Nannostomus unifasciatus (One-lined Pencil Fish)

Family: Lebiasinidae (Pencil Fish)
Order: Characiformes (Characins and Allied Fish)
Class: Actinopterygii (Ray-finned Fish)

Fig. 1. One-lined pencil fish, *Nannostomus unifasciatus.*

[http://www.fishchannel.com/freshwater-aquariums/species-info/pencilfish.aspx, downloaded 10 March 2016]

TRAITS. *Nannostomus unifasciatus*, also known as the one-lined pencil fish, is a species of freshwater fish with adults growing to an average length of 4cm and maximum of 7cm. The one-lined pencil fish is the largest species of *Nannostomus*, with a long slender body containing 17-33 scales in the lateral series, adipose fin (small posterior dorsal fin, without rays) and small terminal mouth (Nelson, 1994). There is a long black stripe which runs laterally down the central length of its body and onto its indented caudal fin (primary stripe) (Fig. 1). Two silver metallic bands border the single black stripe (secondary and tertiary stripes). The colour of the caudal (tail) fin is variable and is dependent on the geographic population of the fish. The colour is usually isolated to the lower section of the caudal fin, beneath the black stripe but with more colourful species, the pigment extends above the stripe. The pelvic fins, dorsal fin and anal fin are slanted back, with the pelvic and anal fins sometimes tipped with the colour of the fish (Weitzman and Weitzman, 2003). They usually possess an ocellus (eyespot) in the upper caudal fin lobe. Sexes have different shape and colours with respect to their body and fins. The males are narrower-bodied and have elongated anal fins and the tips of the ventral and anal fins are brighter and more outstanding compared females (Weitzman and Weitzman, 2002).

DISTRIBUTION. The one-lined pencil fish is endemic to South America; the Amazon basin, Brazil, Colombia, Orinoco Basin of Venezuela, and Demerara River of Guyana (Fig. 2). The species has been introduced to Trinidad (Nelson, 1994).

HABITAT AND ACTIVITY. The one-lined pencil fish can be found in forest streams, swamp areas, rivers and tributaries. They inhabit areas which have slow moving or stagnant shallow water with dense aquatic vegetation and can be found dispersed throughout floodplains during the wet season. They are also found beneath "floating islands" which are masses of floating aquatic plants and mud. They thrive in water that is slightly acidic with pH ranges from 4.0-6.5 and temperature ranges from 23-28^{0}C. *N. unifasciatus* can be diurnal, nocturnal or crepuscular, active at all times of day. Males establish and defend small territories but rarely cause harm to each other. They are sociable in groups as males are friendly towards females.

FOOD AND FEEDING. *N. unifasciatus* is an omnivore, micro-predator which feeds on periphyton (micro-algae films growing on rocks), insects, worms and small crustaceans. After hatching, the larva first feeds by absorbing its yolk sac, followed by periphyton. They are also prey to higher trophic levels and play an important role in the overall health of an aquatic system.

POPULATION ECOLOGY. *N. unifasciatus* are social fish which usually exist in groups of 10 or more of the same kind. Individuals can also exist by themselves but are known to be more timid, avoiding contact with other species and hiding among aquatic vegetation. Males are known to be more aggressive and territorial than the females as they nip the tails of other fish. Larger groups of *N. unifasciatus* are less timid and the males are less aggressive. They live up to 5 years.

REPRODUCTION. Very little is known about the reproduction of *N. unifasciatus as* there is no recorded account of spawning in captivity. However, it is known that *N. unifasciatus* are dioecious (with separate sexes) and are egg-layers; soft, acidic waters which are fairly warm induce spawning. The males flash their brightly coloured displays as part of courtship then adult females scatter their eggs among plants and the males discharge their sperm into open water as fertilization is external. After spawning, the parent fish are not involved with the eggs anymore. The eggs can number up to a hundred, and hatch within 36 hours (Weitzman and Weitzman, 2002). The larvae remain at the river bed and first feed on the yolk sac and later as they grow, start feeding on periphyton. The larvae first cling to surfaces early on while absorbing the yolk sac, but within five days the fry are able to swim.

BEHAVIOUR. *N. unifasciatus* are timid fish which hide in aquatic vegetation and leaf litter. However, males often chase and nip at females and each other. Sometimes, females would also nip at each other. They assume an oblique swimming position where their snout is held upwards. Natural behaviour also includes browsing for algae and hovering at a fixed position in water (Oliveira et al., 2011). Hovering is a form of anti-predator behaviour as it helps with camouflage. Males have brighter colours compared to females and use it as communication by flashing their displays as part of a courtship ritual. Males also establish territories which they defend during courtship. However, they are usually present in relatively peaceful schools of 10 members or more. The greater the size of the school of fish, the more stable the community as rivalries occur less. The greater numbers allow for survivability against predators.

APPLIED ECOLOGY. *N. unifasciatus* are present in large quantities in South America and therefore are essential to the food-chain due to their abundance. This species of fish is not listed by IUCN, however usage of pesticides such as malathion in farming can degrade the population of fish as they are sensitive (Furch, 1984). They are popular in aquarium trade due to their size, colour display and swimming posture, and were introduced in this way to Trinidad. This species also consume mosquito larvae and hence are important in the control of pest. The fish itself is harmless to humans.

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Fig. 2. Geographic distribution of *N. unifasciatus.*

[http://www.aquamaps.org/AM_Americas/receive.php, downloaded 10 March 2016]