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Critically Endangered Algal Couture

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Abstract

Endangered species are strictly contraband within the world of high fashion couture but not for marine fashionistas. During recent surveys a decorator crab (*Hyastenus sp.*) was found exclusively covered in a thick coat of the critically endangered marine brown alga, *Nereia lophocladia*. This marine alga is among only a few to be globally listed as critically endangered and protected by legislation. While decorator crabs are widely known to adorn themselves in algae and other organisms for defense and camouflage, this is the first documented occurrence of critically endangered couture.

Keywords Endangered; Seaweed; Algae; Decorator crab

Introduction

Decorator crabs are perhaps best defined for covering themselves in algae, anemones, sponges and other organisms for defence as well as camouflage [1,2]. During recent surveys, however, a specimen of the decorator crab (*Hyastenus sp.*) was found almost exclusively covered in *Nereia lophocladia* (J. Agardh), a marine brown alga that is listed as critically endangered under Part 7A of the Fisheries Management Act 1994 in New South Wales (NSW) Australia. This species has an extremely limited distribution (Coffs Harbour, NSW, Australia) and its habitat, within its only known location, has been altered due to the construction of a breakwater [3,4]. It remains among only a few species of marine algae globally that are listed and protected by threatened species legislation. Until recently, *N. lophocladia* was thought to be "extinct" because surveys failed to find it over a 13-year period. However, it was found again in 2015 during surveys to assess potential impacts of breakwater upgrade works in its only known habitat [5,6].

The decorator crab was found within a rare, dense patch of *N. lophocladia* and its carapace, legs and rostrum were almost exclusively covered in tufted-apices of *N. lophocladia* (Figure 1a).

The crab had collected ~20 pieces of the algae, which had been cut off below the tuft of apical filaments, and attached to the hooked setae covering its body (Figure 1b). The fragments of *N. lophocladia* were visibly alive with no obvious signs that removal had impacted their viability. The crab had also collected one small piece of unidentified filamentous red algae (Figure 1a).

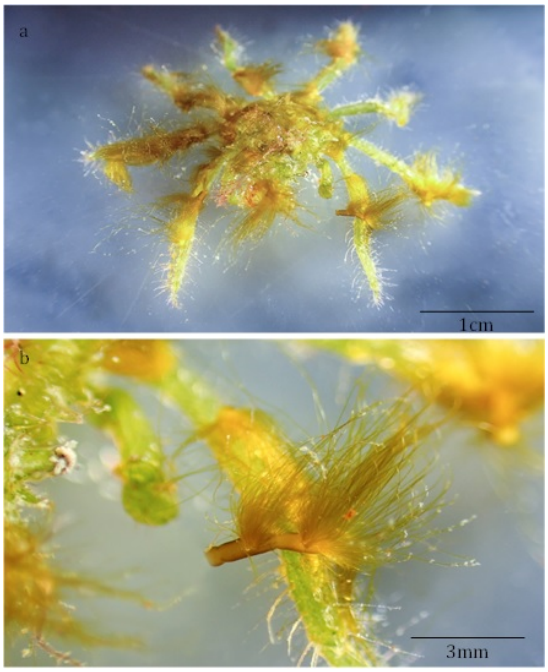

Figure 1: Photograph showing (a) *Hyastenus spp* covered in critically endangered *Nereia lophocladia* and (b) how the tufted apices of *N. lophocladia* had been cut off for attachment.

It is interesting to speculate whether the crab may act as a vector for dispersal of fertile *N. lophocladia* material. Tufted axes bearing reproductive unilocular sporangia were observed on nearby plants

collected at the same time [7] indicating that populations were fertile. Movement of crabs decorated with *N. lophocladia* into other algal habitats may promote the establishment of new and discrete patches. Furthermore, translocation of *N. lophocladia* by crabs could represent a pathway of gene flow that may otherwise not exist given the spatial and temporal scarcity of this species. Genetic analyses could inform dispersal pathways [8] and any role played by decorator crabs.

The reason behind this unique association is unknown but intriguing. *Hyastenus sp.* are regionally known to also cover themselves with sponges and gorgonian tissue so are not specialist algal decorators. It may be that *N. lophocladia* contains deterrent chemicals that the crab uses for defence against predators or that the alga may simply be used for camouflage. What is certain, is that the association is spatially and temporally variable [9], due to the restricted distribution of the alga relative to the crab and the absence of *N. lophocladia* sporophytes in the Austral summer and autumn. Unravelling the mechanisms behind this association will elucidate the ecological role played by this rare alga and, combined with an improving understanding of *N. lophocladia* biology, will help shape future conservation plans for this critically endangered species.

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References

1. Womersley HBS (1987) The Marine Benthic Flora of Southern Australia Part II. xSouth Australian Government Printing Division: Adelaide.
2. Ruxton GD, Stevens M (2015) The evolutionary ecology of decorating behaviour. Biology Letters 11: 20150325.
3. Hultgren KM, Stachowicz JJ (2008) Alternative camouflage strategies mediate predation risk among closely related co-occurring kelp crabs. Oecologia 155: 519-528.
4. http://www.dpi.nsw.gov.au/data/assets/pdf_file/0015/251340/FD36-Nereia lophocladia.pdf. .
5. Yee NR, Findley L (2015) Coffs Harbour underwater inspection: Northern breakwater upgrade project. Targeted surveys for critically endangered marine brown alga, Nereia lophocladia. Elgin Associates.
6. Yee NR, Finley L, Roberts A, Kelaher BP, Millar AJK, et al. (2017) Re-discovery of the critically endangered marine brown alga, Nereia lophocladia (Order Sporochnales) at Coffs Harbour, NSW, Australia. Marine Biodiversity.
7. Kelaher BP (2016) Second pre-clearance survey for the critically endangered marine brown alga Nereia lophocladia on the Coffs Harbour Northern Breakwater. Report to NSW Department of Industry (Lands), Newcastle.
8. Coleman MA, Weigner KE, Kelaher BP (2017) Optimising DNA extraction from a critically endangered marine alga. Conservation Genetic Resources.
9. Stachowicz JJ, Hay ME (2000) Geographic variation in camouflage specialization by a decorator crab. The American Naturalist 156: 59-71.