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Taxonomic Redescription of Lophosoma cuprea (Walker, 1856) (Lepidoptera: Zygaenidae) with first record of mud-puddling behaviour in Zygaenidae

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Short Report

Keywords: Zygaenoidea, Procridinae, Cleleini, taxonomy, redescription, mud-puddling, Assam, India

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Taxonomic Redescription of *Lophosoma cuprea* (Walker, 1856) (Lepidoptera: Zygaenidae) with first record of mud-puddling behaviour in Zygaenidae

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Abstract

The zygaenid moth *Lophosoma cuprea* (Walker, 1856) is redescribed based on specimens collected from Assam, India. The male genitalia is described and illustrated for the first time. Furthermore, mud-puddling behaviour is documented in *L. cuprea*, representing the first report of this behaviour in the family Zygaenidae and contributing to the limited knowledge of the natural history of the genus.

Keywords: Zygaenoidea; Procridinae; Cleleini; taxonomy; redescription; mud-puddling; Assam; India.

Introduction

The genus *Lophosoma* Swinhoe, 1892 (Lepidoptera: Zygaenidae: Procridinae), recently placed in the newly established tribe Cleleini Efetov and Tarmann, 2024, comprises only two species worldwide, both of which are known from India: *Lophosoma cuprea* (Walker, 1856) and *Lophosoma quadricolor* (Walker, 1856) (Efetov and Tarmann 2024; Shashank et al. 2026). Despite their taxonomic significance, both species remain inadequately characterized. To date, only the external morphology and adult habitus of *L. cuprea* have been described and illustrated (Hampson 1892; Efetov and Tarmann 2024), while the genital morphology of both species has remained unknown.

In the present study, we redescribe *L. cuprea* (Walker, 1856), along with the first description and photographic illustrations of the male genitalia. These data substantially improve the diagnosis and facilitate reliable identification of the species. The present study also marks the first record of this species from the state of Assam, India. Additionally, we document the mud-puddling behaviour of *L. cuprea*, which, to the best of our knowledge, represents the first report of such behaviour in the family Zygaenidae.

Material and Methods

The specimens were hand collected while mud puddling, during day time. Live images were taken with a Sony® DSC HX–400v digital camera aided with a Raynox® DCR-250 macro lens. The specimens were examined under a Quasmo® SZB 65A stereo zoom microscope. The male genitalia were prepared by macerating the abdomen in 10% KOH for about 8-10 minutes, followed by rinsing and cleaning in 50% ethanol. Images were captured using a Quasmo® ULTRACAM 5.0 MP Microscope Camera (UC-5) mounted on the stereo microscope. Multiple images captured at different focal planes were stacked and post-processed in Adobe Photoshop® to produce fully focused composite images. The dissected genitalia were preserved in glycerol in a microvial pinned beneath the respective specimen. The specimens are deposited in the reference collection of ICAR–Indian Agricultural Research Institute, Assam. The collection locality map (Fig. 1) was prepared using QGIS v. 3.24.3 (QGIS Development Team 2022).

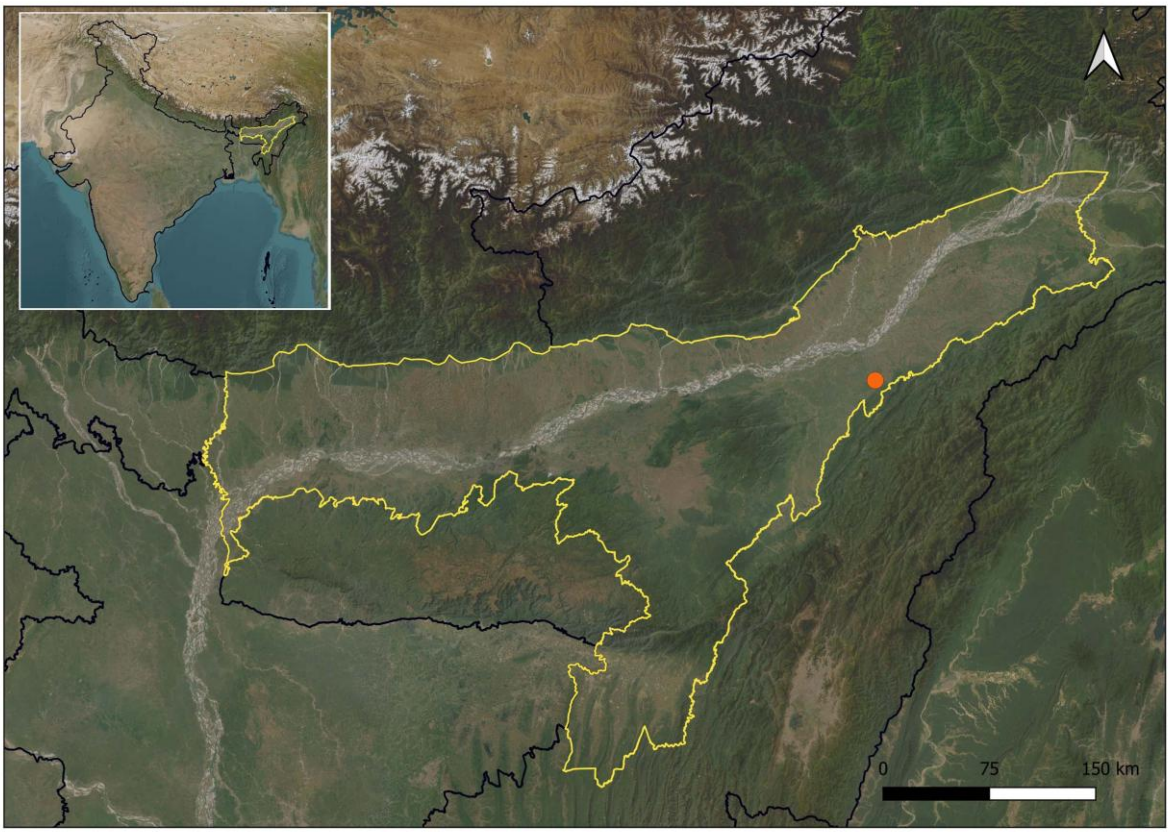


Fig. 1. Collection locality of *Lophosoma cuprea* (Walker) near Hollongapar Gibbon Sanctuary, Assam, India.

Results & Discussion

Systematic Position

Order Lepidoptera Linnaeus

Superfamily Zygaenoidea Latreille, 1809

Family Zygaenidae Latreille, 1809

Subfamily Procridinae Boisduval, 1828

Tribe Cleleini Efetov and Tarmann, 2024

Genus *Lophosoma* Swinhoe, 1892

Type species: *Syntomis cuprea* Walker, 1856, 1596, by original designation

Lophosoma cuprea (Walker, 1856)

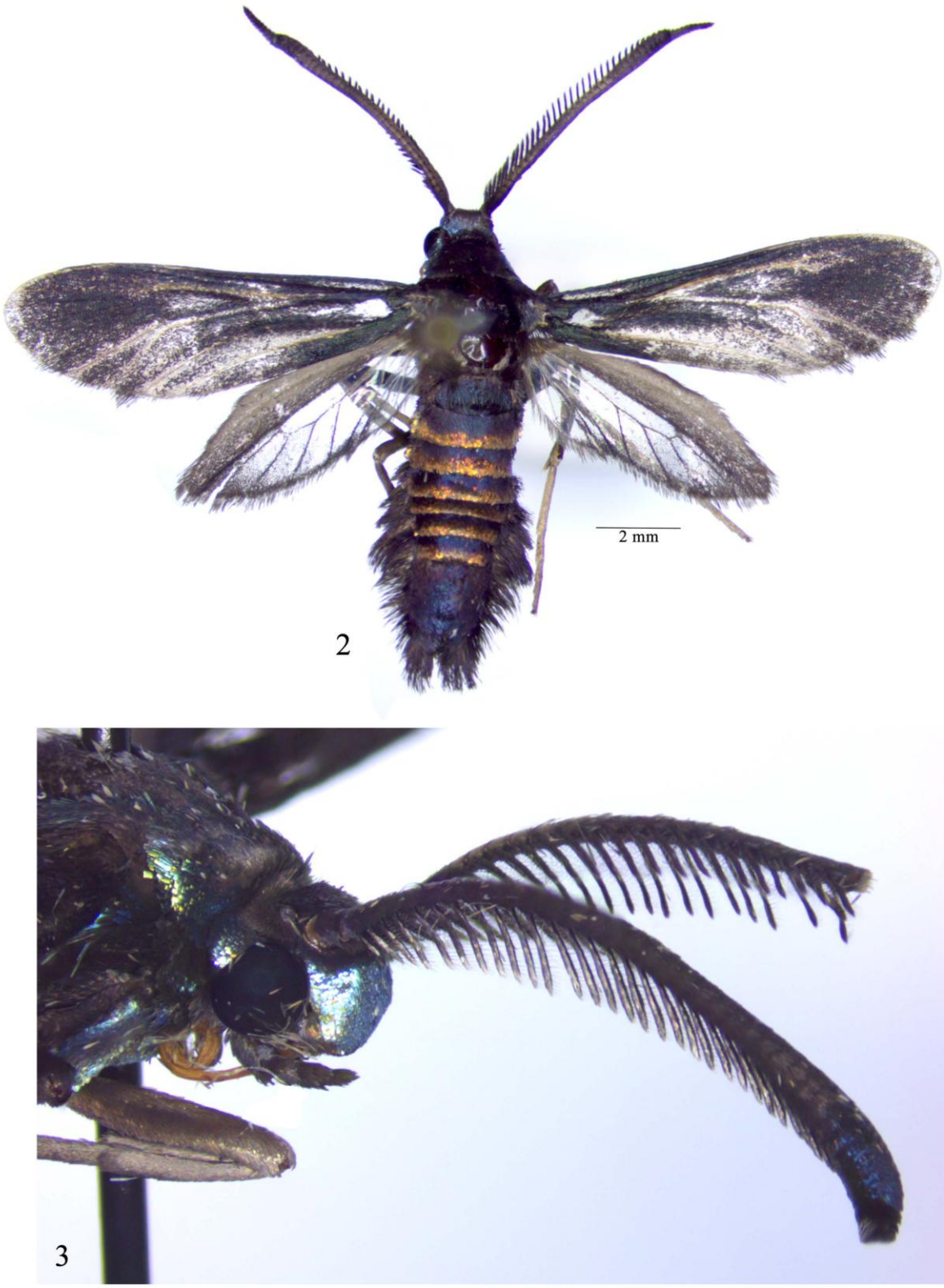
= *Syntomis cuprea* Walker, 1856

TL: Hindostan (= India)

Distribution: India: N. India, Himachal Pradesh (Kullu), Meghalaya (Shillong), Sikkim, Andaman Islands (Hampson 1892; Fletcher 1925; Efetov and Tarmann 2024; Shashank et al. 2026), Assam (Present study).

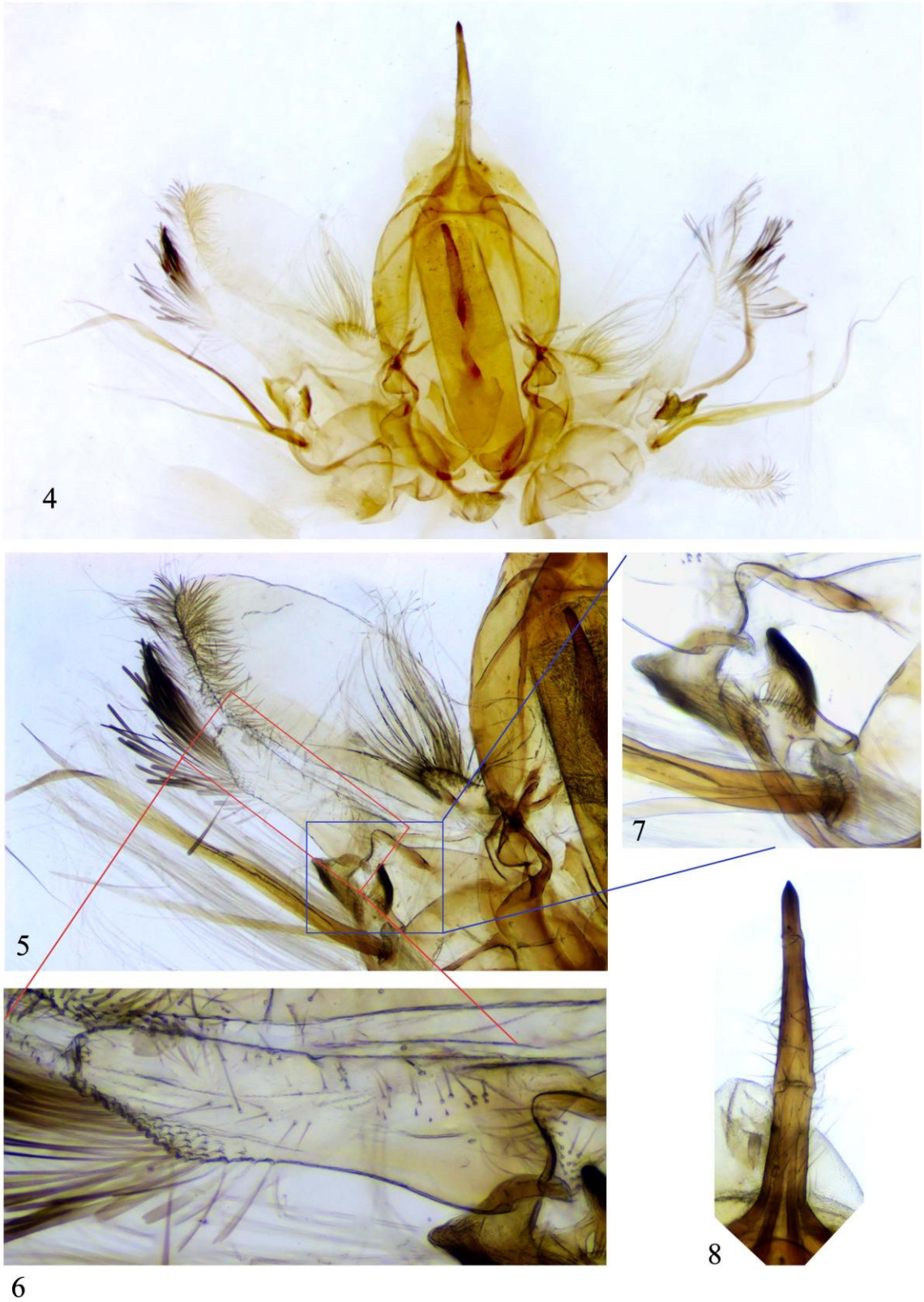
Material examined. 3m#, India: Assam, Mariani, Near Hollongapar Gibbon Sanctuary, 26°40'59"N, 94°21'38"E, 141mt., 02.x.2025, MVL, Kishore C. Sahoo and Abhijith KP (IARI–Assam–LEP–ZYG–01 to 03).

Redescription (Figs. 2–13). Wingspan: 22-24 mm. Vertex smooth-scaled, clothed with velvety smoky brown to black scales, sparsely intermixed with reflective bluish scales anteriorly. Frons nearly rounded, covered with reflective bluish scales sparsely intermixed with golden-yellow scales. Labial palpus (Fig. 3) short, slightly upturned, not extending beyond the anterior margin of the frons, clothed with smoky brown scales intermixed with a few reflective bluish scales. Chaetosema situated between the compound eye and ocellus, forming a nearly crescent-shaped patch, posteriorly curved and tapering towards the thorax. Antenna (Fig. 3) black, bipectinate, except for the distal one-seventh, which lacks pectinations and gradually narrows to a pointed apex. Posterior region of the head behind the compound eyes and lateral portions of the thorax covered with reflective bluish scales sparsely intermixed with golden-yellow. Dorsal surface of thorax and forewing smoky brown to black, slightly dusted with reflective bluish scales. Forewing apex broadly rounded; termen evenly curved, nearly semicircular. Hindwing sub-lanceolate, anterior one-third covered with brownish scales and posterior two-thirds hyaline; costal margin distinctly curved downward at approximately three-fifths of the wing length. Cilia of both wings smoky brown to black. Abdomen purplish, ornamented with yellowish-orange transverse bands and bearing dense lateral tufts of black hairs.

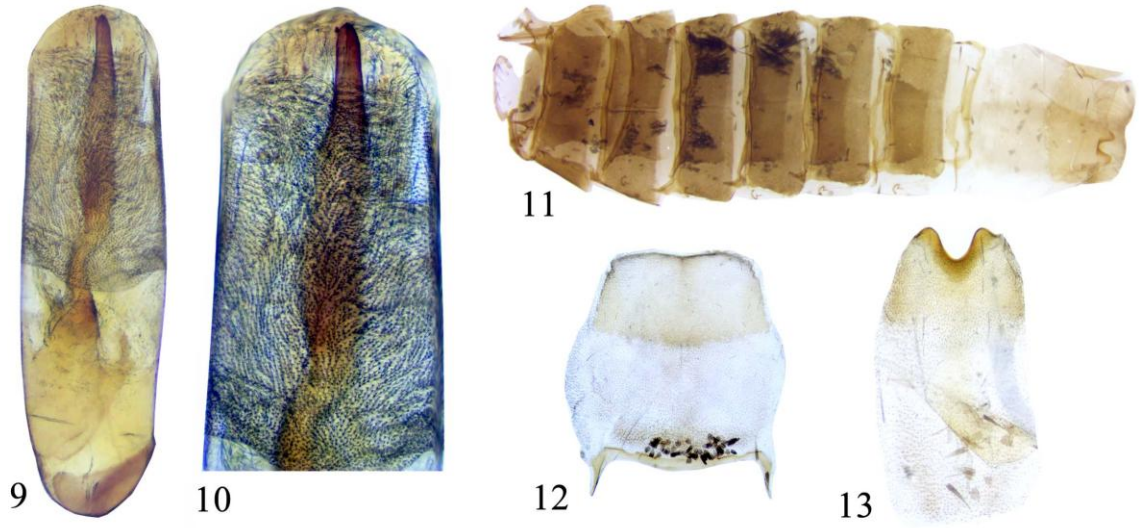


Figs. 2–3. *Lophosoma cuprea* (Walker): 2. Adult habitus; 3. Head, lateral view (left antenna with broken apical portion).

Male genitalia (Figs. 4–10): Uncus (Fig. 8) long, slender, distally pointed, with a distinct transverse line at approximately one-third from the base, giving it the appearance of a finger joint; surface sparsely clothed with hair-like setae on the basal two-thirds, distal one-third smooth and devoid of setae. Tegumen elongate, nearly dome-shaped, approximately 1.5 times as high as the length of the uncus. A pair of strongly sclerotized longitudinal carinae extends through the uncus, originating from the median distal region of the tegumen. Valva broad, distinctly bilobed (Fig. 5). Upper lobe larger, subovate, approximately twice as long as its maximum width; distal half with oblique ventral margin, densely clothed with hair-like setae and elongate scales; apex smoothly rounded. At the base of the upper lobe, near its articulation with the tegumen, a nearly clavate process present, its apex bearing a dense tuft of long hairs. Lower valval lobe (Fig. 6) smaller, elongate, somewhat trapezoidal, with the basal ventral margin slightly swollen and the distal outer margin oblique, clothed with hair-like setae and dark elongate scales. At the base of the lower lobe is a strongly sclerotized, slightly curved comb-like process (Fig. 7) bearing about 16 tooth-like projections, the distal-most projection being the largest and thumb-like. Exterior to this comb-like process is an additional sclerotized structure (Fig. 7) terminating in an outwardly directed, beak-like apex. Phallus (Figs. 9–10) elongate, approximately twice the length of the uncus; distal half bearing a dense patch of minute spinules (Fig. 10) arranged in several irregular longitudinal rows. Cornutus (Fig. 9) single, elongate, exceeding two-thirds the length of the phallus, bulbous at base, medially curved, and becoming progressively more strongly sclerotized and narrowed towards the apex.



Figs. 4–8. *Lophosoma cuprea* (Walker): 4. Male genitalia; 5. Left valva, enlarged; 6. Lower lobe of left valva, enlarged; 7. Base of lower valval lobe, enlarged; 8. Uncus, enlarged.



Figs. 9–13. *Lophosoma cuprea* (Walker): 9. Phallus; 10. Distal half of Phallus, enlarged; 11. Abdomen; 12. Eighth abdominal sternite; 13. Eighth abdominal tergite

Diagnosis. *Lophosoma cuprea* (Walker) can be distinguished from its only known congener, *L. quadricolor* (Walker), by the presence of dense black hair-like tufts on the lateral sides of the abdomen and the absence of purplish coloration on the terminal two abdominal segments. In contrast, *L. quadricolor* lacks lateral abdominal hair tufts and possesses purplish terminal abdominal segments (Hampson 1892).

Notes on mud-puddling behaviour (Figs. 14–15)

During a field survey conducted in the Hollongapar Gibbon Sanctuary, Mariani, Assam, India, three adults of *Lophosoma cuprea* (Walker) were observed resting on a moist muddy patch along a forest trail. Close observations revealed that the moths repeatedly extended their proboscides deep into the saturated soil and actively imbibed fluid, a behaviour characteristic of mud puddling. All three individuals remained on the substrate for several minutes while probing the wet soil. The specimens were subsequently collected and examined, and all were confirmed to be males.



Figs. 14–15. *Lophosoma cuprea* (Walker): Adults engaged in mud-puddling.

Mud-puddling is a well-documented behaviour in Lepidoptera, particularly among butterflies, in which adults (predominantly males) obtain sodium and other dissolved minerals and nutrients from moist soil, mud, perspiration, animal excreta, carrion, and other nutrient-rich substrates (Smedley and Eisner 1995). In moths, however, this behaviour has been documented only sporadically, with published records from a few lineages,

including Notodontidae (Smedley and Eisner 1995), Sesiidae (Volponi 2020), Noctuidae (Xiao et al. 2010) and Pyraloidea (Talukdar and Chowdhury 2024). The nutrients acquired through mud puddling, particularly sodium, are known to enhance male reproductive fitness and may be transferred to females during mating as part of the spermatophore, thereby contributing to egg production and offspring performance (Molleman 2010). The present observation constitutes, to the best of our knowledge, the first published record of mud-puddling behaviour in Zygaenidae and extends the known natural history of the family. Further field observations are needed to determine the frequency, ecological significance, and taxonomic distribution of this behaviour among zygaenid moths.

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DECLARATIONS

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Informed consent: N/A

Author contribution: Sole Author

Data Availability Statement: N/A

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Legends to Figures

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