

**RECORD OF THE BAGWORM MOTH,
CHALIOIDES SUMATRENSIS HEYLAERTS, 1887 IN SINGAPORE
(LEPIDOPTERA: PSYCHIDAE: OIKETICINAE: ACANTHOPSYCHINI)**

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INTRODUCTION

Worldwide, the diversity of bagworm moths (family Psychidae) has been estimated to be ca. 1,000 species belonging to 300 genera (Rhainds et al., 2009). Bagworm moths in the genus *Chalioides* Swinhoe, 1892 belong to the tribe Acanthopsychini, within the subfamily Oiketicinae, and are represented by six species: (i) *Chalioides ferevitrea* Joannis, 1929; (ii) *Chalioides hakatomii* Seino, 1980; (iii) *Chalioides kondonis* Kondo, 1922; (iv) *Chalioides stenocytara* Bourgogne, 1961; (v) *Chalioides sumatrensis* Heylaerts, 1887; and (vi) *Chalioides vitrea* Swinhoe, 1892. The occurrence of *Chalioides sumatrensis* is reported here for Singapore, substantiated with voucher specimens and photographic documentation. This species has a Sundaic distribution and has been recorded from Peninsular Malaysia, Sumatra, and Borneo (Sarawak) (Kamarudin et al., 1994; Robinson et al., 1994).

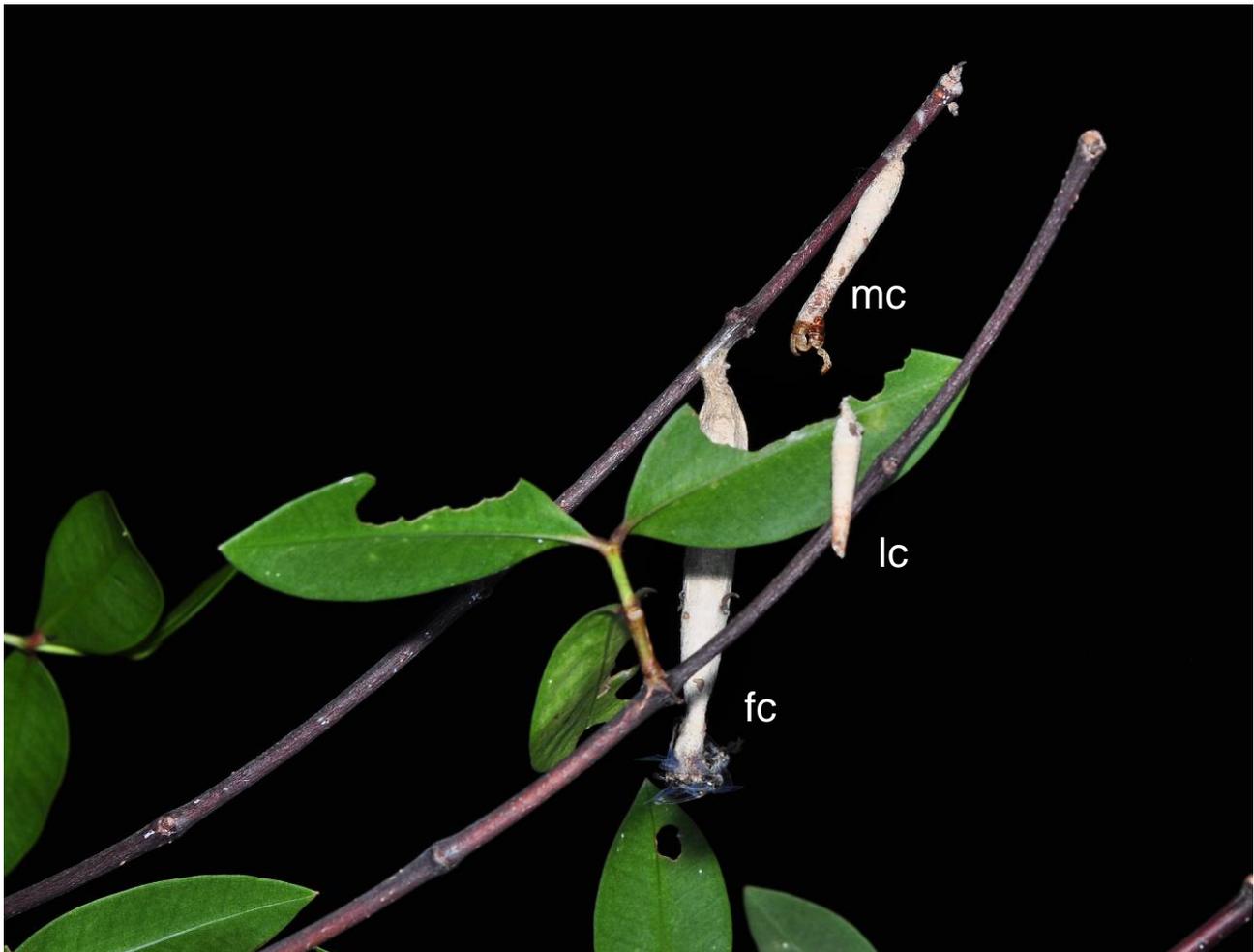


Fig. 1. Cocoons of the bagworm moth, *Chalioides sumatrensis* attached to a berembang tree, *Sonneratia caseolaris* (Lythraceae), at the Department of Biological Sciences, National University of Singapore. The female cocoon (fc) was the longest (63 mm), while the male cocoon (mc) was shorter (32 mm). A larval cocoon (lc; ca. 20 mm) housed a caterpillar within that was actively feeding on the leaves (note fresh signs of folivory). Photographed on the night of 28 Apr.2011.

OBSERVATIONS

On 28 Apr.2011, bagworm moth cocoons were observed to be attached at eye-level to the stems of a berembang tree, *Sonneratia caseolaris* (L.) Engl. (family Lythraceae) at the Department of Biological Sciences, National University of Singapore. The hostplant was growing in a water-filled planter at Block S3, Level 5. At least three bagworms of varying lengths were found in close proximity (Fig. 1). The longest one was 63 mm and belonged to an adult female moth. The shortest one was 20 mm and belonged to a live caterpillar that was still actively feeding on the adjacent leaves. The mid-sized bagworm (32 mm) belonged to a male moth that had recently eclosed, as the pupal case (9×3 mm) was everted at the terminal aperture (Fig. 2).

At the terminus of the female cocoon, an aggregation of four male moths (body length: 5 mm, forewing: 10 mm) had become permanently attached (Fig. 3). Their bodies, limbs, and bipectinate antennae were black, while the wings were delicately transparent and devoid of scales. After in-situ photography, the female and male cocoons were then collected for detailed examination and subsequent preservation at the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore and catalogued as ZRC.LEP.352 (Fig. 4).

A longitudinal dissection was performed on the female cocoon in order to reveal its contents (Fig. 5). Inside, the chestnut brown pupal case (25×7 mm) was prominent, whereas the eclosed female moth was obscured by a dense network of silk. Numerous yellow eggs were randomly distributed within the cocoon. Next, the female moth was carefully extricated from within the silken mesh in order to examine its morphology (Figs. 6, 7). The female moth was 25×6 mm, with a light olive brown colour. Its cuticle was translucent and the underlying eggs within its body could be clearly discerned. The female was typically apterous, and its third pair of thoracic limbs was almost vestigial and could only be perceived under a microscope.

Upon closer inspection of the terminal region of the female cocoon, the telescopic genitalia belonging to one of the male moths was observed (Fig. 8). The bagworm moths were eventually identified by Thomas Sobczyk (Jun.2011), who also generously provided illustrations of the fore- and hindwings of the male moth (Fig. 9). Additional cocoons were subsequently collected from the same host tree (ZRC.LEP.353, six cocoons, lengths: 30–52 mm, coll. T. M. Leong, 3 May 2011), but at least two of them bore holes on their surfaces—possible indications of attack by parasitoids.

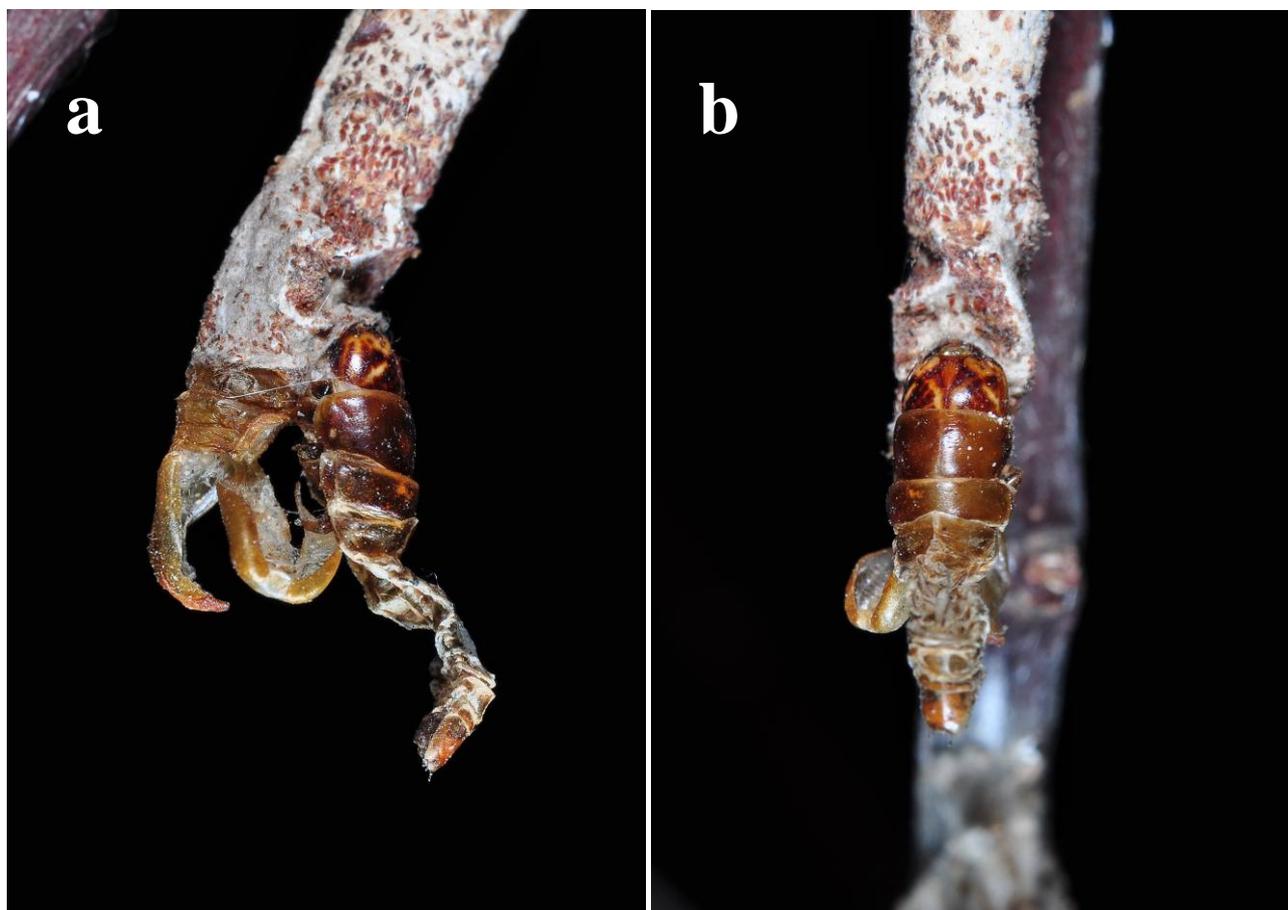


Fig. 2. Lateral (a) and dorsal (b) close-ups of the eclosed pupal case (9×3 mm) of the male moth, attached to the terminus of the cocoon (as in mc in Fig. 1).



Fig. 3. Close-up of the male moths (total four) securely attached to the terminus of the female cocoon (as in fc in Fig. 1). Note transparent wings and bipectinate antennae of the male moths (body length: 5 mm, forewing: 10 mm).



Fig. 4. Comparisons between the male cocoon (mc: 32 × 4 mm) and female cocoon (fc: 63 × 9 mm).

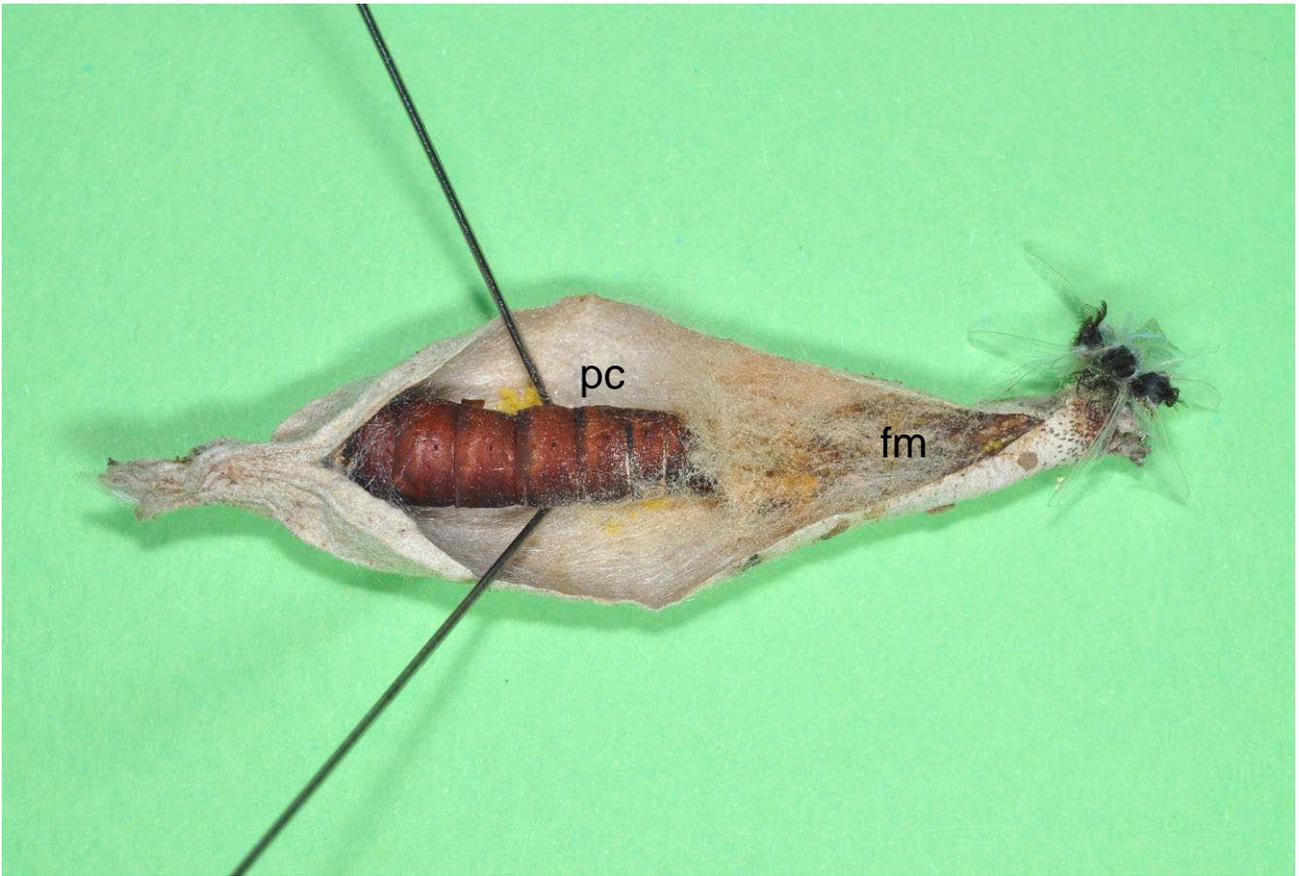


Fig. 5. Internal view of contents of the female cocoon upon dissection. The chestnut brown pupal case (pc) was prominent, whereas the eclosed female moth (fm) was concealed beneath a dense mesh of silk. Recently deposited yellow eggs were found within the walls of the cocoon.



Fig. 6. The delicate body of the female moth (fm: 25 × 6 mm) was carefully extracted from amongst the silk mesh.



Fig. 7. Close-up of the gravid, apterous female moth (as in Fig. 6). Numerous eggs were visible beneath its translucent cuticle.



Fig. 8. Close-up of the telescopic genitalia belonging to one of the male moths that would have succeeded in inseminating the female.



Fig. 9. Fore- and hindwings of male *Chalioides sumatrensis* (scale bar = 5 mm). Illustrated by Thomas Sobczyk. Reproduced with permission.

The previously documented larval hostplants for *Chalioides sumatrensis* include: *Casuarina equisetifolia* L.(Casuarinaceae), *Sandoricum koetjape* (Burm.f.) Merr., *Acacia mangium* Willd. (Fabaceae), *Ardisia elliptica* Thunb.(Myrsinaceae), *Averrhoa carambola* L.(Oxalidaceae), and *Theobroma cacao* L. (Sterculiaceae) (Robinson et al., 1994, 2011). The present larval hostplant record of *Sonneratia caseolaris* (Lythraceae) contributes an additional species (and family) to this modest list. Our understanding of the bagworm moth diversity and hostplant choice in Singapore remains incomplete. This may be partly owed to the cryptic nature of these moths. The atypical life history and unusual adult biology of bagworm moths certainly present much scope for further research on this unique family (Rhainds et al., 2009).

ACKNOWLEDGEMENTS

I am grateful to Thomas Sobczyk for kindly identifying the moth species, and permitting his illustrations of the male wings to be reproduced here.

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