# Coral reef fishes use crown-of-thorns seastar as habitat

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**Fig. 1** *Dascyllus flavicaudus* and *Siphamia* sp. (upper left) sheltering amongst the spines of *Acanthaster planci*. Photo by M.A. Steele

Between January and July 2008, we observed an unusual association between several species of coral reef fishes and the corallivorous crown-of-thorns seastar *Acanthaster planci* within the lagoon of Moorea, French Polynesia (17°30′S: 149°50′W). Four species of recently settled damselfishes (*Pomacentrus pavo*, *Dascyllus aruanus*, *D. flavicaudus*, and *D. trimaculatus*) as well as juveniles and adults of a cardinalfish (*Siphamia* sp.) were seen sheltering within the venomous spines of *Acanthaster*. Three of the damselfish species normally occupy branching corals throughout their lives, one occupies sea anemones when young and shifts to general coral reef habitat when older, and the cardinalfish, an undescribed species (O. Gon and J. Randall, pers. comm.), appears to normally associate with sea urchins.

Fishes only inhabited *Acanthaster* when the seastars occurred on sandy substrate at least several meters away from corals. Surveys done in January along four 200 × 10 m transects (5, 10, 15, and 20 m depth) revealed that 6 out of 29 *Acanthaster* were occupied by cardinalfish (2–18 fish per seastar, mean = 6.2). All occupied seastars were more than 5 m from the reef, whereas none of the *Acanthaster* less than 5 m from the reef contained fishes. The four damselfish species noted above were not seen during this survey, but we observed them occupying *Acanthaster* at other times during January (Fig. 1), also only when the host seastar was distant from the reef. During surveys in June along three transects (5, 10, and 20 m depth), we observed 11 *Acanthaster* and three of these that were more than 5 m from the reef were occupied by cardinalfish (2–9 per seastar, mean = 4.3) and one also had a single damselfish that was too small and unpigmented to identify.

We know no prior records of damselfishes occupying *Acanthaster*. The outcome of this apparently short-term, opportunistic, commensal relationship is unclear. Only recently settled damselfishes were seen inhabiting *Acanthaster*, implying that individuals either move to more typical habitat after settling on *Acanthaster*, perhaps when seastars move near the reef, or die. In contrast, all life stages of the cardinalfish *Siphamia* sp., from recent settlers to adults mouthbrooding eggs were found on *Acanthaster*, as has been noted for other members of this genus (e.g., Allen 1972). These observations reveal previously unappreciated flexibility in the range of habitats used by several coral reef fishes. Future studies will be necessary to document whether this association persists beyond the current outbreak of *Acanthaster* and to determine the types and magnitude of potential effects on the population dynamics of the fish species involved.

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## *Reference*

Allen GR (1972) Observations on a commensal relationship between *Siphamia fuscolineata* (Apogonidae) and the crown-of-thorns starfish, *Acanthaster planci*. Copeia 3:595

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Reef sites

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