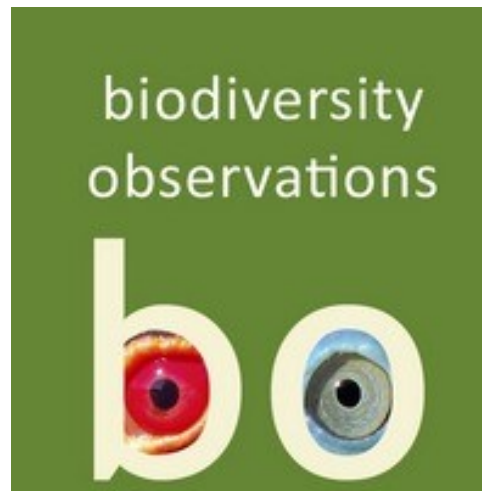


A goby negotiates aerial exposure on the low tide by retreating beneath a rock

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A goby negotiates aerial exposure on the low tide by retreating beneath a rock

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Abstract

Fishes exploit the intertidal zone by coming in and out with the high tide or retreating to small pools or sheltering beneath rocks during the low tide. This note reports an observation of a goby, likely *Mugilogobius platynotus*, out of the water but retreated beneath a rock, with the rising tide returning water to the goby 70 minutes later. During the time of aerial exposure, the sandy mud beneath the rock was noticeably moister than the surrounding mud exposed to sunlight, and pneumatophores and woody debris potentially contributed to maintaining a humid microclimate beneath the rock.

Observation

On 9 November 2024, while exploring a mangrove mudflat in Caringbah South, New South Wales, Australia (34°02'42"S, 151°06'41"E), at low tide, we noticed a goby beneath a rock (Fig. 1). The goby, probably a Flatback Mangrove Goby *Mugilogobius platynotus* based on the flatness of the head, widely separated eyes and dark

spot at the anterior base of the dorsal fin, was entirely out of the water. The sandy mud beneath the rock was notably moister than the surrounding mud exposed to sunlight. Immediately around the goby were pneumatophores and woody debris, which potentially contributed to maintaining a humid microclimate. The rising tide recovered this site approximately 70 minutes after this observation, enabling the goby to return to the water.

Discussion

The intertidal zone, though lacking permanent water coverage, provides a variety of habitats for a diversity of fishes (Gibson 1982, Morrison et al. 2002). Mangrove mudflats, in particular, exhibit a high degree of structural complexity via pneumatophores, fallen timber, leaf litter, bivalve shells and algae (Thayer et al. 1987). Some fish species exploit this habitat transiently, vacating it at low tide by swimming out with the outgoing tide (Gibson 1986), while others retreat to small pools above the low-water mark and some taxa have been documented sheltering beneath rocks (Magnus 1969, Zander 1972, Pelster et al. 1988), like the goby in our observation.

Gobies and their relatives comprise an order of ray-finned fish (Gobiiformes) that are commonly found on tidal mudflats (Clynick & Chapman 2002), and notably include species known as mudskippers that are adapted to an amphibious lifestyle (Hidayat et al. 2022). None of the mudskippers, however, occur as far south as the Sydney region (Murdy 1989) where our observation was made. Despite not having the specific adaptations to move freely between water and land, the goby we observed demonstrated a capacity to negotiate aerial exposure with the assistance of surrounding habitat features. This observation raises questions whether this behaviour occurs in gobies (other than mudskippers) and other fishes more often than thought.

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Figure 1: A living goby out of the water after the tide had receded at a mangrove mudflat in Caringbah South, New South Wales, Australia. Photograph by the authors.

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