Setting Up a Mini-Reef Tank

Tips for setting up a successful mini-reef tank.

By J. Charles Delbeek

One of the primary criticisms of mini-reef tanks is that many of the more popular marine fish, such as most butterflyfish and large angelfish, cannot be kept because of their habit of feeding on the invertebrates and macroalgae. While this may be true, there are, in fact, many beautiful species available to the hobbyist that are eminently suitable for a reef setup.

Until recently, many of these fish were seldom seen because the demand for them had not been great and/or they were difficult to keep in conventional saltwater aquariums. With the increased popularity of "natural" systems, however, we are starting to see more of these fish imported by both wholesalers and retailers. Reef tank aquarists now have a greater choice when stocking their tanks. In this article I will introduce you to some of the fish that can be kept successfully with invertebrates.

Firefish
There are three species within the genus Nemateleotris, two of which are commonly seen and a third that is very rare at present. The first is Nemateleotris magnificus, the firefish or fire goby.

It is easily identified by its elongated first dorsal spine. This spine can be as long as two thirds of the body length in some individual specimens. The front half of the body is a creamy white that gradually darkens, becoming dark red at the end of the body. Along the top of the head is a light purple stripe. In some individuals, the head may have a yellow tinge as well.

The maximum size for this species is approximately 2½ inches (6 centimeters). It is commonly found in most pet stores and can range in price from $15 to $30 depending on availability. These fish were thought to be very rare in the early 1970s but have since been found to be abundant in the Indo-Pacific area.

This is a very peaceful and shy fish that does not react well to very active fish. Therefore, they should be kept only with other peaceful inhabitants, such as gobies, mandarins and blennies. If the other fish in the aquarium are too active, the firefish will spend very little time in the open.

In keeping with their shyness, they tend to do better in small groups of three to six individuals. Although they do well in groups, one individual may become overly aggressive toward the others and kill them off one by one (Achterkamp 1986). In some cases, only a pair will remain and they will then settle down to a peaceful existence. If this occurs, do not add any more!

In a peaceful aquarium, N. magnificus will tend to remain in the open a great deal of the time, but each individual will have dug out a hiding place under a rock to which it can retreat when threatened. In some cases, these fish will also bury themselves in the substrate just like wrasses do at night (Achterkamp 1986).

Feeding these fish is no problem as they readily accept most foods, such as frozen and live adult brine shrimp, flake food and just about any other commercial food you can think of. The only requirement is that the food must be moving in the water, either on its own or as a result of water movement created by the filter. It is best to feed them at least twice a day, because they tend to require large quantities of food to be at their best (Mayland 1977).

In summary, this species is highly recommended for the beginner, although the water quality must certainly be very good. They are surprisingly disease resistant, and if they survive the first week in your tank they will usually live a long time. One thing to be aware of is that they tend to be jumpers. Therefore, you should take precautions to block any openings above the aquarium and the filter overflow (Achterkamp 1986). This is best accomplished by using fiberglass screening.

Dwarf Basslets

Pseudochromis aureus
Pseudochromis cyanotaenia

Pseudochromis dutoiti
Pseudochromis diadema
Pseudochromis flammicauda
Pseudochromis flavivertex
Pseudochromis fridmani
Pseudochromis melanotaenia
Pseudochromis novaehollandiae
Pseudochromis paccagnallae
Pseudochromis perspicillatus
Pseudochromis pesi
Pseudochromis porphyreus
Pseudochromis purpurascens
Pseudochromis ruber
Pseudochromis sankey
Pseudochromis springeriA second species, Nemateleotris decora, differs from N. magnificus in a number of ways. First of all, although the first dorsal fin is elongated, it is nowhere near as elongated as in N. magnificus. Secondly, N. decora has a much different color pattern. The base color of the body is dark greenish-blue extending from the head to a dark blue near the tail. There is also a dark purple stripe extending across the face and along the dorsal surface. In addition, the second dorsal fin, anal fin, tail fin and pelvic fins have bright red trim.

Much of the information about the behavior and feeding of N. magnificus holds true for N. decora as well. However, N. decora tends to be much more aggressive than N. magnificus and does not usually do well in small groups (Achterkamp 1986).

Although N. decora is not as shy as N. magnificus, these fish also do not like to be in aquariums with active fish. One thing to be aware of when purchasing this species is that it comes from deeper water than N. magnificus. This means that collectors must take care in decompressing the fish so as not to damage the swim bladder as the fish is brought to the surface.

The normal swimming posture of N. decora is with the head pointed slightly upward toward the surface. If the fish is swimming with jerky movements and its head is pointing toward the substrate, chances are it is suffering from some sort of swim bladder problem (Achterkamp 1986). In fact, this behavior is sign of a swim bladder problem in any fish that has been collected from deep water and brought up too quickly.

The third species, Nemateleotris helfrichi, has been described only relatively recently. It is similar in appearance to N. decora but its color pattern is much different. The base color of the body is a light blue-purple with a yellow head and tail. The dorsal, anal and pelvic fins have yellow and dark blue horizontal stripes with orange spots in the blue stripes. Along the front of the head, extending along the dorsal surface and up the first dorsal spine, is a bright pink line. In the middle of this pink line is a light blue one that also extends up onto the first dorsal spine. The eye is yellow with a pink line through the top of it.

These jewels come from the central Pacific, namely the Tuamobu-Archipelago and the Society and Palau Islands (Dekker 1988). Early accounts appear to indicate that this species is as hardy as the other two and may even be more aggressive than N. decora (Dekker 1988). As with the other two species, it is just as shy and does not tolerate active fish, such as wrasses, in the same aquarium.

Any of these species will do quite well in an invertebrate aquarium, as well as a fish-only tank, and are a good choice for the beginner. Just remember that tankmates should be quiet, peaceful fish. Sexing these fish is possible, with the female tending to be smaller and thinner than the male (G. Schiller, personal communication). Their eggs are similar in size to those of clownfish, so the fry may be large enough to eat rotifers as a first food, which would make raising them rather easy.

Dwarf Basslets
Species from the family Pseudochromidae have only recently been seen in the retail stores of North America, and new species are still being discovered. They have proven to be hardy, colorful, disease-resistant, small fish that are well suited for invertebrate aquariums. They are widespread, occurring throughout the Indo-Pacific area, with numerous species endemic to the Red Sea. None have as yet been discovered in the Caribbean.

The pseudochromids are closely related to the grouper family and do indeed resemble their cousins in miniature. At present, I am aware of 17 species, which are listed in the sidebar entitled "Dwarf Basslets." Of these, I have actually seen

eight species for sale where I live in Canada, four of which could be said to be relatively common (P. cyanotaenia, P. diadema, P. paccagnallae and P. porphyreus). For color photos of the various species, I highly recommend the Debelius book listed in the "References" sidebar.

The majority of pseudochromids are small (less than 4 inches [10 centimeters]), shy fish that must have a large number of suitable hiding places. Therefore, the aquarium should contain substantial amounts of rockwork or live rock in order to make the fish feel secure. Failure to provide enough hiding places for these fish will cause them to become highly stressed and, as a result, they will become very susceptible to disease no matter how good all other aquarium conditions may be (Achterkamp 1986; Campbell 1979).

As with the firefish above, basslets require peaceful tankmates. They do not do well in aquariums containing larger, more active fish, such as surgeonfish or angelfish (Debelius 1986).

Once the fish has familiarized itself with all the available hiding places in the tank, it will be more at ease and will remain visible the majority of time (Achterkamp 1986). It is not a good idea to keep more than one specimen of any species of pseudochromid in the same tank because the level of aggression will be too high and there will be constant fighting, until only one is left (Debelius 1986). The exception, of course, is if you are able to acquire a true pair (male and female).

Pseudochromids should be acclimated slowly to artificial light when first introduced to your aquarium. The aquarium lights should be increased and dimmed slowly, not suddenly, to prevent panicking the fish. Otherwise they may jump out of the tank (Debelius 1986). The tendency to jump is strongest in the first few days after the fish has been introduced to the tank, so make sure you have blocked all the exits and overflows during this period.

In nature, these fish prey upon small planktonic crustaceans. In captivity, they will accept a wide range of live and prepared foods, including live adult brine shrimp, live black worms, frozen shrimp and Mysis. Their mouth is surprisingly large compared to their body and, consequently, they can ingest rather large pieces of food.

Among the pseudochromids most often available is P. cyanotaenia. This species is commonly imported from the Philippines and Indonesia. The coloration is basically light blue with a light brown head and breast. There is also a brown horizontal stripe running along the upper half of the body.

Shyer than most pseudochromids, P. cyanotaenia tends to remain hidden most of the time (Smit 1986). The maximum size for this species is approximately 2½ inches (6 centimeters) (Smit 1986).

Another species, P. diadema, is also commonly imported from the Philippines and Indonesia (Smit 1986). The coloration consists of a predominantly yellow body with a purple area along the top of the head. In some specimens there is a white line separating the two colors.

These fish can become aggressive toward others of the same species, other pseudochromids and other basslets (Debelius 1986). They can also become aggressive toward other smaller fish, such as firefish and mandarins, to such an extent that the other species may not be able to get food and will starve to death (Achterkamp 1986). P. diadema can reach a maximum length of 2½ inches (Smit 1986).

P. paccagnallae is commonly imported from the Philippines, Australia and Indonesia. It closely resembles the royal gramma (Gramma loreto) in coloration. The purple and yellow coloration, however, does not extend onto the fins to the same extent as in G. loreto. There are reportedly two color forms available. One form from Indonesia has a vertical white line separating the purple and yellow areas of the body, while the Australian form lacks this stripe (Axelrod and Emmens 1971). This species can reach a maximum length of 2½ inches (Smit 1986).

A highly recommended fish for the beginner, this species is extremely hardy and disease resistant. However, it can become extremely aggressive toward other members of the same species, as well as pseudochromids and other basslets (Achterkamp 1986; Debelius 1986; John Burleson, personal communication).

It also seems that the closer the other fish is in color to P. paccagnallae, the greater risk of aggression (Achterkamp 1986). For example, one aquarist lost his royal gramma to an overly aggressive P. paccagnallae.

As with P. diadema, P. paccagnallae can become aggressive toward other smaller fish, such as firefish and mandarins, to the point where the victims of this aggression starve to death (Achterkamp 1986). Although these fish are sensitive to the process of being captured and shipped, once they have become acclimatized to your aquarium they can live many years (Mayland 1981).

Also commonly imported from the Philippines is P. porphyreus, which is probably the most frequently encountered pseudochromid in stores. It is basically solid purple in color with dark blue eyes and clear fins. This species has also proven to be aggressive toward others of the same species, other pseudochromids and other basslets (Debelius 1986), and it can keep smaller fish from getting to food (Achterkamp 1986).

Far more rare is P. dutoiti. A very beautiful fish, it has a more elongated body than other pseudochromids. The base color is a yellowish-orange, with a series of neon-blue stripes extending from the head to the tail along the upper edge of the body. Because this species is endemic only to the Red Sea, it will only be found in stores that receive shipments from this area. As a bonus, this species loves to eat bristle worms!

P. flavivertex, which also comes from the Red Sea, has a blue body with a yellow stripe running along the upper edge of the body from the head to the tail. It is peaceful toward other pseudochromids and basslets (Debelius 1986). This species can reach a maximum length of 2½ inches (6 centimeters) (Smit 1986).

It is an extremely shy species that will not tolerate overly active fish in its tank (Smit 1986). You are most likely to catch glimpses of the fish only as it forages for food, but they will become bolder with time (Debelius 1986; Smit 1986). Males are more brilliantly colored than females.

Another Red Sea species is P. fridmani, which closely resembles P. porphyreus in color, being totally purple. In this fish, however, the purple color extends onto the fins. It has also a black line through its eye. A peaceful species, it can reach a maximum length of 2¾ inches (7 centimeters) (Smit 1986). This fish is very common in the Red Sea but unfortunately is not imported very often.

Little is known about another species, P. novaehollandiae. The coloration is basically grayish with a bright orange head region. There is also a blue arch under each eye. The body has a series of light vertical lines and the tail has orange trim. It is a larger species; the specimen I saw was at least 6 inches (15 centimeters) in length. It is currently available only from Australia according to Debelius (1986).

Pseudochromis aureus is a completely yellow species from the Indo-Pacific (Debelius 1986). It is one of the larger pseuodchromids and can be quite aggressive.

P. flammicauda is an Australian species (but may be available from other areas) that has soft colors. The head and tail are bright orange, while the body is a bluish-gray (Debelius 1986). It does quite well in captivity and is hardy.

P. purpurascens is a very colorful Australian species, with bright red body and fins and numerous thin, wavy vertical lines running through its body color (Debelius 1986). Depending on the area where the fish is collected, the intensity of the red can vary greatly.

P. ruber is a wine-red species found in the Indo-Pacific (Debelius 1986). P. sankey, another species endemic to the Red Sea, has a body coloration consisting of broad horizontal black and white stripes (Debelius 1986).

P. springeri, found only in the Red Sea, has a dark black body and electric-blue stripes running from the tip of the head to the back of the head (Debelius 1986). It does very well in an aquarium and loves to eat bristle worms! Do not keep more than one in a tank as they are very aggressive toward each other.

The Caribbean Basslets
As I noted in the section on dwarf basslets above, there are no Pseudochromidae found in the Caribbean. There are, however, some species of the Grammidae family in the Caribbean that are very similar in appearance and coloration to the dwarf basslets.

There are three genera in the family. The Liopropoma contain the Swissguard and candystripe basslets. The Gramma is best known for the familiar royal gramma. The Lipogramma are represented by several small, rare species (Thresher 1980).

There are five species in the genus Liopropoma and they can easily be distinguished by their color patterns. Three of the species have horizontal stripes (Liopropoma rubre, L. carmabi and L. eukrines), whereas two (L. mowbrayi and L. aberrans) do not (Thresher 1980).

Liopropoma rubre (the Swissguard basslet) and L. carmabi (the candystripe basslet) are very similar in appearance. Both

have numerous horizontal stripes with black spots on the anal, dorsal and caudal fins. The stripes on L. rubre are alternately yellow-orange and red, with a brownish-yellow base color, while those of L. carmabi are more colorful, ranging from blue to pink on an orange background (Dekker 1987; Thresher 1980). The black spots on the fins of L. carmabi are ringed in blue, whereas those of L. rubre appear that way only with some individual specimens.

Another way to distinguish between the two is by body shape and size. Liopropoma rubre has a more pointed snout and reaches a maximum length of 3½ inches (9 centimeters), whereas L. carmabi has a blunter head and only reaches a length of 2 inches (5 centimeters) (Dekker 1987).

These two species also differ in habitat and behavior. L. rubre can be found at depths ranging from 15 to 65 feet (5 to 20 meters), while L. carmabi does not begin to appear until at least 65 feet (Thresher 1980). In addition, L. carmabi appears to be a solitary fish, often found hiding under rocks or in sand tunnels, whereas L. rubre can often be seen in groups of six or more, as well as solitarily (Dekker 1987). Both fish can be found throughout the Caribbean.

Liopropoma eukrines (the wrasse basslet) has only a single black lateral strip running along its body, flanked by thin yellow bands on a rose-colored background (Thresher 1980). It also lives at much greater depths than the other species, commonly seen only below 130 feet (40 meters). It also has a more restricted range, being found only along the coasts of America and Mexico (Thresher 1980).

Liopropoma mowbrayi (the ridgeback basslet), is red-purple in color, with a yellow line running through the head and ringed black spots on the unpaired fins. This species is usually found along coral reef drop-offs and can be quite common at 35 feet (10 meters) and deeper (Thresher 1980). The reason it is usually called the ridgeback basslet is because of a thickened ridge that lies between the dorsal fins.

The final species of Liopropoma, L. abberrans, is rarely seen, perhaps because it is typically found at depths of 325 feet (100 meters) or more. It is red in color with bright yellow fins and spots on its body (Thresher 1980).

All of the Liopropoma species noted above can be described as shy, retiring fish. However, if they are kept in aquariums with numerous suitable hiding places and peaceful cohabitants, they will become bolder and show themselves more often. Both Thresher (1980) and Dekker (1987) report that these fish are extremely sensitive to decreases in dissolved oxygen and are usually the first to succumb to low levels.

Once the fish have become relaxed in the aquarium, which may take up to a week, they will spend much more time in the open. To ensure that they are secure enough to remain visible, be sure to provide numerous hiding places and overhangs, under which they can take up residence. Miniature reef systems, with their abundance of live rock, provide an excellent aquatic environment for these peaceful and hardy fish.

In nature, these species feed on small planktonic organisms. In the aquarium, they will feed on Mysis shrimp, brine shrimp, frozen plankton and even dry foods (Dekker 1987).

These fish are not inexpensive because of the time and effort that go into collecting and decompressing them. As with all fish that are collected at depths requiring decompression, you should carefully observe the swimming behavior of any prospective specimen before you buy it. Unlike the Nemateleotris, which swim slightly head-up, specimens of Liopropoma should be swimming level and ought to be able to maintain position in open water with very little effort.

The Gramma genus currently includes three species, the most well known being Gramma loreto, the royal gramma. The two others are Gramma melacara (the blackcap basslet) and Gramma linki (the dusky gramma). As with the Liopropoma, some of these fish are collected at depths where decompression may be required. Be sure to carefully observe the swimming behavior of any specimen of interest before purchasing it.

The royal gramma is without a doubt the best known and one of the most popular species in the hobby, and for good reason. Few fish can match it for color and hardiness. The fish is basically purple and yellow, with the front half of the fish being yellow and the rear half purple. A black stripe extends diagonally through the eye and a black spot is located on the dorsal fin.

In its natural environment, the royal gramma can be found in water ranging in depth from 15 to 100 feet (4 to 30 meters), but is more common in the deeper areas (Thresher 1980). It tends to live in colonies and does not exhibit a great deal of aggression among individuals. In the wild, this species is fond of swimming upside down under coral ledges, and a suitable substitute should be provided in the aquarium. The royal gramma reaches a maximum length of 4 inches (10 centimeters).

The blackcap basslet (G. melacara) is another beautiful fish. Because it is found in deeper habitats (100 to 300 feet [30 to 90 meters]), however, it is not commonly seen in the aquarium. It is basically a purple fish, 4 to 6 inches (10 to 15 centimeters) long, with a black patch extending across the head from the tip of the mouth onto the dorsal fin.

The third species, the dusky gramma (G. linki), is uniformly blue-green with yellow rings around the eyes and yellow lines on the gill covers. It is a deepwater species (300 feet) and is rarely collected (Thresher 1980).

The royal gramma is one of the hardiest fish for the aquarium and will accept a wide range of foods. It can be kept in groups in large aquariums and will constantly remain in the open if it has a number of suitable hiding places available. Thresher (1980) reports that these fish will often become pale in color after being in captivity for a while and do not come close to the color intensity of fish encountered on the reef. Perhaps this is due to diet, decreased dissolved oxygen levels or high light intensity. Because the grammas are predominantly deepwater fish, the increased light levels in shallow aquariums may be a factor.

Blackcap basslets are more secretive fish and must have a suitable number of hiding places available. In addition, they should not be kept with large, active fish.

The royal gramma and blackcap basslet hold the possibility of being bred by the home aquarist. The royal gramma builds a nest in the rocks using pieces of algae. The male then leads the female into the nest and several (20 to 100) small eggs (1 mm) are laid among the strands. This behavior is repeated almost daily over a period of a month or more.

The eggs have small protuberances covering their surface from which small threads extend. These threads attach the eggs to the algae and make them difficult to remove (Moe 1982). The eggs hatch in 5 to 7 days, usually a few hours after dusk (Moe 1982).

Because of the ongoing breeding behavior, fry are continuously produced in small numbers over a long period of time. This makes collection of the fry difficult and time consuming (Moe 1982). Once collected, the fry can be fed rotifers until they are large enough to accept live baby brine shrimp, at which point they grow quite quickly (Moe 1982).

There are six species within the genus Lipogramma, but only two of them are likely to be available to the hobbyist: L. klayi (the bicolor basslet) and L. trilineata (the threeline basslet). The bicolor basslet is a deepwater species (165 feet [50 meters]) that is similar in coloration to the royal gramma but is smaller in size and lacks the black markings on the fins (Thresher 1980).

The threeline basslet is a small fish, 1 to 2½ inches (3 to 6 centimeters), that is widely distributed throughout the Caribbean and occurs in relatively shallow waters (25 feet [8 meters]) but is not common until greater depths (65 to 100 feet [20 to 30 meters]) (Thresher 1980). It is a rather pretty fish, being dusky gray at the front and yellow at the rear, with three parallel electric-blue lines extending from the tip of the snout to the mid-back (Thresher 1980).

Both species do well in the aquarium but are much shyer, at first, than the Gramma. As with many species, however, once acclimated to the tank and their tankmates, they will show themselves more frequently, eventually spending a great deal of time in the open (Thresher 1980).

Lipogramma klayi tend to be aggressive among themselves and should not be kept in large groups in small aquariums (Thresher 1980). Being planktonic feeders, they will eat almost anything and are quite hardy.

Lipogramma trilineata has exhibited nest-building behavior similar to the royal gramma and could therefore also be a target for potential breeding efforts (Thresher 1980). As Thresher (1980) points out, the similarities among the various species of Gramma and Lipogramma may indicate that they all breed in a similar manner.

The species described in this article are certainly not the only ones suitable for invertebrate tanks. Regardless of the ones you choose, do not forget the liability incurred when including fish in an aquarium housing invertebrates. Should any of the fish become sick, the most common medication, copper, cannot be used. It will kill any and all invertebrates in the tank.

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