

SHORT NOTE

The first species of *Cephalophanus* from India (Coleoptera: Discolomatidae) resembling epilachnine ladybirds

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Abstract. *Cephalophanus epilachnoides* sp. nov. is described and illustrated from Western Ghats, southwestern India. It is the first species of the genus known from the Indian subcontinent. The new species differs from other congeners by the peculiar elytral pattern consisting of ocellate maculation (black spots bordered with pale brown rim) on elytra, strongly resembling the pattern of some epilachnine ladybird beetles (Coccinellidae). A key to identification of *Cephalophanus* species, and an updated checklist of the genus are provided.

Key words. Coleoptera, Discolomatidae, Cephalophaninae, *Cephalophanus*, checklist, key to species, mimetism, new species, taxonomy India, Oriental Region

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Introduction

The small coccinelloid family Discolomatidae consists approximately of 500 species in 16 genera; it has a circumtropical distribution with the highest diversity in the Afrotropics (CLINE & ŚLIPÍŃSKI 2010; H. Yoshitomi, in prep.). Beetles live predominantly in forested habitats from lowlands up to 2,000 m a.s.l. Current knowledge regarding the biology of discolomatids is limited: species are found on dead wood, fungi, or they are sifted from forest leaf litter. Most species are presumed to be mycophagous, but in several genera, there is also evidence of inquilinism with ants (JOHN 1959, CLINE & ŚLIPÍŃSKI 2010).

Discolomatidae are currently divided in five subfamilies (LAWRENCE & NEWTON 1995). The subfamily Cephalophaninae is only represented by the Oriental genus *Cephalophanus* John, 1940: 11 currently known species were described from northern Vietnam (1 species), Peninsular Malaysia (1 sp.), Sumatra (2 spp.) and Borneo Island (the highest known diversity – 7 spp.) (PAL 2007, YOSHITOMI & PHAM 2021, YOSHITOMI 2023). This genus is rarely collected, and its biology remains completely unknown. *Cephalophanus* species exhibit peculiar characteristics within the family Discolomatidae: relatively large body size (3.3–5.2 mm);

labrum visible externally; male pretarsal claws split apically on front legs; well sclerotised, complex male genitalia with multiple processes; and aposematic colouration of elytra consisting of orange/reddish maculation on dark background or reversely black maculation on light background, strongly resembling patterns of ladybird beetles (Coccinellidae) (CLINE & ŚLIPÍŃSKI 2010, YOSHITOMI & PHAM 2021).

The resemblance and confusion of these beetles with ladybirds is evident in the case of the new *Cephalophanus* species described in the present paper. The specimens studied here were hidden unrecognized for more than 30 years within unsorted material of Coccinellidae in the collection of the National Museum of the Czech Republic, Prague. This represents the first *Cephalophanus* species from the Indian subcontinent, and the westernmost record of the genus. The number of *Cephalophanus* species has now increased to 12.

Material and methods

Exact label data are cited and given in quotation marks for the type material. Authors' additional remarks are provided in square brackets; [p] – preceding data are printed. Separate label lines are indicated by a slash (/), separate labels by a double slash (//). The specimens included in



this study are deposited in the National Museum of the Czech Republic, Prague, Czech Republic (NMPC) and in the Ehime University Museum, Matsuyama, Japan (EUMJ).

The following Epilachnini species (Coccinellidae) was studied for comparison:

Epilachna ocellataemaculata (Mader, 1930): 3 spec., China: Yunnan Prov., Gaoligong Mts, 25.22N 98.49E, 1500–2000 m, 17.–24.v.1995, V. Kubáň leg., I. Kovář det. (NMPC).

The material was dissected and examined using a Leica MZ95 stereomicroscope. After observation, the dissected parts were mounted on the same card with the specimen. Habitus photographs were taken using a camera attached to a Leica MZ95 stereomicroscope (Figs 1A–B), and a

Canon EOS 550D digital camera with an attached Canon MP-E65mm f/2.8 1–5× macro lens (Figs 1C–D), as numerous separate images at different focal planes and afterwards combined using Helicon Focus 8.2.0 software.

The terminology follows CLINE & ŚLIPÍŃSKI (2010) and YOSHITOMI & PHAM (2021). The following abbreviations are used for the measurements:

EL	elytral length from anterior margin to elytral apex;
EW	maximum elytral width;
PL	pronotal length in median line;
PW	pronotal maximum width;
TL	total length (PL + EL).

The range and the average (in parenthesis) are given for each measurement.

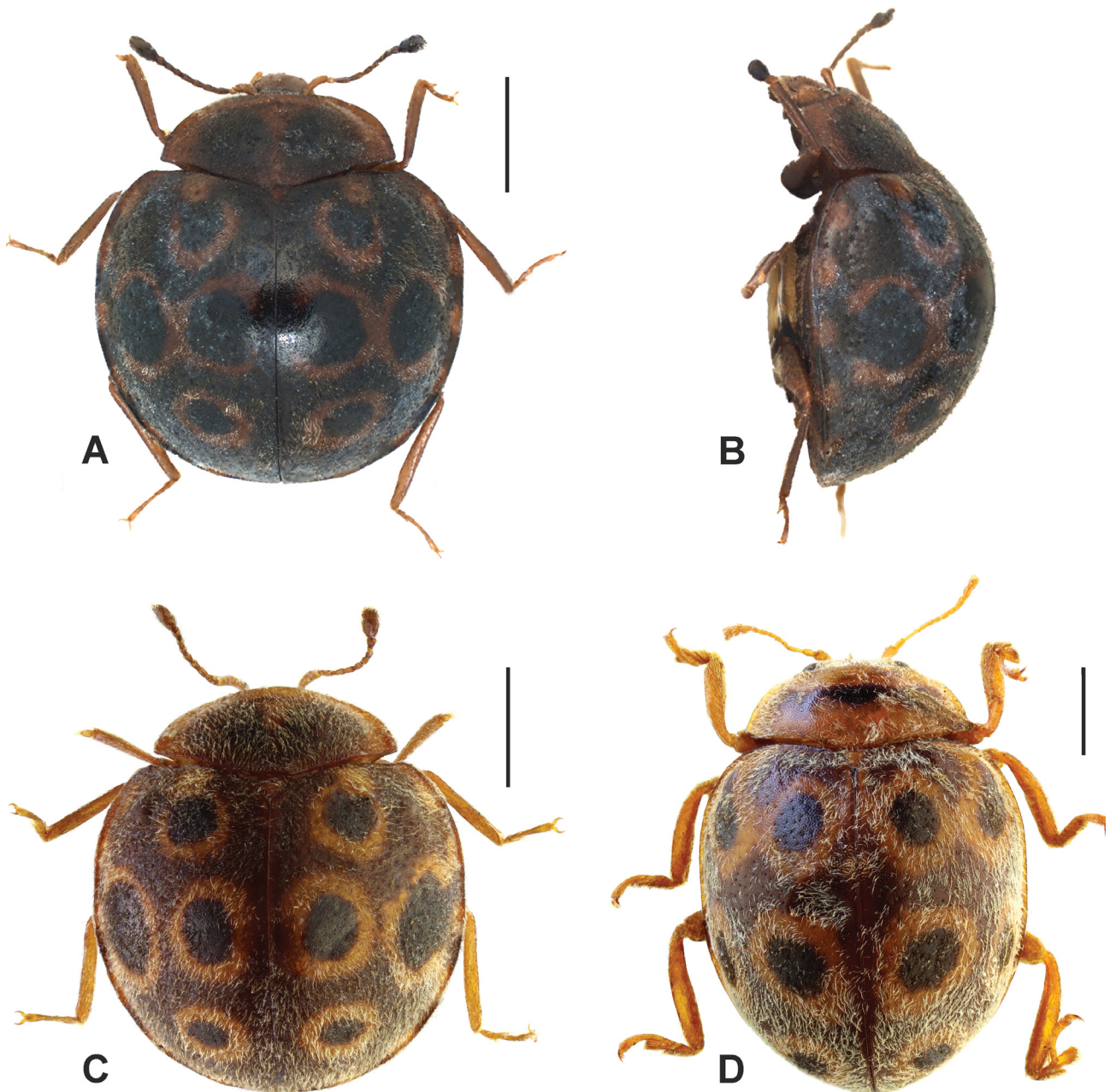


Fig. 1. A–C *Cephalophanus epilachnoides* sp. nov. A – habitus of holotype in dorsal view; B – same in lateral view; C – habitus of paratype showing colour variability. D – *Epilachna ocellataemaculata* (Mader, 1930) (China: Yunnan). Scale bars = 1.0 mm.

Taxonomy

Cephalophanus epilachnoides sp. nov.

(Figs 1A–C, 2)

Type material. HOLOTYPE: ♂ (NMPC), labelled: ‘INDIA: KERALA 6-18. XII. 1993 / Cardamon hills, Vattiar vill. / 10km SW of Munnar / 10°02'N, 77°01'E, 1000m/D. Boukal & Z. Kejval leg. [p]// HOLOTYPE ♂ / *CEPHALOPHANUS* / *epilachnoides* sp. nov. / Yoshitomi & Hájek det. 2025 [red label, p]’. PARATYPES: 3 ♂♂ 3 ♀♀ and 20 unsexed specimens, same data as holotype (EUMJ, NMPC). All paratypes are provided with the respective yellow printed labels.

Additional material studied (based on photos available on the *iNaturalist* platform). **INDIA: KARNATAKA:** Yevakapadi, 12.22308, 75.64952, 21.vii.2024, S. Saya observ. (SAYA 2024). **TAMIL NADU:** Valparai, 10.31221, 76.95105, 21.x.2024, B. Gower observ. (GOWER 2024).

Description. Male holotype. Body hemispherical, sub-matt, densely covered with easily removable short recumbent setae.

Colouration. Head, legs, scutellar shield and ventral surface of thorax and abdomen pale brown; antennae, pronotum and elytra brown but antennomeres I–II and marginal part of pronotum paler. Each elytron with four large ocellate maculae and seven small oval marginal spots; ocellate maculae consisting of black circle spots with pale brown rim, variable in size; marginal spots pale brown, spot at anterior margin of elytra connected with anterior ocellate macula.

Structures. Head finely punctate. Antennae slender, reaching posterior margin of pronotum. Pronotum closely covered with fine punctures. Elytra widest at mid-length, highest just anterior from mid-length. Legs slender, with straight tibiae.

Male genitalia. Aedeagus relatively wide; tegminal strut long and thick, curved dorsally; tegmen long, slightly curved dorsally, narrowed in basal third; parameres long and wide, bearing short setae on ventral surface, obtuse at apices, bearing long setae along apical margins; phallus

long, curved ventrally, truncate at apex; apical lobe distinctly longer than phallus, truncate at apex.

Female. In habitus identical to male; pretarsal claws on front legs simple.

Variability. Specimens of the type series vary in elytral colouration: background colouration is dark brown, light rim of ocellate maculae is thin but median maculae are connected in the holotype; on the other hand, background colouration of most paratypes is rather light brown, rim of ocellate maculation is wider, and median maculae may be separated (see Figs 1A and 1C).

Measurements (n = 20). TL 3.35–3.95 (3.74) mm; PL 0.90–1.10 (1.02) mm; PW 1.90–2.20 (2.09) mm; PW/PL 1.90–2.30 (2.05); EL 2.40–2.85 (2.72) mm; EW 2.90–3.45 (3.21) mm. EL/EW 0.79–0.90 (0.85); EL/PL 2.36–2.89 (2.67); EW/PW 1.45–1.63 (1.54); TL/EW 1.10–1.23 (1.17).

Differential diagnosis. *Cephalophanus epilachnoides* sp. nov. is easily distinguishable from all other members of the genus by the ocellate maculation on the elytra (Figs 1A–C). The male genitalia of the new species are also very characteristic, having truncate apices of the phallus and its apical lobe, and obtuse apices of the parameres (Fig. 2).

Etymology. The specific epithet refers to the characteristic elytral pattern strongly resembling that of *Epilachna* ladybird beetles (Coccinellidae), especially *Epilachna ocellataemaculata* from China and Vietnam (see Fig. 1D, and PANG et al. 2012: Fig. 16).

Collecting circumstances. Specimens of the type series were beaten from dead wood (Z. Kejval, pers. comm.).

Distribution. *Cephalophanus epilachnoides* sp. nov. seems to be relatively widespread in the Western Ghats of southwestern India; in addition to the type locality in Kerala, there are recent records on the *iNaturalist* platform from Karnataka (SAYA 2024) and Tamil Nadu (GOWER 2024), which, based on the characteristic colour pattern, can be assigned to the new species as well.

Discussion

Despite the strong resemblance of the new *Cephalophanus* species with *Epilachna*, the relation between these beetles is not clear so far. *Epilachna ocellataemaculata* is only known from China and northern Vietnam (HOANG 1977, PANG et al. 2012), and thus, it is allopatric with *Cephalophanus epilachnoides* sp. nov. We did not find any epilachnine species with similar colour pattern occurring in southern India; however, ocellate maculation on elytra is not uncommon in coccinellids – see e.g., *Henosepilachna ocellata* (Redtenbacher, 1844), some specimens of *H. verriculata* Pang & Mao, 1979 or *Chnootriba elaterii* (Rossi, 1794) (see IQBAL et al. 2025: Figs 8, 18–19), and therefore, we cannot exclude occurrence of similarly coloured epilachnine ladybirds in Kerala. On the other hand, it is also possible that the colour pattern of *Cephalophanus* species is only a part of general mimetic complexes with coccinellids, either of Batesian or Müllerian type, as discoloratids are known to possess the external secretory glands (JOHN 1959).

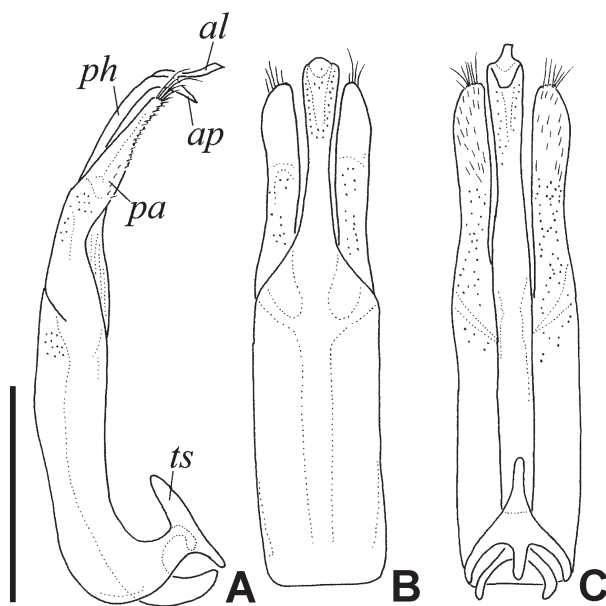


Fig. 2. Male genitalia of *Cephalophanus epilachnoides* sp. nov. holotype. A – aedeagus in lateral view; B – same in dorsal view; C – same in ventral view. Abbreviations: al: apical lobe of phallus (penis); ap: apical part of phallus; pa: paramere; ph: phallus; ts: tegminal strut. Scale bar = 0.5 mm.

Key to the species of the genus *Cephalophanus*

Modified from YOSHITOMI & PHAM (2021).

- 1 Body orange to brown, maculation on elytral disc black. 2
- Body black, elytral maculation orange or reddish. 4
- 2 Maculae on elytral disc ocellate (bordered with yellow or pale brown rim), marginal (lateral) spots pale brown. *C. epilachnoides* sp. nov.
- All maculae on elytra black. 3
- 3 Elytra with 7 black maculae on disc (three lateral on each elytron and one common sutural at elytral mid-length), marginal spots absent. *C. quatei* John, 1967
- Elytra with 10 black maculae on disc (five on each elytron; three maculae near suture may be confluent with their counterpart on other elytron) and 7 small marginal spots. *C. tonkinensis* John, 1942
- 4 Elytral maculation consists of 4–8 large reddish spots on disc, marginal spots usually absent (marginal spots present in *C. octopunctatus* and *C. chhakka*). 5
- Elytral maculation consists of 8–10 small orange maculae on disc and 12 spots near lateral margin. . 9
- 5 Elytra with 4–6 maculae on disc. 6
- Elytra with 8 maculae on disc. Borneo: Sabah. 8
- 6 Elytra with 4 large oval maculae.
- *C. bryanti* John, 1954
- Elytra with 6 oval maculae. 7
- 7 Elytra lacking marginal spots. .. *C. lewisi* John, 1954
- Elytra with 12 marginal spots.
- *C. chhakka* Pal, 2007
- 8 Pronotum black medially from base to near anterior margin; elytral mesal macula circular; marginal spots completely absent. Elytral humeral angle obtuse.
- *C. keninganus* John, 1967
- Pronotum black medially in basal half; elytral mesal macula transverse; three small marginal spots indicated in mid-part of each elytron. Elytral humeral angle prominent. *C. octopunctatus* John, 1967
- 9 Elytra with 8 maculae on disc only (subapical maculae absent). *C. clipeoexcisus* John, 1940
- Elytra with 10 maculae on disc (subbasal maculae may be confluent). 10
- 10 Subbasal maculae on elytral disc usually confluent, forming transverse band in basal third of elytral length. *C. fasciatus* John, 1954
- All maculae on elytral disc well separated. 11
- 11 Elytral maculae larger. Male metatibia at mid-length with tooth on inner margin.
- *C. sakaiorum* Yoshitomi & Pham, 2021
- Elytral maculae smaller. Male metatibia at mid-length without tooth on inner margin.
- *C. dohertyi* John, 1954

Checklist of the genus *Cephalophanus*

- Cephalophanus bryanti* John, 1954 (Malaysia: Sarawak)
Cephalophanus chhakka Pal, 2007 (Indonesia: Sumatra)
Cephalophanus clipeoexcisus John, 1940 (Indonesia: Sumatra)
Cephalophanus dohertyi John, 1954 (Malaysia: Sabah)
Cephalophanus epilachnoides sp. nov. (India: Karnataka, Kerala, Tamil Nadu)

Cephalophanus fasciatus John, 1954. (Malaysia: Pahang, Perak)

Cephalophanus keninganus John, 1967 (Malaysia: Sabah)

Cephalophanus lewisi John, 1954 (Malaysia: Sarawak)

Cephalophanus octopunctatus John, 1967 (Malaysia: Sabah)

Cephalophanus quatei John, 1967 (Malaysia: Sabah)

Cephalophanus sakaiorum Yoshitomi & Pham, 2021 (Malaysia: Sabah)

Cephalophanus tonkinensis John, 1942 (Vietnam).

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