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A new species of *Dendroleon* Brauer, 1866 (Neuroptera, Myrmeleontidae) from China

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Abstract

A new species of the genus *Dendroleon* (*Dendroleon falcatus* Zhan & Wang **sp. nov.**) is described from China. This new species can be distinguished from other *Dendroleon* species by the following characters: the significantly larger size, the long abdomen in males, and the particular wing shape and markings. *Dendroleon javanus* Banks, 1914 was previously reported in China based on a misidentification; the Chinese specimens are actually *Bullanga florida* (Navás, 1913). An identification key and distribution map are provided for *Dendroleon* species recorded from China.

Key words: Tibet, Dendroleontini, antlion

Introduction

The antlion genus *Dendroleon* Brauer, 1866 is one of the most widely distributed genera in the family Myrmeleontidae (Neuroptera). The adults of *Dendroleon* are similar to the genera *Gatzara* Navás, 1915 and *Nepsalus* Navás, 1914 in appearance; however, the latter mentioned genera have elongate anterior gonapophysis which is as long as or longer than posterior gonapophysis. Esben-Petersen (1923) revised the genus *Dendroleon* and recognized eight species worldwide at that time. There are now nineteen extant species listed in the genus (Stange, 2004). Wan *et al.* (2004) and Wang & Wang (2008) reviewed *Dendroleon* species from China and nine species were recognized. *Dendroleon melanocoris* Yang, 1997; *D. argulineurus* Yang, 1987; *D. decorillus* Yang, 1997; *D. decorosus* Yang, 1987 were mentioned by Stange (2004) from China. Based on the result of the latest revisions, *D. melanocoris* Yang, 1997 was synonymized by Wan *et al.* (2006) with *Layahima elegans* (Banks, 1937), later listed three species were combined by Wang *et al.* (2012) in *Gatzara* Navás, 1915.

There were still some unresolved problems with Chinese *Dendroleon* species. One of these species, *Dendroleon javanus* Banks, 1915, was reported in China previously (Yang, 1997, 1999). Wang & Wang (2008) pointed out the specimens of putative *D. javanus* from China didn't agree well with characters typical of *Dendroleon*. Recently we re-examined the same specimens identified as *D. javanus* from China. Compared with the photos of the holotype of *D. javanus*, there are some significant differences between them. *Dendroleon javanus* has a short stripe at the rhexma area in the forewing and the distal vein of 2A is simple. Also, there is no black spot at the rhexma area in the hindwing. The specimens identified as *D. javanus* previously from China have a very long line stripe at the rhexma area in forewings, 2A turns to 1A gently and the distal of 2A furcates many branches. A black spot can be seen at the rhexma area in the hindwing. So we conclude that the identification of *D. javanus* distributed in China is therefore erroneous. Further study shows that the correct name of these specimens is *Bullanga florida* (Navás, 1913). A very similar species to *D. javanus*, namely *D. esbenpeterseni* Miller & Stange, 1999 described from Taiwan, was distinguished only based on their distribution (Miller *et al.* 1999). We compared the paratype of *D. esbenpeterseni* with the above species and they can be easily distinguished by the following

characters: *D. esbenpeterseni*: wings with light color, 2A runs parallel with 3A, distal vein with several branches; base of tarsus yellowish on all legs. *D. javanus*: wings with dark color, 2A runs gradually far from 3A, distal vein of 2A simple; the base of tarsus black.

Recently, we have studied some specimens from Tibet and found a new species. The new species is clearly distinguished from other *Dendroleon* species by the combination of the following characters: the significantly large size, male with long abdomen, and particular wing shape and markings.

Material and methods

Preparations of male and female genitalia were made by macerating the apex of the abdomen in 10% KOH for 5–6 hours. Photographs of partial morphological characteristics were taken using a Canon® EOS 500D digital camera connected with Olympus® U-CTR30-2 microscope and UV-C (Application Suite) applied software by United Vision Ltd. Photographs of whole specimens were taken using a Nikon COOLPIX4500 digital camera. Figures were processed using Adobe Photoshop® CS5. Terminology of wing venation follows Wang *et al.* (2003), while male genitalia and female terminalia terminology follows Stange (1994).

Taxonomy

Dendroleon Brauer, 1866

Dendroleon Brauer, 1866: 42. **Type species:** *Myrmeleon pantherinus* Fabricius, 1787 by subsequent designation by Hagen 1873: 394.

Neglurus Navás, 1921 Synonymized by Stange, 1976: 292.

Borbon Navás, 1914 Synonymized by Stange, 1976: 292.

Pantherleon Yang, 1986 Synonymized by Stange, 2004: 83.

Diagnosis. Costal area of forewing simple, Rs arising much before CuA fork, anterior Banksian line discernible. Hindwing with one presectoral crossvein before origin of Rs. Tibial spurs slender and straight. Female: Anterior gonapophysis shorter than posterior gonapophysis. Male with pilula axillaris, gonarcus somewhat hooded, mediuncus large, situated between parameres; parameres usually broad and plate-shaped.

Distribution. North America, Australia, Europe, Asia.

A key to Chinese *Dendroleon* species

(Fig. A).

1. Anastomosis of CuA and Cup+1A without arch-shaped stripe2
- Anastomosis of CuA and Cup+1A with arch-shaped stripe3
2. Pronotum yellowish without spots, distal and outer margin with several large spots in hindwing ... *D. lii* Wan & Wang, 2004
- Pronotum yellowish with a pair of brown marks, hindwing almost without spots. *D. longicuris* (Yang, 1986)
3. Male abdomen longer than wings, wing margin concave below apex in hindwing *D. falcatus* Zhan & Wang **sp. nov.**
- Male abdomen shorter than wings, outer margin of hindwing not concave4
4. Hindwing without brown spot at hypostigmatic cell *D. esbenpeterseni* Miller & Stange, 1999
- Hindwing with large brown spot at hypostigmatic cell.5
5. Semicircular stripe at anastomosis of CuA and CuP+1A continuous to wing margin *D. pupillaris* (Gerstaecker, 1894)
- The stripe at anastomosis of CuA and CuP+1A interrupted before wing margin6
6. The margin before rhegmal area without spot in hindwing7
- The margin before rhegmal area with many spots in hindwing. *D. callipterus* Wan & Wang, 2004
7. Small spot in rhegmal area in hindwing8
- Large spot in rhegmal area in hindwing. *D. motuoensis* Wang & Wang, 2008
8. Dark brown marks in wings, distinct apically and along outer margin in hindwing *D. pantherinus* (Fabricius, 1787)
- Pale brown marks in wings, usually indistinct marks at apex and along outer margin in hindwing
..... *D. similis* Esben-Petersen, 1923

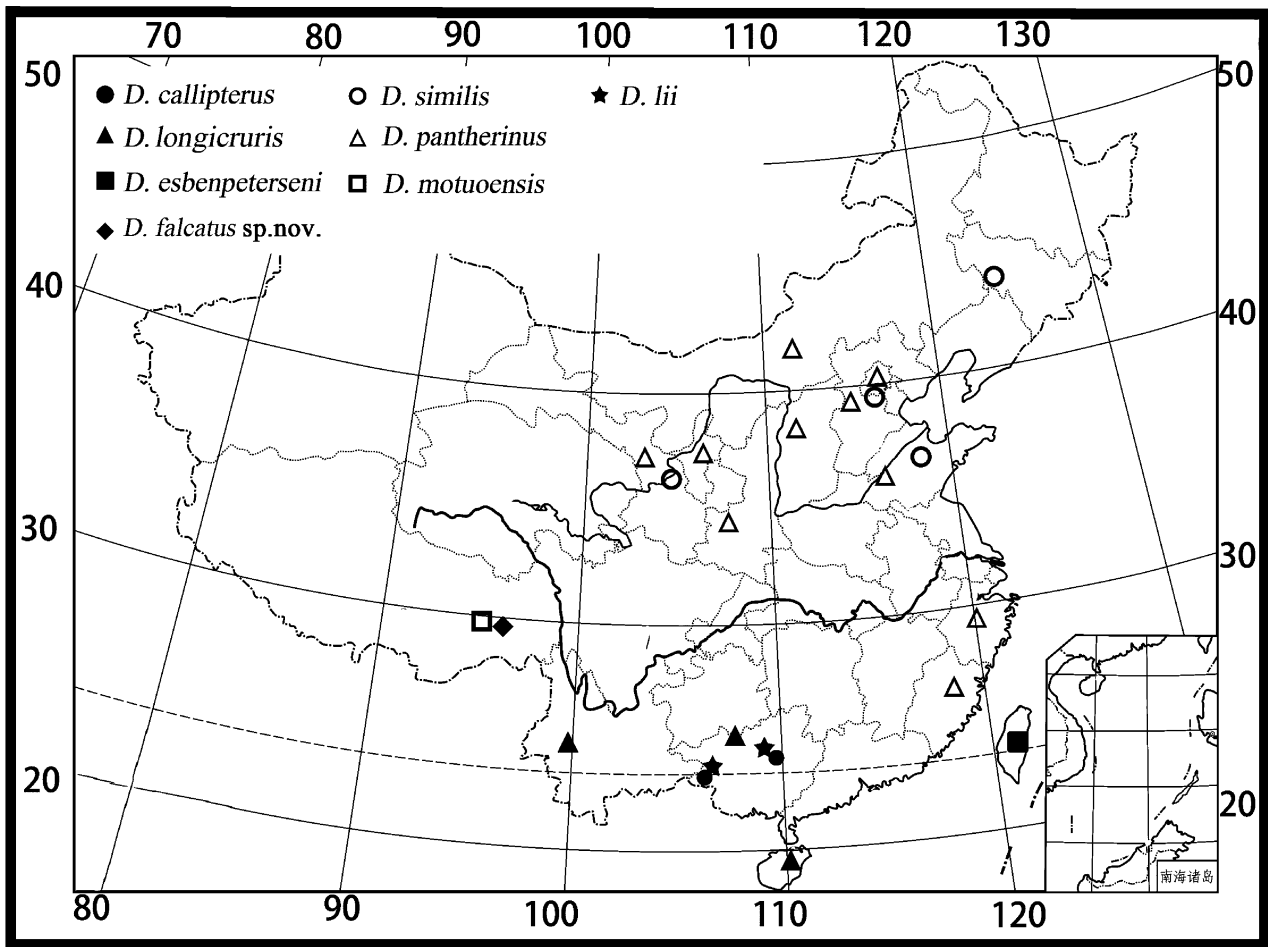


FIGURE A. Distribution map of *Dendroleon* species from China except *D. pupillaris*, whose presence is uncertain, being mentioned only in Kuwayama (1962) without detailed information.

***Dendroleon falcatus* Zhan & Wang X. sp.n.**

(Fig. B: 1; Fig. C: 2–3)

Material examined. Holotype ♂: Motuo County, Hanmi, Tibet, 26.VIII.2005, Dakang Zhou. (CAU-N100691).

Paratype: ♂, Motuo County, Hanmi, Tibet, 26.VIII.2005, Dakang Zhou, (CAU-N100692). ♂, Motuo County, Hanmi, Tibet, 26.VIII.2005, Hao Huang, (CAU-N100193). ♂, Motuo County, Hanmi, Tibet, 26.VIII.2005, Dakang Zhou, (CAU-N100194). ♀, Motuo County, Hanmi, Tibet, 26.VIII.2005, Hao Huang, (CAU-N100195). ♀, Motuo County, Hanmi, Tibet, 26.VIII.2005, Dakan Zhou, (CAU-N100196). 2♂, 80K, Motuo County, Tibet. 18.VIII.2011, Qingbin Zhan. ♀, Tongmai, Bomi County, Tibet. 22.VIII.2011. Qingbin Zhan.

Hanmi, Motuo County: (29° 22' 01"N; 95° 07' 23"E), 2100m

80K, Motuo County: (29° 39' 30"N; 95° 29' 23"E), 2111m

Tongmai, Bomi County: (30° 06' 10.5"N; 95° 04' 46"E), 2200m

The type specimens are deposited in the Insect Collections of China Agricultural University (ICCAU), Beijing, China.

Description. Male: Body length 52–53mm; abdomen length 45–46mm; forewing length 39–40mm; hindwing length 40–41mm. **Head:** Vertex strongly inflated, yellowish with thin middle line and some dark transverse pattern leopard-like; frons, gena and frontal part of clypeus black, ventral part of clypeus and labrum yellow, maxillary palpi yellow and brown; labial palpi yellow except brown basally; antenna clavate, flagellum comprising about 34 flagellomeres, basal and distal flagellomeres dark, middle part about 20 flagellomeres yellow. **Thorax** (Fig. B: 2):

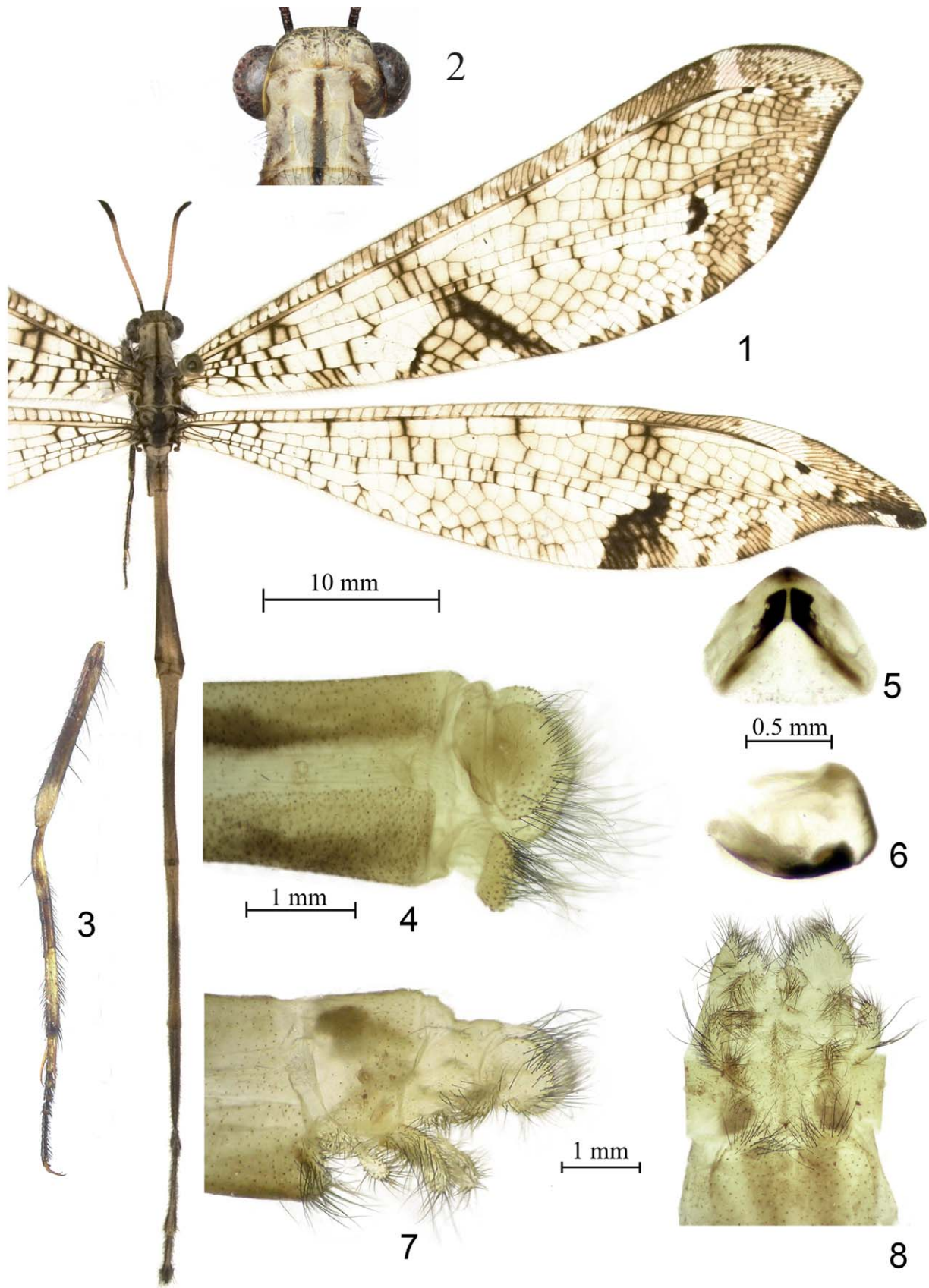


FIGURE B: 1–8. *Dendroleon falcatus* Zhan & Wang **sp. nov.** 1. male habitus; 2. pronotum, dorsal; 3. foreleg; 4. male terminalia, lateral; 5. male genitalia, ventral; 6. male genitalia, lateral; 7. female terminalia, lateral; 8. female terminalia, ventral. 1–6: Holotype; 7–8: Paratype.

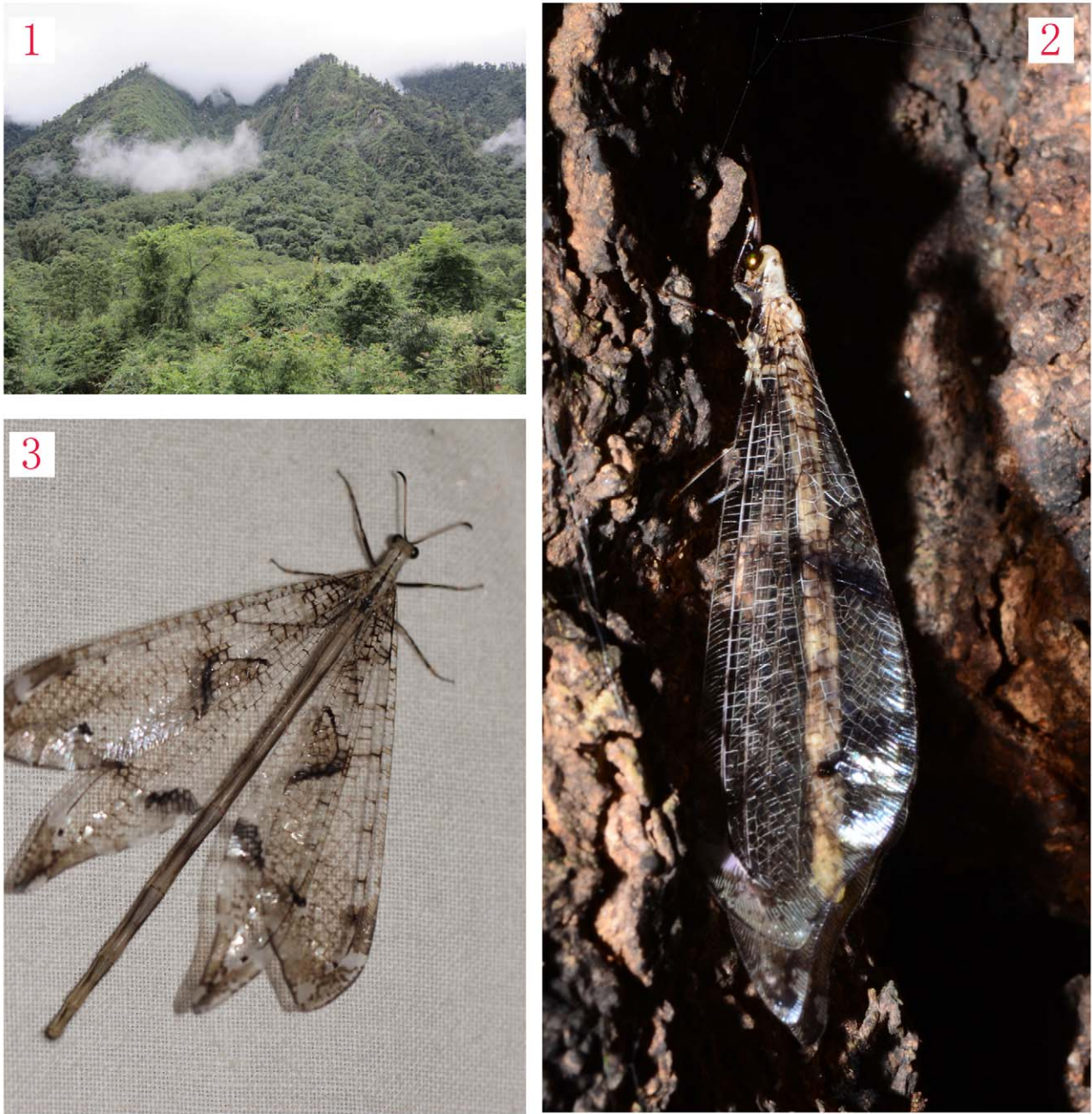


FIGURE C: 1. Type locality of *Dendroleon falcatus*. 2–3: *Dendroleon falcatus* Zhan & Wang *sp. nov.*

Pronotum trapeziform, anterior margin shorter than posterior margin, yellowish with a black longitudinal middle stripe extending to the posterior margin of metanotum. Pleuron with sparse short black setae, yellowish with broad longitudinal black stripe. **Legs** (Fig. B: 3): Slender, yellow and brown; spurs yellow, slightly curved apically, extending beyond 2nd tarsomere; 5th tarsomere about twice longer than 1st tarsomere in foreleg; 5th tarsomere 1–1.5 times longer than 1st tarsomere in middle and hind legs; claw red-brown and curved. **Forewing**: Narrow basally, broadened distally, outer margin slightly concave, apex acute. Costal area as wide as widest area between R and Rs; origin of Rs close to wing base and far from CuA fork; presectoral area with 4 crossveins and without irregular double cells; Rs with 10–11 branches; anterior Banksian line distinct; without posterior Banksian line. Many brownish marks scattered on wing, brown marks on distal part denser than basal part; pterostigma pale, proximal part of pterostigma with big brown mark, distal part of pterostigma with small brown mark; rhexma area with dark brown mark; dark brown bow-shaped stripe from anastomosis place of CuA2 and CuP+1A to about middle of

posterior margin. **Hindwing:** Falcate with acute apex, costal area as wide as or somewhat narrower than widest area between R and Rs; origin of Rs close to wing base and far from CuA fork; presectoral area with 1 crossvein; Rs with 10–11 branches; anterior Banksian line distinct, without posterior Banksian line. Brownish marks less than that of forewing, disperse mostly on distal area; pterostigma pale, longer than that of forewing; apical angle with dark brown stripe; rhegmal area with large irregular dark brown mark extending to posterior margin; no bow-shaped stripe. **Abdomen:** Slender, longer than hindwing; light to dark brown with sparse setae; terminalia with dense long black setae; gonarcus pale, parameres with dark apical and lateral margins, mediuncus distinct (Fig. B: 4–6).

Female: Body length 38–40 mm; abdomen length 28–30 mm; forewing length 43–44 mm; hind wing 45–46 mm. Sexual dimorphism present. Similar to male, but abdomen shorter than hindwing. Genitalia with long black setae; ectoproct oval, anterior gonapophysis short, posterior gonapophysis long and finger-like, lateral gonapophysis without digging setae (Fig. B: 7–8).

Distribution. China (Tibet: Motuo County, Bomi County)

Remarks. The new species is similar to species of *Cymothales* Gerstaecker, 1894 in wing shape and attractive wing marks. They can be distinguished by the following characters: Rs strongly wave between origin and first branch (*D. falcatus*: Rs almost straight in this distance), male abdomen shorter than hindwing, female anterior gonapophysis (posterior gonapophysis by Mansell, 1987) absent or minute. *Cymothales* is distributed in the Afrotropical region (Mansell, 1987) although one species is known from Yemen (Hölzel, 2001). In the Oriental realm, several valid species approach *D. falcatus* superficially such as *Indoclystus singularis* (Westwood, 1848) from India, *Cymothales lestagei* Lacroix, 1920 from Borneo. In the future, these species should be revised and the diagnosis of the genera should be redefined, again. The new species were principally collected at 2100m above sea level of Hanmi, Motuo County. This territory is characterized by humid subtropical climate and mountainous dense forests in Southeastern Tibet (Fig. C-1).

Etymology. The name is derived from the concave-shaped margin below apex of the hindwing.

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