

## A Sea Anemone Outbreak Eliminates Damselfish Territories from Fringing Reefs in Southern Taiwan

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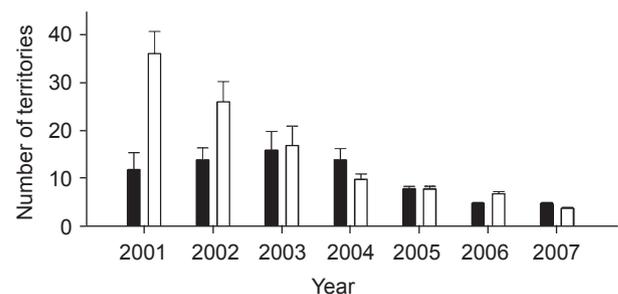
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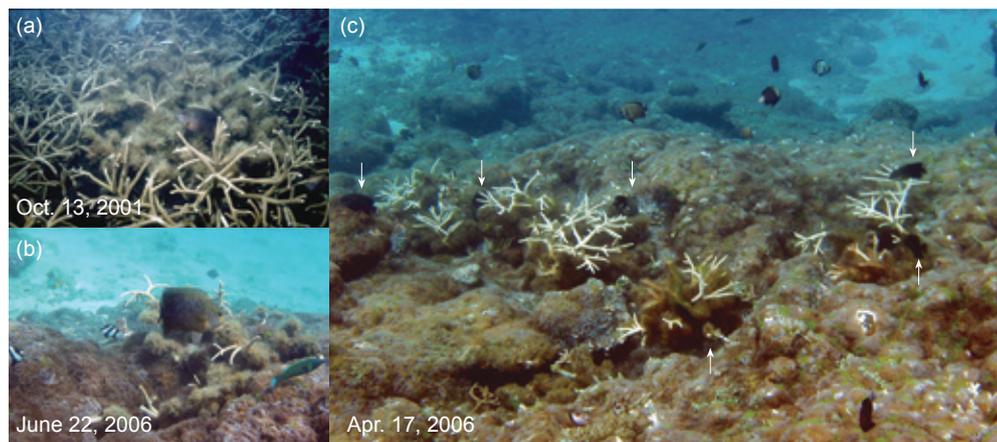
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In 2000, when the sea anemone, *Mesactinia ganesis*, was rare on fringing reefs in an embayment in southern Taiwan (21°57'N; 120°45'E) (Jan et al. 2007), bluntnout gregory *Stegastes lividus* (Bloch and Schneider) (Fig. 1a) and dusky gregory, *S. nigricans* (Lacepède) (Jan et al. 2003) had long-established territories on coral branches on the reef flat. An outbreak of the sea anemone has occurred in recent years in this embayment. Colonies of branching corals on the slanting reef surface were eliminated by the spreading *M. ganesis*. Strong territoriality of the damselfishes has slowed down the elimination process, as remaining coral colonies can still be found within their territories (Fig. 1b). Nevertheless, currently more than 80% of the former damselfish territories have already disappeared from this part of the reef (Fig. 2). Some holders emigrated to the lower part of a near-by reef, competing for new territories on the few subsisting coral colonies (Fig. 1c). In parallel, relic coral skeletons from abandoned damselfish territories have been taken over by Dick's damsel, *Plectroglyphidodon dickii* (Liénard), as nesting substrate. This observation indicates that the sea anemone outbreak has resulted in drastic changes in the demography of habitat specialist in fishes. While the outbreak has

shown no signs of recession, the fish community, along with other fouling organisms, will likely remain unstable in this embayment.



**Fig. 2.** Yearly changes in the number of *Stegastes* territories (mean for 4 seasonal counts, with the standard deviation; filled columns: *S. lividus*; empty columns: *S. nigricans*) built on coral colonies in a fixed quadrat of 45 m<sup>2</sup>.



**Fig. 1.** Transitions of territorial changes of *Stegastes lividus*. (a) An adult and a patch of an algal mat growing on dead branches of the coral *Acopora muricata* as the focal point of its territory; (b) an adult and its territory surrounded by sea anemone colonies; (c) coral colonies shared by a group of *S. lividus* and *S. nigricans*. Note that the reef substratum is mostly covered by sea anemone colonies. The arrow indicates the territory holder.

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