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A taxonomic revision of the *tristrigella* species group of the genus *Nemophora* Hoffmannsegg (Lepidoptera, Adelidae) from the Philippines, Malaysia, Brunei and Indonesia

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Abstract

This study defines and revises the monophyletic *tristrigella* species group of the genus *Nemophora* Hoffmannsegg, 1798, characterized by six presumably apomorphic traits, including (but not limited to) a glossy golden vertex and glossy golden basal part of forewing sharply contrasting with the coppery bronze apical part, which features a distinctive pattern of several yellow spots surrounded by dark brown scales. The group comprises four species: *N. pendleburyi* Kozlov, **sp. nov.**, from Malaysia; *N. vitalii* Kozlov, **sp. nov.**, from Indonesia, Malaysia and Brunei; *N. chalcotechna* (Meyrick, 1937) from the Philippines; and *N. tristrigella* (Walker, 1866) from Indonesia and the Philippines. These species are described and illustrated herein, with identification keys based on external morphology and male genitalia provided. Particular attention is paid to similarities and dissimilarities between *N. chalcotechna* and *N. tristrigella*.

Key words: biogeography, diagnoses, distribution, keys, new species, phylogeny, variation

Introduction

Three mega-diverse countries—Indonesia, Malaysia, and the Philippines—jointly house three of the world's 36 biodiversity hotspots (Myers *et al.* 2000; Habel *et al.* 2019). These countries show both biogeographical similarities and differences due to their tropical climates and complex geological histories. Malaysia lies west of Wallace's Line, with fauna largely of Asian origin; the Philippines are northwest of Wallace's Line, featuring highly endemic and oceanic species; and Indonesia spans both sides of the Line, hosting a mix of Asian and Australasian elements (Hall & Holloway 1998; Ali & Heaney 2021). The biogeographical importance of this region highlights the need for taxonomic revisions of monophyletic species groups represented by distinct species in different parts of it to uncover evolutionary divergence driven by ancient geographic barriers. One of such species groups was currently recognized among fairy moths (Adelidae).

Southeast Asia possesses a remarkable diversity of fairy moths, with many species of the genus *Nemophora* Hoffmannsegg, 1798, recently described from various parts of this region (Kozlov 2016, 2020, 2023, 2024a, b; Ko *et al.* 2025). In this study, I describe the monophyletic *tristrigella* species group containing two new *Nemophora* species from Malaysia, Indonesia and Brunei, and two species previously described from Indonesia and the Philippines. This publication is a part of the ongoing revision of the fairy moth subfamily Adelinae of the World.

Methods

The methodological approach followed in this study aligns with procedures outlined in prior taxonomic revisions of *Nemophora* species groups (e.g., Kozlov 2016, 2024b) and regional faunal treatments (Kozlov 2023, 2024a). For each primary type specimen, I recorded the size of all labels, the paper colour (when it differs from white), and transcribed the original text verbatim within quotation marks. Different lines on labels are separated using a vertical

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bar (|), and any editorial clarifications are enclosed in square brackets. Type locality names are updated to reflect contemporary spelling.

Morphological measurements of moths were taken using a stereomicroscope equipped with an ocular micrometer. Forewing length measurements exclude the fringe, while forewing width refers to the maximum distance between the costal and dorsal margins, measured perpendicularly to the line connecting the RS stem base and the wing apex. The interocular index was calculated as the ratio of the vertical eye diameter to the interocular distance at the midpoint of the frons, between the antennal bases and anterior tentorial pits. The occipital distance is defined as the ratio of the minimum distance between the eyes above the antennal bases to the vertical diameter of the eye. The latter ratio is reported only in species with enlarged male compound eyes.

Several species described herein are based on specimens in poor condition, requiring the inclusion of both colour photographs and schematic diagrams of wing patterns to accurately represent their appearance. Consistent with the tradition initiated by Yasuda (1957) and further developed by Hirowatari (1995, 2007), male genitalia were illustrated from both ventral and lateral perspectives. These illustrations emphasize the natural, non-deformed structure of the genitalia, providing details not typically visible in slide-mounted preparations. Female terminalia, which lack strong diagnostic features in *Nemophora*, were not examined in this work.

The following abbreviations are used: FWL, forewing length; PLB, labial palpus; WLR, width/length ratio. Abbreviations for collections:

DEIE—Deutsches Entomologisches Institut, Eberswalde, Germany;
NHM—Natural History Museum, London, U. K.;
RMNH—Naturalis Biodiversity Center, Leiden, the Netherlands;
USNM—U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.;
ZMUC—Zoological Museum, University of Copenhagen, Denmark.

Diagnosis of the *tristrigella* species group and relationships among its species

The *tristrigella* species group (Fig. 1) can be diagnosed by the following combination of presumably apomorphic characters:

1. The vertex in males is medially covered with glossy golden scales.
2. The forewing fascia is narrow (0.03–0.10 × FWL) and nearly straight.
3. The dark brown band of the forewing fascia extends continuously from the costa to the dorsum, while the yellow medial band is limited to the costal half of the wing.
4. The background forewing colour is light and glossy golden in the basal part of the forewing and darker, coppery bronze in the apical part of it.
5. A costal spot is present in the basal area of the forewing, usually matching its background colour; this spot is discernible only by a diffuse brown line bordering it dorsally.
6. The distal half of the forewing shows a characteristic pattern composed of several yellow spots surrounded by dark brown scales. This combination of pattern elements is unique to the *tristrigella* species group within *Nemophora*, although some features superficially resemble those seen in the *kalshoveni* species group from Indonesia and Papua New Guinea (Kozlov 2016).

A tentative phylogeny of the *tristrigella* species group (Fig. 1) is proposed based on two presumably apomorphic characters:

7. The glossy golden coloration at the base of the forewing extends up to 0.4 × FWL.
8. Male compound eyes are enlarged, with an interocular index ranging from 1.15 to 1.75.

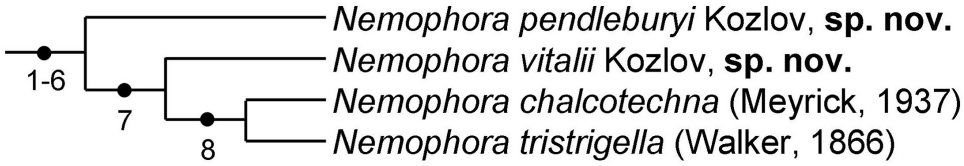


FIGURE 1. Cladogram illustrating the monophyly of the *tristrigella* species group and the phylogenetic relationships among the four species it comprises. Numbers indicate apomorphic characters listed in the text.

List of the species

Nemophora pendleburyi Kozlov, **sp. nov.**
Nemophora vitalii Kozlov, **sp. nov.**
Nemophora chalcotechna (Meyrick, 1937)
Nemophora tristrigella (Walker, 1866)

Key to the species by male external features

1. Compound eyes not enlarged: interocular index 0.5–0.7 2
-. Compound eyes enlarged: interocular index 1.15–1.75 3
2. Smaller: FWL 5.4 mm; glossy golden coloration of forewing base expands up to 0.17 × FWL; costal spot at forewing base extends to 0.25 × FWL . . . . . *N. pendleburyi*
-. Larger: FWL 7.9–9.2 mm; glossy golden coloration of forewing base expands up to 0.35 × FWL; costal spot at forewing base extends to 0.35 × FWL . . . . . *N. vitalii*
3. Oblique yellow spot situated between 0.6 × costal margin and apex of forewing C-shaped; apical third of forewing usually with three additional yellow spots . . . . . *N. chalcotechna*
-. Oblique yellow spot situated between 0.6 × costal margin and apex of forewing S-shaped, sometimes split in two oval spots; apical third of forewing with one additional yellow spot . . . . . *N. tristrigella*

Key to the species by male genitalia

1. Ventral margin of valva W-shaped; base of fused valvae medially with deep indentation (0.05–0.07 × length of valva) . . . . . *N. tristrigella*
-. Ventral margin of valva nearly straight; base of fused valvae medially with minor indentation (0.01–0.02 × length of valva) 2
2. Internal surface of valva with a distinct medial lobe . . . . . *N. vitalii*
-. Internal surface of valva without a distinct lobe 3
3. Medial process of transtilla short (less than 2 × phallus diameter); tips of valvae extend beyond tip of tegumen; valvae fused basally to each other and to vinculum; internal valvar margins indistinct; length of vinculum 2.0–2.1 × length of valva . . . . . *N. chalcotechna*
-. Medial process of transtilla long (more than 2 × phallus diameter); tips of valvae at about same level as tip of tegumen; valvae fused basally to each other but not to vinculum; internal valvar margins distinct; length of vinculum 2.4 × length of valva . . . . . *N. pendleburyi*

Taxonomic accounts

Family Adelidae Bruand, 1850

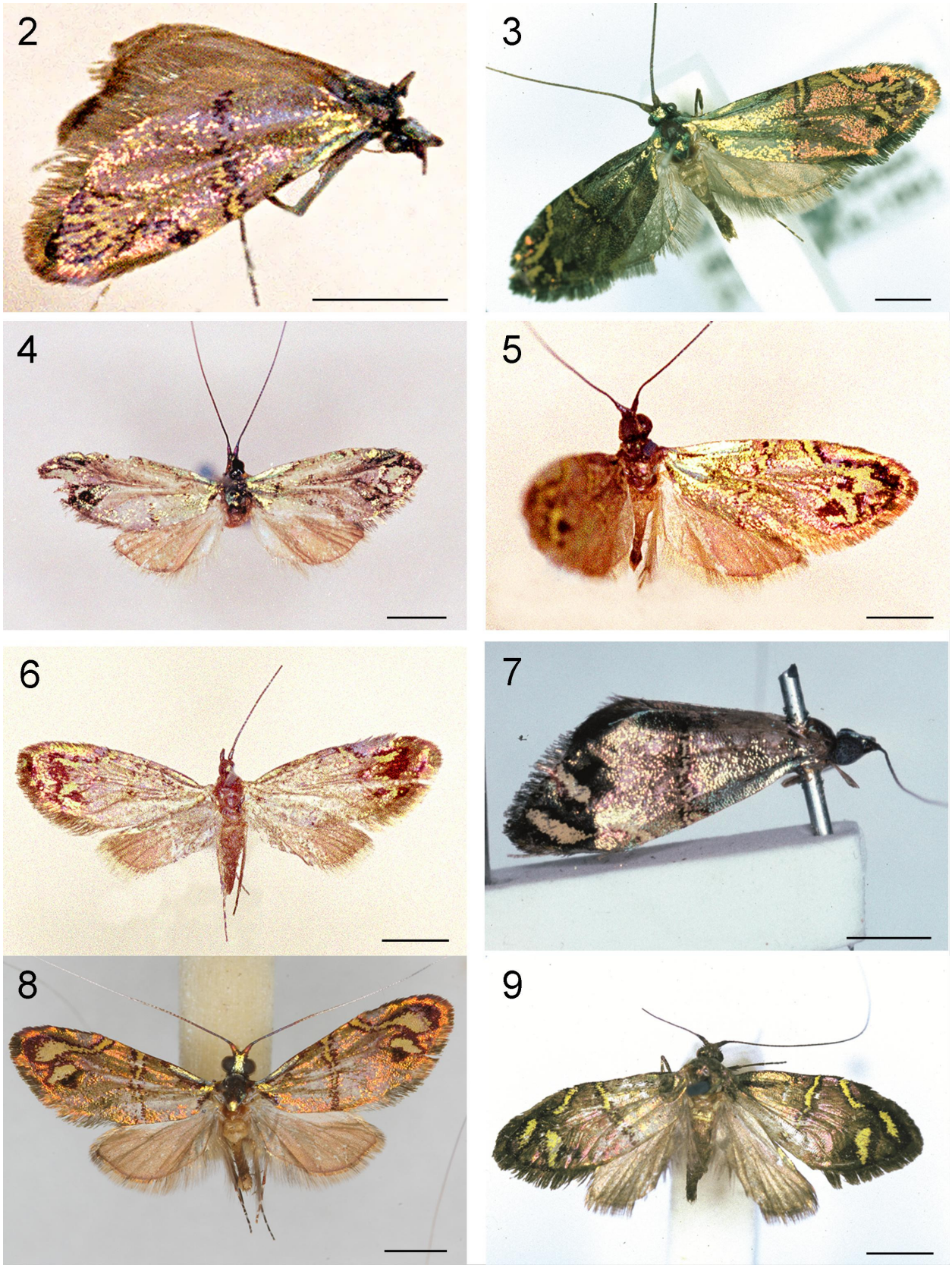
Genus *Nemophora* Hoffmannsegg, 1798

Nemophora pendleburyi Kozlov, sp. nov.

(Figs. 2, 10, 14)
LSID urn:lsid:zoobank.org:act:F3F67963-25CA-467B-B4E4-50F4CCA49840

Holotype ♂: Malaysia, Selangor, Bukit Kutu (3° 32′ 34″ N, 101° 43′ 13″ E); labelled: 8 mm circle with red border, print ‘Holo- │ type’; 13 × 19 mm, print + black ink ‘MALAY PENIN: │ Selangor, Bukit Kutu │ 3.300 ft. │ 29-9-1932. │ H. M. Pendlebury.’, reverse side: ‘Ex Coll: │ F. M. S. │ Museum’; 9 × 16 mm, print ‘B. M. │ Genitalia slide │ No. 29971’; 6 × 18 mm, print ‘HOLOTYPE ♂ │ *Nemophora* │ *pendleburyi* Kozlov’ (NHM) [examined].

Diagnosis. *Nemophora pendleburyi* differs from other species of the *tristrigella* group by the relatively short (up to 0.17 × FWL) extension of glossy golden colour in the basal field of forewing. In both external features and male genitalia traits, *N. pendleburyi* is most similar to *N. vitalii* (Fig. 3), from which it differs by the small size, absence of distinct lobe on internal surface of valva, large medial process of transtilla, and short (less than half of juxta) arrow head.



FIGURES 2–9. Adults of *Nemophora* spp. 2, *N. pendleburyi* Kozlov, **sp. nov.**, male, holotype, from Selangor, Malaysia; 3, *N. vitalii* Kozlov, **sp. nov.**, male, holotype, from Brunei; 4, *N. chalcotechna* (Meyrick, 1937), male, holotype, from Mindanao, the Philippines; 5, ditto, male, from Basilan Island, the Philippines; 6, ditto, female, from the same locality; 7, *N. tristrigella* (Walker, 1866), male, holotype, from Java, Indonesia; 8, ditto, male, from Balikpapan, Indonesia; 9, ditto, female, from Indonesia. Scale bar: 2 mm.

Description. Male (Fig. 2). FWL 5.4 mm, WLR 0.37. Vertex glossy golden; frons glossy silver to light glossy golden. PLB 0.7 × vertical eye diameter (0.85 × length of scape), with light grey appressed scales; base ventrally with few raised dark brown piliform scales. Proboscis light brown, base coppery brown. Eyes slightly enlarged; interocular index 0.7. Length of antenna unknown (tips broken). Scape and base of flagellum dark coppery brown. Tegulae glossy golden; thorax marginally bronze (medial part of dorsum in the single available specimen is abraded). Forewing (Fig. 10) bronze, with slight coppery iridescence; basal part (about 0.17 × FWL) glossy golden; costal spot at forewing base extends to 0.25 × FWL. Fascia dark brown, straight, narrow (0.10 × FWL at costa, 0.05 × FWL at dorsum); its inner margin reaches costa at 0.44 × FWL; costal part of fascia (up to 0.4 × forewing width) with pale yellow medial band. Distal part of forewing with five yellow spots bordered and slightly suffused with dark brown scales. Anterior spot long, shallowly C-shaped, starting from costa at 0.6 × FWL and approaching wing apex between veins RS3 and RS4; four smaller spots positioned between veins RS4 and M3. Fringe dark bronze near apex to bronze along termen. Hindwing brown; costal area grey; fringe grey. Legs glossy bronze; bases of all tarsomeres yellow. Epiphysis at 0.6, almost reaching apex of tibia. Abdomen light brown dorsally, light bronze ventrally.

Female unknown.

Male genitalia (Fig. 14). Tegumen dome-shaped, with distinct medial ridge. Socii 1.1–1.2 × diameter of phallus. Vinculum 2.4 × length of valva, with straight lateral margins and nearly straight distal margin. Tips of valvae at about same level as tip of tegumen. Both ventral and dorsal margins of valva nearly straight; tip of valva narrowly rounded. Valvae fused basally up to 0.35 × total length; their internal margins distinct; base of fused valvae medially with minor indentation (0.01–0.02 × length of valva). Anellus 0.3 × length of valva. Transtilla with large (long and wide) medial process, length of which exceeds diameter of phallus more than twice. Juxta 0.5 × length of phallus; arrow head moderately wide (WLR 0.55), with pointed tip and pointed lateral arms. Phallus of same length as vinculum, in lateral view shallowly S-shaped; distal quarter split into two lateral lobes of similar length and shape; base of phallus narrowly funnel-shaped.

Distribution. Malaysia (Selangor).

Etymology. Named in honour of Henry Maurice Pendlebury (1893–1945), a British entomologist, astute observer and keen naturalist, who assembled extensive insect collections during his expeditions in Malaysia and obtained, among other specimens, the holotype.

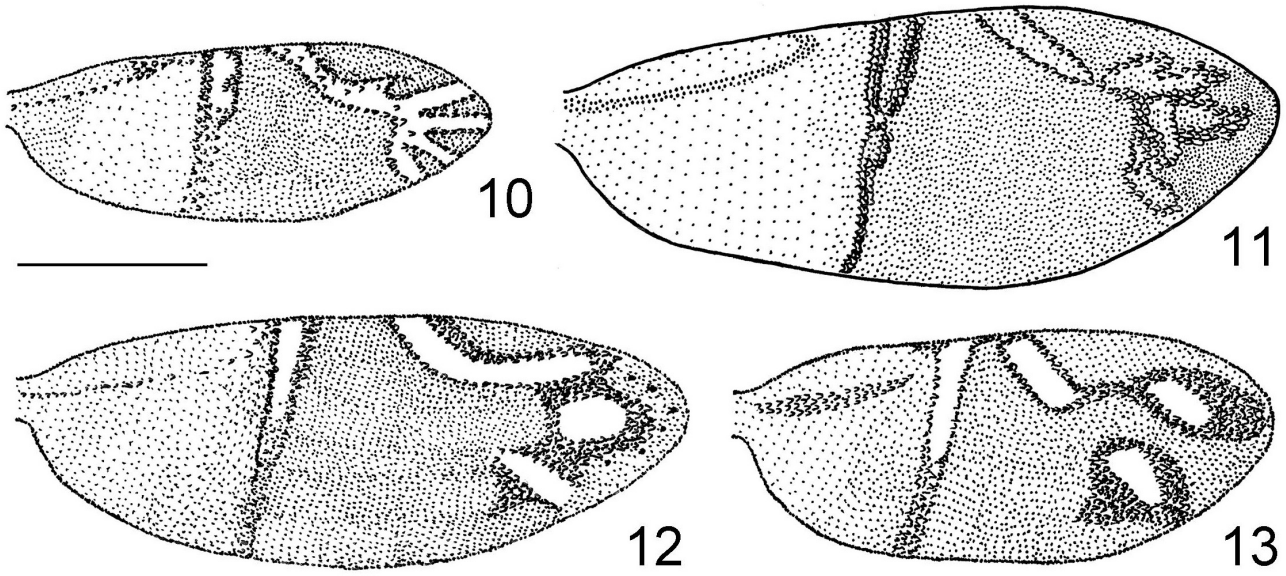
***Nemophora vitalii* Kozlov, sp. nov.**

(Figs. 3, 11, 15, 18)

LSID urn:lsid:zoobank.org:act:728026F7-B3AC-4E2B-B940-6F97D8066743

Holotype ♂: Brunei, Rampayon River (4º 19′ S, 114º 28′ E); labelled: 8 mm circle with red border, print 'Holo- | type'; 7 × 12 mm, print 'Brunei, 300′ | Rampayon R., LP 195, | GR 960785. Lowland | dipterocarp forest. | 21.IX-24.IX.1992'; 4 × 10 mm, print 'G. S. Robinson | Brunei/Malaysia | Brit. Mus. 1993-2'; 9 × 16 mm, print 'B. M. | Genitalia slide | No. 29464'; 6 × 18 mm, print 'HOLOTYPE ♂ | *Nemophora* | *vitalii* Kozlov' (NHM) [examined]. **Paratypes.** 1 ♂, labelled: 8 mm circle with yellow border, print 'Para- | type'; 11 × 17 mm, print 'BRUNEI: 200′ | Labi, | Lowland forest | 28.11.1982 | Alan Cassidy'; 4 × 15 mm, print 'G. S. Robinson | BM 1982-156'; 11 × 14 mm, print 'Collected | by day'; 6 × 18 mm, print 'PARATYPE ♂ | *Nemophora* | *vitalii* Kozlov' (NHM) [examined]. 1 ♂, labelled: 8 mm circle with yellow border, print 'Para- | type'; 9 × 16 mm, print + black ink 'SARAWAK | Semengoh For. Res. | 15 mi. So. Kuching | 12.IX.1966'; 3.5 × 17 mm, print 'J. F. B. Clarke | Thelma M. Clarke'; 6 × 18 mm, print: 'PARATYPE ♂ | *Nemophora* | *vitalii* Kozlov' (USNM) [examined]. 38 ♂, labelled: 10 × 17 mm, print + black ink 'E. Borneo 125 m | Tabang [date from 31.VIII. to 29.IX.] 1956 | Bengen River | A.M.R. Wegner'; 6 × 14 mm, print: 'PARATYPE ♂ | *Nemophora* | *vitalii* Kozlov' (RMNH) [examined].

Diagnosis. *Nemophora vitalii* differs from *N. tristrigella* (Figs. 7–9) and *N. chalcotechna* (Figs. 4–6) by the non-enlarged compound eyes in males, the presence of four yellow spots in the apical part of forewing margin, and by longer male antenna (4.5–4.8 × FWL). It can be distinguished from *N. pendleburyi* by its larger size and twice wider (reaching 0.35 × FWL) glossy golden basal field of the forewing, small medial process of transtilla and the presence of a distinct lobe on the internal surface of the valva.



FIGURES 10–13. Forewing pattern of *Nemophora* spp. 10, *N. pendleburyi* Kozlov, **sp. nov.**; 11, *N. vitalii* Kozlov, **sp. nov.**; 12, *N. chalcotechna* (Meyrick, 1937); 13, *N. tristrigella* (Walker, 1866). Scale bar: 2 mm.

Description. Male (Fig. 3). FWL 7.9–9.2 mm, WLR 0.37–0.39. Vertex medially glossy golden, its margins with dark brown piliform scales; frons glossy golden, with row of pale yellow piliform scales below antennal sockets. PLB 0.70–0.90 × vertical eye diameter (0.75–0.85 × length of scape), covered by pale yellow appressed scales; base with few protracted pale yellow piliform scales. Proboscis light brown, base laterally with dark brown scales. Eyes not enlarged; interocular index 0.55–0.65. Antenna 4.5–4.8 × FWL. Scape coppery bronze; flagellum proximally dark brown, distally light brown. Tegulae and thorax golden. Forewing base (up to 0.4 × FWL) glossy golden; costal spot at forewing base extends to 0.35 × FWL (Fig. 11). Fascia dark brown, straight, narrow (0.07 × FWL at costa, 0.03 × FWL at dorsum), slightly oblique; its inner margin reaches costa at 0.45–0.46 × FWL; costal half of fascia with yellow medial band. Distal part of forewing dark bronze with coppery tint, with pattern consisting of four yellow spots bordered by dark brown scales. Anterior spot long, shallowly C-shaped, starts from costa at 0.59–0.64 × FWL and approaches wing margin between veins RS3 and RS4. Three other spots much smaller, situated near outer wing margin between veins RS4 and M3. Fringe bronze. Hindwing brown, with slight coppery iridescence; costal area brownish grey; fringe light brown. Legs golden proximally to dark coppery brown distally; bases of all tarsomeres pale yellow. Epiphysis at 0.5, almost reaching apex of tibia. Abdomen light brown.

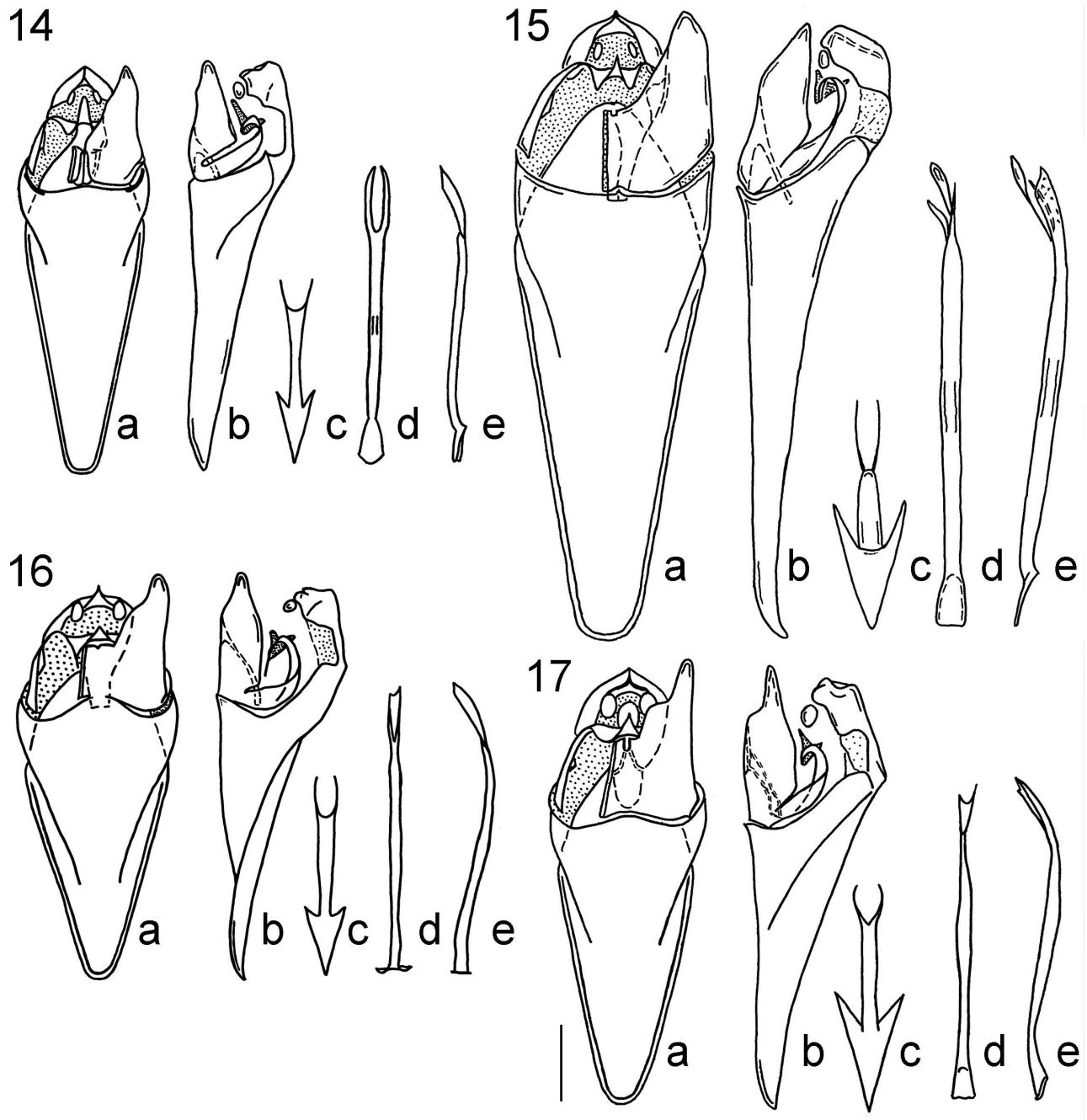
Female unknown.

Male genitalia (Figs. 15, 18). Tegumen dome-shaped, with distinct medial ridge. Socii 1.1 × diameter of phallus. Vinculum 2.4 × length of valva, with nearly straight lateral margins and shallowly concave distal margin. Tips of valvae slightly extend beyond tip of tegumen. Ventral valvar margin slightly concave; dorsal margin nearly straight; tip of valva rounded. Internal surface of valva bears small, broadly rounded lobe near its midpoint; viewed dorsoventrally, this lobe does not extend beyond ventral margin of valva. Valvae fused basally up to 0.35 × total length; base of fused valvae medially with minor indentation (0.01–0.02 × length of valva). Anellus 0.45 × length of valva. Transtilla with small pointed medial process, length of which exceeds diameter of phallus less than twice. Juxta 0.35 × phallus; arrow head moderately wide (WLR 0.55), with pointed tip and pointed lateral arms. Phallus 1.1 × length of vinculum, in lateral view shallowly S-shaped; its tip consists of three lobes: left lobe spinosae, medial lobe of same length as left lobe, and right lobe slightly longer than medial and left lobes; base of phallus narrow, with almost parallel margins.

Distribution. Indonesia (East Kalimantan), Malaysia (Sarawak), Brunei.

Biology. Day-flying species. In Brunei, two specimens were collected in primary lowland dipterocarp forest.

Etymology. The species is named after my friend and colleague Vitali Zverev, who assisted me in the study of fairy moths and, in particular, recognized this species among the *N. tristrigella* accession materials.



FIGURES 14–17. Male genitalia of *Nemophora* spp. 14, *N. pendleburyi* Kozlov, **sp. nov.**; 15, *N. vitalii* Kozlov, **sp. nov.**; 16, *N. chalcotechna* (Meyrick, 1937); 17, *N. tristrigella* (Walker, 1866); a: genital complex, ventral view (right valva not shown); b: genital complex, lateral view; c: juxta; d: phallus, ventral view; e: phallus, lateral view. Scale bar: 0.2 mm.

Nemophora chalcotechna (Meyrick, 1937)

(Figs. 4–6, 12, 16, 19)

Nemotois chalcotechna: Meyrick 1937: 204. **Holotype** ♂: Philippines, Mindanao, near Iligan (8° 12′ N, 124° 13′ E); labelled: 4 × 10 mm, red paper, print 'Holotypus'; 4.5 × 10 mm, print 'Momungan │ Mindanao'; 4 × 12 mm, print 'Staudinger & │ Bang-Haas dedit.'; 5 × 10 mm, print '36'; 3 × 10 mm, print 'Meyrick det.'; 5 × 52 mm, black ink '36. Nemotois chalcotechna n. sp.' [in Meyrick's hand]; 4 × 10 mm, print 'Eberswalde │ coll. DEI' (DEIE) [examined].

Nemotois chalcotechna: Clarke 1955: 81.

Nemophora chalcotechna: Diakonoff 1967: 294–295, 410 fig. 463 (tip of female abdomen), 464 (male genitalia), 453 fig. 798 (black & white photo of a female); Ko *et al.* 2025: 137 (publication year of this name is erroneously indicated as 1928).

Other material. Philippines. 12 ♂ 1 ♀, Basilan Island, ii.–iii.1889 (Doherty) (NHM); 1 ♀, Sulu (Pryer) (NHM); 1 ♀, Mindanao, Lanao, Kolambugan, 16.vi.1914 (Wileman) (NHM); 1 ♂, Mindanao, Surigao (Baker) (USNM).

Diagnosis. *Nemophora chalcotechna* is closely related to *N. tristrigella* (Figs. 7–9), from which differs by the shallowly C-shaped, oblique yellow spot positioned between 0.57–0.59 × FWL at the costal margin and the apex of the forewing; a longer distance (0.10–0.13 × FWL) between the external margin of the fascia's yellow band and the internal margin of this spot; shorter male antenna (3.6–3.7 × FWL) and a smaller arrow head of juxta (reaching less than half of the juxta's total length).

Description. Male (Figs. 4, 5). FWL 6.3–7.4 mm, WLR 0.38–0.44. Vertex covered by appressed glossy golden scales, with protracted tuft of dark brown piliform scales above antennal sockets. Frons glossy golden, with row of light brown piliform scales below antennal sockets. PLB 0.5–0.6 × vertical eye diameter (0.75–0.95 × length of scape), covered by pale yellow appressed scales; base with a few pale yellow piliform scales protracted anteroventrally. Proboscis light brown to ochreous. Eyes enlarged, but not touching each other, with rounded dorsal margins; interocular index 1.15–1.75; occipital distance 0.25–0.30. Antenna 3.6–3.7 × FWL; pegs present. Scape coppery bronze; flagellum dark brown proximally to white distally. Tegulae and thorax golden. Forewing base (up to 0.4 × FWL) glossy golden; costal spot at forewing base extends to 0.35 × FWL (Fig. 12). Fascia dark brown, straight, narrow (0.07 × FWL at costa, 0.03 × FWL at dorsum), slightly oblique; internal margin of fascia reaches costa at 0.39–0.47 × FWL; yellow medial band of fascia reaches 0.4–0.5 × width of forewing. Distal part of forewing bronze with coppery iridescence, with three yellow spots surrounded by dark brown scales. Anterior spot long, shallowly C-shaped, starts from costa at 0.57–0.59 × FWL and approaches wing apex between veins RS3 and RS4. Two smaller spots at outer wing margin are located between veins RS4 and M1 and between veins M3 and CuA1. Fringe bronze. Hindwing light brown to brown, with slight coppery iridescence; anal field semitranslucent; costal area brownish grey; fringe light brown to almost white. Legs golden proximally to dark coppery brown distally; bases of all tarsomeres pale yellow. Epiphysis at 0.5–0.6, almost reaching apex of tibia. Abdomen light ochreous brown.

Female (Fig. 6). FWL 5.5 mm, WLR 0.38. Otherwise similar to male.

Male genitalia (Figs. 16, 19). Tegumen dome-shaped, with prominent medial ridge. Socii 1.5 × diameter of phallus. Vinculum 2.00–2.05 × length of valva, with slightly convex lateral margins and Λ-shaped distal margin. Tips of valvae extend beyond tip of tegumen; valvae ventrally fused to vinculum (suture in medial part indistinct). Ventral margin of valva medially convex; dorsal margin with slight medial protrusion; tip of valva narrowly rounded. Valvae fused basally up to 0.4 × total length; their internal margins indistinct; fused part distally with minor medial indentation (0.01–0.02 × length of valva). Anellus 0.5 × length of valva. Transtilla with small triangular medial process and extended lateral processes. Juxta 0.55 × length of phallus; arrow head moderately wide (WLR 0.55), with pointed tip and short pointed lateral arms; reaches less than half of juxta's total length. Phallus of same length as vinculum, in lateral view shallowly sickle-shaped. Tip of phallus slightly wider than its medial part, with deep ventral incise and small dorsal indentation. Base of phallus developed into nearly rectangular platform perpendicular to main part of it; width of this platform about 3.5 × diameter of phallus.

Distribution. Philippines (Basilan, Sulu, Mindanao).

Comments. Specimen no. 42159, collected by W. Doherty and preserved in the NHM collection, bears a label reading 'Chrysothauma │ basilanica │ Drnt. │ Type ♀'; however, Durrant never published a formal description of this species.

In addition to 15 moth specimens, the NHM collection also includes an empty pin with the label 'Basilan │ PHILIPPINES │ II–III. 1889 │ Doherty 42171', marked with a red hand-written note 'Slide'. The wings of this male specimen were mounted on a slide by J. H. Durrant in 1909. To facilitate access, the slide was assigned number 29978, and the label 'B. M. wing slide No. 29978' was added to the pin.

Nemophora tristrigella (Walker, 1866)

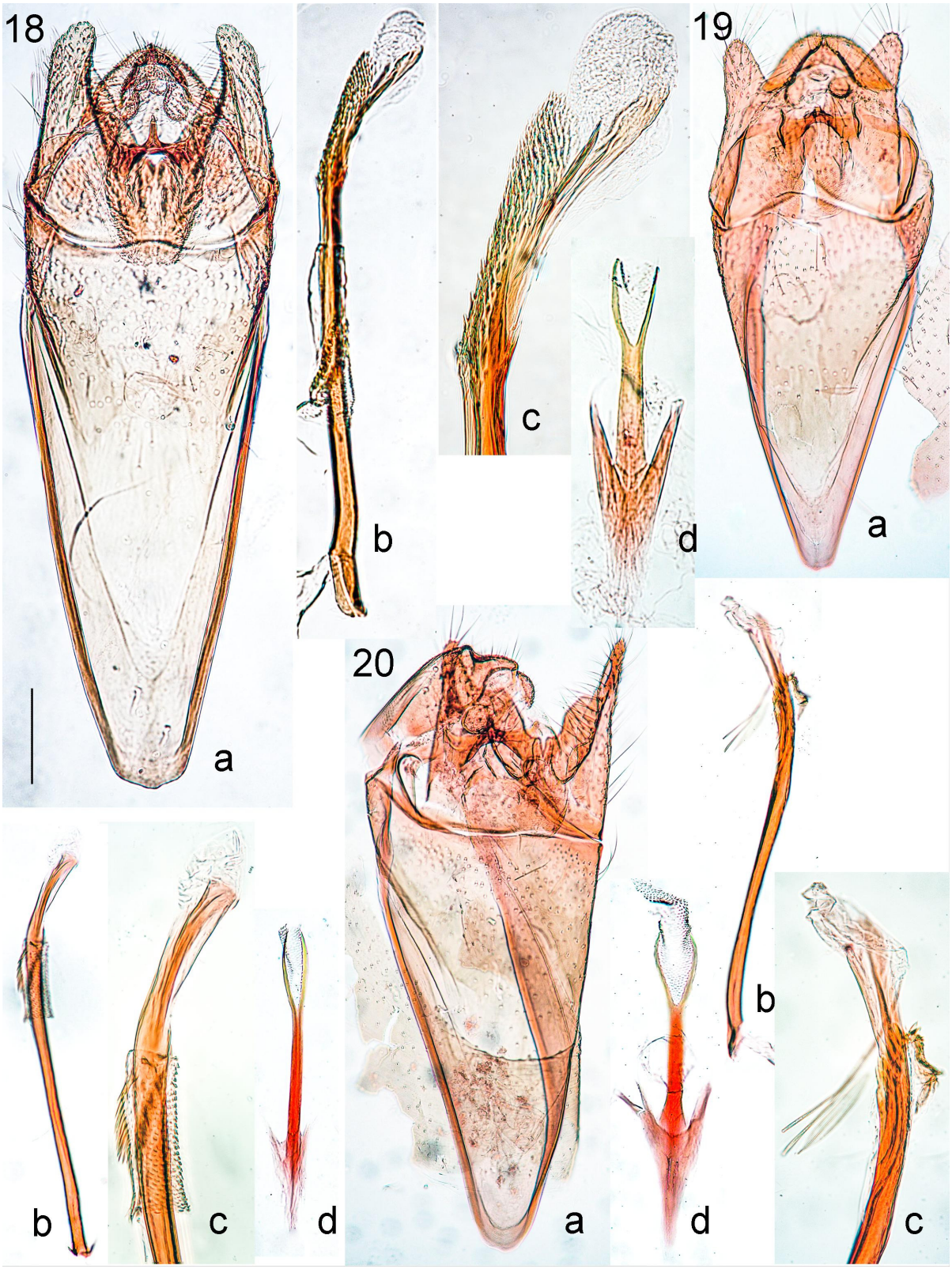
(Figs. 7–9, 13, 17, 20)

Nemotois tristrigella: Walker 1866: 1815. **Holotype** ♂: Indonesia, Java; labelled: 8 mm circle with red border, print 'Holo-│type'; 8 mm circle with red border, print 'Type'; 5 × 6 mm, print '60-15 │ E.I.C. [East India Company]'; 8 × 5 mm, black ink '773.'; 14 × 25 mm, black ink + print 'Nemotois │ tristigella Wkr. │ Cat Lep BM. 35, 1815 (1866) │ TYPE ♂ 1/1';

4 × 32 mm, print ‘Nemotois tristrigella.’; 8 × 20 mm, print ‘HOLOTYPE ♂ | *Nemotois tristrigella* | Walker, 1866 | M. Kozlov design. 1999’ (NHM) [examined].

Nemotois tristrigella: Meyrick 1912a: 7, 1912b: 8.

Nemophora tristrigella: Diakonoff 1951: 158–160, fig. 13 (male genitalia).



FIGURES 18–20. Male genitalia of *Nemophora* spp. 18, *N. vitalii* Kozlov, **sp. nov.**, holotype, from Brunei, genitalia preparation 29464 (NHM); 19, *N. chalcotechna* (Meyrick, 1937), from Basilan Island, the Philippines, genitalia preparation 29977 (NHM); 20, *N. tristrigella* (Walker, 1866), from Marang, Indonesia, genitalia preparation 29973 (NHM); a: genital complex, ventral view; b: phallus; c: apex of phallus; d: juxta. Scale bar: 0.2 mm (valid for a, b and d only).

Other material. Indonesia. 5 ♂ 3 ♀, Sumatra, Marang, vii.–ix.1890 (Doherty) (NHM); 1 ♂, Sumatra, Padang, 3.ix.1913 (Jacobson) (RMNH); 1 ♂, Sipura Island, 9.x.1924 (Karny) (NHM); 1 ♂, Java, Kalipari, 1891 (Doherty) (NHM); 1 ♂, Java, Preanger, Mount Djampang, 1500–2500 ft., ii.–iii.1936 (Walsh) (NHM); 1 ♂, Java, Buitenzorg, Depok, 7.iii.1941 (Toxopeus) (RMNH); 1 ♂, Java, Buitenzorg, 1894 (RMNH); 1 ♂, Java, Cibodas, 22.ix.1929 (Lieftinck) (RMNH); 1 ♂, Java, Depok, 1886 (RMNH); 1 ♀, ibid., 1885 (RMNH); 1 ♀, ibid., 1883 (USNM); 1 ♂, Java, Jakarta, 1886 (RMNH); 18 ♂ 2 ♀, Bali, 1896 (Doherty) (NHM); 1 ♂, Borneo, Balikpapan, Wain River, xi.1950 (Wegner) (RMNH); 1 ♂, Borneo, Gunungsari, 21.viii.1956 (Wegner) (RMNH); 1 ♂, Kangean Archipelago, Petapan, 20.ix.1954 (Hoogerwerf) (RMNH). Philippines. 1 ♂, Tawi-Tawi Island, 22.xi.1961 (Noona Dan Expedition) (ZMUC).

Diagnosis. *Nemophora tristrigella* is closely related to *N. chalcotechna* (Figs. 4–6), from which differs by the shallowly S-shaped, oblique yellow spot positioned between 0.56–0.62 × FWL at the costal margin and the apex of the forewing, which is sometimes split in two separate spots; a shorter distance (0.09–0.10 × FWL) between the external margin of the fascia's yellow band and the internal margin of this spot; longer male antenna (3.9–4.1 × FWL) and a larger arrow head of juxta (exceeding half of the juxta's total length).

Description. Male (Figs. 7, 8). FWL 6.2–7.7 mm, WLR 0.36–0.40. Vertex glossy golden medially, bordered anteriorly and posteriorly by dark brown piliform scales. Frons glossy golden, bearing a few brown piliform scales below antennal sockets. PLB 0.6 × vertical eye diameter (1.05–1.15 × length of scape), covered by light yellowish brown appressed scales. Proboscis light brown. Eyes enlarged, but not touching each other; interocular index 1.4–1.6, occipital distance 0.15–0.30. Antenna 3.9–4.1 × FWL. Scape shining coppery bronze; 8–12 basal flagellomeres dark brown, first 3–5 of them thickened by raised dark coppery brown scales; distal part of flagellum silver grey. Tegulae and thorax golden. Forewing basally (up to 0.4 × FWL) glossy golden; costal spot at forewing base extends to 0.35 × FWL (Fig. 13). Fascia dark brown, straight, narrow (0.07 × FWL at costa, 0.05 × FWL at dorsum), slightly oblique; inner margin of fascia reaches costa at 0.39–0.47 × FWL; costal half of fascia with yellow medial band. Distal part of forewing bronze with coppery iridescence, with two or three yellow spots surrounded by dark brown scales; long axes of these spots parallel to each other. Two of these spots, one touching costa at 0.56–0.62 × FWL and another at wing apex, are connected by narrow band of dark brown scales sometimes including yellow line, forming S-shaped figure. Third yellow spot near termen clearly isolated from two other spots. Fringe gold to bronze apically to brown with coppery iridescence basally. Hindwing brown, with slight coppery iridescence; costal area grey; fringe brown. Legs golden proximally to dark coppery brown distally; bases of all tarsomeres pale yellow. Epiphysis at 0.5, reaching (or almost reaching) apex of tibia. Abdomen light brown.

Female (Fig. 9). FWL 6.0–6.3 mm, wider than in male: WLR 0.42–0.46. Antenna 1.5–1.8 × FWL; base not thickened. Abdomen brown dorsally, gold to coppery ventrally. Otherwise similar to male.

Male genitalia (Figs. 17, 20). Tegumen wide, dome-shaped, with distinct medial ridge. Socii 1.3 × diameter of phallus. Vinculum 1.8–2.2 × length of valva, with slightly convex lateral margins and shallowly W-shaped distal margin. Tips of valvae extend beyond tip of tegumen. Ventral margin of valva medially with prominent lobe; dorsal margin with slight protrusion in the middle; tip of valva narrowly rounded. Valvae fused basally up to 0.4 × total length; their internal margins indistinct; base of fused valvae medially with deep, narrow indentation (0.05–0.07 × length of valva). Anellus 0.4 × length of valva. Transtilla with short triangular medial process. Juxta 0.6 × length of phallus; arrow head wide (WLR 0.6), with pointed tip and pointed lateral arms; it exceeds half of juxta's total length. Phallus 1.0–1.1 × length of vinculum, in lateral view shallowly S-shaped. Tip of phallus slightly wider than its medial part, with deep ventral incision and small dorsal indentation; base of phallus narrowly funnel-shaped.

Distribution. Indonesia (Sumatra, Sipora, Java, Bali, Borneo, Kangean), Philippines (Tawa-Tawa).

Comments. Although A. Diakonoff misidentified one specimen of *N. chalcotechna* from Mindanao (housed in NHM) as *N. tristrigella*, his description of *N. tristrigella* (Diakonoff 1951) is accurate.

Discussion

This part of the taxonomic revision of fairy moth genus *Nemophora* was completed over two decades ago. Its publication was deliberately delayed due to the poor condition of many specimens involved in this study, including primary types (Figs. 2 and 6), which hindered accurate delimitation of some species. However, since no new specimens have been collected or photographed—as confirmed by a review of the iNaturalist platform—I was compelled to publish this revision despite unresolved issues.

I am confident in the identities of the two new species described here, *N. pendleburyi* and *N. vitalii*, as both are distinguished from *N. chalcotechna* and *N. tristrigella* by the small size of compound eyes in males. Although the male interocular index may vary significantly within species possessing enlarged eyes—typically increasing in southern populations (Kozlov & Robinson 1995; Kozlov 2004)—no *Nemophora* species is currently known to include both small- and large-eyed males. Furthermore, *N. pendleburyi* and *N. vitalii* differ from each other in several traits with relatively low variation, and therefore their taxonomic status is unlikely to be questioned in the future.

In contrast, distinguishing *N. chalcotechna* from *N. tristrigella* remains problematic. The holotype of *N. chalcotechna* is worn, explaining the occurrence of misleading statements in earlier literature. Notably, Meyrick (1937) reported that the eyes in the holotype meet at the crown, although they are clearly separated, and did not describe any regular forewing pattern. Diakonoff (1967), having examined the holotype, concluded that *N. chalcotechna* lacks a forewing fascia—a character he used to separate this species from *N. heliochalca* (Meyrick, 1928). He also listed male genitalia differences between *N. chalcotechna* and *N. tristrigella*, although traits considered by him as diagnostic are now known to vary within *Nemophora* species.

Measurements of available specimens revealed minor distinctions between *N. chalcotechna* and *N. tristrigella*, such as relative male antennal length and details of forewing pattern, allowing for tentative confirmation of their species status. Significantly, the two taxa also differ in geographic distribution, although the gap between their ranges (i.e., between the Philippine islands of Sulu and Tawi-Tawi) is only about 150 km. All known specimens of *N. chalcotechna* were collected northeast of this gap, while *N. tristrigella* specimens originate from the southwest. However, if these two species had not already been described, I would hesitate to divide the available material into two separate species. Further research is needed to clarify the taxonomic status of *N. chalcotechna* and *N. tristrigella*.

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