



## Taxonomic study on praying mantids (Insecta: Mantodea) of Goodrical range forest, Kerala, India, with the description of a new species

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**ABSTRACT:** Mantid fauna of the forested tracts of different localities within the Goodrical forest range of the southern Western Ghats, Ranni forest division, Kerala, India were surveyed. During the Rapid Biodiversity Assessment (RBA) a total of 13 mantid specimens belonging to eight species under six families were collected. A new species *Caliris mukherjeei* sp. nov. (Haaniidae: Caliridinae) and two new records of rare mantids to Kerala viz., *Ceratomantis ghatei* Roy & Svenson, 2007 (Hymenopodidae: Oxyphilinae) and *Dysaulophthalma nathani* Stiewe, 2009 (Eremiaphilidae: Iridinae) are reported with description and redescription. © 2022 Association for Advancement of Entomology

**KEY WORDS:** Mantid fauna, new records, Caliridinae, Oxyphilinae, Iridinae

### INTRODUCTION

Goodrical range is the largest reserve forest under the Ranni forest division of Pathanamthitta district of Kerala, India. It is represented by mainly evergreen and semi-evergreen forests with an area of 505.967 km<sup>2</sup> situated in the eastern side of Pathanamthitta district adjacent to Periyar Tiger Reserve. Goodrical forest is well known for its scenic beauty and biodiversity and, due to its vicinity to the Periyar Tiger Reserve, it is the habitat for many wild animals of southern Western Ghats. Praying mantids are a group of ambush predatory insects which act as biocontrol agents. Currently, over 2400 species of mantises under 439 genera and 29 families are known worldwide (Schwarz and Roy, 2019). Based on the classification of Ehrmann and Roy (2002) 170 species, 71 genera in 11 families are currently reported from India

(Mukherjee *et al.*, 2014; Chatterjee *et al.*, 2019). Mantid fauna of Western Ghats are not completely explored and many rare species were described earlier from the forested tracts of southern Western Ghats. For the Rapid Biodiversity Assessment (RBA) of the area, a faunal survey was conducted by Zoological Survey of India, with the joint participation of various organizations in Kerala, during the months of October – November, 2021. The present paper deals with the description of a new species of preying mantids and reports of some rare and interesting species from Goodrical range forest collected during the survey.

### MATERIALS AND METHODS

The mantid specimens were collected from various localities of Goodrical range forest of Pathanamthitta district, Kerala, India during a RBA sponsored by

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Kerala Forest Department in collaboration with Zoological Survey of India. The area lies between 14° 45' and 15° 15' N latitude and 76° 45' and 77° 30' E longitude, at an altitudinal range of 100 to 1400 m (Menon, 2006). The specimens were collected by hand picking and sweep netting and preserved in ethanol (70%), then pinned, dried and examined under Labomed CZM6 Binocular Zoom Stereo-microscope, and the photographs were taken with Leica DFC 500 camera and Canon EOS M50 camera. Images taken at varying depths were stacked using Leica Auto Montage Software V3.80. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop® CS6 software. The specimens are deposited in the 'National Zoological Collections' of the Zoological Survey of India, Western Ghat Regional Centre, Kozhikode (ZSIK). The classification of Schwarz and Roy (2019) is followed in the manuscript and terminology mostly follows Brannoch *et al.* (2017). Various localities within the Goodrical range forest where the specimens collected are (Fig. A) —

1. Gavi: 9° 26' 10" N, 77° 09' 57" E Alt 1184 m
2. Kaattadikunnu: 9° 19' 16.4892" N, 77° 7' 30.4788" E Alt 1176 m
3. Kakki Dam site: 9° 19' 40" N, 77° 08' 36" E Alt 986 m
4. Kochupampa: 9° 23' 44" N, 77° 09' 37" E Alt 1017 m
5. Pannikunnu, Angamoozhi: 9° 19' 6.1032" N, 77° 1' 45.0624" E Alt 76 m

**Abbreviations used:** AvS - anteroventral spines; DS - discoidal spines; F - femur; PvS - posteroventral spines; T - tibia; ZSIK - National Zoological Collections of the Western Ghat Regional Centre, Zoological Survey of India, Kozhikode, Kerala, India.

## RESULTS AND DISCUSSION

**Family:** Haaniidae; **Subfamily:** Caliridinae

**Genus** *Caliris* Giglio-Tos, 1915

*Caliris* Giglio-Tos, 1915. *Bull. Soc. Ent. Ital.*, 46: 82. Type species: *Iris masoni* Westwood, 1889.

*Beesoniella* Werner, 1935. *Proc. Zool. Soc. Lond.*, 498. Type species: *Beesoniella pallida* Werner, 1935.

*Beesonula* Uvarov, 1939. *Ann. Mag. Nat. Hist.*, 3(11): 458. (Preoccupied by *Beesoniella* Werner, 1935)

**Diagnosis:** Medium-sized, green body with round eyes. Lower frons transverse. Vertex arched, higher than eyes. Pronotum with oval supra-coxal dilation, Metazona finely keeled. Fore coxae as long as metazona, delicately toothed, with divergent forecoxal lobes. Fore femora with 4 posteroventral and 4 discoidal spines. Fore tibiae with 6 posteroventral spines. Hind metatarsus much longer than the other segments taken together. Fore wings sub-opaque. Hind wings with coloured patches in females; hyaline or smoky in males.

### 1. *Caliris mukherjeei* sp. nov. (Figs. 1-6)

**Diagnosis:** Hind wings opaque, ivory coloured with two identical oval black-yellowish brown patches in discoidal area followed by 8-10 irregular black stripes towards anal area. Superior edge of fore coxae with 7-9 small spines and few spinules.

#### **Description:**

Female: *Body* (Figs. 1, 2). Medium-sized, green body in live, yellowish brown in dried condition.

*Head* (Fig. 3) - Eyes round. Vertex 4-grooved, juxta-ocular lobes round, prominent. Lower frons wider than high, superior edge arched in middle. Ocelli minute. Antennae simple.

*Thorax* (Fig. 1, 2) - Pronotum with granular disc, lateral edges denticulate, supra-coxal dilation oval; metazona at least two times longer than prozona; metazona highly constricted after dilation; prosternum with a black midline behind coxal junction.

*Forelegs* (Figs. 5, 6) - Fore coxae with 7-9 small spines on superior and inferior margins; fore coxal lobes divergent. Fore femora dorsally with long

groove, both anteriorly and posteriorly; 4 long posteroventral spines with sides and apex black, base with black spot; 4 discoidal spines, 3<sup>rd</sup> longest, all black at apex, 1<sup>st</sup> and 3<sup>rd</sup> dorsally and ventrally with black base, 2<sup>nd</sup> ventrally with black base, 1<sup>st</sup> spine ventrally with a black dot; 14 anteroventral spines (6 long, 8 small), all black at apex, base of long spines ventrally with black dots, more clear in 4<sup>th</sup> and 5<sup>th</sup> long spines; tibial spur groove near base; genicular spur prominent. Tibiae with 6 posteroventral spines; 13 anteroventral spines; all tibial spines black at apex only, gradually increasing in size towards apex. Basitarsus longer than other segments taken together; black spot at distal part of tarsomeres gradually fade towards apex.

Spination formula of fore legs;

F= 4 DS/ 14 AvS/ 4 PvS. T= 13 AvS/ 6 PvS.

*Mid and hind legs* (Figs. 1, 2) - Simple, with femoral genicular spine. Meso-basitarsus a little shorter, meta-basitarsus a little longer than other segments taken together.

*Abdomen* (Figs. 1, 2) - Green. Cerci 17 segmented, highly ciliate.

*Wings* (Figs. 1, 2, 4) - Reach up to 4<sup>th</sup> abdominal segment. Fore wings green (in live), broad, opaque, costal and discoidal area highly reticulate; anal area yellowish green, lower discoidal area with yellowish brown round patch. Hind wings opaque, ivory colour; discoidal area with two identical oval patches that are with 60% black area and remaining part yellowish brown followed by 8-10 irregular black stripes towards anal area.

*Male*: Unknown. Beier

**Material examined: Holotype** 1 Female, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kaattadikunnu, Coll. No. 24266, Lat9° 19' 16.4892" N, Long 77° 7' 30.4788" E, Alt 1176 m, 30. x. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 20259[ZSIK].

**Distribution:** India- Kerala.

**Measurements (mm):** Body length 41, Pronotum 11.2, Prozona 3.6, Metazona 7.6 Foreleg-Coxa 8.07,

Trochanter 2.35, Femur 10.3, Tibia 5.7, Basitarsus 3.46, Other tarsal segments together 2.7, Mid/hind legs - Coxa 3.5/2.9, Trochanter 1.23/1.33, Femur 9.56/11.77, Tibia 7.74/10.16, Basitarsus 2.33/3.5, Other tarsal segments together 2.88/3.03, Forewing 16.42, Hindwing 13.61.

**Etymology:** This species is named after Tushar Kanti Mukherjee, in recognition of his valuable work on Indian Mantodea.

**Remarks:** Five species of mantids are currently present in the genus *Caliris*; *C. elegans* Gigliot-Tos, 1915, *C. masoni* Westwood, 1889, *C. melli* Beier, 1933, *C. mukherjeei* **sp. nov.**, *C. pallens* Wang, 1993 and *C. pallida* (Werner, 1935). All species can be distinguished from each other by their colour pattern on the wings of females. Only *C. pallida* was reported earlier from Kerala which has yellow hind wings apically with two black patches distally with pinkish tint, nine series of 3-4 black spots concentrically arranged towards anal area (Fig. 7). Whereas, hind wings of *C. mukherjeei* **sp. nov.** are ivory coloured discoidal area is with two identical oval black yellow patches followed by 8-10 irregular black stripes towards anal area (Fig. 4). The new species exhibits close affinity to *C. masoni* which was reported from north-east India; especially in the shape of fore wings and the colour of the hind wings but not in the pattern of patches .

## 2. *Caliris pallida* (Werner, 1935) (Figs. 7, 8, 15)

*Beesoniella pallida* Werner, 1935. *Proc. Zool. Soc. Lond.*, 498.

*Iris keralensis* Vyjayandi, Narendran & Mukherjee, 2006. *Orient. Insects.*, 40: 285.

*Caliris pallida* (Werner, 1935). In: Schwarz & Roy, 2018. *Bull. Soc. Entomol. Fr.*, 123(4): 455-456.

**Brief redescription:** Small, green mantis (in live) with round eyes. Vertex 4-grooved, juxta-ocular lobes of vertex round, prominent, with few hairs. Lower frons wider than high, superior edge angular in middle, disc smooth. Ocelli small. Pronotum short, supra-coxal dilation oval, lateral edges not

denticulate, but a little serrate, metazona longer than prozona, metazona a little constricted after dilation. Fore coxae shorter than metazona, upper margin with 4-5 small spines and few spinules; fore-coxal lobe divergent. Fore femora with 4 posteroventral spines, a pit in between first two proximal spines, apex and lateral sides black; 4 discoidal, all black at apex, first and third ventrally with a black spot at base; 14 anteroventral spines (6 long, 8 short), all black at apex, base of long spines ventrally with a black spot which is more visible on last three longer spines. Tibial spur groove near base. Fore tibiae with 6 posteroventral spines, a gap between first two proximal spines; 13 anteroventral spines gradually increase in length towards apex, all spines black at apex only. Fore basitarsus with a reddish tint, longer than other segments together; tarsomeres black at apex. Mid and hind legs simple, with femoral genicular spines; meso-basitarsus almost as long as and meta-basitarsus longer than other segments taken together. Macropterous, costal and adjacent area of fore wings reticulate, green, sub-opaque; other areas hyaline, earth brown in colour. Hind wings brown, hyaline; costal area with a little greenish tinge; anal area with a reddish tinge. Third and fourth abdominal segments dorsally brown.

*Male genitalia:* paa of left phallomere long, broad, hairy tip, curved upward; afa long, finger-like, posteriorly with minute denticles. sdpm of ventral phallomere serrated. Right phallomere narrow.

**Material examined:** 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Pannikunnu, Angamoozhi, Coll. No. 24265, Lat 9° 19' 6.1032" N, Long 77° 1' 45.0624" E, Alt 76 m. 30. x. 2021, P. M. Sureshan and party, ZSI/WGRC/IR/INV 19452 [ZSIK].

**Measurements (mm):** Body length 26.7, Pronotum 8, Prozona 2.5, Metazona 5.4, Foreleg-Coxa 4.6, Trochanter 1.7, Femur 7.2, Tibia 3.6, Basitarsus 2.67, Other tarsal segments together 2.13, Mid/hind legs-Coxa 1.9/2.37, Trochanter 0.93/0.86, Femur 8.05/9.16, Tibia 5.9/8.8, Basitarsus 1.9/3.2, Other tarsal segments together 2.34/2.58, Forewing 18.25, Hindwing 15.17.

**Distribution:** India; Kerala (Vyjayandi *et al.*, 2006), Tamil Nadu (Mukherjee *et al.*, 2017).

**Remarks:** In 2006, Vyjayandi *et al.* had described a new species named *Iris keralensis* which was later re-designated as *C. keralensis* by Stiewe (2009) and it was recently synonymized with *C. pallida* (Schwarz & Roy, 2018).

**Family: Gonypetidae; Subfamily: Iridopteryginae; Tribe: Amantini**

**Genus *Amantis* Giglio-Tos, 1915**

*Amantis* Giglio-Tos, 1915. *Bull. Soc. Ent. Ital.*, 46: 151. Type species: *Mantis (Oxyphilus) reticulata* De Haan, 1842.

*Cimantis* Giglio-Tos, 1915. *Bull. Soc. Ent. Ital.*, 46: 154. Type species: *Cimantis fumosa* Giglio-Tos, 1915.

*Shirakia* Beier, 1935. *Gen. Ins.*, 47. Type species: *Gonypeta maculata* Shiraki, 1911.

**Diagnosis:** Small, bark coloured body. Lower frons slightly wider than high, upper edge feebly round. Antennae ciliate in males. Pronotum short, diamond shaped. Metazona a little longer than prozona. Fore femora with 4 posteroventral, margins granulated, and 4 discoidal spines, not arranged in a row. Hind metatarsus longer than other segments taken together. Costal margin of fore wing ciliated in males.

### 3. *Amantis saussurei* (Bolivar, 1897) (Fig. 9, 16)

*Iridopteryx saussurei* Bolivar, 1897. *Ann. Soc. Ent. Fr.*, 66: 305.

*Amantis saussurei* (Bolivar, 1897). In: Giglio-Tos, 1927. *Tierreich* 50:171.

**Brief redescription:** Small, brownish body with scattered small black dots. Eyes round. Vertex with scattered black patches. Lower frons about as long as wide, with two black dots on either side; superior edge arched in middle; a long black midline end at labrum. Ocelli pale yellowish, round, prominent. Antennae ciliate. Pronotum short, with a median

black line; supra-coxal dilation prominent; metazona, longer than prozona, posteriorly with two robust tubercles in middle. Fore coxa longer than pronotum; edges with ciliated spinules. Fore femora with 4 posteroventral, 4 discoidal, 10-11 anteroventral spines. Tibial spur groove a little proximal to middle. Fore tibia with 10 posteroventral, 11 anteroventral spines. Basitarsus anteriorly brown, posteriorly black; all other tarsomeres black at posterior end. Mid and hind legs simple. Wings smoky brown; anterior edge of forewings ciliate; stigma with a black dot.

*Male genitalia:* paa of left phallomere finger-like, curved upward; afa long, narrow. sdpc sclerotized; sdpm triangular with pointed tip; sdpl round, with minute spines. pva of horse shoe-shaped, posteriorly sclerotized; pia small with minute tubercles.

**Materials examined:** 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Pannikunnu, Angamoozhi, Coll. No. 24265, Lat 9° 19' 6.1032" N, Long 77° 1' 45.0624" E, Alt 76 m. 30. x. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 19451 [ZSIK]. 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Gavi, Coll. No. 24264, Lat 9° 26' 10" N, Long 77° 09' 57" E, Alt 1184 m, 01. xi. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 19453 [ZSIK].

**Measurements (mm):** Body length 17.5, Pronotum 4.9, Prozona 2.1, Metazona 2.8, Foreleg-Coxa 5.3, Trochanter 1.6, Femur 5.8, Tibia 2.8, Basitarsus 3.2, Other tarsal segments together 2.7, Mid/hind legs-Coxa 3.0/2.8, Trochanter 0.95/0.93, Femur 7.2/8.4, Tibia 5.7/8.8, Basitarsus 2.1/3.7, Other tarsal segments together 2.4/3.0, Forewing 13.54, Hindwing 11.81.

**Distribution:** India- Andhra Pradesh (Mukherjee *et al.*, 1995), Chhattisgarh (Majumder *et al.*, 2015), Goa (Vyjayandi *et al.*, 2010), Karnataka (Mukherjee *et al.*, 2014), Kerala (Mukherjee *et al.*, 1995), Maharashtra (Ghate *et al.*, 2012), Tamil Nadu (Bolivar, 1897).

**Remarks:** This species was first reported as *Iridopteryx saussurei* from Madurai and Kodaikanal, Tamil Nadu, India by Bolivar (1897).

In 1904, Kirby transferred the species to the genus *Gonypeta* and finally the genus *Amantis* (Giglio-Tos, 1927).

**Family: Hymenopodidae;**  
**Subfamily: Hymenopodinae;**  
**Tribe: Anaxarchini**

**Genus *Anaxarcha* Stål, 1877**

*Anaxarcha* Stål, 1877. *Bih. K. Svenska. Vetensk. Akad. Handl.*, 4(10): 81. Type species: *Anaxarcha graminea* Stål, 1877.

*Anaxandra* Kirby, 1904. *Syn. Cat. Orth.*, 1: 223. Type species: *Anaxandra grammica* Stål, 1877.

*Parastatilia* Werner, 1922. *Zool. Mededeel. Mus. Leiden.*, 7: 119. Type species: *Parastatilia pulchra* Werner, 1922.

**Diagnosis:** Round eyes. Lower frons transverse, with two lateral carinae, superior angle with a projecting point. Vertex simple with prominent juxta-ocular lobes. Pronotum slender, denticulate borders, slightly longer than fore coxae, with oval supra-coxal dilation. Fore coxae with small marginal spines. Fore femora with 4 posteroventral and 4 discoidal spines. Fore tibiae with densely placed posteroventral spines. Mid and hind legs simple. Fore wings narrow, green, mostly with yellow costal stripes. Hind wings coloured.

#### **4. *Anaxarcha limbata* Giglio-Tos, 1915 (Fig. 10, 17)**

*Anaxarcha limbata* Giglio-Tos, 1915. *Boll. Musei Zool. Anat. Comp. R. Univ. Torino.*, 30(702): 1.

*Oligomantis parallela* Werner, 1930. *Ark. Zool.*, 21A (34): 6.

**Brief redescription:** Medium-sized, greenish body. Eyes round. 4-grooved vertex with prominent juxta-ocular lobes. Lower frons transverse, superior mid angle with a projecting point. Pronotum slender, constricted after dilation; lateral borders black, denticulate; oval supra-coxal dilation; metazona at least 2.5 times longer than prozona. Fore coxa shorter than pronotum. Fore femora with 4 posteroventral, 4 discoidal, 14 anteroventral spines.

Fore tibia with closely placed, decumbent posteroventral spines, 14 anteroventral spines. Fore basitarsus longer than other segments taken together. Mid and hind legs simple, slender. Fore wings narrow, greenish, sub-opaque, densely reticulated. Hind wings hyaline, costal area green, other areas with pinkish veins and veinlets. Abdomen dorsally pink, ventrally green.

*Male genitalia* - paa of left phallomere short, broad; afa sclerotized, round. sdp on ventral phallomere absent. fda of right phallomere with hairy apex; pva horse shoe-shaped, sclerotized, curved upward.

**Material examined:** 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kochupampa, Coll. No. 24267, Lat 9° 23' 44" N, Long 77° 09' 37" E, Alt 1017 m, 31. x. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 19450[ZSIK].

**Measurements (mm):** Body length 28.4, Pronotum 7.5, Prozona 2.1, Metazona 5.5, Foreleg-Coxa 4.7, Trochanter 1.1, Femur 6.2, Tibia 2.5, Basitarsus 2.4, Other tarsal segments together 1.7, Mid/hind legs-Coxa 2.6/2.3, Trochanter 0.53/0.56, Femur 5.9/6.4, Tibia 4.0/6.0, Basitarsus 1.5/2.7, Other tarsal segments together 1.7/2.1, Forewing 21.5, Hindwing 18.

**Distribution:** India; Arunachal Pradesh (Mukherjee *et al.*, 1995), Kerala (Mukherjee *et al.*, 1995), Meghalaya (Mukherjee *et al.*, 1995); Borneo (Giglio-Tos, 1915), Indonesia, Malaysia (Beier, 1937), Thailand (Mukherjee *et al.*, 2014).

**Remarks:** First Indian record of this species was from Kerala in 1995. This species shows closer affinity to *A. graminea* Stål, 1877 than *A. acuta* Beier, 1963 (Mukherjee *et al.*, 1995).

**Subfamily: Oxyphilinae; Tribe: Oxyphilini**

**Genus *Ceratomantis*** Wood-Mason, 1876

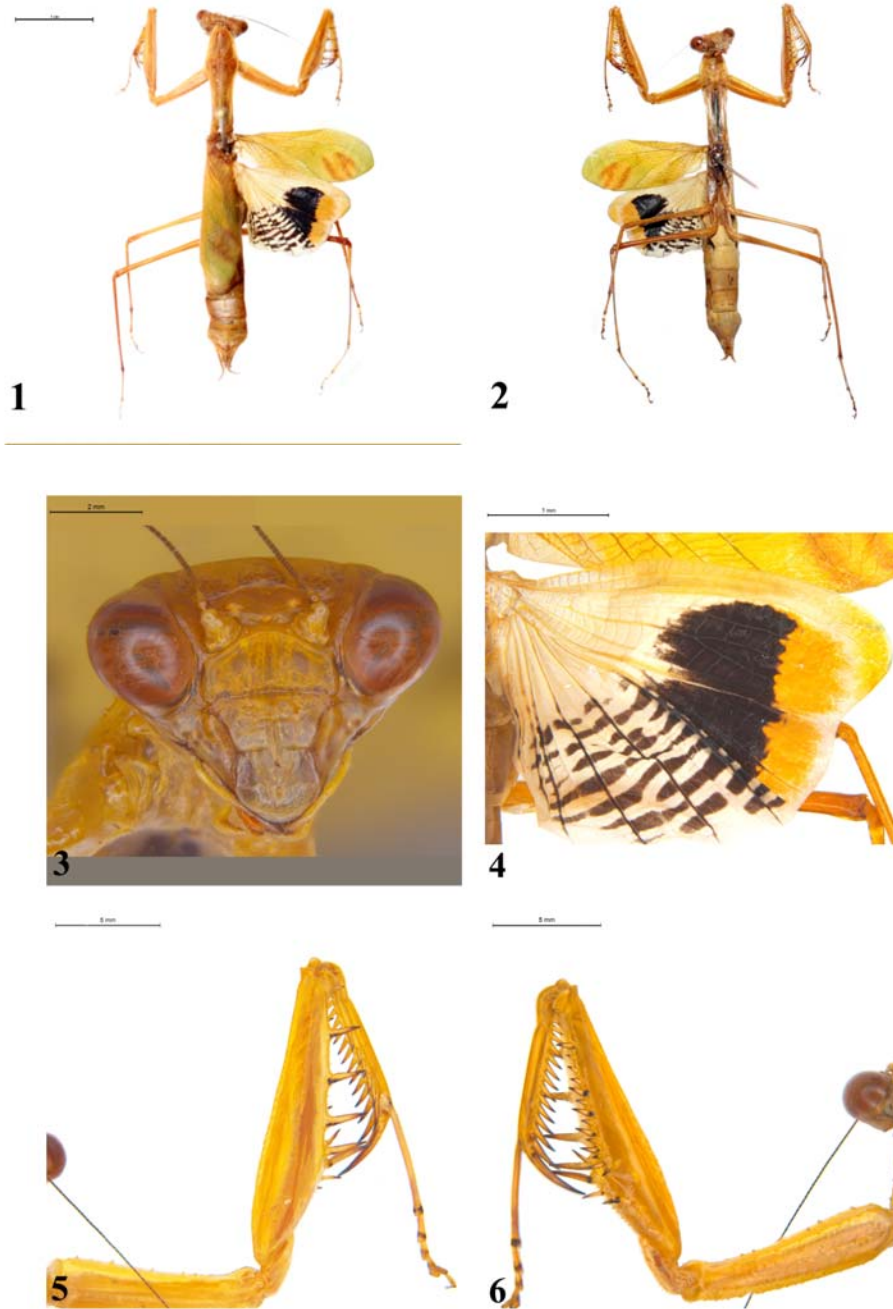
*Ceratomantis* Wood-Mason, 1876. *Bull. Soc. Entomol. Fr.*, 112(4): 175. *Ceratomantis saussurii* Wood-Mason, 1876.

**Diagnosis:** Body small, eyes round. Lower frons transverse, pentagonal, upper margin with a point in the middle. Vertex with a long, conical tubercle above the ocelli. Prominent juxta-ocular lobes. Pronotum short, strongly arched, with prominent dilation. Metazona almost as long as prozona, each with a pair of conical tubercles. Lateral borders of pronotum with long tubercles. Fore femora dilated, with 4 posteroventral and 4 discoidal spines. Mid and hind legs simple. Wings longer than abdomen in males, shorter in females.

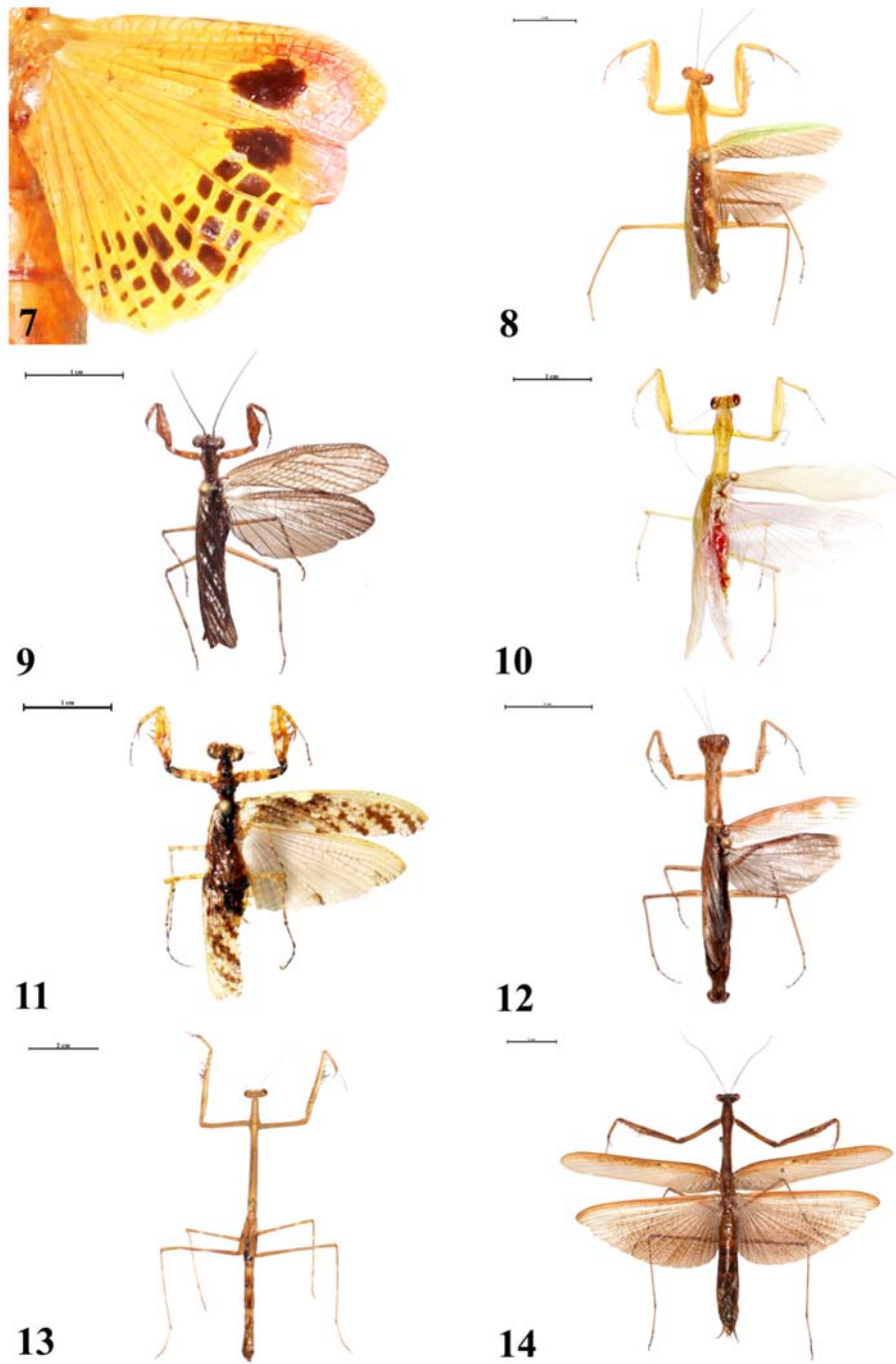
### 5. *Ceratomantis ghattei* Roy & Svenson, 2007 (Fig. 11, 18)

*Ceratomantis ghattei* Roy & Svenson, 2007. *Bull. Soc. Entomol. Fr.*, 112(4): 433.

**Brief redescription:** Medium-sized body. Round, bulging eyes. Lower frons pentagonal with a tubercle. Process of vertex bifid at terminus with two strikingly pronounced carinae; mid and basal lateral projections pronounced, diverging strongly from process. Juxta-ocular lobes prominent with a strong tubercle. Pronotum short, robust, tuberculated with a pair of dorsally projecting spines each on prozona and metazona; lateral edges tuberculate; supra-coxal dilation spinous; prozona almost as long as metazona. Superior margin of fore coxa with strong denticles, inferior margin with many tubercles; internal fore coxae apically with black patch around small pale spot on lower side which continues to trochanter. Fore femora with superior hump near apex; 4 posteroventral, 4 discoidal, 9-10 anteroventral spines; tibial spur groove near base; all longer anteroventral spines completely brown, all other femoral spines black at apex only. Fore tibiae with 11 posteroventral, 7 anteroventral spines. First and second tarsomeres brownish with a pale band in distal half, apically black; all other tarsomeres completely black. Femora of mid and hind legs with sub-apical lobe. Abdomen brown with all lateral lobes pale tan except on third segment. Fore wings with greenish costal area; discoidal area mostly brown with scattered hyaline spots; base and area proximal to middle with a whitish, opaque patch. Hind wings hyaline; costal area green.

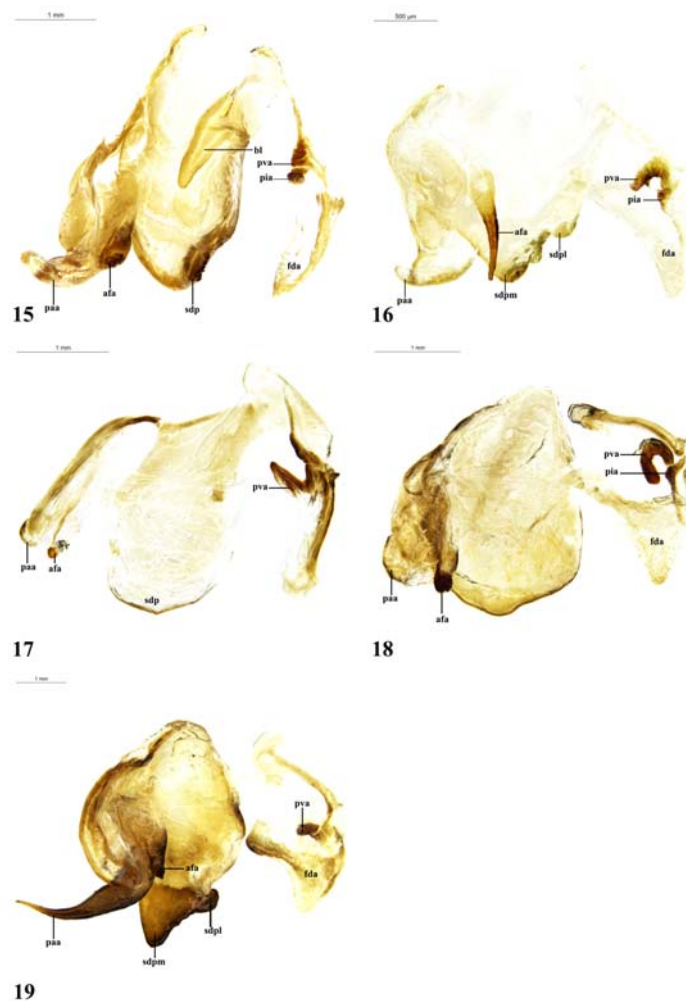


Figs. 1-6 *Caliris mukherjeei* Kamila & Sureshan sp. nov. 1. Dorsal view, 2. Ventral view, 3. Head frontal view, 4. Hind wing dorsal view, 5. Fore leg dorsal view, 6. Fore leg ventral view



Figs. 7-14: 7. *Caliris pallida* (Werner, 1935) female hind wing dorsal view, 8. *Caliris pallida* (Werner, 1935) male, 9. *Amantis saussurei* (Bolivar, 1897), 10. *Anaxarcha limbata* Giglio-Tos, 1915, 11. *Ceratomantis ghatei* Roy & Svenson, 2007, 12. *Dysaulophthalma nathani* Stiewe, 2009, 13. *Indomenella indica* (Ghate & Mukherjee, 2004), 14. *Statilia maculata* (Thunberg, 1784)





Figs. 15-19 Male genitalia Dorsal view. 15. *Caliris pallida* (Werner, 1935), 16. *Amantis saussurei* (Bolivar, 1897), 17. *Anaxarcha limbata* Giglio-Tos, 1915, 18. *Ceratomantis ghattei* Roy & Svenson, 2007, 19. *Statilia maculata* (Thunberg, 1784)

**Male genitalia:** paa broad, semi-circular with a median groove. afa globular with granules. Ventral phallomere terminating with a widely rounded structure. fda of right phallomere posteriorly with hair-like structures; pva sclerotized, cane-shaped; pia small, sclerotized with granules.

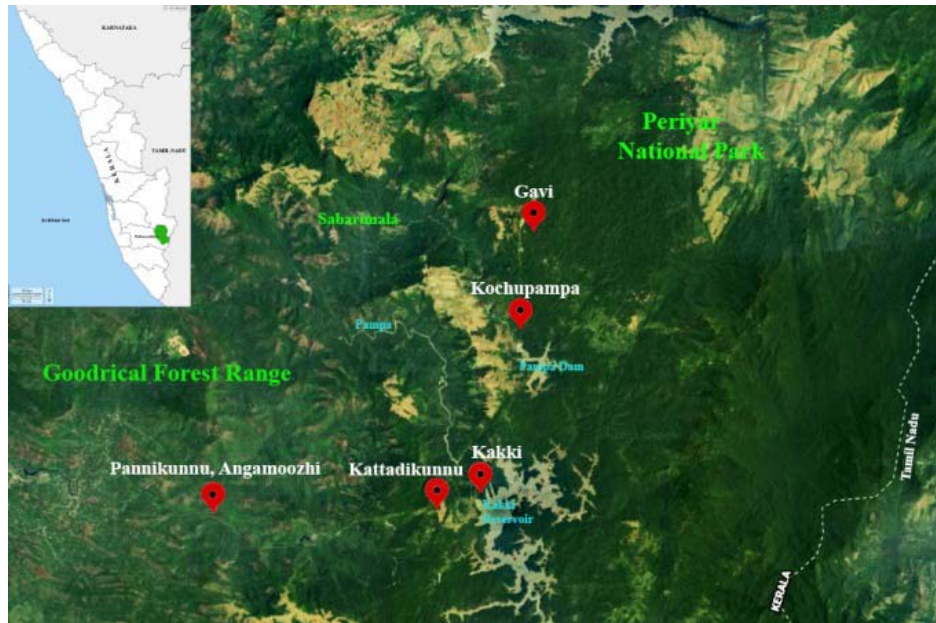
**Material examined:** 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kakki dam site, Lat 9° 19' 40" N, Long 77° 08' 36" E, Alt 986 m, 31. x. 2021, Jafer Palot, ZSI/WGRC/IR/INV 19457[ZSIK].

**Measurements (mm):** Body length 25.3, Pronotum 4.5, Prozona 2, Metazona 2.5, Foreleg-

Coxa 5, Trochanter 1.3, Femur 5.9, Tibia 1.9, Basitarsus 2.6, Other tarsal segments together 2.1, Mid/hind legs-Coxa 2.3/1.9, Trochanter 0.5/0.7, Femur 4.9/5.6, Tibia 4.2/4.7, Basitarsus 2.1/2.4, Other tarsal segments together 2.8/3.1, Forewing 20.1, Hindwing 17.9.

**Distribution:** India- Kerala (New record), Karnataka (Roy and Svenson, 2007).

**Remarks:** This is the first report of *C. ghattei* from Kerala. This species was described by Roy and Svenson with only one male specimen from Agumbe forest of Karnataka, India in 2007. Female unknown.



Area of specimens collection: Gooderical range forest, Pathanamthitta, Kerala

**Family: Eremiaphilidae; Subfamily: Iridinae;  
Tribe: Dysaulini**

**Genus *Dysaulophthalma* Stiewe, 2009**

*Dysaulophthalma* Stiewe, 2009. *Ent. Mon. Mag.*, 145: 52. Type species: *Dysaulophthalma nathani* Stiewe, 2009.

**Diagnosis:** Slender body with oblong eyes. Lower frons trapezoidal. Height of vertex as same as eyes. Pronotum with serrated margin. Fore femora with 4 posteroventral, first spine larger than others, and 4 discoidal spines. Metathorax and first 4 abdominal tergites metallic- black in colour. Fore wing with brown or orange colouration. Hind wing without any colouration.

**6. *Dysaulophthalma nathani* Stiewe, 2009  
(Fig. 12)**

*Dysaulophthalma nathani* Stiewe, 2009. *Ent. Mon. Mag.*, 145: 51.

**Brief redescription:** Medium-size, body brown with scattered brown patches. Eyes oval. Vertex of same height as eyes, juxta-ocular lobes inconspicuous. Lower frons transverse, wider than high, disc smooth. Pronotum long, somewhat rectangular, lateral margins denticulate; supra-coxal

dilation oval; prozona short; metazona a little constricted behind dilation. Fore coxae dorsally with two black parallel patches near apex, ventrally with 4-5 dark granules, ventral posterior apical lobe with black patch, under side of coxa with a black midline. Trochanter dorsally with a black spot and hairs. Fore femora with 4 posteroventral, 4 discoidal and 10-12 anteroventral spines; superior border slightly concave near apex; tibial spur groove proximal to middle. Fore tibiae with 7-8 posteroventral and 8-10 anteroventral spines. Mid and hind legs simple. Wings shorter than abdomen. Fore wings anterior half brown, opaque, medially and distally with two hyaline areas; posterior half hyaline with brown veins. Hind wings smoky, sub-hyaline. First 4 abdominal tergites metallic black, others brown.

**Measurements (mm):** Body length 28.7, Pronotum 7.2, Prozona 2, Metazona 5.2, Foreleg-Coxa 3.5, Trochanter 0.98, Femur 4.4, Tibia 2.6, Basitarsus 2.2, Other tarsal segments together 2.4, Mid/hind legs- Coxa 1.8/1.6, Trochanter 0.65/0.6, Femur 3.7/5.9, Tibia 3.6/5.9, Basitarsus 1.0/1.4, Other tarsal segments together 2/2.65, Forewing 14.7, Hindwing 12.1.

**Material examined:** 1 Female, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kochupampa, Coll. No. 24267, Lat 9° 23' 44" N,

Long 77° 09' 37" E, Alt 1017 m, 31. x. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 19493[ZSIK].

**Distribution:** India- Kerala (New record), Tamil Nadu (Stiewe, 2009).

**Remarks:** The genus *Dysaulophthalma* is endemic to South India. This species is reported for the first time from Kerala since its original description from Anamalai hills, Tamil Nadu, which was collected in 1959. Male unknown.

**Family:** Deroplatyidae; **Subfamily:** Deroplatyinae; **Tribe:** Euchomenellini

**Genus** *Indomenella* Roy, 2008

*Indomenella* Roy, 2008. *Bull. Soc. Entomol. Fr.*, 113(3): 330. Type species: *Euchomenella indica* Ghate & Mukherjee, 2004.

**Diagnosis:** Long, slender body with round, bulging eyes. Lower frons wider than high. Vertex straight. Pronotum much longer than fore coxae, lateral margins denticulated. Superior edge of fore coxae with small spines. Fore femora with 4 posteroventral and 4 discoidal spines. Females brachypterous, males macropterous.

**7. *Indomenella indica* (Ghate & Mukherjee, 2004) (Fig. 13)**

*Euchomenella indica* Ghate & Mukherjee, 2004. *Genus.*, 15(3): 329.

*Indomenella indica* (Ghate & Mukherjee, 2004). In: Roy, 2008. *Bull. Soc. Entomol. Fr.*, 113(3): 330.

**Brief redescription:** Long, slender, body brown. Head wider with round, bulging eyes. Vertex 4-grooved with indistinct juxta-ocular lobes. Lower frons transverse, superior edge arched in middle. Pronotum long, slender, lateral edges serrate; anterior and posterior ends with two small mid lobes; oval supra-coxal dilation; metazona much longer than prozona; two small pits on either side of anterior metazona. Fore coxae shorter than metazona with spinulate edges; convergent fore coxal lobe. Fore trochanter ventrally with few granules. Fore femora ventrally with three distinct brown bands in apical half; spines distally placed; 4

posteroventral, 4 discoidal, 15 anteroventral spines (7 long, 8 short); tibial spur groove a little distal to middle. Fore tibiae with 8 posteroventral spines, all unequal in length; 14 anteroventral spines. Fore basitarsus a little longer than other segments taken together; tarsomeres dorsally black at apex; ventrally completely black. Mid and hind legs simple. Wings brachypterous; fore wings opaque, brown; costal area green; stigma with veinless dark brown patch; anal area with brown spots; ventrally reddish brown with a long black line in lower half of costal area. Hind wings metallic black except brown base; lower half with 12-14 hyaline non-continuous stripes.

**Materials examined:** 2 Females, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Pannikunnu, Angamoozhi, Coll. No. 24265, Lat 9° 19' 6.1032" N, Long 77° 1' 45.0624" E, Alt 76 m, 30. x. 2021, Dr. P.M. Sureshan and Party, ZSI/WGRC/IR/INV 19491-19492[ZSIK].

**Measurements (mm):** Body length 72.7, Pronotum 31.2, Prozona 6.2, Metazona 25, Foreleg-Coxa 14.8, Trochanter 3.1, Femur 16.4, Tibia 6, Basitarsus 3.8, Other tarsal segments together 3.6, Forewing 11.2, Hindwing 7.8.

**Distribution:** India; Kerala (Ghate and Mukherjee, 2004), Tamil Nadu (Mukherjee *et al.*, 2017).

**Remarks:** This species is very common in forested areas of Kerala and looks like slender twigs and branches. When disturbed, they stiffen their body by laying forelegs along the body and sham death for a long time.

**Family:** Mantidae; **Subfamily:** Mantinae

**Genus** *Statilia* Stal, 1877

*Statilia* Stal, 1877: 36. Type species: *Pseudomantis nemoralis* Saussure, 1870.

**Diagnosis:** Lower frons transverse, with arched or a little angular superior edge. Vertex smooth. Pronotum slender, lateral edges denticulated, with pronounced supra-coxal dilation. Fore coxae serrated. Fore femora with 4 posteroventral and 4 discoidal spines. Claw groove placed distally. Mid and hind femora without apical spines. Hind

metatarsus slightly longer than other segments taken together.

**8. *Statilia maculata* (Thunberg, 1784)  
(Fig. 14, 19)**

*Mantis maculata* Thunberg, 1784. *Nov. Ins. Spec.*, 3: 61.

*Mantis orientalis* Saussure, 1870. *Mitt. Schweiz. Ent. Ges.*, 3: 233.

*Pseudomantis haani* Saussure, 1871. *Mem. Soc. Hist. Nat. Geneve.*, 21: 185.

*Statilia maculata* var. *Hyalina* Giglio-Tos, 1927. *Das Tierreich.*, 50: 411.

**Brief redescription:** Medium-sized body with scattered black patches. 4-grooved vertex with black long patch, juxta-ocular lobes indistinct. Eyes round. Ocelli round, prominent. Lower frons wider than high, superior edge angular in middle, inferior edge arched. Pronotum long, slender, lateral margins denticulate. Prosternum with black patch at coxal joint area. Fore coxae ventrally with 6-7 small triangular whitish spines and few spinules on superior margin; internally with black patch near base. Fore femora with 4 posteroventral, 4 discoidal, 14 anteroventral spines (6 long, 8 short); all spines black at apex only; internally with shining yellow patch in tibial spur groove followed proximally with a black patch, distally with a small black patch. Bases of anteroventral spines with a black line which extend to apex of fore femora. Fore tibiae with 7 posteroventral, 11 anteroventral spines. Mid and hind legs simple, without femoral genicular spine. Wings reach beyond abdomen. Fore wings highly reticulate; costal area opaque, pale brown, anteriorly with a black line, posteriorly with few brown patches; other areas hyaline; lower part of anal area with small brown patches; stigma present. Hind wings with opaque, reddish brown costal area; discoidal area highly reticulate, with brown patch at apex; other areas hyaline, black with scattered hyaline patches and stripes.

*Male genitalia* - paa of left phallomere very long, curved leftwards, base broad, gradually become narrow towards apex. afa large with a pointed tip.

sdp of ventral phallomere broad, strongly sclerotized; sdpm triangular; sdpl hook-shaped. pva of right phallomere sclerotized, apex paddle-shaped, curved upward; pia small with a narrow groove.

**Materials examined:** 2 Males, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kochupampa, Coll. No. 24267, Lat 9° 23' 44" N, Long 77° 09' 37" E, Alt 1017 m, 31. X. 2021, P. M. Sureshan and Party, ZSI/WGRC/IR/INV 19454-19455 [ZSIK]. 1 Male, INDIA, Kerala, Pathanamthitta district, Goodrical range forest, Kakki dam, Lat 9° 19' 40" N, Long 77° 08' 36" E, Alt 986 m, 1. Xi. 2021, Jafer Palot, ZSI/WGRC/IR/INV 19456 [ZSIK].

**Measurements (mm):** Body length 50.4, Pronotum 15.4, Prozona 3.9, Metazona 11.5, Foreleg-Coxa 10.7, Trochanter 3.2, Femur 13, Tibia 4.9, Basitarsus 4.2, Other tarsal segments together 3.1, Forewing 34.6, Hindwing 30.5.

**Distribution:** India; Andaman Island (Srinivasan *et al.*, 2017), Andhra Pradesh (Mukherjee *et al.*, 1995), Arunachal Pradesh (Mukherjee *et al.*, 1995), Assam, Bihar (Sureshan and Sambath, 2009), Chhattisgarh (Majumder *et al.*, 2015), Himachal Pradesh, Kerala (Vyjayandi, 2007), Madhya Pradesh, Maharashtra (Ghate *et al.*, 2012), Meghalaya, Odisha (Sureshan *et al.*, 2006), Sikkim (Mukherjee *et al.*, 1995), Tamil Nadu (Mukherjee *et al.*, 2017), Telangana, Uttarakhand (Werner, 1935), Uttar Pradesh, West Bengal (Mukherjee *et al.*, 1995).

Borneo; China, Indonesia (Saussure, 1871), Japan (Thunberg, 1784), Labuan, Laos, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam.

**Remarks:** These mantids are commonly seen on grasses and bushes and exist in brown and green morphs.

The study added three more species to the list of mantid fauna of Kerala state which updates the species list to 52 species under 30 genera and 13 families. Present study is a result of the Rapid Biodiversity Assessment (RBA) survey of Goodrical forest range of Ranni Forest Division,

Pathanamthitta district, Kerala conducted to document the biodiversity of the area and to suggest conservation management measures for the area and document the endangered, threatened and endemic species. During the field survey, 13 mantid specimens of eight species were collected from the area, which include a new species to science and two new records to Kerala state. The study points to the fact that the forested areas of Goodrical range are rich in faunal diversity evidenced by the record of some rare species of preying mantids and other invertebrates.

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