



A synopsis of the Oriental species of *Thaumasura* Westwood (Hym., Pteromalidae, Cleonyminae)

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ABSTRACT. *Thaumasura* Westwood is one of the unique genera of Cleonyminae (Hymenoptera, Pteromalidae) represented from the Oriental region by only three species. The only known representative of the genus from India was described as *Thaumasura indica* Sureshan & Binoy, which was already preoccupied by *Thaumasura indica* Mani & Kaul (currently in *Balcha* Walker). Thus, the replacement name *Thaumasura keralica* Binoy **nom. nov.** is hereby proposed to resolve this homonymy. Furthermore, *Thaumasura femoralis* (Westwood) is redescribed and its morphological characters are illustrated. A key to the Oriental species of the genus is also provided.

Key words: India, key, new combination, nomenclature, taxonomy.

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INTRODUCTION

The genus *Thaumasura* Westwood belonging to the tribe Lyciscini Bouček of the subfamily Cleonyminae Walker (Hymenoptera, Pteromalidae) was established by Westwood (1868) with *T. terebrator* as the type species from Australia. It is a moderately speciose taxon represented by 38 species worldwide, with the majority of species (>35 spp.) occurring in Australia. Only three species, *T. brevicaudata* (Westwood, 1874), *T. femoralis* (Westwood, 1874) and *T. indica* Sureshan & Binoy, 2019 are presently reported from the Oriental Region (Binoy & Sureshan, 2020). *Thaumasura indica* is presently confined to the Oriental region, while *T. brevicaudata* and *T. femoralis* are reported from Indonesia and also recorded to occur in Papua New Guinea (Noyes, 2019). Members of the genus are easily recognisable by their long and slender metasoma with a much longer syntergum extending more than the length of metasoma and are often misidentified as eupelmids and vice versa. Mani et al. (1973) erroneously reported the genus from Dehradun, Uttarakhand in India describing a species *T. indica* Mani & Kaul. Farooqi and Subba Rao (1985) adapting from Mani et al. and included *Thaumasura* in a key to Indian genera of Pteromalidae. Bouček et al. (1979:459) stated the possibility of a misidentification of the species and commented that the specimens in fact belonged to Eupelmidae. A later revision of world Eupelmidae (Gibson, 1989, 2003) and

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of the genus *Balcha* Walker (Gibson, 2005), identified *Thaumasura indica* erroneously described by Mani & Kaul (1973) to be member of the genus *Balcha* Walker (Eupelmidae: Calosotinae) and combined the same as *B. indica* and in part as *B. elegans* (Masi) making the earlier name (*Thaumasura indica*) a junior synonym. However, the International Commission on Zoological Nomenclature (Ride et al., 1999) [Art. 10.6] notes that the name though once available remains so irrespective of its invalidity. Here we provide a synopsis of the Oriental species of *Thaumasura*, providing diagnoses and a key to species. The holotype of *T. femoralis* is redescribed with illustrations to aid future identifications. The unavailable name of the recently described Indian representative, *Thaumasura indica* is amended and a new name is proposed.

MATERIAL AND METHODS

The present compilation is based on the physical examination of type specimens of *T. indica* deposited in the National Zoological Collections of the Zoological Survey of India, Western Ghat Regional Centre, Kozhikode (ZSIK). The photographs of the holotype of *T. femoralis* received from Oxford University Museum of Natural History, Oxford, England (OXUM). The type specimen of *T. brevicaudata* is probably lost, and the original description is vague. The Indian species of *Thaumasura* was collected using modified light trap from Idukki district of Kerala, India. The light trap used was a combination of high intensity battery operated cold UV light source fitted with a yellow basal pan filled with detergent water, essentially acting both as a light trap and a yellow pan trap. Cuticular sculpture terminology for redescription follows Harris (1979) and abbreviations of the morphological terms follows Binoy and Sureshan (2020).

RESULTS

Taxonomic hierarchy

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Superfamily Chalcidoidea Latreille, 1817

Family Pteromalidae Dalman, 1820

Genus *Thaumasura* Westwood, 1868

Key to the Oriental species of *Thaumasura* Westwood, 1868

- 1 Head, and mesosoma green with golden reflections; metasoma black with green-golden reflections syntergum more than 0.6× as long as ovipositor sheaths [free margin of clypeus slightly emarginated inwards]..... *T. keralica*
- Head mesosoma and metasoma green with blue reflections; metasoma black with blue reflections; syntergum as long as, or less than 0.5× as long as ovipositor sheaths. **2**
- 2 Legs red; syntergum 0.4× as long as ovipositor sheaths [small specimen]. *T. brevicaudata*
- Legs yellow-brown; syntergum 0.5× as long as ovipositor sheaths [large specimen]. *T. femoralis*

***Thaumasura brevicaudata* (Westwood, 1874)**

Belonea brevicaudata Westwood 1874:147; Holotype ♀, Indonesia: Misool Island (type lost) [transferred to *Thaumasura* by Bouček (1988:245)].

Note. As per literature, *T. brevicaudata* is closely related to *T. femoralis*, but can be distinguished from it by smaller size shorter abdomen, red legs and its syntergum one fourth as long as the ovipositor sheaths. The species is currently known only by a single female specimen from Mysol (Misool) in West Papua, Indonesia (Westwood, 1874) presumably deposited in W.W. Saunders collection of OXUM. The type even after thorough searching were untraceable (J. Hogan, pers. comm.) and hence treated missing.

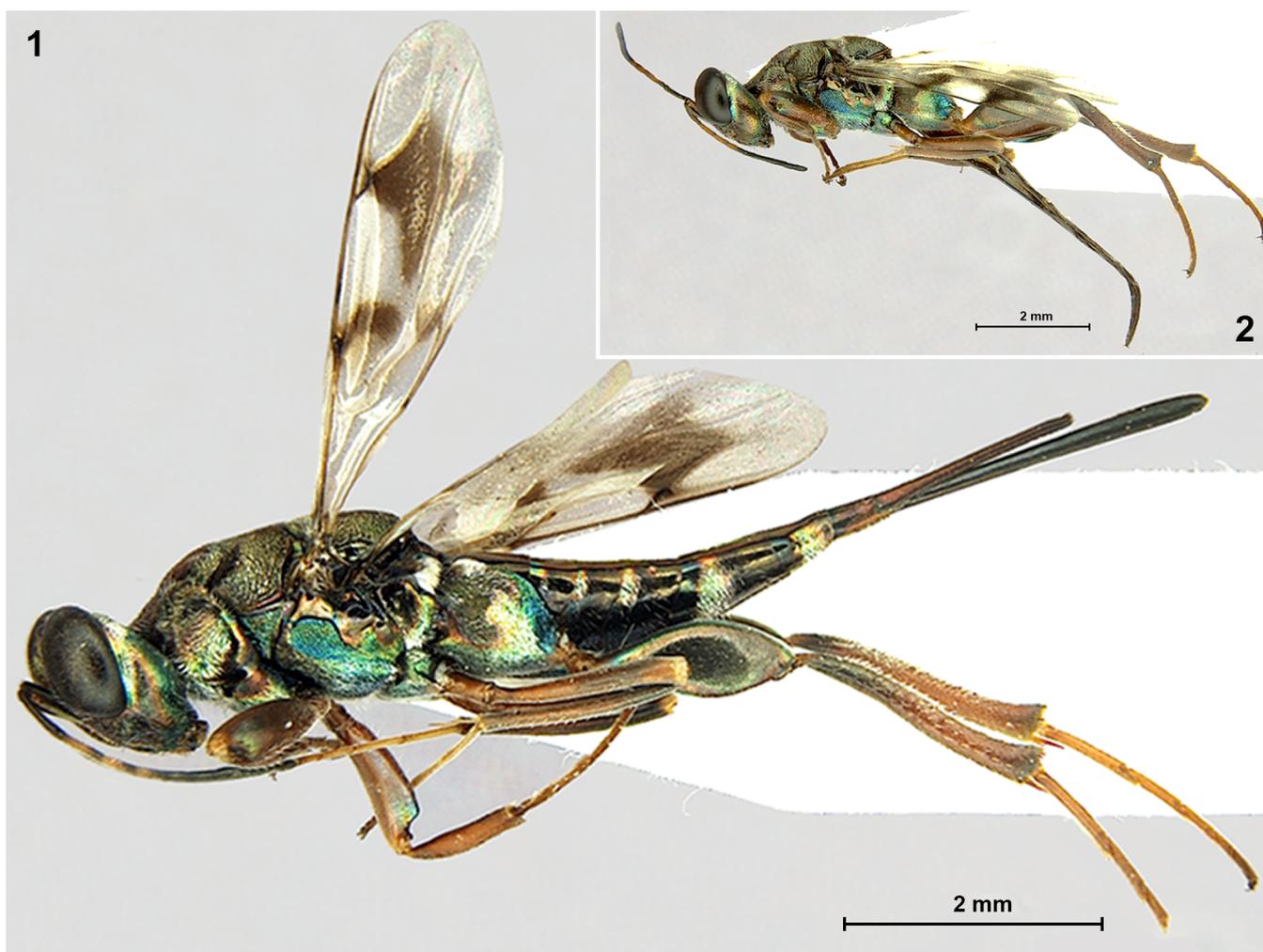
***Thaumasura keralica* Binoy, nom. nov. (Figs 1 & 2)**

<https://zoobank.org/NomenclaturalActs/460A3038-5B68-4E71-A559-B89ADAE4CFB6>

Thaumasura indica Sureshan & Binoy, 2019:488–493, Holotype ♀ (ZSIK).

Type material. **Holotype** ♀, mounted on triangular card. **India:** Kerala, Idukki district, Elappara (09°38'18.1"N and 76°58'56.8" E, 1030 m), 23.v.2019, Coll. C. Binoy, ZSIK Regd. No. ZSI/WGRC/IR/INV.12755; **Paratype** ♂, same details as that of Holotype. ZSIK Regd. No. ZSI/WGRC/IR/INV.12756

Diagnosis. Female (Fig. 1). Head 2.0 × as wide as long and in front view as wide as high in dorsal view; lower margin of clypeus emarginate, malar sulcus distinct; gena striate reticulate; malar space 0.5× eye length in profile; POL almost equal to OOL; antenna with scape just short of reaching anterior ocellus, widened in the upper half, pedicel distinctly longer than all the remaining segments; mesoscutum 1.2× as wide as long, transversely striate reticulate in the upper half and punctate reticulate in the lower half; propodeum medially 0.2× median length of scutellum, median area narrow, almost shiny with rugae forming irregular foveae, plicae and post-spiracular sulcus absent; fore wing with basal cell completely hairy, speculum closed below; petiole transverse, posterior margin of Gt₁ straight and smooth, Gt₂–Gt₅ emarginate, Gt₆ straight; Gt₂–Gt₄ transverse striate reticulate, finer on Gt₂, more than half of Gt₅ distinctly transverse striate reticulate, rest of tergites microreticulate; gaster (excluding ovipositor) 1.6× as long as rest of the body; syntergum 0.65× as long as ovipositor sheaths.



Figures 1–2. *Thaumasura keralica* Binoy, nom. Nov; **1.** Holotype ♀ Habitus, lateral view; **2.** Paratype ♂ Habitus, lateral view.

Male. (Fig. 2) Similar to female but differs in the structure of propodeum; gastral petiole wider than long, basal half with carinae and hind part smooth and shiny, gaster beyond Gt_1 tubular, hind margin of Gt_1 with sharp indentation, all tergites shiny.

Distribution. India, Kerala (Binoy & Sureshan, 2020).

Note. Binoy and Sureshan (2020) reported the first valid discovery of the genus *Thaumasura* from the Indian subcontinent and formally compared with *T. brevicaudata* and *T. femoralis* describing the new species naming it as *T. indica* looking past the combination with *Balcha*. Considering that this name is already preoccupied by *Thaumasura indica* Mani and Kaul, a replacement name, *Thaumasura keralica* **nom. nov.**, is proposed for it under the provisions of Article 60 of the International Code of Zoological Nomenclature (Ride et al., 1999). The new name refers to the Indian state of Kerala from where the holotype was collected.

Thaumasura femoralis (Westwood, 1874) (Figs 3–11)

Belonea femoralis Westwood, 1874:146–147; 1♀, 2♂ syntypes, Indonesia. [transferred to *Thaumasura* by Bouček, 1988:246].

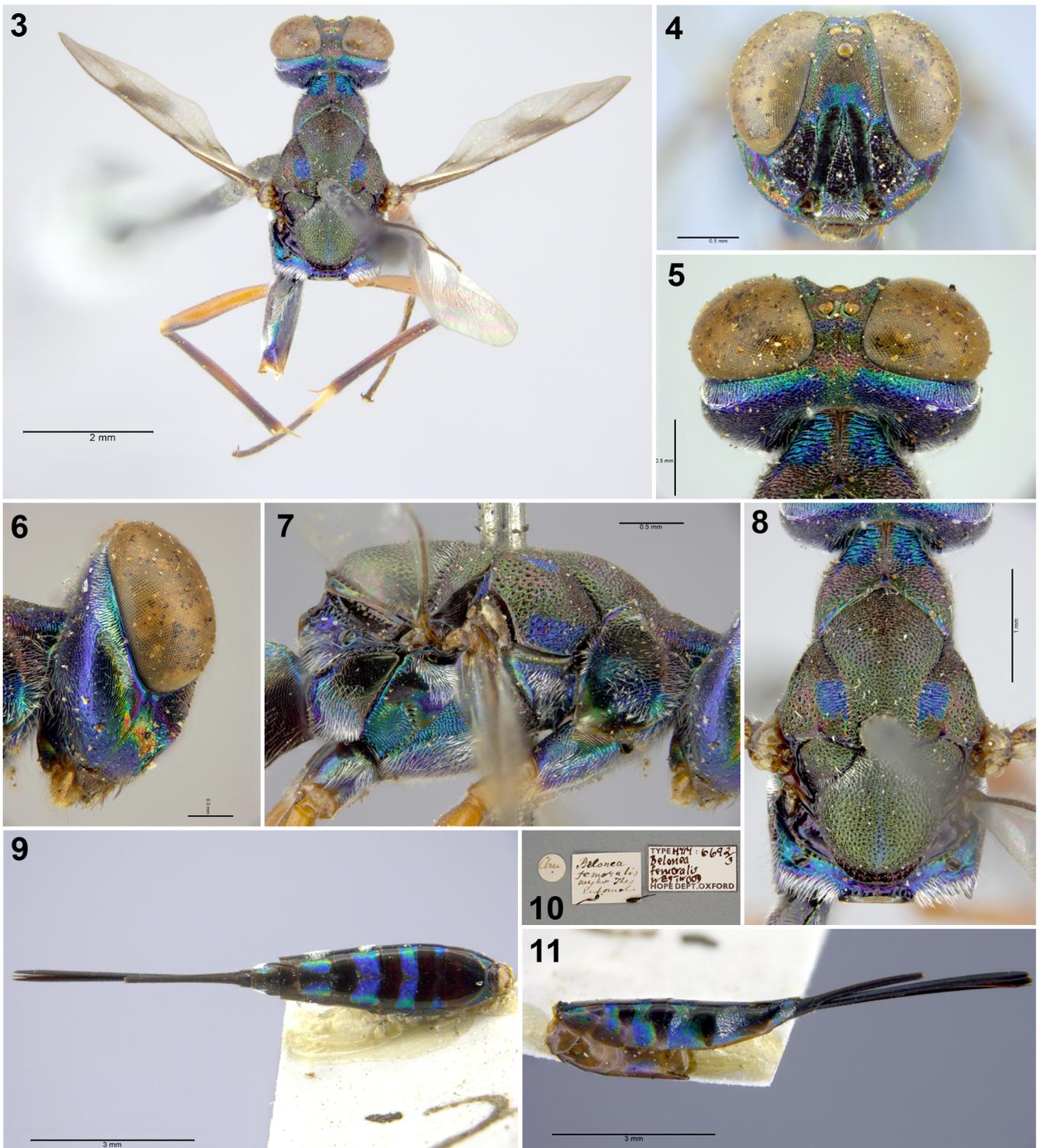
Type material. Holotype ♀, pinned mounted (abdomen and one hind leg on triangular card) “–Type HYM: 6692/3 *Belonea femoralis* Westwood, Hope Dept. Oxford; Aru–” Indonesia: Aru Island; W.W. Saunders collection (Fig. 10) (OXUM).

Redescription (Figs 3–10) Holotype ♀, length 12.9 mm (including ovipositor), exerted part of ovipositor 4.34 mm.

Colour. Body dark green with metallic blue reflections on following: frons; occiput; temple; conspicuously on gena and malar space; collum and posterior margin of pronotum; spot on lateral lobes of mesoscutum on either side adjoining notauli; a faint median streak over scutellum; propodeum conspicuously; all coxae; metasoma with anterior margin of Gt_1 with faint blue reflections; Gt_2 with narrow anterior band; wide anterior bands (except for medial breaks) on Gt_3 and Gt_4 ; dorsum of Gt_5 with two oblong submedian reflective bluish patch anteriorly; wings subhyaline with two light brown infumations, one below parastigma and other on stigmal area; legs: trochanters and mid femur yellow-brown, mid tibia brown with median area pale, apical spur yellow-brown, mid basitarsus yellow, remaining tarsomeres brown-black (other leg parts missing); ovipositor sheaths black.

Head. In dorsal view 2.61× as wide as long and in anterior view 1.05× as wide as high; free margin of clypeus straight (Fig. 4); malar sulcus distinct; gena striate reticulate with scattered pits; outer margin of eye with adpressed setae on to the occiput, laterally and dorsally with thin sparse white setae (Figs 5 & 6); malar space 0.54× eye length in profile; antennal scrobes narrow, converging above onto a median carina, inner surface with coarse transverse striae; lower face distinctly reticulate, above antennal scrobes distinctly reticulate punctate including vertex and occiput with moderately dense thin white setae, occiput with fine carina indicated laterally; POL subequal to OOL (Fig. 5); eyes bare, length 1.82× width in profile; orbital border diverging ventrally; antennal segments thinner towards apex and flagellum black according to literature.

Mesosoma. Pronotum 1.7× as broad as long, neck with strong transverse ridges, median carina distinct reaching posterior margin of pronotum; pubescence confined to lateral parts of collar, white; collar area rugose reticulate (Fig. 8), laterally expanded; lateral panel of prepectus reticulate (Fig. 7); mesoscutum 1.1× as wide as long, transversely striate reticulate in the upper half and regularly foveolate in lower half, median lobe convex in the upper half; notauli distinct and complete, lateral lobes of mesoscutum with a blue spot in the lower half close to notauli on either side; pubescence of mid lobe of mesoscutum distinct; scutellum 0.7× as long as mesoscutum medially, punctate reticulate, pubescence almost absent except near anterior margin; axilla punctate reticulate, dorsellum narrow and shiny (Fig. 8); propodeum with median area narrow, almost shiny, spiracles large, oval, separated from hind margin of metanotum by a narrow gap less than the diameter of spiracle, posterior margin of propodeum on



Figures 3–11. *Thaumasa femoralis* (Westwood, 1874) Holotype ♀; **3.** Head and mesosoma, dorsal view; **4.** Head, frontal view (antenna missing); **5.** Head, dorsal view; **6.** Head, lateral view; **7.** Mesosoma, lateral view; **8.** Mesosoma, dorsal view; **9.** Metasoma, dorsal view; **10.** Type labels (with metasoma and hind leg pasted on it); **11.** Metasoma, lateral view. [Images courtesy of Oxford University Museum of Natural History, Oxford, England]

either side of median area with thick brush of white setae (Fig. 8); mesopleuron rugose reticulate; except upper mesepimeron smooth and shiny; transepimeral sulcus foveolate; pubescence distinct;

metapleuron shiny except posterior one-third portion reticulate; fore coxa distinctly rugulose anteriorly, posteriorly reticulate, sculpture not visible beneath moderately thick pubescence; hind coxae distinctly striate reticulate with dense white setae; hind coxa 1.46× as long as wide; hind femur 2.9× as long as wide; fore wing with marginal fringe small.

Metasoma. Gaster shiny, dorsum transversely reticulate; posterior margin of all tergites straight (Fig. 9); Gt₄-Gt₆ with densely setose basolaterally, dorsum bare; gaster (except ovipositor) 1.51× as long as rest of the body; syntergum 0.5× as long as ovipositor sheaths (Fig. 11).

Male. As per original literature. Smaller in size than female, especially the thicker hind femur.

Distribution. Indonesia; New Guinea (Westwood, 1874).

Host. Unknown.

DISCUSSION

Taking into consideration the high density of *Eucalyptus* trees in the vicinity of collection site of the Indian species, which were once imported from Australian region and first planted around 1790 by Tippu Sultan, then ruler of Mysore (Binoy et al., 2020), it is hypothesized here that the collection of *Thaumasura* from India represents a previously unnoticed accidental introduction of this wasp species inside shipments along with its host via imported timber logs long back to peninsular India, which in the course of time underwent speciation from the ancestral line forming a new species. It may also be hypothesized to indicate the dispersion of ancient Gondwanan elements to or from either of realms concurring with Mani (1974) who noted floral and faunistic affinities of peninsular India with that of Madagascar and South Africa (Gondwanan) and to some extent that of Australia and South America. A recent discovery of New World species, *Brachymeria trinidadensis* (Narendran & Varghese, 1989), *Conura abdominalis* and a representative of *maculata* species group of *Conura* (Hymenoptera: Chalcididae) from peninsular India (Binoy et al., 2022a, 2022b) may also point to either of these possibilities. It is hypothesized that all species of *Thaumasura* are parasitoids of xylophagous beetles. Indeed their presence and diversity in such forests having high woody tree density may be correlated with those habits. Therefore, we encourage entomologists and students to search for these on dead trees felled on the ground which will necessarily be productive in collecting these wasps.

AUTHOR'S CONTRIBUTION

The authors confirm contribution to the paper as follows: C.B. study conception and design, specimen collection and assembling. C.B. and K.S.S. analysis and interpretation of results, draft manuscript preparation; CB, K.S.S. and P.M.S. correction of manuscript after review process. All authors reviewed the results and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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مرور گونه‌های جنس *Thaumasura* Westwood (Hym., Pteromalidae, Cleonyminae) در منطقه اورینتال

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چکیده: جنس *Thaumasura* Westwood یکی از آرایه‌های منحصر به فرد در زیرخانواده Cleonyminae (Hymenoptera, Pteromalidae) و دارای تنها ۳ گونه در منطقه اورینتال است. نام تنها گونه شناخته و توصیف شده از این جنس در هند *Thaumasura indica* Sureshan & Binoy قبلاً توسط یک نام دیگر، *Thaumasura indica* Mani & Kaul (در حال حاضر در جنس *Balcha* Walker) اشغال شده است. بدین لحاظ نام جایگزین *Thaumasura keralica* Binoy **nom. nov.** برای رفع مشکل هم‌نامی پیشنهاد شد. علاوه بر این، گونهٔ مجدد توصیف و تصاویر خصوصیات مرفولوژیک آن تهیه شد. یک کلید نیز برای شناسایی گونه‌های این جنس در منطقه اورینتال ارائه شد.

واژگان کلیدی: هند، کلید شناسایی، ترکیب جدید، نام‌گذاری، تاکسونومی.