

First observations of *Actinopyga* cf. *flammea* Cherbonnier, 1979 in Cook Islands

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Species: *Actinopyga* cf. *flammea* Cherbonnier, 1979

Context: *Actinopyga flammea* was first described by Cherbonnier in 1979 in New Caledonia, where it was found at 40–45 m depth on the outer reef among coral debris, and brown and coralline algae (Cherbonnier, 1979). A holotype specimen is held in the echinoderm collection of the Muséum National d’Histoire Naturelle in Paris, France (MNHN-IE-2013-17833; Cherbonnier 1979).

Since its description, records of this species in the scientific literature have been rare. Purcell et al. (2012) described a similar species, tentatively named *Actinopyga* sp. aff. *flammea*, that is fished in New Caledonia, Fiji and Tonga (Purcell et al. 2012). Purcell et al. (2012) wrote that this species closely resembles, but differs genetically from, the *A. flammea* described by Cherbonnier (1979), however details of this genetic analysis were not provided in the report.

It has been suggested that some *Actinopyga* species may be considered as species complexes (Alcudia-Catalma et al. 2020). For example, high genetic diversity was observed in the mitochondrial COI gene region between *Actinopyga echinites* specimens from different geographic locations (Bohol and Ilocos Norte in the Philippines; Alcudia-Catalma et al. 2020). In contrast, a different study found both *Actinopyga flammea* and *A. caerulea*, to be indistinguishable from *A. palauensis* when comparing mitochondrial COI sequences (Michonneau et al. 2015), although this was limited to an analysis of one individual per species. Further investigation is required to resolve the genetic and morphological diversity within and between *A. flammea* and closely related species.

Both *Actinopyga flammea* and *A. sp. aff. flammea* (*sensu* Purcell et al. 2012) are considered rare species, inhabiting waters between depths of 35 m and 60 m (Bhatnagar et al. 1984; Purcell et al. 2012; Pakoa et al. 2013; Motuhi 2016). Their presence in fisheries catches is likely a result of an increase in deep-water harvest effort (Pakoa et al. 2013). *Actinopyga* sp. aff. *flammea* is fished in low numbers in Fiji and Tonga (Pakoa et al. 2013; Purcell et al. 2012; Ravinesh et al. 2016; Moore et al. 2017). In Fiji, it is considered a “high-value species”, fetching USD 5–15 USD per fresh specimen (Pakoa et al. 2013; Purcell et al. 2012), although Purcell et al. (2014) noted that this value is much lower than the highest valued species, *Holothuria scabra*.

Aside from its commercial exploitation, *A. flammea* has been reported to be highly ichthyotoxic and used as a fish poison by fishers in the Philippines (Motuhi 2016). Multiple novel triterpenoid saponin compounds have been isolated and characterised from *A. flammea* as part of a bio-prospecting study in New Caledonia (Motuhi et al. 2016) following an earlier discovery of triterpenoid saponins from this species (Bhatnagar et al. 1984).

In the Cook Islands, shallow-water sea cucumbers, including *Holothuria* spp. and *Actinopyga varians*, are harvested locally for subsistence and by fishers in small quantities for local artisanal sale. Sea cucumbers are harvested by hand, with gleaning focused in lagoons and on reef flats and reef crests. Underwater breathing apparatuses, trawling and dredging are not used, and harvesting sea cucumbers for commercial export does not occur. Harvests confined to shallow waters and limited resource survey efforts at depth are the likely reason *A. flammea/Actinopyga* sp. aff. *flammea* have not been previously recorded in the Cook Islands.

Date of observations: 5 December 2023

Location: Fore reef slope, 50 m depth, west coast, Atiua, Cook Islands (approximate coordinates: -19.978810°, -158.141161°)

Approximate sizes: 30–35 cm

Observation: One exploratory 83-minute scuba dive was conducted by one diver. The dive started at 54 m depth and finished in 3 m depth. Two specimens of what were identified as *A. cf. flammea* were observed (Fig. 1). Identification was based on morphology consisting of a reddish-pink body covered in blue-grey conical papillae as described by Cherbonnier (1979) and Purcell (2012). The specimens were located within 5 m of each other, at a depth of ~50 m.

The habitat was a steep reef, with a slope greater than 45 degrees. The substrate comprised coral pavement, sand, algae and hard corals.

These are the first records of the species in Cook Islands.

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Figure 1 a and b. Two specimens of *Actinopyga* cf. *flammea*. Images © Kirby Morejohn, Ministry of Marine Resources, Cook Islands.

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