

## OBSERVATIONS OF THE DRAGONFLY, *CAMACINIA GIGANTEA* (BRAUER) AT THE NIGHT SAFARI, SINGAPORE (INSECTA: ODONATA: LIBELLULIDAE)

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### INTRODUCTION

The dragonfly genus *Camacinia* is represented by three species worldwide (Steinmann, 1997), one of which, *Camacinia gigantea* (Brauer), occurs in Singapore. This species ranges from northern India, through tropical Southeast Asia, to New Guinea (Tang et al, 2010). Despite its widespread distribution, *Camacinia gigantea* is regarded as rare in Singapore (Norma-Rashid et al, 2008; Tang et al, 2010) where it has been observed at Bukit Timah Nature Reserve, Bukit Batok Nature Park, and Sungei Buloh Wetland Reserve (Tang et al, 2010). This article records recent observations of *Camacinia gigantea* in a new locality in Singapore, within the grounds of the Night Safari, which is nestled in the north-western part of the Central Catchment Nature Reserve. Mating and egg-laying behaviour of this dragonfly were also observed and reported herein.

### OBSERVATIONS

Seven male *Camacinia gigantea* were sighted at a pond in the Gaur exhibit on 29 Sep.2011 (Fig.1). This is the largest congregation of *Camacinia gigantea* we have recorded to date in the Night Safari. No females were recorded. The dragonflies were observed to be flying around the water feature in the exhibit. They were also seen flying around a dry moat situated next to the water feature. The dragonflies were observed at the same exhibit for a week before they dispersed.



Fig. 1. Male *Camacinia gigantea* resting vertically on the hotwire in the Gaur exhibit (photographed on 29 Sep.2011). Total body length = 53–56 mm.

In the following week, on 2 Oct.2011, one specimen was photographed at the pond in the Banteng exhibit (Fig. 2), which was adjacent to the Gaur exhibit. Another example was observed at the water moat of the Mouflon exhibit on 12 Oct.2011 (Fig. 3). As all the photographs illustrate, these dragonflies were most often observed resting in a vertical position.

The mating and ovipositing behaviours of *Camacinia gigantea* were observed at a pond in the Night Safari's Gaur exhibit (Fig. 4). This kidney-shaped water feature is built with concrete and measures 12 m long, 2.5 m wide, and 0.7 m deep. The water in the pond is changed once every week.

On 10 Nov.2011 at 1320 hours, two male individuals were observed at the pond. One was flying around while the other was resting approximately 3 m away, perched on a fiberglass rod that supports the electric cables around the exhibit. Other dragonfly species observed at the pond were *Orthetrum sabina*, *Potamarcha congener*, *Rudothemis rufa*, *Tramea transmarina*, *Crocothemis servilia*, and *Neurothemis fluctuans*. A female individual arrived at the pond and approached one of the conspecific males in mid-air. Both male and female flew towards each other face to face, and collided in mid air. Thereafter, they were joined to each other in a mating wheel and continued to fly about in that position. After a few seconds, they separated, and the female flew away. The male remained at the pond, fending off the other male which occasionally approached too closely.

A few minutes later, a female individual appeared, but we were uncertain if it was the same female that had mated with the male earlier. Instead of approaching any of the males, the female started to lay eggs on the surface of the water, at the side of the pool with vegetation that extends into the water. The female individual hovered over the water surface while maintaining a vertical position. Very slowly, she dipped her anal appendage into the water and released her eggs (Fig. 5). It did this for a few minutes before flying away. The whole cycle of mating and ovipositing occurred twice during the observation, and only one female was present at the pond at any one time.

On 18 Nov.2011, at least six male individuals were observed flying around the pond. A female seen approaching the water feature was intercepted by the males which tried to latch on to her to form the mating wheel. They were unsuccessful in their attempts and the female flew away from the pond with some of the males in pursuit. Minutes later, a female was observed flying to the pond and started to lay eggs on the surface of the water. It adopted the same vertical position and slowly dipped its anal appendage into the water to release the eggs. Consistent with previous observations, there was only one female at the site at any one time.



Fig. 2. Male individual in vertical resting position in the Banteng exhibit, photographed on 2 Oct.2011.



Fig. 3. Male individual at the pond in the Mouflon exhibit, photographed on 12 Oct.2011.



Fig. 4. Pond at the Gaur exhibit of the Night Safari where *Camacinia gigantea* individuals were observed.



Fig. 5: An ovipositing female individual. The arrow indicates the freshly laid eggs on the water surface. Total body length = 53–56 mm.

## DISCUSSION

*Camacinia gigantea* is very similar to *Neurothemis fluctuans* (Fabricius), a locally common dragonfly which it can easily be mistaken for, and thus often overlooked. One significant difference is the relatively large size of *Camacinia gigantea* (Fig.6). It attains 53–56 mm in total length, and is reputed to be the largest dragonfly in the family Libellulidae (Tang et al, 2010). In contrast, *Neurothemis fluctuans* is 30–34 mm in total length (Tang et al, 2010). The red colouration on the wings of *Camacinia gigantea* almost covers almost 2/3 of its wing while in *Neurothemis fluctuans*, the red colouration is much more extensive, covering approximately 4/5 of its wing. The margin of the red area on the wings in *Camacinia gigantea* is usually straight. In *Neurothemis fluctuans* however, the margins of the red area on the wings is usually curved (Fig.7). *Camacinia gigantea* is sexually dimorphic, the male being red (Figs. 1–3, 6) while the female is brown (Fig. 5).



Fig. 6. Size difference between *Camacinia gigantea* (right) and *Neurothemis fluctuans* (left). The total body length of adult *Camacinia gigantea* is 53–56 mm, and that of *Neurothemis fluctuans* is 30–34 mm.



Fig. 7. Red colouration on the hind wings of *Neurothemis fluctuans* (left) and *Camacinia gigantea* (right). Note the curved margin and more extensive red pigmentation on *Neurothemis fluctuans*, and the straight margin and less extensive red area on *Camacinia gigantea*.

The sightings of *Camacinia gigantea* at the Night Safari represent a new locality for this species in Singapore. They suggest that this species may not be as rare as is currently presumed. They also show that the park's water features are a great attraction for dragonflies, and thus play an important role in local dragonfly conservation. Further investigations are being conducted at the Night Safari to achieve a better understanding of the odonate diversity here.

*Camacinia gigantea* has been sighted sporadically at other water features in the Night Safari. However, mating and ovipositing behaviour have been observed only at the pond in the Gaur exhibit. It suggests that the particular pond may harbour certain features that fulfill the breeding requirements of this species. We do not know what the requirements are yet, but this is worthy of a thorough investigation that will contribute to the conservation of *Camacinia gigantea*.

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