

DNA barcoding and Taxonomic account on some selected species of subfamily Plusiinae (Lepidoptera: Noctuidae) from India

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Abstract

This study represents a detailed taxonomic account of 31 species of Plusiinae (Lepidoptera: Noctuidae) from India. The survey and collection of 39 localities from different regions of India between 2015 and 2018. The tribe Argyrogrammatini Eichlin & Cunningham, 1978 with *Ctenoplusia* Dufey, 1970 was the most species rich genera with seven species, followed by *Thysanoplusia* Ichinose, 1973 and *Chrysodeixis* Hubner, 1821 with four and three species respectively. Among 31 species, 15 species are commonly found in Himalayan regions and while other species were distributed from subtropical to tropical region. Five species, *T. orichalcea* (Fabricius, 1775), *Chrysodeixis eriosoma* (Doubleday, 1843), *C. acuta* (Walker, 1858), *C. chalcites* (Esper, 1789), *Trichoplusia ni* (Hubner, 1803) are widespread throughout India and reported as serious crop pests. Present study also revealed range expansion of four species viz., *Dactyloplusia impulsiva* (Walker, 1865), *Ctenoplusia mutans* (Walker, 1865), *Ctenoplusia tarassota* (Hampson, 1913) and *Zonoplusia ochreatea* (Walker, 1865). Systematic accounts of all 31 species are discussed here with adult images, species diagnostic characters, collection localities, detailed distributions and reported larval host plants. In addition to morphological studies, for the first time, a preliminary barcode library for 25 species of Indian Plusiinae with average intra-specific distance (%), maximum intra-specific distance (%) and distance to nearest neighbor (%) for individual species is provided. Among 25 species, four species barcode data (*Ctenoplusia mutans*, *C. kosemponesis*, *Plusiopalpa adrasta*, *Sclerogenia jessica*) are novel to world and 18 species barcode sequences were novel to India.

Key words: Biodiversity, Distribution, DNA barcodes, India, Plusiinae, Taxonomy

Introduction

The Plusiinae Boisduval, 1829 is a moderately large and cosmopolitan noctuid subfamily representing approximately 500 species worldwide (Zahiri & Fibiger 2008; Ronkay *et al.* 2008). Superficially, they are dark-colored moths having a typical bright silver gamma mark or golden patch on their forewing. The members of Plusiinae have typical roughly scaled head, with prominent frontal hair tufts, large eyes with stronger eyelashes; usually short and upturned labial palpus; with second segment densely hairy well developed proboscis abdominal dorsal crest; broad and usually bright coloured forewing with acute apex, smaller or larger metallic pattern or silvery white to yellow sigma mark. These species share a steeply tectiform resting posture, eye-lashed and well-developed scales on the thoracic crest (Kitching 1987). They are also known as looper moths because most larvae in the subfamily lack prolegs on III and IV abdominal segments which results in a looping movement of their abdomen when crawling (Kitching 1987). The life histories of this group is well documented in pest species. The average development time of Plusiinae species from egg to adult is 30 to 34 days. Most species undergo five larval instars with each instar requiring 3 to 5 days. The prepupal stage lasts from 1 to 2 days. The adults emerge about 8 to 10 days following pupation and usually mate the second day following emergence (Eichlin & Cunningham 1978).

The group is economically significant as majority of its species are pests to agricultural crops having wide distributional ranges (Twinkle *et al.* 2018). The important agricultural crops such as cabbage (*Brassica oleracea*