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

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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’Abrera, 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’Abrera, 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 the Tam Dao range and perhaps distributed in adjacent mountains of northern Vietnam as well (Fig. 2).
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 Leps 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 Stichophthalma 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 Stichophthalma species as in other butterflies of northern Indochina.

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