

A New Spider Species of the Genus *Stenaelurillus* Simon, 1886 (Araneae: Salticidae: Aelurillinae) from India

Bhoopender Prasad Vidhel¹, Shubhi Malik², Binoda Chandra Sabata³, Sanjay Keshari Das^{4#}

^{1,2,4}University School of Environment Management, Guru Gobind Singh Indraprastha University, Sector 16-C, Dwarka, New Delhi 110078, India; [#]Corresponding Author

³Department of Environment, Government of N.C.T. Delhi, India

Abstract: A new jumping spider species of the genus *Stenaelurillus* Simon, 1886, *S. jagannathae* sp. nov. is described from Delhi, India. A detailed taxonomic description of both the sexes is provided here along with the natural history information. Also keys for *Stenaelurillus* species of Asia is provided in this paper.

Keywords: New species, *Stenaelurillus jagannathae*, India, Asia, keys

1. Introduction

The spider family Salticidae Blackwall, 1841 is the most diverse family of spiders and represented by 198 species of 66 genera in India out of 587 genera and 5821 species in the world (World Spider Catalog, 2015). The salticid genus *Stenaelurillus* Simon, 1886, belongs to subfamily Aelurillinae and considered a senior synonym of *Philotheroides* Strand, 1934 (Prószyński, 1984). At present it includes 34 species from all over the world, of these only 7 species are known from Asia and rest from Africa, with none common to both. In India only three species of this genus are found, viz., *S. lesserti* Reimoser, 1934, *S. sarojinae* Caleb and Mathai, 2014 and *S. albus* Sebastian et al. 2015 (Wesołowska, 2013; World Spider Catalog, 2015). Here, we describe *Stenaelurillus jagannathae* sp. nov. from Delhi, India as new to science. A detailed taxonomic description of both the sexes is provided here along with the natural history information. Also keys for the Asian species of the genus *Stenaelurillus* is provided in this paper.

2. Material and Methods

The specimens were collected by hand picking method and preserved in 70% ethyl alcohol with little glycerine. Measurements of body parts were taken with a Mitutoyo™ Vernier Caliper. Leg measurements were taken dorsally for the left side. All measurements are in millimetres. Genitalia were dissected and cleared in concentrated lactic acid in 100°C water bath for 15-20 minutes. All illustrations were prepared with the help of a drawing tube attached to an Olympus SZX10 stereomicroscope. All specimens are deposited at Indraprastha University Museum (IPUM), New Delhi, India.

Abbreviations: AL - abdomen length, AW - abdomen width, CL - cephalothorax length, CW - cephalothorax width, AME - anterior median eyes, ALE - anterior lateral eyes, PME - posterior median eyes, PLE - posterior lateral eyes, ALS - anterior lateral spinneret, PMS - posterior median spinneret, PLS - posterior lateral spinneret, d -

dorsal, fe - femur, mt - metatarsus, pa - patella, p - prolateral, r - retrolateral, ti - tibia, tr - tarsus, v - ventral.

Taxonomy
Salticidae Blackwall, 1841
Aelurillinae Simon, 1901
***Stenaelurillus* Simon, 1886**

Type species. *Stenaelurillus nigricaudus* Simon, 1886; by original designation.

Diagnosis. Medium sized spiders with long spinnerets. Two white longitudinal stripes on carapace and strong bristles on the ocular area. Male palp with a simple, short, not coiled and visible embolus. Tegulum with characteristic retrobasal process and with a tegular apophysis distinctly placed to the embolus (Wesołowska and Cumming, 1999; Szűts and Scharff, 2005).

***Stenaelurillus jagannathae* Das, Malik and Vidhel sp. nov.**

Type specimens

Holotype: Male (IPU-Arach-123): India, Asola Bhatti Wildlife Sanctuary (28°28'34"N; 77°13'48"E), Delhi, Coll. B. P. Vidhel, 23.04.2015, by hand; Allotype: Female (IPU-Arach-121): India, Asola Bhatti Wildlife Sanctuary, Delhi, Coll. S. Malik, 24.08.2014, by hand; Paratypes: 1 male (IPU-Arach-124) and 1 female (IPU-Arach-122), same data as holotype.

Etymology

The specific epithet is a noun taken in apposition to Lord Jagannath due to superficial resemblance of posteroanterior view of dorsal abdomen of this new species to face of Lord Jagannath.

Diagnosis

The male of new species resembles *S. triguttatus* having three round spots on abdomen, chelicerae unidentate, palpal tibia without ventral outgrowth, cymbium dorsally convex,

tegulum without anterior pilose transversal rim, terminal tegular apophysis narrow with curved tip and embolus prolateral on ventral view, but distinctly differs from *S. triguttatus* having tibial apophysis with pointed appendix on tip (no pointed appendix in case of *S. triguttatus*), embolus clearly visible and sperm duct curved anteriorly on retrolateral view (in case of *S. triguttatus* embolus is hidden and sperm duct straight on retrolateral view). The female of new species resembles *S. lesserti* having three round spots on abdomen and closely aligned copulatory openings, but it differs from *S. lesserti* by unidentate chelicerae on both margins (promargin of chelicerae bidentate and retromargin unidentate in case of *S. lesserti*), relative position of copulatory openings (in case of *S. Jagannathae* it is well above on epigastric furrow, but in *S. lesserti* it is at epigastric furrow), having a distinct atrium (atrium invisible in case of *S. lesserti*), wall of copulatory openings are joined by a median, strongly sclerotized, elongated and nearly triangular plate (absent in case of *S. lesserti*), and in shape of spermathecae (it is oval in case of *S. Jagannathae* vs. bean-shaped in case of *S. lesserti*).

3. Description

Holotype Male (IPU-Arach-123; Figs 1, 3-6, 9-11; Table 1). TL 3.75, CL 2.00, CW 1.50, AL 1.75, AW 1.00.

Colour in life: Carapace black with two longitudinal white bands that starts from the cephalic area in front of the rear eyes and run converging backwardly to meet at their ends to form 'V' shape, the front clypeus and eye region with forwarding projecting strong white and brown bristles which is a continuation with yellowish white border on the lateral margins. Abdomen covered with strong black bristles in front, dorsally black with three white spots forming a central triangle, the triangle is bounded by a thick white transverse band followed by a small median brownish patch above and three white transverse lines below just before spinnerets, sides of abdomen with yellowish white border. Maxillae and labium pale yellow with brownish base. Sternum yellowish white covered with white bristles. Ventral abdomen light brown with scattered dark blotches and dark hairs. Chelicerae dark brown, palp and all legs dusty white, palp and leg IV with black rings, tip of all legs black. Spinnerets brown.

Colour in alcohol: Cephalothorax dark dorsally, maxillae and labium yellowish white with brownish base, sternum yellowish white. Abdomen dark dorsally and yellowish white ventrally. Chelicerae orange in colour, palp and all legs segments yellow with dark patches, all leg tips dark. Spinnerets yellowish brown.

Cephalothorax: Moderately high, oblong shaped, slightly broader posteriorly. Eye diameters and inter distances: AME 0.20, ALE 0.08, PME 0.06, PLE 0.14, AME-AME 0.60, PME-PME 1.20, PLE-PLE 1.15, AME-ALE 0.10, ALE-PME 0.50, PME-PLE 0.26. Clypeus height at AMEs 0.25. Chelicera vertical, unidentate. Sternum oval, 0.50 long, 0.25 wide. Labium and maxillae as long as wide, maxillae apically scopulate.

Abdomen: 'U shaped', spinnerets long and without colulus, three pairs, cylindrical, PMS smallest, ALS and PLS similar in size.

Legs: Leg formula 3412 (Table 1); spines, I: fe, d=1, p=2, r=3; ti, p=2, r=2; mt, p=1, r=1; tr, p=1, r=1, II: fe, d=2, p=2, r=2; pa, d=1; ti, p=2, r=2; mt, p=1, r=1, III: fe, d=3, p=2, r=2; pa, p=2, r=2; ti, d=1, p=2, r=2; mt, d=2, p=2, r=2; tr, d=2, IV: fe, d=1, p=2, r=2; pa, d=1, p=1, r=2; ti, d=2, p=2, r=2; mt, d=2, p=1, r=2.

Palp: Palpal tibia with retrolateral tibial apophysis that with a wide base having a pointed appendix on it, cymbium dorsally convex, terminal tegular apophysis narrow with curved tip and embolus prolateral on ventral view, embolus clearly visible and sperm duct curved anteriorly on retrolateral view.

Allotype Female (IPU-Arach-121; Figs 2, 7, 8, 12, 13; Table 2). TL 6.50, CL 3.0, CW 2.50, AL 3.50, AW 2.25.

Colour in life: Carapace black with a transverse white band joining anterior lateral eyes from which emerge two longitudinal white bands that run converging backwardly to form 'U' shape without meeting with each other at their ends, clypeus and eye region with forwarding projecting strong white and brown bristles that is a continuation with yellowish white border on the lateral margins. Abdomen covered with strong black bristles in front, dorsally black with three white spots forming a triangle at centre. The triangle is bounded by two white transverse bands in front, the second band is wavy having a brownish median triangular spot behind. In between this brownish triangular spot and posterior median white spot of central triangle, two converging brownish longitudinal lines extend. The central triangle is followed by three white transverse lines behind just before spinnerets. Sides of abdomen with yellowish white border. Maxillae and labium pale yellow with brownish base. Sternum yellowish white covered with white bristles. Ventral abdomen light brown with scattered dark blotches and dark hairs. Chelicerae dark brown, palp and all legs dusty white, palp and leg IV with black rings, tip of all legs black. Spinnerets brown.

Colour in alcohol: Cephalothorax dark dorsally, maxillae and labium yellowish white with brownish base, sternum yellowish white. Abdomen dark dorsally and yellowish white ventrally. Chelicerae orange in colour, palp and all legs segments yellow with dark patches, all leg tips dark. Spinnerets yellowish brown.

Cephalothorax: Moderately high, oblong shaped, slightly broader posteriorly. Eye diameters and inter distances, AME 0.25, ALE 0.12, PME 0.06, PLE 0.12, AME-AME 0.50, PME-PME 1.50, PLE-PLE 1.25, AME-ALE 0.70, ALE-PME 0.35, PME-PLE 0.25. Clypeus height at AMEs 0.30. Chelicera vertical, unidentate. Sternum oval, 1.00 long, 0.60 wide. Labium and maxillae as long as wide, maxillae apically scopulate.

Abdomen: 'U shaped', spinnerets long and without colulus, three pairs, cylindrical, PMS smallest, ALS and PLS similar in size.

Legs: Leg formula 3412 (Table 2), spines I: fe, d=3, p=2, r=2; ti, p=3, r=3; mt, p=2, r=2; tr, p=1, r=1, II: fe, d=2, p=2, r=3; pa, d=2; ti, p=2, r=2; mt, p=2, r=2, III: fe, d=3, p=2, r=3; pa, p=2, r=2; ti, d=3, p=2, r=3; mt, d=2, p=3, r=3; tr, d=2, IV: fe, d=2, p=2, r=2; pa, d=1, p=1, r=2; ti, d=3, p=3, r=2; mt, d=3, p=2, r=3, PALP: fe, d=2, r=2, p=2; ti, p=2, r=2; mt, p=2, r=2.

Epigyne: Ventrally, with short copulatory ducts that open well above the epigastric furrow into a distinct atrium, copulatory openings wide with weakly sclerotized wall, closely aligned, joined by a median, strongly sclerotized, elongated and nearly triangular plate and with clearly visible mating plugs; dorsally, oval spermathecae with fertilization ducts.

Paratypes: Male (IPU-Arach-124). TL 3.15, CL 2.00, CW 1.50, AL 1.15, AW 1.00. Morphology same to male holotype except minor difference in colour pattern of carapace and abdomen; Carapace black with two longitudinal white bands that starts from the cephalic area in front of the rear eyes and run converging backwardly to form 'U' shape without meeting at their ends, dorsal abdomen without a small median brown patch between thick white transverse

Males

- 1. Tegulum with pilose, anterior transversal rim-----*lesserti*
- Tegulum without transversal rim-----2
- 2. Palpal tibia with a large, ventral outgrowth-----3
- Palpal tibia without ventral outgrowth-----4
- 3. Retrolateral tibial apophysis with long thin appendix on tip; tegular terminal apophysis straight-----*minutus*
- Retrolateral tibial apophysis without terminal appendix; tegular terminal apophysis curved to embolus-----*abramovi*
- Retrolateral tibial apophysis without terminal appendix; tegular terminal apophysis blunt-----*albus*
- 4. Abdomen with three round spots-----5
- Abdomen without three round spots-----6
- 5. Retrolateral tibial apophysis with pointed appendix on tip; terminal tegular apophysis narrow with curved tip--*jagannathae*
- Retrolateral tibial apophysis without terminal appendix; terminal tegular apophysis narrow with curved tip-----*triguttatus*
- 6. Abdomen with a single, median, broad white spot on the abdomen, terminal tegular apophysis wide with blunt tip-----*sarojinae*
- Abdomen with striped pattern; terminal tegular apophysis wide with blunt tip-----*marusiki*

Females

- 1. Copulatory openings closely aligned-----2
- Copulatory openings separated-----3
- 2. Copulatory openings at epigastric furrow-----*lesserti*
- Copulatory openings above and widely separated from epigastric furrow-----*jagannathae*
- 3. Epigynal pocket not in front of copulatory openings-----*minutus*
- Epigynal pocket in front of copulatory openings-----4
- 4. Spermathecae bean-shaped and closely aligned-----*sarojinae*
- Spermathecae bean-shaped and separated-----*abramovi*
- Spermathecae vase-shaped and closely aligned-----*albus*

4. Acknowledgements

Authors are grateful to the Department of Forest, Government of NCT Delhi, for according permission and providing logistic support during survey. The authors express their sincere thanks to Miss Paridhi Jain, Education Officer, Bombay Natural History Society for her help and support during the study. Due thanks are also to Mr. Somanath Sahoo for taking live photographs of the species and Mr. Manish Joshi for his valuable assistance during preparation of the paper.

band and central triangle of white spots. **Female (IPU-Arach-122).** TL 6.25, CL 3.0, CW 2.00, AL 3.25, AW 2.00. Morphologically same to female allotype.

Natural History

The species is very common in leaf litters of semiarid woody forest habitat of Asola Bhatti Wildlife Sanctuary, Delhi, India from where it was collected and the area lies at the foot hills of Aravalli. The species is active predator and both male and female are active throughout the day.

Key to *Stenaelurillus* species from Asia

Wesołowska (2013) has been provided key to five *Stenaelurillus* species known from Asia till 2013. Subsequently two new species are added to this genus from India (Caleb and Mathai, 2015; Caleb et al. 2015; Sebastian et al. 2015). With present discovery of *S. jagannathae* sp. nov. from India, the *Stenaelurillus* species from Asia goes to a total eight species. Here, we are updating key to *Stenaelurillus* species known from Asia till date after Wesołowska (2013).

References

[1] Caleb, T.D.J. and Mathai, M.T. 2014. Description of some interesting jumping spiders (Araneae: Salticidae) from South India. *Journal of Entomology and Zoology Studies*, 2: 63-71.

[2] Caleb T.D.J., Mungkung, S. and Mathai, M.T. 2015. Four new species of jumping spider (Araneae: Salticidae: Aelurillinae) with the description of a new genus from South India. *Peckhamia*, 124(1): 1-18.

[3] Prószyński, J. 1984. Atlas rysunków diagnostycznych mniej znanych Salticidae (Araneae). Wyzsza Szkola Rolniczo-Pedagogiczna. *Siedlacz*, 2: 1-177.

[4] Sebastian, P.A., Sankaran, P.M., Malamel, J.J. and Joseph, M.M. 2015. Description of new species of *Stenaelurillus* Simon, 1886 from the Western Ghats of India with the redescription of *Stenaelurillus lesserti* Reimoser, 1934 and notes on mating plug in the genus (Arachnida, Araneae, Salticidae). *ZooKeys*, (491): 63-78.

[5] Szüts, T. and Scharff, N. 2005. Redescriptions of little known jumping spider genera (Araneae: Salticidae) from West Africa. *Acta zoologica Academiae Scientiarum Hungaricae*, 51: 357-378.

[6] Wesolowska, W. 2013. A review of the Asian species of the spider genus *Stenaelurillus* (Araneae: Salticidae). *Oriental Insects*, 47(4): 246-254.

[7] Wesolowska, W. and Cumming, M.S. 1999. The first termitivorous jumping spider (Araneae: Salticidae). *Bulletin of the British Arachnological Society*, 11(5), 204-208.

[8] World Spider Catalog. 2015. World Spider Catalog (version 15.5). Natural History Museum Bern. <http://wsc.nmbe.ch> [accessed 01.VI.2015].

Table 1: Morphometry of legs of male *Stenaelurillus jagannathae* sp. nov. (IPU-Arach-123 &124)

	Leg I	Leg II	Leg III	Leg IV	Palp
Femur	1.00-1.15	1.00	1.25-1.50	1.15-1.25	0.60-0.70
Patella	0.25-0.5	0.25	0.35-0.50	0.25-0.5	0.20-0.25
Tibia	0.45-1.00	0.45-0.75	1.00	1.00	0.15-0.25
Metatarsus	0.50	0.25-0.50	1.00	1.00	-
Tarsus	0.25-0.50	0.45-0.50	0.60-0.75	0.50-0.75	-
Total	2.85-3.25	2.40-3.00	4.20-4.75	3.90-4.50	0.95-1.20

Table 2: Morphometry of legs of female *Stenaelurillus jagannathae* sp. nov. (IPU-Arach-121 &122)

	Leg I	Leg II	Leg III	Leg IV	Palp
Femur	1.00-1.25	1.00	2.00	1.25-1.50	0.6-0.8
Patella	0.25-0.50	0.25-0.50	0.50-0.75	0.75	0.12
Tibia	0.75	0.5-0.75	1.25	1.00	0.35-0.40
Metatarsus	0.50	0.50	1.25	1.25	0.6
Tarsus	0.50	0.50	0.75	0.75	-
Total	3.00-3.50	2.75-3.25	5.75-6.00	5.00-5.25	1.67-1.92



Figure 1 & 2: *Stenaelurillus jagannathae* sp. nov. 1. Dorsal view of male habitus; 2. Dorsal view of female habitus



Figure 3-8: *Stenaelurillus jagannathae* sp. nov. 3. Male palp, ventral view; 4. Prolateral view; 5. Retrolateral view; 6. Dorsal view; 7. Female epigyne, ventral view; 8. Dorsal view

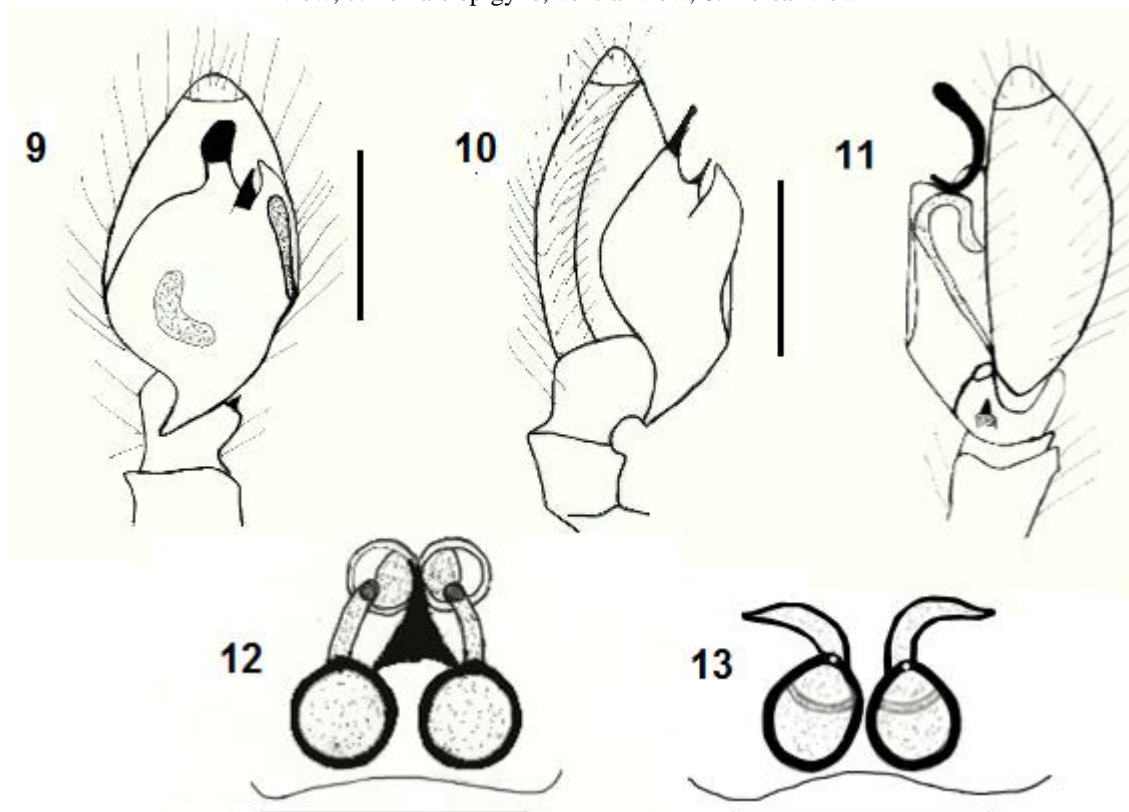


Figure 9-13: *Stenaelurillus jagannathae* sp. nov. 9. Male palp, ventral view; 10. Prolateral view; 11. Retrolateral view; 12. Female epigyne, ventral view; 13. Dorsal view, Scale, 9-11=0.3mm; 12 & 13=0.1mm.