

Description of a new species of genus *Chloroplaga* Hampson (Lepidoptera, Nolidae) from India

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ABSTRACT: A new species of the genus *Chloroplaga* Hampson was identified in Mizoram, India, through detailed morphological and genitalia analysis. This discovery emphasizes the unexplored biodiversity of the region and the necessity of conservation efforts in such ecologically rich habitats.

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KEY WORDS: Morphological, genitalia analysis, Mizoram

INTRODUCTION

India's diverse altitudes and distinct climatic conditions, shaped by the southwest and northeast monsoons, have produced varied ecological niches supporting a wide range of forest types. These include tropical moist deciduous, tropical semi-evergreen, tropical wet evergreen, subtropical, temperate, and alpine forests, each reflecting the country's geographical and climatic diversity. Situated at the intersection of Indian, Malayan, and Indo-Chinese biogeographical zones, India harbours rich biodiversity, including a high proportion of endemic species. The order Lepidoptera, which includes moths, butterflies, and skippers, is globally widespread and it is the third-largest group in the class Insecta. These insects are known for their distinctive scales, covering their wings and bodies, which give them their vivid colours and complex patterns. With membranous wings and a specialised proboscis for feeding, Lepidoptera are among the most successful insect groups in the world, thriving in a variety of environments from deserts to

rainforests and mountains.

The family Nolidae, comprising approximately 202 genera and 2179 species (Joshi *et al.*, 2021), is dispersed globally, with the highest diversity in tropical regions. There has long been disagreement over the taxonomic classification of its subfamilies, especially Nolinae. While Nolinae was historically treated as part of Noctuidae, it is now recognized as a subfamily within Nolidae based on molecular studies (Zahiri *et al.*, 2013). Nolinae moths are small, with distinct forewing patterns and structural features like apodemes on the male eighth tergite. Some members are significant agricultural pests. In this study, a new species of the genus *Chloroplaga* Hampson was discovered in Mizoram, India, an area known for its rich biodiversity. A detailed morphological analysis confirmed its novelty, emphasizing the importance of exploring under-researched regions. Such findings not only expand scientific knowledge but also highlight the critical need for conservation efforts in these biologically rich habitats.

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MATERIALS AND METHODS

In the present study, extensive surveys across Mizoram, India were conducted. Adult Noctuid moths were collected using light traps, including vertical sheets and portable methods (Fry and Waring, 1996), during nighttime. In areas without electricity, Petromax or battery-operated lamps were used. Sampling was conducted during pre-monsoon and post-monsoon seasons. Adult moths collected from the field were immobilized using ethyl acetate vapours and mounted on stretching boards or thermocol sheets. Preserved specimens were stored in airtight wooden boxes lined with thermocol and fumigated with naphthalene balls to prevent pest damage.

Permanent slides of fore and hind wings were prepared following the methods of Common (1970) and Zimmerman (1978) to study venation for accurate identification. Wings were detached using a fine needle, placed in alcohol (70%), descaled with sodium hypochlorite (4% w/v chlorine solution), and washed with distilled water. They were stained 70% with alcoholic eosin for 12–14 hours, dehydrated in graded alcohol, and mounted in Canada balsam. Venation patterns, essential for taxonomic studies, were examined under a stereo zoom microscope. Wing nomenclature followed Comstock and Needham (1898-99), later refined by Imms (1957) and Miller (1970).

For genitalic studies, abdomens were detached with care to avoid damaging genital structures (Robinson, 1976) and softened overnight in 10% KOH to remove muscles and debris. After washing in distilled water and treating with 1% glacial acetic acid to neutralize residual KOH, dissections were performed in 50% alcohol. Male and female genitalia were carefully extracted, with the aedeagus separated and the vesica everted using fine forceps. Structures were dehydrated in graded alcohol, cleared in clove oil, and mounted in Canada balsam on cavity slides. Genitalic terminology followed Klots (1970).

RESULTS AND DISCUSSION

Genus *Chloroplaga* Hampson

Chloroplaga Hampson, 1912 . *Cat. Lepid. Phalaenae Br. Mus.*: 16: 596.

Type species: *Acontia nygmia* Swinhoe.

The genus *Chloroplaga* Hampson (Family, Nolidae) displays a variety of distinct morphological traits. It has a fully developed proboscis, and the palpi are upturned, with the second joint extending to the middle of the frons and slenderly scaled, while the third joint is elongated. The frons are smooth, and the eyes are large and round. In males, the antennae are almost simple. The thorax is covered with a mix of hairs and scales, with no crests present, and the tibiae have slight hair fringes. The abdomen features a dorsal crest only at the base, and males have large lateral scale fans that cover a prominent ventral opening.

The forewings are distinctive, with a pointed and acute apex, an evenly curved, non-crenulate termen, and a lobed inner margin. Venation includes Cu1 and M2 arising near the angle of the cell; R5, R4, R3, and R2 are stalked, with R2 emerging beyond R5, and R1 arising from the cell. The hindwings are characterized by veins Cu1 and M3 originating from the cell angle, M2 extending fully from just above the angle, and M1 and Rs from the upper angle. Additionally, Sc+R1 briefly fuses with the cell near the base, further distinguishing this genus.

Chloroplaga minuta sp. nov.

LSIDurn:lsid:zoobank.org:act:EAFBC97D-5FAA-4012-A8A1-D5606134789E

The head is pale white with upturned, pale brown palpi that have a greenish tinge; the third joint has a pale tip. Antennae are finely ciliated, with a reddish-brown shaft and whitish base. The collar is pale white with a hint of green. The thorax is similarly pale white. The forewings are pale white with a pinkish hue, speckled with green. A green mark appears at the base of the costa and another at the vein's base within the cell. Near the inner margin's base, there is a yellowish patch adjacent to a green speck. A sap-green antemedial patch on the costa merges with a lunulate medial patch in and below the cell, faintly edged in whitish. A small green speck is visible below the costa beyond the middle, while

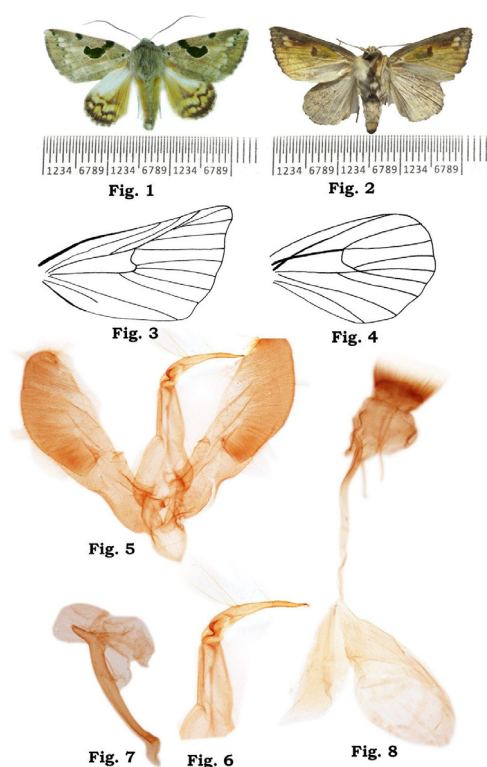


Fig. 1 Upper side & Fig. 2 Under side of *Chloroplaga minuta* sp. nov. Adult moth;
Fig. 3 Forewing venation; Fig. 4 Hindwing venation;
Fig. 5 Male genitalia; Fig. 6 Uncus; Fig. 7 Aedeagus;
Fig. 8 Female genitalia

a diffused greenish subterminal wavy line extends from a subapical dark brown spot. The cilia are dark brown. The hindwings are yellowish with medial, postmedial, and terminal reddish-brown bands, the medial band showing a sinuous curve in the center. The abdomen is yellowish. On the underside, the forewings are yellowish with whitish costal nervature and inner margins, while the subapical area is suffused with dark green. The hindwings are whitish with reddish-brown speckling.

Male genitalia: The uncus is broad at the base, tapering towards a setose tip that is spined. The tegumen is elongated, narrow, and weakly sclerotized. The juxta is small and round, while the vinculum is V-shaped, small, and also weakly sclerotized. The valve is broad, with a concave and sclerotized saccular margin near the tip. The costal

margin is nearly straight, and the tip of the valve is rounded and covered in hair. The aedeagus is long and tubular, narrowing towards the tip and pointed at the base. The vesica is scobinated, and the ductus ejaculatoris enters it subapically.

Female genitalia: The papilla analis is rectangular in shape and covered with hair. The posterior and anterior apophyses are equal in length. The ductus bursae is elongated and becomes sclerotized near the papilla analis. The corpus bursae is also long, narrow, and membranous.

Material examined:

Holotype ♀: Mizoram: Hrangchalkwan 18.ix.2012.

Paratypes: Mizoram: 1 ♀ Champhai 25.ix.2009; 1 ♂, 1 ♀ Hrangchalkwan 18.ix.2012; 1 ♂ Serchip 24.ix.2012; 1 ♂ Sangau 21.ix.2012; 2 ♀♀ Thingsul 18.ix.2009.

The holotype and paratypes are deposited in the Department of Zoology and Environmental Sciences, Punjabi University, Patiala.

Discussion: The genus *Chloroplaga* was first established by Hampson in 1912, with *Acontia nygmia* Swinhoe from Singapore designated as the type species. Warren (1916) later added another species, *C. pallida* Warren, to the genus. Subsequently, Roepke (1948) included *C. javana* Roepke, but this species was later synonymized with *C. pallida* by Holloway (1976). Poole (1989) documented three species under this genus globally: *C. pallida*, *C. javana*, and *C. nygmia*. Genitalia of *C. pallida* and *C. nygmia* was described along with pictures by Holloway (2003) in *The Moths of Borneo*. In the current study, twelve adult specimens of genus *Chloroplaga* Hampson were collected from various localities in Mizoram, India. *Chloroplaga minuta* sp. nov. closely resembles *C. pallida* Warren but can be differentiated by distinct male and female genitalic features. In *C. minuta*, the spine on the basal half of the inner valve wall is shorter and less prominent, the proximal end of the aedeagus has a more noticeable curvature, and it tapers to a sharp, well-defined tip. In females, the corpus bursae is reduced in size.

Conversely, in *C. pallida*, the spine on the inner valve wall is longer, the proximal end of the aedeagus is nearly straight with a rounded tip, and the corpus bursae is comparatively larger and more prominent. Based on these differences, *C. minuta* **sp. nov.** is proposed as a new species.

Etymology: The name of the species pertains to a small spine on the valve.

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