New observation of juvenile *Stichopus herrmanni* within a dense population of mixed ages in Vanuatu

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Species: *Stichopus herrmanni* (Semper, 1868; syn. *S. variegatus*), also known as "curryfish".

Context: *Stichopus herrmanni* is one of the increasingly targeted beche-de-mer species in the Indo-Pacific (Purcell et al. 2012; Di Simone et al. 2022), and listed as Vulnerable (A2bd) by the International Union for Conservation of Nature since 2013 (Conand et al. 2014). Hence, improving the knowledge on its biology, particularly its ecology, reproduction and growth is paramount (Wolfe and Byrne 2017a). Although considered scarce in many areas, this species is also known to occur in high densities in some places, especially inside some marine protected areas (Eriksson et al. 2010).

Juvenile beche-de-mer (Holothuroidea) are rarely observed and particularly difficult to identify because many species exhibit very different morphologies and color patterns from the adults, hence constituting a challenge for scientists (Shiell 2004). Observations of large, single-species aggregations of individuals of mixed ages, sizes and morphological features can enable a better understanding of these variations and provide better *in situ* identification of isolated juveniles.

Place: This observation took place at the "waterfront" of Port Vila, the capital and main city of Vanuatu (South Pacific) during a survey of beche-de-mer (see Ducarme et al. 2023, p.4 in this issue). It was observed on the shallow reef at the north of Port Vila's main bay, about 100–300 m westof Kumul Highway, in depths of 1–3 m (approximate coordinates 17°43'56.2"S, 168°18'33.1"E). This area is considered polluted because it is in the center of a Port Vila with a population of 60,000 inhabitants. Port Vila has very little in the way of sewage treatment, and the water is often milky or murky. The bottom is a detritic sandy bay with dead coral, sparse live reef elements, and an irregular rubble matrix. The water receives a high nutrient input due to its proximity to the city and a small estuary. This site appears quite different from previously reported habitats for juveniles (i.e. seagrass beds) as reported on in Conand (1993), "coralline algae and associated bacterial films" in Eriksson et al. (2013) and "piecrust reef" in Wolfe and Desbiens (2022).

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Observation: A couple of hundred meters from the seashore at shallow depths, we observed a dense population of *Stichopus herrmanni* exhibiting many different sizes (hence ages), ranging from 6 cm to 40 cm in length. The smallest specimens had various mottled colour patterns, mostly yellowish-brown with dark or light areas, and black wrinkles. Juveniles also had more elevated papillae than adults (making them looking like species from the *Stichopus horrens* complex), with the same distinctive concentric wrinkles around them. The largest specimens tended to have the smoothest tegument, and uniform colouration. These observations are consistent with the appearance of juveniles reported from New Caledonia by Conand (1993) and Réunion Island by Bourjon and Morcel (2016).

The size of the smaller specimens suggests an age of one or two months if the growth rate of these are similar to the ones described by Hu and al. (2010), hence likely born from a summer spawning event, consistent with Conand (1993) and Wolfe and Byrne (2017b).

The co-occurrence of juveniles and large adults is surprising as this species is known to experience ontogenic migrations towards deeper waters (Conand 1993; Palazzo et al. 2016; Wolfe and Byrne 2017b). Some ecological parameters (such as food availability) may prevent this behaviour from occurring here.

This population was part of a densely populated ecosystem, including important populations of synaptids (*Synapta maculata* and *Opheodesoma* sp.), as well as other sea cucumber species (*Holothuria hilla* and *H. difficilis*, along with scarcer *H. atra*, *H. coluber* and *Chiridota* sp.). Apart from sea cucumbers, the bottom was also densely populated by other echinoderms, especially the sea urchins *Mespilia globulus, Parasalenia gratiosa* and *Laganum laganum*, and diverse ophiotrichid brittle stars. *Stichopus chloronotus* was not observed around the site, although this species was associated with juvenile *S. herrmanni* in Wolfe and Desbiens (2022).

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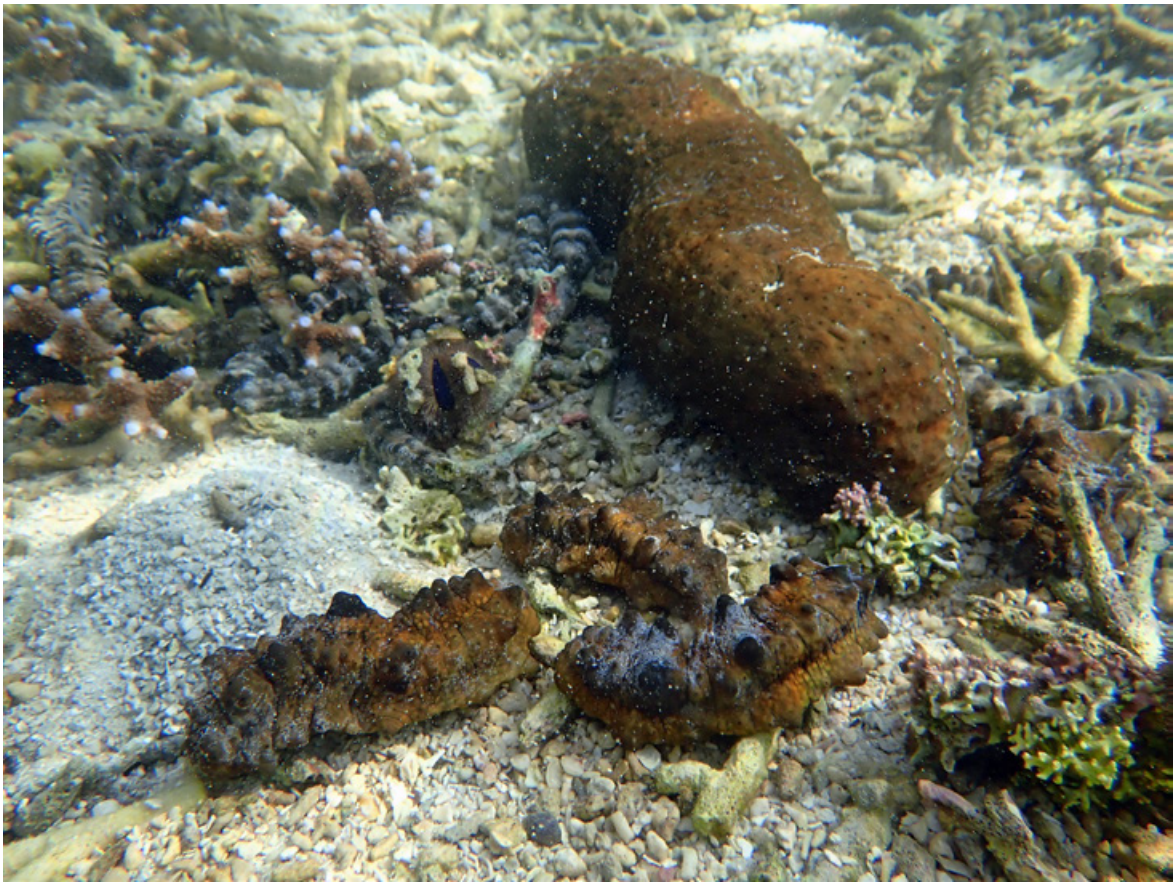
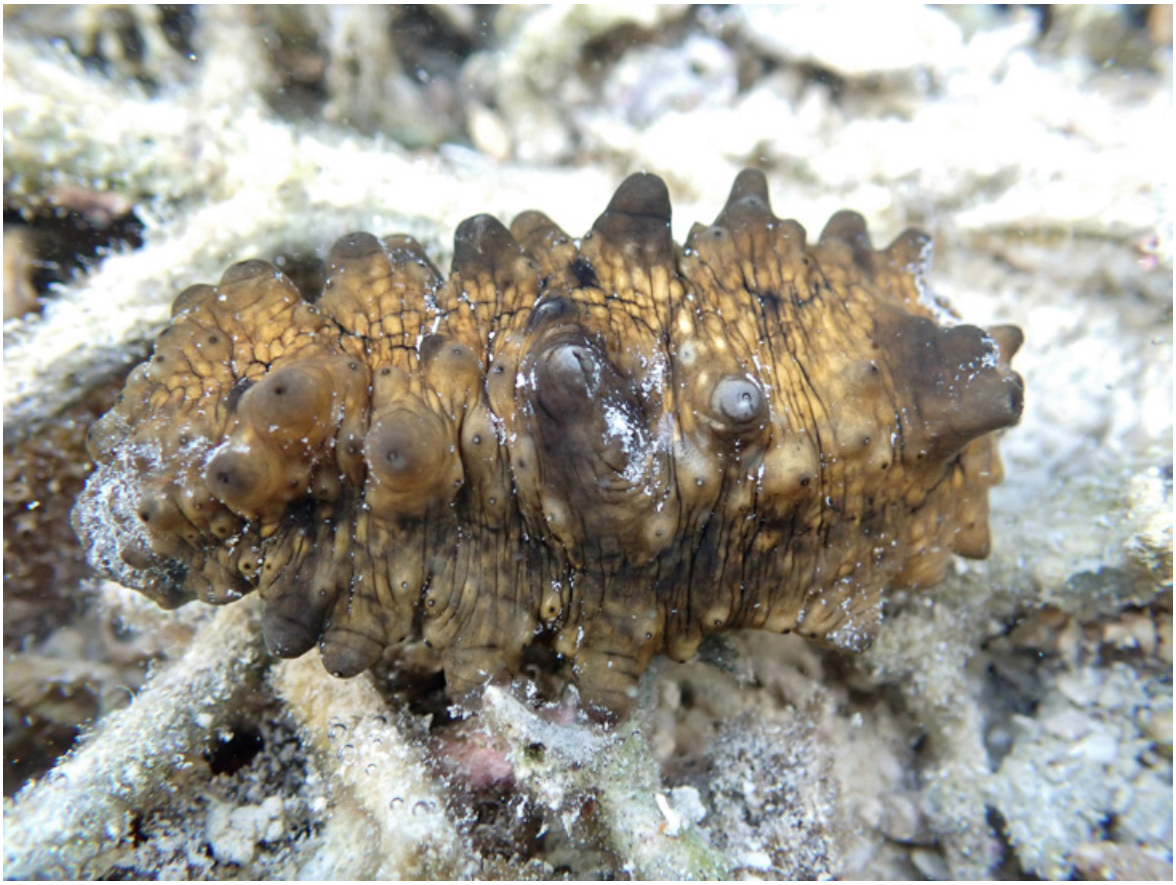


One large adult and four juvenile *Stichopus herrmanni*.



A small *Stichopus herrmanni*.

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