

**FIRST RECORD OF THE SPIDER GENUS *EPISINUS*
(ARANEAE: THERIDIIDAE: SPHINTHARINAE)
FROM INDIA WITH DESCRIPTION OF A NEW SPECIES**

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ABSTRACT: Spiders of the family Theridiidae is represented in India by 57 valid species. A Theridiid female of the genus *Episinus* was found from Shimla, Western Himalayan hills of India and *E. pentagonalis* is described as a new species. A comparison with other closely related species of *Episinus* is also deliberated in the present communication.

KEY WORDS: *Episinus pentagonalis*, Western Himalaya, India.

Indian Theridiidae is represented by 57 valid species which includes 49 species from Indian mainland, 5 species from Andaman Is., and 3 species from Nikobar Is. (Platnick, 2012). However as the geographic locations of the spiders collected by Stolickza during Yarkand Mission (Cambridge, 1885) are not clear, 12 species of Theridiid spiders are not considered to be as Indian species. Genus *Episinus* Walckenaer, 1809, is a very well studied taxa (Kulczynski, 1905; Becker, 1896; Bosenburg, 1903; Simon, 1895; Walckenaer, 1841; Walckenaer & Gervais, 1847), which contains 58 species worldwide, none from India. Most of the *Episinus* spiders are similar in having long pyramidal or triangular abdomen with abdominal humps or small beaks and a few bear no tooth on the chericeral fang-furrow (Levi & Levi, 1962; Levi, 1964; Okuma, 1994).

It would be erroneous to mention that genus *Episinus* was not recorded from India. During Yarkand Mission, Stolickza collected a spider from Muree, now in Pakistan, which was mentioned as *Episinus algiricus* by Cambridge (1885). Though he analyzed the characters of the species with *E. truncatus*, but his text was not supported by any distinctive drawings, neither of habitus of the spider nor genitalia. Probably that is why in the geographic location of *E. algiricus*, India, Yarkand or Pakistan were not included in Platnick's world spider catalogue. Genus *Episinus* is well represented from Asian countries like, China (Zhu, 1998), Japan and Taiwan (Bosenburg & Strand, 1906; Yoshida, 1983, 1991; Okuma, 1994), Singapore, Korea, Myanmar, (Simon, 1894) totaling 13 Asian species.

The present spider was collected from Himachal Pradesh and its morphological characters, colouration and especially female genitalia were compared with all Asian as well as Mediterranean species. As this spider from Western Himalaya differs from all valid species, a new one, viz. *E. pentagonalis*, has been erected, which happens to be the first Indian record the genus *Episinus* too.

MATERIAL AND METHODS

Spiders collected from the forest were preserved in 75% Ethyl Alcohol and kept in glass vial with plastic screw-cap (Borosil) of 20 ml. capacity. Photographs were taken with a Nikon D80 digital SLR camera having a 60mm AF Micro-

Nikkor 1:2.8 D Lens. For geo-referencing a GPS instrument (GPSmap 76CSx, Garmin) was used.

Preserved spider was studied under a Stereozoom Microscope (RSM-9) having a CCTV Camera (Calton) connected with a desktop computer. All measurements in millimeter (mm) were done through an image analyzing software (USB Digital Scale 1.1.0, Scaler Corp.) Microscopic photographs were taken with a digital camera (Nikon D80, Japan) attached with the trinocular tube of the microscope.

Female genitalia were cut, soft tissues removed and kept in Clove Oil overnight for clearing. As the internal genitalia was highly chitinized, compact and looping patterns of copulatory ducts were not clearly visible, the genital was further cleared in 5% aqueous solution of KOH. Thus the internal genitalia became dilated and inflated exhibiting all parts clearly.

Temporary microscopic slide was prepared with the female genitalia submerged in glycerol on a cavity slide and studied under Nikon Eclipse 400 research microscope. Camera Lucida drawings were made with a Drawing Tube.

Abbreviation used: CP: Carapace, CL: Cephalic, ABD: Abdomen, AME: Anterior median eye, ALE: Anterior lateral eye, PLE: Posterior lateral eye, PME: Posterior median eye, OQ: Ocular quadrangle.

TAXONOMY

Episinus pentagonalis, sp. nov.

General morphology. Small web-building spider with light yellowish grey colour having darker spots and lines on long and pentagonal flat abdomen (Fig.10). Legs long, slender but stout, faint yellowish appeared as semi transparent. Two pairs of front legs projected forward with each lateral pair close together and hind pair of legs are similarly positioned when on rent on leaf-surface or on substratum. A pair of oblong mid-dorsal abdominal sigila and a pair of roundish black patch is prominent.

Measurements. Body length: 3.313, CP length 1.078, CP width: 1.148, CL length: 0.539, CL width: 0.381, ABD length: 2.235, ABD width ant. end: 0.518, ABD. width across mid-lateral humps: 1.469, ABD. width at below humps: 0.743, AME-ALE distance: 0.137, PME-PLE distance: 0.149, distance between AME: 0.168, distance between PME: 0.187, clypeus length: 0.204, clypeus width: 0.383, chelecera length: 0.355, chelecera width 0.156, labium length: 0.140, labium width: 0.238, maxilla length: 0.328, maxilla width: 0.134, sternum length: 0.739, sternum width: 0.594. width of epigynal atrium: 0.191.

Cephalothorax. Yellowish brown, almost circular, slightly broader than long, tapered apically. Cephalic region prominent, elevated and roundish, posteriorly slopes down and meet carapace. Immediately after the depression the thoracic part raises up and suddenly drops down at the posterior end. The central top of the raised thoracic part bears a deep 'V' shaped fovea. Several light brown irregular reticulate patches originate from periphery of cephalothorax (Fig. 1). Eyes clustered on elevated cephalic region, encircled by black ring, and black patches mark the ocular quad. ALE and PLE are close, PME are largest and close to PLE, OQ almost square, cephalic region darker than thoracic region (Fig. 5). Clypeus flat, wider than long, projected forward, appears as a semi-circular beak (Figs. 1 and 5). Chelicera cylindrical, glossy yellowish, smooth, few hairs crowd the apex. Grey coloured patches present at the inner side of the base of chelecera (Fig. 5). Cheleceral fang small, sharp, dark coloured, and curved without any

serration, anterior and posterior margin of fang furrow without any tooth (Fig. 3c). Labium wider than long, semicircular, with broad flat base. Maxilla quadrangular, longer than wide, apically provided with tuft of hairs. Sternum yellowish without any mid dorsal line, pear shaped, broader at proximal end, tapered at distal end, grey patches encircle the periphery (Fig. 2). Pedipalp normal, light brownish and remain folded on vertical plane, with one serrated palpal claw (Fig. 3b). Legs light brownish, appears almost transparent, joints of each leg segment is darker, distal half of 4th tibia dark brown, light brownish broken patches irregularly distributed on legs, covered with very fine hairs and few dark spines are present. Each tarsus having three dark brown minute claws, upper pair is slightly curved and serrated, the lower claw smooth without any serration, curved at the base and straight afterwards, without tuft of hairs (Fig. 3a).

Abdomen. Darker than prosoma, numerous chalk white granules spread all over dorsally and ventrally. Longer than wide, pentagonal, truncated, broader at the posterior end. Abdomen covered with fine pubescence and decorated with black and grey spots and patches (Fig. 1). A longitudinal mid-dorsal thick semitransparent line over the abdomen indicates presence of heart beneath. Two lateral line originate from it and ends obliquely down just above the lateral hump. In continuation of the above mid line a black thin line runs down caudal part of abdomen and ends above anal tubercle. At the mid length of abdomen a pair of prominent elliptical sigilla present laterally along the mid dorsal line. A mid dorsal depression at the anterior end gives rise a pair of small shoulder humps. Numerous long dark brown and hyaline thin hairs are present on the ventro-lateral side of the proximal end of abdomen. Distal end of abdomen provided with a pair of prominent lateral conical humps, slightly bent down. The ventro-lateral surface of the humps are striated. Each lateral humps are having 3-4 dark hairs, flat on the surface. A prominent ridge of dark wavy line and white patch along runs across the humps over the abdomen and immediately below that a pair of dark circular lateral spots marks the distal half of abdomen. Below the humps the abdomen narrows down ending as a conical cauda. Ventrally abdomen is lighter and chalk white granules of different sizes are numerous laterally, giving an appearance of 'U' shaped design between epigastric furrow and spinner (Fig. 2). Spinners normal, colulus absent, area covering spinner is darker, having a pair of lateral white spots and few white spots present at the bottom (Fig. 4).

Measurement of legs.

Legs	Coxa	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total Length
I	0.386	0.193	1.920	0.491	1.370	2.005	0.552	6.917
II	0.356	0.189	1.445	0.282	0.889	1.219	0.540	4.920
III	0.350	0.180	1.001	0.278	0.857	1.020	0.547	4.233
IV	0.391	0.201	1.947	0.500	1.399	2.114	0.552	7.104

Leg-Formula: 4:1:2:3

Female genitalia. Epigynum appears as a dirk semi-circular area wider than long, several long dark hairs present around epigynum (Fig. 6). The cleared epygynal plate shows spacious atrium and no septum is found (Fig. 7). Internal genitalia including the copulatory ducts highly chitinized (Fig. 8). Spermatheca pear-shaped, two in number, the epical ends corrugated. Thick, broad, long and dark copulatory tubes originate from the apical half of spermatheca, bends down

and turns up forming a loop. After reaching the top end of spermatheca laterally, the loop bend down posteriorly and ends near the vulva (Fig. 9).

Material Studied. 1 mature female Holotype, Coll. S. Chakrabarti, dt. 19/06/2007, from a mixed deciduous forest in Nahan, Sirmour, H.P. India, Altitude: 542 MSL, Latitude: 77° 17' 39.22" E, Longitude: 30° 32' 27.09" N. Paratype: 1 mature female, Coll. S. Chakrabarti, dt. 9/9/2011, from Chir Pine (*Pinus roxburghii*) forest near Conifer Campus, Panthaghathi, Shimla, Himachal Pradesh; Altitude: 1891 MSL, Latitude: 77° 10' 21.14" E, Longitude: 30° 04' 00.82" N.

Etymology. The specific name of the present *Episinus* was assigned as *pentagonalis* referring to its two shoulder humps at apex of abdomen, two abdominal humps at the distal part and the conical abdominal extremity, which altogether gives a pentagonal appearance of the abdomen.

Diagnosis. The present spider, *Episinus pentagonalis*, erected as a new species, is very much similar to *E. algiricus*, *E. maculipes* and *E. truncatus* described by various authors, by external appearance but differs by distinct shoulder humps, lateral abdominal hump which is slightly bent down and prominent conical abdominal end. Cambridge's description of *E. algiricus* resembles with the present spider by the absence of short & distinct yellow longitudinal line on carapace, colour of legs, distribution of chalk-white granules on the ventral side of the abdomen, more conical abdominal extremity, roundish dark epigyne etc. But detail structures of internal genitalia of the present spiders differ a lot with *E. algiricus*. Knoflach's recent studies on the Mediterranean *Episinus* disclosed the distinctness among closely related species. Now it is evident that *E. algiricus* have the epigynum longer than wide and internal genitalia shows that the fertilization tubes are thicker, robust and having more loops. *E. pentagonalis* has got copulatory ducts which are highly sclerotised than others. The size and shape of spermatheca similar with *E. maculipes* to some extent but looping pattern of copulatory ducts are different. The epigynal cavity of *E. pentagonalis* is spacious but narrower than other species as evident from measurements.

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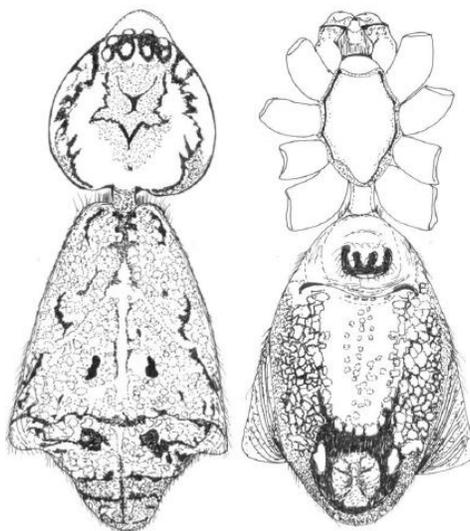
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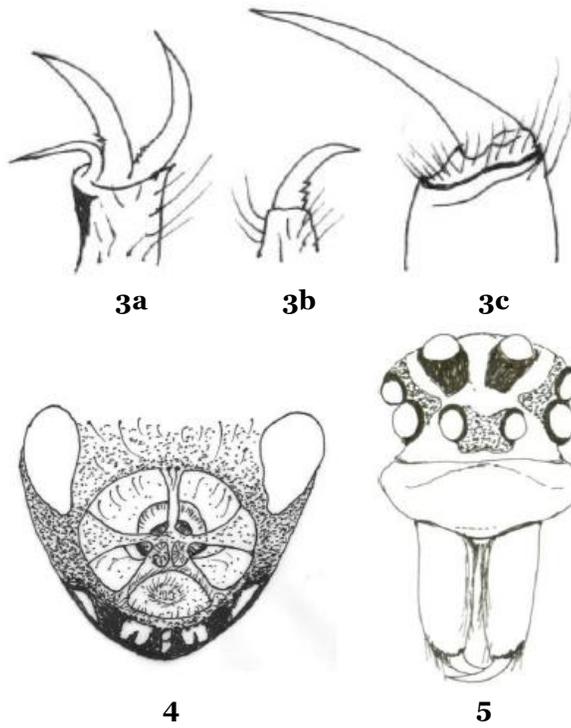
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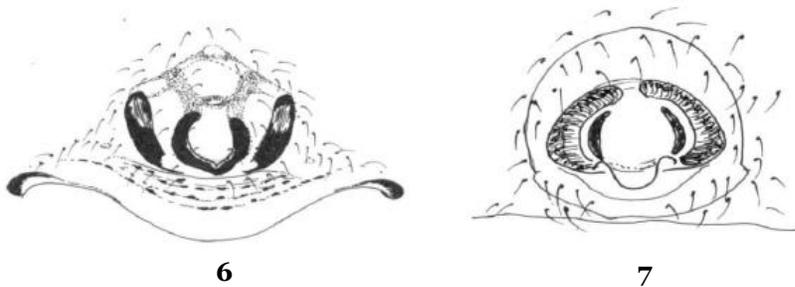
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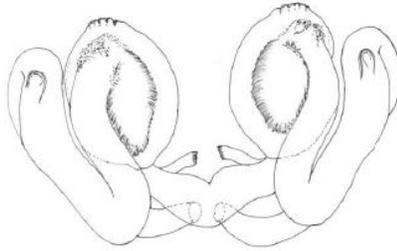
Figures 1. Dorsal habitus of adult female in spirit, 2. Ventral habitus adult female in spirit.



Figures 3a. Tarsal claws of the female, 3b. Palpal claw of the female, 3c. Cheleceral fang of the female, 4. Abdominal area covering spinners, 5. Frontal view of ocular area, clypeus, and cheleceras.



Figures 6. External view of epigynum in situ, 7. Dissected and cleared epigynal plate.

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Figures 8. Microphoto of internal genitalia of female, 9. Posterior view of internal genitalia of female.



Figure 10. Dorsal habitus of adult female in situ.