

RESEARCH PAPER

Taxonomic notes on the Indian assassin bug *Ectomocoris simulans* (Hemiptera: Heteroptera: Reduviidae) with two new synonyms

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Abstract. The Indian assassin bug, *Ectomocoris simulans* Distant, 1919 (Hemiptera: Heteroptera: Reduviidae: Peiratinae) is redescribed, with habitus images and figures of male genitalia provided. *Ectomocoris melanopterus* Distant, 1919, syn. nov., and *E. xavierei* Vennison & Ambrose, 1990, syn. nov., are placed as its junior subjective synonyms. Types of the above three nominal species were examined, illustrated, and lectotypes of *E. simulans* and *E. melanopterus* are designated.

Key words. Hemiptera, Heteroptera, Reduviidae, Peiratinae, assassin bug, lectotype, new synonym, taxonomy, India, Oriental Region

Zoobank: <http://zoobank.org/urn:lsid:zoobank.org:pub:E6532EA1-712E-4E0B-AD62-F14F76CA6FD7>

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Introduction

Peiratinae is the sixth largest subfamily of Reduviidae (assassin bugs) comprising 34 genera and more than 300 described species (MALDONADO CAPRILES 1990; COSCARÓN 2002; CHLOND 2007; ZHANG & WEIRAUCH 2011; MELO 2012; WEIRAUCH et al. 2014; SWANSON 2019; LIU et al. 2020a, b, 2021). Intraspecific morphological variation in some species of Peiratinae is relatively high, suggesting that some described species may be invalid (COSCARÓN & MORRONE 1995, COSCARÓN 1997, CHLOND et al. 2017, CHLOND 2018, LIU et al. 2020c). In particular, the wing polymorphism of certain taxa may lead to new synonymies as well. For example: *Catamiarus championi* Miller, 1959 was found to be the macropterous male of *C. brevipennis* (Serville, 1831) (DISPONS 1969); *Pirates sobrius* Walker, 1873 was confirmed to be the brachypterous female of *Microsandalus umbrosus* Stål, 1867 (CASSIS & GROSS 1995, LIU et al. 2021); and combining morphological characters and molecular data, species of *Mutillocoris* Villiers, 1964 were confirmed to be the brachypterous females of *Bekilya* Villiers, 1949 and *Hovacoris* Villiers, 1964, and therefore synonymized with the corresponding male species (ZHANG & WEIRAUCH 2011).

Ectomocoris Mayr, 1865 has a wide distribution throughout the Old World tropics. So far, *Ectomocoris* has been the most speciose genus within Peiratinae with over 90 described species, but only a few of them have been revised

thoroughly (LIVINGSTONE & MURUGAN 1988, MALDONADO CAPRILES 1990, VENNISON & AMBROSE 1990, CAI & LU 1991, BÉRENGER 1995, MOULET 2000, LIU et al. 2020c). DISTANT (1919) described both *E. simulans* Distant, 1919 and *E. melanopterus* Distant, 1919 based on specimens from southern India in the same paper with concise descriptions of brachypterous form only. In their paper, VENNISON & AMBROSE (1990) described another Indian species, *E. xavierei* Vennison & Ambrose, 1990. Their description was based on macropterous male, brachypterous male and brachypterous female with hand drawings of habitus and important characters of head, pronotum, legs, wings, abdomen, and male genitalia. They also provided a key to the Indian species of *Ectomocoris*, but neither *E. simulans* nor *E. melanopterus* were included in the key and thus there was no morphological comparison among these three species (VENNISON & AMBROSE 1990). Following this, VENNISON & AMBROSE (1991) presented a study on biology and behaviour of *E. xavierei* along with color photographs of live forms to exhibit morphological variations between individuals within this species.

After examining the type specimens of the above three *Ectomocoris* species, we found that the “ochraceous” markings of *E. melanopterus* that Distant mentioned in the original description were in fact pieces of dirt on the type specimen, and there are no obvious structural differences between the types of *E. melanopterus* and *E. simulans*. In



addition, the type specimens of *E. simulans* and *E. melanopterus* match well the description and images of the brachypterous male of *E. xavierei* provided by VENNISON & AMBROSE (1990, 1991). In the present study, we designate lectotypes of *E. simulans* and *E. melanopterus*, propose *E. melanopterus* and *E. xavierei* as two new junior subjective synonyms of *E. simulans*, and redescribe *E. simulans* with habitus images of all the three nominal species together with male genitalia figures.

Material and methods

This study is based on specimens preserved in the Natural History Museum (NHM), London, United Kingdom. Male genitalia were soaked in hot 20% lactic acid solution for approximately ten minutes to remove soft tissue, rinsed in distilled water, then dissected under a binocular dissecting microscope. Dissected genitalia were placed in vials with glycerin and pinned under the corresponding specimens after examination and imaging. Photographs were all taken using a Canon 7D Mark II digital camera with Canon micro lens EF 100 mm (for habitus and labels) and MP-E 65 mm (for male genitalia). Helicon Focus version 5.3 was used for image stacking. Measurements were obtained using a calibrated micrometer and given in millimeters. Body length represents the distance between the apex of the head and the tip of the abdomen in resting condition. Morphological terminology mainly follows that of LENT & WYGODZINSKY (1979), CAI & TAYLOR (2006) and LIU et al. (2020a, b).

Taxonomy

Ectomocoris simulans Distant, 1919

(Figs 1–20)

Ectomocoris simulans Distant, 1919: 74 (original description). Type locality: S. India (Chikkaballapura and Nandidrug; Vizagapatam).

Ectomocoris simulans: MALDONADO CAPRILES (1990): 356 (catalogue).

Ectomocoris melanopterus Distant, 1919: 74 (original description). Type locality: S. India (Chikkaballapura). **New junior subjective synonym.**

Ectomocoris melanopterus: MALDONADO CAPRILES (1990): 354 (catalogue).

Ectomocoris xavierei Vennison & Ambrose, 1990: 43 (original description). Type locality: India (Courtallam tropical evergreen forest, Nellai Kattabomman district, Tamil Nadu). **New junior subjective synonym.**

Type material examined. *Ectomocoris simulans*: LECTOTYPE (present designation), ♂, purple-margined “LECTOTYPE” disc // “S. India. / T.N. Campbell. / 1915-60.” // “Chikkaballapura / S. India. / T. V. Campbell.” // “Ectomocoris simulans / type Dist.” // “NHUMK 013588427” (NHM).

Ectomocoris melanopterus: LECTOTYPE (present designation): ♂, purple-margined “LECTOTYPE” disc // “S. India. / T.N. Campbell. / 1915-60.” // “Chikkaballapura / S. India. / T. V. Campbell.” // “Ectomocoris melanopterus / type Dist.” // “NHMUK 013588426” (NHM).

Ectomocoris xavierei: HOLOTYPE: ♂, red margined “Holotype” disc // “India: Tamil Nadu / Nellai Kattabomman / District, Courtallam / forest, 12. ix. 1985” // “Holotype / Ectomocoris / xavierei Vennison / & Ambrose, 1994” // “NHMUK 013585976” (NHM).

Additional material examined. INDIA: 1 ♀, “South India: / Tamil Nadu Tirunelveli, / ix. 1985 D. Ambrose” (NHM); 3 ♂♂ 1 ♀, “S. INDIA: / Mysore Chikballapur, / South India / T. V. Campbell / Coll. B.M. 1930-599.” (NHM).

Redescription. Brachypterous male (Figs 1–5), macropterous male (Figs 6–8) and brachypterous female (Figs 9–11) known. **Coloration.** Black (sometimes faded into blackish brown in dry specimens); antenna yellowish brown with basiflagellomere and distiflagellomere darker; labium and prosternal process yellowish brown; legs with coxae black, trochanters dark brown, femora and tibiae yellowish brown with mottled dark brown markings, tarsi yellowish brown; hemelytron blackish brown with yellow, irregular, broad band near base in brachypterous form and somewhat trapezoid yellow spot on connecting area of clavus, corium and membrane in macropterous male.

Structure. Body robust, medium-sized. Antenna covered with yellowish brown setae, scape also with several blackish brown thick setae; head, pronotum, scutellum and corium of hemelytra with blackish brown setae; dorsal surface of head, meso- and metathoracic pleura and sterna, connexivum and abdominal sternites densely covered with yellowish-white to gold, procumbent, short pubescence; legs densely covered with yellowish-white, procumbent pubescence and brown, suberect or erect, thick setae of varying lengths.

Head moderately elongate, antecular portion about 2.72 times as long as postocular portion, postocular portion protruding laterally; antenna inserted near anterior margin of eye, scape thickest and shortest, last three antennomeres gracile with pedicel longest; first and second visible labial segment thick, third segment noticeably tapered, second segment longest with basal half swollen; eye reniform in lateral view, reaching upper margin but not reaching lower margin of head, interocular region distinctly longer than width of eye in dorsal view, with shallow longitudinal groove in middle; ocelli moderately separated, slightly elevated; neck with lateral tubercles.

Pronotum with collar process rounded, produced forward; anterior pronotal lobe with median longitudinal sulcus on posterior portion, subbasally with shallow apodeme depression, stripes distinct; pronotal transverse sulcus deep with some shallow, short, longitudinal wrinkles; posterior pronotal lobe somewhat reduced in brachypterous female; lateral pronotal angle round, posterior margin of pronotum arcuate; meso- and metathoracic pleura and sterna finely granulate; mesosternum carinate; disc of scutellum with median longitudinal depression, Y-shaped ridges slender, scutellar process long, apex slightly directed obliquely backward in lateral view. Fore femur thickest with thin ridge on ventral surface, middle femur slightly thicker than hind femur; fore tibia with fossula spongiosa occupying 3/4 of tibial length, middle tibia with fossula spongiosa occupying more than 1/2 of tibial length. Hemelytron slightly surpassing tip of abdomen in macropterous male, reaching fourth to fifth abdominal tergite in brachypterous male and reaching third tergite in brachypterous female.

Abdomen of male oval with longitudinal ridge on ventral surface, abdomen of female fusiform with connexivum more dilated laterally.

Male genitalia with pygophore oval (Fig. 12), median pygophore process oblique to right side in caudal view (Fig. 13), apex sharp (Figs 13, 14), dorsal surface of median



1

2



S. India,
T. N. Campbell.
1915-60.

Chikkaballapura
S. India.
T. V. Campbell.

Ectomocoris
simulans
type. Dist.



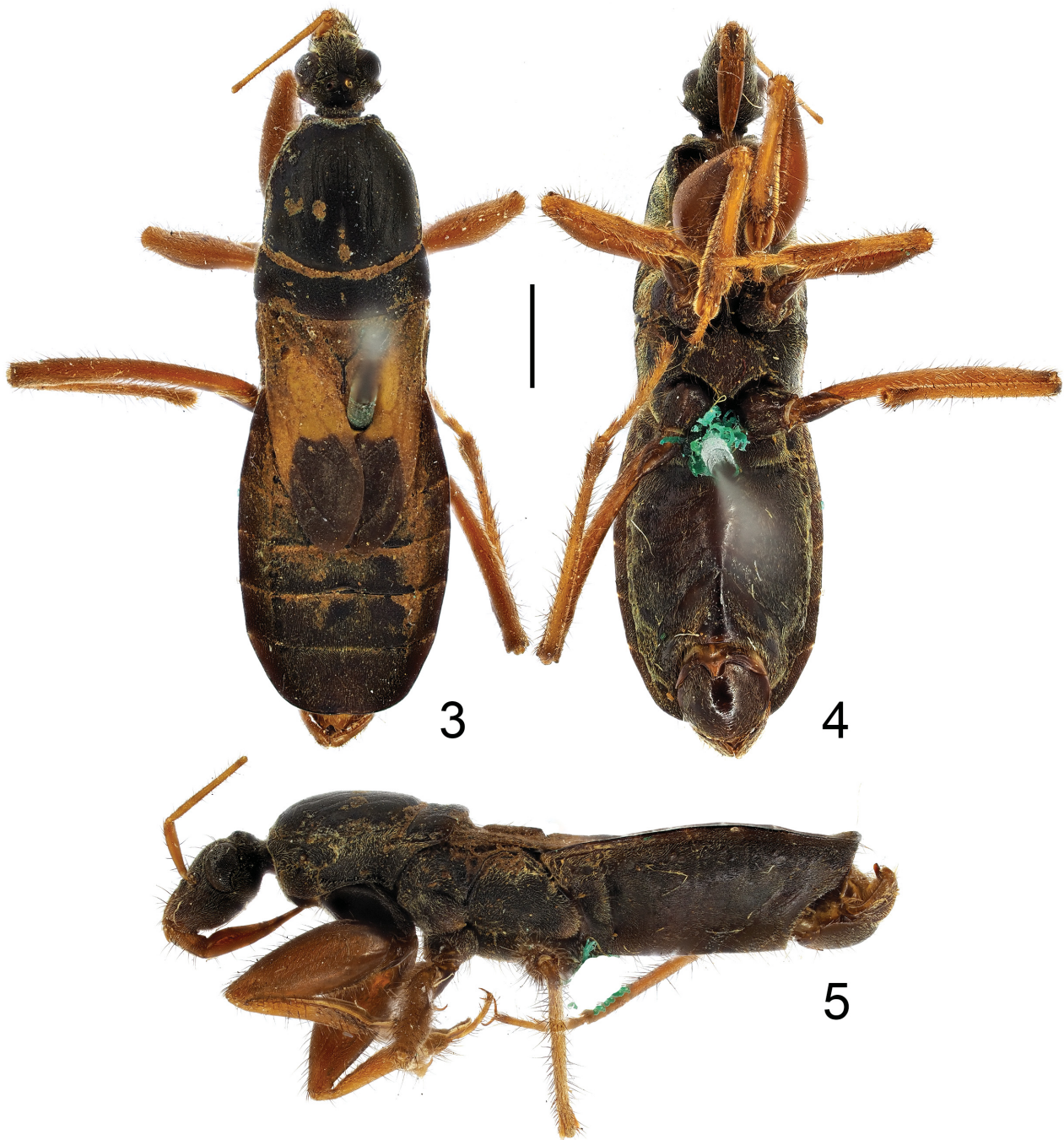
NHMUK 013588427

Figs 1-2. *Ectomocoris simulans* Distant, 1919, lectotype, male, habitus. 1 – dorsal view; 2 – lateral view. Scale bar: 3.00 mm.

pygophore process with ridge (Figs 13, 14); parameres subtriangular with outer margin arcuate, apex of each paramere with small sharp process (Figs 15, 16), left paramere (Fig. 15) longer and straighter than right one (Fig. 16); phallus in resting condition (Figs 17–20) with basal plate bridge slightly shorter and slenderer than basal plate (Figs 17, 18), basal plate slightly curved in middle portion (Figs 17, 18); basal plate prolongation short (Figs 19, 20); dorsal phallosclerite broad and strongly sclerotized, apex blunt (Fig. 17); lateral phallosclerite moderately

sclerotized with irregular margins, lower corner of inner margin with small spine-like process (Fig. 20).

Measurements [in mm, ♂ (n = 6), ♀ (n = 2)]. Body length 13.05–13.16 (♂), 14.82–17.95 (♀); maximum width of abdomen 3.80–4.05 (♂), 4.33–5.80 (♀); length of head 2.29–2.41 (♂), 2.35–2.63 (♀); width of head 1.54–1.74 (♂), 1.61–1.90 (♀); length of anteocular part 1.12–1.20 (♂), 1.17–1.29 (♀); length of postocular part 0.41–0.42 (♂), 0.40–0.54 (♀); width of eye in dorsal view 0.45–0.49 (♂), 0.49–0.54 (♀); width of interocular space 0.59–0.78 (♂),



S. India.
T. N. Campbell.
1915–60.

Chikkaballapura
S. India.
T. V. Campbell.

*Ectomocoris
melanopterus*
type. Distant.

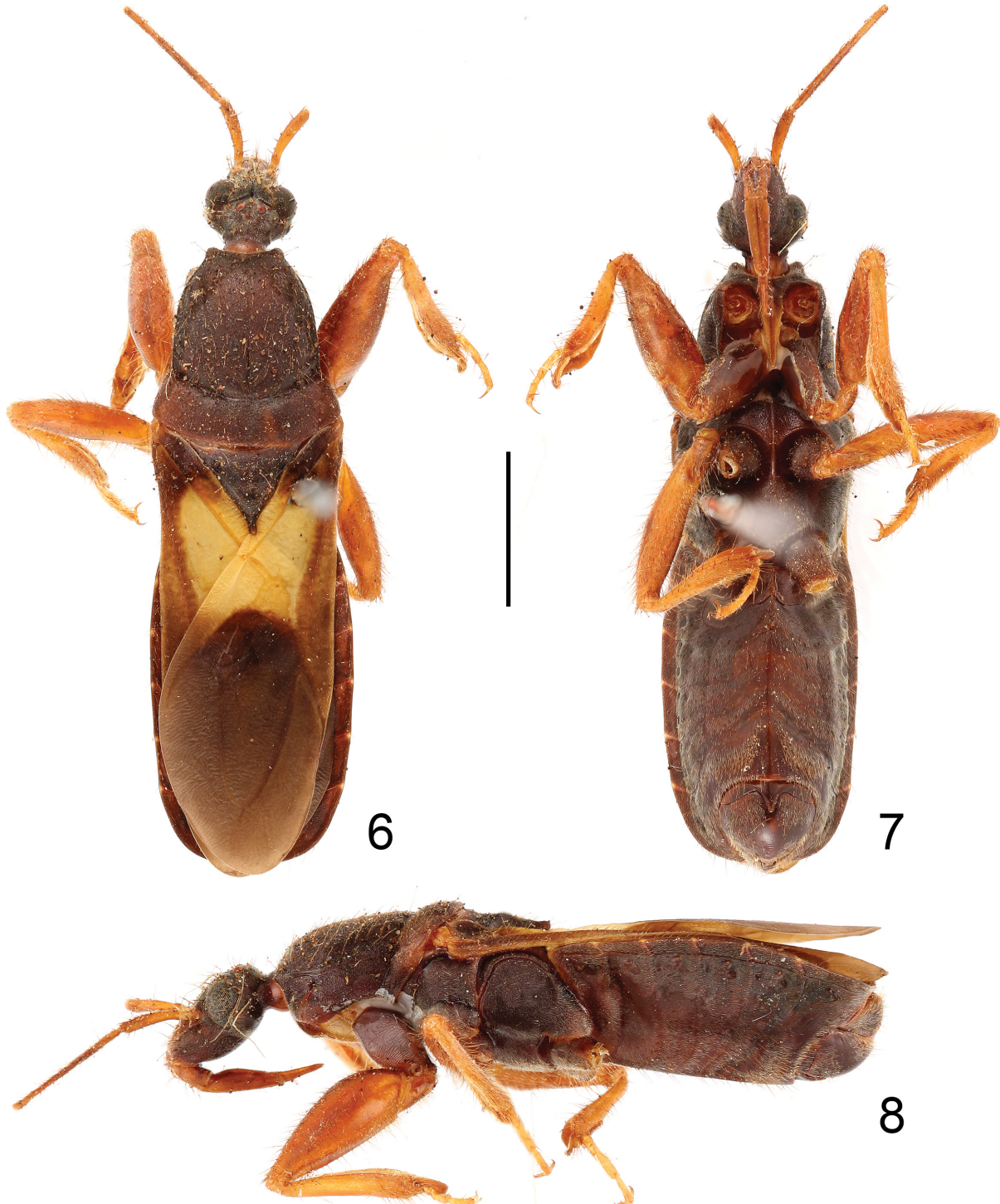


NHMUK 013588426

Figs 3–5. *Ectomocoris melanopterus* Distant, 1919, lectotype, male, habitus. 3 – dorsal view; 4 – ventral view; 5 – lateral view. Scale bar: 2.00 mm.

0.70–0.73 (♀); width of interocellar space 0.25–0.29 (♂), 0.27–0.34 (♀); lengths of antennomeres I–IV 1.11–1.42 (♂), 1.12–? (♀) / 2.70–3.02 (♂), 2.30–? (♀) / 2.22–? (♂), 2.06–? (♀) / ? (♂), 2.15–? (♀); length of visible labial segments I–III 0.88–0.92 (♂), 0.94–0.99 (♀) / 1.29–1.48 (♂),

?–1.55 (♀) / 0.71–0.87 (♂), ?–0.99 (♀); length of pronotum 3.59–3.60 (♂), 3.50–3.99 (♀); length of anterior pronotal lobe 2.72–2.78 (♂), 2.75–3.18 (♀); length of posterior pronotal lobe 0.85–0.86 (♂), 0.75–0.79 (♀); width of anterior pronotal lobe 2.70–2.80 (♂), 2.73–3.39 (♀); width of po-



India: Tamil Nadu
Nellai Kattabomman
District, Courtallam
forest, 12.ix.1985

Holotype
Ectomocoris
xavierei Vennison
& Ambrose 1994



NHMUK 013585976

Figs 6–8. *Ectomocoris xavierei* Vennison & Ambrose, 1990, holotype, male, habitus. 6 – dorsal view; 7 – ventral view; 8 – lateral view. Scale bar: 3.00 mm.

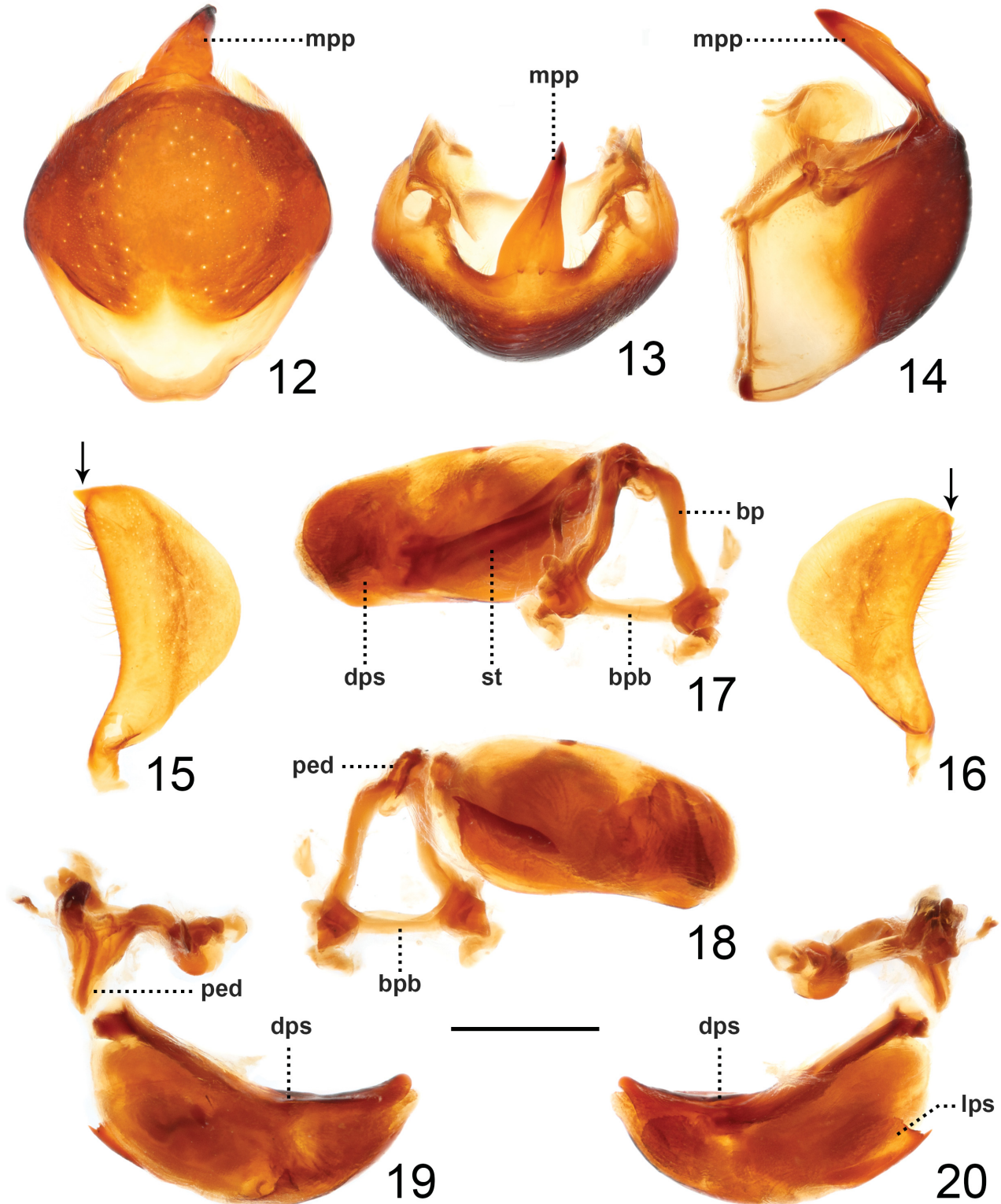


Figs 9–11. *Ectomocoris simulans* Distant, 1919, non-type, female, habitus. 9 – dorsal view; 10 – ventral view; 11 – lateral view. Scale bar: 3.00 mm.

sterior pronotal lobe 3.18–3.51 (♂), 2.96–3.59 (♀); length of scutellum 1.65–1.66 (♂), 1.15–1.51 (♀); maximum width of scutellum 1.39–2.19 (♂), 1.12–1.26 (♀); length of hemelytra 4.61–8.71 (♂), 3.00–3.74 (♀).

Remarks. DISTANT (1919) described both *E. simulans* and *E. melanopterus* in the same paper. However, the descrip-

tion of *E. melanopterus* was based actually on artefacts and the “ochraceous markings” considered diagnostic by DISTANT (1919) are here confirmed to be dirt coverings on the type specimen (Fig. 3). Therefore, we choose *E. simulans* Distant, 1919 as the valid name, and *E. melanopterus* Distant, 1919 as its junior subjective synonym, acting as



Figs 12–20. Male genitalia of *Ectomocoris simulans* Distant, 1919, non-type. 12–14 – pygophore; 15 – left paramere; 16 – right paramere; 17–20 – phallus. 12, 18 – ventral view; 13 – caudal view; 14, 19, 20 – lateral view; 15, 16 – outer ventrolateral view; 17 – dorsal view. Abbreviations: bp – basal plate; bpb – basal plate bridge; dps – dorsal phallosclerite; lps – lateral phallosclerite; mpp – median pygophore process; ped – pedicel; st – struts. Arrow indicates the small sharp process on the apex of paramere. Scale bars: 1.00 mm (Figs 12–14), 0.80 mm (Figs 15–20).

the First Reviser according to Articles 24.2.1 and 24.2.2 of the ICZN (1999).

According to the original data, DISTANT (1919) described *E. simulans* based on more than one specimen (body length measurement: “Long. 13–20 mm”; locality: “Hab. S. India; Chikkaballapura and Nandidrug (Dr. T. V. Campbell); Vizagapatam.”). We could only confirm one syntype with Distant’s handwritten label deposited in NHM and therefore designate it as the lectotype (Figs 1–2). The holotype of *E. xavierei* was deposited in the Entomology Research Unit, Department of Zoology, St Xavier’s College, Palayankottai, India at first and then donated to NHM for permanent preservation.

Distribution. India: Andhra Pradesh (DISTANT 1919), Karnataka (DISTANT 1919), Tamil Nadu (VENNISON & AMBROSE 1990).

Discussion

DISTANT (1919) described two Indian species, *Ectomocoris simulans* and *E. melanopterus*, in the same paper and on the same page (p. 74) without any comparison between them. Instead, the description of *E. simulans* consisted mainly of the differences between it and another species, *E. tibialis* Distant, 1904. In the description of *E. melanopterus*, we observed some unique characters that might explain why Distant proposed it as a valid species, like “irregular broad transverse fascia on hemelytra ochraceous” and “the (abdominal) segmental margins very narrowly ochraceous”, which are not observed in *E. simulans*. However, when examining the lectotype of *E. melanopterus*, we realized that the ochraceous markings that DISTANT (1919) recorded are in fact ochraceous dirt coverings on hemelytra and abdominal tergites (Fig. 3); the latter possibly led to the misidentification of the species. In addition to this, we could not find any valuable morphological character to distinguish the type specimens of *E. simulans* and *E. melanopterus*.

VENNISON & AMBROSE (1990) described *E. xavierei* based on plenty of material reared from nymphs and gave detailed descriptions of macropterous male, brachypterous male and brachypterous female. Though we only examined the macropterous male holotype of *E. xavierei*, the lectotypes of *E. simulans* and *E. melanopterus* well match the description and illustration of the brachypterous male of this species. VENNISON & AMBROSE (1990) also provided a key to the Indian species of *Ectomocoris*, but it’s a pity that all Indian *Ectomocoris* species Distant described in his 1919’s paper (*E. picturatus*, *E. simulans*, *E. melanopterus* and *E. apimaculatus*) were not included in this key, and this oversight led to their redundant description. In later study on biology and behavior of *E. xavierei*, the mating photographs they provided (VENNISON & AMBROSE 1991: 256, Fig. 13) gave us a chance to compare the types of *E. simulans* and *E. melanopterus* with the brachypterous form of *E. xavierei* and further confirm this synonymy.

From what has been discussed above, we therefore conclude that *E. melanopterus* and *E. xavierei* should be regarded as the junior subjective synonyms of *E. simulans*.

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