

Tooth Blennies

Mythical No More

Jonathan Fung
Courtesy of ProAquatix

We are happy to bring a report of the latest addition to the growing pool of tank-bred marine fish available to the public. ProAquatix continues to demonstrate the skills and dedication needed to move the marine hobby away from a dependence on wild-caught specimens in the Twenty-first Century.

Difficult-to-find Tooth Blennies

Saber tooth blennies, poison tooth blennies, or fanged blennies are interchangeable names that describe the same group of blennies. As the names suggest, all these blennies possess large teeth as a distinguishing feature. Marine aquarists lucky enough to have kept any of the species that belong to this group quickly realize that these blennies make great additions to reef aquaria. Combined with their alluring colors and personalities, the blennies inevitably become one of the aquarist's all-time reef-compatible favorites. At least, that is what happened to me.

There are about nine tooth blennies of the genus *Meiacanthus* that are colorful and attract the attention of the marine aquarium trade. Aquarists, however, have probably only encountered the two most common members of the genus: the bright yellow canary blenny (*Meiacanthus oualanensis*) and the striped tooth blenny (*Meiacanthus grammistes*). Unfortunately, the availability of specimens in this genus is so limited and unreliable that aquarists, and even retailers, often remain unfamiliar with the other species that also make great fishes for the reef aquarium. In fact, it is not uncommon for most importers to only land about 20 individuals per shipment, and usually these are all of the same species, depending on the origin of their supply. This means that any given retailer has little chance to get many specimens for sale and would have much difficulty if they sought a particular species. The obscurity of these fishes transcends down the line from supply to demand, leaving hobbyists fascinated by the photos in their books, but only able to say, "I've heard of these mythical fish."



Anticipated Rise in Popularity

Because the availability of tooth blenny species is so intermittent and few, it is not the case that they are unpopular, since aquarists cannot want what they don't know about. All this should change with the advances made in marine ornamental aquaculture at ProAquatix, whose biologists recognized the potential popularity of these fish and targeted this substantial group. Dottybacks experienced a dramatic increase in their popularity and demand immediately after their captive cultivation. Similarly, the popularity of *Meiacanthus* tooth blennies is expected to rise dramatically and may even exceed that of dottybacks because these fishes

are more compatible with other fishes and reef invertebrates. ProAquatix is currently producing the Bundoon blenny (*Meiacanthus bundoon*), the canary blenny (*Meiacanthus oualanensis*), the disco blenny (*Meiacanthus smithi*), the fork-tail blenny (*Meiacanthus atrodorsalis*), the green canary blenny (*Meiacanthus tongaensis*), and the striped tooth blenny (*Meiacanthus grammistes*). Despite their upcoming increased availability, I personally continue to call them my rare gems of the reef aquarium.

Increasing the availability of tooth blennies through captive breeding is just one of the bonuses of marine ornamental aquaculture. It is worthwhile to note that tank-

Canary blenny *Meiacanthus oualanensis*.

Photo by P. Hunt

bred specimens have also been weaned to conventional feeds and have been specifically selected for conditions of aquarium life by the time they reach your local retailer (Fung, 2003). This is an indirect result of the aquaculture process, where, simply, only those individuals suitable for aquarium life have been bred in captivity, and only those offspring who tolerate aquarium life enter the market. Tank-bred fish are healthier, hardier, and more tolerant of aquarium life than a wild-collected specimen because that is the only way their aquaculture is possible.



Photo by M. Smith

Green (or Tonga) canary blenny *Meiacanthus tongaensis*.

Meiacanthus within Blenniidae

Aside from their increased vigor, tank-bred tooth blennies are every bit like their wild counterparts. Tooth blennies belong to the family Blenniidae, a large group of fishes. Blennies are usually scaleless, have long continuous dorsal fins that are composed mostly of soft rays, and most species sit on the bottom with a non-functional swim bladder (Michael, 1998). Members of the genus *Meiacanthus*, however, have functional swim bladders that they use to regulate buoyancy and hover in mid-water. Within Blenniidae, five genera (*Aspidontus*, *Meiacanthus*, *Petroscirtes*, *Plagiotremus*, and *Xiphasia*) are collectively termed tooth (also saber tooth or fanged) blennies. These genera encompass about 50 species, and almost half of these (22 species) are in the genus *Meiacanthus* (Fenner, Wet Web Media). Most of these species are marine, except *Meiacanthus anema*, which is known to occur in fresh water (Michael, 1998). It should be noted that species of the genera *Aspidontus* and

Plagiotremus are predator-parasites of other fishes, where scale, fin, and flesh tissues are primary constituents of their diet (Fenner, 2001). These fishes would make fascinating specimens to provide that aspect of parasitic behavioral ecology to your aquarium, if you're into that sort of thing. In fact, *Aspidontus taeniatus* has evolved to look like the cleaner wrasse, *Labroides dimidiatus*, so that it gets plentiful opportunities to attack when host fishes mistakenly trust them as they do cleaner commensals.

It is also interesting that some *Plagiotremus* species, and other taxa, have evolved to bear the same color

patterns as some *Meiacanthus* species (Russell *et. al.*, 1976), which presumably have adaptive significance because predators avoid *Meiacanthus* species and their venomous fangs. A venomous bite is an effective predator deterrent, and many *Meiacanthus* species have also evolved conspicuous colors to advertise this adaptation to predators—an example of aposematism. Since predators recognize and learn to avoid these *Meiacanthus* species, it is advantageous for other taxa, such as the species listed in the table below, to mimic the colors of these aposematic *Meiacanthus* to avoid predation. This mimicry is called Batesian mimicry.

SOME VENOMOUS MEIACANTHUS SPECIES AND THEIR RESPECTIVE MIMICS

VENOMOUS MEIACANTHUS SPECIES	MIMIC
<i>Meiacanthus grammistes</i> (striped tooth blenny)	<i>Petroscirtes breviceps</i> (dandy blenny)
<i>Meiacanthus lineatus</i> (lined tooth blenny)	<i>Petroscirtes fallax</i> (Batesian mimic blenny), <i>Scolopsis bilineatus</i> (two line spinecheek juv.)
<i>Meiacanthus nigrolineatus</i> (blackline blenny)	<i>Escenius gravieri</i> (mimic blenny)
<i>Meiacanthus atrodorsalis</i> (forktail blenny)	<i>Plagiotremus landandus</i> (forktail blenny mimic), <i>Plagiotremus townsendi</i> (Townsend's blenny)
<i>Meiacanthus oualanensis</i> (canary blenny)	<i>Plagiotremus laudandus flavus</i> (golden mimic blenny)
<i>Meiacanthus smithi</i> (disco blenny)	<i>Plagiotremus phenax</i> (imposter blenny)

The Venom of *Meiacanthus*

All *Meiacanthus* possess a pair of grooved fangs in their lower jaws (Lieske and Myers, 1994). The grooves deliver venom when these fish bite, which in humans has been at worst described as painful (Fenner, 2001). Despite their potential to inflict some pain, *Meiacanthus* are considered passive fishes of the reef aquarium and use their teeth only in self-defense. The chances of a person actually being bitten by *Meiacanthus* are quite remote because of their small mouths and passive nature. Perhaps deliberately poking a finger in the den of a resident *Meiacanthus* might entice a human attack. Because the chances of getting bitten are remote and inconsequential, *Meiacanthus* are routinely handled just like any other fish by aquarium industry professionals.

In the wild, it has been reported that *Meiacanthus* species will bite the inside of a predator's mouth when ingested, causing it to be promptly spit out (Michael, 1999). To explore this adaptation, Losey (1975) wanted

to demonstrate that venomous fangs affect the survival probability of tooth blennies. In an experiment, *Meiacanthus atrodorsalis* were introduced to a reef where they did not previously occur, some with their fangs removed, while others were left with their fangs intact. Losey found that 71% of the fish with intact fangs survived while 57% of the fish without fangs survived. Losey concluded that intact venomous fangs helped survival and that predator-learned avoidance of *Meiacanthus atrodorsalis* might have improved the survival among those without fangs since their survival was still relatively high. Another possibility is that the surgical fang removal procedure itself or an inferior feeding ability could also have contributed to lower survival rates among the de-fanged fish. Although Losey had an innovative experimental approach to elucidate the adaptive significance of venomous fangs in *Meiacanthus*, such research is ill advised, since non-indigenous aquarium species can have adverse impact when released outside their natural range (Fung, 2002).

Meiacanthus: Description and Husbandry

Although *Meiacanthus* blennies are passive to other tank occupants, they are not shy by any means. Their protection against predation is probably reflected in this nonchalant behavior. These small reef fishes attain total lengths of 2½ to 3½ inches. Using their functional swim bladders, they are most often seen hovering in mid-water. Their streamlined bodies and large tails (relative to their bodies) enable them to give short bursts of speed. For someone who has not seen their movements in person, I can only describe their behavior as hovering and zipping through the water, as though they were buzzing about like hummingbirds. They have often been described in nature as hovering above rock and rubble that offer holes for refuge (Fishelson, 1975). In a tank environment, it is fascinating to watch one approach a hole, look into it, and then back into it tail-first, only to perch at the entrance with its head protruding. Within the home

Disco (or Smith's) blenny *Meiacanthus smithi*.



Photo by M. Smith



Photo by K. Paysan

Meiacanthus oualanensis can be identified by both its rich yellow coloration and pronounced lyretail.

aquarium, the most suitable habitat would be the live rock of a reef aquarium, where the intricate labyrinth of holes and spaces provide various narrow crevices.

Since *Meiacanthus* species are reef aquarium fishes, they should be kept according to normal reef aquarium parameters (temperature 77° to 82°F, 1.020 to 1.026 specific gravity, pH 8.0 to 8.3). *Meiacanthus* are natural

your aquarium light on in the middle of the night, or upon their arrival after shipping. The stress markings in *Meiacanthus* species usually appear as faded colors with mottled patterns. This color change is often associated with a behavior where the fish lay against a surface, presumably blending in for camouflage. The effectiveness of this cryptic evasion has surprised many unsuspecting aquarists.

can be applied to temporary housing in wholesale, retail display, and quarantine purposes. Although it is best to keep singles of any particular species in an aquarium, *Meiacanthus* of different species seem to be highly compatible if they are dissimilar enough in color from each other. Incompatible groupings can have mortal consequences, and deaths seem to occur mysteriously without the typical signs of fighting (e.g. torn fins),

“*Meiacanthus* species naturally occur as solitary fishes and do not form bonded pairs. Thus, multiple individuals of the same species should not be attempted within the home aquarium unless you have a large tank with adequate live rock.”

planktivores and can be fed with conventional frozen invertebrates on the aquarium market such as brine shrimp or mysis shrimp. I have found that *Meiacanthus* species, even wild specimens, have yielded high survival rates in shipping. Furthermore, they are able to tolerate prolonged freshwater baths for treatment of some diseases. Note that most *Meiacanthus* species can exhibit a stress color morphology, and this should not be confused with disease. This altered coloration may be seen when turning

Meiacanthus species naturally occur as solitary fishes and do not form bonded pairs. Thus, multiple individuals of the same species should not be attempted within the home aquarium unless you have a large tank with adequate live rock. From my experience, *Meiacanthus* species will tolerate conspecifics provided that there is crowding, as in an African cichlid aquarium. That is, as long as sufficient individuals are present, any particular individual will rarely receive the focus of aggressive attacks. This phenomenon

suggesting that their venom is effective in conspecific conflicts. I have not observed any sexual dimorphism to date, although *Meiacanthus smithi* is reportedly sexually dimorphic (fishbase.org).

Of the known species of *Meiacanthus*, there are at least nine that are noteworthy for the aquarium trade:

MEIACANTHUS ATRODORSALIS

This *Meiacanthus* is commonly referred to as the fork-tail blenny. It is also occasionally referred to as the

yellowtail poison fang blenny or the cat-eye blenny. This colorful fish has a blue-teal head that blends over the length of the body into a yellow tail. A black line runs longitudinally along its dorsal fin. A black mark also originates from its eyes, exaggerating each eye to look elongated like a cat's eye. This widely distributed species has many geographical variants that may deviate slightly from this form (Lieske and Myers, 1994). As the name fork-tail suggests, this species has a lyretail. Native biomes of fork-tail blennies consist of lagoon and seaward reefs, at one- to 30-meter depths (Lieske and Myers, 1994). This fish is found in the Philippines and Bali eastward to Samoa, northward to Southern Japan's Ryukyu Islands, and southward to the Great Barrier Reef and New Caledonia (Lieske and Myers, 1994).

MEIACANTHUS BUNDOON

Native to Fiji (Lieske and Myers, 1994), Bundoon blennies are solid black fish with green stripes running

longitudinally along both sides of their bodies. The stripe seems somewhat neon, varying from light lime color to darker green, and narrows in width as it approaches the tail. There have also been anecdotal reports of occasional specimens with orange stripes in lieu of green stripes, one of which can be seen in Dr. Burgess's *Atlas of Marine Aquarium Fishes* (3rd ed.). The caudal fin of this fish forms a streaking lyretail. Note that the fish identified as *Meiacanthus bundoon* by *A Pocket Expert Guide: Marine Fishes* (Michael, 1999) is more likely a *Meiacanthus tongaensis* (see description below).

MEIACANTHUS GRAMMISTES

Striped tooth blennies, or striped poison tooth blennies, are widely distributed in the Pacific. Having a larger range for wild collection than the other *Meiacanthus* species has probably led to its ubiquity in the aquarium trade and may explain why *Meiacanthus grammistes* was one of the first poison tooth blennies to be

imported. Its natural range spans from Indo-China eastward to Papua New Guinea, northward to Southern Japan's Ryukyu Islands, southward to Northwest Australia and the Great Barrier Reef (Lieske and Myers, 1994). Sheltered lagoon and seaward reef communities support their natural biomes (Lieske and Myers, 1994). This species bears alternating black and white longitudinal stripes, with the white stripes increasingly blending into yellow pigments toward the head. Striped tooth blennies have a less pronounced lyretail.

MEIACANTHUS LINEATUS

Commonly referred to as lined poison tooth blennies, these fish resemble *Meiacanthus grammistes* except their alternating stripes remain solid yellow throughout the length of their bodies (rather than fading into white). Their tails are also completely yellow. Lined poison tooth blennies are naturally found on the Great Barrier Reef (Lieske and Myers, 1994).

Canary blennies on the reef in their native waters off Fiji.



Photo by P. Colin



Photo by H.R.A.

Striped tooth blenny *Meiacanthus grammistes*.

MEIACANTHUS MOSSAMBICUS

Harptail blennies, sometimes referred to as Mozambique blennies (Michael, 1999), are black with dark green pigments near their heads. These fish also have discrete yellow tail fins resembling a golden harp in shape. Before becoming comfortable in an aquarium, the Harptail blenny's normally green-black body is sometimes blue-gray, while its dorsal and anal fins remain black. This species is naturally found near coral reefs with poor to moderate growth, sometimes near coral rubble, at depths of one to 25 meters, among the Comore Islands and Madagascar off the East African Coast (Lieske and Myers, 1994).

MEIACANTHUS NIGROLINEATUS

Blackline blennies have a blue-teal head that blends into a yellow tail. Black spots are located along the anterior (near the head) dorsal fins, confined only to the soft tissues that inter-digit the fin rays. This species gets its common name from a prominent black line that originates from the eye and runs longitudinally about half or

two-thirds the length of the body, where it turns into a broken line before terminating. Some geographic variants exist that deviate from this basic form. For example, there is one with a black dorsal fin amalgamating with the black stripe on the body, accompanied by two black stripes highlighting the two outer most rays of the lyre-shaped caudal fin (fishbase.org). Blackline blennies are found around corals in shallow water of the Red Sea (Fishelson, 1975) and the Gulf of Aden (Lieske and Myers, 1994).

MEIACANTHUS OUALANENSIS

Canary blennies, sometimes with the species name spelled *ovalauensis* (Michael, 1999), are uniformly rich with solid yellow coloring. Like most species of *Meiacanthus*, this fish also has a trailing lyretail. Canary blennies are native to Fiji and have been more commonly found in the aquarium trade because of their conspicuous color.

MEIACANTHUS SMITHI

Common names of this species include disco blenny (fishbase.org) and Smith's blenny. They have a light blue-

gray body and a black mark that exaggerates the eye to look elongated like a cat's eye. A black line also runs longitudinally through the dorsal fin, with an adjacent bright white line running parallel along the tip of the fin. This *Meiacanthus* has a round tail with black lines formed by pigments confined on caudal fin rays, somewhat resembling a paintbrush. Disco blennies are found on the coral reefs of Maldives, and range from Southeast India to West Indonesia (Lieske and Myers, 1994). The shape and patterns, combined with the daily activities of this blenny, make it reminiscent of something having to do with disco dancing.

MEIACANTHUS TONGAENSIS

Searching through available texts that are common to aquarists, a photograph of this species can be seen in *A Pocket Expert Guide: Marine Fishes* (Michael, 1999), where it appears to be misidentified as *Meiacanthus bundoon*. This species is commonly called a green canary blenny, or the Tonga canary blenny. This predominantly yellow fish has a green head and a black stripe



Photo by M. Smith

Meiacanthus grammistes has white stripes blending into yellow towards the head, as well as a less pronounced lyretail.

running along its dorsal fin, as described by Lieske and Myers (1994). Green canary blennies have a lyretail and are found near Tonga as suggested by their scientific name.

Within the Scope of Marine Ornamental Aquaculture

Aquaculture breakthroughs of obscure groups, such as *Meiacanthus* tooth blennies or *Cryptocentrus* watchman gobies (Fung, 2003), enable hobbyists to easily acquire rare fish. Without these developments in aquaculture, wild collection could neither induce nor sustain the dramatic increase in popularity of these fishes. This phenomenon was clearly demonstrated by the captive cultivation of dotybacks and their subsequent ubiquity in the aquarium trade.

ProAquatix is steadily increasing the number of available tank-bred species. Through scientific endeavors, marine ornamental aquaculture can complement the traditional wild collection trade and relieve fishing pressure, creating a more sustainable wild collection fishery. While the

development of aquaculture for all the ornamental species of importance will stretch beyond our lifetimes, these first steps lead us toward an enduring aquarium trade. Retailers and wholesalers that wish to stock tank-bred *Meiacanthus* species, or many other tank-bred ornamentals, can write ProAquatix at P.O. Box 4119, Vero Beach, FL 32964; call 904-223-8733; or send email to info@proaquatix.com. The ProAquatix website is <http://www.proaquatix.com>.

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