

THE YELLOWHEAD JAWFISH

Breeding the Marine Mouthbrooder in Captivity

By Forrest A. Young

■ The yellowhead jawfish (*Opistognathus aurifrons*) is the most colorful and least secretive member of the otherwise shy and drab Caribbean jawfish family. These two characteristics, and the jawfish's unusual habit of tunnel building and tail standing above the burrow, makes it an extremely interesting and worthwhile aquarium specimen; it is, therefore, also an excellent candidate for tank rearing.

Jawfishes, as the name implies, have large mouths that are used to move gravel and small rocks during tunnel building. These burrows can be as shallow as four or six inches for smaller individuals to perhaps a foot or more for large adults and usually terminate underneath a rock or a chunk of coral. Yellowhead jawfish aggregate in small colonies (usually less than a dozen fish) in the sands and gravels that border living coral reefs, while other species of jawfish which live in the same area, tend to be more solitary. These colonies are generally found three to five miles offshore of the Florida Keys and in twenty to fifty feet of water. Elsewhere in the Caribbean the distribution can be quite different as I have observed colonies barely thirty yards offshore in eight feet of water off Belize, C. A. and other authors, such as Bohlke and Chaplin (1968), report their occurrence in both shallow and deep water (to 115 feet) in the Virgin Islands, the Bahamas and Cuba.

From a fish culturist's point of view, one of the most interesting aspects of the jawfish's nature is their mouthbrooding reproductive behavior. At least three out of the five tropical Western Atlantic species are known to exhibit this habit (Bohlke and Chaplin, 1968) and the yellowhead is perhaps the most prominent to aquarists. In both *O. aurifrons* and *O. whitehursti* (dusky jawfish) it is the male's job to orally incubate the eggs (Bohlke and Chaplin,

1968) and this he does with great diligence. The only time they have been observed not brooding the eggs is during feeding. In the aquarium, brooding males attempt feeding unsuccessfully. They then enter the burrow where they deposit the eggs and return to feed unencumbered.

The observed behavior of the incubating male in the aquarium includes two regularly repeated patterns. The first of these involves quietly holding the egg mass and hovering just inside, or slightly above, the burrow. Most of the brooding male's time is spent in this position. The other pattern is a process of frequent biting motions on the egg mass with rapid outward thrusting and recovery. This appears to have an aeration and cleansing function and may also remove dead or diseased eggs. The egg mass is spherically shaped to the contours of the mouth and contains approximately 150 to 300 yellowish eggs that are a little over a millimeter in diameter. Each individual egg is attached to the mass by a strong, fibrous material that in turn is connected to the main stem in much the same manner as a bunch of grapes. This main stem is woven through the mass and maintains the spherical shape while allowing enough flexibility to permit entry of oxygen bearing water and the removal of waste materials.

At the Aqualife Research Hatchery in the Florida Keys, we were successful in inducing more than a dozen spawns, and in each, the males appeared to follow the prescribed pattern of incubation. However none of the spawns were incubated beyond five days and none produced viable larvae.

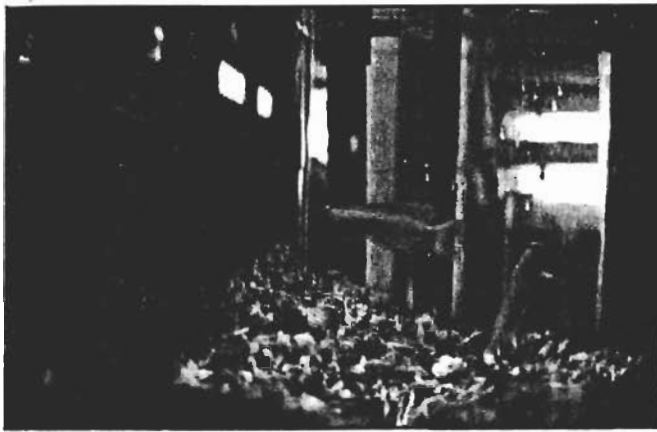
The problems of jawfish propagation seem to be the result of partial inhibition of a full spawning sequence. In nature, the pair has a great deal of open water above the den to move around in. They are often observed

several feet above the bottom procuring food and posturing to one another. This environment is difficult to provide in relatively small aquaria. The courtship ritual, itself, may also require more space. The photographs shows the hyper-extension of the fins and the gaping jaw. This is probably part of the complex courtship ritual, but other phases may not be occurring due to crowded aquarium conditions. Deletion of any of the steps in a spawning sequence can result in a failure to produce viable eggs. Our particular problem appears to be infertile eggs which are eaten, or discarded, a few days into incubation (Martin Moe, personal communication).

There are also other technical problems such as the recovery of either eggs (from an unwilling brooder) or the recovery of the larvae once the eggs hatch naturally. The nutritional requirements of the larvae can also be a major source of difficulty.

Upon completion of the initially unsuccessful jawfish work, we redesigned our jawfish facility and again began to explore some of the mysteries of this interesting fish. We experimented with large and small tanks and it seems that tank size is not a critical factor. It is important to use the proper type and size of undergravel filter medium. Our work indicates that an aggregate material of crushed shell and coral from pea size to lima bean size is optimal. Anything larger or smaller makes the burrowing actions of the fish difficult or impossible.

We begin to see signs of progress after about two months and were rewarded with our first successful hatch on Christmas night of 1979. The larvae were very active swimmers and devoured the live planktonic foods that were presented to them. We raised the first batch of about a hundred larvae with one of our tanks of neon goby



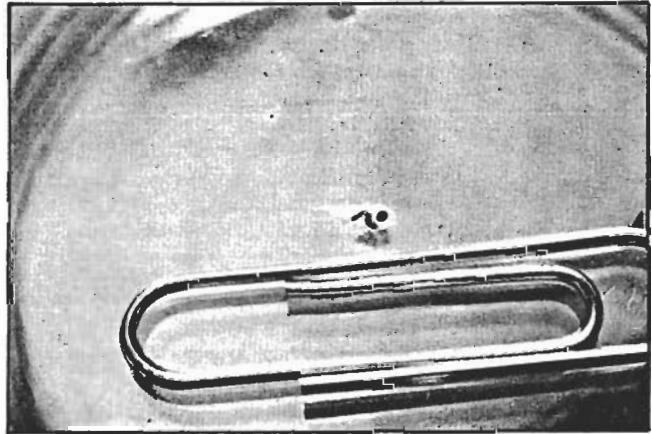
Male, at left, in courtship display.



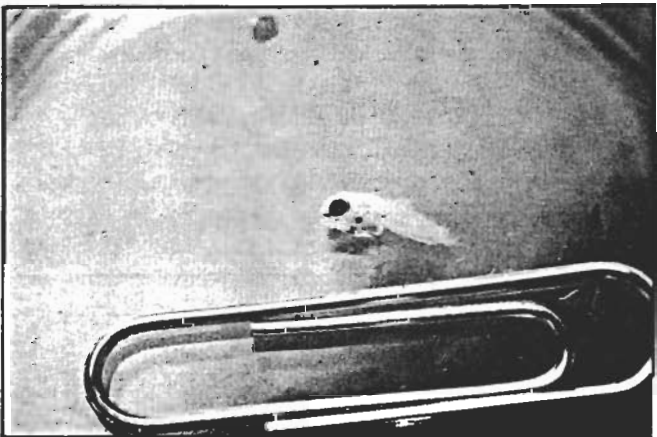
Male, at left, beginning to court.



This photo shows the brooding male, left.



Yellowhead jawfish larvae, one week old.



Yellowhead jawfish larvae, three weeks old.



Yellowhead jawfish at two months.

larvae. At first it was quite difficult to distinguish the jawfish from the hundreds of developing gobies, but later the jawfish developed a prominent dark pigment spot that is illustrated in the accompanying photograph. Also, the eyes and head of the jawfish larvae were proportionally larger than the gobies.

Metamorphosis occurred at about three weeks and at this time the post larvae were first seen starting to hover in the typical jawfish position. The

color intensified after about two days and then they assumed a benthic mode of existence that they will follow for the rest of their life.

The juveniles were placed in a small tank with an undergravel filter. I have found that the CaribSea brand is excellent for jawfish at this stage of development. This was aptly demonstrated by the immediate burrowing of all of the young jawfish. Within a day all had excavated its own burrow and had set up housekeeping.

The juveniles in the photographs are two months old and are growing rapidly. They are eating a wide variety of natural and "artificial" foods and could be easily maintained by the hobbyist at this point.

At this time we have not yet produced commercial quantities of this species, but we may send out some in the near future.

Literature Cited

Bohlke, James E. and Charles C.G. Chaplin. 1968. Fishes of the Bahamas. Livingston Publishing Co., Wynnewood, PA; pages 483 to 489.