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RESEARCH ARTICLE

A new species of the genus *Scarlata* (Lepidoptera: Sesiidae) from Laos

Новый вид рода *Scarlata* (Lepidoptera: Sesiidae) из Лаоса

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Abstract. *Scarlata namsanam* **sp. nov.** from Laos is described and illustrated. The type series was collected on wet soil near the drying stream within a primary monsoon lowland tropical forest. This new species is most similar to *S. guichardii* Skowron Volponi, 2022, from which it differs in the coloration of the hind tibia, forewing and abdomen and in noticeably wider discal spot of the hindwing.

Резюме. Приведено описание *Scarlata namsanam* **sp. nov.** из Лаоса. Типовая серия была собрана на влажной почве у пересыхающего ручья среди первичного муссонного низинного тропического леса. Новый вид наиболее близок к *S. guichardii* Skowron Volponi, 2022, но отличается от него окраской задних голеней, переднего крыла и брюшка и существенно более широким дискальным пятном заднего крыла.

Key words: clearwing moths, taxomony, Laos, Oriental Region, Sesiidae, Sesiinae, Osminiini, new species

Ключевые слова: бабочки-стеклянницы, таксономия, Лаос, Ориентальный регион, Sesiidae, Sesiinae, Osminiini, новый вид

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Introduction

In the spring of 2005, I collected several hundreds of the clearwing moths of different species in Laos. Some of these species were poorly represented in collections and were therefore redescribed (Gorbunov, 2015, 2021b, c), others were described as new for science (Gorbunov, 2021a). For a long time, an putative new species remained undescribed due to its uncertain position in the tribe Osminiini. The systematic position of this species became clear only after by M. Skowron Volponi (2022) established the genus *Scarlata* for three species known from Laos, northern Thailand, western and eastern Malaysia: *S. ignisquamulata* (Kallies et Štolc, 2018), *S. guichardii* Skowron Volponi, 2022, and *S. nirvana* Skowron Volponi, 2022 (the type species of the genus).

Material and methods

The morphological examinations were made using a Leica EZ4 stereomicroscope with LED illumination. All images of moths were taken with a Sony α450 DSLR camera equipped with a Minolta 50 mm f/2.8 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 specimens of the type series were collected with an entomological net. All labels of the holo-

type are cited verbatim. The labels are printed on white paper, with the exception of the type labels of the holotype and paratypes, which are printed on red paper. When quoting, labels are separated by semicolons; lines in a label are separated by a slash. All images of moth are provided with individual numbers consisting of a family name, two consecutive numbers separated by an n-dash and a year following the m-dash (e.g. SESIIDAE pictures №№ 0279-0280–2021). These codes can be used to identify specimens in the author's archive. Genitalia preparations are stored in microtubes with glycerol, provided with an individual number (e.g. Genitalia preparation № OG–017-2021) and pinned under the corresponding specimens.

The names of the host plants were verified with the WFO (2022). The type material of the new species and other specimens mentioned herein are deposited in the A.N. Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russia (COGM).

Taxonomy

Order **Lepidoptera**

Family **Sesiidae**

Subfamily **Sesiinae**

Tribe **Osminiini**

Genus ***Scarlata*** Skowron Volponi, 2022

Scarlata namsanam **sp. nov.**
(Figs 1–14)

Holotype. Male, "Laos, Khammouang Prov., / Ban Khounkham (Nahin), / 18°13′ N, 104°31′ E, 200 m, / 19.IV.2005, / O. Gorbunov leg."; "SESIIDAE / Pictures №№ / 0021-0022–2022 / Photo by O. Gorbunov"; "HOLOTYPUS ♂ / *Scarlata namsanam* / O. Gorbunov, 2022 / O. Gorbunov des., 2022".

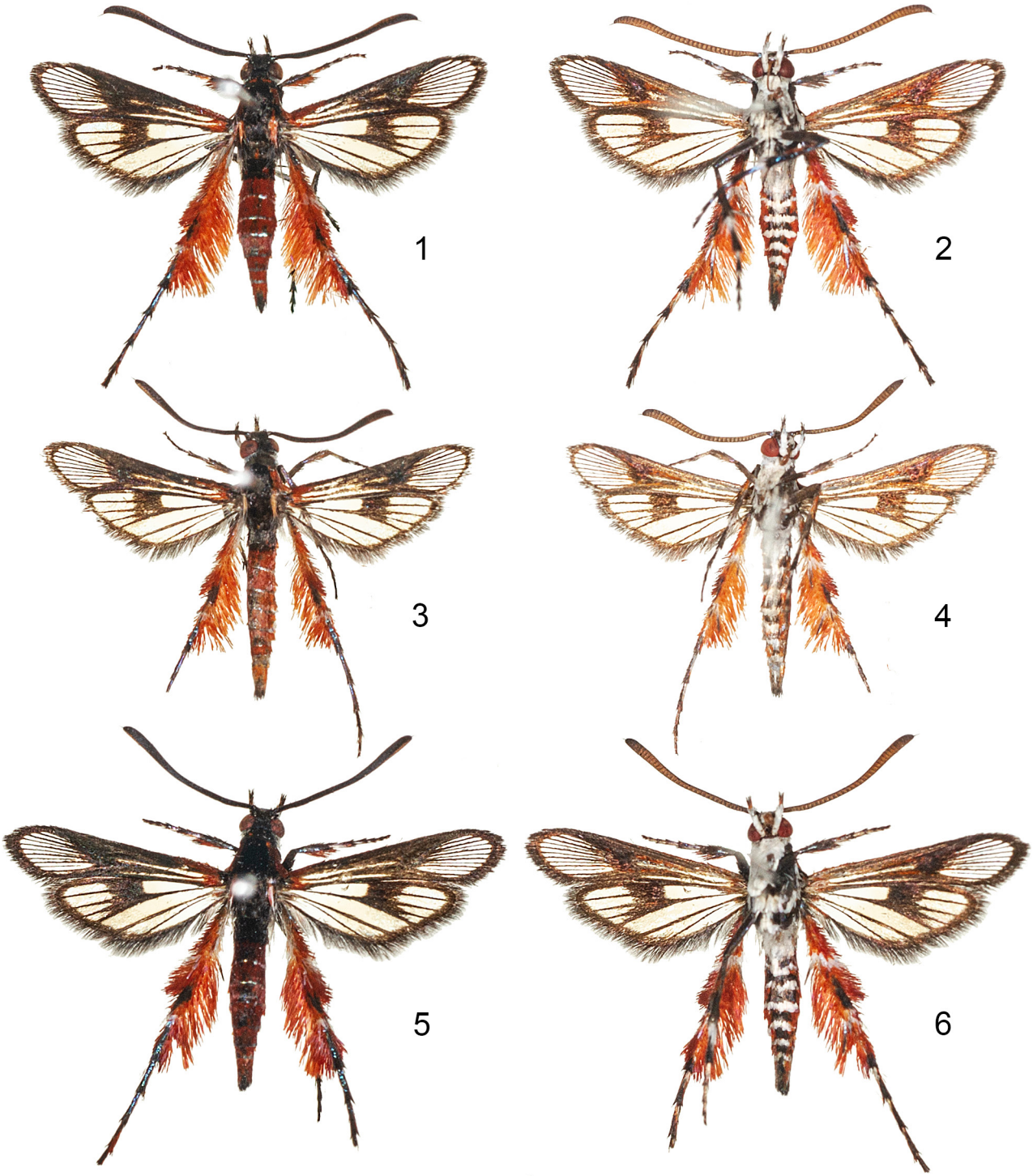
Paratypes. Same locality as for holotype: 1 male, 15.IV.2005; 1 male, 17.IV.2005 (genitalia preparation № OG–063-2018); 1 male, 18.IV.2005; 1 male, 19.IV.2005; 1 male, 24.IV.2005 (genitalia preparation № OG–009-2021); 2 males, 25.IV.2005; 2 males, 27.IV.2005.

Description. *Male* (holotype) (Figs 1–2). Wing span 14.0 mm; body length 8.0 mm; forewing length 6.4 mm; length of antenna 4.6 mm.

Head. Antenna dorsally black with dark violet sheen, ventrally dark yellow. Scapus black with dark violet sheen. Frons dark grey with bright bronze-violet sheen and a narrow lateral silvery white stripe. Labial palpus white with bronze-violet tint and with an admixture of grey-brown scales at apex. Vertex black with bright greenish purple sheen. Occipital fringe white with a few black and brick red scales dorsally. Neck plate white with golden tint.

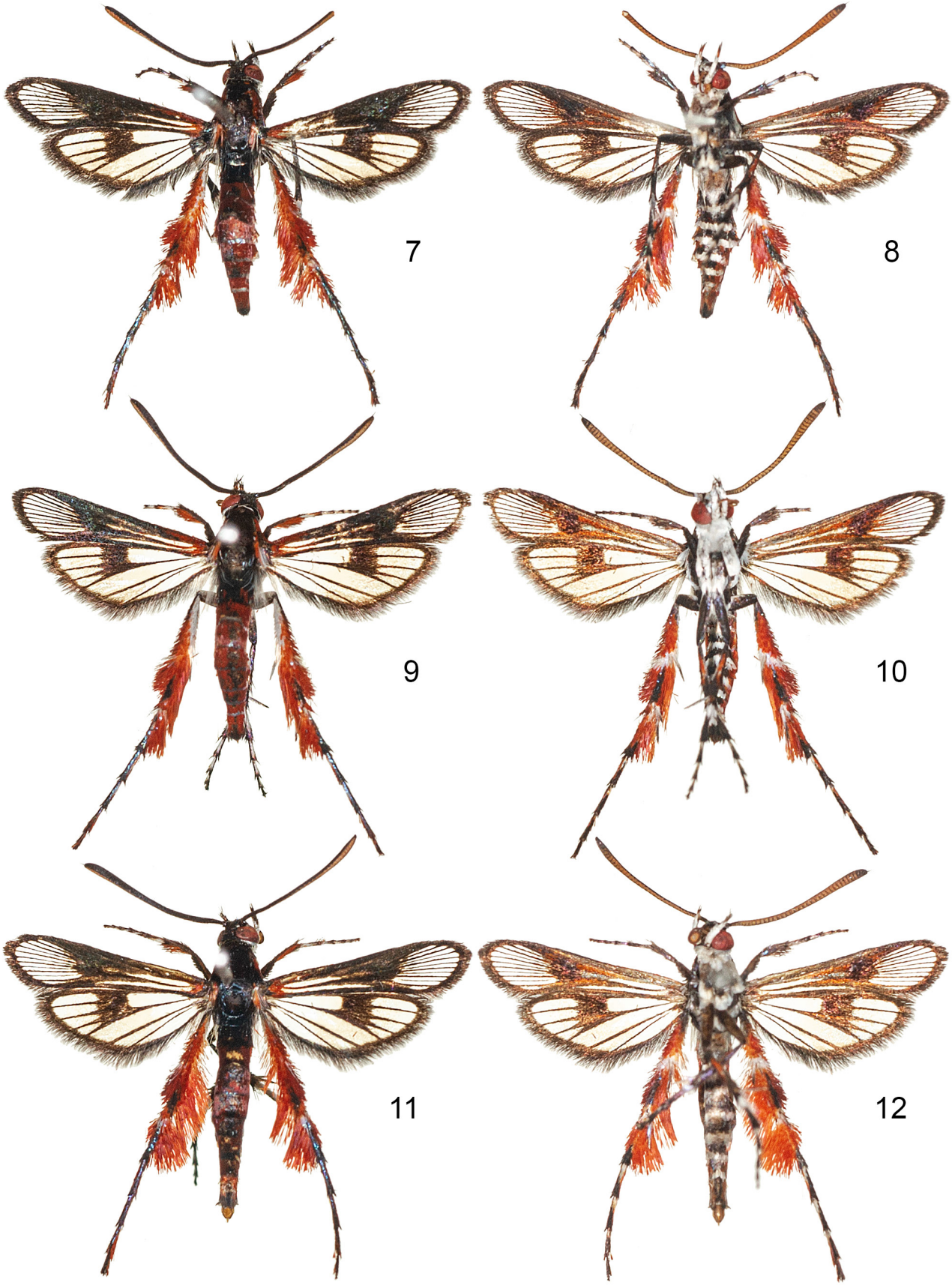
Thorax. Patagium black with greenish violet sheen and with a few brick red scales anteriorly. Tegula black with dark greenish violet sheen, densely covered with brick red scales masking background coloration. Mesothorax black with dark greenish violet sheen. Metathorax black with dark greenish violet sheen, with a few brick red scales medially and with a tuft of white hair-like scales laterally. Thorax laterally grey-brown with blue-violet sheen, narrow white stripe dorsally and broad white distal margin of mesomeron. Posteriorly both metepimeron and metameron dark grey-brown with bluish sheen and with a few white scales, densely covered with white hair-like scales.

Legs. Fore coxa white with golden tint. Fore femur black with greenish violet sheen and short and narrow white spot at posterior margin basally. Fore tibia dorsally dark brown to black with bright blue-violet sheen and tuft of brick red elongated scales at posterior margin, ventrally dark brown with bronze-violet sheen. Fore tarsus dorsally dark brown to black with bright blue-violet sheen and a few orange and brick red scales posteriorly on basal tarsomere, ventrally yellowish with golden tint, small black spot with bright blue-violet sheen distally on basal tarsomere and with a few black scales distally on remaining tarsomeres. Mid coxa white with golden tint. Mid femur externally dark brown to black with bright greenish violet sheen with white with golden tint and brick red scales at anterior margin, internally dark brown with bronze-violet sheen. Mid tibia externally black with bright purple sheen, with admixture of brick red scales in basal half, internally dark brown to black with bronze-violet sheen, with admixture of white and yellowish scales with golden tint in basal half and a few elongated scales distally; spurs externally dark brown with bronze-violet sheen, internally white with golden tint. Mid tarsus dorsally black with bright blue-violet sheen, ventrally white with golden tint and a small black spot with



Figs 1–6. Variability of males of *Scarlata namsanam* **sp. nov. 1–2**, holotype, wing expanse 14.0 mm, Sesiidae picture №№ 0021-0022–2022; **3–4**, paratype, wing expanse 13.1 mm, Sesiidae picture № 0023-0024–2022; **5–6**, paratype, wing expanse 15.5 mm, Sesiidae picture № 0149-0150–2021. Dorsal (1, 3, 5) and ventral (2, 4, 6) view.

Figs 7–12. Variability of males of *Scarlata namsanam* **sp. nov. 7–8**, paratype, wing expanse 15.5 mm, Sesiidae picture №№ 0025-0026–2022; **9–10**, paratype, wing expanse 15.3 mm, Sesiidae picture № 0027-0028–2022; **11–12**, paratype, wing expanse 15.5 mm, Sesiidae picture № 0147-0148–2021. Dorsal (7, 9, 11) and ventral (8, 10, 12) view.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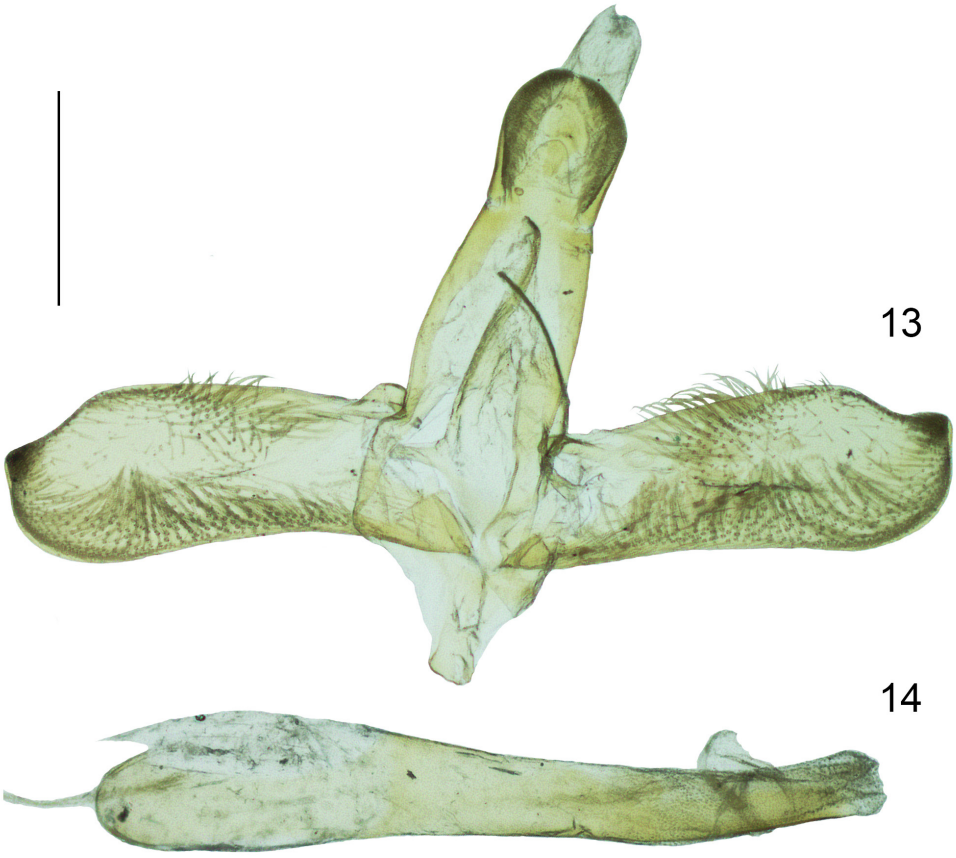

Figs 13, 14. Male genitalia of *Scarlata namsanam* **sp. nov.** Paratype. Genital preparation № OG–009-2021. **13**, ventral view; **14**, aedeagus. Scale bar: 0.5 mm.

bronze-violet sheen distally on each tarsomere. Hind coxa white with golden tint and large grey-brown spot with blue-violet sheen externally. Hind femur dark brown to black with violet sheen. Hind tibia brick red, narrowly black with bright greenish blue sheen both exterior-basally and exterior-apically, with white scales with purple tint exterior-medially and white scales in basal half internally; spurs white with purple tint and a few brown scales with bronze sheen externally. Hind basal tarsomere with elongated brick red scales forming continuation of tibial tuft, dorsally narrowly black with bright greenish blue sheen, remaining tarsomeres dorsally black with dark purple sheen and a small black spot with bright greenish blue sheen on each tarsomere basally, tarsomeres 2–4 each with a few brick red scales both externally and internally and with large white to yellowish spot with golden tint interior-ventrally.

Wings. Costal and anal forewing margins and *CuA*–stem brick red basally, remaining opaque parts dark brown to black with dark purple sheen; anterior and posterior transparent areas narrow and short; external transparent area extremely large, divided into six cells between veins R_{3+4}–CuA_2, cells between veins R_{3+4}–CuA_1 divided by a scaled stripe into two cells; apical area narrow, about as broad as cilia; cilia dark brown to black with dark bronze sheen. Ventrally, costal and anal margins and *CuA*–stem of forewing ochreous with bright golden tint, remaining opaque parts dark brown with bright golden-purple sheen with admixture of brick red scales. Hindwing transparent but part of wing distally of discal spot covered with hyaline scales with brownish tint; dorsally veins, discal spot and outer margin dark brown to black with dark purple sheen; discal spot extremely broad, surface between veins CuA_1 and CuA_2 opaque in basal half; outer margin narrow, about 0.5 times as broad as cilia; cilia dark brown to black with dark purple sheen; ventrally veins, discal spot and outer margin dark brown to black with bright golden-purple sheen, with a few brick red scales on costal margin, *CuA*–stem and vein M_3.

Abdomen dorsally black with dark purple sheen; tergites 2–7 densely covered with brick red scales masking background colouration; distal row of scales on tergites 2–7 white with strong silvery shine; ventrally sternite 1+2 white with golden tint; remaining sternites dark brown to black with dark bronze sheen, broad white stripe with golden tint distally and brick red scales laterally; anal tuft nearly undeveloped.

Male genitalia (paratype; genital preparation № OG–009-2021; Figs 13–14). Tegumen broad, slightly narrowing towards uncus; uncus oval, slightly narrower than tegumen, with margins densely covered with very short setae in inner part; gnathos triangular, rounded at tip; valva elongated, with slightly arcuated coastal margin, small triangular patch of dense short setae at apex and long setae densely scattered along both dorsal and ventral margins; saccus short and nearly straight basally (Fig. 13); aedeagus (Fig. 14) relatively broad and long, about 1.7 times as long as valva; vesica with numerous minute granular cornuti.

Female. Unknown.

Individual variability (Figs 1–12). The specimens slightly varying in the number of brick red and white scales on various parts of the body and wings. In addition, the size of the anterior and posterior transparent areas of the forewing, as well as the size of the discal spot of the hindwing, are slightly variable. Wing expanse 13.1–15.5 mm; body length 8.0–8.6 mm; forewing length 5.9–7.0 mm; antenna length 4.0–4.9 mm.

Comparison. By the structure of the male genitalia, this new species is most similar to *S. guichardii* Skowron Volponi, 2022 (type locality: Malaysia, Sabah, Poring hot springs), but it differs from the latter in the coloration of the hind tibia ["...hind legs dorsally black with tufts of scarlet hair-like scales on tibia and inner margin of 1st tarsomere..." (Skowron Volponi, 2022: 586) in *S. guichardii*, *vs.* hind tibia brick red, narrowly black with bright greenish blue sheen both exterior-basally and exterior-apically, with white scales with purple tint exterior-medially and white scales in basal half internally in *S. namsanam* **sp. nov.**], forewing [dorsally opaque parts black in the species comparing, *vs.* dorsally costal and anal margins, *CuA*–stem brick red basally in *S. namsanam* **sp. nov.**], abdomen ["...black, tergites with narrow white margins" (Skowron Volponi, 2022: 586) in *S. guichardii*, *vs.* dorsally black with dark purple sheen; tergites 2–7 each densely covered with brick red scales masking background coloration; distal row of scales on tergites 2–7 white with strong silvery shine in *S. namsanam* **sp. nov.**] and in noticeably wider discal spot of the hindwing in the new species; cf. Figs 1, 3, 5, 7, 9, 11 in this article with fig. 3b in Skowron Volponi (2022). From *S. ignisquamulata* (Kallies et Štolc, 2018) (type locality: North Thailand, Nan, Nam Om), *S. namsanam* **sp. nov.** differs in the coloration of the mesothorax [dorsally completely red in *S. ignisquamulata*, *vs.* completely black with dark greenish violet sheen in *S. namsanam* **sp. nov.**], fore- and hindwing [forewing dorsally red in basal half; veins, except vein *CuP*, of hindwing red in basal third in *S. ignisquamulata*, *vs.* costal and anal margins, and *CuA*–stem of forewing brick red basally; all veins of hindwing dark brown to black with dark purple sheen in *S. namsanam* **sp. nov.**; *cf.* Figs 1, 3, 5, 7, 9, 11 in this article with fig. 1 in Kallies & Štolc, 2018]. In addition, these two species are well distinguished from each other by the shape of the uncus and valva in the male genitalia; *cf.* Fig. 13 in this article with fig. 3 in Kallies & Štolc (2018). From *S. nirvana* Skowron Volponi, 2022 (type locality: Malaysia, Pahang Merapoh), *S. namsanam* **sp. nov.** is separable in the coloration of the fore and mid coxae [fore coxa white with several black and orange scales ventrally; mid coxa black with silver sheen in basal half, white in distal half in *S. nirvana*, *vs.* both fore and mid coxae entirely white with golden tint in *S. namsanam* **sp. nov.**] and hind tibia [entirely scarlet-red in *S. nirvana*, *vs.* brick red, narrowly black with bright greenish blue sheen both exterior-basally and exterior-distally, with white scales with purple tint exterior-medially and white scales in basal half internally in *S. namsanam* **sp. nov.**]. Moreover, these two species differ in the size of the transparent areas of the forewing and the discal spot of the hindwing [transparent areas of the forewing visibly more developed and the discal spot of the hindwing distinctly narrower in *S. nirvana*; *cf.* Figs 1, 3, 5, 7, 9, 11 in this article with fig. 3a in Skowron Volponi, 2022]. In addition, these two species are well separated from each other by the shape of the uncus and valva in the male genita-

lia; *cf.* Fig. 13 in this article with fig. 5 in Skowron Volponi (2022). From *Nepyrophleps haematochrodes* (Le Cerf, 1912) (type locality: North Vietnam, Hòa Bình, Song Da River), which lives syntopically with the new species, *S. namsanam* **sp. nov.** differs in the less developed transparent areas of the forewing and the noticeably broader discal spot of the hindwing (*cf.* Figs 1–12 in this article with figs 9–20 in Gorbunov, 2021c). In addition, these two species clearly differ from each other in the structure of the male genitalia (*cf.* Figs 13–14 in this article with figs 21–22 in Gorbunov, 2021c), which is a reliable diagnostic character for the separation of these genera.

Etymology. The new species is named after the Nam Sanam stream in the vicinity of the village of Ban Khounkham or Na-Hin (Nahin), where it was collected on drying banks. The specific name is a noun in apposition.

Distribution. Known from the type locality only.

Bionomics. The larval host plant and the larval biology are unknown. The specimens were collected in April among wasps and bees on wet soil near the drying Nam Sanam stream. They were exhibiting the typical mud-puddling behaviour (Gorbunov 2015; Skowron Volponi, Volponi, 2018) and usually appeared at moist soil early in the day. Usually they came across among more numerous *Aschistophleps longipoda* Arita et O. Gorbunov 2000, *A. zamesovi* O. Gorbunov, 2021 and *N. haematochrodes.*

Habitat. The new species inhabits a primary monsoon semi-deciduous lowland tropical forest with *Dipterocarpus alatus* Roxb. ex G.Don, *Hopea odorata* Roxb., *H. ferrea* Laness. (Dipterocarpaceae), *Lagerstroemia cochinchinensis* Pierre ex Laness. (Lythraceae), *Afzelia xylocarpa* (Kurz) Craib (Fabaceae) and *Alstonia scholaris* (L.) R. Br. (Apocynaceae) as the most common species.

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