



Taxonomic revision of the *Idalima aethrias* (Turner, 1908) complex (Lepidoptera: Noctuidae) from northern Australia

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Abstract

Taxonomic revision of the *Idalima aethrias* (Turner, 1908) (Agaristinae) complex from northern Australia indicates that it comprises three distinct species according to morphological criteria: *I. aethrias* from northern Queensland (southern Torres Strait, Cape York Peninsula, Wet Tropics), *Idalima cyanobasis* Hampson, 1910 **reinst. stat.** from north-western 'Top End' of the Northern Territory and Kimberley (Mitchell Plateau) of northern Western Australia, and *Idalima petrina* **sp. nov.** from the Northern Territory (Arnhem Land Plateau) where it is parapatric with *I. cyanobasis* **reinst. stat.** *Idalima luna* Buchsbaum & Chen, 2020 **syn. nov.** is shown to be a junior subjective synonym of *I. cyanobasis* Hampson, 1910 **reinst. stat.**

Key words: Dilleniaceae, Gulf of Carpentaria, Kakadu National Park.

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<http://zoobank.org/urn:lsid:zoobank.org:pub:CCC8CDF6-9A66-4D47-8F78-B4347D69F1FF> <http://zoobank.org/urn:lsid:zoobank.org:author:4D3A7605-EBD0-40F6-A5F2-7F67F59E3D60>

Introduction

The Australian endemic genus *Idalima* Turner, 1903 of day-flying moths (Agaristinae) currently includes seven species (Wragg & Braby 2025), with larvae specialising on the plant family Dilleniaceae (Braby 2025). The genus is almost certainly non-monophyletic, with two taxa [*Idalima leonora* (Doubleday, 1846), *Idalima tasso* (Jordan, 1912)] belonging in a separate genus closely related to *Idalima* (Wragg & Braby 2025). The type species of the genus, *Idalima affinis* (Boisduval, 1832), and the four other species (*I. metasticta*, *I. polysticta*, *I. butleri*,

I. aethrias) are defined by several characters, including ground colour of wings black, subbasal (antemedial) markings of forewing comprising a row of spots, subterminal markings of forewing comprising one or two rows of spots, forewing with a short cream or white variable transverse median bar or band that may be divided into two sections, and the midtibiae furnished with a prominent patch of orange piliform scales (long, thin hairs). In addition, the male genitalia are characterised by the valva with apex produced and a medial bulge along the inner margin, apex of harpe blunt or sharply pointed,

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and phallus usually shorter than four times its width, typically straight without ventral curve (Wragg & Braby 2025). Moreover, the larvae (for those species that have been reared) are characterised by a series of black transverse bands enclosing numerous white spots or white/grey transverse bands enclosing black spots (Braby 2011, 2015, unpubl. data).

Turner (1908) described *Argyrolepidia aethrias* Turner, 1908 from Cape York, QLD based on a single holotype male (Fig. 1A–C). The species is currently known under the name *Idalima aethrias* (Turner, 1908) (Edwards 1996; Wragg & Braby 2025) and it occurs in the southern Torres Strait, Cape York Peninsula and the Wet Tropics biome of north-eastern Queensland. Specimens west of the Gulf of Carpentaria from the ‘Top End’ of the Northern Territory (Jordan 1912; Turner 1920; Kiriakoff 1977; Edwards 1996; Braby 2011; Braby *et al.* 2018; Wragg & Braby 2025) and the Kimberley of Western Australia (Braby *et al.* 2023) have traditionally been placed under this name. Recently, Buchsbaum and Chen (2020) hypothesized that the disjunct population from the Top End was specifically distinct from that in northern Queensland based on differences in wing pattern elements, morphology of the female genitalia, and molecular data (~1% pairwise divergence according to the mitochondrial *COI* barcode region). These authors proposed a new taxonomic name to differentiate the Top End population; however, they overlooked an earlier available name coined by Hampson (1910) 110 years earlier (Fig. 1D–F). A second undescribed species from the Top End closely allied to *I. aethrias sensu lato* was reported by Braby *et al.* (2018). Thus, the purpose of this revision is to resolve the nomenclature and taxonomy of the *Idalima aethrias* complex in northern Australia.

Methods

The male genitalia were dissected and examined according to the method outlined in Wragg and Braby (2025). Two specimens of *Idalima* sp. ‘Arnhem Land’ were dissected as follows: 1♂ “Genitalia No. MFB-182”, “12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 16 DEC. 2011, MF Braby” (MFBC); 1♂ “Genitalia No. MFB-183”, “12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 19 NOV. 2011, MF Braby” (MFBC). The genitalia were each mounted with Euparal on a microscope and then photographed using a Leica Application Suite X (LAS X) DVM6-BM life science microscope software platform. The preparations were then compared with the illustrations of the male genitalia for *I. aethrias* [see Wragg and Braby (2025, fig. 32A)] and *I. cyanobasis* reinst. stat. [see Buchsbaum and Chen (2020, fig. 5)].

Adult size was determined by measuring the length of the right forewing, that is, the straight-line distance between the base and apex (i.e., the point of attachment of the wing with the thorax), using a digital calliper to an accuracy of 0.1 mm.

The following acronyms refer to repositories where type material and other specimens have been lodged: AMS—Australian Museum, Sydney, Australia; ANIC—Australian National Insect Collection, Canberra, Australia; MFBC—private collection of Michael F. Braby, Canberra, Australia; NHMUK—The Natural History Museum, London, United Kingdom; NMV—Museums Victoria, Melbourne, Australia; NTM—Museum and Art Galleries of the Northern Territory, Darwin, Australia; ZSM—Zoologische Staatssammlung München, Germany

Discussion

Taxonomic revision of the *Idalima aethrias* complex from northern Australia indicates that the number of species recognised in the genus *Idalima* now currently stands at nine. *Idalima aethrias* (northern Queensland) and *I. cyanobasis* reinst. stat. (Kimberley-Top End) are distinguished from each other by at least 13 morphological character differences (6 phenotypic concerning wing pattern elements, 3 male genitalia, 4 female genitalia), suggesting these two allopatric populations have indeed speciated. However, as noted earlier, the allopatric pair *I. tasso* (northern Queensland) and *I. leonora* (Kimberley-Top End) almost certainly do not belong in this genus. The larva of *I. leonora* is also fundamentally different to those of other *Idalima* spp. in that the series of transverse bands enclosing white or black spots are absent, being entirely replaced with orange, and abdominal segments 1–3 each bear a conspicuous black dorsal patch (Braby 2011, 2015).

Further work is needed to determine the systematic relationships of *Idalima*, and their biogeographic history. The distributions of *I. aethrias* and *I. cyanobasis* reinst. stat. are separated by the Gulf of Carpentaria (Fig. 2), which strongly suggests this seaway has been a major barrier promoting speciation between these closely related taxa, as it has for many other species of plants and animals (Bowman *et al.* 2010; Beaver *et al.* 2023). The timing of this speciation event using modern molecular dating methods may help determine whether the mode of speciation has been facilitated by vicariance or dispersal. Buchsbaum and Chen (2020) showed that *I. aethrias* and *I. cyanobasis* reinst. stat. are reciprocally monophyletic according to phenetic (neighbour-joining) analysis of *COI* barcodes; however, their analysis was based on only two samples of each taxon. Thus, more samples and/or additional markers are needed to determine the pairwise distance between these species.

The local occurrence of *I. petrina* sp. nov. to rocky sandstone areas of the Arnhem Land Plateau suggests it is restricted to this region. The Arnhem Land Plateau supports numerous endemic plants (Woinarski *et al.* 2006) and invertebrates (Andersen *et al.* 2014), including diurnal Lepidoptera (Braby *et al.* 2018). *Idalima petrina* sp. nov. represents one of several diurnal moths and butterflies endemic, or largely endemic, to the Arnhem Land Plateau—the others being *Hecatesia* sp. ‘Arnhem



Figure 1. Type material of *Idalima* spp., showing dorsal and ventral surfaces and labels: **(A–C)** holotype male of *Argyrolepidia aethrias* Turner, 1908 from Cape York, Cape York Peninsula, QLD (ANIC); **(D–F)** holotype male of *Idalima cyanobasis* Hampson, 1910 from Port Essington, Cobourg Peninsula, NT (NHMUK); reference collection number NHMUK016479866. Scale bar = 10 mm.

Land', *Protographium leosthenes geimbia* (Tindale, 1927), *Taractrocera ilia* Waterhouse, 1932 and *Erina geminus gagadju* (Braby, 2017).

Taxonomy

Idalima aethrias (Turner, 1908)

Splendid Day-moth

(Figs 1A–C, 3A–D)

Argyrolepidia aethrias Turner, 1908, p. 55.

Argyrolepidia aethrias Turner.—Jordan (1912), p. 22; Kiriakoff (1977), p. 108.

Idalima aethrias (Turner).—Turner (1920), p. 127; Edwards (1996), p. 321; Braby (2025), p. 11; Wragg & Braby (2025), pp. 164, 168, figs 1P, 23A.

Type locality: Cape York, QLD, Australia.

Material examined

Holotype

♂ "C. York, 1906", "Argyrolepidia aethrias. Turn. TYPE", "HOLOTYPE *Argyrolepidia aethrias* Turner, 1908" [on red card], ANIC Database No. 31-005108" (ANIC) (Fig. 1A–C).

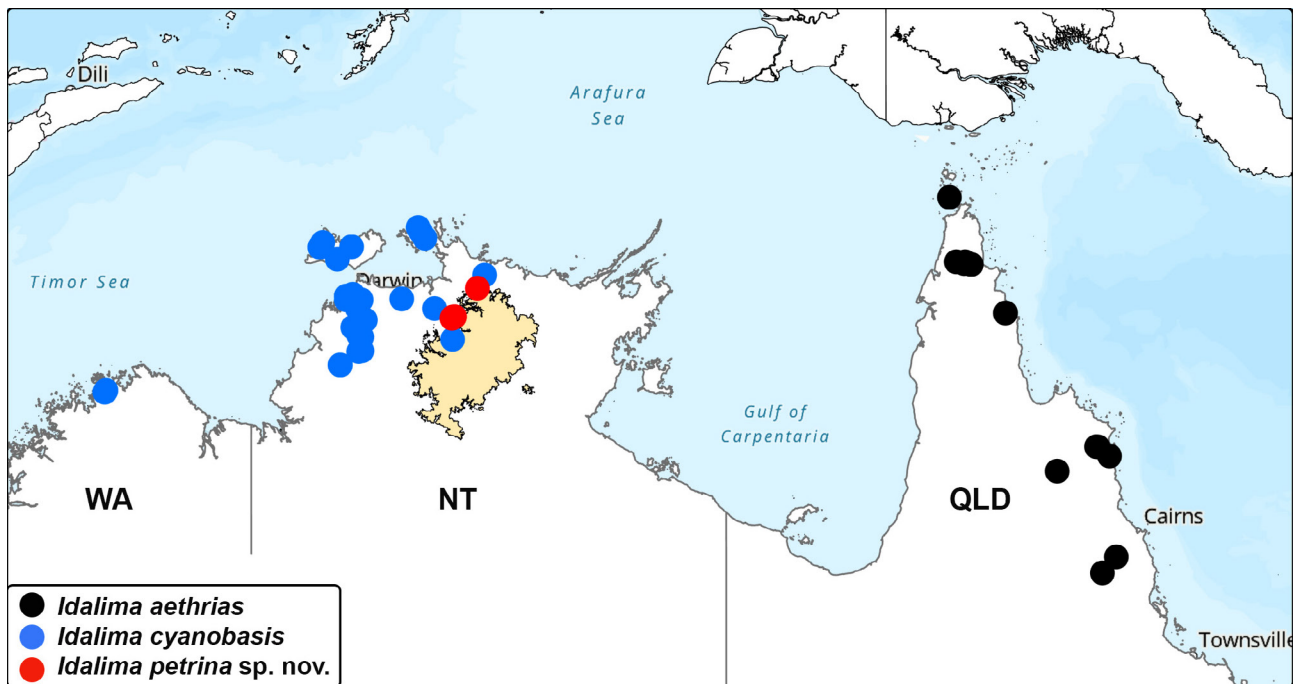


Figure 2. Distribution map of *Idalima* spp. from northern Australia showing the three species (*I. aethrias*, *I. cyanobasis* reinst. stat., *I. petrina* sp. nov.) based on specimens examined in Australian museum and private collections (see Materials and Methods). Note, sand-coloured area in the Northern Territory (NT) denotes the Arnhem Land Plateau.

Other material

Australia, Queensland: 13♂, 13♀. 1♂ "THURSDAY ISLD., [QLD], DEC. 1943, W.D. McKnight | DEC. 1943, W.D. McKnight", "HET-22263" (NMV); 1♂ "Cape York, N.Q.[LD], 26-4-[19]28, W.B. Barnard.", "G. Lyell Coll. Pres: 31.7.32", "HET-22258" (NMV); 1♂ "11.48S 142.31E, 9 km SW Heathlands, Q.[LD], 20 Mar. 1992, E.D. Edwards", "ANIC database No. 31-005114" (ANIC); 2♂, 3♀ "11.50S 142.30E, Dulhunty R., 13 km SW Heathlands, Q.[LD], 21 Mar. 1992, E.D. Edwards", males with "ANIC database No. 31-005113", females with additional label "ANIC database No. 31-005119", one female with "Barcode of Life, DNA voucher specimen, smple ID: 10ANIC-06780, BOLD Proc: ID ANIC-J873-10", second female with "Barcode of Life, DNA voucher specimen, smple ID: 10ANIC-06869, BOLD Proc: ID ANIC-J872-10" (ANIC); 1♀ "11.51S 142.38E, 12km SSE Heathlands, Q.[LD], 16 Mar. 1992, E.D. Edwards", "ANIC database No. 31-005120" (ANIC); 1♀ "Claudie R., [QLD], 4.11.[19]13, Coll. J.A.K.[ershaw]", "HET-22260" (NMV); 1♀ "Nat. Mus. Victoria, Claudie R., Queensland", "6.1.[19]14", "HET-22261" (NMV); 1♀ "Claudie R., N.Q.[LD], Coll. J. A. Kershaw, 11/12-2/13", "18.2.[19]14", "HET-22262" (NMV); 1♂ "Claudie R., [QLD] aethrias", "C.G.L. Gooding Coll., donated to A.N.I.C. 1979", "ANIC database No. 31-005111" (ANIC); 1♂, 2♀ "Bald Hills Hmstd, 30km N of Cooktown, N. Qld, 14 Feb. 1982, M.S. & B.J. Moulds", male with additional label "ANIC database No. 31-005112", females with "ANIC database No. 31-005118" (ANIC); 3♂, 1♀ "Isabella Falls, Cooktown, [QLD], 08 Jan 1992, L.R. Ring", one male with additional label "Barcode of Life, DNA voucher specimen, smple ID: 10ANIC-06781, BOLD Proc: ID ANIC-

J874-10" (ANIC); 1♀ "COOKTOWN, ? Q[LD], 1908, C. F.[rench]", "G. Lyell Coll. Pres: 31.7.32", "HET-22259" (NMV); 1♀ "Cooktown, [QLD], 21-1-[20]09, J.M. Landy" (ANIC); 2♂ "15.46S 144.16E, 2 km ESE of Jowabinna [Jowalbinna], Q.[LD], 16 Jan. 1994 GPS, E.D. Edwards & P. Zborowski", one specimen with additional label "ANIC database No. 31-005115", second specimen with "ANIC database No. 31-001975" (ANIC); 1♀ "Herberton, [QLD], Jan. 1911, F. P. D.[odd]", "G. Lyell Coll. Pres: 31.7.32", "HET-22257" (NMV); 1♂ "Mt. Garnet, [QLD], Jan. 1910, F.P. D[odd]", "31-005107" (ANIC).

Variation

The extent and shape of the blue markings on the underside of the hindwing vary slightly.

Distribution

Idalima aethrias occurs in the southern Torres Strait (Thursday Island), Cape York Peninsula (Cape York to Iron Range) and the Wet Tropics (from 30 km N of Cooktown to Mt Garnet), QLD (Fig. 2). It is allopatric with *I. cyanobasis* reinst. stat., the two species being separated by the Gulf of Carpentaria.

Idalima cyanobasis Hampson, 1910 reinst. stat.

Cyane Day-moth

(Figs 1D–F, 3E–H)

Agarista novae-hiberniae Butler, 1877, p. 8, pl. IV, fig. 5. [junior primary homonym].

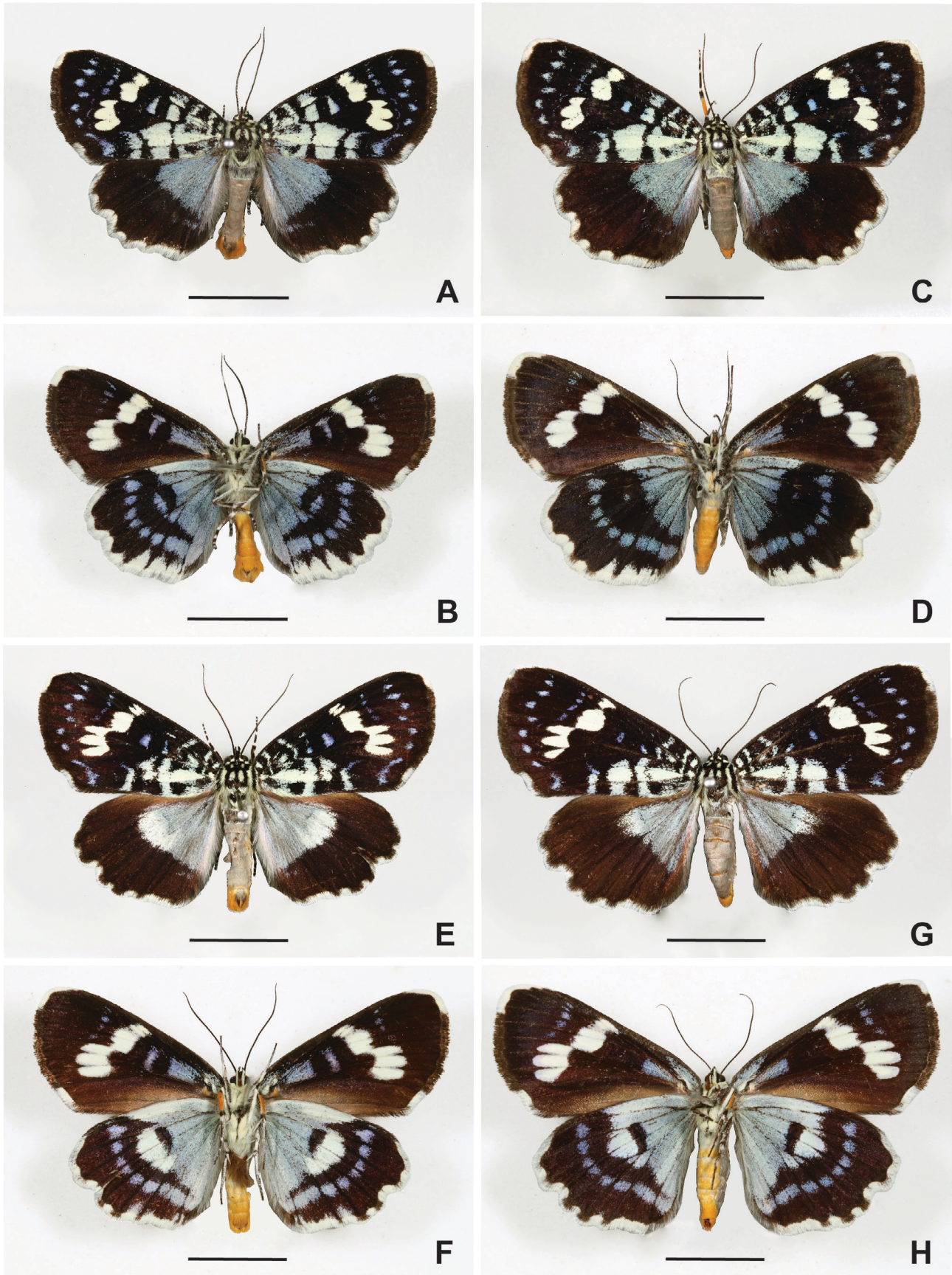


Figure 3. Adults of *Idalima* spp., showing dorsal and ventral surfaces: **(A–B)** male *Idalima aethrias* (Turner, 1908) from Isabella Falls, Cooktown, QLD (ANIC); **(C–D)** female *Idalima aethrias* from Isabella Falls, Cooktown, QLD (ANIC); **(E–F)** male *Idalima*

cyanobasis Hampson, 1910 reinst. stat. from Mount Burrell, NT (MFBC); (**G–H**) female *Idalima cyanobasis* reinst. stat. from Cobourg Peninsula, NT (MFBC). Scale bar = 10 mm.

Idalima aethrias (Turner, 1908).—Braby (2011), pp. 93, 102, fig. 4; Braby *et al.* (2018), pp. 370–371, 394, pls. 217–218, map 10A; Braby *et al.* (2023), p. 4; Braby (2025), p. 11. [misidentifications in literature].

Idalima cyanobasis Hampson, 1910, p. 460. [*nomen novum*].

Idalima luna Buchsbaum & Chen, 2020, pp. 157–160, figs 1–4, 10–11. **syn. nov.** [junior subjective synonym].

Type locality: Port Essington, Cobourg Peninsula, NT, Australia.

Diagnosis

Idalima cyanobasis (Fig. 3E–H) is distinguished from *I. aethrias* (Fig. 3A–D) by the following six character differences: (1) the cream transverse or oblique median band on the forewing upperside is of a different shape, with the distal edge between veins M_2 and CuA_2 deeply divided forming three prominent dentations in *I. cyanobasis*, whereas in *I. aethrias* the distal edge is only partially divided; (2) the series of seven blue subterminal spots on the forewing upperside is smaller in *I. cyanobasis* than in *I. aethrias*; (3) the basal colour on the hindwing upperside is greyish blue, usually with a yellowish white patch or diffuse marking distal to the discal cell in *I. cyanobasis*, whereas in *I. aethrias* the basal colour is uniformly blue without the yellowish white patch; (4) the basal colour of the hindwing underside is greyish blue, usually enclosing or partly enclosing a prominent black spot at the end of the discal cell, distal to which is a yellowish white crescent-shaped central patch in *I. cyanobasis*, whereas in *I. aethrias* the basal colour is blue and reduced in extent, without the yellowish white patch; (5) the series of postmedian spots on the hindwing underside is paler blue in *I. cyanobasis* and usually less prominent than in *I. aethrias*; and (6) the white terminal band (scale-fringe) on the hindwing underside, especially the section between CuA_1 and tornus, is narrower in *I. cyanobasis* than in *I. aethrias*.

In addition, there are minor differences in the male genitalia of the two species [see Wragg and Braby (2025, fig. 32A) for *I. aethrias*, and Buchsbaum and Chen (2020, fig. 5) for *I. cyanobasis*]. In *I. cyanobasis*, the width of the valva is slightly broader, with the apex more rounded, and the harpe is narrower and substantially smaller in length compared with *I. aethrias*. There are also minor differences in the female genitalia concerning the structure of the papillae anales, posterior apophyses, ductus bursae and corpus bursae (Buchsbaum and Chen 2020).

Material examined

Holotypes

Idalima cyanobasis Hampson, 1910

♂ “Pt. Essington”, “N. Australia, Pt. Essington, McGillivray, 46–73”, “*Idalima cyanobasis* type ♂ Hmpsn”, “Type”, “Specimen photog for CHECKLIST AUST LEP Film 82/16”, “NHMUK016479866” (NHMUK) (Fig. 1D–F).

Idalima luna Buchsbaum & Chen, 2020

♂ “Australia, Northern Territory, Robin Falls, 85 m, 3. November 2016, LF. leg. Mei-Yu Chen & U. Buchsbaum” (ZSM). [Buchsbaum and Chen (2020) illustrated the holotype on p. 158, figs 1–2.]

Other material

Australia, Northern Territory: 32♂, 31♀. 1♀ “BATHURST Is., [NT], G.F. Hill, DEC. 1916”, “HET-22264” (NMV); 1♂ “11°31.411’S, 130°17.888’E, 10.5 km NNE of Wurankuwu, Bathurst Island, NT, 1 MAR. 2009, DA Young (MFBC); 1♂ “Melville Island, Andranangoo Creek, NT, 3 Oct. 1996, G.R. Brown & G. Dally”, “I005650” (NTM); 1♂ “11.15015°S, 132.16125°E, Cobourg Peninsula, NT, 2 FEB. 2007, M.F. Braby”, “I004881” (NTM); 1♀ “11.15015°S, 132.16125°E, Cobourg Peninsula, NT, 3 FEB. 2007, M.F. Braby”, “I004882” (NTM); 3♂ labelled similarly but in MFBC; 1♀ “11.15015°S, 132.16125°E, Cobourg Peninsula, NT, 22 FEB. 2007, M.F. Braby & D.A. Lane” (MFBC); 1♀ “11.35538°S, 132.28961°E, Cobourg Peninsula, [27 km SSE of Black Point], NT, 5 FEB. 2007, M.F. Braby”, “I009067” (NTM); 1♀ “11.22504°S, 132.20236°E, Caiman Creek, Cobourg Peninsula, NT, 7 FEB. 2007, M.F. Braby” (MFBC); 1♂ “11.22504°S, 132.20236°E, Caiman Ck, Cobourg Peninsula, NT, 21 FEB. 2007, M.F. Braby & D.A. Lane”, “I005111” (NTM); 1♂, 1♀ labelled similarly but in MFBC; 1♀ labelled similarly but date “22 FEB. 2007” (MFBC); 1♀ “King R., NT, 133½E 12S, 31.12.[19]15”, “HET-22265” (NMV); 1♂ “Swim Creek crossing, Point Stuart Station, NT, 15 Feb. 1972, T. Weir & T. Angeles”, “I005649” (NTM); 1♂ “Darwin, NT, 1881”, “HET-22792” (NMV); 1♀ “P.[ort] Darwin, [NT], Sep. [19]08, F.P. Dodd”, “ANIC database No. 31-005117” (ANIC); 1♂, 1♀ “P.[ort] Darwin, [NT], Sep. [19]08, F.P. Dodd”, “G. Lyell Coll. Pres: 31.7.32”, male with additional label “HET-22253”, female with “HET-22256” (NMV); 1♂ “P.[ort] Darwin, [NT], Oct. [19]08, F.P. Dodd”, “ANIC database No. 31-005109” (ANIC); 1♀ “P.[ort] Darwin, [NT], Oct. [19]08, F.P. Dodd”, “From FP Dodd n. Q. Land n-1-10”, “HET-22255” (NMV); 1♂ “P.[ort] Darwin, [NT], Nov. [19]08, F.P. Dodd”, “K.318026” (AMS); 2♂, 1♀ “P.[ort] Darwin, [NT], Nov. [19]08, F.P. Dodd”, “G. Lyell Coll. Pres: 31.7.32”, male with additional label “HET-22250”, second male with “HET-22252”, female with “HET-22254” (NMV); 1♀ “P.[ort] Darwin, [NT], Dec. [19]08, F.P. Dodd”, “K.318025” (AMS); 1♂ “P.[ort] Darwin, [NT], Jan. [19]09, F.P. Dodd”, “From FP Dodd n. Q. Land n-1-10”, “HET-22251” (NMV); 1♀ “12°24’48”S, 130°55’19”E, Berrimah, Darwin, NT, 15 DEC. 2008, M.F. Braby”, “I005594” (NTM); 1♂ “Stapleton, N.T.,

2/1/[19]13, G.F.H[ill], No 28 J.A.K.", "J.C. & M. LeSouef collection, donated to ANIC 1983", "ANIC database No. 31-005110" (ANIC); 1♀ "12.67576°S, 131.00883°E, Berry Springs, NT, 11 Dec. 2006, T. Johansen", "I005132" (NTM); 1♂ "12.67576°S, 131.00883°E, Berry Springs, NT, 14 DEC. 2006, T. Johansen", "I005133" (NTM); 1♂ "12.67576°S, 131.00883°E, Berry Springs, NT, 15 DEC. 2006, T. Johansen", "I008840" (NTM); 1♂, 2♀ "12.67554°S, 131.00994°E, Berry Springs, NT, 16 DEC. 2006, M.F. Braby", with accession numbers "I008839", "I005112" and "I005595" (NTM); 3♂, 2♀ labelled similarly but in MFBC; 1♀ "12.67554°S, 131.00994°E, Berry Springs, NT, 21 DEC. 2006, T. Johansen", "I005134" (NTM); 1♀ "12.67576°S, 131.00876°E, Berry Springs, NT, 14 JAN. 2007, M.F. Braby" (MFBC); 1♂ "12.67576°S, 131.00876°E, Berry Springs, NT, emg. 25 FEB. 2007, M.F. Braby", "Reared from early instar larva on *Hibbertia* sp. Mt Finniss [*brevipedunculata*], coll. 14 JAN. 2007" (MFBC); 2♂, 3♀ "12.67554°S, 131.00994°E, Berry Springs, NT, 2 NOV. 2008, M.F. Braby" (MFBC); 1♀ "12.67554°S, 131.00994°E, Berry Springs, NT, emg. 20 NOV. 2008, M.F. Braby", "Reared from larva on *Hibbertia* [*brevipedunculata*], coll. 2 NOV. 2008" (MFBC); 1♀ "12.67554°S, 131.00994°E, Berry Springs, NT, emg. 23 NOV. 2008, M.F. Braby", "Reared from larva on *Hibbertia* [*brevipedunculata*], coll. 2 NOV. 2008" (MFBC); 1♂ "12.67554°S, 131.00994°E, Berry Springs, NT, emg. 2 DEC. 2008, M.F. Braby", "Reared from larva on *Hibbertia* [*brevipedunculata*], coll. 2 NOV. 2008" (MFBC); 1♀ "12.67554°S, 131.00994°E, Berry Springs, NT, emg. 25 OCT. 2013, M.F. Braby", "Reared from larva on *Hibbertia* *brevipedunculata*, coll. 2 NOV. 2012" (MFBC); 1♂ "13°02'19S, 130°55'27"E, Litchfield NP, [fire trail at park entrance from Batchelor], NT, 1 Mar. 2006, D.A. Young", "I004880" (NTM); 1♀ "13.48284°S, 131.09755°E, Adelaide River crssng, Daly River Rd, NT, 21 NOV. 2009, M.F. Braby" (MFBC); 2♂, 1♀ "13.49623°S, 131.03572°E, Daly River Rd. Mount Burrell, NT, 12 DEC. 2008, M.F. Braby" (MFBC); 1♀ "13.49623°S, 131.03572°E, Mount Burrell, NT, 21 NOV. 2009, M.F. Braby" (MFBC); 2♂ "13.49623°S, 131.03572°E, Mount Burrell, NT, 8 DEC. 2012, M.F. Braby" (MFBC); 1♀ "Daly River Mission, N.T., 17 Oct. 1974, J.F. Hutchinson", "ANIC database No. 31-005116" (ANIC).
Australia, Western Australia: 1♂, 1♀. 1♀ "14°13.880'S, 126°14.955'E, Rocky Cove, Vansittart Bay, Kimberley, WA, 10 DEC. 2020, J.E. & A. Koeyers" (MFBC); 1♂ "14°15.928'S, 126°13.600'E, Rocky Creek, Vansittart Bay, Kimberley, WA, 16 DEC. 2020, J.E. & A Koeyers" (MFBC).

Variation

The size of the cream crescent-shaped central patch on the underside of the hindwing is variable.

Remarks

Idalima cyanobasis Hampson, 1910 was described by Hampson (1910) based on a single specimen, but it was not illustrated; it was introduced as a replacement name for *Agarista novae-hiberniae* Butler, 1877 (type locality: Australia), a junior primary homonym of *Agarista novae-*

hiberniae Boisduval, 1832 from the Bismark Archipelago (type locality: New Ireland). However, *I. cyanobasis* was then treated as a junior subjective synonym of *Argyrolepidia aethrias* Turner, 1908 (type locality: Cape York, QLD) by all subsequent authors (Jordan 1912; Turner 1920; Kiriakoff 1977; Edwards 1996; Wragg & Braby 2025). Buchsbaum and Chen (2020) described the taxon *Idalima luna* Buchsbaum & Chen, 2020 from the Top End (type locality: Robin Falls, NT) apparently unaware of the earlier work by Hampson (1910). Thus, Buchsbaum and Chen (2020) inadvertently created a junior subjective synonym of *Idalima cyanobasis*. They also overlooked previous publications concerning the ecology (larval food plants, habitat), biology and geographical distribution of *I. cyanobasis* (Braby 2011; Braby *et al.* 2018), as well as material in Australian museum collections (e.g., 14♂, 16♀ in NTM, NMV, ANIC and AMS).

With regard to type locations, Butler (1877) simply gave the distribution of *Agarista novae-hiberniae* Butler, 1877 as 'Australia', but his colour illustration of the dorsal surface of a male on plate 4, figure 5 is clearly the species from the Top End, so the syntype(s) must have come from the Northern Territory. Hampson (1910) referred to a single type male of *Idalima cyanobasis* and indicated that the specimen was collected from Port Essington by McGillivray. John McGillivray was employed as a naturalist and travelled from England to Australia on H.M.S. *Fly* under Captain F.P. Blackwood (Fisher & Calaby 2009). He visited Port Essington, a British military settlement (1838–1849) located on Cobourg Peninsula in northern Australia, in August 1843, between September 1844 and January 1845, and in June 1945 (Fisher & Calaby 2009). McGillivray also visited Port Essington in November 1948 on H.M.S. *Rattlesnake* under Captain O. Stanley, but he stayed for only one week and little collecting was done. Thus, given that adults of *I. cyanobasis* fly mainly during the wet season (Braby *et al.* 2018), the holotype male was most likely collected sometime between September 1844 and January 1845 when McGillivray was stationed at the settlement for five months to collect natural history specimens. Buchsbaum and Chen (2020) listed Robin Falls as the type locality for *Idalima luna*; they also listed 18 paratypes (14♂, 4♀) in ZSM from various nearby locations.

Distribution

Idalima cyanobasis (Fig. 2) occurs mainly in the north-western corner of the Top End of the Northern Territory west of the Arnhem Land Plateau (Braby *et al.* 2018). It has also been collected from near the Mitchell Plateau in the north-western Kimberley of Western Australia (Braby *et al.* 2023) where it appears to have a disjunct occurrence. *Idalima cyanobasis* is restricted to the higher rainfall areas (> 1,200 mm mean annual rainfall) where it has been recorded as far south as Daly River Mission and Kakadu National Park (near Twin Falls) and as far east as the King River, NT (Braby *et al.* 2018). It is not known to occur in areas east of the Arnhem Land

Plateau, such as Gove Peninsula. The species breeds in savannah woodland where the larval food plants *Hibbertia brevipedunculata* and *H. cistifolia* (Dilleniaceae) grow as small perennial shrubs (Braby 2011).

Biology

Adults are seasonal, occurring during the 'build-up', wet season and early dry season (September–May), but they are most abundant during the early wet season (November and December) following the first substantial pre-monsoon storms (Braby *et al.* 2018). Eggs or larvae have been recorded during the wet season (November–February). The duration of the pupal stage is variable and there is probably only a single generation annually, followed by a partial second generation in the late wet season. The species survives the dry season in the pupal stage, which may remain in diapause for up to 11 months (Braby *et al.* 2018).

Idalima petrina sp. nov.

Rock-art Day-moth

(Figs 4A–H, 5A–B)

<http://zoobank.org/>

urn:lsid:zoobank.org:act:BD19306E-4FA4-4832-8470-2CECF1EB7EF7

Idalima sp. 'Arnhem Land'.—Braby (2015), pp. 88–89, fig. 4; Braby *et al.* (2018), pp. 372–373, 394, pl. 219; Braby (2025), p. 11; Braby (2026), p. 343.

Type locality: Nourlangie Rock, Kakadu National Park, NT, Australia.

Diagnosis

Idalima petrina (Fig. 4A–H) is readily distinguished from *I. aethrias* (Fig. 3A–D) and *I. cyanobasis* (Fig. 3E–H) by several characters, including: (1) presence of a prominent pale blue subbasal line on the forewing upperside (absent in both *I. aethrias* and *I. cyanobasis*); (2) the shape of the cream median bar on the forewing, which is narrower without the distal extensions; (3) presence of a narrow S-shaped pale blue postmedian line distal to the median bar that terminates at mid-dorsum on the forewing upperside (absent in both *I. aethrias* and *I. cyanobasis*); (4) darker blue basal and subbasal markings on the hindwing upperside and underside; (5) presence of a series of blue postmedian spots on the hindwing upperside (absent in both *I. aethrias* and *I. cyanobasis*); and (6) the white terminal band (scale-fringe) on the hindwing, when present, of even width.

In addition, the male genitalia of *I. petrina* (Fig. 5) differ from those of *I. aethrias* [see Wragg and Braby (2025, fig. 32A)] and *I. cyanobasis* [see Buchsbaum and Chen (2020, fig. 5)] with regard to: (7) the shape of the valva, which is evenly broad along its length, not constricted medially, and more truncate towards the apex; (8) the less pronounced medial bulge along the inner margin of the valva; (9) the substantially longer harpe; (10) the shape of the socius, which is simple and not produced (in *I.*

aethrias and *I. cyanobasis* the socii terminate in a curved projection posteriorly); (11) the more rounded saccus; and (12) the relatively straight phallus without the dorso-posterior lobe.

Male

Size: (forewing length): mean = 17.7 mm ± 0.76 mm (SD), range 16.5–19.0 mm ($n = 20$). **Head:** vertex black with a few white piliform scales, white lamella scales around eye; frons black edged with white; labial palpus black with a few white lamella scales except terminal (third) segment; compound eye black; antenna approximately half length of forewing costa, shaft of flagellum with 67–73 segments, black ringed with a few white lamella scales. **Thorax:** dorsal surface black with a series of prominent bluish white longitudinal bands (piliform scales), ventral surface grey, pale orange at base of mid- and hindlegs; legs black with scattered white and bluish white lamella scales, tarsal segments ringed with white, midtibia with bright orange piliform scales dorsally and a pair of prominent apical spurs, hindtibia with a pair of prominent medial and apical spurs. **Abdomen:** dorsal surface grey with orange dorsolateral patches on segment 7, ventral surface orange, segments 8–10 black. **Forewing:** dorsal surface black, a series of bluish white basal markings, a narrow bluish white subbasal line extending from subcosta to dorsum, followed by an irregular or ill-defined bluish white submedian band, a central bluish white spot towards end of discal cell, a conspicuous wave-shaped cream median bar extending from subcosta to vein CuA_2 , followed by a narrow S-shaped bluish white postmedian line that terminates at mid-dorsum, a series of 9 bluish white subterminal spots from veins R_3 to $1A + 2A$, the largest near tornus, scale-fringe usually dark grey becoming white at apex and tornus; ventral surface ground colour black becoming brown towards dorsum below cubitus and CuA_2 , an iridescent blue subbasal patch in discal cell, a broad cream median bar extending from subcosta to CuA_2 , a series of up to 9 obscure blue postmedian spots from veins R_3 to $1A + 2A$, scale-fringe similar to upperside. **Hindwing:** termen rounded with prominent indentation between veins M_1 and M_3 ; dorsal surface black, scattered blue lamella scales in basal half, a series of up to 8 obscure blue postmedian spots from veins R_s to $3A$, scale-fringe usually dark grey becoming white at apex and tornus; ventral surface ground colour black, blue markings similar to upperside but more extensive and iridescent, obscure postmedian spots larger with up to 9 spots from veins $Sc + R_1$ to $3A$, those between CuA_2 and $1A + 2A$ frequently fused, scale-fringe similar to upperside.

Genitalia (Figs 5A, B): uncus narrow, tapering to a point, greater than half but less than full-length of tegumen; socius small, triangular-shaped, furnished with numerous setae; valva broad with apex produced, inner margin with slight medial bulge, distal portion furnished with numerous fine setae; sacculus broader at base, ter-

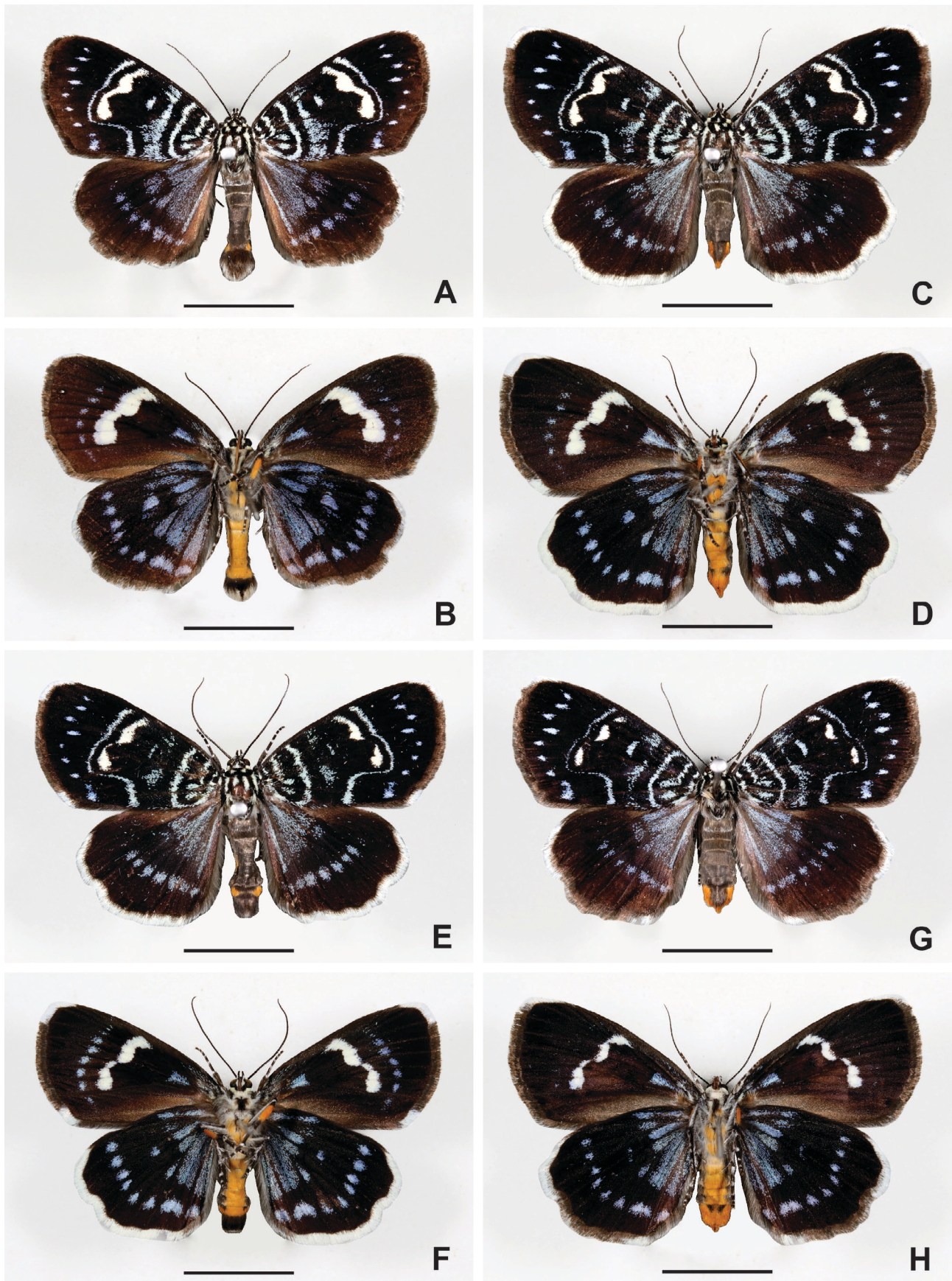


Figure 4. Adults of *Idalima petrina* sp. nov., showing dorsal and ventral surfaces: **(A-B)** holotype male (ANIC); **(C-D)** paratype female (MFBC); **(E-F)** paratype male showing variation (MFBC); **(G-H)** paratype female showing variation (MFBC). Scale bar = 10 mm.

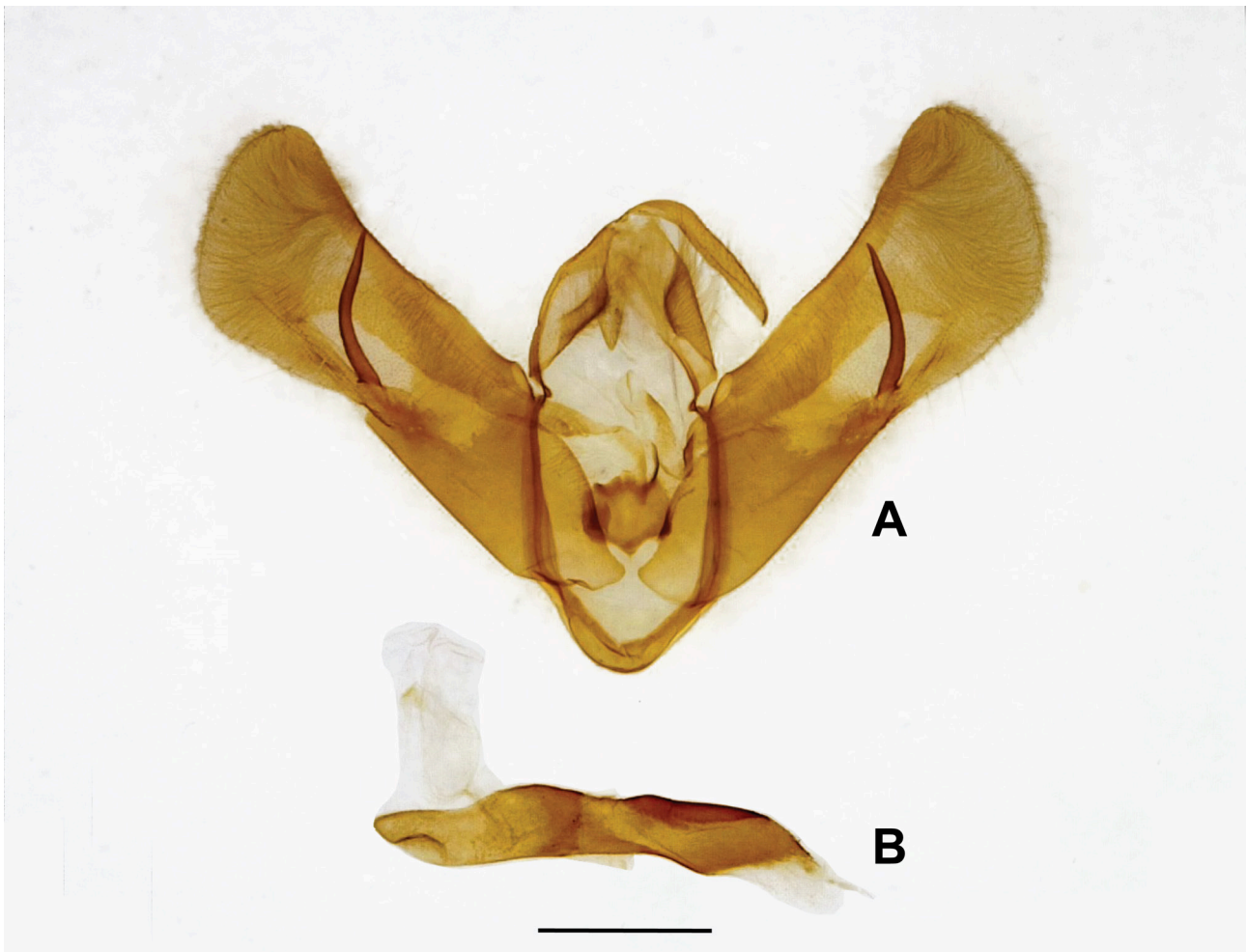


Figure 5. Male genitalia of *Idalima petrina* sp. nov.: **(A)** posterior view of valva, tegumen and vinculum; **(B)** lateral view of phallus. Scale bar = 1 mm.

minating at middle of valva; harpe comprising a sclerotized spine with apex sharply pointed, less than one-third length of valva; saccus rounded ventrally, less than width of proximal valva; phallus straight, without dorsoposterior lobe, length shorter than four times width, cornuti of vesica absent.

Female

Size: (forewing length): mean = 19.4 mm ± 0.70 mm (SD), range 17.6–20.3 mm ($n = 17$). Similar to male but larger, forewing broader.

Material examined

Holotype

♂ "12.84650°S, 132.82295°E, Nourlangie Rock, Kakadu NP, NT 120 m, 1 FEB. 2009, MF Braby & LJ Aitchison" (ANIC) (Figs 4A–B).

Paratypes

Australia, Northern Territory: 15♂, 12♀. 1♂ "12.18S 133.17E, 15 km SW by S of Nimbuwah Rock, N.T., 10 Nov. 1972, E.D. Edwards & M.S. Upton", "Barcode of Life, DNA voucher specimen, smple ID: 10ANIC-06878, BOLD Proc: ID ANIC-J881-10" (ANIC); 1♀ "12.84650°S, 132.82295°E,

Nourlangie Rock, Kakadu NP, NT 120 m, 1 FEB. 2009, MF Braby & LJ Aitchison" (MFBC); 2♂ "12.84650°S, 132.82295°E, 0.6 km E Nanguluwur, Kakadu NP, NT 120m, 7 DEC. 2009, MF Braby & J Armstrong" (MFBC); 1♂ "12.84650°S, 132.82295°E, 0.6 km E Nanguluwur, Kakadu NP, NT 120m, 24 JAN. 2010, MF Braby & LJ Aitchison" (MFBC); 2♂ "12.84650°S, 132.82295°E, Nourlangie Rock, Kakadu NP, NT, 8 DEC. 2013, M.F. Braby" (MFBC); 2♀ "12.84535°S, 132.82072°E, 0.4 km NE Nanguluwur, Kakadu NP, NT 160m, 24 JAN. 2010, MF Braby & LJ Aitchison" (MFBC); 1♂, 1♀ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 23 JAN. 2010, MF Braby & LJ Aitchison" (MFBC); 1♂, 2♀ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 25 JAN. 2010, MF Braby & LJ Aitchison" (MFBC); 1♀ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, emg. 10 FEB. 2010, M.F. Braby & L.J. Aitchison", "Reared from egg on *Hibbertia candidans*, laid 9 DEC. 2009, larva 14 DEC. 2009, pupated 21 JAN. 2010" (MFBC); 1♂ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 19 FEB. 2010, M.F. Braby" (MFBC); 1♂ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 20 FEB. 2010, M.F. Braby" (NTM); 1♀ labelled similarly but in MFBC; 1♂

"12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, emg. 19 MAR. 2010, M.F. Braby", "Reared from larva on *Hibbertia candicans*, coll. 20 FEB. 2010, Pupated 2 MAR. 2010" (MFBC); 1♂ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, emg. 24 APR. 2010, M.F. Braby & S. Keates", "Reared from larva on *Hibbertia candicans*, coll. 27 MAR. 2010, Pupated 6 APR. 2010" (MFBC); 1♂ "12.83721°S, 132.84970°E, 0.6 km W Gubara Tk carprk, Kakadu NP, NT, 20 NOV. 2011, M.F. Braby" (MFBC); 1♀ labelled similarly but date "17 DEC. 2011" (NTM); 1♂ labelled similarly but date "18 DEC. 2011" (MFBC); 1♀ labelled similarly but date "27 NOV. 2012" (MFBC); 1♂ "12.84650°S, 132.82295°E, Barrk Track, Nourlangie Rock, Kakadu NP, NT, 17 NOV. 2012, M.F. Braby" (MFBC); 1♀ "12.84262°S, 132.81895°E, Nanguluwur Art Site, Kakadu NP, NT, 17 NOV. 2012, M.F. Braby" (MFBC).

Other material

1♂ "12.52S 132.48E, 10 km E of Mt Cahill, N.T., 18 Nov. 1972, E.D. Edwards & M.S. Upton", "Barcode of Life, DNA voucher specimen, smple ID: 10ANIC-06879, BOLD Proc: ID ANIC-J882-10" (ANIC). A further 15 specimens (7♂, 8♀) from the Nourlangie Rock area of Kakadu National Park, NT collected between 5 December 2009 and 7 December 2013 were examined in MFBC.

Variation

The width of the cream median bar on the forewing upperside (and corresponding bar on the underside) varies and it may be divided into two or very occasionally three sections. The series of blue postmedian spots on the forewing underside may be well developed or absent. The terminal band (scale-fringe) on the hindwing is usually dark grey with the white sections restricted to the apex and tornus or it may be entirely white (36% of type specimens examined, $n=28$).

Etymology

The Latin noun *petra* means rock and refers to the sandstone breakaway habitat in which the species occurs.

Distribution

Idalima petrina is restricted to the Arnhem Land Plateau in the Top End of the Northern Territory (Fig. 2). It has been recorded from 15 km south-west by south of Nimbawah Rock, and Kakadu National Park (Nourlangie Rock), NT (Braby 2015; Braby *et al.* 2018). It appears to be parapatric with *I. cyanobasis*, which reaches only the western most edge of the plateau. The species breeds in eucalypt heathy woodland on broken sandstone hill slopes where the larval food plant *Hibbertia candicans* (Dilleniaceae) grows as a perennial shrub in the understory (Braby 2015).

Biology

Adults are seasonal, occurring only during the wet season (November–April), but they are most abundant dur-

ing the early wet season (November–January) following the pre-monsoon storms (Braby *et al.* 2018). The immature stages (eggs or larvae) have been recorded during the wet season (December–April). There is probably only a single generation annually, followed by a partial second generation in the late wet season. Presumably, the species survives the dry season in pupal diapause.

Disclosures

I declare no conflicts of interest.

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