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ICHTHYOLOGY

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 re-covered 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.

References

Clynick B, Chapman MG 2002. Assemblages of small fish in patchy mangrove forests in Sydney Harbour. Marine and Freshwater Research 53: 669–677.

Gibson RN 1982. Recent studies on the biology of intertidal fishes. Oceanography and Marine Biology: An Annual Review 20: 363–414.

Gibson RN 1986. Intertidal teleosts: life in a fluctuating environment. In: Pitcher TJ (ed). The Behavior of Teleost Fishes. Johns Hopkins University Press, Baltimore, Maryland: 388–408.

Hidayat S, Wicaksono A, Raharjeng A, Jin DSM, Alam P, Retnoaji B 2022. The morphologies of mudskipper pelvic fins in relation to terrestrial and climbing behaviour. Proceedings of the Zoological Society 75: 83–93.

Magnus DBE 1969. Bewegungsweisen des amphibischen Schleimfisches *Lophalticus kirkii magnusi* Klausewitz (Pisces, Salariidae) im Biotop. Zoologischer Anzeiger (Supplement) 29: 547–555.

Morrison MA, Francis MP, Hartill BW, Parkinson DM 2002. Diurnal and tidal variation in the abundance of the fish fauna of a temperate tidal mudflat. Estuarine, Coastal and Shelf Science 54: 793–807.

Murdy EO 1989. A taxonomic revision and cladistic analysis of the oxudercine gobies (Gobiidae: Oxudercinae). Records of the Australian Museum (Supplement) 11: 1–93.

Pelster B, Bridges CR, Grieshaber MK 1988. Physiological adaptations of the intertidal rockpool teleost *Blennius pholis* L., to aerial exposure. Respiration Physiology 71: 355–374.

Thayer GW, Colby DR, Hettler WF 1987. Utilization of the Red Mangrove prop root habitat by fishes in south Florida. Marine Ecology Process Series 35: 25–38.

Zander CD 1972. Beziehungen zwischen korperbau und Lebensweise bei Blennidae (Pisces) aus dem Roten Meer. I. Außere morphologie. Marine Biology 13: 238–246.

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