

NOTES ON *STICHOPHTHALMA* SPECIES IN THE TAM DAO MOUNTAINS OF NORTHERN VIETNAM (LEPIDOPTERA: AMATHUSIIDAE)

KAREL SPITZER AND JOSEF JAROŠ

Institute of Entomology, Czech Academy of Sciences, Branišovská 31, CZ-370 05 České Budějovice, Czech Republic

ABSTRACT.— The sympatric occurrence of *Stichophthalma louisa* Wood-Mason and *S. howqua* (Westwood) (Amathusiidae) has been investigated in the Tam Dao Mountains in northern Vietnam. Distribution and diagnosis of both species and their subspecies are discussed. The Tam Dao range seems to be the only locality of sympatric occurrence of both closely related species.

KEY WORDS: Asia, Burma, China, ecology, flight period, geographical races, India, Indochina, Laos, Nymphalidae, Oriental, rainforest, Thailand.

Species of the genus *Stichophthalma* are distributed in mountains of southern China, most of Indochina and northeastern India (Janet, 1905; Fruhstorfer, 1927; Kirchberg, 1942; Lemée and Tams, 1950; Pinratana, 1983; D'Abbrera, 1984; Motono and Negishi, 1989). The two very closely related species, *Stichophthalma louisa* Wood-Mason, 1877, and *S. howqua* (Westwood, 1851), were recorded from separate localities of montane rainforests. No sympatric occurrence was known. The comparative diagnosis and general distribution of both species are given by Fruhstorfer (1927) and Kirchberg (1942) only. In the present paper, basic illustrations and characteristics of the sympatric Tam Dao forms of *S. louisa* and *S. howqua* are given, with notes on flight activity and distribution.

SPECIES DIFFERENCES IN *STICHOPHTHALMA*

The taxonomical characteristics of both species conform to revisional notes of Fruhstorfer (1927) including a number of individual forms from Vietnam ("Tonkin"). Kirchberg (1942) keyed all the species of *Stichophthalma*. In our studies we did not find taxonomically important differences in the male genitalia (Fig. 1), or the female genitalia, of both species from most parts of their geographical range. The variability of both species from a particular locality, including Tam Dao, is high and overlapping in both species. The genital structure seems not to be useful for practical diagnosis of *S. louisa* and *S. howqua*. Useful external characteristics are the basic coloration and shape of the wings (see Fruhstorfer, 1927; Kirchberg, 1942; and D'Abbrera, 1984). Pinratana (1983) illustrated typical *S. louisa* as well. Characteristic specimens of *S. louisa* are also illustrated by Lekagul *et al.* (1977), Okano (1985), and Motono and Negishi (1989). The forms of *S. howqua* are illustrated in various publications from China and Taiwan (e.g., Lee and Zhu, 1992). The local forms (geographical races) from the Tam Dao Mts. are *S. louisa fruhstorferi* Röber (Fig. 2) and *S. howqua suffusa* Leech (Fig. 3). Both subspecies have a number of individual forms. The taxon *S. louisa fruhstorferi* is probably an endemic geographical race in

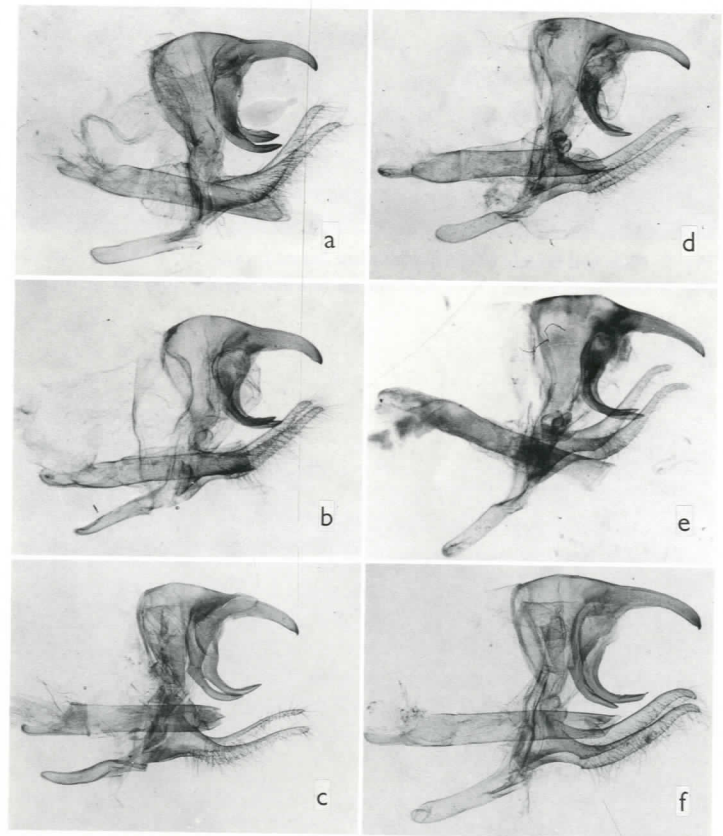


Fig. 1. Male genitalia of *Stichophthalma louisa* and *S. howqua*: *S. louisa*: a) Tenasserim (Burma), b) Assam (India), c) Tam Dao (Vietnam). *S. howqua*: d) West China, e) Taiwan, f) Tam Dao (Vietnam).

the Tam Dao range and perhaps distributed in adjacent mountains of northern Vietnam as well (Fig. 2).



Fig. 2. Male and female of *Stichophthalma louisa fruhstorferi* from the Tam Dao Mts., northern Vietnam.
 Fig. 3. Male and female of *Stichophthalma howqua suffusa* from the Tam Dao Mts., northern Vietnam.



Fig. 4. Montane tropical rainforest of the Tam Dao Mts., northern Vietnam.

HABITAT AND FLIGHT PERIOD

Species of the genus *Stichophthalma*, *S. louisa* and *S. howqua*, were discovered and their flight activity was studied in the Tam Dao Mts. in 1988, 1993 and 1995 by the authors. The ecological and lepidopterological characteristics (including a list of butterflies) of the Tam Dao Mts. were described by Lepš and Spitzer (1990) and Spitzer *et al.* (1993). Both *Stichophthalma* species occur in montane tropical rainforest at 800-1100m alt. (cloud forest), both occupying the same identical habitat of closed forest and small forest gaps (Fig. 4). In a previous ecological paper from Tam Dao Mts. both species were checked in transects together, but the dominant taxon during July flight period was probably the Tam Dao form of *S. howqua* (Novotný *et al.*, 1991). The abundance (dominance) of both species fluctuate yearly in Tam Dao, but *S. howqua* and its forms seems to be perhaps more abundant in recent years than *S. louisa* (1993, 1995). The flight period of *S. louisa* is from late April to early September. Adults of *S. howqua* were usually observed from late May or early June to late September. The cryptic coloration, resembling dead leaves, is characteristic for adults. Larvae of neither species were found in the Tam Dao Mts. and the bionomics of immature stages remain unknown.

CONCLUSIONS

Both *Stichopthalma* species, *S. howqua* and *S. louisa*, are very closely related rainforest montane species. The species differ in phenology and size of geographical range. *S. howqua* seems to be distributed mostly in subtropical China (Thailand?, Laos?, Burma?) and in parts of northern Vietnam. *S. louisa* is a montane tropical rainforest species distributed in most of Indochina including Thailand, Burma and northeastern India. In the Tam Dao Mts., in northern Vietnam, both species occur sympatrically from June to September. Further studies of "geographical forms" of both species and their bionomics are badly needed. The process of endemic species (and/or subspecies) development seems to be a characteristic of isolated montane cloud rainforests of northern Indochina. A possible phenomenon of Müllerian mimicry is expected near the contact zone of the *Stichopthalma* species as in other butterflies of northern Indochina.

ACKNOWLEDGEMENTS

Our research was supported partially by the Grant Foundation of the Czech Republic (Grant No. 204/94/0278). We wish to thank Dr. F. Krampfl for facilities in studies of *Stichopthalma* materials deposited in the National Museum, Prague. Last but not least, we are grateful to our friend Dr. Nguyen Van San (National University of Hanoi) for his field assistance in Vietnam.

REFERENCES

- D'Abbrera, B.**
1984. *Butterflies of the Oriental Region, Part 2: Nymphalidae, Satyridae & Amathusiidae*. Melbourne: Hill House. 534pp.
- Fruhstorfer, H.**
1927. Amathusiidae. In A. Seitz (ed.), *Die Gross-Schmetterlinge der Erde. Die indo-australischen Tagfalter*, 9:403-452. Stuttgart: A. Kernen.
- Janet, A.**
1905. Description d'une nouvelle espèce de Lépidoptères de l'Indo-Chine. *Bull. Soc. Ent. France* (Paris), 15:215-216.
- Kirchberg, E.**
1942. Genitalmorphologie und natürliche Verwandtschaft der Amathusiinae (Lep. Nymphalidae) und ihre Beziehungen zur geographischen Verbreitung der Subfamilie. *Mitt. Münchner Ent. Ges.* (Munich), 32:44-87.
- Lekagul, B., K. Askins, J. Nabhitabhata, and A. Samruadkit**
1977. *Field Guide to the Butterflies of Thailand*. Bangkok: Assoc. Conserv. Wildlife. 262pp.
- Lemée, A., and W. H. T. Tams**
1950. *Contribution à l'étude des Lépidoptères du Haut-Tonkin (Nord-Vietnam) et de Saïgon*. Paris: Lechevalier. 82pp.
- Lepš, J., and K. Spitzer**
1990. Ecological determinants of butterfly communities (Lepidoptera, Papilionoidea) in the Tam Dao Mountains, Vietnam. *Acta Ent. Bohemoslov.* (Prague), 87:182-194.
- Li, C. L., and B. Y. Zhu**
1992. *Atlas of Chinese Butterflies*. Beijing: Publ. Acad. Sci. 79pp, 152pl.
- Motono, A., and N. Negishi**
1989. *Butterflies of Laos*. Tokyo: Karihara Shoten. 215pp.
- Novotný, V., M. Tonner, and K. Spitzer**
1991. Distribution and flight behaviour of the jungle queen butterfly, *Stichopthalma louisa* (Lepidoptera: Nymphalidae), in an Indochinese montane rainforest. *J. Res. Lepid.* (Beverly Hills), 30:279-288.
- Okano, K.**
1985. Descriptions of four new butterflies on Amathusiidae, Nymphalidae and Papilionidae (Lepidoptera). *Tokurana* (Tokyo), 10(2):1-17.
- Pinratana, A.**
1983. *Butterflies in Thailand. Vol. 2. Pieridae and Amathusiidae*. Bangkok: Viratham Pr. 71pp, 48pl.
- Spitzer, K., V. Novotný, M. Tonner, and J. Lepš**
1993. Habitat preferences, distribution and seasonality of the butterflies (Lepidoptera, Papilionoidea) in a montane tropical rain forest, Vietnam. *J. Biogeog.* (Hull), 20:109-121.