On the new sac spiders (Araneae: Clubionidae)
of Dooars, West Bengal, India

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ABSTRACT

Seven new sac spiders, including one new from India, of the genus Clubiona Latreille, 1804 are recorded from the forest reserves and their adjoining tea estates of Dooars, West Bengal, India. The species are described and illustrated with suitable key.

Keywords: New Sac spiders; Clubiona; Forest reserves; Tea estates; Dooars; West Bengal; India

1. INTRODUCTION

Clubionids are abundant in tropical and subtropical habitats, especially in the foliages of shrubs and trees (Jaeger and Dankittipakul, 2010). Clubiona Latreille, 1804, is the largest genus of the family. The genus known by about 474 species (www.wsc.nmbe.ch), is widely distributed around the world (except in South America) and has been revised both on a worldwide and regional scale (Mikhailov, 1995; Deeleman-Reinhold, 2001). Southeast Asian spiders are receiving serious attention since last decade (Murphy and Murphy, 2000; Deeleman-Reinhold, 2001; Jäger 2007; Dankittipakul and Singtripop 2008a, 2008b; Jäger and Praxaysombath 2009). Deeleman-Reinhold (op. cit.) provided a thorough taxonomic treatment of the family from the area, with a key to subfamilies, genera and species.
So far, only 20 species of the genus are known from India (Keswani et al., 2012; Keswani and Vankhede, 2014; www.wsc.nmbe.ch). The present discourse is on 7 new clubionid species including 1 new to India recorded from Dooars of West Bengal. In the process, other publications consulted are Majumder and Tikader (1991), Biswas and Biswas (1992), and Keswani and Vankhede (2014) of India; Biswas and Raychaudhuri (1996) from Bangladesh, Ono (2009) from Vietnam, Zhang and Yin (1999), Chen and Huang (2004) from Taiwan and China and Ono and Hayashi (2009) from Japan.

2. MATERIALS AND METHODS

Materials were mainly collected by hand from the ground and litter and under stones during the surveys conducted during 2008-2011 in the reserve forests of Dooars viz. Chapramari Wild Life Sanctuary, Gorumara National Park, Jaldapara Wild Life Sanctuary, Buxa Tiger Reserve and their adjoining tea estates namely Kailashpur and Shikarpur. They were also collected by pitfall traps and Berlese extraction.

Spider specimens thus sampled were preserved following Tikader (1987) and Barrion and Litsinger (1995) 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 Department of Agricultural Biotechnology, IRDM Faculty Centre, Ramakrishna Mission Vivekananda University, Narendrapur, Kolkata.

Abbreviations used in the text and in the figures are as follows: 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, sp = spermatheca, cd = copulatory duct, fd = fertilization duct, ehd = epigynal hood, Fm = femur, Pt= patella, Tb = tibia, Mt = metatarsus, Tr = tarsus, CWLS = Chapramari Wild Life Sanctuary, GNP = Gorumara National Park, JWLS = Jaldapara Wild Life Sanctuary, BTR = Buxa Tiger Reserve, KTE = Kailashpur Tea Estate, STE = Shikarpur Tea Estate.

3. RESULTS

Family: Clubionidae Wagner
Genus: Clubiona Latreille
Key to species:

1. Dorsum without any sigilla; fangs denticulate; fertilization ducts long, coiled and downwardly directed
   -Dorsum with paired sigilla; fang not denticulate; fertilization ducts otherwise
   denticulata sp. nov.

2. Retromargin of chelicerae with 3 teeth; spermatheca bean shaped
   -Retromargin of chelicerae never with 3 teeth; spermatheca otherwise

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3. Dorsum with 1 pair of sigilla in female but male without any such; abdomen elongate cylindrical; copulatory ducts not convoluted; fertilization ducts upwardly directed

- Dorsum with 4 pairs of sigilla; abdomen elongate oval; copulatory ducts convoluted; fertilization ducts upwardly and then downwardly directed

---tridentata sp. nov.

4. Retromargin of chelicerae with 6 teeth; spermatheca apple like; outer margin of hoods serrate

- Retromargin of chelicerae with 2 teeth; spermathecae lobular; hoods not serrate

---rama

5. Dorsum with 3 pairs of sigilla; cephalothorax anteriorly with u-shaped brown patch; fertilization ducts long and convoluted

- Dorsum with 2 pairs of sigilla; cephalothorax anteriorly without any u-shaped brown patch; fertilization ducts short and not convoluted

---pila sp. nov.

6. Epigynum with a common guide pocket and anteriorly not septate; anterior lobe of spermatheca not strongly sclerotised, lobe like; fertilization ducts divergent

---bilobata sp. nov.

Epigynum without a common guide pocket and anteriorly septate; anterior lobe of spermatheca strongly sclerotised, ball like; fertilization ducts convergent

---pseudocordata sp. nov.

---Clubiona denticulata sp. nov.

(Figure 1-2)


Description: (Female- Holotype) CL- 4.06, CW- 4.06, AL- 6.12, AW- 3.53, TL- 10.18. Cephalothorax (Figure1A and 2A) brown, globose, convex, anteriorly narrowed and truncate in front, clothed with small, black hairs, few black, large setae just below PLE on each side and few white lanceolate hairs just anterolateral to ocular area; cephalic region raised medially, groove indistinct. Eyes 8, pearly white, ringed with black, in 2 rows, anterior recurved and shorter than procured posterior, laterals on tubercles; ocular quad squarish, basally little broader. Eye diameter AME> ALE> PLE> PME. 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. Clypeus medially yellow, laterally brown, anterolateral corners with deep chillum, vertical, height small, margined with brown lanceolate hairs and white setae. Thorax posteriorly sloped, with a deep brown, small, midlongitudinal, prominent fovea; radii indistinct. Chelicerae (Figure1B) dorsally dark brown, ventrally red brown, inner base with a black spot, longer than wide, robust, promargin with 2 and retromargin with 4 unequal teeth, clothed with white, long hairs, scopulate; fang darker, long, strong, erect and inner margin serrate. Labium (Figure1C) brown, apically yellow, round, wider than long, basally constricted, and scopulate.

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Figure 1. Clubiona denticulata sp. nov. A- Cephalothorax and abdomen, dorsal view. B-Chelicerae, ventral view. C-Maxillae, labium and mandible, ventral view. D-Epigynum. E-Internal genitalia.
Maxillae (Figure 1C) yellowish brown, longer than wide, inner margin with a concavity, outer margin nearly round, and scopulate. Sternum (Figure 1C) yellow, subtriangular, anteriorly concave, posteriorly pointed behind coxae IV clothed with brown, lanceolate hairs. Legs brown, excepting deep brown metatarsi and tarsi, long, fragile, 2 clawed, each basally with numerous pectinations and with claw tufts; metatarsi and tarsi fringed with hairs on each margins; femora I with 2-0-3-2 and tibia I with 0-4 (2-2)-2-2 spination. Leg measurements: (Table 1). Leg formula- 1234.

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Abdomen (Figure 1A and 2A) grey, with numerous brown, irregular patches, elongately oval, anteriorly weakly concave, clothed with pubescence; venter creamy white, with numerous, irregular, small, grey patches. Epigynum-Internal genitalia (Figure 1D, 1E, 2B and 2C): Epigynum highly sclerotised; copulatory openings near epigastric furrow, with ducts long, opening into a large, bilobed, spermatheca; fertilization ducts long, coiled.

Distribution: India: West Bengal.
Etymology: The species name is derived from denticulate fang.
Remarks: The present species shows close resemblance to Clubiona odesanensis Paik, 1990, but can be separated by (i) cheliceral promargin margin with 2 teeth (cheliceral promargin margin with 6 teeth in C. odesanensis), (ii) leg formula- 1234 (leg formula- 4123 in C. odesanensis), (iii) femora I with 2-0-3-2 and tibia I with 0-4 (2-2)-2-2 spination (femora I with 3-0-1-0 and tibia I with 0-4 (2-2)-0-0 spination in C. odesanensis) and (iv) spermatheca bilobed (spermatheca trilobate in C. odesanensis). Such differences justify the erection of the new species.
Figure 2. *Clubiona denticulata* sp. nov. A-Dorsal habitus. B-Epigynum. C-Internal genitalia.

*Clubiona tridentata* sp. nov.

(Figure 3-6)


Description: (Female- Holotype) CL- 2.22, CW- 1.52, AL- 3.65, AW- 1.00, TL- 5.87. Cephalothorax (Figure 3A, 5A and 6A) pale, longer than wide, anteriorly narrowed, subtruncate, medially widest, posteriorly round, convex, clothed with pubescence, setae and few brown, long hairs; cephalic region little raised, with a midlongitudinal groove, extending
from thoracic fovea to PME. Eyes 8, transparent excepting pearly white PME, ringed with black, in 2 rows, anteriorly weakly procurred and shorter than the recurved posterior; ocular quad wider than long, basally broader. Eye diameter- PME>ALE>PME>PLE. 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. Clypeus pale, vertical, height small, each anterolateral corner with a weak, downward projection. Thorax with a depressed, indistinct, v-shaped fovea; radii indistinct. Chelicerae (Figure 3B) pale, longer than wide, robust, both margin with 3 unequal teeth and scopulate; fang pale brown, long, robust, erect. Labium (Figure 3C) pale brown, longer than wide, apically round, medially constricted, basally broader and subtruncate, scopulate. Maxillae (Figure 3C) pale, longer than wide, twice longer than the labium, erect, inner margin outwardly rounded, outer margin concave, and scopulate. Sternum (Figure 3C) white, margins pale brown, elongately cordate, margins projected sharply towards each coxa, clothed with setae. Legs pale, long, slender, 2 clawed, each with more than 6 pectinations and with claw tufts; metatarsi I-II with ventrally with fringe of setae, femora I- II with 3-0-2-2, femora III-IV with 3-0- 0- 0 tibia I-II with 3-4(2-2)-0-0 and tibia III-IV with 2-4(2-2)-2-2 spination. Leg measurements:( Table 2). Leg formula- 1423.

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Abdomen (Figure 3A,5A and6A) creamy white, elongate, anteriorly weakly concave, posteriorly pointed, clothed with pubescence and medially; venter pale with faint black, parallel, longitudinal lines, extending from epigastric furrow to spinnerets.

Epigynum-Internal genitalia (Figure 3D, 3E, 5B and 5C): copulatory openings round, situated basally near epigastric furrow, with ducts long, incurved, further divergent, opening in the cup like spermaphetea; fertilization ducts short, outwardly and upwardly directed.
Figure 3. *Clubiona tridentata* sp. nov. female A- Cephalothorax and abdomen, dorsal view. B-Chelicerae, ventral view. C-Maxillae, labium and mandible, ventral view. D-Epigynum. E- Internal genitalia.

Male (Allotype): Similar to the Holotype but length of body little shorter and abdominal dorsum without any sigilla(Figure6A). CL- 2.02, CW- 1.52, AL- 3.45, AW- 1.00, TL- 5.47. Leg measurements:( Table 3). Leg formula- 1423.

Table 3. Leg measurements of *Clubiona tridentata* sp. nov. male.

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Male palp (Figure 4A, 4B, 4C, 6B, 6C and 6D) relatively simple, RTA small and simple and blunt tip from retrolateral view; tegulum rounded at base; sperm duct distinct, encircling, long loop, originating from upper part of tegulum; spongiform embolus originating from apical tegulum, with relatively large embolar base, the tip reaching beyond tip of tegulum; membranous conductor situated apically; median apophysis sickle shaped.

**Figure 4.** *Clubiona tridentata* sp. nov. male A- palp, dorsolateral view. B- palp, ventral view. C- palp, ventrolateral view.
Distribution: India: West Bengal.
Etymology: The species name is derived from the tridentate chelicerae.
Remarks: The present species shows close resemblance to *Clubiona bengalensis* Biswas, 1984, but can be separated by (i) each cheliceral margin with 3 teeth (each cheliceral margin with 1 tooth in *C. bengalensis*), (ii) elongate abdominal dorsum of female with 1 pair of sigilla (oval abdominal dorsum with 2 pairs of sigilla in *C. bengalensis*), (iii) spermatheca bean shaped (spermatheca convoluted in *C. bengalensis*), (iv) fertilization ducts upwardly directed (fertilization ducts laterally directed in *C. bengalensis*). Such differences justify the erection of the new species.

![Image A](image_a.png)

**Figure 5.** *Clubiona tridentata* sp. nov. female A-Dorsal habitus. B- Epigynum. C-Internal genitalia.
Figure 6. *Clubiona tridentata* sp. nov. male A-Dorsal habitus. B- Palp, dorsolateral view. C- Palp, ventral view. D- Palp, ventrolateral view.
Clubiona rama Dankittipakul and Singtripop
(Figure 7-8)


Description: (Female) CL- 2.57, CW- 2.35, AL- 4.41, AW- 2.12, TL- 7.10. Cephalothorax (Figure 7A and 8A) red brown, longer than wide, anteriorly narrow and truncate, medially widest, posteriorly round, convex, clothed with black lanceolate hairs, ocular area with black, long hairs and pubescence; cephalic region posteriorly raised, anteriorly sloped, midlongitudinally with a shallow groove, extending from the black, short thoracic fovea up to PME. Eyes 8 pearly white except white PME, ringed with black, in 2 rows, anterior shorter and weakly recurved, posterior row weakly procured; ocular quad wider than long, basally broader. Eye diameter ALE> PLE> PME> AME. 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. Clypeus dark brown, margined with black, anterolateral corners black, vertical, height medium, clothed with 2 pairs of black, long, spiny hairs. Thoracic radii distinct. Chelicerae (Figure7B) dark brown, longer than wide, robust, both margins with 3 black teeth, scopulate; fang dark brown, long, strong and erect. Labium (Figure 7C) reddish brown, apically greyish, midlaterally marked by black, longer than wide, basolaterally constricted, and scopulate. Maxillae (Figure 7C) brown, apically yellowish, laterally margined with black, longer than wide, twice longer than the labium, inner margin with a concavity, outer margin medially concave, and scopulate. Sternum (Figure 7C) yellowish brown, margined brown, oval, margins with brown, sharp projections toward each coxa, clothed with pale brown, erect hairs.

Legs yellow, tibia I-II and metatarsi I-II ventrally scopulate, long, slender, 2 clawed, each with 5 pectinations and with claw tufts; femora with 3-0-1-1, tibia I-II with 0-4 (2-2)-0-0 and tibia III-IV with 0-4(2-1-1)-2-2 spination. Leg measurements (Table 4).

Leg formula- 4231.

Table 4. Leg measurements of Clubiona rama Dankittipakul and Singtripop.

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Abdomen (Figure 7A and 8A) grey, anteromedially with faintly marked by whitish area, longer than wide, anteriorly truncate, medially widest, posteriorly pointed, clothed with setae and black spiny hairs; dorsum subanteromedially with 2 brown sigilla, medially with 3 sigilla in a row on each side; venter grey, midlongitudinally with 2 rows of dark, tiny sigilla on each side. Epigynum-Internal genitalia (Figure 7D, 7E, 8B and 8C): copulatory ducts parallel, convoluted; spermatheca sclerotized, bean shaped; fertilization ducts incurved at the top.

Distribution: India (new record): West Bengal; Thailand (Dankittipakul and Singtripop, 2008; www.wsc.nmbe.ch).
**Figure 8.** *Clubiona rama* Dankittipakul and Singtripop. female A-Dorsal habitus, view. B- Epigynum. C-Internal genitalia.

*Clubiona serrata* *sp. nov.*
(Figure 9-10)

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Description: (Female- Holotype) CL- 5.45, CW- 4.73, AL- 6.36, AW- 4.00, TL- 11.81. Cephalothorax (Figure 9A and 10A) red brown, glossy, marginally blackish, longer than wide, anteriorly narrowing and truncate, medially widest, posteriorly round, convex, clothed with white pubescence and black, short hairs; cephalic region little raised, midlongitudinally with a groove, alongside 2 red brown, parallel, bands, extending from the base to PME. Eyes 8, pearly white, ringed with black, in 2 rows, anterior row procurred shorter than the recurved posterior row; ocular quad wider than long, basally broader. Eye diameter- AME>ALE>PLE>PME. Inter ocular distance: AME-AME- 0.55, ALE-ALE- 1.72, PME-PME- 0.82, PLE-PLE- 0.73, PLE-PLE- 2.27, AME-PME- 0.45, and ALE-PLE- 0.45. Clypeus dark brown, vertical, margined with dark brown hairs. Thorax with a black, midlongitudinal fovea; radii distinct. Chelicerae (Figure 9B) black brown, ventrally paler, longer than wide, robust, promargin with 3 and retromargin with 6 brown teeth, scopulate; fang dark brown, long, curved and strong. Labium (Figure 9C) yellow, basally brown, truncate, medially broad, apically concave, wider than long, and scopulate. Maxillae (Figure 9C) yellow, glossy, concave, twice longer than the labium, anteriorly widest, posteriorly narrowed, outer margin medially concave, and scopulate. Sternum (Figure 9C) dark brown, cordate, anteriorly nearly straight, posteriorly narrowed and pointed up to coxa IV, clothed with black, erect hairs and numerous tiny white spots. Legs yellowish brown, long, strong, 2 clawed, each basally with 3 pectinations and with claw tufts; femora I- III with 2-0-3-3; femora IV with 2-0-3-0 tibia I-II with 0-10 (2-2-2-2)-0-0 and tibia IV with 0-6(2-2-2)-2-2 spination. Leg measurements(Table 5). Leg formula- 1243.

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Abdomen (Figure 9A and 10A) yellow, decorated with black, longer than wide, anteriorly weakly concave, medially widest, posteriorly narrow, clothed with black hairs and pubescence; dorsum with 2 pairs of sigilla anteriorly; venter yellow with midlongitudinal, triangular, broad, black band, extending from epigastric furrow to spinnerets, laterally too. Epigynum-Internal genitalia (Figure 9D, 9E, 10B and 10C): epigynum distinct with 2 pockets anteriorly; copulatory ducts indistinct; spermatheca apple like; fertilization ducts long and coiled; median septum present; hoods serrate.

Distribution: India: West Bengal.

Etymology: The species name is derived from serrate hood.

Remarks: The species in question does not show any resemblance to the known congeners and therefore recognized new.
**Figure 10.** *Clubiona serrata* sp. nov. female A-Dorsal habitus. B- Epigynum. C-Internal genitalia.

*Clubiona pila* sp. nov.  
(Figure 11-12)  
Description: (Female- Holotype) CL= 1.89, CW= 1.29, AL= 2.21, AW= 1.08, TL= 4.21. Cephalothorax (Figure 11A and 12A) reddish, basally paler, anteriorly with u-shaped brown patches, longer than wide, anteriorly truncate, medially widest, posteriorly round, convex, clothed with pubescence; cephalic region raised, midlongitudinally with a shallow groove, extending from the PME to the red brown, small, midlongitudinal thoracic fovea. Eyes 8, dark excepting white PME, in 2 rows, anterior weakly recurved and shorter than the strongly procurved posterior; ocular quad wider than long, basally little broader. Eye diameter- ALE>PME>AME>PLE. Inter ocular distance: AME-AME= 0.18, ALE-AME= 0.14, ALE-ALE= 0.47, PME-PME= 0.35, PLE-PME= 0.14, PLE-PLE= 0.64, AME-PME= 0.21, and ALE-PLE= 0.18. Clypeus blackish brown, vertical, height small, each anterolateral corner with a small downward projection, clothed with few grey, long hairs. Thoracic region with faintly distinct radii. Chelicerae (Figure 11B) dorsally blackish brown, ventrally brown, longer than wide, stout, promargin with 4 unequal and retromargin with 2 equal teeth, scopulate; fang deep brown, base black, long, strong and curved. Labium (Figure 11C) brown, long, longer than wide, basally constricted, apically concave and scopulate. Maxillae (Figure 11C) brown, long, twice longer than the labium, margins concave, outer strongly so and scopulate. Sternum (Figure 11C) yellow excepting brown margins, cordate, margins with spiny projection towards each coxa, clothed with small and long hairs. Legs yellow, apically with a black, transverse patch on femur, patella, tibia and metatarsus, and tibia basally also with same, long, slender, 2 clawed, each with 4 pectinations and with claw tufts; femora with 2-0-0-0, tibia I with 0-3(2-1)-0-0 and tibia II, III, IV with 0-1-0-0 spination. Leg measurements (Table 6). Leg formula- 4123.

Table 6. Leg measurements of Clubiona pila sp. nov. female.

<table>
<thead>
<tr>
<th>Leg No.</th>
<th>Fm</th>
<th>Pt</th>
<th>Tb</th>
<th>Mt</th>
<th>Tr</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.00</td>
<td>0.76</td>
<td>0.53</td>
<td>4.23</td>
</tr>
<tr>
<td>II</td>
<td>1.29</td>
<td>0.71</td>
<td>1.18</td>
<td>0.94</td>
<td>0.53</td>
<td>4.65</td>
</tr>
<tr>
<td>III</td>
<td>1.18</td>
<td>0.59</td>
<td>0.76</td>
<td>1.00</td>
<td>0.53</td>
<td>4.06</td>
</tr>
<tr>
<td>IV</td>
<td>1.65</td>
<td>0.65</td>
<td>1.29</td>
<td>1.76</td>
<td>0.59</td>
<td>5.94</td>
</tr>
</tbody>
</table>

Abdomen (Figure 11A and 12A) yellow, with numerous black patches, longer than wide, anteriorly truncate, posteriorly pointed, clothed with both long and short, erect, brown setae; dorsum, with 2 long spines anteriorly, 3 pairs of yellow, small, sigilla, medial 2 very close to each other; venter pale yellow, with short, minute hairs. Epigynum-Internal genitalia (Figure 11D, 11E, 12B and 12C): epigynum distinct with a pocket anteriorly; copulatory ducts short, thin, coiled; spermatheca large, ball like; fertilization ducts long and coiled. Distribution: India: West Bengal. Etymology: The species name is derived from the ball like spermathecae. Remarks: The closest ally of the present species appears to be Clubiona drassodes O. P. Cambridge, 1874, but can be separated by (i) cephalothorax reddish and anteriorly with u-shaped brown patches (cephalothorax yellowish brown and anteriorly without any patch in C.

-295-
drassodes), (ii) abdominal dorsum with 3 pairs of sigilla (abdominal dorsum without any sigilla in C. drassodes), (iii) cheliceral promargin with 4 teeth (cheliceral promargin with 3 teeth in C. drassodes), (iv) spermatheca large, ball like (spermatheca very small and tubular in C. drassodes) and (v) fertilization ducts long and coiled (fertilization ducts very short and straight in C. drassodes). Such differences justify the erection of the new species.

**Figure 11.** Clubiona pila sp. nov. female A- Cephalothorax and abdomen, dorsal view. B-Chelicerae, ventral view. C-Maxillae, labium and mandible, ventral view. D-Epigynum. E-Internal genitalia.
**Clubiona pila** sp. nov.

(Figure 12)


Description: (Female- Holotype) CL- 2.50, CW- 1.96, AL- 2.86, AW- 1.47, TL- 5.50. Cephalothorax (Figure 13A and 14A) red brown, longer than wide, anteriorly weakly narrow and truncate, medially widest, posteriorly nearly straight, convex, clothed with pubescence
and anteriorly with few white hairs; cephalic region little raised, midlongitudinally with a shallow distinct groove, extending from the dark, small, midlongitudinal thoracic fovea to PME. Eyes 8, pearly white, excepting white PME, ringed with black, in 2 rows, anterior row straight, shorter than the weakly procurred posterior; ocular quad wider than long, basally broader. Eye diameter- PLE>ALE>PME>AME. Inter ocular distance: AME-AME- 0.29, ALE-AME- 0.21, ALE-ALE- 0.71, PME-PME- 0.39, PLE-PME- 0.29, PLE-PLE- 0.97, AME-PME- 0.21, and ALE-PLE- 0.21. Clypeus dark brown, vertical, height small. Thoracic radii distinct. Chelicerae (Figure 13 B) brown, longer than wide, strong, promargin with 3 and retromargin with 2 teeth, scopulate; fang deep brown, base black, long, curved and strong. Labium (Figure 13C) brown, anteriorly yellow, longer than wide, constricted little below the middle, apically concave and scopulate. Maxillae (Figure 13 C) brown, twice longer than the labium, anteriorly widest, basally narrow, cylindrical, outer margin medially concave, inner margin too, scopulate. Sternum (Figure 13C) yellowish brown, margins deep brown, oval, margins sharply projected towards each coxa, clothed with variable brown hairs. Legs pale brown, long, slender, fragile, metatarsi I-II and tarsi I-II ventrally with thick hairs, 2 clawed, each with 4 pectinations and with claw tufts; femora with 3-0-1-1, tibia I-II and IV with 0-6(2-2-2)-0-0 and tibia III with 0-6(2-2-2)-0-0 spination. Leg measurements (Table 7). Leg formula- 4213.

<table>
<thead>
<tr>
<th>Leg No.</th>
<th>Fm</th>
<th>Pt</th>
<th>Tb</th>
<th>Mt</th>
<th>Tr</th>
<th>Total</th>
</tr>
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<td>1.53</td>
<td>1.00</td>
<td>0.60</td>
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<tr>
<td>III</td>
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<td>1.27</td>
<td>0.67</td>
<td>4.61</td>
</tr>
<tr>
<td>IV</td>
<td>2.02</td>
<td>0.80</td>
<td>1.73</td>
<td>2.02</td>
<td>60</td>
<td>7.17</td>
</tr>
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</table>

Abdomen (Figure 13A and 14A) pale yellow, marked by black patches in series, longer than wide, anteriorly constricted near base and truncate, medially widest, posteriorly narrowed, clothed with few long, brown, spiny and small hairs; dorsum, with 2 pairs of brown, small, sigilla medially; venter creamy white, with 2 rows of longitudinal brown, tiny sigila on each side, extending from epigastric furrow to spinnerets. Epigynum-Internal genitalia (Figure 13D, 13E, 14B and 14C): copulatory openings in a sclerotized pocket; copulatory ducts upwardly and downwardly curved, then anticlockwise, reaching bilobed spermatheca; fertilization ducts short, outwardly and upwardly curved. Distribution: India: West Bengal. Etymology: The species name is derived from the bilobed spermatheca. Remarks: None of the congeners known till date appear close to the present species and as such the species in question is recognized as new to science.
Figure 14. Clubiona bilobatasp. nov. female A-Dorsal habitus. B- Epigynum. C- Internal genitalia.

Clubiona pseudocordata sp. nov.
(Figure 15-16)
Description: (Female- Holotype) CL- 1.68, CW- 1.21, AL- 3.00, AW- 1.54, TL- 4.68. Cephalothorax (Figure 15A and 16A) brown, dark anteriorly, longer than wide, anteriorly
narrowing and sub truncate, medially widest, posteriorly round, convex, clothed with pubescence and anteriorly with few brown, long, erect hairs; cephalic region little raised medially, with a mid longitudinal, shallow groove, extending from deep brown, mid longitudinal, prominent thoracic fovea up to the PME. Eyes 8, pearly white, excepting dark AME, ringed with black, in 2 rows, anterior weakly recurved and shorter than procurved posterior, laterals on tubercles; ocular quad wider than long, basally broader. Eye diameter PME > PLE > ALE > AME. 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. Clypeus deep brown, margin black medially, anterolateral corners black, downwardly projected, vertical, height small. Thoracic radii indistinct. Chelicerae (Figure 15B) brown, longer than wide, apically narrowed, robust, promargin margin with 4 and retromargin with 2 unequal teeth, scopulate; fang pale brown, robust, erect. Labium (Figure 15C) brown, apically concave, posterolateral margins black, constricted, basally sub truncate, longer than wide, and scopulate. Maxillae (Figure 15C) yellowish brown, longer than wide, twice longer than the labium, apically round, basally subtriangular, inner margin with a concavity, outer margin medially concave and scopulate. Sternum (Figure 15C) yellow, margins brown and with 10 black markings, oval, anteriorly concave, with brown, spiny projections towards each coxa, clothed with pubescence and few brown, erect hairs. Legs yellow, excepting brown metatarsi I, II and tarsi I, II, long, slender, 2 clawed, each basally with few indistinct pectinations and with claw tufts; femora with 3-0-1-1, tibia I, II with 0-4(2-2)-0-0 and tibia III, IV with 2-2-2-2 spination. Leg measurements (Table 8). Leg formula-4213.

Table 8. Leg measurements of Clubiona pseudocordata sp. nov. female.

<table>
<thead>
<tr>
<th>Leg No.</th>
<th>Fm</th>
<th>Pt</th>
<th>Tb</th>
<th>Mt</th>
<th>Tr</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.07</td>
<td>0.54</td>
<td>0.93</td>
<td>0.73</td>
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<tr>
<td>II</td>
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<td>0.54</td>
<td>1.00</td>
<td>0.73</td>
<td>0.33</td>
<td>3.67</td>
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<tr>
<td>III</td>
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<tr>
<td>IV</td>
<td>1.27</td>
<td>0.54</td>
<td>1.00</td>
<td>1.33</td>
<td>0.47</td>
<td>4.61</td>
</tr>
</tbody>
</table>

Pedicel yellow, narrow, 2 segmented, anterior segment produced behind. Abdomen (Figure 15A and 16A) pale yellow, elongately oval, clothed with pubescence and brown, long hairs; dorsum with 2 pairs of brown sigilla; venter creamy white, colulus present, posteriorly with few pale brown, long, erect hairs above colulus. Epigynum-Internal genitalia (Figure 15D, 15E, 16B and 16C): Epigynum anteriorly septate; copulatory openings small, round; copulatory ducts moderate, thin, outwardly and inwardly curved; spermatheca bilobed, anterior strongly sclerotised, ball like, posterior transparent, roughly squarish; fertilization ducts inwardly curved.

Distribution: India: West Bengal.

Etymology: The species name is derived from its closest ally Clubiona cordata Zhang & Zhu.
Remarks: The present species shows close resemblance to *Clubiona cordata* Zhang & Zhu, 2009, but can be separated by (i) abdominal dorsum without any chevron band (abdominal dorsum with 6 or 7 chevron bands at hinder part in *C. cordata*), (ii) cheliceral promargin with 4 variable teeth (cheliceral promargin with 3 teeth in *C. cordata*), (iii) atrium nearly cordiform (atrium cordiform in *C. cordata*), (iv) anterior lobe of spermatheca ball like and posterior transparent, roughly squarish (anterior lobe of spermatheca triangular and posterior semitransparent and ball like in *C. cordata*). Such differences justify the erection of the new species.

![Image](image_url)

**Figure 15.** *Clubiona pseudocordata* sp. nov. female A- Cephalothorax and abdomen, dorsal view. B-Chelicerae, ventral view. C-Maxillae, labium and mandible, ventral view. D-Epigynum. E-Internal genitalia.
Figure 16. *Clubiona pseudocordata* sp. nov. female A-Dorsal habitus. B- Epigynum. C- Internal genitalia.

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 agroecosystem.

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 Dooars, Dept. of Forest, Govt. of West Bengal, The Head, Dept. of Zoology, University of Calcutta and Hon’ble Vice Chancellor, Ramakrishna Mission Vivekananda University for necessary support.
References


( Received 09 June 2016; accepted 28 June 2016 )