

Observation of confusing ventral colour patterns of juvenile teatfish (Holothuroidea) for species identification in Solomon Islands

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Teatfish are commercially the most valuable holothurians in tropical areas (Purcell 2014), more so than any other holothurian species (Eriksson and Byrne 2015). They have been overfished during earlier boom-and-bust cycles of the fishery (Anderson et al. 2011), which has resulted in a worldwide decrease of teatfish resources (CITES 2019; FAO 2019). In 2019, three species of teatfish – *Holothuria (Microthele) nobilis* (Selenka, 1867), *H. (M.) whitmaei* (Bell, 1887) and *H. (M.) fuscogilva* (Cherbonnier, 1980) – were listed in CITES⁵ Appendix II, which was enabled by the resolution of the previous taxonomic confusion of teatfish (e.g. Cherbonnier 1980; Rowe and Gates 1995; Massin 1999) by comparing morphology and genetic sequences (Uthicke et al. 2004).

According to Uthicke et al. (2004), the above three species of teatfish are morphologically discernible by their body colours: *H. (M.) whitmaei* is entirely black on the dorsal side and dark brown on the ventral side, while *H. (M.) nobilis* has large white markings around the lateral teats. The colour of *H. (M.) fuscogilva* is white or beige on both the dorsal and ventral sides (but more yellowish on the ventral than on the dorsal side), and there is usually black or dark brown mottling on the dorsal side, which is variable in size or sometimes lacking, depending on the individual. In the case of juveniles, however, visual identification is rather difficult compared to that of adults, because the dorsal side of juvenile *H. (M.) whitmaei* can have white or yellow patches, somewhat similar to juveniles of *H. (M.) fuscogilva* (Uthicke et al. 2004; Purcell and Tekanene 2006). A clear morphological difference to distinguish juveniles of the two species has been suggested, as their respective ventral colours, which have been described as entirely dark and white or beige for *H. (M.) whitmaei* and *H. (M.) fuscogilva*, respectively (Uthicke et al. 2004).

We observed, however, several juveniles of teatfish showing intermediate ventral colour morphs, as dark brown to black in the central section of the body, and beige in the peripheral parts (Fig. 1e, f, j, k). As the peripheral white area is partly covered with ambulacra, there were undoubtedly both light and dark areas on the trivium. The series of the ventral colour morphs were continuous in ratios of light and dark areas, and also in lightness of the dark area from brown to nearly black (Fig. 1e, f, j, k). This fills the gap between the entirely white (Fig. 1d) and black (Fig. 1l) morphs, typical of *H. (M.) fuscogilva* and *H. (M.) whitmaei*, respectively (Uthicke et al. 2004). Because relatively large (≥ 18 cm) individuals of teatfish observed in this area exclusively show uniformly light ventral colours as Fig. 1d, most of these intermediate variants (relatively small juveniles ≤ 12 cm) were possibly also *H. (M.) fuscogilva*. Nevertheless, the continuous variation of ventral colour morphs makes it difficult to define a clear morphological border between juveniles of *H. (M.) fuscogilva* and *H. (M.) whitmaei*, unless testing DNA sequences. These results imply potential risks of misidentification of juvenile teatfish in visual-based data such as field surveys and also in trade records.

Time of observation: 11:00 to 16:00 on 24 January 2020

Location: Danisavo Harbour located between Danisavo and Buena Vista Islands in the Nggela (Florida) Islands, Solomon Islands. Mainly around S 8° 53' 58", E 159° 58' 50".

Water depth: ca. 30 cm to 1 m.

Habitat: Seagrass beds mainly comprising *Enhalus acoroides*.

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⁵ CITES = the Convention on International Trade in Endangered Species of Wild Fauna and Flora

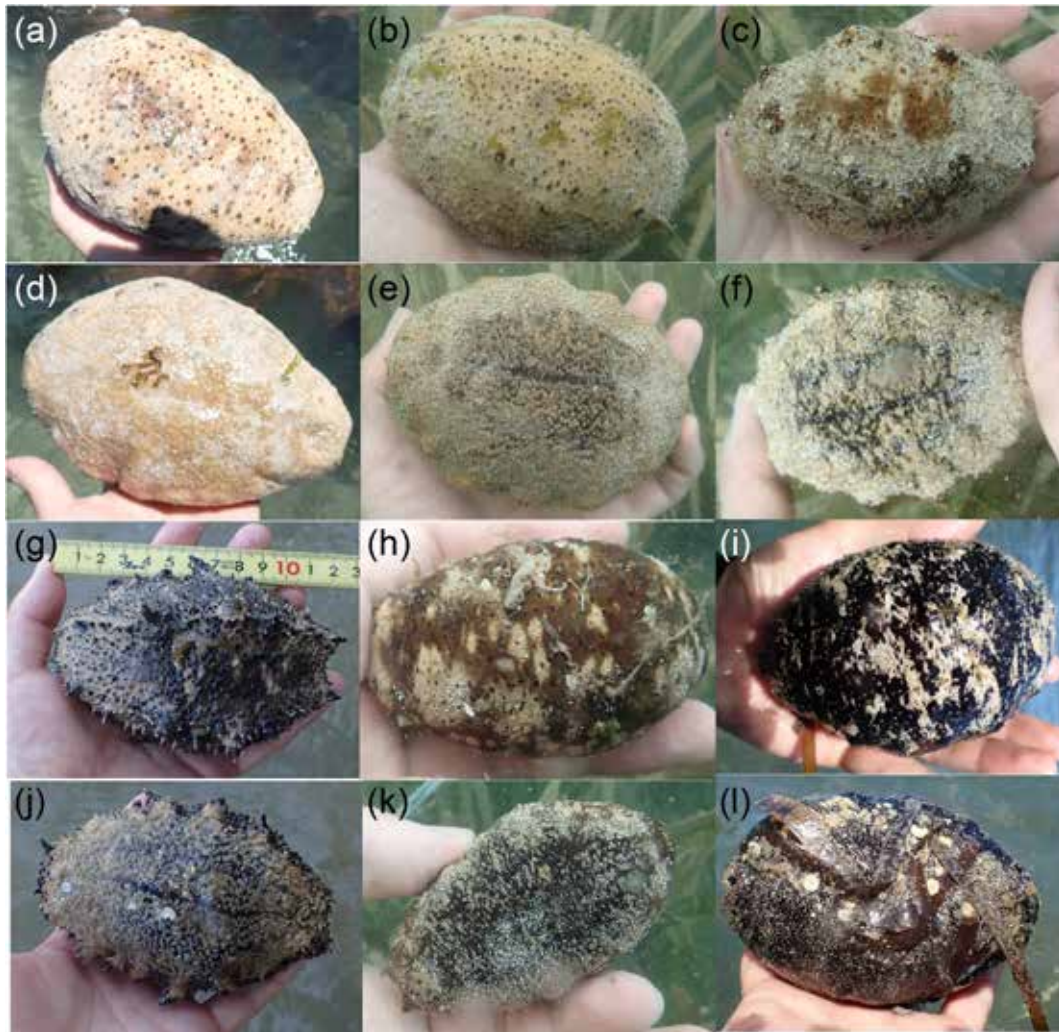


Figure 1. Teatfish juveniles in pairs, showing dorsal (a, b, c, g, h, i) and ventral (d, e, f, j, k, l) views. A white individual (a, d) showed an entirely beige-coloured ventral side (d), while a black individual with small white patches on the dorsal side (i) showed a uniformly black ventral colour (l). Other individuals showed mixed ventral colours of dark brown and beige in the central and peripheral parts, respectively (e, f, j, k). Body length: (a, d) 18 cm, (b, e) 10 cm, (c, f): 9 cm, (g, j) 12 cm, (h, k): 7 cm, (i, l): 12 cm. image: Iwao Tanita

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