

Carapus bermudensis (Atlantic Pearlfish)

Family: Carapidae (Pearlfish)

Order: Ophidiiformes (Snakefish)

Class: Actinopterygii (Ray-finned Fish)

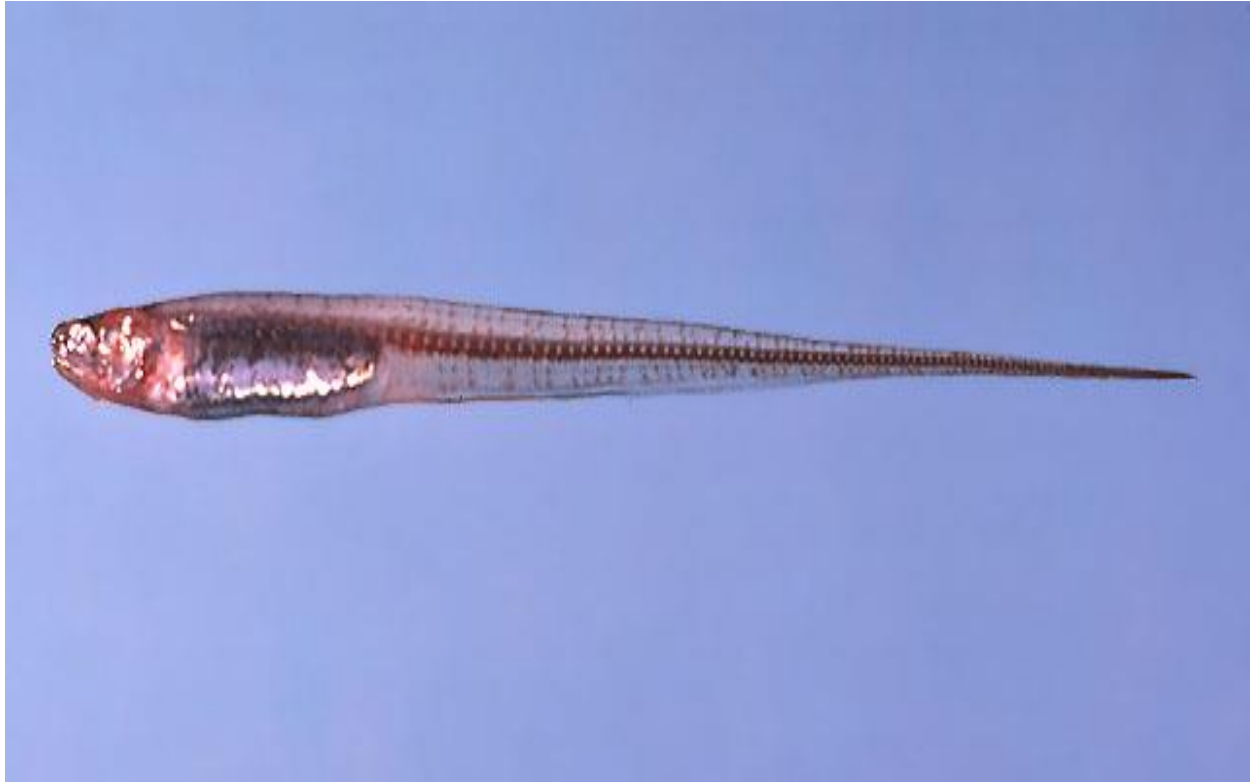


Fig. 1. Atlantic pearlfish, *Carapus bermudensis*.

[<http://www.fishbase.org/photos/ThumbnailsSummary.php?ID=3128> downloaded 8 March 2016]

TRAITS. *Carapus bermudensis* is translucent, with red markings and silver bands along the flanks, and internal black pigment noticeable along the vertebral column (Fig. 1). They are 15-24cm in length, slender and eel-like in appearance, and their bodies are laterally compressed. The dorsal fin is longer than the anal fin (Cohen and Nielsen, 1978). The first 13-18 rays of the anal fin are anterior to the dorsal fin. They possess small heart-shaped teeth along the upper jaw and large, conical teeth on lower jaw. Pelvic and caudal fins are absent; pectoral fin bases lobate with 17-20 rays (Cohen and Nielsen, 1978). These fishes have two-chambered constricted swim bladder, used to make sounds for communication. Males and females are alike.

DISTRIBUTION. Atlantic pearlfish are native to the tropical western North Atlantic Ocean from Bermuda, the Bahamas and south Florida through the Caribbean Sea, including Trinidad and Tobago, to the north coast of South America (Fig. 2).

HABITAT AND ACTIVITY. Tropical and sub-tropical benthic zones are the primary location of *Carapus bermudensis*. They usually occur in or around near shallow seagrass beds or among

reef-dominated communities. They are most prevalent in depths of 1-34m, but have also been found at depths of up to 235m (Lieske and Myers, 1994). While Atlantic pearlfish have been found free-living, most adults exhibit the extremely specific behaviour of existing within the body cavity of invertebrates, in particular sea cucumbers (holothurians) (Fig. 3). Their behaviour is nocturnal as they live in the body cavity of sea cucumbers by day and forage at night to feed (Smith and Tyler, 1969).

FOOD AND FEEDING. *C. bermudensis* are nocturnal carnivores; most of their prey are captured when they are outside their host (ADW, 2016). They usually feed on crustacean invertebrates including caridean shrimps and crabs, annelids and fish remains but generally are non-specific eaters that consume whatever food source is abundant and easily accessible.

POPULATION ECOLOGY. *C. bermudensis* are solitary, aquatic organisms. They exist within hosts and are extremely abundant. However, it is unknown the amount of larvae that are produced or the amount of individuals present in this species. Larvae of this species are widely dispersed and long lived. Adults and juveniles are similar in appearance. Generally they have long lives as they escape predation since they are almost always within the stomach of hosts.

REPRODUCTION. Little is known about the reproductive behaviour of *Carapus bermudensis*. It is believed that the reproductive behaviour is similar to that of *Carapus acus*. Females lay their eggs on a gelatinous raft that floats freely in open water; the males then release their sperms over the eggs. Eggs are hatched within 24-48 hours following external fertilization. Adults therefore do not invest time and effort into parental care (Froese and Kesner-Reyes, 2016). Early larval stages develop into a vexillifer characterised by a branched filament or vexillum. Continued growth and eventual loss of the vexillum produces a tenuis stage which is long and slender. It is at the final stage of growth that *C. bermudensis* enters the body cavity of the host. *Carapus bermudensis* is dioecious (with separate males and females), and is known to reproduce throughout the year. It is uncertain the amount of eggs released at a particular period or the age at which the fish reach sexual maturity.

BEHAVIOUR. *C. bermudensis* resides in the body cavity of their primary host, *Actinopyra agassizi*, during the day and exit at night to feed. This relationship protects individuals from predation by other fish. In order to recognise a viable host, these fish swim with their heads towards the sea bed to receive currents exhaled by a potential host (Fig. 4). Once a potential host is recognised, the fish locates the anus of the host and positions its head there. The body then bends and the end of the tail tracks along the lateral line as a guide, until it reaches the anus. This facilitates proper alignment of the tail and positions it at the anal opening; the fish then rapidly spins, forcefully pushing its tail into the host. Atlantic pearlfish communicate via sounds that are heard long distances even when produced by fish within their hosts. These sounds are of two types; non-harmonic, created when body parts are rubbed together, and swim bladder vibrations. They are generally used in sex identification by pearlfish.

APPLIED ECOLOGY. *C. bermudensis* have not been placed on the IUCN red list for threatened species (IUCN, 2016). Predation is not of major concern to this species as individuals are well protected once their host, sea cucumbers, reside in a protected area of the reef. Atlantic pearlfish do not provide any economic benefit to humans nor are they known to cause any

diseases or affect humans in any way. They are not fished commercially and there are no known threats to *Carapus bermudensis*.

REFERENCES

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Author: Malika Noor

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Fig. 2. *Carapus bermudensis* geographic distribution.

[<http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T16431946A16510322.en>, downloaded 8 March 2016]



Fig. 3. Commensal relationship between *Carapus bermudensis* and sea cucumber.

[<http://bio390parasitology.blogspot.com/2012/04/relaxing-in-rectum.html>, downloaded 8 March 2016]



Fig. 4. *Carapus bermudensis* searching for currents exhaled by a potential host.

[https://adlayasanimals.files.wordpress.com/2015/05/caacu_u1.jpg, downloaded 9 March 2016]