 5.72(1.57,1.00,1.29,0.86, 1.00); IV 5.43(1.00,0.86,1.71, 1.00, 0.86).

**Leg formula** - 3412.

**Material examined:** 1♀, Chapramari, CWLS, Jalpaiguri, West Bengal, India, 02.vi. 2009, coll. D. C. Dhali.

**Distribution:** India: Assam, West Bengal (Tikader, 1974; Tikader & Biswas, 1981; Sebastian & Peter, 2009; Dhali et al., 2010b; Chetia & Kalita, 2012; Keswani et al., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

**Genus: Bianor Peckham & Peckham**


**Diagnosis:** Moderately small. Cephalothorax brown, oval, moderately high, flat on top, thorax sloping steadily to the posterior margin, widest at posterior eyes and truncate basally. Eye field trapezoid. Chelicerae with 2 promarginal and 1 retromarginal teeth. Leg I swollen and strongly robust. Abdomen light brown, with 2 or 3 pairs of large circular tufts of light coloured hairs. Male palp with thin embolus, coiled around bulbous. Epigynum ovoid, depressed, with a bell shaped pocket in middle; spermathecae hardly visible, variable and surrounded by tangled loops, copulatory ducts running from it.

**Type species:** Scythropa maculata Keyserling, 1883.

**Distribution:** Cosmopolitan except Nearctic region (Metzner, 2016; WSC, 2016).

**Key to species:**

1. Abdominal dorsum without any sigilla; 2 retromarginal teeth of chelicerae widely separate; spermathecae comma shaped; fertilization ducts V-shaped

------------------------ narmadaensis (Tikader)

-Abdominal dorsum with 4 sigilla; 2 retromarginal teeth of chelicerae appearing fused; spermathecae bean shaped; fertilization ducts otherwise

------------------------ piratus Sen et al.

**Bianor narmadaensis** (Tikader)

(Fig. 53-57: Pl. XVI)


**Measurements:** Female
CL- 1.55, CW- 1.47, AL- 1.50, AW- 1.18, TL- 3.20.

**Inter ocular distance:** AME-AME- 0.41, ALE-AME- 0.32, ALE-ALE- 0.95, PME-PME- 1.05, PLE-PME- 0.41, PLE-PLE- 1.20, AME-PME- 0.55, and ALE-PLE- 0.75.

-31-
Leg measurements: I 2.94(0.93,0.55,0.67, 0.47, 0.32); II 2.78(0.90,0.51,0.64,0.41, 0.32); III 3.08(0.96,0.55,0.71,0.51, 0.35); IV 3.23(1.02,0.51,0.78, 0.51, 0.41).

Leg formula- 4312.


Distribution: India: Madhya Pradesh, West Bengal (Tikader, 1975; Biswas & Biswas, 1992; Sebastian & Peter, 2009; Kaldari, 2010; Keswani et al., 2012; Proszyński, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

Bianor piratus Sen et al.
(Figs. 58-62: Pl. XVI)

Measurements: Female
CL- 1.89, CW- 1.61, AL- 2.25, AW- 1.75, TL- 4.29.

Inter ocular distance: AME-AME- 0.43, ALE-AME- 0.36 ALE-ALE- 1.14, PME-PME- 1.08, PLE-PME- 0.36, PLE-PLE- 1.14, AME-PME- 0.57, and ALE-PLE- 0.67.

Leg measurements: I 3.18(1.00, 0.52, 0.70, 0.57, 0.39); II 2.91(0.96, 0.43, 0.65, 0.48, 0.39); III 3.26(1.09, 0.39, 0.65, 0.65, 0.48); IV 3.39(1.17, 0.39, 0.70, 0.61, 0.52).

Leg formula- 4312.


Distribution: India: West Bengal (Sen et al., 2015; WSC, 2016).

Genus: Euophrys C. L. Koch

Diagnosis: Small spiders (3–5 mm long). Cephalothorax as dark as eye field or only slightly lighter, moderately high and convex, accommodating the eyes in 2/5 area. Abdomen with light mosaic pattern on dark grey background. Male palp with thin tibia and long apophysis, bulbous than longer with wide and posterior lobe, spermatophore meandering, embolus base coiled and set on distal haematodocha, spermathecae oval or round.

Type species: Aranea frontalis Walckenaer, 1802.

Distribution: Throughout except Nearctic (Metzner, 2016; WSC, 2016).

Key to species:
1. Abdominal dorsum with 2 pairs of sigilla; cheliceral promargin with 3 teeth, fangs serrate; spermathecae curved, both ends swollen
   ------------------------------- frontalis Walckenaer
-Abdominal dorsum without any sigilla; cheliceral promargin with 2 teeth, fangs not serrate; spermathecae round
   ------------------------------- omnisuperstes Wanless

Euophrys frontalis (Walckenaer)
(Figs. 63-67: Pl. XVII)
• *Euophrys frontalis* (Walckenaer, 1802); C. L. Koch, 1834. Arachniden. In Herrich-Schäffer, G. A. W., Deutschlands Insekten. Heft. 123.

**Measurements:** Female
CL- 2.00, CW- 1.50, AL- 2.89, AW- 1.93, TL- 5.07.

**Inter ocular distance:** AME-AME- 0.46, ALE-AME- 0.43, ALE-ALE- 1.14, PME-PME- 1.14, PLE-PME- 0.43, PLE-PLE- 1.39, AME-PME- 0.61, and ALE-PLE- 0.71.

**Leg measurements:** I 3.47(1.04, 0.50, 0.89, 0.54, 0.50); II 3.28(0.96, 0.57, 0.79, 0.64, 0.32); III 3.89(1.18, 0.68, 0.71, 0.82, 0.50); IV 3.83(1.18, 0.54, 0.79, 0.93, 39).

**Leg formula**- 3412.

**Material examined:** 1♀, Jayanti, BTR, Jalpaiguri, West Bengal, India, 10.x. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal; Afghanistan, Austria, Azerbaijan, Belgium, China, Croatia, Czech Republic, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Iran, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Libya, Lithuania, Macedonia, Netherlands, Poland, Portugal, Romania, Russia, Sakhalin, Serbia, Slovakia, South Korea, Switzerland, Turkey, Turkmenistan, Ukraine (Dhali *et al.*, 2014; Prószyński, 2015; Sen *et al.*, 2015; Metzner, 2016; WSC, 2016).

*Euophrys omnisuperstes* Wanless
(Figs. 68-72: Pl. XVII)


**Measurements:** Female
CL- 1.51, CW- 1.30, AL- 2.41, AW- 1.30, TL- 3.81.

**Inter ocular distance:** AME-AME- 0.38, ALE-AME- 0.27, ALE-ALE- 0.86, PME-PME- 0.86, PLE-PME- 0.29, PLE-PLE- 0.89, AME-PME- 0.43, and ALE-PLE- 0.59.

**Leg measurements:** I 3.35(1.09, 0.39, 0.91, 0.61, 0.35); II 4.23(1.04, 0.48, 0.87, 1.45, 0.39); III 3.78(1.26, 0.48, 0.74, 0.91, 0.39); IV 3.95(1.30, 0.39, 1.04, 0.87, 0.35).

**Leg formula**- 2431.

**Material examined:** 1♀, Dhupjhora, GNP, Jalpaiguri, West Bengal, India, 12.iv. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal; Nepal, USA (Dhali *et al.*, 2014; Prószyński, 2015; Sen *et al.*, 2015; Metzner, 2016; WSC, 2016).

**Genus: Phintella Strand**


**Diagnosis:** Moderately small, slender, pale gray or pale brown, body covered with scales. Chelicerae slender, fangs long and curved at tip. Femur and tibia of leg I without distinct swellings; former with lines or spots or darkening on ventroprolateral surface; later with 2-3 pairs of ventral spines. Abdomen often with transverse light and dark streaks or pale yellow gray indistinct linear patterns, anteriorly divided by a shallow furrow. Male palp with a prolonged tibial apophysis, bulbous simple, embolus fleshy, tegular extension posteriorly to tibia. Epigynum simple, depressed weakly, sclerotized; spermathecae spherical; copulatory canal short and broad; accessory glands with double openings.
Type species: *Telamonia bifurcilinea* Bösenberg & Strand, 1906.

**Distribution:** Paleartic, India, Srilanka to Indonesia and Philippines (Prószyński, 2015; Metzner 2016; WSC, 2016).

*Phintella vittata* (C. L. Koch)  
(Figs. 73-77: Pl. XVIII)

**Measurements:** Female  
CL- 1.68, CW- 1.32, AL- 1.95, AW- 1.45, TL- 3.95.  
**Inter ocular distance:** AME-AME- 0.45, ALE-AME- 0.32, ALE-ALE- 1.05, PME-PME- 0.86, PLE-PME- 0.32, PLE-PLE- 1.05, AME-PME- 0.55, and ALE-PLE- 0.86.  
**Leg measurements:** I 3.00(0.91, 0.45, 0.64, 0.55, 0.45); II 2.63(0.91, 0.36, 0.64, 0.36, 0.36); III 3.63(1.00, 0.45, 0.73, 1.00, 0.45); IV 3.81(1.18, 0.36, 0.82, 1.00, 0.45).  
Leg formula- 4312.


**Distribution:** India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Kerala, Maharashtra, Manipur, Punjab, Sikkim, West Bengal;China, Indonesia, Malaysia, Penang Island, Philippines, Singapore, Sri Lanka, Sumatra, Vietnam (Tikader, 1981; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2010a,b; Chetia & Kalita, 2012; Keswani et al., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

**Genus: Thiania** C. L. Koch  
- *Thiania* C. L. Koch, 1846. Die Arachniden, 171.

**Diagnosis:** Small to medium. Cephalothorax black or dark brown, followed by broad, crescent shaped band of iridescent, bronzy, squamose hairs, sides and rest of thorax brown, longer than broad, flat, sides almost straight, curving to a wide truncated posterior. Abdomen with variable colour and pattern, elongate, round at front and converging steadily to the spinnerets. Leg I slightly swollen and larger than others. Legs I and II brown while III and IV yellow except brown femora. Epigynum large, with 2 depressions divided by a median ridge, copulatory opening silt like, internal canals often with accessory glands, spermathecae ovoid or pear shaped. Male palp thick, tibial apophysis large, hooked laterally and with a curved conductor.

**Type species:** *Thiania pulcherrima* C. L. Koch, 1846.
**Distribution:** Oriental (Prószyński, 2015; Metzner, 2016; WSC, 2016).

*Thiania bhamoensis* Thorell (Figs. 78-85: Pl. XVIII)


**Measurements:** Female

- **Inter ocular distance:** AME-AME: 0.41, ALE-AME: 0.54, ALE-ALE: 0.61, PME-PME: 1.13, PLE-PME: 0.32, PLE-PLE: 1.13, AME-PME: 0.56, and ALE-PLE: 0.68.
- **Leg measurements:** I 4.14(1.21, 0.67, 1.04, 0.71, 0.51); II 3.38(1.08, 0.64, 0.64, 0.51, 0.51); III 3.56(1.14, 0.57, 0.67, 0.71, 0.47); IV 3.91(1.21, 0.55, 0.93, 0.79, 0.43).

**Measurements:** Male

- **Inter ocular distance:** AME-AME: 0.41, ALE-AME: 0.54, ALE-ALE: 0.61, PME-PME: 1.13, PLE-PME: 0.32, PLE-PLE: 1.13, AME-PME: 0.56, and ALE-PLE: 0.68.
- **Leg measurements:** I 3.91(1.21, 0.67, 1.04, 0.71, 0.51); II 3.38(1.08, 0.64, 0.64, 0.51, 0.51); III 3.56(1.14, 0.57, 0.67, 0.71, 0.47); IV 3.91(1.21, 0.55, 0.93, 0.79, 0.43).

**Leg formula:** 1432.

**Remarks:** Morphological features of male are similar to female, excepting palp. So, only drawings of male palp are given here.


**Distribution:** India: Andaman & Nicobar Islands, Assam, Kerala, Manipur, West Bengal; China, Krakatau, Malacca, Malaysia, Myanmar, Singapore, Sumatra, Vietnam, (Biswas & Biswas, 1992, 2004; Majumder, 2005; Sebastian & Peter, 2009; Dhali *et al*., 2010a,b; Chetia & Kalita, 2012; Keswani et al., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Sen *et al*., 2015; Metzner, 2016; WSC, 2016).

**Genus: Harmochirus Simon**


**Diagnosis:** Very small spiders. Cephalothorax dark brown, cube shaped, cuticle highly sclerotised, smooth and shiny; ocular quad broad and almost spreads over entire cephalic region. Legs generally small and thin except very robust leg I, with flat femur, patella and...
tibia, both patella and tibia ventrally with rows of fringe hairs and long and slightly curved spines. Abdomen circular or oval, entirely covered by dark brown setae.

**Type species:** *Ballus brachiatus* Thorell, 1877.

**Distribution:** Africa to Japan and Australia (Metzner, 2016; WSC, 2016).

**Harmochirus brachiatus** (Thorell) (Figs. 86-91: Pl. XVI)


**Measurements:**

**Female**

CL- 1.27, CW- 1.16, AL- 1.19, AW- 1.06, TL- 2.49.

**Inter ocular distance:** AME-AME- 0.41, ALE-AME- 0.27, ALE-ALE- 0.91, PME-PME-1.02, PLE-PME- 0.29, PLE-PLE- 1.16, AME-PME- 0.54, and ALE-PLE- 0.61.

**Leg measurements:**

I 3.85(0.64,0.67,0.85, 0.79, 0.39); II 1.98(0.54,0.36,0.51,0.36, 0.21); III 2.35(0.51,0.36,0.61,0.58, 0.36); IV 2.24(0.54,0.29,0.47, 0.58, 0.36).

**Male**

CL- 1.21, CW- 1.12, AL- 1.16, AW- 1.03, TL- 2.43.

**Inter ocular distance:** AME-AME- 0.38, ALE-AME- 0.24, ALE-ALE- 0.86, PME-PME- 0.97, PLE-PME- 0.27, PLE-PLE- 1.11, AME-PME- 0.52, and ALE-PLE- 0.59.

**Leg measurements:**

I 3.21(0.61, 0.64, 0.82, 0.45, 0.39); II 1.87(0.51, 0.36, 0.47, 0.32, 0.21); III 2.24(0.47, 0.36, 0.57, 0.55, 0.29); IV 2.14(0.51, 0.29, 0.43, 0.55, 0.36).

**Leg formula-** 1342.

**Remarks:** Morphological features of male are similar to female, excepting palp. So, only drawings of male palp are given here.

**Material examined:**


**Distribution:** India: Gujarat, Kerala, Maharashtra, West Bengal; Australia, Bhutan, Borneo, Celebes, China, Indochina, Indonesia, Japan, Lao, Lombok, Malacca, Malaysia, Myanmar, Philippines, Singapore, South Korea, Sri Lanka, Sumatra, Taiwan, Thailand, Vietnam (Sebastian & Peter, 2009; Dhali et al., 2010a; Kewsani et al., 2012; Prószyn’ski, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

**Genus: Siler Simon**


**Diagnosis:** Small, usually with attractive colouration. Cephalothorax circular or U-shaped, with flat and almost rectangular ocular quad, usually covered with soft and colorful hairs;
thorax long, sloping steadily from posterior eyes to posterior edge. Legs long, slender, moderately spiny, leg I more robust than the rest, leg IV longest, tibia I with dense fringes of black hairs. Abdomen elongate or oval, widest at rear half, truncate anteriorly, with soft hairs or lustrous setae. Male palp moderately sclerotised, embolus swollen, with a thick, short, curved conductor and a pouch pointing downwards. Epigynum moderately sclerotised, spermathecae spherical, with a short, curved copulatory duct.

Type species: *Siler cupreus* Simon, 1889.


*Siler semiglaucus* (Simon) (Figs. 92-95: Pl. XVIII)

- *Siler semiglaucus* (Simon, 1901); Prószyński, 1984. Wyzsza Szkoła Rolniczo-Pedagogiczna, Siedlcach 2: 137.

Measurements: male
CL- 1.82, CW- 1.25, AL- 1.98, AW- 1.00, TL- 3.80.

Inter ocular distance: AME-AME- 0.36, ALE-AME- 0.41, ALE-ALE- 0.89, PME-PME- 0.93, PLE-PME- 0.41, PLE-PLE- 1.00, AME-PME- 0.50, and ALE-PLE- 0.71.

Leg measurements: I 3.50(1.18,0.46,0.86, 0.64, 0.36); II 2.62(0.79,0.36,0.57,0.54,0.36); III 2.65(0.54,0.36,0.64,0.75,0.36); IV 3.68(0.75,0.43,0.96,1.00,0.54).

Leg formula- 4132.


Distribution: India: Kerala, West Bengal; China, Krakatau, Nepal, Philippines, Singapore, Sri Lanka, Sumatra, Vietnam, (Sebastian & Peter, 2009; Dhal i et al., 2010a; Keswani et al., 2012; Prószyński, 2015; Sen et al., 2015; Metzner 2016; WSC, 2016).

Genus: *Myrmarachne* MacLeay


Diagnosis: Ant mimicking, with long and narrow cephalothorax. Cervical grooves deeply distinct; cephalic area flat, usually much higher than the steeply sloping to convex thoracic area. Ocular quad nearly as long as broad. Sternum usually lanceolate and about three times as long as broad, apical end truncate and posterior end sharply pointed anterior to coxae IV. Cheliceral retromargin with several teeth, males with strongly developed chelicerae. Pedicel often visible from above. Abdomen elongate to ovate with transverse depression in male.

Type species: *Myrmarachne melanocephala* MacLeay, 1839.

Distribution: Cosmopolitan (Metzner, 2016; WSC, 2016).

Key to species:
1. Abdominal dorsum with 2 pairs of sigilla; cheliceral margins with more than 2 rows of teeth
   ------------------------------- caliraya Barrion & Litsinger

-37-
Abdominal dorsum without any sigilla; cheliceral margins with 2 rows of teeth

2. Abdomen overlapping the cephalothorax, pedicel not evident from above; cheliceral retromargin with 5 teeth, fangs with a median cusp; spermathecae united medially, elongate, each end bifurcate - robusta (Peckham and Peckham)

-Abdomen not overlapping the cephalothorax, pedicel well evident from above; cheliceral retromargin with 6 teeth, fangs smooth; spermathecae separate, coiled

-Myrmarachne caliraya Barrion & Litsinger

(Figs. 96-99: Pl. XVII)


Measurements: Male
CL- 3.00, CW- 1.82, AL- 3.00, AW- 2.06, TL- 6.18.

Inter ocular distance: AME-AME- 0.53, ALE-AME- 0.41, ALE-ALE- 1.18, PME-PME- 1.24, PLE-PME- 0.65, PLE-PLE- 1.47, AME-PME- 0.59, and ALE-PLE- 0.94.

Leg measurements: I 8.67(2.93, 1.07, 2.80, 1.27, 0.60); II 4.66(1.40, 0.60, 1.33, 0.93, 0.40); III 5.08(1.47, 0.54, 1.33, 1.20, 0.54); IV 8.07(2.80, 0.67, 2.33, 1.73, 0.54).

Leg formula- 1432.


Distribution: India: West Bengal; Philippines (Barrion & Litsinger, 1995; Dhali et al., 2010; Keswani et al., 2012; Sen et al., 2015; Metzner, 2016; WSC, 2016).

Myrmarachne robusta (Peckham & Peckham)

(Figs. 100-104: Pl. XVII)

- Salticus robustus Peckham & Peckham, 1892. Occasional Papers of the Natural History Society of Wisconsin 2(1): 27.

Measurements: Female
CL- 2.16, CW- 1.46, AL- 2.32, AW- 1.35, TL- 4.48.

Inter ocular distance: AME-AME- 0.49, ALE-AME- 0.49, ALE-ALE- 1.46, PME-PME- 1.14, PLE-PME- 0.46, PLE-PLE- 1.30, AME-PME- 0.62, and ALE-PLE- 0.86.

Leg measurements: I 7.11(2.32, 0.89, 2.18, 1.21, 0.51); II 4.47(1.39, 0.47, 1.14, 1.08, 0.39); III 4.08(1.29, 0.47, 1.18, 0.75, 0.39); IV 7.66(2.54, 0.79, 2.03, 1.79, 0.51).

Leg formula- 4123.


Distribution: India: Maharashtra, West Bengal; Myanmar (Tikader, 1973; Tikader, 1981; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Keswani et al., 2012; Benjamin, 2015; Prószyński, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).
**Myrmarachne melanocephala** MacLeay (Figs. 105-109: Pl. XVII)


**Measurements:** Female CL- 2.05, CW- 1.00, AL- 2.54, AW- 1.19, TL- 5.10.

**Inter ocular distance:** AME-AME- 0.35, ALE-AME- 0.29, ALE-ALE- 0.95, PME-PME- 0.84, PLE-PME- 0.35, PLE-PLE- 0.32, AME-PME- 0.46, and ALE-PLE- 0.61.

**Leg measurements:** I 2.93(1.00, 0.32, 0.85, 0.47, 0.29); II 2.40(0.79, 0.36, 0.61, 0.39, 0.25); III 3.05(0.97, 0.36, 0.61, 0.79, 0.32); IV 4.55(1.47, 0.51, 1.44, 1.04, 0.39).

**Leg formula-** 4312.


**Distribution:** India: Andaman Island, Assam, Kerala, West Bengal; Pakistano Indonesia (Tikader, 1973; Tikader, 1981; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Chetia & Kalita, 2012; Keswani et al., 2012; Benjamin, 2015; Prószyński, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

**Genus: Brettus Thorell**


**Diagnosis:** Cephalothorax oval, widest at middle, posterior end somewhat flat, laterally convex, covered with hairs, a white band along the margin, highest point at middle of ocular quad. Highly recurved anterior eye row makes arrangement in 4 rows. Legs long and slender; femur, patella and tibia of 1st leg robust with fringe of hairs on ventral margin, sharp spines on tibia. Abdomen spherical and dorsally covered with lustrous flat setae, ventrally with soft hairs. Male palp with spherical bulbous, conductor long, hair like and placed around bulbous. Epigynum anchor like.

**Type species:** *Brettus cingulatus* Thorell, 1895.

**Distribution:** Oriental and Ethiopian (Sebastian & Peter, 2009; Metzner, 2016; WSC, 2016).

**Key to species:**

1. Cheliceral teeth variable in size, fang serrate; sternum midlongitudinally with a black, narrow band ---------------------------------- anchorum Wanless

- Cheliceral teeth uniform in size, fang not serrate; sternum without any band

---------------------------------- albolimbatus Simon

**Brettus anchorum** Wanless (Figs. 110-115: Pl. XVI)


**Measurements:** Male CL- 2.14, CW- 1.95, AL- 2.55, AW- 1.50, TL- 4.55.
Inter ocular distance: AME-AME- 0.55, ALE-AME- 0.32, ALE-ALE- 1.18, PME-PME- 0.82, PLE-PME- 0.55, PLE-PLE- 1.00, AME-PME- 0.36, and ALE-PLE- 0.73.

Leg measurements: I 5.57(0.57,0.43,1.71, 0.43, 2.43); II 5.99(1.43,0.57,1.57,1.71, 0.71); III 4.29(1.00,0.43,1.14,1.29, 0.43); IV 7.88(1.71,0.43,2.14, 2.71, 0.89).

Leg formula- 4-21-3.


Distribution: India: Tamil Nadu, West Bengal; Nepal (Wanless, 1979; Sebastian & Peter, 2009; Keswani et al., 2012; Prószyński, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

*Brettus albolimbatus* Simon
(Figs. 116-122: Pl. XVI)


Measurements: Female
CL- 2.00, CW- 1.89, AL- 3.50, AW- 2.61, TL- 5.72.

Inter ocular distance: AME-AME- 0.44, ALE-AME- 0.39, ALE-ALE- 1.17, PME-PME- 1.00, PLE-PME- 0.50, PLE-PLE- 1.06, AME-PME- 0.56, and ALE-PLE- 0.78.

Leg measurements: I 17.19(2.09,0.64,1.91, 1.73, 0.82); II 5.45(1.45,0.45,1.27,1.64, 0.64); III 6.00(1.45,0.36,1.82,1.64, 0.73); IV 7.92(1.82,0.55,1.82, 2.73, 1.00).

Leg formula- 4132.


Distribution: India: Assam, Kerala, West Bengal; China (Wanless, 1979; Sebastian & Peter, 2009; Dhali et al., 2010a; Keswani et al., 2012; Prószyński, 2015; Saha & Raychaudhuri, 2015; Sen et al., 2015; Metzner, 2016; WSC, 2016).

**Genus: Portia** Karsch


Diagnosis: Moderate in size, usually with cryptic colour pattern. Carapace orange brown, covered with brown black hairs, wedge shaped white band running from conspicuous fovea to rear edge, broad white band marginally, longer than wide, widest at posterolateral eyes, with broad white moustache and exceedingly long hair anteriorly. Legs dark brown with light brown markings and moderately strong spines; femur, patella and tibia long, strong and hairy while metatarsi and tarsi slender and bare. Abdomen oval, slightly rounded anteriorly, pointed posteriorly and tufts of long, erect, orange white hairs on dorsum. Male palp generally with oval bulbus and long curved embolus. Epigynum with large spermathecae.

Type species: *Portiaschultzii* Karsch, 1878.

Distribution: Throughout tropics from Africa to Australia and the Solomon islands (Proszynski, 2015; Metzner 2016; WSC, 2016).
Portia fimbriata (Doleschall)
(Figs. 123-129; Pl. XVIII)

- Portia fimbriata (Doleschall, 1859); The World Spider Catalog, Version 17.5, 2016, [http://www.wsc.nmbe.ch].

Measurements: Female
CL- 2.64, CW- 2.29, AL- 2.86, AW- 1.71, TL- 5.50.

Inter ocular distance: AME-AME- 0.71, ALE-AME- 0.50, ALE-ALE- 1.71, PME-PME- 1.50, PLE-PME- 0.71, PLE-PLE- 1.64, AME-PME- 0.64, and ALE-PLE- 1.00.

Leg measurements: I 7.33(1.50,1.00,1.83, 2.00, 1.00); II 6.67(2.00,0.67,1.67,1.50, 0.83); III 5.33(1.17,0.67,1.33,1.33, 0.83); IV 8.99(1.83,0.83,2.50, 2.83, 1.00).


Distribution: India: Kerala, West Bengal; Amboina, Australia, Japan, Java, Krakatau, Malaysia, Nepal, Papua New Guinea, South Africa, Sri Lanka, Taiwan (Sebastian & Peter, 2009; Keswani et al., 2012; Prószyński, 2015; Sen et al., 2015; Metzner 2016; WSC, 2016).

FAMILY: CTENIDAE KEYSERLING
(False lycosids)


Diagnosis: Medium to very large, 2 clawed hunting spiders. Eyes 8, in 3 rows with 2, 4, 2 respectively. Legs I and II armed with strong bristles on lower side. Trochanters with deep ventral notch. Anterior spinnerets conical and not widely separated. Epigynum with broad septum and lateral horns. Male palp with a dorsal median concave apophysis.

Biology: They are large, free living, hunting spiders and appear to roam aimlessly over the leaf litter in rainforests and fallen logs on the ground. They are primarily nocturnal while many are diurnal and may be confused with lycosids. Speedy, unpredictable and several large ctenid species will readily attack humans if surprised or provoked. Reports of people getting 'chased' by these spiders are not uncommon. Such aggressive disposition combined with extremely toxic venom and a propensity to 'wander' into human habitation, may arguably qualify some ctenids as the world's most dangerous spiders.
Distribution:

Genus: *Ctenus* Walckenaer

**Diagnosis:** Cephalothorax longer than wide, wider at the middle, narrower at front. Both rows of eyes recurved, ALE in line with PME thus forming 3 rows of eyes. ALE smaller than AME. Tarsi with 2 claws. Retromargin of chelicerae armed with 4 or sometimes with 5 teeth. Labium longer than broad. Trochanters ventrally notched. Male palp always with tibial apophysis and with lamina. Epigynum with broad septum and lateral horns.

**Type species:** *Ctenus dubius* Walckenaer, 1805.
**Distribution:** Cosmopolitan (WSC, 2016).

*Ctenus sikkimensis* Gravely (Figs. 130-134; Pl. XVIII)

**Measurements:** Female
CL- 6.64, CW- 5.09; AL- 7.09, AW- 4.00; TL- 13.73.

**Inter ocular distance:** AME-AME- 0.64, ALE-AME- 0.36, ALE-ALE- 0.73, PME-PME- 1.36, PLE-PME- 0.45, PLE-PLE- 1.54, ALE-PLE- 0.64, and AME-PME- 0.64.

**Leg measurements:** I 16.33 (4.67, 2.22, 4.22, 3.78, 1.44); II 15.21 (4.44, 2.11, 3.78, 3.44, 1.44); III 18.33 (4.00, 1.78, 3.00, 3.33, 1.44); IV 18.33 (5.22, 2.11, 4.11, 5.11, 1.78).

**Leg formula:** 4123.


**Distribution:** India: Sikkim, West Bengal (Gravely, 1931; Tikader, 1970; Sebastian & Peter, 2009; Keswani *et al.*, 2012; Sen *et al.*, 2015; WSC, 2016).

**FAMILY: SPARASSIDAE BERTKAU**

(Giant crab spiders)


**Diagnosis:** Medium to large; cephalothorax usually broader than long except a few, with variable convexity and thickness; thoracic groove distinct and longitudinal. Eyes 8, size variable, in 2 rows, medians forming a quadrangle. Cheliceral margin with teeth. Legs long, laterigrade, at 90° angle to body, legs I and II longer than III and IV, with well developed scopulae; tarsal claw 2, with 2 teeth and claw tufts; trochanters notched; apical end of metatarsi with a soft trilobite membrane. Colulus absent. Epigynum complex, sclerotized and conspicuous. Male palp with strong tibial apophysis.

**Distribution:**

**Biology:** They are typically grey, brown and black, often with enough mottling to provide useful camouflage when they are resting on dark surfaces. It is usual to find huntsman spiders under bark, although they will sometimes be found on the walls of man-made constructions, inside fruit boxes, under stones, leaf litters. These are nocturnal, and females with their egg sac hide by day. The females of some species carry their egg sacs underneath the body by clasping it with their pedipalp. They do not spin webs, only build silk retreats.

**Key to genera:**

1. Femora with spine patches; abdomen dorsally mostly with bright transversal band in the posterior half, ventrally mostly with dark patch in front of the spinnerets; male palp with membranous conductor; epigynum with lateral lobes

-----------------------------------------
**Pseudopoda** Jager
Femora without spine patches; abdomen dorsally mostly without bright transversal band in the posterior half, ventrally mostly without dark patch in front of the spinnerets; male palp sheath-like; epigynum without lateral lobes

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Heteropoda Latreille

Genus: Pseudopoda Jager


Diagnosis: Small to large. Yellow, yellow-brown or dark red-brown with dark pattern. Femora with spine patches. Abdomen dorsally mostly with bright transversal band in the posterior half, abdomen ventrally mostly with dark patch in front of the spinnerets. Male palp with membranous conductor (not sheath-like as in Heteropoda spp.), embolus at least in its proximal part broadened (not filiform as in Heteropoda spp.), mostly whole embolus broadened and flattened, tegulum as long as bulb (not smaller as in Bhutaniella Jager), RTA arising in a mesial or basal position (not in a distal position as in Heteropoda spp.). Epigynum with lateral lobes (and mostly copulatory ducts) rising distinctly beyond epigastric furrow posteriad and covering median septum (in most Heteropoda spp. median septum visible).

Type species: Sarotes promptus O.P. Cambridge 1885.

Distribution: South East Asia (Jager, 2000; WSC, 2016).

Pseudopoda straminiosa (Kundu et al.)

(Figs. 135-139; Pl. XIX)


Measurements: Female
CL- 3.29, CW- 3.06, AL- 4.12, AW- 2.00, TL- 7.12.

Inter ocular distance: AME-AME 0.18, ALE-AME 0.29, ALE-ALE 0.76, PME-PME 0.29, PLE-PME 0.41, PLE-PLE 1.24, AME-PME 0.41, and ALE-PLE 0.41.

Leg measurements: I 11.22(3.44, 1.00, 3.11, 2.67, 1.00); II 11.33(3.33, 1.11, 3.33, 2.56, 1.00); III 7.90(2.56, 0.78, 2.22, 1.56, 0.78); IV 9.11(3.22, 0.67, 2.44, 2.00, 0.78).

Leg formula- 2143.


Distribution: India: West Bengal (Kundu et al., 1999; Sebastian & Peter, 2009; Keswani et al., 2012; Jager, 2014; Sen et al., 2015; WSC, 2016).

Genus: Heteropoda Latreille


Diagnosis: Carapace nearly as long as wide, upper surface nearly flat or in some very high posteriorly; cephalic part slightly depressed in front. Posterior eye row recurved and anterior eye row straight or little procurred, lateral eyes larger than medians and prominent. Ocular
quadrangle longer than wide, narrow in front. Epigynum with a pair of lobes, separated by a median septum. Male palp with a developed RTA, embolous short, tegulum without apophysis; ejaculatory duct prominent and thick.

**Type species:** *Aranea venatoria* Linnaeus, 1767.

**Distribution:** Throughout except Nearctic (WSC, 2016)

**Key to species:**
1. Maxillae with a basal piece; labium anteriorly truncate; abdominal dorsum without any marking; thoracic fovea deeply grooved

   - Maxillae without any extra piece; labium anteriorly round; abdominal dorsum with markings; thoracic fovea shallowly grooved

   **Heteropoda venatoria** (Linnaeus)

   (Figs. 140-145; Pl. XIX)


**Measurements:** Male  
CL- 7.00, CW- 6.44, AL- 8.00, AW- 4.11, TL- 14.78.

**Inter ocular distance:** AME-AME- 0.22, ALE-AME- 0.67, ALE-ALE- 1.44, PME-PME- 1.22, PLE-PME- 0.78, PLE-PLE- 2.22, AME-PME- 0.78 and ALE-PLE- 0.67.

**Leg measurements:** I 34.56(9.89, 4.00, 9.56, 9.00, 2.11); II 36.66(10.11, 4.00, 10.89, 9.22, 2.44); III 29.32(9.44, 3.44, 8.00, 6.44, 2.00); IV 30.67(8.00, 3.22, 8.56, 8.67, 2.22).

**Leg formula:** 2143.

**Material examined:** 1♂, Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 09.iv. 2009, coll. D. C. Dhali; 1♂, Ghoramara, BTR, Jalpaiguri, West Bengal, India, 31.x. 2010, coll. D. C. Dhali.

**Distribution:** India: Andaman & Nicobar Island, Kerala, West Bengal (Tikader, 1977; Sebastian & Peter, 2009; Keswani *et al*., 2012; Sen *et al*., 2015; WSC, 2016).

**Heteropoda nilgirina** Pocock

(Figs. 146-150; Pl. XIX)


**Measurements:** Female  
CL- 5.00, CW- 4.67, AL- 6.78, AW- 4.78, TL- 11.78.

**Inter ocular distance:** AME-AME- 0.44, ALE-AME- 0.44, ALE-ALE- 1.22, PME-PME- 0.44, PLE-PME- 0.67, PLE-PLE- 1.78, AME-PME- 0.56, and ALE-PLE- 0.56.

**Leg measurements:** I 19.46(5.56, 1.67, 5.89, 4.78, 1.56); II 20.12(5.89, 1.67, 6.22, 4.78, 1.56); III 17.33(5.44, 2.00, 4.56, 4.00, 1.33); IV 18.56(5.56, 1.78, 5.11, 4.89, 1.22).

**Leg formula:** 2143.

Distribution: India: Tamil Nadu, Uttar Pradesh, Uttaranchal, West Bengal (Sethi & Tikader, 1988; Sebastian & Peter, 2009; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

**FAMILY: GNAPHOSIDAE POCOCK**
(Running or ground or mouse spiders)

Diagnosis: Small to medium size, 2 clawed ecribellate spiders. Eyes 8, heterogeneous, in 2 rows. Chelicerae with boss and scopulae. Labium longer than wide; maxillae obliquely depressed, more or less converging, scopulate. Legs moderate, tapered, spinose, scopulate. Anterior spinnerets large, parallel, cylindrical, usually well separated, anterior lateral spinnerets with enlarged pyriform gland spigots.

Distribution:

Biology: Most of them are ground dwellers with only a few living on plants, where they roll up leaves; construct a silk retreat under stones or litter within which they remain during inactive period. They never spin a web but catch their prey using speed, force and agility. Their eyesight is poor but perceive prey by tactile or chemotactic stimuli and feed on ground and litter dwelling ants, termites and other insects.

**Genus: Drassodes Westering**

Diagnosis: Cephalothorax flat, broad in front, with a fovea, covered with pubescence. Anterior eye row slightly procurred, medians slightly larger than laterals, little closer to laterals than to each other. Posterior eye row longer than anterior, procurred, medians oval, slightly larger than laterals, much closer to each other than to adjacent laterals. Chelicerae strong, retromargin usually with 2, but promargin always with 2 teeth. Tibia I and II with 1 ventral spine on apical half. Abdomen longer than wide, posteriorly narrowed, covered with pubescence.

Type species: *Aranea lapidosa* Walckenaer, 1802.
**Distribution:** Cosmopolitan except Australia (WSC, 2016).

**Key to species:**

1. Abdominal dorsum with 1 pair of sigilla; cheliceral retromargin with 3 teeth; labium with an inverted U shaped band  
   \[ \text{Drassodes gujaratensis Patel & Patel} \]

- Abdominal dorsum with 2 pair of sigilla; cheliceral retromargin with 2 teeth; labium without any band  
   \[ \text{Drassodes meghalayaensis Tikader & Gajbe} \]

**Drassodes gujaratensis Patel & Patel**

(Figs. 151-156; Pl. XIX)


**Measurements:** Female

- **CL:** 1.50, **CW:** 1.09, **AL:** 1.93, **AW:** 1.07, **TL:** 3.63.

- **Inter ocular distance:** AME-AME: 0.11, ALE-AME: 0.09, ALE-ALE: 0.30, PME-PME: 0.11, PLE-PME: 0.11, PLE-PLE: 0.36, ALE-PLE: 0.11, and AME-PME: 0.16.

- **Leg measurements:** I: 4.09 (1.13, 0.52, 1.00, 0.96, 0.48); II: 3.16 (1.00, 0.43, 0.78, 0.52, 0.43); III: 2.74 (0.78, 0.39, 0.57, 0.61, 0.39); IV: 4.13 (1.04, 0.52, 1.00, 1.00, 0.57).

- **Leg formula:** 4123.

**Material examined:** 1♀, Malangi, JWLS, Jalpaiguri, West Bengal, India, 14. xi. 2002, coll. S. Saha; 1♀, South Rydak, BTR, Jalpaiguri, West Bengal, India, 07.x.2009, coll. D. C. Dhali.

**Distribution:** India: Gujarat, West Bengal (New record) (Patel & Patel, 1975; Sebastian & Peter, 2009; Keswani et al., 2012; WSC, 2016).

**Drassodes meghalayaensis Tikader & Gajbe**

(Figs. 157-163; Pl. XIX)


**Measurements:** Female

- **CL:** 2.32, **CW:** 1.71, **AL:** 3.86, **AW:** 1.96, **TL:** 6.47.

- **Inter ocular distance:** AME-AME: 0.18, ALE-AME: 0.11, ALE-ALE: 0.43, PME-PME: 0.18, PLE-PME: 0.21, PLE-PLE: 0.54, ALE-PLE: 0.14, and AME-PME: 0.21.

- **Leg measurements:** I: 4.79 (1.53, 0.73, 1.20, 0.73, 0.60); II: 4.33 (1.33, 0.67, 1.00, 0.73, 0.60); III: 4.13 (1.27, 0.53, 0.93, 0.80, 0.60); IV: 5.53 (1.53, 0.73, 1.27, 1.27, 0.73).

- **Leg formula:** 4123.


**Distribution:** India: Meghalaya, West Bengal (New record) (Tikader & Gajbe, 1977; Sebastian & Peter, 2009; Keswani et al., 2012; WSC, 2016).

**FAMILY: EUTICHURIDAE LEHTINEN**

(Dark sac spiders)


**Diagnosis:** Cephalothorax longer than wide, without fovea. Eyes 8, arranged in 2 rows, equal or sub equal, laterals close to each other. Maxillae with or without lateral notch. Legs

**Distribution:**

**Biological note:** They are usually found in sac like retreats made up of green leaves. Different types of sacs are used for nesting and mating.

**Genus: Cheiracanthium C. L. Koch**

**Diagnosis:** Cephalothorax ovoid, longer than wide, convex, without fovea or hardly noticeable. Eyes 8, small, in 2 rows, posterior row scarcely longer than anterior, median 4 eyes form trapezium, relatively narrow in front, lateral pairs very close to each other. Both margins of cheliceral with 2 or 3 teeth, far separated from fang. Dorsal spines on femur I and II absent; no ventral spines on tibia III. Tibia of male palp noticeably long and slender, with retrolateral apophysis, sometimes with dorsal and ventral apophysis; cymbium with strong spur at its base; tegulum with stout apophysis; embols long, arising on retrolateral side of tegulum. Epigynal plate flat or concave, copulatory opening at lateral margin; spermathecae small, nearly round and separate.

**Type species:** *Aranea punctoria* Villers, 1789.

**Distribution:** Throughout except North and South America (WSC, 2016).

**Key to species:**

1. Retromargin of chelicerae with 2 teeth ------------------------------------------- 2
   - Retromargin of chelicerae with 3 teeth ------------------------------------------ 6
2. Promargin of chelicerae with 2 teeth --------------------------------------------- 3
   - Promargin of chelicerae with 3 teeth -------------------------------------------- 5
3. Abdominal dorsum with 2 pairs of sigilla; cymbium with long and stout spur at its base, extending almost to the middle of tibia; retrolateral apophysis enormously developed ------------------------------------------ *indicum* O. P. Cambridge
   - Abdominal dorsum never with 2 pairs of sigilla; cymbium otherwise; retrolateral apophysis otherwise ------------------------------------------ 4
4. Abdominal dorsum with 1 pair of sigilla; spermathecae ball like; fertilization ducts long and spring like  \textit{triviale} (Thorell)  
- Abdominal dorsum with 3 pairs of sigilla and with a pale longitudinal marking; spermathecae sac like; fertilization ducts short and coiled  \textit{sikkimense} Majumder & Tikader
5. Abdominal dorsum with 1 pair of sigilla and devoid of markings; copulatory ducts long, tubular and opening into spermathecae after 1.5 turns; fertilization ducts flame like  \textit{himalayense} Gravely  
- Abdominal dorsum with 2 pairs of sigilla and with a basal marking; copulatory ducts short and opening into spermathecae without any turn; fertilization ducts tube like  \textit{melanostomum} (Thorell) 
6. Abdominal dorsum without any sigilla; lateral eyes closely apposed; embolous enormously long and coiled; tegular apophysis highly developed  \textit{insigne} O. P. Cambridge  
- Abdominal dorsum with 4 pairs of variable sigilla; lateral eyes separate; embolous not long and coiled; tegular apophysis weakly developed (from lit.)  \textit{murinum} (Thorell)

\textit{Cheiracanthium indicum} O. P. Cambridge  
(Figs. 164-169; Pl. XIX)  

\textbf{Measurements:} Male  
CL- 3.00, CW- 2.29, AL- 3.59, AW- 1.65, TL- 6.65.  
\textbf{Inter ocular distance:} AME-AME- 0.29, ALE-AME- 0.35, ALE-ALE- 1.06, PME-PME- 0.35, PLE-PME- 0.35, PLE-PLE- 1.12, AME-PME- 0.24 and ALE-PLE- 0.18.  
\textbf{Leg measurements:} I 19.33(4.78,1.11,5.44, 6.11, 1.89); II 13.65(3.53,1.00,3.55,4.44, 1.11); III 9.89(2.78,0.89,2.22,3.22, 0.78); IV 13.66(3.44,0.89,3.44, 4.78, 1.11).  
\textbf{Leg formula-} 1423.  

\textit{Cheiracanthium triviale} (Thorell)  
(Figs. 170-174; Pl. XX)  

\textbf{Measurements:} Female  
CL- 2.43, CW- 1.78, AL- 3.78, AW- 2.43, TL- 6.21.  
\textbf{Inter ocular distance:} AME-AME- 0.26, ALE-AME- 0.30, ALE-ALE- 0.87, PME-PME- 0.34, PLE-PME- 0.30, PLE-PLE- 0.91, AME-PME- 0.22 and ALE-PLE- 0.13.
Leg measurements: I 10.20(2.60,0.93,2.67, 2.80, 1.20); II 6.86(1.80,0.73,1.60,1.73, 1.00); III 5.07(1.33,0.73,1.07,1.40, 0.54); IV 7.61(2.07,0.80,1.87, 2.27, 0.60).

Leg formula- 1423.


Cheiracanthium sikkimense Majumder & Tikader
(Figs. 175-179; Pl. XX)

- Cheiracanthium sikkimense Majumder & Tikader, 1991; World Spider Catalog, Version 17.5, 2016, [www.wsc.nmbe.ch]

Measurements: Female

Inter ocular distance: AME-AME- 0.35, ALE-AME- 0.47, ALE-ALE- 1.29, PME-PME- 0.47, PLE-PME- 0.89, PLE-ALE- 0.24 and ALE-ALE- 0.24.

Leg measurements: I 17.89(4.67,1.11,5.00, 5.67, 1.44); II 11.99(3.44,1.00,3.22,3.44, 0.89); III 8.44(2.33,0.89,2.00,2.44, 0.78); IV 12.10(3.44,1.00,3.22, 3.55, 0.89).

Leg formula- 1423.


Cheiracanthium himalayense Gravely
(Figs. 180-184; Pl. XIX)

- Cheiracanthium himalayense Gravely, 1931; World Spider Catalog, Version 17.5, 2016, [www.wsc.nmbe.ch]

Measurements: Female

Inter ocular distance: AME-AME- 0.47, ALE-AME- 0.59, ALE-ALE- 1.65, PME-PME- 0.71, PLE-PME- 0.53, PLE-ALE- 1.71, AME-PME- 0.35, and ALE-ALE- 0.18.

Leg measurements: I 17.22(4.44,1.44, 4.56, 5.00, 1.78); II 11.66(3.11,1.11,3.00, 3.33, 1.11); III 8.68(2.56, 0.78, 2.00, 2.56, 0.78); IV 12.32(3.44, 1.22, 3.00, 3.56, 1.11).

Leg formula- 1423.


Cheiracanthium melanostomum (Thorell)  
(Figs. 185-189: Pl. XX)  

**Measurements:** Female  
CL- 3.00, CW- 2.35, AL- 3.76, AW- 2.47, TL- 6.70.  
**Inter ocular distance:** AME-AME- 0.35, ALE-AME- 0.47, ALE-ALE- 1.24, PME-PME- 0.47, PLE-PME- 0.47, PLE-PLE- 1.41, AME-PME- 0.35, and ALE-PLE- 0.18.  
**Leg measurements:** I 10.55(3.09, 1.00, 2.55, 2.91, 1.00); II 8.37(2.55, 0.91, 1.91, 2.09, 0.91); III 5.84(1.55,0.82, 1.18,1.65,0.64); IV 8.55(2.09,0/91,1.91, 2.73, 0.91).  
**Leg formula**- 1423.  
**Distribution:** India: Assam, Maharashtra, West Bengal; Bangladesh, Myanmar (Tikader, 1981; Majumder & Tikader, 1991; Sebastian & Peter, 2009; Keswani *et al.*, 2012; Saha & Raychaudhuri, 2015; Sen *et al*., 2015; WSC, 2016).  

Cheiracanthium insigne O. P. Cambridge  
(Figs. 190-195: Pl. XIX)  

**Measurements:** Male  
CL- 2.26, CW- 1.74, AL- 2.78, AW- 1.48, TL- 4.95.  
**Inter ocular distance:** AME-AME- 0.22, ALE-AME- 0.26, ALE-ALE- 0.65, PME-PME- 0.26, PLE-PME- 0.26, PLE-PLE- 0.74, AME-PME- 0.17 and ALE-PLE- 0.13.  
**Leg measurements:** I 14.20(3.33,0.87,3.93, 4.27, 1.80); II 8.74(2.50, 0.67, 2.27, 2.53, 0.87); III 6.47(1.73, 0.67, 1.33, 2.07, 0.67); IV 9.73, 2.60(0.73, 2.53, 3.14, 0.73).  
**Leg formula**- 1423.  
**Distribution:** India: Assam, Bihar, Maharashtra, Tamil Nadu; Sri Lanka, China (Majumder & Tikader, 1991; Biswas & Biswas, 1992; Sebastian & Peter; 2009; Keswani *et al*., 2012; WSC, 2016).  

Cheiracanthium murinum (Thorell)  
(Figs. 196-200: Pl. XX)  

-51-
Measurements: Female

Interocular distance: AME-AME- 0.41, ALE-AME- 0.47, ALE-ALE- 1.29, PME-PME-0.31, PLE-PME- 0.47, PLE-PLE- 1.29, AME-PME- 0.24 and ALE-PLE-0.18.

Leg measurements: I 12.78(3.11,1.00,3.56, 3.78, 1.33); II 9.56(2.22,1.11,2.56,2.78, 0.89); III 7.23(2.11,0.78,1.56,2.00, 0.78); IV 9.22(2.00,1.00,2.33, 3.00, 0.89).

Leg formula- 1243.


Distribution: India: Maharashtra, West Bengal; Myanmar (Majumder & Tikader, 1991; Biswas & Biswas, 1992; Sebastian & Peter; 2009; Kewani et al., 2012; Sen et al., 2015; WSC, 2016).

FAMILY: CORINNIDAE KARSH

(Ant-mimicking sac spiders)


Diagnosis: Small to medium, yellowish brown to dark brown, metallic, hunting spiders. Eyes 8, in 2 rows, widelror closely spaced, bulging anteriorly. Cephalothorax ovoid, sometimes elongate and heavily sclerotised. Abdomen ovoid, elongate, sometimes scutum with transverse bands or patches of white setae, strongly sclerotised at the book lung region. Anterior spinnerets sturdy and contiguous, posteriors slightly more separated than anteriors, median spinnerets with 3 and posterior spinnerets with 2 large, cylindrical spigots in females, these in males absent. Epigynum variable; median apophysis in most genera absent.

Distribution:

Biology: They are free living ground dwellers, usually found in woody debris, litter or humus on the forest floor in shady deciduous forest. Some members of the family mimic ants. They move ant like, involving rapid movements with jerky pauses and sudden changes in direction.
While walking, the abdomen moves up and down and the front legs are held in the air to mimic the antennae of ants. They build silky retreats in rolled up leaves and plant debris. If disturbed, they run rapidly in all directions and very difficult to catch.

Key to genera:
1. Carapace broad; ALE usually considerably larger than AME; posterior eye row larger than those of the anterior; male always with two or three rows of very distinct, long thickened setae at the distal end of the dorsal surface of the palpal cymbium

- Carapace narrow; ALE usually considerably smaller than AME; posterior eye row smaller than those of the anterior; male not always with two or three rows of very distinct, long thickened setae at the distal end of the dorsal surface of the palpal cymbium

Genus: Cambalida Simon


Diagnosis: Carapace relatively broad (width approximately 0.75x carapace length, usually less than 0.70x in Castianeira), ALE usually considerably larger than AME, and the posterior eye row larger than those of the anterior. Male always with two or three rows of very distinct, long, thickened setae at the distal end of the dorsal surface of the palpal cymbium. Number of these setae 6 – 10, and sometimes may be accompanied by slightly shorter thickened setae on the sides of the rows. Other genera that possess thickened setae do not show such an arrangement and usually only have 2 or 3 thickened setae at the cymbial apex.

Type species: Cambalida insulana Simon, 1909 by original designation (currently considered as nomen dubium as the types are lost (Haddad 2012)).

Distribution: Tropica Africa and India (Haddad, 2012; Murthappa et al., 2016; WSC, 2016).

Cambalida flavipes (Gravely)

(Figs. 201-208: Pl. XX)

- Cambalida flavipes (Gravely); Murthappa et al., 2016. Zootaxa, 4103(6): 533-535.

Measurements: Female:
CL- 2.57, CW- 1.48, AL- 2.57, AW- 1.82, TL- 5.17.

Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.09, ALE-ALE- 0.34, PME-PME- 0.22, PLE-PME- 0.13, PLE-PLE- 0.17, AME-PME- 0.17, and ALE-PLE- 0.17.

Leg measurements: I 4.94(1.33, 0.54, 1.20, 1.07, 0.80); II 4.40(1.20, 0.54, 1.00, 0.93, 0.73); III 3.95(0.80, 0.47, 0.93, 1.14, 0.61); IV 6.61(1.67, 0.67, 1.57, 1.87, 0.87).

Male:
CL- 2.50, CW- 1.45, AL- 2.52, AW- 1.80, TL- 5.10.

Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.09, ALE-ALE- 0.31, PME-PME- 0.20, PLE-PME- 0.13, PLE-PLE- 0.17, AME-PME- 0.17, and ALE-PLE- 0.17.

Leg measurements: I 4.90(1.30, 0.54, 1.20, 1.06, 0.80); II 4.35(1.18, 0.54, 1.00, 0.93, 0.70); III 3.95(0.80, 0.47, 0.93, 1.14, 0.61); IV 6.51(1.62, 0.67, 1.57, 1.82, 0.87).

Leg formula: 4123.

Material examined: 1♀, CWLS, Jalpaiguri, West Bengal, India, 02. vi. 2009, coll. D.C. Dhali; 1♀, Bhutanghat, BTR, Jalpaiguri, West Bengal, India, 11. x. 2009, coll. D.C. Dhali;

**Distribution:** India: Karnataka, Orissa, Tamil Nadu, West Bengal, (Tikader, 1981; Majumder & Tikader, 1991; Sebastian & Peter, 2009; Keswani et al., 2012; Sen et al., 2015; Murthappa et al., 2016; WSC, 2016).

**Genus: Castianeira Keyserling**

**Diagnosis:** Medium size, ant-like, heavily sclerotised and shiny spiders. Cephalothorax elongate, ovoid, with a prominent cephalic shield, usually dark to dark brown and with a distinct median fovea, short sparse scale like recumbent setae and frontally with few longer setae. Anterior eye row recurved, posterior row distinctly procurred, longer than former and medians slightly close to laterals than to each other. Chelicerae long, stout, with 2 promarginal and 2-3 retromarginal teeth. Tibia I and II with 2-3 pairs of ventral spines. Cymbium of male palp rounded at base, long and slender distally; embolus usually long, slender and spirally twisted. Epigynal plate rounded, convex and hairy; copulatory openings small, rounded or elliptical, well separated and distinct; spermatheca longer than wide; copulatory ducts short.

**Type species:** *Castianeira rubicunda* Keyserling, 1879.

**Distribution:** Cosmopolitan except Australian region (WSC, 2016).

**Key to species:**

1. Abdominal dorsum with 2 pairs of sigilla; scutum placed immediately below the pedicel, produced up to basal 2/3rd; copulatory openings at the epigynal fold; spermathecae oval and separate ------------------------------- *indica* Tikader - Abdominal dorsum with 3 pairs of sigilla; scutum placed below the pedicel but never produced; copulatory openings just above the epigynal fold; spermathecae elongate and fused with each other. 2

2. Spermathecae medially neck like, free, at both ends closely apposed; fertilization ducts long, gradually broadened and weakly curved outwardly

-------------------------------------------- *zetes* Simon  
Spermathecae closely apposed throughout, distally convergent; fertilization ducts long, gradually narrowing, curved at both ends -------------------------------- *himalayensis* Gravely

**Castianeira indica Tikader**

(Figs. 209-213: Pl. XX)

**Measurements:** Female
CL- 2.96, CW- 1.79, AL- 3.25, AW- 1.85, TL- 6.32.

**Inter ocular distance:** AME-AME- 0.25, ALE-AME- 0.18, ALE-ALE- 0.61, PME-PME- 0.29, PLE-PME- 0.18, PLE-PLE- 0.71, AME-PME- 0.21, and ALE-PLE- 0.14.

**Leg measurements:** I 5.68(1.73, 0.61, 1.27, 1.20, 0.87); II 5.61(1.53, 0.61, 1.40, 1.20, 0.87); III 4.74(1.33, 0.54, 1.00, 1.07, 0.80); IV 6.60(1.93, 0.61, 1.53, 1.73, 0.80).

**Leg formula:** 4123.

Distribution: Maharashtra, West Bengal (Majumder & Tikader, 1991; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Keswani et al., 2012; WSC, 2016).

Castianeira zetes Simon
(Figs. 214-218: Pl. XX)


Measurements: Female

Inter ocular distance: AME-AME- 0.29, ALE-AME- 0.18, ALE-ALE- 0.66, PME-PME- 0.36, PLE-PME- 0.24, PLE-PLE- 0.78, AME-PME- 0.18, and ALE-PLE- 0.18.

Leg measurements: I 6.61(1.87,0.54, 1.87, 1.40, 0.93); II 5.86(1.53,0.60, 1.73, 1.27, 0.73); III 5.47(1.67,0.60, 1.20, 1.33, 0.67); IV 7.54(2.00,0.67, 1.87, 2.00, 1.00).

Leg formula- 4.1.2.3.


Distribution: Assam, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal; Bangladesh, Bhutan (Majumder & Tikader, 1991; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

Castianeira himalayensis Gravely
(Figs. 219-223: Pl. XX)


Measurements: Female

Inter ocular distance: AME-AME- 0.20, ALE-AME- 0.27, ALE-ALE- 0.67, PME-PME- 0.47, PLE-PME- 0.20, PLE-PLE- 0.87, AME-PME- 0.33, and ALE-PLE- 0.20.

Leg measurements: I 8.59(2.13,0.80, 2.33, 2.00, 1.33); II 8.07(1.73,0.80, 2.27, 2.00, 1.27); III 7.34(1.67,0.80, 1.80, 2.00, 1.07); IV 9.94(2.33,0.87, 2.67, 3.27, 0.80).

Leg formula- 4.1.2.3.


Distribution: West Bengal (Majumder & Tikader, 1991; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).
FAMILY: CLUBIONIDAE WAGNER
(Sac spiders)

**Diagnosis:** Medium size, hunting spiders, with thoracic fovea shallow or absent. Eyes 8, in 2 rows, small, uniform in size, posterior eye row slightly longer than anterior row. Legs long, strongly spined, 2 clawed tarsi and metatarsi with dense claw tufts and scopulae. Anterior spinnerets close together and medians cylindrical. Male palp with variable retrolateral apophysis; embolus usually arise prolaterodistally on tegulum; cymbium usually with basal spur.

**Distribution:**

**Biology:** These nocturnal spiders are commonly found on foliage or on ground where they make tubular retreats in rolled up leaves or under stones or in litter. Their flat egg sac remains suspended within the retreat, guarded by the female. They are aggressive and use their legs to detect and grab prey. These are frequent on crops and play an important role in agro-ecosystems.

**Genus: Clubiona Latreille**

**Diagnosis:** Cephalothorax longer than wide, frontally somewhat narrowed and with a few large hairs, slightly convex, covered with fine and silky hairs. Fovea usually short, striae faint, radiating, occasionally with a pattern of darker veining. Eyes nearly straight or very slightly procured, AME close together than PME, PME nearer to PLE than to each other or all PE somewhat equidistant. Sternum attenuated in front and pointed behind. Cheliceral retromargin with 2-6 and promargin with 3-6 teeth in females while males tend to have fewer. Epigynal plate convex, flat or concave, round to elongate, well sclerotized; copulatory openings distinct and cavity like; copulatory duct anteriorly produced from spermathecae, bent or coiled; spermathecae variable with 2 parts.

**Type species:** Araneus pallidulus Clerck, 1757.
**Distribution:** Cosmopolitan (WSC, 2016).

**Key to species:**

1. Dorsum without any sigilla; fang denticulate; fertilization ducts long, coiled and downwardly directed  
   -Dorsum with paired sigilla; fang not denticulate; fertilization ducts otherwise  
   ____________________________________________________________  
   **denticulata** Dhali et al.

2. Retromargin of chelicerae with 3 teeth; spermathecae bean shaped  
   ____________________________________________________________  
   **2**

3. Retromargin of chelicerae with 3 teeth; spermathecae bean shaped  
   ____________________________________________________________  
   **tridentata** Dhali et al.

4. Retromargin of chelicerae with 3 teeth; spermathecae bean shaped  
   ____________________________________________________________  
   **rama** Dankittipakul & Singtripop

5. Dorsum with 3 pairs of sigilla; cephalothorax anteriorly with U-shaped brown patch; fertilization ducts long and convoluted  
   ____________________________________________________________  
   **pila** Dhali et al.

6. Epigynum with a common guide pocket and anteriorly not septate; anterior lobe of spermathecae not strongly sclerotised, lobe like; fertilization ducts divergent  
   ____________________________________________________________  
   **biloba** Dhali et al.

7. Epigynum without a common guide pocket and anteriorly septate; anterior lobe of spermathecae strongly sclerotised, ball like; fertilization ducts convergent  
   ____________________________________________________________  
   **pseudocordata** Dhali et al.

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**Clubiona denticulata Dhali et al.**

(Figs. 224-228: Pl. XXI)


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**Measurements:** Female  
CL- 4.06, CW- 4.06, AL- 6.12, AW- 3.53, TL- 10.18.

**Inter ocular distance:** AME-AME- 0.53, ALE-AME- 0.47, ALE-ALE- 0.82, PME-PME- 0.71, PLE-PME- 0.53, PLE-PLE- 1.76, AME-PME- 0.41, and ALE-PLE- 0.41.

**Leg measurements:** I 8.69(2.52,0.78,2.08, 2.57, 0.74); II 7.05(2.04,0.87,1.74,1.70, 0.70); III 6.76(1.87,0.96,1.66,1.70, 0.57); IV 5.57(1.70,0.78, 1.26, 1.26, 0.57).

**Leg formula:** 1234.

**Material examined:** 2♀♀, Buxaduar, BTR, Jalpaiguri, West Bengal, India, 25. v. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal (Dhali et al., 2016).
Clubiona tridentata Dhali et al.
(Figs. 229-236: Pl. XXI)


Measurements: Female
CL- 2.22, CW- 1.52, AL- 3.65, AW- 1.00, TL- 5.87.
Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.13, ALE-ALE- 0.52, PME-PME-0.34, PLE-PME- 0.17, PLE-PLE- 0.70, AME-PME- 0.17, and ALE-PLE- 0.17
Leg measurements: I 9.26(2.60,0.93, 2.80, 1.93, 1.00); II 7.33(2.20,0.80,2.20,1.40, 0.73); III 4.87(1.33,0.60,1.20,1.20, 0.54); IV 9.13(2.93,0.73, 2.07, 2.67, 0.73).
Leg formula- 1423.
Remarks: Morphological features of male are similar to female, excepting palp. So, only drawings of male palp are given here.
Distribution: India: West Bengal (Dhali et al., 2016).

Clubiona rama Dankittipakul & Singtripop
(Figs. 237-241: Pl. XXI)


Description: Female
Inter ocular distance: AME-AME- 0.29, ALE-AME- 0.29, ALE-ALE- 0.88, PME-PME-0.53, PLE-PME- 0.29, PLE-PLE- 1.18, AME-PME- 0.29, and ALE-PLE- 0.29.
Leg measurements: I 5.13(1.33,1.00,1.20, 1.00, 0.60); II 6.20(1.60,1.07,1.60,1.33, 0.60); III 5.47(1.67,0.80,1.13,1.40, 0.47); IV 7.26(2.27,0.93, 1.33, 2.13, 0.60).
Leg formula- 4231.
Distribution: India: West Bengal; Thailand (Dankittipakul & Singtripop, 2008a,b; Dhali et al., 2016; WSC, 2016).

Clubiona hexadentata Dhali et al.
(Figs. 242-246: Pl. XXI)


Measurements: Female
CL- 5.45, CW- 4.73, AL- 6.36, AW- 4.00, TL- 11.81.
Inter ocular distance: AME-AME- 0.64, ALE-AME- 0.55, ALE-ALE- 1.72, PME-PME-0.82, PLE-PME- 0.73, PLE-PLE- 2.27, AME-PME- 0.45, and ALE-PLE- 0.45.
Leg measurements: I 12.33(3.44,2.00,3.22, 2.56, 1.11); II 11.88(3.33,2.00,3.00,2.44, 1.11); III 9.00(2.78,1.67,2.22,1.44, 0.89); IV 11.00(2.33,1.56, 2.89, 2.89, 1.33).
Leg formula- 1243.


Distribution: India: West Bengal (Dhali et al. 2016).

Clubiona pila Dhali et al.
(Figs. 247-251: Pl. XXI)


Measurements: Female
CL- 1.89, CW- 1.29, AL- 2.21, AW- 1.08, TL- 4.21.

Inter ocular distance: AME-AME- 0.18, ALE-AME- 0.47, ALE-ALE- 0.14, PME-PME- 0.35, PLE-PME- 0.14, PLE-PLE- 0.64, AME-PME- 0.21, and ALE-PLE- 0.18.

Leg measurements: I 4.23(1.29,0.65,1.00, 0.76, 0.53); II 4.65(1.29,0.71,1.18,0.94, 0.53); III 4.06(1.18,0.59,0.76,1.00, 0.53); IV 5.94(1.65,0.65, 1.29, 1.76, 0.59).

Leg formula- 4123.


Distribution: India: West Bengal (Dhali et al. 2016).

Clubiona bilobata Dhali et al.
(Figs. 252-256: Pl. XXI)


Description: Female
CL- 2.50, CW- 1.96, AL- 2.86, AW- 1.47, TL- 5.50.

Inter ocular distance: AME-AME- 0.29, ALE-AME- 0.71, ALE-ALE- 0.21, PME-PME- 0.39, PLE-PME- 0.29, PLE-PLE- 0.97, AME-PME- 0.21, and ALE-PLE- 0.21.

Leg measurements: I 5.54(1.60,0.80,1.40, 1.07, 0.67); II 5.73(1.67,0.93,1.53,1.00, 0.60); III 4.61(1.20,0.54,0.93,1.27, 0.67); IV 7.17(2.02,0.80, 1.73, 2.02, 0.60).

Leg formula- 4213.


Distribution: India: West Bengal (Dhali et al., 2016).

Clubiona pseudocordata Dhali et al.
(Figs. 257-261: Pl. XXI)


Measurements: Female
CL- 1.68, CW- 1.21, AL- 3.00, AW- 1.54, TL- 4.68.

Inter ocular distance: AME-AME- 0.14, ALE-AME- 0.11, ALE-ALE- 0.36, PME-PME- 0.25, PLE-PME- 0.18, PLE-PLE- 0.57, AME-PME- 0.14, and ALE-PLE- 0.18.
Leg measurements: I 3.60(1.07,0.54,0.93, 0.73, 0.33); II 3.67(1.07,0.54,1.00,0.73, 0.33); III 3.27(0.93,0.47,0.67,0.87, 0.33); IV 4.61(1.27,0.54, 1.00, 1.33, 0.47).


Distribution: India: West Bengal (Dhali et al., 2016).

FAMILY: OXYOPIDAE THORELL

(Lynx spiders)


Diagnosis: Small to large, bright green to yellowish brown or dark brown, 3 clawed spiders. Eyes 8, arranged in a hexagon by strongly recurved anterior row and procurved posterior row. Clypeus wide, vertical and usually with conspicuous stripes and spots. Legs long, slender, with long, black, prominent spines.

Distribution:

Biology: They are mainly plant dwelling spiders, commonly found on grass, shrubs and trees and sometimes found on litter also. These are diurnal or nocturnal hunters with good vision, enabling quick detection of prey, which is caught with legs, and often by jumping a few centimeters or more into the air to seize a passing insect in full flight or executing short jumps in pursuit of prey flying over plants. The egg sac remains fastened to twig or leaf or suspended in small irregular web.

Key to genera:

1. Carapace straight in lateral view, rectangular, front face shorter than rear, clypeus vertical; AME close, separated by less than their diameter; genital organs in both sexes heavily sclerotised, tegular lobe U-shaped, epigynum with a U-shaped chitinized rim, with spermathecae anterior to it ---------------- Hamataliwa Keyserling

-Carapace not straight in lateral view, more or less oval, rear face vertical, clypeus sloped; AME not close, separated by more than their diameter; genital organs in both
sexes not heavily sclerotised, tegular lobe absent, epigynum otherwise with spermathecae lateral to it

Oxyopes Latreille

Genus: Hamataliwa Keyserling


Diagnosis: Carapace straight in lateral view, rectangular, front face shorter than rear, rear face vertical or receding. Abdomen not more than 1/5th longer than carapace or shorter; AME close, separated by less than their diameter and situated in front of the space between the ALE; genital organs in both sexes heavily sclerotised; tegulum with an U-shaped lobe; embolus shiny black, long, thin, flat, arising medially from the membranous part of tegulum, arches clockwise around laterally, distal end strongly thinning and completely hidden by the heavily sclerotised shield- or sheath-like conductor; epigynum with a U-shaped chitinized rim and a pair of spermathecae anterior to it, copulatory openings usually underneath the rim; long and thin fertilization ducts on the outer and lateral side of it.

Type species: Hamataliwa grisea Keyserling, 1887.

Distribution: Throughout except Palearctic region (WSC, 2016).

Key to species:

1. Abdominal dorsum with one pair of muscular apodemes; spermathecae smaller, concave laterally and separated; fertilization ducts inwardly curved
   ------------------------------- incompta (Thorell)
   -Abdominal dorsum with more than one pair of muscular apodemes; spermathecae larger, concave anteriorly and united together; fertilization ducts outwardly curved
   ------------------------------------------ hellia sp. nov.

Hamataliwa incompta (Thorell, 1895)

(Figs. 262-269: Pl. XXII)


Description: Female

Cephalothorax (Figs. 262) yellowish brown, glossy, nearly rectangular, convex, anteriorly subtruncate, medially widest, clothed with white pubescence, a patch of brown pubescence posteriorly on each side; both cephalic and thoracic region in same plain, latter with a brown, indistinct, midlongitudinal fovea. Eyes 8, pearly white, ringed with black, in 2 rows, anterior row strongly recurved, posterior row strongly procurred, PME at the top while AME at the lowest height; ocular quad longer than wide. Eye diameter- ALE>PLE>PME>AME. Clypeus yellowish brown, high, anterolateral corners black. Thoracic radii distinct and diverging. Chelicerae (Fig. 263) yellowish brown, longer than wide, robust, promargin with 2 and retromargin with 1 black tooth, scopulate; fang dark brown, short, robust. Labium (Fig. 264) yellowish brown, longer than wide, lateromedially produced, both ends subtruncate, clothed with black hairs and scopulate. Maxillae (Fig. 264) yellowish brown, longer than wide, inner margin of lower submedian concave, outer margin medially incurved, both ends triangular, clothed with black hairs and scopulate. Sternum (Fig. 264) yellowish, subcordate, anteriorly

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weakly concave, posteriorly narrow, blunt tip extending beyond coxae IV, clothed with long, erect spines. Legs yellow, long, slender, 3 clawed, each superior with more than 8 pectinations while inferior without such, without claw tufts; femora I with 3-0-3-2, femora II with 3-0-2-2, femora III with 3-0-2-1, femora IV with 3-0-2-0, tibia I-II with 2-4(2-2)-2-2, tibia III with 2-6(2-2-2)-2-3 and tibia IV with 2-4(2-2)-2-2 spination.

Abdomen (Figs. 262) chalk white, elongately oval, clothed with pale brown, dense, patches of hairs, laterally and posteriorly more dense; venter faintly chalk white, clothed with pale brown pubescence and brown hairs. Epigynum-Internal genitalia (Figs. 265-266): Epigynum black, strongly sclerotized.

**Measurements:** CL- 3.67, CW- 2.93, AL- 4.47, AW- 2.60, TL- 7.84.
Inter ocular distance: AME-AME- 0.13, ALE-AME- 0.27, ALE-ALE- 0.60, PME-PME- 0.67, PLE-PME- 0.47, PLE-PLE- 1.33, ALE-PLE- 0.73 and AME-PME- 0.80.

**Description:** Male-
Cephalothorax (Fig. 262) more or less similar to that of the holotype excepting femora III with 3-0-2-2, IV with 3-0-2-1, tibia II-III with 2-6 (2-2-2)-2-2, and IV with 2-4 (2-2)-2-1 spination.

Abdomen (Fig. 262) dorsally clothed with pale brown, patches of hairs, in a low dense manner, with 1 pair grey, small, sigilla medially.

Palp (Figs. 267, 268 & 269): Male palp with RTA triangular, often with acutely pointed tip in the upper middle; conductor boat-like, tip gradually widening, distally with a strongly chitinized, undulating rim; embolus very thin and filiform, base strongly chitinized, with transverse bar.

**Measurements:** CL- 2.87, CW- 2.01, AL- 3.17, AW- 2.10, TL- 6.04.
Inter ocular distance: AME-AME- 0.13, ALE-AME- 0.27, ALE-ALE- 0.53, PME-PME- 0.60, PLE-PME- 0.40, PLE-PLE- 1.26, ALE-PLE- 0.66, and AME-PME- 0.73.

**Material examined:** 3♀♂, 02. iv. 2009, Murti, GNP, Jalpaiguri, West Bengal, India, 26°44’N; 88°47’E, coll. D. C. Dhali; 1♂, 01. vi. 2009, Murti, GNP, Jalpaiguri, West Bengal, India, 26°44’N; 88°47’E, coll. D. C. Dhali.

**Remarks:** Present species is found to be a replica of *Hamataliwa reticulata* (Biswas et al., 1996) (particularly in dorsal habitus, u shaped rim of epigynum, fertilization duct, conductor and embolus of the male palp). Intense study on the species leads to conclude that the species is *Hamataliwa incompta* (Thorell, 1895). *Hamataliwa reticulata* (Biswas et al., 1996) is therefore proposed as the junior synonym of *H. incompta* (Thorell, 1895).

**Distribution:** India (New record): West Bengal; Myanmar, Thailand, Malaysian, Indonesia, Philippines: (WSC, 2016).

*Hamataliwa hellia sp. nov.*
(Figs. 270-274; Pl. XXII)

**Description:** Female (Holotype)
CL- 2.76, CW- 2.35, AL- 4.10, AW- 2.94, TL- 700. Cephalothorax (fig. 270) yellowish brown, nearly rectangular, convex, clothed with white pubescence; both cephalic and thoracic region in same plain, with an indistinct, midlongitudinal furrow, extending from short, reddish brown, longitudinal fovea to below PME. Eyes 8, pearly white, ringed with black, in 2 rows, anterior row strongly recurved, posterior row strongly procured, PME at the top while AME at the lowest height; ocular quad longer than wide. Eye diameter- ALE>PLE>PME>AME.
Inter ocular distance: AME-AME 0.18, ALE-AME 0.18, ALE-ALE 0.47, PME-PME 0.41, PLE-PME 0.47, PLE-PLE 1.18, ALE-PLE 0.65, and AME-PME 0.71. Clypeus yellowish brown, height high, anterolateral corners black. Thoracic radii distinct and diverging. Chelicerae (fig. 271) yellowish brown, subtriangular, robust, promargin with 2 and retromargin with 1 black teeth, scopulate; fang dark brown, short, robust, inner margin weakly serrated.

Labium (fig. 272) yellowish brown, longer than wide, inner margin of lower submedian concave, outer margin medially incurved weakly, clothed with black hairs and scopulate. Maxillae (fig. 272) yellowish brown, longer than wide, inner margin of lower submedian concave, outer margin medially incurved weakly, clothed with black hairs and scopulate. Sternum (fig. 272) yellowish brown, subcordate, anteriorly weakly concave, posteriorly narrow, blunt tip extending beyond coxae IV, clothed with 2 long, erect spines anteriorly. Legs yellow, long, slender, 3 clawed, each superior with more than 10 pectinations while inferior without such, without claw tufts; femora I-II with 3-0-2-2, femora III with 3-0-2-1, femora IV with 3-0-1-1, tibia I with 2-4(2-2)-2-2, tibia II-III with 2-6(2-2)-2-2 and tibia IV with 2-4(2-2)-2-1 spination. Leg measurements: I 9.69(2.87,0.67,2.69,2.53,0.93); II 8.14(2.40,0.73,2.27,1.87,0.87); III 5.54(1.67,0.73,1.47,1.07,0.60); IV 5.79(1.73,0.60,1.33,1.40,0.73). Leg formula 1243.

Abdomen (fig. 270) creamy white, oval, clothed with pubescence; dorsum midlongitudinally with a chalk white reticulate band enclosing a creamy white lance shaped region, extending from little below the anterior margin to lower sub middle, with 2 pairs brown, small, sigilla on each side of mid line, 5 tiny sigilla in a row on each side medially; venter creamy white, with midlongitudinal pale band, 4 rows of tiny sigila on it, clothed with brown pubescence.

Epigynum-Internal genitalia (figs. 273-274): Epigynum black, highly sclerotized, ring like, excepting v-shaped incurved anteriorly; copulatory ducts short and thin; spermathecae large fused together, each with a notch anteriorly; fertilization ducts short, thin, medially curved, and opened into atrium.

Material examined: 1♀, Jayanti, BTR, Jalpaiguri, West Bengal, India, 01. x. 2009, coll. D. C. Dhali; 2♀♀, South Rydak, BTR, Jalpaiguri, West Bengal, India, 06. x. 2009, coll. D. C. Dhali.

Distribution: India: West Bengal.

Etymology: The species name is derived from H. helia (Chamberlin, 1929).

Remarks: The species shows a close affinity to Hamataliwa helia (Chamberlin, 1929), but can be separated by i) dorsum with 2 pairs brown, small, sigilla on each side of mid line, 5 tiny sigilla in a row on each side medially (without any sigilla in H. helia); ii) epigynum ring like, excepting v-shaped incurved anteriorly (epigynum pear-shaped, void in H. helia); iii) spermathecae large fused together, each with a notch anteriorly (spermathecae smaller, round, not fused together in H. helia). Such differences justify the erection of the new species.

Genus: Oxyopes Latreille


Diagnosis: AME over half way up to the front of face, PME just beyond the top of front face, posterior eye row strongly procurved and equidistant from each other, clypeus and femora usually lined with black, cheliceral retromargin with at least single tooth, male palp without tegular lobe, retrolateral margin of cymbium without basal apophysis.
Type species: *Aranea heterophthalma* Latreille, 1804.

**Distribution:** Cosmopolitan (WSC, 2016).

**Key to species:**

1. Abdominal dorsum with paired of muscular apodemes ---------------------------------- 2
   - Abdominal dorsum without muscular apodemes ----------------------------------- 5
2. Abdominal dorsum with a pair of muscular apodemes; epigynum heavily sclerotized, nearly v-shaped; spermathecae comma shaped ----------------------hotingchiehi Schenkel
   - Abdominal dorsum with more than a pair of muscular apodemes; epigynum moderately sclerotised, shaped otherwise; spermathecae otherwise --------------- 3
3. Abdominal dorsum with lance shaped grey marking; clypeus with dark lines, extending from AME to the base of cheliceral fang ---------------------------- 4
   - Abdominal dorsum with scattered grey markings; clypeus with chalk white lines, extending from AME to the base of cheliceral fang -------------------------- pawani Gajbe
4. Thorax with indistinct, diverging radii; lance shaped marking of abdominal dorsum distally radiating, further posterolaterally with few oblique dark lines; labium anteriorly rounded ------------------- fabae Dhali et al.
   - Thorax with prominent, diverging radii; lance shaped marking of abdominal dorsum neither radiating nor with any dark lines further; labium anteriorly weakly concave ----------------------------- javamus Thorell
5. Sternum posteriorly long, produced and bifid; internal genitalia without any accessory structure; spermathecae comma shaped ------------------------ pankaji Gajbe & Gajbe
   - Sternum posteriorly shortly produced but not bifid; internal genitalia with accessory structures; spermathecae triangular ----------------------------- shweta Tikader

**Oxyopes hotingchiehi Schenkel**
(Figs. 275-279: Pl. XXII)


**Measurements:** Female
CL- 2.73, CW- 1.93, AL- 5.00, AW- 2.33, TL- 8.33.

**Inter ocular distance:** AME-AME- 0.20, ALE-AME- 0.13, ALE-ALE- 0.47, PME-PME-0.40, PLE-PME- 0.33, PLE-PLE- 0.93, AME-PME- 0.54, and ALE-PLE- 0.33.

**Leg measurements:** I 10.13(2.73,0.87,2.73, 2.73, 1.07); II 9.53(2.73,0.87,2.47,2.53, 0.93); III 7.47(2.07,0.80,1.73,2.07, 0.80); IV 8.54(2.07,0.80, 2.20, 2.60, 0.80).

**Leg formula**- 1243.

**Material examined:**

**Distribution:** India: Assam, West Bengal; China (Schenkel, 1963; Chen & Zhang, 1991; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).

**Oxyopes pawani Gajbe**
(Figs. 280-284: Pl. XXII)


**Measurements:** Female
CL - 3.47, CW - 2.73, AL - 6.80, AW - 2.60, TL - 10.27.

**Inter ocular distance:** AME-AME - 0.20, ALE-AME - 0.20, ALE-ALE - 0.47, PME-PME - 0.54, PLE-PME - 0.47, PLE-PLE - 1.00, AME-PME - 0.40, and ALE-PLE - 0.80.

**Leg measurements:**
- I: 13.11(3.56,1.11,3.89, 3.11, 1.44);
- II: 13.00(3.89,1.11,3.56,3.33, 1.11);
- III: 11.55(3.44,1.11,3.00,2.89, 1.11);
- IV: 11.66(3.44, 1.00,3.11,3.00, 1.11).

**Leg formula:** - 1243.

**Material examined:** 3♀♀, Dima, BTR, Jalpaiguri, West Bengal, India, 18. ix. 2010, coll. D. C. Dhali.

**Distribution:** India: Madhya Pradesh, West Bengal (Gajbe, 1992, ’99, 2008; Sebastian & Peter, 2009; Keswani et al., 2012; WSC, 2016).

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**Oxyopes fabae Dhali et al.**
(Figs. 285-289: Pl. XXII)


**Measurements:** Female
CL - 2.26, CW - 1.96, AL - 3.09, AW - 1.57, TL - 5.35.

**Inter ocular distance:** AME-AME - 0.22, ALE-AME - 0.17, ALE-ALE - 0.39, PME-PME - 0.34, PLE-PME - 0.39, PLE-PLE - 0.87, AME-PME - 0.70, and ALE-PLE - 0.34.

**Leg measurements:**
- I: 8.34(2.20,0.60, 2.27,2.40, 0.87);
- II: 7.29(2.07,0.60,2.02,1.93, 0.67);
- III: 6.14(1.67,0.60,1.60,1.67, 0.60);
- IV: 7.02(2.02,0.60, 1.80, 1.87, 0.73).

**Leg formula:** - 1243.

**Material examined:** 1♀, Jaldapara, JWLS, Jalpaiguri, West Bengal, India, 12. iv. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal (Dhali et al., 2015).

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**Oxyopes javanus Thorell**
(Figs. 290-295: Pl. XXII)


**Measurements:** Male
CL - 2.43, CW - 1.96, AL - 3.13, AW - 1.30, TL - 5.56.

**Inter ocular distance:** AME-AME - 0.17, ALE-AME - 0.17, ALE-ALE - 0.34, PME-PME - 0.30, PLE-PME - 0.34, PLE-PLE - 0.74, AME-PME - 0.57, and ALE-PLE - 0.30.

**Leg measurements:**
- I: 19.60(2.40,0.67,2.60, 2.80, 1.13);
- II: 8.52(2.33,0.73,1.80,2.73, 0.93);
- III: 7.41(2.20,0.54,1.67,2.20, 0.80);
- IV: 8.32(2.33,0.60,1.73, 2.73, 0.93).

**Leg formula:** - 1243.


**Distribution:** India: Assam, Kerala, Madhya Pradesh, West Bengal; China to Indonesia, Philippines (Tikader & Biswas, 1981; Barrion & Litsinger, 1995; Gajbe, 2008; Sebastian & Peter, 2009; Keswani et al., 2012; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).
Oxyopes pankaji Gajbe & Gajbe
(Figs. 296-300: Pl. XXII)


Measurements: Female
CL- 3.86, CW- 2.00, AL- 3.71, AW- 1.41, TL- 6.71.

Inter ocular distance: AME-AME- 0.24, ALE-AME- 0.12, ALE-ALE- 0.41, PME-PME- 0.41, PLE-PME- 0.41, PLE-PLE- 1.00, AME-PME-0.53, and ALE-PLE- 0.35.

Leg measurements: I 7.95(2.13, 0.67, 2.20, 2.02, 0.93); II 7.40(2.27,0.73, 1.67, 1.80, 0.93); III 6.40(1.87,0.67, 1.40, 1.73, 0.73); IV 8.06(2.27,0.73, 1.80, 2.53, 0.73).

Leg formula- 4123.


Oxyopes shweta Tikader
(Figs. 301-305: Pl. XXII)


Measurements: Female

Inter ocular distance: AME-AME- 0.36, ALE-AME- 0.18, ALE-ALE- 0.45, PME-PME- 0.55, PLE-PME- 0.36, PLE-PLE- 1.09, ALE-PLE- 0.36, and AME-PME- 0.73.

Leg measurements: I 15.55(4.44,0.89,4.33, 4.22, 1.67); II 15.00(4.22,0.89,4.11,4.22, 1.56); III 13.23(4.00,1.11,3.56,3.67, 0.89); IV 15.34(4.56,1.00,4.11, 4.56, 1.11).

Leg formula- 1423.


Distribution: India: Arunachal Pradesh, Assam, Kerala, Manipur, Meghalaya, Sikkim, Tripura, West Bengal; China (Tikader, 1970; Tikader & Biswas, 1981; Gajbe, 1999, 2008; Biswas & Biswas, 1992, 2004,’06; Sebastian & Peter, 2009; Dhali et al., 2010b; Keswani et al., 2012; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).
FAMILY: LYCOSIDAE SUNDEVALL
(Wolf spiders)

**Diagnosis:** Small to large, cephalothorax high, narrowing in front; eyes 8, in 3 rows, anterior row with 4, small, forming straight or recurved or procurred line; posterior row strongly recurved so as to form 2 rows, each of 2 large eyes. Legs spiny, 3rd shorter than others, tarsi with 3 claws without claw-tuft, trichobothria numerous, irregularly arranged on tibiae, metatarsi and tarsi; all trochanters with a semi circular notch on distal margin below.

**Distribution:**

**Biological note:** These free living, ground dwelling spiders are most likely to be encountered in the field. They will be seen running away through the grass when one walks along. They are commonly known as wolf spiders because they run down their prey.

**Key to genera:**
1. Metatarsi IV usually as long as to longer than patella plus tibia together
   - Metatarsi IV usually shorter than patella plus tibia together

2. Posterior spinnerets prominently longer than others, 2 segmented, apical one conical; epigynum with distinct process; sternum usually with mid longitudinal black band
   - Posterior spinnerets not longer than others, not 2 segmented; epigynum without any distinct process; sternum without any band

3. Epigynal cavity partly divided by a tongue like septum; subpaleal sclerite of male palp with 2 processes; tegular apophysis basally wide, bearing variable projections while narrow distal part carrying small subapical protrusion before evenly curved tip
   - Epigynal cavity discretely divided into 2 cavities by the median septum; subpaleal sclerite of male palp without any process; tegular apophysis with usual base, neither bearing any projection nor protrusion

-67-
4. Median septum inverted “T”-shaped; spines of femur I variable; abdomen variably coloured
   -Median septum otherwise; femur I with 2 dorsal and 1 or 2 prolateral spines; abdomen usually pale, mottled or similar to carapace
   \textit{Arctosa} C. L. Koch

5. Epigynum with 2 hoods; tibia I and II armed with 3 pairs of ventral spines; cymbium with cluster of thick setae; tegular lobe not ear-like
   \textit{Lycosa} Latreille
   -Epigynum without any hood; tibia I and II never armed with 3 pairs of ventral spines; cymbium never with cluster of thick setae; tegular lobe ear-like
   \textit{Hogna} Simon

\textbf{Genus: Hippasa Simon 1885}


\textbf{Diagnosis:} Cephalothorax convex, longer than wide, cephalic area pronouncedly narrowed in front. Anterior row of eyes slightly wider than 2\textsuperscript{nd} row, ocular quad posteriorly wider. Sternum cordate, pointed posteriorly behind coxae IV, usually black banded midlongitudinally. Chelicerae relatively strong and with 3 retromarginal teeth. Legs long, thin, clothed with spines and hairs, leg IV exceptionally long. Posterior spinnerets prominently longer than the others, 2 segmented. Epigynum with distinct process.

\textbf{Type species:} \textit{Pirata agelenoides} Simon, 1884.

\textbf{Distribution:} Cosmopolitan except Australian region (Biswas & Biswas, 1992; Sebastian & Peter, 2009; WSC, 2016).

\textbf{Key to species:}

1. Sternum uniform in colour; body elongate
   -Sternum with midlongitudinal band; body not elongate
   \textit{Hippasa madraspatana} Gravely

2. Abdominal dorsum without any sigilla; labium basally pedunculate; spermathecae elongate, medially weakly concave
   \textit{Hippasa agelenoides} (Simon)
   -Abdominal dorsum with 3 pairs of sigilla; labium roughly rectangular; spermathecae otherwise
   \textit{Hippasa greenalliae} (Blackwall)

\textbf{Hippasa madraspatana} Gravely

(Figs. 306-311: Pl. XXIII)


\textbf{Measurements:} Male
CL- 1.75, CW- 1.00, AL- 1.75, AW- 0.95, TL- 3.50.

\textbf{Inter ocular distance:} AME-AME- 0.09, ALE-AME- 0.11, ALE-ALE- 0.32, PME-PME- 0.32, PLE-PME- 0.20, PLE-PLE- 0.43, ALE-PLE- 0.30, and AME-PME- 0.16.

\textbf{Leg measurements:} I 5.88(1.47, 0.41, 1.59, 1.35, 1.06), II 4.47(0.82, 0.35, 1.06, 1.24, 1.00), III 4.17(0.82, 0.35, 1.06, 1.29, 0.65), IV 6.65(1.41, 0.35, 1.65, 2.12, 1.12).

Leg formula- 4123.

\textbf{Material examined:} 1\^\textcircled{a}, CWLS, Jalpaiguri, West Bengal, India, 02.vi. 2009, coll. D. C. Dhali.

\textbf{Distribution:} India: Gujarat, Tamil Nadu, West Bengal (Gravely, 1924; Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali \textit{et al.}, 2012; Sen \textit{et al.}, 2015; WSC, 2016).
Hippasa agelenoides (Simon)
(Figs. 312-316: Pl. XXIII)

Measurements: Female

Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.13, ALE-ALE- 0.43, PME-PME-0.57, PLE-PME- 0.61, PLE-PLE- 0.74, and AME-PME- 26.

Leg measurements: I 7.14(2.00, 0.87, 1.73, 1.47, 1.07); II 6.79(1.73, 0.93, 1.60, 1.53, 1.00); III 6.14(1.47, 0.87, 1.40, 1.47, 0.93); IV 9.41(1.80, 0.87, 2.20, 3.07, 1.47).

Leg formula- 4123.


Distribution: India: Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal; to Taiwan (Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

Hippasa greenalliae (Blackwall)
(Figs. 317-321: Pl. XXIII)

Measurements: Female
CL- 2.00, CW- 2.43, AL- 4.30, AW- 2.48, TL- 6.30.

Inter ocular distance: AME-AME- 0.22, ALE-AME- 0.17, ALE-ALE- 0.52, PME-PME-0.39, PLE-PME- 0.39, PLE-PLE- 0.70, ALE-PLE- 0.48, and AME-PME- 0.17.

Leg measurements: I 5.79(1.53, 1.07, 1.53, 1.13, 0.53); II 5.68(1.07, 1.27, 1.40, 1.27, 0.67); III 5.14(0.87, 0.80, 1.20, 1.60, 0.67); IV 6.13(1.13, 0.80, 1.33, 2.33, 0.73).

Leg formula- 4123.

**Distribution:** India: Karnataka, Kerala, Maharashtra, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh, China, Sri Lanka, (Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Genus: Draposa Kronestedt**


**Diagnosis:** Small to medium size, cephalic region nearly in same plane with thoracic region, clypeus vertical; chelicerae much smaller. Labium usually wider than long with basal articular notch. Metatarsi IV usually longer than or as long as patella plus tibia together; superior claw toothed all over the length. Subpaleal sclerite of male palp with 2 processes partly hidden by palea in terminal part of the bulbus, as well as by transverse tegular apophysis with wide basal part carrying variable projections and narrow distal part carrying small subapical protuberance before evenly curved tip; Epigynum with a cavity partly divided by a tongue like septum.

**Type species:** Lycosa nicobarica Thorell, 1891.

**Distribution:** Oriental region only (Kronestedt, 2010; WSC, 2016).

**Key to species:**

1. Ocular area pale; abdominal dorsum with 11 pairs of small sigilla; cheliceral promargin with 3 teeth; cephalothorax medially with 2 pairs of black, small spots
   ----------------------------- amkhasensi (Tikader & Malhotra)
   -Ocular area very dark; dorsum without any sigilla; cheliceral promargin with 2 teeth; cephalothorax without any spot
   ----------------------------- burasantiensis (Tikader & Malhotra)

**Draposa amkhasensis** (Tikader & Malhotra)

(Figs. 322-326; Pl. XXIII)


**Measurements:** Male

CL-2.91, CW-2.35, AL-2.70, AW-1.70, TL-5.61.

**Inter ocular distance:** AME-AME-0.17, ALE-AME-0.22, ALE-ALE-0.57, PME-PME-0.57, PLE-PME-0.65, PLE-PLE-0.96, ALE-PLE-0.83, and AME-PME-0.30.

**Leg measurements:** I 8.40(2.07, 1.00, 1.93, 2.07, 1.33); II 7.13(1.47, 0.93, 1.73, 1.93, 1.07); III 7.40(1.87, 0.93, 1.53, 2.00, 1.07); IV 10.73(2.53, 1.00, 2.20, 3.47, 1.53).

**Leg formula-** 4132.

**Material examined:** 1 ♂, Jaldapara, JWLS, Jalpaiguri, West Bengal, India, 12. iv. 2009, coll. D. C. Dhali; 3 males, Murti, GNP, Jalpaiguri, West Bengal, India, 01. vi. 2009, coll. D. C. Dhali.

**Distribution:** India: Madhya Pradesh, West Bengal (Tikader & Malhotra, 1980; Majumder & Tikader, 1991; Biswas & Biswas, 1992; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).
**Draposa burasantiensis** (Tikader & Malhotra)  
(Figs. 327-331: Pl. XXIII)


**Measurements:** Male  
CL - 2.50, CW - 1.96, AL - 2.25, AW - 1.36, TL - 4.75.

**Inter ocular distance:** AME-AME- 0.18, ALE-AME- 0.14, ALE-ALE- 0.32, PME-PME-0.71, PLE-PME- 0.64, PLE-PLE- 0.82, ALE-PLE- 0.71, and AME-PME- 25.

**Leg measurements:** I 6.28(1.47, 0.87, 1.67, 1.67, 0.60); II 6.21(1.27, 0.80, 1.47, 1.67, 1.00); III 5.99(1.20, 0.90, 1.33, 1.73, 0.93); IV 8.68(1.87, 0.87, 1.87, 2.87, 1.20).

**Leg formula:** 4123.

**Material examined:** 1♂, Bichabhanga, GNP, Jalpaiguri, West Bengal, India, 15. iv. 2009, coll. D. C. Dhali; 1♂, Murti, GNP, Jalpaiguri, West Bengal, India, 01. vi. 2009, coll. S. Sen.

**Distribution:** India: West Bengal; China (Tikader & Malhotra, 1976, 1980; Tikader & Biswas, 1981; Biswas & Biswas, 1992; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Genus: Pardosa C. L. Koch**


**Diagnosis:** Small to medium size, cephalic region nearly in same plane with thoracic region, clypeus vertical; chelicerae much smaller. Labium usually wider than long with basal articular notch. Metatarsi IV usually longer than or as long as patella plus tibia together; superior claw toothed all over the length. Cymbium of male palp with 1-3 sharp spines apically, terminal apophysis tooth like, conductor shaft like, reaching basal margin of palea to dorsolateral border of bulbus, anterior and posterior paleal process absent, tegulum without subapical protuberance. Epigynum with distinct hoods, with 1 or 2 paired cavities, atrium broad, and deep, copulatory opening usually laterally to median septum.

**Type species:** *Lycosa alacris* C. L. Koch, 1833.

**Distribution:** Cosmopolitan except Australian region (WSC, 2016).

**Key to species:**

1. Size more than 7 mm  
2. -Size less than 7 mm  
3. Abdominal dorsum with 1 pair of sigilla; epigynal median septum posteriorly v-shaped; spermathecae tubular and curved  
4. -Abdominal dorsum with more than 1 pair of sigilla; median septum posteriorly not v-shaped; spermathecae not as above  
5. Abdominal dorsum with 3 pairs of sigilla; cephalothorax with 1 pair of black markings medially; cheliceral promargin with 3 teeth  
6. -Abdominal dorsum with 5 pairs of sigilla; cephalothorax without any marking; cheliceral promargin with 2 teeth  
7. Anterior eye row weakly procurved  
8. -Anterior eye row weakly recurved
5. Sternum unmarked; abdominal dorsum with sigilla -------------------------------6
   -Sternum marked by elongately triangular, black markings both posteromedially and anteromedially; dorsum without sigilla; spermathecae bean shaped
   ---------------------------------------- pusiola (Thorell)
6. Epigynum with 2 large hoods -----------------------------------------------7
   -Epigynum with 2 small, indistinct hoods; abdominal dorsum with 4 pairs of sigilla; spermathecae roughly comma like ------------------ birmanica Simon
7. Spermathecae bilobed, coiled; abdominal dorsum with 1 pair of sigilla; cheliceral promargin with 3 teeth -------------------------------------- procura Yu & Song
   -Spermathecae bilobed but uncoiled; dorsum with 6 pairs of sigilla; cheliceral promargin with 2 teeth ------------------------- songosa Tikader & Malhotra
8. Sternum marked
   -Sternum unmarked; epigynal median septum inverted T shaped; spermathecae comma shaped ------------------------------------- sumatra Thorell
9. Sternum with V shaped mark; abdominal dorsum with 7 pairs of sigilla; spermathecae tube like; copulatory ducts short and straight ---------------- heterophthalma (Simon)
   -Sternum posteriorly marked; dorsum with 3 pairs of sigilla; spermathecae flat, leaf like; copulatory ducts long and curved ---------------- kupupa (Tikader)

Pardosa chambaensis Tikader & Malhotra
(Figs. 332-336: Pl. XXV)


Measurements: Female
Inter ocular distance: AME-AME- 0.24, ALE-AME- 0.24, ALE-ALE-0.72, PME-PME-0.76, PLE-PME- 0.82, PLE-PLE-1.53, ALE-PLE- 1.12, and AME-PME- 0.47.
Leg measurements: I 7.87(2.00, 0.67, 2.13, 1.87, 1.20); II 7.74(1.87, 0.67, 2.13, 1.87, 1.20); III 7.74(2.00, 0.67, 2.00, 2.07, 1.00); IV 9.80(2.40, 0.67, 2.00, 3.13, 1.60).
Leg formula- 412=3.
Distribution: India: Himachal Pradesh, West Bengal (Tikader & Malhotra, 1976, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

Pardosa tridentis Caporiacco
(Figs. 337-342: Pl. XXVI)


Measurements: Male
CL- 5.00, CW- 4.00, AL- 4.00, AW- 2.53, TL- 9.00.
Inter ocular distance: AME-AME- 0.27, ALE-AME- 0.27, ALE-ALE- 0.80, PME-PME-0.67, PLE-PME- 0.67, PLE-PLE- 1.00, ALE-PLE- 0.93, and AME-PME- 0.33.
Leg measurements: I 14.00(3.78, 1.89, 3.33, 2.89, 2.11); II 12.56(3.56, 1.67, 2.44, 2.89, 2.00); III 11.34(2.78, 1.56, 2.22, 2.89, 1.89); IV 16.45(4.00, 1.67, 3.33, 4.89, 2.56).
Leg formula- 4123.

_Pardosa pseudoannulata_ (Bösenberg & Strand)  
(Figs. 343-347: Pl. XXV)


Measurements: Female  
Inter ocular distance: AME-AME- 0.29, ALE-AME- 0.18, ALE-ALE- 0.65, PME-PME-0.76, PLE-PME- 0.71, PLE-PLE- 1.18, ALE-PLE- 0.88, and AME-PME- 0.29.  
Leg measurements: I 9.89(2.67, 1.22, 2.56, 2.33, 1.00); II 9.89(2.67, 1.22, 2.67, 2.33, 1.00); III 9.66(2.33, 1.22, 2.11, 2.56, 1.44); IV 14.55(3.56, 1.33, 3.22, 4.56, 1.89).  
Leg formula- 41=23.

Distribution: India: Kerala, Tamil Nadu, West Bengal; Bangladesh, Bhutan, Japan, Indonesia, Myanmar, Nepal, Pakistan, Philippines (Gravely, 1924; Tikader & Malhotra, 1980; Tikader & Biswas, 1981; Biswas & Biswas, 1992; Barrion & Litsinger, 1995; Biswas & Raychaudhuri, 2003b Gajbe, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

_Pardosa pusiola_ (Thorell)  
(Figs. 348-352: Pl. XXV)


Measurements: Female  
CL- 2.64, CW- 2.17, AL- 3.11, AW- 1.96, TL- 6.18.  
Inter ocular distance: AME-AME- 0.21, ALE-AME- 0.18, ALE-ALE- 0.55, PME-PME-0.61, PLE-PME- 0.57, PLE-PLE- 1.00, ALE-PLE- 0.79, and AME-PME- 0.29.  
Leg measurements: I 8.00(1.91, 1.00, 2.00, 1.82, 1.27); II 7.28(1.73, 1.00, 1.73, 1.73, 1.09); III 6.74(1.45, 0.82, 1.56, 1.82, 1.09); IV 10.64(2.36, 0.91, 2.36, 3.45, 1.56).  
Leg formula- 4123.

Distribution: India: West Bengal; Bangladesh, Bhutan, China, Indonesia, Myanmar, Nepal, Sri Lanka (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Biswas &
Raychaudhuri, 2003; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Pardosa birmanica** Simon
(Figs. 353-357: Pl. XXV)


**Measurements:** Female

**Inter ocular distance:** AME-AME- 0.21, ALE-AME- 0.14, ALE-ALE- 0.50, PME-PME- 0.39, PLE-PME- 0.54, PLE-PLE- 0.82, ALE-PLE- 0.61, and AME-PME- 0.21.

**Leg measurements:** I 5.73(1.60, 0.90, 1.53, 1.13, 0.67); II 5.07(1.53, 0.73, 1.27, 0.87, 0.67); III 4.33(1.27, 0.73, 1.13, 0.60, 0.60); IV 8.00(1.87, 0.80, 1.67, 2.53, 1.13).

**Leg formula:** 4123.


**Distribution:** India: Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh, Bhutan, China, Myanmar, Pakistan, Philippines (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Barrion & Litsinger, 1995; Biswas & Raychaudhuri, 2003; Gajbe, 2007; Sebastian & Peter, 2009; Dhali et al., 2010b, ‘12; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).

**Pardosa procurva** Yu & Song
(Figs. 358-362: Pl. XXV)


**Measurements:** Female
CL- 1.93, CW- 1.68, AL- 2.93, AW- 2.07, TL- 4.86.

**Inter ocular distance:** AME-AME- 0.13, ALE-AME- 0.13, ALE-ALE- 0.36, PME-PME- 0.60, PLE-PME- 0.51, PLE-PLE- 0.80, ALE-PLE- 0.76, and AME-PME- 0.33.

**Leg measurements:** I 5.20(1.27, 0.73, 1.27, 1.13, 0.80); II 4.74(1.20, 0.67, 1.07, 1.07, 0.73); III 4.94(1.27, 0.60, 1.00, 1.40, 0.67); IV 6.94(1.73, 0.67, 1.60, 2.27, 0.60).

**Leg formula:** 4132.

**Material examined:** 1♀, Buxaduar, BTR, Jalpaiguri, West Bengal, India, 08.iv. 2010, coll. D. C. Dhali.

**Distribution:** India: West Bengal; China, Taiwan (Tso & Chen, 2004; Dhali et al., 2012; WSC, 2016).
Pardosa songosa Tikader & Malhotra

(Figs. 363-373: Pl. XXV)


**Measurements:** Female
CL- 2.54, CW- 2.00, AL- 2.50, AW- 1.82, TL- 5.08.

**Inter ocula distance:** AME-AME- 0.18, ALE-AME- 0.14, ALE-ALE- 0.46, PME-PME-0.61, PLE-PME- 0.61, PLE-PLE- 0.93, ALE-PLE- 0.71, and AME-PME- 0.25.

**Leg measurements:** I 6.13(1.33, 0.87, 1.53, 1.40, 1.00); II 5.74(1.20, 0.87, 1.40, 1.40, 0.87); III 5.46(1.47, 0.73, 1.20, 1.33, 0.73); IV 8.33(1.80, 0.87, 1.80, 2.73, 1.13).

**Leg formula**- 4123.

**Measurements:** Male

**Inter ocula distance:** AME-AME- 0.17, ALE-AME- 0.17, ALE-ALE- 0.48, PME-PME-0.57, PLE-PME- 0.52, PLE-PLE- 0.96, ALE-PLE- 0.70, and AME-PME- 0.30.

**Leg measurements:** I 5.00(1.14, 0.25, 1.43, 1.39, 0.79); II 4.89(1.14, 0.39, 1.36, 1.29, 0.71); III 4.86(1.29, 0.32, 1.11, 1.43, 0.71); IV 6.33(1.21, 0.43, 1.54, 2.11, 1.04).

**Leg formula**- 4123.


**Distribution:** India: Assam, Uttar Pradesh, West Bengal; Bangladesh, China (Tikader & Malhotra, 1976, 1980; Tikader & Biswas, 1981; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2010b, ’12; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).

Pardosa sumatrana (Thorell)

(Figs. 374-378: Pl. XXVI)


**Measurements:** Female
CL- 2.39, CW- 1.89, AL- 2.25, AW- 1.43, TL- 4.64.
Inter ocular distance: AME-AME 0.18, ALE-AME 0.14, ALE-ALE 0.46, PME-PME 0.57, PLE-PME 0.61, PLE-PLE 1.00, ALE-PLE 0.71, and AME-PME 0.25.

Leg measurements: I 6.53(1.47, 0.80, 1.73, 1.60, 0.93); II 6.47(1.67, 0.80, 1.53, 1.60, 0.87); III 6.06(1.67, 0.60, 1.33, 1.73, 0.73); IV 9.67(2.13, 0.80, 2.07, 3.20, 1.47).

Leg formula- 4123.


Pardosa heterophthalma (Simon) (Figs. 379-383: Pl. XXV)


Measurements: Female
CL- 2.43, CW- 1.91, AL- 2.91, AW- 1.78, TL- 5.34.

Inter ocular distance: AME-AME 0.17, ALE-AME 0.13, ALE-ALE 0.43, PME-PME 0.57, PLE-PME 0.61, PLE-PLE 0.91, ALE-PLE 0.74, and AME-PME 0.26.

Leg measurements: I 6.48(1.74, 0.83, 1.52, 1.43, 0.96); II 5.83(1.48, 0.83, 1.26, 1.30, 0.96); III 5.40(1.35, 0.74, 1.22, 1.26, 0.83); IV 8.56(2.04, 0.91, 1.74, 2.65, 1.22).

Leg formula- 4123.


Distribution: India: Tamil Nadu, West Bengal; to Indonesia (Tikader & Malhotra, 1980; Biswas & Raychaudhuri, 2003; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

Pardosa kupupa (Tikader) (Figs. 384-388: Pl. XXV)

Measurements: Female
CL- 2.32, CW- 1.75, AL- 2.68, AW- 1.54, TL- 5.12.

Inter ocular distance: AME-AME- 0.18, ALE-AME- 0.14, ALE-ALE- 0.43, PME-PME- 0.57, PLE-PME- 0.61, PLE-PLE- 0.97, ALE-PLE- 0.75, and AME-PME- 0.21.

Leg measurements: I 7.63(2.09, 0.82, 2.09,1.72,0.91); II 6.45(2.00,0.64,1.72,1.45, 0.64); III 6.75(1.65,0.73,1.54,1.92, 0.91); IV 10.45(2.36,0.82,2.27, 3.55, 1.45).

Leg formula: 4123.


Distribution: India: Sikkim, West Bengal (Tikader, 1970; Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

Genus: Arctosa C. L. Koch

Diagnosis: Moderately large. Carapace mottled, longitudinal light band variable. Chelicerae with 2 or 3 promarginal and 3 retromarginal teeth. Femur I with 2 dorsal and 1 or 2 prolateral spines. Abdomen usually pale, mottled, similar in color to carapace. Terminal apophysis of male palp conspicuous; embolous straight or curved, largely hidden by median apophysis in ventral view. Tegulum with retrolateral prominence bearing small soft area. Epigynum with conspicuous atrium divided by median septum, without hood.

Type species: Aranea cinerea Fabricius, 1777.


Key to species:
1. Length more than 5 mm; carapace with 2 prominent black spots above; abdominal dorsum without any band -------------------------- himalayensis Tikader & Malhotra
- Length less than 5 mm; carapace without any spot; abdominal dorsum with pale or black longitudinal band -------------------------- 2

2. Carapace with 2 curved bands in between PLE, 2 black lines just above thoracic groove; abdominal dorsum with pale brown longitudinal band; labium cake like, apically round -------------------------- quinquedens Dhali et al.
- Carapace devoid of band and line; abdominal dorsum with a black longitudinal band; labium not cake like, apically concave ---------------------------- indica Tikader & Malhotra

Arctosa himalayensis Tikader & Malhotra
(Figs. 389-393: Pl. XXIII)

Measurements: Female
CL- 2.82, CW- 1.82, AL- 3.18, AW- 2.18, TL- 6.00.

Inter ocular distance: AME-AME- 0.21, ALE-AME- 0.11, ALE-ALE- 0.43, PME-PME- 0.29, PLE-PME- 0.39, PLE-PLE- 0.54, ALE-PLE- 0.46, and AME-PME- 0.11.
**Leg measurements:** I 6.28 (1.82, 0.82, 1.35, 1.41, 0.88); II 5.74 (1.59, 0.82, 1.24, 1.24, 0.88); III 4.83 (1.24, 0.65, 0.94, 1.24, 0.76); IV 7.93 (2.34, 0.65, 1.76, 2.12, 1.06).

**Leg formula:** 4123.

**Material examined:** 1 ♀, Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 14. iv. 2010, coll. D. C. Dhali; 1 ♀, Poro, BTR, Jalpaiguri, West Bengal, India, 22. ix. 2010, coll. D. C. Dhali.

**Distribution:** India: Uttar Pradesh, West Bengal (Tikader & Malhotra, 1980; Majumder & Tikader, 1991; Biswas & Biswas, 1992; Sebastian & Peter, 2009; Dhali et al., 2012; WSC, 2016).

**Arctosa quinquedens Dhali et al.**
(Figs. 394-398: Pl. XXIII)


**Measurements:** Female
CL- 2.22, CW- 1.57, AL- 2.52, AW- 1.61, TL- 4.74.

**Inter ocular distance:** AME-AME-0.13; ALE-AME-0.13; ALE-ALE-0.39; PME-PME-0.61; PLE-PME-0.57; PLE-PLE-0.83; ALE-AME-0.30.

**Leg measurements:** I 4.86(1.40,0.53, 1.20, 1.00, 0.73); II 3.94(1.07,0.60, 0.73, 0.53); III 3.66(0.73,0.40, 1.27, 0.73, 0.53); IV 5.47(1.13,0.60, 1.47, 1.40, 0.87).

**Leg formula:** 4123.

**Material examined:** 1 ♀, Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 9. iv. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal (Dhali et al., 2012).

**Arctosa indica Tikader & Malhotra**
(Figs. 399-403: Pl. XXIII)


**Measurements:** Male
CL- 2.16, CW- 1.49, AL- 1.76, AW- 1.24, TL- 4.11.

**Inter ocular distance:** AME-AME- 0.14, ALE-AME- 0.11, ALE-ALE- 0.32, PME-PME-0.27, PLE-PME- 0.27, PLE-PLE- 0.35, ALE-PLE- 0.35, and AME-PME- 0.08.

**Leg measurements:** I 4.80(1.27, 0.73, 1.33, 0.87, 0.60); II 3.86(1.23, 0.67, 0.73, 0.73, 0.60); III 3.94(1.07, 0.60, 0.67, 1.07, 0.53); IV 5.46(1.53, 0.67, 1.00, 1.53, 0.73).

**Leg formula:** 4132.

**Material examined:** 2 ♂♂, Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 12. iv. 2010, coll. D. C. Dhali.

**Distribution:** India: Maharashtra, West Bengal; China (Tikader & Malhotra, 1980; Majumder & Tikader, 1991; Biswas & Biswas, 1992; Sebastian & Peter, 2009; Dhali et al., 2012; WSC, 2016).
Genus: *Lycosa* Latreille


**Diagnosis:** Carapace longer than wide, clypeus slanting, ocular quad slightly wider behind. Labium always longer than wide, with basal prominent excavations, usually 1/3 or more of its length. Tibia I and II armed with 3 pairs of ventral spines. Metatarsi IV shorter than tibia plus patella together. Epigynum with 2 hoods, median septum inverted “T”-shaped, copulatory tube thin and short, spermathecae expanded. Male palp with triangular, laterally directed median apophysis and with a triangular, ventrally directed prominence on anterior margin, cymbium with cluster of thick setae.

**Type species:** *Aranea tarantula* Linnaeus, 1758.

**Distribution:** Cosmopolitan (WSC, 2016).

**Key to species:**

1. Total length more than 10 mm
   - 2
   - Total length less than 10 mm
     - 4

2. Anterior eye row slightly procurved; base of thoracic region with 2 dark, large, depressed, triangular patches
   - *indagatrix* Walckenaer
   - Anterior eye row straight or nearly straight; base of thoracic region without any such
     - 3

3. Abdominal dorsum with 4 pairs of sigilla but without any marking and patch; inner base of chelicerae with a black marking and promargin with 2 teeth; epigynum with a transverse, semicircular, large guide pocket anteriorly
   - *carmichaeli* Gravely
   - Abdominal dorsum without any sigilla but with a lens shaped marking anteriorly, followed by posteromedian black patches; inner base of chelicerae without any marking and promargin with 1 tooth; epigynum with 2 longitudinal, large guide pockets
   - *shillongensis* Tikader & Malhotra

4. Cheliceral promargin with 2 teeth
   - 5
   - Cheliceral promargin with 3 teeth

5. Anterior eye row slightly recurved; sternum pointed beyond coxae IV; epigynal median septum heart shaped and posteriorly free
   - *mackenziei* Gravely
   - Anterior eye row straight; sternum not pointed behind beyond coxae IV; median septum not heart shaped and posteriorly attached

6. Pedicel evident from above; epigynal median septum anteriorly much wider; spermathecae oval; fertilization ducts upwardly directed
   - *kempi* Gravely
   - Pedicel not evident from above; median septum not so wide; spermathecae tubular; fertilization ducts downwardly directed

7. Abdominal dorsum with 5 pairs of sigilla and a spindle shaped pale patch anteriorly; ring like copulatory openings prominent on either side of median septum
   - *tista* Tikader
   - Abdominal dorsum without any sigilla but with patch otherwise; copulatory openings otherwise

8. Abdominal dorsum pale with midlongitudinal brown irregular markings; thorax medially with a pair of tiny, black spots; spermathecae bilobed, triangular and sac like; fertilization ducts downwardly and then outwardly directed

-79-
- Abdominal dorsum pale with few brown spots; thorax medially without any spot; spermathecae single lobed, tubular; fertilization ducts downwardly and then inwardly directed

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**Lycosa indagatrix Walckenaer**

(Figs. 404-409: Pl. XXIV)


**Measurements:** Male

- CL- 6.53, CW- 4.73, AL- 5.33, AW- 3.20, TL- 11.86.
- **Inter ocular distance:** AME-AME- 0.40, ALE-AME- 0.33, ALE-ALE- 0.60, PME-PME- 1.00, PLE-PME- 0.80, PLE-PLE- 1.40, ALE-PLE- 1.13, and AME-PME- 0.47.
- **Leg measurements:** I 18.00(4.00, 2.33, 4.33, 4.56, 2.78); II 16.67(3.78, 2.00, 4.00, 4.00, 2.89); III 15.54(3.44, 2.11, 3.22, 4.44, 2.33); IV 20.11(5.11, 2.33, 4.56, 5.11, 3.00).
- **Leg formula:** 4123.

**Material examined:** 1♂, Rymatang, BTR, Jalpaiguri, West Bengal, India, 09.iv. 2010, coll. D. C. Dhali; 1♂, Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 12.iv. 2010, coll. D. C. Dhali.

**Distribution:** India: Andhra Pradesh, Tamil Nadu, West Bengal (*New record*); Sri Lanka (Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; WSC, 2016).

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**Lycosa carmichaeli Gravely**

(Figs. 410-414: Pl. XXIV)


**Measurements:** Female

- CL- 5.26, CW- 4.07, AL- 5.67, AW- 3.07, TL- 10.93.
- **Inter ocular distance:** AME-AME- 0.40, ALE-AME-0.27, ALE-ALE-0.93, PME-PME-1.00, PLE-PME-1.00, PLE-PLE-1.60, ALE-PLE-1.20, and AME-PME-0.40.
- **Leg measurements:** I 15.45(4.22, 1.89, 3.67, 3.67, 2.00); II 14.66(4.33, 1.44, 3.56, 3.33, 2.00); III 14.11(4.00, 1.22, 3.33, 3.56, 2.00); IV 19.45(5.00, 1.89, 4.11, 5.89, 2.56).
- **Leg formula:** 4123.

**Material examined:** 1♂, Dhupjora, GNP, Jalpaiguri, West Bengal, India, 15.x. 2009, coll. D. C. Dhali; 2♀♀, Poro, BTR, Jalpaiguri, West Bengal, India, 13.vi. 2010, coll. D. C. Dhali.

**Distribution:** India: Assam, Uttar Pradesh, West Bengal (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

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**Lycosa shillongensis Tikader & Malhotra**

(Figs. 415-419: Pl. XXIV)


**Measurements:** Female

- CL- 6.18, CW- 5.18, AL- 6.00, AW- 4.36, TL- 12.19.
Inter ocular distance: AME-AME- 0.36, ALE-AME- 0.36, ALE-ALE- 1.09, PME-PME- 0.91, PLE-PME- 1.00, PLE-PLE- 1.63, ALE-PLE- 1.36, and AME-PME- 0.45.

Leg measurements: I 14.77(3.56, 2.33, 3.44, 3.44, 2.00); II 13.77(3.00, 2.22, 3.33, 3.11, 2.11); III 13.33(3.22, 2.00, 2.67, 3.44, 2.00); IV 18.00(3.67, 3.22, 4.00, 4.78, 2.33).

Leg formula- 4123.


Distribution: India: Manipur, Meghalaya, West Bengal (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992, 2004; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Lycosa mackenziei** Gravely
(Figs. 420-424: Pl. XXIV)


Measurements: Female

Inter ocular distance: AME-AME- 0.22, ALE-AME- 017, ALE-ALE- 0.52, PME-PME- 0.57, PLE-PME- 0.57, PLE-PLE- 0.96, ALE-PLE- 0.70, and AME-PME- 0.26.

Leg measurements: I 8.87(2.40, 0.93, 2.07, 2.07, 1.40); II 8.47(2.07, 1.13, 1.93, 2.07, 1.27); III 8.14(2.07, 1.00, 1.67, 2.20, 1.20); IV 12.01(2.87, 1.20, 2.67, 3.67, 1.67).

Leg formula- 4123.


Distribution: India: Bihar, Karnataka, Kerala, Punjab, West Bengal; Bangladesh, Pakistan (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Lycosa kempi** Gravely
(Figs. 425-432: Pl. XXIV)


Measurements: Female

Inter ocular distance: AME-AME- 0.18, ALE-AME- 0.14, ALE-ALE- 0.39, PME-PME- 0.30, PLE-PME- 0.39, PLE-PLE- 0.55, ALE-PLE- 0.39, and AME-PME- 0.11.

Leg measurements: I 5.80(1.53, 0.87, 1.33, 1.00, 1.07); II 5.20(1.40, 0.80, 1.20, 1.13, 0.67); III 4.67(1.20, 0.80, 1.07, 1.00, 0.60); IV 7.14(1.93, 0.87, 1.60, 1.87, 0.87).

Leg formula- 4123.

Measurements: Male
CL - 2.80, CW - 2.00, AL - 2.72, AW - 1.75, TL - 6.16.

Inter ocular distance: AME-AME- 0.18, ALE-AME- 0.14, ALE-ALE- 0.39, PME-PME- 0.30, PLE-PME- 0.39, PLE-PLE- 0.50, ALE-PLE- 0.35, and AME-PME- 0.11.

Leg measurements: I 5.75(1.50, 0.87, 1.31, 1.00, 1.07); II 5.15(1.38, 0.80, 1.20, 1.10, 0.67); III 4.64(1.20, 0.80, 1.04, 1.00, 0.60); IV 7.10(1.90, 0.87, 1.60, 1.86, 0.87).

Leg formula- 4123.
Remarks: Morphological features of male are similar to female, excepting palp. So, only drawings of male palp are given here.


Distribution: India: Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, West Bengal; Bhutan, China, Pakistan (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992, 2004,' 06; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; WSC, 2016).

Lycosa madani Pocock
(Figs. 433-437: Pl. XXIV)


Measurements: Female
CL- 3.04, CW- 2.18, AL- 3.04, AW- 1.74, TL- 6.08.

Inter ocular distance: AME-AME- 0.26, ALE-AME- 0.13, ALE-ALE- 0.52, PME-PME- 0.52, PLE-PME- 0.57, PLE-PLE- 0.83, ALE-PLE- 0.91, and AME-PME- 0.26.

Leg measurements: I 8.36(1.73, 1.18, 2.00, 2.09, 1.36); II 7.74(1.65, 1.09, 1.82, 1.82, 1.36); III 6.80(1.54, 0.91, 1.54, 1.63, 1.18); IV 10.08(2.09, 1.18, 2.18, 3.00, 1.63).


Distribution: India: Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Orissa, West Bengal (Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

Lycosa tista Tikader
(Figs. 438-442: Pl. XXV)


Measurements: Female
CL- 2.39, CW- 1.78, AL- 2.39, AW- 1.52, TL- 4.78.

Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.13, ALE-ALE- 0.43, PME-PME- 0.39, PLE-PME- 0.39, PLE-PLE- 0.57, ALE-PLE- 0.48, and AME-PME- 0.17.

Leg measurements: I 5.60(1.40, 0.80, 1.40, 1.20, 0.80); II 5.27(1.27, 0.73, 1.27, 1.27, 0.73); III 5.19 (1.33, 0.73, 1.07, 1.33, 0.73); IV 7.89(2.02, 0.87, 2.67, 2.33, 1.00)

Leg formula- 4123.


**Lyco**sa **b**istriata **G**ravely
(Figs. 443-447: Pl. XXI)

- **Lyco**sa **b**istriata **G**ravely, 1924. [Indian Mus. Calcutta, 26: 600.]

**Measurements:** Female
CL- 3.09, CW- 2.17, AL- 4.82, AW- 3.04, TL- 8.34.

**Inter ocular distance:** AME-AME- 0.22, ALE-AME- 0.17, ALE-ALE- 0.39, PME-PME- 0.57, PLE-PME- 0.61, PLE-PLE- 0.78, ALE-PLE- 0.78, and AME-PME- 0.30.

**Leg measurements:** I 8.54(2.67, 0.93, 2.07, 1.67, 1.20); II 8.00(2.40, 0.87, 1.80, 1.73, 1.20); III 7.27(2.27, 0.60, 1.73, 1.67, 1.00); IV 10.86(3.07, 0.93, 2.53, 2.80, 1.53).

**Leg formula**- 4123.


**Distribution:** India: Madhya Pradesh, Tamil Nadu, West Bengal; Bhutan (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Gajbe, 2007; Sebastian & Peter, 2009; Dhali et al., 2012; Sen et al., 2015; WSC, 2016).

**Lyc**osa **p**hipsoni **P**ocock
(Figs. 448-452: Pl. XXIV)


**Measurements:** Female

**Inter ocular distance:** AME-AME- 0.21, ALE-AME- 0.21, ALE-ALE- 0.64, PME-PME- 0.51, PLE-PME- 0.47, PLE-PLE- 0.71, ALE-PLE- 1.08, and AME-PME- 0.21.

**Leg measurements:** I 5.74(1.80, 0.97, 1.40, 1.00, 0.67); II 5.18(1.40, 0.87, 1.04, 1.00, 0.87); III 4.58(1.47, 0.73, 1.04, 0.67, 0.67); IV 6.93(1.80, 1.13, 1.40, 1.47, 1.13).

**Leg formula**- 4123.

Distribution: India: Assam, Maharashtra, Orissa, West Bengal; Bhutan, China, Nepal, Taiwan (Tikader & Malhotra, 1980; Sebastian & Peter, 2009; Dhali et al., 2012; Saha & Raychaudhuri, 2015; Sen et al., 2015; WSC, 2016).

Genus: Hogna Simon


Diagnosis: Medium to large; carapace low and uniform in height between dorsal groove and middle eye row, medially with a pale band. Anterior eye row procurved, slightly shorter than or as long as posterior median. Chelicerae robust, hirsute, both row with 3 teeth. Legs scopulate. Tibia of male palp longer than wide, broadest at tip; cymbium with 2 or more terminal spines, tegular apophysis sickle shaped, often coiled reaching the tip of its lobe; tegular lobe large, ear-like, functioning as conductor; median apophysis large, oblique with stout spur near base; Epigynum with shallow or deep atrium; median septum inverted T-shaped; copulatory opening at anterior margin of transverse piece of median septum.

Type species: Lycosa radiate Latreille, 1817.

Distribution: Cosmopolitan (WSC, 2016).

Hogna himalayensis (Gravely) (Figs. 453-463: Pl. XXIII)


Measurements: Female

Inter ocular distance: AME-AME- 0.36, ALE-AME- 0.21, ALE-ALE- 0.79, PME-PME- 0.64, PLE-PME- 0.64, PLE-PLE- 1.00, ALE-PLE- 0.79, and AME-PME- 0.29.

Leg measurements: I 8.00(2.47, 0.93, 1.73, 1.67, 1.20); II 7.34(2.20, 0.87, 1.60, 1.60, 1.07); III 6.80(2.07, 0.80, 1.27, 1.73, 0.93); IV 10.14(2.67, 1.00, 2.07, 3.00, 1.40).

Leg formula- 4123.

Measurements: Male
CL- 3.50, CW- 2.50, AL- 3.00, AW- 2.00, TL- 6.50.

Inter ocular distance: AME-AME- 0.30, ALE-AME- 0.21, ALE-ALE- 0.70, PME-PME- 0.60, PLE-PME- 0.60, PLE-PLE- 0.90, ALE-PLE- 0.70, and AME-PME- 25.

Leg measurements: I 7.00(2.00, 0.90, 1.73, 1.17, 1.20); II 6.34(2.00, 0.77, 1.50, 1.00, 1.07); III 5.80(1.57, 0.70, 1.07, 1.63, 0.83); IV 9.14(2.67, 1.00, 2.07, 2.00, 1.40).

Leg formula- 4123.


**Distribution:** India: Assam, West Bengal; Bhutan, China (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007; Sebastian & Peter, 2009; Dhali et al., 2010b, ‘12; Sen et al., 2015; WSC, 2016).

**FAMILY: PISAURIDAE SIMON**

(Nursery web spiders)


**Diagnosis:** Medium to large spiders; eyes 8, dark, ringed with black, homogenous, usually on tubercles, posterior eye row slightly recurved and making 2 rows arrangement, with 4, 4 configuration. Legs long, tapered and 3 clawed; tibia, metatarsi and tarsi with numerous and irregular trichobothria; trochanters deeply notched. Abdomen elongate, widest and rounded at the front and tapering towards the back.

**Distribution:**

**Biology:** They are active wanderers and non webers. Somespecies are found in open areas of grass, litter fall, dwarf shrub, along the edges of streams and ponds, where they fish for prey. Just before the young emerge, the female only constructs a silky nursery web, in which the egg sac is deposited. After emergence, the young remain in the nursery web until dispersal commences, hence the common name ‘nursery web spiders’.

**Key to genera:**

1. Anterior eye row strongly recurved; posterior eye row weakly recurved; epigynum with distinct lateral lobes; spermathecae short and thick--------- *Nilus* O.P.Cambridge
   - Anterior eye row straight or weakly recurved; posterior eye row strongly recurved; epigynum without lateral lobe; spermathecae otherwise-----------------------------2
2. Median eyes of both rows subequal; both AME and ALE subequal; each cheliceral margin with 3 teeth
   ----------- *Dendrolycosa* Doleschall
   - Median eyes of both rowsunequal; AME much smaller than ALE; cheliceral retromargin with 2 while promargin 3 teeth
     ---------------------- *Polyboea* Thorell

-85-
Genus: *Nilus* O. P. Cambridge


**Diagnosis:** Anterior eye row strongly recurved, anterior and posterior median eyes subequal, anterior lateral eyes equidistant to the remaining 3 on each side; clypeus beyond ocular quadrangle; chelicerae with 3 retromarginal teeth; tibia1 apophysis of pedipalp reduced; epigynum with distinct lateral lobes and median septum; spermatheca short and thick.

**Type species:** *Nilus curtus* O. P. Cambridge, 1876.

**Distribution:** Throughout except Neotropical and Nearctic (WSC, 2016).

*Nilus pseudoalbocinctus* (Sen et al.)

(Figs. 464-468: Pl. XXVI)


**Measurements:** Female

CL- 5.55, CW- 4.73, AL- 7.36, AW- 3.27, TL- 12.46.

**Inter ocular distance:** AME-AME- 0.45, ALE-AME- 0.36, ALE-ALE- 1.09, PME-PME- 0.55, PLE-PME- 0.55, PLE-PLE- 1.45, AME-PME- 0.36, and ALE-PLE- 0.45.

**Leg measurements:** I 21.33(5.67,1.89, 6.22, 5.22, 2.33); II 21.44(5.67,1.67, 6.33, 5.44, 2.33); III 18.00(4.22, 1.44,5.67, 4.56, 2.11); IV 21.89(5.56,2.00, 6.22, 5.67, 2.44).

**Leg formula:** 4213.

**Material examined:** 1♀, Bichabhanga, GNP, Jalpaiguri, West Bengal, India, 17. x. 2006, coll. D. Raychaudhuri; 2♀♀, Jayanti, BTR, Jalpaiguri, West Bengal, India, 10. x. 2009, coll. D. C. Dhali.

**Distribution:** India: West Bengal (Sen et al., 2010; Jager, 2011; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

Genus: *Dendrolycosa* Doleschall


**Diagnosis:** Small to large (6–21 mm) size. Carapace much longer than wide; ocular area inclined at an angle to clypeus, quadrangle longer than wide, exceeding clypeus; anterior and posterior median eyes subequal, anterior eye row straight or weakly recurved, much wider than those of posterior row. Cheliceral promargin with 3 teeth. Legs straight; tarsi short and rigid. Sheet webers with a funnel retreat in vegetation. Epigynum with 1 or 2 depressions in the anterior, intromittent ducts wide. Male palp without embolar membrane.

**Type species:** *Dendrolycosa fusca* Doleschall, 1859.

**Distribution:** Throughout except Neotropical and Nearctic (WSC, 2016).

*Dendrolycosa gitae* (Tikader)

(Figs. 469-474: Pl. XXVI)

Measurements: Male
CL- 1.68, CW- 1.29, AL- 2.14, AW- 1.14, TL- 3.82.

Inter ocular distance: AME-AME- 0.14, ALE-AME- 0.14, ALE-ALE- 0.43, PME-PME- 0.21, PLE-PME- 0.21, PLE-PLE- 0.57, AME-PME- 0.14, and ALE-PLE- 0.21.

Leg measurements: I 8.88(2.29,0.76,2.24, 2.35, 1.24); II 8.53(2.18,0.71,2.00,2.35, 1.29); III 5.53(1.59,0.59,1.47,1.00, 0.88); IV 6.12(1.71,0.53, 1.71, 1.35, 0.82).

Leg formula- 1243.


Genus: Polyboea Thorell


Diagnosis: Cephalothorax longer than broad, anterior 1/3 narrower. AME very much smaller than ALE, anterior eye row slightly shorter and straight, posterior row longer and strongly recurved, ocular quadrangle longer than wide, widest at base. Chelicerae with 2 retromarginal and 3 promarginal teeth. Tibia lacking a pair of ventral spines at the distal end. Carina of epigynum entire; conductor with 2 guiding lamellae.

Type species: Polyboea vulpine Thorell, 1895.

Distribution: So far known from Oriental region only (WSC, 2016).

Polyboea zonaformis (Wang) (Figs. 475-479: Pl. XXVI)


Measurements: Female
CL-2.30, CW- 2.04, AL- 4.52, AW- 1.65, TL- 6.73.

Inter ocular distance: AME-AME- 0.17, ALE-AME- 0.34, ALE-ALE- 0.83, PME-PME- 0.34, PLE-PME- 0.43, PLE-PLE- 0.91, AME-PME-0.26, and ALE-PLE- 0.70.

Leg measurements: I 13.23(3.67,0.67, 4.33, 3.56, 1.00); II 13.79(3.78,0.67, 4.00, 3.67, 1.67); III 10.12(2.78,0.56, 2.89, 2.67, 1.22); IV 12.33(3.22,0.67, 3.33, 3.67, 1.44).

Leg formula- 2143.

**Distribution:** India: West Bengal; China, Laos (Sen et al., 2010; Jager, 2011; Keswani et al., 2012; Sen et al., 2015; WSC, 2016).

**FAMILY: ZODARIIDAE THORELL**

(Burrowing spiders)


**Diagnosis:** Small to medium, shiny, smooth to sparsely haired, red to dark spiders. Cephalothorax strongly convex, high anteriorly and sometimes sloping in the longitudinal, well developed and deep fovea. Eyes 8, in 2 or 3 rows, anterior eye row slightly procurved, posterior eye row straight to strongly procured. Legs moderately long, without spines; metatarsi usually with a mat of black apicoventral hairs; tarsi with 3 claws; lateral teeth on superior claw implanted laterally facing opposite claw. Chelicerae strong and vertical, usually both margins toothless, sometimes promargin with 2 and retromargin with 1-3 teeth; cheliceral fang very short. Anterior spinnerets large, obscuring the other 4.

**Distribution:**

**Biology:** These ground dwelling spiders are often found on soil debris, in leaf litter, underneath stones and logs. Some species construct a palisade of vertically arranged twigs or leaves around the entrance of the burrow.

**Key to the genera:**

1. Posterior eye row recurved while anterior row weakly procurred; thoracic groove deep and distinct; epigynum strongly chitinized with a central plate
   
   "Storenomorpha" Simon

- Both row of eyes procurred; thoracic groove indistinct; epigynum with strongly sclerotised copulatory ducts

"Suffasia" Jocqué
Genus: *Storenomorpha* Simon


**Diagnosis:** Large spiders with dark reddish integument and orange legs. Chelicerae long, tapering towards extremity, both margin without tooth; fang short and thick at base; chillum wide, triangular and with some hairs. Tarsi widened towards extremity with dense scopulae, 3 clawed, unpaired one very short, paired claws closely set and implanted in shallow concavity; teeth on paired claws implanted on lateral sides. Epigynum strongly chitinized, with a central plate, 2 entrance openings in anterior part. Male palp with ventrolateral boss on patella; tibia with lateral or dorsolateral apophysis; cymbium with cylindriform hairs apically; bulbous with long embolous, implanted mesally at proximal end of tegulum, partly or completely hidden by long, semi-circular conductor; tegular apophysis well developed and strongly sclerotized.

**Type species:** *Storenomorpha comottoi* Simon, 1884.

**Distribution:** Oriental region only (WSC, 2016).

*Storenomorpha joyaus* (Tikader)  
(Figs. 480-484: Pl. XXVI)


**Measurements:** Male
- CL- 5.36, CW- 4.09, AL- 7.09, AW- 4.64, TL- 12.64.

**Inter ocular distance:** AME-AME- 0.45, ALE-AME- 0.27, ALE-ALE- 1.00, PME-PME-0.45, PLE-PME- 0.82, PLE-PLE- 1.82, AME-PME- 0.27, and ALE-PLE- 0.82.

**Leg measurements:** I 10.33(2.89, 1.44,2.67, 2.00, 1.33); II 10.12(2.78,1.67, 2.56, 1.67, 1.44); III 8.55(2.22, 1.33,2.67, 1.33, 1.00); IV 9.11(1.89,1.44, 2.67, 1.78, 1.33).

**Leg formula-** 1243.


**Distribution:** India: Sikkim, West Bengal (Tikader, 1970; Jocqué & Bosmans, 1989; Sebastian & Peter, 2009; Keswani *et al*., 2012; Sen *et al*., 2015; WSC, 2016).

Genus: *Suffasia* Jocqué


**Diagnosis:** Medium size, carapace short, oval, narrowed in front and widest between coxae II and III, thoracic groove indistinct. Eyes 8, in 2 rows, circular, anteromedians dark, rest pale, anterior row slightly procured, posterior row strongly so. Legs pale yellow with brown rings and patches. Abdomen oval, with dark pattern on pale background. Colulus with a small group of hairs. Female palp with a long, slender, tapering tarsus with toothed claw, turned inward over at 30°, with strong ventral spines. Epigynum simple, with strongly sclerotised copulatory ducts, with a dead end on one side, other side forward to anterior thick walled spermathecae.

**Type species:** *Suffasia tigrina* Simon, 1893.
**Distribution:** Oriental region only (WSC, 2016).

*Suffasia ala Sen et al.*
(Figs. 485-489: Pl. XXVI)

**Measurements:** Female
CL- 3.04, CW- 2.04, AL- 4.00, AW- 2.56, TL- 7.56.

**Inter ocular distance:** AME-AME- 0.30, ALE-AME- 0.26, ALE-ALE- 0.83, PME-PME- 0.26, PLE-PME- 0.39, PLE-PLE- 1.00, AME-PME- 0.26, and ALE-PLE- 0.17.

**Leg measurements:** I 6.87(1.73, 0.60, 1.67, 1.60, 1.27); II 6.06(1.47, 0.73, 1.33, 1.40, 1.13); III 6.02(1.47, 0.73, 1.33, 1.60, 1.07); IV 6079(1.80, 0.73, 1.73, 1.53, 1.00).

**Leg formula** - 1423.


**Distribution:** India: West Bengal (Sen et al., 2015).

**FAMILY: AGECLENIDAE C. L. KOCH**
(Funnel web spiders)

**Diagnosis:** Medium size, 3 clawed, sheet web building spiders. Cephalothorax oval, attenuated in front, with a longitudinal fovea. Eyes 8, nearly similar in size, silvery white or dark or both, usually anterior median silvery white, rest dark, always in 2 rows. Posterior spinnerets very long and slender. Abdomen oval, a transverse slit near spinners.

**Biological notes:** The funnel web spin flat, slightly concave mesh of silk threads close to the soil surface with funnel shaped permanent, non-adhesive retreat at one end. The retreat is usually provided with exits at both ends. Webs are built in grass, under logs and in abandoned burrows of small mammals.
Genus: *Agelena* Walckenaer

**Diagnosis:** Cephalothorax long and narrow. Both rows of eyes strongly procurred, so that posterolaterals and anteromedians form a nearly straight line. Abdomen with a reddish tinge and several clearly marked chevrons. Anterior spinners clearly separated, posterior much longer, 2 segmented, apical one longer than the basal and tapering.

**Type species:** *Agelena labyrinthica* Clerk, 1757.

**Distribution:** Ethiopian, Oriental and Palearctic (WSC, 2016).

*Agelena barunae* Tikader
(Figs. 490-494: Pl. XXVI)

**Measurements:** Female
- CL- 4.00, CW- 3.41; AL- 6.00, AW- 3.41; TL- 10.00.
- **Inter ocular distance:** AME-AME- 0.35, ALE-AME- 0.24, ALE-ALE- 0.82, PME-PME- 0.41, PLE-PME- 0.24, PLE-PLE- 0.94, AME-PME- 0.29 and ALE-PLE- 0.24.,
- **Leg measurements:** I 12.00 (3.09, 1.36, 2.91, 3.00, 1.64); II 10.73 (3.27, 1.09, 2.64, 2.73, 1.00); III 10.45 (3.00, 1.18, 2.27, 2.64, 1.36); IV 13.64 (3.73, 1.18, 3.56, 3.64, 1.56).
- **Leg formula:** 4-1-2-3.

**Material examined:** 1♀, Daidaighat, JWLS, Jalpaiguri, West Bengal, India, 14. iv. 2009, coll. S. Sen; 4♀♀, Chipra, BTR, Jalpaiguri, West Bengal, India, 29. x. 2010, coll. D.C. Dhali.

**Distribution:** India: Sikkim, West Bengal (New Record) (Tikader, 1970; Keswani *et al.*, 2012; WSC, 2016).
### 7.0 DISTRIBUTION PATTERN

**Table 2.** Distribution pattern of spider taxa recorded.

<table>
<thead>
<tr>
<th>TAXA</th>
<th>RESERVE FORESTS</th>
<th>DISTRIBUTION</th>
<th>ZOOGEOGRAPHICAL</th>
<th>SEASONAL</th>
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<td>G</td>
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<tr>
<td><strong>Chilobrachys hardwickei</strong> (Pocock) ♠</td>
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<td><strong>Chilobrachys khasiensis</strong> (Tikader) ♠</td>
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<td>Family: Salticidae</td>
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<td><strong>Aelurillus improvisus</strong> Azarkina ♠</td>
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<td>+</td>
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<tr>
<td><strong>Bianor narmadaensis</strong> (Tikader) ♠</td>
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<tr>
<td><strong>Bianor pirates</strong> Sen et al. ♠</td>
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<tr>
<td><strong>Brettus albolimbatus</strong> Simon</td>
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<td><em>Evarcha flavocincta</em> (C. L. Koch)</td>
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-93-
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<td>Gujarat, Maharashtra, Meghalaya, Sikkim, West Bengal</td>
<td>OR</td>
<td>PrM</td>
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<tr>
<td><strong>Cheiracanthium insigne</strong> O. P. Cambridge</td>
<td></td>
<td></td>
<td></td>
<td>Assam, Bihar, Maharashtra, Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td><strong>Cheiracanthium melanostomum</strong> Thorell ♣</td>
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<td></td>
<td>Assam, Maharashtra, West Bengal</td>
<td>OR</td>
<td>PrM, PsM</td>
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<tr>
<td><strong>Cheiracanthium murinum</strong> Thorell ♣</td>
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<td></td>
<td>Maharashtra, West Bengal</td>
<td>OR</td>
<td>PrM, M,</td>
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<tr>
<td><strong>Cheiracanthium sikkimense</strong> Majumder &amp; Tikader ♦</td>
<td></td>
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<td></td>
<td>Sikkim, West Bengal</td>
<td>OR</td>
<td>PsM</td>
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<tr>
<td><strong>Cheiracanthium triviale</strong> (Thorell) ♣</td>
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<td>Madhya Pradesh, Maharashtra, Manipur, Tamil Nadu, West Bengal</td>
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<td>PrM</td>
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<tr>
<td><strong>Family: Corinnidae</strong></td>
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<tr>
<td><strong>Cambalida flavipes</strong> (Gravely) ♣</td>
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<td>Karnataka, Orissa, Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td><strong>Castianeira himalayensis</strong> Gravely ♣</td>
<td></td>
<td></td>
<td></td>
<td>West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
</tr>
<tr>
<td><strong>Castianeira indica</strong> Tikader ♣</td>
<td></td>
<td></td>
<td></td>
<td>Maharashtra, West Bengal</td>
<td>OR</td>
<td>PrM, PsM</td>
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<tr>
<td>Genus</td>
<td>Species Details</td>
<td>Distribution</td>
<td>Phylogenetic Position</td>
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<td>Castianeira</td>
<td>zetes Simon</td>
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<td>OR, M</td>
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<tr>
<td>Clubiona</td>
<td>rama Dankittipakul &amp; Singtripop</td>
<td>West Bengal</td>
<td>OR, PrM, PsM</td>
<td></td>
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<tr>
<td>Clubiona</td>
<td>pila Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PrM, PsM</td>
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<tr>
<td>Clubiona</td>
<td>bilobata Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PrM, PsM</td>
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<tr>
<td>Clubiona</td>
<td>hexadentata Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, M</td>
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<tr>
<td>Clubiona</td>
<td>tridentata Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PrM</td>
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<tr>
<td>Clubiona</td>
<td>denticulate Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PrM</td>
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<tr>
<td>Clubiona</td>
<td>pseudocordata Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PsM</td>
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<tr>
<td>Hamataliwa</td>
<td>incompta (Thorell) •</td>
<td>West Bengal</td>
<td>OR, PrM, M</td>
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<tr>
<td>Hamataliwa</td>
<td>hellia sp. nov. ♥</td>
<td>West Bengal</td>
<td>OR, PsM</td>
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<tr>
<td>Oxyopes</td>
<td>hotingchiehi Schenkel</td>
<td>Assam, West Bengal</td>
<td>OR, PrM, M</td>
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<tr>
<td>Oxyopes</td>
<td>javanus Thorell</td>
<td>Assam, Kerala, Madhya Pradesh, West Bengal</td>
<td>OR, PrM, M</td>
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<tr>
<td>Oxyopes</td>
<td>pankaji Gajbe &amp; Gajbe ■ ♣</td>
<td>Madhya Pradesh, West Bengal</td>
<td>OR, PrM</td>
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<tr>
<td>Oxyopes</td>
<td>pawani Gajbe ♣</td>
<td>Madhya Pradesh, West Bengal</td>
<td>OR, M</td>
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<tr>
<td>Oxyopes</td>
<td>shweta Tikader</td>
<td>Arunachal Pradesh, Assam, Kerala, Manipur, Meghalaya, Sikkim, Tripura, West Bengal</td>
<td>OR, PrM, M</td>
<td></td>
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<tr>
<td>Oxyopes</td>
<td>fabae Dhali et al. ♣</td>
<td>West Bengal</td>
<td>OR, PrM</td>
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<td></td>
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<tr>
<td>Family: Lycosidae</td>
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<tr>
<td>Species Name</td>
<td>Location</td>
<td>Status</td>
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<tr>
<td>Arctosa himalayensis Tikader &amp; Malhotra ♠</td>
<td>+</td>
<td>Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
<td></td>
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<tr>
<td>Arctosa indica Tikader &amp; Malhotra</td>
<td>+</td>
<td>Maharashtra, West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
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<tr>
<td>Arctosa quinquedens Dhali et al. ♣</td>
<td>+</td>
<td>Madhya Pradesh, West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
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<tr>
<td>Draposa amkhasensis (Tikader &amp; Malhotra)</td>
<td>+</td>
<td>West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
<td></td>
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<tr>
<td>Draposa burasantiensis (Tikader &amp; Malhotra)</td>
<td>+</td>
<td>West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
<td></td>
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<tr>
<td>Hippasa agelenoides (Simon)</td>
<td>+</td>
<td>Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td>Hippasa greenalliae (Blackwall)</td>
<td>+</td>
<td>Karnata, Kerala, Maharashtra, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>M, PsM</td>
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<tr>
<td>Hippasa madraspatana Gravely ♣</td>
<td>+</td>
<td>Gujarat, Tamil Nadu, West Bengal</td>
<td>OR</td>
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<tr>
<td>Hogna himalayensis (Gravely)</td>
<td>+</td>
<td>Assam, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td>Lycosa bistriata Gravely</td>
<td>+</td>
<td>Madhya Pradesh, Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
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<tr>
<td>Lycosa carmichaeli Gravely ♣</td>
<td>+</td>
<td>Assam, Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>M, PsM</td>
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<tr>
<td>Lycosa indagatrix Walckenaer ■</td>
<td>+</td>
<td>Andhra Pradesh, Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
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<tr>
<td>Lycosa kempi Gravely</td>
<td>+</td>
<td>Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, West Bengal</td>
<td>OR</td>
<td>PrM, PsM</td>
<td></td>
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<tr>
<td>Lycosa mackenziei Gravely</td>
<td>+</td>
<td>Bihar, Karnataka, Kerala, Punjab, West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
<td></td>
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<tr>
<td>Lycosa madani Pocock ♣</td>
<td>+</td>
<td>Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Orissa, West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
<td></td>
<td></td>
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<tr>
<td>Lycosa phipsoni Pocock</td>
<td>+</td>
<td>Assam, Maharashtra, Orissa, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td><strong>Lycosa shillongensis</strong> Tikader &amp; Malhotra ♠</td>
<td>+</td>
<td>Manipur, Meghalaya, West Bengal</td>
<td>OR</td>
<td>PrM</td>
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<tr>
<td><strong>Lycosa tista</strong> Tikader ♠</td>
<td>+</td>
<td>Arunachal Pradesh, Kerala, Manipur, Sikkim, West Bengal</td>
<td>OR</td>
<td>PrM, M</td>
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<tr>
<td><strong>Pardosa birmanica</strong> Simon</td>
<td>+</td>
<td>Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
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<tr>
<td><strong>Pardosa chambaensis</strong> Tikader &amp; Malhotra ♠</td>
<td>+</td>
<td>Himachal Pradesh, West Bengal</td>
<td>OR</td>
<td>M, PsM</td>
<td></td>
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<tr>
<td><strong>Pardosa heterophthalma</strong> (Simon)</td>
<td>+</td>
<td>Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>M</td>
<td></td>
<td></td>
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<tr>
<td><strong>Pardosa kupupa</strong> (Tikader)</td>
<td>+</td>
<td>Sikkim, West Bengal</td>
<td>OR</td>
<td>PrM, PsM</td>
<td></td>
<td></td>
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<tr>
<td><strong>Pardosa pseudoannulata</strong> (Bösenberg &amp; Strand)</td>
<td>+</td>
<td>Kerala, Tamil Nadu, West Bengal</td>
<td>OR</td>
<td>PrM, PsM</td>
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<tr>
<td><strong>Pardosa pusiola</strong> (Thorell)</td>
<td>+</td>
<td>West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
<td></td>
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<tr>
<td><strong>Pardosa procurva</strong> Yu &amp; Song</td>
<td>+</td>
<td>West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pardosa songosa</strong> Tikader &amp; Malhotra ♠</td>
<td>+</td>
<td>Assam, Uttar Pradesh, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
<td></td>
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<tr>
<td><strong>Pardosa sumatrana</strong> (Thorell)</td>
<td>+</td>
<td>Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Tamil Nadu, Tripura, West Bengal</td>
<td>OR</td>
<td>PrM, M, PsM</td>
<td></td>
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<tr>
<td><strong>Pardosa tridentis</strong> Caporiacco</td>
<td>+</td>
<td>Jammu &amp; Kashmir, Uttarakhand, West Bengal</td>
<td>OR</td>
<td>PrM</td>
<td></td>
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</table>

**Family: Pisauridae**
**Dendrolycosa gitae** (Tikader) ♠ + + + Andaman Islands, Assam, Kerala, Sikkim, West Bengal OR PrM, M

**Nilus pseudoalbocinctus** (Sen et al.) ♠ + + West Bengal OR PsM

**Polyboea zonaformis** (Wang) + West Bengal OR M, PsM

**Family: Zodariidae**

**Storenomorpha joyaous** (Tikader) ♠ + + Sikkim, West Bengal OR M

**Suffasia ala** Sen et al. ♠ + + + West Bengal OR PrM, M, PsM

**Family: Agelenidae**

**Agelena barunae** Tikader ■ ♠ + + Sikkim, West Bengal OR PrM, M

- New to World
- New to India
- New to West Bengal
- ♠ Endemic to India

**Distribution of Families in 4 Reserve Forests**

![Map showing distribution of Families in 4 Reserve Forests](image)
8.0 DISCUSSION

The present study prompts to comprehend the following:

**Morphological variations** are the basic parameters for the identity of the taxon, for which the order Araneae provides innumerable features. Observations presented in this monograph especially the illustrations, photographs, diagnosis, dichotomous keys and descriptions exemplify the structural diversities in spider taxa.

**Phenotypic variations** are quite common among spiders. Many spider taxa are so varied in their structure that two individuals or adult males and females of same species may not be recognizable as being identical without collateral bio-informations. The failure to recognize such intra-specific diversity has resulted in giving different names for the same species and at times grouped under different genera. In some cases the variation is directly controlled by underlying genetic variation where as in other cases variation in phenotype is induced by the environment.

**Phenotypic plasticity** is the resultant effect of environment induced variation. Such plasticity becomes significant in understanding the ecology, taxonomy and evolution of populations and species (Scheiner, 1993; West-Eberhard, 2003).

Typical **Batesian mimicry** is exhibited by members of the genera *Myrmarachne* (Salticidae) and *Castianeira* (Corinnidae) closely resembling the ants. Members of *Drassodes* (Gnaphosidae) look like mouse.

The current list of Indian spiders includes 1686 species under 438 genera distributed over 60 families (Keswani *et al*., 2012). In West Bengal they are represented by 213 species belonging to 70 genera of 20 families (Biswas & Biswas, 1992).

The diversity spectrum of spiders in these 4 reserve forests is exhibited by the recognition of 89 species under 38 genera distributed over 13 families (fig. 495 & 496).

**Out of these 1 species is new to the World** (figs. 497).

Family Oxyopidae: *Hamataliwa hellia* sp. nov.

**1 species is reported as new to India** (figs. 497).

Family Oxyopidae: *Hamataliwa incompta* (Thorell)

**7 species are recorded for the first time from the state** (fig. 497).

Family Salticidae: *Epeus indicus* Prószyński

Family Gnaphosidae: *Drassodes gujaratensis* Patel & Patel
*Drassodes meghalayaensis* Tikader & Gajbe

Family Eutichuridae: *Cheiracanthium sikkimense* Majumder & Tikader

Family Lycosidae: *Lycosa indagatrix* Walckenaer

Family Oxyopidae: *Oxyopes pawani* Gajbe

Family Agelenidae: *Agelena barunae* Tikader
**Fig. 495.** Total no. of spider taxa trapped from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.

**Fig. 496.** Total no. of spider species trapped under different families from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.
Fig. 497. New findings and notable species.

**NOTABLE SPECIES**

This section includes notable species such as disjunct species, range extensions, colonizer species, and tourist species, as indicated by life history information. **Disjunct species** or **endemic species** are those species whose life history information indicated that their normal ranges occurred some distance from where they are collected during the study. Species are considered **range extensions** if their presence in the study area had previously gone unrecorded, but they have been collected in areas near the study area. Species are considered **colonizers** if the habitat in which they are predominantly collected is a disturbed habitat, such as agricultural fields, floodplain, etc. Species are considered **tourists** if their usual habitat is not that which is being sampled for the study (ground or litter dwelling), such as bush or tree dwelling species.

Life history information indicates that approximately 58 of the species collected are typical litter dwellers, while a few tourist species are present. Examples of tourists species recorded during the study are *Siler semiglaucus* (Simon) [Salticidae], *Heteropoda andamanensis* Tikader [Sparassidae], *Cheiracanthium himalayense* Gravely [Eutichuridae] and *Oxyopes shweta* Tikader [Oxyopidae]. Examples of litter inhabiting spiders include 2 species of Gnaphosidae, 28 of Lycosidae, 4 of Corinnidae and others which are surface-active hunting spiders.

**DISJUNCT SPECIES OR ENDEMIC SPECIES** (fig. 497 & 498)

Family Theraphosidae: *Chilobrachys hardwickei* (Pocock)
*C. khasiensis* (Tikader)

Family Salticidae: *Aelurillus improvisus* Azarkina
Bianor narmadaensis (Tikader)
B. pirates Sen et al.
Marpissa decorata Tikader
Plexippus pseudopaykulli Sen et al.

Family Ctenidae: Ctenus sikkimensis Gravely
Family Sparassidae: Pseudopoda straminiosa (Kundu et al.)
Family Gnaphosidae: Drassodes gujaratensis Patel & Patel
D. meghalayensis Tikader & Gajbe
Family Eutichuridae: Cheiracanthim himalayense Gravely
C. indicum O. P. Cambridge

Fig. 498. Spider families representing no. endemic (to India) species trapped from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.

Family Clubionidae: Clubiona pila Dhali et al.
C. bilobata Dhali et al.
C. hexadentata Dhali et al.
C. tridentata Dhali et al.
C. denticulata Dhali et al.
C. pseudocordata Dhali et al.
Family Corinnidae: Cambalida flavipes (Gravely)
C. himalayensis Gravely
C. indica Tikader
Family Oxyopidae: Oxyopes pankaji Gajbe & Gajbe
O. fabae Dhali et al.
O. pawani Gajbe
Family Lycosidae: Arctosa himalayensis Tikader & Malhotra
A. quinquedens Dhali et al.
Hippasa madraspatana Gravely
Lycosa carmichaeli Gravely
L. madani Pocock
L. shillongensis Tikader & Malhotra
L. tista Tikader
Pardosa chambaensis Tikader & Malhotra

Family Pisauridae: Dendrolycosa gitae (Tikader)
Nilus pseudoalbocinctus (Sen et al.)

Family Zodariidae: Storenomorpha joyaus (Tikader)
Suffasia ala Sen et al.

Family Agelenidae: Agelena barunae Tikader

**RANGE EXTENSIONS** (fig. 497)

Family Salticidae: Epeus indicus Prószyń'ski
Family Gnaphosidae: Drassodes gujaratensis Patel & Patel
D. meghalayaensis Tikader & Gajbe

Family Eutichuridae: Cheiracanthium sikkimense Majumder & Tikader
Family Oxyopidae: Oxyopes pawani Gajbe
Family Agelenidae: Agelena barunae Tikader

**COLONIZER SPECIES** (fig. 497)

Family Theraphosidae: Chilobrachys hardwickei (Pocock)
Chilobrachys khasiensis (Tikader)

Family Salticidae: Aelurillus improvisus Azarkina
Harmochirus brachiatus (Thorell)
Myrmarachne caliraya Barrion & Litsinger

Family Ctenidae: Ctenus sikkimensis Gravely
Family Gnaphosidae: Drassodes gujaratensis Patel & Patel
D. meghalayaensis Tikader & Gajbe

Family Corinnidae: Cambalida flavipes (Gravely)
C. himalayensis Gravely
C. indica Tikader
C. zetes Simon

Family Clubionidae: Clubiona rama Dankittipakul & Singtripop
Family Lycosidae: Arctosa himalayensis Tikader & Malhotra
A. indica Tikader & Malhotra
A. quinquedens Dhali et al.
Draposa amkhasensis (Tikader & Malhotra)
D. burasantiensis (Tikader & Malhotra)
Hippasa agelenoides (Simon)
H. greenalliae (Blackwall)
H. madraspatana Gravely
Hogna himalayensis (Gravely)
Lycosa bistriata Gravely
L. carmichaeli Gravely
L. indagatrix Walckenaer
L. kempi Gravely
L. mackenziei Gravely
L. madani Pocock
L. pipsoni Pocock
L. shillongensis Tikader & Malhotra
L. tista Tikader
Pardosa birmanica Simon
P. chambaensis Tikader & Malhotra
P. heterophthalma (Simon)
P. kupupa (Tikader)
P. pseudoannulata (Bösenberg & Strand)
P. pusiola (Thorell)
P. procurva Yu & Song
P. songosa Tikader & Malhotra
P. sumatrana (Thorell)
P. tridentis Caporiacco

Family Pisauridae: Dendrolycosa giteae (Tikader)
Nilus pseudoalbocinctus (Sen et al.)
Polyboea zonaformis (Wang)

Family Zodariidae: Storenomorpha joyaus (Tikader)
Suffasia ala Sen et al.

Family Agelenidae: Agelena barunae Tikader

TOURISTS SPECIES (fig. 497)

Family Salticidae: Bianor narmadaensis (Tikader)
Brettus albolimbatus Simon
B. anchorum Wanless
Epeus indicus Prószyn'ski
Euophrys frontalis (Walckenaer)
E. omnisuperstes Wanless
Evarcha flavocincta (C. L. Koch)
Marpissa decorate Tikader
Myrmarachne robusta (Peckham and Peckham)
M. melanocephala MacLeay
Phintella vittata (C. L. Koch)
Plexippus paykulli (Audouin)
Portia fimbriata (Doleschall)
Siler semiglaucus (Simon)
Thiania bhamoensis Thorell

Family Sparassidae: Heteropoda venatoria (Linnaeus)
H. nilgirina Tikader
Pseudopoda straminiosa (Kundu et al.)
Family Eutichuridae: *Cheiracanthium himalayense* Gravely
- *C. indicum* O. P. Cambridge
- *C. insigne* O. P. Cambridge
- *C. melanostomum* Thorell
- *C. murinum* Thorell
- *C. sikkimense* Majumder & Tikader
- *C. triviale* (Thorell)

Family Oxyopidae: *Hamataliwa incompta* (Thorell)
- *Oxyopes hotingchiehi* Schenkel
- *O. javanus* Thorell
- *O. pankaji* Gajbe & Gajbe
- *O. pawani* Gajbe
- *O. shweta* Tikader

Of these, most of the species are recorded from the family Lycosidae (28), followed by Salticidae (21), Oxyopidae (8), Clubionidae and Miturgidae (7 each), Corinnidae (4) (fig. 496). As a part of Megadiversity Hot Spot sector these small patches of forests exhibit high endemicity (43%) of spider taxa reflecting extreme faunal richness. The uniqueness of species compositions, as indicated by levels of endemism and habitat specialization, is more important in establishing regional conservation priorities (Platnick, 1995). The spider fauna at family, genus and species level in these reserve forests shows a close similarity with that of Fassbender (2002).

![Bar graph showing species richness across different forests](image)

**Fig. 499.** Comparative account.

On the basis of species richness the decreasing order of the reserve forests are BTR>JWLS>GNP>CWLS (fig. 499). All these forests are dominated by the members of the family Lycosidae, excepting JWLS, where the family Salticidae (fig. 500) is dominant. The reason may be attributed to the grassland present only in Jaldapara Wildlife Sanctuary.
**Fig. 500.** Total no. of spider species trapped under different families from each of the reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.
Their seasonal distribution is mostly during Premonsoon (51.32%), followed by Postmonsoon (25.75%) and Monsoon (22.93%) (fig. 508) which again is in conformity with the incidence of the insect species. Seasonal distribution (%) of 13 spider families in these reserve forests is also presented graphically (fig. 501 & 502). 13 species are recorded throughout the year (table - 2). Analysis of their zoogeographical distribution reveals that the fauna is largely Oriental (100%), followed by Palaearctic (5.62%), Australian (4.49%), Ethiopian (3.37%) and Nearctic and Neotropical (2.25%) elements (table 2; fig. 503).

![Seasonal distribution (%) of spider taxa trapped from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.](image1)

Fig. 501. Seasonal distribution (%) of spider taxa trapped from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.

![Seasonal distribution (%) of spider families trapped in 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.](image2)

Fig. 502. Seasonal distribution (%) of spider families trapped in 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.
An important achievement of the study is the record of primitive spiders (Mygalomorphae) *Chilobrachys hardwickei* (Pocock) and *C. khasiensis* (Tikader). Some of the recorded spider taxa (like *Chilobrachys*, *Ctenus*, *Heteropoda*, *Hogna*, *Lycosa*, *Oxyopes*, etc.) are also identified as potential bioresource for their toxin and silk. (Sen *et al.*, 2010)

**Fig. 503.** Zoogeographical distribution (%) of spider taxa trapped from 4 reserve forests (GNP+CWLS+JWLS+BTR) of Dooars.

Photographic documentation of 89 species will prove to be valuable for future researchers while undertaking the study of spiders in India. Many of the species with their epigynum and internal genitalia are illustrated for the first time.
9.0. SUMMARY

Litter is an important habitat of forests, which plays a major role in the transfer of energy and nutrients in the ecosystem; often litter fall data is used to predict its productivity. Litter harbors a good number of spiders that are ecologically important. Beside this, their products such as silk and venom have immense value. Recent data base suggests that nearly $\frac{1}{3}$ of the total spider fauna are named so far and India represents nearly $\frac{1}{25}$ of it. Globally people are laying emphasis on studies of litter and ground dwelling spiders while India is yet to jump into.

Above prompted to study the taxonomic diversity of litter and ground dwelling spiders of the tropical rain forests of Dooars. It is well known that tropical rain forests have high species richness.

The study area includes 4 reserve forests namely Gorumara National Park (GNP), Chapramari Wild Life Sanctuary (CWLS), Jaldapara Wild Life Sanctuary (JWLS) and Buxa Tiger Reserve (BTR) situated in the Himalayan foothills of North Bengal [District Jalpaiguri]. All the reserve forests fall under the biogeographic province 7B Lower Gangetic Plain.

Altogether, 89 species under 38 genera distributed over 13 families could be recognized from the study area. Out of these one species is new to the world, one from the country while 7 from the state. Thirty two (38) species are reported as endemic to India. The study includes recognition of 2 new male morphs each of Lycosidae and Pisauridae. The study includes notable species such as 32 disjunct species, 23 range extensions, 47 colonizer species, and 31 tourist species, as indicated by their life history information. Such information also indicates that approximately 58 of the species collected are typical litter dwellers, while remaining 31 are tourists. On the basis of species richness the decreasing order of the Reserve Forests are BTR>JWLS>GNP>CWLS. The forests are dominated by the members of the family Lycosidae.

Premonsoon appears to be the most preferred season. Distributional analysis further reveals that the fauna is largely Oriental (100%) followed by Palaeartic (5.62%), Australian (4.44%), Ethiopian (3.37%), Nearctic (2.25%) and Neotropical (2.25%) elements. The spider fauna at family, genus and species level in these Reserve Forests represents 21.67%, 8.22% and 5.28% of the Indian fauna respectively.

As a part of Biodiversity Hot Spot these small patches of forests exhibit high endemicity (43%) of spider taxa reflecting extreme faunal richness.
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PLATE - I

LOCATIONS OF THE RESERVE FORESTS

GATE-WAYS TO THE RESERVE FORESTS
PLATE- II

Premonsoon

NORTH RANGE

Postmonsoon

Monsoon

Khunia Beat

Murti River

Saltlicks

SOUTH RANGE

Chuk chuki Tower
PLATE VII

Buxaduar beat

BUXADUAR RANGE

Buxaduar Forest

Sal plantation

HATIPOTA RANGE

Monsoon Forest

Panbari North

EAST RAJABHATKHAWA RANGE

South Rajabhatkhawa

Panbari South

Changmari forest

BHOLKA RANGE

Ghoramara beat
PLATE-X

**GENERAL MORPHOLOGY**

**Fig. A:** General habitus-dorsal view

**Fig. B:** Clypeus

**Fig. C:** Leg segments

**Fig. D:** Male palp

**Fig. E:** General habitus-ventral view

**Fig. F:** Epigynum with median septum

**Fig. G:** Epigynum without median septum

**Fig. H:** Internal genitalia
PLATE- XI

Fig. I: Eyes in 2 rows (4:4)

Fig. J: Eyes in 3 rows (4:2:2)

Fig. K: Eyes in 4 rows (2:2:2:2)

Fig. L: Eyes heterogeneous

Fig. M: Eyes in 3 rows (2:4:2)

Fig. N: Eyes forming a hexagon
PLATE- XII

Fig. O: Fang diaxial

Fig. P: Fang paraxial

Fig. Q: Anterior lobe of maxillae & labium without cuspules

Fig. R: Anterior lobe of maxillae with cuspules

Fig. S: Labium with cuspules
PLATE- XIII

Fig. T: Tarsi with 2 claws & claw tuft

Fig. U: Tarsi with 3 claws but without claw tuft

Fig. V: Laterigrade legs

Fig. W: Prograde legs

Fig. X: Apical end of metatarsi with a soft trilobite membrane
Fig. f: Posterior spinnerets 2 segmented, distal one long, with cone shaped spinning area

Fig. g: Median spinnerets with 3 gland spigots

Fig. h: Anterior lateral spinnerets with 3 enlarged pyriform gland spigots

Fig. i: Abdominal venter with colulus
Family: Theraphosidae

*Chilocorachys hardwicki* (Pocock)

*Chilocorachys khasiensis* (Tikader)

Family: Salticidae

*Aelurillus improvisus* Azarkina

*Bianor narmadaensis* (Tikader)

*Bianor piratus* Sen *et al.*

*Brettus albolimbatus* Simon

*Brettus anchorum* Wanless

*Epeus indicus* Prószyński
PLATE- XVII

Euophrys frontalis (Walckenaer)
Euophrys omnisuperstes Wanless
Evarcha flavocincta (C. L. Koch)

Harmochirus brachiatatus (Thorell)
Marpissa decorata Tikader
Menemurus bivittatus (Dufour)

Myrmarchne caliraya Barrion & Litsinger
Myrmarchne robusta (Peckham & Peckham)
Myrmarchne melanocephala MacLeay
PLATE-XVIII

Phintella vittata
(C. L. Koch)

Phintella vittata
(C. L. Koch)

Plexippus paykulli
(Audouin)

Plexippus pseudopaykulli
Sen et al.

Portia fimbriata
(Doleschall)

Siler semiglaucus
(Simon)

Family: Ctenidae

Thiania bhamoensis
Thorell

Ctenus sikkimensis
Gravely
Family: Sparassidae

Heteropoda venatoria (Linnaeus)
Heteropoda nilgirina Tikader
Pseudopoda straminiosa (Kundu et al.)

Family: Gnaphosidae

Drassodes gujaratensis Patel & Patel
Drassodes meghalayaensis Tikader & Gajbe

Family: Eutichuridae

Cheiracanthium himalayense Gravely
Cheiracanthium indicum O. P. Cambridge
Cheiracanthium insigne O. P. Cambridge
PLATE- XX

Cheiracanthium melanostomum
Thorell

Cheiracanthium murinum
Thorell

Cheiracanthium sikkimense
Majumder & Tikader

Family: Corinnidae

Cheiracanthium triviale
(Thorell)

Cambalida flavipes
(Gravely)

Castianeira himalayensis
Gravely

Castianeira indica
Tikader

Castianeira zetes
Simon

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Family: Clublonidae

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  Dankittipakul & Singtripop

- Clubiona pila
  Dhali et al.

- Clubiona bilobata
  Dhali et al.

- Clubiona hexadentata
  Dhali et al. (female)

- Clubiona tridentata
  Dhali et al. (female)

- Clubiona tridentata
  Dhali et al. (male)

- Clubiona denticulata
  Dhali et al.

- Clubiona pseudocordata
  Dhali et al.
Family: Oxyopidae

PLATE-XXII

*Hamataliwa incompta* (Thorell) (female)  
*Hamataliwa hellia* sp. nov. (female)  
*Hamataliwa incompta* (Thorell), (male)

*Oxyopes honingchielhi* Schenkel  
*Oxyopes javanus* Thorell  
*Oxyopes pankaji* Gajbe & Gajbe

*Oxyopes pawani* Gajbe  
*Oxyopes shweta* Tikader  
*Oxyopes fabae* Dhali *et al.*
Family: Lycosidae

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*Arctosa himalayensis*  
Tikader & Malhotra

*Arctosa indica*  
Tikader & Malhotra

*Arctosa quinquedens*  
Dhali et al.

*Draposa amkhasensis*  
(Tikader & Malhotra)  
(male)

*Draposa burasantiensis*  
(Tikader & Malhotra)  
(male)

*Hippasa agelenoides*  
(Simon)

*Hippasa greenalliae*  
(Blackwall)

*Hippasa madraspatana*  
Gravely

*Hogna himalayensis*  
(Gravely)
PLATE- XXV

*Lycosa tista*  
Tikader

*Pardosa birmanica*  
Simon

*Pardosa chambaensis*  
Tikader & Malhotra

*Pardosa heterophthalma*  
(Simon)

*Pardosa kupupa*  
(Tikader)

*Pardosa pseudoannulata*  
(Bösenberg & Strand)

*Pardosa pusiola*  
(Thorell)

*Pardosa procurva*  
Yu & Song

*Pardosa songosa*  
Tikader & Malhotra
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Family: Pisauridae

*Pardosa sumatran*na (Thorell)

*Pardosa tridentis* Caporiacco

*Dendrolycosa gitae* (Tikader) (male)

*Dendrolycosa gitae* (Tikader) (female)

*Nilus pseudoalbocinctus* (Sen et al.)

*Polyboea zonataformis* (Wang)

Family: Zodariidae

*Storenomorpha joyaus* (Tikader)

*Suffasia ala* Sen et al.

Family: Agelenidae

*Ageleena barunae* Tikader

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