**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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(Received 08 April, 2014, Accepted 23 May, 2014)

**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, Pahalgaon, Katra (Jammu and Srinagar), Manali, Mandi, Kullu, Hamirpur, Palampur, Kangra, Pathannkot, Una, Bilaspur, Shimla, Solan, Dharampur, Daghshai, YSP Univ. Nauni, Sabathu, Kasauli, Kumaunhati, Ochghat, Chambaghlat, Barog, Salogra, Dedgharat, Kandhagarhat, Warkaghat, Yashwant Nagar, Gaura, Raigarh, Badu sahib, Renuka (Himachal Pradesh), Dehradun Vikasnagar, Haridwar, Rishikesh, Karanparayag, 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 disecting/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


Type species: Sphinx atropos Linnaeus, 1758, Syst. Nat. (Edn 10):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 lachesis Fabricius, 1798
Sphinx lachersis fabricius, 1798, Ent. Syst. Suppl. P. 434.
Acherontia lachesis Fabricius; Rothschild and Jordan, 1903:17.


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.


Acherontia lachesis Fabricius, 1798
Sphinx lachersis fabricius, 1798, Ent. Syst. Suppl. P. 434.
Acherontia lachesis Fabricius; Rothschild and Jordan, 1903:17.

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

*Ambulyx siamensis* Inoue, 1991


*Ambulyx matti* Jordan, 1923

*Oxyambulyx matti* Jordan, 1923.


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.phalris* is dated from wrapper of part13, not from the title page of volume 2 which is dated 1779.

*Clanis titan* Rothschild and Jordan, 1903


*Dolbina inexacta* Walker, 1856


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

*Lapara coniferarum* Abbott and Smith, 1797


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 lineata* Westwood, 1847


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

*Pachysphinx occidentalius* occidentalis H. Edwards


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


Psilogramma menophron menophron Cramer


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


Marumba cristata Butler, 1875


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


Marumba dyras Walker, 1856


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


SUB FAMILY: MACROGLOSSINAE


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

Cephonodes hylas Linnaeus, 1771

Sphinx hylas Linnaeus, 1771.


**Daphnis nerius** Linnaeus


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

*Exot.* 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♀).


**Hippotion celerio** Linnaeus, 1758


**Hippotion echeclus** Boisduval, 1875


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


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

Macroglossum assimilis assimilis Swainson

Nephele hespera Fabricius, 1775


Pergesa acteus Cramer, 1779


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


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


Theretra clotho clotho Drury, 1773


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

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


**Theretra odenlandiae odenlandiae** Fabricius, 1775

**Theretra oldenlandiae** Fabricius; Rothschild and Jordan, 1903: 781.


**Acknowledgements**

We are very thankful to UGC, New Delhi for funding the project and also to our worthy Vice-Chancellor and Head, Department of Entomology for providing necessary research facilities. Authors would like to thank Dr. V.V. Ramamurthy (Principal Scientist) for their help in consultation of the National Pusa collection housed at Indian Agricultural Research Institute, New Delhi.

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