Invasive didemnid tunicate spreading across coral reefs at remote Swains Island, American Sāmoa

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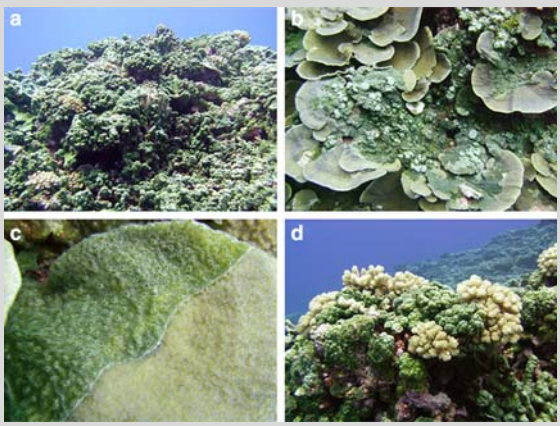

Fig. 1 *Diplosoma similis* overgrowing live coral and benthic substrata at Swains Island, American Sāmoa, March 2008. (**a**) Reef-wide, (**b** and **c**) *Montipora*, and (**d**) *Pocillopora* and encrusting coralline algae

Scleractinian mortality and coral reef benthos overgrowth resulting from the infestations of native colonial ascidians have been documented, however, without a clear understanding of causation (Littler and Littler 1995; Bak et al. 1996). Here, we report on a major population outbreak of the native Indo-Pacific species *Diplosoma similis* observed in March 2008, during benthic surveys around remote Swains Island, American Sāmoa. Towed-diver benthic surveys, covering 28.6 ha (28.6 km × 10 m, 3.2–21.4 m depth) of forereef habitat encircling the island, confirmed widespread occurrence of the tunicate, with elevated abundance observed along the north-northwest side of the island. Fifteen, 25-m line-point intercept survey transects (50 cm intervals at 10.9–13.9 m depths) at eight long-term (established since 2002) monitoring stations around Swains indicated relative abundances of *D. similis* as high as 76.5% and 35.0% at two sites within the major center of occurrence (Fig. 1a), and between 0% and 23.5% for the remaining six sites. Qualitative roving diver surveys at shallower depths (5–10 m) found comparable levels of infestation. Aggressive overgrowth on the species of live *Montipora*, *Pocillopora*, and *Porites*, as well as coralline algae and the green macrophytes *Microdictyon* and *Dictosphaeria*, was noted at the two highly infested sites (Fig. 1b–d).

Diplosoma similis is one of the 18 known phototrophic didemnid species found in the tropics, and it is widespread across American Sāmoa (Godwin pers. obs.). It is a common coelobite (cavity-dwelling) that generally grows on the shaded bases, branches, and undersides of live corals, as well as on rubble (Stoner 1989). Although *D. similis* was observed at Swains Island during 2004 and 2006 surveys (Godwin and Vargas-Ángel pers. obs.), drastic reductions (~50%) in the percentage of live coral cover between 2002 and 2004 (Brainard et al. 2008) along the north-northwest forereefs suggest that the increase in abundance observed in 2008 may be a secondary effect of storm damage caused by the passage of Hurricane Heta in January, 2004. *D. similis* reproduces advantageously through fragmentation caused by natural disturbances, such as storm events (Stoner 1986), and is facilitated by its competitive ability associated with phototrophy, rapid growth, and cytotoxicity (Sings and Rinehart 1996). Thus, at Swains Island, this colonial tunicate may be rapidly colonizing open spaces created in the reef matrix by stochastic events.

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Reef sites

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