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Notes on the Indian species of *Phaeochrous* Laporte, 1840 (Coleoptera: Hybosoridae), with three new country records

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Abstract

The genus *Phaeochrous* Laporte, 1840 (Coleoptera: Hybosoridae) is a poorly studied group of saprophagous beetles in India, with limited taxonomic and distributional information available. The present study is based on the examination of 245 dried and pinned museum specimens housed in the National Zoological Collections of the Zoological Survey of India, Kolkata. Six taxa of *Phaeochrous* were identified, including three taxa —*P. emarginatus suturalis* Lansberge, 1885, *P. compactus* Kuijten, 1978, and *P. separabilis* Zhang, 1990—recorded for the first time from India. In addition, new distributional data are provided for *P. emarginatus emarginatus* Laporte, 1840, *P. enigmaticus enigmaticus* Kuijten, 1978 and *P. diversipes* Kuijten, 1928. With these additions, the Indian fauna of *Phaeochrous* now comprises a total of eight species. Diagnostic features and male genitalia of all examined species are illustrated to aid accurate identification. The distributional ranges of each species within India are mapped and discussed in relation to their known global distribution. These new records significantly expand the known range of *Phaeochrous* species in the Indian subcontinent and contribute to a better understanding of the diversity, distribution, and biogeographical patterns of Hybosoridae in the Oriental Region.

Key words: New distribution records, Oriental, Palaearctic, *Phaeochrous*, Scarabaeoidea, taxonomy

Introduction

The genus *Phaeochrous* Laporte, 1840 (Coleoptera: Hybosoridae) comprises 51 species distributed across the Afrotropical, Oriental, Palaearctic, and Australian regions (Kuijten, 1978; Kral and Löbl, 2006; Ballerio and Bezděk, 2016; Schoolmeesters, 2025). A single record exists for the Nearctic region (USA: California) for the enigmatic species *Phaeochrous behrensii* Horn, 1867, while no records have been reported from the Neotropical region (Allsopp, 1984). Beetles of the genus *Phaeochrous* Laporte primarily feed on dung, carrion, fungi, or rotting wood (Kuijten, 1978). Some species are also found in ant and termite nests (Ocampo, 2002). Accurate species-level identification within *Phaeochrous* can only be achieved by examining the structure of the parameres, as most species appear morphologically similar (Kuijten, 1978, 1984; Zhang, 1990).

Early studies on *Phaeochrous* species from India were conducted by Westwood (1841), Macleay (1864), Fairmaire (1879), Lansberge (1885), Lewis (1896), Arrow (1909), Pic (1943), and Petrovitz (1975). Kuijten (1978) subsequently revised the Indo–Australian species of *Phaeochrous*, identifying five species/subspecies from India: *P. diversipes* Pic, 1928, *P. emarginatus emarginatus* Laporte, 1840, *P. enigmaticus enigmaticus* Kuijten, 1978, *P. intermedius occidentalis* Kuijten, 1978, and *P. madrassicus* Kuijten. 1978. A subsequent report by

Chandra (1992) documented *P. intermedius intermedius* Pic, 1928 from the Andaman and Nicobar Islands. Nikolajev (2008), Keith and Aston (2011), and Chandra and Gupta (2013) have also contributed to the taxonomic understanding of *Phaeochrous*. Despite the record of five taxa from India, the majority of these are known only from limited geographic distributions, resulting in a significant knowledge gap regarding Indian *Phaeochrous* species.

While examining a collection of *Phaeochrous* from various localities in India housed at the Zoological Survey of India, Kolkata, we identified six taxa. Of them, *Phaeochrous emarginatus suturalis* Lansberge, 1885, *P. compactus* Kuijten, 1978, and *P. separabilis* Zhang, 1990 are here reported for the first time from India. Furthermore, we present new distribution records for *P. emarginatus emarginatus* Laporte, *P. enigmaticus enigmaticus* and *P. diversipes* for the country.

Material and Methods

A total of 245 dried and pinned museum specimens of *Phaeochrous* from 18 localities across India were examined from the collections of the Zoological Survey of India, Kolkata (NZSI). Specimens were photographed using a Nikon SMZ–25 stereo zoom microscope equipped with NIS–Elements BR 5.10.00 software, and images were digitally processed to remove dust and standardize the background. Species identifications were made primarily based on male genital morphology following Kuijten (1978, 1981) and Zhang (1990). Distribution maps were prepared using QGIS version 2.8.1. An asterisk (*) indicates species recorded from India for the first time; a hash (#) denotes new distribution records.

Results

Family Hybosoridae Erichson, 1847
Genus *Phaeochrous* Laporte, 1840

Phaeochrous compactus* Kuijten, 1978
(Figs. 1A, 1B, 3A, 5A)

Phaeochrous compactus Kuijten, 1978: 34, fig. 20 (parameres) (type locality: Sri Lanka); Kuijten, 1981: 46, figs., 1–3 (parameres); Allsopp, 1984: 111 (checklist).

Material examined: 2 ♂, India: Himachal Pradesh, Hamirpur, Chauntra, 31.635°N, 76.628°E, 19.vii.2014, leg. V.D. Hegde (ZSI/H4A/30292). 1 ♂, India: Himachal Pradesh, Chamba, Rajpura, 32.556°N, 76.103°E, 08.vii.2014, leg. V.D. Hegde (ZSI/H4A/21614). 2 ♂, 2 ♀, India: Tamil Nadu, Western Ghats, Suruli Falls, 10.225°N, 77.469°E, 12.vi.2015, leg. S. Prabhakaran (ZSI/H4A/30291).

Diagnosis: Length: 8.3 mm. Left paramere relatively short, somewhat triangular, without blade and excavation (Fig. 1A); right paramere with well-defined ridges and excavations on dorsal surface (Fig. 1B). Protibiae with 13–20 denticles. Elytral surface opaque.

Distribution: (Fig. 5A) India: Tamil Nadu* (Suruli Falls) and Himachal Pradesh* (Hamirpur, Chamba). Global: Sri Lanka.

Remarks: *Phaeochrous compactus* was originally described by Kuijten (1978) from Sri Lanka and was later reported from additional localities within the island by Kuijten (1981). In the present study, the species is recorded from India for the first time. Notably, its occurrence at higher elevations (approximately 800 m) in the western Himalayas suggests a much wider distribution than previously recognized, extending from the Western Ghats to the Himalayan region.

***Phaeochrous diversipes* Pic, 1928**
(Figs. 1C, 1D, 3B, 5A)

Phaeochrous diversipes Pic, 1928: 5 (type locality: India: Kodaikanal); Kuijten, 1978: 27, fig. 11 (parameres); Allsopp, 1984: 111 (checklist); Chandra, 2009: 80 (checklist); Chandra et al., 2020: 474; Gupta et al., 2022: 423 (checklist).

Material examined: 2 ♂, India: Tamil Nadu, Agasthyamalai Biosphere Reserve, Tirunelveli, Iron Bridge, 8.679°N, 77.346°E, 29.ix.2018, leg. R.V. and Party (ZSI/H4A/30629).

Diagnosis: Length: 11.3 mm. Left paramere with long excavation, tooth indistinctly developed (Fig. 1C); right paramere rounded at apex with nearly straight edges in frontal view (Fig. 1D). Protibiae with 15 denticles, proximal one of three outer teeth indistinguishable. Pronotum shining.

Distribution: (Fig. 5A) India: Karnataka (Kannada), Kerala, and Tamil Nadu (Kodaikanal, Agasthyamalai Biosphere Reserve, Tirunelveli#) (Kuijten, 1978; Allsopp, 1984).

Remarks: *Phaeochrous diversipes* was originally described by Pic (1928) from Kodaikanal and later redescribed by Kuijten (1978), who also reported additional records from Karnataka (Kanara) and Kerala (Travancore). Since that time, the species has been mentioned only in regional checklists. The material examined in the present study confirms its continued occurrence in Tamil Nadu, based on specimens collected from the Agasthyamalai Biosphere Reserve, Tirunelveli, and represents the first documented record of the species in nearly five decades. Based on currently available data, *P. diversipes* appears to be restricted to the Western Ghats of India.



Figure 1: Parameres (left and right) of *Phaeochrous* species. (A-B) *Phaeochrous compactus*, (C-D) *P. diversipes*, E-F, *P. emarginatus emarginatus*, (G-H) *P. emarginatus suturalis*, (I-J) *P. enigmaticus enigmaticus*, and (K-L) *P. separabilis*.

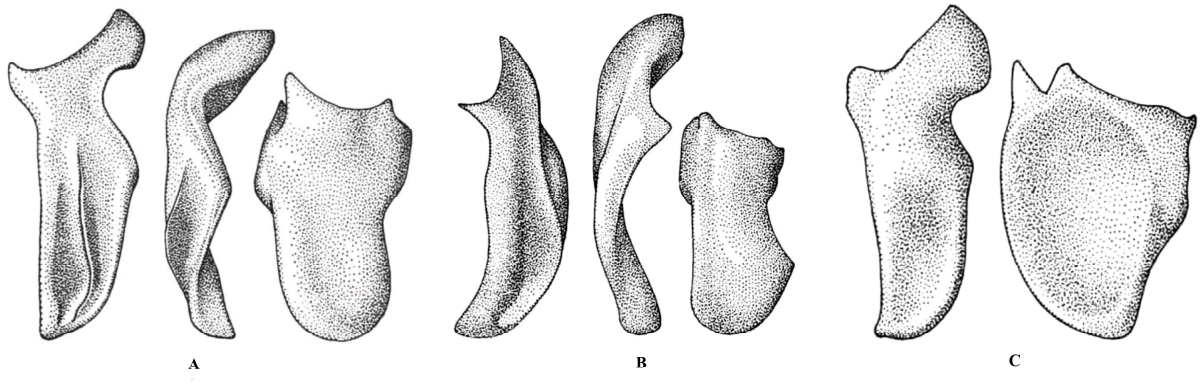


Figure 2: Parameres (left and right) of *Phaeochrous* species. (A) *Phaeochrous elevatus*, (B) *P. intermedius intermedius*, and (C) *P. madrassicus* (modified and redrawn from kuijten, 1978).

***Phaeochrous emarginatus emarginatus* Laporte, 1840** (Figs. 1E, 1F, 3C, 5A)

Phaeochrous emarginatus Laporte, 1840: 109 (type locality: Indonesia: Banjoewangi, Java).

Phaeochrous sumatrensis Westwood, 1841: 41 (type locality: Indonesia: Sumatra).

Phaeochrous hirtipes W.J. Macleay, 1864: 125 (type locality: Australia: Port Denison).

Phaeochrous alternatus Fairmaire, 1879: 112 (type locality: Papua New Guinea: New Britain).

Phaeochrous asiaticus Lewis, 1896: 332 (type locality: Japan: Okinawa).

Phaeochrous pallidus Arrow, 1909: 496 (type locality: India: Nilgiri Hills).

Phaeochrous celebensis Pic, 1928: 5 (type locality: Indonesia: Bonthain).

Phaeochrous perroudi Pic, 1943: 15 (type locality: Philippines).

Phaeochrous gracilis Petrovitz, 1975: 222 (type locality: Bhutan: Phuntsholing).

Phaeochrous emarginatus emarginatus: Kuijten, 1978: 18, fig. 3 (parameres), pl. I (habitus); Kuijten, 1981: 47, figs., 4–6; Král and Löbl, 2006: 97 (catalogue); Chandra et al., 2012: 51 (checklist); Chandra and Gupta, 2013: 336 (distribution); Ballerio and Bezděk, 2016: 87 (catalogue); Gupta et al., 2018: 481 (checklist); Ghosh et al., 2020: 233 (checklist); Ghosh et al., 2021: 4 (checklist); Gupta et al., 2021: 162 (checklist); Gupta et al., 2022: 423 (checklist); Bhunia and Gupta, 2025: 12 (India: Madhya Pradesh: Mandla: Kisli).

Material examined: 1 ♂, India: Andaman and Nicobar Islands, South Andaman, Alexandra Island, 11.585°N, 92.603°E, 15.vi.1982, leg. R.M. Sharma (ZSI/H4A/33088). 6 ♂: India, Himachal Pradesh, Solan, 30.908°N, 77.103°E, 01.vii.1968, leg. O.B. Chhotani (ZSI/H4A/8633–8636). 3 ♂, India: Jammu and Kashmir, Samba, 33.394°N, 75.609°E, 22.v.2025, leg. Irtiza. Wani (ZSI/ H4A/33087).

Diagnosis. Length: 8.0–12.5 mm. Left paramere with excavation well defined, covering entire apical portion, upper margin of blade gently curved, apex more or less curved downward, lateral tooth well developed (Fig. 1E). right paramere slightly curved at apex, edges straight and base with a longitudinal ridge (Fig. 1F).

Distribution. (Fig. 5A) India: Andaman and Nicobar Islands[#] (South Andaman), Chhattisgarh (Raipur), Haryana, Himachal Pradesh[#] (Solan), Jammu and Kashmir[#] (Samba), Karnataka (South Mysore), Madhya Pradesh (Mandla: Kisli), Tamil Nadu (Nilgiri Hills), Uttarakhand, and Uttar Pradesh. Global: Australia, Bhutan, China, Cambodia, Japan, Indonesia, Laos, Malaysia, Melanesia, Nepal, Pakistan, Sri Lanka, Thailand, Philippines, Papua New Guinea, South Korea, Taiwan, and Vietnam (Kuijten, 1978, 1981).

Remarks: *Phaeochrous emarginatus* is a polytypic species comprising seven subspecies: *P. emarginatus benderitteri* Pic, 1928 (Indonesia), *P. emarginatus buruensis* Kuijten, 1978 (Indonesia), *P. emarginatus cyclops* Prokofiev, 2012 (Papua New Guinea), *P. emarginatus davidis* Fairmaire, 1886 (China, Laos), *P. emarginatus emarginatus* Laporte, 1840 (widely distributed in the Oriental, Palaearctic, and Australasian regions), *P. emarginatus suturalis* Lansberge, 1885 (China, Myanmar, India), and *P. emarginatus thilliezi* Keith, 1999 (Pakistan). In India, two subspecies are known, *P. emarginatus emarginatus* and *P. emarginatus suturalis*. The nominate subspecies is widely distributed across the Oriental, Palaearctic, and Australasian regions. The material examined herein represents the first confirmed records of *P. emarginatus emarginatus* from the Andaman and Nicobar Islands and from Jammu and Kashmir. These records further demonstrate the broad ecological and biogeographic distribution of the subspecies within India, ranging from island ecosystems to the Himalayan region.

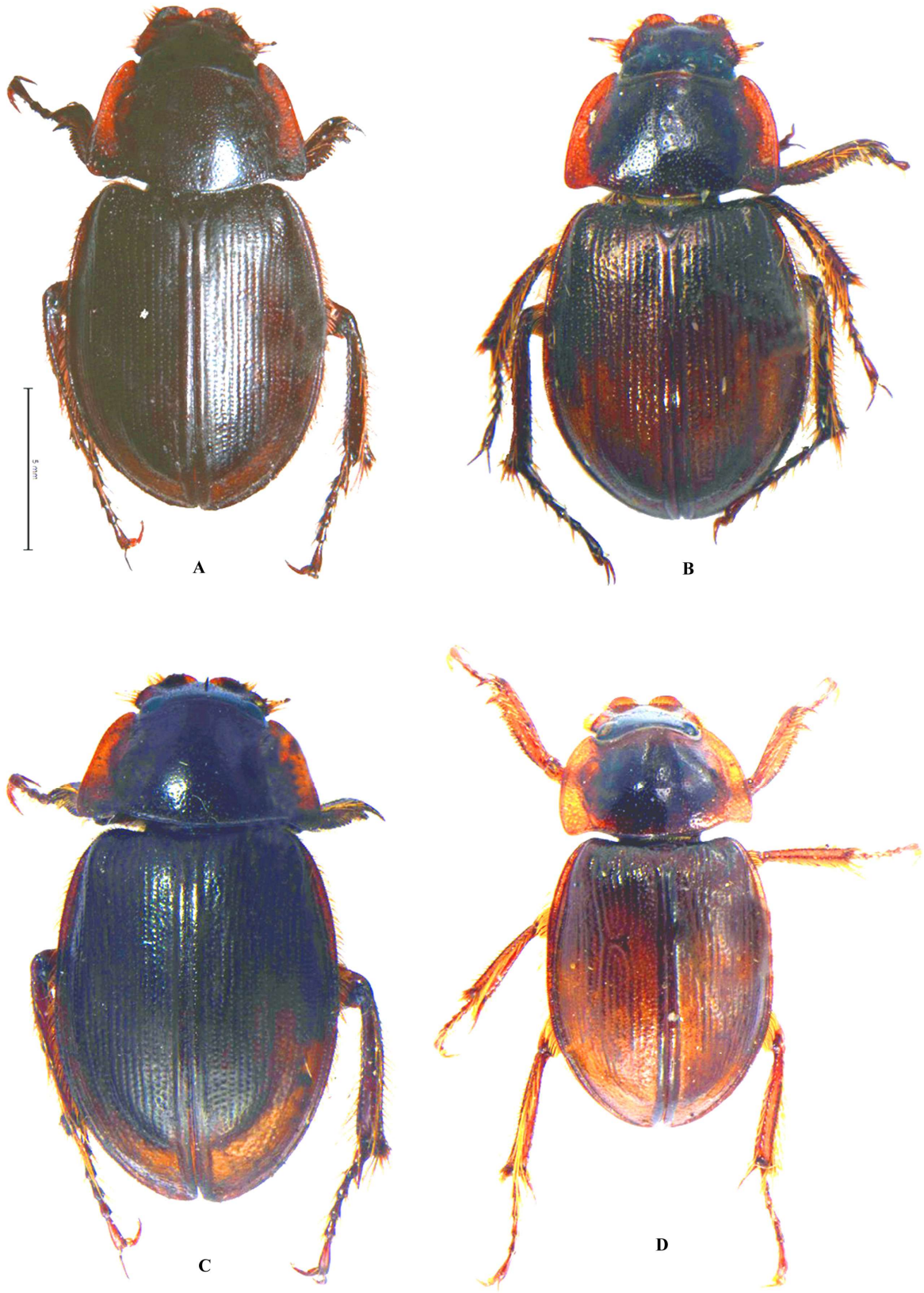


Figure 3: Habitus (in dorsal view) of *Phaeochrous* species. (A) *Phaeochrous compactus*, (B) *P. diversipes*, (C) *P. emarginatus emarginatus*, and (D) *P. emarginatus suturalis*.

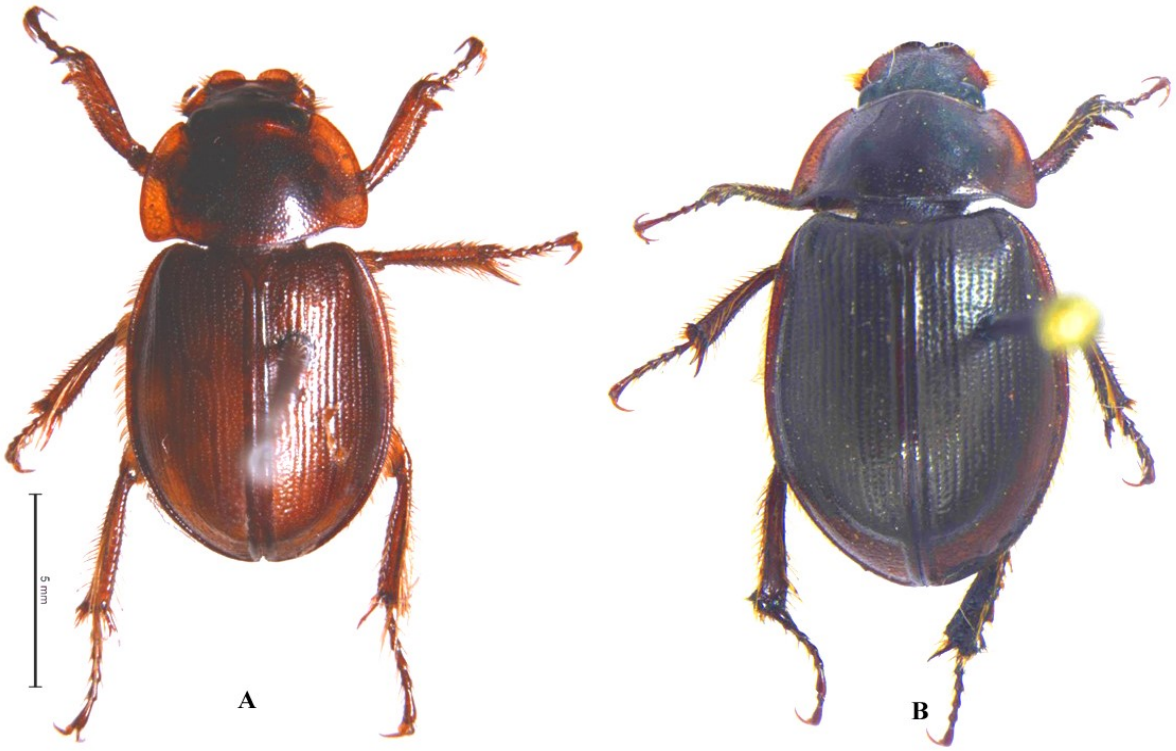


Figure 4: Habitus (in dorsal view) of *Phaeochrous* species: (A) *P. enigmaticus enigmaticus*, and (B) *P. separabilis*.

Phaeochrous emarginatus suturalis *Lansberge, 1885**
(Figs. 1G, 1H, 3D, 5A)

Phaeochrous suturalis Lansberge 1885: 394 (type locality: Myanmar: Minhla, Birmânia, Comotto 81).

Phaeochrous emarginatus suturalis: Kuijten, 1978: 23, fig., 4 (parameres); Allsopp, 1984: 111 (checklist); Král and Löbl, 2006: 97 (catalogue); Ballerio and Bezděk, 2016: 87 (catalogue).

Material examined: 1 ♂, India: Arunachal Pradesh, Talley Valley Wildlife Sanctuary, Lower Subansiri Range, 27.547°N, 93.897°E, 13.vi.2017 (ZSI/H4A/30633); 1 ♂, 13.vi.2017 (ZSI/H4A/30631); 2 ♂, 17.vi.2017 (ZSI/H4A/30632), leg. R.K. Kushwaha. 5 ♂, 14 ♀, India: Arunachal Pradesh, Namdapha National Park, Miao Camp, 27.470°N, 96.178°E, 05.v.1981, leg. S. Biswas (ZSI/H4A/30630).

Diagnosis: Length: 7.8 mm. Left paramere long and slender, excavation centred at apical half, tooth distinctly developed (Fig. 1G); right paramere round at apex, edge straight at one side and sinuate on other side in frontal view (Fig. 1H). Protibiae with 17 denticles. Surface of pronotum shining (Fig. 3D).

Distribution: (Fig. 5A) India: Arunachal Pradesh* (Talley Valley National Park, Namdapha National Park). Global: Myanmar (Kuijten, 1978).

Remarks: *Phaeochrous emarginatus suturalis* was originally described by Lansberge (1885) from Minhla, central Myanmar, and was subsequently treated as a subspecies of *P. emarginatus* by Kuijten (1978). Based on currently available evidence, the subspecies is reliably documented from Myanmar and is here recorded from India for the first time. Records from China (Xizang) are more plausibly attributable to the nominate subspecies *P. emarginatus emarginatus* and are therefore not considered further here in the context of *P. emarginatus suturalis*. The material examined herein extends the known distribution of *P. emarginatus suturalis* westwards into the eastern Himalayas.

Phaeochrous enigmaticus enigmaticus **Kuijten, 1978**
(Figs. 1I, 1J, 4A, 5A)

Phaeochrous enigmaticus Kuijten, 1978: 32, fig. 17 (parameres) (type locality: Indonesia: Java); Kuijten, 1984: 49; Allsopp, 1984: 111 (checklist); Keith, 1999: 11 (distribution); Král and Löbl, 2006: 97 (catalogue).

Phaeochrous enigmaticus enigmaticus: Nikolajev, 2008: 203, figs., 7–8; Ballerio and Bezděk, 2016: 87 (catalogue); Gupta et al., 2022: 423 (checklist);

Material examined: 1 ♂, India: Andhra Pradesh, Nellore, Dakkili Forest Rest House, 14.106°N, 79.551°E, 27.v.2000, leg. S.K. Chatterjee (ZSI/H4A/30639). 1 ♂, 1 ♀, India: Arunachal Pradesh, Lower Subansiri Range, Talley Valley Wildlife Sanctuary, 27.547°N, 93.897°E, 18.vi.2017, leg. R.K. Kushwaha (ZSI/H4A/30642). 13 ♂, 40 ♀,

India: Chhattisgarh, Jagdalpur, Tirathgarh Forest Rest House, 18.913°N, 81.866°E, 25.vii.2022, leg. R.P. Gupta (ZSI/H4A/30636). 2 ♂, 1 ♀, India: Chhattisgarh, Raipur, Barnawapara Wildlife Sanctuary, Barnawapara Camp, 21.400°N, 82.503°E, 14.vi.2013, leg. Sunil Gupta (ZSI/H4A/30641). 15 ♂, 38 ♀, India: Jharkhand, Dalma Wildlife Sanctuary, Makula Kocha Guest House, 22.916°N, 86.151°E, 08.vii.2021 (ZSI/H4A/30286), 4 ♂, 08.vii.2021 (ZSI/H4A/30637), 4 ♂, 12 ♀, 09.vii.2021 (ZSI/H4A/30288), 17 ♂, 21 ♀, 11.vii.2021 (ZSI/H4A/30293), 2 ♂, 22.vii.2021 (ZSI/H4A/30289), leg. J. Chitra. 5 ♂, 7 ♀, India: Jharkhand, Pindrabera, 22.894°N, 86.197°E, 10.vii.2021, leg. J. Chitra (ZSI/H4A/30287). 4 ♂, India: Jharkhand, West Singhbhum, Kamdeyong Nursery, Porahat, 22.605°N, 85.439°E, 15.vii.2021, leg. J. Chitra (ZSI/H4A/30636). 3 ♂, India: Maharashtra, Bhimashankar Wildlife Sanctuary, 19.148°N, 73.527°E, 01.xi.2012, leg. Bulganin Mitra (ZSI/H4A/30640).

Diagnosis: Length 10.1–11.1 mm. Left paramere with a weakly developed tooth and a deep median excavation extending to the apex, bearing an angular protrusion on the upper margin of excavation (Fig. 1I); right paramere with the apical portion strongly notched and margins sinuate in dorsal view (Fig. 1J). Protibiae with at least 12–14 denticles.

Distribution: (Fig. 5B) India: Andhra Pradesh[#] (Nellore), Arunachal Pradesh[#], Chhattisgarh[#] (Jagdalpur, Raipur: Barnawapa Wildlife Sanctuary), Jharkhand[#] (Dalma Wildlife Sanctuary, West Singhbhum), Maharashtra (Nagpur, Bhimashankar Wildlife Sanctuary[#]), Assam, Uttarakhand, and Tamil Nadu (Madura). Global: Bangladesh, China, Indonesia (Kuijten, 1978, 1984) and Pakistan (Keith, 1999; Král and Löbl, 2006; Ballerio and Bezděk, 2016).

Remarks: *Phaeochrous enigmaticus* comprises two subspecies: *P. enigmaticus enigmaticus* and *P. enigmaticus ovchinnikovi* Nikolajev, 2008 (Pakistan). The nominate subspecies was described by Kuijten (1978) from Java (Indonesia) based on material including specimens from China and Rangpur (Bangladesh). In India, it was previously known only from Assam, Maharashtra (Nagpur), and Tamil Nadu (Madurai) (Kuijten, 1984). The present study extends its distribution to Andhra Pradesh, Arunachal Pradesh, Chhattisgarh, and Jharkhand. Based on our material, this indicates that this is the most abundant and widely distributed species of the genus in India.

***Phaeochrous elevatus* Kuijten, 1978**
(Figs. 2A, 5B)

Phaeochrous elevatus Kuijten, 1978: 28, fig., 13 (parameres) (type locality: India: Coromandel); Kuijten, 1981: 46, figs., 7–9 (parameres); Gupta et al., 2022: 423 (checklist).

Diagnosis: Length 10.3–10.7 mm. Right paramere with tooth hardly developed and a strongly elevated, sharp ridge on dorsal margin of excavation. Protibiae with 13 denticles.

Distribution: India: Tamil Nadu (Coromandel). Global: Sri Lanka.

Remarks: Indian records of this species remain limited to the original description provided by Kuijten (1978).

***Phaeochrous intermedius intermedius* Pic, 1928**
(Figs. 2B, 5B)

Phaeochrous intermedius Pic, 1928: 5 (type locality: Vietnam: Chapa, Tonkin).

Phaeochrous intermedius intermedius: Kuijten, 1978: 28, fig., 14 (parameres); Allsopp, 1984: 111 (checklist); Chandra, 1992: 79 (distribution); Chandra and Rajan, 2004: 55 (distribution); Král and Löbl, 2006: 97 (catalogue); Keith and Aston, 2011: 3; Ballerio and Bezděk, 2016: 87 (catalogue); Chandra et al., 2018: 273 (checklist).

Diagnosis: Length 9.5–10.3 mm. Excavation in left paramere far extended towards base and rather narrow; tooth, in lateral view, hardly visible; right paramere slightly widening in apical half, with an angular protrusion on its outer margin; interstriae slightly shining.

Distribution: (Fig. 5B) India: Andaman and Nicobar Islands (Andaman Islands – Chandra, 1992; Chandra and Rajan, 2004). Global: Bhutan, China, Laos, Myanmar, Thailand, and Vietnam (Král and Löbl, 2006; Ballerio and Bezděk, 2016; Schoolmeesters, 2025).

Remarks: *Phaeochrous intermedius* exhibits a clear east–west subspecific pattern within India. The nominate subspecies, *P. intermedius intermedius*, is distributed in eastern India and the Indo-Chinese region, with confirmed records from Bhutan, China, Laos, Myanmar, Thailand, and Vietnam. Previous records from the Andaman and Nicobar Islands (Chandra, 1992; Chandra and Rajan, 2004) could not be verified during the present study. In contrast, *P. intermedius occidentalis* is confined to the western Himalayan region of India (Himachal Pradesh and Uttarakhand) and extends into Bhutan, Nepal, and mainland Southeast Asia. The two subspecies appear to be allopatric within India, with no confirmed areas of overlap.

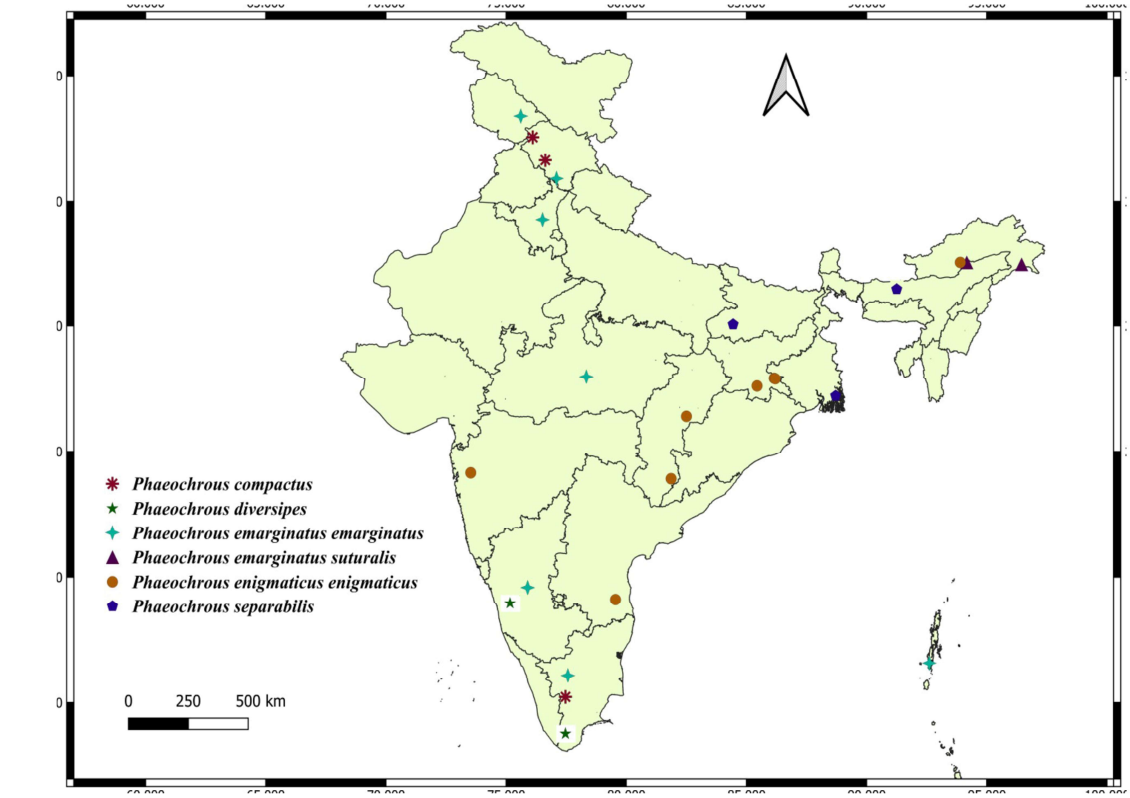
***Phaeochrous intermedius occidentalis* Kuijten, 1978**
(Fig. 5B)

Phaeochrous intermedius occidentalis Kuijten 1978: 29 (type locality: India: Solan); Allsopp, 1984: 111 (checklist); Král and Löbl, 2006: 97 (catalogue); Ballerio and Bezděk, 2016: 87 (catalogue); Gupta et al., 2018: 481 (checklist); Ghosh et al., 2021: 4 (checklist).

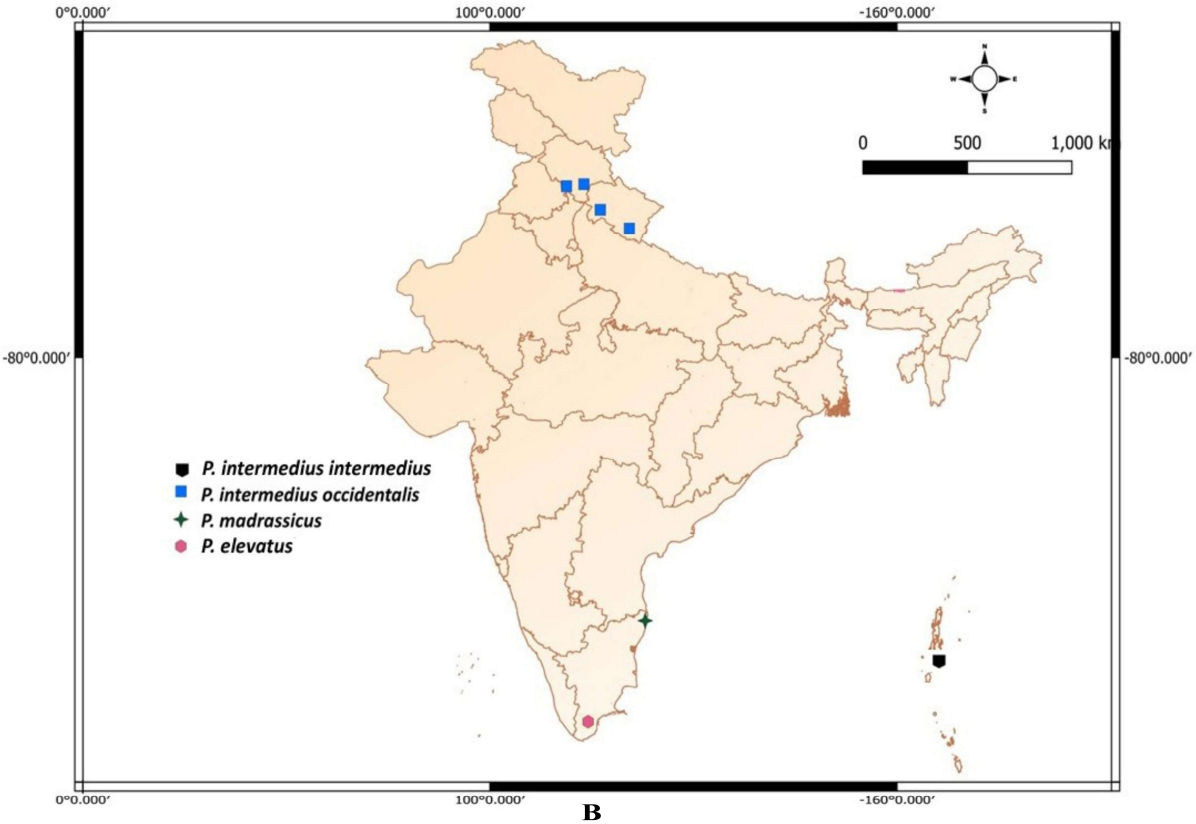
Diagnosis: Length 8.7–11.2 mm. Right paramere lacking angular protrusion in outer margin; interstriae slightly opaque.

Distribution: (Fig. 5B) India: Himachal Pradesh (Solan, Shimla) and Uttarakhand (Bhimtal). Global: Bhutan, Laos, Nepal, Thailand and Vietnam.

Remarks: Refer to remarks under *P. intermedius intermedius*.



A



B

Figure 5: (A, B) Map of India showing distribution of *Phaeochrous* species in India.

***Phaeochrous madrassicus* Kuijten, 1978**

(Figs. 2C, 5B)

Phaeochrous madrassicus Kuijten, 1978: 27, fig., 12 (parameres) (type locality: India: Indes orientales, Mts. Kodeicanel); Kuijten, 1984: 49 (distribution); Allsopp, 1984: 112 (checklist); Chandra, 2009: 80 (checklist); Gupta et al., 2022: 423 (checklist).

Diagnosis: Length 9.2–10.5 mm. Left paramere rather compactly built, with weakly developed excavation and tooth; right paramere slightly tapering towards apex. Protibiae with 10–16 denticles.

Distribution: (Fig. 5B) India: Tamil Nadu (Kodaikanal). Global: Sri Lanka (Kuijten, 1978, 1984).

Remarks: Indian records of this species remain limited to the original description provided by Kuijten (1978).

Phaeochrous separabilis* Zhang, 1990

(Figs. 1K, 1L, 4B, 5A)

Phaeochrous separabilis Zhang 1990: 146, figs., 6 – 8, 9–11 (parameres) (type locality: China: Jinhe, Xianyuan, Sichuan); Král and Löbl, 2006: 97; Ballerio and Bezděk, 2016: 87 (catalogue).

Material examined: 8 ♂, 2 ♀, India, Bihar, Aurangabad, Mahawar, 25.055370N, 84.443930E, 19.vi.1983 (ZSI/H4A/30634), leg. S.M. Ali. 1 ♂, 1 ♀, India, Assam, Manas Tiger Reserve, Barpeta, 26.331°N, 91.003°E, 15.iv.1985 (ZSI/H4A/30643); 1 ♂, 04.iv.1987 (ZSI/H4A/30644), leg. S.S. Saha.

Diagnosis: Length: 8.0–9.0 mm. Left paramere long and narrow, inner surface concave at apical part, lateral tooth well developed (Fig. 1K); right paramere rounded, folded at base. Protibiae narrow and long, 3 small teeth and 18–21 smaller teeth on outer edge.

Distribution: (Fig. 5A) India: Assam* (Manas Tiger Reserve) and Bihar* (Aurangabad). Global: China (Zhang, 1990).

Remarks: *Phaeochrous separabilis* was originally described from Sichuan, China (Zhang, 1990). The material examined here from Bihar and Assam represents the first confirmed records of this species from India, extending its known range westwards. The Indian specimens conform well to the original description, particularly in the structure of the parameres and protibial dentition.

Discussion

The present analysis substantially refines the understanding of the distributional structure and biogeographic affinities of *Phaeochrous* in India. The examined material reveals pronounced differences in range size, regional concentration, and apparent ecological breadth among the recorded taxa, suggesting that the genus comprises both widespread ecological generalists and geographically restricted elements within the Indian subcontinent. The Indian fauna of *Phaeochrous* now comprises a total of eight species.

The updated distributional data (Table 1; Figs. 5A, 5B) reveal clear biogeographic patterns. *Phaeochrous emarginatus emarginatus* and *P. enigmaticus enigmaticus* are the most widespread and abundant taxa, occurring across multiple biogeographic zones from the Himalayas to the southern peninsula. Their broad ecological amplitude suggests strong dispersal capability and possible adaptation to diverse habitats. In contrast, *P. diversipes* and *P. madrassicus* appear restricted to the Western Ghats, indicating endemism within this biodiversity hotspot. The detection of *P. emarginatus suturalis* in Arunachal Pradesh and *P. compactus* in both the Western Ghats and the Himalayas suggests a wider ecological tolerance and a potential faunal link between these two major mountain systems. In India, the two subspecies of *P. emarginatus* exhibit a clear allopatric distribution. *P. emarginatus emarginatus* occurs widely across peninsular India, the western and north-western Himalayas, and island systems (Andaman and Nicobar Islands), whereas *P. emarginatus suturalis* is so far restricted to the eastern Himalayan region of Arunachal Pradesh. No overlap in their known Indian distributions has been observed, suggesting geographical segregation possibly linked to biogeographic barriers and regional ecological differentiation.

The discovery of *P. separabilis* from Bihar and Arunachal Pradesh extends the species' known range beyond China, reinforcing the biogeographic continuity between northeastern India and the Indo-Chinese subregion. Similarly, the record of *P. compactus*, previously known only from Sri Lanka (Kuijten, 1978, 1981, 1984), supports faunal affinities between the Indian mainland and the island's southern biota, a pattern observed in several saproxylic and coprophagous beetle groups (Allsopp, 1984; Chandra, 1992).

Collectively, these findings expand the known Indian diversity of *Phaeochrous* to eight species and provide valuable baseline data for future taxonomic and ecological studies. The wide distribution of some species across varied climatic regions and altitudinal gradients suggests that the genus has achieved considerable ecological plasticity within India. However, the absence of historically reported taxa from recent collections may reflect localized rarity, habitat loss, or, in some cases, historical misidentifications, particularly where the original specimens or records have not been re-examined. Further fieldwork, especially in underexplored northeastern and central regions, is essential to clarify the distributional limits and conservation status of Indian *Phaeochrous*.

Key to Indian species of *Phaeochrous*

1. Right paramere with apical margin interrupted or excised, distal outline discontinuous (Figs. 1B, J) …...2
– Right paramere with apical margin continuous, not excised (Figs. 1D, F, H, L; 2A-C) …….3
2. Left paramere relatively short, somewhat triangular, without excavation (Fig. 1A); right paramere with well–defined ridges and excavations on dorsal surface (Fig. 1B); protibiae with 13–20 denticles ……..... *P. compactus*
– Left paramere with a weakly developed tooth and a deep median excavation extending to apex, bearing an angular protrusion on upper margin of excavation (Fig. 1I); right paramere with the apical portion strongly notched (Fig. 1J); protibiae with 12–14 denticles .....*P. enigmaticus enigmaticus*
3. Left paramere with a distinct or well-developed basal tooth or protrusion in lateral view (Figs. 1 E, G, K)……..4
– Left paramere without a distinct or well-developed basal tooth or protrusion in lateral view (Figs. 1C; 2A-C)…….....6
4. Right paramere relatively short and compact (Fig. 1I); left paramere long and narrow, inner surface excavation, only at apical end (Fig. 1K).....……...*P. separabilis*
– Right paramere long and elongate (Figs. 1F, H); left paramere with excavation well defined (Figs. 1E, G)……5
5. Right paramere slightly curved at apex, edges straight and base with a longitudinal ridge (Fig. 1F); left paramere with excavation well defined, covering entire apical portion, upper margin of blade gently curved, apex more or less curved downward……..…*P. emarginatus emarginatus*
– Right paramere round at apex, edge straight at one side and sinuate on other side in frontal view (Fig. 1H); left paramere long and slender, excavation centred at apical half……. *P. emarginatus suturalis*
6. Right paramere plate like, slightly tapering towards apex without a longitudinal ridge at base (Fig. 2C)… *P. madrassicus*
– Right paramere more or less rounded at apex with a longitudinal ridge at base (Figs. 1D, 2A, B)…….…7
7. Right paramere a strongly elevated, sharp ridge on dorsal margin (Fig. 2A)……..……. *P. elevatus*
– Right paramere without a strongly elevated, sharp ridge on dorsal margin (Figs. 1D, 2B)……..8
8. Left paramere with a long and deep excavation (Fig. 1C)..……...……...……...…...*P. diversipes*
– Left paramere with excavation rather narrow (Fig. 2B)..……...……...……...……..…9
9. Right paramere with an angular protrusion on its outer margin (Fig. 2B)…….. *P. intermedius intermedius*
– Right paramere without an angular protrusion on its outer margin……*P. intermedius occidentalis*

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Author contributions

The authors confirm their contributions to this paper as follows: P. Ghosh: data collection, species distribution mapping, and manuscript drafting; I. Wani: data validation, geographic distribution analysis, and figure preparation; D. Bhunia: data organization; D. Keith: identification of species, valuable input for the discussion and final revision of the manuscript. S. Sonali: literature survey and manuscript proofreading; D. Gupta: identification of specimens, conceptualization, study design, data compilation, manuscript writing, and overall supervision.

Conflict of interest

The authors declare that there are no conflicting issues related to this research article.

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