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A record of *Sinolestes editus* Needham, 1930 (Odonata: Zygoptera: Synlestidae) from the Central Highlands of Vietnam, with descriptions of the collected male and female specimens

Van Quang To^{1,2} & Quoc Toan Phan³

¹Department of Zoology, Southern Institute of Ecology, Vietnam Academy of Science and Technology, 01 Mac Dinh Chi, Ho Chi Minh City, Vietnam.

²Graduate University of Science and Technology, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Hanoi, Vietnam.

Email: toquang196@gmail.com

³Center for Entomology & Parasitology Research, Institute of Research & Training of Medicine, Biology & Pharmacy, Duy Tan University, 3 Quang Trung, Da Nang, Vietnam.

Email: pqtoan84@gmail.com

Abstract

A record of male and female specimens of *Sinolestes editus* Needham, 1930 collected in Dak Hro village (14°19'45'' N, 108°24'23'' E, alt. 1,420m a.s.l.), Dak Roong Commune, K'Bang District, Gia Lai Province, Central Highlands of Vietnam is present with a detailed description of the morphology of these two specimens.

Key words: Odonata, Synlestidae, *Sinolestes editus*, Central Highlands, Vietnam.

Introduction

The genus *Sinolestes* Needham, 1930 was originally established to house three species described from southern China: *S. edita* Needham, 1930 (= *S. editus*) from Zhejiang, *S. truncata* (= *S. truncatus*) Needham, 1930 from Zhejiang and *S. ornata* (= *S. ornatus*) Needham, 1930 from Guangxi; *S. truncatus* being subsequently designated as the type species of the genus by Cowley (1934). May (1933), based on the manuscript by the late Dr F. Ris, discussed the systematic position of the genus and provided a detailed description of *S. ornatus*. Later, *Sinolestes ornatus* and *S. truncatus* were synonymized with *S. editus* by Chao (1947) and Wilson & Reels (2003), respectively. Therefore, at present the genus *Sinolestes* contains only one species, *Sinolestes editus*. The differentiating characters between these three taxa, as suggested already by Asahina (1956), are only the width of the brownish wing band.

Sinolestes editus has a wide distribution in the southern part of China. Presently it is known from Sichuan, Guizhou, Hubei, Anhui, Zhejiang, Fujian, Guangdong, Guangxi, Hainan and Taiwan (Zhang, in press). In Vietnam it was first recorded (with a photo document placed on internet by Sadayuki Udai) in Tam Dao (Vinh Phuc province) in 1999 (referred by Yeh et al. 2006). Further specimens were recorded and collected

at Tam Dao by Tom Kompier in April 2016 (Kompier 2016). Here we publish a new record of *Sinolestes editus* from Gia Lai Province in the Central Highlands of Vietnam

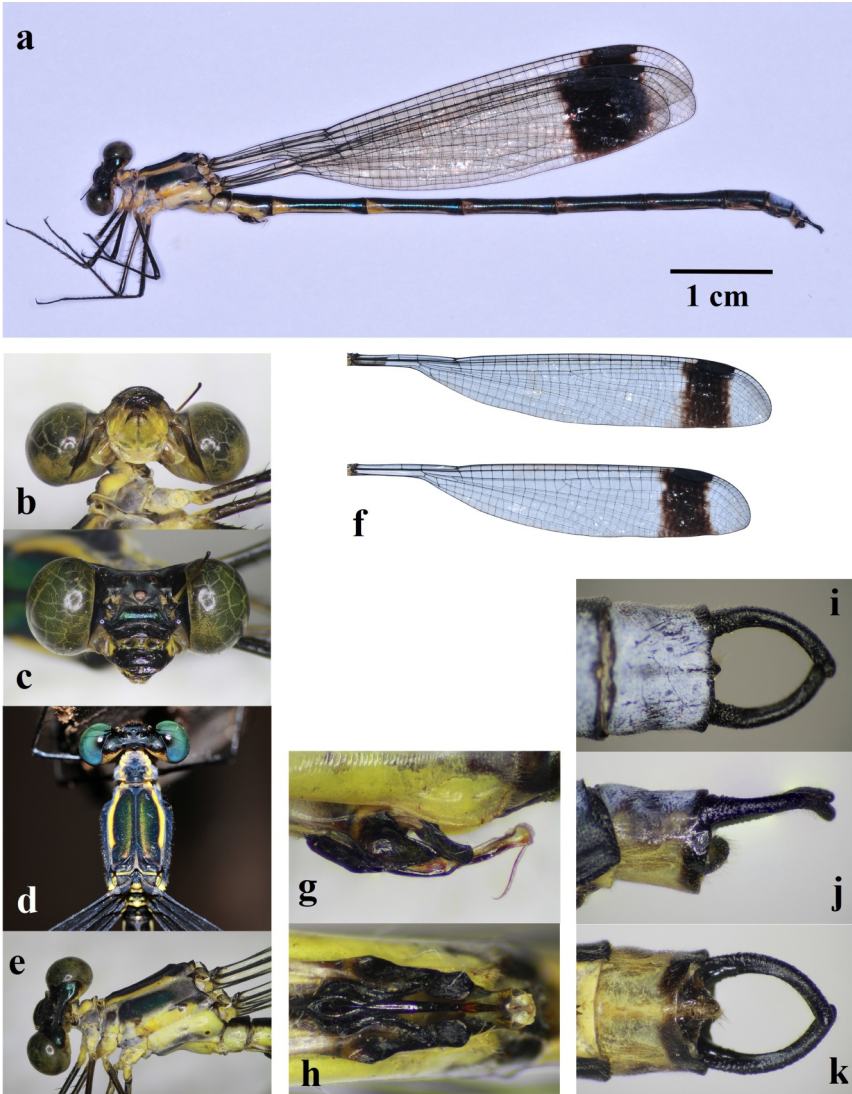


Figure 1. Details of *Sinolestes editus*, male. (a), habitus, scale bar is 1 cm; (b), labium; (c), head in frontal view; head and thorax in (d), dorsal view & (e), lateral view; (f), wings; genital ligula in (g), lateral view & (h), dorsal view; anal appendages in (i), dorsal view, (j), lateral view & (k), ventral view. Not to scale.

and provide detailed morphological descriptions with color photos of the structures of the single male and female specimens collected there.

Material and Methods

Field photographs of *Sinolestes editus* were taken using a Nikon D300 camera, AF 105mm macro and AF-S 18–55mm kit lens. Colour figures were taken using a Canon 7D Mark II camera attached to a Leica S6D Trinocular Stereo Microscope.

Abbreviation: S1–10 = abdominal segments 1 to 10; Px = postnodal crossveins; Ax = antenodal crossvein; HW = hindwing; FW = forewing.

Sinolestes editus Needham, 1930

(Figures 1–3)

Examined specimens. 1♂ and 1♀, Dak Hro village (14°19'45'' N, 108°24'23'' E, alt. 1,420 m elevation), Dak Roong commune, K'Bang district, Gia Lai Province, Central Highlands, Vietnam, 5.iv.2018, V.Q. To leg. Specimens are in the private collection of the first author.

Description of male.

Head (Fig. 1b-d). Labium yellow, movable hooks black (Fig. 1b). Labrum and postclypeus shining black (Fig. 1c). Mandibles yellow with black posterior margin. Anteclypeus yellow with a pair of symmetrical concave black spots. Postclypeus black. Antefrons metallic green. The first segment of antennae black except yellow apical part; the second segment yellow at base, slowly changes into brown at middle and become dark at apex (Fig. 1c). Dorsal head matt black two yellow postocular spots (Fig. 1d).

Thorax (Fig. 1d-e). Prothorax largely yellow, dorsal side metallic green; propleuron yellow. Synthorax metallic green with yellow markings as follow: a long, thin antehumeral stripe. Mesepimeron with a metallic green marking at middle part, which is rounded anteriorly and narrowed posteriorly, the rest light black but anterior part darker. Metepisternum and 2/3 length of ventral mesepimeron covered by a large yellow stripe, which has an indented upper edge mediodorsally and curved downward to ventroposterior corner of metepisternum. Metepimeron yellow with light black streaks at lateral and ventromiddle part.

Legs (Fig. 1a). Coxae yellow with whitish pruinosity on anterior and inner surfaces; trochanter yellow; femur, tibia, tarsi and spines black but back surface of femur on third legs somewhat yellow brown.

Wings (Fig. 1f) hyaline with black venation. Px 23 in FW and 20–21 in HW respectively. Pterostigma black, covering 6.5–7 cells, about 4 mm in length. Each wing has a large black brown marking about 5 mm length just below pterostigma and straight down to hind margin of the wing.

Abdomen (Figs 1a, 3a-b). Metallic green with yellow markings as follows: ventrolateral of S1–2 yellow; the yellow marking extended at the base of S2–3, narrow toward the

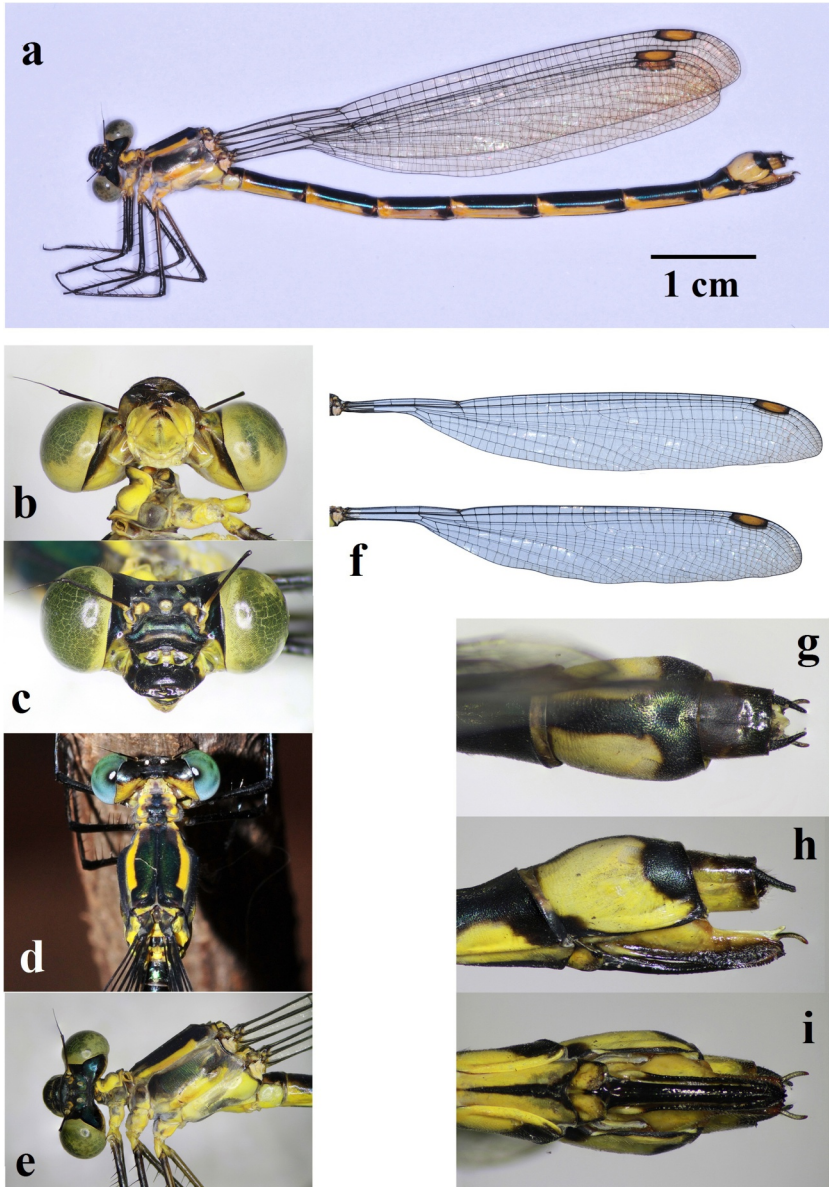


Figure 2. Details of *Sinolestes editus*, female. (a), habitus, scale bar is 1cm; (b), labium; (c), head in frontal view; head and thorax in (d), dorsal view & (e), lateral view; (f), wings; caudal appendages in (g), dorsal view, (h), lateral view & (i), ventral view. Not to scale.

end of the segment; S4–8 largely black with dark yellow marking ventrally; S9–10 black, pruinosity dorsally. Genital ligula (Fig. 1g-h) with a long thin flagella which is pointed and curved forward at tip. Anal appendages (Fig. 1i-k) entirely black, cerci slightly longer than S10, surface rounded evenly with many small nodules, somewhat broadens at base and rounded at apex, slightly waving in lateral view, curved inward in dorsal view with a small triangular basomedial swelling.

Measurements (in mm). HW 44; abdomen + anal appendages 60.

Description of female.

Head (Fig. 2b-c). All markings are similar to male except yellow markings broader strongly on the first segment of antennae and on the epicranium at just behind the bases of antennae.

Thorax and legs (Fig. 2a, d-e). The same markings as in male but with much less whitish pruinosity, mainly concentrated in mesinfraepisternum, metinfraepisternum and coxae.

Wings (Fig. 2f). Hyaline, transforming matt yellow at apical part. Px 25–26 in FW and 21–22 in HW respectively. Pterostigma brown covering 5.5 cells (3.5mm) with a yellow oval marking inside.

Abdomen (Fig. 2a, g-i). S1–8 metallic green dorsally, yellow ventrally. S9 largely yellow except ventrobasal corner black; dorsal S10 black, lateral part yellowish. Cerci metallic green. Ovipositor yellow, black ventrally.

Measurements (in mm). HW 46.5; abdomen + caudal appendages 56.

Remarks

The male wings of *Sinolestes editus* show considerable variation: (1) completely clear wings in the populations in Lixihe (Guangdong Prov., southern China; Wilson & Xu 2007) and in Yilan County (northeastern Taiwan; Yeh et al. 2006 and Kuwahara & Matsumoto 2018) (Fig. 3a) and (2) wings with black apical cross-band (Fig. 3b, c).

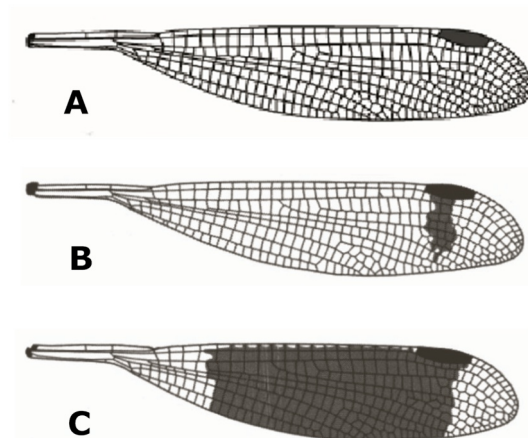


Figure 3: Wing colour forms. A: hyaline/clear form (Wilson & Xu 2007). B: "ornata" form (Wilson & Reels 2003). "truncata"-form (Wilson & Reels 2003).



Figure 4. *Sinolestes editus* in K'Bang District, Gia Lai Province, photographed by the first author. (a, b), male & (c, d), female..



Figure 5. *Sinolestes editus* in Tam Dao National Park, North Vietnam (rearranged from Kompier 2018). (a) male & (b) female.

The "ornata"-form (Fig. 3b) is described by Needham (1930) as follows: „Wings hyaline with a diffuse band of brown, a little wider than the stigma is long, extending backward from the stigma across each wing." Wilson & Reels (2003) describe the wings as "coloured with a narrow blackish cross band, hardly wider than pterostigma." Fig 5 demonstrates that the male specimen photographed in Tam Dao, northern Vietnam belongs to this "ornata"-form.

The wings of our record of *Sinolestes editus* in K'Bang District, Gia Lai Province, Vietnam (Fig. 1f, 4a,b) show a transition to the "truncata"-form. The black band is as wide as the pterostigma and not diffuse as in the "ornata"-form but of solid black as in the "truncata"-form.

The "truncata"-form (Fig. 3c) found in "Zakow, Chekiang" (Zhakou, Zhejiang Prov.) is characterised by Needham (1930) as „Wings hyaline at the base; apex with the broad cross band of brown extending from the base of the radial sector to the middle of the stigma. Veins brown. Stigma very large, black, [...] covering 7-8 cells." Wilson & Reels (2003) found "two of the 12 males collected from Damingshan (Guangxi Province, southern China) possessed wings coloured with a broad blackish cross band, covering more than one half of the wing."

Obviously, *S. editus* is subject of a broad variation of wing colouration without any diagnostic value (see introduction).

Habitat and Ecology. In Gia Lai *Sinolestes editus* was found in highland evergreen forest. The habitat was a narrow stream (about 1–1.5 m) with sandy bottom and large rocks, surrounded by bushes (Fig. 6).

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Figure 6. Habitat of *Sinoles-tes editus* in K'Bang District, Gia Lai Prov., photographed by the first author.

of the manuscript, to Dr. Matti Hämäläinen, Dr. Oleg Kosterin and Martin Schorr for reviewing the manuscript, to Mr. Haruki Karube who identified the species, to Mr. Pham Anh Tuan (Duy Tan University) and Mr. Pham Nhat Tan (Vietnam Forest Museum) for their assistance during the field work and to the directorate of Kon Ka Kinh National Park for providing support and permission. This study is part of the ongoing project entitled "Databasing biodiversity of flora and fauna of Kon Ka Kinh National Park with recommended conservation measures" funded by Gia Lai Provincial Department of Science and Technology (Contract no. 09/HD-SKHCN dated 29 July 2014).

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