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### Abstract

A third species of the genus *Orthophana* Melichar, 1923 (Nogodinidae, Tongini), *O. (Orthophana) bidoupensis* **sp. nov.** is described from Bidoup-Nui Ba National Park, Central Vietnam and compared with the two species hitherto described in the genus, *O. (Orthophana) spinata* Melichar, 1923 and *Orthophana (Eupharos) tamdaoina* Gnezdilov & Constant, 2014. A key to the subgenera and species of the genus is given. *Habitus* and female genitalia are illustrated and a distribution map is provided.

**Keywords:** Global Taxonomic Initiative, Dalat Plateau, Planthopper, Fulgoroidea.

### Introduction

MELICHAR (1923) described the genus *Orthophana* in the family Acanaloniidae to accommodate one new species from Malaysia: *Orthophana spinata* Melichar, 1923 and stated that the genus is close to *Tonga* Kirkaldy, 1900. The tribe Tongini was transferred to the Nogodinidae by GNEZDILOV (2007). GNEZDILOV & CONSTANT (2014) recently described a second species, *O. (Eupharos) tamdaoina* Gnezdilov & Constant, 2014 from North Vietnam for which they erected the subgenus *Eupharos* based on the tegmen venation and shape, general colour, shape of the frons and spines of the metatibiae.

We have recently collected another species of *Orthophana* s. str. in Bidoup-Nui Ba National Park in Central Vietnam, which is here described. This new data greatly extends the distribution of the subgenus *Othophana* s. str. and leads us to slightly modify its definition.

### Material and methods

The measurements were taken as in Constant (2004) except as given below and the following acronyms are used: BF—breadth of the frons, BTg—breadth of the tegmen, BV—breadth of the vertex, LF—length of the frons, LT—total length, LTg—length of the tegmen, LV—length of the vertex.

The definition of the subgenus *Orthophana* given by GNEZDILOV & CONSTANT (2014) is slightly modified.

For each picture a number of photographs were taken with a Canon camera and processed with Zerene Stacker software. They were optimized with Adobe Photoshop CS3.

The type of the new species is deposited in the collections of the Royal Belgian Institute of Natural Sciences, Brussels, Belgium (RBINS).

## Taxonomy

### Family **Nogodinidae** Melichar, 1898

### Tribe **Tongini** Kirkaldy, 1907

### Genus *Orthophana* Melichar, 1923

*Orthophana* MELICHAR, 1923: 11. Type species: *Orthophana spinata* Melichar, 1923 (by original designation).

### Identification key to the subgenera and species of *Orthophana*

- 1 Branches of radius of tegmina with a common stem basally and costal vein furcating apically; tegmina without apical tooth-shaped spine (Fig. 3 A). Ratio LTg/BTg = 1.93. Hind tibia with two lateral spine distally. Lateral margins of frons not projecting laterally before clypeus (Fig. 3 C). General coloration brown or dark brown (Fig. 3 A-C). Larger, total length: 14-15 mm – N Vietnam .....(subgenus *Eupharos*) *O. tamdaoina* Gnezdilov & Constant, 2014
- Branches of radius of tegmina separated since basal cell and costal vein simple; tegmina with apical tooth-shaped spine (Figs 1 A, 5). Ratio LTg/BTg = 2.2. Hind tibia with one lateral spine distally. Lateral margins of frons projecting laterally before clypeus (Fig.1 C). General coloration green or brown (Figs 1 A-C, 5). Smaller, total length < 12.5 mm. Malaysia and Vietnam .....(subgenus *Orthophana*) 2
- 2 General coloration green; hind wings white; costal margin of tegmina smoothly rounded (Fig. 5). Total length: 12.5 mm – Malaysia ..... *O. spinata* Melichar, 1923
- General coloration brown with dark brown markings; hind wings yellow and largely infusate; costal margin of tegmina sinuate on posterior half (Fig. 1 A-C). Total length: 11.9 mm – Central Vietnam ..... *O. bidoupensis* sp. nov.

Note: the coloration as a character proposed to separate the subgenera *Eupharos* (brown) and *Orthophana* (green) by GNEZDILOV & CONSTANT (2014) is not valid. The series of characters allowing the separation of the two subgenera is consequently restricted to the tegmen shape and venation, the structure of the head and the spines on the hind tibiae as mentioned in the above key.

### *Orthophana (Orthophana) bidoupensis* sp. nov.

Figs 1 A-E, 2, 4.

ETYMOLOGY. The species epithet refers to the type locality: Bidoup-Nui Ba National Park.

TYPE MATERIAL. Holotype ♀ (dissected, right hind wing mounted): Vietnam: [Coll. I.R.Sc.N.B., Vietnam, Lam Dong prov., Bidoup-Nui Ba N. P., 12°26'N 108°30'E, 21-25.VII.2014, Mal. trap, Leg. J. Constant & J. Bresseel, GTI project, I.G.: 32.779] (RBINS)

DIAGNOSIS. The species is easily separated from (1) *O. (Eupharos) tamdaoina* by the apical spinose process of the tegmina (absent in *tamdaoina*) and the by veins Sc and R of tegmina running separately from the basal cell (fused basally in *tamdaoina*), from (2) *O. (Orthophana) spinata* by the brown colour of the tegmina (green in *spinata*), the margin of tegmina slightly sinuate on apical half (rounded in *spinata*) and the hind wings largely infusate (white in *spinata*).

DESCRIPTION.

Measurements and ratios (♀; n = 1): LT = 11.9 mm; LTg/BTg = 2.21; BV/LV (LV measured to level of anterior margin of eye) = 1.26; BF/LF (LF measured as the visible part in normal view of frons) = 0.71.

*Head.* brown. Frons and vertex concave, not separated by a carina, narrow with lateral margins slightly foliaceous (Fig. 1 A-C). Head semicircular in lateral view with smooth antero-ventral angle (Fig. 1 A). Posterior margin of vertex slightly carinate and curved (Fig. 1 C). Lateral carinae of frons slightly projecting laterally then curved internally in obtuse angle before clypeus (Fig. 1 B). Frontoclypeal suture transverse, deeply grooved (Fig. 1 B). Clypeus strongly convex, not carinate, much longer than broad (Fig. 1 B). Ocelli very small. Scape ring-shaped; pedicel subcylindrical, about 1.5 times longer than broad (Fig. 1 B).

*Thorax.* pronotum brown, smooth with anterior margin strongly curved and posterior margin straight (Fig. 1 A, C). Paradiscal fields of pronotum wide behind eyes (Fig. 1 A, C). Paranotal lobes of pronotum elongate and broad, without carina (Fig. 1 A). Mesonotum brown with yellow dots on lateral fields; median and lateral carinae smooth, median carina narrowly yellow (Fig. 1 C).

*Tegmina.* crescent-shaped without hypocoastal plate, brown with minute yellow spots, some bigger yellow spots along veins and black-brown marking at apical third between veins Cu<sub>1</sub> and M<sub>1</sub> (Fig. 1 A, C). Costal margin slightly sinuate and narrowly marked with yellow and black-brown alternately on apical half (Fig. 1 A). Apex with tooth-shaped spine formed by fusion of veins Cu<sub>1+2</sub> and M<sub>2</sub> (Fig. 1 A, C). Costal area broad (Fig. 1 A). Clavus slightly surpassing 2/3 of tegmen length, closed (Fig. 1 A, C).

Venation: (Fig. 1 A, C) C visible to 2/3 of tegmen length, densely furcate; Sc and R running separately from basal cell, simple, subparallel; M furcate at basal third; Cu furcate after half of tegmen; Cu<sub>2</sub> fused with costal margin after clavus and with Cu<sub>1</sub> before apex; A<sub>1</sub> and A<sub>2</sub> fused at half of clavus.

*Hind wings.* (Fig. 1 D) pale yellow, infusate in middle basally and largely infusate apically. Well developed, bilobed apically. Costal margin concave with coupling lobe after middle.

Venation: see Fig. 1 D.

*Legs.* elongate and slender. All tibiae with strong longitudinal carinae. Metatibiae with one anteapical lateral spine and 8-9 apical spines. Metatarsomeres with long setae ventrally; first and second with 2 strong lateral spines, first longer than second and with 10 small ventral spines arranged in arc ventrally.

*Genitalia* ♀. (Fig. 1 E) anal tube elongate and narrow, pointed apically, sinuate in lateral view with apex strongly curved ventrally. Gonoplags subpentagonal with dorsal margin concave with a straight part in middle in lateral view. Apical margin of gonoplags with numerous minute teeth.

**BIOLOGY.** The holotype was collected with a Malaise trap in moist evergreen mountain forest (1400 m asl.). The biotope around the trap is illustrated Fig. 2.

**DISTRIBUTION.** Recorded from the southern part of Central Vietnam, Dalat Plateau (Fig. 4).

***Orthophana (Eupharos) tamdaoina* Gnezdilov & Constant, 2014**

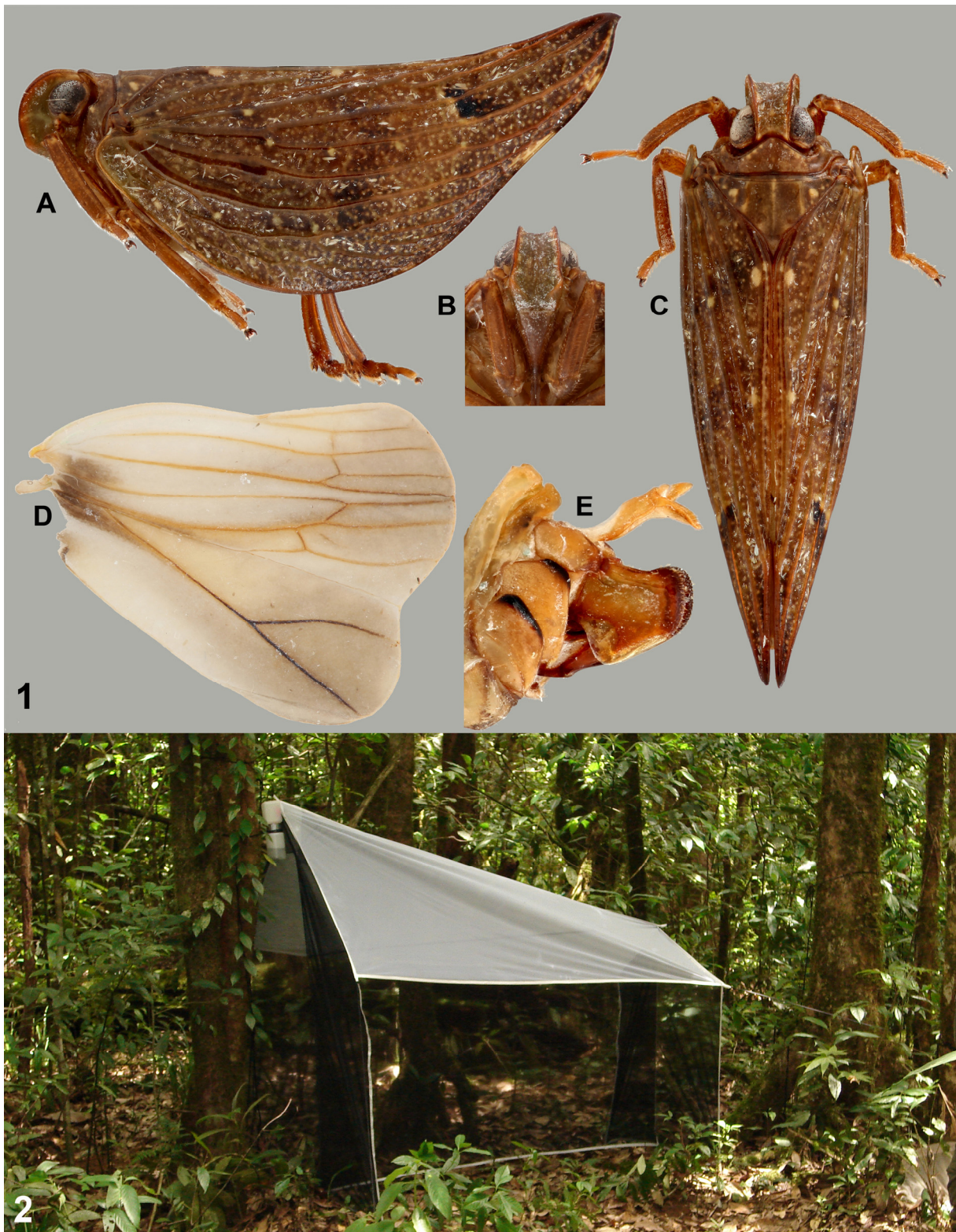
Figs 3 A–E, 4.

*Orthophana (Eupharos) tamdaoina* GNEZDILOV & CONSTANT, 2014: 51.

**MATERIAL EXAMINED.** Holotype ♀: Vietnam, Tam Dao National Park, 21°31' N 105°33' E, 27.VII.2011, night collecting, on fern, I.G.31.933, leg. J. Constant & J. Bresseel (RBINS); 1 ♀: Vietnam, Tam Dao N. P., 21°31' N 105°33' E, 25-30.VI.2011, Malaise trap, leg. J. Constant & J. Bresseel, I.G.: 31.993 (RBINS).

Measurements and ratios (♀; n = 2): LT = 14.0-14.9 mm; LTg/BTg = 1.93; BV/LV (LV measured to level of anterior margin of eye) = 1.89; BF/LF (LF measured as the visible part in normal view of frons) = 0.95.





Figs 1-2. 1 A-E, *Orthophana (Orthophana) bidouensis* sp. nov., holotype, total length: 11.9 mm. A, habitus, left lateral view. B, head, antero-ventral view. C, habitus, dorsal view. D, right posterior wing. E, female genitalia, left lateral view (photographs J. Brecko). 2. Malaise trap where the type specimen was collected, Bidoup-Nui Ba National Park, 25.VII.2014 (photograph J. Constant).





Fig. 3 A-E. *Orthophana (Eupharos) tamdaoina*, holotype, total length: 14 mm. A, habitus, left lateral view. B, head, antero-ventral view. C, habitus, dorsal view. D, right posterior wing. E, female genitalia, left lateral view (photographs J. Brecko).

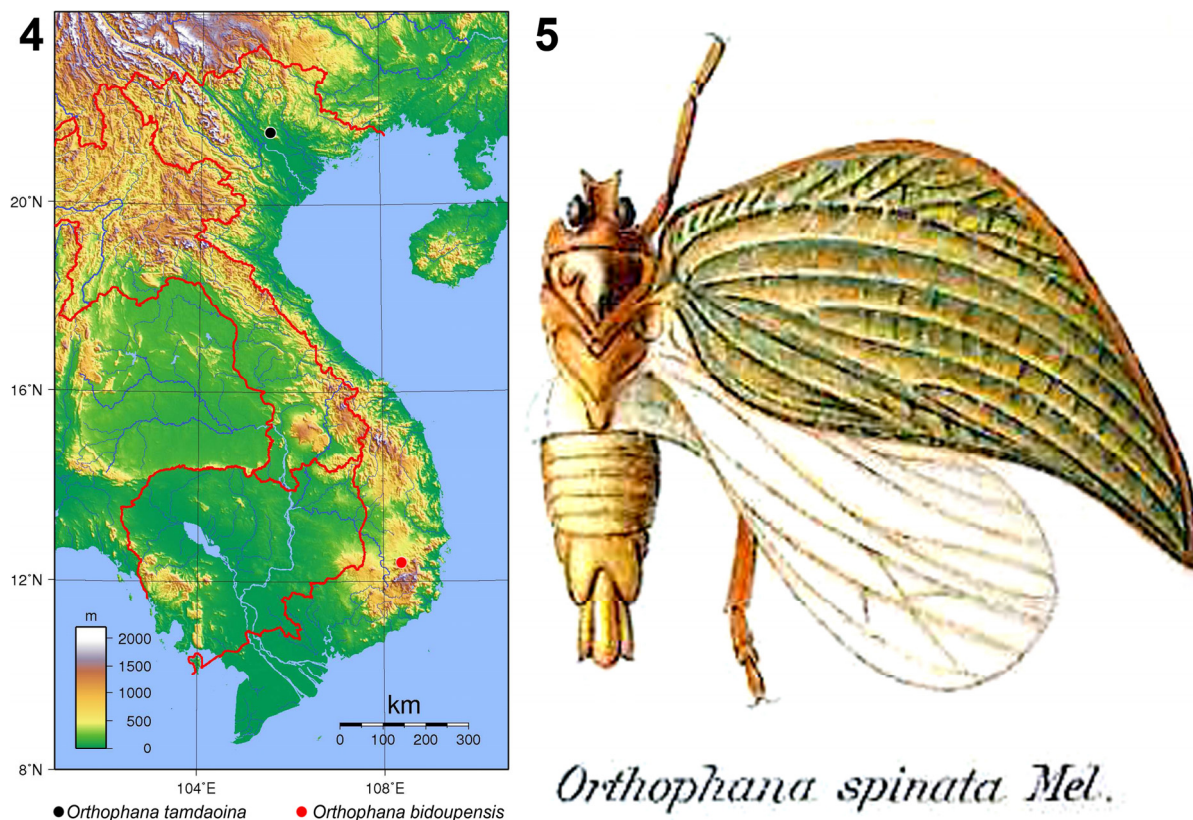
A second female of this species was found among the recently sorted material collected with Malaise traps in Tam Dao National Park in July 2011. The Malaise traps were installed close to the place where the holotype of the species was collected.

### Discussion

All recorded specimens of the genus *Orthophana* have been collected at altitude between 1000 and 1600 m (see GNEZDILOV & CONSTANT, 2014 for data of *O. spinata*) in tropical mountain evergreen forest.

Two of the three specimens found in Vietnam were captured with Malaise traps so it would be advisable for hemipterists to routinely study all samples collected with Malaise traps which are more widely used by dipterist and hymenopterist colleagues.

The new species here described belongs to the subgenus *Orthophana* although its colour pattern is very similar to that of *O. (Eupharos) tamdaoina*.



Figs 4-5. 4, distribution map of the Vietnamese species of *Orthophana*. 5, *Orthophana (Orthophana) spinata*, illustration in MELICHAR, 1923.

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