



# Far Eastern Entomologist

Дальневосточный энтомолог

Journal published by Far East Branch  
of the Russian Entomological Society  
and Laboratory of Entomology, Federal  
Scientific Center of the East Asia  
Terrestrial Biodiversity, Vladivostok

---

Number 494: 1-13

ISSN 1026-051X (print edition)  
ISSN 2713-2196 (online edition)

February 2024

---

<https://doi.org/10.25221/fee.494.1>

<https://elibrary.ru/hthhnt>

<https://zoobank.org/References/D9F00211-B455-4DC6-BC81-8BBE90A3A465>

## A NEW SPECIES OF THE GENUS *PARANTHRENELLA* STRAND, 1916 (LEPIDOPTERA: SESIIDAE) FROM MALAYSIA

O. G. Gorbunov

*A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences,  
Leninsky prospekt 33, Moscow, 119071, Russia. E-mail: gorbunov.oleg@mail.ru*

**Summary.** *Paranthrenella tricincta* **sp. n.** is described and illustrated from the Fraser's Hill Resort in Pahang State, West Malaysia. The new species differs from all other congeners in the coloration of various parts of the body and forewings, as well as in some details of the male genitalia. The type series was bred from larvae collected in the stems of *Rubus sumatranus* Miq. (Rosaceae).

**Key words:** clearwing moths, Synanthedonini, taxonomy, new species, host plant, *Rubus sumatranus*, Oriental Region.

**О. Г. Горбунов. Новый вид рода *Paranthrenella* Strand, 1916 (Lepidoptera: Sesiidae) из Малайзии // Дальневосточный энтомолог. 2024. № 494. С. 1-13.**

**Резюме.** С курорта Фразер Хилл в штате Паханг в Западной Малайзии описан и проиллюстрирован *Paranthrenella tricincta* **sp. n.** Новый вид отличается от всех других представителей рода окраской различных частей тела и передних крыльев, а также некоторыми деталями гениталий самца. Типовая серия была выведена из личинок, собранных в стеблях *Rubus sumatranus* Miq. (Rosaceae).

## INTRODUCTION

The genus *Paranthrenella* Strand, 1916 was established as a subgenus of *Paranthrene* Hübner, 1819 for a single Taiwanese species, *Paranthrene (Paranthrenella) formosicola* Strand, 1916 (Strand, 1916). The subgeneric status of this taxon was supported by Dalla Torre and Strand (1925), but Gaede included *formosicola* in the genus *Paranthrene*, while indicating that “the generic name of *Paranthrenella* Strd. may be used for this species” (Gaede, 1933: 796). Further, the taxon *Paranthrenella* was used either as a subgenus of the genus *Paranthrene* (Naumann, 1971; Fletcher & Nye, 1982) or as its junior synonym (Heppner & Duckworth, 1981; Arita, 1992), and only in 1998, having revised the type species, we came to the conclusion that *Paranthrenella* is a good genus in the tribe Synanthedonini (Arita & Gorbunov, 1998).

Currently, 20 species of this genus are known from the Oriental and Australian Realms (Pühringer & Kallies, 2023) from Nepal, South China and North Vietnam in the north to the state of Victoria in South Australia. The new species described below increases this number to 21.

## MATERIAL AND METHODS

The morphological examinations were made using a Leica EZ4 stereomicroscope with LED illumination. Photos of the biotope, elements of biology and a living moth were photographed with a Konica Minolta Dynax 7D equipped with a Minolta 50 mm f/2.8 macro lens. All images of dry moths were taken with a Sony  $\alpha$ 450 DSLR camera equipped with the same macro lens. The genitalia were photographed using a Keyence BZ-9000 Biorevo fluorescence microscope. The processing of all illustrations was finalised using Adobe Photoshop CC2020 software.

All labels of the holotype are cited verbatim. The labels with geographical data, data on photos and preparation numbers of the genitalia are printed on white paper, but the type label of the holotype and paratypes are printed on red paper. Each label is separated by a semicolon (“;”) lines in a label are separated by a slash (“/”). All pictures of specimens are labelled with a number, consisting of letters and digits: name of the family, two consecutive digits separated by an n-dash and a year following the m-dash (e.g. SESIIDAE pictures №№ 0005-0006–2023). These letters and digit codes correspond to the numbering system of the figured specimens in the author’s archive. Each preparation of the genitalia is stored in a microtube with glycerol pinned under the specimen. The dissected genitalia are equipped with the corresponding number placed in the microtube. This number as a label (e.g. Genitalia preparation № OG–018-2018) is pinned under the specimen and listed in the author’s archive.

The names of plants were verified with the WFO (2023).

The type material is kept in the collection of the A.N. Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russia (COGM).

## DESCRIPTION OF NEW SPECIES

### *Paranthrenella tricincta* O. Gorbunov, sp. n.

<https://zoobank.org/NomenclaturalActs/CF592D7C-05CF-469F-A959-6162867E3DF9>

Figs 1–14

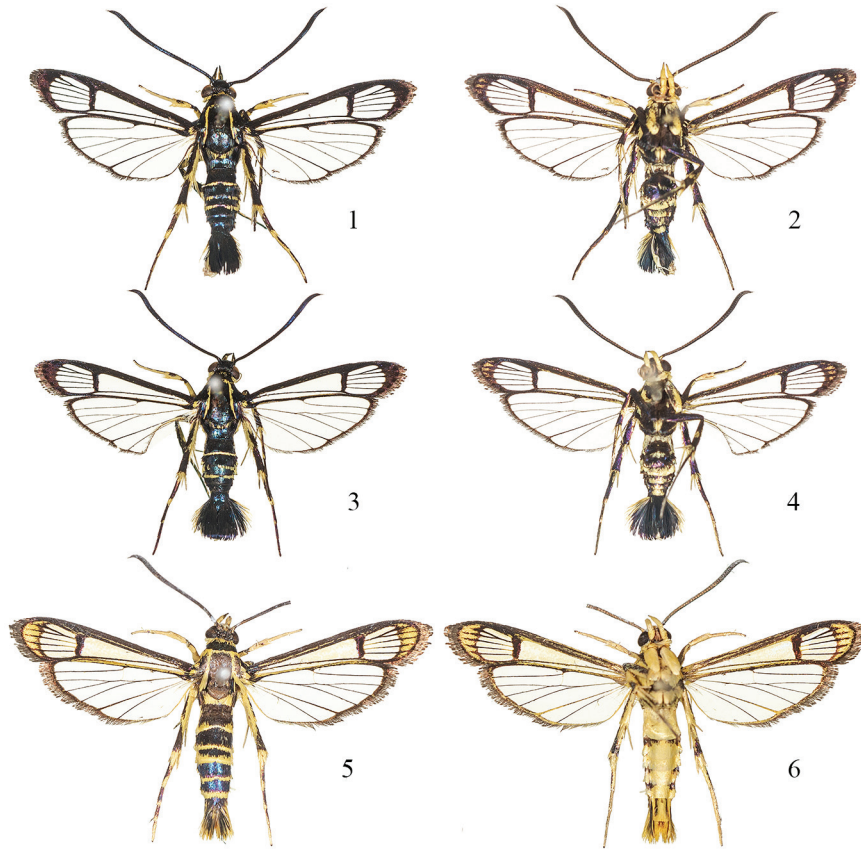
**MATERIAL.** Holotype – ♂, with labels: “**W. Malaysia**, Pahang, / Fraser’s Hill, 1300 m, / 03°43’N, 101°44’E, / 17.VII.2009, *ex l.*, / O. Gorbunov leg.”; “Host plant: / *Rubus sumatranus* / (Rosaceae) / Moth emerged 15.VIII.2009”; “SESIIDAE / Pictures №№ / 0041-0042–2023 / Photo by O. Gorbunov”; “Genitalia examined / by O. Gorbunov / Preparation № / OG–018-2018”; “HOLOTYPUS ♂ / *Paranthrenella tricincta* / O. Gorbunov, 2024 / O. Gorbunov des., 2023”. Paratypes: 1 ♂, with same locality and date as in holotype, *ex l.*, O. Gorbunov leg., emerged 15.VIII.2009 (Pictures №№ 0039-0040–2023; genitalia preparation № OG–019-2018); 1 ♀, with same locality and date as in holotype, *ex l.*, O. Gorbunov leg., emerged 06.IX.2009 (Pictures №№ 0043-0044–2023).

**DESCRIPTION.** Male (holotype) (Figs 1–2, 13). Wing expanse 18.8 mm; body length 9.4 mm; forewing length 8.6 mm; length of antenna 6.3 mm.

Head: antenna black with dark blue-violet shine, scapus black with blue shine dorsally and lemon-yellow ventrally; frons dark brown to black with bronze-violet shine and narrow silvery-white stripe laterally; labial palpus black with dark bronze-blue shine exterior-dorsally and lemon-yellow interior-ventrally; vertex black with bright greenish shine; occipital fringe black mixed with lemon-yellow dorsally and lemon-yellow laterally; neck plate lemon-yellow with few black scales with bright violet shine.

Thorax: patagia black with bright greenish shine and few lemon-yellow scales laterally; tegula black with bright greenish shine and narrow lemon-yellow inner margin; mesonotum black with bright greenish shine anteriorly and greenish-violet shine posteriorly, and few lemon-yellow scales cranially; metanotum mixed with black with greenish-violet shine and lemon-yellow scales; thorax laterally dark brown to black with bright violet shine and large lemon-yellow spot medially; both metepimeron and metameron posteriorly smooth-scaled mixed with dark brown with violet shine and pale lemon-yellow scales. Fore coxa lemon-yellow with golden tint and admixture of black scales with bright violet shine; fore femur black with bright violet shine externally and lemon-yellow internally; fore tibia lemon-yellow with admixture of black scales with bronze-violet shine dorsally; fore tarsus ventrally lemon-yellow, dorsally black with bronze-violet shine and small lemon-yellow spot distally on two basal tarsomeres. Mid coxa black with bright violet shine; mid femur black with bright violet shine externally and lemon-yellow internally; mid tibia black with bright violet shine exterior-dorsally and distally, lemon yellow interior-ventrally, exterior medially and at base of spurs; spurs pale lemon-yellow with golden tint; mid tarsus black with bright bronze-violet shine exterior-dorsally, lemon-yellow interior-ventrally and small lemon-yellow spot dorso-distally on basal tarsomere. Hind coxa black with bright violet shine and narrowly lemon-yellow internally; hind

femur dark black with bright violet shine externally and lemon-yellow internally; hind tibia black with bright violet shine exterior-dorsally and distally, lemon yellow interior-ventrally and at base of both pairs of spurs; spurs pale lemon-yellow with golden tint; hind tarsus black with bright bronze-violet shine exterior-dorsally, lemon-yellow interior-ventrally and small lemon-yellow spot dorso-distally on two basal tarsomeres.



Figs 1–6. *Paranthrenella tricincta* sp. n. 1–2 – Holotype ♂. Sesiidae picture №№ 0041-0042–2023. Alar expanse 18.8 mm; 3–4 – Paratype ♂. Sesiidae picture №№ 0039-0040–2023. Alar expanse 18.0 mm; 5–6 – Paratype ♀. Sesiidae picture №№ 0043-0044–2023. Alar expanse 20.5 mm. 1, 3, 5 – dorsal view; 2, 4, 6 – ventral view.

Forewing dorsally with basal part black with bright greenish shine and small lemon-yellow spot; costal and anal margins, CuA-stem, discal spot, veins within external transparent area and apical area black with dark violet shine; ventrally costal and anal margins, CuA-stem, discal spot, veins within external transparent area and

apical area black with dark bronze-violet shine with few lemon-yellow scales on costal margin distally and on apical area between veins  $R_4-M_2$ ; cilia dark brown with bronze shine; discal spot almost rectangular, narrow, level to vein  $M_2$  about 0.7 times as broad as apical area; transparent areas well-developed; posterior transparent area exceeding distal margin of discal spot; external transparent area large, rounded distally, divided into six cells between veins  $R_3$  and  $CuA_1$ , level to vein  $M_2$  about 6.75 times as broad as discal spot. Hindwing transparent; dorsally costal margin, discal spot, veins and outer margin black with dark bronze-violet shine; ventrally with few lemon yellow scales on costal margin; cilia dark brown with bronze shine, anally yellow; discal spot triangular, small, reaching base of vein  $M_2$ ; outer margin narrow, about 0.2 times as broad as cilia.

Abdomen dorsally black with bright greenish-violet shine; tergites 3–5 each with narrow lemon-yellow stripe distally; ventrally black with bronze-violet shine; sternite 2 with few pale lemon-yellow scales both cranially and laterally; sternite 3 with few lemon-yellow scales distally; remaining sternites densely mixed with lemon-yellow scales; anal tuft well-developed, black with bright greenish-violet shine and narrow lemon-yellow exterior margin.

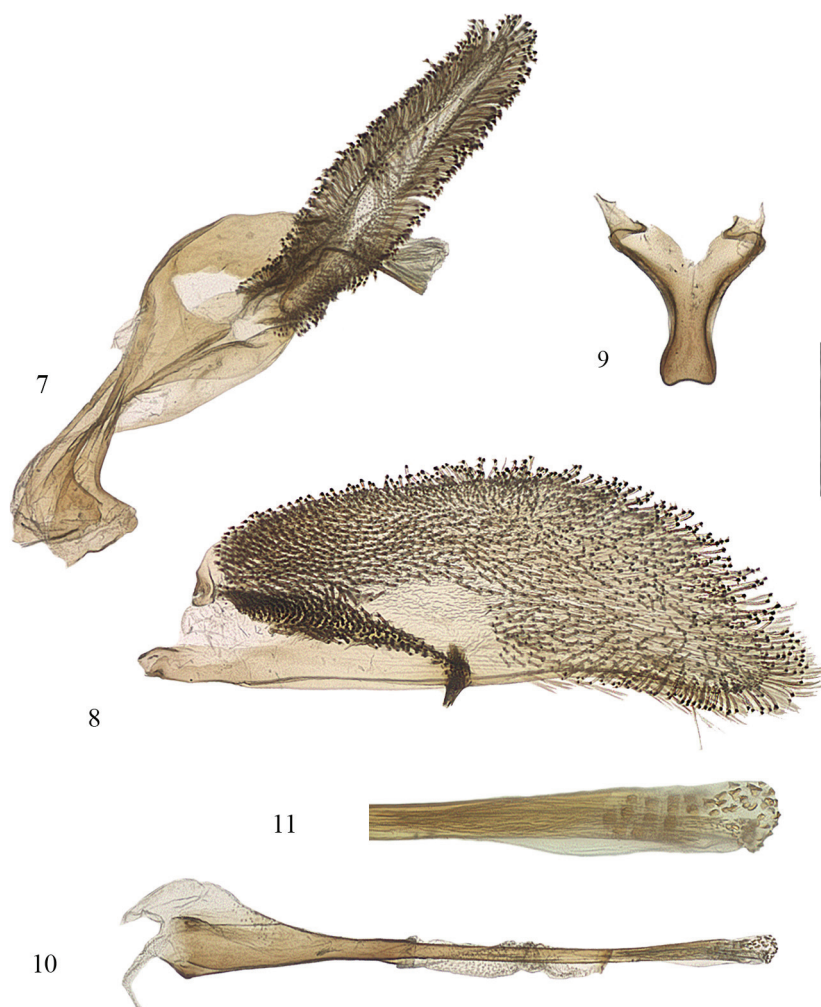
MALE GENITALIA (paratype, genital preparation № OG–018-2018) (Figs 7–11). Tegumen-uncus complex relatively broad; scopula androconialis well-developed, about 0.9 times as long as tegumen-uncus complex (Fig. 7); crista gnathi medialis long and broad; crista gnathi lateralis elongated semi-oval, short and slightly shorter than crista gnathi medialis (Fig. 7); valva (Fig. 8) trapeziform-oval, crista sacculi oblique, long, about 0.4 as long as length of valva, nearly flat, anteriorly not separated from sensory field of setae, covered with apically bifurcate setae; ventral crista small, covered with triangular flat-topped setae; saccus (Fig. 9) slightly broadened basally with somewhat bifurcated base, short, slightly shorter than vinculum; aedeagus (Fig. 10) thin, straight, slightly shorter than valva; vesica with numerous, strong, irregular, nearly flat cornuti (Fig. 11).

FEMALE (paratype) (Figs 5–6). Slightly larger and robust than male. Wing expanse 20.5 mm; body length 10.4 mm; forewing length 9.3 mm; length of antenna 5.5 mm.

Head: antenna black with dark blue-violet shine and few lemon-yellow scales ventrally, scapus black with blue shine dorsally and lemon-yellow ventrally; frons silvery-white with yellowish with golden tint scales medially; labial palpus lemon-yellow with few black scales externally on mid palpomere and dorso-distally on apical palpomere; vertex black with bright greenish shine; occipital fringe lemon-yellow; neck plate lemon-yellow with few black scales with bright violet shine.

Thorax: patagia black with bright greenish shine and few lemon-yellow scales laterally; tegula lemon-yellow with black scales with bright greenish shine medially; mesonotum black with bright greenish shine anteriorly and greenish-violet shine posteriorly, and few lemon-yellow scales cranially; metanotum lemon-yellow; thorax laterally lemon-yellow with bright golden tint; both metepimeron and metameron posteriorly smooth-scaled pale lemon-yellow.

Legs: fore coxa lemon-yellow with golden tint; fore femur black with bright violet shine externally and lemon-yellow internally; fore tibia and fore tarsus lemon-yellow



Figs 7–11. Male genitalia of *Paranthrenella tricincta* **sp. n.** Holotype, genitalia preparation № OG-018-2018. 7 – tegumen-uncus complex; 8 – valva; 9 – saccus; 10 – aedeagus; 11 – vesica. Scale bar: 0.5 mm, 0.2 mm for 11.

with golden tint; mid coxa lemon-yellow with golden tint; mid femur lemon-yellow with golden tint and large black spot with bright violet shine dorso-distally; mid tibia lemon-yellow with golden tint and large black spot with bronze-violet shine dorso-subdistally; spurs pale lemon-yellow with golden tint; mid tarsus black with bright bronze-violet shine exterior-dorsally, lemon-yellow interior-ventrally and large lemon-yellow spot dorso-distally on two basal tarsomeres; hind coxa lemon-yellow with golden tint and black scales with bright violet shine at posterior margin;

hind femur lemon-yellow with golden tint and large black spot with bright violet shine exterior-distally; hind tibia lemon-yellow with golden tint and large black spot with bright violet shine both dorso-basally and subdistally; spurs pale lemon-yellow with golden tint; hind tarsus lemon-yellow with golden tint, dorso-externally three basal tarsomeres black with bright bronze-violet shine and large lemon yellow spot distally, forth tarsomere lemon-yellow with golden tint and few black scales with bright bronze-violet shine, apical tarsomere lemon-yellow with golden tint.

Forewing dorsally with basal part black with bright greenish shine and small lemon-yellow spot; costal margin black with dark violet shine and narrow lemon-yellow stripe between vein Sc and R-stem; CuA-stem black with dark violet shine; anal margin mixed with black and lemon-yellow scales; discal spot black with dark violet shine; veins within external transparent area black with dark violet sheen and yellow scales on veins  $M_1$  and  $M_2$  basally; apical area lemon-yellow with golden tint and with black veins with dark violet shine; outer margin extremely narrow black with dark violet shine; ventrally costal and anal margins and CuA-stem black with dark bronze shine and admixture of lemon-yellow scales; discal spot black with dark bronze-violet shine; veins within external transparent area black with dark bronze-violet sheen and yellow scales on veins  $M_1$  and  $M_2$  basally; apical area lemon-yellow with golden tint and with black veins with dark bronze-violet shine; outer margin extremely narrow black with dark bronze-violet shine; cilia dark brown with bronze shine; discal spot almost rectangular, narrow, level to vein  $M_2$  about 0.5 times as broad as apical area; transparent areas well-developed but densely covered with translucent scales with brownish hue; posterior transparent area exceeding distal margin of discal spot; external transparent area large, rounded distally, divided into six cells between veins  $R_3$  and  $CuA_1$ , level to vein  $M_2$  about five times as broad as discal spot.

Hindwing transparent; dorsally costal margin, discal spot, veins and outer margin black with dark bronze-violet shine; ventrally costal margin and vein CuP lemon yellow; outer margin black with bronze shine and admixture of lemon-yellow scales, more dense anally; cilia dark brown with bronze shine, anally yellow; discal spot triangular, small, reaching base of vein  $M_2$ ; outer margin narrow, about 0.2 times as broad as cilia.

Abdomen dorsally black with bright blue-violet shine; tergites 2–6 each with narrow (more broad on tergite 4) lemon-yellow stripe with golden tint distally; ventrally lemon-yellow with golden tint; sternite 3 with admixture of black scales with bronze shine basally; sternites 5 and 6 each with small black spot with bronze shine latero-basally; anal tuft well-developed, black with bright blue-violet shine mixed with lemon-yellow scales with golden tint.

FEMALE GENITALIA. Not studied.

INDIVIDUAL VARIABILITY. The second male (Figs 3–4) has no differences in the color of the various parts of the body. It is only slightly smaller: wing expanse 18.0 mm; body length 8.7 mm; forewing length 8.0 mm; length of antenna 5.7 mm. Variation for females is unknown.

BIONOMICS. The larval host plant is *Rubus sumatranus* Miq. (Rosaceae). The larval biology is similar to that of *P. dumonti* and *P. koshiensis* (see: Gorbunov &

Arita, 1995, 1999), but usually only one larva lives inside a stem about 1–2 m above the ground level (Fig. 12). The larvae bores a short tunnel about 5 cm in length and pushes out the bored deposits. The presence of even small thickenings on the stem, as well as the visible results of larval activity, unmistakably indicate the presence of larvae of this species inside the stem. Pupation takes place without construction of a cocoon, inside the tunnel in a pupal chamber, which is braided with a cobweb. The pupal stage lasts slightly less than three weeks. Collected larvae were emerged 15 of August and 6 of September as the type series of this beautiful new species (Fig. 13).



Figs 12–13. *Paranthrenella tricincta* sp. n. 12 – Pupal skin (exuvium), male, holotype, 15.VIII.2009; 13 – Freshly emerged male, holotype, 15.VIII.2009.

**HABITAT.** The larvae of the type series were collected on the border of the virgin tropical forest on the way to the Jeriau Waterfall (Fig. 14).

**DISTRIBUTION.** The new species is known only from the type locality on the Titiwangsa Ridge in Raub District of the state of Pahang in West Malaysia.

**ETHYMOLOGY.** The name of this new species is derived from the Latin *tres*, *tria*, meaning three, and *cinctus*, meaning belt, and corresponding to the colouration of the abdomen of males.

#### DISCUSSION

*Paranthrenella tricincta* sp. n. is most similar to *P. duporti* (Le Cerf, 1927) (type locality: North Vietnam, Prov. Ninh Binh, Chợ Gành), but the male of it differs from the latter in the colouration of the frons (white with large grey spot mixed with yellow scales medially in *P. duporti*, vs. dark brown to black with bronze-violet shine and narrow silvery-white stripe laterally in *P. tricincta* sp. n.), labial palpus



Fig. 14. The type locality of *Paranthrenella tricincta* sp. n.: West Malaysia, Pahang, Fraser's Hill.

(yellow with narrow black stripe on apical half externally in *P. duporti*, vs. black with dark bronze-blue shine exterior-dorsally and lemon-yellow interior-ventrally in the new species), patagia (black with violet shine in the species compared, vs. black with bright greenish shine and few lemon-yellow scales laterally *P. tricincta* sp. n.), thorax laterally (yellow with few black scales in *P. duporti*, vs. dark brown to black with bright violet shine and large lemon-yellow spot medially in *P. tricincta* sp. n.), fore coxa (yellow with small, narrow, longitudinal black spot medio-basally in *P. duporti*, vs. lemon-yellow with golden tint and admixture of black scales with bright violet shine in the new species), and abdomen dorsally (black with violet shine, tergites 1, 2, 4 and 6 with broad yellow distal stripe, tergites 3 with narrow yellow stripe distally and tergite 5 with few yellow scales at distal margin in *P. duporti*, vs. dorsally black with bright greenish-violet shine, tergites 3–5 each with narrow lemon-yellow stripe distally in *P. tricincta* sp. n.; cp. Figs 1 and 3 in this article with fig. 7 in Gorbunov & Arita, 1995, fig. 5 in Gorbunov & Arita, 2000 or with figs 342a and 342c in Arita *et al.*, 2021). The males of the two species can also be distinguished by the shape of the external transparent area of the forewing (large, nearly straight distally, level to vein  $M_2$  about 4.5–5.0 times as broad as discal spot and about 1.5 times broader than apical area in *P. duporti*, vs. large, rounded distally, level to vein  $M_2$  about 6.75 times as broad as discal spot and about 3.6 times as broad as apical area in the new species) and some minor details in the genitalia (cp. Figs 7–11 in this article with figs 15a–e in Gorbunov & Arita, 1995).

The female of the new species is separable from the female of *P. duporti* in the colouration of the frons (pale yellow with large grey spot mixed with yellow medially in *P. duporti*, vs. silvery-white with yellowish with golden tint scales medially *P. tricincta* **sp. n.**), labial palpus (yellow with few black scales externally on apical joint in *P. duporti*, vs. lemon-yellow with few black scales externally on mid joint and dorso-distally on apical joint in the new species), hind tibia (yellow with broad black ring with green-blue shine at base of apical spurs in the species compared, vs. lemon-yellow with golden tint and large black spot with bright violet shine both dorso-basally and subdistally in *P. tricincta* **sp. n.**), apical area of the forewing dorsally (black with purplish shine with narrow yellow stripe between veins  $R_4$ – $M_3$  in *P. duporti*, vs. lemon-yellow with golden tint and with black veins with dark bronze-violet shine; outer margin extremely narrow black with dark bronze-violet shine in *P. tricincta* **sp. n.**; cp. Fig. 5 in this article with fig. 8 in Gorbunov & Arita, 1995 or with fig. 342e in Arita *et al.*, 2021), and abdomen (dorsally tergite 1 entirely yellow, tergites 2 and 3 each with yellow distal half, tergites 4–6 each yellow with narrow black proximal margin; ventrally sternite 3 yellow with narrow black proximal margin, other sternites entirely yellow in *P. duporti*, vs. tergites 2–6 each with narrow (more broad on tergite 4) lemon-yellow stripe with golden tint distally; ventrally lemon-yellow with golden tint, sternite 3 with admixture of black scales with bronze shine basally, sternites 5 and 6 each with small black spot with bronze latero-basally in the new species).

The male of *P. tricincta* **sp. n.** clearly differs from the male of *P. koshiensis* Gorbunov *et al.*, 1999 (type locality: Nepal, Koshi zone, 3 km N of Dhankuta) in the colouration of the frons (snow-white with grey-brown scales with golden shine medially in *P. koshiensis*, vs. dark brown to black with bronze-violet shine and narrow silvery-white stripe laterally in *P. tricincta* **sp. n.**), hind tibia (golden yellow with sparse black spot with blue-violet shine exterior-medially and broad black ring with blue-violet shine distally in the species compared, vs. black with bright violet shine exterior-dorsally and distally, lemon yellow interior-ventrally and at base of both pairs of spurs in the new species), and abdomen (dorsally black with dark green shine; tergite 1 densely mixed with golden yellow scales medially; tergite 2 and 4 each with broad golden yellow stripe distally; tergite 7 with narrow golden yellow stripe subdistally; ventrally black with blue-green shine; sternites 2 and 4 each densely mixed with golden yellow scales; remaining sternites with broad golden yellow stripe distally in *P. koshiensis*, vs. dorsally black with bright greenish-violet shine; tergites 3–5 each with narrow lemon-yellow stripe distally; ventrally black with bronze-violet shine; sternite 2 with few pale lemon-yellow scales both cranially and laterally; sternite 3 with few lemon-yellow scales distally; remaining sternites densely mixed with lemon-yellow scales in the new species; cp. Figs 1 and 3 in this article with fig. 16 in Gorbunov & Arita, 1999). There are some minor differences between these two species in the male genitalia, compare Figs 7–11 in this article with Figs 46a–e in Gorbunov & Arita, 1999.

The female of *P. tricincta* **sp. n.** is easily distinguished in the colouration of the apical area of the forewing (black with bronze-purple shine, densely mixed with yellow

scales between veins in *P. koshiensis*, vs. apical area lemon-yellow with golden tint and with black veins with dark bronze-violet shine; outer margin extremely narrow black with dark bronze-violet shine in the new species; cp. Fig. 5 in this article with fig. 17 in Gorbunov & Arita, 1999) and abdomen (dorsally black with dark green shine; tergites 2, 4 and 6 each with broad golden yellow stripe distally; tergite 3 with narrow golden yellow stripe distally; ventrally golden yellow; sternite 4 with narrow, broadened laterally, black with greenish-purple shine stripe proximally; sternites 5 and 6 each with small black spot with greenish-bronze shine latero-proximally in the species compared, vs. dorsally black with bright blue-violet shine; tergites 2–6 each with narrow (more broad on tergite 4) lemon-yellow stripe with golden tint distally; ventrally lemon-yellow with golden tint; sternite 3 with admixture of black scales with bronze shine basally; sternites 5 and 6 each with small black spot with bronze shine latero-basally in the new species; cp. Fig. 5 in this article with fig. 17 in Gorbunov & Arita, 1999).

From all other congeners, especially those species whose larvae are associated with *Rubus*, this new species is well distinguished in the colouration of the forewing and abdomen and in the shape and size of the external transparent area of the forewing.

Larval host plants are known only for seven species of the genus *Paranthrenella*. So, larvae of *P. duporti* (Le Cerf, 1927) from North Vietnam feed in stems of *Rubus* sp. (Rosaceae) (Le Cerf, 1927; Gorbunov & Arita, 1995), these of *P. koshiensis* (Gorbunov et Arita, 1999) were bred from the stems of *Rubus ellipticus* Sm. (Rosaceae) in East Nepal (Gorbunov & Arita, 1999). The confirmed larval host plants of *P. formosicola* from China (Taiwan) are *Rubus alnifolius* Rydb. (as *R. anlifoliatus*) and *R. croceacanthus* H.Lév. (as *R. piptopetalus* Hayata ex Koidz.) (Rosaceae) (Liang & Hsu, 2015). Taiwanese specimens of *P. weiyui* Liang et Hsu, 2015 were bred from “the trunks of 3–5 cm diameter” of *Lindera megaphylla* Hemsl. (Lauraceae) (Liang & Hsu, 2015: 543), but larvae of *P. helvola* Liang et Hsu, 2019 “bores into the trunks of *Cinnamomum camphora* (L.) J.Presl (Lauraceae) and feeds on callus tissue around the hole” (Liang & Hsu, 2019: 88). Specimens of *P. terminalia* Kallies, 2020 from New Guinea were bred from *Terminalia papuana* Exell (as *Terminalia brassii* Exell) (Combretaceae) (Kallies, 2020). And, finally, the Australian species *P. chrysophanes* (Meyrick, 1887) is reported as polyphagous on many woody plants, namely *Alphitonia excelsa* (Fenzl) Benth. (Rhamnaceae), *Eucalyptus* spp. (Myrtaceae), *Exocarpos cupressiformis* Labill. (Santalaceae), *Ficus* spp. (Moraceae), *Wisteria* spp. (Fabaceae) (Duckworth & Eichlin 1974; Common, 1990; Kallies, 2020). In addition, it is considered a pest of *Diospyros kaki* L.f. (Ebenaceae) (Bignell *et al.* 2014; Kallies, 2020). The type series of this new species was bred by me from larvae collected from stems of *Rubus sumatranus* Miq. (Rosaceae), which is a new host plant for the genus.

There is no generalized summary on the fauna of clearwing moths in West Malaysia. I managed to find information about only 24 species in the literature (Dalla Torre & Strand 1925; Gaede 1933; Bradley, 1957; Robinson *et al.* 1994; Fischer 2002, 2003, 2006; Hosaka *et al.* 2007; Skowron *et al.* 2015; Skowron Volponi & Volponi 2017b; Gorbunov 2018b, 2021c, 2022). Of course, this number should be considered insignificant for such a region rich in biological diversity.

## ACKNOWLEDGEMENTS

I express my heartfelt gratitude to my wife Lyudmila M. Petrova (Moscow, Russia) for the company and help during our trip to Malaysia in 2009 and in many of our other joint trips to many countries to collect the most mysterious Lepidoptera, which are clearwings. I am indebted to Dr. Anatoly V. Krupitsky (Moscow, Russia) for carefully checking the English of an advanced draft.

The study was conducted using the equipment of the Joint Usage Center “Instrumental methods in ecology” at the A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences (Moscow, Russia). The investigation was fulfilled within the State research projects № AAAA-A18-118042490060-1.

## REFERENCES

- Arita, Yu. 1992. Sesiidae. In: Heppner, J.B. & Inoue H. *Lepidoptera of Taiwan. Checklist*, 1(2): 97.
- Arita, Yu., Gorbunov, O.G. 1998. A revision of Embrik Strand’s clearwing moth types (Lepidoptera: Sesiidae) from Taiwan. *Chinese Journal of Entomology*, 18: 141–165.
- Arita, Yu., Gorbunov, O.G., Kallies, A. & Yata, N. 2021. Historical type specimens of Sesiidae species kept in European museums. *Tinea*, 25(Supplement 3): 1–211.
- Bignell, G., Bruun, D. & Senior, L. 2014. Final report for HAL project PR12000. Australian sweet persimmon industry development project (Phase 3). *Horticulture Australia*, Sydney. 100 pp.
- Bradley, J.D. 1957. A new species of *Conopia* from Malaya (Lep.: Aegeriidae). *The Entomologist*, 90: 67–69.
- Common, I.F.B. 1990. *Moths of Australia*. Melbourne University Press, Carlton, Victoria, 535 pp., 32 pls.
- Dalla Torre, K.W. von & Strand, E. 1925. Aegeriidae. In: Strand, E. (Hrsg.) *Lepidopterorum Catalogus*, 31. W. Junk, Berlin. 202 pp. DOI: 10.5962/bhl.title.143714
- Duckworth, W.D. & Eichlin, T.D. 1974. Clearwing moths of Australia and New Zealand (Lepidoptera: Sesiidae). *Smithsonian contributions to Zoology*, 180: 1–45. DOI: 10.5479/si.00810282.180
- Fischer, H. 2002. *Nokona stroehlei* sp. nov., eine neue Glasflüglerart aus den Cameron Highlands in Malaysia (Lepidoptera: Sesiidae, Sesiinae). *Entomologische Zeitschrift*, 112(5): 141–143.
- Fischer, H. 2003. *Nokona christineae* sp. nov., eine neue Glasflüglerart aus den Cameron Highlands in Malaysia (Lepidoptera: Sesiidae, Sesiinae). *Entomologische Zeitschrift*, 113(5): 139–141.
- Fischer, H. 2006. *Paranthrene dominiki* sp. n., a new clearwing moth species from the Cameron Highlands in West Malaysia (Lepidoptera: Sesiidae, Sesiinae). *Nachrichten des entomologischen Vereins Apollo, N.F.*, 27(1/2): 53–54.
- Fletcher, D.S. & Nye, I.W.B. 1982. Bombycoidea, Castnioidea, Cossoidea, Mimallonoidea, Sesiioidea, Sphingoidea, Zygaenoidea. In: Nye, I.W.B. (Ed.) *The generic names of moths of the world. Vol. 4*. Trustees of the BMNH, London. XIV + 192 pp. DOI: 10.5962/bhl.title.119597
- Gaede, M. 1933. 23. Familie: Aegeriidae. S. 775–802, Taf. 94–95. In: Seitz, A. (Hrsg.). 1926–1930. *Die Gross-Schmetterlinge der Erde, 10 (Die indoaustralischen Spinner und Schwärmer)*. A. Kernen Verlag, Stuttgart.

- Gorbunov, O.G. 2018. A new species of the genus *Taikona* Arita et O. Gorbunov, 2001 from the Malay Peninsula (Lepidoptera, Sesiidae). *Russian Entomological Journal*, 27(3): 293–296. DOI: 10.15298/rusentj.27.3.10
- Gorbunov, O.G. 2021. A new species of the genus *Paradoxecia* Hampson, 1919 (Lepidoptera, Sesiidae) from West Malaysia with a catalogue of the genus. *Russian Entomological Journal*, 30(3): 328–335. DOI: 10.15298/rusentj.30.3.11
- Gorbunov, O.G. 2022. A new species of the genus *Tyriactaca* Walker, 1862 (Lepidoptera: Sesiidae) from West Malaysia with a catalogue of the genus. *Zootaxa*, 5104(1): 125–136. DOI: 10.11646/zootaxa.5104.1.7
- Gorbunov, O.G. & Arita, Yu. 1995. New and poorly known clearwing moth taxa from Vietnam (Lepidoptera, Sesiidae). *Transactions of the Lepidopterological Society of Japan*, 46(2): 69–90.
- Gorbunov, O.G. & Arita, Yu. 1999. New taxa of the clearwing moths (Lepidoptera, Sesiidae) from Nepal. *Tinea*, 16(2): 106–143.
- Gorbunov, O.G. & Arita, Yu. 2000. Study on the Synanthedonini (Lepidoptera, Sesiidae) of Vietnam. *The Japanese journal of Systematic entomology*, 6(1): 85–113.
- Heppner, J.B. & Duckworth, W.D. 1981. Classification of the Superfamily Sesiioidea (Lepidoptera, Ditrysia). *Smithsonian Contribution to Zoology*, 314: 1–144. DOI: 10.5479/si.00810282.314
- Hosaka, T., Arita, Y. & Kirton L.G. 2007. Seed predation on the dipterocarp *Neobalanocarpus heimii* (Dipterocarpaceae) by the clearwing moth *Synanthedon nautica* (Lepidoptera, Sesiidae) in Peninsular Malaysia. *Transactions of the lepidopterological Society of Japan*, 58(2): 165–171.
- Kallies A. 2020. The clearwing moths (Lepidoptera, Sesiidae) of Australia, New Guinea and the Pacific Islands. *Zootaxa*, 4833(1): 1–64. DOI: 10.11646/zootaxa.4833.1.1
- Le Cerf, F. 1927. Aegeriidae nouvelles du Tonkin. In: Lechevalier, P. (Ed.). *Encyclopédie entomologique. Série B. Mémoires et notes. III. Lepidoptera. Tome II*: 147–149.
- Liang, J.-Yu. & Hsu, Yu-F. 2015. A review of clearwing moths in the tribe Synanthedonini, with descriptions of six new species from Taiwan (Lepidoptera: Sesiidae). *Zootaxa*, 4044(4): 535–555. DOI: 10.11646/zootaxa.4044.4.4
- Liang, J.-Yu. & Hsu, Yu-F. 2019. Two new species of the tribe Synanthedonini (Lepidoptera, Sesiidae), with new hostplant associations from Taiwan. *ZooKeys*, 861: 81–90. DOI: 10.3897/zookeys.861.34387
- Naumann, C.M. 1971. Untersuchungen zur Systematik und Phylogese der holarktischen Sesiiden (Insecta, Lepidoptera). *Bonner zoologische Monographien*, 1: 1–190.
- Pühringer, F. & Kallies, A. 2023. *Checklist of the Sesiidae of the world (Lepidoptera: Ditrysia)*. Online database. Last modified: 17.05.2023. Available from: <http://www.sesiidae.net> (accessed 20 June 2023)
- Robinson, G.S., Tuck, K.R. & Shaffer, M. 1994. *A Field Guide to the Smaller Moths of South-East Asia*. Malaysian Nature Society, Kuala Lumpur, 309 pp., 32 pls.
- Skowron, M.A., Munisamy, B., Hamid, S.B.A. & Wegrzyn, G. 2015. A new species of clearwing moth (Lepidoptera: Sesiidae: Osminiini) from Peninsular Malaysia, exhibiting bee-like morphology and behaviour. *Zootaxa*, 4032(4): 426–434. DOI: 10.11646/zootaxa.4032.4.7
- Skowron Volponi, M.A. & Volponi, P. 2017. A new species of wasp-mimicking clearwing moth from Peninsular Malaysia with DNA barcode and behavioural notes (Lepidoptera, Sesiidae). *ZooKeys*, 692: 129–139. DOI: 10.3897/zookeys.692.13587
- Strand, E. 1916. H. Sauter's Formosa-Ausbeute: Noctuidae p. p. (Agaristinae, *Macrobroschis*), Aganaidae, Saturniidae, Uraniidae, Cossidae, Callidulidae und Aegeriidae. *Archiv für Naturgeschichte. Abteilung A*, 81(8): 34–49.
- WFO 2023. *World Flora Online*. Available at: <http://www.worldfloraonline.org> (accessed 21 June 2023).