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Faunistic Studies on the Genus, *Leucania* Ochsenheimer, 1816 (Lepidoptera: Noctuidae: Leucaniini) from Karnataka, India

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ABSTRACT: Armyworms and cutworms are agricultural pests that can occasionally damage agricultural crops significantly. Armyworm, *Leucania* Ochsenheimer is one of the most significant pests on graminaceous crops, which is widespread in Africa, Australia, Asia, and the Middle East. A thorough comparative study on the taxonomy of species within the genus *Leucania* Ochsenheimer has identified two recognized species: *L. loreyi* and *L. roseilinea.* Detailed discussions include morphological characteristics such as frons, vertex, antennae, labial palpi, compound eyes, ocelli, proboscis, wing venation, and male and female genital features, along with identification keys supported by photographs and illustrations. Armyworm species are known to be polyphagous and are commonly found in the Indian subcontinent. The taxonomic research presented here lays the foundation for future monitoring of species identities and potential outbreaks affecting cereal crops.

Keywords: Armyworm, *Leucania loreyi*, Taxonomy, Leucanini, Male genitalia.

INTRODUCTION

Armyworms (Lepidoptera: Noctuidae) with high larval populations have become significant pests globally. These armyworms are polyphagous, primarily feeds on cereals, pastures, and forage crops (Rungs, 1955). Although species from the genera *Mythimna* and *Spodoptera* are widely reported as armyworms or cutworms, information on outbreak occurrences of other genera remains unclear. In Australia, the sugarcane armyworm, *Leucania loreyi*, is reported as an armyworm infesting graminaceous crops (Edwards, 1992). During the revision of the common names list of Australian insects, it was determined that all examined specimens from Australia belonged to *Leucania loreyimima* rather than *Leucania loreyi* (Gay, 1966).

The maize caterpillar, *Leucania loreyi* (Duponchel, 1827) (Noctuidae), is commonly known as the *Loreyi* leaf worm, cosmopolitan rice armyworm, rice cutworm, cereal armyworm, or false armyworm (Hill, 1988; Jalaeian *et al.*, 2017). This noctuid is a native species of East Asia (Nam *et al.*, 2020) and is a pest of grain crops in Africa, Australia, the Near East, and the Middle East, where it undergoes multiple generations each year (Calora, 1966; Chandler & Benson, 1991). This pest has been reported on several gramineous hosts, including nine Poaceae species (*Arundo donax*, *Avena sativa*, *Oryza sativa*, *Pennisetum purpureum*, *Saccharum officinarum*, *Sorghum bicolor*, *Triticum aestivum*, *Triticum durum*, and *Zea mays*), two Solanaceae species (*Capsicum* spp. and *Nicotiana tabacum*), and one Fabaceae species (*Cicer arietinum*) (Hill *et al.*, 1997; Ikincisoy & Kornosor 1996; Vieira, 2008). Kornosor (1999) noted that *L. loreyi* primarily infests maize and significantly reduces yields when attacks occur just before silking and pollination. In Egypt, the fecundity of female moths is highest when the larvae feed on maize (El-sharif, 1972). Additionally, Guo *et al.* (2003) reported that *L. loreyi* often occurs alongside the closely related species *Mythimna separata* (Walker, 1865), causing considerable damage to host plants. The caterpillars bore into the plants and attack the developing flower spikes. Moreover, Holloway (1989) reported that *L. loreyi* caused significant crop production losses. His study, based on Bornean specimens, divided the genus *Mythimna* into several subgenera: *Aletia*, *Pseudaletia*, *Acantholeucania*, and *Leucania*. In contrast, Edwards (1996) treated *Leucania* as a distinct genus, placing *Acantholeucania* under the subgenus *Leucania* and *Pseudaletia* under the subgenus *Mythimna.*

Leucania Ochsenheimer, 1816, is a globally distributed genus in the family Noctuidae, comprising up to 350 valid species, with approximately one-third of this diversity found exclusively in the New World

(Lafontaine & Schmidt 2010; Adams, 2001; Cocco *et al*., 2019; Dolibaina *et al.*, 2019). The taxonomy of the genus has been thoroughly studied in the Neotropical region (Adams, 2001), but this is not the case for South and Southeast Asia (Kalleshwaraswamy *et al.*, 2023). The *Leucania*-complex is an assemblage of species belonging to the subfamily Hadeninae of the family Noctuidae. The moths are superficially very similar, and may be described as average-sized, hairy-eyed moths without bright coloration: they are usually pale ochreous white to deepochreous, striate with darker transverse markings usually inconspicuous and usually reduced to dots (Calora, 1966). Adults in this group are cryptically coloured, with phenotypes resembling dried grasses, which are their natural habitats (Adams, 2001). The species are difficult to distinguish based on colour or superficial pattern. As a result, species have been poorly characterized by authors, are frequently misidentified, and many synonyms have been proposed inadvertently. To the best of our knowledge, no taxonomic studies have been conducted on the moth genus *Leucania* (Noctuidae: Hadeninae) in India, excepting for the work of Moore (1881). To address these taxonomic challenges and to understand the biology of these pests, there was a need to clarify the species identity and composition. Hence, we conducted extensive surveys and collections of *Leucania* moths from Karnataka, and the findings are presented in this paper.

MATERIAL AND METHODS

The extensive collection-cum-survey tours were made from different locations of Karnataka, representing major host plants growing areas of state. A 200W mercury vapor lamp was used as the light source, with a white cloth background (10 ft × 6 ft) in the fields to collect adult moths. The moths attracted to the light trap were collected, and their processing and preservation were carried out following the standard procedures for Lepidoptera. External morphological structures were studied using a Nikon SMZ 1000 Stereo-zoom microscope. The *Leucania* were identified based on characters like orbicular and reniform spot, attributes of male genitalia such as the shape of uncus, tegumen, valve, ampulla, cucullus, juxta, aedeagus and also with female genitalia characters like corpus bursae, ductus bursae, signum, ventral plate, anterior and posterior apophyses.

To prepare genitalia slides, the adults were sexed based on wing coupling *i.e.*, males having a single frenulum and females possessing two or three frenular spines. The abdomen was detached from the thorax using a needle and forceps, as cutting the last few segments often damaged the genital structures in both males and females. The separated abdomen was then placed in a cavity block containing a 10% KOH solution and left overnight. Afterward, the abdomen was washed with distilled water in a cavity block to remove any excess KOH. It was then placed in another cavity block containing 10% ethanol. Using fine forceps, the genitalia were carefully separated from the abdomen. The genital structures were then placed on a clear microscope slide in 98% pure glycerol, covered with a cover slip, and subsequently photographed and identified. The aedeagus was detached from the main genitalia while ensuring that the juxta and transtilla remained intact. Later, vesica was everted from the aedeagus by using syringe. Aedeagus and female genitalia were stained with acid fuchsin or chlorazol black for a few minutes. Specimens were initially identified based on their genitalia structures with reference to relevant literature (Adams, 2001; Calora, 1966; Edwards, 1992; Moore, 1881; Poole, 1989; Yoshimatsu, 1994). The terminologies of Klots (1970) were used to describe the genitalia. After examining the specimen parts, they were transferred into a micro-vial containing 98% glycerol and pinned beneath the corresponding specimen. The forewing length was measured from the tip of the wing apex to the outer edge of the tegula. Photography of adult moths was made with the help of a canon 80D digital camera with 100mm lens. Photographs of the male and female genitalia structures were taken using a Leica 25°C auto-montage microscope mounted with a Leica DFC 450 camerain the Taxonomy Laboratory. All images were processed using Adobe Photoshop®CS6. The voucher specimens have been deposited in the insect collection museum, Department of Entomology, University of Agricultural Sciences, GKVK, Bengaluru.

RESULTS AND DISCUSSION

Genus *Leucania* Ochsenheimer, 1861

Ochsenheimer, 1816, *Eur. Schmett*, 1816: 81

Type species: *Leucania comma* Linnaeus, 1761

Distribution: Found worldwide, except in the Australian region.

Diagnosis: Palpi obliquely upturned, with the 2nd joint roughly scaled and the 3rd joint prominent, short, naked, and depressed. The proboscis is fully formed, and the eyes are hairy. Antennae are minutely ciliated in males. The head is not deeply retracted into the thorax, which is smoothly scaled. The abdomen with scarcely a trace of dorsal tufts on the basal segments. The tibia and tarsi are covered with short hairs.

Remarks: Genus *Leucania* was proposed by Ochsenheimer in 1816, on type species *comma* Linnaeus. Hampson (1894) studied 47 species under this genus from different localities of British India. Fronclemont (1951) studied species of *Leucania* group of North America. In 1962, Sugi studied *Leucania insecuta* Walker and *Leucania striata* Leech as two distinct species from China. Two species of genus, *Leucania viz., L. loreyi* (Duponchel, 1827) and *L. roseilinea* (Walker, 1862) have been collected from different localities of Southern Karnataka of India for external genital attributes.

Table 1: A checklist of armyworm genus *Leucania* Ochsenheimer, 1816 from India.

Sr. No.	Scientific Name	Distribution
1.	*Leucania albistigma* Moore, 1881	West Bengal (Darjeeling)
2.	*Leucania loreyi* (Duponchel, 1827)	India
3.	*Leucania percussa* Butler, 1880	West Bengal
4.	*Leucania designata* Walker, 1856	Karnataka
5.	*Leucania fragilis* (Butler, 1883))	Himachal Pradesh
6.	*Leucania ineana* (Snellen, 1880)	Madhya Pradesh
7.	*Leucania roseilinea* (Walker, 1862)	Nilgiris
8.	*Leucania celebensis* (Tams, 1935)	India
9.	*Leucania corrugata* (Hampson, 1894)	Himachal Pradesh
10.	*Leucania curvilinea* (Hampson, 1891)	Nilgiris
11.	*Leucania polemusa* (Swinhoe, 1885)	Maharashtra (Mumbai)
12.	*Leucania semiusta* (Hampson, 1891)	Nilgiris
13.	*Leucania venalba* (Moore, 1867)	West Bengal
14.	*Leucania uniformis* (Moore, 1881)	NW Himalaya
15.	*Leucania vana* (Swinhoe, 1885)	Maharashtra (Mumbai)
16.	*Leucania vindhyae* (Hreblay & Legrain 1999)	Vindhyas
17.	*Leucania yu* (Guenée, 1852)	India

(Chandra *et al*., 2021; Hampson, 1984) (Anonymous, 2024; URL: https://www.mothsofindia.org/leucania-loreyi)

Key to species of *Leucania*

1. Forewing greyish brown with dark stria at middle, ventroposterior process of valvula acutely curved posteriorly……..……..…***loreyi***

- Forewing reddish brown with prominent white line at middle, ventroposterior process of valvula absent…….……..….***roseilinea***

***Leucania loreyi* (Duponchel, 1827) (Fig. 1)**

Noctua loreyi Duponchel, 1827: 81.
Leucania collecta Walker, 1856:105.
Acantho Leucania loreyi Inque and Sugi, 1958: 474.
Leucania loreyi Calora, 1966: 65.
Mythimna (Acantholeucania) loreyi Holloway, 1989, 89.
Leucania loreyi Poole, 1989, 582.
Leucania loreyi Sugi, 1992, 200. Yoshimatsu, 1993.

Description: Forewing pale brown with a dark stria below the median vein and the upper portion of the median vein pale brown. A small white spot is present at the end of the discal cell, followed by a fuscous area. The terminal line is marked by black spots on the interspaces, and the fringe is fuscous. The hindwing is whitish with pale brown veins. The terminal line is indicated by black spots on the interspaces, and the fringe is dull whitish.

Length of forewing: 17-19.2 mm (male) and 17.4-19.7 mm (female).

Male genitalia: Uncus moderately long, strongly curved ventrally on subbasal portion with hairs on distal $^{3}/_{4}$. Tegumen long, moderately broad and almost straight in lateral view. Vinculum narrow and with short slender dorsal arm. Saccus rounded. Valva except cucullus slightly long with a long process at the ventroposterior portion and with membraneous posterior margin, costa gradually curved dorsally. Ampulla short, tapering, curved ventrally, with a small rounded process at the middle. Sacculus moderately broad. Valvula broad with broad membraneous area, the ventroposterior process strongly curved posteriorly on distal $^{1}/_{4}$. Cucullus moderately long, semicircular, with rounded ventral margin and a few spines marginally, without coronal spine. Juxta was pentagonal shape. Aedeagus short bulged at tip, with the vesica being twice as long as the aedeagus and with a tubular diverticulum at middle, bearing a patch of small spines at tip of the diverticulum and a large spine near distal end.

Female genitalia: Ductus bursae sclerotised, curved dorsal at the middle with many longitudinal striae on anterior half, ostium bursae unmodified. Corpus bursae was rounded, appendix bursae short, small, membranous and projecting from anterior portion of ductus bursae. Apophyses anterior and apophyses posterior were moderately long. Papilla analis unmodified.

Materials examined: INDIA: Karnataka:2♂, Mandya V.C. Farm, 13.ix.2018, Basavaraj N. H.;3♂, Mandya V.C. Farm, 22.xi.2018, Basavaraj N. H.;2♂, Bengaluru, GKVK campus, 7.ii.2019, Basavaraj N. H.; 5♂, Bengaluru, GKVK campus, 9.ii.2019, Basavaraj N. H.; 2♂, Bengaluru, GKVK campus, 25.i.2019, Basavaraj N. H.

Remarks: In male genitalia valvula with long ventroposterior process bent at distal portion. Sexual dimorphism absents. Semi-circular cuculls with ventral portion rounded with spines like structure, coronal spines absent, pentagonal juxta. This species may be confused with *M. venalba* Moore and *M. roseilinea* Walker, but it is larger and has a distinct white fleck at the discal end of CuA in the forewing cell. Unlike the other two species, *L. loreyi* lacks the postmedial costal brown mark on the forewing. Additionally, the hindwing margin often displays dark brown marks on the veins, which are rarely seen in the other two species.

***Leucania roseilinea* (Walker, 1862)(Fig. 2)**

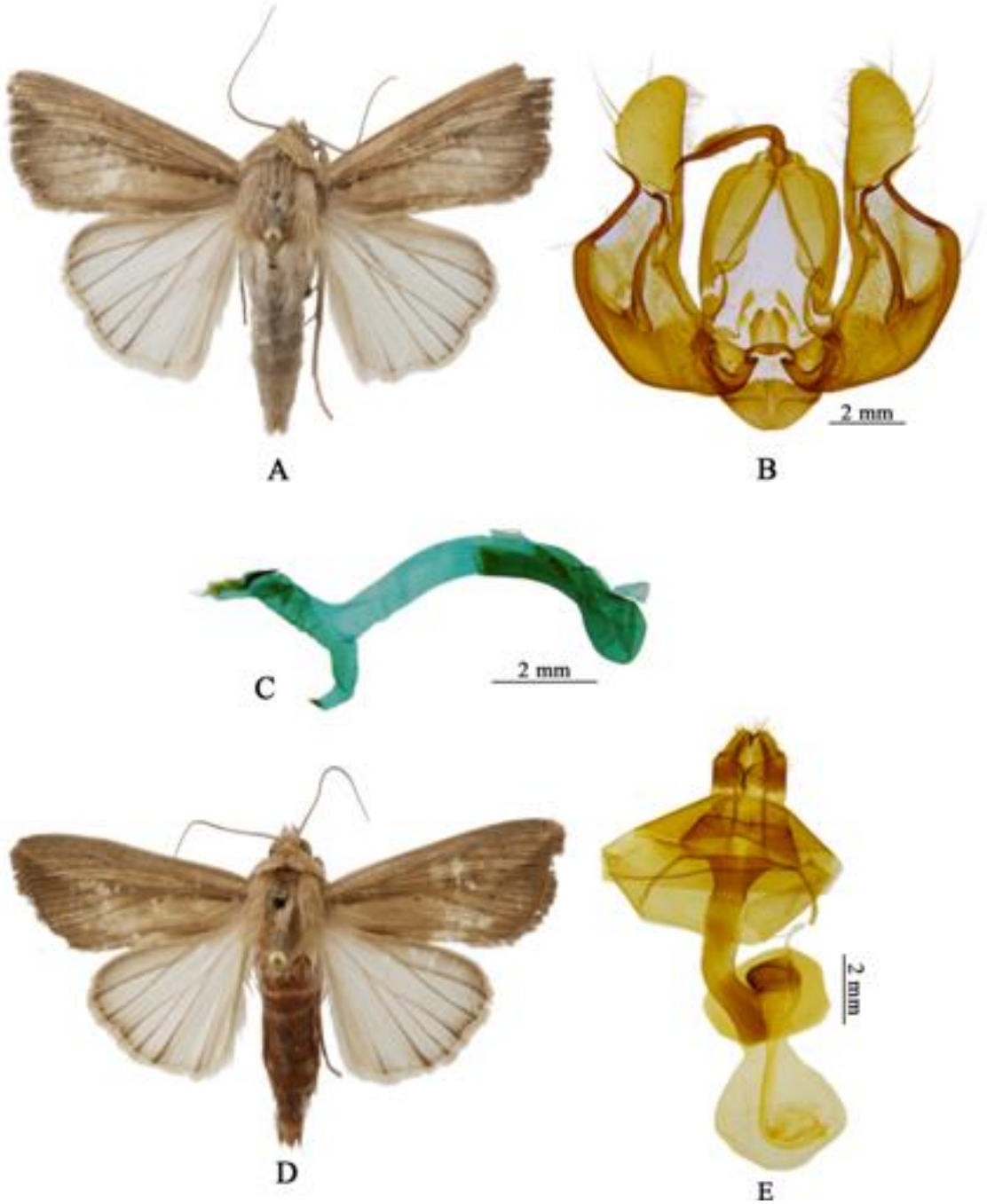
Leucania roseilinea Walker, 1862: 179.
Leucania compta Moore, 1881a, 336.
Leucania compta Hampson, 1894, 272.
Leucania roseilinea Poole, 1989:211; Hacker *et al*., 2002: 4.

Description: Forewing were pale brown, the veins white, median nervure prominent with expanded distal portion, beyond which is fuscous, pale brown striae on

interspaces below veins, postmedial line is marked by black spots on the veins, and a pale brown triangular shade extends from the termen below the apex, terminal line represented by black spots on interspaces, fringe fuscous brown. Hindwing white with pale brown scales on subterminal area, fringe dull white.

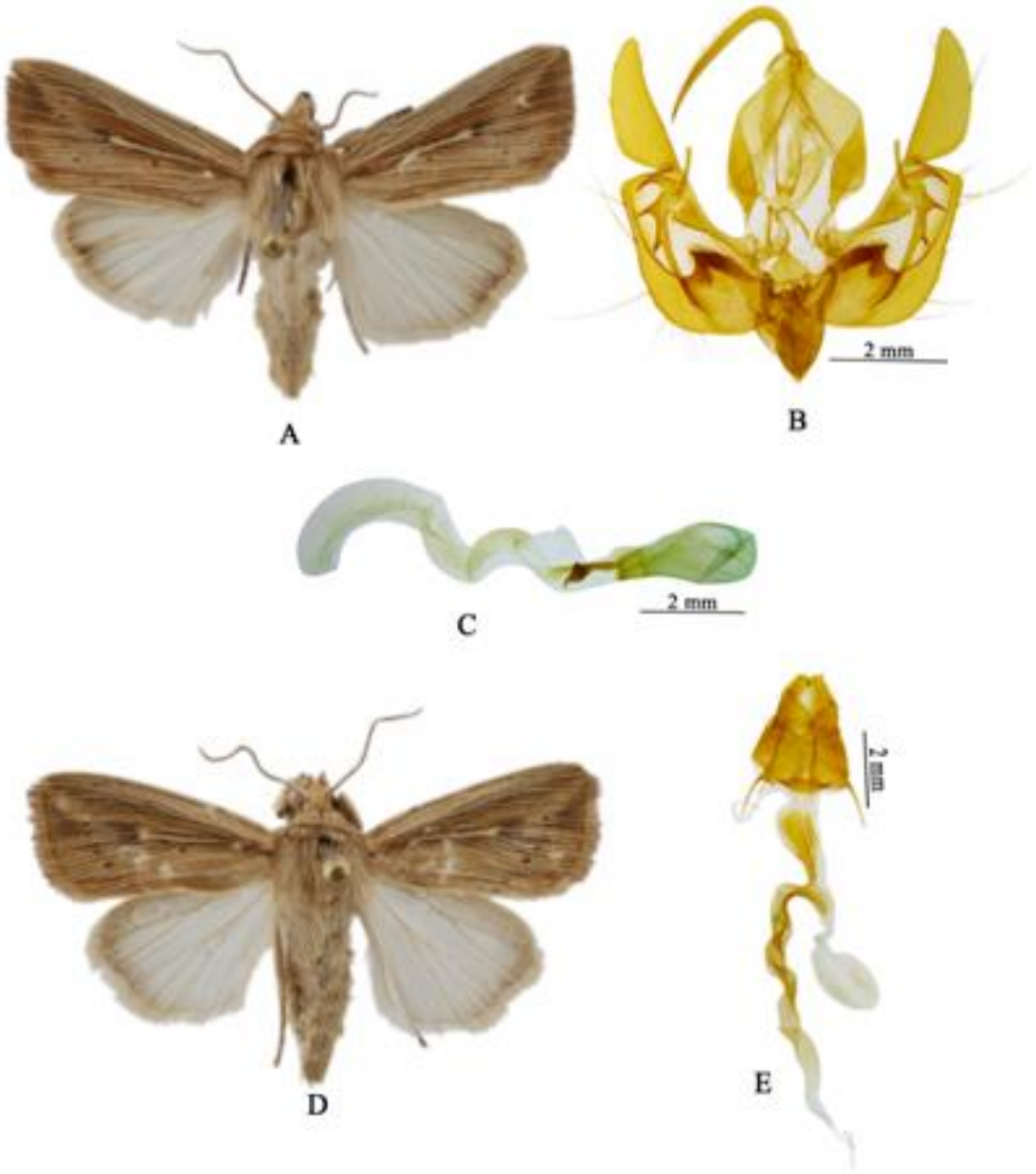
Length of forewing: 12.9-14.3 mm (male) and 12-15.2 mm (female).

Male genitalia: Uncus long, slender, strongly curved ventrally on the subbasal portion. Tegumen slightly broad in lateral view. Vinculum with well curved dorsal arm, saccus broad and pointed at tip. Valva except cucullus with round ventral margin and rectangular corner on the ventroposterior portion, costa abruptly descending ventrally on the basal portion with a small haired rounded process at the end of costa. Ampulla short and hooked ventrally, sacculus broad, harpe very long with two small processes along the ventral margin, dorsal process of harpe long, slender and beyond the dorsal margin of costa. Valvula moderately broad membranous area and few long spines along ventral margin. Cucullus crescent shaped, without coronal spine and basal arm. Juxta nearly triangular. Aedeagus with a long slender ventral plate bearing a thorn, vesica long, about three times as long as aedeagus when everted, bearing dense spinules on entire surface of distal ¾.



A. Adult male; **B.** Male gennitalia; **C.** Aedeagus; **D.** Adult female; **E.** Female genitalia

Fig. 1. *Leucania loreyi* (Duponchel, 1827).



A. Adult male; **B.** Male gennitalia; **C.** Aedeagus; **D.** Adult female; **E.** Female genitalia.
Fig. 2. *Leucaniaroseilinea* (Walker, 1862).

Female genitalia: Ductus bursae sclerotised strongly curved ventrally near corpus bursae, with many longitudinal striae on anterior portion, ostium bursae narrow. Corpus bursae rounded, appendix bursae long, tubular, sclerotised with membraneous distal portion, waved on basal 2/3. Apophyses anterior and apophyses posterior were moderately long. Papilla analis unmodified.

Materials examined: INDIA: Karnataka: 2♀, Mysore, Hunasur, 10.xii.2018, Basavaraj N. H.; 3♂, Mysore, Hunasur, 10.xii.2018, Basavaraj N. H.

Remarks: This species has been reported for the first time from Karnataka state. In this species white colour median nervure prominent with expanded distal portion on forewing. Adult were small compared to *Leucania loreyi*. Cucullus crescent shaped, without coronal spine and basal arm. Juxta was nearly triangular.

Moreover, the misidentifications are linked with the fact that all species have a similar habitus. There is a need to carry out systematic studies on the genus *Mythimna*and *Leucania*. Earlier authors both genus *Mythimna* and *Leucania* were grouped together. Few authors (Hampson, 1894) mentioned these two genera are grouped together and, in others (Edwards, 1992; Holloway, 1989; Yoshimatsu, 1994), they are kept separately. According to Rungs (1955) and Lafontaine & Schmidt (2010) described *Leucania* spp. do not possess a corona on the cucullus while *Mythimna* spp. have a corona. Moore (1881) described 20 new species from India under the genus *Leucania*, accompanied by a hand-drawn plate in his initial description. Additionally, Yoshimatsu (1994) provided a genitalia description and confirmed the findings. The male genitalia of the available specimens were compared with reference illustrations of *Leucania* species provided by Adams (2001); Calora (1966); Edwards (1992); Yoshimatsu (1994). The specimens were found to be identical and were confirmed as *Leucania loreyi* and *L. roseilinea*. Species identification was further validated through morphological examination and male

genitalia comparison. Robinson *et al*. (2001) reported *L. roseilinea* on rice, with its distribution recorded in states such as Nagaland, Odisha (Ganjam), and Tamil Nadu (Nilgiris) (Chandra *et al.,* 2021; Hampson, 1984). *L. loreyi* is widely distributed across India (Hampson, 1984) and feeds on crops including chillies, sorghum, oats, and rice (Robinson *et al.,* 2001; Sharma *et al.,* 2002). However, this study confirms the presence of *L. loreyi and L. roseilinea* in Karnataka as well. In India, no species of *Leucania* has yet been reported to occur in outbreak form. One possible reason for this could be that field entomologists have mistakenly identified them as *Mythimna* without proper taxonomic identification (Kalleshwaraswamy *et al.,* 2023).

CONCLUSIONS

Accurate identification of pest species is essential for effective pest management programs, whether through biological control or pheromone-based methods. This study provides a valuable foundation for the precise identification of *Leucania* species, which cause significant crop losses in various regions of the country. Rapid and accurate identification is crucial for developing targeted control strategies. In this study, taxonomic identification was based on the morphological characteristics of adults. The findings revealed the distribution of two false armyworm species, *Leucania loreyi* and *L. roseilinea*, in Karnataka.

FUTURE SCOPE

Advancements in molecular techniques, integrative taxonomy, and ecological studies offer promising avenues for the taxonomic identification of *Leucania* species (Lepidoptera: Noctuidae). However, comprehensive surveys and extensive specimen collection across various states of India, including additional locations within Karnataka, are essential to enhance our understanding of species diversity and distribution. Given that larvae are the primary damaging stage responsible for economic losses, their accurate taxonomic identification is crucial for developing effective pest management strategies.

Author contribution. Investigation, data curation and formal analysis were performed by BNH, PCG, ST and DO. The initial draft of the manuscript was written by BNH, PCG, ST, and DO, while KC and CKB provided feedback for its improvement. All authors reviewed and approved the final version of the manuscript.

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REFERENCES

Adams, M. S. (2001). A revision of the moth genus *Leucania* Ochsenheimer in the Antilles (Insecta Lepidoptera: Noctuidae). *Annals of Carnegie Museum*, *70*(3), 179-220.

Anonymous (2024). *Leucania loreyi* (Duponchel, 1827) – False Army Worm; Cosmopolitan. In Sondhi, S., Y. Sondhi, R.P. Singh, P. Roy and K. Kunte (Chief Editors). *Butterflies of India*, v. 3.82. Published by the Indian Foundation for Butterflies.

Calora, F. B. (1966). A revision of the species of the *Leucania*-complex occurring in the Philippines (Lepidoptera, Noctuidae, Hadeninae). *Philipp. Agric.*, *50*, 633-728.

Chandler, K. J. and Benson, A. J. (1991). Evaluation of armyworm infestation in north Queensland sugarcane ratoon crops. *Proceedings of South African Sugar Technologists Association*, *13*, 79–82.

Chandra, K., Pathania, P. C., Rajmohana, K. and Hundal, S. S. (2021). *Faunal Diversity of Agroecosystems in India*: Published by the Director, Zool. Surv. India, Kolkata, pp.1-767.

Cocco, J., Dolibaina, D. R., Casagrande, M. M., Specht, A. and Foerster, L. A. (2019). First records of *Leucania rawlinsi* Adams and *L. senescens* Möschler (Lepidoptera: Noctuidae) in Brazil: redescription, potential association with *Bt* maize, larval parasitoids, and spatial and temporal distribution. *Zootaxa*, *4604*(3), 441-460.

Dolibaina, D. R., Casagrande, M. M., Specht, A., Mielke, O. H. H., Legrain, A., Zilli, A. and Goldstein, P. (2019). Taxonomy of the *rivorum* species-group of *Leucania* Ochsenheimer, 1816 (Lepidoptera: Noctuidae). Zootaxa, 4711(3).

Edwards, E. D. (1996). Noctuidae. In: Nielsen et al. (ed). Checklist of the lepidoptera of Australia. *Monographs on Australian Lepidoptera*. Australia, CSIRO.

Edwards, E. D. (1992). A second sugarcane armyworm (*Leucania loreyi* (Duponchel) from Australia and the identity of *L. loreyimima* Rungs (Lepidoptera: Noctuidae). *Journal of the Australian Entomological Society*, *31*, 105–108.

El-Sherif, S. I. (1972). On the biology of *Leucania loreyi* Dup. (Lepidoptera, Noctuidae). *Zeitschrift für Angewandte Entomologie*, *71*(1-4), 104-111.

Franclemont, J. G. (1951). The species of the *Leucaniaunipuncta* group, with a discussion of the generic names for the various segregates of *Leucania* in North America. *Proceedings of the Entomological Society of Washington*, *53*, 57-85.

Ganeshan, S. and Rajabalee, A. (1996). The *Mythimna* spp. (Lepidoptera: Noctuidae) complex on sugarcane in Mauritius. In *Proceedings of South African Sugar Technologists Association*, *70*, 15-17.

Gay, F. J. (1966). Scientific and common names of insects and allied forms occurring in Australia. Bulletin 285. CSIRO, Melbourne.

Guo, S. J., Li, S. M., Ma, L. P. and Zhuo, X. N. (2003). Research about biological characteristics and damage laws of *Leucania loreyi*. *Journal of Henan Agricultural Sciences*, *9*, 37-39.

Hampson, G. F. (1894). *Fauna of British India, Moths, 2*; Taylor and Francis Ltd., London, 3, 1-107.

Hill, M. G. (1988). Analysis of the biological control of *Mythimna separata* (Lepidoptera: Noctuidae) by *Apanteles ruficrus* (Braconidae: Hymenoptera) in New Zealand. *Journal of applied ecology*, *25*, 197-208.

Hill, M. P., Hulley, P. E. Allsopp, J. and Van Harmelen, G. (1997). Glandular trichomes on the exotic *Solanum sisymbriifolium* Lamarck (Solanaceae): effective deterrents against an indigenous South African herbivore. *African Entomology*, *5*(1), 41-50.

Holloway, J. D. (1989). The moths of Borneo: family Noctuidae, trifine subfamilies: Noctuinae, Heliothinae, Hadeninae, Acronictinae, Amphipyrinae, Agaristinae. *Malayan Nature Journal*, *42*(2), 57-228.

Ikincisoy, Y. and Kornosor, S. (1996). Investigations on some biological features of the maize pest *Acantho Leucania loreyi* in Çukurova Region. In *Proceedings*

of the Third National Congress of Entomology, Florence, Italy, pp. 590–594.

Jalaeian, M., Farahpour-Haghani, A. and Esfandiari, M. (2017). First report of damage caused by *Leucania loreyi* (Lep.: Noctuidae) on rice in Guilan province. Coop. *Plant Pest Research*, *7*, 77–80.

Kalleshwaraswamy, C. M., Karthik, C. M., Meghana, K. J., Durga, G., Madhu, G. A., Ratnakala, B. and Shashank, P. R. (2023). Outbreak of Army Worm, *Leucania albistigma* Moore on Maize with Notes on Taxonomy and Management. *Indian Journal of Entomology*, pp. 857-866.

Klots, A. B. (1970). Lepidoptera in Taxonomists Glossary of Genitalia in Insects, (Ed.S.D. Tuxen), Munksgaard, Copenhagern pp. 97-111.

Kornosor, S. (1999). Entomological Problems of Maize in Turkey. In Proceedings of the XXth Conference of the International Working Group on Ostrinia and other Maize Pests, Adana, Turkey, 4–10 September 1999.

Lafontaine, J. D. and Schmidt, B. C. (2010). Annotated check list of the Noctuoidea (Insecta, Lepidoptera) of North America north of Mexico. *ZooKeys*, *40*, 1-239.

Moore, F. (1881). Descriptions of new genera and species of Asiatic nocturnal Lepidoptera *Proceedings of the Zoological Society of London*, *49*(2), 326-380.

Nam, H. Y., Kwon, M., Kim, H. J. and Kim, J. (2020). Development of a species diagnostic molecular tool for an invasive pest, *Mythimna loreyi*, using LAMP. *Insects*, *11*(11), 817.

Poole, R. W. (1989). Noctuidae. Lepidopterorum Catalogus (New Series). E.J. Brill and Flora and Fauna Publications, Leiden, xii,pp. 1313.

Robinson, G. S., Ackery, P. R., Kitching, I. J., Beccaloni, G. W. and Hernández, L. M. (2001). Hostplants of the Moth and Butterfly Caterpillars of the Oriental Region. *The Natural History Museum, London and Southdene* SDN BHD, Malaysia. pp. 1-744.

Rungs, C. (1955). Contribution à l'étude des *Leucaniaauct*. de Madagascar (Lepidoptera, Phaleinidae, Hadeninae). *Memoires de l'Institut Scientifique de Madagascar*. *Serie E Tome. 6*, 65–108.

Sharma, H. C., Sullivan, D. J. and Bhatnagar, V. S. (2002). Population dynamics and natural mortality factors of the Oriental armyworm, *Mythimna separata* (Lepidoptera: Noctuidae), in South-Central India. *Crop Protection*, 21(9), 721-732.

Sugi, S. (1982). Noctuidae. In Inque, H. et al., *Moths of Japan*. pp. 699-935.

Vieira, V. (2008). Lepidopteran fauna from the Sal Island, Cape Verde (Insecta: Lepidoptera). *SHILAP Rev. Lepidopterol*, *36*, 243–252.

Yoshimatsu, S. (1994). A revision of the genus *Mythimna* (Lepidoptera: Noctuidae) from Japan and Taiwan. *Bulletin of the National Institute of Agro Environmental Sciences*, *11*, 81-323.

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