



Epitranus longicaudatus: A new species of chalcidid wasps (Hymenoptera: Chalcididae, Epitraninae) from southern India

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ABSTRACT. A new species, *Epitranus longicaudatus* **sp. nov.**, is described with illustrations from South India, expanding the genus *Epitranus* Walker to 73 species globally and 18 from India. The new species is compared with the congeneric species *E. salinae* Narendran, originally described from Malaysia. Both *E. longicaudatus* **sp. nov.** and *E. salinae* are easily identified within the monotypic subfamily in having large metasoma, more than twice as long as petiole and having gastral terga following the first, telescopic and retracted beneath the first. *E. salinae* is also diagnosed and illustrated using digital images for the first time. These two species complex is the largest of all described *Epitranus*.

Keywords: Chalcidoidea, Malaysia, parasitoid, Oriental, nomenclature, taxonomy

Received:

29 May, 2024

Accepted:

10 July, 2024

Published:

21 July, 2024

Subject Editor:

Hossein Lotfalizadeh

Citation: Binoy, C., Santhosh, S. & Nasser, M. (2024) *Epitranus longicaudatus*: A new species of chalcidid wasps (Hymenoptera, Chalcididae, Epitraninae) from southern India. *Journal of Insect Biodiversity and Systematics*, 10 (4), 737–745.

INTRODUCTION

Members of the monotypic subfamily Epitraninae, represented by the singular genus *Epitranus* Walker can easily be identified from its congeneric chalcidids by its petiolate body and shielded clypeus (Binoy et al. 2021). Bouček (1982), Husain & Agarwal (1981) and Narendran (1989) provided voluminous works on the species of the genus from the Oriental region in addition to the revision of the family from Vietnam by Narendran & van Achterberg (2016). The monophyly of the subfamily is unambiguously supported by varied character states, most peculiar of which is the head with frontal lobe below antennal toruli forming a shield over clypeus, gaster strongly bulging ventrally and the shallow antennal scrobes often delimited laterally by faint carinae. The genus presently contains 72 valid species (UCD community, 2023), but type examinations are understood to lower the number (Gérard Delvare, unpublished data). Members of the genus are mostly encountered in the tropical regions of the Old World (Afrotropical realm: Schmitz, 1946; Steffan, 1957, and Indopacific realm: Habu, 1960; Bouček, 1982, 1988; Narendran, 1989; Narendran & van Achterberg, 2016). Few species of *Epitranus* were also recently discovered in the Palaearctic region (Fakhrzadeh et al., 2021). The New World reports of the genus possibly point to the introduction of the parasitoid with their respective stored pest host (Bouček, 1982). Koutsoukos and Delvare (2021) confirm the occurrence of the genus from Europe. Nevertheless, host data on the genus are scarce except for the report from small moths of families

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Crambidae, Pyralidae and Tineidae as hosts (Bouček, 1982). Binoy et al. (2021, 2022) reared *E. uterellophagus* Binoy & Santhosh from household case bearer *Phereoeca uterella* (Walsingham, 1897) (Lepidoptera: Tineidae) from South India. Apart from this, two species of *Epitranus* are reported as myrmecophiles or termitophiles collected from nests of these social insects (Narendran, 1989; Rasplus, 1993). Here we describe with illustrations a new species of *Epitranus* from south India, distinguished easily by the presence of a long gaster, closely resembling a Malaysian species, *E. salinae* Narendran, 1989.

MATERIAL AND METHODS

The new species was collected from the Botanical Garden at the University of Calicut (11°08'01.6"N & 75°53'26.5"E, 105m) in the Malappuram district of Kerala, India using a Malaise trap. Further expeditions to collect additional samples did not materialize, and this description is based on the specimen collected and here designated as holotype. The specimen was transferred to 70% ethyl alcohol and card-mounted for microscopic observations. The specimen was examined under Leica® M205A stereo-zoom microscope and images were taken using Leica® S8 APO attached to a Leica® DFC 2900 digital camera attached to the stereomicroscope. Measurements of the specimens were obtained using Leica® LAS (Leica® Application Suite V4.7.1) microsystems by Leica® (Heerburg, Switzerland). Images at varying depths were stacked into a single image using Leica® Automontage Software V4.2 and final illustrations were post-processed for contrast and brightness using Adobe Photoshop® CS5 (Version 6.1). The type specimen is deposited in the collections of the Systematic Entomology Laboratory, Malabar Christian College, Calicut. A distribution map of the species of long-tailed species of *Epitranus* occurring in the Oriental Region was constructed using ArcGIS Online by Environmental Systems Research Institute, Redlands, California (Esri, 2024) (Fig. 18). The new species was initially identified using the Oriental key to species (Narendran, 1989) and further compared with digital images of the holotype of photographs of closely related type species, *Epitranus salinae* Narendran, 1989 (No. 3111) (Figs 11–17) made available from the American Entomological Institute, Utah USA (AEI) (Dr James Pitts, curator) for comparative morphological analysis.

Terms and measurements. The terminology used is mainly that of Binoy et al. (2021) and Yoder et al. (2010). The general abbreviations of the terms are as follows: **fu_x** – funiculars, x being the funicle number; **mv** – marginal vein; **OD** – diameter of median ocellus; **OOL** – oculo-ocellar distance; **POL** – post-ocellar distance; **stv** – stigmal vein; **Gt_x** – gastral tergites, x being the tergite number.

RESULTS

Taxonomic hierarchy

Order Hymenoptera Linnaeus, 1758

Superfamily Chalcidoidea Latreille, 1817

Family Chalcididae Latreille, 1817

Subfamily Epitraninae Burks, 1936

Genus *Epitranus* Walker, 1834

Epitranus Walker, 1834:21, 26. Type species: *Epitranus fulvescens* Walker, by monotypy.

Narendran & van Achterberg (2016:102) provides the list of complete synonymies, hence not repeated here.

Amended Key to Oriental Species of *Epitranus* Walker (from Narendran, 1989)

- 31 Gaster with epipygium long, longer than half pre-epipygial part of gaster (excluding petiole) (Figs 1, 11). 32
 – Characters not as above.33 (couplet 32 in Narendran, 1989)
- 32 Clypeus tridentate (Fig. 15, arrow head); Gt₁ 2.9× length of petiole (Fig. 11). *E. salinae* Narendran
 – Clypeus edentate (Fig. 3, inset); Gt₁ 2.2× as long as petiole (Fig. 1).*E. longicaudatus* sp. nov.

***Epitranus longicaudatus* Binoy sp. nov.** (Figs 1–10)

<https://zoobank.org/urn:lsid:zoobank.org:act:748BB3B4-62C5-4D18-8C4B-FE360AC9F3BA>

Type material. **Holotype** ♀, India: Kerala, Malappuram district, Botanical Garden, University of Calicut (11°08'01.6"N, 75°53'26.5"E, 105m above MSL), Malaise Trap, 1.iii.2018–2.iv.2018, Coll. C. Binoy.

Etymology. The species name is derived from Latin *longicauda* (long-tail), in reference to the long acuminate gaster of the new species.

Diagnosis. The new species resembles *E. salinae* in general morphology and runs close to it in the key to Oriental species of *Epitranus* (Narendran, 1989) in having epipygium distinctly long, last sternite plough shaped, propodeum with a small and often raised areola followed by a median carina, and gastral apex acuminate in profile. *Epitranus longicaudatus* Binoy sp. nov. differs from *E. salinae* as follows: Gt_1 long, twice as long as epipygium (in *E. salinae* epipygium longer than half length of Gt_1 (Fig. 11)); hind femur deep reddish brown, no median black patch (in *E. salinae*, hind femur with distinct median black patch (Fig. 16)); Gt_1 2.2× as long as petiole (in *E. salinae* first tergite 2.9× length of petiole) (Fig. 12); clypeus edentate (in *E. salinae*, clypeus with three well-formed teeth) (Fig. 15, arrow head).

Description. — **Holotype** ♀ (Figs 1–10). Body length 5.08 mm, length of fore wing 2.44 mm. Body black except following parts: eyes pale golden yellow with black patches, ocelli reddish brown, scape, pedicel and ring segment reddish brown, following segments darker; tegulae rufous; wings hyaline with brown veins; fore and mid legs brown, hind coxa brown-black with apical third red-brown, hind femur red-brown with moderate white pubescence, ventrally with basal one largest followed by seven short black teeth, hind tibia red-brown with pale yellow sub-basal tooth, all tarsi rufous; pubescence on thorax pale golden yellow; metasoma deep red-brown with ovipositor sheath black.

Head. Head with dense setigerous punctures, wider than mesoscutum in dorsal view (1.2×), distinctly transverse (1.6× as wide as high in frontal view); scrobe 1.5× as long as wide with weak striae (Fig. 3). Vertex finely densely punctate between, interspaces smooth, POL 1.4× OOL. Preorbital carina weakly indicated; malar area densely finely punctate; malar space 0.43× as long as eye height in lateral view; malar carina absent; gena with coarse setigerous punctures; post-orbital carina indicated. Occipital area finely densely punctate, interspaces wide, smooth; occipital carina, just above foramen magnum. Frontal lobe very short, not masking clypeus, with free margin entire (Fig. 3 inset). **Antenna.** 12 antennomeres with sparse short setae; scape relatively long not reaching median ocellus, as long as fu_2 to fu_6 combined; pedicel sub-cylindrical; anellus transverse; clava bluntly tapered apically, 2.2× as long as wide. Flagellomeres (except the first) bearing mostly a single row of MPS; relative length of antennomeres in the ratio 5.5: 1.1: 1.1: 1.2: 1.2: 1.1: 1.1: 1.1: 1.2: 3.1.

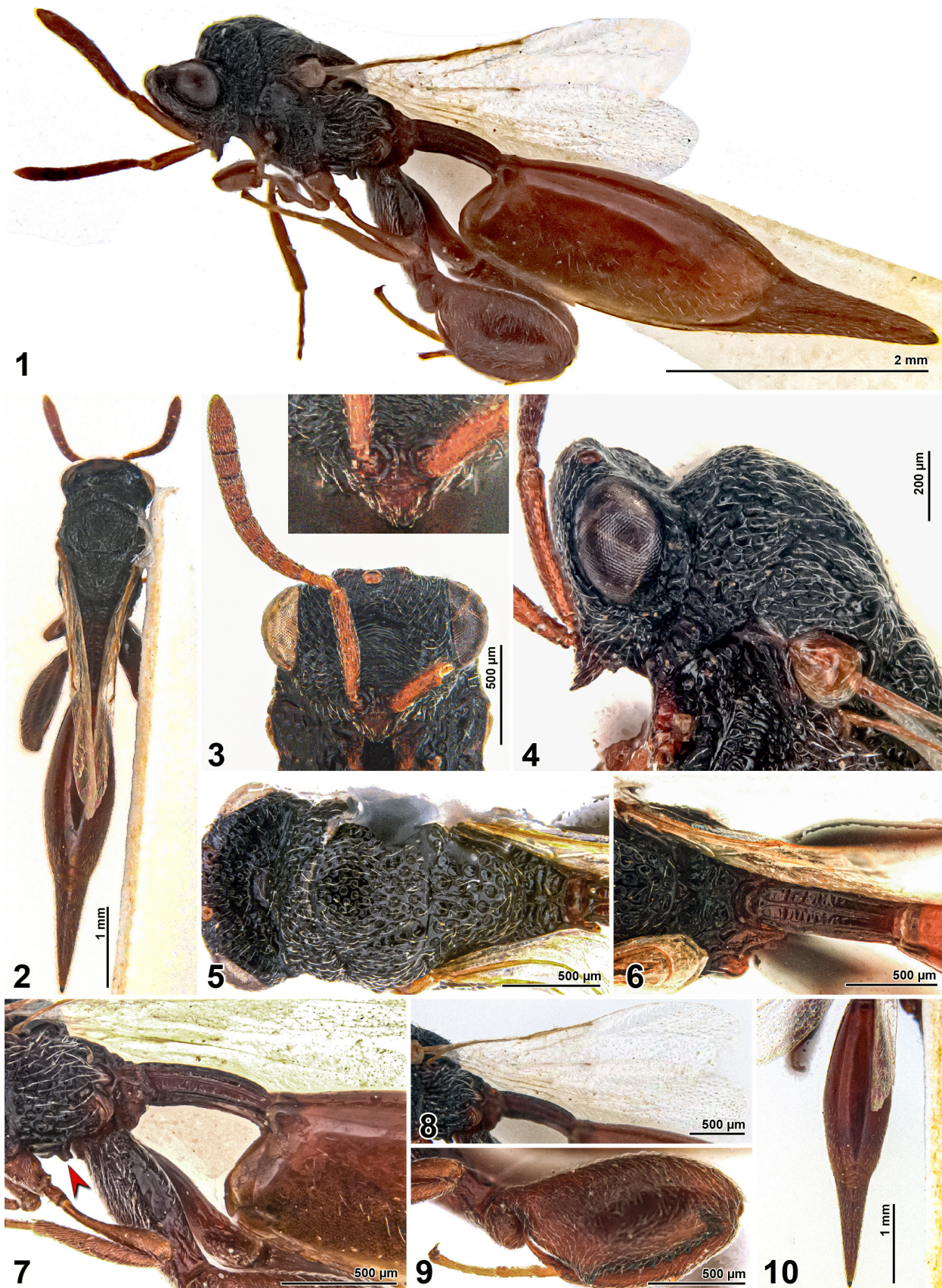
Mesosoma. Pronotum and mesoscutum dorsally with close pits, interstices wide, sparse yellow pubescence; diameter of the pit on mesoscutum increases posteriorly; mesoscutellum as long as wide with wide pits, single pale golden yellow seta arising from each pit; median short carina on anterior scutellar margin; mesoscutellum rounded apically (Fig. 5); propodeum with small areola anteriorly followed by raised median carina accompanied by sublateral carinae (Fig. 6); lower episternum ending in blunt notches ventrally before insertion of hind coxa (Fig. 7, arrow head); **Wings.** Hyaline, with sparse short scattered setae on lamina, *mv* long, bending in a curve forming small *stv* (Fig. 8); **Hind leg.** Hind femur matt with dense brown setae, ventrally with basal tooth large, sharp, followed by seven regularly placed black teeth; hind tibia ventrally with groove, with subbasal hump and a sharp tooth (Fig. 9).

Metasoma. Metasoma long, 1.6× as long as mesosoma; petiole red-brown, long and arching 3.9× as long as broad, 5.3× as long as high with carinae on dorsal and lateral margins in lateral view (Fig. 6); terga with sparse pubescence ventro-laterally, base bulging ventrally inwards, apically acuminate, Gt_1 as long as 0.7× total length of metasoma (including epipygium), 2.5× as long as petiole; Gt_2 0.3× as long as Gt_1 ; Gt_3 – Gt_6 small, retracted or partially behind Gt_1 ; epipygium very long, as long as 0.5× length of Gt_1 ; ovipositor sheath black, visible dorsally (Fig. 10).

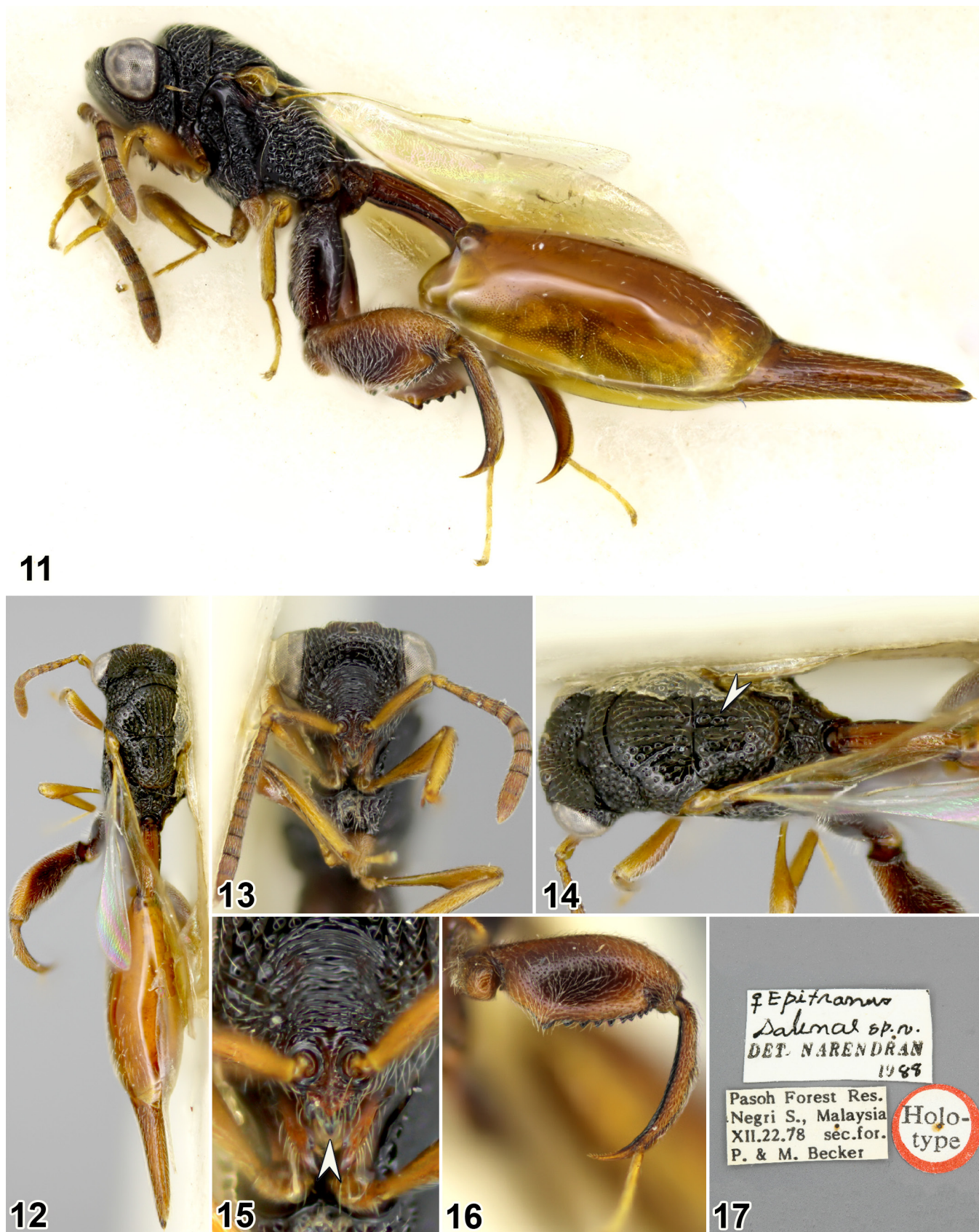
Male. Unknown.

Host. Unknown.

Distribution. India: Kerala.



Figures 1-10. *Epitranus longicaudatus* Binoy sp. nov. Holotype ♀. **1.** Habitus, lateral view; **2.** Habitus, dorsal view; **3.** Head, frontal view, clypeus enlarged in inset; **4.** Head, lateral view; **5.** Head and mesosoma, dorsal view; **6.** Propodeum and petiole, dorsal view; **7.** Petiole, lateral view (arrow head showing apical notches on episternum); **8.** Fore wing; **9.** Hind leg; **10.** Metasoma, dorsal view.



Figures 11-17. *Epitranus salinae* Narendran, 1989, Holotype ♀. **11.** Habitus, lateral view; **12.** Habitus, dorsal view; **13.** Head, frontal view; **14.** Head, mesosoma and petiole, dorsal view, arrow head showing antero-medial depression on mesoscutellum; **15.** Clypeus, arrow head showing clypeal dentation; **16.** Hind leg; **17.** Type labels.

***Epitranus salinae* Narendran, 1989 (Figs 11–17)**

Type Material examined [images]. Holotype, ♀ Malaysia, Negrís, Pasoh For. Res. Coll. P.&M. Baker, 22.xii.1978 [AEI].

Diagnosis. Black specimen except following parts: scape, pedicel, fu_1 , fore and mid legs testaceous, hind coxa black with apex red-brown, hind femur brown with conspicuous medial black patch, femoral teeth black, wings hyaline, venation pale brown, metasoma pale brown, pale yellow-brown below. Frons and vertex closely punctate, interstices smooth; scrobe weakly striated; toruli situated on produced clypeal shield (Fig. 13). Clypeus produced, distinctly tridentate apex (Fig. 15, arrow head); POL almost twice as long as OOL; occiput similarly pitted, interstices smooth; antenna with scape, not reaching front ocellus. Mesosoma with close umbilicate pits, interstices smooth and shiny; mesoscutellum with basal area slightly sunken medially (Fig. 14, arrow head), apex rounded; fore wing with *mv* apically curved into short *stv*. Hind coxa polished dorsally, sparsely pitted and pubescent ventrally; hind femur more than twice as long as broad, surface distinctly pubescent; ventral margin with nine irregular teeth, basal tooth large, disc moderately pubescent; hind tibial hump with a single large tooth, not crenulate (Fig. 16); metasoma Gt_1 2.9× medial length of petiole; remaining terga telescopic within Gt_1 ; epipygium long, more than half of Gt_1 (Fig. 11, 12).

Male. Unknown.

Host. Unknown.

Distribution. Malaysia: Negeri Sembilan state (Pasoh Forest Reserve).

DISCUSSION

The close morpho-taxonomic relationship between *E. longicaudatus* Binoy **sp. nov.** and *E. salinae* highlights an interesting biogeographical pattern. The geographic separation of South India and Malaysia suggests a historical dispersal or vicariance event that led to the divergence of these species (Fig. 18).

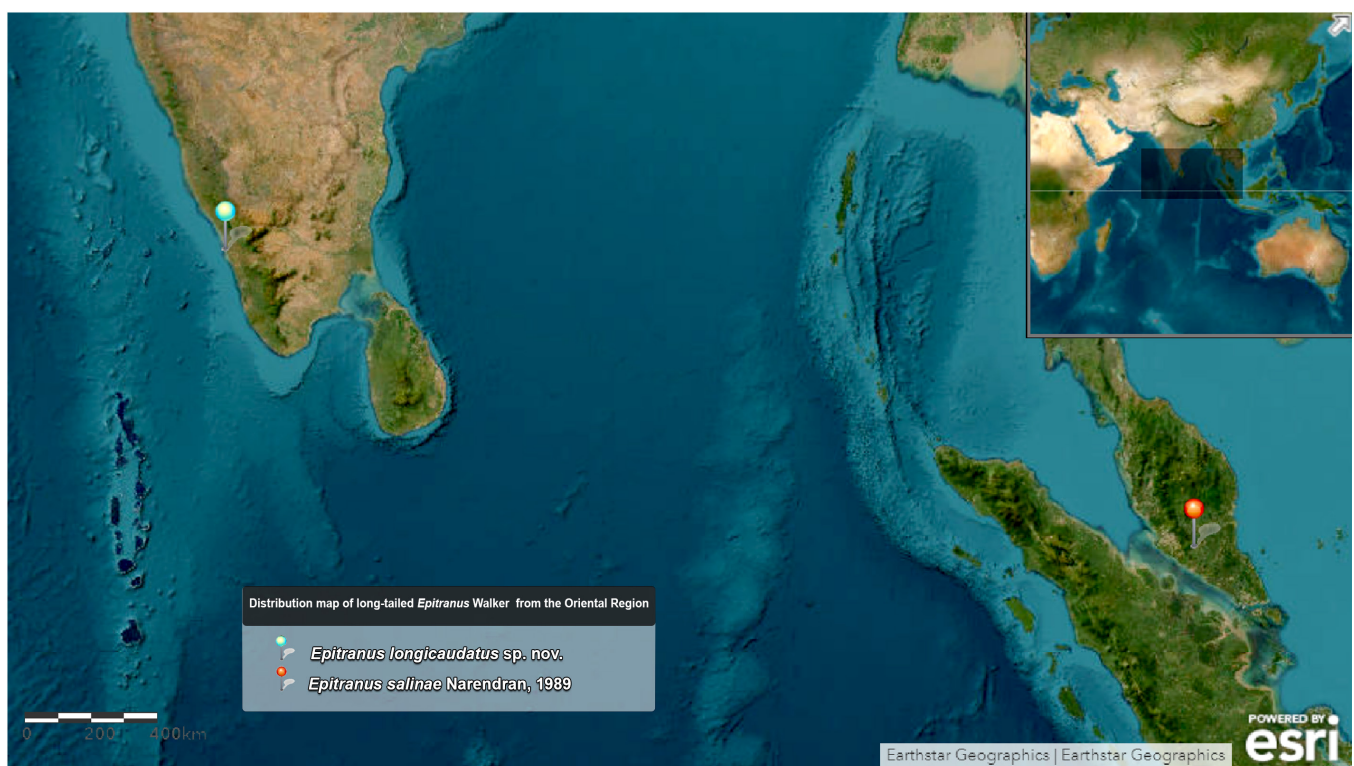


Figure 18. Distribution map of long-tailed *Epitranus* from the Oriental region.

The divergence of these species likely occurred due to geographic isolation and subsequent adaptation to distinct ecological niches. The adult parasitoids are known to be feeding primarily on honeydew, pollen or nectar (and host haemolymph rarely) (Jervis & Kidd, 1986). Modifications on clypeus, a structure used extensively in burrowing/ digging wasps (Crabronidae) while seen as tridentate on *E. salinae* and edentate on *E. longicaudatus* Binoy **sp. nov.** point to the ecological advantage of the archipelago species over its Indian counterpart. Host associations of these parasitoids are thus necessary to clarify the distributions as well as the varying ecology role played by them in geographical isolations.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: C. Binoy: study conception and design, specimen collection and assembling, analysis and interpretation of results, and drafting the manuscript; C. Binoy, S. Santhosh & M. Nasser: Commented and reviewed the manuscript. All authors reviewed the results and approved the final version of the

FUNDING

This research received no specific grant from any funding agencies.

AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the collections of Systematic Entomology Laboratory, Malabar Christian College, Calicut and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included plants and arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

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

ACKNOWLEDGMENTS

The authors are thankful to authorities at the Department of Zoology, University of Calicut and P.G. & Research Department of Zoology, Malabar Christian College Calicut for encouragement and facilities. The authors are thankful to Brandon Claridge (PhD biology student, Utah State University) and Dr James Pitts (American Entomological Institute, Utah, U.S.A.) for providing a digital loan of type specimen *E. salinae* for comparative analysis. The study was carried out during the PhD of CB at the University of Calicut, financially supported by UGC by means of NFSC. SS thankfully acknowledges SERB, Department of Science and Technology, Govt. of India, New Delhi (File No. EMR/2017/005528) for financial assistance.

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زنبور *Epitranus longicaudatus*: گونه جدیدی از کالسیدها (Hymenoptera, Chalcididae, Epitraninae) از جنوب هند

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تاریخ دریافت: ۰۹ خرداد ۱۴۰۳ | تاریخ پذیرش: ۲۰ تیر ۱۴۰۳ | تاریخ انتشار: ۳۱ تیر ۱۴۰۳ |

چکیده: یک گونه جدید، به نام *Epitranus longicaudatus* sp. nov. در جنوب هند شناسایی و توصیف شد و خصوصیات مرفولوژیک آن به تصویر کشده شد. با این شناسایی، تعداد گونه‌های جنس *Epitranus* Walker در سطح جهانی به ۷۳ و به ۱۸ گونه در هند رسید. گونه جدید با گونه نزدیک در همان جنس به نام *E. salinae* Narendran که قبلاً از مالزی جمع‌آوری و توصیف شده، مقایسه شد. هر دو گونه *E. longicaudatus* sp. nov. و *E. salinae* به راحتی با داشتن شکم بزرگ به اندازه دو برابر طول ساقه از سایر گونه‌های این زیرخانواده متمایز می‌شوند. به‌علاوه در هر دو گونه، پس از بند اول، دیگر بندهای شکمی به صورت تلسکوپی در آمده و به زیر بند اول کشیده می‌شوند. برای اولین بار تصاویر جزئیات خصوصیات مرفولوژیک زنبور *E. salinae* نیز ارائه شد. این دو کمپلکس گونه‌ای جزو بزرگ‌جثه‌ترین گونه‌های جنس *Epitranus* هستند.

واژگان کلیدی: کالسیدها، مالزی، شبه‌انگل، خاورزمین، نامگذاری، تاکسونومی