

Antennarius striatus (Hairy Frogfish)

Family: Antennariidae (Frogfish)

Order: Lophiiformes (Anglerfish and Frogfish)

Class: Actinopterygii (Ray-finned Fish)



Fig. 1. Hairy frogfish, *Antennarius striatus*.

[<http://www.divewet.com/hairy-frog-fish-gallery/>, downloaded 21 March 2015]

TRAITS. The hairy or striated frogfish can grow up to 25cm in length with a round, expandable body, covered with dermal spinules (small skin extensions) which bear a resemblance to hairs and aid camouflage among corals, sponges and sea weed. It has three dorsal fin spines in which the first extends as a rod (illicium) and bait (esca) on the tip of the snout (Bester, 2015). Frogfish have a large mouth with broad teeth that projects forward to swallow prey (Fig. 1). It varies in colour from yellow, yellow-brown, brown, grey, green, off-white and black and prominent lines extend from the eyes (Bester, 2015). Males are much smaller than females but have stronger coloration and more dermal extensions on the body. The body has pelvic, pectoral, dorsal, anal, and caudal fins. Swimming through open water uses the caudal and/or dorsal fins, or by and kick and glide using the pectoral fins (Pietsch and Grobecker, 1987). They can also walk along the sea bed using pelvic fins at a speed of 0.30-1.0 standard length per second (Pietsch and Grobecker, 1987).

DISTRIBUTION: Hairy frogfish are found in the Indo-Pacific Ocean and Red Sea coast, the Hawaiian Islands, Japan, Australia and New Zealand. In the Atlantic Ocean they are seen on both western and eastern sides; West Africa, and the Americas from New Jersey to Brazil, including the Gulf of Mexico and Caribbean Sea (Bester, 2015; Zuberbuhler, 2014) (Fig. 2).

HABITAT AND ACTIVITY: This species is subtropical benthic and inhabits shallow estuaries 40-210m deep (Bester, 2015). Rubble, rocky and sandy areas along with coral reefs are residences in which they can change colour and pigment pattern to match. Some inflate to appear like pufferfish. Frogfish exist in disturbed habitats and are active at dawn and dusk (Zuberbuhler, 2014).

FOOD AND FEEDING: Exists in moving water up to 200m deep and spends most of its time still, camouflaged among corals, sponges, in front of burrows and seaweed. It forages at night. Most animals think it is a place of shelter, grazing ground or a harmless sponge. The bait is enlarged up to 35 % to resemble a fat worm and via aggressive mimicry it is dangled to attract prey within seven body lengths. When the target is less than one body length away the oral cavity is expanded and the prey is sucked in with water within 6 milliseconds (Zuberbuhler, 2014). The sphincter muscles in the oesophagus contracts closing the mouth and the water exits through the gills (Bester, 2015). Digestive juices in the stomach breaks down the prey and sometimes it can be seen moving against the wall of the stomach. If the bait is not successful the frogfish stalks the victim slowly by groping along the ground (Zuberbuhler, 2014). Also a chemical attractant is secreted from the esca glands therefore the frogfish positions itself in front of water current and capture prey (Dive-the-world, 2015). They feed on crustaceans and benthic fish such as shrimps, gobies, lionfish and flounders. It can swallow prey of its own length by expanding the stomach to twice its size (Bester, 2015). Smaller frogfish inhabit shallow water and feed on small fish hiding between corals and rubble. After consumption, water is forced from the oral cavity, expelling any remains of prey, and the jaw is realigned (Fig. 3) (Zuberbuhler, 2014).

POPULATION ECOLOGY. *Antennarius striatus* has a solitary lifestyle just as the other members of its family. During the mating period the male and female gather and depart after fertilization. If they prolong their stay or are too close either may kill and eat the partner (Zuberbuhler, 2014). Frogfish live for a couple of years and are abundant in some areas (Dive-the-world, 2015).

REPRODUCTION. During the process of reproduction the female's body expands immensely, filled with up to 180,000 eggs (Dive-the-world, 2015). The body becomes buoyant and the male's snout is in direct contact with the female's vent. For several hours the male bumps the female's stomach and occasionally trembles intensely. The pair rushes to the surface and the female ejects a mass of eggs while the male discharges sperm. Spawning occurs multiple times for a few weeks and the eggs are constrained in a mass of viscous mucus known as an egg raft or veil (Fig. 4) (Pietsch and Grobecker, 1987). The veil functions as a transport over great geographical distances for the larger number of eggs (Bester, 2015). Fertilized eggs are oval shaped, 0.62-0.70mm long, very transparent and glassy. During development the egg raft unfolds and expands to 300-900 mm length, 8.2-16.4 mm thickness and 51-76 mm width (Pietsch and Grobecker, 1987). At 35 hours post fertilization the yolk is enveloped by the embryo with a large

head, eyes and a short free portion of the tail. At 122 hours post fertilization the larva is developed, the yolk is completely absorbed, eyes are distinct, the intestinal tract and pectoral fins are seen (Ortiz-Ramírez et al, 2005). The egg hatches after 2-5 days and at 4 days old the larva is free swimming (Pietsch and Grobecker, 1987), 5-10mm in size, deep-bodied, has a large head, fins and a lure. For a month the larvae live in the plankton and at size 15-28mm they attain the same form as an adult frogfish and initiate life on the sea floor. Parental care ends at mating (Zubi, 2014).

BEHAVIOUR. Young frogfish are pelagic for the first two months after they hatch then they settle on the reef (Pietsch and Grobecker, 1987). They hide between corals and rubble, mostly in shallow water and can mimic the colouration of poisonous flatworms and sea slugs. Camouflage is the best defence used by frogfish (Fig. 5). Only taking a few weeks to adapt to their surroundings frogfish change colouration and pigment pattern to match their living environment (Zuberbuhler, 2014). It is essential for both hiding from predators such as scorpionfish, lizardfish and eels, and for catching prey. Via mimesis they can take the same form of sea urchins such as the venomous *Astropyga radiata* (Randall, 2005). *Antennarius striatus* are defensive of their hunting ground. When an organism approaches it will intensify its body's colour and locate itself between the invader and its territory. To appear more threatening they open their mouth and spread their fins. It bends its body in the direction of the organism and shrugs (Zuberbuhler, 2014).

APPLIED ECOLOGY. The striated frogfish has not been evaluated by the World Conservation Union (IUCN).

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Fig. 2. World distribution map for striated frogfish.

[<http://www.flmnh.ufl.edu/fish/gallery/Descript/StriatedFrogfish/StriatedFrogfish.html>, downloaded 23 March 2015]



Fig. 3. Hairy frogfish yawning.

[<http://www.bluewaterdivetravel.com/lembah-dive-report-2014>, downloaded 21 March 2015]



Fig. 4. Egg raft of *Antennarius striatus*.

[<http://www.frogfish.ch/image/behavior-Verhalten/Robert-Sunderland-FrogFishEggVeil-2.jpg>, downloaded 23 March 2015]



Fig. 5. *Antennarius striatus* camouflaged in its environment.

[<http://marine-snapshots.com/galleries/Philippines/Juicebox/images/Hairy%20Frogfish-%20Antennarius%20striatus.jpg>, downloaded 5 April 2015]