

Disruption in shell colour patterns of nerite snails

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Subjects: *Nerita articulata* (Mollusca: Gastropoda: Neritidae);
Nerita undata (Mollusca: Gastropoda: Neritidae).

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

Location, date and time: Singapore Island, East Coast Park Area B; 23 December 2019; 1600 hrs.

Habitat: Estuarine. Wall at tidal section of a concrete monsoon drain, in coastal parkland.

Observer: Lau Wing Lup.

Observation: Many examples of *Nerita articulata* and *Nerita undata* were found crawling on drain walls and in weep holes (Fig. 1). They display disruption in colour patterns on their shells during growth (Fig. 2-6).

Remarks: Some neritid snails are extremely polymorphic in that their shells exhibit a wide variety of patterns and colours (Tan & Gopalasamy, 2008). Examples of *Nerita articulata* and *Nerita undata* featured here underwent abrupt changes in colour pattern during growth. Although the cause for such pattern changes on seemingly normal snails cannot be properly ascertained, it is believed to be caused by the stimulation of the snail mantle's secretory cells by the activity of the animal's central nervous system (Ermentrout et al, 1986). Such changes on the shell's colour patterns could be a recording of the mantle's nervous activity, being somewhat equivalent to an electroencephalogram (EEG) machine that tracks and records human brain wave patterns (Blocka, 2018).

References:

- Blocka K (2018). EEG (Electroencephalogram): purpose, procedure, and risks. Accessed on 29 September 2018 at <https://www.healthline.com/health/eeeg>.
- Ermentrout B, Campbell J & Oster G (1986). A model for shell patterns based on neural activity. *The Veliger*, 28(4): 369-388.
- Tan SK & Gopalasamy RC (2008). Taxonomy and distribution of the Neritidae (Mollusca: Gastropoda) in Singapore. *Zoological Studies*, 47: 481-494.



Fig. 1. Neritids and other molluscs aggregating in a weep hole of a monsoon drain at East Coast Park.

Photograph by Lau Wing Lup



Fig. 2. *Nerita undata* specimen in-situ with disruption in colour pattern.



Fig. 3. Colour pattern variation in some specimens of *Nerita undata*. Space between vertical black bars = 1 mm.



Fig. 4. Example of a *Nerita undata* with shell pattern disruption and pseudo-melanism.



Fig. 5. *Nerita articulata* with shell colour and pattern changes. Scale between vertical black bars = 1 mm.

Photographs by Lau Wing Lup