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<https://doi.org/10.1080/00222933.2025.2531159>

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## *Camptopoeum paruii* sp. n., the first species of *Camptopoeum* described from India (Hymenoptera: Andrenidae)

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### ABSTRACT

*Camptopoeum* (*Epimethea*) *paruii* Patiny and Roberts, **sp. n.**, a new panurgine bee from southern Asia, is described and diagnosed. The species is currently reported from two locations in the state of Odisha in eastern India. These records represent the remarkable first data for the genus in the Indo-Malayan part of the Indian subcontinent. An identification key is presented to members of the subgenus *Camptopoeum* (*Epimethea*) Morawitz, and problems with some of Klaus Warncke's species concepts are highlighted. The present description highlights the growing trend of isolated species from within largely Palaearctic bee lineages that have been found in Southeast Asia, and the pressing need for modern taxonomic revisions of the Indian bee fauna.

<http://www.zoobank.org/urn:lsid:zoobank.org:pub:A058A8AB-DEAF-4C6B-BE7B-E3E1F4E5F8AA>

### ARTICLE HISTORY

Received 9 May 2025  
Accepted 2 July 2025

### KEYWORDS

Indian endemic species;  
Melitturgini; solitary bees;  
disjunct distribution;  
taxonomy

## Introduction

The subfamily Panurginae consists of seven tribes distributed in both the Old and the New World (Bossert et al. 2022). Among these, the genus *Panurginus* Nylander, 1848 is the only Holarctic group. In the Old World, the subfamily consists of 15 genera, most of which are distributed around the Mediterranean basin with extensions in Africa (eastern and southern), the Middle East, and Central Asia (Patiny and Gaspar 2000; Michener 2007; Patiny and Michez 2007; Ascher and Engel 2017; Bossert et al. 2022).

Within the Panurginae, the moderately sized genus *Camptopoeum* Spinola, 1843 consists of around 30 described species mainly distributed across the West and Central Palaearctic, with a centre of diversity in the Turkey and the Middle East (Patiny 2001; Monks 2023; Ascher and Pickering 2025). One species, *C. friesei euzonus* (Warncke, 1972), ranges west to Spain, and four species *C. nadigi* (Warncke, 1972), *C. pseudorubrum* (Warncke, 1987), *C. simile* (Pérez, 1895) and *C. variegatum* (Morawitz, 1875), range west to Morocco (Warncke 1972; Wood and Cross 2017; Lhomme et al. 2020; Wood 2023a). A species from Portugal originally described in the genus *Camptopoeum* has since been shown to belong to a new genus in a different tribe (Panurgini vs the Melittugini of *Camptopoeum*), illustrating the challenges of correctly placing panurgine bees due to convergent evolution producing superficially similar morphologies (Bossert et al. 2022; Wood et al. 2022). Until now, the most easterly species in the genus *Camptopoeum* have been described from Pakistan (*Camptopoeum bakeri* Rozen, 1988) and eastern Kazakhstan (*Camptopoeum altaicum* Morawitz, 1891) (Rozen 1988; Astafurova and Proshchalykin 2024), and the genus is typically considered to be restricted to the West and Central Palaearctic regions.

The taxonomic concept and status of the genus *Camptopoeum* has lacked universal consensus until relatively recently. Workers in the early to mid twentieth century often treated *Camptopoeum* as distinct from *Epimethea* Morawitz, (eg Popov 1967a). Warncke (1972), in his major contribution to Old World Panurginae taxonomy, considered *Epimethea* to be synonymous with *Camptopoeum*, but treated *Camptopoeum* as a subgenus of *Panurgus* Panzer, 1806 in a typically broad interpretation. Some workers continued to use

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*Camptopoeum* as a distinct genus inclusive of *Epimethea* after the work of Warncke (eg Ruz 1986; Rozen 1988). *Camptopoeum* was explicitly restored to generic rank by Patiny (1999, 2001) and containing two distinct subgenera: *C. (Camptopoeum)* and *C. (Epimethea)*. This taxonomic option was later followed by Michener (2007), whereas authors diverged on the tribal association of the genus, positioning it as a distinct tribe (Patiny) or keeping it in the Panurgini (Michener). Recently, Bossert et al. (2022) demonstrated that *Camptopoeum* constitutes a distinct genus in the tribe Melitturgini, cementing a stable generic concept and classificatory framework. Within the genus, *Epimethea* species appear to be oligolectic on the family Apiaceae (Popov 1967b; authors' pers. obs.) in contrast to members of *Camptopoeum* s. str. which are mostly oligolectic on Asteraceae (Carduoideae) (though see Wood 2023a). This reflects their differing evolutionary strategies and morphologies, the former necessitating a short tongue and the latter a long tongue.

The present paper describes a new species, *Camptopoeum paruii* sp. n., belonging to the subgenus *Epimethea*. The type series was caught at two sites in agricultural areas of the Indian state of Odisha (Eastern India). The description of this species is notable as it extends the distribution of this genus into the Indo-Malayan part of the Indian subcontinent for the first time, considerably altering our previous understanding of the global distribution of this genus.

## Material and methods

Morphological terminology used in the description is based on Michener (2007), and that for microsculpture is based on Harris (1979). The following abbreviations are used in the species descriptions and diagnoses: A = antennal segments, S = metasomal sterna, and T = metasomal terga. Publication dates for Radoszkowski (1871) and Morawitz (1875) follow Ebmer (2021) in dating the volumes of the *Horae Societatis Entomologicae Rossicae*. The type series was databased in the Banque de Données Fauniques Gembloux Mons (BDFGM) hosted in UMons, Department of Zoology. The datasets were managed using DFF (Barbier et al. 2015), and visualised using CFFedit 2.0 (Barbier and Rasmont 2000).

Images were taken using an Olympus E M1 Mark II with a 60 mm macro lens, and close-ups were taken with the addition of a Mitutoyo M Plan Apo 10× infinity corrected objective lens in combination with an Olympus M.Zuiko 2× teleconverter lens, a 10 mm Kenko DG extension tube, and a Meike MK-P-AF3B 10 mm extension tube. Photographs were stacked using Helicon Focus B (HeliconSoft, Ukraine) and plates were prepared in GNU Image Manipulation Program (GIMP) 2.10. Post-processing of some images was made in Photoshop Elements (Adobe Systems, USA) to improve lighting to highlight specific characters. An identification key is presented that builds on the keys published by Warncke (1987) and Patiny (2001).

## Results

### *Camptopoeum (Epimethea) paruii* Patiny and Roberts, sp. n.

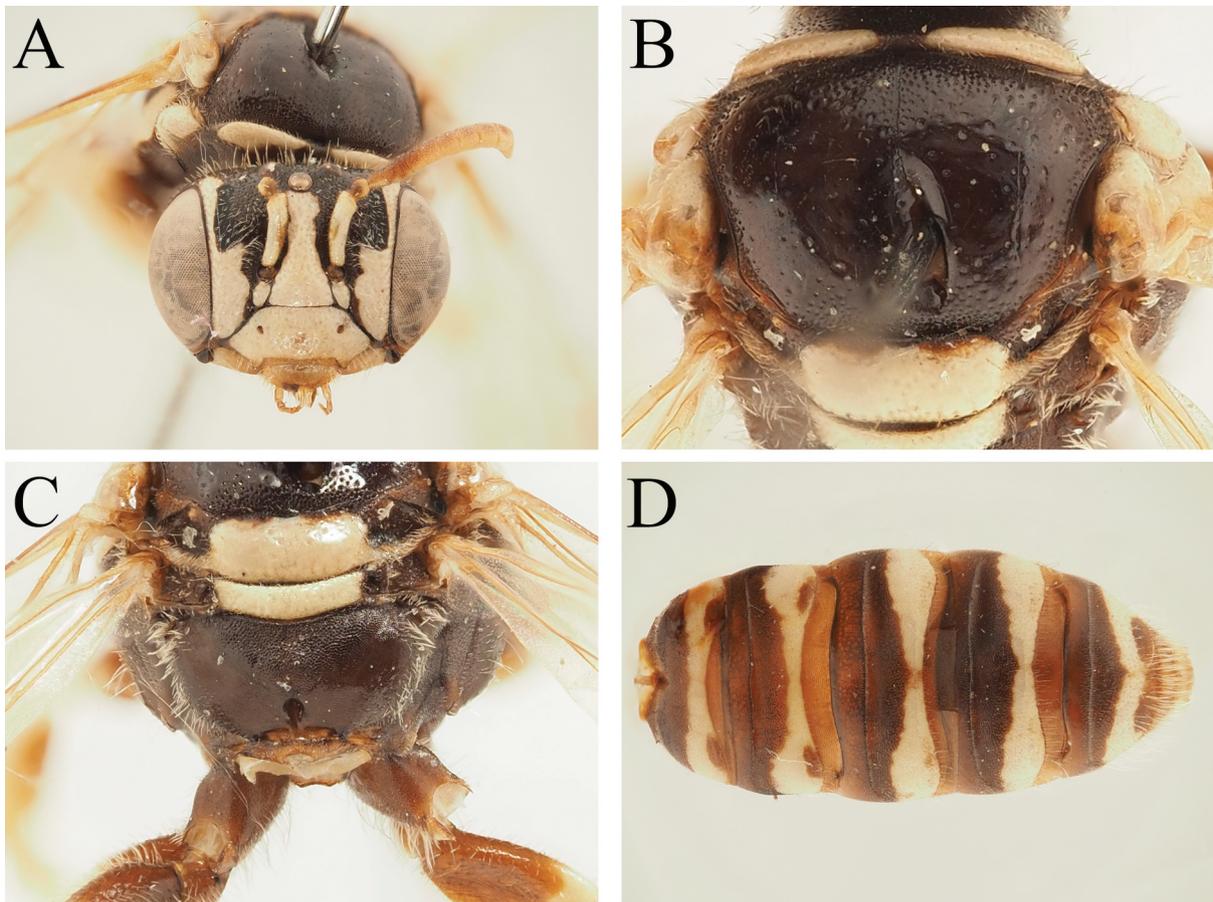
**Holotype** 1♀; 1♂: **INDIA** • 1♀; **Odisha**, Keramara [8.5 km SE of Kaptipada] (low-intensity farming site); 21° 27.244'N, 86° 35.123'E [21.4567°N, 86.5867°E]; 1–30 April 2014; A. Chatterjee and S. Laha leg.; ZSI; O-KRMV-0414-00746.

**Paratype**: **INDIA** • 1♂; **Odisha**, Gobardhan Pur [Gobardhanpur, 6 km SE of Santoshpur] (highly intensive farming site); 21° 43.231'N, 87° 12.594'E [21.7231°N, 87.2164°E]; 1–30 April 2014; A. Chatterjee and S. Laha leg.; ZSI; O-GBRV-0414-00656.

Both specimens are deposited at the Zoological Survey of India (ZSI), Kolkata, India.

### Diagnosis

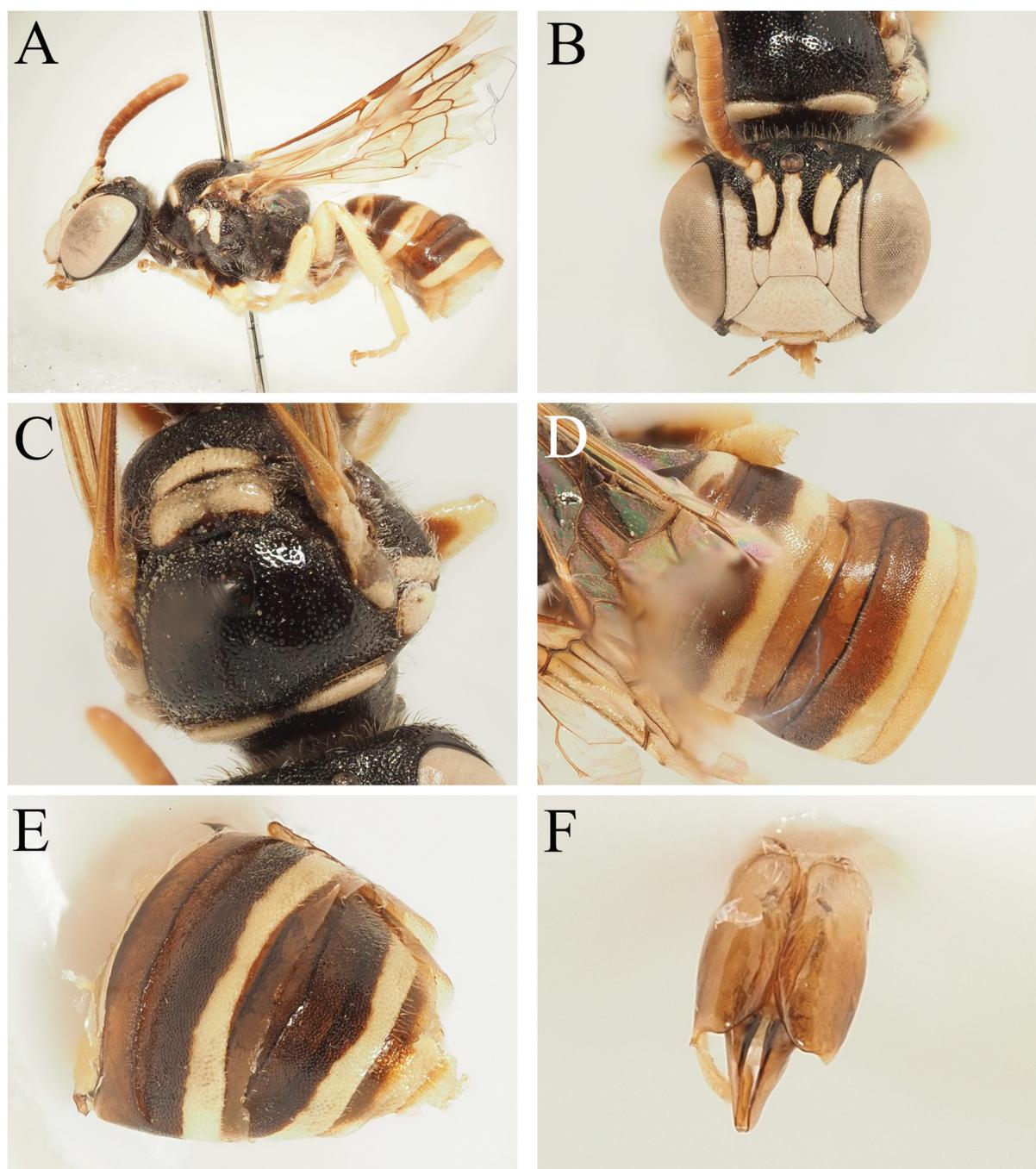
*Camptopoeum paruii* can be recognised due to the combination of fore wing with two submarginal cells, marginal cell apically truncate, face with two subantennal sutures (Figure 1A), facial foveae weak, shining, and hairless (allowing placement in Panurginae), and then cuticle with extensive yellow markings on face, thorax and metasoma (Figure 1A–D), face including frons clearly punctate, and male genital capsule simple with the inner margins of the gonocoxae smooth and not produced into anteriorly projecting teeth (allowing placement in *Camptopoeum*), and body size small (6 mm), head short, mouthparts clearly shorter than the length of the head (Figures 1A and 2B), glossa about one-half as long as prementum; first segment of labial palpus shorter than second to fourth segments taken together (allowing placement in subgenus *Epimethea*).



**Figure 1.** *Camptopoeum paruii* sp. n. female. A. Face, frontal view; B. scutum, dorsal view; C. propodeum, dorso-posterior view; D. terga, dorsal view.

Diagnosis can be made through the identification key to the subgenus *C. (Epimethea)* below, and is further detailed here. At a specific level, female *C. paruii* can be recognised due to the punctuation of the scutum combined with the facial and metasomal markings, after excluding distinctively coloured species (eg those with the integument almost entirely yellow-marked). Over the majority of the central part of the disc, the scutum is very sparsely and irregularly punctate, punctures separated by 1–5 puncture diameters, with a dense line of punctures (punctures separated by 0.5–1 puncture diameters) along the anterior and posterior margins of the disc (Figure 1B). The female face is also extensively marked with yellow-ivory colouration on the clypeus paraocular areas extending dorsally to the vertex, between the subantennal sutures, and on the supraclypeal area extending dorsally to the anterior ocellus (Figure 1B). The terga have yellow markings medially, forming transverse bands across the tergal discs, not extending onto the marginal areas, all bands slightly constricted medially but remaining complete (Figure 1D).

This combination excludes all similar species. The geographically closest *C. (Epimethea)* species, *C. samarkandum* (Radoszkowski) (Central Asia south to Tajikistan and Afghanistan) and *C. variegatum* (Morawitz) (West and Central Palaeartic, east to Iran and Turkmenistan), can both be distinguished due to their scutal punctuation which is dense, at most separated by 1 puncture diameter, their facial markings which are dark to minimally yellow-marked around the supraclypeal area, and their tergal markings which show transverse yellow bands that are either clearly interrupted laterally or reduced to yellow spots at the sides of the terga. Structurally, *C. paruii* is closer to *C. (E.) simile* (north-western Africa) and *C. (E.) nadigi* (Morocco) due to the sparser scutal punctuation, with punctures separated by 2–4 puncture diameters. However, these two species have reduced yellow colouration of the face, either being entirely dark (*C. simile*) or with yellow markings restricted to the supraclypeal area, slightly extending towards but not reaching the anterior ocellus (*C. nadigi*), and the scutellum is either dark or only partially yellow-marked, never entirely yellow-marked as in *C. paruii*.



**Figure 2.** *Camptopoeum paruii* sp. n. male. A. Profile; B. face, frontal view; C. scutum, dorsal view; D. tergal segments 1–3, dorsal view; E. tergal segments 4–7, dorsal view; F. genital capsule, dorsal view.

Recognition of the male is more challenging due to the more homogeneous nature of male *C. (Epimethea)* specimens. The metasoma is black with complete transverse yellow bands which are only very slightly narrowed medially (Figure 2D–E; metasoma without the integument entirely yellow or reddish). The scutum has the punctation across the median portion of the disc slight spaced, punctures separated by 0.5–1 puncture diameters, up to a maximum of 2 puncture diameters (Figure 2C). The slightly separated scutal punctures place it structurally close to *C. nadigi*, but the posterior margins of the transverse tergal bands are complete (Figure 2D; slightly but distinctly emarginate by the presence of black marks mediolaterally in *C. nadigi*) and the mesepisternum adjacent to the pronotal lobe has an elongate pale ivory mark that, measured from dorsal to ventral extent, clearly exceeds the pronotal lobe in length (Figure 2A; with a yellow mark adjacent to the

pronotal lobe in *C. nadigi*, this mark short and equalling the pronotal lobe in length). For (relatively) geographically close species, the frons has a weak carina extending part of the way between the upper margin of the supraclypeal area and the anterior ocellus (Figure 2B), but this is difficult to see due to the extensive yellow colouration (in *C. samarkandum* the carina on the supraclypeal area extends all the way to the anterior ocellus), and the transverse tergal bands are complete (interrupted to almost interrupted in *C. samarkandum* and *C. variegatum*).

### Description

**Female.** Body length: 6 mm. **Head:** Clypeus yellow, coarsely punctate, punctures separated by distance equal to diameter (Figure 1A). Labral lamella trapezoidal, slightly concave, yellow, coarsely shagreened. Mouthparts shorter than clypeus. Maxillary palpus longer than galea. Mandible blunt, conspicuously short, almost entirely yellow. Supraclypeal area, median part of frons and paraocular areas yellow, coarsely punctate with large shallow punctures. Facial fovea well-delimited, dark; dark cuticle extending behind scape. Vertex black, coarsely punctured. Gena black, punctuation fine and dense, denser along ocular margin. Scape yellow, except dorsal side black. Antennal flagellum orangish, darker dorsally; A3–5 darker.

**Mesosoma.** Pronotum black, posterior margin and lobes yellow; cuticle finely and densely punctured, anterior margin less punctured. Scutum black, anteriorly and posteriorly with dense punctures, punctures separated by 0.5–1 puncture diameters, medially with punctures sparse and irregular, separated by 2–4 puncture diameters, underlying surface polished and shining (Figure 1B). Mesopleuron black, yellow on anterior part of mesepisternum, coarsely punctured, punctuation strongly relaxed on ventral part. Anterior part of mesepisterna, behind pronotal lobe, dull, finely and densely punctured, yellow. Scutellum and metanotum, entirely yellow. Scutellum scarcely punctured, metanotum dull, finely and densely punctured. Propodeum black, finely shagreened, sculpture becoming stronger on propodeal triangle, here finely rugose (Figure 1C). Wings hyaline, veins brown, two submarginal cells. Legs yellow from femoro-tibial articulation to tarsi; hind tibia darker.

**Metasoma.** Disc margins of T1–5 marked with two large yellow spots which coalesce medially (forming stripe, wider laterally and narrower medially), very densely sculptured, finely punctate, dull (Figure 1D). No hair fringe on proximal terga, T5 apically with dense fringe of light brown hairs. Pygidial plate rounded triangular, lateral rim narrowly but distinctly depressed, majority of surface thus elevated, surface dull and featureless. Sterna dark brown.

**Male.** Body length: 6 mm (Figure 2A). **Head:** Colour pattern similar to female (Figure 2B). Yellow marks slightly more extensive than in females (including for instance antennal pedicel), paler, white yellow, with less black cuticle intermixed. Punctuation similar to female, vertex sculpture denser, labral lamella flat shiny, displaying an apico-median indentation. Mandibles longer than female, normally tapered.

**Mesosoma.** Colour pattern similar to female. Scutum densely punctate, punctures separated by 0.5–1 puncture diameters (Figure 2C). Yellow marks on legs extended from coxa to apex of tarsus. Trochanters and femora partly brown. Punctuation of mesonotum, mesopleura and propodeum fine and dense; denser and more regular than in female (unpunctured cuticle reduced in regard of female pattern). Propodeal triangle very densely sculptured, rippled. Wing surface lightly darkened.

**Metasoma.** Colour pattern similar to female. Yellow marks of terga more uniform in breadth, not distinctly narrowed medially (Figure 2D–E). Tergal discs with punctuation very dense, marginal areas almost impunctate, smooth and shinier. S2–5 with small median symmetric yellow spots. S2 with additional lateral spots. Pygidial plate undeveloped. Genital capsule with inner margins of gonocoxae apically diverging, forming large V-shaped emargination, gonostyli small and spatulate, penis valves basally broad, gently narrowing apically (Figure 2F).



**Figure 3.** Global distribution map of *Camptopoeum* Spinola, 1843 species. Records of *Camptopoeum paruii* sp. n. are indicated with a blue arrow, and unclear possible records of *Camptopoeum* from northern Thailand indicated with a '?'.  
DFF - 1999

### Etymology

This species is named in honour of Arpan Parui, a student in the lab of the Centre for Pollination Studies at the University of Calcutta who was instrumental in recognising the significance of these specimens. He passed away under tragic circumstances in September 2017.

### Distribution

India (Odisha) (Figure 3).

Identification key to *Camptopoeum* (*Epimethea*) species

### Notes

The key includes taxa that are treated in line with the works of Warncke (1972, 1987). However, the holotype of *Camptopoeum nigrotum* (Warncke, 1987) appears to be identical to the holotype of *Camptopoeum pictipes* (Morawitz, 1875) (see illustration of Astafurova and Proshchalykin 2024). Warncke (1987, p. 76) indicates that *C. pictipes* has the scutum finely and densely punctate and that the metasoma always bears yellow maculations, whereas *C. nigrotum* has the scutum irregularly punctate and the metasoma is always dark; these characterisations do not correspond to Morawitz's type material, implying that Warncke (1987) was using *C. pictipes* in a sensu auctorum. Warncke (1987, p. 77) states that he never found the type of *C. pictipes* in St. Petersburg; this is unfortunate, since the single holotype specimen is indeed present in the collection (Astafurova and Proshchalykin 2024). A revision of *pictipes/nigrotum* material is required with this in mind, but it is beyond the scope of this work to provide a resolution to this problem here. We take no taxonomic action, and indicate in the key the likely incorrect species concepts.

*Camptopoeum guichardi* Patiny is not included in the female identification key, as it is known only from the male sex. Equally, *C. pseudorubrum* (Warncke) and *C. warnckei* Patiny, are not included in the male key, since they are known only from the female sex.

- |  |    |
|--|----|
| 1. Twelve antennal segments, 6 visible metasomal segments; females . . . . . | 2  |
| - Thirteen antennal segments, 7 visible metasomal segments; males . . . . .  | 14 |

2. Body length >8 mm. Scutum sparsely punctate, punctures separated by 1–3 puncture diameters, allowing the polishing and shining interspaces to be easily seen. Yellow metasomal bands occupying more than ½ the visible length of each disc, almost from the base of each tergum up to the beginning of the marginal area. Found in Iran and Turkmenistan . . . . . **abbasi (Warncke)**
- Without this combination of characters; body length <8 mm, scutum densely or sparsely punctate, and metasoma either entirely with pale colouration, or with metasomal bands narrower or absent. Distribution variable . . . . . 3
3. Body with yellow markings covering almost its entire surface; scutum predominantly pale, with conspicuous narrow longitudinal black lines that contrast the predominantly yellow integument . . . 4
- Body predominantly black, never with yellow markings on scutal disc itself . . . . . 5
4. Scutum finely, densely, and regularly punctate, punctures separated by <0.5 puncture diameters. Tergal margins white-pale. Found in Central Asia (Uzbekistan, Kazakhstan) . . . . . **mirabile Morawitz**
- Scutum with large, coarse, and irregular punctures, punctures separated by 0.5–2 puncture diameters. Tergal margins reddish-brown. Found in Iran . . . . . **warnckeii Patiny**
5. Scutum sparsely and irregularly punctate, punctures (or macropunctures for species where additional micropunctures are scattered between larger punctures) separated by 1–4 puncture diameters, but clearly with large polished shining interspaces . . . . . 6
- Scutum densely and consistently punctate, punctures separated by up to 1 puncture diameter . . . . . 9
6. Face with abundant pale maculations, these present on the mandibular bases, clypeus, supraclypeal area, between the subantennal sutures, and paraocular areas. Scutellum almost entirely yellow-marked. Found in India (Odisha) . . . . . **paruii Patiny and Roberts, sp. n.**
- Face at most with pale maculations on the supraclypeal area. Scutellum entirely dark or with a narrow yellow band. Not found in India . . . . . 7
7. Face entirely black. Mesosoma dark with yellow maculations only on the pronotal lobes. Terga entirely dark, without yellow bands or lateral maculations. Found in Turkey and Israel . . . . .
- . . . . . **nigrotum Warncke** [likely = *pictipes* (Morawitz)]
- Face either black or with a yellow maculation on the supraclypeal area. Mesosoma with yellow marks at least on the metanotum in addition to those on the pronotal lobes. Terga with clear yellow bands or lateral maculations. Found in north-western Africa . . . . . 8
8. Face entirely black. Scutellum black, metanotum partially yellow-marked. T1–4 with only a yellow strip laterally. Found in north-western Africa (Morocco, Algeria, Tunisia) . . . . . **simile (Pérez)**
- Face with a large triangular yellow maculation on the supraclypeal area. Scutellum with a narrow yellow band apically, metanotum entirely yellow-marked. T1–5 with abundant yellow markings, forming more or less complete but irregular bands. Found in Morocco only . . . . . **nadigi (Warncke)**
9. Face with yellow maculations on the supraclypeal area, between the subantennal sutures, and on the basal ½ of the clypeus forming an inverted 'W' pattern, thus resembling the colour pattern seen in certain *C. (Camptopoeum)* species. Mesepisternum adjacent to the pronotal lobe with a large patch of yellow colouration. Scutellum almost entirely yellow-marked. Found in Turkey . . . . .
- . . . . . **subflavum (Warncke)**
- Species darker, without such abundant yellow colouration . . . . . 10
10. Mesosoma almost entirely dark, at most with slight narrow yellow markings on the pronotum. Terga dark, without yellow maculations, marginal areas lightened to rufescent . . . . . 11
- Mesosoma with more abundant and broader yellow markings, most typically on the pronotal lobes, the pronotum, and the metanotum. Terga with at least some yellow maculations . . . . . 12
11. Scutum finely and densely punctate, punctures separated by 0.5–1 puncture diameters. Pronotum with slight narrow yellow markings on the pronotum. Found in Turkey . . . . . **rubrum (Warncke)**
- Scutum finely but somewhat irregularly punctate, punctures separated by 0.5–2 puncture diameters, sparsest mediolaterally, here separated by up to 3 puncture diameters. Pronotum entirely dark. Found in Morocco . . . . . **pseudorubrum (Warncke)**
12. Very small species (5 mm). Terga with both lateral and medial yellow maculations. Frons anterior to median ocellus with a fine but prominent ridge. Found in Central Asia (Uzbekistan, Tajikistan) . . . . .
- . . . . . **samarkandum (Radoszkowski)**

- Slightly larger (6–7 mm). Terga with yellow maculations placed laterally, never medially. Frons without such a ridge. Found from North Africa to Iran and Turkmenistan . . . . . 13
  - 13. Wings lightly infuscate with the stigma dark. Mesosoma with yellow maculations on the pronotum, pronotal lobes, and metanotum. Found in North Africa, south-eastern Europe, the Near East, Turkey, Armenia, Turkmenistan, Iran . . . . . **variegatum (Morawitz)**
  - Wings milky white with the stigma light. Mesosoma often entirely dark, with only some individuals showing small yellow markings. Found in Turkey, Israel, Armenia, Kazakhstan, Turkmenistan, Iran . . . . . **pictipes (Morawitz)** [likely *pictipes* sensu auctorum; taxon possibly undescribed]
- It should be noted that the identification of male *C. (Epimethea)* is challenging due to the lack of clear morphological differences and the homogeneous nature of the genital capsule. It is not clear whether all of the characters presented here are robust. Association with concurrently active females should be made, as well as consideration of the known distribution.
- 14 (1). Metasoma almost entirely red-marked, at most with irregular dark markings covering <10% of the surface. Scutum densely and finely punctate, punctures separated by <0.5 puncture diameters. Found in Turkey . . . **rubrum (Warncke)**
  - Metasoma never with extensive red markings. Scutum often with punctation sparser . . . . . 15
  - 15. Metasoma ventrally predominantly yellow-marked . . . . . 16
  - Metasoma ventrally predominantly dark, never predominantly yellow-marked . . . . . 17
  - 16. Face with yellow colouration predominantly in ventral half, slightly extending above antennal insertions along inner margins of compound eyes. Scutum with punctures separated by 0.5–2 puncture diameters, but typically by up to 1 puncture diameter. Mesopleuron black. Scutum yellow-marked in posterior ½. Found in Turkey . . . **subflavum (Warncke)**
  - Face with extensive yellow colouration, extending above antennal insertions to cover majority of frons. Scutum more sparsely punctate, punctures separated by 0.5–2 puncture diameters, but typically by over 1 puncture diameter, in direct comparison with larger shining interspaces. Mesopleuron in dorsal part with yellow mark. Scutellum entirely yellow-marked. Found in Iran and Turkmenistan . . . . . **abbasi (Warncke)**
  - 17. Integument of body predominantly pale yellow. Mesonotum pale with three strongly contrasting longitudinal black lines. Found in Central Asia (Uzbekistan, Kazakhstan) . . . . . **mirabile Morawitz**
  - Integument of body predominantly dark, with distinct yellow maculations. Scutum dark, without any yellow maculations . . . . . 18
  - 18. Species very small (5 mm). Frons medially with a strong and distinct longitudinal carina that maintains a consistent height running between the antennal insertions up to the anterior ocellus. Found in Central Asia (Uzbekistan, Tajikistan) . . . . . **samarkandum (Radoszkowski)**
  - Species either larger, or without such a strong distinct carina on the frons . . . . . 19
  - 19. Scutum with punctation very sparse, macropunctures separated by 1–4 puncture diameters. Body size small (4.5 mm). Found in Oman . . . . . **guichardi Patiny**
  - Scutum with punctation variable, but never so sparse. Body size variable. Distribution otherwise . . . 20
  - 20. Scutum with punctation variable, punctures separated by 0.5–1 puncture diameters, up to a maximum of 2 puncture diameters. Terga with transverse yellow bands complete, not interrupted. Mesepisternum adjacent to pronotal lobe with an elongate pale ivory mark. Found in India (Odisha) . . . . . **paruii Patiny and Roberts, sp. n.**
  - Combination of characters otherwise. Found from Morocco to Central Asia . . . . . 21
  - 21. Small species (5 mm). Scutum densely and uniformly punctate, punctures separated by <0.5–0.5 puncture diameters. Terga with yellow markings scattered, present laterally and medially in the form of spots, thus appearing to represent transverse bands that are broadly interrupted in multiple places. Found in North Africa, south-eastern Europe, the Near East, Turkey, Armenia, Turkmenistan, Iran . . . . . **variegatum (Morawitz)**
  - Combination of characters otherwise . . . . . 22
  - 22. Found in north-western Africa . . . . . 23
  - Found from the Levant and Turkey to Central Asia . . . . . 24

23. Terga with transverse yellow bands complete, with only small, weak, and dark emarginations posteriorly. Clypeus weakly domed with its apical margin straight. Face between the antennal insertions with a pale triangular marking. Found in Morocco only . . . . . **nadigi (Warncke)**  
 - Terga typically with yellow marks laterally, not forming complete transverse bands. Clypeus regularly convex, the anterior margin presenting a clear median emargination. Face between the antennal insertions not forming a triangle. Found in north-western Africa (Morocco, Algeria, Tunisia) . . . . .  
 . . . . . **simile (Pérez)**
24. Scutum finely and moderately punctate, punctures separated by 1–2 puncture diameters. Terga with lateral yellow marks. Frons shallowly and somewhat indistinctly punctured. Found in Turkey, Israel, Armenia, Kazakhstan, Turkmenistan, Iran . . . . .  
 . . . . . **pictipes (Morawitz)** [likely *pictipes* sensu auctorum; taxon possibly undescribed]  
 - Scutum coarsely and irregularly punctate, punctures typically separated by >2 puncture diameters. Terga predominantly dark, with yellow marks almost absent. Frons strongly and deeply punctate. Found in Turkey and Israel . . . . . **nigrotum Warncke** [likely = *pictipes* (Morawitz)]

## Discussion

Although India is one of the 17 megadiverse countries, from the perspective of bees the Indian subcontinent is unusual in that it does not appear to have hosted any bees at all until relatively recently in geological time. When the subcontinent collided with Asia over a period between 40 and 50 million years ago (Bouilhol et al. 2013), it allowed colonisation by bees from the Asian continent for the first time. Given the emergence of bees in western Gondwana around 120 million years ago, this has resulted in the lack of any ancient endemic lineages of bees in the Indian subcontinent (Almeida et al. 2023), since such lineages had no means of accessing this region for approximately 80 million years after the original emergence of bees.

Although the bee fauna of India has a long history of study (eg Lepeletier de Saint-Fargeau 1841; Smith 1854; Bingham 1897; Cameron 1897; Nurse 1903; Cockerell 1920), it also has a confused history of study due to the lack of detailed revisionary work, including type revision for many groups. In this context, study of the Indian fauna presents many difficulties when attempting to integrate modern studies with this historical legacy, particularly considering the often scattered and obscure nature of Indian bee types (eg Baker 1994; Gautam et al. 2024; Sardar et al. 2024). However, when dealing with bee lineages which are species-poor in India or previously considered absent, it is much easier to identify genuine novelties for the region. The description of *C. paruii* highlights a trend of isolated Indian or Southeast Asian members of bee lineages which are more typically considered to be Palaearctic, or largely Palaearctic. This would include species of *Andrena* Fabricius, *Colletes* Latreille, *Nomiapis* Cockerell, and *Tarsalia* Morawitz, (eg LaBerge 1968; Baker 1972, 1995, 1998a, 2002; Kuhlmann 2003; Wood 2023b; see Ebmer 2021 for publication date of Morawitz 1894), or recognition of unusual lineages like *Aglaopis* Cameron (Baker 1998b). Beyond the Himalayan region, such examples of isolated representatives of largely Palaearctic genera are often found in the mountains of southern India such as in the Western Ghats or the mountains of Tamil Nadu.

What is interesting about the discovery of *C. paruii* is that it was found in eastern India at low altitude (below 200 m in elevation), breaking this emerging pattern. Its presence here gives the genus a disjunct distribution, with the nearest records from Pakistan approximately 1800 km distant (Figure 3). In Pakistan, *Camptopoeum* (*Camptopoeum*) species are known from the west around Quetta in dry semi-arid conditions (Rozen 1988), conditions strongly differing from those seen in Odisha state. An area lacking clarity is the situation farther to the east. Patiny (2001, p. 144) examined a single specimen nominally belonging to *Camptopoeum* (*Camptopoeum*) *frontale* (Fabricius, 1804) from Chiang Mai in northern Thailand (• 1♂; Thāi N., Chiang Māi prov., San Pa Kia; 1400 m a.s.l.; 1–15 May 1996; V. Kuban leg.; S. Patiny det.; Oberösterreichisches Landesmuseum, Linz, Austria). If correctly labelled, this would create a strongly disjunct distribution, as based on confirmed records this species extends to the east only to Iran (Patiny 2012). Further study of material from Thailand and Southeast Asia more generally is needed to understand whether these specimens represent the genuine presence of the genus in this region, as well as their specific status and identity. Basic research is also needed to understand whether *C. paruii* is also associated with the family Apiaceae, as is the case for all *C. (Epimethea)* species studied to date (Popov 1967b).

Finally, Panurginae have been shown to be closely associated with xeric ecosystems and are not excluded even by the driest environments (eg the Sahara desert), as they can occur intermittently based on the local availability of water and ephemeral vegetation (Patiny and Michez 2007; Patiny et al. 2009). Although the state of Odisha is considered to have a tropical climate, the northern half of India does contain landscapes of xeric grassland and open forests (Mani 1974) which nominally offer the conditions needed to support *Camptopoeum* populations. Evidently, the presence of a member of the genus in this region demonstrates that local conditions are suitable. The genus may have dispersed across northern India from the west via semi-arid western ecosystems and the Gangetic ecosystems ranging along the river valley up to Odisha's neighbouring regions. Indeed, bees more typical of xeric habitats of North Africa and the Middle East such as *Andrena savignyi* Spinola, 1838 and *Andrena aegyptiaca* ssp. *comberi* Cockerell, 1920 occur in the neighbouring state of Bihar (Cockerell 1920; Gautam et al. 2024). If *Camptopoeum* can be found in eastern India, then it raises the possibility that many more bee genera that are typically considered to be 'Palearctic' may also present relictual members in this biodiverse but still understudied region.

## Acknowledgements

Our thanks go to Dr Arnob Chatterjee (lab and field colleague at the Centre for Pollination Studies, University of Calcutta) for assisting in specimen collection, and to Dr John Ascher (National University of Singapore) who recognised the specimens as those of a species of *Camptopoeum* via social media. We are also grateful to Doug Yanega (University of California, Riverside) who provided help in interpreting some of the details of the International Code of Zoological Nomenclature (ICZN), and Prof. Pierre Rasmont who prepared the *Camptopoeum* distribution map. We also acknowledge 'India Post' for uninterrupted and careful delivery of the bee specimens. The specimens were collected as part of the project Enhancing the Relationship between People and Pollinators in Eastern India, funded through the Game & Wildlife Conservation Trust (UK) by the Defra Darwin Initiative (No. 019-24).

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This work was supported by the Department for Environment, Food and Rural Affairs, UK Government [Darwin Initiative (No. 019-24)]; DEFRA [Darwin Initiative (No. 019-24)].

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