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**Description of the female and notes on ecology
of *Sieboldius nigricolor* (Fraser, 1924)
from central Vietnam (Odonata: Gomphidae)**

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Abstract

The female of *Sieboldius nigricolor* (Fraser, 1924) is formally described from Central Vietnam, and both male and female specimens are illustrated. Information is given on the occurrence and ecology of the species in Vietnam.

Key words: Odonata, Gomphidae, *Sieboldius nigricolor*, Vietnam

Introduction

The genus *Sieboldius* Selys, 1854 is characterised by a combination of large body size, small head and long hind legs. The genus is widely distributed throughout East and South-East Asia. Eight species have been described: *Sieboldius albardae* Selys, 1886, *S. alexanderi* (Chao, 1955), *S. deflexus* (Chao, 1955), *S. herculeus* Needham, 1930, *S. japonicus* Selys, 1854, *S. maai* Chao, 1990, *S. gigas* Martin, 1904 and *S. nigricolor* (Fraser, 1924). The two latter species have been recorded from Vietnam (Martin 1904; Karube 2016; Kompier 2014). Martin (1904) described *Sieboldius gigas* from "Tonkin" (Northern Vietnam at present) based on a single male with a uniquely long abdomen including appendages (79 mm); later Karube (2016) re-described this species from a male specimen collected from Huu Lien Nature Reserve, Lang Son Province, Northern Vietnam. *Sieboldius nigricolor* was described from India on the basis of male specimens (Fraser

1924). Later this species was recorded in northern Thailand (Hämäläinen & Pinratana 1999), China (Zhang 2019), Laos (Yokoi 2011) and northern Vietnam (Kompier 2014). Although Kompier (2014), Yokoi (2011) and Zhang (2019) provided habitus photos of the female of *S. nigricolor* from northern Vietnam, Laos and China respectively, a formal description of the female is still lacking. Here, we provide a detailed description and illustration of the female of *S. nigricolor* based on a specimen from central Vietnam. Illustrations and short descriptive notes from a male Vietnamese specimen are also provided.

Material and Methods

We collected specimens using a hand net, treating them in acetone 100% for 8–12 hours. After 24 hours of drying in envelopes, they were replaced in new envelopes with its data printed on the card. Close-ups photos were made using Axiocam Erc 5s on Zeiss Stemi 508 Stereo Microscope. All figures are made using Photoshop Adobe version 7.0.

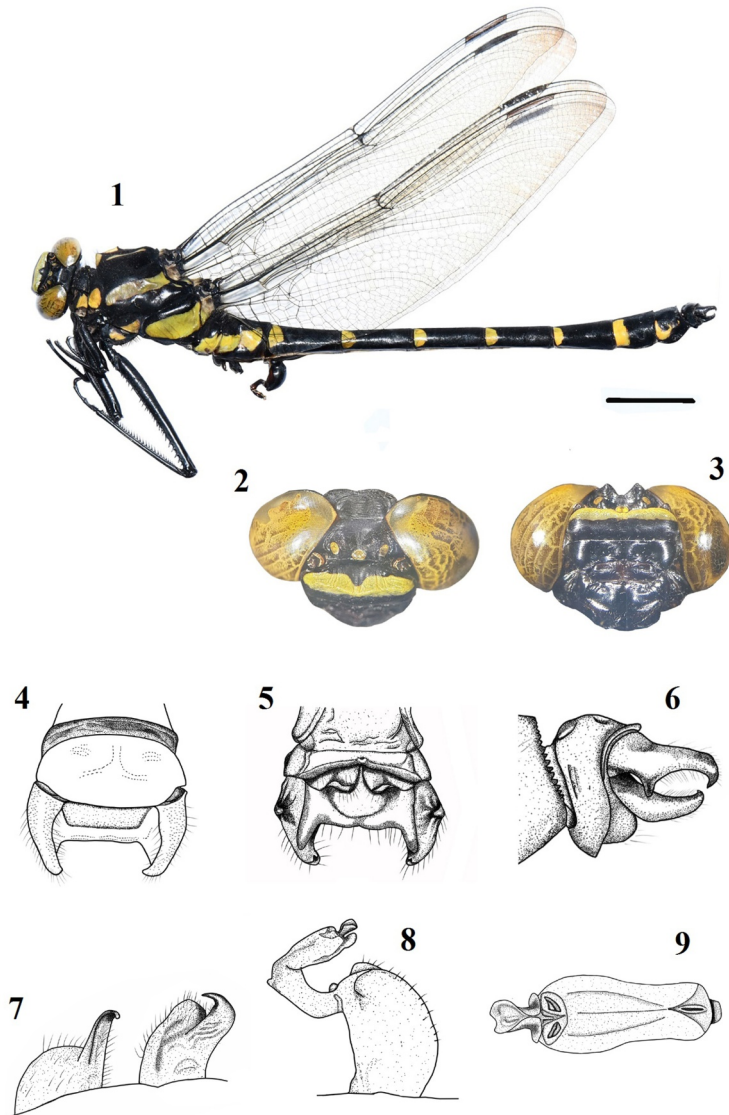
Abbreviation: S1–10 indicates abdominal segments 1 to 10; Ax = antenodal crossveins; Px = postnodal crossveins; HW = hindwing; FW = forewing; Pt = pterostigma. Specimens used in this study are deposited in the Zoological Collection of the Duy Tan University (ZCDTU), Vietnam, Kanagawa Prefectural Museum of Natural History (KPMNH), Japan and Tom Kompier's private collection (TKC).

Sieboldius nigricolor (Fraser, 1924) (Figures 1–15)

Examined specimens. 2 ♂♂, Sao La Nature Reserve (17.6208 N, 108.9575 E, 1020 m a.s.l.), A Luoi District, Thua Thien Hue Province, 18.ix.2015, H. Karube & Q.T. Phan leg. (KPMNH); 1 ♂, Tr'Hy Commune (15.8776 N, 107.3966 E, 1423m a.s.l.), Tay Giang District, Quang Nam Province, Vietnam, 24.vii.2019, Q.P. Ngo leg. (ZCDTU); 1 ♀, a stream near head-quarter Kon Chu Rang Nature Reserve (14.4753 N, 108.5412 E, 911 m a.s.l.), Ka Bang District, Gia Lai Province, Vietnam, 28.vi.2019, Q.T. Phan leg. (ZCDTU); 1 ♂, 1 ♀, Pia Oac National Park, 4.x.2014, T. Kompier leg. (TKC); 1 ♀, same location and collector, 13.ix.2015 (TKC).

Descriptive notes on male

Body color pattern (Fig. 1) and caudal appendages (Figs 4–6) of male specimens from the North as shown by Kompier (2020) and from central Vietnam are similar and match Fraser's (1924) original description. We provide color photos and illustrations of male structures of the male from Quang Nam Province in central Vietnam. S9 expanded distally, uniquely marked laterally with a curved yellow spot (Fig 1); caudal appendages (Figs 4–6) entirely black, cerci slightly longer than epiproct, decumbent and armed with a robust spine in lateral view, strongly curved medially at tip; epiproct with a deep u-shaped incision, apices directed slightly dorsally and slightly diverging laterally. Accessory genitalia (Fig. 7) with anterior and posterior hamules broad basally, anterior hamule narrowing apically, strongly hooked, posterior hamule hooked anteriorly (Fig. 7). Vesica spermalis (Fig. 8) with the first segment enormously inflated, round, glabrous. Stem, median and distal segment not enlarged (Fig. 9).



Figures 1–9. *Sieboldius nigricolor* male, Tay Giang. (1) Habitus, scale bar = 1 cm; (2) head, dorsal view; (3) head, frontal view; (4) appendages, dorsal view; (5) appendages, ventral view; (6) appendages, lateral view; (7) genital accessory; (8) vesica spermalis, lateral view; (9) apical segment, ventral view.

Description of female

Head (Figs. 11, 12) entirely black apart from a broad yellow dorsal stripe across frons which is constricted centrally. Antennae, vertex and occiput entirely black ocelli yellowish with a pair of two prominent projections posterior to paired ocelli. Vertex broad with short setae distally.

Thorax. (Fig. 10). Prothorax all black. Synthorax robust, black with greenish yellow markings, dorsal stripes and collar stripes not connecting, upper ends of dorsal stripes turned out slightly curving away from middorsal carina, no humeral stripes, ventral part of mesokatepisternum yellow; mesepimeron and anterior border of metepisternum with broad yellow stripe, metepimeron yellow except for anterior border.

Wings (Fig. 10) hyaline, smokey toward tip. Ax/Px: 26/22 in FW; 16/20 in HW. No cross veins in median space in both wings. Triangle in both wings with 2 cells. Cubital space with 4 cross veins in both wings. Anal loop 8-10 celled. Pt black, 5.5–6mm in both wings, surmounting 6.5–7 cells.

Legs (Fig. 10). Legs stoutly built, entirely black. Hind legs very long, hind femur extending back nearly as far as the apical end of S2, with a row of closely set spines, gradually widening and lengthening distally, spines on tibia close set, relatively short but very thick and robust. Hooks of tarsus claws minute, curved and sharp.

Abdomen (Fig. 10). S1–2 black with an oblique yellowish lateral stripe extending from base of S1 mid-laterally to S2; S3–8 black with anterior annulus yellow, these reduced to a tiny spot on S9; S10 entirely black.

Caudal appendages (Figs 13, 14). Cerci entirely black, conical, slightly longer than S10. Large semicircular epiproct entirely black, shorter than cerci, convex in lateral view (Fig. 13).

Vulvar lamina (Fig. 14) with a broad V-shaped notch with each lateral lobe extending almost 1/3 length of S9. The shape of the vulvar lamina in our females (Fig. 14) is similar to those from northern Laos (Yokoi 2001: Fig. 4, p. 26).

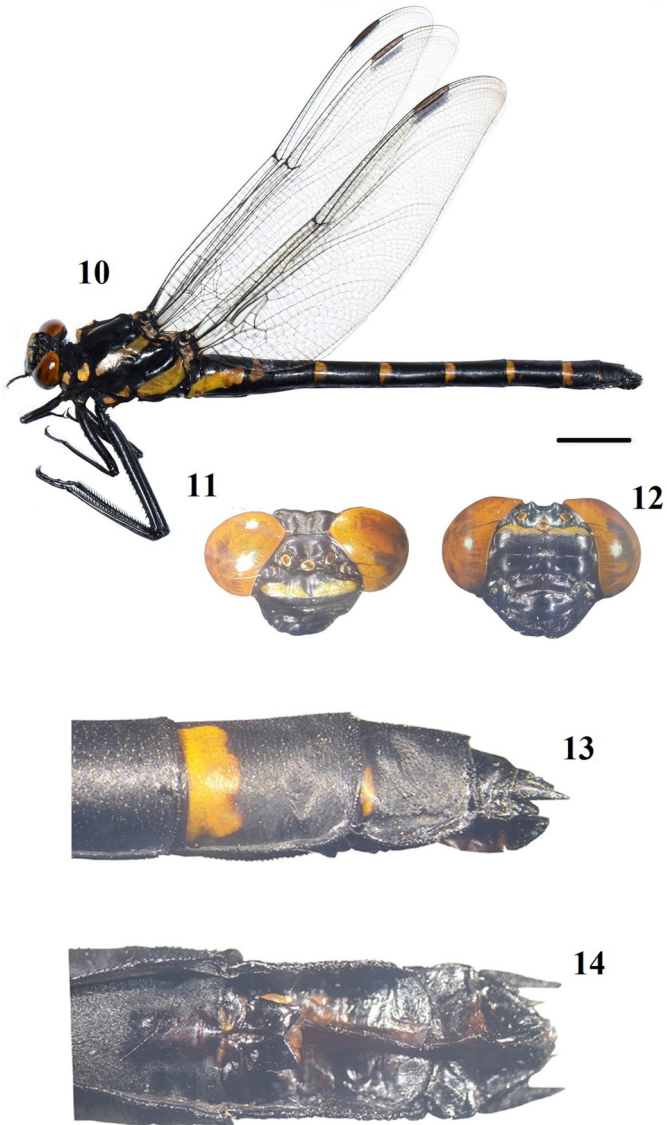
Measurements. Abdomen (incl. appendages) 62 mm. HW 56 mm.

Habitat and Ecology

In central Vietnam, a male was found on an open stream in high mountain area (4–8 m width, 1000 - 1400 m a.s.l.) with sandy bottom and many large rocks (Fig. 15). The female was found in a small, densely vegetated stream (2–4 m width, 900 m a.s.l.) (Fig. 16); the upper sections of which run over large rocks while the area near the headquarters of the Nature Reserve, where the female was caught, is characterized by a muddy and sandy bottom. *Sieboldius nigricolor* is widely distributed in Vietnam while *S. gigas* have been poorly known from a single location of the North (Fig. 17).

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Figures 10–14. *Sieboldius nigricolor*, female, Kon Chu Rang. (10) Habitus, scale bar is 1 cm; (11) head, dorsal view; (12) head, frontal view; (13) caudal appendages, lateral view; (14) caudal appendages, ventral view.



Figures 15–16. Habitats of *Sieboldius nigricolor* in central Vietnam. (15) Tr’Hy Commune, Tay Giang District, Quang Nam Province; (16) Kon Chu Rang Nature Reserve, Gia Lai Province. Photographed by Q.T. Phan.

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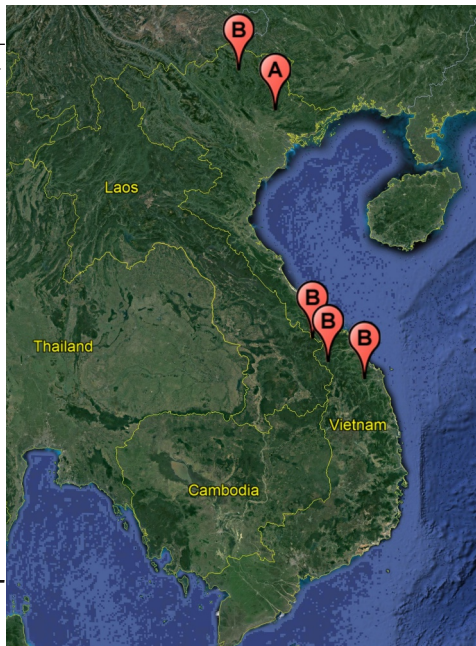


Figure 17. Provincial distribution map of *Sieboldius nigricolor* (A) and *Sieboldius gigas* (B) in Vietnam (based on Karube 2016; Kompier 2014; this study).

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