Journal of Advanced Zoology
ISSN: 0253-7214
Volume 45 Issue 1 Year 2024 Page 01-10

Taxonomic Assessment and Distributional Records of Sphingidae Moths (Lepidoptera: Heterocera) from Nagaland

Abesh Chakraborty[1*], Dipanwita Chakraborty[1], Sangeeta Biswas[1], Anurudha Chakraborty[1] and Mitrajit Deb[1]

[1]*Department of Zoology, The Assam Royal Global University, Guwahati-781035, Assam, India*

***Corresponding Author:** E-mail: achakraborty9@rgu.ac*

Abstract

An updated checklist of 22 moth species under 14 genera belonging to Sphingidae has been catalogued with an aim to follow the current state of knowledge in moth diversity from the north-eastern state of Nagaland. Although, richly endowed with an array of biodiversity, the state seriously lacks attention regarding faunal status and distributions; ergo, the present work to ascertain the diversity of hawk moths of the state based on records from available literature to fill the void on the path of systematic research.

Keywords: checklist, distribution, moths, Sphingidae, synonyms

Introduction

Sphingidae, one of the most conspicuous Heteroceran families of Lepidoptera, includes 1,450 described species worldwide (Nieukerken et al., 2011) bearing a wide range of physical characteristics and ecological adaptations (Pittaway, 1993). The species within the family are distinguished by their large size, quick flight and lengthy proboscis which makes them an efficient pollinator of numerous plants (Kitching, 2018). The considerable size of hawkmoths has rendered them invaluable as model organisms in investigations concerning genetics, physiology and development (Wannenmacher & Wasserthal, 2003; Roe et al., 2009). Additionally, these moths have been instrumental in studies of functional morphology (Eaton, 1988), interactions between plants and herbivores (Kessler & Baldwin, 2002; Agosta & Janzen, 2005), pollination biology (Ragusso & Willis, 2002) and biogeography (Beck et al., 2006).

However, the updated knowledge about their taxonomic composition stands scanty. Post independence, limited comprehensive works on Sphingidae has been carried out from the state of Nagaland. Moreover, a lack of distributional data poses major barriers to conservation status assessment and biodiversity management (Amano & Sutherland, 2013). Hence, the present review attempts to compile the documented Sphingidae moths from the state including notes on their updated synonymy and distribution with a view to support further systematic studies.

Nagaland, positioned in the extreme north-eastern part of India, is home to an array of floral and faunal diversity with one-sixth of the state under the cover of tropical and sub-tropical evergreen forests. The mountainous state, bounded by the Indian states of Arunachal Pradesh to the northeast, Manipur to the south, Assam to the west and northwest and Myanmar (Burma) to the east, bears a monsoonal climate with average rainfall between 70 and 100 inches. A geographic map of the concerned site was generated using QGIS (Version 3.30.3 's-Hertogenbosch).

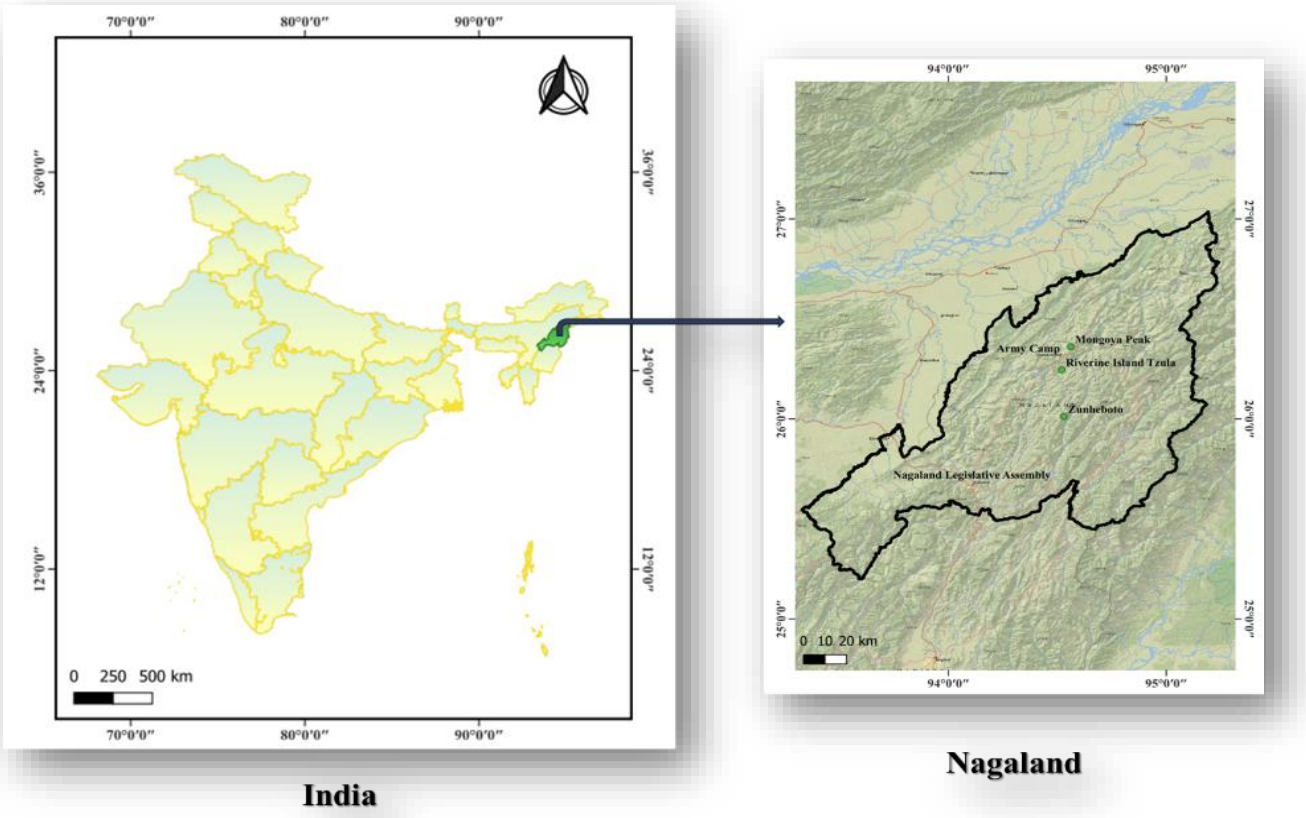

Fig. Geographical map of Nagaland, India.

Methodology

The compilation of checklist is based on available literature (Cotes & Swinhoe, 1887; Bell & Scott, 1937; Hampson, 1892; Singh et al., 2021; Shubhalaxmi et al., 2011; Sethi et al., 2017, Irungbam & Fric, 2021; Irungbam & Irungbam, 2019) which serves as the first consolidated documentation of Sphingidae moths from Nagaland. Synonymy information was sourced from Catalogue of the family-group, genus-group and species-group names of the Sphingidae of the world (Bridges, 1993) and the online database named Catalogue of Life (Roskov et al., 2019).

Taxonomic accounts

The current taxonomic framework suggests the existance of three subfamilies: Macroglossinae, Smerinthinae and Sphinginae under Sphingidae. The subfamily Macroglossinae consists of the tribes Dilophonotini (25 genera), Macroglossini (55 genera) and Philampelini (2 genera), Smerinthinae includes Ambulycini (10 genera) and Smerinthini (60 genera) and Sphinginae encompasses Acherontiini (5 genera), Sphingini (38 genera) and Sphingulini (9 genera). Two genera of sphingids are still not assigned to any of the existing subfamilies (Beccaloni, 2023). The taxonomic checklist has been prepared in accordance with the present nomenclatural changes (Beccaloni, 2019).

Order Lepidoptera Linnaeus, 1758

Superfamily Bombycoidea Latreille, 1802

Family Sphingidae Latreille, 1802

Subfamily Smerinthinae Grote and Robinson, 1865

Genus *Callambulyx* Rothschild & Jordan, 1903

1. *Callambulyx junonia* Butler, 1881

Synonyms:

Ambulyx junonia Butler, 1881. Ambulyx OD: II. Lepid. Het. B. M. 5:9, pl 80, CG: Callambulyx [Type: BMNHht) [TypeL - Bhutan, N. India.]

Callambulyx orbita Chu & Wang, 1980. Callambulyx OD: Acta zootaxon. sinica (5)441, SS: chinensis Clark,

1938; Callambulya [Type L- Yunnan, China.]
Distribution in India: Arunachal Pradesh, Nagaland, Sikkim, Manipur.
Elsewhere: Bhutan, Vietnam, China (Irungbam & Fric, 2021).

2. *Callambulyx rubricosa* Walker, 1856
Synonyms:
Ambulyx rubricosa Walker, 1856. *Callambulyx* Rothschild & Jordan, 1903 OD: Novit. zool. 9(Suppl.):173,307. TS: *Ambulyx rubricosa* Walker, 1856. OD: List Spec. Lep. Ins. Brit. Mus. (8):122 . TM: by original designation.
Ambulyx amanda Rothschild & Jordan, 1903; *Callambulyx* OD: Novit. zool. 9(Suppl.):309, SS: *rubricosa* (Walker), 1856; *Callambulyx* [Type: BMNH-ht) [TypeL- Kina Balu, N. Bomeo.]
Ambulyx indochinensis Clark, 1936; Callambulyx OD: Proc. New Engl zool. Club 15:84, SS: *rubricosa* (Walker), 1856; Callambulyx [TypeL - French Indo-China.]
Ambulyx piepersi (Snellen), 1880; Metagastes OD: Tijdschr. Ent. 23: xxii_ [b1266] SS: rubricosa (Walker), 1856; Callambulyx [Type: pce; collection of Snellen.] [TypeL - Vietnam] [Check - Type locality and spelling.]
Ambulyx rubricosa (Walker), 1856; Ambulyx OD: List Spec. Lep. Ins. Brit. Mus. 8:122, CG: Callambulyx [Type: UMO] [TypeL - Hindostan, India.]
Basiana superba (Moore), 1866; Basiana OD: Proc. zool. Soc. Lond. 1865:793, SS: mubricosa (Walker), 1856; Callambulyx [Type: BMNH] [TypeL - Not stated.]
Distribution in India: (Northeastern India), Nagaland (Sethi et al., 2017).
Elsewhere: Bhutan- Mendrelgang, Dagana and Paro, Nepal, Thailand, Vietnam (Irungbam & Irungbam, 2019).

Genus *Marumba* Moore, 1882

3. *Marumba dyras* Walker, 1856
Synonyms:
Marumba andamana Moore, 1877. OD: Proc. zool. Soc. Lond. 1877:595, SS: dyras (Walker), 1856, Marumba [Type: BMNH] [TypeL- Andaman _Islands.]
Marumba ceylanica Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:255, SS: dyras (Walker), 1856; Marumba [Type: BMNH] [TypeL - Ceylon.]
Marumba ceylonica Kernbach, 1960. Moore, 1882, 1882-1883, (ISS); Marumba OD: Lep. Ceylon 2:9, pl 79, SS: ceylanica (Butler), 1875; Marumba
Marumba fuscescens Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:256, SS: dyras (Walker), 1856; Marumba [Type: BMNH] [TypeL - Darjling, N. India.]
Marumba handelioides Mell, 1937. handelioides Mell, 1937; Marumba OD: Deut. ent. Zeit. 1937:5, SS: dyras (Walker), 1856, Marumba [TypeL - Hunan, China.]
Marumba massurensis Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:256, SS: dyras (Walker), 1856; Marumba [Type: BMNH] [TypeL - Massuri.]
Marumba oriens Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:255, SS: dyras (Walker), 1856; Marumba [Type: BMNH] [TypeL - N. E. India.]
Marumba plana Clark, 1923. OD: Proc. New Engl. zool. Club 8:54, SS: dyras (Walker), 1856; Marumba [TypeL - S. E. China.]
Marumba silhetensis Butler, 1875. Chaerocampa OD: List Spec. Lep. Ins. Brit. Mus. 8:143, CG: Theretra [Type: BMNH]
Marumba sinensis Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:254, SS: dyras (Walker), 1856; Marumba [Type: BMNH] [TypeL - Hongkong.]
Marumba tonkinensis Clark, 1936. D: Proc. New Engl. zool. Club 15:81, SS: dyras (Walker), 1856; Marumba [TypeL - Tonkin].
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Karnataka, Gujarat, Maharashtra, Andaman & Nicobar Islands.
Elsewhere: Sri Lanka, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, S. China, Philippines, Indonesia, Malaysia (Borneo), Taiwan (Subhalaxmi et al., 2011).

4. *Marumba irata* Joicey & Kaye, 1917
Synonyms:
Marumba irata Joicey & Kaye, 1917. Joicey & Kaye, 1917; Marumba OD: Ann. Mag. nat. Hist. (8)20:305 [TypeL - Tibet.]

Marumba fortis Jordan, 1929. OD: Novit. zool. 35:85, SS: gaschkewitschi (Bremer & Grey), [1852]; Marumba [TypeL - Yunnan.]
Distribution in India: Manipur, Nagaland, Sikkim.
Elsewhere: Northern Vietnam, Myanmar, China (Iringbam & Fric, 2021).

Genus *Clanis* Hübner, 1819

5. *Clanis phalaris* Cramer, 1777
Synonyms:
Clanis cervina Walker, 1856. OD: List Spec. Lep. Ins. Brit. Mus. 8:237, SS: phalaris (Cramer), [1777]; Clanis [TypeL - N. India.]
Clanis gigantea Rothschild, 1894. OD: Novit. zool. 1:96, SS: undulosa Moore, 1879; Clanis [TypeL - Khasia Hills.]
Clanis nicobarensis Esper, 1794. OD: Cat. Lep. Het. Mus. Ox. 1:29, SS: nicobarensis (Schwarz), 1810. TypeL: Not known.
Clanis pagana Fabricius, 1781. OD: Spec. Ins. 2:146, SS: phalans (Cramer), [1777]; Clanis [TypeL - Ind. or.]
Clanis phalaris Butler, 1877. phalaris (Cramer), [1777], 1775-1790; Sphinx OD: Ui. Kapellen 2:83, pl 149, CG: Clanis [TypeL - Coromandel.]
Distribution in India: (Sikkim, Assam, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Mizoram, Maharashtra, Karnataka, Uttarakhand, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Pondicherry, Andaman & Nicobar Is.).
Elsewhere: Sri Lanka, Myanmar. (Subhalaxmi et al., 2011).

Subfamily Sphinginae Latreille, 1802
Genus *Psilogramma* Rothschild & Jordan, 1903

6. *Psilogramma menephron* Cramer, 1780
Synonyms:
Psilogramma ahrendti Pagenstecher, 1888. OD: Jb. nass. Ver. Nat. 41.104, SS: menephron (Cramer), [1780]; Psilogramma [TypeL - Amboina.]
Distribution in India: (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Gujarat, Andaman Is.).
Elsewhere: Sri Lanka, Nepal, China, Myanmar, Thailand, Vietnam, Indonesia, Philippines, Australia (Subhalaxmi et al., 2011).

7. *Psilogramma discistriga* (Walker, 1865)
Synonym:
Psilogramma darius Ménétriés, 1857 (unavailable);
Psilogramma emarginata Moore (unavailable);
Psilogramma melanomera Butler, 1877 (unavailable);

Distribution: India (Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Gujarat, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Uttrakhand, West Bengal, Delhi, Punjab, Himachal Pradesh, Karnataka, Tamil Nadu, Uttarakhand, West Bengal (Singh et al., 2021).

Genus *Agrius* Hübner, 1819

8. *Agrius convolvuli* Linnaeus, 1758
Synonyms:
Agrius aksuensis Bang-Haas, 1927. OD: Horae Macrolep. 1:78, SS: convolvuli (Linnaeus), 1758; Agrius [TypeL - Tian Shan, China.]
Agrius alicea Neuburger, 1899 (unavailable). OD: Illte Z. Ent. 4:297, SS: convolvuli (Linnaeus), 1758; Agnus
Agrius batatae Christ, 1882. OD: Mitt. schweiz. ent. Ges. 6:346, SS: convolvuli (Linnaeus), 1758; Agnus [TypeL - Teneriffe.]
Agrius distans Butler, 1874. OD: Voy. Erebus & Terror 2:30, pl 9, SS: convolvuli (Linnaeus), 1758; Agnus [TypeL - New Zealand.]
Agrius grisea Tutt, 1904 (unavailable). OD: Fauna Bm. India (Moths) 1:104, CG: Dolbinopsis [TypeL - Kulu, N. W. India.) [Type of - Dolbinopsis]

Agrius indica Skell, 1913. OD: Mitt. munchn. ent. Ges. 4:56-61, SS: convolvuli (Linnaeus), 1758; Agrius [TypeL - Sumatra.]
Agrius intermedia Tutt, 1904. OD: In Richardson, Fauna Bor.-Amer. 4:302, SS: gallii (Rottemburg), 1775; Hyles [TypeL - North America.]
Agrius major Tutt, 1904. OD: Proc. zool. Soc. Lond. 1875:249, SS: lineosa (Walker), 1856; Cechenena [Type: BMNH-st] [TypeL - Darjiling; Silhet.]
Agrius marshallensis Clark, 1922. OD: Proc. New Engl. zool. Club 8:3 ,SS: convolvuli (Linnacus), 1758; Agnus [TypeL - Turkestan.]
Agrius minor Tutt, 1904. OD: Proc. zool. Soc. Lond. 1875:249, CG: Cechenena [Type: BMNH] (TypeL - Masuri.]
Agrius nigricans Cannaviello, 1900. OD: Boll. Soc. ent. ital 32:295, SS: convolvuli (Linnaeus), 1758. [TypeL - Madagascar.]
Agrius obscura Tutt, 1904. OD: Syst. Ent. :538, CG: Erinnyis [TypeL - America.]
Agrius orientalis Butler, 1876. OD: In Reise Novara 2(Abt. 2):pl 77, SS: helops (Walker), 1856; Cechenena [Type: BMNH] [TypeL - Java.]
Agrius patatas Ménétriés, 1857. OD: Enum. Corp. Anim. :90, SS: convolvuli (Linnaeus), 1758; Agnus [TypeL - Taiti.]
Agrius peitaihoensis Clark, 1922. OD: Proc. New Engl. zool. Club 8:2, SS: convolvuli (Linnaeus), 1758; Agrius [TypeL - N. China.]
Agrius pseudoconvolvuli Schaufuss, 1870. OD: Nunquam ouiosus 1:15, SS: convolvuli (Linnaeus), 1758; Agnus [TypeL - Natal.]
Agrius suffusa Tutt, 1904. OD: List Spec. Lep. Ins. Brit Mus. 8:146, CG: Theretra [Type: BMNH] [TypeL - Hongkong.]
Distribution: India (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Maharashtra, Gujarat, Andaman Is.).

Elsewhere: Pakistan, Sri Lanka, Myanmar, China, Malaysia, Indonesia, Mongolia, Siberia, Japan, Africa, Australia, the Pacific and Southern Europe (Subhalaxmi et al., 2011).

Genus *Acherontia* Laspeyres, 1809

9. *Acherontia lachesis* Fabricius, 1798
Synonyms:
Acherontia atra Huwe, 1895. OD: Berl. ent Z 40:368, SS: lachesis (Fabricius), 1798; Acherontia [TypeL - Java.]
Acherontia lethe Westwood, 1847. OD: Cabinet orient. Ent. :87, pl 42, SS: lachesis (Fabricius), 1798. [TypeL- Unkown]
Acherontia morta Hübner 1819. OD: Verz bekannt. Schmett. :140, SS: lachesis (Fabricius), 1798. [TypeL- Unkown]
Acherontia satanas Boisduval, 1836. OD: Spec. gén. Lépid. l:pl 16, SS: lachesis (Fabricius), 1798; Acherontia. [TypeL- Unkown]
Distribution: India (Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Uttarakhand, West Bengal) (Singh et al., 2021).

Elsewhere: Sri Lanka, Pakistan, Nepal, Myanmar, Malaysia, Indonesia, China, Japan, Philippines, Hawaii Is., Russia (Subhalaxmi et al., 2011).

10. *Acherontia styx* Westwood, 1847
Synonyms:
Acherontia ariel Boisduval, 1875. OD: In Hist. nat. insectes 1:6, SS: styx (Westwood), 1847; Acherontia. [TypeL- Unkown]
Acherontia interrupta Closs, 1911. OD: List Spec. Lep. Ins. Bnt. Mus. 31:29, SS: lusca (Fabncius), 1777; Pengonia [TypeL - Mexico; Guatemala; Haiti.].
Acherontia obsoleta Schmidt, 1914. OD: In Cat. Lep. Palae. Faun. (3rd ed) :100, SS: kindermanni Lederer, 1852; Smerinthus [Type: pc; collection of Staudinger.] [TypeL - Korla.].
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Maharashtra, Gujarat, Andaman Is.

Elsewhere: Sri Lanka, Pakistan, China, Nepal, Myanmar, Bangladesh, Indonesia, Saudi Arabia, Iraq, Iran. (Subhalaxmi et al., 2011).

Subfamily Macroglossinae Harris, 1839

Genus *Ampelophaga* Bremer & Grey, 1853

11.*Ampelophaga rubiginosa* Bremer & Grey, 1852

Synonyms:

Ampelophaga romanovi Staudinger, 1887. OD: In Romanoff, Mém. Lép. 3:pl 9, SS: rmubiginosa Bremer & Grey, [1852]; Ampelophaga [Type: pc; collection of Staudinger.) [TypeL - Amurland.]

Ampelophaga fasciosa Moore, 1888. OD: Proc. zool. Soc. Lond. 1888:391, SS: rubiginosa Bremer & Grey, [1852]; Ampelophaga [Type: BMNH] [TypeL - Dhamrmsala, N. India.].

Ampelophaga alticola Mell, 1922. OD: Proc. New Engl. zool. Club 8:8, SS: planus Walker, 1856; Smerinthus [TypeL - China.].

Ampelophaga marginalis Matsumura, 1927. OD: Bull. Buffalo Soc. nat. Sci. 1:6; 18, pl 1, SS: diffinis (Boisduval), 1836; Hemaris [TypeL- Michigan.].

Ampelophaga submarginalis Matsumura, 1927. OD: List Spec. Lep. Ins. Bnt. Mus. 31:37, SS: contraria Walker, 1856; Andnasa [Type: BMNH-ht] [TypeL - Sierra Leone.]

Distribution: Dhamrmsala, N. India, Nagaland.

Elsewhere: Michigan, Sierra Leone, China and Amurland.

Genus *Deilephila* Laspeyres, 1809

12. *Deilephila elpenor* Linnaeus, 1758

Synonym:

Elpenor vitis Oken, 1815. OD: Lehrbuch Nawrgesch. 3(1):760. [R+J HC-Sem: Phi: Nephelicae] SS: Deilephila [Laspeyres], 1809. [TypeL- Unkown]

Distribution: Nagaland.

Elsewhere: Not Known.

Genus *Gurelca* Kirby,1880

13.*Gurelca hyas* Walker, 1856

Synonyms:

Neogurelca hyas Walker, 1856. OD: List Spec. Lep. Ins. Bnit. Mus. 8:107, CG: Gurelca [Type: BMNH-st] [TypeL - Silhet; Hongkong; Java; N. India.].

Neogurelca conspicua Mell, 1922. OD: Deut. ent. Zeit. 1922:119, SS: hyas (Walker), 1856; Gurelca [TypeL - S. China.].

Neogurelca geometricum Moore, 1857. OD: In Cat. Lep. Ins. E. India Co. 1:265. SS: hyas (Walker), 1856; Gurelca. [TypeL –Unknown].

Neogurelca macroglossoides Walker, 1866. OD: List Spec. Lep. Ins. Bnt. Mus. 35:1851, SS: hyas (Walker), 1856; Gurelca [Type: pc; collection of Staudinger.] [TypeL - Darjiling, India.)

Distribution: N. India, Darjiling, Nagaland.

Elsewhere: Silhet; Hongkong; Java, S. China.

Genus Nephele Hübner 1819

14.*Nephele hespera* Fabricius, 1775

Synonyms:

Nephele chiron Cramer, 1777. OD: Uiu. Kapellen 2:62, pl 137, SS: didyma (Fabricius), 1775; Nephele [TypeL - Coromandel.]

Nephele obliterans Walker, 1865. OD: List Spec. Lep. Ins. Brit. Mus. 8:28, SS: didyma (Fabricius), 1775; Nephele [TypeL - N. Hindostan.]

Nephele quaterna Esper, 1794. OD: In Sep., Ausland. Schm. :pl 1, SS: didyma (Fabricius), 1775, Nephele. [TypeL – Unkonwn].

Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Pondicherry, Karnataka, Gujarat, Maharashtra, Andaman & Nicobar Is.
Elsewhere: Sri Lanka, Pakistan, Bhutan, Nepal, China, Thailand, Vietnam, Malaysia, Indonesia) (Subhalaxmi et al., 2011).

Genus *Daphnis* Hübner, 1819

15.*Daphnis nerii* Linnaeus, 1758
Synonyms:
Daphnis bipartita Gehlen, 1934. OD: Ann. Mag. nat. Hist. (S)2:455, CG: Nephele [Type: BMNH] [TypeL - Old Calabar.]
Daphnis confluens Closs, 1912. OD: Novit. zool. 13:407, SS: hirundo (Boisduval), 1832; Macroglossum. [TypeL – Unkonwn].
Daphnis infernelutea Saalmüller, 1884. OD: Lepid. Madagascar :123, SS: neni (Linnaeus), 1758; Daphnis [TypeL - Madagascar]
Daphnis nigra Schmidt, 1914. OD: Naturaliste (2)6:280 , SS: stellatarum (Linnaeus), 1758; Macroglossum. [TypeL – Unkonwn].
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Maharashtra, Gujarat.
Elsewhere: (Sri Lanka, Pakistan, Bhutan, Myanmar, Thailand, China, Taiwan, Japan, Malaysia, Europe,Yemen, Africa, Mauritius, Saudi Arabia, Afghanistan) (Subhalaxmi et al., 2011).

Genus *Macroglossum* Scopoli, 1777

16.*Macroglossum gyrans* Walker, 1856
Synonyms:
Macroglossum bombus Mabille, 1879. OD: Annls Soc. ent. Fr. (5)9:347, SS: gyrans (Walker), 1856; Macroglossum [TypeL- Madagascar (in error).] .
Macroglossum burmanica Rothschild, 1894. OD: Nowit. zool. 1:68, pl 5, SS: gyrans (Walker), 1856; Macroglossum [TypeL - Burma.]
Macroglossum zena Boisduval, 1875. ns (Walker), 1856; Macroglossum [Type: pc; collection of Oberthir.] [TypeL - Simla.].
Macroglossum fervens Pagenstecher, 1896. OD: Proc. zool. Soc. Lond. 1875:4, pl 1, SS: regulus Boisduval, [1875]; Macroglossum [Type: BMNH] [TypeL - Canara.].
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Madhya Pradesh, Karnataka, Tamil Nadu, Gujarat, Maharashtra.
Elsewhere: Sri Lanka, Pakistan, Bhutan, Myanmar, Thailand (Subhalaxmi et al., 2011).

Genus *Pergesa* Walker, 1856

17.*Pergesa acteus* Cramer, 1779
Synonyms:
Pergesa butleri Rothschild, 1894. OD: Novit. zool. 1:69, pl 6, CG: Hypaedalea [Type: BMNH] [TypeL - Aburi, W. Africa.]
Distribution in India: Andaman Islands, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, South India, Uttrakhand, West Bengal, Western & Eastern Himalayas, Nicobar Island (Singh et al., 2021),
Elsewhere : Sri Lanka, Nepal, China, Myanmar, Thailand, China, Taiwan, Japan, Malaysia, Singapore, Indonesia, Philippines (Subhalaxmi et al., 2011).

Genus *Theretra* Hübner, 1819

18. *Theretra nessus* Drury, 1773
Synonyms:
Theretra equestris Fabricius, 1793. OD: Ent. syst. 3(1):365 [b0475] SS: nessus (Drury), [1773]; Theretra [TypeL - Ind. or.] [Type of - Theretra].
Theretra rubicundus Schaufuss, 1870. OD: Nunquam ouiosus 1:18, SS: nessus (Drury), [1773]; Theretra (TypeL - Java.)

Distribution in India: Andaman & Nicobar Islands, Gujarat, Himanchal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Sikkim, Tamil Nadu, Tripura, Uttrakhand, Andhra Pradesh, Arunachal Pradesh, Assam, Eastern Himalaya, Goa, Jammu & Kashmir, Jharkhand, Karnataka, Mizoram, Nagaland, Southern India and West Bengal) (Singh et al., 2021).
Elsewhere: Sri Lanka, Nepal, China, Bhutan, Myanmar, Thailand. (Subhalaxmi et al., 2011).

19. *Theretra clotho* Drury, 1773
Synonyms:
Theretra aspersata Kirby, 1877. OD: Trans. ent. Soc. Lond. 1877:241, SS: clotho (Dmnury), [1773]; Theretra [Type: Dublin.] [TypeL - Andamans.]
Theretra bistrigata Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:249, SS: clotho (Drury), [1773]; Theretra [Type: BMNH] [TypeL - Java.]
Theretra butus Hampson, 1892. OD: Uitl. Kapellen 2:88, pl 152, SS: gnoma (Fabricius), 1775; Theretra [TypeL - Coromandel.]
Theretra cyrene Westwood, 1847. OD: Cabinet orient. Ent :13, pl 6, SS: clotho (Drury), [1773]; Theretra [Type: UMO] [TypeL - C. India; Ceylon.]
Distribution in India: Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Uttrakhand, West Bengal (Singh et al., 2021).
Elsewhere: Sri Lanka, Nepal, China, Myanmar, Indonesia (Subhalaxmi et al., 2011).

20. *Theretra alecto* Linnaeus, 1758
Synonyms:
Theretra intermissa Gehlen, 1941. OD: Ent Zeit. 55(24):186, SS: alecto (Linnaeus), 1758; Theretra [Type: pc-ht; collection of Gehlen] [TypeL - Turkestan.].
Theretra transcaspica Bang-Haas, 1927. OD: Horae Macrolep. 1:80, SS: alecto (Linnaeus), 1758; Theretra [TypeL - Transcaspia.].
Theretra cretica Boisduval, 1827. OD: Annls Soc. linn. Paris 6:118, pl 6, SS: alecto (Linnaeus), 1758; Theretra [Type: pc; collection of Oberthur.] [Note - Based on a mixed series. The female was later named boisduvali.].
Distribution in India: India (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram).

Elsewhere: Pakistan, Iraq, Iran, Afghanistan, Uzbekistan, Kyrgyzstan, Greece, Bulgaria, Egypt, Lebanon, Israel, Turkey, Turkmenistan. (Subhalaxmi et al., 2011).

21.*Theretra lycetus* Cramer, 1775
Synonyms:
Theretra prunosa Butler,1875. OD: Proc. zool. Soc. Lond. 1875:622, SS: lycetus (Cramer), [1775]; Theretra [Type: BMNH] [TypeL - Ceylon.].
Theretra rosina Butler, 1875. OD: Proc. zool. Soc. Lond. 1875:248, pl 37, SS: lycetus (Cramer), [1775]; Theretra [Type: BMNH] [TypeL - Masuri.].
Theretra japonica Piepers, 1897. OD: In Lép. Jap. grande Exposn int. :36, CG: Theretra [Type: pc; collection of Oberthir.] [TypeL - Japan.] [Type of - Florina].
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, West Bengal, KWS Gujarat, Maharashtra, Karnataka.
Elsewhere: Sri Lanka, Bhutan, Myanmar, Indonesia. (Subhalaxmi et al., 2011).

22.*Theretra oldenlandiae* Fabricius, 1775
Synonyms:
Theretra argentata Stephens, 1828. OD: Proc. zool. Soc. Lond. 1875:8, pl 2, SS: firmata (Walker), 1856; Theretra [Type: BMNH] [TypeL- Moreton Bay; Sydney; N. Australia.].
Theretra drancus Cramer, 1777. OD: Uiul. Kapellen 2:56, pl 132, SS: oldenlandiae (Fabricius), 1775; Theretra [TypeL - E. Ind.].
Theretra fuscata Gehlen, 1941. OD: Berl. ent. Z. 40:358, pl 3, SS: glaucoptera (Butler), 1875; Macroglossum [TypeL - Java.].
Theretra olivacens Inoue, 1973. OD: Biol. Syst. stidchin. Sphingiden 1922(2):309, SS: oldenlandiae (Fabricius), 1775; Theretra [TypeL - S. China.].

Theretra proxima Austaut, 1892. OD: Proc. zool. Soc. Lond. 1875:4, pl 1, SS: corythus (Walker), 1856; Macroglossum [Type: BMNH-st] [TypeL - Canara; Ceylon.] [Note - Based on a mixed series.].
Theretra puellaris Butler,1875. OD: Proc. zool. Soc. Lond. 1875:623, SS: oldenlandiae (Fabricius), 1775; Theretra [Type: BMNH] [TypeL - Rawul Pindi.]
Theretra sobria Walker, 1856. OD: List Spec. Lep. Ins. Brit. Mus. 8:148, SS: oldenlandiae (Fabricius), 1775; Theretra [Type: BMNH]
Theretra gortys Hübner, 1825. OD: Zutr. Samml. exot. Schmett. 3:28, SS: oldenlandiae (Fabricius), 1775; Theretra [TypeL - Batavia.]
Distribution in India: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Madhya Pradesh, KWS Gujarat, Maharashtra, Karnataka. **Elsewhere:** Sri Lanka, Nepal, China, Bhutan, Myanmar, Malaysia, Indonesia, Philippines. (Subhalaxmi et al., 2011).

Acronyms for World Museum Collections of Insects, with an Emphasis on Oriental Lepidoptera
BMNH: British Museum of Natural History
UMO: University Museum Oxford
ZSI: Zoological Survey of India
Abbreviations
FG: Family group
Ref: References
OD: Original Description
SS: Subjective synonym
TypeL: Type Locality
Type: Specimen Housed in
CG: current genra
ht Holotype

Discussion

The compilation not only addresses a knowledge gap in the documentation of the Sphingids from Nagaland but also provides vital insights into distribution and diversity of these moths. *Psilogramma discistriga* (Walker, 1865) seems to be data deficient in distribution aspects of taxonomic assessment. *Deilephila elpenor* Linnaeus, 1758, seems to be exclusively found in Nagaland. The checklist may serve as a platform for deciphering out evolutionary trajectories as well as future ecological investigations, assisting in the evaluation of population dynamics, habitat preferences and potential conservation measures for Sphingidae moths in Nagaland. Furthermore, this checklist gives an important archive for all concerned stakeholders from local farmers to researchers, conservationists and policymakers synergistically working towards biodiversity conservation and management.

References

1. Agosta, S.J. & D.H. Janzen, 2005. Body size distributions of large Costa Rican dry forest moths and the underlying relationship between plant and pollinator morphology. Oikos, 108: 183–193.
2. Amano, T. & W.J. Sutherland, 2013. Four barriers to the global understanding of biodiversity conservation: wealth, language, geographical location and security. Proc. R. Soc. B: Biol. Sci., 280(1756): 20122649. https://doi.org/10.1098/rspb.2012.2649
3. Beccaloni, G., M. Scoble, I. Kitching, T. Simonsen, G. Robinson, B. Pitkin, A. Hine, C. Lyal, J. Ollerenshaw, P. Wing & D. Hobern, 2023. Global Lepidoptera Index. In O. Bánki, Y. Roskov, M. Döring, G. Ower, D. R. Hernández Robles, C. A. Plata Corredor, T. Stjernegaard Jeppesen, A. Örn, L. Vandepitte, D. Hobern, P. Schalk, R. E. DeWalt, M. Keping, J. Miller, T. Orrell, R. Aalbu, J. Abbott, R. Adlard, E. M. Adriaenssens, et al., Catalogue of Life Checklist. 2023. (0.33.1). https://doi.org/10.48580/dfsr-49xk
4. Beck, J., I.J. Kitching & K.E. Linsenmair, 2006. Effects of habitat disturbance can be subtle yet significant: biodiversity of hawkmoth-assemblages (Lepidoptera: Sphingidae) in Southeast-Asia. Biodivers. Conserv., 15: 465–486.
5. Bell, T.R.D. & F.B. Scott, 1937. Moths. Vol. V. Sphingidae. In: R.B.S. Sewell, The Fauna of British India including Ceylon and Burma, Taylor & Francis Ltd., London.
6. Bridges, C.A. 1993. Catalogue of the family-group, genus-group and species-group names of the

Sphingidae of the world. Urbana, III, C.A. Bridges, c1993. https://doi.org/10.5962/bhl.title.15283
7. Cotes, E.C. & C. Swinhoe, 1887. A Catalogue of the Moths of India. Printed by order of the Trustees of the Indian Museum, Calcutta.
8. Eaton, J.L. 1988. Lepidopteran Anatomy. New York: John Wiley and Sons. xiii+257 p.
9. Hampson, G.F. 1892. Moths Vol 1. In: E. T. Blanford, The Fauna of British India including Ceylon & Burma, Taylor & Francis, London.
10. Irungbam, J.S. & Z.F. Fric, 2021. Checklist of the family Sphingidae Latreille, 1802 (Lepidoptera: Bombycoidea) from Shirui Hills, Manipur, India. Records of the Zoological Survey of India, 121(1): 173–194. DOI: 10.26515/rzsi/v121/i1/2021/153911.
11. Irungbam, J.S. & M.J. Irungbam, 2019. Contributions to the knowledge of moths of Bombycoidea Latreille, 1802 (Lepidoptera: Heterocera) of Bhutan with new records. J. Threat. Taxa, 11(8): 14022–14050. DOI: 10.11609/jott.4358.11.8.14022-14050.
12. Kessler, A. & I.T. Baldwin, 2002. Manduca quinquemaculata's optimization of intraplant oviposition to predation, food quality, and thermal constraints. Ecology 83, 2346–2354.
13. Kitching, I.J. 2018. Food Plant Diversity and Adaptive Radiation: Morphological and Phylogenetic Perspectives on Swallowtail Butterflies. In J. D. Holloway (Ed.), Swallowtails of the World: An Annotated Catalogue and Generic Key (pp. 43-55). IUCN SSC Lepidoptera Specialist Group.
14. Mandal, D.K. & S.K. Ghosh, 1999. Insecta: Lepidoptera: Sphingidae, Noctuidae and Geometridae. In: Fauna of Meghalaya, State Fauna Series, 4(6), 405-465 (Published by the Director, Zoological Survey of India, Kolkata).
15. Nieukerken, E.J et al. 2011. Order Lepidoptera Linnaeus, 1758. In: Zhang, Z.-Q. (Ed.) Animal biodiversity: an outline of higherlevel classifcation and survey of taxonomic richness. Zootaxa 3148: 212–221.
16. Pittaway, A.R. 1993. The Hawkmoths of the Western Palaearctic. Harley Books.
17. QGIS Development Team, 2009. QGIS Geographic Information System. Open Source Geospatial Foundation. URL http://qgis.org. (Version 3.30´s-Hertogenbosch).
18. Raguso, R.A. & M.A. Willis, 2002. Synergy between visual and olfactory cues in nectar feeding by naive hawkmoths, *Manduca sexta*. Anim. Behav., 64: 685–695.
19. Roe, A.D et al. 2009. Evolutionary framework for Lepidoptera model systems. In: Goldsmith M, Marec F, eds. Genetics and molecular biology of Lepidoptera. Gainesville: CRC Press
20. Roskov Y., G. Ower, T. Orrell, D. Nicolson, N. Bailly, P.M. Kirk, T. Bourgoin, R.E. DeWalt, W. Decock, E. van Nieukerken, J. Zarucchi & L. Penev (eds.), 2019. Species 2000 & ITIS Catalogue of Life, 2019 Annual Checklist. Digital resource at www.catalogueoflife.org/annual-checklist/2019. Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-884X.
21. Sethi, P., S. Edake, Y. Lele, V. Kapur, A. Sharma, B.S. Negi & B. Singh, 2017. People's Biodiversity Register (PBR) of Village Ghukhuyi, Zunheboto, Nagaland. The Energy and Resources Institute
22. Shubhalaxmi, V., R.C. Kendrick, A. Vaidya, N. Kalagi & A. Bhagwat, 2011. Inventory of Moth Fauna (Lepidoptera: Heterocera) of the Northern Western Ghats, Maharashtra, India. J. Bombay Nat. Hist. Soc., 108(3): 183-205.
23. Singh, N., J. Ahmad & K. Chandra, 2021. An updated checklist of Sphingidae (Lepidoptera) from Great Nicobar Island with a new species record from India. Records of the Zoological Survey of India, 121(3): 375–381. DOI: 10.26515/rzsi/v121/i3/2021/157648.
24. Sondhi, S., T. Karmakar, Y. Sondhi & K. Kunte, 2021. Moths of Tale Wildlife Sanctuary, Arunachal Pradesh, India with seventeen additions to the moth fauna of India (Lepidoptera: Heterocera). Trop. Lepid. Res., 31(Supplement 2): 1–53. DOI: 10.5281/zenodo.5062572.
25. Wannenmacher, G. & L.T. Wasserthal, 2003. Contribution of the maxillary muscles to proboscis movement in hawkmoths (Lepidoptera: Sphingidae)- an electrophysiological study. J. Insect Physiol., 49: 765–776.