

An addition to the biogeography of the genus *Stichophthalma* C. & R. FELDER, 1862:

A new species from the Vietnamese central highlands

(Lepidoptera, Nymphalidae: Amathusiinae)

by

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Abstract: A new species, *Stichophthalma devyatkini spec. nov.* is described and illustrated from Hon Ba Nature Reserve (Central Vietnam, Khanh Hoa province, Dien Khanh District). The new species belongs to the *Stichophthalma louisa* (WOOD-MASON, 1877) group and appears related to *S. mathilda* JANET, 1905 and *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA, 2000, while differing in a number of major characters. The new taxon fills a biogeographical vacuum for this group of species and reaffirms vicarious ranges of endemic *Stichophthalma* in the Indochinese Peninsula.

Stichophthalma devyatkini spec. nov. (colour plate: 1, 2, 5, 6)

Holotype ♂: Central Vietnam, Khanh Hoa province, Dien Khanh district, Hon Ba Nature Reserve, evergreen mountain forest ridge at 1500 m, 15.VI.2013, A. L. MONASTYRSKII leg.

Paratypes: 2 ♂♂, 14.VI.2013; 3 ♂♂, 15.VI.2013; 6 ♂♂, 16.VI.2013; 4 ♂♂, 1 ♀, 17.VI.2013; 3 ♂♂, 1 ♀, 18.VI.2013; 2 ♂♂, 1 ♀, 19.VI.2013 collected at the same location and habitat as the holotype. The holotype and one paratype will be deposited in the collection of the Natural History Museum, London (BMNH); the other paratypes will be kept in the collection of the Vietnam-Russia Tropical Research Centre, Toyosato Museum of Entomology (Japan) and Kitakyushu Museum of Natural History and Human History (Japan).

Description: Both sexes have black antennae and dark brown hairs which densely cover the thorax and abdomen.

The ♂ (col. pl.: 1) has secondary sexual characters on the upper surface of the hindwing: hair brush in the oval androconial patch on the UpH is brown. This character is similar to *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA (col. pl.: 3), but darker than in *S. mathilda* JANET (light brown) (col. pl.: 4). The shape of the forewing is rounded and the termen is evenly convex as in *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA.

Upperside: The forewing ground colour is pale brown with a slightly darker tint in the basal area and light brown with an ochreous tint in the discal area instead of uniformly brown as in *S. mathilda* JANET (col. pl.: 4) and uniformly reddish brown as in *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA (col. pl.: 3); the distal part of the wing is snowy white and of the same width as *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA. The apex is black and this colour narrowly extends along the termen almost to the tornus while the margins are white from vein 4 (M3) to the dorsum. Arrowhead marks are small, I-shaped and peaked and are usually connected to the marginal black border.

The hindwing ground colour is brown with slightly pale tint in costal and discal areas and dark brown in the dorsal area. Large black arrowhead submarginal marks are weakly peaked and merge with each other, forming a narrow space between them in cells 2/3 (Cu1a/M3), 3/4 (M3/M2), 4/5 (M2/M1) and 5/6 (M1/R5). This differs from *S. mathilda* JANET and *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA in which black arrowed marks in cells 2A, Cu1b, Cu1a and sometimes M3 are merged without spaces forming a fully black area. In *S. devyatkini spec. nov.* spaces separating arrowhead marks in cells 2/3 (Cu1a/M3), 3/4 (M3/M2) and partly in cell 4/5 (M2/M1) are yellowish, whereas spaces between marks in cells 5/6 (M1/R5), 6/7 (R5/R1) and partly in cell 4/5 (M2/M1) are mostly whitish. Margins are also whitish with a pale violet tinge.

Underside: The forewing ground colour is slightly variable dark greenish olive but more brownish than in *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA (col. pl.: 7) and *S. mathilda* JANET (col. pl.: 8); an irregular black outer margin of the discal fascia in cell 1b (Cu1b) is directed towards the termen along vein 1b (1A+2A); however the inner and outer margins are often joined along the central line of cell 1b (Cu1b). The postdiscal ocellus in cell 2 (Cu1a) is large and much larger in contrast with the small ocelli in cells 3-6 (M3-R5); sometimes the ocellus in cell 3 (M3) is absent.

The hindwing ground colour is similar to the forewing; sometimes the postdiscal area is more greenish; the whitish area along the black outer margin of the discal fascia is sullied (it is wider and clear in *S. mathilda* JANET and *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA). The postdiscal ocelli in cells 2 (Cu1a) and 6 (R5) are very large; a small ocellus is present in cell 4 (M2), but spots in cells 3 (M3) and 5 (M1) are either absent or very small.

The ♀ (col. pl.: 2, 6) is usually larger. Generally, the wing pattern is similar to the ♂, though the ground colour on the upperside is slightly paler; paler from both sides, with more yellow colour on the upperside and more white on the underside of both wings.

Length of the forewing: ♂♂ n=21; $\bar{x}=66,0 \pm 0,526$ mm; xmin= 64; xmax =68 mm; ♀♀ n=3; $\bar{x}= 72,0$.

Diagnosis and discussion: The following characters demonstrate that the new taxon belongs to *S. louisa* (WOOD-MASON) group: 1. weakly developed sexual dimorphism (the ♀♀ are just larger); 2. extensive pure white distal area on the upperside of the forewing; 3. basal and sub-basal areas on both wings are coloured uniformly; 4. ground colour of the

submarginal area on the upperside of the hindwing is much paler than other areas of the wing; 5. underside ground colour with a greenish tinge; 6. all submarginal ocelli on the underside of forewing are similar in size which is variable within the group; submarginal ocelli on the hindwing are well developed; ocelli in cells 2 (Cu1a) and 6 (R5) are usually larger; 7. discal area on hindwing is without a small streak inside the discal cell.

Judging from the wing pattern, shape of wings and behaviour, the new species is related to the Vietnamese representatives of the *S. louisa* (WOOD-MASON) group, *S. mathilda* JANET and *S. eamesi* MONASTYRSKII, DEVIATKIN & UEMURA. However features of the wing pattern and the low variability seen in 21 ♂♂ and 3 ♀♀ indicate that the new taxon evidently belongs to a distinct species.

In comparison to *S. mathilda* JANET and *S. eamesi* MONASTYRSKII, DEVIATKIN & UEMURA, the new species exhibits a previously unknown combination of several external characters which demonstrate high stability:

1. Ground colour of the upper forewing varies from brown to pale brown while ground colour of the hindwing varies from brown to dark brown.

Comment: This tint and variation in ground colour is unknown in Vietnamese representatives of the *S. louisa* (WOOD-MASON) group.

2. Submarginal black arrowhead markings on the hindwing are very large and fully merged in cells 1a, 1b and 2 (2A, Cu1b, Cu1a) and sometimes in cell 3 (M3); spaces between other arrowhead marks are narrow and vary in colouration.

Comment: This character is very distinctive and unknown in other representatives of the *S. louisa* (WOOD-MASON) group which usually possess well delineated and distinct arrowhead markings.

3. Underside forewing postdiscal ocellus in cell 2 (Cu1a) are much larger than others.

Comment: In other related Vietnamese species this ocellus is even larger but comparable with other ocelli.

4. Underside hindwing postdiscal ocelli in cells 2 (Cu1a) and 6 (R5) are bright red and large and much larger than other postdiscal ocelli in cells 3-5.

Comment: Contrast in size between very large postdiscal ocelli in cells Cu1a (2) and R5 (6) and other smaller postdiscal ocelli is a very distinctive character that is unknown for other species of the *S. louisa* (WOOD-MASON) group and representatives from other groups.

Bionomics: The new species inhabits a dense mountain cloudy forest where it is active all day long. The butterflies are timid but attracted well by rotting fruits and may be collected by traps (fig. 1). Courtship and mating were observed around 2-3 p.m.

Biogeographical significance of the new species: Incorporating the recent revisions to the genus *Stichophthalma* (MONASTYRSKII & DEVIATKIN, 2008; MONASTYRSKII, 2010; MONASTYRSKII & HOLLOWAY, 2013), the vicarious distribution patterns of six Indochinese species are shown in fig. 2. It has been shown that Indochinese taxa previously regarded as subspecies of *S. louisa* (WOOD-MASON) are in fact distinct species characterised by high stenotopic levels and narrow and isolated ranges (MONASTYRSKII & DEVIATKIN, 2008). Some of these species show similarities in some of the characters listed above and can be reasonably considered as members of the *S. louisa* (WOOD-MASON) group. The range of *S. mathilda* JANET includes N. Vietnam, N. Laos and the Northern Truong Son mountain range. The geographic range of *S. eamesi* MONASTYRSKII, DEVIATKIN & UEMURA is restricted to the Kon Tum plateau habitats. The degree of overlap in the ranges of these species is currently unknown. The discovery from the Dalat plateau of an unknown species of *Stichophthalma* belonging to the *S. louisa* (WOOD-MASON) group confirms that these species form a montane fauna and occupy forest habitats above 700-1000 m a.s.l. The butterfly fauna of the Dalat plateau includes endemics of Sundanian, Sino-Himalayan and Indo-Burmese origin. The *Stichophthalma* genus is an element of Indo-Burmese autochthon origin. This fauna could be assessed further by conducting rigorous phylogenetic studies of butterfly groups exhibiting vicariant endemism within the Indochinese Peninsula, particularly *Stichophthalma*, and also of those groups where considerable overlap occurs in species ranges.

Derivatio nominis: The species is named after my late friend and co-author, ALEXEY L. DEVIATKIN (1957-2012).

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Fig. 1: *Stichophthalma devyatkini* spec. nov. in trap on rotting banana at the type locality.

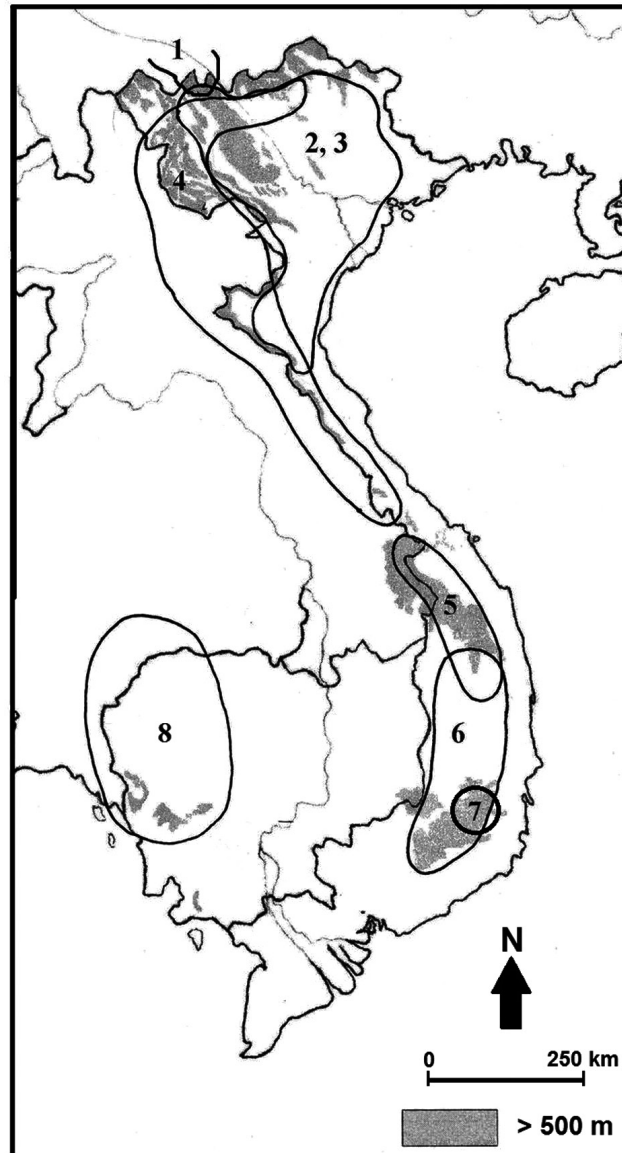


Fig. 2: Vicarious ranges of the *Stichophthalma* spp.: (1) *S. howqua iapetus* BROOKS, 1949; (2) *S. suffusa tonkiniana* FRUHSTORFER, 1901; (3) *S. fruhstorferi* RÖBER, 1903; (4) *S. mathilda* JANET, 1905; (5) *S. eamesi* MONASTYRSKII, DEVYATKIN & UEMURA, 2000; (6) *S. uemurai* NISHIMURA, 1998; (7) *S. devyatkini* spec. nov.; (8) *S. cambodia* HEWITSON, 1862.

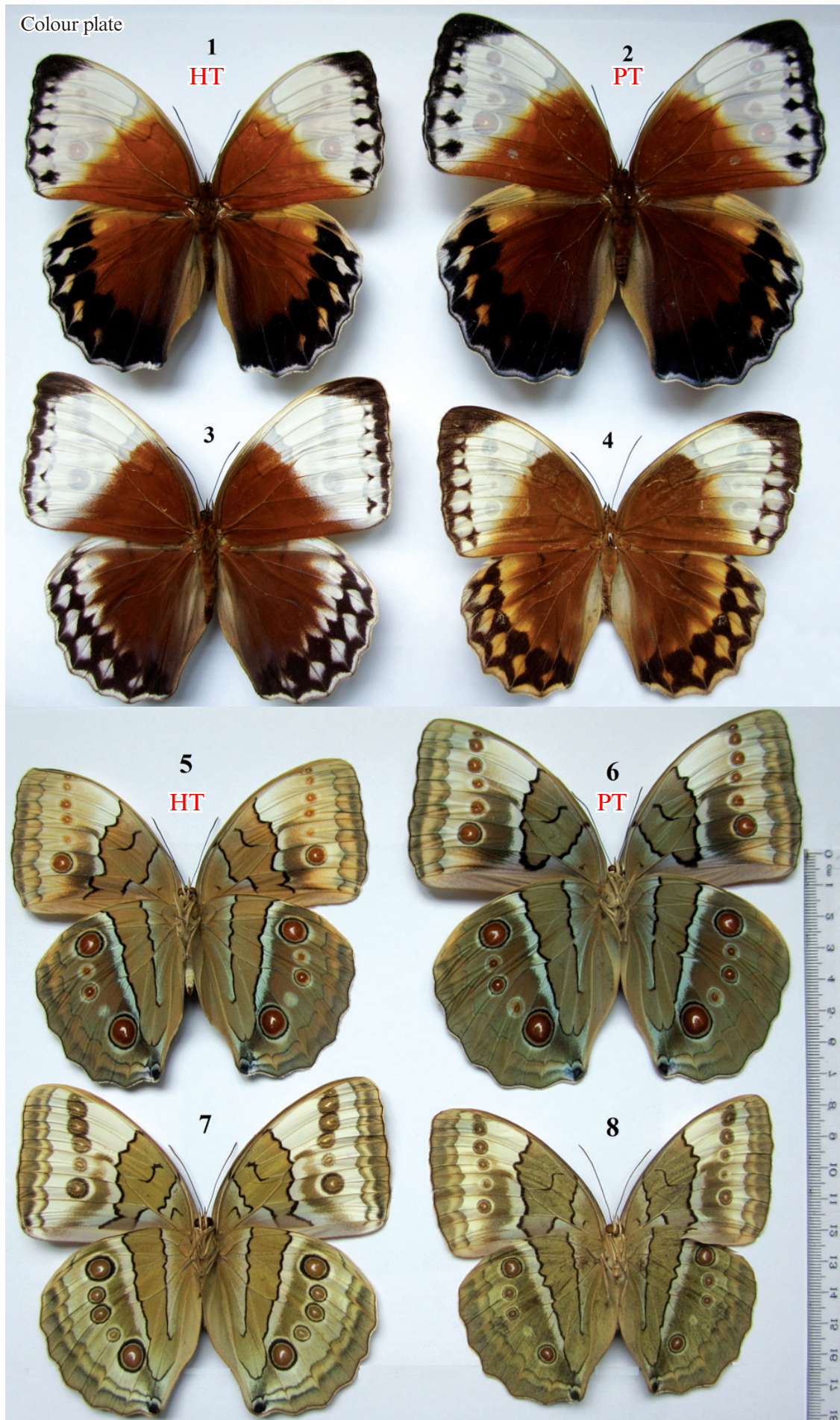


Fig. 1, 5: *Stichophthalma devyatkini* spec. nov., holotype ♂, upperside/underside.
 Fig. 2, 6: *Stichophthalma devyatkini* spec. nov., paratype ♀, upperside/underside.
 Fig. 3, 7: *Stichophthalma eamesi* MONASTYRSKII, DEVYATKIN & UEMURA, 2000, ♂ upperside/underside.
 Fig. 4, 8: *Stichophthalma mathilda* JANET, 1905, ♂ upperside/underside, Central Vietnam, Pu Mat Nature Reserve.

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