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# Further evidence of disjunctions in ranges of East Asian satyrine butterflies: a new subspecies of *Rhaphicera dumicola* (Oberthür, 1876) from Northern Vietnam

(Lepidoptera, Nymphalidae: Satyrinae)

by

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**Summary**: A new subspecies of satyrine butterfly: *Rhaphicera dumicola* ***lethanhi*** **subspec. nov.** is described from the vicinity of Sa Pa town (North Vietnam, Lao Cai Province, Sa Pa District). This represents additional evidence of disjunction in the ranges of nymphalid butterflies (Satyrinae) distributed from West and Central areas of China (Sichuan Province) to the massif Hoang Lien Son and penetrating to the central territories of the Indochinese Peninsula.

**Introduction**: The satyrine genus *Rhaphicera* Butler, 1867, bridges the eastern Palaearctic and Oriental Regions and is restricted to northern India, the Himalaya, southern China (Bozano, 1999), Burma (=Myanmar) and northern Indo-China. The genus comprises three species: *R. satricus* (Doubleday, 1849), *R. moorei* Butler, 1867, and *R. dumicola* (Oberthür, 1876) - the last previously known only from a small area centred on Sichuan Province. Two ♂♂ recently collected in North Vietnam represent a significant extension of the known range of *R. dumicola* (Obth.), and are presented here as a new subspecies.

***Rhaphicera dumicola l e t h a n h i*** **subspec. nov.** (figs. 4, 5)

Holotype ♂: North Vietnam, Lao Cai Province, Sa Pa District, in the vicinity of Suoi thau (Suối thầu) village (22°16'29" N; 104°03'41" E), hilltop vegetation at 1800 m a.s.l., VI.2013, Le Luong Thanh leg. (BMNH, London). Paratype ♂: same locality, X.2012, Le Luong Thanh leg. (coll. Dirk Casteleyn, Andries-Brugge, Belgium).

**Description and diagnosis**: Upperside. Ground colour of both wings uniformly dull orange with dark brown, almost black spots and fasciae, (ground colour of nominotypical subspecies fundamentally pale yellow, with a slight orange tinge in some cells on the forewing (figs. 6-8).

Forewing. Pattern of blackish spots and fasciae like *R. d. dumicola* (Obth.), clear and distinct [markings heavily suffused with grey scales, giving an overall rather smudged appearance in *R. d. dumicola* (Obth.)]. Small postmedian spots in cells M2, M1 and R5 and larger spot in cell Cu1a represented by the square black patches, typical of Lethini.

Hindwing. Pattern of black spots and fasciae similar to nominotypical subspecies; marginal (terminal) orange fields in cells Cu1a - M3 clear, distinct (yellowish ground colour heavily dusted with greyish scales, submarginal markings orange, contrasting with yellow fields on remainder of hindwing in nominotypical subspecies). Submarginal black round spots in cells Cu1b - R5 are well developed.

Underside. Ground colour of both wings dark creamy-yellow with some pale orange fields.

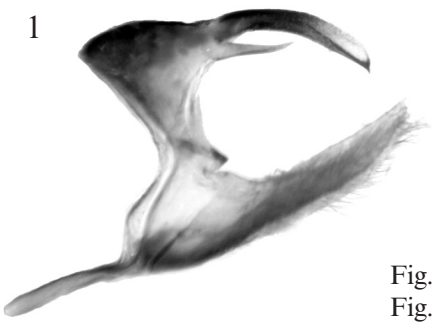
Forewing. Ground colour creamy-yellow in cells of subcostal and apical areas with pale orange colour in cells Cu1b, Cu1a and M3, in the lower part of discal cell and in restricted marginal area in cells M2, M1 and R5. Three small whitish centred black spots in cells M2, M1 and R5 and a large black spot in cell Cu1a [ground colour more widely pale yellow in *R. d. dumicola* (Obth.)].

Hindwing. Ground colour uniformly creamy orange-yellow, with orange fields in tornal areas of cells Cu1b, Cu1a and M3 and lunular orange spot in postdiscal area of cell M2. Series of submarginal round spots slightly dusted with greyish-brown scales (holotype). In paratype these spots are coloured with creamy-yellow similar to ground colour (this appears to be a variable feature, as it is in nominotypical subspecies from western China, which often has spots with a rather thick blackish-brown border with whitish centres). Complex pattern of blackish-brown fasciae in discal and postdiscal areas similar to that in *R. d. dumicola* (Obth.), however all fasciae notably broader. Submarginal fasciae in cells Cu1b and Cu1a are broken and this area sullied with orange, which extends to reach the border of submarginal spots in these cells (submarginal fasciae in Cu1b and Cu1a well defined in nominotypical subspecies).

♂ genitalia: Structure of the ♂ genitalia typical of genera of the tribe Lethini, characterised by the narrow distal part of valve, well developed sociae, rather long uncus (shape variable). Genitalia of the new taxon similar to the nominative subspecies: dome-shaped tegumen, well developed sociae approximately half length of uncus, rather long saccus; valvae of even wideth from base, gradually tapered and rounded at apex which is serrated (fig. 1). Structure of genitalia in the nominative subspecies similar however uncus less broad at base (fig. 2).

Length of the forewing: both holotype and paratype ♂ - 30 mm. This character overlaps the data on Chinese specimens varied from 25 to 30 mm; ♀ is unknown.

Bionomics. Both specimens were collected on the heavily degraded hilltop vegetation (Fig. 3) which probably is not a natural habitat. The foodplant is unknown.



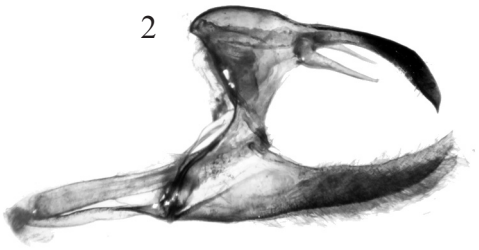




Fig. 1: ♂ genitalia of *Rhaphicera dumicola* ***lethanhi*** **subsp. nov.**
Fig. 2: ♂ genitalia of *Rhaphicera dumicola dumicola* (Oberthür, 1876).

**Discussion**: Natural causes of disjunctions between butterfly populations are important in understanding the evolutionary processes that have resulted in the taxonomic composition of the modern fauna, and also for the prediction of its future transformations. In Vietnam populations of many butterfly species have lost links with the main part of their ranges, and have adapted to new natural conditions. This adaptation has been accompanied by the appearance of new taxonomic units (new species and subspecies) (Monastyrskii & Holloway, 2013).
Recent biogeographical studies of the tribe Lethini demonstrate disjunctions in ranges of some species distributed from West and Central territories of China (Sichuan, N. Yunnan) to mountain areas of North and Central Vietnam. For example, among the members of this taxonomic group remarkable disjunctions were identified in the ranges of *Lethe ocellata* Poujade, 1885, *L. neofasciata* Lee, 1985, *L. monilifera* Oberthür, 1923; *L. hecate* Leech, 1891 and *L. umedai* Koiwaya, 1998 (Monastyrskii, 2012; Monastyrskii & Devyatkin, 2000; Yoshino, 2008). Disjunction in the range of *R. dumicola* (Obth.) provides additional evidence in support of the evolutionary scenario occurring during Pleistocene processes of glaciation and warming. In this epoch, geographical ranges of a number of Sino-Himalayan species moved in southern direction. The warming processes change altitudinal location of habitats, forming disjunctions in ranges of these species.

**Etymology**: This new taxon is named in honour for the Vietnamese collector Le Luong Thanh who discovered the new taxon in Vietnam.

**Acknowledgement**: Thanks to Mr. Dirk Casteleyn (Belgium) who kindly provided colour photographs of the paratype specimen.

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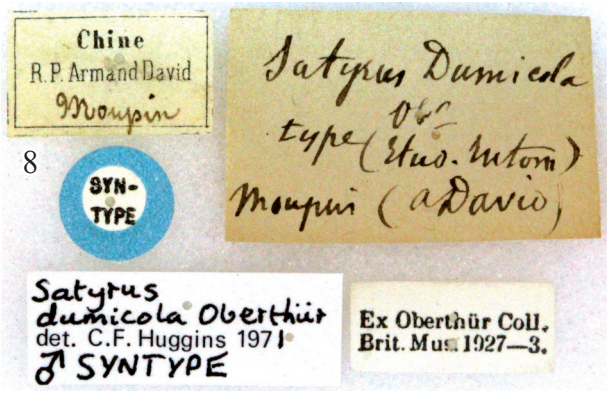



Fig. 3: Degraded hilltop vegetation in Hoang Lien Son massif (N. Vietnam, Lao Cai Province, Sa Pa District): place of the discovery of *Rhaphicera dumicola* ***lethanhi*** **subspec. nov.**

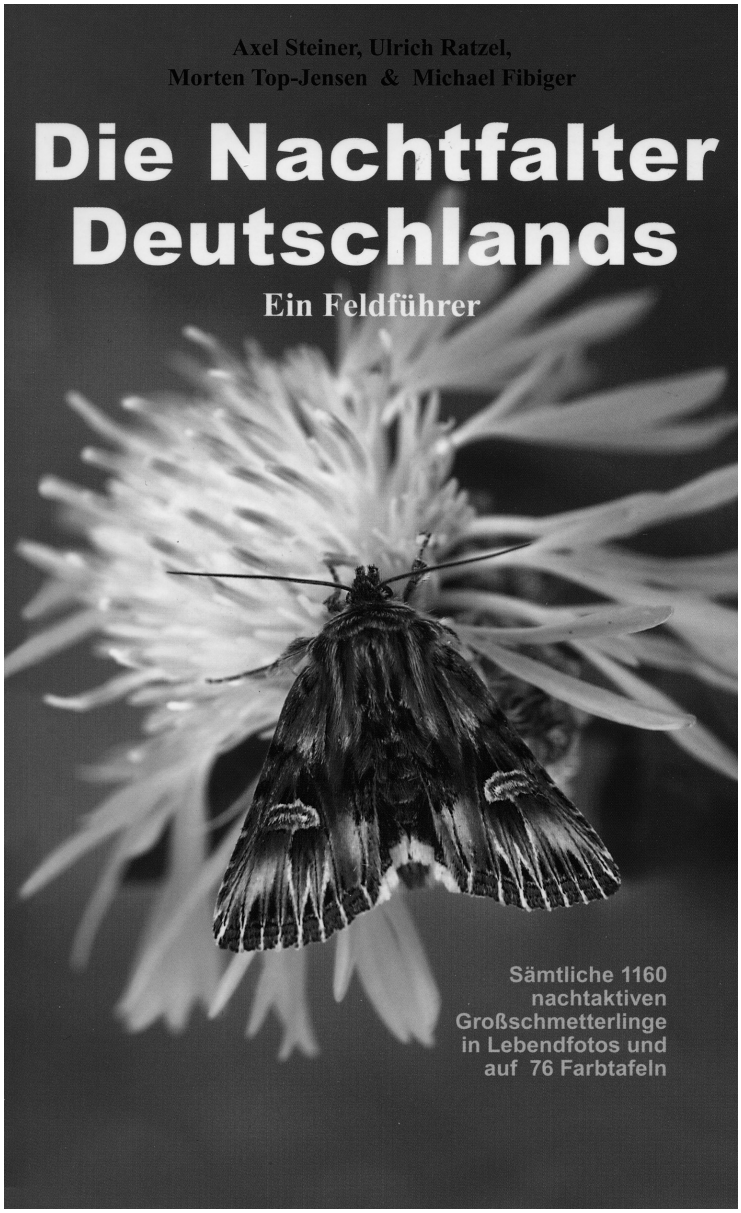
Figs. 4, 5: *Rhaphicera dumicola* ***lethanhi*** **subspec. nov.**. holotype ♂ upper- and underside, N. Vietnam, Lao Cai Province, Sa Pa District, 1800 m a.s.l., VI.2013, Le Luong Thanh leg. BMNH.

Figs. 6-8: *Rhaphicera dumicola dumicola* (Oberthür, 1876), syntype ♂ upper- and underside, with original labels, China, Moupin, Armand David leg. /Type (Syntype). BMNH.

# Steiner, Ratzel, Top-Jensen & Fibiger, Die Nachtfalter Deutschlands

Zum ersten Mal werden in einem Feldführer alle in Deutschland vorkommenden Nachtfalter auf Lebendfotos in ihrer natürlichen Ruhestellung abgebildet. Mehr als 90 Fotografen stellten ihre Bilder zur Verfügung. Zusätzlich wird eine repräsentative Auswahl von Raupen gezeigt.

Der Pluspunkt dieses Buchs ist seine Vollständigkeit: Da sämtliche 1160 Arten der einheimischen Nachtfalterfauna behandelt werden, kommen im Einzelfall keine Zweifel auf, ob es vielleicht noch mehr ähnliche oder verwechselbare Arten gibt.

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