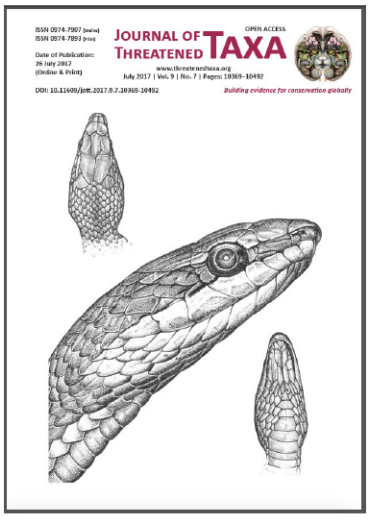


Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

Note

Eight new records of the family Erebidae (Lepidoptera: Noctuoidea) from India

Jagbir Singh Kirti, Navneet Singh & Harkanwal Singh

26 July 2017 | Vol. 9| No. 7 | Pp. 10480–10486
10.11609/jott.3690.9.7.10480–10486

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 July 2017 | 9(7): 10480–10486

ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Eight new records of the family Erebidae (Lepidoptera: Noctuoidea) from India

Jagbir Singh Kirti [1], Navneet Singh [2] & Harkanwal Singh [3]

[1] Department of Zoology & Environmental Sciences, Punjabi University, Patiala, NH 64, Urban Estate Phase II, Patiala District, Punjab 147002, India
[2] Zoological Survey of India,Gangetic Plains Regional Centre, Sector-8, Bahadurpur Housing Colony, Patna, Bihar 800026, India
[3] Department of Zoology, S.D. College, Barnala, Punjab 148101, India
[1] prjagbir2005@gmail.com, [2] nsgill007@gmail.com (corresponding author), [3] dr.harkanwalsingh@gmail.com

Erebidae, undoubtedly a well-defined group of moths, is the largest family of the order Lepidoptera. Globally, it is known by approximately 24,500 described species under 1750 genera (Nieukerken et al. 2011) and 18 subfamilies: Scoliopteryginae, Rivulinae, Anobinae, Hypeninae, Lymantriinae, Pangraptinae, Herminiinae, Aganainae, Arctiinae, Calpinae, Hypocalinae, Eulepidotinae, Toxocampinae, Tinoliinae, Scolecocampinae, Hypenodinae, Boletobiinae and Erebinae (Zahiri et al. 2012). Family Erebidae is of immense economic importance as it includes a large number of major and minor pest species in its fold. The caterpillars of various species attack different agricultural crops, forest trees and ornamental plants. These moths and their immature stages occupy a variety of niches, such as external foliage feeders on trees, forbs or grasses and are known by different names such as subsurface cut worms, army worms, boll worms, stem borers, bud feeders, etc. The huge losses caused by their larvae are counted in terms of millions of rupees every year which farmers spend for their control. Thus, the distributional knowledge of such an economically important group of insects is vital for the economy of any country, agriculture sector and for mankind as a whole.

The present communication deals with the new additions of eight species to the known Indian fauna of Erebidae. All the newly reported species are distributed in northeastern India. For each of the newly reported species: first and latest reference, diagnosis, wing length, remarks, material examined and distribution is given whereas, first reference and name of the type species is provided for the respective genus.

Materials & Methods

The studied material was collected using light traps from different localities mentioned under material examined. The collected moths were killed with the help of ethyl acetate vapours and processed as per standard techniques in Lepidopterology. The wing venation and genital studies have been done by following Klots (1970), Robinson (1976), and Zimmerman (1978). The identification was done with the help of relevant literature (Hampson 1894; Holloway 2005). Furthermore, the reported species of Indian Erebidae have been verified from the following published works: Hampson (1891, 1893, 1894, 1895, 1896, 1897, 1898, 1899a,b,c, 1900, 1902, 1903, 1904, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1913a,b, 1914, 1918, 1920, 1922, 1924, 1926), Rose (2002), Srivastava (2002), Smetacek (2008), Zaspel

DOI: http://doi.org/10.11609/jott.3690.9.7.10480-10486 | **ZooBank:** urn:lsid:zoobank.org:pub:50D9ADA4-1ED1-4DB8-8669-449A5C548A42

Editor: Anonymity requested. **Date of publication:** 26 July 2017 (online & print)

Manuscript details: Ms # 3690 | Received 10 December 2016 | Final received 18 May 2017 | Finally accepted 13 June 2017

Citation: Kirti, J.S., N. Singh & H. Singh (2017). Eight new records of the family Erebidae (Lepidoptera: Noctuoidea) from India. *Journal of Threatened Taxa* 9(7): 10480–10486; http://doi.org/10.11609/jott.3690.9.7.10480-10486

Funding: UGC, New Delhi in form of MANF to Harkanwal Singh (40-116/(M/S)/2009(SA-III/MANF) dated 08/01/2011).

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are thankful to their respective administrative authorities for their kind support and for providing the necessary facilities to carry out this research work.

& Branham (2008), Gurule et al. (2011), Sivasankaran et al. (2012), Gurule & Nigam (2013), Kirti & Singh (2013), and Singh et al. (2014). All the voucher specimens of the newly recorded species are deposited in the Department of Zoology & Environmental Sciences, Punjabi University, Patiala (PUP/ZOO).

Abbreviations used: AED - Aedeagus, ANT.APO - Anterior apophyses, CRP.BU - Corpus bursae, DU.BU - Ductus bursae, VLV - Valva, PAP.A - Papilla anales, PO.APO - Posterior apophyses, TG - Tegumen, UN - Uncus, VES - Vesica, VIN - Vinculum, JX - Juxta.

Results and Discussion

Family: Erebidae

Subfamily: Erebinae

Genus *Ischyja* Hübner

Hübner, 1823; *Verz. bekannt. Schmett.*: 265.

Type species: *Phalaena manlia* Cramer.

Ischyja hagenii (Snellen, 1885) (Images 1,2,3)

Potamorpha hagenii Snellen, 1885; Tijdschr. Ent., 28: 6

Ischyja hagenii (Snellen, 1855); Kononenko & Pinratana (2005), Moths of Thailand 3: 106

Material Examined: PUP/ZOO/HAR/R-840, 13. ix.2012, 1 male, Mizoram: Mamit (23.92916667 N & 92.49055556 E, elevation 875m).

Diagnosis: Male genitalia with uncus swollen at tip, followed by a claw; juxta flask like; valvae robust with broad base, narrow beyond the basal half; vesica with small sclerotizations and spines as well as scobination.

Forewing length: 41mm.

Remarks: This species is distinct from its closely similar species *Ischyja anna* Swinhoe by the following characters: second segment of labial palpi is dark brown below, an ovate mark on forewing dorsum and a much broader blue band on the hindwing (in *hagenii* second segment of labial palpi is pale blue, forewing mark is angular and blue band of hindwing is narrow)

Distribution: India (Mizoram), Thailand, peninsular Malaysia, Indonesia (Sumatra, Borneo, Java, Lombok).

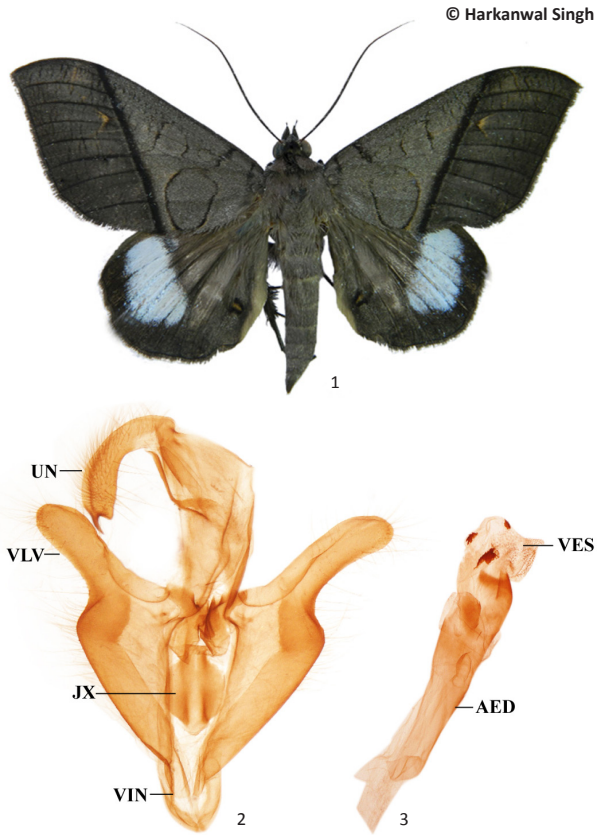
Genus *Ophisma* Guenée

Guenée, 1852; in Boisduval & Guenée. Hist. nat. Ins. 7: 236.

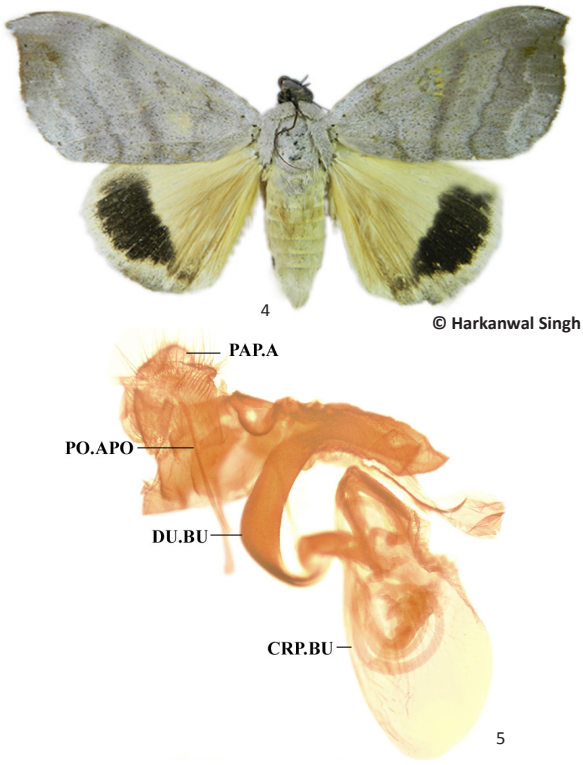
Type species: *Ophisma gravata* Guenée.

Ophisma pallescens (Walker, [1863] 1864) (Images 4,5)

Lagoptera pallescens Walker, [1863] 1864; J. Proc. Linn. Soc. (Zool.), 7: 179.



Images 1–3. *Ischyja hagenii* (PUP/ZOO/HAR/R-840)



Images 4–5. *Ophisma pallescens* (PUP/ZOO/HAR/R-843)

Ophisma pallescens (Walker, [1863] 1864); Kononenko & Pinratana (2005), Moths of Thailand, 3: 34.

Material Examined: PUP/ZOO/HAR/R-843, 12.ix.2012, 1 male, Mizoram: Mamit (23.92916667 N & 92.49055556 E, elevation 875m).

Diagnosis: Forewing pale brownish-grey, slightly falcate; the reniform and orbicular outlined with black. Hindwing pale yellow, with a submarginal black band, broadest at apex and narrowing to a point at anal angle. Female genitalia with papilla anales rectangular, setosed with long and small setae; posterior apophyses longer than the anterior apophyses; ductus bursae strongly curved, slender, long and sclerotized; corpus bursae irregular, pyriform with a small patch of sclerotization and lower half membranous.

Forewing length: 44mm.

Remarks: The second known species of this genus, *O. gravata* Guenée is much smaller in size than *O. pallescens*.

Distribution: India (Mizoram), Thailand, peninsular Malaysia, Indonesia (Sumatra, Borneo, Sulawesi, Seram), New Guinea.

Genus *Serrodes* Guenée

Guenée, 1852; in Boisduval & Guenée. Hist. nat. Ins. 7: 251.

Type species: *Phalaena inara* Cramer.

***Serrodes caesia* Warren, 1915**
(Images 6,7)

Serrodes caesia Warren, 1915; Novit. Zool. 22: 150

Serrodes caesia Warren, 1915; Holloway (2005), Moths of Borneo, 15–16: 89

Material Examined: PUP/ZOO/HAR/R-846, 12.ix.2012, 1 female, Mizoram: Mamit (23.92916667N & 92.49055556E, elevation 875m).

Diagnosis: Forewing slightly variegated, two irregular sub-basal markings, a fine but somewhat obscure post-medial line, outwardly angled at centre. Female genitalia with ductus bursae small, strongly sclerotized; corpus bursae elongated, weakly sclerotized.

Forewing length: 25mm.

Remarks: According to Holloway (2005) the species is non-congeneric with *Serrodes* and may be related to *Avatha bipartita* Wileman (Taiwan); however, due to lack of voucher specimens of related species we are following Holloway (2005).

Distribution: India (Mizoram), Indonesia (Java, Borneo, Sumatra, Sulawesi), New Guinea, Thailand.

Subfamily Herminiinae

Genus *Simplicia* Guenée

Guenée, 1854; in Boisduval & Guenée. Hist. nat. Ins. 8: 15.

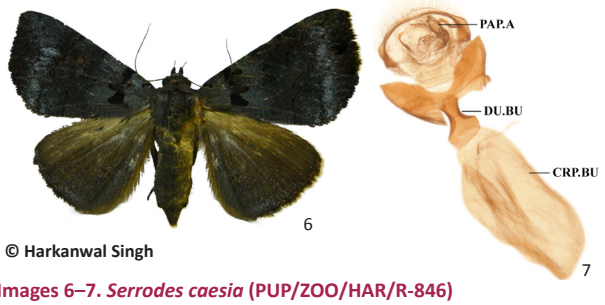
Type species: *Herminia rectalis* Eversmann.

***Simplicia bimarginata* (Walker, [1863], 1864)**
(Images 8,9,10)

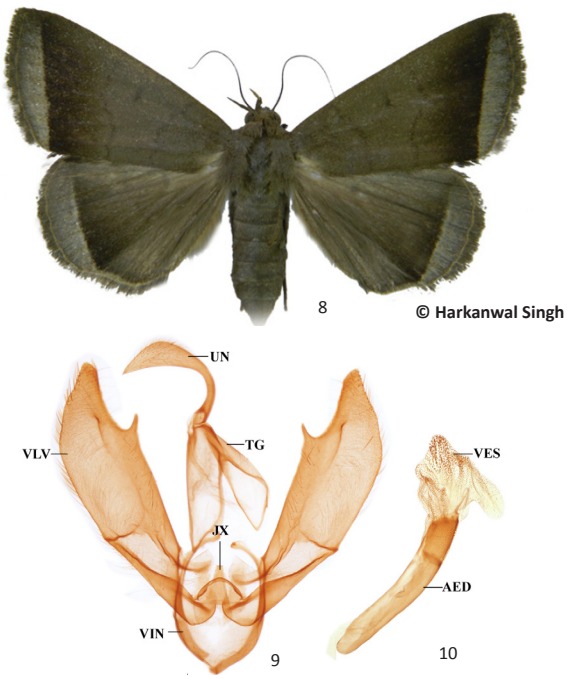
Culicula bimarginata Walker, [1863], 1864; J. Proc. Linn. Soc. (Zool.) 7: 178.

Simplicia bimarginata (Walker, [1863], 1864); Holloway (2005), Moths of Thailand, 3: 14

Material Examined: PUP/ZOO/HAR/R-42, 18.ix.2012, 1 male, 2 females, Mizoram: Hrangchalkwan (22.86083333N & 92.80416667E, elevation 1,230m); PUP/ZOO/HAR/R-42a, 17.ix.2009, 1 male, Mizoram: Thingsul (23.706604N & 92.866734E, elevation 850 m).



Images 6–7. *Serrodes caesia* (PUP/ZOO/HAR/R-846)



Images 8–10. *Simplicia bimarginata* (PUP/ZOO/HAR/R-42)

Diagnosis: Forewing fuscous grey; a straight sub-marginal line with diffused fuscous shade on inner side, area beyond it grey; antemedial and post-medial lines weak, waved and approaching each other towards inner margin. Hindwing with a similar sub-marginal line, angled at vein Cu_1. Male genitalia with sickle shaped uncus; valvae long, acute towards apex, small finger-like subapical costal process; aedeagus with a sclerotized, serrate band at tip; vesica with fields of scobination.

Forewing length: 18mm.

Remarks: *S. bimarginata* is morphologically similar to *S. marginata* (Moore) but its straight sub-marginal line of forewing is diagnostic, which is inwardly angled in the latter.

Distribution: India (Mizoram), Thailand, Malaysia, Sri Lanka, Indonesia, New Guinea, Philippines, Taiwan.

Subfamily Calpinae

Genus *Diomea* Walker

Walker, [1858], 1857; List Spec. lepid. Insects Colln Br. Mus. (13): 1079.

Type species: *Diomea rotundata* Walker.

***Diomea fasciata* (Leech, 1900)**

(Images 11,12,13)

Homoptera fasciata Leech, 1900; Trans. Ent. Soc. Lond., 1900: 553.

Diomea fasciata (Leech, 1900); Kononenko & Pinratana (2005), Moths of Thailand, 3: 62

Material Examined: PUP/ZOO/HAR/R-570, 27.ix.2012, 1 male, Mizoram: Saitual (23.689630 N & 92.955670 E, elevation 1,180m).

Diagnosis: Forewing pale yellow; interspaces of veins filled in with brown, markings of basal half irregular; a medial bluish band, broadest at costa. Hindwing with one medial, three post-medial diffused fuscous lines, a sub-marginal white line. Male genitalia with uncus long rod-like; valvae long and narrow; aedeagus with a long robust spine at tip; vesica unornamented.

Forewing length: 17mm.

Remarks: Only two species of *Diomea*, *D. rotundata* Walker and *D. cremata* Butler are reported from India (Sivasankaran et al. 2012). *D. fasciata* is the third species from India and its markings are unique and unmistakable.

Distribution: India (Mizoram), Thailand, China.

Genus *Platyja* Hübner

Hübner, 1823; Verz. bekannt. Schmett.: 268.

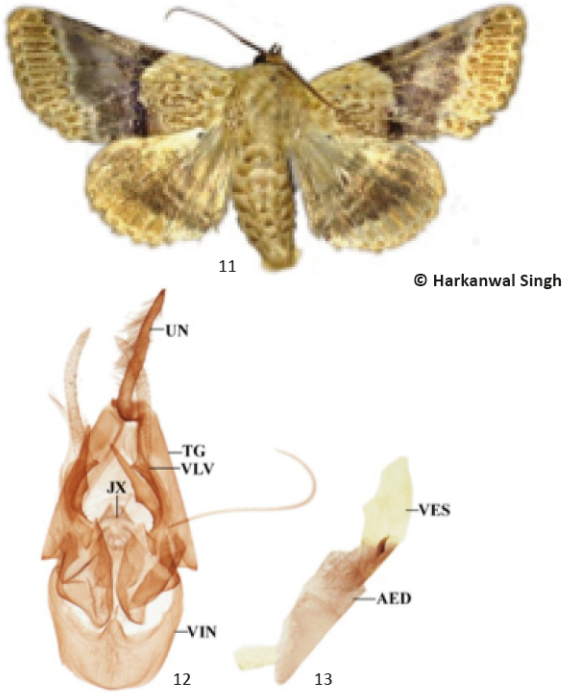
Type species: *Phalaena umminia* Cramer.

***Platyja acerces* (Prout, 1928)**

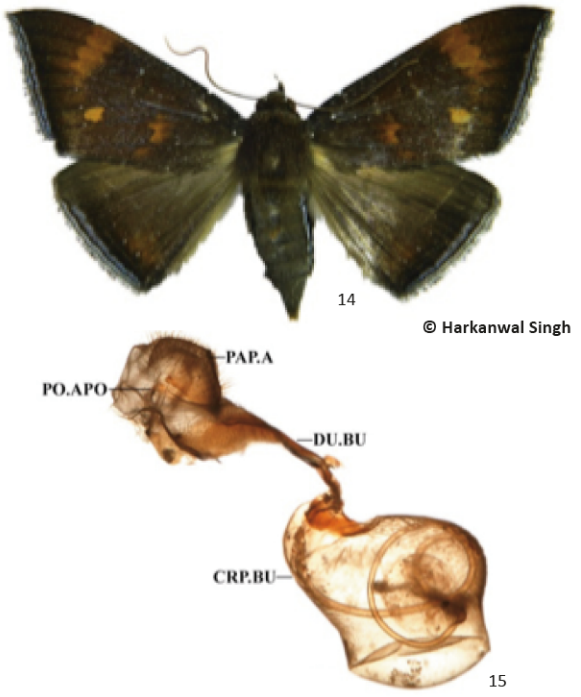
(Images 14,15)

Iontha acerces Prout, 1928; Bull. Hill Mus. Witley, 2: 261.

Platyja acerces (Prout, 1928); Holloway (2005), Moths of Borneo, 15–16: 145.



Images 11–13. *Diomea fasciata* (PUP/ZOO/HAR/R-570)



Images 14–15. *Platyja acerces* (PUP/ZOO/HAR/R-873)

Material Examined: PUP/ZOO/HAR/R-873, 18.ix.2011, 1 female, Arunachal Pradesh: Hunli (28.32166667 N & 95.97055556 E, elevation 1,460m).

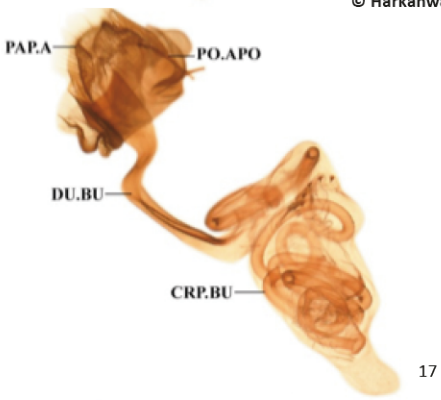
Diagnosis: Wings triangular, rufous brown. Forewing with a post-medial, outwardly oblique, orange band from costa to vein M_3; some yellow, orange spots at interno-median space; a silver-bluish marginal line. Hindwing with fuscous shade, basal area paler; an obscure orange patch at anal angle; a silver-bluish marginal line from below costa to anal angle. Female genitalia with ductus bursae strongly sclerotized; corpus bursae irregular and membranous.

Forewing length: 28mm.

Remarks: Males of this species have larger and comparatively more triangular hindwings. *P. acerces* is closely similar to *P. silvani* Zilli from Borneo. The markings are obscure in the latter. Another similar species is *P. umbrina* Doubleday but the male has a long abdomen and comparatively less triangular wings in females.

Distribution: India (Arunachal Pradesh), Taiwan, peninsular Malaysia, Indonesia (Sumatra, Borneo, Java).

16



17

Images 16–17. *Tamba delicata* (PUP/ZOO/HAR/R-874)

Subfamily Bolitobiinae

Genus *Tamba* Walker

Walker, 1869; Charact. undescr. Lepid. Heterocera: 94.

Type species: *Tamba submicacea* Walker.

***Tamba delicata* Prout, 1932**

(Images 16,17)

Tamba delicata Prout, 1932; Bull. Hill Mus. Witley, 4: 273.

Tamba delicata Prout, 1932; Holloway (2005), Moths of Borneo, 15-16: 355

Material Examined: PUP/ZOO/HAR/R-874, 19.ix.2011, 1 female, Arunachal Pradesh: Hunli (28.32166667 N & 95.97055556 E, elevation 1,460m).

Diagnosis: Adults brownish, wings with dark brown patches. Female genitalia with ductus bursae long, flat and ribbon shaped; corpus bursae pyriform, elongate and narrow, with an incomplete ring of small spines.

Forewing length: 19mm.

Remarks: Males are with green patches, a diagnostic character for the species. Females are brownish.

Distribution: India (Arunachal Pradesh), peninsular Malaysia, Indonesia (Borneo, Sumatra, Java).

Genus *Tiruvaca* Swinhoe

Swinhoe, 1901, Ann. Mag. nat. Hist. 7: 497.

Type species: *Thermesia subcostalis* Walker.

***Tiruvaca hollowayi* Kobes, 1988**

(Images 18,19)

Tiruvaca hollowayi Kobes, 1988; Heterocera Sumatrana 2: 99.

Tiruvaca hollowayi Kobes, 1988; Holloway (2005), Moths of Borneo, 15–16: 349

Material Examined: PUP/ZOO/HAR/R-877, 19.ix.2010, 1 female, Arunachal Pradesh: Hunli (28.32166667 N & 95.97055556 E, elevation 1460m).

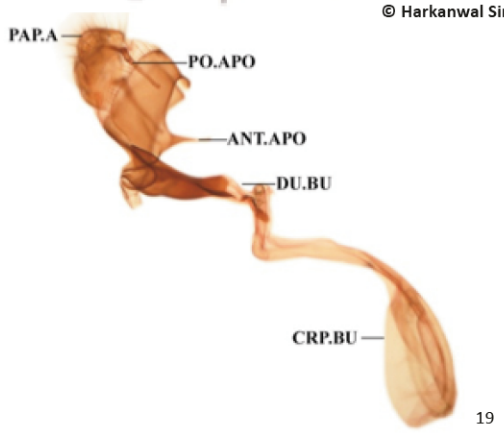
Diagnosis: Forewing markings are more prominent than its closely similar species T. *subcostalis* Walker. Hindwing with medial and post-medial lines coming closer towards costa, are diagnostic. Female genitalia with ductus bursae almost straight, narrow, sclerotized; corpus bursae with the basal section looped and distal section pyriform.

Forewing length: 18mm.

Remarks: The genus is known by T. *subcostalis* Walker and *T. hollowayi kobes*. Both the species exibit sexual dimorphism. The forewing termen in the male of the latter is excavate sub-tornally.

Distribution: India (Arunachal Pradesh), Indonesia (Sumatra, Borneo).

18 © Harkanwal Singh



19

Images 18–19. *Tiruvaca hollowayi* (PUP/ZOO/HAR/R-877)

References

Gurule, S.A. & S.M. Nigam (2013). The moths (Lepidoptera: Heterocera) of northern Maharashtra: a preliminary checklist. *Journal of Threatened Taxa* 5(12): 4693–4713; http://doi.org/10.11609/JoTT.o2555.4693-713

Gurule, S.A., S.M. Nigam & B.B. Vinod (2011). Faunastic studies on macro moth (Lepidoptera: Noctuoidea) from North Maharashtra. Proceedings: International Conference on Biodiversity and Its Conservation, 1-16.

Hampson, G.F. (1891). Illustrations of typical specimens of Lepidoptera Heterocera in the collection of the British Museum. Part 8. The Lepidoptera of Heterocera of the Nilgiri District Ill. *Typical Specimens of Lepidoptera Hetetocera in the Collection of British Museum* 8: 1–144, pl. 139–156.

Hampson, G.F. (1893). Illustrations of typical specimens of Lepidoptera Heterocera in the collection of the British Museum. Part 9. The macrolepidoptera heterocera of Ceylon *Ill. Typical Specimens of Lepidoptera Hetetocera in the Collection of British Museum* 9: 1–182, pl. 157–176.

Hampson, G.F. (1894). *Fauna of British India, Moths, including Ceylon and Burma* - 2. Taylor and Francis Ltd., London, 609pp.

Hampson, G.F. (1895). Description of New Heterocera from India. *Transactions of the Entomological Society of London* 1895: 277–315.

Hampson, G.F. (1896). *Fauna of British India, Moths, including Ceylon and Burma* - 4. Taylor and Francis Ltd., London, 594pp.

Hampson, G.F. (1897). The moths of India. Supplementary paper to the volumes in the Fauna of British India. Part II. *Journal of the Bombay Natural History Society* 11: 438–462.

Hampson, G.F. (1898). The Moths of India. Supplementary paper to the volumes in the Fauna of British India. *Journal of the Bombay Natural History Society* 11: 698–724.

Hampson, G.F. (1899a) . The Moths of India. Supplementary paper in the volume in the Fauna of British India, Part VII. *Journal of the Bombay Natural History Society* 12: 697–715.

Hampson, G.F. (1899b). The Moths of India. Supplementary paper to the volumes in the Fauna of British India. Part VI. *Journal of the Bombay Natural History Society* 12: 475–485.

Hampson, G.F. (1899c). The Moths of India. Supplementary paper in the Volume in the Fauna of British India, Part VII. *Journal of the Bombay Natural History Society* 12: 697–715.

Hampson, G.F. (1900). *Catalogue of the Arctiidae (Nolinae: Lithosianae) in the Collection of the British Museum*, 2. Taylor and Francis Ltd., London, 589pp.

Hampson, G.F. (1902). The Moths of India. Supplementary paper to the volumes in the Fauna of British India Series II, Part V. *Journal of the Bombay Natural History Society* 15: 103–117.

Hampson, G.F. (1903). *Catalogue of the Lepidoptera Phalaenae in the British Museum* - 4. Taylor and Francis, London, 689.

Hampson, G.F. (1904). The Moths of India. Supplementary paper to the volumes in The Fauna of British India, Series III, Part I. *Journal of the Bombay Natural History Society* 15: 630–653.

Hampson, G.F. (1907). Descriptions of new genera and species of Syntomidae, Arctiadae, Agaristidae, and Noctuidae. *The Annals Magazine of Natural History Series* 7(19): 221–257.

Hampson, G.F. (1908). *Catalogue of Lepidoptera Phalanae in the British Museum - 7*. Taylor and Francis, London, 692pp.

Hampson, G.F. (1909). *Catalogue of Lepidoptera Phalanae in the British Museum - 8*. Taylor and Francis, London, 583pp.

Hampson, G.F. (1910). *Catalogue of the Lepidoptera Phalanae in the British Museum - 9*. Taylor and Francis, London, 552pp.

Hampson, G.F. (1911). The Moths of India, Series IV, Part I. *Journal of the Bombay Natural History Society* 20(3): 634–674.

Hampson, G.F. (1912). The Moths of India Supplementary Paper to the volume in the fauna of British India, series IV, Part III-V. *Journal of the Bombay Natural History Society* 21: 411–446, 878–911, 1222–1272.

Hampson, G.F. (1913). *Catalogue of Lepidoptera Phalanae in the British Museum - 12*. Taylor and Francis, London, 626pp.

Hampson, G.F. (1913a). Descriptions of new Genera and Species of Noctuidae. *The Annals Magazine of Natural History Series* (8) 12(72): 580–660.

Hampson, G.F. (1913b). *Catalogue of Lepidoptera Phalanae in the British Museum*. 13. Taylor and Francis, London, 609pp.

Hampson, G.F. (1914). Description of a new genera and species of Noctuidae (contd.). *The Annals Magazine of Natural History Series* 13: 146–175.

Hampson, G.F. (1918). Descriptions of New Genera and Species of Amatidae, Lithosidae, and Noctuidae. *Novitates Zoologicae* 25: 93–217.

Hampson, G.F. (1920). *Catalogue of the Lepidoptera Phalaenae in the British Museum.* Supplement. 2. Taylor and Francis Ltd., London, 619pp.

Hampson, G.F. (1922). Four apparently new Noctuidae. *Bulletin of the Hill Museum* 1: 189–192.

Hampson, G.F. (1924). Description of two new genera and two new species of Ophiderinae (Noctuidae). *Entomologist* 57: 182–184.

Hampson, G.F. (1926). *Description of new genera and species of Lepidoptera, Phalaenae of the subfamily Noctuinae (Noctuidae) in the British Museum*. Trustees of the British Museum (NH), London, 641pp.

Holloway, J.D. (2005). The Moths of Borneo (part 15 & 16): Family Noctuidae, Subfamily Catocalinae. *Malayan Nature Journal* 58: 1–529.

Kirti, J.S. & H. Singh (2013). An inventory of subfamily Catocalinae (Noctuidae: Lepidoptera) from North-East India. *Journal of Applied Biosciences* 39(1): 24–29.

Klots, A.B. (1970). Lepidoptera, pp. 115–130. In: Tuxen, S.L. (eds.). *Taxonomists's Glossary of Genitalia in Insects*. Munksgaard, Copenhagen, 359pp.

Nieukerken, E.J.V., L. Kaila, I.J. Kitching, N.P. Kristensen, D.C. Lees, J. Minet, C. Mitter, M. Mutanen, J.C. Regier, T.J. Simonsen, N. Wahlberg, S.H. Yen, R. Zahiri, D. Adamski, J. Baixeras, D. Bartsch, B.A. Bengtsson, J.W. Brown, S.R. Bucheli, D.R. Davis, J. De Prins, W. De Prins, M.E. Epstein, P. Gentili Poole, C. Gielis, P. Ha¨ttenschwiler, A. Hausmann, J.D. Holloway, A. Kallies, O. Karsholt, A. Kawahara,

S.J.C. Koster, M. Kozlov, J.D. Lafontaine, G. Lamas, J.-F. Landry, S. Lee, M. Nuss, C. Penz, J. Rota, B.C. Schmidt, A. Schintlmeister, J.C. Sohn, M.A. Solis, G.M. Tarmann, A.D. Warren, S. Weller, R. Yakovlev, V. Zolotuhin & A. Zwick (2011). Order Lepidoptera Linnaeus, 1758. In: Zhang, Z.Q.(ed.). Animal Biodiversity: An Outline of Higher-Level Classification and Survey of Taxonomic Richness. *Zootaxa* 3148: 212–221.

Robinson, G.S. (1976). The preparation of slides of Lepidoptera genitalia with special reference to Microlepidoptera. *Entomologist's Gazette* 27: 127–132.

Rose, H.S. (2002). An inventory of the moth fauna (Lepidoptera) of Jatinga, Assam, India. *Zoos' Print Journal* 17(2): 707–721; http://doi.org/10.11609/JoTT.ZPJ.17.2.707-21

Smetacek, P. (2008). Moths recorded from different elevations in Nainital District, Kumaon Himalaya, India. *Bionotes* 10(1): 5–15.

Singh, J., N. Singh & R. Joshi (2014). A checklist of subfamily Arctiinae (Erebidae: Noctuoidea: Lepidoptera) from India. *Records of Zoological Survey of India, Occasional Paper* 367: 1–76.

Sivasankaran, K., S. Ignacimuthu, M.G. Paulraj & S. Prabakaran (2012). A checklist of Noctuidae (Insecta: Lepidoptera: Noctuoidea) of India. *Records of the Zoological Survey of India* 111(3): 79–101.

Srivastava, A. (2002). *Taxonomy of Moths in India*. International Book Distributors, Deheradun, India, 334pp.

Zahiri, R., J.D. Holloway, I.J. Kitching, D. Lafontaine, M. Mutanen & N. Wahlberg (2012). Molecular phylogenetics of Erebidae (Lepidoptera, Noctuoidea). *Systematic Entomology* 37: 102–124.

Zaspel, J.M. & M.A. Branham (2008). World checklist of tribe Calpini (Lepidoptera: Noctuidae: Calpinae). *Insecta Mundi* 47: 1–15.

Zimmerman, E.C. (1978). *Microlepidoptera Insects of Hawaii*. University Press Hawaii, Honolulu, 1903pp.

Journal of Threatened Taxa

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

July 2017 | Vol. 9 | No. 7 | Pages: 10369–10492
Date of Publication: 26 July 2017 (Online & Print)
DOI: 10.11609/jott.2017.9.7.10369-10492
www.threatenedtaxa.org

Communications

Short Communications

Notes

zooh! ZÜRICH

WILD ZOO Threatened Taxa