

## Biodiversity Record: Metamorphosis of the mango hawkmoth, *Amplifyterus panopus*

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**Subjects:** Mango hawkmoth, *Amplifyterus panopus* (Insecta: Lepidoptera: Sphingidae).

**Subjects identified by:** Jerome Lee.

**Location, date and time:** Singapore Island, Queenstown, housing estate along Commonwealth Avenue; 11 March 2021; 1000 hrs.

**Habitat:** Urban area of concrete high-rise buildings.

**Observers:** Bryan Lim Wei Ping and Jerome Lee.

**Observations:** A mango hawkmoth of about 9 cm total length (Fig. 1) entered the house of the first observer, and died after having laid approximately 40 yellowish, translucent eggs (Fig. 2). While dying, the moth released copious amounts of meconium, which appeared as an orange fluid. Each egg was around 0.3 mm in diameter and had two small red flecks on the surface. Closer to hatching, a thin black stripe became visible around the circumference of the egg, which seemed to correspond to the black tail horn of the first instar larva. The authors decided to hatch the eggs and rear the larvae.



Fig. 1. Dead adult female mango hawkmoth. (Photograph by: Jerome Lee).



Fig. 2. Some of the eggs laid by the moth. (Photograph by: Bryan Lim Wei Ping).

The eggs hatched on the afternoon of 15 March 2021. The larvae, each around 10 mm (Fig. 3), consumed their eggshells. Although provided with leaves of the mango tree (*Mangifera indica*), they did not feed for about 12 hours. When they began feeding, the larvae grew rapidly (Fig. 4). However, many died from an unknown infection. The infected caterpillars became listless and stopped feeding. They leaked a brownish fluid from their mouth and anus, then shrivelled up and died (Fig. 5). The survivors moulted frequently and turned bright green with bluish-grey spiracles and yellow stripes across their anterior segments. At instars 3 and 4, the larvae developed a green, conical, horn-like projection on the head (Fig. 4). This structure was lost in later instars, and the head became conical in shape. While moulting, the larvae would appear to have two heads, the second head being the hollow empty cuticle with the shape of the head capsule. The larvae would attach themselves with silk while moulting.

At their fifth and final instar, the larvae were around 10 cm long and developed a grey tint over their anterior segments (Figs. 6, 7). Some individuals lost their tail horn. When disturbed, the larvae tended to freeze and press themselves to

the leaf surface (Fig. 7). On 9 April 2021, the larvae began to turn pale with a purple tint over their dorsal surface (Fig. 8), which were signs of the onset of pupation. The larvae began covering themselves with a sticky salivary secretion from the mouth, following which they roamed around restlessly and thrashed violently when touched. When placed on soil, they began to dig downwards. Once settled, they constructed an oblong pupal cell where they shrank and moulted into a pupa (Fig. 9). The exuvia surrounding the head was cast off, and the pre-pupa turned from white to dark reddish-brown, taking on the features of the adult moth. The pupae were around 50 and 55 mm. Thirteen larvae successfully made it to pupation.

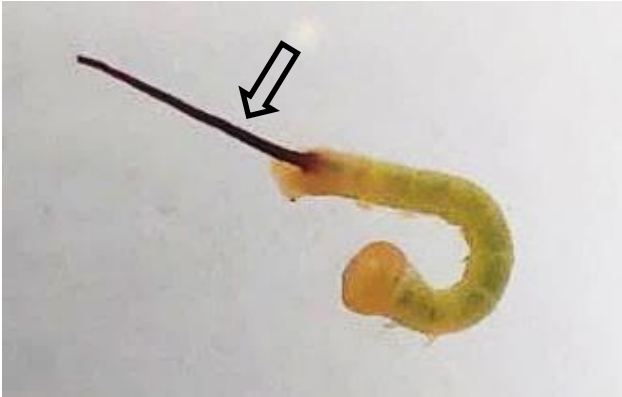


Fig. 3. Newly hatched mango hawkmoth larva (about 10 mm) with tail horn (indicated by arrow). (Photograph by: Jerome Lee).



Fig. 4. Third instar larva with conical projection on its head (indicated by arrow). (Photograph by: Jerome Lee).



Fig. 5. Mango hawkmoth larvae that succumbed to an unknown infection. Note their shrivelled appearance. (Photograph by: Jerome Lee).



Fig. 6. Lateral view of a mango hawkmoth larva at the final instar. (Photograph by: Jerome Lee).



Fig. 7. Final instar larva pressing itself against a leaf when disturbed. (Photograph by: Jerome Lee).



Fig. 8. Dorsal view of a pre-pupal mango hawkmoth larva. Note the reddish back. (Photograph by: Jerome Lee).



Fig. 9. A mango hawkmoth pupa. (Photograph by Jerome Lee).



Fig. 10. Dorso-lateral (left) and hind dorsal (right) views of the first freshly eclosed mango hawkmoth. (Photographs by: Jerome Lee).

On 25 April 2021, the first moth emerged in the early morning. It released a large amount of meconium and immediately climbed to a higher perch to dry its wings. It was about 10 cm in total length (Fig. 10). Thereafter to mid-May, a total of 10 moths had eclosed. They emerged sporadically, usually in the early evening or early morning. Their size ranged from around 7 to 10 cm. While at rest, the hindwings of the moths were obscured by their forewings, but when disturbed, they would reveal the reddish-pink hindwings. The moths also had large (about 15 mm long) tibial spines on their legs, but they did not attempt to stab with them. All the adult moths were released outdoors in the neighbourhood.

**Remarks:** Although the featured observation shows that the mango hawkmoth does occur in the urban environment, it has been regarded as rare in Singapore (Morrell, 1973, as *Compsogene panopus*). The larvae and adults shown here are consistent with the depiction of this species by Pittaway & Kitching (2021).

**Literature cited:**

- Morrell RCR (1973) Butterflies and moths. In: Chuang SH (ed.) Animal Life and Nature in Singapore. Singapore University Press, Singapore, pp. 74–84.
- Pittaway AR & Kitching IJ (2021) Sphingidae of the Eastern Palaearctic (including Siberia, the Russian Far East, Mongolia, China, Taiwan, the Korean Peninsula and Japan). <https://tpittaway.tripod.com/china/china.htm> (Accessed 1 May 2021).