



Description of the males of the subgenus *Eofoersteria* Mathot, 1966 (Hym., Mymaridae, *Camptoptera* Foerster), with new distributional records in India

Prince Tarique Anwar^{1*} , Shahid Bin Zeya¹ , Farmanur Rahman Khan²
& Syeda Uzma Usman^{3*}

- 1 Department of Zoology, Aligarh Muslim University, Aligarh – 202002, Uttar Pradesh, India. ta.friday@gmail.com; drsbz1966@gmail.com
- 2 Department of Biology, Deanship of Educational Services, Qassim University, Buraydah, Saudi Arabia. insectqh11@gmail.com
- 3 Department of Zoology, Mohammad Ali Jauhar University, Rampur – 244901, Uttar Pradesh, India. insect.11lab@gmail.com

Received:
02 August, 2021

Accepted:
12 October, 2021

Published:
14 November, 2021

Subject Editor:
Hossein Lotfalizadeh

ABSTRACT. Males of the subgenus *Eofoersteria* Mathot (Hym., Mymaridae, *Camptoptera* Foerster) are diagnosed, described, and illustrated for the first time, based on examination of specimens from Tamil Nadu and from photographs of the male paratype of *Camptoptera matcheta* Subba Rao from Karnataka. New distributional records of *C. (Eofoersteria) manipurensis* (Rehmat & Anis) from Karnataka and Kerala states of India are documented.

Key words: *Eofoersteria*, Male, Diagnosis, Description, New Records

Citation: Anwar, P.T., Zeya, S.B., Khan, F.R. & Usman, S.U. (2021) Description of the males of the subgenus *Eofoersteria* Mathot, 1966 (Hym., Mymaridae, *Camptoptera* Foerster), with new distributional records in India. *Journal of Insect Biodiversity and Systematics*, 7 (4), 437–447.

Introduction

Due to their small size, less than about 300 micrometers in length, species of the subgenus *Eofoersteria* Mathot, 1966 (Hym., Mymaridae, *Camptoptera* Foerster, 1856) are among the most rarely collected Mymaridae (Hymenoptera: Chalcidoidea). Four species are described: *Camptoptera (Eofoersteria) camptopteroides* (Mathot, 1966) from Africa; *C. secunda* (Viggiani, 1978), *C. manipurensis* (Rehmat & Anis, 2014) from India; and *C. vasta* (Girault, 1920) from Australia. Huber & Lin (1999) reported an undescribed female of *Eofoersteria* from Trinidad and southern Florida, USA. Anwar et al. (2020) reported that the male paratype of *Camptoptera matcheta* Subba Rao, 1989 is actually an undetermined male of *Eofoersteria* and this was the first report of the male. It is worth to note the above mentioned species were already classified within the genus *Eofoersteria* Mathot, 1966, which very recently has been placed in synonymy under *Camptoptera*, treating it as a subgenus (Huber et al., 2021). Our recent sampling in Tamil and Manipur led to the discovery of male specimens of *Camptoptera (Eofoersteria)* representing new distributional records. Here, we provide the diagnoses, and the first detailed descriptions and illustrations of the males of the newly collected specimens, as well as those already recorded from India.

Corresponding authors: Prince Tarique Anwar & Syeda Uzma Usman, E-mail: ta.friday@gmail.com; insect.11lab@gmail.com

Copyright © 2021, Anwar et al. This is an open access article distributed under the terms of the Creative Commons NonCommercial Attribution License (CC BY NC 4.0), which permits Share - copy and redistribute the material in any medium or format, and Adapt - remix, transform, and build upon the material, under the Attribution-NonCommercial terms.

Material and methods

The specimens were collected from fields of various agricultural and horticultural crops using malaise traps and sweep nets. Zeya & Hayat (1995) and Gibson (1997) were followed for the terminology of the morphological characters. Radicle was excluded from measurements of scape length. Body length was taken from a card-mounted specimen; other measurements, in μm , are from slide mounts. Specimens were slide-mounted in Canada balsam following the method in Noyes (1982) with modifications as mentioned in Anwar et al. (2020). All the photographs were taken from with a digital camera attached to a compound microscope Leica® DM 2500 (Leica Microsystems GmbH, Wetzlar, Germany) except photos 4(A–C) which were taken from a Nikon® DS-Fi1c digital camera, attached to a Nikon® ECLIPSE Ci (Nikon Instruments Inc., USA) compound microscope and further retouched using Adobe Photoshop®.

The following abbreviations are used in the text:

- F = funicle segment of the female antenna or flagellomere of the male antenna
- mps** = multiporous plate sensillum or sensilla (= longitudinal sensillum or sensilla)
- MT** = Malaise trap
- SN** = Sweep net

The following acronyms are used for specimen depositories:

- BMNH**: The Natural History Museum, London, England, UK.
- ZDAMU**: Insect Collections, Department of Zoology, Aligarh Muslim University, Aligarh, Uttar Pradesh, India.

Results

Taxonomy

Genus: *Camptoptera* Foerster, 1856

Subgenus *Eofoersteria* Mathot, 1966 (Figs 1–4)

Eofoersteria Mathot, 1966: 231. Type species *Eofoersteria camptopteroides* Mathot, by original designation; *Eofoersteria* Mathot, 1966 in Huber & Lin, 1999:37; *Camptoptera* (*Eofoersteria* Mathot, 1966): Huber et al., 2021:21.

Diagnosis

Female. Mandible with one pointed tooth. Antenna with funicle 6-segmented (Fig. 4B). Petiole ridged (Fig. 4D). Tarsi 4-segmented, the last tarsal segment clearly longer than the preceding segments (Fig. 4E). (Huber & Lin, 1999; Rehmat & Anis, 2014).

Male. Similar to female. Body length, less than 300 μm . Antenna with 8-segmented flagellum (Figs 1B, 2C). Genitalia as in figure 3A.

Remarks. Huber & Lin (1999:24) expected that the males of *Eofoersteria* when found would have at most 9 flagellomeres. We report here that reduction of the ring-like segment has occurred in males, with loss of both F2 and F4 (the ring-like segments) of *Camptoptera* (*Eofoersteria*) so, the known males thus have the flagellum 8-segmented.

Hosts. Unknown.

Distribution. Afrotropical, Australian, Oriental, Nearctic, Neotropical regions (Huber & Lin, 1999).

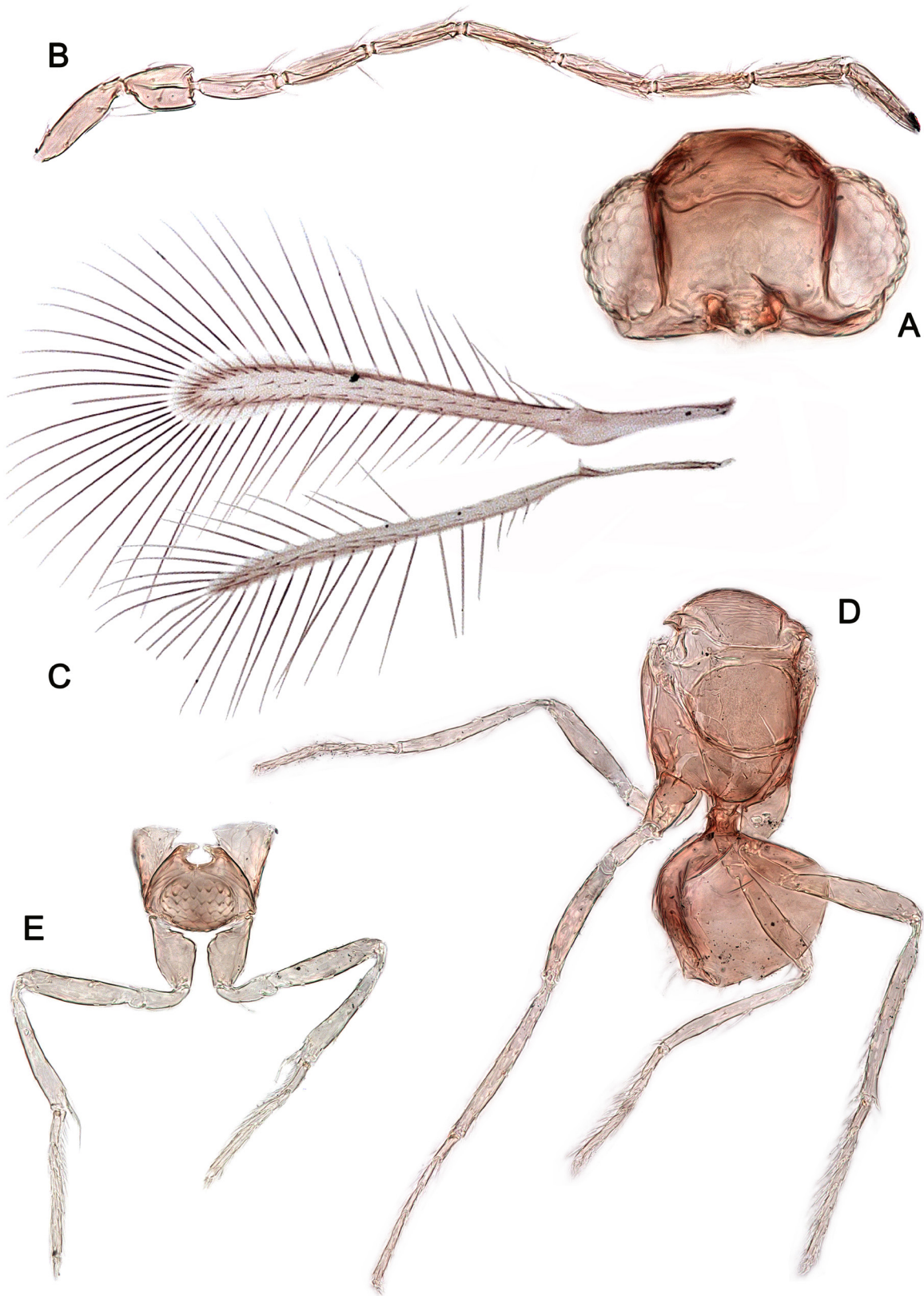


Figure 1. *Camptoptera (Eofoersteria)* sp. 1, male: **A.** Head, ventral; **B.** Antenna; **C.** Wings; **D.** Mesosoma and metasoma; **E.** Prosternum and propleura with fore legs.

***Camptoptera* (*Eofoersteria*) sp. 1 (Fig. 1)**

Material examined. INDIA: TAMIL NADU: Shembaganur, 2.IV.2014 (MT), Coll. K. Veenakumari (1 male on slide under 4 coverslips, slide No. MYM.159, ZDAMU).

Diagnosis. Antenna with each flagellomere about 3.1–3.9× as long as wide. Mesoscutum with distinctly transverse reticulations (Fig. 1D); frenum with faint longitudinal striations on the sides and medially with polygonal reticulations. Prosternum with peculiar scale-like sculpture (Fig. 1E).

Description

Male. Length, 240µm. Body dark brown. Antenna pale brown. Legs, including coxae, pale brown.

Head (Fig. 1A). Antenna with each flagellomere more than 3× as long as wide (Fig. 1B).

Mesosoma (Fig. 1D). Mesosoma 1.4× as long as gaster; mesoscutum with transverse reticulate sculpture; frenum with faint longitudinal striations on the sides and medially with polygonal reticulations; propodeum with submedian carinae extending full length of propodeum. Prosternum with scale-like raised sculpture (Fig. 1E). Fore wing (Fig. 1C) 14× as long as broad, with a complete row of setae beginning beyond venation and extending to wing apex; longest marginal seta 6× as long as maximum wing width. Hind wing (Fig. 1C) 29× as long as broad; longest marginal setae 7× as long as maximum wing width.

Metasoma (Fig. 1D). Petiole 1.3× as long as broad, without median lateral lamella. Genitalia 0.6× mesotibia length.

Relative measurements (µm): antennal segments length:width – radicle, 5:8; scape, 48:13; pedicel, 30:18; F1, 38:10; F2, 33:10; F3, 41:13; F4, 43:13; F5, 43:11; F6, 45:13; F7, 43:13; F8, 46:13; mesosoma length, 140; mesoscutum, 40; scutellum, 10; frenum, 58; metanotum, 5; propodeum, 28; forewing length:width, 433:33; longest marginal seta, 188; hind wing length:width, 430:15; longest marginal seta, 113; protibia, 83; mesotibia, 103; metatibia, 120; petiole length:width, 23:18; gaster, 98; genitalia, 58.

Female. Unknown.

Hosts. Unknown.

Distribution. India: Tamil Nadu.

***Camptoptera* (*Eofoersteria*) sp. 2 (Figs 2–3)**

Camptoptera matcheta Subba Rao, 1989:161 (misidentification, male paratype only), 185 (fig. 96, illustration of the slide mounted paratype).

Camptoptera matcheta Subba Rao: [Triapitsyn, 2017:16](#) (remarks). [Anwar et al. 2020:14](#) (comments based on photographs of male paratype).

Diagnosis

Antenna with flagellomeres each about 3× as long as broad (Fig. 2C). Fore wing about 15× as long as wide (Fig. 2D). Mesoscutum with isodiametric reticulate sculptures posteromedially and notaular lines incomplete reaching at most to the mid of mesoscutum (Fig. 3B). Frenum with sculpture isodiametric medially and elongate reticulate laterally (Fig. 3B). Prosternum and propleura with polygonal reticulations (Fig. 3C). Petiole broader than long (Fig. 3A).

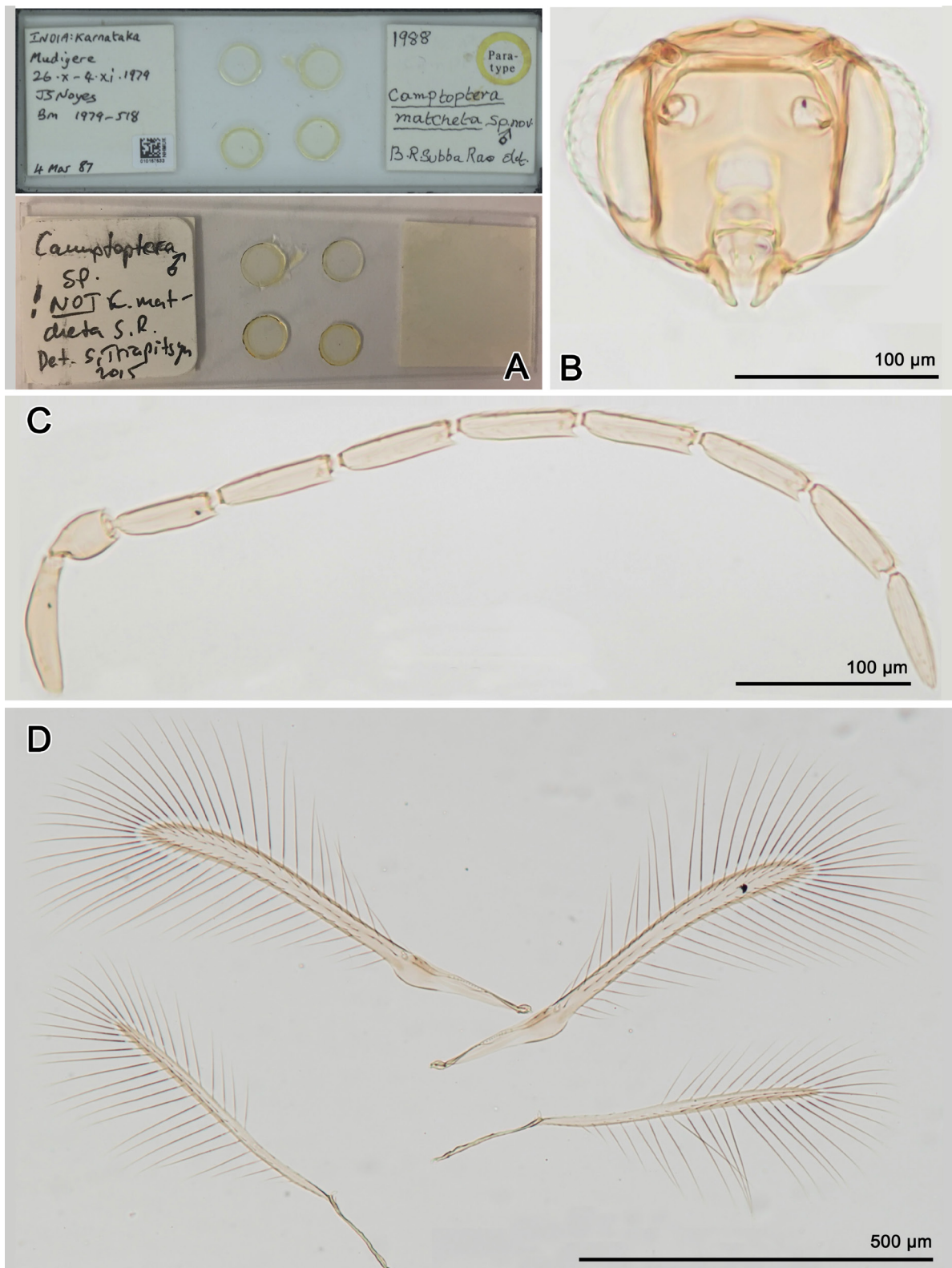


Figure 2. *Camptoptera* (*Eofoersteria*) sp. 2, male (paratype of *Camptoptera matcheta* Subba Rao). Photographs courtesy of Natalie Dale-Skey Papilloud, BMNH: **A.** Slide mounted specimens; **B.** Head; **C.** Antenna; **D.** Wings.

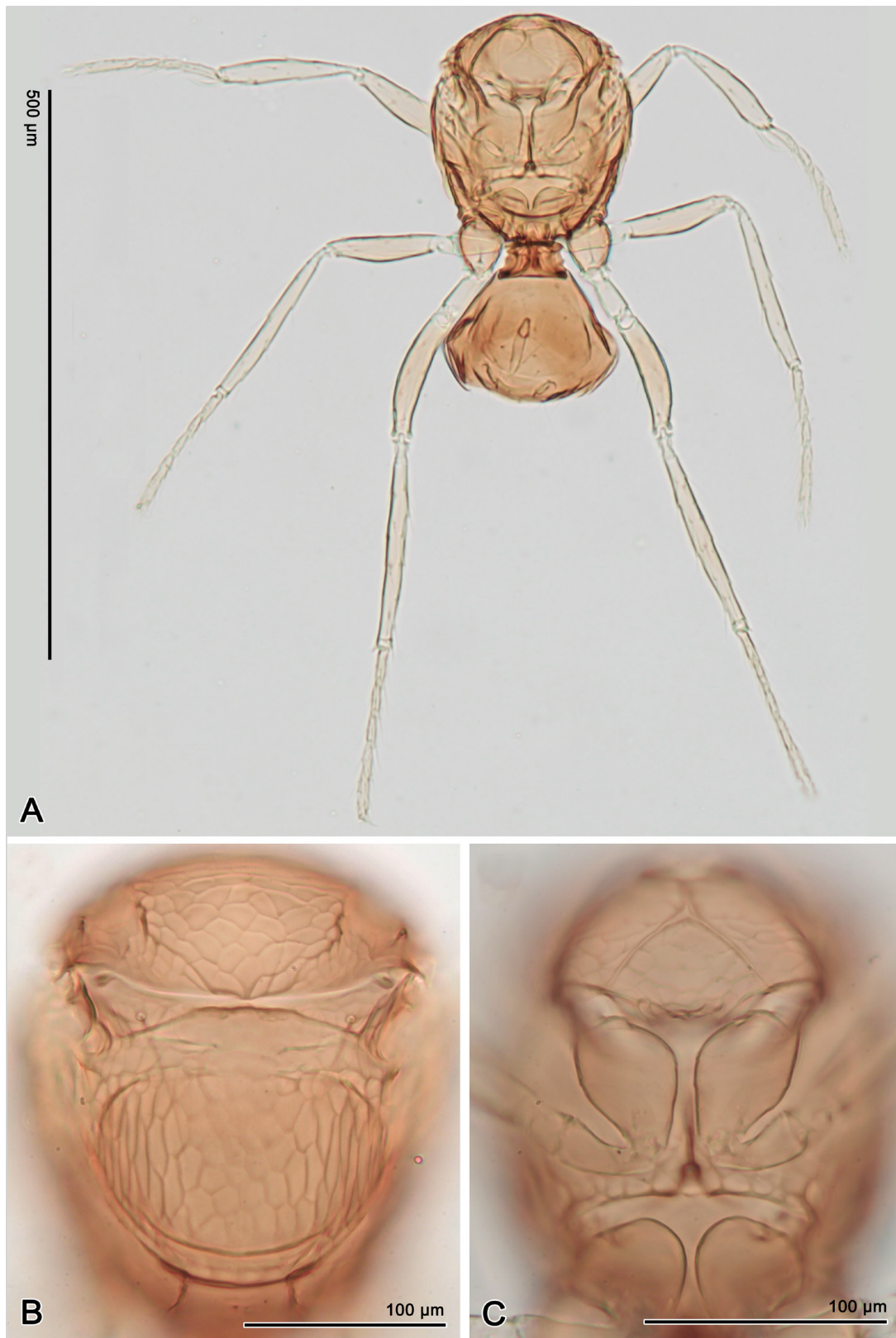


Figure 3. *Camptoptera* (*Eofoersteria*) sp. 2, male (Paratype of *Camptoptera matcheta* Subba Rao). Photographs courtesy of Natalie Dale-Skey Papilloud, BMNH: **A.** Mesosoma and metasoma with legs; **B.** Mesosoma, dorsal; **C.** Mesosoma, ventral showing prosternum and propleura.

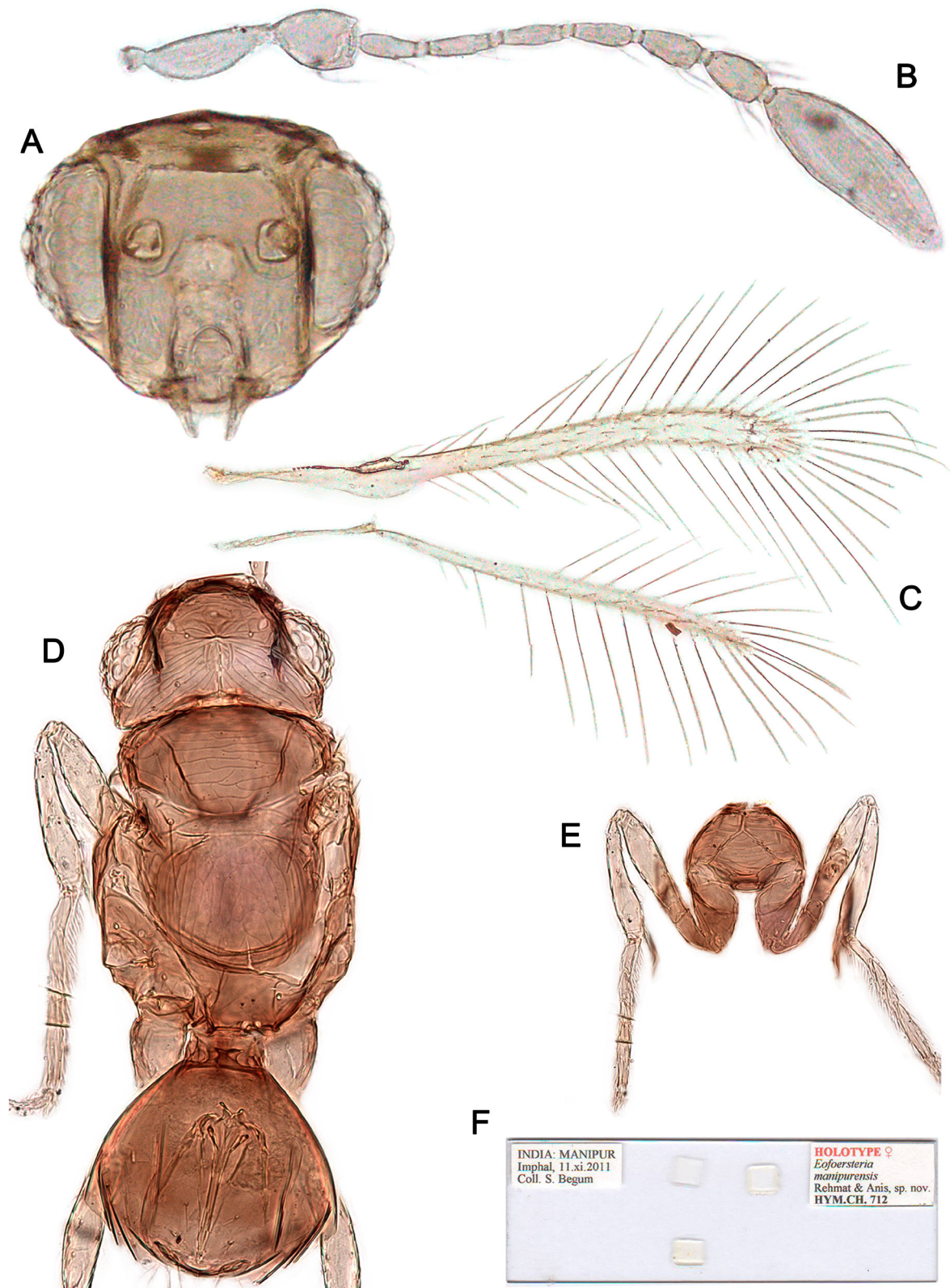


Figure 4. *Camptoptera (Eofoersteria) manipurensis* (Rehmat & Anis, 2014). Females: (A-C, non-type): A. Head; B. Antenna; C. Wings. (D-F, holotype): D. Body dorsal; E. Prosternum and propleura with fore legs; F. Holotype slide.

This specimen does not match with any of the described females of the genus and hence, a conspecific female is needed for its formal description and nomenclature. However, the specimen resembles *C. secunda* (Viggiani) on the features of mesoscutum and scutellum sculpture but differs in having propodeum smooth with submedian carina widely apart, with a few peg-like setae medially (in *C. secunda*, propodeum sculptured and, with peculiar submedian carina Fig. 3; Viggiani, 1978). It differs from *Camptoptera* (*Eofoersteria*) sp. 1 by the different sculpture on the mesoscutum (transverse striate in *Camptoptera* (*Eofoersteria*) sp. 1) and the different proportions of the flagellar segments (flagellomeres relatively shorter in *Camptoptera* (*Eofoersteria*) sp. 1).

Female. Unknown.

Hosts. Unknown.

Distribution. India: Karnataka.

***Camptoptera* (*Eofoersteria*) *manipurensis* (Rehmat & Anis) comb. n. (Fig. 4)**

Eofoersteria manipurensis Rehmat & Anis, 2014:130, female. Holotype, female, India, Manipur (ZDAMU), examined.

Eofoersteria manipurensis Rehmat & Anis, in Manickavasagam & Palanivel, 2015:19 (New record from Nagaland).

Material examined: Holotype, female (ZDAMU, registration No. HYM.CH.712, on slide under 3 coverslips); INDIA: MANIPUR, Imphal, 11.xi.2011, Coll. S. Begum. **Non-type material.** INDIA: KARNATAKA: Bengaluru, Kanakapura Road, Near Sangama, 21.ix.2012, Coll. K. Veenakumari (1 female on slide under 4 coverslips, slide No. MYM.160, ZDAMU). KERALA: Ernakulam, Ambaliur, 10.i.2012 (SN), Coll. F.R. Khan. (2 females each on slide under 4 coverslips, slide Nos. MYM.665, 666, ZDAMU).

Diagnosis

Body length 220–290 µm. Antenna with F2 the longest; clava subequal to F4–F6 (Fig. 4B). Mesoscutum with transverse reticulations, notaular lines well developed but not extending to posterior margin of mesoscutum; scutellum and frenum with longitudinal reticulate sculpture (Fig. 4D). Prosternum with transverse reticulations (Fig. 4E). Petiole broader than long, ridged and without lateral lamellae (Fig. 4D). Ovipositor 0.6–0.8× metatibia (Fig. 4D).

All the specimens were compared with the holotype.

Male. Unknown.

Hosts. Unknown.

Distribution. India: Manipur, Nagaland, Karnataka (new record), Kerala (new record).

Key to the species of *Camptoptera* (*Eofoersteria*) based on both male and female specimens

1. Flagellum 8-segmented (Figs 1B, 2C), the apical segment similar to rest of the funicles (males)2
- Flagellum 6-segmented (Fig. 4B), the apical segment modified into clava (females) ...3
2. Frenum with faint longitudinal striations laterally and, medially with polygonal reticulations (Fig 1D); prosternum with scale-like sculpture (Fig. 1E). *C. (Eofoersteria) sp.1*

- Frenum with elongate reticulate sculpture laterally and, medially with isodiametric reticulations (Fig. 3B); prosternum with polygonal reticulations (Fig. 3C).
..... *C. (Eofoersteria) sp.2*
- 3. F1, the longest funicle segment; mesoscutum and scutellum with polygonal reticulate sculpture. *C. (Eofoersteria) secunda Viggiani*
- F1, not the longest funicle segment; mesoscutum and scutellum with elongate reticulate sculpture. **4**
- 4. Fore wing with a complete row of discal setae medially.
..... *C. (Eofoersteria) camptopteroides (Mathot)*
- Fore wing with an incomplete row of discal setae medially. **5**
- 5. Scape distinctly longer than F1 and F2 combined; F1 twice longer than wide.
..... *C. (Eofoersteria) vasta (Girault)*
- Scape shorter than F1 and F2 combined; F1 at least 3× as long as wide (Fig. 4B).
..... *C. (Eofoersteria) manipurensis Rehmat & Anis*

Discussion

Three species of the subgenus *Eofoersteria* are recognized among the examined specimens from India. The occurrence of *Camptoptera (Eofoersteria) manipurensis* (Rehmat & Anis) is first recorded from Karnataka and Kerala states of India on the basis of female specimens. Two other species were only recognized on the basis of male specimens, which are described and illustrated for the first time. Subba Rao (1989) described *Camptoptera matcheta* and designated a male as its paratype based on similarity in body sculpture. Triapitsyn (2017) remarked that the wing character does not match with the female of *C. matcheta* and indicated it as an undetermined species of *Camptoptera* Forester. Anwar et al. (2020) reported that it is an undetermined male of *Eofoersteria* Mathot based on four segmented tarsi. Huber et al. (2021) synonymised *Eofoersteria* under *Camptoptera* and explained that loss of one funicle segment in females, and reduction of tarsal number due to fusion of the apical two segments were sufficient to keep it as a subgenus, but all other features place *Eofoersteria* in *Camptoptera*. At present following Huber et al. (2021) we have placed the recorded species of *Eofoersteria* under the subgenus of *Camptoptera* and provided their brief diagnoses with illustrations. Classification of *Camptoptera* is still unresolved and we strongly believe that an informal species-group placement would be rather useful to identify genus upto species.

Acknowledgments

We pay our sincere gratitude to Natalie Dale-Skey, Curator Hymenoptera, BMNH for providing images of the male paratype of *Camptoptera matcheta*. Prince T. Anwar gratefully acknowledges the Council of scientific and industrial research (CSIR) for providing financial assistance in the form of Research Associateship.

Conflict of Interests

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

ORCID

Prince Tarique Anwar: <https://orcid.org/0000-0002-1682-0033>

Shahid Bin Zeya: <https://orcid.org/0000-0003-1594-0372>

Farmanur Rahman Khan: <https://orcid.org/0000-0001-8906-709X>

Syeda Uzma Usman: <https://orcid.org/0000-0003-2578-2515>

References

- Anwar, P.T., Zeya, S.B. & Veenakumari, K. (2020) Fairyfly genus *Camptoptera* Foerster (Hymenoptera: Chalcidoidea: Mymaridae) in India and Sri Lanka, with descriptions of eleven new species. *Zoologica*, 165, 1–89.
- Gibson, G.A.P. (1997) Chapter 2. Morphology and terminology. In: Gibson, G.A.P., Huber, J.T. & Woolley, J.B. (eds) *Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)*. NRC Research Press, Ottawa, Ontario, Canada, pp. 16–44.
- Girault, A.A. (1920) New genera and species of Australian Mymaridae. *Insector Inscitiae Menstruus*, 8, 96–100.
- Huber, J.T. & Lin, N.Q. (1999) World review of the *Camptoptera* group of genera (Hymenoptera: Mymaridae). *Proceedings of the Entomological Society of Ontario*, 130, 21–65.
- Huber, J.T., Read, J.D. & Triapitsyn, S.V. (2021) Illustrated key to the genera and catalogue of Mymaridae (Hymenoptera) in the Afrotropical region. *Zootaxa*, 5036 (1), 001–166. <https://doi.org/10.11646/zootaxa.5036.1.1>
- Manickavasagam, S. & Palanivel, S. (2015) Description of a new and records of other fairyfly species (Hymenoptera: Mymaridae) from India. *Journal of Insect Systematics*, 2 (1), 15–23.
- Mathot, G. (1966) Contribution à la connaissance des Mymaridae et Mymarommatidae d'Afriquecentrale. *Bulletin et Annales de la Société Royale Entomologique de Belgique*, 102, 231.
- Noyes, J.S. (1982) Collecting and preserving chalcid wasps (Hymenoptera: Chalcidoidea). *Journal of Natural History*, 16, 315–334. <https://doi.org/10.1080/00222938200770261>
- Rehmat, T. & Anis, S.B. (2014) Description of a new species of *Eofoersteria* Mathot (Hymenoptera: Mymaridae) from India, with a key to world species. *Entomon*, 39 (3), 129–134.
- Subba Rao, B.R. (1989) On a collection of Indian Mymaridae (Chalcidoidea: Hymenoptera). *Hexapoda*, 1, 139–186.
- Triapitsyn, S.V. (2017) Taxonomic notes on *Camptoptera* Foerster, 1856 (Hymenoptera: Mymaridae). *Far Eastern Entomologist*, 332, 7–18.
- Viggiani, G. (1978) Unanuova specie di *Eofoersteria* Mathot (Mymaridae). *Bollettino della Società Entomologica Italiana*, 110, 39–41.
- Zeya, S. B. & Hayat, M. (1995) A revision of the Indian species of *Gonatocerus* Nees (Hymenoptera: Chalcidoidea: Mymaridae). *Oriental Insects*, 29, 47–160. <https://doi.org/10.1080/00305316.1995.10433741>

توصیف نر زنبورهای زیرجنس *Eofoersteria* Mathot, 1966 (Hymenoptera, Mymaridae) و گزارش‌های جدید پراکنش در هند

پرنس طارق انور^{۱*}، شاهد بن ضیاء^۱، فرمان‌الرحمن خان^۲، سیدعظما عثمان^{۳*}

۱ گروه جانورشناسی، دانشگاه اسلامی آلیگار، آلیگار، اوتار پرداش، هند.

۲ گروه زیست‌شناسی، رئیس خدمات آموزشی، دانشگاه قصیم، القصیم، عربستان.

۳ گروه جانورشناسی، دانشگاه محمد علی گوهر، رامپور، اوتار پرداش، هند.

* پست الکترونیکی نویسندگان مسئول مکاتبه: insect.11lab@gmail.com تا: ta.friday@gmail.com

| تاریخ دریافت: ۱۱ مرداد ۱۴۰۰ | تاریخ پذیرش: ۲۰ مهر ۱۴۰۰ | تاریخ انتشار: ۲۳ آبان ۱۴۰۰ |

چکیده: جنس نر زنبورهای متعلق به زیرجنس *Eofoersteria* Mathot, 1966 از جنس *Camptoptera* (Hymenoptera, Mymaridae) بر اساس نمونه‌های جمع‌آوری شده از ایالت تامیل نادو و تصاویر نر *Camptoptera matcheta* Subba Rao از کارناتاكا برای اولین بار شناسایی و توصیف شد. گزارش جدید از پراکنش گونه *C. (Eofoersteria) manipurensis* (Rehmat & Anis) از ایالت‌های کارناتاكا و کرالای هند نیز ثبت شد.

واژگان کلیدی: *Eofoersteria*، نر، شناسایی، توصیف، گزارش‌های جدید