





https://doi.org/10.11646/zootaxa.5570.1.4 http://zoobank.org/urn:lsid:zoobank.org:pub:1995C18B-1993-4DC4-B8AB-E4891F148A1E

Five new species of the genus *Mallinella* Strand, 1906 (Araneae: Zodariidae) from Sri Lanka

NARUWAN DAYANANDA^{1,2} & SURESH P. BENJAMIN^{1*}

¹National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka. **s** ngdayananda23@gmail.com; **b** https://orcid.org/0000-0002-5338-7283 *Corresponding author: **s** uresh.benjamin@gmail.com; **b** https://orcid.org/0000-0003-4666-0330

Abstract

Five new species of the ant-eating spider genus *Mallinella* from the natural forests of Sri Lanka are described and illustrated: *Mallinella dhanahami* **sp. nov.** (male, female), *M. milkyway* **sp. nov.** (male, female), *M. moncheri* **sp. nov.** (male, female), *M. oreo* **sp. nov.** (male, female), and *M. truffles* **sp. nov.** (male, female). A key to all the known *Mallinella* species from Sri Lanka is provided, and their current distribution in Sri Lanka is mapped.

Key words: Biodiversity, speciation, South Asia, taxonomy, Zodariids

Introduction

Family Zodariidae Thorell, 1881 is represented by 90 genera and 1297 known species worldwide (World Spider Catalog 2024). Among them, only five species attributed to four genera (*Cryptothele* L. Koch, 1872, *Hermippus* Simon, 1893, *Mallinella* Strand, 1906 and *Suffasia* Jocqué, 1991) have been reported from Sri Lanka (World Spider Catalog 2024). Of these four genera, only *Cryptothele* and *Suffasia* have been studied recently (Benjamin 2007; Benjamin & Jocqué 2000; Benjamin & Dayananda 2023). *Mallinella*, the species zodariid genus, currently comprises 229 nominal species distributed globally, including a single species, *Mallinella redimita* (Simon, 1905) from Sri Lanka (Simon 1905; Dankittipakul *et al.* 2012; World Spider Catalog 2024).

During the examination of recent spider collections from Sri Lanka, five new *Mallinella* species were recognised, and are described here as *Mallinella dhanahami* **sp. nov.**, *M. milkyway* **sp. nov.**, *M. moncheri* **sp. nov.**, *M. oreo* **sp. nov.**, and *M. truffles* **sp. nov.** Four of the five species are named for their chocolate-like coloration.

Material and methods

Fieldwork was conducted in all climatic regions of Sri Lanka. All spiders were collected from litter by sieving and hand collection. Specimens for the morphological study were preserved in 70% ethanol. The specimens examined using an Olympus SZX7 stereo microscope. Left male palps were immersed in a few drops of methyl salicylate, slide-mounted, and illustrated with the aid of a drawing tube attached to a Leica DM3000 compound microscope. Female genitalia were excised and digested with Sigma Pancreatin lp 1750 enzyme complex, in a solution of sodium borate (Dingerkus & Uhler 1977), slide-mounted, and illustrated as given above. Photographs of palps, epigynes and intact spiders were taken with a Leica flexcam C3 camera mounted on a Leica M205C stereomicroscope using Leica Application Suite X. Images were merged with Zerene stacker image stacking software version 1.04. Field photographs were taken using a Nikon D7000 camera with a macro lens. All measurements are in millimeters (mm). The material listed are currently deposited in the National Institute of Fundamental Studies, Kandy, Sri Lanka (NIFS).

Abbreviations used in the text. ALE, anterior lateral eyes; AME, anterior median eyes; BPF, basoprolateral fold; EF, epigynal furrow; EP, epigynal plate; LB, lateral border of epigyne; LR, lateral ramus of embolus; MOA, median

ocular area; MR, mesal ramus of embolus; PLE, posterior lateral eyes; PME, posterior median eyes; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; TA, tegular apophysis; TS, tegular spine; TT, tegular tubercle; VTA, ventral tibial apophysis.

Taxonomy

Family ZODARIIDAE Thorell, 1881

Genus Mallinella Strand, 1906

Diagnosis. The genus is characterised by the presence of a single row of ventral spines situated in front of the spinnerets, the palpal tibia with one or three apophyses, the conductor consisting of several parts, the embolic base connected to a tegulum via a thin membrane, the epigyne with a deep anterior median incision and the short and diverging copulatory ducts (Dankittipakul *et al.* 2012).

Type species. *Mallinella maculata* Strand, 1906, by monotypy. **Distribution.** Africa, Asia, Central and South America (World Spider Catalog 2024)

Key to the species of Mallinella known from Sri Lanka (males)

1.	PVS tear-shaped; narrowed at base (Fig. 2E)
-	PVS cylindrical or elongated gradually; broad at base (Figs 1E, 3E, 4E, 5E)
2.	MR and LR of embolus sharply pointed at apex
-	MR and LR blunt at apex (Figs 2G, 8B)
3.	Embolus branched (Figs 1F–G, 2F–G, 4F–G, 8A–B, 8D)
-	Embolus unbranched (Figs 3F–G, 5F–G, 8C, 8E)
4.	TA hook-shaped; VTA beak-shaped; TS indistinct (Figs 1F–H, 8A) Mallinella dhanahami sp. nov.
-	TA elongated; VTA modified as a triangular hump; sharp TS present (Figs 4F-H, 8D) Mallinella oreo sp. nov.
5.	TT large well developed; TS indistinct; BPF subtriangular (Figs 3F-H, 8C)
-	TT indistinct; TS triangular; BPF indistinct (Figs 5F-H, 8E)

Key to the species of Mallinella known from Sri Lanka (females)

1.	PVS tear-shaped, narrowed at base (Fig. 2E)2
-	PVS cylindrical or elongated gradually, broad at base (Figs 1E, 3E, 4E, 5E)
2.	Anterior median depression present, globular spermathecae (Figs 2C–D, 7B–G, 9C–D) Mallinella milkyway sp. nov.
-	Anterior median depression absent, truncated spermathecae
3.	V- shaped EP present (Figs 1C, 3C, 9A, 9E)
-	Semi-circular or sub-rectangular EP present (Figs 2C, 4C, 5C, 9A, 9E, 9G, 9I)
4.	Digitiform LB, no anterior median depression of epigyne, highly sclerotized EF (1C, 9A) Mallinella dhanahami sp. nov.
-	Triangular LB, deep median depression of epigyne, weakly sclerotized EF (3C, 9E) Mallinella moncheri sp. nov.
5.	Semi-circular EP, small median depression of epigyne, highly sclerotized EF (4C, 9G)
-	Sub-rectangular EP, no median depression of epigyne, weakly sclerotized EF (5C, 9I) Mallinella truffles sp. nov.

(Details of *M. redimita* are taken from Simon 1905; Dankittipakul et al. 2012; World Spider Catalog 2024)

Mallinella dhanahami sp. nov.

Figs 1, 6A, 6F, 7A, 7F, 8A, 9A–B, 10C–E

Type material. Holotype \mathcal{J} : **SRI LANKA:** *Sabaragamuwa Province:* Rathnapura District, Gilimale Forest Reserve, 06°45'51"N 80°25'40"E, 126 m, 25 March 2024, leg. SP. Benjamin *et al.* (IFS_ZOD_234). **Paratype:** 1 \mathcal{Q} , with same data as for holotype (IFS_ZOD_235).

Etymology. This new species is named after the first author's grandmother, Dhanahami. Used as a noun in apposition.



FIGURE 1. *Mallinella dhanahami* **sp. nov.** A, E–H holotype male (IFS_ZOD_234) and B–E paratype female (IFS_ZOD_235). A–B habitus, dorsal; C epigyne intact, ventral; D vulva, ventral; E posterior ventral spines, ventral; F left palp, prolateral; G idem, ventral; H idem, retrolateral. Abbreviations: APP = apicoprolateral process of tegular apophysis; C = conductor; Cy = cymbium; CF, cymbial fold; DB, dark bands; DS, dorsal scutum; E, embolus; EB, embolic base; EF, epigynal furrow; EP, epigynal plate; F, fovea; ID, insemination ducts, LB, lateral border of the epigyne; LR, lateral ramus of embolus; MR, mesal ramus of embolus; mEB, membranous area of the embolic base; pC, prolateral extension of conductor; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; S, spermatheca; Sp, spinnerets; T, tegulum; TA, tegular apophysis; TT, tegular tubercle; VTA, ventral tibial apophysis. Scale lines: A–B = 0.5 mm; C–H = 0.2 mm.

Diagnosis. *Mallinella dhanahami* **sp. nov.** share features such as inwardly projecting digitiform lateral borders of the epigyne, round proximal tubercle on anterior femora and pale oblong spots on the dorsum of opisthosoma with the members of the annulipes-group. Within the annulipes-group, males of *M. dhanahami* **sp. nov.** are most similar to the males of *M. calilungae* as both share bifurcated embolus and elongated TA but can be separated from it by beak shaped VTA (triangular shaped in *M. calilungae*), and digitiform RTA (broad triangular ridge in *M. calilungae*) (cf. Dankittipakul *et al.* 2012: figs. 757–759 and Figs 1F–H, 8A). Females are most similar to the females of *M. annulipes* as both share V-shaped epigynal plate and the digitiform lateral border of the epigyne but can be separated from it by the anterior median depression (absent in *M. annulipes*) and the highly sclerotized epigynal furrow of the epigyne (weakly sclerotized in *M. annulipes*). (cf. Dankittipakul *et al.* 2012: figs. 753–734 and Figs. 1C, 9A).

Description. Male in alcohol (holotype; Fig. 1A). Body length 4.92; carapace 2.70 long, 1.93 wide; opisthosoma 2.22 long, 1.67 wide. Habitus as in Figs 1A, 10C-E. Carapace ovoid, smooth and shiny; fovea straight, longitudinal, red-brown. Clypeus brown, 0.45 high. Eye sizes and inter-distances: AME 0.16, ALE 0.09, PME 0.12, PLE 0.09; AME-AME 0.11, AME-PME 0.17, AME-ALE 0.10, ALE-ALE 0.60, PME-PME 0.15, PME-PLE 0.20, PLE-PLE 0.77, ALE-PLE 0.08. MOA 0.45 long, front width 0.39, back width 0.43. Chilum unipartite, trapezoid. Chelicerae 0.92 long, light brown, without teeth. Endites yellow. Labium triangular, yellow-brown, 0.19 long, 0.38 wide. Sternum lateral margins with small semi-circular pits in front of each coxa of third and fourth pair of legs, furnished heavily with sparse black setae, 1.17 long, 0.95 wide (Fig. 6F). Legs yellowish, round proximal tubercle on anterior femora (Fig. 6A). Measurements of palp and legs: pedipalp (right) 3.45 (1.15 + 0.59 + 0.62 + 1.09), I 8.50 (2.10 + 0.70 + 1.90 + 1.95 + 1.85, II 7.40 (1.85 + 0.65 + 1.55 + 1.75 + 1.60), III 8.20 (2.05 + 0.70 + 1.60 + 2.15 + 1.70), IV 10.15 (2.30 + 0.60 + 2.25 + 3.25 + 1.75). Leg formula: 4132. Opisthosoma pear-shaped with lanceolate dorsal scutum (Fig. 1A). Pattern on dorsum of opisthosoma with five pairs of spots: first pair is represented by minute pale spots; second pair is represented by oval spots obliquely arranged; third pair by transverse pale spots; fourth pair by paired spots medially connected; fifth pairs of the pattern on opisthosoma represented by minute pale spots distinctly smaller than anterior second and third pairs (Fig. 1A). Posterior ventral spines elongated, gradually tapering with smoothly rounded apices. Spinnerets pale yellow (Fig. 1E).

Palp (Figs 1F–H, 8A). RTA digitiform, tapered towards blunt apex; VTA beak shaped (Figs 1G, 8A); Retrolateral cymbial fold broad, slightly more than half the length of cymbium (Fig. 1G). TA hook-shaped; apico-prolateral process of TA rod-shaped, directed posteromesad (Figs 1G, 8A). TS almost indistinct. TT rounded protrusion. Embolic base aligned in longitudinal direction, with narrow membranous area. Embolus medially bifurcated; mesal ramus slender, elongated, lateral ramus broad, blade-like (Figs 1G, 8A). Conductor an elevated mound with a groove to accommodate embolus (Figs 1G, 8A).

Female in alcohol (paratype; Fig. 1B). Body length 5.46; carapace 2.70 long, 1.96 wide; opisthosoma 2.76 long, 2.11 wide. Habitus and details as in male except for the following (Fig. 1B). Clypeus 0.58 high. Eye sizes and inter-distances: AME 0.16, ALE 0.10, PME 0.13, PLE 0.11; AME–AME 0.09, AME–PME 0.14, AME–ALE 0.13, ALE–ALE 0.62, PME–PME 0.16, PME–PLE 0.24, PLE–PLE 0.80, ALE–PLE 0.08. MOA 0.46 long, front width 0.40, back width 0.42. Chelicerae 0.94 long, light brown. Labium 0.29 long, 0.45 wide. Sternum; 1.20 long, 1.06 wide. Measurements of palp and legs: pedipalp (right) 2.72 (0.91 + 0.47 + 0.49 + 0.85), I 7.40 (1.90 + 0.60 + 1.75 + 1.40 + 1.75), II 6.50 (1.60 + 0.55 + 1.55 + 1.30 + 1.50), III 7.35 (1.85 + 0.60 + 1.70 + 1.65 + 1.55), IV 9.05 (2.10 + 0.60 + 1.85 + 2.80 + 1.70). Leg formula: 4132. Opisthosoma oval-shaped; dorsum covered with dense black hairs; without dorsal scutum.

Genitalia (Figs 1C–D, 7A, 7F, 9A–B). Epigynal plate narrowed, highly sclerotized, V-shaped, with anterior median depression. Lateral borders narrow, digitiform, terminally blunt. Epigynal furrow sclerotized. Spermathecae short, truncated. Insemination ducts shorter than the length of spermathecae. Fertilization ducts as in Fig. 7F.

Distribution. Known only from the type locality (Fig. 12).

with same data as for holotype (IFS ZOD 34, 35, 37).

Mallinella milkyway sp. nov. Figs 2, 6B, 6G, 7B, 7G, 8B, 9C–D

Type material. Holotype ∂: **SRI LANKA:** *Central Province:* Kandy District, Corbett's Gap, Knuckles Range, 07°21'40"N 80°50'00"E, 1360 m, 2 February 2010, leg. S. Batuwita *et al.* (IFS ZOD 36). **Paratypes:** 2∂ 1♀,



FIGURE 2. *Mallinella milkyway* **sp. nov.** A, E–H holotype male (IFS_ZOD_36) and B–E paratype female (IFS_ZOD_37). A–B habitus, dorsal; C epigyne intact, ventral; D vulva, ventral; E posterior ventral spines, ventral. F left palp, prolateral; G idem, ventral; H idem, retrolateral. Abbreviations: APP, apicoprolateral process of tegular apophysis; C, conductor; Cy, cymbium; CF, cymbial fold; DB, dark bands; DS, dorsal scutum; E, embolus; EB, embolic base; EF, epigynal furrow; EP, epigynal plate; F, fovea; ID, insemination ducts; LB, lateral border of the epigyne; LR, lateral ramus of embolus; MR, mesal ramus of embolus; mEB, membranous area of the embolic base; pC, prolateral extension of conductor; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; S, spermatheca; Sp, spinnerets; T, tegulum; TA, tegular apophysis; TS, Tegular spine; VTA, ventral tibial apophysis. Scale lines: A-B = 0.5 mm; C–H = 0.2 mm.

Other material examined. SRI LANKA: *Central province:* Matale District, NIFS arboretum, 07°51'34"N 80°40'28"E, 180 m, 1 \checkmark , 7 July 2013, leg. SP. Benjamin *et al.* (IFS_ZOD_25); 3 \circlearrowright , 24 August 2010, NP. Athukorala *et al.* (IFS_ZOD_41, 210, 211); 3 \bigcirc , 20 January 2016, leg. NP. Athukorala *et al.* (IFS_ZOD_132, 133, 134); 1 \circlearrowright and 1 \bigcirc , 16 February 2019, leg. NP. Athukorala *et al.* (IFS_ZOD_182, 183); 1 \circlearrowright , 28 May 2015, leg. NP. Athukorala *et al.* (IFS_ZOD_209). *North Western Province:* Puttalam District, Wanatha Villu, 08°10'15"N 79°52'30"E, 30 m, 6 \bigcirc , 24 May 2010, leg. NP. Athukorala *et al.* (IFS_ZOD_23, 53, 142, 143, 144, 145). *North Central Province:* Anuradhapura District, Padaviya, 08°48'00"N 80°45'00"E, 56 m, 3 \bigcirc , 10 January 2012, leg. NP. Athukorala *et al.* (IFS_ZOD_158,159,160). *Eastern Province:* Trincomalee District, Arisimale Beach Side, 08°56'12"N 81°00'23"E, 9 m, 2 \bigcirc and 2 \circlearrowright , 26 September 2023, leg. NG. Dayananda *et al.* (IFS_ZOD_205, 206, 207, 208). *Nothern Province:* Jaffna District, Mandaitivu, 09°37'30"N 79°59'50"E, 4 m, 1 \bigcirc and 1 \circlearrowright , 20–22 September 2016, leg. SP. Benjamin *et al.* (IFS_ZOD_180, 181); 4 \circlearrowright , 03 October 2023, NG. Dayananda *et al.* (IFS_ZOD_224, 222, 223); Allaipiddy, 09°37'12"N 79°58'41"E, 6 m, 3 \circlearrowright and 3 \circlearrowright , 04 October 2023, leg. NG. Dayananda *et al.* (IFS_ZOD_220, 21, 222, 223); Allaipiddy, 09°37'12"N 79°58'41"E, 6 m, 3 \circlearrowright and 3 \circlearrowright , 04 October 2023, leg. NG. Dayananda *et al.* (IFS_ZOD_220, 21, 222, 223); Allaipiddy, 09°37'12"N 79°58'41"E, 6 m, 3 \circlearrowright and 3 \circlearrowright , 04 October 2023, leg. NG. Dayananda *et al.* (IFS_ZOD_220, 21, 222, 223); Allaipiddy, 09°37'12"N 79°58'41"E, 6 m, 3 \circlearrowright and 3 \circlearrowright , 04 October 2023, leg. NG. Dayananda *et al.* (IFS ZOD 214, 215, 219, 216, 217, 218).

Etymology. The new species is named after the chocolate 'MilkyWay'. Used as a noun in apposition.

Diagnosis. *Mallinella milkyway* **sp. nov.** share features such as U-shaped epigynal plate, tear-shaped PVS, and tremendously lengthened insemination ducts with the members of the redimita-group. Within the redimita-group, males of *M. milkyway* **sp. nov.** are most similar to the males of *M. redimita* as both share flange-like RTA, bifurcated embolus, sharp apical ridge directed posteromesad and a triangular apico-retrolateral fold with a blunt apex but can be separated from it by the rami of the embolus with blunt apices (sharply pointed in *M. redimita*) and lanceolate dorsal scutum (cf. Dankittipakul *et al.* 2012: figs. 706–707 and Figs. 2A, 2F–H, 8B). Females are also most similar to the females of *M. redimata* as both share U-shaped epigynal plate, and elongated insemination ducts but can be separated from it by globular spermathecae (truncated spermathecae in *M. redimita*) (cf. Dankittipakul *et al.* 2012: figs. 694–699, 701-703 and Figs. 2C–D, 7B–G, 9C–D).

Description. *Male* in alcohol (holotype; Fig. 2A). Body length 3.96; carapace 2.25 long, 1.76 wide; opisthosoma 1.71 long, 1.36 wide. Habitus as in Figs 2A, 11A–B. Carapace ovoid, granulate, brown, slightly darker anteriorly; fovea red-brown (Fig. 2A). Clypeus light brown, 0.42 high. Eye sizes and inter-distances: AME 0.13, ALE 0.12, PME 0.12, PLE 0.12; AME–AME 0.08, AME–PME 0.15, AME–ALE 0.12, ALE–ALE 0.55, PME–PME 0.12, PME–PLE 0.20, PLE–PLE 0.68, ALE–PLE 0.06. MOA 0.41 long, front width 0.34, back width 0.38. Chilum unipartite, trapezoid. Chelicerae 0.78 long, brown, without teeth. Endites yellow-brown. Labium triangular, yellow-brown, 0.23 long, 0.38 wide. Sternum brown, with sparse black setae, 1.01 long, 0.93 wide. Lateral margins of sternum with small semi-circular pits in front of each coxa of third and fourth pair of legs (Fig. 6G). Legs generally yellowish, except for brown femora, proximal tubercle on anterior femora (Fig. 6B). Measurements of palp and legs: pedipalp (right) 2.78 (0.97 + 0.45 + 0.47 + 0.89) I 6.70 (1.60 + 0.50 + 1.75 + 1.50 + 1.35), II 5.90 (1.45 + 0.45 + 1.30 + 1.40 + 1.30), III 6.25 (1.40 + 0.35 + 1.25 + 1.35 + 1.90), IV 8.17 (1.95 + 0.50 + 1.85 + 2.15 + 1.72). Leg formula: 4132. Opisthosoma oval, covered with black short setae, with lanceolate dorsal scutum. Dorsum of opisthosoma dark sepia. Pattern on dorsum of opisthosoma represented by a paired of large anterior patches followed by irregular arrangement of pale spots. Posterior ventral spines short, tear-shaped (Fig. 2E).

Palp (Figs 2F–H, 8B). RTA flange-like in retrolateral view, broad at base, gradually tapered towards sharply pointed apex (Figs 2G, 8B). VTA subtriangular blunt apex. Tegular spine minute (Fig. 8B). Cymbial fold shallow, less than half the length of cymbium (Fig. 2G). TA with sharply pointed apical ridge directed posteromesad with triangular apicoprotrolateral process having blunt apex, directed mesad (Fig. 8B). Embolic base aligned in retrolateral direction, anterior membranous part broad, triangular (Figs 2G, 8B). Embolus blade-like, broadest medially, subterminally divided, both rami slender, with blunt tips (Fig. 8B). Conductor beak-shaped, sharply pointed apex.

Female (paratype; Fig. 2B). Body length 4.98; carapace 2.24 long, 1.54 wide; opisthosoma 2.74 long, 1.91 wide. Habitus and details as in male except for the following (Figs 2B, 10A–B). Carapace with smooth tegument. Clypeus 0.50 high. Eye sizes and inter-distances: AME 0.10, ALE 0.09, PME 0.09, PLE 0.09; AME–AME 0.08, AME–PME 0.14, AME–ALE 0.12, ALE–ALE 0.41, PME–PME 0.12, PME–PLE 0.16, PLE–PLE 0.58, ALE–PLE 0.05. MOA 0.36 long, front width 0.27, back width 0.31. Chelicerae 0.75 long. Labium 0.25 long, 0.39 wide. Sternum with shallow semi-circular pits, 0.94 long, 0.89 wide Legs with proximal tubercle on anterior femora. Measurements of palp and legs: palp (right) 1.94 (0.64 + 0.36 + 0.39 + 0.55), I 4.85 (1.25 + 0.50 + 1.10 + 1.15 + 0.85), II 4.75 (1.15)

+ 0.45 + 1.05 + 1.15 + 0.95), III 5.00 (1.25 + 0.45+ 1.00 + 1.35 + 0.95), IV 6.25 (1.50 + 0.55 + 1.80 + 1.25 + 1.15). Leg formula: 4132. Dorsum of opisthosoma without scutum (Fig. 2B).

Genitalia (Figs 2C–D, 7B, 7G, 9C–D). Epigynal plate; narrow, U-shaped, prominent anterior median depression, weakly sclerotized. Lateral borders retracted (Figs 2C, 7B, 9C). Insemination ducts elongated, slightly curving inwardly (Figs 7G, 9D). Spermathecae globular in shape, slightly widened distally. Insemination ducts short and straight extend posteriorly from the copulatory openings. Fertilization ducts as in Fig. 7G.

Variation. Male (n=22): body length 3.90–4.02. Female (n=21): body length 5.00–5.19.

Distribution. Sri Lanka (Matale District, Jaffna District, Anuradhapura District, Trincomalee District, Puttalam District, Kandy District) (Fig. 12). Possibly also present in India.

Mallinella moncheri sp. nov.

Figs 3, 6C, 6H, 7C, 7H, 8C, 9E-F

Type material. Holotype \mathcal{S} : **SRI LANKA:** *Southern Province:* Galle District, Kottawa Forest, 06°05'40"N 80°19'25"E, 152 m, 23 August 2023, leg. NG. Dayananda *et al.* (IFS_ZOD_231). **Paratype:** 1 \mathcal{Q} , leg. SP. Benjamin *et al.* with same data as for holotype (IFS_ZOD_103).

Other material examined. SRI LANKA: *Southern province:* Galle District, Hiyare Forest, $06^{\circ}03'32''N$ $80^{\circ}19'15''E$, 121m, 2° , 23 August 2023, leg. NG. Dayananda *et al.* (IFS ZOD 232, 233).

Etymology. The new species is named after the chocolate 'Mon Cheri'. Used as a noun in apposition.

Diagnosis. *Mallinella moncheri* **sp. nov. s**hare features such as triangular lateral border of the epigyne, V-shaped epigynal plate with the members of the annulipes-group. Within the annulipes-group, males of *M. moncheri* **sp. nov.** are most similar to the males of *M. dhanahami* **sp. nov.** as both share digitiform RTA, and black colour bands on either side of the carapace of both male and female but can be separated from it by slender, unbranched embolus (bifurcated embolus in *M. dhanahami* **sp. nov.**) and diagonally aligned emobolic base (aligned longitudinally in *M. dhanahami* **sp. nov.**) (Figs 1G, 8A; 3G, 8C). Females are also most similar to the females of *M. dhanahami* **sp. nov.** as both share V-shaped epigynal plate but can be separated from it by deeper anterior depression of the epigyne and triangular lateral borders of the epigyne (digitiform lateral borders in *M. dhanahami* **sp. nov.**). (Figs. 1C, 7A, 7F; 3C, 7C, 7H).

Description. *Male* in alcohol (holotype; Fig. 3A)). Body length 3.57; carapace 2.16 long, 1.49 wide; opisthosoma 1.41 long, 1.08 wide. Habitus as in Fig. 5A. Carapace ovoid, smooth and shiny, orange-brown, with two longitudinal lateral dark bands (Fig. 3A); fovea red-brown. Clypeus light brown, 0.44 high. Eye sizes and inter-distances: AME 0.17, ALE 0.10, PME 0.11, PLE 0.11; AME–AME 0.04, AME–PME 0.09, AME–ALE 0.08, ALE–ALE 0.45, PME–PME 0.08, PME–PLE 0.20, PLE–PLE 0.60, ALE–PLE 0.03. MOA 0.39 long, front width 0.30, back width 0.35. Chilum unipartite, trapezoid. Chelicerae 0.79 long, light brown, without teeth. Endites yellow. Labium triangular, yellow-brown, 0.20 long, 0.35 wide. Sternum yellow, furnished with sparse black setae, 0.89 long, 0.74 wide. Lateral margins of sternum with small semi-circular pits in front of each coxa of third and fourth pair of legs. Legs yellow-brown, except pale yellowish coxae, proximal tubercle on anterior femora. Measurement of palp and legs: pedipalp (right) 1.93 (0.70 + 0.33 + 0.35+0.55), I 4.62 (1. 25 + 0.52 + 1.20 + 0.75+ 0.90), II 4.35 (1.20 + 0.50 + 0.80 + 0.95 + 0.90), III 4.60 (1.20 + 0.50 + 0.90 + 1.15 + 0.85), IV 6.21 (1.55 + 0.51+ 1.35 + 1.85 + 0.95). Leg formula: 4132. Opisthosoma oval, covered with black short setae, Dorsum of opisthosoma dark sepia, with lanceolate scutum. Pattern on dorsum of opisthosoma with anterior paired patch followed by medially connected large transverse patches (Fig. 3A). Posterior ventral spines cylindrical, with blunt apices (Fig. 3E).

Palp (Figs 3F–H, 8C). VTA moderately developed, subtriangular, with curved apex (Fig. 8C). RTA digitiform in retrolateral view, broad at base, gradually tapered towards acute apex (Fig. 3H). Cymbial fold deep, more than half the length of the cymbium. Apicoprolateral process of TA with, sharply pointed, elongated, slender flange, directed posteromesad (Figs 3G, 8C). Tegulum with large, well developed tegular tubercle (Fig. 8C). Basoprolateral fold of TA, subtriangular (Fig. 8C). Embolic base aligned diagonally; membranous area of embolic base narrow. Embolus slender, unbranched, elongated, with blunt apex (Figs 3G, 8C). Tegular spine absent. Conductor triangular, apex blunt.



FIGURE 3. *Mallinella moncheri* **sp. nov.** A, E–H holotype male (IFS_ZOD_231) and B–E paratype female (IFS_ZOD_232). A–B habitus, dorsal. C epigyne intact, ventral. D vulva, ventral; E posterior ventral spines, ventral. F left palp, prolateral; G idem, ventral; H idem, retrolateral. Abbreviations: APP, apicoprolateral process of tegular apophysis; BPF, basoprolateral fold of tegular apophysis; C, conductor; Cy, cymbium; CF, cymbial fold; DB, dark bands; DS, dorsal scutum; E, embolus; EB, embolic base; EF, epigynal furrow; EP, epigynal plate; F, fovea; ID, insemination ducts; LB, lateral border of the epigyne; LR, lateral ramus of embolus; MR, mesal ramus of embolus; mEB, membranous area of the embolic base; pC, prolateral extension of conductor; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; S, spermatheca; Sp, spinnerets; T, tegulum; TS, Tegular spine; VTA, ventral tibial apophysis. Scale lines: A–B = 0.5 mm; C–H = 0.2 mm.

Female in alcohol (paratype; Fig. 3B). Body length 4.51; carapace 2.41 long, 1.70 wide; opisthosoma 2.10 long, 1.62 wide. Habitus and details as in male except for the following (Fig. 5B). Clypeus 0.46 high. Eye sizes and inter-distances: AME 0.15, ALE 0.10, PME 0.11, PLE 0.10; AME–AME 0.07, AME–PME 0.14, AME–ALE 0.08, ALE–ALE 0.53, PME–PME 0.14, PME–PLE 0.18, PLE–PLE 0.68, ALE–PLE 0.06. MOA 0.42 long, front width 0.32, back width 0.35. Chelicerae 0.81 long, Labium 0.30 long, 0.44 wide. Sternum: 1.00 long, 0.96 wide. Measurements of palp and legs: pedipalp (right) 1.68 (0.63 + 0.27 + 0.29 + 0.49), I 6.00 (1.50 + 0.50 + 1.45 + 1.30 + 1.25), II 5.75 (1.35 + 0.45 + 1.30 + 1.45 + 1.20), III 5.80 (1.35 + 0.50 + 1.20 + 1.55 + 1.20), IV 7.85 (1.75 + 0.50 + 1.85 + 2.25 + 1.50). Dorsum of pear-shaped opisthosoma, covered with dense black setae. Dorsal scutum on opisthosoma absent (Fig. 3B). Pattern on dorsum of opisthosoma with a pair of anterior small oblique patches, followed by numerous pale spots (Fig. 3B).

Genitalia (Figs 3C–D, 7C, 7H, 9E–F). Epigynal plate, V-shaped, with deep anterior median invagination. Lateral borders triangular, terminally blunt. Epigynal furrow highly sclerotized (Figs 3C, 7C, 9E). Insemination ducts longer than spermathecal length. Spermathecae globular in shape. Fertilization ducts as in Fig. 7H.

Distribution. Known only from the collecting localities (Fig. 12).

Mallinella oreo sp. nov. Figs 4, 6D, 6I, 7D, 7I, 8D, 9G–H

Type material. Holotype *∂***: SRI LANKA:** *Uva Province:* Badulla District, Namunukula Peak, along Passara— Ella Road, 06° 52' N, 81° 07' E, 2000 m, 23 January 2014, leg. SP. Benjamin *et al.* (IFS_ZOD_137). **Paratype:** 1♀, with same data as for holotype (IFS_ZOD_138).

Etymology. The new species is named after the chocolate 'Oreo'. Used as a noun in apposition.

Diagnosis. *Mallinella oreo* **sp. nov.** shares the feature of inwardly projected digitiform lateral borders of the epigyne with the members of the annulipes-group. Within the annulipes-group, males of *M. oreo* **sp. nov.** are most similar to the males of *M. moncheri* **sp. nov.** as both share digitiform RTA, less prominent cymbial fold which is less than half the length of the cymbium, and diagonally aligned embolic base but can be separated from it by the triangular hump like VTA (moderately developed with curved apex in *M. moncheri* **sp. nov.**), and subterminally bifurcated embolus (slender unbranched in *M. moncheri* **sp. nov.**) (Figs 3G, 8C; 4G, 8D) Females are also most similar to the females of *M. moncheri* **sp. nov.** as both share terminally blunt digitiform lateral borders of the epigyne but can be separated from it by semi-circular shaped epigynal plate (*V-shaped* in *M. moncheri* **sp. nov.**) (Figs 3C, 9E; 4C, 9G).

Description. *Male* in alcohol (holotype; Fig. 4A). Body length 4.41; carapace 2.42 long, 1.83 wide; opisthosoma 1.99 long, 1.45 wide. Habitus as in Fig. 4A. Carapace ovoid, smooth, shiny, dark brown anteriorly; fovea red brown. Clypeus brown, 0.38 high. Eye sizes and inter-distances: AME 0.16, ALE 0.11, PME 0.13, PLE 0.11; AME–AME 0.07, AME–PME 0.13, AME–ALE 0.08, ALE–ALE 0.50, PME–PME 0.10, PME–PLE 0.18, PLE–PLE 0.68, ALE–PLE 0.04. MOA 0.42 long, front width 0.36, back width 0.39. Chilum unipartite, trapezoid. Chelicerae 0.86 long, light brown, without teeth. Endites yellow. Labium triangular, yellow-brown, 0.20 long, 0.35 wide. Sternum yellow, furnished with sparse black setae, 1.05 long, 0.96 wide. Lateral margins of sternum with small semi-circular pits in front of each coxa of third and fourth pair of legs. Legs yellowish, with proximal tubercle on anterior femora. Measurements of palp and legs: pedipalp (right) 2.20 (0.88 + 0.40 + 0.42 + 0.50) I 5.51 (1. 51 + 0.55 + 1.15 + 1.35 + 0.95), II 5.30 (1.50 + 0.55 + 1.05 + 1.25 + 0.95), III 5.39 (1.35 + 0.54 + 1.10 + 1.50 + 0.90), IV 6.95 (1.60 + 0.50 + 1.65 + 2.10 + 1.10). Leg formula: 4132. Opisthosoma oval; dorsum dark sepia (Fig.4A). Pattern on dorsum of opisthosoma provided with large pale patches, first and second pairs of patches fused to form reniform patches, followed by third and fourth pairs of oblong patches, fifth pair of patches connected vertically with fourth pair. Dorsum of opisthosoma with lanceolate scutum. Posterior ventral spines moderate in length, gradually tapering, with blunt apices (Fig. 4E). Spinnerets yellow (Fig. 4E).

Palp (Figs 4F–H, 8D). VTA triangular hump (Fig. 4G); RTA digitiform, tapered towards blunt apex (Figs 4G–H, 8D), Cymbial fold less prominent, less than half the length of cymbium (Fig. 4G). TA elongated, Apicoprolateral fold of TA triangular, apicoprolateral process of TA triangular, broad at base, with blunt apex, directed posteromesad (Fig. 8D). Apicoretrolateral fold of TA triangular, with blunt apex. Mesoprolateral fold of TA, short, triangular



FIGURE 4. *Mallinella oreo* **sp. nov.** A, E–H holotype male (IFS_ZOD_137) and B–E paratype female (IFS_ZOD_138). A–B habitus, dorsal. C epigyne intact, ventral. D vulva, ventral; E posterior ventral spines, ventral. F left palp, prolateral; G idem, ventral; H idem, retrolateral. Abbreviations: APF, apicoprolateral fold of tegular apophysis; APP, apicoprolateral process of tegular apophysis; BPF, basoprolateral fold of tegular apophysis; C, conductor; Cy, cymbium; CF, cymbial fold; DB, dark bands; DS, dorsal scutum; E, embolus; EB, embolic base; EF, epigynal furrow; EP, epigynal plate; F, fovea; ID, insemination ducts; LB, lateral border of the epigyne; LR, lateral ramus of embolus; MR, mesal ramus of embolus; mEB, membranous area of the embolic base; pC, prolateral extension of conductor; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; S, spermatheca; Sp, spinnerets; T, tegulum; TS, Tegular spine; VTA, ventral tibial apophysis. Scale lines: A-B = 0.5 mm; C–H = 0.2 mm.

(Fig. 8D). Baso-prolateral fold of TA large, directed posteriad. Tegular spine large, prolaterally directed (Fig. 8D). Embolic base aligned diagonally, directed posteriorly, with broad membranous area (Fig. 4G). Embolus branched sub-terminally, with long lateral ramus. Both rami with blunt apices. (Fig. 4G, 8D). Embolus elongated with blunt apex.

Female in alcohol (paratype; Fig. 4B). Body length 5.22; carapace 2.46 long, 1.67 wide; opisthosoma 2.76 long, 2.03 wide. Habitus and details as in male except for the following (Fig. 4B). Clypeus 0.34 high. Eye sizes and inter-distances: AME 0.11, ALE 0.09, PME 0.11, PLE 0.09; AME–AME 0.06, AME–PME 0.15, AME–ALE 0.11, ALE–ALE 0.50, PME–PME 0.10, PME–PLE 0.19, PLE–PLE 0.64, ALE–PLE 0.06. MOA 0.39 long, front width 0.28, back width 0.32. Chelicerae 0.83 long Labium 0.30 long, 0.44 wide. Sternum yellow with shallow semicircular pits, 1.06 long, 1.04 wide. Legs with proximal tubercle on anterior femora (Fig. 6D). Measurements of palp and legs: pedipalp (right) 1.98 (0.77 + 0.37 + 0.38 + 0.46), I 5.00 (1.40 + 0.45 + 1.20 + 1.00 + 0.95), II 4.85 (1.30 + 0.45 + 1.25 + 0.95 + 0.90), III 4.95 (1.35 + 0.45 + 1.15 + 1.10 + 0.90), IV 6.75 (1.65 + 0.50 + 1.50 + 2.00 + 1.10). Leg formula: 4132.

Genitalia (Figs 4C–D, 7D, 7I, 9G–H). Epigynal plate, semi-circular, small median depression. Lateral borders digitiform, terminally blunt (Fig. 9G). Both epigynal plate and furrow highly sclerotized (Figs 4C, 9G). Insemination ducts long, thick, sclerotized, distally diverging (Figs 4D, 7D, 7I, 9H.). Insemination ducts longer than spermathecal length. Spermathecae round, fertilization ducts as in Fig. I.

Distribution. Known only from the type locality (Fig. 12).

Mallinella truffles sp. nov.

Figs 5, 6E, 6J, 7E,7J, 8E, 9I–J

Type material. Holotype *∂***: SRI LANKA:** *Central Province:* Kandy District, Loolecondera Estate, 07°08'45"N 80°41'53"E, 1480 m, 13 July 2010, leg. SP. Benjamin *et al.* (IFS_ZOD_43). **Paratypes:** 1♀, with same data as for holotype (IFS_ZOD_230).

Etymology. The new species is named after the chocolate 'Truffles'. Used as a noun in apposition.

Diagnosis. *Mallinella truffles* **sp. nov.** share features such as unbranched embolus, simple rostrated TA, longitudinal furrow of the epigyne with the members of the tuberculata group. Within tuberculata group, males of *M. truffles* **sp. nov.** are most similar to the males of *M. brachiata* as both share digitiform RTA, cymbial fold which is less than half the length of the cymbium, triangular apico prolateral process but can be separated from it by long narrow unbranched embolus. (cf. Dankittipakul *et al.* 2012: figs 147–151 and Figs 5F–H, 8E). Females are also most similar to the females of *M. tuberculata* as both share sub-rectangular epigynal plate, and deep anterior median depression, but can be separated from it by globular spermathecae (cf. Dankittipakul *et al.* 2012: figs 152–155 and Figs. 5C–D, 7E, 7J, 9I–9J).

Description. *Male* in alcohol (holotype; Fig. 5A). Body length 4.96; carapace 2.66 long, 2.20 wide; opisthosoma 2.30 long, 1.60 wide. Habitus as in Fig. 7A. Carapace ovoid, smooth, red-brown; fovea red-brown. Clypeus brown, 0.57 high. Eye sizes and inter-distances: AME 0.16, ALE 0.10, PME 0.12, PLE 0.10; AME–AME 0.10, AME–PME 0.13, AME–ALE 0.12, ALE–ALE 0.55, PME–PME 0.12, PME–PLE 0.25, PLE–PLE 0.76, ALE–PLE 0.06. MOA 0.44 long, front width 0.38, back width 0.41. Chelicerae 0.89 long, light brown, without teeth. Endites yellow. Labium triangular, yellow-brown, 0.20 long, 0.35 wide. Sternum yellowish, furnished with sparse black setae, 0.89 long, 0.74 wide. Lateral margins of sternum with small semi-circular pits in front of each coxa of third and fourth pair of legs. Legs yellowish, with proximal tubercle. Measurements of palp and legs: pedipalp (right) 2.36 (0.83 + 0.40 + 0.44 + 0.69), I 6.10 (1.60 + 0.65 + 1.40 + 1.45 + 1.00), II 5.45 (1.45 + 0.65 + 1.10 + 1.25 + 1.00), III 6.00 (1.60 + 0.65 + 1.25 + 1.50 + 1.00), IV 8.00 (2.00 + 0.70 + 1.60 + 2.35 + 1.35). Leg formula: 4132. Opisthosoma oval; pattern on dorsum of opisthosoma provided large pale patches, roughly oval first pair of patches connected wertically with nearly round second pair, third and fourth pairs of nearly round patches connected medially and vertically with each other (Fig. 5A). Dorsum of opisthosoma with large ovoid scutum. Posterior ventral spines elongated, gradually tapering, with acute apices (Fig. 5A). Spinnerets pale yellow (Fig. 5E).

Palp (Figs 5F–H, 8E). VTA elevated subtriangular hump (Figs 5G, 8E); RTA digitiform, tapered towards blunt apex (Figs. 5G–H); Cymbium with deep retrolateral fold, less than half the length of cymbium (Fig. 5G), apicoprolateral process triangular with blunt apex, TT large triangular with pointed apex. Embolic base aligned in

diagonally, directed posteriorly, with narrow membranous area (Fig. 5G). Embolus, long, narrow, unbranched, with blunt apex. Conductor triangular, pointed apex.



FIGURE 5. *Mallinella truffles* **sp. nov.** A, E–H holotype male (IFS_ZOD_43) and B–E paratype female (IFS_ZOD_230). A–B habitus, dorsal. C epigyne intact, ventral. D vulva, ventral; E posterior ventral spines, ventral. F left palp, prolateral; G idem, ventral; H idem, retrolateral. Abbreviations: APP, apicoprolateral process of tegular apophysis; C, conductor; Cy, cymbium; CF, cymbial fold; DB, dark bands; DS, dorsal scutum; E, embolus; EB, embolic base; EF, epigynal furrow; EP, epigynal plate; F, fovea; ID, insemination ducts; LB, lateral border of the epigyne; LR, lateral ramus of embolus; MR, mesal ramus of embolus; mEB, membranous area of the embolic base; pC, prolateral extension of conductor; PVS, posterior ventral spines; RTA, retrolateral tibial apophysis; S, spermatheca; Sp, spinnerets; T, tegulum; TS, Tegular spine; VTA, ventral tibial apophysis. Scale lines: A–B = 0.5 mm; C–H = 0.2 mm.

Female in alcohol (paratype; Fig. 5B); Body length 6.46; carapace 2.97 long, 2.01 wide; opisthosoma 3.49 long, 2.46 wide. Habitus and details as in male except for the following (Fig. 5B). Clypeus 0.34 high. Eye sizes and inter-distances: AME 0.13, ALE 0.11, PME 0.12, PLE 0.11; AME–AME 0.09, AME–PME 0.18, AME–ALE 0.13, ALE–ALE 0.60, PME–PME 0.13, PME–PLE 0.26, PLE–PLE 0.78, ALE–PLE 0.04. MOA 0.45 long, front width 0.36, back width 0.38. Labium 0.34 long, 0.47 wide. Sternum with shallow semi-circular pits, 1.25 long, 1.08 wide. Measurements of palp and legs: pedipalp (right) 2.25 (0.81 + 0.37 + 0.40 + 0.67) I 6.65 (1.80 + 0.75 + 1.60 + 1.55 + 0.95), II 6.60 (1.65 + 0.75 + 1.40 + 1.55 + 1.25), III 6.70 (1.70 + 0.75 + 1.50 + 1.75 + 1.00), IV 8.05 (1.95 + 0.75 + 1.75 + 2.25 + 1.35). Dorsum pattern of opisthosoma, indistinct, covered with thick black and white pubescence (Fig. 5B).

Genitalia (Figs 5C–D, 7E, 7J, 9I–9J). Epigynal plate wide, sub rectangular, with curved sclerotized epigynal furrows directed towards posteriorly (Figs 5C, 9I). Lateral borders sub-triangular, terminally acute (Figs 5C, 9I). Insemination ducts short, thick, distally diverging (Figs 5D, 7E, 7J, 9J), longer than spermathecal length. Spermathecae, globular in shape distally with coiled internal ducts (Fig. 9J). Fertilization ducts as in fig 7J.

Distribution. Known only from the type locality (Fig.12).



FIGURE 6. *Mallinella* spp., Legs: A, B, C, D, E, anterior femora; F, G, H, I, J, sternum, ventral A–F Mallinella dhanahami **sp. nov.** B–G *Mallinella milkyway* **sp. nov.** C–H *Mallinella moncheri* **sp. nov.** D–I *Mallinella oreo* **sp. nov.** E–J *Mallinella truffles* **sp. nov.** Abbreviations: CP, semicircular pits on sternum; PT, posterior tubercle. Scale lines = 1 mm.



FIGURE 7. *Mallinella* spp., female genitalia: A, B, C, D, E, vulva ventral; F, G, H, I, J, vulva, retrolateral A–F *Mallinella dhanahami* **sp. nov.** B–G *Mallinella milkyway* **sp. nov.** C–H *Mallinella moncheri* **sp. nov.** D–I *Mallinella oreo* **sp. nov.** E–J *Mallinella truffles* **sp. nov.** Abbreviations: FD, fertilization duct; ID, insemination ducts; S, spermathecae. Scale lines = 0.2 mm.



FIGURE 8. A–E. *Mallinella* spp., male left palps, ventral. A *Mallinella dhanahami* **sp. nov.** (IFS_ZOD_234). B *Mallinella milkyway* **sp. nov.** (IFS_ZOD_36). C *Mallinella moncheri* **sp. nov.** (IFS_ZOD_231). D *Mallinella oreo* **sp. nov.** (IFS_ZOD_137). E *Mallinella truffles* **sp. nov.** (IFS_ZOD_43). Abbreviations: APF, apicoprolateral fold of tegular apophysis; APP, apicoprolateral process of tegular apophysis; BPF, basoprolateral fold of tegular apophysis; C, conductor; E, embolus; EB, embolic base; LR, lateral ramus; MPF, meso prolateral fold; MR, mesal ramus; pC, prolateral extension of conductor; RTA, retrolateral tibial apophysis; T, tegular; TA, tegular apophysis; TS, tegular spine; TT, tegular tubercle; VTA, ventral tibial apophysis. Scale lines = 0.2 mm.



FIGURE 9. *Mallinella* spp., female genitalia: A, C, E, G, I, epigyne, ventral; B, D, F, H, J, vulvae, ventral. A–B Mallinella dhanahami **sp. nov.** (IFS_ZOD_235). C–D *Mallinella milkyway* **sp. nov.** (IFS_ZOD_37). E–F *Mallinella moncheri* **sp. nov.** (IFS_ZOD_232). G–H *Mallinella oreo* **sp. nov.** (IFS_ZOD_138). I–J *Mallinella truffles* **sp. nov.** (IFS_ZOD_230). Abbreviations: EF, epigynal furrow; EP, epigynal plate; ID, insemination duct; LB, lateral border; S, spermatheca. Scale lines = 0.2 mm.



FIGURE 10. Photographs of live *Mallinella* spp. described from Sri Lanka. A–B *Mallinella milkyway* **sp. nov.**, paratype female from Arisimale Beach Side (IFS_ZOD_205). C–E *Mallinella dhanahami* **sp. nov.**, paratype female from Gilimale Forest Reserve (IFS_ZOD_235). Photographs by SP. Benjamin.



FIGURE 11. Photographs of live *Mallinella milkyway* sp. nov. from Sri Lanka, paratype male from Arisimale Beach Side (IFS_ZOD_207). Photographs by SP. Benjamin

Discussion

The description of five new *Mallinella* species from Sri Lanka significantly enhance our understanding of the genus and its diversity in the region. The biodiversity of the *Mallinella* of Sri Lanka and its potential overlap with Indian species, particularly from the Western Ghats and surrounding regions, is a point of significant interest. Four *Mallinella* species are recorded in India (Fig. 13). The Indian *Mallinella* species, including *M. indica* Tikader & Patel, 1975, *M. nilgherina* Simon, 1906, and *M. dibangensis* Biswas & Biswas, 2006, but not *M. redimita* Simon, 1905 exhibit several key morphological features that are not present in the five newly described species.

The males of *M. indica* is characterised by longitudinal dorsal scutum of opisthosoma (cf. P. M. Sankaran *et al.* 2020: fig. 10C and Figs. 1A–5A) and a bifid apico-prolateral process in the TA (cf. P. M. Sankaran *et al.* 2020: figs 11C–E and Figs 1G–5G, 8A–8E). The females feature a rectangular epigynal plate (cf. P. M. Sankaran *et al.* 2020: fig. 11A and Figs 1C–5C), and a distinct pattern on the dorsum of the opisthosoma, consisting of two pairs of pale patches followed by three pairs of transverse patches located medially (cf. Tikader & Patel, 1975: fig. 1 and Figs 1B–5B). These features are common among the members of the fronto-group (Dankittipakul *et al.* 2012) and are not observed in any of the Sri Lankan species described in this study.

The males of *M. nilgherina* of fronto-group (Dankittipakul *et al.* 2012) is characterised by morphological features such as longitudinal dorsal scutum of opisthosoma (cf. Dankittipakul *et al.* 2012: figs. 1171 and Figs 1A–5A), a bifid apico-prolateral process of the TA, the sharp baso-prolateral tooth of the TA (cf. Dankittipakul *et al.* 2012: figs 1175–1177 and Figs 1G–5G, 8A–8E) which are not identified in the described species from Sri Lanka. The female of *M. nilgherina* is unknown (Dankittipakul *et al.* 2012).

The males of *M. dibangensis* are unknown (P. M. Sankaran *et al.* 2020). The females of *M. dibangensis* is characterised by the unique dorsal pattern on dorsum of opisthosoma consisting of two pairs of white patches, one long and one small rounded (Biswas & Biswas, 2006: fig. 1). This pattern is not identified in the described species in the study.

Furthermore, there is a notable overlap between some species, such as *M. redimita* distributed over a wide area across two biogeographic regions which is likely due to the tropical and subtropical climates in both regions which may provide suitable habitats and food sources. Additionally, historical land connections and human-mediated dispersal may have facilitated this.

The newly described species are distributed across various ecological zones in Sri Lanka, from lowland tropical forests to montane regions. This distribution highlights the species' ecological adaptability and underscores the biodiversity significance of Sri Lanka's Forest ecosystems. These findings also emphasize the conservation importance of Sri Lanka's natural habitats, as many of these species are restricted to specific forest reserves and

montane areas. Ongoing deforestation and habitat degradation pose significant threats to these endemic species, highlighting the need for conservation measures. Further, research should focus on phylogenetic analysis to clarify the evolutionary relationships among *Mallinella* species in Sri Lanka and adjacent regions. Molecular studies, in conjunction with detailed behavioral and ecological investigations, will enhance our understanding of the genus' diversification and evolutionary history in South Asia.



FIGURE 12. Distribution map of known Mallinella species of Sri Lanka.



FIGURE 13. Distribution map of known Mallinella species of India.

Acknowledgments

This study was funded by the National Institute of Fundamental Studies, Kandy. Special thanks to A. Satkunanathan, D.D. Ekanayake, K.M.R.K.T. Hearth, N. Athukorala, U.G.S.L. Ranasinghe and W.M.H.U. Wijerathna for their assistance in the field. Thanks to N. Athukorala, P.M.H. Sandamali, and S. Batuwita for collecting some of the specimens described in this study. Thanks to the Department of Wildlife and Forest Department of Sri Lanka for granting permits for fieldwork. We also thank the subject editor, Dr. Arnaud Henrard, and two reviewers, Dr. Pradeep M. Sankaran and Dr. John Caleb, for their suggestions and comments that improved the manuscript.

References

- Benjamin, S.P. (2007) The male of *Suffasia attidiya* (Araneae: Zodariidae). *Journal of Arachnology*, 34, 636–637. https://doi.org/10.1636/H05-26SC.1
- Benjamin, S.P. & Jocqué, R. (2000) Two new species of the genus Suffasia from Sri Lanka (Araneae: Zodariidae). Revue Suisse de Zoologie, 107, 97–106.

https://doi.org/10.5962/bhl.part.80120

Benjamin, S.P. & Dayananda, N. (2023) Redescription and new locality records of *Cryptothele ceylonica* O. Pickard-Cambridge, 1877 from Sri Lanka (Araneae: Zodariidae). *Zootaxa*, 5352 (2), 296–300. https://doi.org/10.11646/zootaxa.5352.2.11

Dingerkus, G. & Uhler, L.D. (1977) Enzyme Clearing of Alcian Blue Stained Whole Small Vertebrates for Demonstration of Cartilage. *Stain Technology*, 52, 229–232.

https://doi.org/10.3109/10520297709116780

Dankittipakul, P. & Jocqué, R. (2004) Two new genera of Zodariidae (Araneae) from Southeast Asia. *Revue Suisse de Zoologie*, 111, 749–784.

https://doi.org/10.5962/bhl.part.80268

- Dankittipakul, P., Jocqué, R. & Singtripop, T. (2012) Systematics and biogeography of the spider genus *Mallinella* Strand, 1906, with descriptions of new species and new genera from south East Asia (Araneae, Zodariidae). *Zootaxa*, 3369 (1), 1–327. https://doi.org/10.11646/zootaxa.3369.1.1
- Jocqué, R. (1991) A generic revision of the spider family Zodariidae (Araneae). Bulletin of the American Museum of Natural History, 201, 1–160.
- Koch, L. (1872) n.k. *In: Die Arachniden Australiens, nach der Natur beschrieben und abgebildet.* Bauer & Raspe, Nürnberg, pp. 105–368, pls. 8–28.

https://doi.org/10.5962/bhl.title.121660

Sankaran, P.M., Caleb, J.T.D. & Sebastian, P.A. (2020) A review of the Indian species formerly assigned to the genus Storena Walckenaer, 1805 (Araneae: Zodariidae) with the description of a new genus. European Journal of Taxonomy, 707, 1–23.

https://doi.org/10.5852/ejt.2020.707

- Simon, E. (1905) Voyage de M. Maurice Maindron dans l'Inde méridionale (mai à novembre 1901). 7me Mémoire. Arachnides (1re partie). Annales de la Société Entomologique de France, 74, 160–180. https://doi.org/10.1080/21686351.1905.12279338
- Simon, E. (1906) Voyage de M. Maurice Maindron dans l'Inde méridionale (mai à novembre 1901). 8me Mémoire. Arachnides (2e partie). Annales de la Société Entomologique de France, 75, 279–314. https://doi.org/10.1080/21686351.1906.12279880
- Strand, E. (1906) Diagnosen nordafrikanischer, hauptsächlich von Carlo Freiherr von Erlanger gesammelter Spinnen. Zoologischer Anzeiger, 30, 604–637 + 655–690.
- Tikader, B.K. & Patel, B.H. (1975) Studies on some rare spiders of the family Zodariidae from India. *Bulletin of the British* Arachnological Society, 3, 137–139.
- World Spider Catalog (2024) *World Spider Catalog. Version 25.0.* Natural History Museum Bern. Available from: http://wsc. nmbe.ch (accessed 15 May 2024)