

## HAWK MOTHS (SPHINGIDAE) OF TANDO JAM, PAKISTAN

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### ABSTRACT

Hawk moths were collected from various localities of Tando Jam. Further examination and identification of moths revealed the occurrence 07 species under three subfamilies:

1. *Daphnis nerii* (Linnaeus, 1758) |
2. *Hyleslivornica* (Esper, 1780) | Tribes; Macroglossini, Harris, 1839 of Subfamily Macroglossinae, Harris, 1839
3. *Nephele hespera* (Fabricius, 1775) |
4. *Cephonodeshyla* - Hemarini, Tutt, 1902 of Subfamily Macroglossinae, Harris, 1839
5. *Acherontia styx* (Westwood, 1847) | Tribe Sphingini, Latreille 1802 of Subfamily Sphinginae, Latreille 1802
6. *Agrius convolvuli* (Linnaeus, 1758) |
7. *Smerinthus kindermannii* Lederer, 1853 - Tribe Smerinthini, Grote & Robinson 1865 of Subfamily Smerinthinae, Grote & Robinson 1865

**Key words:** Moths, Taxonomy, Tando Jam, Sphingidae

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### INTRODUCTION

According to the (Nieukerken, 2011) the Sphingidae counted about 1450 species, they have kinship to moths (Lepidoptera) family, usually known as hawk moths, sphinx moths, and hornworms. These are found in every region of the world but almost present throughout the tropic. They are reasonably large in size and are distinguished by speedy and maintained flying ability among moths (Scoble, 1995).

The classification of the family Sphingidae started back to 1892 in India, when Hampson classified it into six subfamilies. Then, in 1903 the Sphingidae revised by Rothschild and Jordan (1903) into three subfamilies. During the British-India era, the Sphingidae were monographed by Beland Scot (1937).

Sphingidae is classified on the molecular bases into subfamilies, tribes and subtribes, on phenotypic appearance, larva and pupal phases including molecular aspect by various authors (Kawahara *et al.*, 2009; Regier *et al.* 2001; Kitching and Cadiou, 2000; Nakamura 1976; Rothschild and Jordan, 1903). But none of them was able to provide data on its taxonomic status. Present study, is first of its kind from this area.

### MATERIALS AND METHODS

For present studies various localities of Tando Jam were selected for the collection of Hawk moth's samples. The research was accomplished at Department of Entomology's Insect Systematic Laboratory (ISL), in Sindh Agriculture University Tando Jam.

**Collection Method:** The Moths collected through light trapping, using 160-watt mercury bulb. A white sheet of cloth was used with strong source of light placed over it.

### RESULTS

In the present study total 33 members of the Sphingidae were collected from Tando Jam, Sindh, Pakistan. This revealed the occurrence 07 species under three subfamilies. Subfamily Macroglossinae, Harris 1839 had 4 species within two tribes; Macroglossini, Harris 1839 with three species; *Daphnis nerii* by Linnaeus (1758), *Hyleslivornica* by Esper (1780), *Nephele hespera* (Fabricius, 1775) and Hemarini, Tutt 1902 with one species *Cephonodes hylas* (Linnaeus, 1771). Latreille (1802) revealed two species; *Acherontia styx* (Westwood, 1847), *Agrius convolvuli* (Linnaeus, 1758) in subfamily Sphinginae, and tribe Sphingini. Lastly, Grote and Robinson

(1865) revealed only one species; *Smerinthus kindermannii* Lederer, 1853 in family Smerinthinae and tribe Smerinthini.

### Taxonomy

Order: Lepidoptera, Linnaeus 1758

Suborder: Glossata, Fabricius 1775

Superfamily: Bombycoidea, Latreille 1802

Family: Sphingidae, Latreille 1802

Subfamily Macroglossinae, Harris 1839

Macroglossini, Harris 1839

*Daphnis nerii* (Linnaeus, 1758) (Plate, 1a)

Oleander Hawk moth or Army Green Moth

**Identification.** Adults look like army dresses. Wing entire in outline, with forewing apex pointed. Antenna slightly clubbed in female; setiform in male. Sclerotized jagged plate paramere.

**Material examined.** Pakistan: 1♂, 1♀, Sindh Prov., Tando Jam, 02.vii.2014, Panhwar N., light trap.

*Hyles livornica* (Esper, 1780) (Plate, 1b)

Striped Hawk moth

**Identification.** Males are slightly smaller than females with olive brown body, white ribbon and fore wings. They have pink hind wings with black-cum-white corner. Olive-brown head-cum-thorax with white ribbons. Wingspan reaching 60–80 mm.

**Material examined.** Pakistan: 2♂, 10♀, Sindh Prov., Tando Jam, 23.viii.2014, Panhwar N., light trap.

*Nephele hespera* (Fabricius, 1775) (Plate, 1c)

**Identification.** It differs from nearly all other *Nephele* species in the apical hindtibial spurs having only a few-cum-thin, distally situated spines. The wingspan is 70–86 mm. The silver markings on the wings may be present or absent in both sexes. The hindcomb is not well organized as in African species of *Nephele*.

**Material examined:** Pakistan: 1♂, Sindh Prov., Tando Jam, 28.vii.2014, Panhwar N., light trap.

Tribe: Hemarini, Tutt 1902

*Cephonodes hylas* (Linnaeus, 1771) (Plate, 1d)

Common Bumble-Bee / CoffeeBee Hawk Moth

**Identification:** Wingspan: 45-73mm. They have black-cum-dark red belt on the above side of abdomen; middle spot of tergite 6 is a black, sometime have red scales; tuft green anal. Foretibia have incomplete apical claw. Thorax is white or slightly yellowish below the head. Fully uneven male bollocks.

**Material examined:.** Pakistan: 1♂, Sindh Prov., Tando Jam, 09.vi.2014, Panhwar N., light trap.

### Subfamily: Sphinginae

*Acherontia Styx* (Westwood, 1847) (Plate, 1e)

Lesser Death's Head Hawk moth

**Identification:** Wingspan 90-120mm. Cranium-like marking is darker, present on hindwing's upper side and there is a dim blue tornal spot confined by a black submarginal ring. Lightly bent uncus present in males, gnathos wanting, and fully outer margin paramere, in females apex of papillae analesis sub-rounded.

**Material examined:** Pakistan: 1♂, 2♀, Sindh Prov., Tando Jam, 29.viii.2014, Panhwar N., light trap.

*Agrius convolvuli* (Linnaeus, 1758) (Plate, 1f)

Convolvulus Hawk moth

**Identification:** Wingspan is 95-130mm. sexually dimorphic; Males are considerably smaller than females. They have extensive or absent light-cum-dark grey forewing, with dark dots and bands. These large moth can'tbaffle by no other Sphingid of the region. Uncus is dilated before apex in the male bollocks.

**Material examined:** Pakistan: 1♂, 1♀, Sindh Prov., Tando Jam, 22.vii.2014, Panhwar N., light trap.

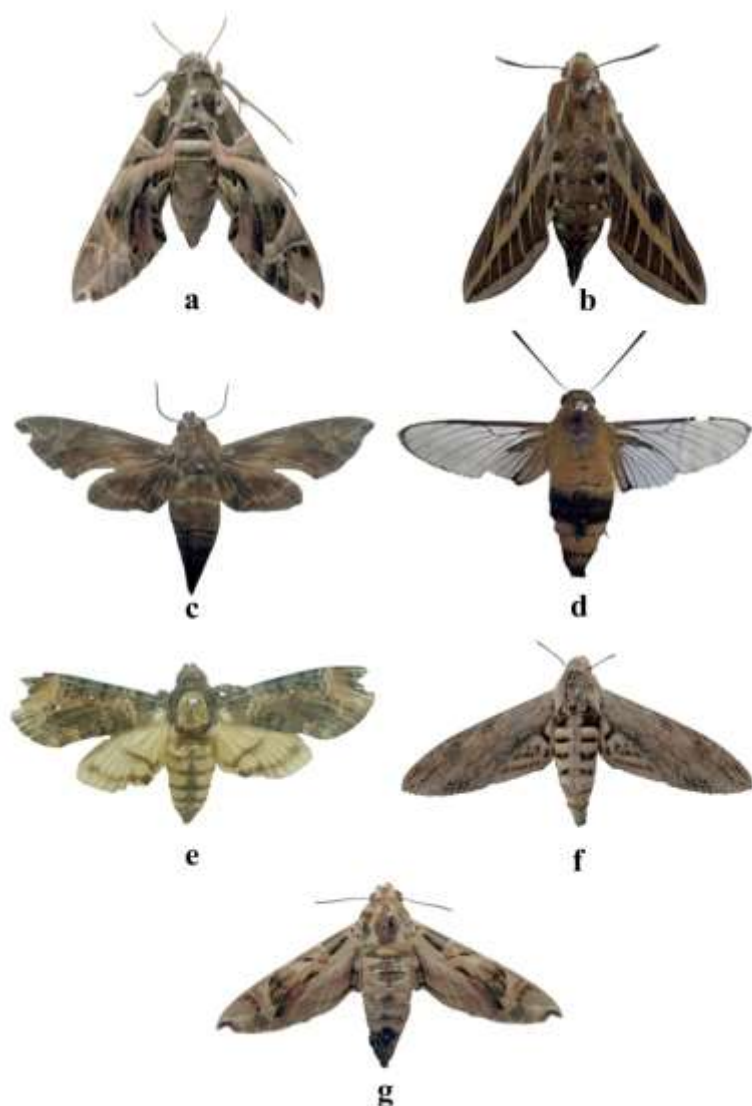


Fig.1.a, *Daphnis nerii*; b, *Hyles livornica*; c, *Nephele hespera*; d, *Cephonodes hylas*; e, *Acherontia styx*; f, *Agrius convolvuli*; g, *Smerinthus kindermannii*.

Family Smerinthinae

Tribe Smerinthini

*Smerinthus kindermannii* Lederer, 1853 (Plate, 1g)

Southern Eyed Hawk moth

**Identification:** Wingspan: 65-80mm. sexually dimorphic, elongated forewing, heavily dentate along the outer margin, with the cryptic pattern clearer and outlined in light brown or buff. Abdominal patterns fringed with white. There is very little variation, except between generations, the first being paler and lighter in colour.

**Material examined:** Pakistan: 1♂, 1♀, Sindh Prov., Tando Jam, 16.vii.2014, Panhwar N., light trap.

## DISCUSSION

*Acherontia styx* is similar to *Acherontia atropos* (Linnaeus, 1758) but analogous in, beneath the forewing they have two medial bands instead of one and usually no dark lines across the ventral surface of the abdomen. To deter predator moths have some uncommon characters. To deter predator, these have the ability to produce a loud squeak by expelling air from the pharynx, sometime accompanied by flashing of coloured abdomen. Lederer (1853) said *Smerinthus kindermanni* similar to *Smerinthus ocellata* (Linnaeus), but elongated forewing, heavily dentate along the outer margin, with the cryptic band more distinct and outlined in light brown or buff. *Daphnis nerii* (Linnaeus, 1758), have general characters like large greenish body easily distinguishable in having longer uncus than gnathos, curve-shaped thecal appendage, apophyses front with shorten pinnacles and by the additional features as documented in the key-cum-description. It's most closely related to *D. placida* (Walker). Esper (1780) said *Hyleslivornica* have apical angle sub-rounded fore wings and is most closely related to *Hylesgallii* (von Rottenburg).

Fabricius (1775) reported that *Nephele hespera* have common colour arrangement on body, full large second piece of palpus easily characterized with longer basal piece than second, bent-shape large uncus, a friction scales paramere at central rear surface and by additional features as documented in the description as well as in key, and is closely related to *N. didyma* (Fabr.). *Cephonodeshyla* (Linnaeus, 1771) takes after *C. Picus* in having hyaline wings, simulate with a Humblebee and effortlessly be distinguishable in having front tibiae flowing without apical thorn, shortened membranous gnathos, shapeless paramere, rear apophyses is longer and stick-like, and by the additional aspects as documented in the key-cum-description.

In Oriental region, *Agrius convolvuli* (Linnaeus, 1758) is the only documented species, easily distinguishable from the others in body shape, wing arrangements, diminished membranous gnathos, one tooth-like process paramere at ventro-basal surplus, aedeagus confined by two finger-like flap between membranous flap, membranous conjunctiva and by other added aspects as mentioned in the key-cum-description. *Smerinthus kindermanni* (Lederer 1853) is closely analogous in colouration-cum-body shape to *S. ocellata* (L.) but easily distinguished in having three across dark linings, a large dull bone-like process wide paramere at ventro-outer surplus, aedeagus with distally snout-shaped thecal limb and by the added features as mentioned in description as well as in key.

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