

Boxfish Tankmates

Boxfish are interesting to keep, but choose their tankmates carefully to avoid disaster.

By Scott W. Michael

Q. I have freshwater and saltwater tanks, and believe your coverage of both is very balanced. I am interested in keeping a yellow boxfish (*Ostracion cubicus*) in my reef tank. I have heard several different opinions on whether this is possible or not. One shop owner even told me that you couldn't keep boxfish in a tank with other fish because they release a toxin that will kill everything in the tank. Is this true?

I have many soft corals in my tank, with a couple of open brain corals and an elegance coral. Any information you can give me on how to keep this fish would be much appreciated! Keep up the good work AFI!

A. The box, or trunkfishes, belong to the family Ostraciidae and are some of the most comical looking fish on the reef. They are encased in a bony carapace that has holes where the eyes, mouth, gills, anus, fins and tail fin base are. They are slow swimmers that move primarily by sculling with their dorsal and anal fins. They use their tail fin for sudden bursts of speed.

Not only do these fish rely on armor plating to deter would-be predators, they also have a chemical defense. This consists of a potent toxin, known as ostracitoxin, which they exude in their slime when they are stressed. When secreted into the aquarium water, this toxin can kill other reef fishes at concentrations as low as 10 parts per million, and the secretions of a single adult boxfish can contain as much as 50 to 100 milligrams of crude toxin (Thomson 1964)! Although they are less susceptible to ostracitoxin, boxfishes are often killed by their own secretions in a closed system. A boxfish could kill every fish in a medium-size aquarium within 10 minutes.

However, even though a boxfish can be lethal to its tankmates, these types of episodes are very rare if precautions are taken. I have kept numerous boxfishes, and have also sold many specimens, and only know of two occasions where individuals "nuked" a tank.

The most important thing you can do to reduce the likelihood of this happening is to keep your boxfish with passive tankmates. If other fishes are harassing a boxfish, it is more likely to exude ostracitoxin. Some obvious species you will want to exclude include morays, larger dottybacks, snappers, aggressive angelfishes, larger damselfishes, surgeonfishes, triggerfishes and puffers. A less obvious group of fishes that should be avoided that are known to pester boxfishes is the cleaner wrasses (*Labroides*). These wrasses often chase and pick at the less maneuverable boxfish when the boxfish doesn't want to be cleaned.

Boxfishes are rarely aggressive toward non-related species, so they can be kept with species with similar dispositions, like anthias, grammas, chromis, flasher wrasses, gobies and fire fishes. Very large boxfishes have been reported to eat smaller fishes, but these incidents are rare.

If you want to house more than one boxfish in the same tank, keep a male and a female. It's also possible to house two females together in a larger aquarium, but never keep two males in the same tank. Fortunately, most of the Indo-Pacific members of the genus *Ostracion* are easily distinguished, with males attaining a larger size and usually displaying dramatically different color patterns. In the case of the yellow boxfish, females are yellow with black-bordered white spots, while males are larger and are purplish brown with faint spots (males are rarely seen in the aquarium trade). Both male and female juveniles are yellow with black spots. There is still debate as to whether boxfishes do or do not change sex from female to male.

When working in the aquarium (arranging decor or cleaning the tank), move your hands very slowly and never corner the boxfish. If you have to catch a boxfish, use a specimen container and place it against the front glass of the tank. Then slowly herd the boxfish into the container. Never chase the boxfish around the tank with a net. Maintaining good water quality in the aquarium also reduces boxfish stress.

One of the most dangerous times for the boxfish keeper is when the fish is transported from the dealer's tank to the home aquarium. During this process it is likely to become highly excited and distressed. This is when they are most likely to exude the toxic secretions. To reduce stress during transport place the boxfish in a cooler and keep it in the dark until you get it home. When you move the boxfish from the bag to the aquarium, pour off as much of the water in the bag as

possible and then pour the remaining water and boxfish into the tank.

The most obvious indicator of boxfish poisoning is the behavior of the other fish in the aquarium. Symptoms include nervousness and gasping, followed by inactivity and a decrease in respiration. Finally, the fish will begin moving sporadically, convulse and die. Once the initial symptoms are exhibited it is usually too late to revive the suffering fish, even if you quickly move them to another tank (although it never hurts to try and save them). Another sign of poisoning is the presence of foam on the water surface.

If you really want a boxfish, but are worried that it may kill your other fish, you can always keep it by itself in a specimen tank. The yellow boxfish will need a tank of at least 75 gallons because it can attain a length of about 18 inches, but other species can be kept in tanks as small as 30 gallons. As indicated above, these fish rarely poison their tankmates, but I would not place a boxfish in a tank with extremely valuable fish.

Certain boxfish can present feeding problems. Some individuals will ingest food as it sinks when they are initially introduced to the tank, but most prefer to feed off the substrate. If there are aggressive feeders in the tank with a boxfish, it may never get enough to eat.

The best way to entice a finicky boxfish is to add a piece of live rock that is encrusted with invertebrates and algae. If you don't have access to live rock, you can press frozen prepared food or fresh seafoods, like shrimp, into the small openings on a dead stony coral where the polyps were, and add this to the tank. Make sure you remove any uneaten food after a few hours have passed. Once it begins feeding in captivity you can usually switch a boxfish over to normal aquarium fare, including finely chopped fresh seafoods, krill, brine shrimp, mysid shrimp, live black worms and even flake food. When they fully acclimate they will even take food from your fingers. A tank with a healthy algae crop can help meet a boxfish's nutritional needs as well.

If you feed flake food or any other food that floats, make sure you saturate it with water before adding it to the tank so it sinks immediately. It is possible that a boxfish will ingest air when feeding at the surface and may have difficulty expelling it. This can cause buoyancy problems, with the boxfish having difficulty maintaining its position in the water column. Often it will swim with its tail well above its head, and may end up wedging itself between rocks or under a piece of coral. If this occurs you can only hope that the fish expels the air through its mouth or anus.

I have also seen these fish unintentionally get stuck between aquarium decor and the aquarium glass, between the glass and the uplift tube of the undergravel filter, or between rocks. I have even seen them get stuck on top of an undergravel uplift tube that was just submerged under the water's surface! Take these things into consideration when aquascaping the boxfish aquarium. Boxfishes often contract ich (Cryptocaryon irritans), but can be treated with the common antiparasitics (copper-based medications).

References

Thomson, D. A. 1964. Ostracitoxin: An ichthyotoxic stress secretion of the boxfish, *Ostracion lentiginosus*. *Science* 146(3641):244-245.

The boxfishes feed mainly on sessile invertebrates like tunicates and sponges. However, the yellow boxfish also is reported to ingest polychaete worms, algae, small bivalves, gastropods and even small fish. Although most boxfishes don't typically eat corals in the wild, they may nip at, and even eat them, in the confines of an aquarium. They are more likely to ignore larger soft corals, like *Cladiella*, *Sinularia* and *Sarcophyton*, but may pick at small-polyped (e.g., *Anthelia*, *Xenia*) and large-polyped stony corals (like your open brain and elegance corals). Boxfishes will also nip at small-polyped stony corals, fan worms, tridacnid clams and echinoderm tube feet, and eat sponges and tunicates. I have never had a boxfish "nuke" a reef tank, but the toxin is known to kill some invertebrates.

A final note: Boxfishes apparently vary in the potency of their toxin and their propensity to exude it. The members of the genus *Ostracion* are the most dangerous species to keep with other fish, while the cowfishes of the genus *Acanthostracion* and *Lactoria* and the Atlantic trunkfishes of the genus *Lactophrys* rarely, if ever, cause problems.