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Diving for Candy Bass, *Liopropoma carmabi*

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The candy bass is a beautiful and extremely interesting aquarium fish. It is hardy, intelligent for a fish and survives the rigors of capture and shipping very well. Combining this with the ease of maintaining it in captivity, and the fact that it does not eat corals or other polyp animals, makes the candy bass an excellent selection for the reef marine aquarium.

This fish inhabits a wide range of habitats in the Caribbean Sea and is found not only on vertical walls in relatively deep water, but also on deep water coral heads and rubble piles as well. The typical depth range is from 180' to 330' (60 to 100m), though they can be found both deeper and shallower. The author has caught this fish as shallow as 50 feet deep (15m) and as deep as 100m (330'). The author has not seen this fish off of Florida, but has had reliable reports of it being seen here off the southern Florida Keys (Pete Kehoe, pers. com). While this fish is rarely or occasionally seen off of Florida and in the northern Caribbean, it is much more common in the southern Caribbean.

This fish was only recently discovered in the 1960's by Dr. Jack Randall off the island of Curacao, Netherlands Antilles. The species name, "carmabi" was used in honor of the famed Antillean marine biological research facility, Caribbean Marine Biology Station (Car-Ma-Bi). This is also the area where the author has collected most of his specimens.

The candy bass is a relatively secretive species and it usually lives around coral heads and coral ledges. Sometimes they live alone and but often they can be found together living as a mated pair. They prey on small fishes and crustaceans that live in these areas. The candy bass typically stays close to the coral and does not venture very far from up off from the bottom. They usually are very familiar with every hole and crevice in the coral area where they live and can be very difficult to catch because of this. They go in the front door and dart out the back or side door when you are occupied with your net placed at the front door!

They are quite an intelligent species (as far as fish are intelligent) and are more difficult to capture than almost all other reef fish species. The only other small reef fishes here, that are more difficult to catch, are the swissguard bass (*Liopropoma rubre*) and the cave bass (*Liopropoma mowbrayi*) in a very deep crevice. We catch all of them in a small hand net that we make out of very fine plastic netting and an aluminum handle. A small fine meshed barrier net could also be used.

A typical dive for candy bass is prepared one or two days in advance by mixing the gasses needed for both the penetration to the bottom and for the long decompression that follows. Typical 20 to 25 minute bottom times, that is working time, spent at depth on dives to 65 (200') to 100m (330') take two to three hours. Most of this time is spent in shallow water decompressing. This slow ascent to the surface and periodic stops at specific depths allows dissolved gasses to exit the body in a safe and predictable manner.

One of the biggest risks in deep diving is decompression sickness or "the bends" Since we are diving relatively deep, we have to use a lot of care and select our gas mixes according to the dive plan that we establish well in advance of the dive.

The use of modern closed circuit rebreathers has greatly expanded the author's team's capability to

explore and catch fishes in the depths to as deep as 150m (500'). The advantage of the rebreather is that it consumes only the gas needed to fill the buoyancy compensator (BC) and the oxygen that the diver's body metabolizes. The rebreather automatically mixes the oxygen with the helium diluent (inert gas that dilutes the oxygen) to optimum levels. A discussion of the diving methods is well outside the scope of this article. Dr. Richard Pyle has published numerous articles on this subject. Anyone looking for more information is suggested to research Pyle's work.

We will use a minimum of three different gas blends as back up gas supply in this dive, and often we add a forth gas for additional safety. This means that for every gas blend, we will need a separate tank and regulator, plus secondary back up regulators and tank should one of the primary regulators or tank valves fail. The author often dives deep with as many as five regulators and five tanks carried all at the same time on a special rig and harness.

Obviously it takes a lot of training and skills to do this diving. ***It is very risky and should not ever be attempted without the proper training, trained dive team and emergency support.*** All of this support is very expensive, thus explaining the high cost of rare deepwater fishes such as the candy bass. In many cases, the sales of four or five fish support the entire costs of a four or five man team for two days' time. One day spent in preparation, gas mixing etc. and the other spent in executing the dive. There is also a cost associated with risk and it is not easy to calculate how expensive risk is until you have had a loss of a team member. Then there is not enough money in the world to support the loss of a trusted friend.

Each day of deep diving is preceded by a full day of preparation. That includes gas mixing, gas analyzation, rigging the boat with all the gas mixtures stored in separate diving cylinders and planning the operations in advance.

In deep helium-mix diving, we have what is known as a "virtual ceiling", one that we cannot penetrate or surface without serious risk of severe decompression illness that include, death, complete paralysis or partial paralysis. We cannot surface until all the decompression stops are finished. For this reason, we have to approach the diving with much training and much preparation; this is another part of the reason that deepwater fishes are expensive. Further, there is a significant amount of mental preparation, as all of us are completely aware of the substantial risks that we are taking.

For dives in the 160' to 190' (50 to 60 m) range we will use air as the diluent, but for dives in excess of 60 m, which are the usual for candy bass collections, we will use heliox which is a blend of helium and oxygen. The usual candy bass dive is to 70 or 80 m and we use a mix of 15% oxygen, and 85% helium in our diluent bottler for these dives

Beyond 210' (67m), the partial pressure of oxygen in air (under this pressure) makes air dangerous to breath, as it becomes toxic at this partial pressure. Many people (the author included) have dove this deep and deeper breathing air, but it is strongly discouraged. We have had several near-accidents using air at depths in excess of 210' (67m) and we do not do these dives any more.

There is an American saying that goes something like this:" there are bold divers and there are old divers, but there are no old BOLD divers!"

We typically follow a dive profile of 30 minutes on the bottom, or at a specific depth if we are on a wall or a sloping area, and spend about 120 minutes decompressing to allow the excess dissolved nitrogen and or helium escape our body tissue gradually, with out harm to us. This kind of diving is for trained professionals and should ***NEVER*** be attempted by recreational divers.

Our normal procedure is to descend to the collecting area in 190'-250' (60 to 80m). During the descent, we run a line with a large capacity cave diving reel from directly under the boat to the collecting area in the depths that we are working. We then work a small distance away from the reel/line until we have used one half of our bottom time or one third of our gas supply (leaving 2/3 still in our tanks), whichever is

reached first. This rule of thirds (developed by the late Sheck Exley, cave diver extraordinaire) states that a safe diver uses: one third of the gas for the dive, one third for your dive buddy and one third for emergencies. It has saved many lives in both deep diving and cave diving.

At the turning point, we head back in the direction of the reel and line and once the line is reached, we slowly ascend at about 30' (10m) per minute until we reach the first decompression stop at 120' or 110' (depending upon actual bottom time). The safety diver meets us at 150' to be sure that our decompression bottles and regulators are functioning properly. Further, the safety diver carries a spare set of decompression bottle(s) and regulators with him or her at all times.

{Author's note: In the USA we typically use the English system, eg. inches and feet. One inch is equal to 2.54cm and 1 foot is equal to 30.5cm, the 10 foot intervals used in the decompression table are equal to 3.05m.}

At 110' (34m) we switch from breathing the helium diluent to a mix of 36% oxygen and 64% nitrogen in our diluent. This switch of diluent gas totally eliminates helium in the breathing gas and assists greatly to help us expel helium from our bodies. This gas mix is breathed through all the stops until a depth of 25' feet (7m) is reached. The rebreather automatically supplies oxygen to the optimum level.

At the 70 (22m) foot stop, we use a very small hypodermic needle to deflate the gas bladder of the fish and allow it to survive the transition from living at 5 to 7 times (5 to 7 BAR) normal atmospheric pressure to sea level atmospheric pressure (1BAR). Once the fish have had the excess gas removed, we put them into individual small holding containers so they do not fight during the balance of their decompression.

At 25 feet (7m) we flush the rebreather and exhaust all the inert gasses and this leaves only pure oxygen. For the rest of the decompression, we breathe pure oxygen. By keeping our lung tissue exposure to a partial pressure of oxygen at the highest level that the body can stand safely, we greatly accelerate the rate of dissipation of inert gasses out of our body tissue. The use of these many gas blends reduces our decompression times by as much as 300%. The real safety issue in technical diving is managing our body's exposure to the toxic effects of oxygen. The balance of that discussion is well beyond the scope of this article.

After we have finished our decompression at 25', we slowly ascend to the surface, while leaving the candy bass at the last stop depth. We let the fish there for about 1/2 hour more and raise them to about 15' for another 1/2 hour. After this time (total approximate time, 3 hours), we bring the fish to the surface.

If any of the candy bass have excess gas in their bladders at this time, it is again carefully removed by insertion of the needle into the gas bladder. The small wound that is caused by this action heals quite quickly and most of the fish (98%) experience no problems with this procedure. During the first week of captive husbandry, we administer antibiotics (furacin is the most commonly used antibiotic) to reduce the chances of infection of this small wound and any other small capture nicks and scrapes. After a week or two, the candy bass are ready to be shipped to their new homes all over the world.

Most of the collections of other species of deepwater fishes are done in a manner similar to this. The real difference is usually in different gas mixes for shallower or deeper penetration and in examining the other types of habitats that are searched for the different fish species.

In conclusion, this fish is a super addition to the aquarium. It will live for many years in captivity and is one of the most prized and beautiful fishes that is available to the marine tropical fish hobby. If you would like one and can't find it in the stores that you visit, please contact our sales department (Ginny@dynastymarine.net) or via our website Dynasty-marine.com for a recommendation to the store nearest to you that we can supply them with a candy bass for you. We do not sell fish to hobbyists at any time.