

Onychothemis yvonneae spec. nov. (Odonata: Libellulidae), a new dragonfly from a lowland riverine forest in northern Palawan, Philippines

Reagan Joseph T. Villanueva^{1,*} and Jonah Van Beijnen²

Abstract

The Cleopatra's Needle Mountain Range (CNMR) in northern Palawan includes one of the largest remaining patches of primary forest in the Philippines and has a high conservation value. To provide scientific baseline information to recognize the CNMR as a protected area, biologists mapped its biodiversity during fieldwork conducted from October to December 2014. The present study proposes a new species of Odonata discovered during the survey. *Onychothemis yvonneae* spec. nov. is described, illustrated, and compared with its nearest allies. The new species is the second member of the genus *Onychothemis* in the Philippines and is the seventh known overall. *Onychothemis yvonneae* appears to be most closely related to *O. testacea* and *O. tonkinensis*.

Keywords: Anisoptera, biodiversity, Cleopatra's Needle, entomology, new species

Introduction

The Palawan Odonata fauna is relatively well studied. Hämäläinen & Müller (1997) recorded 78 species from the main island of Palawan based on previous literature and materials from various collections. Since then, several new studies have been published that expanded our understanding of the Odonata of the island (Dow & Orr 2012; Gassmann & Hämäläinen 2008; Hämäläinen 1997; van Tol 2005; Villanueva 2012). The latest overview on the Odonata of Palawan raised the total number of recorded species for the island province to 82 (Villanueva *et al.* 2018).

The Cleopatra's Needle Mountain Range (CNMR) in northern Palawan contains one of the largest remaining patches of primary forest in the Philippines. The area contains the highest peak of northern Palawan (Cleopatra's Needle, 1602 masl) and is also responsible for the supply of fresh water for most of central Palawan. Despite the area being listed as a Key Biodiversity Area (KBA) and being part of the homeland of the Batak and other indigenous groups, the area had no official

protective status (van Beijnen & Hoevenaars 2015).

As part of the conservation plan to protect the CNMR and to provide a scientific foundation to declare the area protected, a group of biologists set out to do an inventory of the biodiversity in the CNMR. Fieldwork focusing on the local fauna was conducted from October to December 2014.

The authors of this study presented an updated overview of the Odonata from Palawan that was partly based on data obtained during this fieldwork (Villanueva *et al.* 2018). The continued odonatological exploration led to the discovery of an unknown species of dragonfly belonging to the genus *Onychothemis* Brauer, 1868.

The genus *Onychothemis* is represented by six species distributed in the Oriental region (Schorr & Paulson 2020) mainly found in clear running streams of forested areas. In the Philippines, *Onychothemis abnormis* Brauer 1868, a widely distributed species, was the only recorded species until the chance discovery of another species in Palawan. This new species brings the total number of *Onychothemis* species to seven worldwide. At present, this is the only known *Onychothemis* to occur in Palawan Island which is described in this paper.

Systematics

Onychothemis yvonneae spec. nov.

(Figs 1a)

¹College of Arts and Sciences Education, University of Mindanao, Matina, 8000 Davao City, Philippines

²Fins & Leaves, Oude Bennekomseweg 23, 6706 ER Wageningen, the Netherlands

*Corresponding author: rjtvillanueva@gmail.com

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Holotype: male, Magbabaw, barangay Langoyan, Puerto Princesa, Palawan, Philippines, xii.2–7.2014, H. Cahilog leg., deposited in the Coleoptera Research Center, University of Mindanao, Davao City, Philippines.

Paratypes: 3 males, 1 female, same label as holotype, deposited in the private collection of the first author (Coll. Villanueva), Davao City, Philippines.

Etymology

A noun in the genitive case named after the mother of the second author - Yvonne van Vliet (1957–2018) - who had a big passion for Odonata and who inspired her son to become engaged in the study of Odonata and biodiversity conservation.

Diagnosis

Onychothemis yvonneae (Fig. 1a) appears closely related to *O. testacea* Laidlaw, 1902 (Fig. 1b) and *O. tonkinensis* Martin 1904 (Fig. 1c) by general coloration. *Onychothemis yvonneae* is easily distinguished as the darkest species of the three with less yellow markings on the abdomen. This is clearly seen in the absence of a lateral yellow patch in S3 which is present in the two other species (indicated by arrows in Figs. 1b and 1c). The yellow lateral patch from S4–S7 that is present in *O. testacea* and *O. tonkinensis* is replaced by basal yellow rings on these segments in *O. yvonneae*. The new species has prominent brick red dorsal patches on S8 and S9 that are absent in *O. tonkinensis* and although *O. testacea* has a similar but smaller patch on S8 and an almost vestigial patch on S9, these are colored yellow instead of brick red.

Description of male holotype

Head. Mandibles brown, basally brownish black; labium yellow; labrum light brown, darker medially; genae, clypeus and anterior portion of frons light brown. The rest of the head glossy is black.

Thorax. Prothorax black except for the outer margin of posterior lobe that is yellow and covered with yellow fine setae. Synthorax generally black with glossy reflection: the following bear yellow markings; thin line along entire length of dorsal carina that is covered with long, fine yellow setae; three small spots along the mesopleural suture; circular spot near the wing base, ovoid spot near the mesinfraepisternum border, and faint spot in between the two; large faint streak on the mesinfraepisternum, large rectangular streak along the posterior border of mesepisternum, small circular spot on the postero-superior border of metepimeron, and a large patch on the posterior portion of metepisternum. Legs black including the spines except for dark brown coxae. Wings hyaline with black

venation. Anx 16/9 forewing and hind wing respectively. Pnx 10/11 forewing and hind wing respectively. The triangle in forewing crossed.

Abdomen. Generally black except: S1 narrow lateral yellow streak, S2–S3 narrow middle incomplete yellow ring that is broader dorsally, S1–S7 incomplete basal yellow ring, very narrow on S7; S8 small dorso-basal red patch, S9 dorsum red except for central black spot; S10 irregularly shaped dorsal red patch. Anal appendages black of the typical form for the genus. Accessory genitalia with posterior hamules brownish black, broad and bulging base with slender hook shape elongation.

Measurements (mm): hindwing: 40; abdomen including anal appendage: 34

Variation

Among the three male paratypes, there is no significant variation noted.

Description of female paratype

Female coloration similar to the male except for the following: smaller red dorso-basal spot on S8 and vestigial red spot on S9.

Measurements (mm): hindwing: 45; abdomen: 34

Remarks

As noted in the diagnosis, *Onychothemis yvonneae* appears to be most closely related to *O. testacea* and *O. tonkinensis*. However, *O. testacea* is known from India and Sri Lanka to Peninsular Malaysia and parts of China and Indochina, while *O. tonkinensis* is known from northern Vietnam and parts of China, so that *O. yvonneae* does not occur sympatrically with either species.

Although the researchers visited several areas in the CNMR, the species was only found in one locality along the Langogan River. This river is the second largest on the island and is in relatively good shape, flanked by lowland riverine forest with high water transparency. However, with the fast pace of economic development in Puerto Princesa, the area has received significant interest from land speculators. These speculators often clear-cut large pieces of land along the river (for future riverfront property development), decreasing the quality of the habitat significantly. Additionally, gold has been found in the area and several illegal mining operations have been observed in and near the river.

With the species so far only observed in one locality, and only a handful of specimens observed, and taking the above

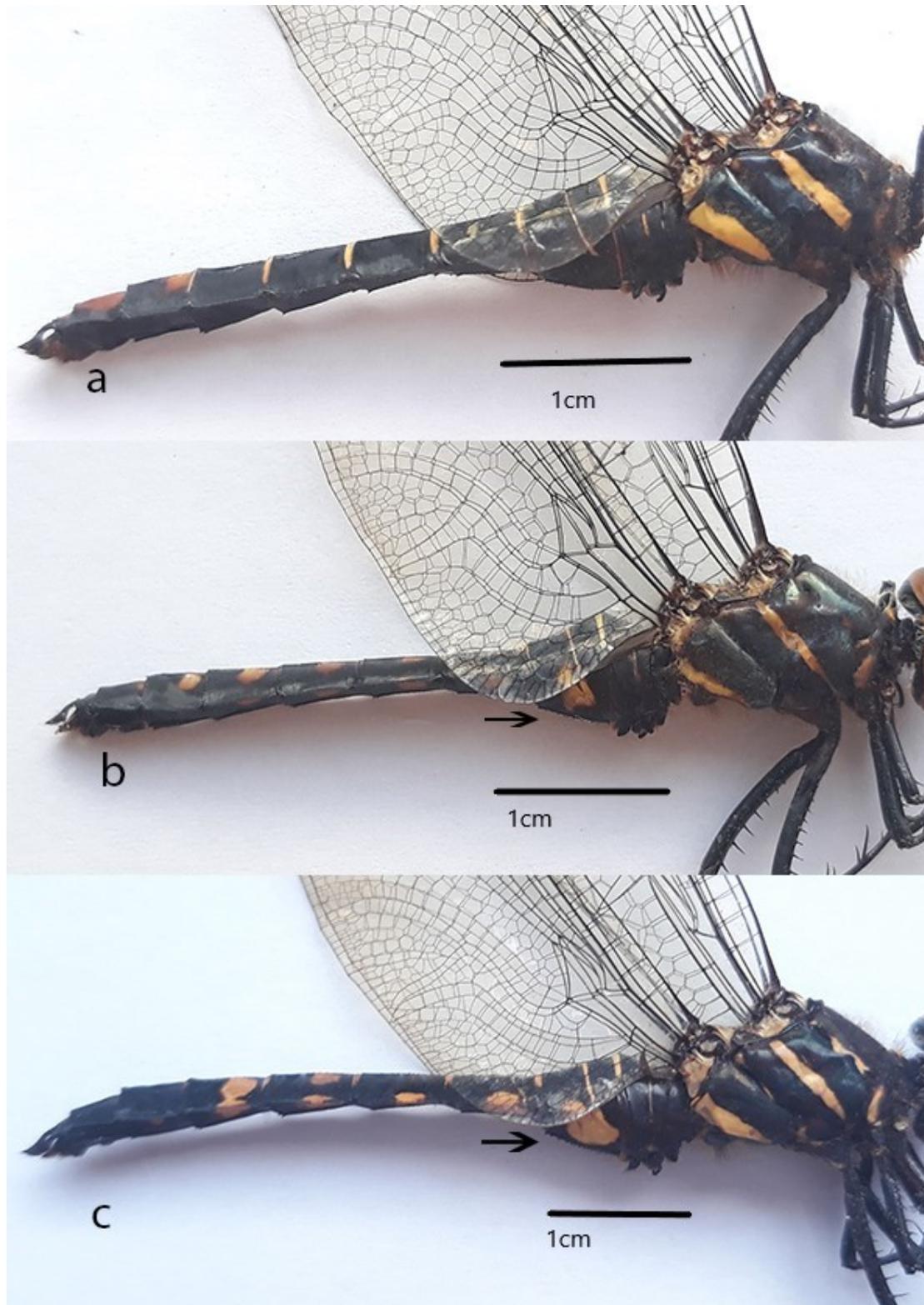


Figure 1. Thorax and abdomen; a. *Onychothemis yvonneae* (paratype), b. *Onychothemis testacea* (Peninsular Malaysia), c. *Onychothemis tonkinensis* (Taiwan); arrow indicating the yellow lateral patch.

threats into consideration, the authors believe an Endangered (EN) conservation status is warranted under IUCN criteria.

The authors further hope that this paper will provide additional scientific evidence of the uniqueness of the Langogan River and the CNMR, providing more support for the conservation of the habitats therein.

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