

Observation of the sea cucumber Stichopus horrens during fission in eastern Guadalcanal, Solomon Islands

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19 The peanutfish, *Stichopus horrens* Selenka, 1867, is a sea cucumber found in coral reefs in the Indian and western (North and South) Pacific Oceans. This species is exploited by 20 21 fisheries in these regions, including Solomon Islands. An adult-sized (roughly 20 cm long) individual of *S. horrens* was observed undergoing fission on July 27th, 2011, in the Ma'au reef 22 (9° 51′ 59″ S, 160° 49′ 41″ E) of Hatare, Marau, Guadalcanal, Solomon Islands. The individual 23 was found on a sand-rubble flat in the back-reef. At the time of discovery, fission had already 24 25 begun (Fig. 1A). After 6 minutes, the transverse fission plane became narrower (Fig. 1B). The observation was done from 17:14 to 17:20, but the entire process of the fission was not 26 27 continuously observed. During the observation, this individual was locomoting on the rubble, 28 without body-twisting behavior.

Several previous studies have reported that *S. horrens* reproduces asexually through fission (Harriott 1982; Kohtsuka et al. 2005; Charan-Dixon et al. 2019). While Harriott (1982) and Charan-Dixon et al. (2019) only briefly noted that *S. horrens* undergoes fission, Kohtsuka et al. (2005) provided detailed reports and photographs of the process. However, Byrne et al. (2010) pointed out that the individuals reported by Harriott (1982) and Kohtsuka et al. (2005) were misidentified and actually corresponded to *S. monotuberculatus* and *S. naso*, respectively.

35 The present fissiparous individual was identified to be S. horrens, referring to Byrne et al. (2010), which introduced molecular phylogeny to the taxonomy of the family Stichopodidae. 36 Byrne et al. (2010) clearly distinguished S. horrens from those similar species, S. 37 *monotuberculatus* and *S. naso*, by the molecular phylogeny and also found some morphological 38 39 differences between them. Morphologically, S. horrens is characterized by the distinct conical 40 papillae on the dorsal surface, and the presence of tack-like ossicles in those dorsal papillae 41 (Byrne et al. 2010). Although the present study did not inspect ossicles, the individual shown in Fig. 1 has numerous conical papillae, consistent with the above description about the external 42 43 morphology of S. horrens. The observed individual also showed cream color with dark meshlike pattern on the dorsal surface, well consistent with photographs of S. horrens shown in 44 Byrne et al. (2010). Moreover, the authors previously read sequences of mitochondrial 45 cytochrome oxidase subunit I of the warty sea cucumber individuals called "peanutfish" within 46 47 the same Ma'au reef population (but not including the present fissiparous individual). As a result, all individuals whose external morphology coincided with that of the present fissiparous 48 49 individual as described above had sequences corresponding to those of S. horrens reported by Byrne et al. (2010) (Tanita et al. unpublished data). 50

In conclusion, the present observation suggests that *S. horrens* is likely capable of fission, as well as other *Stichopus* species with relatively small body sizes (< 30 cm), namely *S. chloronotus*, *S. monotuberculatus*, and *S. naso* (Byrne et al. 2010).



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- 56 **Fig. 1**

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- 58 Figure caption
- 59 **Fig. 1** An individual of *Stichopus horrens* during fission, photographed at 17:14 (A) and 17:20
- 60 (B). White arrowheads and orange circles indicate the transverse fission plane and the anterior
- 61 end (head) of the body, respectively. Photographer: Ken Okaji.

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71 Compliance/Conflict of interest

72 No permission was required for the conduct of the present study. The authors declare that they

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