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***Platycnemis doi* sp. nov. from Huu Lien nature reserve in northern Vietnam (Odonata: Platycnemididae)**

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Platycnemis doi sp. nov. (holotype ♂ Vietnam, Lang Son province, Huu Lien nature reserve, Tan Lai, Hang Chau, altitude 200 m above sea level, 22 June 2010, deposited in RMNH, Leiden), is described on the basis of a series of male specimens. A preliminary description of the female based on a photograph taken in the field is included. The affinities of the new species are discussed.

Keywords: Odonata; Platycnemididae; *Platycnemis*; new species; Vietnam; Huu Lien

Introduction

In June 2008, May 2009 and June 2010, together with my Vietnamese colleague Do Manh Cuong and his junior co-workers, I made three separate field trips to Huu Lien nature reserve located within a limestone mountain area in Lang Son province in northern Vietnam. The main objective of these expeditions was to find the enigmatic, large calopterygid '*Echo*' *maxima* Martin, 1904, so far known only from a single female specimen collected in 1901 (Martin, 1904). The type locality of this species and of another rare member of that family, *Atrocalopteryx atrocyana* (Fraser, 1935), is Dong Mo (Than Moi), which is located c.20 km east from Huu Lien. The Dong Mo area lost its forests decades ago and the streams are badly polluted. In Huu Lien a few good forested patches with unpolluted streams still remain, although this area also suffers from small-scale illicit logging by the resident human population, despite its protected status. Although our attempts to find '*E.*' *maxima* at Huu Lien were not successful, we did find viable populations of *A. atrocyana*, as well as other interesting calopterygoids, such as *Vestalaria miao* (Wilson & Reels, 2001) and an unidentified *Rhinocypha* species, evidently close to *Rhinocypha huai* (Zhou & Zhou, 2006). We also recorded at Huu Lien several other new or rare species: *Nihonogomphus schorri* Do & Karube, 2011 (Do & Karube, 2011), *Sieboldius gigas* (Martin, 1904) and an undescribed *Coeliccia* species. During my most recent visit there on 17–22 June 2010, I found a small population of a new, rather inconspicuous platycnemidid species along a small shady trail on the way to Mo Ang waterfalls. This new species, which exhibits characters unusual within the subfamily Platycnemidinae, is

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described here. It is provisionally placed in the genus *Platycnemis*, but it may eventually require a new genus of its own.

***Platycnemis doi* sp. nov.**

(Figures 1–5)

Specimens examined

Holotype ♂. Vietnam, Lang Son province, Huu Lien nature reserve, Tan Lai village, a trail beyond Hang Chau stream on way to Mo Ang waterfall, alt. c.220 m [c.21° 39' 44" N, 106° 22' 18" E], 22 June 2010, M. Hämäläinen leg. Deposited at RMNH (Leiden, the Netherlands).

Paratypes. 6 ♂, same locality as holotype, 21–22 June 2010, M. Hämäläinen leg.

Etymology

The species is named in honour of my good friend and colleague Captain Do Manh Cuong, in recognition of his significant contributions to our knowledge of the Vietnamese odonate fauna.

Diagnosis

A slender platycnemidine with a disproportionally long abdomen; the abdomen is nearly twice as long as the wings. Middle and hind tibiae slightly widened, white. Unusually among the Platycnemidinae, the inferior appendages are bifurcate at tip. Glans of genital ligula with long lateral recurved flagella, slightly clubbed terminally.

Description of male holotype (cf. Figures 1–4, showing paratype males)

Head. Labium pale, tips of lateral lobes brown. Labrum pale with the posterior border black and with a short, black, triangular indentation in the middle, extending one-third of the length of labrum. Anteclypeus largely pale, postclypeus black. Face crossed by a broad, obscure, pale stripe as in Figure 2a. Most of frons and head above shining black with a faint metallic lustre. Tiny pale spots beside the lateral ocelli. Scape (first segment) of antennae black, with its upper surface pale, pedicel (second segment) pale in the lower half, but brown in the apical half; flagellum brown.

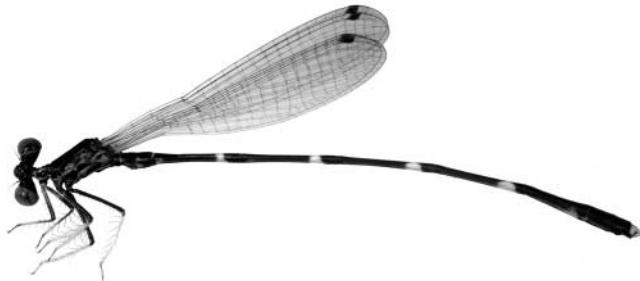


Figure 1. *Platycnemis doi* sp. nov., habitus of male (a paratype).

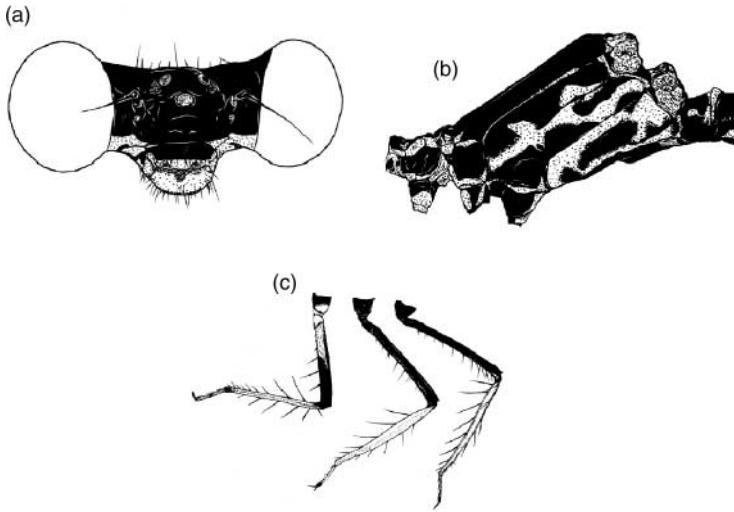


Figure 2. *Platycnemis doi* sp. nov., male: (a) head, frontal view; (b) thorax, lateral view; (c) legs. Ink drawings by Do Manh Cuong.

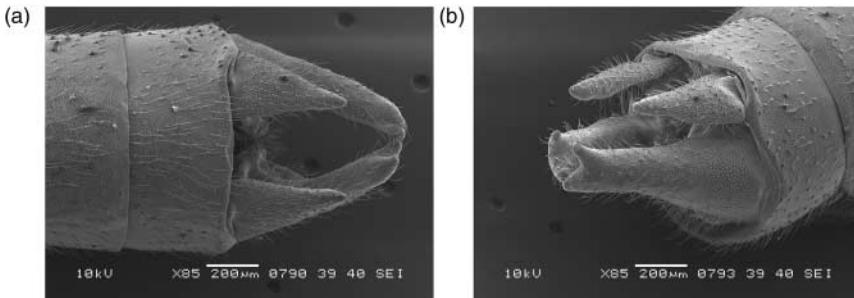


Figure 3. *Platycnemis doi* sp. nov., male anal appendages: (a) dorsal view; (b) oblique lateral view. Scanning electron micrographs by Dirk Gassmann.

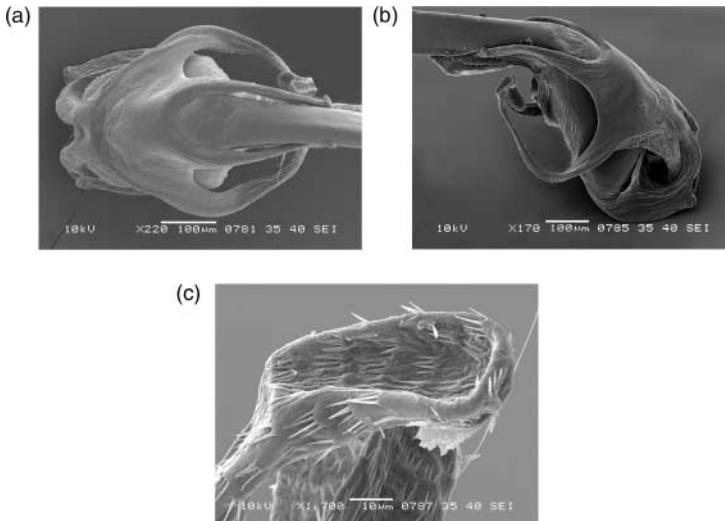


Figure 4. *Platycnemis doi* sp. nov., glans of genital ligula: (a) ventral view; (b) lateral view; (c) tip of lateral flagellum. Scanning electron micrographs by Dirk Gassmann.



Figure 5. *Platycnemis doi* sp. nov., female specimen photographed in nature on 21 June 2010.

Thorax. Prothorax matt black with pale greenish markings as in Figure 2b. Synthorax bronzy-black with intricate, pale yellowish markings laterally as in Figure 2b. Metepisternum with only small pale marks anteriorly. Venter of synthorax black with the apical part paler. Legs with coxae mainly black; with yellow apical patch in fore leg and with yellow borders in mid and hind legs. In fore legs trochanters pale, femora greyish brown, except the upper half of the anterior side pale; tibiae greyish brown. Middle and hind legs with femora black, with a narrow pale ring near the base. Middle and hind tibiae moderately flattened and dilated, white with black setae (Figure 2c).

Wings. Hyaline. Pterostigma a greyish brown trapezium, the costal side shorter than the anal side. Arculus slightly distal to Ax2. Quadrangle an elongate rectangle.

Abdomen. Proportionally slender (Figure 1). Black with pale markings as follows. S1 with a pale greenish half ring dorsally near the apex, a pale greenish lateral band expanded upwards and downwards near the apex of the segment. S2 with pale greenish markings as follows: a tiny dot mid-dorsally at the base, a narrow, obscure lateral stripe on the apical half, an obscure streak on lower edge, not reaching the apex of the segment. S3 with a narrow pale greenish dorsal half ring near the base, the colour extending slightly apically at the mid-dorsal line; an obscure pale marking on the lower side near the base. S3–6 with distinct, pale yellowish, complete, subapical rings; the rings extend around the entire segment, but dorsally are partly obscured by the intrusion of pale brownish colour; laterally the rings become gradually longer in successive segments; S7–9 black, except for a pale greenish, triangular subapical marking on lower side of S7. S10 with dorsum broadly creamy white, dorsally the basal border narrowly black, the black colour extending towards apex ventrolaterally. Seen laterally the apical ridge of S10 black in the lower half of the segment.

Anal appendages creamy whitish, inferiors ventrally darkened at base. The extreme tips of inferiors black. Appendages shaped as in Figures 3a,b. Superiors distinctly shorter than inferiors. Tips of inferiors distinctly bifurcate, the upper branch somewhat smaller and narrower than the lower.

Genital ligula (not examined in holotype, but in a paratype, cf. Figures 4a–c). Glans bearing two long, lateral, recurved flagella. Tip of flagellum expanded to form a peculiarly scooped club, bearing numerous tiny backward-pointing spines (Figure 4c). Such spines are also present in groups of two to four along the distal part of the flagellum. Terminal lobe of glans recurved and produced to form two narrow and long flagella, appressed to the shaft and not bearing prominent small spines.

Measurements (mm). Total length 39, forewing 19, hind wing 18, abdomen 33. Abdomen/hind wing ratio 1.83.

Variation in male paratypes

There are no obvious differences in the colour pattern, but there is some variation in size and in the relative length of abdomen and wings.

Measurements (mm). Hind wing 16.5–19.0, abdomen 30.0–34.5. Abdomen/hind wing ratio 1.71–1.91.

Preliminary descriptive notes on the female, based on a photograph

A single female specimen was observed at the same site as the males. It was photographed (Figure 5), but unfortunately was not captured. The eyes were green with darker longitudinal stripes. The colour pattern of the thorax, with pale greenish markings, resembled that of the male. The subapical pale rings on S3–7 were pale bluish, and unlike the male the ring on S7 is complete. Segment 10 and cerci pale.

Habitat and notes on biology

The population was observed in shady evergreen forest along a trail ascending a low limestone hill, c.20–30 m from a 1 to 2 m wide stream with a moderately fast current. The specimens were seen only in heavily shaded places along a short 10 to 15 m long section of the trail and in its immediate vicinity. They were inconspicuous and perched on vegetation close to the ground. When disturbed they flew weakly for a few metres. Other damselfly species observed along the same trail included *Copera marginipes* (Rambur, 1842), *Copera ciliata* (Selys, 1863), an undescribed *Coelliccia* species, *Vestalis gracilis* (Rambur, 1842), *Rhinocypha* sp. (cf. *huai*) and *Atrocalopteryx atrocyana*.

Discussion

The family Platycnemididae is presently divided into two subfamilies: Platycnemidinae and Calicnemidinae, based on the grouping by Fraser (1957). Four genus-group names are available in the first subfamily: *Platycnemis* Burmeister, 1839 (type species *Libellula pennipes* Pallas, 1771), *Copera* Kirby, 1890 (a replacement name for the preoccupied name *Psilocnemis* Selys, 1863; type species *Platycnemis marginipes* Rambur, 1842), *Proplatycnemis* Kennedy, 1920 (type species *Platycnemis hova* Martin, 1908), *Pseudocopera* Fraser, 1922 [type species *Pseudocopera arachnoides* Fraser, 1922; a taxon synonymized with *Copera ciliata* (Selys, 1863) by Asahina, 1984]. *Proplatycnemis* and *Pseudocopera* are currently regarded as synonyms of *Platycnemis* and *Copera*, respectively. However, the generic taxonomy of the subfamily Platycnemidinae still remains unsettled. The most recent contribution on this matter was Dijkstra et al. (2007), reviewing the Afrotropical species of Platycnemidinae.

Currently DAWN (Damselfly Workers at Naturalis) – a research group at the Netherlands Centre for Biodiversity Naturalis in Leiden, is conducting a study of the phylogenetic affinities of the platycnemidine damselflies, based on molecular data. This study will most probably result in a new generic classification within the subfamily. A male specimen of *Platycnemis doi* has already been analysed in this study.

In order to assign a formal name to this new species, it is here provisionally placed in the genus *Platycnemis*, because the structure of the glans of the genital ligula, with both terminal and lateral flagella, resembles most closely that of a *Platycnemis* species (especially those from Madagascar); in *Copera* species the lateral flagella are missing. Lateral flagella are also present in the Oriental *Platycnemis phasmovolans* Hämäläinen, 2003 (cf. scanning electron micrographs in Hämäläinen, 2003). The new species also has a unique character, the bifurcate tip of the male inferior appendage, which does not exist in any other known *Platycnemis* or *Copera* species, and tends to suggest a significant divergence from known related taxa.

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