

Salassa shuyiae n. sp., a new giant silkworm from Hainan, China (Lepidoptera, Saturniidae, Salassinae)

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Abstract: *Salassa shuyiae* n. sp. is described from the island of Hainan, China. The holotype ♂ of the new species is deposited in the collection of the College of Life Science, Chongqing Normal University, China. The new species is compared to *Salassa lemai* LE MOULT, 1933, with which it shares the general appearance and the late flight season. The female holotype of *Salassa lemai* (in coll. MNHN, Paris) is illustrated here for the first time in colour.

Keywords: *Salassa lemai*, taxonomy, biology, endemic species, Oriental region.

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Zusammenfassung: *Salassa shuyiae* n. sp. wird von der chinesischen Insel Hainan beschrieben. Der Holotypus ♂ wird in der Sammlung des College of Life Science, Chongqing Normal University, China, deponiert. Die neue Art wird mit *Salassa lemai* LE MOULT, 1933 verglichen, die ihr morphologisch und von der späten Flugzeit her innerhalb des Genus *Salassa* am nächsten steht. Der weibliche Holotypus von *Salassa lemai* (in coll. MNHN, Paris) wird hier erstmals farbig abgebildet.

Introduction

During the last decade, a lot of entomological material has been obtained from the People's Republic of China, and many new species have been described since. Concerning the Saturniidae, apart from the newly described species added to China's faunal list, there has been an important amount of interesting new distributional data for China's Saturniid fauna, e.g. for *Actias chapae* MELL, 1950, which was long thought to be endemic to the Fan Si Pan mountain in Vietnam, but later proved to be present in China (MORISHITA & KISHIDA 2000, WU & NAUMANN 2006) as well. From the island of Hainan, there have been some descriptions of new species of Saturniidae in the last years (NAUMANN 1999, BRECHLIN 2004, NÄSSIG & WANG 2006), first attempts to a faunal list (NAUMANN 1999), and an interesting statement found on the internet concerning *Salassa lemai* LE MOULT, 1933 on Hainan (WANG & FAN 2007). This later citation is probably based on an erroneous identification of the species involved, and should therefore be considered as the first known data on the new species described herein.

In early December 2007, the senior author conducted a successful entomological expedition to Hainan with the principal aim to collect specimens of *Salassa lemai*, having in mind the note by WANG & FAN (2007). All the specimens captured during this expedition later proved to be constantly different from typical *S. lemai* from Vietnam.

The genus *Salassa* MOORE, 1859 currently includes 15 Asian species and subspecies (one new species and one

new subspecies just described recently: WITT & PUGAEV 2007), some of them with unclear status. Among those known species, only the large sized *Salassa lemai* from Vietnam and Thailand shows big translucent green eyespots on both fore- and hindwings in both sexes, making its identification easy. *Salassa shuyiae* n. sp. from Hainan province of China described here is the only species found very similar to *Salassa lemai* up to now.

Abbreviations

AT	Allotype.
CLRR	Private collection of Luigi RACHELI, Rome, Italy.
CQNU	College of Life Science, Chongqing Normal University, Chongqing, China.
CSHF	Private collection of Sami HAAPALA, Finland.
CSKL	Private collection of Steve KOHLL, Luxembourg.
CTKF	Private collection of Teemu KLEMETTI, Finland.
GP	Genitalia dissection with number.
HT	Holotype.
INCA	Insects collection of INCA Science Ltd., Chongqing, China.
MHNN	Insects collection of the Muséum National d'Histoire Naturelle, Paris.
PT	Paratype.
SIV	<i>Salassa lemai</i> specimens from Tam Dao, Vietnam.
SIT	<i>Salassa lemai</i> specimens from Doi Inthanon, Thailand.

Description of the new species

Salassa shuyiae n. sp.

Holotype ♂: People's Republic of China, Hainan prov., Ledong county, Mt. Jianfengling, 1050 m, 6.-9. XII. 2007, ZHANG W. leg, in coll. CQNU.

Paratypes (in total 5 ♂♂, 4 ♀♀): 1 ♀ (AT), same data as HT, in coll. INCA. 2 ♂♂, 1 ♀, same data as HT, in coll. INCA; 2 ♂♂ (GP WZ 2008002, GP WZ 2008003), 1 ♀ (GP WZ 2008004), same data as HT, in coll. INCA; 1 ♂ (GP SK 52/08), 1 ♀ (GP SK 53/08), same data as HT, in CSKL.

Derivatio nominis: The new species is named after the senior author's daughter Shuyi.

Material used for comparison:

Salassa lemai LE MOULT, 1933

♀ holotype, N. Vietnam, Tam Dao, deposited in coll. MNHN, Paris, illustrated here for the first time in colour (Figs. 11, 12, 13).

12 ♂♂, Vietnam, Vinh Phuc Province, Tam Dao, 950 m, road from village to the peaks, 19. x. 2006, leg. T. KLEMETTI, distributed as follows: 1 ♂ in coll. INCA (GP WZ 2008001); 1 ♂ in CSKL (GP SK 51/08); 4 ♂♂ in CTKF; 6 ♂♂ in CSHF.

2 ♂♂, Thailand, Chiang Mai province, 1680 m, XII. 2007, leg. local people, in CLRR. 1 ♀, Thailand, Chiang Mai province, 1680 m, XII. 2007, leg. local people, GP SK 55/08, in CSKL.

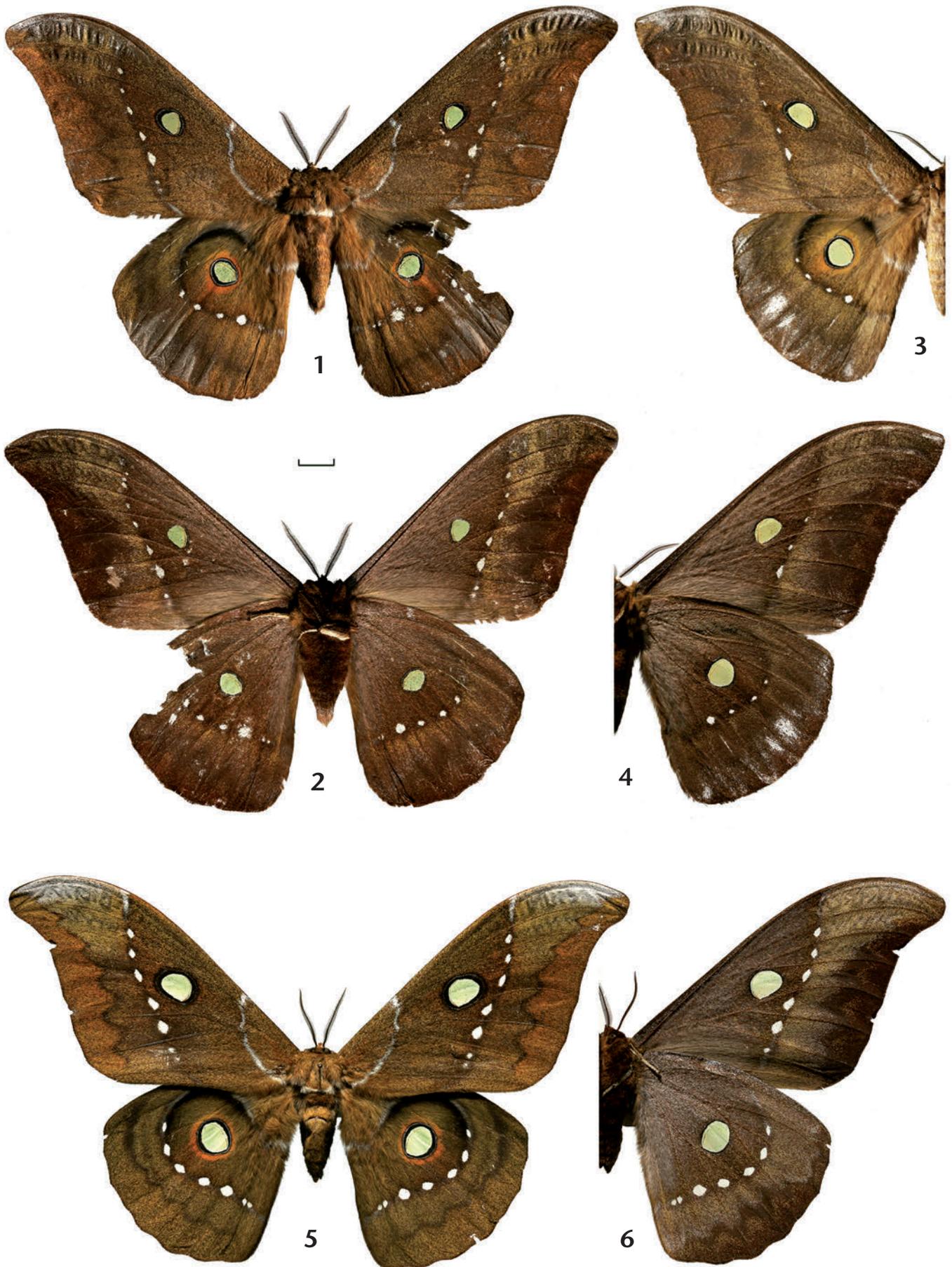


Plate 1, Figs. 1–6: Males. Fig 1: *Salassa shuyiae* n. sp.: holotype ♂, dorsal view. Fig. 2: dito, ventral view. Fig. 3: Paratype ♂, dorsal view. Fig. 4: dito, ventral view. — Fig. 5: *Salassa lemai*, ♂ from Tam Dao, Vietnam, dorsal view. Fig. 6: dito, ventral view. — Figs. 1–6 by W. ZHANG. — Scale = 10 mm.



Plate 2, Figs. 7–13: Females. Fig. 7: *Salassa shuyiae* n. sp.: allotype ♀, dorsal view. Fig. 8: dito, ventral view. Fig. 9: Paratype ♀, dorsal view. Fig. 10: dito, ventral view. Scale = 10 mm. — Fig. 11: *Salassa lemai* holotype ♀, dorsal view (MNHN). Fig. 12: dito, ventral view. Fig. 13: dito, labels. — Figs. 7–10 by W. ZHANG; Figs. 11–13 MNHN. — Scale = 10 mm.

13



Description

♂ (Figs. 1–4): HT (Figs. 1, 2): Head, thorax, abdomen and legs in ground colour, dorsal part of the metathorax white, this white line joining the base of the antemedian lines of the forewings.

Base of antennae white, antennae quadripectinate, the last 7 segments bipectinate, length 21 mm (mean 19,1 mm, n = 6; SIV mean 19,25 mm, n = 12; SIT mean 20 mm, n = 2), 46 segments, longest rami 1,8 mm.

Forewing: Wingspan 182 mm (mean 169,6 mm, n = 6; SIV mean 177,4 mm, n = 5), length of forewing, measured from the base to the apex, 98 mm (mean 92 mm, n = 6; SIV mean 93,66 mm, n = 12; SIT mean 105 mm, n = 2). Forewing with prominent apex, rounded tornus, the outer margin concave. Ground colour yellowish-brown, the yellowish coloration resulting from the inclusion of light yellow scales on all wing parts, the density of these yellow scales increasing from base to outer margin. The external area lighter in colour. Antemedian line white, describing a concave arc to the costa. Postmedian line almost straight, base of postmedian line from the inner margin to CuA2 white, outlined by brown. This white line is replaced to the costa by a row of 5 small hyaline fenestrae between veins, whereas the brown line is continuous. Area between the postmedian and the external line yellowish brown, the density of the yellow scales being higher than in the median area. External line, starting at 1A at the tornus to the apex, concave, wavy, of brown colour. Apical area, between the external and postmedian lines, from the costa approximately to vein M1 of greyish coloration. External area from external line to outer margin yellow-brown, density of the yellow scales higher again. Discal spot oval, translucent, greenish, length 7 mm, width 6 mm (mean 7,16 mm × 6,16 mm, n = 6; SIV mean 10,5 mm × 8,17 mm, n = 12; SIT mean 16 mm × 9 mm, n = 2). The discal spot is rounded by an inner black, median white and outer purplish brown ring.

Hindwing: Ground colour like the forewing, postmedian line greyish, replaced between veins by a row of 6 fenestrae. The line joins the whitish-grey antemedian line by surrounding the ocellus in a circular bow, outlined to the inner by black (maximal width 2 mm), which is typical for the genus. The discal spot, greenish and translucent, is almost circular, length 7 mm, width 6 mm (mean 7,25 mm × 6,25 mm, n = 6; SIV mean 9,41 mm × 9,41 mm, n = 12; SIT mean 12,5 mm × 11 mm, n = 2), rounded by an inner black, median white and outer purplish-brown ring, the whole being rounded by a broader yellow-orange ring. External line composed of two more or less parallel dark-brown lines, the internal one not being continuous.

Ventral side of both wings brown, base of wings bearing whitish scales. Postmedian line dark-brown outlined by the vitreous spots of the upper side. The yellow scales only appear in the external area, between postmedian

line and external line, and only externally of the external line. This line wavy, dark purplish-brown, broadest between veins M3 and CuA1. Outer margin chocolate brown. The postmedian line of the hind wing begins near the base of the wing, and is therefore strongly curved basad.

♂ **genitalia**, Fig. 13: Tegumen presenting a pseudouncus, acting as a hood to the protruded claw-shaped uncus, which bears sparse small setae and regularly narrows to the rounded tip. Gnathos weakly defined, being present as a slender sclerotized plate. Valvae narrowing to the apical part, which is composed of 2 ending points, the dorsal one shorter, bearing numerous setae, the ventral one longer, bare and more pointed. Saccular process strong, ending in 2 points, the lower being armed with 3 to 4 heavily sclerotized teeth (asymmetrical number of teeth for both valvae). Saccus triangular, regularly tapering to a rounded tip.

Phallus tubular, straight, length 5,4 mm (SIV 6,5 mm, GP SK 51/08), caecum penis weakly sclerotized, vesica small without cornuti.

♀ (Figs. 7–10): AT (Figs. 7, 8): Head and thorax in ground colour, legs and ventral side of abdomen darker greenish-brown, densely covered with longer hairs, dorsal side of abdomen in ground colour, laterally with a faint greyish line.

Antennae 47 segments, length 19 mm (mean 18,75 mm, n = 4; SIT 17 mm, n = 1), longest rami 1 mm, base of antennae whitish-grey.

Forewing: Wingspan 153 mm, (mean 154,75 mm, n = 4; SIT 179 mm, n = 1), length of forewing, measured from the base to the apex, 85 mm (mean 85,5 mm, n = 4; SIT 99 mm, n = 1; SIV 97 mm, n = 1); in general pattern similar to the ♂, differing as follows: Apex not protruded, outer margin straight, tornus more rounded. Ground colour appearing more greenish-brown, due to an increased presence of interspersed yellow scales. Postmedian line outlined with 7 vitreous spots between veins, not as straight as in the ♂, slightly bowed. Ocellus larger, length 10,5 mm, width 7 mm (mean 9,875 mm × 7,125 mm, n = 4; SIT 18 mm × 10 mm, n = 1; SIV 14 mm × 8,5 mm, n = 1), external line more contrasted, wavy, dark brown. Similar greyish area at the apex of the wings, but descending to M1/M2

Hindwing: apex more squared, the double external line's outer part well marked, continuous, the inner part more diffuse, broader and interrupted. Base of the brown postmedian line whitish-grey, outlined with 7 transparent spots, rejoining the antemedian line by rounding the ocellus in a bow; this portion of the postmedian line whitish-grey, outlined externally by brown coloration, and to the inner by black. Hyaline fenestra of the ocellus larger than in the ♂, length 9 mm, width 7,5 mm (mean 8,75 mm × 7,75 mm, n = 4; SIT 15,5 mm × 13 mm, n = 1; SIV 10 mm × 10,5 mm, n = 1), of green colour, with rounding rings of the same colour than in the ♂.

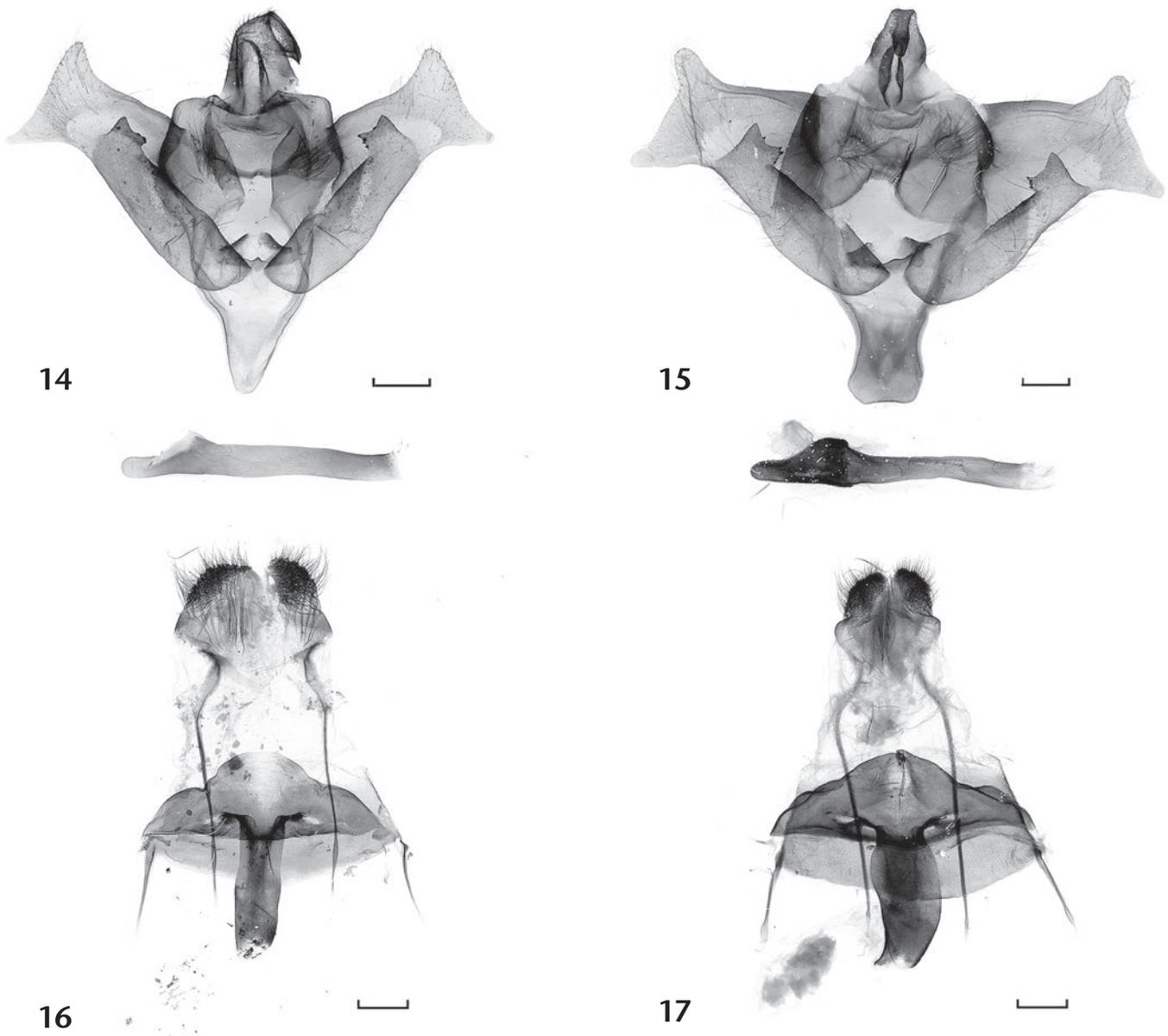


Plate 3, Figs 14–17: Genitalia of ♂♂ and ♀♀. **Fig. 14:** *Salassa shuyiae* n. sp., ♂, GP SK 52/08. — **Fig. 15:** *Salassa lemii* from Tam Dao, Vietnam, ♂, GP SK 51/08. — **Fig. 16:** *Salassa shuyiae* n. sp., ♀, GP SK 53/08. — **Fig. 17:** *Salassa lemii* from Doi Inthanon, Thailand, ♀, GP SK 55/08. — Figs. 14–17 by S. KOHLL. — Scale = 1 mm.

Ventral side of both wings more greyish-brown, contrasted, basal area to postmedian band with whitish-grey inserted scales, postmedian line suffused with yellow scales. The external area much lighter, suffused with both whitish-grey and yellow scales, external line dark brown, concave, outlined to the margin by patches of yellow scales, those being parallel to the outer margin. Marginal area dark brown.

♀ genitalia, Fig. 15: Papillae anales of ovoid shape. Apophyses posteriores strongly sclerotized, about 2 times longer than the weakly sclerotized apophyses anteriores. Vaginal plate large, heavily sclerotized, with rounded margins above ostium. Ostium sclerotized, antrum with straight external margins, sclerotized, cone-shaped. Ductus bursae with almost parallel margins, length 2,8 mm, corpus bursae pear-shaped, membranous, without signa.

Biology

The adults have been captured in early December 2007, indicating that the species is a winter flyer. All specimens were taken at light. Weather conditions were rainy, and the moths arrived at random time. The first ♀ was attracted at about 20:00 h, only one or two specimens were taken after midnight, and there was no clear time difference for the arrival of ♂♂ and ♀♀.

According to the junior author's experience with the breeding of caterpillars from the genus *Salassa*, the new species should have only one generation per year.

Distribution

So far, the new species has only been found on the island of Hainan, China, and is supposed by the authors to be an endemic of this island.

Discussion

Only two localities for *Salassa lemaii* are known to the authors: these are the mountains of Tam Dao in Vietnam (LE MOULT 1933, NÄSSIG 1994) (type locality for *Salassa lemaii* LE MOULT, 1933) and Chiang Mai province in Thailand (PINRATANA & LAMPE 1990). These localities are about 700 km separate from each other. A third locality, which appeared on the internet and supposed to host *Salassa lemaii* (WANG & FAN 2007), are the mountains of Jianfengling on the Chinese island of Hainan. This location lies some 550 km away from Tam Dao in Vietnam, and more than 1000 km away from Chiang Mai in Thailand. There are no populations known inbetween the three localities, and specimens of both *Salassa* species compared here were all collected at medium to high altitudes.

The study of the specimens collected by the senior author on Hainan revealed minor differences in wing pattern and sufficient differences in genitalia structures, and eventually led to the herein presented description of *Salassa shuyiae* n. sp.

Obviously, the new species is closely related to *Salassa lemaii* LE MOULT, 1933, sharing its general appearance and late flight period. Differences can be found externally in the size of the ocelli in both fore- and hind-wings, those being on average much larger in *S. lemaii*. Also, the fenestrae on the postmarginal lines are smaller in the new species. Further, the interspersed yellow scaling on the dorsal sides of both fore- and hind wing seems to be denser in *Salassa lemaii* than in the new species.

In the ♂ genitalia, *Salassa shuyiae* n. sp. differs from *S. lemaii* in the overall smaller size, the differently shaped apex of the valvae, the ventral point of the apex being longer and slender in the new species, the width of the valvae, being much broader in *lemaii* than in the new species, the shorter and lesser sclerotized phallus, and most of all, the different shape of the saccus which is triangular in the new species, being almost square with rounded corners in *Salassa lemaii*. Furthermore, the hood-like pseudouncus is larger and basally broader in the new species.

In the ♀ genitalia of *Salassa shuyiae* n. sp., the ductus bursae is narrower than in *Salassa lemaii*, with almost parallel margins, whereas in *S. lemaii*, those margins give the ductus bursae a more bulbous appearance. The apophyses posteriores are shorter in *S. shuyiae* n. sp., and both apophyses anteriores and posteriores are not as strong as in *S. lemaii*. The rounded margin above the ostium of the vaginal plate is more eminent in *S. shuyiae* n. sp. than in *S. lemaii*. In general, the ♀ genitalia of *Salassa shuyiae* n. sp. appears to be less sclerotized than the ♀ genitalia of *S. lemaii* with which it is compared here.

The authors like to point out that the populations of both Thailand and Vietnam are here treated as belonging to the same species *Salassa lemaii*, but feel that a thorough study of the Thai population should be conducted in order to assess the correct status of its representatives.

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