



Diversity of Hawk Moths (Lepidoptera: Sphingidae) in Veerangana Durgavati Wildlife Sanctuary, Damoh, Madhya Pradesh

Kailash Chandra*, Roshni Pandey**, Rita Bhandari ** and S. Sambath***

* Zoological Survey of India, M, Block, New Alipore, Kolkata, West Bengal

** Govt. Model Science College, Jabalpur, (MP)

***Zoological Survey of India, Jabalpur, (MP)

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ABSTRACT: The paper deals with the study of hawk moth's diversity in Veerangana Durgavati Wildlife Sanctuary, Madhya Pradesh. The faunal exploration of the sanctuary during 2009 to 2011, resulted the enumeration of 12 species of hawk moths belonging to 10 genera and 3 subfamilies. Of these, one species viz. *Agnosia microta* (Hampson) is new addition to the fauna of Madhya Pradesh. All the specimens are deposited in the national repository of Zoological Survey of India, Jabalpur.

Key words: Lepidoptera, Diversity, Sphingidae, Moths, Veerangana Durgavati Wildlife Sanctuary, Damoh, Madhya Pradesh.

INTRODUCTION

Moths of the Sphingidae are medium size to large and heavy bodied with long narrow fore wings and relatively small hind wings. Wingspans range from about 40 mm to 140 mm. In the fore wing vein M2 arises a little closer M3 than M1. Veins Sc and Rs in the hind wing are to end of discal cell and beyond; near the middle point of the discal cell, connected by an oblique cross vein. A frenulum present, thickened and somewhat spindle-shaped towards the tip. Sometimes bipectinate. The proboscis usually long sometimes much longer than the body (Sphinginae) but sometimes short or vestigial (Smerithinae). Sphingid moths fly very strongly with rapidly beating wings.

Hawk moths are a very diverse group represented by 203 genera and 1348 species described all over the world (Pogue, 2009) and about 200 species are known from India. Moth fauna of Madhya Pradesh and Chhattisgarh was studied by Chandra and Nema (2007) and 313 species of moths were listed, which included 23 species of family Sphingidae. However there was no report of any hawk moth neither from Damoh district nor the Veerangana Durgavati Wildlife Sanctuary, therefore while undertaking the faunal explorations of the sanctuary, the hawk moth diversity of the sanctuary was also investigated.

The present study deals with the detail account of 12 species of hawk moths of the sanctuary, which includes material examined, diagnostic characters and distribution of each species.

MATERIALS AND METHODS

Study area: The present study was undertaken in the Veerangana Durgavati Wildlife Sanctuary (VDWLS), Madhya Pradesh. The sanctuary is named after 'Rani Durgavati' the famous queen of Gond dynasty, the area now coming under the sanctuary fall under her regime. The sanctuary was created in the year 1996 vide Notification of Government of Madhya Pradesh (Tiwari, 2003). The area of the sanctuary is 24 sq.kms. The sanctuary lies between 23°30'9" & 24°35' N latitudes & between 79°51'0" & 79°51'13" E longitudes.

Collection methods: The collection of moths was made through the light traps, using 160-watt mercury bulb connected with the light sources. For collecting moths, a white sheet of cloth was spread on the ground, with a strong source of light placed over it. The white cloth sheet may also be hung between two vertical poles in such a way that it touches the surface and extends forwards over the ground for a few feet so that all those moths, which are in the habit of settling on the ground slightly away from the direct source of light are also caught.

Identification: The specimens collected from different areas were identified with the help of all available traditional taxonomic characters for the group & available literature (Bell & Scott 1937). The current nomenclature used for species identification is based on LEPINDEX (Beccaloni *et al.* 2003). The characters of male genitalia were also studied for distinguishing the allied species.

OBSERVATIONS

The following list of the Sphingidae of VDWS is based mainly on the classification of Bell & Scott (1937) and the species under tribes are arranged in alphabetical order.

Systematic account

Order: Lepidoptera

Superfamily: Bombycoidea

Family: **Sphingidae**

1. SUBFAMILY: SPHINGINAE

TRIBE: ACHERONTIINI

1. *Acherontia lachesis* (Fabricius)

1798. *Sphinx lachesis* Fabricius, *Syst. Ent. Suppl.*: 434.

1937. *Acherontia lachesis*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 55.

Material examined: Sangrampur FRH, 18.xi.2009 (1ex.), coll. J. Thilak & party.

Diagnostic characters: Head and thorax blackish, powdered with white, yellow and blue-grey scales. The skull mark on the dorsum of the thorax more conspicuous. Fore wing blackish, powdered with white, yellow and bluish grey scales. Hind wing upper side with the basal third marked with black. Abdomen black with a broad, interrupted, grey-blue dorsal stripe and small yellow side patches on the four proximal segments. Underside of both wings yellow. *Wingspan:* 102-132 mm.

Distribution: Throughout India including Madhya Pradesh (Damoh, Indore, Seoni). *Elsewhere:* Bangladesh, Bhutan, China, Java up to Southern Moluccas in the farther east, Malaysia, Myanmar, Pakistan and Sri Lanka.

2. *Acherontia styx styx* (Westwood)

1844. *Sphinx (Acherontia) styx* Westwood, *Cab.*

Orient. Ent., : 88, t. 42. f. 3.

1937. *Acherontia styx styx*, Bell & Scott, *Fauna Brit. India, Moths*, 5: 58.

Material examined: Sangrampur. FRH, 18.xi.2009 (1ex.), coll. J. Thilak & party

Diagnostic characters: This species distinguished from *Acherontia lachesis* by the basal third of hind wing upper side being immaculate instead of marked with black. Skull-mark on thorax is less conspicuous. Fore wing with tawny-russet streaks. Antennae much more slender and longer in both sexes. Abdomen bears yellow side-patches well extensive. Fore tibiae with few spines. *Wingspan:* 90-130 mm.

Distribution: Throughout India including Madhya Pradesh (Indore, Jabalpur, Damoh, Seoni). *Elsewhere:* Bangladesh, Bhutan, Myanmar, Pakistan and Sri Lanka.

3. *Agrius convolvuli convolvuli* (Linnaeus)

1767. *Sphinx convolvuli* Linnaeus, *Syst. Nat. ed.* xii: 798.

1937. *Herse convolvuli convolvuli*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 61.

Material examined: Sangrampur FRH, 18.xi.2009 (1ex.); Bhisaghat, 23.xi.2009 (1ex.), coll. J. Thilak & party; Danital, 08.ix.2010 (1 ex.), coll. K. Chandra & party;

Diagnostic characters: Head, thorax, abdomen and fore wing grey; dark brown bands along sides of palpi and thorax meeting on metathorax, with a few blue and yellow scales present on abdomen with blackish dorsal stripe and brown subdorsal, segmental patches. Fore wing with dark oblique lines from costa; two black streaks from cell, continued as a dentate streak to apex of wing and obliquely to costa at the proximal end and sharply defining a pale apical patch, a series of whitish sub marginal lunules, cilia chequered black and white. Hind wing brown, with a black patch at anal angle, limited inwardly by a pale submarginal line and more or less suffused with grey. *Wing expanse:* Male: 82-122 mm. Female: 108-138 mm.

Distribution: India: Madhya Pradesh (Damoh, Jabalpur, Mandla, Seoni), Chhattisgarh, West Bengal and rest of the mainland. *Elsewhere:* Eastern Hemisphere except higher altitudes; rarely in Siberia.

TRIBE: SPHINGINI

4. *Psilogramma menephron menephron* (Cramer)

1780. *Sphinx menephron* Cramer, *Pap. Exot.* 3: 164.

1937. *Psilogramma menephron menephron*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 77-78.

Material examined: Tilgula patrolling, 28.vi.2010 (1 ex.), coll. J. Thilak & party.

Diagnostic characters. Colour head, thorax, abdomen and fore wing grey, dark brown bands along sides of palpi and thorax meeting on metathorax, where there are a few blue and yellow scales abdomen with a blackish dorsal stripe and brown subdorsal, segmental patches. Fore wing with dark oblique lines from costa, two black streaks from cell. Continued as a dentate streak to apex of wing and obliquely to costa at the proximal end and sharply defining a pale apical patch, a series of whitish submarginal lunules, cilia chequered black and white. Hind wing brown, with a black patch at anal angle, limited inwardly by a pale submarginal line and more or less suffused with grey. *Wing expanse.* Male: 82-122 mm., Female: 108-138 mm.

Distribution. India: Throughout India including Madhya Pradesh (Damoh, Seoni, Umaria). *Elsewhere:* China and eastwards to the Solomon Islands.

2. SUBFAMILY: MACROGLOSSINAE

TRIBE : MACROGLOSSINI

5. *Daphnis nerii* (Linnaeus)

1758. *Sphinx nerii* Linnaeus, *Syst. Nat. ed.* 10: 490.

1937. *Deilephila nerii*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 268-269.

Material examined: Sangrampur FRH, 18.xi.2009 (1ex.), coll., J. Thilak & party.

Diagnostic characters: The head of adult male and female moth green; rufous in front, a grey band on vertex; thorax green, the collar outlined in grey; a triangular grey patch on vertex. Abdomen pale green, with dark green lateral oblique stripes and a pale subbasal belt. Fore wing bright green; a basal white patch with a black spot on it. Hind wing fuscous with a pale, curved, submarginal line, beyond which the colour dark olivaceous. Underside suffused with chestnut. *Wing expanse:* Male, 84-116 mm.; Female, 84-126 mm.

Distribution: Throughout India including Madhya Pradesh (Damoh, Jabalpur, Indore, Hoshangabad) and West Bengal. *Elsewhere:* Europe, Myanmar, Pakistan, Sri Lanka, Ethiopian Regions and West Asia.

6. *Hippotion boerhaviae* (Fabricius)

1775. *Sphinx boerhaviae* Fabricius, *Syst. Ent.* : 542.

1937. *Hippotion boerhaviae*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 424.

Material examined: Bhaisaghat, 08.ix.2010 (1ex.); Danital, 08.ix.2010 (2 exs.), coll., K. Chandra & party; Sangrampur FRH, 18.xi.2009 (1ex.), coll. J. Thilak & party.

Diagnostic characters: This species usually less red than allied species. The head, thorax and abdomen of the adult moth pale brown, antennae and sides of thorax whitish, abdomen having faint ochraceous

stripes and black patches, Fore wing pale brown, with a dark speck at end of cell, six faint oblique lines from near apex to inner margin. Hind wing being smaller and with black patch at base. *Wing expanse:* 50-58 mm.

Distribution: India: Madhya Pradesh (Damoh, Hoshangabad, Indore, Mandla, Seoni and Umaria), Andhra Pradesh, Chhattisgarh, Eastern Himalayas, Gujarat, Maharashtra Orissa, Sikkim, Southern Peninsula, West Himalaya and West Bengal. *Elsewhere:* Bhutan, China (south), Malaya, Pakistan, Philippines and Sri Lanka.

7. *Nephele hespera* (Fabricius)

1777. *Sphinx hespera* Fabricius, *Syst. Ent.*: 546.

1937. *Nephele didyma*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 325.

Material examined: Sangrampur FRH, 18.xi.2009 (1ex.), coll. J. Thilak & party.

Diagnostic characters: The head, thorax, and abdomen olive-brown or green; abdomen with lateral black segmental bands. Fore wing olive-brown, with six wavy, transverse lines and an angled submarginal line, the space between it and outer margin paler. Hind wing raw-umber colour, with a tint of russet, or more russet; outer marginal area darker in tint; the cilia ochreous. Underside paler, each wing with two transverse lines.

Wing expanse: Male, 70-78 mm.; Female, 72-86 mm.

Distribution: Throughout India including Madhya Pradesh (Damoh, Indore, Seoni, Shivpuri and Umaria), Andaman Islands, Western and Eastern Himalayas, South India. *Elsewhere:* Myanmar, Sri Lanka extending to Malaya.

8. *Theretra alecto alecto* (Linnaeus)

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

1937. *Theretra alecto alecto*: Bell & Scott, *Fauna Brit. India, Moths*, 5: 440.

Material examined: Thilgula Patrolling, 28.vi.2010 (3 exs.), coll., J. Thilak & party.

Diagnostic characters: Head and thorax dark brown, abdomen pale brown; antennae and side of head and thorax whitish; abdomen with a black side patch on first segment and three dorsal lines. Fore wing pale brown with a dark speck at end of cell. Hind wing pink, black at base, anal angle flesh colour. *Wingspan:* 85 mm.

Distribution: India: Madhya Pradesh (Damoh, Indore, Jabalpur, Hoshangabad, Mandla, Seoni, Umaria), South India, Western and Eastern Himalaya and West Bengal. *Elsewhere:* Afghanistan, Bhutan, Indonesia, Malaysia, Myanmar, Northward to Formosa and eastward to the key Islands, Pakistan, Sulawesi and Taiwan.

9. *Theretra oldenlandiae oldenlandiae* (Fabricius)1775. *Sphinx oldenlandiae* Fabricius, *Syst. Ent.*: 542.1937. *Theretra oldenlandiae oldenlandiae*: Bell &Scott, *Fauna Brit. India*, Moths, **5**: 448.*Material examined*: Tilgula patrolling, 28.vi.2010 (1 ex.), coll., J. Thilak & party.*Diagnostic characters*: Head and thorax brown; a pale lateral stripe from palpus to end of thorax. Fore wing greyish-brown. Hind wing dusky with a pale submarginal band not reaching apex. Abdomen with double white dorsal lines. *Wingspan*: 54 – 70 mm.*Distribution*: India: Madhya Pradesh (Damoh, Indore, Jabalpur, Hoshangabad, Mandla, Seoni, Umaria), South India, West and East Himalaya and West Bengal. *Elsewhere*: Bhutan, Japan, Myanmar, Pakistan, Papua and Sri Lanka.

3. SUBFAMILY: SMERINTHINAE

TRIBE : SMERINTHINI

10. *Agnosia microta* (Hampson)*1907. *Marumba microta* Hampson, *Nov. Zool.* 14: 327.1937. *Agnosia microta*: Hampson, *Fauna Brit. India*, Moths, **5**: 213.*Material examined*: Tilgula Patrolling, 28.vi.2010 (3 exs.), coll., J. Thilak and party.*Diagnostic characters*: Head and thorax red-brown, the head rather paler except palpi; antennae whitish; abdomen red-brown. Fore wing grey-brown suffused with purplish-rufous and with slight dark suffusion; a black and rufous subbasal spot on SM²; an oblique brown medial line, diffuse on outer side; post medial area somewhat greyer; an indistinct slightly curved subterminal line with two conjoined red-brown spots on it at inner margin; a small dark brown spot on termen below apex. Hind wing purplish red-brown with indistinct darker shade on termen near tornus. Fore tibia with a long curved at tip. *Wing expanse*: Male, 37-44 mm.*Distribution*: India: Madhya Pradesh (Damoh) and South India.**11. *Marumba dyras dyras*** (Walker)1856. *Smerinthus dyras* Walker, *Cat. Lep. Het. Brit. Mus.*, **8**: 250.1937. *Marumba dyras dyras*, Bell & Scott, *Fauna Brit. India*, Moths, **5**: 179.*Material examined*: Tilgula patrolling, 28.vi.2010 (1 ex.), coll., J. Thilak & party.*Diagnostic characters*: Fore wing grey or earthen brown with grey powdering of the most distal double line, the external one much heavier than proximal one. Hind wing reddish to yellowish with fuscous base and large anal spot. Antenna one-third length of fore wing in male, a little shorter in female. *Wing expanse*: Male: 90-92 mm.; Female: 90-119 mm.*Distribution*: India: Madhya Pradesh (Damoh, Hoshangabad, Mandla, Seoni), Andamans, Chhattisgarh, Western and Eastern Himalayas and South India. *Elsewhere*: Sri Lanka.**12. *Polyptychus dentatus*** (Cramer)1777. *Sphinx dentatus* Cramer, *Pap. Exot.* **2**: 42 t.125 f. G.1937. *Polyptychus dentatus*: Bell & Scott, *Fauna Brit. India*, Moths, **5**: 169.*Material examined*: Tilgula patrolling, 28.vi.2010 (1 ex.), coll., J. Thilak & party.*Diagnostic characters*: Colour grey wing with a diffused medial band, oblique antemedial, postmedial and submarginal lines, the last curved in some specimens, between the postmedial and submarginal lines an indistinct waved line, apical area clouded. Hind wing with a waved postmedial line. Cilia chequered brown and white. Under side, fore wing with submarginal, hind wing with medial and submarginal lines. *Wing expanse*. - Male: 92-108 mm., Female: 116-120 mm.*Distribution*: India: Madhya Pradesh (Damoh, Indore, Seoni), Maharashtra, Uttar Pradesh, West Bengal, Eastern and Northwest Himalayas, Southern peninsula. *Elsewhere*: China, Pakistan and Sri Lanka.**RESULTS**

Altogether 12 species belonging to 10 genera and 3 subfamilies are studied from the Veerangana Durgavati Wildlife Sanctuary, Damoh, Madhya Pradesh. Of these, one species- *Agnosia microta* (Hampson) is new addition to the fauna of Madhya Pradesh. The number of species differs in various subfamilies. The maximum number of species is recorded in the subfamily Macroglossinae (5) followed by Sphinginae (4) and Smerinthinae (3).

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