

**RECORDS OF THE LANTERN BUG, *LATERNARIA OCULATA* (WESTWOOD, 1839),
(HOMOPTERA: FULGORIDAE: FULGORINAE) IN SINGAPORE,
WITH NOTES ON *ZANNA NOBILIS* (WESTWOOD, 1839)**

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INTRODUCTION

Members of the genus *Laternaria* Linnaeus, 1764, possess a pronounced anterior elongation in their heads and have often been commonly referred to as lantern bugs or lantern flies, as many species exhibit bright red/orange colours at their bulbous tips, bearing resemblance to a glowing torch or lantern. The type species for this genus is *Laternaria candelaria* (Linné, 1758), and *Laternaria* currently contains 59 species, which has a predominant Australasian distribution (Bourgoin, 2009). Until recently, the generic name of *Pyrops* Spinola, 1839, was widely applied to its members (Nagai & Porion, 1996, 2002, 2004), but it is apparent that *Laternaria* has priority and has been increasingly adopted (Hua, 2000; ZSM, 2005; EOL, 2009). In this article, recent field encounters and early museum records of *Laternaria oculata* (Westwood, 1839), in Singapore are presented. A historical record of another closely related fulgorid, *Zanna nobilis* (Westwood, 1839), (subfamily Zanninae) and its possible local extinction is briefly discussed.



Fig. 1. Dorsal view of *Laternaria oculata*, encountered on the night of 29 Aug.2009 at Nee Soon Swamp Forest. (Photograph by: Tzi Ming Leong).

OBSERVATIONS

The earliest known records of *Laternaria oculata* for Singapore are represented by two pre-war specimens currently residing in the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore. While examining these fulgorids, we also measured their forewing length (FW) and head length (HL). The earliest specimen was catalogued as ZRC.6.518 (wings spread, FW: 40 mm, HL: 24 mm, 'Singapore', collector unknown, 19 Dec.1921). The other specimen is ZRC.6.519 (wings not spread, FW: 39 mm, head missing, 'Singapore', coll. Xavier, 9 Apr.1927).

In the 1960s, two additional specimens were collected by DHM from separate localities. The first is ZRC.6.21654 (FW: 34 mm, HL: 20 mm, University Campus, coll. D. H. Murphy, 21 Jan.1965). The second is ZRC.6.21655 (FW: 40 mm, HL: 22 mm, Bukit Timah Nature Reserve, on trunk of tree, coll. D. H. Murphy, 24 Nov.1966). In the 1970s, Lua Hui Kheng (Raffles Museum of Biodiversity Research) recalled a sighting of a single individual on a tree trunk at Taban Valley, Bukit Timah Nature Reserve (H. K. Lua, pers. comm.).

While there have been no recent sightings of this lantern bug at the Bukit Timah Nature Reserve, a thriving, but sparsely distributed population occurs within the Central Catchment Nature Reserve. An individual was photographed on a tree at the core of the Upper Peirce Reservoir forest by Norman Lim in Feb.2006. Another was photographed on a tree deep within the Upper Seletar Reservoir forest by Yeo Suay Hwee on the night of 25 Jul.2008. It was first spotted by Chan Su Hooi (National Parks Board) while assisting with the nocturnal faunal survey.

On the night of 29 Aug.2009 (ca. 2030 hours), another individual was encountered by TML et al. at the Nee Soon swamp forest (Figs. 1, 2). It was resting on a leaf at head level and photographed in-situ prior to collection as a voucher specimen. Upon preservation (ZRC.6.21653, FW: 35 mm, HL: 21 mm), the characteristic pattern of its hindwings may be admired (Fig. 3). Yet another was encountered at the Upper Seletar Reservoir forest on the night of 12 Sep.2009 (2355 hours). It was perched ca. 3 m high on the trunk of a tall tree and was first noticed by Chan Su Hooi. On the morning of 15 Oct.2009, three adults were sighted and photographed by Derek Liew (Central Nature Reserve Branch, National Parks Board), also at the Upper Seletar Reservoir forest, adjacent to the Seletar Expressway (SLE). The lantern bugs were perched within close proximity of each other, up on the trunk of a tall albizia (*Falcataria moluccana*) tree (family Fabaceae).

Various aspects of its natural history have been previously documented by LL at the Lower Peirce Reservoir forest. In 1989, a single lantern bug was observed to be cautiously approached and tended to by a giant forest ant, *Camponotus gigas* (Latreille, 1802), (Hymenoptera: Formicidae: Formicinae) (Fig. 4a). The ant was most probably soliciting for the excess fluid excretions passed out by the lantern bug. This very image had been featured earlier in a local publication on our native flora and fauna (Chua, 1993: 85). In 1990, at the same locality, LL was fortunate to have encountered a copulating pair during the late morning (Fig. 4b).

Apart from *Laternaria oculata*, there does not appear to be records of other species in this diverse genus for Singapore. However, in Peninsular Malaysia, the diversity of lantern bugs clearly surpasses that of Singapore, with certain representatives exhibiting bright red colours at the apices of their head projections, such as *Laternaria ruhli* Schmidt, 1926 (see Figs. 5, 6).

While examining the Fulgoridae collection at the ZRC, we discovered two historical specimens of *Zanna nobilis* (Westwood, 1839), in the subfamily Zanninae. The first one, ZRC.6.540 (wings not spread, FW: 49 mm, HL: 22 mm, "Singapore Island", coll. K. S. Lue, 1939) was originally labeled as '*Pyrops nobilis*' (Fig. 7). Its elongated frons was noticeably more robust than that of *Laternaria*, and was adorned with a uniform row of low, broad spines dorsally and ventrally (Fig. 8). The other specimen, ZRC.6.1115 (wings spread, FW: 46 mm, HL: 27 mm), was without data, but possibly collected at approximately the same period/locality as the previous specimen. Both specimens share a characteristically similar type of insect pin and comparably faded condition. The original label for this second specimen may have been misplaced while previously exhibited for public display at earlier museum premises.

Since 1939, there have not been subsequent museum specimens of *Zanna nobilis* collected from Singapore. In the last decade, forays into our remnant forests of the Bukit Timah Nature Reserve and Central Catchment Nature Reserve have not reproduced a sighting of this distinct lantern bug thus far. Unfortunate as it may seem, this species is likely to have joined the long list of insect species that have inevitably become extinct in Singapore, as their forest habitats progressively contracted and disappeared.

Nevertheless, lantern bugs and other allied members within the Fulgoridae in Asia and beyond remain fascinating subjects of study from multiple perspectives. Most recently, a phylogenetic assessment was performed on this diverse family for the first time, which incorporated DNA nucleotide sequence data alongside morphological characters (Urban & Cryan, 2009).



Fig. 2. Lateral view of *Laternaria oculata* (as in Fig. 1). (Photograph by: Tzi Ming Leong).



Fig. 3. Dorsal view of *Laternaria oculata* (as in Figs. 1, 2; ZRC.6.21653, forewing length: 35 mm, head length: 21 mm), with wings spread to reveal hindwing patterns. (Photograph by: Tzi Ming Leong).

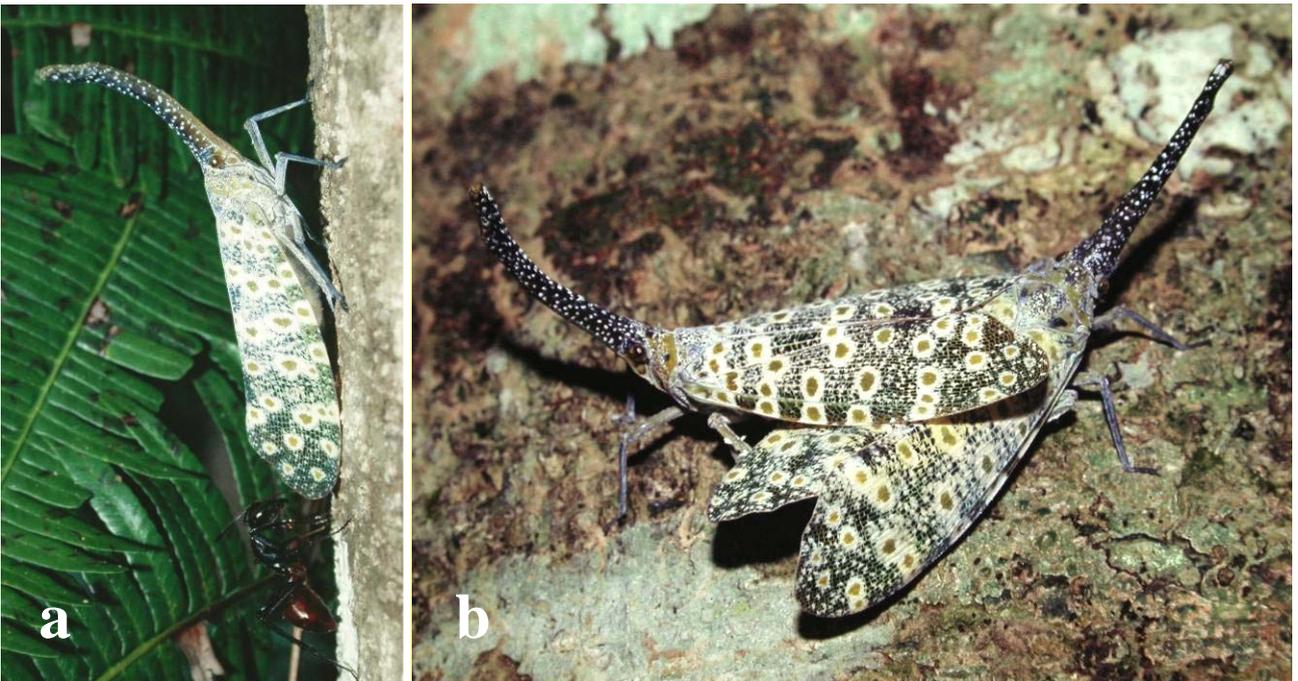


Fig. 4. At the Lower Peirce Reservoir forest, in the year 1989, an individual *Laternaria oculata* was observed to be carefully tended to by a giant forest ant, *Camponotus gigas* (a). At the exact same locality, in the year 1990, a mating pair was encountered (b). (Photographs by: Laurence Leong).



Fig. 5. Dorsal view of *Laternaria ruhli*, encountered in a forest reserve in Johor, Peninsular Malaysia on 1 Aug.2006. (Photograph by: Tzi Ming Leong).



Fig. 6. Lateral view of *Laternaria ruhli* (as in Fig. 5). Note camouflage patterns intended to blend with pale lichen on bark of tree. (Photograph by: Tzi Ming Leong).



Fig. 7. Dorsal (a) and lateral (b) views of *Zanna nobilis* (as “*Pyrops*” *nobilis* in original label, ZRC.6.540, forewing length: 49 mm, head length: 22 mm) collected from Singapore in 1939. (Photographs by: Tzi Ming Leong).



Fig. 8. Lateral close-up of elongated head of *Zanna nobilis* (ZRC.6.540). (Photograph by: Tzi Ming Leong).

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