



Hawk moths (Lepidoptera: Sphingidae) from North-West Himalaya along with collection housed in National PAU Insect museum, Punjab Agricultural University, Ludhiana, India

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ABSTRACT: A check list of hawk moths collected from North-West Himalaya and preserved in National PAU Insect Museum, Ludhiana is being represented. 30 species belonging to 20 genera of family Sphingidae have been identified. The paper gives details regarding distribution and synonymy of all these species.

Keywords: Collection, Himalaya, moths, Lepidoptera, Sphingidae

INTRODUCTION

Lepidoptera (moths, butterflies and skippers) includes scaly winged insects is the third largest order after Coleoptera and Hymenoptera in the class Insecta. Sphingidae is one of the family in this order are present. Otherwise family Sphingidae is represented by as many as 1354 species and subspecies on world basis, out of which 204 species belong to India (Hampson, 1892; Bell and Scott, 1937; Roonwal *et. al* 1964; D' Abrera, 1986). As part of the biosystematic studies, inventorization on Sphingid moth diversity was undertaken at the taxonomy laboratory, Department of Entomology, Punjab Agricultural University, Ludhiana. Survey- cum-collection tours were undertaken from various localities such as Jammu, Srinagar, Pahalgaoon, Katra (Jammu and Srinagar), Manali, Mandi, Kullu, Hamirpur, Palampur, Kangra, Pathannkot, Una, Bilaspur, Shimla, Solan, Dharampur, Dagshai, YSP Univ. Nauni, Sabhatu, Kasauli, Kumarhatti, Ochghat, Chambaghat, Barog, Salogra, Dedgharat, Kandhagarhat, Wagnaghat, Yashwant Nagar, Gaura, Rajgarh, Badu sahib, Renuka (Himachal Pradesh), Dehradun Vikasnagar, Haridwar, Rishikesh, Karanparyag, Ruderparyag (Uttarakhand) during different seasons were examined. The details on their distribution of different species/ genera collected from various localities of North- West Himalaya and those preserved in the National PAU Insect Museum, PAU, Ludhiana are also provided. The Hawk- moths are among the most familiar and best known of Lepidoptera with streamlined adults and horned larvae are the characteristics of the family Sphingidae.

In all, 30 species belonging to 20 genera of family Sphingidae has been identified and studied.

MATERIAL AND METHODS

The collected moths were killed by using ethyl acetate, pinned, stretched and preserved in well-fumigated wooden boxes. The standard technique given by Robinson (1976) and Zimmerman (1978), Klots (1970) were followed for wing venation and genitalia, respectively of specimens. All illustrations were made by using camera lucida attached to a zoom stereo microscope and photographs of the adults were taken prior to dissection.

RESULTS AND DISCUSSION

The result of these survey-cum-collection tours led to the collections of about 408 specimens belonging to 30 species of 20 genera of family Sphingidae. The lists of all the identified species are provided below. The study involved examination of various morphological characters such as antennae, labial palpi, legs, and wing venation and wing maculation. The other technique in biosystematic studies has been utilized by dissecting/studying their external male and female genitalic characters. The authentic identification was done by comparisons with the collections lying at different National Museums like National Pusa Collections, IARI, New Delhi, FRI Dehradun and ZSI Kolkatta.

OBSERVATIONS**SUB FAMILY: SPHINGINAE**

1. Genus: *Acherontia* [Laspeyres], 1809, *Jena. Allg.Lit.-Ztg* 4 (240): 100.

Type species: *Sphinx atropos* Linnaeus, 1758, *Syst. Nat.* (Edn 10)1:489, by original designation. Ochsenheimer, 1808, *Schmett. Eur.*2:183-256, divided the genus sphinx Linnaeus, 1758, into five sections, which he termed Families. In an anonymous review, later attributed to Ochsenheimer (1816, *Schmett. Eur.* 4: v) to Laspeyres, the four species included in Ochsenheimer's Family IV were separated into two genera; three species were placed in *Sphinx*, and *Acherontia* was proposed for *Atropos*.

***Acherontia styx* Westwood, 1847**

Sphinx (Acherontia) styx Westwood, 1844, *Cab. Orient. Ent.* ,p. 88

Acherontia styx Westwood; Rothschild and Jordan, 1903: 21.

Acherontia medusa Butler, 1876, *Trans. Zool. Soc. Lond.* , 9:597.

Material examined: 21♂ 12♀, India: 26 PS, 03.viii.2008, A. Seni and A. Katewa (1♂); Solan, 02.vii.2009, P.C. Pathania, A. Seni and A. Katewa (4♂ and 4♀); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania (1♀); Punjab Agricultural University Ludhiana 04.xii.2009, P.C. Pathania, S. Kumar, V. Singh (1♂ and 3♀); Solan, 27.iv.2011, P.C. Pathania and A. Punj (2♀); Nanital, 27.vi.2012, P.C. Pathania (1♂); Punjab Agricultural University Ludhiana, 5.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (3♂ and 1♀); Punjab Agricultural University Ludhiana, 29.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (3♂); Punjab Agricultural University Ludhiana, 2.ix.2012, P.C. Pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 20.ix.2012, P.C. Pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 25.iv.2013, P.C. Pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 29.iv.2013, P.C. Pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 06.v.2013, P.C. Pathania, S. Sharma (2♂); Punjab Agricultural University Ludhiana, 23.v.2013, P.C. Pathania, S. Sharma (1♀); Punjab Agricultural University Ludhiana, 14.viii.2013, P.C. Pathania, A. Kumar (2♂).

***Acherontia lachesis* Fabricius, 1798**

Sphinx lachesis fabricius, 1798, *Ent. Syst. Suppl.* P. 434.

Acherontia lachesis Fabricius; Rothschild and Jordan, 1903:17.

Material examined: 3♂ 1♀, India: Pynursia, 06.vi.2013, P.C. Pathania, R. Kumar, S. Sharma (1♂); Serighat, 13.vii.2013, P.C. Pathania, A. Kumar (1♂); Solan, 14.vii.2013, P.C. Pathania, A. Kumar (1♂, 1♀).

2. Genus: *Agrius* Hubner, [1819] 1816, *Verz. Bekannt Schmett.*:140.

Type-species: *Sphinx cingulata* Fabricius, 1775, *Syst. Ent.*:545, by subsequent designation by Tutt, 1902, *Nat. Hist. Br. Lepid.*3: 355. [CANADA to ARGENTINA]America. Tutt stated incorrectly that the type of *Agrius* Hubner, [1819], had been fixed as *cingulata* by Hubner *ante* 1826'. Tutt's statement, however, satisfies the provision of Article 69 (a) (iii) of the *Code* which states that '...an author is considered to have designation one of the originally included nominal species as type- species, if he states that it is the type (or type-species), for what reason, right or wrong, and if it is clear the he himself accepts it as the type- species'. Incorrect type-species designation: *Agrius eremitus* Hubner, [1823], a name not originally included in *Agrius*, and not linked with one of the originally included names when designated by Grote, 1873, *Bull. Buffalo Soc. Nat. Sci.* 1:26.

***Agrius convolvuli* Linnaeus, 1758**

Sphinx convolvuli Linnaeus, 1758, *Syst. Nat.* edn.10: 490.

Herse convolvuli Linnaeus; Rothschild and Jordan, 1903:11.

Material examined:: 22♂ 7♀, India: Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (2♂); 26 PS, 03.viii.2008, A. Seni and A. Katewa (5♂ and 2♀); Punjab Agricultural University Ludhiana 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂); Solan, 27.iv.2011, P.C. Pathania and A. Punj (1♂); Solan, 23.v.2011, P.C. Pathania and A. Punj (2♂); Punjab Agricultural University Ludhiana, 9.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (♂); Punjab Agricultural University Ludhiana, 25.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 27.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (3♂ and 1♀); Punjab Agricultural University Ludhiana, 28.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 29.iv.2013, P.C. Pathania, S. Sharma (2♂); Punjab Agricultural University Ludhiana, 06.v.2013, P.C. Pathania, S. Sharma (2♀); Punjab Agricultural University Ludhiana, 15.v.2013, P.C. Pathania, S. Sharma (2♂ and 1♀); CSK,HPKV, Palmpur, 09.vi.2013, P.C. Pathania, S. Sharma (2♂).

3. Genus: *Ambulyx* Westwood, 1847, *Cab. Oriental Ent.* : [61].

Type- species: *Sphinx substriligis* Westwood, 1847, *ibidem*: [61], pl.30, fig. 2, by monotypy. [BANGLADESH]: Sylhet.

***Ambulyx siamensis* Inoue, 1991**

Ambulyx siamensis Inoue, 1991

Material examined: 5♂ 4♀, India: Gharkhal, 10.vii.2013, P.C.Pathania, A.Kumar (1♂); Serighat, 13.vii.2013, P.C.Pathania, A.Kumar(1♀); Solan (Nauni), 14.vii.2013, P.C.Pathania, A.Kumar(3♂and 1♀); Solan (Nauni), 15.vii.2013, P.C.Pathania, A.Kumar(1♂and 2♀).

***Ambulyx matti* Jordan, 1923**

Oxyambulyx matti Jordan, 1923.

Material examined: 1♀, India: Cherapunji, 05.vi.2013, P.C.Pathania, S.Sharma and R.Kumar (1♀).

4. Genus: *Clanis* Hubner, [1819] 1816, *Verz.bek. Schmett.*:138.

Type- species: *Sphinx phalaris* Cramer, 1777, *Uitlandsche Kapellen (Popillons exot.)* 2:83, pl. 149, fig. A, by subsequent designation by Kirby, 1892, *Synonymic Cat. Lepid.Heterocera* 1: 702. [INDIA]: Coromandel coast.*S.phalaris* is dated from wrapper of part13, not from the title page of volume 2 which is dated 1779.

***Clanis titan* Rothschild and Jordan, 1903**

Material examined: 2♂, India: Nongstoin, 07.vi.2013, P.C. Pathania, S. Sharma, R. Kumar (1♂); Upper Shilong, 10.vi.2013, P.C. Pathania, S. Sharma, R. Kumar (1♂).

5. Genus: *Dolbina* Staudinger, 1887, in *Rem. Mem. Lep.* 3:155. Type- species: *Dolbina tancrei* Staudinger, 1887, *ibidem* 3:155, pl. 17, fig. 8, monotypy. [U.S.S.R.]: western Amur district, Blagoweschtschensk.

***Dolbina inexacta* Walker, 1856**

Material examined: 3♂ 2♀, India: Barnala, 25.ix.2009, P.C. Pathania, A. Seni and A. Katewa(1♂); Tanyhar, 27.vi.2013, P.C. Pathania, A. Kumar (1♀); Tanyhar, 28.vi.2013, P.C. Pathania, A.Kumar (2♂); Gharkhal, 09.vii.2013, P.C.Pathania, A.Kumar (1♀).

6. Genus: *Lapara* Walker, 1856, *List Lep. Ins. Brit. Mus.* 8:78 (Key), 232.

Type- species: *Lapara bombycoides* Walker, 1856, *ibidem* 8:233, by monotypy.CANADA.

***Lapara coniferarum* Abott and Smith, 1797**

Material examined: 1♂ 3♀, India: Punjab Agricultural University Ludhiana 04.xii.2009, P.C.Pathania, S. Kumar, V.Singh (1♀); Punjab Agricultural University Ludhiana 04.xii.2009, P.C.Pathania, A.Seni and A. Katewa (1♀); Punjab Agricultural University Ludhiana, 04.viii.2012, P.C.Pathania, S.Sharma and K.Sharma (1♂); Tanyhar, 27.vi.2013, P.C.Pathania, A.Kumar (1♀).

7. Genus: *Leucophlebia* Westwood, 1847, *Cab. Or. Ent.* : 46.

Type- species: *Leucophlebia lineata* Westwood, 1847, *ibidem* 46, pl.22, fig. 2, by monotypy.INDIA: central, Assam. The date is that of the plate, not of the title-page of the work which is dated 1848.

***Leucophlebia lineate* Westwood, 1847**

Material examined: 2♂ 2♀, India: Solan, 02.vii.2009, P.C. Pathania, A. Seni and A. Katewa (1♀); Tanyhar, 27.vi.2013, P.C. Pathania, A. Kumar (2♂); Solan (Nauni), 14.vii.2013, P.C. Pathania, A. Kumar (1♀).

8. Genus: *Pachysphinx* Rothschild and Jordan, 1903, *Nov. Zool.* 9 (Suppl.): 339.

Type- species: *Smerinthus modesta* Harris, 1839, *Am. J. Sci.* 36: 292, by original designation. NORTH AMERICA.

***Pachysphinx occidentalius occidentalis* H. Edwards**

Material examined: 6♂ 9♀, India: Ballawal Saunkri, 07.ix.2006, Rajinder and Amardeep (1♂); Solan, 18.ix.2006, Rajinder and Amardeep (1♂); Mandi, 11.vi.2008, P.C. Pathania, A. Seni (1♀); Renukaji lake, 09.vii.2008, P.C. Pathania, A. Seni and A. Katewa (1♀); Ballawal Saunkri, 12.viii.2011, P.C. Pathania and A. Punj (2♂); Renukaji lake, 17.viii.2011, P.C. Pathania and A. Punj (1♀); Serighat 13.vii.2013, P.C. Pathania and A. Kumar (2♀); Serighat 15.vii.2013, P.C. Pathania and A. Kumar (1♂); Langkyrdew, 06.vi.2013, P.C. Pathania, S. Sharma and R. Kumar(2♀).

9. Genus: *Psilogramma* Rothschild and Jordan, 1903, *Nov. Zool.* 9(Suppl.): 29 (Key), 42.

Type- species: *Sphinx menephron* 1780, *Uitlandsche Kapellen (Popillons exot.)* 3:164, pl. 285, fig. A. by original designation. [INDONESIA]: [Moluccas], [Ambon Island]. *S. menephron* is dated from the wrapper of part 24 of the page, not from the title- page of volume 3 which is dated 1782.

***Psilogramma majunataha* Eitschberger and Melichar**

Material examined: 6♂ 8♀, India: Solan, 18.ix.2006, Rajinder and Amardeep (1♂); Kangra, 27.viii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 1♀); Barnala, 08.x.2009, P.C. Pathania, A. Seni and S. Kumar (1♀); Hamirpur, 26.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Hamirpur, 27.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Hamirpur, 28.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Nongstoin, 07.vi.2013, P.C. Pathania, R. Kumar, S. Sharma (1♀); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (3♀); Sabathu 12.vii.2013, P.C. Pathania and A. Kumar (1♂); Punjab Agricultural University Ludhiana, 22.vii.2013, P.C. Pathania and A. Kumar (1♀); Samirpur, 03.viii.2013, P.C. Pathania and R. Kumar (2♀).

***Psilogramma menophron menophron* Cramer**

Sphinx menophron Cramer, 1780, *Uitl. Kapell.* 3:164.

Psilogramma menophron menophron Cramer; Rothschild and Jordan, 1903: 42.

Material examined: 6♂ 8♀, India: Katrain, 17.ix.2006, Rajinder and Amardeep (2♂ and 1♀); Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (1♂); Renukaji lake, 09.vii.2008, P.C. Pathania, A. Seni and A. Katewa (1♀); Palampur, 13.viii.2008, P.C. Pathania, A. Seni and A. Katewa (1♀); Palampur, 14.viii.2008, P.C. Pathania, A. Seni and A. Katewa (1♀); Punjab Agricultural University Ludhiana, 29.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 27.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Gharkhal, 10.vii.2013, P.C. Pathania, A. Kumar (2♀); Sabathu 11.vii.2013, P.C. Pathania and A. Kumar (1♂); Serighat 13.vii.2013, P.C. Pathania and A. Kumar (1♀).

10. Genus: *Marumba* Moore, [1882] 1882-3, *Lep. Ceyl.* 2:8.

Type- species: *Smerinthus dyras* Walker, 1856, *List Specimens Lepid. Insects Colln Br. Mus.* 8:250, by subsequent designation by Kirby, 1883 in Rye, *Zool. Rec.* 19 (Insecta): 183. [SRI LANKA] Ceylon. The lectotype designation was made by Swinhoe, 1892, *Cat. East. And Aust. Lepid. Heterocera Colln Oxf. Univ. Mus.* 1:27.

***Marumba cristata* Butler, 1875**

Triptogon cristata Butler, 1875, *Proc. Zool. Soc. Lond.* :253.

Marumba cristata Butler; Rothschild and Jordan, 1903: 272.

Marumba cristata titan Rothschild, 1920, *Ann. Mag. Nat. Hist.* (9), 5:480.

Material examined: 6♂ 4♀, India: Hamirpur, 07.vi.2008, P.C. Pathania and A. Seni (1♀); Hamirpur, 08.vi.2008, P.C. Pathania and A. Seni (1♀); Solan, 02.vii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 1♀); Tanyhar, 27.vi.2013, P.C. Pathania, A. Kumar (3♂); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (3♀).

***Marumba dyras* Walker, 1856**

Smerinthus dyras Walker, 1856, *List Specimens, Lepid. Ins. Colln. Brit. Mus.*, 8: 250.

Marumba dyras Walker; Rothschild and Jordan, 1907: 274.

Triptogon javanica Butler, 1875, *Proc. Zool. Soc. Lond.* 1875: 254.

Material examined: 13♂ 6♀, India: Hamirpur, 07.vi.2008, P.C. Pathania and A. Seni (1♂ and 2♀); Solan, 02.vii.2009, P.C. Pathania, A. Seni and A. Katewa (2♀); Tanyhar, 27.vi.2013, P.C. Pathania, A. Kumar (4♂); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (4♂); Sabathu, 11.vii.2013, P.C. Pathania, A. Kumar (1♂ and 1♀); Serighat, 13.vii.2013, P.C. Pathania, A. Kumar (1♂); Solan (Nauni), 15.vii.2013, P.C. Pathania, A. Kumar (1♀); Samirpur, P.C. Pathania and R. Kumar (2♂).

SUB FAMILY: MACROGLOSSINAE

11. Genus: *Cephonodes* Hubner, [1819] 1816, *Verz. bek. Schmett.*:131

Type- species: *Sphinx hylas* Linnaeus, [1771], *Mant. Plant.* (2): 539, by subsequent designation by Grote and Robinson, 1865, *Proc. Ent. Soc. Philad.* 5:172. CHINA.

S. hylas was incorrectly attributed to Fabricius both by Hubner and by Grote and Robinson.

***Cephonodes hylas* Linnaeus, 1771**

Sphinx hylas Linnaeus, 1771.

Material examined: 6♂ 4♀, India: Punjab Agricultural University Ludhiana, 03.viii.2010, P.C. Pathania, V. Singh (3♂); Punjab Agricultural University Ludhiana, 12.viii.2010, P.C. Pathania, V. Singh (1♀); Punjab Agricultural University Ludhiana, 30.viii.2010, P.C. Pathania, V. Singh (1♀); Punjab Agricultural University Ludhiana, 31.viii.2010, P.C. Pathania, V. Singh (1♀); Nanital, 27.vi.2010, P.C. Pathania, (1♂); Punjab Agricultural University Ludhiana, 06.ix.2010, P.C. Pathania, V. Singh (1♂); Punjab Agricultural University Ludhiana, 26.ix.2010, P.C. Pathania, V. Singh (1♂); Punjab Agricultural University Ludhiana, 16.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀). ee also *Potidaea* Wallengren, 1858.

12. Genus: *Daphnis* Hubner, 1819] 1816, *Verz. bekannt. Schmett.*:134.

Type- species: *Sphinx nerii* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1:490, by subsequent designation by Curtis, 1837, *Br. Ent.* 14:626. TYPE- LOCALITY: not stated, [EUROPE], [AFRICA].

***Daphnis nerii* Linnaeus**

Material examined:: 7♂ 5♀, India: Punjab Agricultural University Ludhiana, 25.ix.2012, P.C.P pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 24.iv.2013, P.C. Pathania, S. Sharma (1♀); Punjab Agricultural University Ludhiana, 26.v.2013, P.C. Pathania, S. Sharma (3♂); Punjab Agricultural University Ludhiana, 29.v.2013, P.C. Pathania, S. Sharma (2♂ and 4♀); Punjab Agricultural University Ludhiana, 26.vii.2013, P.C. Pathania, A. Kumar (1♂).

13. Genus: *Gnathothlibus* Wallengren, 1858, *Ofvers. K. Vetensk. Akad. Forh. Stockh.* **15**:137.

Type- species: *Gnathothlibus erotoides* Wallengren, 1858, *ibidem* **15**:137,138, by original designation. AUSTRALIA. *G. erotoides* is a junior subjective synonym of *Deilephila eras* Boisduval, 1832, in d'Urville, *Voyage de Decouvertes de l'Astrolabe* (Faune ent.) **1**:185, which is sub species of *Sphinx erotus* Cramer, 1777, *Uitlandsche Kapellen (Popillons exot.)* **2**:12, pl. 104, fig.B. *Gnathothlibus erotoides* was again proposed as a new species by Wallengren, 1860, *Wien. ent. Monatschr.* **4**: 43; and as a new genus and a new species in 1861, *K. Svenska Fregatten Eugenie Resa.... C.A. Virgin 1851-1853* **2** (Zool.) (1, Insecta): 362, pl.7, fig.4.

***Gnathothlibus erotus erotus* Cramer, 1777 pap.**

Exot. 2.: 12.

Sphinx erotus Cramer, 1777, *Uitl. Kapell*, **2**: 12.

Chromis erotus Cramer; Rothschild and Jordan, 1903: 503.

Material examined: 1♂ 2♀, India: Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (1♂); Mandi, 11.vi.2008, P.C. Pathania, A. Seni (1♀); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♀).

14. Genus: *Hippotion* Hubner, [1819] 1816, *Verz. Bek. Schmett.*:135.

Type- species: *Sphinx celerio* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1:491, by subsequent designation by Kirby, 1892, *Synonymic Cat. Lepid. Heterocera* 1:747. TYPE- LOCALITY: not stated, [EUROPE].

***Hippotion celerio* Linnaeus, 1758**

Sphinx celerio Linnaeus, 1758, *Syst. Nat. ed.* **10**: 491.

Hippotion celerio Linnaeus; Rothschild and Jordan, 1903:751.

Material examined: 27♂ 29♀, India: Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (1♀); 26 PS, 03.viii.2008, A. Seni and A. Katewa (3♂ and 4♀); 26 PS, 04.viii.2008, A.Seni and A. Katewa (2♂); Solan, 02.vii.2009, P.C. Pathania, A.Seni and A. Katewa (3♂); Solan, 03.vii.2009, P.C. Pathania, A. Seni and A. Katewa (1♀); Punjab Agricultural University Ludhiana 04.xii.2009, P.C. Pathania, S. Kumar, V. Singh (1♀); Bajoura, 17.iv.2010, P.C. Pathania and V. Singh (1♂); Punjab Agricultural University Ludhiana 05.x.2010, P.C. Pathania and V. Singh (2♀); Solan, 27.iv.2011, P.C. Pathania and A. Punj (3♂); Solan, 23.v.2011, P.C. Pathania and A. Punj (1♂ and 6♀); Zira, 23.vi.2011, P.C. Pathania and A. Punj (3♂); Punjab Agricultural University Ludhiana, 9.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 22.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (3♂); Punjab Agricultural University Ludhiana, 23.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 27.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♂); Punjab Agricultural University Ludhiana, 28.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♀); Punjab Agricultural University Ludhiana, 23.v.2013, P.C. Pathania, S. Sharma (2♀); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (2♂). Solan (Nauni), 14.vii.2013, P.C. Pathania, A. Kumar (2♀); Punjab Agricultural University Ludhiana, 15.vii.2013, P.C. Pathania, A. Kumar (1♂). Samirpur, 03.viii.2013, P.C. Pathania, A. Kumar (2♀); Punjab Agricultural University Ludhiana, 08.viii.2013, P.C. Pathania, R. Kumar (1♀); Punjab Agricultural University Ludhiana, 16.viii.2013, P.C. Pathania, A. Kumar (1♂); Punjab Agricultural University Ludhiana, 19.viii.2013, P.C. Pathania, A. Kumar (1♂); Punjab Agricultural University Ludhiana, 12.ix.2013, P.C. Pathania, A. Kumar (1♀); Renukaji, 15.x.2013, P.C. Pathania, A. Kumar (1♀); Punjab Agricultural University Ludhiana, 06.xi.2013, P.C. Pathania, A. Kumar (1♂); Punjab Agricultural University Ludhiana, 07.xi.2013, P.C. Pathania, A. Kumar (1♀).

***Hippotion echeclus* Boisduval, 1875**

Choerocampa echeclus Boisduval, [1875] 1874, *Hist. Nat. Insects. (Spec. Gen. Lep. Het.)* **1**: 233.

Hippotion echeclus Boisduval; Rothschild and Jordan, 1903:754.

Material examined: 4♂ 3♀, India: 26 PS, 03.viii.2008, A.Seni and A. Katewa (2♀); Zira, 25.vi.2011, P.C. Pathania and A. Punj (1♂); Punjab Agricultural University Ludhiana, 06.v.2013, P.C. Pathania, S. Sharma (1♂); Solan (Nauni), 14.vii.2013, P.C. Pathania, A. Kumar (1♂); Solan (Nauni), 15.vii.2013,

P.C. Pathania, A. Kumar (1♀); Punjab Agricultural University Ludhiana, 14.viii.2013, P.C. Pathania, A. Kumar (1♀).

15. Genus: *Hyles* Hubner, [1819] 1816, *Syst. Verz. Schmett.*:137. Type- species: *Sphinx euphorbiae* Linnaeus, 1758, *Syst. Nat* (Edn 10) 1:492 (but included by Hubner as '*euphorbiae* Schiff', an incorrect authorship), by subsequent designation by Tutt, 1902, *Nat. Hist. Br. Lepid.*:3: 355. TYPE- LOCALITY: not stated, [EUROPE].

***Hyles livornica* Esper, 1779** *Schmett.* 2 188, 196.

Material examined: 19♂ 30♀, India: Solan, 02.vii.2009, P.C. Pathania, A. Seni and A. Katewa (3♂ and 12♀); Shimla, 02.ix.2009, P.C. Pathania, S. Chandel and V. Singh (1♂); Hamirpur, 14.vi.2012, P.C. Pathania (1♀); Punjab Agricultural University Ludhiana, 5.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 9.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 13.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 17.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 27.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Hamirpur, 26.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (3♂ and 1♀); Punjab Agricultural University Ludhiana, 10.x.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Renukaji, 16.x.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 19.x.2012, P.C. Pathania, S. Sharma and K. Sharma (8♀); Bhoirymbong, 09.vi.2013, P.C. Pathania, S. Sharma and R. Kumar (2♂ and 1♀); Punjab Agricultural University Ludhiana, 15.v.2013, P.C. Pathania, S. Sharma (4♂); Samirpur, 03.viii.2013, P.C. Pathania and R. Kumar (1♀); Punjab Agricultural University Ludhiana, 05.xi.2013, P.C. Pathania and A. Kumar (1♀); Punjab Agricultural University Ludhiana, 06.xi.2013, P.C. Pathania and A. Kumar (1♂ and 1♀); Punjab Agricultural University Ludhiana, 27.xii.2013, Birpal (1♂ and 1♀).

16. Genus: *Macroglossum* Scopoli, 1777, *Inter. Hist. nat.*: 414.

Type- species: *Sphinx stellatarum* Linnaeus, 1758, *Syst. Nat* (Edn 10) 1:493, by monotypy. TYPE- LOCALITY: not stated, [EUROPE].

***Macroglossum assimilis assimilis* Swainson**

Material examined: 8♂ 9♀, India: Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania (1♀); Punjab Agricultural University Ludhiana, 14.vii.2010, P.C. Pathania, V. Singh (1♂); Punjab Agricultural University Ludhiana, 9.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂ and 1♀); Punjab

Agricultural University Ludhiana, 12.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♀); Punjab Agricultural University Ludhiana, 25.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 28.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 31.v.2013, P.C. Pathania and S. Sharma (1♀); Mawpran, 06.vi.2013, P.C. Pathania, S. Sharma and R. Kumar (1♂); Punjab Agricultural University Ludhiana, 08.vii.2013, P.C. Pathania and A. Kumar (1♂ and 2♀); Punjab Agricultural University Ludhiana, 10.vii.2013, P.C. Pathania and A. Kumar (2♂ and 1♀); Solan, 14.vii.2013, P.C. Pathania and A. Kumar (1♂).

***Macroglossum belis* Linnaeus, 1776**

Material examined: 1♂ 1♀, India: Pusa, 15.vii.2003, D, Nadan (1♂); Bihar, 19.vii.2003, D, Nadan (1♀).

17. Genus: *Nephele* Hubner, [1819] 1822, *Verz. bek. Schmett.*:133.

Type- species: *Sphinx didyma* Fabricius, 1775, *Syst. Ent.*:543, by subsequent designation by Kirby, 1892, *Synonymic Cat. Lepid. Heterocera* 1:680. TYPE- LOCALITY: stated to be America but this was evidently an error for the species is not known from the New World. It is widely distributed in the Oriental Region, occurring from INDIA to JAVA.

***Nephele didyma* Fabricius, 1775**

Material examined: 16♂ 23♀, India: Ballawal Saunkri, 07.ix.2006, Rajinder and Amardeep (1♀); Hamirpur, 07.vi.2008, P.C. Pathania, A. Seni (1♀); Mandi, 11.vi.2008, P.C. Pathania, A. Seni (1♀); 26 PS, 03.viii.2008, A. Seni and A. Katewa (6♂ and 7♀); 26 PS, 04.viii.2008, A. Seni and A. Katewa (3♂); Kangra, 27.viii.2009, P.C. Pathania, A. Seni and A. Katewa (2♀); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 2♀); Dr. Y.S. Parmar University, Nauni, 27.iv.2011, P.C. Pathania and A. Punj (1♀); Hamirpur, 13.vi.2012, P.C. Pathania (1♂); Punjab Agricultural University Ludhiana, 04.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 9.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 16.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 27.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♀); Punjab Agricultural University Ludhiana, 18.x.2012, P.C. Pathania and S. Sharma (1♀); Punjab Agricultural University Ludhiana, 28.x.2012, P.C. Pathania and S. Sharma (2♂ and 1♀); Punjab Agricultural University Ludhiana, 17.x.2013, P.C. Pathania and A. Kumar (3♀).

***Nephele hespera* Fabricius, 1775**

Material examined: 16♂ 20♀, India: Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (1♂ and 2♀); 26 PS, 03.viii.2008, A. Seni and A. Katewa (6♂ and 2♀); 26 PS, 04.viii.2008, A. Seni and A. Katewa (3♀); Nauni, 16.x.2008, P.C. Pathania, A. Seni and A. Katewa (3♀); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 1♀); Punjab Agricultural University Ludhiana, 05.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♂ and 2♀); Punjab Agricultural University Ludhiana, 27.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); CSK, HPKV, Palampur, 06.vi.2013, P.C. Pathania, S. Sharma (1♂); Punjab Agricultural University Ludhiana, 08.vii.2013, P.C. Pathania and A. Kumar (3♀); Gharkhal 09.vii.2013, P.C. Pathania and A. Kumar (1♂); Sabathu 11.vii.2013, P.C. Pathania and A. Kumar (1♀); Serighat 13.vii.2013, P.C. Pathania and A. Kumar (1♀); Serighat 15.vii.2013, P.C. Pathania and A. Kumar (3♀); Punjab Agricultural University Ludhiana, 10.ix.2013, P.C. Pathania and A. Kumar (3♂); Punjab Agricultural University Ludhiana, 13.xi.2013, P.C. Pathania and A. Kumar (3♀).

18. Genus: *Pergesa* Walker, 1856, *List. Lep. Ins. Brit. Mus.* 8: 149. Type- species: *Sphinx acteus* Cramer, 1779, *Uitlandsche Kapellen (Popillons exot.)* 3:93, pl. 248, fig. A. by subsequent designation by Moore, [1882] 1882-3, *Lepid. Ceylon* 2:23. JAVA: north-western, Samarang. *S. acteus* is dated from the wrapper of part 21, not from the title- page of volume 3 which is dated 1782.

***Pergesa acteus* Cramer, 1779**

Material examined: 7♂ 9♀, India: Renukaji lake, 09.vii.2008, P.C. Pathania, A. Seni and A. Katewa (1♂); 26 PS, 03.viii.2008, A. Seni and A. Katewa (1♂); Kapurthala, 23.x.2006, Rajinder and Amardeep (1♀); Kangra, 27.viii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 1♀); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, S. Kumar, V. Singh (1♂); Bhoirymbong, 09.vi.2013, P.C. Pathania, R. Kumar, S. Sharma (1♀); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (1♀); Solan (Nauni) 14.vii.2013, P.C. Pathania and A. Kumar (2♂); Samirpur, 03.viii.2013, P.C. Pathania and R. Kumar (3♂ and 3♀).

19. Genus: *Rhopalopsyche* Butler, 1875, *Proc. Zool. Soc. Lond.* 239.

Type- species: *Macroglossa nycteris* Kollar, [1848] 1848, in Hugel, Kaschmir und das Reich der sirk 4:458, pl. 19, fig. 5, by original designation. [INDIA]: [Uttar Pradesh], Mussooree.

***Rhopalopsyche nycteris* Kollar, 1844**

Material examined: 5♂ 4♀, India: Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania (3♂ and 1♀); Kalatop, 24.v.2011, P.C. Pathania and A. Punj (1♂); Rajgarh, 24.x.2011, P.C. Pathania and A. Punj (1♀); Punjab Agricultural University Ludhiana, 22.v.2012, P.C. Pathania (1♀); Nanital, 26.vi.2012, P.C. Pathania (1♀); Punjab Agricultural University Ludhiana, 24.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂).

20. Genus: *Theretra* Hubner, [1819] 1822, *Verz. Bek. Schmett.*:135.

Type- species: *Sphinx equestris* Fabricius, 1793, *Ent. Syst.* 3 (1):365, by subsequent designation by Kirby, 1892, *Synonymic Cat. Lepid. Heterocera* 1:659 (but cited as *Sphinx nessus* Drury; see below). INDIA: eastern.

***Theretra alecto* Linnaeus, 1758**

Sphinx alecto Linnaeus, 1758, *Syst. Nat. ed.* 10: 492.

Theretra alecto Linnaeus; Royhschild and Jordan, 1903: 776.

Material examined: 11♂ 16♀, India: Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 6♀); Solan, 27.iv.2011, P.C. Pathania and A. Punj (2♀); Solan, 23.iv.2011, P.C. Pathania and A. Punj (1♂); Nanital, 28.vi.2012, P.C. Pathania (1♂); Punjab Agricultural University Ludhiana, 04.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 05.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (2♀); Punjab Agricultural University Ludhiana, 24.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 26.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (2♂); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (2♂ and 1♀); Serighat 13.vii.2013, P.C. Pathania and A. Kumar (3♂); Samirpur, 03.viii.2013, P.C. Pathania and R. Kumar (4♀).

***Theretra clotho clotho* Drury, 1773**

Sphinx clotho Drury, 1773, *Ex. Ins.*, 2: 48.

Theretra clotho Drury; Rothschild and Jordan, 1903: 769.

Material examined: 6♂ 5♀, India: Hamirpur, 08.vi.2008, P.C. Pathania, A. Seni (1♂); Barnala, 25.ix.2009, P.C. Pathania, A. Seni and A. Katewa (1♀); Punjab Agricultural University Ludhiana, 27.viii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂); Punjab Agricultural University Ludhiana, 28.x.2012,

P.C. Pathania, S. Sharma and K. Sharma (1♀); Upper Shilong, 10.vi.2013, P.C. Pathania, S. Sharma and R. Kumar (1♀). Tanyhar, 27.vi.2013, P.C. Pathania, A. Kumar (2♂ and 1♀); Tanyhar, 28.vi.2013, P.C. Pathania, A. Kumar (1♂); Sabathu, 11.vii.2013, P.C. Pathania, A. Kumar (1♂).

***Theretra nessus* Drury, 1773**

Sphinx nessus Drury, 1773, *Ex. Ins.*, 2:46.

Theretra nessus Drury; Rothschild and Jordan, 1903: 765.

Material examined: 3♂ 6♀, India: Hamirpur, 26.ix.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂ and 3♀); Nongstoin, 07.vi.2013, P.C. Pathania, R. Kumar, S. Sharma (1♀); Serighat 13.vii.2013, P.C. Pathania and A. Kumar (2♂); Solan, 14.vii.2013, P.C. Pathania and A. Kumar (2♀).

***Theretra odenlandiae odenlandiae* Fabricius, 1775**

Sphinx odenlandiae Fabricius, 1775, *Syst. Ent.*, P. 542.

Theretra odenlandiae Fabricius; Rothschild and Jordan, 1903: 781.

Material examined: 15♂ 24♀, India: Palampur, 14.ix.2006, Sarwan Kumar (1♂); 26 PS, 03.viii.2008, A. Seni and A. Katewa (1♀); 26 PS, 04.viii.2008, A. Seni and A. Katewa (2♂ and 1♀); Renuka Lake, 09.vii.2008, P.C. Pathania, A. Seni and A. Katewa (1♂); Punjab Agricultural University Ludhiana, 04.xii.2009, P.C. Pathania, A. Seni and A. Katewa (1♂ and 2♀); Tanihar, 12.v.2011, P.C. Pathania, A. Punj (1♂ and 3♀); Punjab Agricultural University Ludhiana, 09.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♂ and 1♀); Punjab Agricultural University Ludhiana, 10.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 25.vii.2012, P.C. Pathania, S. Sharma and K. Sharma (1♀); Punjab Agricultural University Ludhiana, 25.iv.2013, P.C. Pathania, S. Sharma (2♂ and 4♀); Punjab Agricultural University Ludhiana, 29.iv.2013, P.C. Pathania, S. Sharma (3♂ and 1♀); Punjab Agricultural University Ludhiana, 28.v.2013, P.C. Pathania, S. Sharma (1♀); Punjab Agricultural University Ludhiana, 12.vii.2013, P.C. Pathania, A. Kumar (1♂ and 4♀); Punjab Agricultural University Ludhiana, 29.vii.2013,

P.C. Pathania, A. Kumar (4♀); Punjab Agricultural University Ludhiana, 05.ix.2013, P.C. Pathania, A. Kumar (1♂); Punjab Agricultural University Ludhiana, 28.x.2013, P.C. Pathania, A. Kumar (1♂ and 1♀).

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