12. PUBLICATION
Survey of spiders in the Tea Ecosystem of Dooars, West Bengal is initiated since 2008, with the objective of addressing to the issues of pest problem. Our effort is largely concentrated in the following 7 Tea Estates: Kailashpur T.E., Nepuchapur T.E., Meenglas T.E., Dalgaon T.E., Kurti T.E., Bhogotpore T.E. & Nagrakata T.E.

Spider samples, after careful evaluation, revealed the existence of 31 typical Orb-weaving species belonging to 11 genera. Of these one is reported as new from India, 3 from the state and 8 from the district Jalpaiguri. Table indicates the species recorded from the study area.

We thank National Tea Research Foundation and the Head, Dept. of Zoology, University of Calcutta for necessary support.

Table 1. Orb-weaving spiders of Tea Ecosystems of Dooars, West Bengal

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Tea Estates of Dooars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kailashpur</td>
</tr>
<tr>
<td>Araneus</td>
<td>mitificus (Simon)</td>
<td>+</td>
</tr>
<tr>
<td>Argiope</td>
<td>aemula (Walckeneer)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>pulchella Thorell</td>
<td>+</td>
</tr>
<tr>
<td>Genus</td>
<td>Species</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Chorizopes</td>
<td>sp. [nr. calclope] (Simon)</td>
<td></td>
</tr>
<tr>
<td>Cyclosa</td>
<td>bifida (Doleschall)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hexatuberculata Tikader</td>
<td></td>
</tr>
<tr>
<td></td>
<td>insulana (Costa)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>multimeinensis (Thoréll)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>quinqueguttata (Thoréll)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>simoni Tikader</td>
<td></td>
</tr>
<tr>
<td></td>
<td>spirifera Simon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sp</td>
<td></td>
</tr>
<tr>
<td>Cyrtarachne</td>
<td>raniceps Pocock</td>
<td></td>
</tr>
<tr>
<td>Cytophora</td>
<td>cicatrosa (Stoliczka)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exanthematica (Doleschall)</td>
<td></td>
</tr>
<tr>
<td>Erionobia</td>
<td>excelsa (Simon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>leglaizei (Simon)</td>
<td></td>
</tr>
<tr>
<td>Gasteracantha</td>
<td>diadesnia Thoréll</td>
<td></td>
</tr>
<tr>
<td></td>
<td>kuhlii C.L. Koch</td>
<td></td>
</tr>
<tr>
<td>Gaa</td>
<td>subarmata Thoréll</td>
<td></td>
</tr>
<tr>
<td>Neoscona</td>
<td>bangalensis Tikader &amp; Bal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>chrysanthsii Tikader &amp; Bal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>elliptica Tikader &amp; Bal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mukerjei Tikader</td>
<td></td>
</tr>
<tr>
<td></td>
<td>neutica (L. Koch)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pavida (Simon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rumpfi (Thoréll)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shillongensis Tikader &amp; Bal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sinhagadensis (Tikader)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>theisi (Wälckenaer)</td>
<td></td>
</tr>
<tr>
<td>Parawida</td>
<td>dehaani (Doleschall)</td>
<td></td>
</tr>
</tbody>
</table>

Ψ New Record from India
Φ New Record from West Bengal
* New Record from tea ecosystem of Dooars
RESURRECTION OF THE ENDEMIC BIRD DUNG CRAB SPIDERS, PHRYNARACHNE THORELL (ARANEAE: THOMISIDAE) OF 19TH CENTURY INDIA.

Tapan Kumar Roy*, Dhruba Chandra Dhali*, Sumana Saha** and Dinendra Raychaudhuri*

* Entomology Laboratory, Department of Zoology, University of Calcutta, 35, Ballygunge Circular Road, Kolkata- 700019, INDIA. E-mails: dinendrarc@rediffmail.com; dinendrarccu@gmail.com
**Department of Zoology, Lady Brabourne College, Govt. of West Bengal, P- ½, Suhrawardy Avenue, Kolkata- 700017, INDIA. E-Mail: sumu17@rediffmail.com


ABSTRACT: Phrynarachne tuberosa (Blackwall, 1864) and P. peeliana (Stoliczka, 1869), the only two bird dung crab spiders, known in the 19th century India, could once again be recorded in the 21st century. Both the species are resurrected and new from West Bengal, India. These are described and illustrated here.

KEY WORDS: Resurrection, Bird dung crab spiders, Phrynarachne, India.

Bird dung crab spiders recognized under the genus Phrynarachne appear to be one of the rarest group. This is well evident from the world catalogue of spiders (Platnick, 2010). Only 30 species are recognized as such spiders as against 41,253 species of spiders known globally. In India, they are known by only two endemic species namely P. tuberosa (Blackwall, 1864) and P. peeliana (Stoliczka, 1869). The former was initially described as Thomisus tuberosus and the latter as T. peelianus. Cambridge in 1884 proposed a new combination, Ornithoscatoides for T. tuberosus. Again, Simon in 1895 revised the status of both tuberosus and peelianus and placed them under the genus Phrynarachne.

Even though listed in the world catalogue (Platnick, 2010) and in the checklists of Indian spiders (Siliwal & Molur, 2007; Sebastian & Peter, 2009), none could record any further Phrynarachne since 19th century India.

We feel happy to communicate that both the species could be resurrected from the protected areas and tea ecosystem of Dooars. The outcome is the result of our effort in assessing the resource potentials of spiders, since 2006.

Both the species Phrynarachne tuberosa and P. peeliana demand contemporary taxonomic treatment and hence described and illustrated.

MATERIALS AND METHODS

Collection and preservation of the spider specimens were done following Tikader (1987). The materials were studied under Stereo Zoom Binocular Microscope, model Olympus SZX-7. The measurements indicated in the text are in millimeters, made with an eye piece graticule. Identification of the taxa was done with the help of Blackwall (1864), Stoliczka (1869), Cambridge (1884), Simon (1895). Spider specimens are in the deposition of Entomology Laboratory, Department of Zoology, University of Calcutta, Kolkata.

Abbreviations used: AME= anterior median eye, PME= posterior median eye, ALE= anterior lateral eye, PLE= posterior lateral eye, T.E. = tea estate.
Phrynarachne tuberosa (Blackwall, 1864)  
(Figs. 1-6 & 14)


Description: Female

Total length- 9.07, carapace length- 3.64, carapace width- 4.71; abdominal length- 5.43, abdominal width- 6.93. Cephalothorax (Fig. 1) brown, globose, anteriorly narrowed with variably developed tubercles and abruptly depressed posteriorly. Caput strongly raised, rectangular, anteriorly broad, posteriorly narrowing, marginally marked by inward longitudinal depression, posterolateral angles strongly tuberculate, directed upward and weakly backward, anterior angles transversely tuberculate, midlongitudinally marked by black tuberculate carina, rest of the surface warty to tuberculate. Eyes 8, transparent, each ringed by black, disposed on the anterior part of caput in two recurved rows, posterior row much recurved, lateral eyes situated on tubercle, anterolaterals largest, anteromedians on either side of the down slope of the raised square area, ocular quad nearly square, eye diameter ALE>PLE>AME>PME. Inter ocular distance: AME-AME=0.57, ALE-AME=0.18, ALE-ALE=1.14, PME-PME=0.54, PLE-PME=0.43, PLE-PLE=1.60, ALE-PLE=0.29, AME-PME=0.29. Clypeus sloped, dark brown, clypeal angles obtusely produced, margin with lanceolate hairs and numerous granulations. Thoracic groove deeply distinct, radii equally so, in between with tubercles in outwardly directed series, fovea longitudinal on diffused black patch, little posterior to posterior tubercles of caput. Chelicerae (Fig. 2) dark brown, robust, rugose, strongly scopulate, retromargin with one small brown tooth and promargin with two pale rather large teeth. Fangs (Fig. 2) red brown, small, stout, strongly curved. Labium (Fig. 3) dark brown, longer than wide, anterior margin pale, basally notched, with strong long brown hairs. Maxillae (Fig. 3) brown, scopulate, with strong, long hairs, apical 1/3 yellowish brown, rest blackish, outer margin incurved near palpal base. Sternum (Fig. 4) dark brown, longer than wide, anterior margin pale, basally notched, with strong long brown hairs. Legs brown black, dorsally marked by offwhite to yellow patches, coxae, trochanter, femur ventro- laterally with offwhite narrow to broad patch, femora with many small tubercles, tibiae and metatarsi with strong spines, tibial spines beset on small tubercles, patella triangular, femora I & II robust. Tarsi of leg I & II with 2 brown black pectinate claws with claw tuft, each with 7 teeth, 3rd one small and pale, claws of leg III & IV 2, pectinate. Leg formula 2134.

Abdomen (Fig. 1) subpentagonal, posteriorly broad, anteriorly round and straight overhanging the base of cephalothorax. Dorsum pale olive brown, with strong variably developed tubercles. Cardiac marking bar shaped, longitudinal, anteriorly marked by a muscular apodeme, posteriorly little distinctly two submedian lateral broad apodeme. Either side of the cardiac bar with 3 red brown tubercles, the median largest appearing like a bivalve shell, posterior one smallest. Further laterally with two large yellow brown upwardly directed tubercles disposed obliquely to both anterior and median tubercules, two more apodemes of smaller dimension present between the median and the largest tubercules, anterior to anterior apodeme 2 more brown tubercles disposed transversely, posterior to posterior apodeme 2 such tubercles disposed transversely, further beyond in an oblique line 2 more rather large, outwardly and downwardly directed tubercles, further below with 2 smaller yellow tubercles little inwardly placed. Thus forming
3 rows of which the median one largest, the rows separated by a transverse infolding. Anterior margin with 4 moderately developed tubercles, laterally with 6 such, either side submarginally with 8 apodemes marked by black, otherwise rest of the dorsum with small to large tubercles of variable shape, marginally with 3 spiniform apophysis on either side, posterior margin wavy, marked by tubercles. Venter black with offwhite markings, these marginally broad, mediially with muscular apodemes in series, medians longitudinal, rest oblique, converging towards spinnerets. The black above the epigastric furrow with arm like extension, separating the branchial lamellae, infolded further below the 2nd pair of lamellae.

Epigynum-Internal genitalia (Figs. 5 & 6): Spermatheca bean shaped, copulatory duct at the micropylar region, fertilization duct distinct, atrium narrow.


**Distribution:** India (Platnick, 2010): West Bengal (New Record).

**Remark:** Both Blackwall and Cambridge indicated the record of the species from East Indies (East India). They however, did not mention other taxonomic data.

**Phrynarachne peeliana (Stoliczka, 1869)**

*(Figs. 7-13 & 15)*


**Description:** Female

Total length- 11.29, carapace length- 4.21, carapace width- 4.36; abdominal length- 6.32, abdominal width- 7.07. Cephalothorax (Fig. 7) grayish brown, margin offwhite, globose, anteriorly narrowed, truncate in front, with lanceolate hairs, surface warty, these denser anteriorly. Cephalic area raised medially, with a Y-shaped groove, arms of which extending from the area between AME and ALE converging to the base of ocular quad further extending between the PME upto anterior one-third. Eyes 8, transparent, ringed with black, arranged in two recurved rows, posterior row strongly so, lateral eyes on tubercles, such with further raised triangular tubercles, anterior row on the slope, posterior row on the edge, anterolaterals largest, ocular quad nearly square, anteriorly narrow, medially raised, this midlongitudinally grooved forming two gibbosities, each at its tip with a brown long spine like seta, eye diameter: ALE>PLE>AME>PME.

Inter ocular distance: AME-AME=0.32, ALE-AME=0.21, ALE-ALE=0.04, PME-PME=0.46, PLE-PME=0.14, PLE-PLE=1.29, ALE-PLE=0.29, AME-PME=0.14. Clypeus broad, on slope, margin with ten small tubercles, each with a strong transparent lanceolate hair. Further anteromedially with a large offwhite tubercle. Cervical furrows deeply distinct, fovea marked by a shallow groove, radii distinct, with basal mid-longitudinal groove, posterolateral angles dark brown. Pedicelar node garlic like. Chelicerae (Fig. 8) brown, offwhite at base, short, stout, subtriangular, basally broad, covered with thick hairs, scopulate, each margin with two teeth, fang brown, strongly curved. Maxillae and labium (Fig. 9) offwhite, maxillae apically broad, incurved near palpal base, thickly hairy. Labium elongate, constricted basally, forming a basal stalk, strongly hairy. Sternum (Fig. 545)
10) offwhite, marginally grey brown, basally with a small midlongitudinal black line, pitcher like, anterior margin weakly incurved, thickly hairy. Legs yellow brown basally and apically darker with offwhite patches, femora I & II ventrally with tubercles, each with a transparent lanceolate hair, tubercles on femora III & IV in decreasing number. Each leg with two brown, curved, basally pectinate claw with claw tuft. Tibia and metatarsi of all legs with two rows of spines laterally. Leg formula 1=243.

Abdomen (Fig. 7) greyish brown, margin with offwhite, this posterolaterally strongly so, pentagonal, posteriorly broad, anteriorly narrowed, both ends nearly truncate and tuberculate, surface anteriorly and laterally with small warts, this medially and posteriorly scanty. Dorsum midlongitudinally grooved, the groove medially marked by offwhite, on either side of it medially with a pair of transverse offwhite muscular apodemes, further marginally with two rows of such apodemes faintly marked by offwhite, rows apparently converging to the apodemes at tip of the longitudinal depression, again a pair of large muscular apodemes located lateral to the postermedian longitudinal offwhite marking. Anterior margin with four tubercles leaving the median area free, each anterolateral margin with three such of smaller dimension, posterior area with four median large tubercles, anterior two largest, anterior to it two such small tubercles, two small tubercles on either side of the postermedian, spiniform apophysis three on either side, each tubercle at its tip with a small spiny hair excepting the last pair. Venter entirely offwhite with grey brown patches medially arranged in longitudinal line, posteriorly with three triangularly arranged tubercles on either side of the spinnerets, lateral ones largest. Behind the spinnerets with a tongue shaped hairy projection (Fig. 13), surface with several muscular apodemes marked by grey brown.

Epigynum-Internal genitalia (Figs.11 & 12): Spermatheca oval, fertilization duct inwardly curved, copulatory duct medially produced from spermatheca, atrium distinct.

Male: Unknown


Distribution: India (Platnick, 2010): Assam (Stoliczka, 1869), West Bengal (New Record).

Remark: Stoliczka (1869) provided the collection locality only. No more information is available in the original literature.

ACKNOWLEDGEMENTS

We thank NTRF, C/o-Tea Board [17(177)/2008 dt.27.3.2008] and WBBB, Govt. of West Bengal [326/5K(Bio)-3/2007 dt.11.12.2008 & 21/5K(Bio)-3/2007 dt.14.1.2009] for sponsoring the projects and the officials of the respective Tea estates of Dooars, the Dept. of Forest, Govt. of West Bengal and the Head, Dept. of Zoology, University of Calcutta for necessary support.

LITERATURE CITED


Table 1. Length of legs of female of *Phrynarachne tuberosa* (Blackwall, 1864)

<table>
<thead>
<tr>
<th>Leg</th>
<th>Femur</th>
<th>Patella</th>
<th>Tibia</th>
<th>Metatarsus</th>
<th>Tarsus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>3.23</td>
<td>1.93</td>
<td>2.16</td>
<td>1.81</td>
<td>1.25</td>
<td>10.38</td>
</tr>
<tr>
<td>II</td>
<td>3.18</td>
<td>1.93</td>
<td>2.16</td>
<td>1.93</td>
<td>1.25</td>
<td>10.45</td>
</tr>
<tr>
<td>III</td>
<td>2.05</td>
<td>1.25</td>
<td>1.36</td>
<td>1.02</td>
<td>0.90</td>
<td>6.58</td>
</tr>
<tr>
<td>IV</td>
<td>1.36</td>
<td>1.31</td>
<td>1.36</td>
<td>0.85</td>
<td>0.68</td>
<td>5.56</td>
</tr>
</tbody>
</table>

Table 2. Length of legs of female of *Phrynarachne peeliana* (Stoliczka, 1869)

<table>
<thead>
<tr>
<th>Leg</th>
<th>Femur</th>
<th>Patella</th>
<th>Tibia</th>
<th>Metatarsus</th>
<th>Tarsus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>4.11</td>
<td>1.89</td>
<td>2.89</td>
<td>3.44</td>
<td>1.56</td>
<td>13.89</td>
</tr>
<tr>
<td>II</td>
<td>4.11</td>
<td>1.89</td>
<td>3.00</td>
<td>3.22</td>
<td>1.67</td>
<td>13.89</td>
</tr>
<tr>
<td>III</td>
<td>2.44</td>
<td>0.56</td>
<td>1.78</td>
<td>1.00</td>
<td>1.00</td>
<td>6.78</td>
</tr>
<tr>
<td>IV</td>
<td>2.78</td>
<td>0.89</td>
<td>2.78</td>
<td>1.00</td>
<td>1.11</td>
<td>8.56</td>
</tr>
</tbody>
</table>
Orb-weaving Spiders (Araneae: Araneidae) in the Tea Ecosystem of Assam

TAPAN KUMAR ROY, DHIRUBA CHANDRA DIHAL, SUMANA SAHA* and DINENDRA RAYCHAUDHURI

Entomology Laboratory, Department of Zoology, University of Calcutta, 33, Ballygunge Circular Road, Kolkata - 700019; and *Department of Zoology, Lady Brabourne College, Sarat Chandra Avenue, Kolkata - 700017.

Spiders of the family Araneidae are mostly typical Orb-weavers. Globally the family contains 2992 species under 169 genera (Platnick, 2010). This includes 154 Indian species, in over 29 genera (Sebastian & Peter, 2009). Literature reveals that such spiders from the tea ecosystem of Assam, or even from the state as a whole, are poorly documented. Barrion & Litsinger (1995), Tikader (1982), Sebastian & Peter (2009) and Platnick (2010) were consulted for Araneidae spiders of India. Hazarika & Chakraborti (1998), Mukhopadhyay & Sarkar (2007), Roy et al. (2009), and Sukla & Banerjee (2009) have worked earlier on the spiders of Assam and Dooars.

Authors have been surveying spiders of the tea ecosystem of Assam since 2008. The study area included four tea estates, namely Bukhial Tea Estate (BTE, 830.56 ha.), Jamguri Tea Estate (JTE, 735 ha.), Hunwal Tea Estate (HTE, 1295.27 ha.) and Kotalgoorie Tea Estate (KTE, 720.02 ha.). The present communication includes 31 araneid species belonging to 15 genera (Table 1). Of these Tikaroneus pattdisus Barrion & Litsinger is reported for the first time from India. This record is second since its original description. 18 other recorded species are new from the Assam state, while 21 species are first record from the tea ecosystem of Assam. Neoscona yptinikd is earlier known from Guatemala.

Analysis of zoogeographical distribution of the mentioned species shows that the fauna is composed of Oriental (OR) (100%), followed by Australian (AS) (35.5%), Palaearctic (PL) (22.6%), Ethiopian (ET) (12.9%) and Neotropical (NT) (3.2%) elements. These results may be compared with the spiders of tea ecosystem of Dooars. Species richness is found to be more in Dooars as compared to Assam. Diversity spectrum is found to vary between the two areas. 8 of the presently reported species could never be sampled from Dooars. Likewise there are many species that are known from Dooars only. Should such a variation be relegated to the fencing trees surrounding a plot, usually practiced in Dooars? Is it possible that fencing trees provide a favourable refuge for many of the araneid species, even though the tea bushes face pesticides.

Acknowledgements: Authors thank the National Tea Research Foundation, c/o Tea Board, and the officials of the respective Tea Estates of Assam, and the Head of Dept. of Zoology, University of Calcutta, for necessary support.

Table 1. Orb-weaving Spiders recorded from four Tea Estates of Assam.

<table>
<thead>
<tr>
<th>Species Distribution</th>
<th>B</th>
<th>J</th>
<th>H</th>
<th>K</th>
<th>Zootepo-</th>
<th>T</th>
<th>T</th>
<th>T</th>
<th>T</th>
<th>graphical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aculelatis sp.</td>
<td>+</td>
<td>OR</td>
<td>Dry folded leaves of shade trees.</td>
<td>Pre-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(nt. indicus)**#</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Tea leaves</td>
<td>Throughout</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Araneus millicus</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Tea bushes, Fencing trees.</td>
<td>Monsoon, Pre-monsoon</td>
<td>Throughout</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Simon)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees, shade trees.</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Argiopex aemula</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Tea bushes, Fencing trees.</td>
<td>Monsoon, Pre-monsoon</td>
<td>Throughout</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Walckenaer)**</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees, shade trees.</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Argiopex pulchella</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thorrell</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Chorizopes sp.</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Weeds near the drains.</td>
<td>Throughout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(nt. calcicola)**</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Tea bushes, Fencing trees.</td>
<td>Pre-monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Cyclosa bifida</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Doleschall)**</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Pre-monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Cyclosa confregua</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Pre-monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Thorrell)</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Pre-monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Cyclosa hexactuberculata</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tikader**</td>
<td>+</td>
<td>+</td>
<td>OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Cyclosa insulana Costa</td>
<td>+</td>
<td>+</td>
<td>AS, OR</td>
<td>Tea bushes, Fencing trees</td>
<td>Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Species Name</td>
<td>Habitat Details</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cyclosa mulmeinensis</td>
<td>ET, OR, PL Tea bushes, Fencing trees Throughout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Cyclosa quinqueguttata</td>
<td>OR. PL Tea bushes, Fencing trees Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Cyclosa simoni</td>
<td>OR Tea bushes, Fencing trees Monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Cyclosa spirifera</td>
<td>OR Tea bushes Fencing trees Throughout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Cyrtarachne arinervaria</td>
<td>OR Tea bushes, Fencing trees Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Cyrtarachne inequallis</td>
<td>OR Tea bushes, Fencing trees Monsoon, Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Cyrtophora cicatrosa</td>
<td>OR Tea bushes, Fencing trees Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Neoscona bengalensis</td>
<td>OR Tea bushes between shade trees &amp; tea bushes Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Gasteracantha diadema</td>
<td>AS, OR Tea bushes Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Gasteracantha kuhlil</td>
<td>OR Tea bushes Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Gasteracantha suberiana</td>
<td>AS, OR Tea bushes Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Neoscona mukerjei</td>
<td>OR Tea bushes, Fencing trees Post-monsoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Oligurus sexspinosus</td>
<td>OR Tea bushes, Fencing trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Neoscona punctigera</td>
<td>OR Tea bushes, Fencing trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Parawixia dehaani</td>
<td>OR Tea bushes, Fencing trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Pasilobus kotigehars</td>
<td>OR Tea bushes, Fencing trees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New from India; ** Assam; *** Tea plantations of Assam; # Not found in Doors.

References
HOOLLONGAPAR Gibbon Wildlife Sanctuary, popularly known as Gibbon Wildlife Sanctuary, the only protected area in India for Hoolock gibbon (Hoolock hoolock), is a tropical deciduous forest, dominated by Dipterocarpus retusa (Hollong). This has an area of 20.98 sq. km., lying on 26°25' N latitude and 94°20'—94°25' E longitude (Chetry et al., 2007). It is located in the Matriani range of Jorhat district in upper Assam and surrounded by human habitation and tea gardens.

Authors started to survey the spiders of mentioned area since 2008 at the adjoining forest to Kotalgoorie Tea Estate.

Earlier Tikader (1968) has reported spiders of Khasi & Jaintia Hills in the then Assam; Hazarika & Chakraborti (1998) on the spiders of tea plantation ecosystem in Assam; and Saikia & Baruah (2009) on the spiders of rice ecosystem of Assam.

All collected spider samples, reveal the existence of 36 species under 28 genera (Table 1). Of these 16 are new records from Assam (marked*) (Sebastian & Peter, 2009). This is the first report on the spiders of this sanctuary.

Table 1. List of spiders recorded from Gibbon wildlife Sanctuary, Assam.

<table>
<thead>
<tr>
<th>Family</th>
<th>Genus</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araneidae</td>
<td>Araneus</td>
<td>sp.</td>
</tr>
<tr>
<td></td>
<td>Argiope</td>
<td>sensula (Walkeraert)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pulchella Thorell</td>
</tr>
<tr>
<td></td>
<td>Cyclura</td>
<td>bifida (Doleschall)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spirifera Simon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mulmeinensis (Thorell)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sp.</td>
</tr>
<tr>
<td></td>
<td>Exothele</td>
<td>laglaeizei (Simon)</td>
</tr>
<tr>
<td></td>
<td>Gasteracantha</td>
<td>daly Pocock*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>diademis Thorell</td>
</tr>
<tr>
<td></td>
<td>Neoscona</td>
<td>sp.</td>
</tr>
<tr>
<td></td>
<td>Lycomatidae</td>
<td>Parawixius</td>
</tr>
<tr>
<td></td>
<td></td>
<td>makedjei Tikader</td>
</tr>
<tr>
<td></td>
<td>Miturgidae</td>
<td>Cheiracanthium</td>
</tr>
<tr>
<td></td>
<td>Nephilidae</td>
<td>Herennia</td>
</tr>
<tr>
<td></td>
<td>Oxyopidae</td>
<td>Ozyopes</td>
</tr>
<tr>
<td></td>
<td>Salticidae</td>
<td>Assemena</td>
</tr>
<tr>
<td></td>
<td>Theridiidae</td>
<td>Achaearanea</td>
</tr>
<tr>
<td></td>
<td>Tetragnathidae</td>
<td>Leucauge</td>
</tr>
<tr>
<td></td>
<td>Theridiidae</td>
<td>Argyrodes</td>
</tr>
<tr>
<td></td>
<td>Uloboridae</td>
<td>Uloborus</td>
</tr>
</tbody>
</table>

* New to Assam.

Acknowledgements: Authors thank National Tea Research Foundation c/o Tea Board, for sponsoring the project and to the officials of Kotalgoorie Tea Estate of Assam, officials and staff of Gibbon Wildlife Sanctuary, and the Head, Dept. of Zoology, University of Calcutta, for necessary support.

References
Short Communication

First record of the genus *Tukaraneus* Barrion and Litsinger and *Neoscona yptinika* Barrion and Litsinger (Araneae: Araneidae) from India

Souvik Sen, Tapan Kumar Roy, Dhruba Chandra Dhal, Sumana Saha, Dinendra Raychaudhuri

* Entomology Laboratory. Department of Zoology. University of Calcutta. 35. Ballygunge Circular Road. Kolkata- 700019. India

* Corresponding author. E-mail address: dinendrarccue@gmail.com (D. Raychaudhuri),

ARTICLE INFO

Article history:
Received 16 March 2010
Revised 27 January 2011
Accepted 28 January 2011
Available online 4 February 2011

Keywords:
Araneidae
Tukaraneus
Neoscona yptinika
First record
India

Introduction

Globally, the orb weaving spiders (Araneidae) are known to comprise 170 genera and 2999 species (Platnick, 2010). In India, they comprise by 154 species belonging to 29 genera (Sebastian and Peter 2009; Platnick. 2010).

Such spiders in the reserve forests and Tea Estates of Dooars and Darjeeling, West Bengal, have previously been studied by Biswas and Biswas (1992). Saha et al. (1994,1995), Biswas et al. (1997). Saha and Raychaudhuri (2004a,b) and Sen et al.(2009). A systematic survey has been conducted beginning in 2006 in the reserve forests and their adjoining Tea Estates (T.E.) of Dooars and Darjeeling, West Bengal, to explore the diversity of spiders that might have resource potential. In the process, we came across 2 species: namely, *Tukaraneus palawanensis* Barrion and Litsinger, 1995 and *Neoscona yptinika* Barrion and Litsinger, 1995 from Mahananda Wildlife Sanctuary (Darjeeling) and Dalgaon T.E. (Dooars). A literature search revealed that this work is the first report of the species from India, and only the second in the world thus far (Sebastian and Peter, 2009; Platnick, 2010). The recorded taxa are described and illustrated in the interest of Indian Arachnology, as many currently do not have the access to original descriptions.

Material and methods

Spiders were collected and preserved in accordance with the work of Tikader (1987). The materials were studied under a Stereo Zoom Binocular Microscope, model Zess SV-11. The measurements indicated in the text are expressed in millimeters and were made with an eye piece graticule. Taxa identification was conducted with the help of Barrion and Litsinger (1995). Illustrations and labeling of male palps were conducted according to the work of Coddington (1990), Scharff and Coddington (1997), and Framenau et al. (2010). Leg measurements are shown as total length (femur, patella, tibia, metatarsus, tarsus).

Abbreviations used are as follows: AME = anterior median eyes, ALE = anterior lateral eyes, PME = posterior median eyes, PLE = posterior lateral eyes, BH = basal haematodocha, Cy = cymbium, PCy = paracymbium, R = radix, Te = tegulum, Ste = subtegulum, C = conductor, TA = terminal apophysis, MA = median apophysis, MWLS = Mahananda Wildlife Sanctuary.

Material specimens have been deposited to the Entomology Laboratory. Department of Zoology, University of Calcutta, Kolkata, India.

Taxonomic accounts

*Tukaraneus palawanensis* Barrion and Litsinger
(Fig. A(1–7); Fig. C(15))

*Tukaraneus palawanensis* Barrion and Litsinger, 1995, Riceland spiders of South and Southeast Asia: 645.
Fig. A. Tuliarimeus paralemus Barrion and Utsinger: Male: 1. Whole body. 2. Lateral view of carapace. 3. Chelicerae. 4. Maxillae and labium. 5. Sternum.

Diagnosis. Median apophysis with 3 apical teeth; fovea double anchor-like; tibia I with 1 ventral spine.

Description. Male.

Total length 3.32, cephalothorax length 1.71, cephalothorax width 1.53, abdominal length 1.60, abdominal width 1.55.

Cephalothorax (Fig. A(1)) yellow, cephalic area a little darker, longer than wide, flat, narrowed, forming a snout in front of the AME (Fig. A(2)), thoracic area wider, thoracic fovea longitudinal, distinctly double anchor-like. Eyes 8, transparent, dissimilar, arranged in 2 strongly recurved rows, anteromedians on the produced end, laterals contiguous, ocular quad wider than long, with 2 small spines, eye diameter: AME (0.14) > PME (0.10) > PLE > ALE (0.07), inter ocular distance: AME-AME = 0.14, ALE-ALE = 0.10, ALE-AME = 0.53, PME-PM = 0.10, PLE-PLE = 0.02, PLE-AME = 0.06, AME-PME = 0.03. Clypeus height small. Chelicerae (Fig. A(3)) yellow, small, promargin and retromargin with 3 and 2 small teeth respectively, fangs yellowish-brown, small, weakly curved. Both labium and maxillae (Fig. A(4)) yellow with apices paler, maxillae longer than wide, apically strongly scopulate, labium wider than long, distally broad and weakly scopulate, medially constricted. Sternum (Fig. A(5)) yellow, margins brown, longer than wide, anterior margin concave and fused with labium, posteriorly narrowed, pointed, clothed with minute hairs. Legs yellow with brown bands, each femora with 2 brown bands, each tibia, metatarsi III and IV with 1 band. Leg measurements: 14.45 (1.13, 0.53, 1.33, 1.03, 0.73); II 3.22 (1.0, 0.43, 0.76, 0.30); III 2.17 (0.66, 0.33, 0.46, 0.60, 0.26); IV 3.19 (0.93, 0.33, 0.08, 0.33). Leg spination: femora: I = 1-0-3-2, II = 3-3-1-1, III = 3-1-0-2, IV = 3-4-4-1; tibiae: I = 3-1-4-2, II = 5-5-5-3, III = 3-4-4-2, IV = 1-4-4-2; metatarsi I and II with 1 and IV with 2 prolateral spines, Tarsal claw 3-toothed.

Abdomen (Fig. A(6)) sub-triangular, dorsum off-white, with 3 pairs of lateral grey markings extending inward and a pair of white, short, longitudinal, narrow bands, outwardly bordered by grey-black, apically with a transverse, crescent, grey-black, narrow band, clothed with few brown spines and hairs, with 3 pairs of brown sigilla (muscular
Photographs: General habitus: 15. Tukaraneus palawanensis Barrion and Utsinger (male) and 16. Neoscona yptinika Barrion and Litsinger (male).

apodemes); venter yellowish with grey patches and a pair of white spots anterolateral to spinnerets, spinnerets grey, small.

Palp (Fig. A(6 and 7)): Tibia with 4 setae, median apophysis basally swollen, apically with 3 strong teeth, embolus long with a pointed tip.

Female: unknown.

Variation: Total length: male 3.32-3.40.

Material examined. 2 males, Kalijhora, MWLS, Darjeeling, West Bengal, India, 14.iii.2009, coll. S. Sen.


Neoscona yptinika Barrion and Litsinger (Fig. B(8—14): Fig C(16))

Neoscona yptinika Barrion and Litsinger, 1995, Riceland spiders of South and Southeast Asia: 620.

Diagnosis. Median apophysis sickle-shaped and terminal apophysis with 2 sub-basal teeth; abdomen longer than wide; chelicerae with 4 promarginal and 3 retromarginal teeth; tibia II with 51-65 proventralateral spines.

Description. Male.

Total length-11.26, cephalothorax length-5.45, cephalothorax width-5.27, abdominal length-5.81, abdominal width-4.63

Cephalothorax (Fig. B(8)) brown with 2 broad lateral dark reddish-brown bands, longer than wide, cephalic area produced forward, slightly elevated, cervical furrows weakly distinct, thoracic fossa dark brown, long and longitudinal, clothed with hairs and pubescence. Eyes B, transparent, ringed with black, arranged in 2 recurved rows, anterior row much more recurved than posterior row, postmedianians very close, nearly touching, lateral to ceratog不下中 taller dense media marking, uniformly clothed with spine-like brown hairs, midlongitudinally with 3 pairs of sigilla (muscular apodemes), 3rd one small, further laterally 4 pairs of black oblique markings; venter light-brown, with a transverse chalk white marking just below the epigastric furrow, 4 pairs of brown, small spots between the epigastric furrow and spinnerets, clothed with hairs, spinnerets brown, uniform, 2 globular white spots above the spinnerets.

Palp (Fig. B(13 and 14)): Tibia with 2 long setae, median apophysis sickle-shaped, terminal apophysis with 2 sub-basal teeth, embolus filiform, conductor elongately triangular, basally broad.

Female: unknown.

Variation: Total length: male 10.80-11.26. Proventralateral spines on tibia II: 54-59


Acknowledgments

We gratefully acknowledge the help rendered by the anonymous reviewers to improve the manuscript. We would also like to thank the Department of Biotechnology, Government of India [BT/PR6371/NDB/51/078/2005 dt. 20.11.2006] and National Tea Research Foundation, c/o Tea Board [17(177)/2008 dt. 27.3.2008] for sponsoring the projects and the Directorate of Forests, Government of West Bengal.
and the Head of the Department of Zoology, University of Calcutta for the necessary support.

References


Spiders (Arachnida : Araneae) of the Corbett National Park, Uttarakhand

DHUBRA CHANDRA DBALI, TAPAN KUMAR ROY, SOUVIK SEN, SUMANA SAHA* and DINENDRA RAYCHAUDHURI

Entomology Laboratory, Department of Zoology, University of Calcutta, 35, Ballygunge Circular Road, Kolkata- 700019; and
*Department of Zoology, Lady Braboume College, Govt. of West Bengal, Saharwardy Avenue, Kolkata- 700017.

E-mail: dinendraracw@gmail.com

Introduction

Corbett National Park is well known since long. The park is situated in the foothills of the Northwest Himalaya, within the state of Uttarakhand (formerly Uttaranchal). The coordinates of the National park are 29°25’ to 29°39’N latitude and 78°44’ to 79°07’E longitude. The average altitude of the region ranges between 360m and 1,040m. It covers an area of 1288 sq. km. Main vegetation types include Sal forest, Khair-Sissoo forest, Haldu, Pipal, Mango trees and savannah grasslands (locally known as Chaur). The river Ramganga and its tributaries are flowing through the National Park (Lamba, 1987; Anonymous: 2003).

For introduction on the fauna of Corbett National Park one may refer to Lamba (1987) and Khanna & Tak (2008). They however, did not report any spider taxa from the Park. Also, spider fauna of Uttarakhand (Biswas & Biswas, 2010) excluded any taxa from the National Park.

In our first attempt with the spiders (Araneae) of this protected forest area, we report 34 species of 27 genera and 12 families, observed during November 2010.

Material & Methods

Spiders were collected and preserved following Tikader (1987) and Baynes & Litsinger (1995). The samples were studied using Stereo Zoom Binocular Microscopes, model Olympus SZX-7 and Zeiss SV-11.

Table 1. Spiders recorded from the Corbett National Park, Uttarakhand.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>India (States)</th>
<th>Elsewhere in World</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family: Araneidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cyclosa quadruqueguttata (Thorell)***</td>
<td>Assam, Sikkim, Uttarakhand, West Bengal.</td>
<td>Bhutan, China, Myanmar, Taiwan.</td>
</tr>
<tr>
<td>5. Cyclosa simoni Tikader</td>
<td>Assam, Sikkim, Uttarakhand, West Bengal.</td>
<td>—</td>
</tr>
</tbody>
</table>
8. *Neoscona mukerjei* Tikader
   Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Madhya Pradesh, Maharashtra, Manipur, Uttarakhand, West Bengal.

9. *Neoscona pavida* (Simon)
   Uttarakhand, West Bengal.

10. *Neoscona theisi* (Würtken)
    Gujarat, Madhya Pradesh, Maharashtra, Orissa, Uttarakhand, West Bengal.

II. Family: Clubionidae
11. *Clubiona* sp.
    Uttarakhand.

III. Family: Linyphiidae
12. *Linyphia* sp.
    Uttarakhand.

IV. Family: Lycosidae
13. *Lycosa mackenziei* Gravely ***
    Bihar, Karnataka, Punjab, Uttarakhand, West Bengal.

    Uttarakhand.

V. Family: Miturgidae
15. *Cheiracanthium indicum* Cambridge ***
    Gujarat, Maharashtra, Sikkim, Uttarakhand, West Bengal.

VI. Family: Nephilidae
16. *Nepila* sp.
    Uttarakhand.

VII. Family: Oxyopidae
17. *Oxyopes* sp.
    Uttarakhand.

VIII. Family: Pisauridae
18. *Pisaura* sp. **
    Uttarakhand.

IX. Family: Salticidae
19. *Hyllus* sp. **
    Uttarakhand.

20. *Marpissa* sp.
    Uttarakhand.

21. *Mymaracantha orientalis* Tikader
    Kerala, Uttarakhand, West Bengal.

22. *Platypus poykellii* (Andozin)
    Arunachal Pradesh, Kerala, Manipur, Uttarakhand, West Bengal.

23. *Rhene* sp. **
    Uttarakhand.

24. *Tolomonia climaciata* (Simon)
    Assam, Gujarat, Kerala, Maharashtra, West Bengal.

25. *Thania biomoeonis* Thorell ***
    Andaman Island, Assam, Kerala, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal.

X. Family: Tetragnathidae
26. *Lenaconge decorata* (Blackwall)
    Assam, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal.

27. *Lenaconge penda* Tikader ***
    Sikkim, Uttarakhand, West Bengal.

**Family: Thomisidae**

30. *Pistius* sp. **Uttarakhand.
32. *Xysticus* sp. Uttarakhand.

**Family: Uloboridae**

33. *Miagrammopes* sp. **Uttarakhand.
34. *Uloborus krishnae* Tikader **Sikkim, Uttarakhand.

*Family new from Uttarakhand  **Genus new from Uttarakhand; *** Species new from Uttarakhand.


All material are in the deposition of Entomology Laboratory, Department of Zoology, University of Calcutta, Kolkata.

**Results & Discussion**

A total of 34 species are recorded in the present study (Table 1). Of the recorded spider taxa, one family (marked by*), 5 genera (marked by**) and 8 species (marked by***) are reported for the first time from the state of Uttarakhand. Four species namely *Cyclosa simotti*, *Neoscona mukerjei*, *Leucauge ponawai*, and *Uloborus krishnae* are reported as endemic to India. Analysis of their zoogeographical distribution reveals that the fauna is largely Oriental (100%), followed by Palaearctic (12%), Ethiopian (12%), Australian (6%), Nearctic (3%) and Neotropical (3%) elements. Authors could not determine the species status of *Clubiona*, *Hyllus*, *Linyphia*, *Marpissa*, *Miagrammopes*, *Oxyopes*, *Pardosa*, *Pisaura*, *Pistius*, *Rhene*, *Thomisus* and *Xysticus* because of specimens’ immaturity.

**Acknowledgements:** We wish to acknowledge the help by undergraduate students of Lady Braboume College for collection of spider samples. We also thank authorities of the Lady Braboume College, the Corbett National Park and the Head, Department of Zoology, University of Calcutta, for necessary support.

**References**

WOLF SPIDERS (ARANEAE: LYCOSIDAE) OF THE RESERVE FORESTS OF DOOARS, WEST BENGAL, INDIA

Dhruba Chandra Dhali*, Tapan Kuamr Roy*, Souvik Sen**, Sumana Saha*** and Dinendra Raychaudhuri*

* Entomology Laboratory, Department of Zoology, University of Calcutta, 35, Ballygunge Circular Road, Kolkata- 700019, INDIA. E-mail: dhruba.83dhali@gmail.com; tapanroyca1@gmail.com; dinendrarccu@gmail.com
** Tea Research Association, North Bengal Regional R & D Centre, Nagrakata, Dist. Jalpaiguri, West Bengal, INDIA. E-mail: souvik_ind_o6@yahoo.co.in
*** Dept. of Zoology, Darjeeling Govt. College, Govt. of West Bengal, Darjeeling-734101, West Bengal, INDIA. E-mail: sahasumana2010@gmail.com


ABSTRACT: 31 species under 6 genera till date are found to compose lycosid fauna of Dooars, West Bengal. Of these Arctosa quinquedens is considered as new to science. Hitherto unknown male morph of Draposa amkhasensis (Tikader & Malhotra) comb. nov. is reported. Record of Pardosa procurva Yu & Song from the country delimits its distribution range. All these new spiders are described and illustrated. New combination for the species Draposa amkhasensis (Tikader & Malhotra) and D. burasantiensis (Tikader & Malhotra) is proposed.

KEY WORDS: Lycosid, new species, new male morph, new combination, Dooars, West Bengal.

Wolf spiders are free living, litter and ground dwellers found worldwide with 2387 species under 120 genera (Platnick, 2012). They are so named because of their chasing habit. They are supposed to play an important role in regulating ground dwelling insect pests. Sebastian & Peter (2009) listed 126 species under 17 genera from our country that includes 48 species under 8 genera known from the state (Tikader & Biswas, 1981; Biswas & Biswas, 1992; Majumder, 2005, 2007).

Despite several publications dealing with the spiders of Dooars (for details see Raychaudhuri & his coworkers), lycosids are known by 3 species, Hippasa partita (O. P. Cambridge), Pardosa sumatrana (Thorell) and P. duplicata Saha et al. (Saha et al., 1994a,b) only.

An attempt is therefore made to deal with 205 lycosid individuals representing 31 species under 6 genera sampled (67.16% by hand picking; 23.0% by pit fall trap; and 9.84% through Berlese extraction) till date from the area. These include a new species Arctosa quinquedens, hitherto unknown male morph of Draposa amkhasensis (Tikader & Malhotra) comb. nov. and Pardosa procurva Yu & Song as new from the country. We propose new combination for the species Draposa amkhasensis (Tikader & Malhotra) and D. burasantiensis (Tikader & Malhotra). Besides providing data of the recorded species, the species considered new are described and illustrated.

MATERIAL AND METHODS

Materials were mainly collected by hand on the ground and under stone during the surveys conducted (1993-2011) in the reserve forests of Dooars viz. Chapramari Wild Life Sanctuary (CWLS), Gorumara National Park (GNP),
They were also collected by pitfall traps and Berlese extraction.

Spider specimens thus sampled were preserved following Tikader (1987) and were studied under Stereo Zoom Binocular Microscopes, model Olympus SZX-7 and Zeiss SV-11. The measurements indicated in the text are in millimeters (mm), made with an eye piece graticule. Materials are in the deposition of Entomology Laboratory, Department of Zoology, University of Calcutta, Kolkata.

Abbreviations used: AL= abdominal length, ALE= anterior lateral eye, AME= anterior median eye, AW= abdominal width, CL= cephalothoracic length, CW= cephalothoracic width, PLE= posterior lateral eye, PME= posterior median eye, TL= total length.

RESULTS

Genus: Arctosa C. L. Koch

Arctosa himalayensis Tikader & Malhotra


The species is the first record for the Dooars fauna.


Arctosa indica Tikader & Malhotra


The species is the first record for the Dooars fauna.

Distribution: India: Maharashtra, West Bengal; China (Tikader & Malhotra, 1980; Majumder & Tikader, 1991; Biswas & Biswas, 1992).

Arctosa quinquedens sp. nov.

Description: Female (Holotype)

CL= 2.22, CW= 1.57, AL= 2.52, AW= 1.61, TL= 4.74. Cephalothorax (Fig. 1) dark brown, longer than wide, anteriorly narrowed, posteriorly deeply depressed, convex, glabrous, clothed with pubescence, margined with transparent, short hairs, midlongitudinally with a pale brown band extending up to the middle of ocular quad. Cephalic region raised, with 2 dark brown, narrow, nearly parallel sided, basally convergent bands between the PLE, cephalic groove inconspicuous, cervical furrow deeply grooved. Eyes 8, transparent, except anteromedians, round, ringed with black, arranged in 2 rows, anterior straight or nearly so, posterior strongly recurved; eye diameter: PME > PLE > ALE > AME; interocular distance (Fig. 2): AME-AME=0.13; ALE-AME=0.13; ALE-AME=0.13; PME-PME=0.57; PLE-PLE=0.83; ALE-PLE=0.74; and AME-PME=0.30. Clypeus pale brown, basally darker, armed with more than 10 dark spines. Thoracic region with prominent short, black, midlongitudinal fovea, 2 short black lines just above it, radii 3 on each side distinct. Chelicerae (Fig. 3) pale brown, small, stout, retromargin with 3 and promargin with 2 black, equal sized teeth and scopulate; fang brown, short, stout, curved. Labium (Fig. 4) pale brown, basally constricted, distally swollen, apical margin round, scopulate. Maxillae (Fig. 4) pale brown, longer than wide, inner margin concave, outer margin inwardly curved at both ends and scopulate. Sternum (Fig. 4) pale brown, cordate, anteriorly weakly concave, posteriorly narrowed, clothed with black hairs. Legs dark brown except coxae and trochanter, femur 1 more dark, moderate, slender, coxae with a longitudinal in fold laterally, claw brown, 3, unequal, larger with 2 pectinations; femora with 2-0-0-0 and tibia with 0-6 (2-2-2)-0-0 spinations. Leg formula = 4:1:2:3.

Abdomen (Fig.1) dark brown, elongate oval, anteriorly with several dark brown hairs, posteriorly pubescent. Dorsum with longitudinal pale brown band, enclosing 4 tiny, brown...
sigilla on the anterior half. Venter pale brown, clothed with pubescence, medially faintly dark, epigastric furrow distinct.

Epigynum and internal genitalia (Figs. 5-6): Epigynum conspicuous; copulatory openings small, round, near epigastric furrow; copulatory ducts short, thin, coiled; spermathecae elongate, tubular, basally inwardly curved and converging at the narrower apex of median septum; fertilization ducts short, very thin, curved and opening into atrium near septal apex.

Material examined: 1 female (Holotype), Rajabhatkhawa, BTR, Jalpaiguri, West Bengal, India, 9. iv. 2009, coll. D. C. Dhal.
Type deposition: Entomology Laboratory, Department of Zoology, University of Calcutta, Registration no. EZC 0025-12.
Distribution: India: West Bengal.
Etymology: The species name is derived from the five chelieeral teeth.
Remark: The closest ally of the present species appears to be Arctosa subamylacea (Bosenberg & Strand, 1906), but can be separated by (i) short length, 4.82 mm (longer, 6.92 in A. subamylacea), (ii) femora I with 2 dorsal spines (femora I with 3 dorsal spines in A. subamylacea), (iii) tibia I with 3 pairs of ventral spines (tibia I with 2 pairs of ventral spines in A. subamylacea), (iv) spermathecae elongate, tubular, basally inwardly curved and converging at the narrower apex of median septum (spermathecae round in A. subamylacea) and (v) fertilization ducts short, very thin, curved and opening into atrium near septal apex (fertilization ducts short, thin and opening into atrium just above the septum apex in A. subamylacea). Such differences justify the erection of the new species.

Genus: Draposa Kronestedt
Draposa amkhasensis (Tikader & Malhotra) comb. nov.


Description: New male morph
CL-2.91, CW-2.35, AL-2.70, AW-1.70, TL-5.61. Cephalothorax (Fig. 7) pale brown, with brown patch, ocular area black, longer than wide, convex, both ends narrowing and truncate, medially widest, clothed with pubescence and black, long, erect hairs and white pubescence on and around ocular area; both cephalic and thoracic region in the same plane, former with a mld longitudinal, faint groove, extending from the mld longitudinal, deep, brown, long thoracic fovea up to the middle. Eyes 8, transparent, posterior row with bluish tinge, ringed with black, in 2 rows, anterior shorter and weakly recurved than the recurved posterior; ocular quad longer than wide, basally broader. Eye diameter PME>PLE>AME>ALE. 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. Clypeus brown, medially marked by black, anterolateral corners blackish brown, vertical, height medium, clothed with 2 black, long hairs on each side of median black marking. Thorax with numerous distinct radii. Chelicerae (Fig. 8) brown, long, strong, both margins with 3 teeth and scopulate; fang deep brown, medially black, long and curved. Labium (Fig. 9) grey brown, basally darker, wider than long, apex rounded, medially widest, basally narrowing, shortly pedunculate, truncate, and scopulate. Maxillae (Fig. 9) grey, longer than wide, apically widest, basally pointed, inner margin concave, outer margin round, and scopulate. Sternum (Fig. 9) pale, cordate, anteriorly truncate, posteriorly pointed, margins weakly produced between each coxa, clothed with spiny hairs. Legs pale, femora dorsally with numerous faint black patches, long, slender, 3 clawed, superior 2 with 6 pectinations all over the length while inferior without such, clothed with hairs, each trochanter distally broadly bifurcate with apices spiny; femora I with 3-0-2(2)-4(2-1), femora II with 3-0-2-4, femora III with 3-0-2-2, femora IV with 3-0-2-1 and tibia with 2-6(2-2-2)-2-2 spination. Leg formula- 4132.

Abdomen (Fig. 7) pale, with numerous black patches, elongately oval, clothed with pubescence and black, spiny hairs; dorsum anteromedially with a faint, pale yellow marking, mld longitudinally with 11 pairs of tiny, black spots; venter pale, posteralateral margins spotted with black, clothed with pubescence.
Male palp (Figs. 10-11): pale brown; embolus long, curved, wider before sharp tip; tegular apophysis sclerotised and hook like, sub apically protruberant; palea with variable projections, subpalea with prominent projections, these remain covered by terminal part of bulbous; paleal apophysis at the base of embolus; sperm duct long, distinct and curved.


Note: The species was so far known by the females only and hence the male is described and illustrated.

**Draposa burasantiensis** (Tikader & Malhotra) comb. nov.


Material examined: 1 male, Bichabhanga, GNP, Jalpaiguri, West Bengal, India, 15. iv. 2009, coll. D. C. Dhali; 1 male, Murti, GNP, Jalpaiguri, West Bengal, India, 01. vi. 2009, coll. S. Sen. This species is the first record for the Dooars fauna.


Remarks: Kronestedt (2010) opined that *Pardosa amkhasensis* Tikader & Malhotra and *P. burasantiensis* Tikader & Malhotra may qualify for transfer to the genus *Draposa* Kronestedt. Our perception to the species in question fits well with the definition of *Draposa* Kronestedt. Hence we propose new combination *Draposa amkhasensis* (Tikader & Malhotra) and *D. burasantiensis* (Tikader & Malhotra).

Genus: *Hippasa* Simon


The species is the first record from West Bengal.

Distribution: India: Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal (new record); to Taiwan (Tikader & Malhotra, 1980).

**Hippasa greenalliae** (Blackwall)


Material examined: 1 female, Murti, GNP, Jalpaiguri, West Bengal, India, 01. ix. 2009, coll. D. C. Dhali; 1 female, Buxaduar, BTR, Jalpaiguri, West Bengal, India, 09. ix. 2009, coll. D. C. Dhali; 1 female, Barovisha, BTR, Jalpaiguri, West Bengal, India, 01. x. 2010, coll. S. Sarkar. This species is the first record for the Dooars fauna.
Distribution: India: Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh, China, Sri Lanka, (Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Thulsi Rao et al., 2005; Majumder, 2007).


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

The species is the first record from West Bengal.

Distribution: India: Gujarat, Tamil Nadu, West Bengal (new record) (Gravely, 1924; Tikader & Malhotra, 1980).

_Hippasa partita_ (O. P. Cambridge)


Material examined: 1 male, South Rydak, BTR, Jalpaiguri, West Bengal, India, 05. iv.1993, coll. S. Saha.

Distribution: India: Gujarat, Madhya Pradesh, Rajasthan, West Bengal; Alexandria, Egypt, Central Asia, Pakistan (Tikader & Malhotra, 1980; Saha et al., 1994a,b; Gajbe, 2004; Majumder, 2007).

_Genus: Hogna Simon_


This species is the first record for the Dooars fauna.

Distribution: India: Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal (new record); to Taiwan (Gravely, 1924; Tikader & Malhotra, 1980).

_Genus: Lycosa Latreille_


This species is the first record for the Doorsa fauna.

Distribution: India: Madhya Pradesh, Tamil Nadu, West Bengal; Bhutan (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Gajbe, 2007).


This species is the first record for the Doorsa fauna.
Distribution: India: Assam, Uttar Pradesh, West Bengal (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007).

**Lycosa indagatrix** Walckenaer


The species is a new record for the West Bengal fauna.

Distribution: India: Andhra Pradesh, Tamil Nadu, West Bengal (new record); Sri Lanka (Tikader & Malhotra, 1980).

**Lycosa kempi** Gravely


This species is the first record for the Dooars fauna.


**Lycosa mackenziei** Gravely


This species is the first record for the Dooars fauna.

Distribution: India: Bihar, Karnataka, Kerala, Punjab, West Bengal; Bangladesh, Pakistan (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992; Majumder, 2007).

**Lycosa madani** Pocock


This species is the first record for the West Bengal fauna.

**Lycosa phipsoni** Pocock


This species is the first record for the West Bengal fauna.
Distribution: India: Maharashtra, Orissa, West Bengal (new record); Bhutan, China, Nepal, Taiwan (Tikader & Malhotra, 1980).

*Lycosa shillongensis* Tikader & Malhotra


Genus: *Pardosa* C. L. Koch


This species is the first record for the Dooars fauna.

Distribution: India: Andhra Pradesh, Bihar, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh, Bhutan, China, Myanmar, Pakistan, Philippines (Gravely, 1924; Tikader & Malhotra, 1980; Biswas & Biswas, 1992, 2004; Majumder, 2007).

*Pardosa chambaensis* Tikader & Malhotra


This species is the first record for the Dooars fauna.


*Pardosa duplicata* Saha, Biswas et Raychaudhuri


Distribution: India: West Bengal (Saha et al, 1994).

*Pardosa heterophthalma* (Simon)


Material examined: 4 females, Murti, GNP, Jalpaiguri, West Bengal, India, 01. vi. 2009, coll. D. C. Dhali. This species is the first record for the Dooars fauna.
Distribution: India: Tamil Nadu, West Bengal (new record); to Indonesia (Tikader & Malhotra, 1980; Biswas & Raychaudhuri, 2003).

Pardosa pseudoannulata (Bösenberg & Strand)


Pardosa pusiola (Thorell)


The species is the first record for the Dooars fauna.

Pardosa procurva Yu & Song


Description: Female

Material examined: 4 females, Murti, GNP, Jalpaiguri, West Bengal, India, 01. vi. 2009, coll. D. C. Dhali. This species is the first record for the Dooars fauna.
Distribution: India: Tamil Nadu, West Bengal (new record); to Indonesia (Tikader & Malhotra, 1980; Biswas & Raychaudhuri, 2003).
Epigynum-internal genitalia (Figs. 16-17): Epigynum distinctly with 2 large, M-shaped hood; copulatory ducts long, thin; spermathecae basally expanded, medially thin, coiled and apically again expanded and round; fertilization ducts short, thin; lateral margins of median septum nearly straight.


Distribution: India (new record): West Bengal; China, Taiwan (Yu & Song, 1988).

Note: The species is described and illustrated in the interest of Indian Arachnology.

**Pardosa songosa Tikader & Malhotra**


This species is the first record for the Dooars fauna.


**Pardosa sumatrana (Thorell)**


Distribution: India: Andhra Pradesh, Arunachal Pradesh, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Tamil Nadu,

Pardosa tridentis Caporiacco


Pardosa kupupa (Tikader)


ACKNOWLEDGEMENTS

We thank National Tea Research Foundation, C/o-Tea Board [17(177)/2008 dt.27.3.2008], West Bengal Biodiversity Board, Govt. of West Bengal [326/5K (Bio)-3/2007 dt.11.12.2008 & 21/5K (Bio)-3/2007 dt.14.1.2009] and Department of Biotechnology, Government of India (BT/PR6391/NDB/ 51/078/2005 dt. 20.11.2006) for sponsoring the projects and the officials of the respective Tea estates of Doors, the Dept. of Forest, Govt. of West Bengal and the Head, Dept. of Zoology, University of Calcutta for necessary support.

LITERATURE CITED


Table 1. Length of legs of female (Holotype) of Arctosa quinquedens sp. nov. (in mm).

<table>
<thead>
<tr>
<th>Leg</th>
<th>Femur</th>
<th>Patella</th>
<th>Tibia</th>
<th>Metatarsus</th>
<th>Tarsus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.40</td>
<td>0.53</td>
<td>1.20</td>
<td>1.00</td>
<td>0.73</td>
<td>4.86</td>
</tr>
<tr>
<td>II</td>
<td>1.07</td>
<td>0.60</td>
<td>0.73</td>
<td>0.87</td>
<td>0.67</td>
<td>3.94</td>
</tr>
<tr>
<td>III</td>
<td>0.73</td>
<td>0.40</td>
<td>1.27</td>
<td>0.73</td>
<td>0.53</td>
<td>3.66</td>
</tr>
<tr>
<td>IV</td>
<td>1.13</td>
<td>0.60</td>
<td>1.47</td>
<td>1.40</td>
<td>0.87</td>
<td>5.47</td>
</tr>
</tbody>
</table>

Table 2. Length of legs of new male morph of Draposa amkhasensis (Tikader & Malhotra) comb. nov. (in mm).

<table>
<thead>
<tr>
<th>Leg</th>
<th>Femur</th>
<th>Patella</th>
<th>Tibia</th>
<th>Metatarsus</th>
<th>Tarsus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>2.07</td>
<td>1.00</td>
<td>1.93</td>
<td>2.07</td>
<td>1.33</td>
<td>8.40</td>
</tr>
<tr>
<td>II</td>
<td>1.47</td>
<td>0.93</td>
<td>1.73</td>
<td>1.93</td>
<td>1.07</td>
<td>7.13</td>
</tr>
<tr>
<td>III</td>
<td>1.87</td>
<td>0.93</td>
<td>1.53</td>
<td>2.00</td>
<td>1.07</td>
<td>7.40</td>
</tr>
<tr>
<td>IV</td>
<td>2.53</td>
<td>1.00</td>
<td>2.20</td>
<td>3.47</td>
<td>1.53</td>
<td>10.73</td>
</tr>
</tbody>
</table>
Table 3. Length of legs of female of *Pardosa procurva* Yu & Song (in mm).

<table>
<thead>
<tr>
<th>Leg</th>
<th>Femur</th>
<th>Patella</th>
<th>Tibia</th>
<th>Metatarsus</th>
<th>Tarsus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.27</td>
<td>0.73</td>
<td>1.27</td>
<td>1.13</td>
<td>0.80</td>
<td>5.20</td>
</tr>
<tr>
<td>II</td>
<td>1.20</td>
<td>0.67</td>
<td>1.07</td>
<td>1.07</td>
<td>0.73</td>
<td>4.74</td>
</tr>
<tr>
<td>III</td>
<td>1.27</td>
<td>0.60</td>
<td>1.00</td>
<td>1.40</td>
<td>0.67</td>
<td>4.94</td>
</tr>
<tr>
<td>IV</td>
<td>1.73</td>
<td>0.67</td>
<td>1.60</td>
<td>2.27</td>
<td>0.60</td>
<td>6.94</td>
</tr>
</tbody>
</table>

Z2. TYPICAL ORB-WEAVING SPIDERS (ARANEAE: ARANEIDAE) : POTENTIAL BIORESOURCE IN TEA ECOSYSTEM OF DOOARS, WEST BENGAL

Tapan Kumar Roy1, Dhruba Chandra Dhal2, Sumana Saha* and Dinendra Raychaudhuri

Entomology Laboratory, Department of Zoology, University of Calcutta, 35 B.C. Road, Kolkata- 700019.
*Department of Zoology, Lady Braboume College, Govt. of West Bengal, P ½ Sunnawardy Avenue, Kolkata - 700017.
Email: 1.taoanrovcall@email.com; 2.dhruba.83dhal@gmail.com

ABSTRACT

Being monoculture, tea plantation of Dooars serves as permanent habitat of many arthropod and nematode pests. Per hectare consumption of pesticides is so high that subsequently disrupts the ecological balance and leaves undesirable residues in made tea. This in turn largely affects the revenue from tea. Recent trends in agriculture is to reduce pesticidal load thereby restoring ecological sustainability. This has led to increase interest in spiders as bio-control agent. Because of being generalist predator, researchers are stressing on their assemblage that would effectively address the issues of prey densities.

We too have initiated generating data on spider bioresource of tea ecosystem of Dooars since May, 2008 in the eight identified tea gardens namely Kailashpur T. E., Shikarpur T. E., Nepuchapur T. E., Meenglas T. E. (Western Dooars); Nagrakata T. E., Kurti T. E., Bhogotpore T. E. and Dalgaon T. E (Central Dooars). The tea estates of Western Dooars lie close to the forests while those of Central Dooars are far away from the forest ecosystem. Till date we could record 162 species distributed over 73 genera under 20 families. Despite indiscriminate use of pesticides and other agronomic practices, typical orb weavers (Araneidae) are the dominant group. 40 species under 15 genera compose this group. Some of its members such as Araneus mitificus (Simon), Argiope spp, Cyclosa spp, Cyrtophora spp, Gasteracantha spp, Neoscona spp and Parawixia dehaani (Dolischall) are supposed to be potential predators. Species richness is found to be always more in the gardens lying within Western Dooars.
Genus: *Phrynarachne* Thorold, 1869

*f peeliana* (Stoliczka, 1869) ................... India [urn:lsid:amnh.org:spidersp:030985]

*Thomisus peelianus* Stoliczka, 1869: 229, pl. 20, f. 4 (Df).

*P. p.* Simon, 1895a: 1044.


*f tuberosa* (Blackwall, 1864) ................. India [urn:lsid:amnh.org:spidersp:030993]

*Thomisustuberosus* Blackwall, 1864b: 38 (Df).

*Ornithoscatoides* t. O. P.-Cambridge, 1884a: 200, pl. 15, f. 2 (Df).

*P. t.* Simon, 1895a: 1045.


*P. t.* Simon, 1895a: 1045.

Genus: *Neoscona* Simon, 1864

*m yptinika* Barrion & Litsinger, 1995 ........... India, Philippines [urn:lsid:amnh.org:spidersp:016779]

*N. y.* Barrion & Litsinger, 1995: 620, f. 390a-l (Dm).

*N. y.* Sen, Roy, Dhali, Saha & Raychaudhuri, 2011: 370, f. 8-14, 16 (m).

Genus: *Eriovixia* Archer, 1951

*m palawanensis* (Barrion & Litsinger, 1995) .......... India, Philippines [urn:lsid:amnh.org:spidersp:017090]
