Observations of juvenile *Stichopus herrmanni* and confirmation of "pie crust" nursery grounds

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Some of the smallest *Stichopus herrmanni* found in the wild are documented from the outer reef crest of Heron Island, Great Barrier Reef, Australia (Fig. 1A) (Palazzo et al. 2016; Wolfe and Byrne 2017). Juveniles as small as 10 cm in length were found in April 2015 and 2016. The size distribution of *S. herrmanni* across Heron Reef during this period indicated a pattern of ontogenetic migration lagoonward, wherein smaller individuals dominated the outer shallow reef matrix. As such, this habitat – commonly termed "pie crust" (Fig. 1A,B) – was suggested to be an important recruitment and juvenile nursery site for *S. herrmanni* (Wolfe and Byrne 2017).

The same location at Heron Reef was revisited in March 2021 to investigate the possibility for this spatio-demographic structure to be maintained through time. In a ~1 h reef walk at around 14:00, we found eight *S. herrmanni* below 15 cm, including individuals of 8, 9, 9.5, 10.5, 12, 13, 14, 14.5 cm in length (Fig. 1C–E). These individuals were found in almost the exact same location as previous observations in the shallow water (0–0.5 m) pie crust matrix (Fig. 1B). This confirms previous suggestions that this habitat type provides a nursery ground for juvenile *S. herrmanni* on Heron Reef (Palazzo et al. 2016, Wolfe and Byrne 2017), as indicated elsewhere (Bourjon and Morcel 2016).

Larger adult *S. herrmanni* were found nearby, generally lagoonward in slightly deeper and sandier patches (Fig. 1A). Newly settled juveniles have not been found in this location, but this would likely require more intensive surveys in the dead reef, rubble matrix, as noted for some of the smallest *Stichopus* sp. found in nature elsewhere (Bourjon and Conand 2015; Desbiens and Wolfe 2020).

We also observed high densities of *Stichopus chloronotus* in this shallow reef area, with individuals as small as 5–10 cm in length (Fig. 1F). Aggregations of juvenile *S. chloronotus* have been noted previously, including their tendency to aggregate on hard-reef substrate (Eriksson et al. 2012). This behaviour is supported by our observations at Heron Reef.

Additionally, two small holothuroids were found under plate-like rubble in the shallow pie crust matrix (Fig. 1G). These may belong to the Apodida but remain unidentified and are not necessarily juveniles. One individual eviscerated when it was spotted in the rubble (Fig. 1G).

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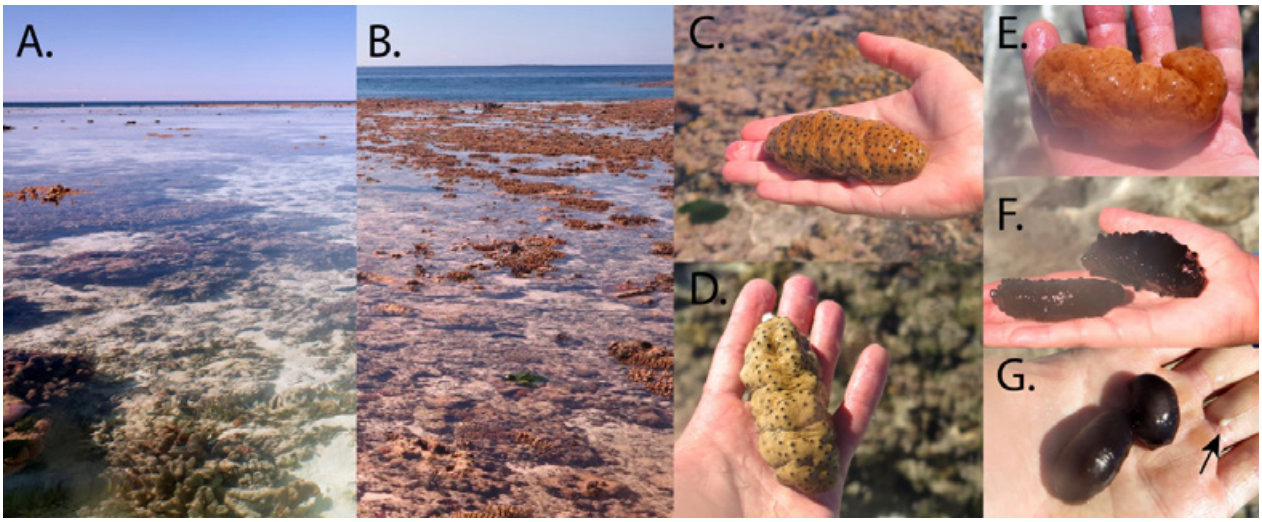

Figure 1. Photographs of the shallow (A) sandy reef and (B) pie crust at Heron Island, Australia, as well as of juvenile (C–E) *Stichopus herrmanni*, (F) *S. chloronotus* and (G) two unidentified holothuroids with black arrow indicating evisceration.

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