

**THE CATERPILLAR AND COCOON OF *POMPELON MARGINATA* (GUERIN, 1843)
IN SINGAPORE (LEPIDOPTERA: ZYGAENIDAE: CHALCOSIINAE),
WITH AN ACCOUNT OF PARASITISM BY THE TACHINID FLY,
SENOMETOPIA DISTINCTA (BARANOV, 1931)**

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INTRODUCTION

The day-flying moth, *Pompelion marginata* (Guerin, 1843) has a broad Southeast Asian distribution, and is known from Myanmar, Thailand, Peninsular Malaysia, Sumatra, Borneo, Sulawesi, and the Philippines (Barlow, 1982). Throughout its range, there is recognition of six subspecies (Endo & Kishida, 1999). In Singapore, the nominate subspecies, *Pompelion marginata marginata* occurs, and examples may be encountered seasonally in gardens, parks, and along forest fringes, especially where the trees of wild cinnamon (*Cinnamomum iners* Reinw. ex Blume; Lauraceae) have been established. This medium-sized moth has predominantly black, rounded wings with metallic blue margins (Fig. 1). A red ‘collar’ is sometimes discernible just behind its head. From the ventral perspective, the brilliant colour of its abdomen (red with a pair of black dots per segment) is prominent (Fig. 2). Its thorax is red as well. Its limbs are a combination of black and metallic blue. In both sexes, the antennae (Fig. 3) are bipectinate (Barlow, 1982). The moth has been regarded as a mimic of butterflies in the genus *Euploea* (Barlow, 1982). Here, its characteristic caterpillar and cocoon are illustrated and briefly described. An incident of a caterpillar that succumbed to tachinid flies is also highlighted.



Fig. 1. Dorsal view of a female *Pompelion marginata* (ZRC.LEP.356, body length: 23 mm, forewing: 34 mm), encountered at the Bukit Timah Nature Reserve on 19 Aug.2009.



Fig. 2. Ventral view of the same female individual (as in Fig. 1), illustrating the striking colour patterns of its abdomen.



Fig. 3. Anterior close-up of the female moth (as in Figs. 1, 2) to view bipectinate antennae.

CATERPILLAR

The typical caterpillar of *Pompelom marginata* has a short and stout body, with a rectangular cross-section (Figs. 4, 5). It is mostly ivory white, with scattered black markings. Its first thoracic segment (T1) is black, with a white anterior margin. There are evenly distributed verrucae along its dorsum and flanks. On its dorsum, there is a pair of pointed verrucae (tipped with black) on each segment between T2 to A8. Fine setae radiate from these points. Verrucae along the flanks are not coloured, but also produce fine setae.

When disturbed, clear droplets of fluid may be exuded momentarily from the apical pores of these verrucae, possibly serving as a defensive mechanism. Black patches adorn its flanks between A4 to A6. A series of mid-dorsal, black dashes occur at the inter-segmental junctures between A4 to A7. There is a similar black dash at the anal segment. All its spiracles are distinctly black. When the caterpillar is feeding, its head remains unseen, as it is hidden by a membranous hood at T1 (Fig. 6). Only when the caterpillar begins to crawl about are the head and thoracic limbs clearly visible (Fig. 7).

Encounters with caterpillars of *Pompelom marginata* in Singapore have consistently been on *Cinnamomum iners*. In Peninsular Malaysia and Brunei (Borneo), caterpillars have been recorded to feed on *Cinnamomum verum* J.Presl (Robinson et al., 2011). Earlier illustrations of the caterpillar have previously appeared in a review of Chalcosiine moths by Yen et al. (2005: 232, Fig. 48G), as well as a recent treatment of the Zygaenidae of Borneo by Holloway (2011: Plate 9, Fig. 2).

COCOON

Pupation often occurs on the dorsal surface of the leaf of its hostplant (*Cinnamomum iners*), with the cocoon positioned parallel to/above the mid-vein of the leaf (Fig. 8). The pale, beige cocoon appears as a flattened, elliptical sheet with a protruding central knob. Above this, there is an attractive, delicate network of white silk radiating towards the elliptical margin. A typical cocoon may measure 30 × 15 mm. Usually, the sides of the leaf become arched upwards (forming a U-shaped cross-section), as a result of the cocoon construction. At the time of eclosion, the adult moth will exit from one end of the cocoon, with the vacated exuvia partially exposed.



Fig. 4. Lateral view of final instar caterpillar (26 × 10 mm), feeding on the leaves of *Cinnamomum iners* (Lauraceae) at Upper Seletar Reservoir forest on the night of 11 Jun.2011.



Fig. 5. Dorsal view of the caterpillar (as in Fig. 4, head towards left). Note symmetrical rows of black-tipped verrucae along its dorsum.



Fig. 6. Anterior close-up of the caterpillar (as in Figs. 4, 5). While feeding, its head is concealed and protected beneath a membranous hood.



Fig. 7. Dorso-lateral view of caterpillar (as in Fig. 4) on the move, with its head extended, and thoracic limbs clearly visible.



Fig. 8. Typical cocoon of *Pompon marginata*, reared from a caterpillar found at Bukit Kallang forest in Jul.2005. The elliptical cocoon is flattened and characteristically aligned along the mid-vein of the *Cinnamomum iners* leaf. This cocoon measured 30 × 15 mm.

PARASITOID

On the night of 11 Jun.2011, the final instar caterpillar of *Pompelon marginata* was encountered at chest level on its hostplant (*Cinnamomum iners*) along a forest edge at Upper Seletar Reservoir. It measured 26 × 10 mm and appeared seemingly healthy. When reared in captivity, it displayed a consistent appetite and discharged round, dry faecal pellets on a regular basis. On the 15 Jun.2011, it ceased to feed and displayed apparent signs of pupation by laying down a thin sheet of silk on a leaf. However, it did not proceed with the rest of cocoon construction but crawled away instead. The next day, the white of its body had turned brown and an underlying, cylindrical bulge could be discerned (presumably the outline of an internal tachinid maggot). By 18 Jun.2011, the caterpillar's body had become discoloured and shriveled considerably, with a pool of ink-black fluid leaking out from its head region (Fig. 9). Along the left flank of its posterior segments, a small aperture had been created through the caterpillar cuticle, and the black pair of posterior spiracular discs belonging to a tachinid maggot could be seen (Fig. 10).



Fig. 9. A pool of black fluid had emanated from the head region of this lifeless caterpillar on the evening of 18 Jun.2011.



Fig. 10. Towards the rear end of this parasitised caterpillar, the posterior spiracular discs (arrowed) of a tachinid maggot could be observed through an aperture on the body wall.

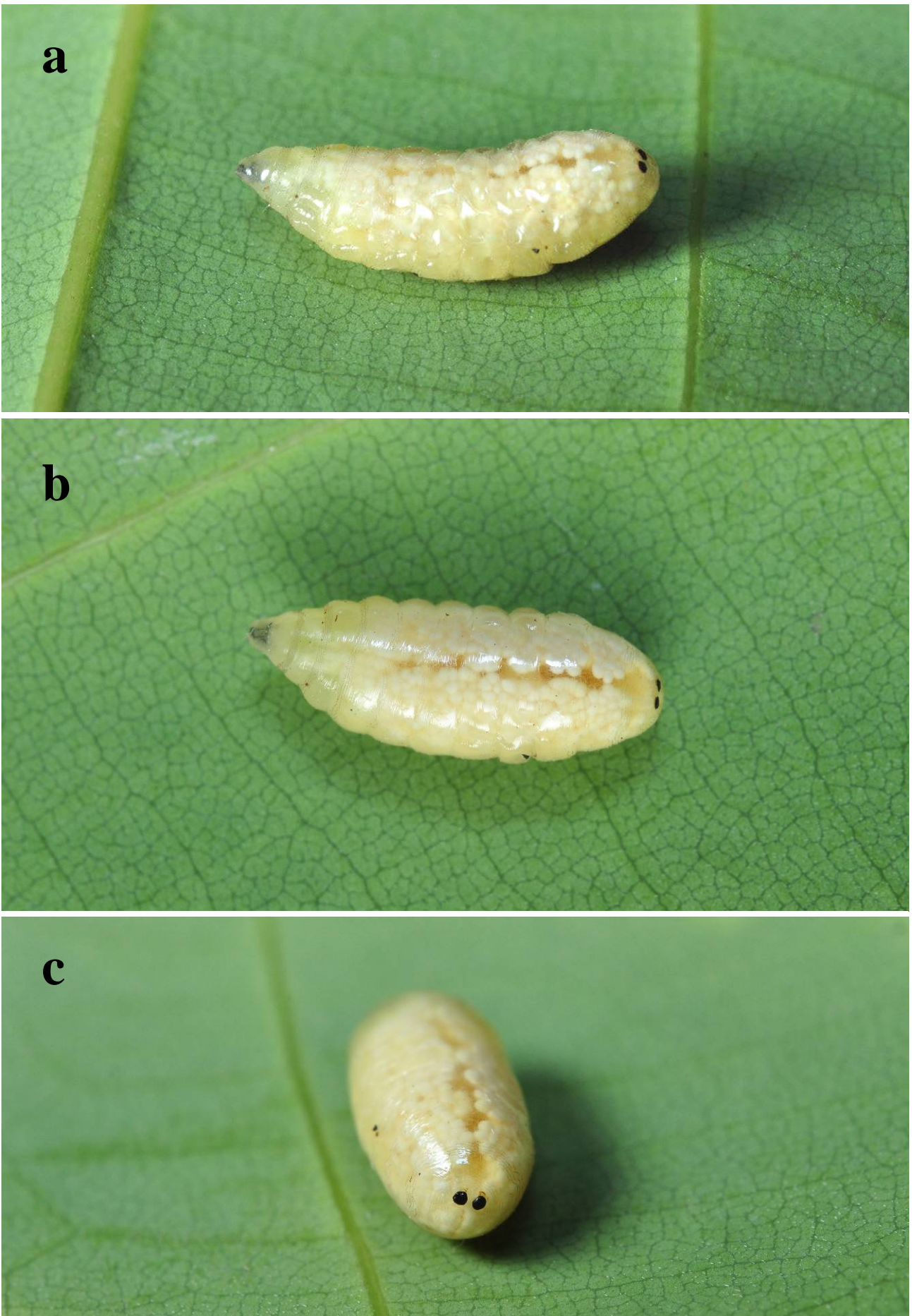


Fig. 11. Lateral (a), dorsal (b), and posterior (c) views of the tachinid larva (body length: 10 mm) shortly after emergence from within the caterpillar's body (as in Figs. 9, 10).

Between 18–19 Jun.2011, two tachinid maggots had emerged from within the caterpillar host's body. The maggots had a body length of 10 mm, and were pale white (Fig. 11). Soon after their exit, pupation occurred. The puparium was a golden brown when freshly formed (Fig. 12a), but eventually turned dark, purplish brown (Fig. 12b). The puparia measured 7×3 mm. On the late morning of 28 Jun.2011 (ca. 1100 hours), the first adult tachinid fly emerged from its puparium (Fig. 13). It was preserved as a voucher specimen at the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore, and catalogued as ZRC.6.22171 (body length: 9 mm, forewing: 7 mm). Shortly after, the fly was identified to be a male *Senometopia distincta* (Baranov, 1931) by Hiroshi Shima (Jul.2011). This species of tachinid belongs to the tribe Eryciini, within the subfamily Exoristinae, and has been recorded from China and Taiwan (O'Hara et al., 2009). Previously, a male specimen of *Senometopia distincta* had been collected from Bukit Timah by H. Shima and D. H. Murphy on 3 Dec.1975 (H. Shima pers. comm., Jul.2011).

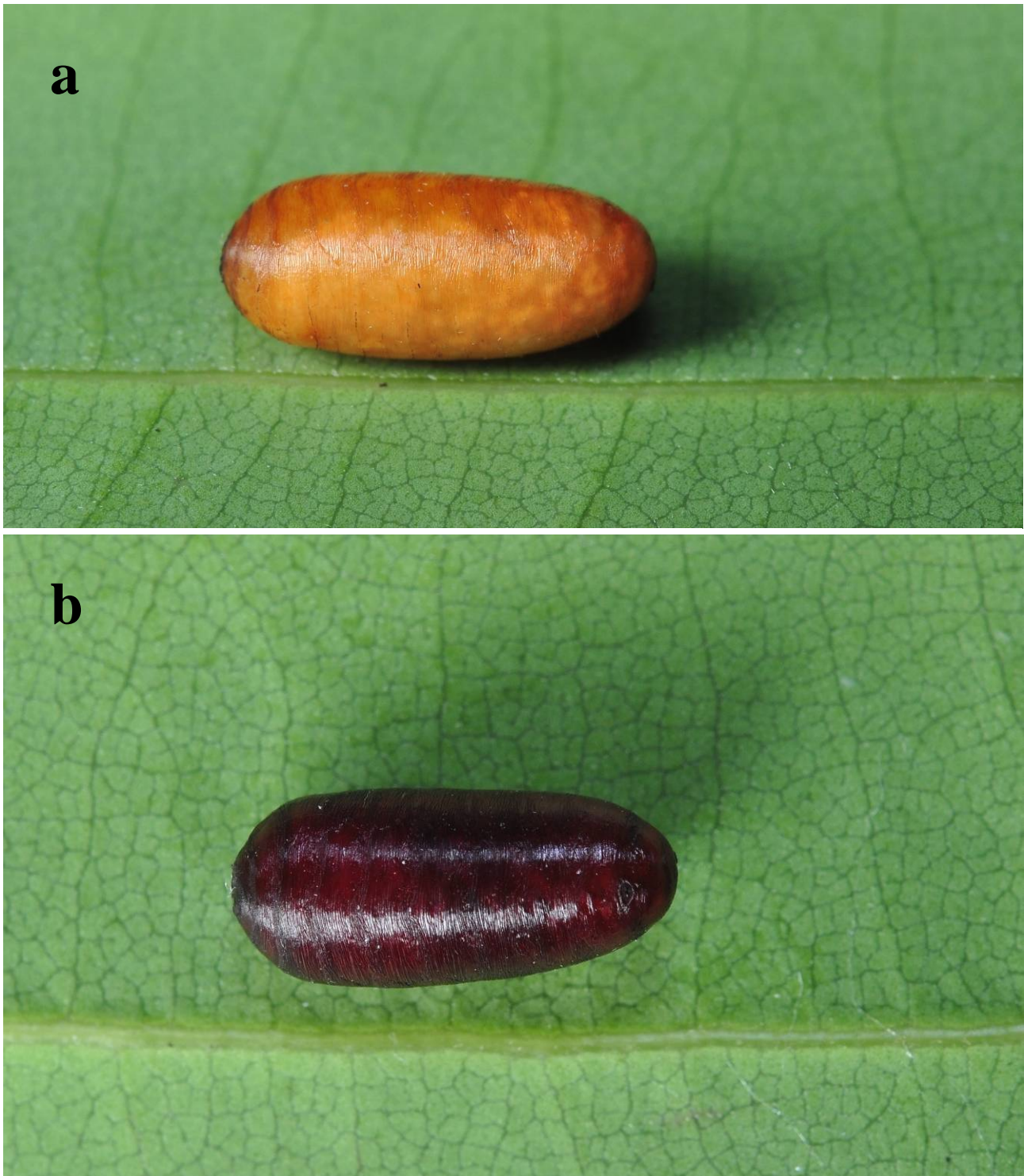


Fig. 12. Tachinid puparium shortly after completion of pupation (a), and one day later (b). The puparium measured 7×3 mm.



Fig. 13. Lateral (a) and dorsal (b) views of adult male fly, *Senometopia distincta* (ZRC.6.22171, body length: 9 mm, forewing: 7 mm), recently emerged from its puparium on 28 Jun.2011.

ACKNOWLEDGEMENTS

I am grateful to Hiroshi Shima for kindly examining and identifying the tachinid fly to the species level, as well as sharing a historical record of this species from Bukit Timah. An anonymous reviewer provided a quick and thorough assessment of the original manuscript, while contributing useful suggestions for improvement.

LITERATURE CITED

- Barlow, H. S., 1982. *An Introduction to the Moths of South East Asia*. The Malayan Nature Society, Kuala Lumpur. vii + 305 pp., 50 col. pls.
- Endo, T. & Y. Kishida, 1999. *Day-flying Moths: Chalcosiinae & Epicopeia. Endless Collection Series. Volume 8*. Endless Science Information, Tokyo. 119 pp.
- Holloway, J. D., 2011. The Moths of Borneo (Part 2): Families Phaudidae, Himantopteridae and Zygaenidae; revised and annotated checklist. *Malayan Nature Journal*, **63**(1–2): 1–548.
- O'Hara, J. E., H. Shima & C. Zhang, 2009. Annotated catalogue of the Tachinidae (Insecta: Diptera) of China. *Zootaxa*, **2190**: 1–236.
- Robinson, G. S., P. R. Ackery, I. J. Kitching, G. W. Beccaloni & L. M. Hernández, 2011. *HOSTS—A Database of the World's Lepidopteran Hostplants*. Natural History Museum, London. <http://www.nhm.ac.uk/research-curation/research/projects/hostplants/>. (Accessed: 8 Aug.2011).
- Yen, S.-H., G. S. Robinson & D. L. J. Quicke, 2005. The phylogenetic relationships of Chalcosiinae (Lepidoptera, Zygaenoidea, Zygaenidae). *Zoological Journal of the Linnean Society*, **143**(2): 161–341.