

## Biodiversity Record: New Singapore record of the dragonfly, *Tetrathemis flavescens*, with a note on *Tetrathemis hyalina* in Singapore

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**Subjects:** Yellow-tinted elf, *Tetrathemis flavescens* (Insecta: Odonata: Anisoptera: Libellulidae).

**Subjects identified by:** Rory A. Dow and Robin W. J. Ngiam.

**Location and dates:** Singapore Island, Clementi Forest; between 19 June 2023 and 26 February 2024.

**Habitat:** Edge of a swampy secondary forest near a construction site.

**Observers:** Thio Hui Bing, Chan Wan Ting and Robin W. J. Ngiam.

**Observations:** On 19 June 2023, a few individuals, including a mating pair (Fig. 1), were observed. Subsequent visits recorded egg laying behaviour whereby a female adhered her eggs onto a hanging filament of a *Caryota* palm (Fig. 2) above a swampy pool. On 26 February 2024 at around 1030 hrs, an adult male (Fig. 3) was obtained as a voucher specimen on under an NParks Research Permit.



Fig. 1. Lateral view of a mating pair on 19 June 2023 (Photograph by: Thio Hui Bing).

Based on the voucher specimen, the following morphological features were observed (terminology follows New et al., 2006 and Dijkstra, 2016): Eyes bluish-green or light pinkish, with yellow (depending on lighting conditions). Frons black, clypeus yellow and labrum black. Prothorax black. Synthorax black with broad dorso-lateral yellow stripes on mesepisternum and broad, yellow lateral stripes covering most of the mesepimeron and metepimeron. Antealar ridge yellow. Legs largely black except for extensive yellow ventrally on the back of femur of fore legs. Wings with extensive yellow tint, up to midpoint between nodus and pterostigma in forewings, and almost to pterostigma in hindwings. Abdominal segments one to three (S1 to S3) with lateral yellow markings. S4 to S10 black (only for the voucher, as other specimens have reduced yellow markings). Superior anal appendage (Fig. 4) black, straight but slightly curved distally, expanded ventrally at apex with ventral serrations. Inferior appendage slightly longer than superior appendages, black with upward pointed tip. Total body length 22 mm, hindwing length 17 mm.

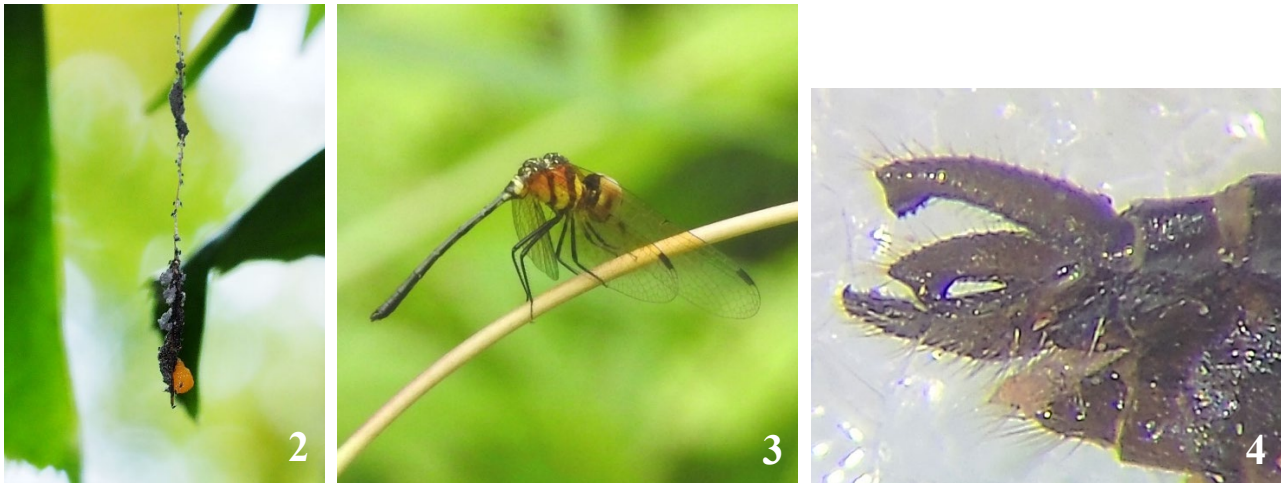


Fig. 2. Freshly adhered and brightly coloured egg mass of *Tetrathemis flavescens* on a hanging filament of a *Caryota* palm. (Photograph by: Robin W. J. Ngiam) Fig. 3. Lateral view of voucher male specimen of *Tetrathemis flavescens* in life before capture on 26 February 2024. (Photograph by: Chan Wan Ting) Fig. 4. Lateral view of the anal appendages of the voucher specimen (Photograph by: Robin W. J. Ngiam).

**Remarks:** The identity of the featured dragonfly was based on the diagnostic features of the anal appendages on the voucher specimen (Fig. 4). Taking reference from the specific epithet, we propose the English vernacular name ‘yellow-tinted elf’ for *Tetrathemis flavescens* Kirby (1889). *Tetrathemis flavescens* represents a new record for Singapore and increases the national odonate list to 138, since the discovery of *Aciagrion borneense* in 2023 (Ngiam et al., 2023). Based on the conservation assessment criteria set out in Ngiam & Cheong (2016) for Singapore, we determined *Tetrathemis flavescens* to have a national conservation status of Endangered, Restricted and Rare.

Prior to the discovery reported here, all observations and photographs of both sexes of *Tetrathemis* recorded in Singapore were considered to be *Tetrathemis hyalina* (see Ngiam & Ng, 2022). The three species known from Sundaland: *Tetrathemis flavescens*, *Tetrathemis hyalina* and *Tetrathemis platyptera*, are very similar in appearance and are best identified by close inspection of the male’s anal appendages. At least in the case of Sundaland populations, the extent of the yellow tint on wings can also be a reliable distinguishing character between *Tetrathemis hyalina* and *Tetrathemis flavescens*, with the yellow tint in *Tetrathemis hyalina* slight and much smaller than that in *Tetrathemis flavescens*.

The present discovery throws the status of the congener *Tetrathemis hyalina* in Singapore into question. The species is confirmed to occur there based on a female specimen (Fig. 5) in the Lee Kong Chian Natural History Museum, collected in October 1964 by the late D. H. Murphy (ZRC.ODO.0793), and originally identified as a subspecies *Tetrathemis irregularis hyalina* (see Tang et al., 2010). We treat this taxon as *Tetrathemis hyalina* following Dow et al. (2019, 2024) and Ngiam & Ng (2022).

A number of photographs of *Tetrathemis* dragonflies obtained in Singapore are available on iNaturalist ([https://www.inaturalist.org/observations?place\\_id=6734&taxon\\_id=1010909](https://www.inaturalist.org/observations?place_id=6734&taxon_id=1010909), accessed on 4 May 2024). A quick examination of these photographs shows that while nothing diagnostic at species level is visible in some images, others, based on extent of yellow tint on wings, appear to be *Tetrathemis flavescens* and *Tetrathemis hyalina*, and possibly *Tetrathemis platyptera* (which is locally common in Peninsular Malaysia). It must be noted that the extent of the yellow tint can vary in photographs depending on the light condition and angle of the subject. More collections of *Tetrathemis* in Singapore are clearly needed to determine how many species are actually present and to clarify which species are found at which sites. We emphasise that species identification based purely on photographs posted on internet platforms like iNaturalist should be treated with caution especially for species that are superficially similar in appearance.



Figs. 5a & b. Dorsal view of the female *Tetrathemis hyalina* collected by D. H. Murphy in October 1964, deposited in the Lee Kong Chian Natural History Museum (Photographs by: Robin W. J. Ngiam).

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Robin Ngiam dedicates this article to **Dr Leong Chee Chiew** (1952–2024). A highly respected pioneer conservation leader whose steady hand guided Singapore’s journey from A Garden City to City in Nature. (Photograph of Dr Leong courtesy of Daniel and Esther Leong).



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