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First report of Lophoptera trigonoprocessa Qi & Xue (Lepidoptera, Euteliidae, Stictoperinae) from India

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Subject Editor: Asghar Shirvani ABSTRACT. The Chinese species, Lophoptera trigonoprocessa Qi & Xue, 2011 is reported for the first time from India. Apart from this, L. squammigera Guenée, 1852 and L. illucida (Walker, 1865) are illustrated from the Indian region. Images of the adults and genitalia are provided. A checklist of all the known species of the genus from India is also provided.

Key words: India, new record, Lepidoptera, Deccan peninsula, Checklist

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INTRODUCTION

The family Euteliidae is known by modified basiconic sensilla on the proboscis, reduced frenulum in females, presence of a small oval plate in the ductus ejaculatorius, anal papillae modified so that their inner surfaces are directed posteriorly and the counter-tympanal hood with a unique double structure (Holloway, 1985; Zahiri et al., 2011). In India, the family is known by approximately 85 species. Genus Lophoptera Guenée, 1852 under subfamily Stictoperinae is widely distributed in the Oriental, Australian and Afro-tropical regions. Adults show a characteristic feature of equal development of bursa and appendix bursae in the female genitalia. Most of the females have a horn-like invagination posterior to the ostium bursae of the female or a pair of setose lobes laterally to the ostium and post-ostial invagination. In males, the valva is complete instead of bifid into two arms, sometimes with harpe (Holloway, 1985; Qi et al., 2011).

In the present paper, Lophoptera trigonoprocessa Qi & Xue, 2011, previously only known from China, is recorded for the first time from India. Apart from this, L. squammigera Guenée, 1852 and L. illucida (Walker, 1865) are also reported for the first time in Jharkhand state falling under the Deccan Peninsular biogeographic zone of India. Images of the adults and genitalia are provided. A checklist of all the known species of the genus from India is also provided. Globally known by more than 75 species (Hampson, 1894; Holloway, 1985; Poole, 1989; Qi et al., 2011), the genus is now represented by 21 species from India.

MATERIAL AND METHODS

Collection of adult moths was done at different localities as mentioned under the material examined by using a vertical sheet light trap illuminated by a 160W mercury vapour lamp. The collected specimens were processed as per standardized techniques in Lepidopterology (Holloway et al., 2001). Genitalia preparations were carried out following the standard methods using the RI-90-03A Stereo-zoom microscope (Rescholar® Equipment, India). Images of adults and genitalia were taken by Leica DFC 500 (Leica® Microsystems Inc., USA). Specimens and genitalia slides are preserved in the insect cabinets at National Zoological Collections, Zoological Survey of India (NZC, ZSI), Gangetic Plains Regional Centre, Patna.

RESULTS

Systematic accounts

Class Insecta Linnaeus, 1758

Order Lepidoptera Linnaeus, 1758

Family: Euteliidae Grote, 1882

Subfamily: Stictoperinae Hampson, 1894

Genus Lophoptera Guenée, 1852

Type species: Lophoptera squammigera Guenée, 1852, by subsequent designation by Hampson, 1912.

Lophoptera trigonoprocessa Qi & Xue, 2011 (Figs. 1, 2, 7, 8, 9)

Lophoptera trigonoprocessa Qi & Xue [in Qi et al.], 2011:25.

Material examined. INDIA - Jharkhand, Netarhat, 15-16.x.2014, 3, leg. N. Singh; Rajderwa, 02-03.ix.2016, 4, leg. N. Singh; Topchanchi, 06.ix.2016, 1, 10.x.2016, 1, leg. N. Singh; East Singhbhum, Dalma WLS, Makula Kocha, 08.vii.2021, 1, leg. R. Joshi; Way to Pindrabera, 10.vii.2021, 3, leg. R. Joshi; INDIA - Bihar, Bodhgaya, Goutam Buddha WLS, Watch Tower, 23-25.viii.2017, 2, leg. N. Singh; Lohawar Hill, 08.viii.2018, 1, leg. R. Joshi; INDIA - West Bengal, Kalimpong, Uper Kuwapani, 12.viii.2019, 1, leg. N. Kuni; Tamil Nadu, Yercaud, Selam, 19.x.2019, 1, leg. R. Joshi.

Diagnosis: Forewing length: male 14mm, female 15–16 mm. Forewing with a medial longitudinal white band from base to the postmedial line below the longitudinal black band. Hindwing blackish-brown with basal half transparent. Single frenulum in females also. Male genitalia with uncus beak-like; valva with a strong triangular process at the middle of the costa. Aedeagus long, narrow, with a small bulge at the apical end. Female genitalia. Ovipositor short and wide, with thick hairs. Apophyses posteriores longer than apophyses anteriores. Lateral lobes reduced, post-ostial invagination not clearly expressed, ostium surrounded with folds. Appendix bursae same size as corpus bursae, corpus bursae rounded, with a short spinose signum.

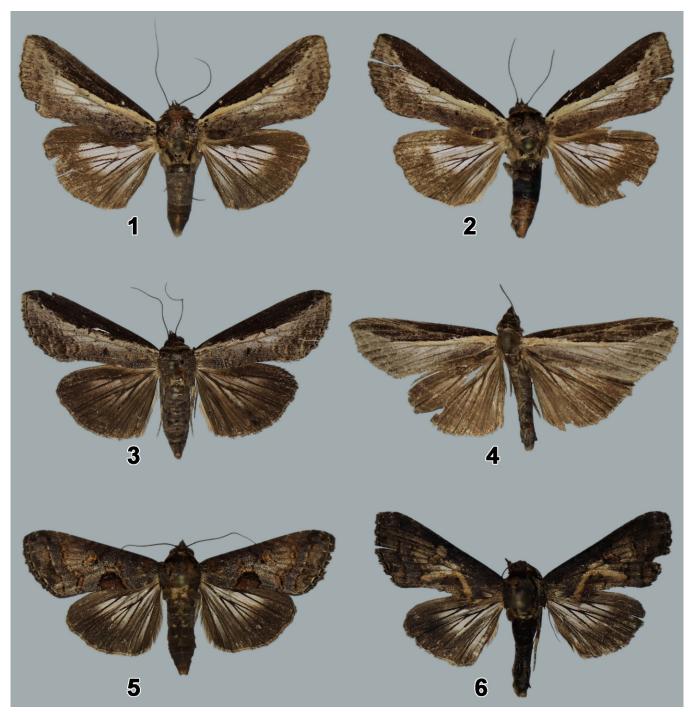
Distribution: India, Bihar, Jharkhand, West Bengal, Tamil Nadu (present study); China (Qi et al., 2011).

Remarks. Morphologically, *L. trigonoprocessa* is similar to *L. squammigera* Guenée, 1852, *L. squammilinea* Holloway, 1985 and *L. nanheng* Fu, Owada, Wu, Ronkay & Shih, 2021. However, the more distinct longitudinal white band on the forewing, the transparent zone of the hindwing in adults and the triangular process at the middle of the costa in the male genitalia of *trigonoprocessa* differentiate it from all its allied species. This is the first record of the species from India. *L. squammigera* from Maharasthra by Gurule and Nikam (2013), from Jharkhand by Singh et al. (2017) and from Kerala by Sondhi et al. (2018) are probably misidentifications of *L. trigonoprocessa*.

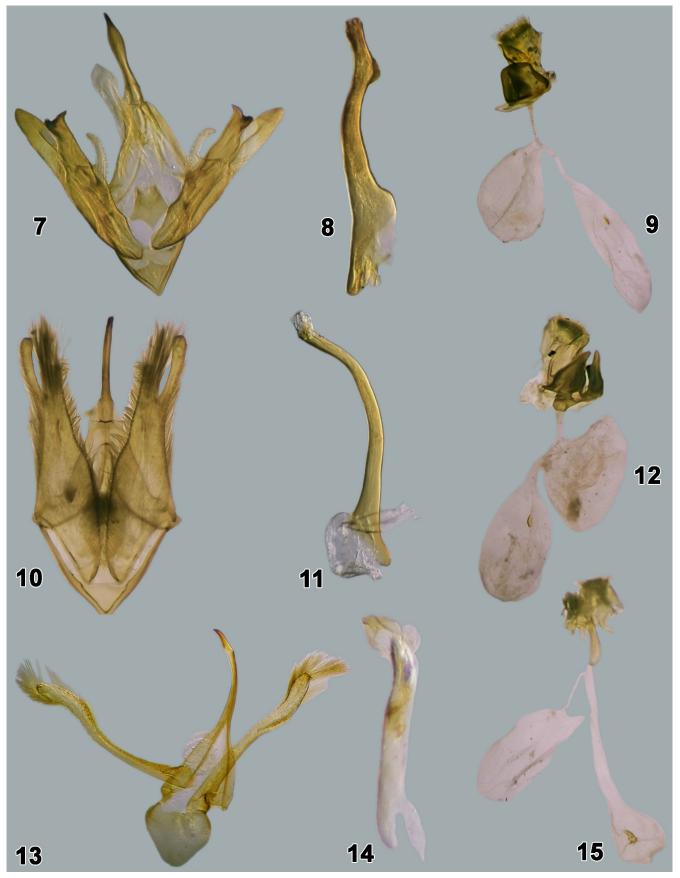
Lophoptera squammigera Guenée, 1852 (Figs 3, 4, 10, 11, 12)

Lophoptera squammigera Guenée, 1852:55. Lophoptera costata Moore, 1885:123. Lophoptera smaragdipanni Chen, 1999:952.

Material examined: INDIA - Bihar, Bodhgaya, Goutam Buddha WLS, Watch Tower, 24.viii.2017, 1° , leg. N. Singh; West Champaran, Valmiki TR, Mangooraha, 17.x.2017, 1° , leg. N. Singh; INDIA - Arunachal Pradesh, West Kameng, Tenga Valley, 08.v.2019, 2° , 3° , leg. N. Kuni; Shergaon, 11.v.2019, 2° , leg. N. Kuni; Salari, 12.v.2019, 1° , leg. N. Kuni.



Figures 1–6. Adult *Lophoptera* species: **1, 2.** *Lophoptera trigonoprocessa* Qi & Xue, 2011: ♂ & ♀; **3, 4.** *Lophoptera squammigera* Guenée, 1852: ♂ & ♀; **5, 6.** *Lophoptera illucida* (Walker, 1865): ♂ & ♀.



Figures 7–15. Male and female genitalia of *Lophoptera* species: **7–9.** *Lophoptera trigonoprocessa* Qi & Xue, 2011; **10–12.** *Lophoptera squammigera* Guenée, 1852; **13–15.** *Lophoptera illucida* (Walker, 1865).

Table 1. Checklist of the known species of *Lophoptera* from India.

Species	Distribution in India	References
Lophoptera anthyalus (Hampson, 1894)	Khasis, Ganjam	Hampson (1894)
Lophoptera apirtha (Swinhoe, 1900) Syns: Lophoptera plumbeola Hampson, 1912:184 Gyrtona chalybea Butler, 1883:163	Himachal Pradesh (Solan)	Hampson (1912)
Lophoptera belliinopinata Holloway, 1985	South India	Holloway (1985)
Lophoptera coangulata Warren, 1914	Meghalaya, Khasis, NE Himalaya	Warren (1914) Holloway (1985)
Lophoptera denticulata (Walker, 1865) Syn.: Lophoptera denticulata brunneostriata Holloway, 1976:19	Indian region	Poole (1989)
Lophoptera hemithyris (Hampson, 1905)	Tamil Nadu, Madras	Hampson (1905)
Lophoptera hypenistis (Hampson, 1905)*	Sikkim, Mizoram	Qi et al. (2011) Kirti et al. (2014)
Lophoptera illucida (Walker, 1865) Syn.: Noctua abortiva Herrich-Schäffer, [1869]:4	Orissa, Punjab Jharkhand, Bihar	Hampson (1894) present study
Lophoptera khasiana Warren, 1914 Syns.: Lophoptera albilinea Warren, 1914:415 Stictoptera apicalis Wileman & South, 1920:271 Lophoptera strigilota de Joannis, 1928:335	Meghalaya (Khasis), NE Himalaya	Warren (1914) Holloway (1985)
Lophoptera longipennis (Moore, 1882)	NE Himalaya, Darjeeling	Holloway (1985)
Lophoptera nama (Swinhoe, 1900) Syn.: Lophoptera acrogramma Turner, 1932:177	NE Himalaya, Jaintia hills	Holloway (1985)
Lophoptera negretina (Hampson, 1902)	Meghalaya (Khasis)	Hampson (1902)
Lophoptera olivascens (Moore, 1882)	N.E. Himalaya (Khasi hills)	Holloway (1985)
Lophoptera polygrapha (Walker, 1864) Syns.: Stictoptera luctuosa Hampson, 1902:212 Lophoptera malayica Warren, 1914:415	South India	Holloway (1985)
Lophoptera pustulifera (Walker, 1864) Syn.: Stictoptera cerea Swinhoe, 1897:167 Stictoptera brunneipennis Holland, 1900:564	N.E. Himalaya (Khasi hills)	Holloway (1985)
Lophoptera quadrinotata (Walker, 1864): 162 Syn.: Steiria aequilinea Walker, 1864:174	North India	Kononenko & Pinratana (2005)
Lophoptera squammigera Guenée, 1852 Syn.: Lophoptera costata Moore, 1885:123 Lophoptera smaragdipanni Chen, 1999:952	Himalayas, Bihar, Arunachal Pradesh	Hampson (1894) present study
Lophoptera squammilinea Holloway, 1985	Meghalaya, Khasis	Holloway (1985)
Lophoptera tenuis (Moore, 1868) Syn.: Lophoptera tenuis turgida Holloway, 1985:264	NE Himalaya, Darjeeling	Holloway (1985)
Lophoptera trigonoprocessa Qi & Xue, 2011	Bihar, Jharkhand, West Bengal, Tamil Nadu	present study
Lophoptera vittigera Walker, 1865 Syn.: Lophoptera aleuca Hampson, 1912:178	South India	Holloway (1985)

^{*} Kirti et al. (2014) mentioned *L. hypenistis* as a new record from India probably missed the publication by Qi et al. (2011) in which it was already mentioned from Sikkim.

Distribution: NW Himalayas (Hampson, 1894), Bihar, Arunachal Pradesh (present study); Australia, China (Jiangxi, Hunan, Fujian, Guangdong, Hainan, Hong Kong, Guangxi, Sichuan, Guizhou, Yunnan, Tibet), Indonesia, Japan, Papua New Guinea, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam (Qi et al., 2011).

Remarks. The more greyish longitudinal stripe on the forewing, male genitalia valva divided into two small arms apically and triangular lateral lobes in female genitalia separate it from its closely allied *squammilinea*. This is the first record of the species from India.

Lophoptera illucida (Walker, 1865) (Figs 5, 6, 13, 14, 15)

Stictoptera illucida Walker, 1865:918. Noctua abortiva Herrich-Schäffer, 1869:4.

Material examined: INDIA - Jharkhand, Koderma, Meghatari, 20.ix.2014, 1♀, leg. N. Singh; Saranda Forest Division, Kiribru, 13.ix.2014, 1♀, leg. N. Singh; East Singhbhum, Dalma WLS, Pindrabera, 12.vii.2021, 2♀, leg. R. Joshi; INDIA - Bihar, Bodhgaya, Goutam Buddha WLS, Lohawar Hill, 08.viii.2018, 1♂, leg. R. Joshi.

Distribution: Orissa, Punjab (Hampson, 1894), Jharkhand, Bihar (present study); China (Taiwan, Guangdong, Hainan, Guangxi, Sichuan, Yunnan, Tibet), Korea, India, Vietnam, Burma, Sri Lanka, Malaysia, Singapore, Indonesia, Australia (Qi et al., 2011).

Remarks. The species shows morpho-variation in adults. Forewing with a black semicircular dot or inverted V-shaped patch in the middle of dorsum. Finger-like short medial costal process running parallel to valva and inverted triangular saccus in male genitalia is diagnostic for the species.

DISCUSSION

Genus *Lophoptera* is globally known by more than 75 species and is represented by 21 species from India (Table 1). Though, the genus was well represented from the North East region, South India and North India, the genus was not reported from Bihar state (Gangetic Plains) so far. Moreover, most of the *squammigera* reporting from the Indian region seems misidentification of *trigonoprocessa* (see Gurule & Nikam, 2013; Singh et al., 2017; Sondhi et al., 2018). A proper examination of the genitalia, as well as hindwing, is needed to distinguish these two species. So, based on these two characters, we have confirmed the presence to *L. trigonoprocessa* in India and the species ranges from the Himalayan region to eastern Ghats passing from Gangetic Plains and the central Deccan peninsula. Furthermore, *L. squammigera* and *L. illucida* are also reported for the first time in Jharkhand state falling under Deccan Peninsular biogeographic zone of India. A checklist of Indian species along with their preliminary distribution from India is also provided. This also includes synonyms under valid species so as to give the clear picture of known species. We are very much hopeful that if more concentrated efforts are put on this genus, many new records/species will come up from the Indian region.

AUTHOR'S CONTRIBUTION

The authors confirm contribution to the paper as follows: R.J. & N.S. conceived the ideas and described the materials; N.K. prepared the plates. All authors collected materials and contributed to the drafts and gave final approval for publication.

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AVAILABILITY OF DATA AND MATERIAL

Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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اولین گزارش گونه Lepidoterera, Euteliidae, Stictoperinae) Lophoptera trigonoprocessa Qi & Xue اولین گزارش گونه

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چکیده: گونهٔ توصیف شده از چین به نام , L. squammigera ولین بار از هند گزارش شد. علاوه بر این، گونههای L. squammigera و Guenée, 1852 و این بار از هند گزارش شد. علاوه بر این، گونههای و Guenée, 1852 و Lophoptera و ژنیتالیا ارایه شد. لیست تمام گونههای جنس حسرات کامل و ژنیتالیا ارایه شد. لیست تمام گونههای جنس مناخته شده در هند نیز ارایه شد.

واژگان کلیدی: هند، گزارش جدید، بالپولکداران، شبه جزیره دکن، چکلیست