Text and figures of an article published in
***Zootaxa* 2927: 63–68 (22 June 2011)**
by Magnolia Press

Matrona taoi spec. nov., a new damselfly species from northern Vietnam (Odonata: Calopterygidae)

QUOC TOAN PHAN[1] & MATTI HÄMÄLÄINEN[2]

[1]*Department of Biology, Vietnam National Museum of Nature, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. E-mail: phanquoctoan84@gmail.com*

[2]*Netherlands Centre for Biodiversity Naturalis, P.O.Box 9517, 2300 RA, Leiden, The Netherlands. E-mail: matti.hamalainen@helsinki.fi*

Abstract

Matrona taoi Phan & Hämäläinen, **spec. nov.** (holotype ♂, from Vietnam, Phu Tho province, Xuan Son National Park, Xom Coi, alt. 442 m, 15 xi 2010, deposited in Vietnam National Museum of Nature, Hanoi) is described from both sexes, illustrated and compared with other species in the genus.

Key word: Odonata, Calopterygidae, *Matrona*, new species, Vietnam, Xuan Son

Introduction

Vietnam, Laos and the southern provinces of China (south of 30º N) constitute a 'hotspot' of calopterygid diversity. About 1/3rd of the world's known species of this family (in the strict sense, excluding hetaerinids) are represented in this area. In Vietnam there occur several enigmatic species. The rarest among them is the large, probably generically misplaced *Echo maxima* Martin, which is still known only from a single female specimen taken in Lang Son province (Martin 1904). This species seems to be related to the two known *Archineura* species, the giants among the Demoiselles, found only in this faunal region. Another unusual and rare Vietnamese calopterygid is the recently discovered *Noguchiphaea mattii* Do, 2008 from the southern Khanh Hoa province.

During a visit to Xuan Son national park in Phu Tho province in northern Vietnam in December 2009, the first author discovered a *Matrona* species new to science, providing yet more evidence of the remarkable diversity of the Vietnamese fauna. Further specimens were collected at the same locality in November 2010.

This new species brings the total number of Calopterygidae recorded from Vietnam to 18 species (Do & Tang 2007, Do 2008, Phan & al. 2011).

Matrona taoi Phan & Hämäläinen, spec. nov.

(Figs. 1–7)

Material. Holotype ♂: Vietnam, Phu Tho province, Tan Son district, Xuan Son National Park, Xom Coi, (21°06'56.6"N, 104°57'27.4"E), elevation 442 m, 15 xi 2010, Phan Quoc Toan leg. Holotype to be deposited in Vietnam

National Museum of Nature (VNMN), Hanoi.

Paratypes: 1 ♂, 3 ♀, same locality as for holotype, 07 xii 2009, Phan Quoc Toan leg.; 2 , ♂ 4 ♀, same locality as for holotype, 15 xi 2010, Phan Quoc Toan and Do Manh Cuong leg.). Paratypes are deposited in the authors'
collections; 2 ♂, 2 ♀ in coll. Hämäläinen, the rest in coll. Phan.

Etymology. The species is named after Mr Nguyen Thien Tao (Biology Department, Vietnam National Museum of Nature) as a token of gratitude for his friendly support of the first author's field work and research activity.

[p. 65]

Diagnosis. A *Matrona* species with reddish-brown wings, lacking any milky coloured reticulation at the wing bases of the male; apical 1/3rd of male fore wing subhyaline. Posclypeus metallic green. Ventral side of the apical segments of abdomen a conspicuous pale olive yellow.

Description of male (Figs 1, 3)**.** *Head*: Labium olive yellow, the lateral lobes black at tips. Labrum black with an olive yellow median band, narrowed in the middle; in older specimens the yellow colour reduced to two separate spots. Base of mandibles largely yellow. Anteclypeus black with an obscure yellow spot in the middle. Postclypeus shining metallic green. Frons and upper surface of head black with obscure metallic green sheen. Genae

[p. 66]

black. Antennae dark, with a yellowish stripe on pedicel. *Prothorax* dark metallic green. *Synthorax* dark metallic green. Pale yellow portions are restricted to the level anterior to stigma and around metepimeron (Fig. 3). Underside of synthorax largely pale yellow. *Legs*: Coxae pale yellow with black markings on pro- and mesothoracic legs. Femora black with flexor surface partly pale in younger specimens, more markedly so in meso- and metathoracic legs. Tibiae black; meso- and metathoracic tibiae moderately curved (Fig. 3). *Wings* (Fig. 5) largely brownish, the apical 1/3rd of fore wing subhyaline; in hind wing the apical part slightly more hyaline than base; this difference

[p. 67]

less marked than in fore wing. In hind wing lower half darker in middle section of wing. Venation dark violet red. Reticulation sparse for genus, best seen in number of intercalary veins and density of crossveins in the area defined by CuP and wing border (Fig. 7) and in wing tip. Only 1–3, partly reticulated, crossveins in median space. Cubital space with 17–20 crossveins in fore wing, 17–20 in hind wing (in holotype 20 crossveins in all wings). Quadrangle with 13–18 crossveins in fore wing, 14–20 in hind wing (in holotype 15–13 and 18–18, respectively). Antenodals (in first row) number 41–53 in fore wing and 36–48 in hind wing (in holotype 41–41 and 38–36, respectively). Arculus (Arc) situated at the level of the fifth antenodal. Pterostigma absent in both wings. *Abdomen* metallic bluish-green dorsally and laterally; the lower half of side of S10 yellow (Fig. 3). Ventral side of S1-S5 blackish brown, S6-7 obscurely pale yellow and S8-S10 conspicuous pale olive yellow (Figs 1, 3). *Anal appendages* of the typical shape for the genus: cercus wholly black, bearing a row of small spines laterally; paraproct more than half of the length of cercus, black at tip, yellow laterally and ventrally.

Measurements (mm): Hind wing 38–42 (in holotype 38); abdomen (incl. appendages) 54–61 (in holotype 54).

Description of female (Figs 2, 4)**:** Head and thorax coloured as in male. Wings (Fig. 6) reddish-brown throughout, an obscure darker band in the apical third of hind wing, the darker colour extending basad along wing border. Venation reddish brown to pale brown. Reticulation as sparse as in male. Median space of fore wing with 1–3 crossveins; 2–4 crossveins in hind wing. Cubital space with 18–23 crossveins in fore wing, 18–23 in hind wing. Quadrangle with 12–20 crossveins in fore wing, 15–19 in hind wing. Antenodals (in the first row) number 45–54 in fore wing and 41–48 in hind wing. Pseudopterostigma yellowish cream, short, covering 6–9 underlying cells. Abdomen dark reddish brown, the apical segments obscurely pale laterally.
Measurements (mm): Hind wing 44–46; abdomen (incl. appendages) 53–57 mm.

Biology. The species was found on three streams located about 4–5 km from the Centre of Xuan Son Community. Two of the streams were open in places, 3–5 m and 5–10 m wide, respectively. *Matrona taoi* were collected along sections of these streams where riffles and quieter waters alternate and where the banks are densely vegetated. The third stream, a 1–7 m wide shaded branch of the narrower stream above, is in primary forest. Other calopterygids occurring on these streams were *Matrona basilaris* Selys, *Neurobasis chinensis* (Linnaeus), *Vestalis gracilis* (Rambur), *Vestalaria miao* (Wilson and Reels) and *Noguchiphaea yoshikoae* Asahina. For more details and photographs of these streams, and of their calopterygid, chlorocyphid and euphaeid fauna, see Phan & al. (2011).

[p. 68]

Females were observed from 0800 h to 1700 h, but males were seen only around noon. The damselflies perched on tree branches and bushes at the water's edge, 50 cm to 2–3 m above the surface. No territorial behaviour
was documented. In sunshine the wings display a distinct reddish violet sparkle.

Discussion

The known *Matrona* species have tentatively been placed in two species groups (Hämäläinen *et al.* 2011) as follows:

Matrona basilaris –group. This group includes species in which mature males have dark blue wings with a distinctive area at the wing base, of variable size, which appears milky when viewed from an oblique angle, since the transverse crossveins are bluish white. The reticulation of wings is dense to very dense, especially in hind wings. This group includes: *Matrona basilaris* Selys, *M. nigripectus* Selys, *M. japonica* Förster and *M. cyanoptera* Hämäläinen & Yeh.

Matrona oreades –group. Including species in which the males are characterized by brownish wings without any milky reticulation at the wing base. The reticulation of wings is clearly sparser than in the *basilaris* –group.
This group includes two recently described species from China: *M. oreades* Hämäläinen, Yu & Zhang and *M. corephaea* Hämäläinen, Yu & Zhang.

M. taoi belongs to the *M. oreades* –group. It is about the same size and build and also has a sparse reticulation. However, *M. taoi* can be easily separated from the two other species by the colour of

its wings and other details discussed below. For descriptions, colour photos and other illustrations of *M. oreades* and *M. corephaea*, see Hämäläinen & al. (2011).

In male *M. taoi* the wings are reddish-brown with apical third of the fore wing subhyaline and the hind wing mainly opaque, whereas in males of both *M. oreades* and *M. corephaea* fore and hind wings have darkened tips. In *M. taoi* the wings are proportionally distinctly broader than in *M. oreades* and slightly broader than in *M. corephaea*. Other conspicuous diagnostic characters include the colour of the postclypeus in males, metallic green in *M. taoi*, metallic blue in *M. oreades* and *M. corephaea*. The ventral side of male abdomen is differently coloured; in *M. taoi* S6-10 are pale (S8-10 being conspicuously olive yellow), whereas in *M. oreades* only the apex of S8 and S9-10 are pale. The yellow in *M. corephaea* is further reduced. Lateral yellow of S10 is more extensive in *M. taoi* than in *M. oreades*; in *M. corephaea* the sides of S10 are black. Female *M. taoi* differs from *M. oreades* and *M. corephaea* by the tip of fore wing not being darkened. In *M. taoi* the frons and the upper surface of the head are darker than in the other species.

Acknowledgements
The first author is grateful to Mr Nguyen Thien Tao, who supported his first field trip to Xuan Son National Park, and to Mr Do Manh Cuong for his company on the second field trip and for other help. Dr A. G. Orr checked a preliminary
version of this manuscript and made many useful comments and suggestions. Dr Sami Karjalainen took the photos of the specimens.

References

Do, M.C. (2008) *Noguchiphaea mattii* sp.nov. from southern Vietnam (Odonata: Calopterygidae). *International Journal of Odonatology*, 11(1), 21–26, pl. 1 excl.

Do, M.C. & Dang, T.H. (2007) *Checklist of dragonfly from Vietnam*. Vietnam National University Publisher, Hanoi, 6 + 181 pp.

Hämäläinen, M., Yu, X. & Zhang, H-M. (2011) Descriptions of *Matrona oreades* spec. nov. and *M. corepahaea* spec. nov. from China (Odonata: Calopterygidae). *Zootaxa*, 2830, 20–28.

Martin, R. (1904) Liste des Névroptères de l'Indo-Chine. *In*: *Mission Pavie Indo-Chine 1879–1895. Études diverses. III. Recherches sur l'histoire naturelle de l'Indo-Chine orientale*, Ernest Leroux, Paris, pp. 204–221.

Phan, Q.T., Do, M.C. & Hämäläinen, M. (2011) Xuan Son National Park, a paradise for Caloptera damselflies in northern Vietnam. *IDF-Report, Newsletter of the International Dragonfly Fund*, 32, 1–34.

Figure legends.

[p. 64]

FIGURES 1–2. *Matrona taoi* **sp. nov.**, damselflies photographed in the field in Xuan Son by Phan Quoc Toan on 15 December 2010. **1)** male; **2)** female.

[p. 65]

FIGURES 3–4. *Matrona taoi* **sp. nov. 3)** habitus of paratype male (right hind wing incomplete at base); **4)** habitus of paratype female.

[p. 66]

FIGURES 5–6. *Matrona taoi* **sp. nov. 5)** wings of paratype male; **6)** wings of paratype female.

[p. 67]

FIGURE 7. *Matrona taoi* **sp. nov.** paratype male; venation at hind wing base.

Fig. 1 *Matrona taoi* male.

Fig. 2 *Matrona taoi* female.

Figs. 3-4. *Matrona taoi*: (3) male, (4) female.

Figs. 5-6. Wings of *Matrona taoi*: (5) male, (6) female.

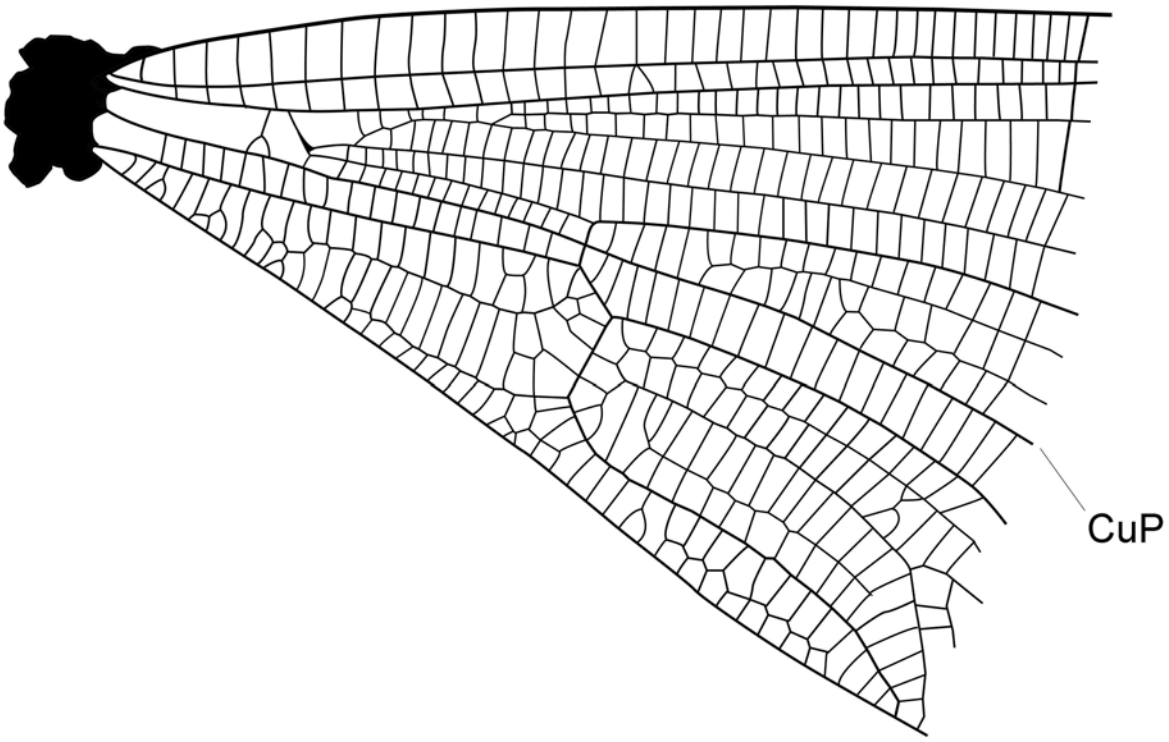

Fig. 7. Venation at hind wing base of *Matrona taoi* male.