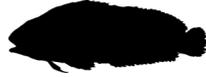


THE STRIPED BLENNY (*CHASMODES BOSQUIANUS*) AND OTHER BLENNIES OF THE GENUS *CHASMODES*



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During one of my college courses, I had an opportunity to observe an aquarium maintained by a researcher who was studying a Chesapeake Bay native combtooth blenny species, the Striped Blenny (*Chasmodes bosquianus*). I don't recall the results of the study, but that wasn't what caught my curiosity about them, it was their behavior. His Striped Blenny research tank sparked my dream of keeping a group of them in an oyster reef biotope aquarium.

What was it about them that caught my attention? Their behavior was quite unique, as these blennies seemed to have human-like intelligence. Striped Blennies are curious fish with active eyes, often observing everything about their surroundings from their favorite perch. It's almost as if they have a neck, and turn their head to look up, down, and about without missing anything going on around them. Striped Blennies are quick to check out any movement, creature, or thing that drifts by their perch. They hop on the bottom and squeeze through tight crevices, nooks, and crannies in search of food. These fascinating critters often have a routine or familiar route where they scoot through crevices in the oyster reef and perch on the same objects throughout that route, as if on patrol of their territory.

Photos by the author unless otherwise indicated.

Kevin Wilson is a NANFA member, an avid angler, aquarist, and amateur paleontologist. He created an oyster reef biotope aquarium and is working on a native stream tank build. His aquariums consist of North American native species that he and his daughter, Riley, collect locally. As an angler, he pursues Stripers, Largemouth Bass, Smallmouth Bass, Muskellunge, Walleye, and anything else that is willing to bite. He is also an avid ice angler who targets panfish through the ice during the winter months. Professionally, Kevin serves the public as a Budget Officer for the National Institute of Nursing Research at the National Institutes of Health. You can share his fishing, fossil collecting and other adventures by visiting his blog at <https://fatboysoutdoors.blogspot.com/>.

STRIPED BLENNY AND OTHER *CHASMODES* BLENNY DESCRIPTIONS

Like most combtooth blennies, Striped Blennies lack a swim bladder, leaving them with a benthic lifestyle. Evolution of these fish provided them with large, thick-rayed pectoral fins that give them the ability to perch upright on oysters, substrate, and various other objects. A pair of small, narrow, thick-rayed pelvic fins are located directly below the pectoral fins, which provide them with additional support. The alert eyes of these remarkable fish are positioned toward the upper front of the head, providing them with excellent binocular vision. The Striped Blenny is laterally compressed somewhat more than other species of blennies, making their body shape ideal for slipping into narrow, empty oyster shell openings to escape predators and which provide suitable protective spawning locations (Figure 1).

According to the ETYFish Project (www.etyfish.org) *Chasmodes* is simply Greek for yawning or gaping, referring to the large mouth opening of *C. bosquianus* (Chris Scharpf, personal communication). Indeed, these fish have



Figure 1. A Striped Blenny and a Skilletfish (*Gobiesox strumosus*) briefly tolerate each other to pose in an oyster shell. Notice the large, thick-rayed pectoral and pelvic fins of the Striped Blenny that allow this benthic species to perch effectively on objects.



Figure 2. Male Striped Blenny sporting adult spawning coloration, as seen in my tank.



Figure 3. Male Striped Blenny adult coloration. (Photo courtesy of Joshua Carter)

large, bass-like mouths that enable their predatory lifestyle. They swim almost eel-like with their long bodies and long continuous dorsal and anal fins. Yet they can be quite quick, with short bursts to attack rivals, chase away enemies, escape predators, or ambush prey.

Chasmodes blennies display sexual dimorphism. As with many other fish species, males are brightly colored to attract potential spawning females. Males can afford to display their coloration because they don't venture far from their oyster shell territories. Both the males and females exhibit a tan stripe from the dorsal fin down the front of their head, almost as if to divide the blenny in half. Some researchers theorize that this stripe may mimic the live tissue of the oyster shell that is visible when an oyster feeds, providing additional camouflage to aid them from being detected by predators. Next to each other, the live oyster and the blenny look strikingly similar, likely not by coincidence. In contrast with the brightly colored males, the highly camouflaged females and juveniles can wander virtually unseen about the oyster reef (personal communication, Joshua Carter, Texas A&M, Galveston).

Adult male Striped Blennies have a bright blue spot on the front of their dorsal fin along with a yellow-to-orange streak running from the front of the dorsal for about half of



Figure 4. The adult coloration of the female Striped Blenny. Also, notice the tan stripe running from the dorsal fin to the snout along the front of the head, which almost divides the blenny in half. This stripe is common to all *Chasmodes* species.

the length of that fin. They sport irregular, horizontal, thin, tan stripes on an olive base coloration, giving the Striped Blennies their common name. Their mouth and operculum are highlighted with a peach-like or light orange coloration. The pectoral fins, back end of their dorsal and anal fins, and tail contain a dark orange or almost reddish coloration. The anal fin is trimmed in black and white, giving it a saw-like pattern. This anal trim pattern, along with the bright blue spot of male Striped Blennies, are traits shared with other combtooth blennies found along the Western Atlantic and Gulf of Mexico (Figures 2–3).

Female and juvenile Striped Blennies have the same horizontal, thin, tan stripes on the olive background as the males, but also have thick, dark, mottled vertical bars that break up their outline and provide them with perfect camouflage on an oyster reef to avoid predation. They lack the blue spot and orange tinting of the males' fins, mouth, and gill cover.

Striped Blennies can alter their coloration, becoming darker or lighter based on their mood, background, or other factors, which enhances their ability to conceal themselves from predators (Figure 4).

For those who collect *Chasmodes* species along the Atlantic and Gulf coasts, I've included some information to help you identify the ones you may catch. These photographs, along with the distribution map, will assist you in identification. Although I've described features that will enable you to identify your catch in the field, please keep in mind that there are other physical characteristics that distinguish the species.

Florida Blennies (*C. saburrae*) have a much smaller mouth, which is the easiest way to identify them. The males, females, and juveniles have similar coloration to Striped Blennies (Figures 5–6).

Stretchjaw Blennies (*C. longimaxilla*), as the name suggests, have a much larger mouth than either the Striped or Florida blennies. Their coloration and general body shape are very similar to *C. bosquianus* (Figures 7–8).



Figure 5. Male Florida Blenny adult coloration. (Photo courtesy of Joshua Carter)

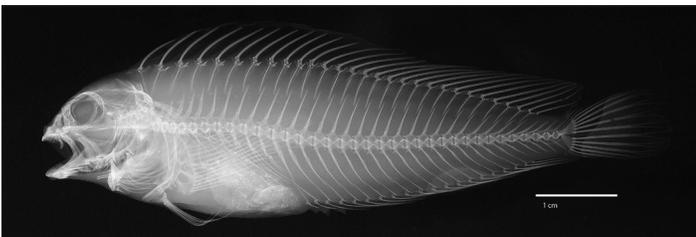


Figure 6. Florida Blenny x-ray, showing the smaller mouth structure. (Photo by Dr. Jeffrey T. Williams, Encyclopedia of Life_a)

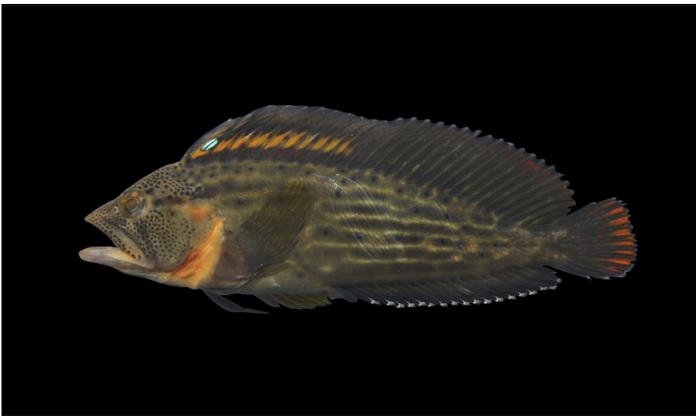


Figure 7. Male Stretchjaw Blenny adult coloration. (Photo courtesy of Joshua Carter)

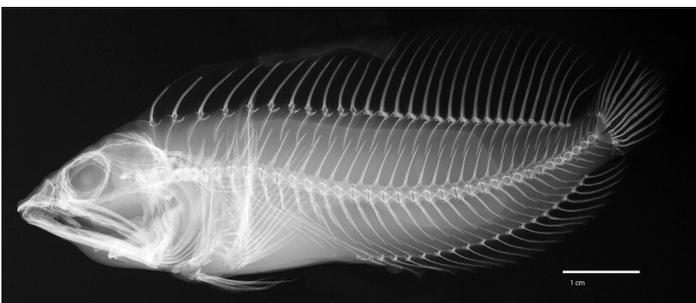


Figure 8. Stretchjaw Blenny showing the largest mouth structure of all blennies in the genus *Chasmodes*. (Photo by Dr. Jeffrey T. Williams, Encyclopedia of Life_b)

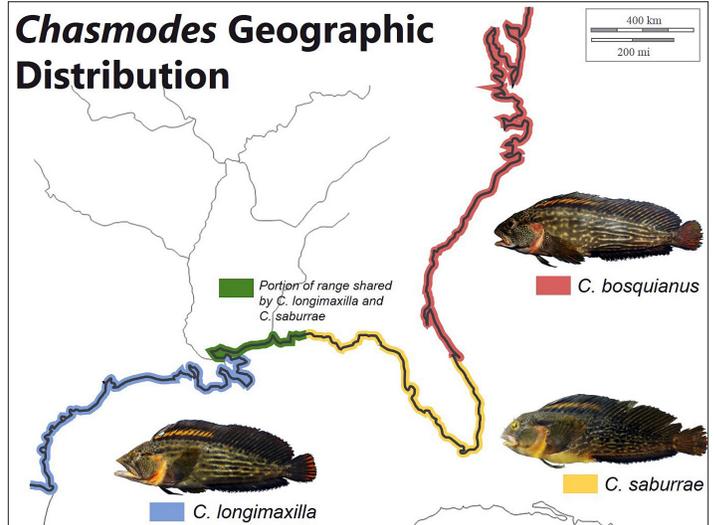


Figure 9. This diagram depicts the range of the three *Chasmodes* species. Note that the green line reflects the overlapping range between *C. saburrae* and *C. longimaxilla*. (Diagram courtesy of Joshua Carter)

DISTRIBUTION OF CHASMODES BLENNIES:

Striped Blenny ranges from the southern New York Coast south along the Western Atlantic to Cape Canaveral, Florida. This species is frequently found on oyster reefs, and in estuarine bays and tributaries but can also be found on coastline hard structures such as jetties, docks, and pilings.

In addition to the Striped Blenny, there are two other species of *Chasmodes*, both having similar behavior, body form, and coloration of the Striped Blenny. The Florida Blenny can be found from Cape Canaveral, Florida, along the Western Atlantic Coast to New Orleans along the Gulf Coast. The Stretchjaw Blenny, similar in form and coloration to the Striped Blenny but with a much larger jaw, hails from the Pensacola, Florida, Gulf shoreline to the mouth of the Rio Grande River in Texas. The ranges of the Florida and Stretchjaw blennies overlap from Pensacola to New Orleans. It is interesting to note that the ranges of the Florida and Striped blennies are not known to overlap, most likely due to a biogeographical break at Cape Canaveral where water temperatures and currents differ significantly. These differences are possibly due to the proximity of the Gulf Stream, perhaps preventing expansion of the range of each species (personal communication, Joshua Carter) (Figure 9).

COLLECTING STRIPED BLENNIES AND MY AQUARIUM CONCEPT

About ten years ago, I started to build my dream tank and had a custom-made, 101-gallon cube-like acrylic aquarium constructed along with a 40-gallon sump. I built my own stands out of two-by-fours for each tank. I created an oyster reef by matching up and gluing together oyster shells that I collected from restaurants, and then glued them together into oyster cultches that were arranged in the tank to mimic an actual



Figure 10. My daughter and I used The Perfect Dipnet to scoop up a bunch of oyster shells and she found a Striped Blenny inside one. (Photo by Kevin Wilson)

oyster reef. This provides the blennies and other collected fishes a suitable habitat with plenty of empty shells, nooks, crannies, and crevices to feel right at home. However, progress has been slow, and I'm still working on this build.

I couldn't wait to keep them, however, so I started up and cycled a 20-gallon-long brackish aquarium, placed a few of the oyster cultches that I built for my main tank and set up a mini version of my oyster reef tank. I ordered The Perfect Dipnet and some extra handle extensions from Jonah's Aquarium and began collecting blennies and other life from several locations along the Chesapeake Bay in Maryland.

Striped Blennies can be collected from oyster reefs, grass, or other types of inland structures, from full sea water to brackish water tributaries with a specific gravity as low as 1.010. The best collecting spots are near oyster reefs, or places where people dump shucked oyster shells. When collecting, make sure to thoroughly check each empty whole shell that you may scoop up in your net (Figure 10), as well as clumps of macro algae and weeds. Not only have I found blennies inside the shells,



Figure 11. This oyster shell provides a Striped Blenny with a perfect vantage point to ambush prey, ward off rival males, hide from predators or attract females to spawn. (Photo by Kevin Wilson)

but I've found adult males guarding eggs. You will also collect other local benthic species that share the same type of habitat.

I currently keep six Striped Blennies: five males and a lone female that gets a ton of attention. All my blennies were collected as juveniles at about an inch to inch-and-a-half long. The males start to show differences when they reach about two inches long. I was amazed to find that all my blennies reached full adult size and coloration within a year. Currently, the males are three-and-a-half to four inches long, while the female is much shorter and stout at about three inches long.

As juveniles, they establish a pecking order and vie for territory, with the largest fish being the most dominant, as one would suspect. However, even the most chased blennies will, at times, turn and defend themselves. They are brave little fish! When collecting and removing them from your net, don't be surprised if they bite you. Although their bite doesn't hurt, it can surprise you with a bit of a pinch!

When Striped Blennies reach adulthood, the males will find a suitable oyster shell to both provide cover from predators and function as a place to spawn. In my tank, each male defends a perimeter of about six inches around his shell. If another male claims a shell within that distance, each seems to know where the boundary is, and most of the time they avoid each other. However, when paths cross, conflicts occur. The males may bite each other, display threatening postures with open mouths, or have shoving matches until one goes back to his shell. They chase off any fish that gets too close to their shell, though they are less tolerant of rival males than they are of other fish species. They will chase off females unless they sense a female is ready to breed (Figures 11–12).

When they are ready to spawn, the adult male will block the female's escape and "flash" a potential spawning female by rapidly shaking his head and body with fins fully erect, while displaying his colors. He will continue to block the female



Figure 12. Two adult male Striped Blennies defend their territory by trying to intimidate each other with open-mouthed, aggressive displays. (Photo by Kevin Wilson)

from escaping by nipping the female gently on the side and will attempt to push her toward their oyster shell. When she's ready, she will enter and then they both will spawn. If she isn't ready, then she will either try and escape, or the male will tire of her and chase her off.

I originally collected two females, but one of them went carpet surfing while in quarantine. The lesson here is that the fish will jump out of a tank, so a tight lid is necessary. I had a small hole near my hang-on-back power filter that was just barely big enough for her to leap out. Having another female would ease some of the pressure that my current female endures from the five anxious males that are always ready to spawn. My original intent was to have a more balanced male-to-female ratio, but it is difficult to sex these fish at one inch. When collecting my fish, I wanted juveniles so that they would grow up in a tank environment. When collecting adults, you should have no trouble distinguishing the males from females.

CAPTIVE CARE

Captive care and aquarium maintenance is relatively easy for keeping Striped Blennies. They are hardy fish that live in extreme environments. Since these are temperate fish, I maintain my Striped Blenny oyster reef aquarium at room temperature. My tanks are in my basement and, at my location in the Mid-Atlantic, room temperature is 62°F during the winter and 70°F in the summer. You do not need to use a chiller or heater if you keep your tank in your house. If you collect your fish in a warmer climate, then room temperature in your house should be adequate. However, if you wish to mimic summer conditions, then use of a heater could be an option for you.

I don't think that you need an elaborate filtration system as you might with a marine fish tank. For mechanical filtration, I use an inexpensive hang-on-back power filter matched to the tank size. I clean the filter and change the cartridge every other month. My tank has a one-inch sand bed that I seeded with substrate from one of my collection spots to speed up the aquarium cycling process and provide biological filtration. Most of my substrate was play sand purchased from a popular local home improvement store. I use a circulation pump and an air stone to provide additional aeration and circulation, keeping uneaten food and detritus from settling. The additional current keeps detritus suspended with a better chance at being collected by the hang-on-back filter.

If you don't have access to collect your own substrate and seed your tank, I do not think it is necessary to achieve good biological filtration. You can perform a fishless cycle or cycle the tank as you would any freshwater tank. The right type of bacteria will find a way to populate your tank, so don't worry about that. If you want to try and mimic what I'm doing and don't have access to collect your own live sand, then I'm sure that live sand purchased from your



Figure 13. This photograph shows my current aquascape. I glued oyster shells together into cultches to form the oyster reef structure. The substrate is play sand purchased from a popular home improvement chain. The sand and oyster shells provide plenty of surface area for biological filtration.

local fish store would achieve a similar result, but it isn't necessary. Also, I used bottled bacteria to seed my quarantine tank, and it worked quite well, as it cycled the tank in a couple days. I kept an eye on my parameters and performed regular water changes early in the life of that tank. I have tried a couple brands and they both worked well. Make sure that you purchase the type that is meant for saltwater or marine aquariums (Figure 13).

I keep the specific gravity only slightly higher than my collecting spots, at 1.016. I think that you can house *Chasmodes* blennies at any salinity between a specific gravity of 1.012 to full sea water. If your display tank is a different specific gravity than your collecting spot, it might be wise to quarantine your fish and start with the same specific gravity as the collecting spot. You can gradually raise or lower it a couple points each day until you reach the specific gravity of your display tank. *Chasmodes* blennies may tolerate slight changes in salinity, but drastic changes in salinity could potentially harm them.

I perform a monthly 25-percent water change to siphon out accumulating detritus and replace trace elements. When performing water changes, I do not stir up the sand bed because it is a living sand bed, which contains worms and other burrowing creatures that feed on detritus and houses beneficial bacteria. Make sure that you use salt that is designed for use in marine aquariums when mixing water for your water changes as well as water conditioner to remove chlorine additives.

You can measure the specific gravity by using a simple hydrometer. I prefer the floating style of hydrometer because it is inexpensive and simple to use. Many reef aquarists prefer to use a refractometer, as they feel that it is more accurate. For *Chasmodes* blennies, I don't think accuracy is quite as important as what might be required for expensive reef fauna because in the wild, the blennies can adapt to and tolerate quick changes in salinity, especially in estuarine environments. First, measure

the specific gravity in your display tank. Then, when mixing salt into your replacement water, try to match the display tank specific gravity by using the hydrometer. Many marine and reef aquarists recommend mixing and storing the water for at least 24 hours prior to performing a water change. These fish are very hardy, so I'm not sure that is necessary. If you plan to change the same amount of water during each water change, then I'd recommend measuring out how much salt you use, knowing that measurement will simplify the process when you perform your next water change. This assumes that you will change the same amount of water each time.

I have a regular water change schedule because I am housing a high bioload of estuarine life. I think that you could perform water changes less often if you have a larger tank with fewer inhabitants per gallon. These blennies, as well as fishes caught in estuarine environments, tolerate a wide range of temperature, salinity, and other parameters in the wild, so they tend to do quite well in aquaria.

Eventually, I'd like to effectively grow macroalgae to improve the overall appearance of my aquarium. Growing and harvesting macroalgae is also an effective way to export nutrients. This would allow me to reduce water change frequency and better deal with the high bioload of my aquarium. The added benefit is that this would ultimately save me money by using less salt. Until then, water changes are my primary method of nutrient export.

As with any aquarium, water will evaporate over time. When that happens, do not add salt water to replace the evaporated water. As water evaporates, your specific gravity increases. Replacing the evaporated water with fresh water ensures that you maintain your desired specific gravity.



Figure 14. *Chasmodes* blennies are carnivorous and, thus, prefer meaty foods. Provide them with fresh or frozen foods from the collecting site, grocery store, or local fish store and your blennies will be colorful and healthy.

The lighting in my tank is an inexpensive LED freshwater light with a selection for a blue moonlight option. If you plan on keeping plants or macroalgae, you might want to consider a more powerful light, but this light shows off fish colors nicely.

Striped Blennies can be trained to eat just about anything within a day or two after capture. They are predators that feed on worms, small fishes, and crustaceans in the wild. They are not like the algae-eating blennies that you see in your local fish stores. Rather, *Chasmodes* blennies require a meaty diet. I feed them various frozen foods that I purchase from local fish stores. These foods include frozen brine shrimp, frozen mysis shrimp, frozen clams, frozen bloodworms, and various frozen mixtures designed for marine fishes. I've also collected and/or purchased live mussels, oysters and clams, and chopped them up for fresh food (Figure 14).

My fish have also been trained to eat flake foods via automatic feeders that are quite handy when you are out of town. Providing them with a variety of live, fresh, or frozen food that they eat in the wild encourages spawning behavior and improved coloration. Feeding them quality food also ensures that they have a strong immune system and remain healthy.

My blennies and Skilletfish (*Gobiesox strumosus*) have been laying eggs and producing fry regularly. Usually, fish tend to spawn in ideal conditions, so I take that as a sign that my fishkeeping methods are adequate for these fishes. I don't have grow-out tanks set up to raise fry yet, but plan to do that in the future. Breeding Striped Blennies is also one of my goals. If the fry survive, then that is a bonus. Until then, the fry are a good source of fresh food for the other fish.

My blennies seem to get along fine with several Skilletfish and Naked Gobies (*Gobiosoma bosc*). In addition to these fishes, I've kept live mussels, grass shrimp, a couple species of mud crabs, sea squirts, anemones, and live barnacles to better mimic the oyster reef biotope.

Most of what you read in literature or on the Web states that you should not keep more than one individual of each species of blenny in an aquarium unless you have a very large tank. Striped Blennies, as with other benthic fishes that share the oyster reef in the wild, often defend territories that are inches from several neighboring blenny territories. The key to reducing aggression is to provide plenty of hiding places and escape routes in your tank. In other words, provide plenty of cover and oyster shells for them to hide in. If you do that, then you can keep multiple Striped Blennies in your tank. Striped Blennies live and compete for empty oyster shells as spawning locations in close quarters in the wild, so they tend to tolerate each other much more than many other blenny species. In my experience, this seems to be the case in captivity as well.

Joshua Carter, a graduate student at Texas A&M Galveston, who studies, keeps, and breeds Western Atlan-



Figure 15. Notice the many nooks, crannies, empty oyster shells and macroalgae in my aquarium that provide cover and escape routes available to my fish. I feel that having many hiding spots and escape routes allows for keeping a higher number of Striped Blennies than what most reef keepers with other blenny species can house.

tic and Gulf of Mexico blennies, states: "I see this type of thing with the Florida Blennies that I've bred. They can be held at very high density and still be agreeable towards their tank mates. I've kept 400 newly settled juveniles together in a bare bottom 20-gallon-long and they do well together, so well that mortality is almost zero, if cared for correctly. We split them as they grow, of course. If you try that with some of the other species that we breed, then, no way: they'll soon become territorial and injury ensues. It's really cool that you can stack these guys so thick (within reason) and, perhaps, this early peaceable nature is the reason why they can share a reef at such relatively high densities in the wild. Plus, it makes for an interesting sight in the aquarium!" (Figure 15).

Striped Blennies get along well with most other fish species if they aren't small enough for blennies to eat, or too big to eat the blennies. brackisj killifish and Sheeps-head Minnows (*Cyprinodon variegatus*) are nice choices

as other fish if you want more than just benthic fish in your aquarium. Other good choices might include the Striped Burrfish (*Chilomycterus schoepfi*), or the Spotfin Butterflyfish (*Chaetodon ocellatus*), which show up as tropical strays in the Chesapeake Bay. Both species exhibit plenty of personality and will use the upper layer of the water column of the aquarium. These fishes also can be purchased by online retailers or local fish stores that sell marine fish. They are very hardy, but burrfish reach a size of ten inches, so a larger aquarium may be necessary to keep them.

One common oyster reef fish to avoid is the Oyster Toadfish (*Opsanus tau*), because it will eat blennies, gobies, and Skilletfish. Also, avoid keeping Blue Crabs in your tank. As common, colorful and popular as they are, they will eat your fish and are not good tank mates. Basically, any peaceful fish that you collect where blennies live will also be compatible in your tank. My advice is to do some research on fishes that you catch from the wild before adding them to your tank to make sure that they are compatible with your blennies but also to make sure that they are not a protected species.

As far as the captive care of Florida and Stretchjaw blennies, their requirements probably are much the same as the Striped Blenny, since these blenny species are so closely related.

If you are looking for a different type of North American hardy, native fish with tons of personality, you can't go wrong with keeping a colony of Striped, Florida or Stretchjaw blennies.

References:

Encyclopedia of Life (EOL)_a.<http://eol.org/pages/207088/overview>, © Smithsonian Institution, National Museum of Natural History, Department of Vertebrate Zoology, Division of Fishes

Encyclopedia of Life (EOL)_b.<http://eol.org/pages/211150/overview>, © Smithsonian Institution, National Museum of Natural History, Department of Vertebrate Zoology, Division of Fishes

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