

FINAL INSTAR CATERPILLAR AND METAMORPHOSIS OF THE MOTH, *DYSPHANIA MALAYANUS* (GUÉRIN-MÉNEVILLE) IN SINGAPORE (LEPIDOPTERA: GEOMETRIDAE: GEOMETRINAE)

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INTRODUCTION

The geometrid moth, *Dysphania malayanus* (Guérin-Méneville, 1843) belongs to the Tribe *Dysphaniini* within the Subfamily Geometrinae, and has a typical Sundaic distribution, occurring in Peninsular Malaysia, Sumatra, Borneo, and Palawan (Philippines) (Holloway, 1996). In Singapore, at least four other species in this genus have been recorded, namely: *Dysphania subrepleta* (Walker, 1854), *Dysphania bivexillata* Prout, 1912, *Dysphania discalis* (Walker, 1854), and *Dysphania glaucescens* (Walker, 1861). Here, we present our first encounter with the final instar larva of *Dysphania malayanus* from the Central Catchment Nature Reserve and document its eventual metamorphosis.



Fig. 1. Final instar caterpillar of *Dysphania malayanus*, perched on a leaf of its hostplant, *Carallia brachiata* (Rhizophoraceae), encountered at MacRitchie Reservoir forest on the night of 20 Jun. 2009. The larva had a total length of 57 mm. (Photographed in-situ by: Sai Koon Foo).

OBSERVATIONS

While conducting a faunal survey within the MacRitchie Reservoir forest on the night of 20 Jun.2009, we encountered the characteristic final instar larva of *Dysphania malayanus*, as it was perched on the thick leaves of its hostplant *Carallia brachiata* (family Rhizophoraceae) at waist level (Fig. 1). The larva was photographed in-situ, then subsequently reared to observe its development. Its entire body was a uniform yellow, with a dense aggregation of black spots. Its spiracles were also black, but surrounded by turquoise blue. Its total length was measured to be 57 mm and its body width was 6 mm. The general shape, form and striking colouration of this caterpillar was consistent with the typical larvae of *Dysphania*, as previously illustrated for species such as *Dysphania transducta* (Barlow, 1982: Plate 50—caterpillar 3), *Dysphania militaris* (Holloway, 1996: Plate 12—caterpillar 2) and *Dysphania numana* (Zborowski & Edwards, 2007: 137—bottom right figure).

By the pre-dawn hours of the following day (21 Jun.2009), the larva had begun to attach strong, silken threads onto adjacent leaves and proceeded with its bodily contractions and fluid secretion in the following days. On the 23 Jun.2009, pupation was complete and the moulted exuvia was retrieved, washed and preserved. The resultant pupa was an overall chestnut brown, with black spots on its abdominal segments (Fig. 2). Its spiracles were prominently black, outlined with ivory white. From the dorso-anterior perspective, a distinct pair of black ocelli presented an illusion of large, staring ‘eyes’ (Fig. 2d). The dimensions of the pupa were 28 mm by 9 mm.

On the afternoon of 9 Jul.2009, the moth finally emerged and was determined to be a female (Fig. 3). Its body was yellow ventrally, but greyish-white with black stripes dorsally. Its wings were also greyish-white, with symmetrical black dots and stripes. Along the inner margins of its hindwings, a narrow segment of yellow was present. Unfortunately, the left forewing was mildly crumpled and this was probably owed to a slight indentation at that position during the pupal phase (see Fig. 2a). Nevertheless, the moth was preserved as a voucher specimen at the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research, National University of Singapore, with measurements of its body length (BL) and forewing length (FW) taken (ZRC.LEP.170, BL: 26 mm, FW: 34 mm).

Examination of the geometrid collection at the ZRC revealed that there were two existing specimens (one male, one female) of *Dysphania malayanus* from Singapore (Fig. 4). The smaller male (ZRC.LEP.166, BL: 24 mm, FW: 29 mm), was collected by unnamed surveyors (using a UV light trap) from the Nee Soon Swamp Forest on 22 May 1992. The female (ZRC.LEP.167, BL: 27 mm, FW: 36 mm) was collected from Kent Ridge on 2 May 1989 (collector unknown). In addition, there is also a faded specimen of the same species from Peninsular Malaysia (ZRC.LEP.226, male, BL: 27 mm, FW: 35 mm) collected by E. Sumund on 30 Aug.1922 from “Jor camp, 2000 ft.” [= 600.6 m], Perak.

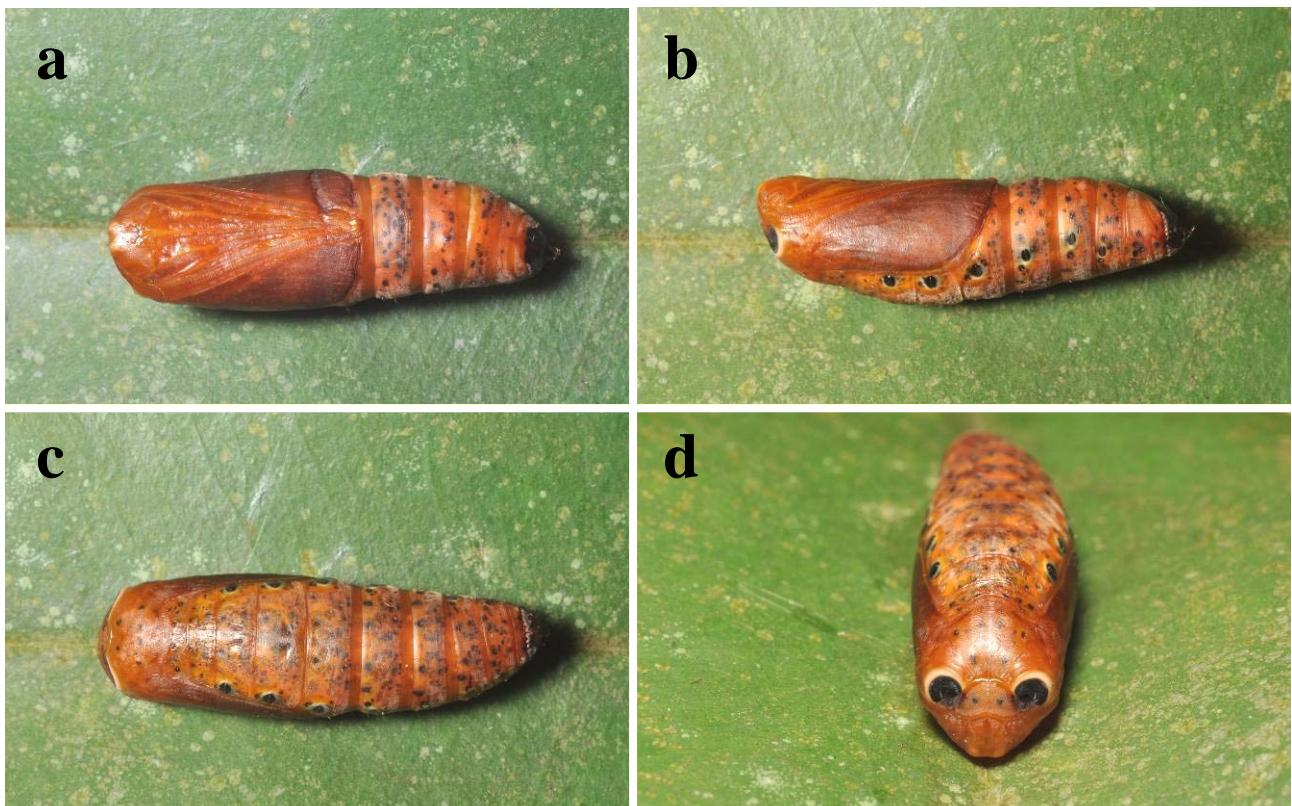


Fig. 2. Ventral (a), lateral (b), dorsal (c), and frontal (d) views of pupa (28 mm by 9 mm). Pupation was complete by the morning of 23 Jun.2009.

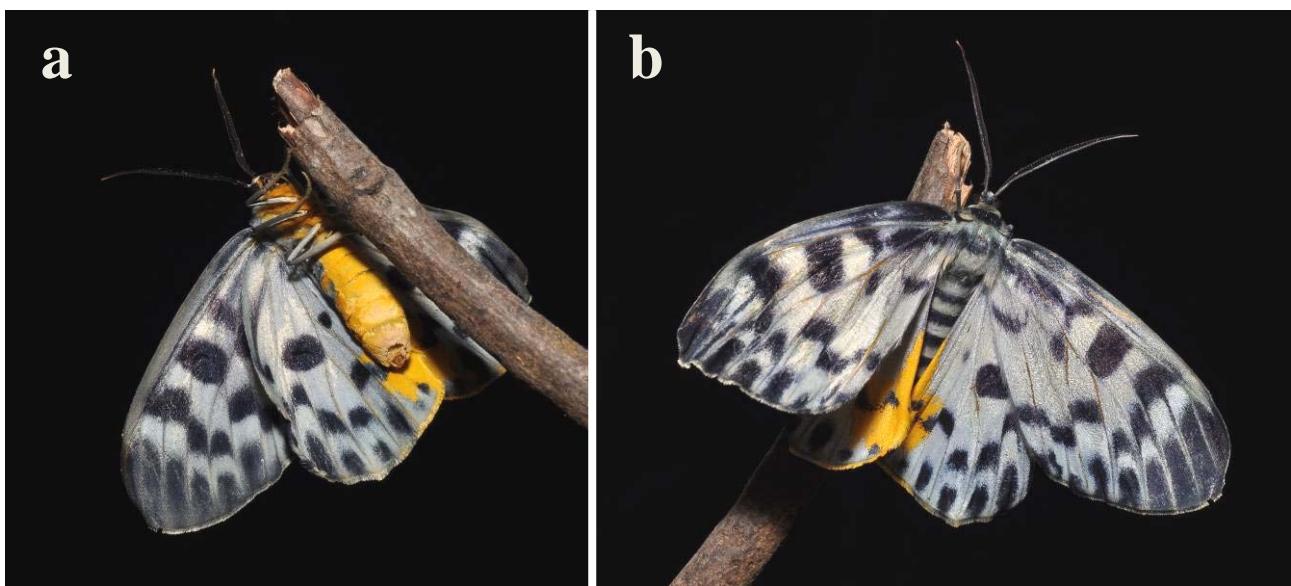


Fig. 3. Ventro-lateral (a) and dorsal (b) views of recently emerged female (ZRC.LEP.170, body length: 26 mm, forewing length: 34 mm). Eclosion occurred on 9 Jul. 2009.



Fig. 4. Specimens of male (ZRC.LEP.166, body length: 24 mm, forewing length: 29 mm) and female (ZRC.LEP.167, body length: 27 mm, forewing length: 36 mm) from Singapore.

DISCUSSION

In Singapore, the caterpillar of another species of *Dysphania* had been previously reared and documented, with its foodplant being *Bruguiera cylindrica* (family Rhizophoraceae) from mangrove forest (Murphy, 1990: Plate 6—Figs. J–L). The moth identity had been tentatively referred to as *Dysphania subrepleta*, but was subsequently more accurately perceived to be *Dysphania bivexillata* instead (Holloway, 1996).

Of the nine species of *Dysphania* whose larval hostplants have been recorded, six are known to feed on *Carallia* thus far, namely: (i) *Dysphania numana* (Cramer, 1779) [senior synonym of *Dysphania fenestrata* (Swainson, 1833)]; (ii) *Dysphania malayanus* (Guérin-Méneville, 1843); (iii) *Dysphania militaris* (Linnaeus, 1758), (iv) *Dysphania percota* (Swinhoe, 1891), (v) *Dysphania sagana* (Druce, 1882); and (vi) *Dysphania transducta* (Walker, 1861) (Robinson et al., 2009; Zborowski & Edwards, 2007). Apart from *Carallia brachiata*, the larva of *Dysphania malayanus* has also been known to feed on *Carallia eugenoidea* in Peninsular Malaysia (Robinson et al., 2009).

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