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A new genus of praying mantis *Cotigaonopsis* from Goa, India (Insecta: Mantodea)

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ABSTRACT. *Cotigaonopsis providenceae*, new genus and species, is described and illustrated based on the male specimens collected from Goa, India. This genus belongs to subfamily Angelinae and has affinities with the genera *Agrionopsis* WERNER, 1908, *Euchomenella* GIGLIO-TOS, 1916 and *Indomenella* ROY, 2008. A modified key to the subfamily Angelinae including the new genus *Cotigaonopsis* is provided. The main feature of this genus is the brachypterous condition in male. *Euchomenella* GIGLIO-TOS and *Indomenella* have been reported from the Oriental Region, but the genus *Agrionopsis* WERNER is known only from the Ethiopian region.

Key words: entomology, taxonomy, new genus, new species, Mantodea, Angelinae, *Agrionopsis*, *Euchomenella*, *Cotigaonopsis*.

INTRODUCTION

Three male mantids from Cotigao forest, Goa, India were collected in 2008. Our study revealed that they belong to the subfamily Angelinae and represent an undescribed genus with affinities to genera *Agrionopsis* WERNER, *Euchomenella* GIGLIO-TOS and *Indomenella* ROY of the same subfamily. The new genus shows remarkable differences from these three genera particularly in the brachypterous condition of male. Normally the females in the above mentioned genera are brachypterous or with reduced wings (GIGLIO TOS 1927). Moreover, they are different in general body size, shape of the pronotum, colour, and number and arrangement of spines on the fore leg. Based on these differences we erected a new genus, *Cotigaonopsis* under the subfamily Angelinae.

The state Goa is located between the latitudes 15°48'00" North to 14°53'54" North and longitudes 74° 20' 13" East to 73°40'33" East. Temperature ranges from 20- 34°C. The boundaries of the state are the Terekhol River in the North, Karnataka in the South, the Western Ghats in the East, and the Arabian Sea in the West.

MATERIALS AND METHODS

The detailed study of the type specimen was carried out using Leica EZ4D Stereo Zoom Microscope and images were taken using inbuilt digital camera of the microscope. Based on the observations, a description has been prepared; the format of the description follows MUKHERJEE (1995); drawings were made using Camera Lucida mounted on LeicaMZ6 Stereo Zoom Microscope. Male genitalia were dissected from one male specimen and placed in 10% KOH for one hour to dissolve sclerotised tissue, mounted using glycerin and examined under the microscope. Specimens are temporarily deposited in Entomology Research Laboratory, Providence Women's college Calicut Kerala, India and eventually they will be transferred to Zoological Survey of India, Calicut station.

RESULT AND DISCUSSION

Key to genera of the subfamily Angelinae

1. Cerci expanded, flattened, foliaceous *Angela*
- Cerci rounded, not expanded 2.
2. The first discoidal spine of anterior femora longer than the second
..... *Thespoides*
- The first discoidal spine of anterior femora shorter than the second 3.
3. Internal apical lobes of anterior coxae adjacent 4.
- Internal apical lobes of anterior coxae not adjacent, divergent 6.
4. Wings of female long *Mythomantis*
- Wings of female markedly reduced 5.
5. Male genitalia simple, pseudophallus not hooked *Euchomenella*
- Male genitalia not simple, pseudophallus hooked *Indomenella*
6. Vertex even, supra-anal plate rounded or trapezoidal, cerci not protruding beyond tip of abdomen *Stenopyga*
- Vertex arched, supra-anal plate triangular, pointed, cerci protruding beyond tip of abdomen 7.
7. Anterior tibia greatly reduced, claw groove approximately at the beginning of the distal quarter of anterior femur *Leptocola*
- Anterior tibia less reduced, claw groove approximately at middle of the anterior femur 8.
8. Fore wing long in male (17-31 mm) *Agrionopsis*
- Fore wing very short in male (6-7 mm)..... *Cotigaonopsis*

Genus *Cotigaonopsis* VYJAYANDI gen. nov.

ETYMOLOGY

Genus name has been given in relation with the place of collection.

DESCRIPTION

Body slender, head wider than high with striking eyes, frontal sclerite transverse with arched superior margin. Pronotum long, lateral margins with tubercles, metazona prismatic, ventro-laterally two longitudinal grooves present ornamented with fine tubercles. Fore femora with 4 external, 4 discoidal and 14 internal spines. Fore tibia with 8 external spines and 12 internal spines. Both fore and hind wings opaque highly reduced in male, fore wing ranges between 6-7mm, anal membrane black with a little iridescence.

Type species: *Cotigaonopsis providenceae* VYJAYANDI sp. nov. Gender: feminine.

***Cotigaonopsis providenceae* VYJAYANDI sp. nov.**

ETYMOLOGY

The species name is associated with the name of the institution (Providence college) in which research work has been carried out.

DESCRIPTION

Holotype: Male

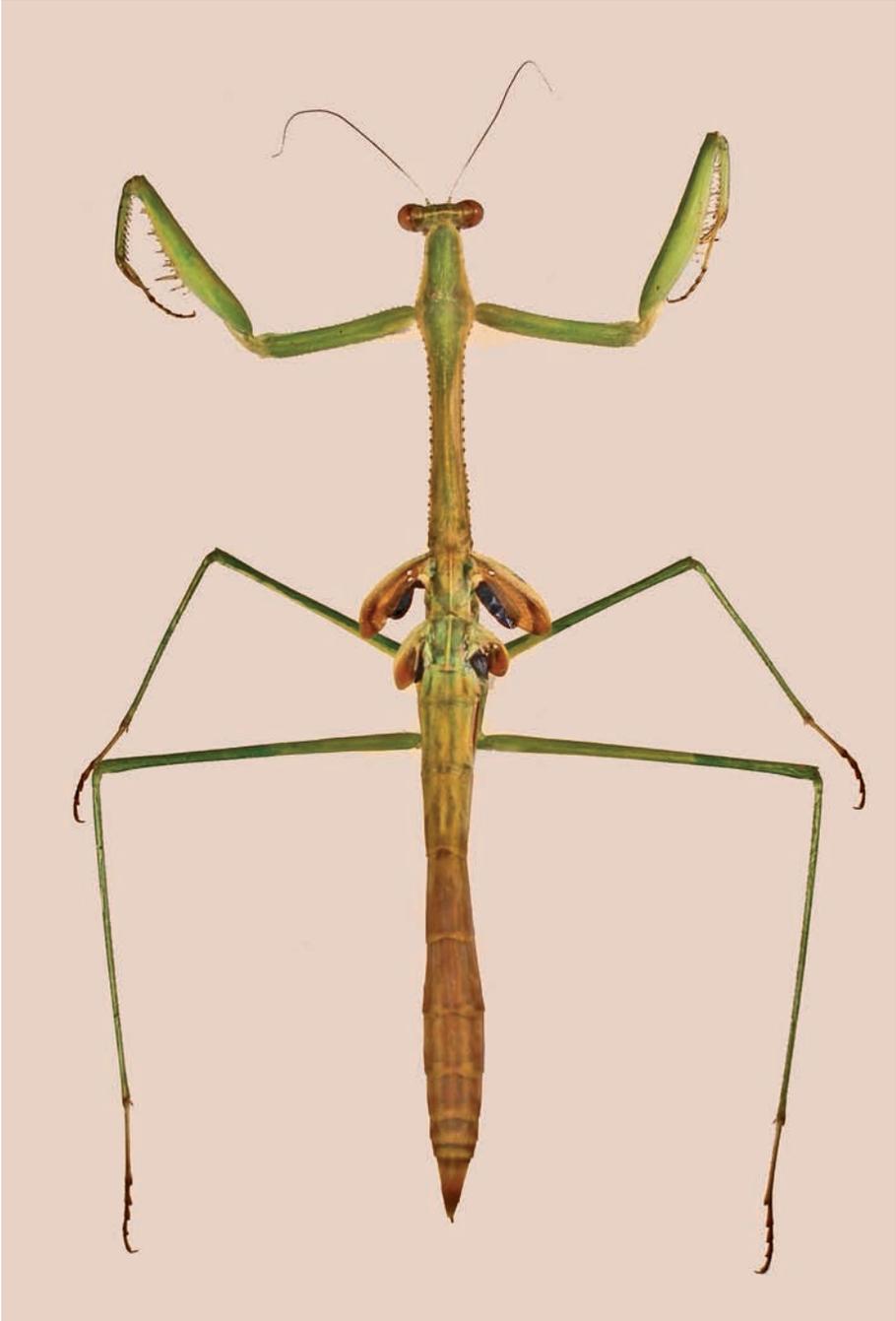
Measurements of male (in mm, C – coxa, F – femur, T – tibia): total length: 64; pronotum: 21.5; fore leg: C 11, F 13.5, T 12; mid leg: C – 3, F – 14, T – 12; hind leg: C – 3.5, F – 21, T – 20; fore wing: 7; hind wing: 4.5.

Colour: Body light green; eyes in frontal view fuscous at proximal half, orange at distal half; all spines on fore femora black at tips only; fore wing light greenish yellow at costal area, discoidal area brown, anal membrane black with a little iridescence (Fig. 1).

Head (Figs. 2, 3, 7, 8): 1.4x wider than high; vertex smooth, median lobe bulged laterally, lateral lobe prominent; eyes round, large, striking; antenna a little shorter than pronotum, sparsely setaceous; ocelli small, distantly placed; frontal sclerite transverse more than 2.5x wider than high, superior margin arched, a little sinuate at middle, inferior margin concave and forms a groove near clypeus; clypeus well elevated at middle.

Pronotum: (Fig. 9) Long, slender, prismatic more than 1.5x longer than fore coxa, lateral margin bordered with small tubercles, supracoxal dilation prominent, metazona longer than fore coxa with a dorsomedian carina, more than 3x longer than prozona, ventro laterally two longitudinal grooves present bordered with fine tubercles.

Fore leg (Figs. 5, 10): slender, coxa a little shorter than femur with 6-7 small spines at superior margin, lower margin slightly denticulate, internal apical lobe divergent; trochanter dentate at lower side; femur more than 2x longer than tibia with 4 external, 4 discoidal, 14 internal spines, anterior margin straight with fine spinules; claw groove a little proximal from middle; tibia short with 12 internal, 8 external spines; tarsi,

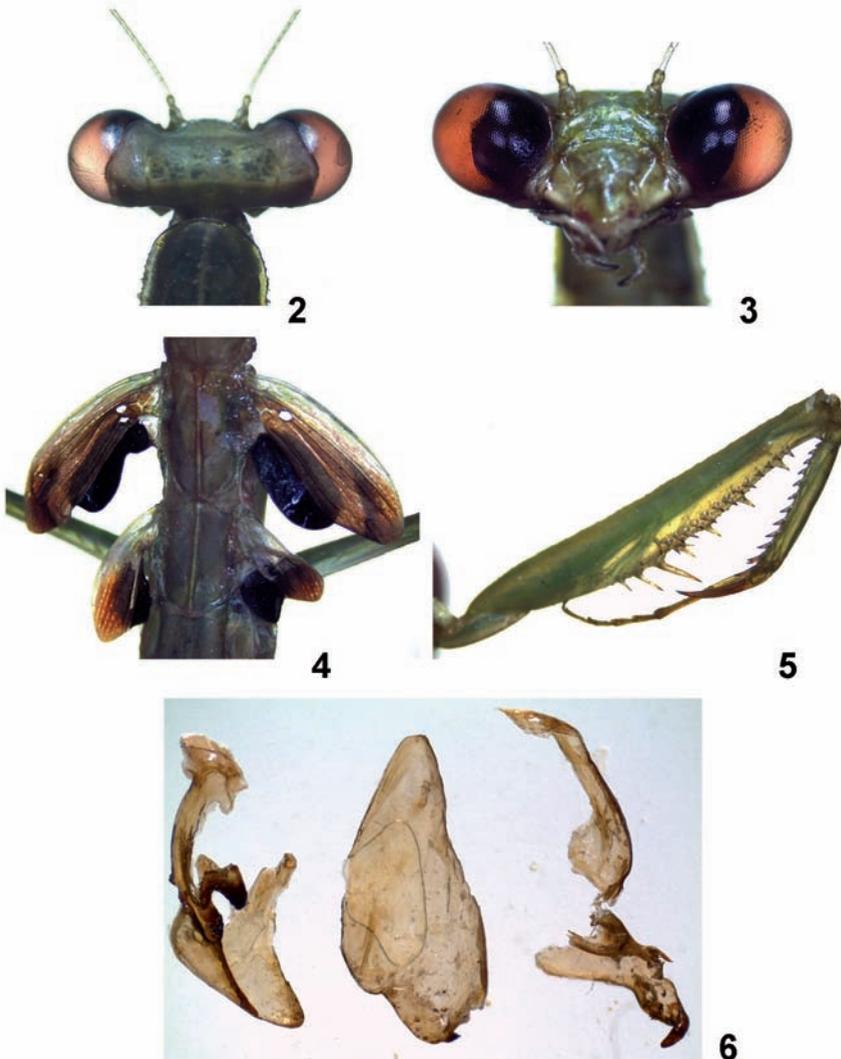


1. *Cotigaonopsis providenciae* n. sp.

metatarsus well setaceous. Mid and hind legs: very slender, hind leg distinctly longer than mid legs, setaceous; hind metatarsus longer than all other tarsal segments together, an apical spine present on hind femur.

Wings (Fig. 4): Both fore and hind wings opaque, highly reduced, forewing ranges between 6-7mm. Anal membrane of fore wing black with a little iridescence.

Abdomen: long, fuciform, supra anal plate long, triangular, truncate at tip with a dorsomedian carina; cerci long exceeding supra anal plate.



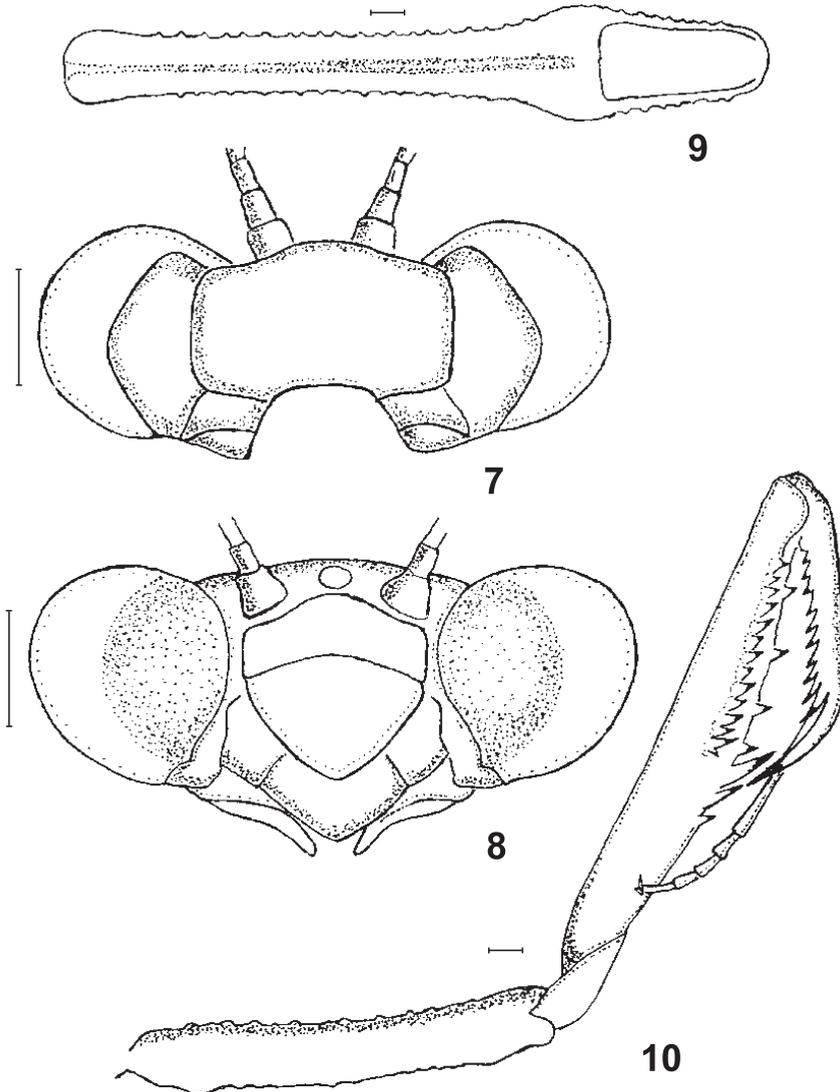
2-6. *Cotigaonopsis providenciae* n. sp.: 2 – head dorsal, 3 – head in front view, 4 – wings, 5 – fore leg, 6 – male genitalia

Male genitalia (Fig. 6): Hypophallus broader at base with a strong spine turned to the right and anteriorly conical. The right epiphallus triangular. Titillator and pseudophallus short.

Female: Unknown.

HABITAT

Bushy vegetations.



7-10. *Cotigaonopsis providenciae* n. sp.: 7 – head dorsal, 8 – head in front view, 9 – pronotum, 10 – fore leg

MATERIAL EXAMINED

Holotype: Male, INDIA, Goa, Cotigao forest, Canacona, 02-x -2008, Altitude: 20m, Coll. Vyjayandi & party (deposited in Entomology Research Laboratory, Providence Women's college Calicut Kerala, India). Other specimens examined: 2 Males, Goa, Cotigao forest, Canacona, 03-x -2008, Coll. Vyjayandi & party.

DIAGNOSIS

Differences of *Cotigaonopsis* VYJAYANDI gen.nov. from the genus *Agrionopsis* WERNER:

1. Wings highly reduced in male (in *Agrionopsis* wings are highly developed in male and reduced in female).
2. First discoidal spine placed at proximal half (in *Agrionopsis* first discoidal spine placed towards the middle).
3. Superior margin of frontal sclerite a little sinuate at middle (in *Agrionopsis* truncate at middle).
4. Superior edge of fore femur simple (in *Agrionopsis* superior edge of fore femur twisted).

Differences of *Cotigaonopsis* VYJAYANDI gen.nov. from the genus *Euchomenella* GIGLIO-TOS:

1. All the external spines black at tip only (in *Euchomenella* 1st and 2nd external and all discoidal spines, entirely black).
2. Fore tibia with 12 internal spines (in *Euchomenella* fore tibia with 12-14 internal spines).
3. Head 1.4x wider than high (in *Euchomenella* head is 2.6x wider than high with bulging eyes).
4. Fore tibia 2x longer than Fore femur and claw groove placed near the middle(in *Euchomenella* 3x longer than femur and claw groove paced in the distal half).
5. Metazona 3x longer than prozona (in *Euchomenella* metazona more than 4x longer than prozona).
6. Supra anal plate long, triangular, truncate at tip with a dorsomedian carina; cerci long exceeding supra anal plate(in *Euchomenella* supra anal plate transverse, round at tip, cerci long and cylindrical).
7. Both wings opaque, highly reduced in male; forewing ranges between 6-7mm, anal membrane black with a little iridescence (in *Euchomenella* both the wings extend beyond the abdomen in males and are hyaline, in female wings are reduced).

Differences of *Cotigaonopsis* VYJAYANDI gen. nov. from the genus *Indomenella* ROY:

Shows remarkable dissimilarities in structure of male genitalia. In *Cotiganopsis* the basal half of hypophallus broad and anteriorly conical (in *Indomenella* anterior half

broad with a small spine) and in *Cotiganopsis titillator* and pseudophallus short without any prominent characteristics (in *Indomenella*, titillator twisted and pseudophallus curved, forms a hook like structure).

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