

New record of the semi-slug, *Helicarion permolle*, in Singapore

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Subjects: Very-weak semi-slug, *Helicarion permolle* (Mollusca: Gastropoda: Helicarionidae).

Subjects identified by: Chan Sow-Yan & Lau Wing Lup.

Location and date: Singapore Island, Bukit Batok on 15 August 2017 and Gardenia Road on 27 April 2019.

Habitat: Fringe of secondary forest (Bukit Batok) and urban parkland (Gardenia Road).

Observers: Chan Sow-Yan & Lau Wing Lup.

Observation: One example was observed at the fringes of a patch of secondary forest in Bukit Batok. More recently, another specimen was found at the end of Gardenia Road (Fig. 1 & 2 centre).

Remarks: Semi-slugs are land snails with a vestigial shell which the snail-animal cannot completely retract into (see Fig. 2 centre). In live semi-slugs, the outer surface of the entire shell is largely covered by four mantle lobes (Fig. 1). Many references (eg. Foon et al., 2017; Godwin-Austen, 1909) rely on empty shells as the main identification tool, but the species are more easily identified by colour markings on the live animals. Diagnostic characters based on colour markings of the snail-animal found in the original description of *Helicarion permolle* by Stoliczka (1873) include 'a large black spot about the middle of the foot on each side [that] reaches down to the sole' (marked with red arrow in Fig. 1), 'mantle blackish with small whitish dots' (indicated with green arrows in Fig. 1), and 'a broad blackish band [that] runs from each pedicle along the sides of the whole back, and also on the sides of the posterior part of the foot' (blue arrows in Fig. 1).

In Fig. 2, the shell of a retracted *Helicarion permolle* (centre) is shown with an empty shell of a conspecific from Pulau Tuba, one of the islands of the Langkawi Archipelago off Peninsular Malaysia (left); and a shell of *Helicarion perfragilis*, the congener that occurs commonly in Singapore (right; see Tan et al., 2012). Compared with *Helicarion perfragilis*, the shell of *Helicarion permolle* is larger and higher spired with a less-expanded last whorl.

When disturbed, some semi-slugs display wriggling behaviour in their attempts to escape. *Helicarion permolle* closely resembles *Helicarion perfragilis* in this behaviour, although the foot of *Helicarion permolle* appears to be more out-stretched in the process.

Helicarion permolle is herein documented as a new record for Singapore (see Tan et al, 2012), but we are unable to ascertain if it is an introduced species.

References:

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- Foon, J. K., G. R. Clements & T.-S. Liew, 2017. Diversity and biogeography of land snails (Mollusca, Gastropoda) in the limestone hills of Perak, Peninsula Malaysia. *ZooKeys*. 682: 1-94.
- Stoliczka, F., 1873. On the land-shells of Penang Island, with descriptions of the animals and anatomical notes; part second, Helicacea. *Journal of the Asiatic Society of Bengal*. 42: 11-38, pls.1-3.
- Tan S. K., S. Y. Chan & G. R. Clements, 2012. *A Guide to Snails and other non-marine Molluscs of Singapore*. Science Centre Singapore, 176 pp.

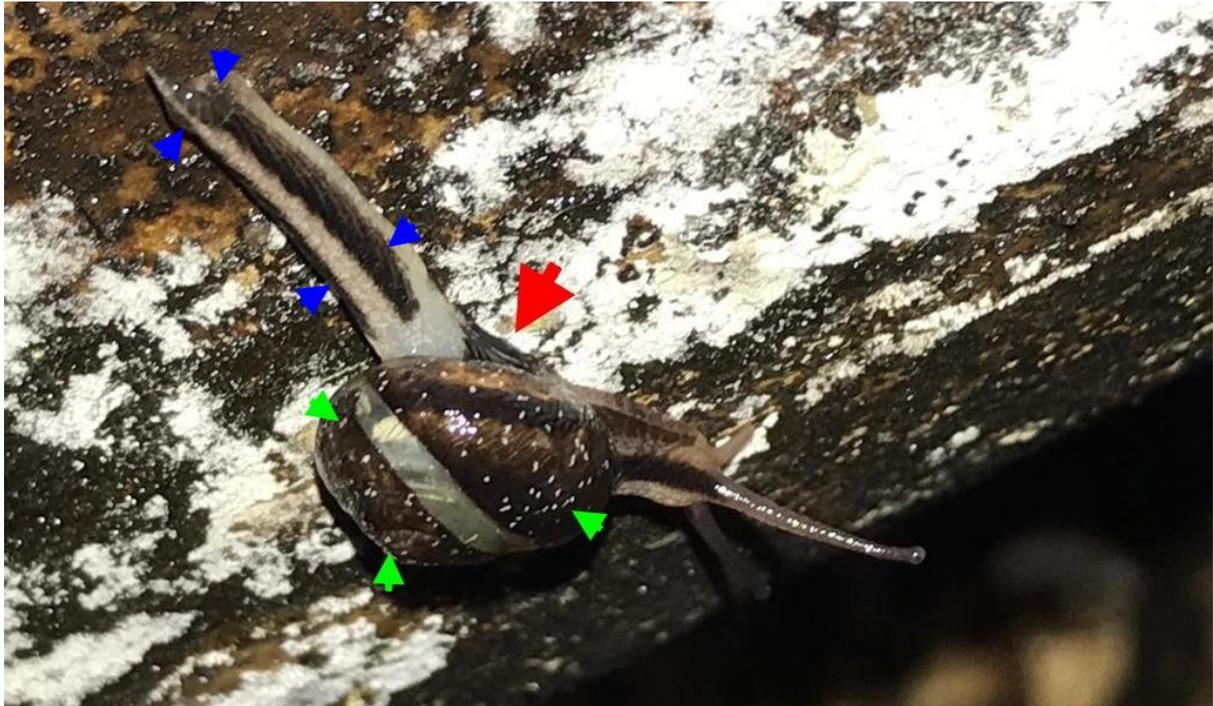


Fig. 1. Live *Helicarion permolle* in-situ at Gardenia Road, with animal fully extended upside-down on a fallen tree trunk. The beige stripe over the shell is the part of the shell's surface that is not covered by its four mantle lobes. Coloured arrows indicate diagnostic colour markings (see Remarks). Photograph by Lau Wing Lup.

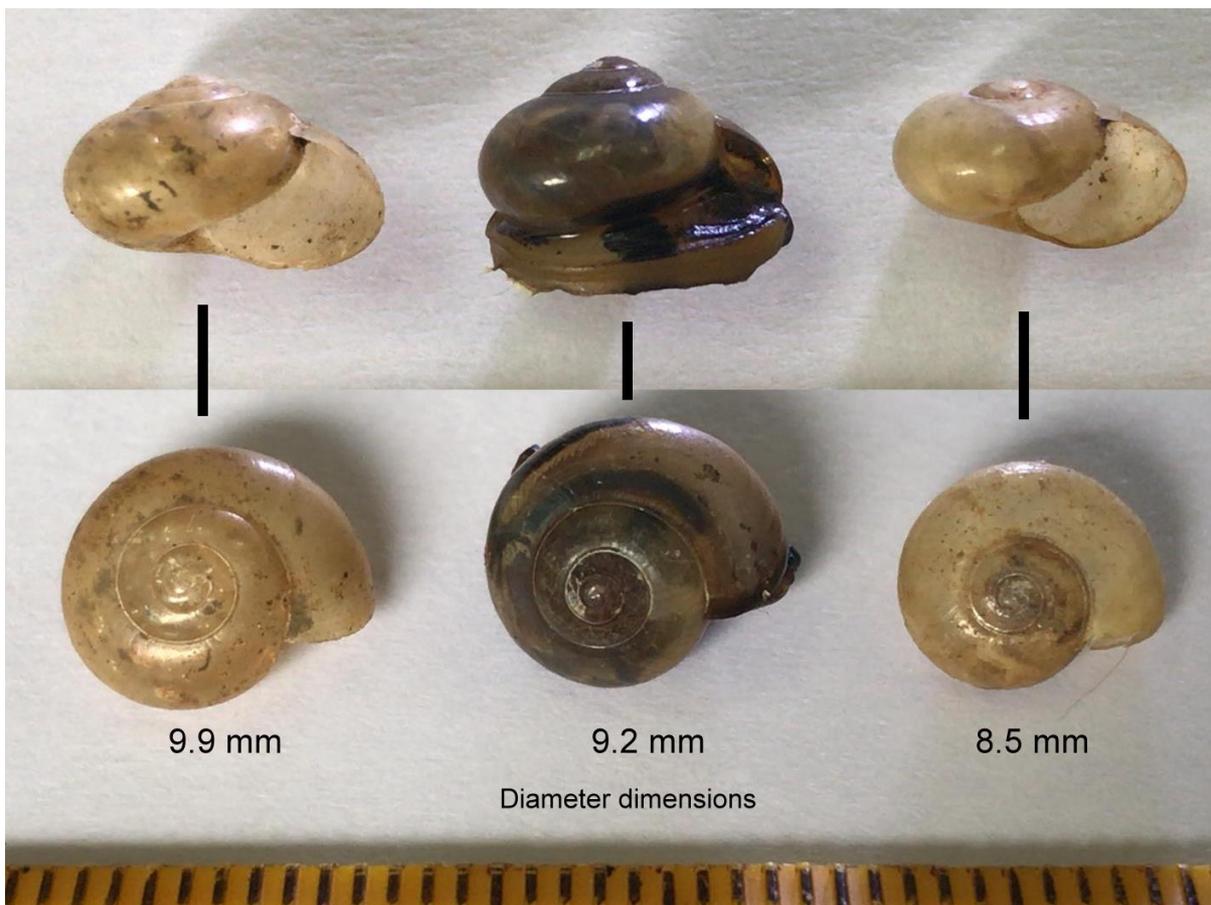


Fig. 2. Apertural (top row) and apical (bottom row) views of *Helicarion* shells. Left - empty shell of *Helicarion permolle* from Pulau Tuba, Peninsular Malaysia. Centre - shell with snail-animal retracted of *Helicarion permolle* from Gardenia Road, Singapore. Right - empty shell of *Helicarion perfragilis* from Dairy Farm area, Singapore. Photographs by Chan Sow-Yan.