



TAXONOMIC STUDIES ON GRAMINACEOUS STEM BORERS FROM NORTH INDIA

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ABSTRACT

Thirteen species of stemborers attacking graminaceous crops, belonging to five genera viz. *Chilo* Zincken, 1817; *Scirpophaga* Treitschke, 1832; *Bissetia* Kapur, 1950; *Emmalocera* Ragonot, 1888; *Sesamia* (Guenée, 1852) have been redescribed with current valid names, synonyms, authors, distribution, and host plants. The specimens were identified from characters of the genitalia such as shape of the uncus, gnathos, valva, projections of the costa or tegumen, and shape of aedeagus. The genitalia of *Emmalocera aurifusellus* (Walker, 1866) is described here for the first time. We provide photographic illustrations for each species which includes the male and female habitus, and the genitalia of both sexes and diagnostic keys.

Key words: Lepidoptera, Noctuidae, Crambidae, Pyralidae, *Chilo*, *Scirpophaga*, *Bissetia*

Graminaceous crops are one of the most important sources of food for humans and their livestock. Rice, maize, wheat, sugarcane, pearl millet and sorghum are important graminaceous crops in India. Many biotic factors hinder the productivity of these crops of which 20–40% of crop losses occur across the world due to pests and among them lepidopteran stem borers cause the most significant damage (Vallée et al., 2016). Especially, lepidopteran stem borers belonging to family Crambidae, Pyralidae and Noctuidae are the important economic pests of these graminaceous crops worldwide, reducing crop yields up to 40% (Lee et al., 2019). Among several stem borers, genus *Chilo* Zincken, 1817; *Scirpophaga* Treitschke, 1832 and *Sesamia* (Guenée, 1852) are economically important and taxonomically complex.

In India, many historical accounts have documented lepidopteran insect pests viz., Cotes (1889-1896), Lefroy (1909), Fletcher (1914), Pruthi (1969), Kapur (1950) Kollar (1844-48) and Moore (1865) contributed to stem borer fauna from India. Walker (1863) published a list of specimens in the collection of British Museum (now NHM, London). Moore (1884-87) published the *Lepidoptera of Ceylon*, including pyralid and present crambids fauna. Butler (1879) dealt with the North Eastern fauna and provided illustrations of lepidopteran type specimens present in the British Museum. Ghai et al. (1979) reported lepidopterous pests associated with rice crop in India including several rice stem borers. Arora (2000) studied taxonomy of economically important pyralids and crambids from India and provided keys for identification of economically important species of crambids. However, most of the isolated publications

are on stem borers with special reference to crops i.e., rice, maize, sugarcane and sorghum. Moreover, majority of the publications provide line diagrams which are difficult to be understood by many non-taxonomists. Keeping this in view, in present study we redescribe important stem borer species occur in North India along with current taxonomic status, colour illustrations, Host plants, distribution, remarks and diagnostic keys for their identification.

MATERIALS AND METHODS

The materials used were obtained from different sources. A substantial number of identified specimens were obtained from National Pusa Collection (NPC), Division of Entomology, ICAR-Indian Agricultural Research Institute, New Delhi. Some specimens were also sorted out from the unidentified collections at NPC. The specimens were also collected from different locations viz., New Delhi, Lucknow and Punjab. Characters like length of labial palpi with respect to the diameter of the eye, venation of forewing and hindwing giving emphasis to the origin of the veins, specific colour and markings on wings, characters of male genitalia like the shape of gnathos, uncus, the shape of the valva, presence of costal or subteguminal processes, shape of the aedeagus etc. and characters of the female genitalia like the presence or absence of signum, shape of the bursa copulatrix etc. were used in the present study.

For preparation of genitalia slides, the abdomen of the moths was separated by a small hitch at its base. The separated abdomen was then placed in a