THE MOTTLED SCULPIN (Cottus bairdi)

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The bright colors and easy maintenance of tropical fishes have distracted many aquarists from our own native species. Several of these natives have behavior patterns that may be unfamiliar to the tropical-fish fancier. The Mottled Sculpin (Cottus bairdi) is one temperate fish that holds particular interest for me, and has been the subject of much of my research during the last decade. The freshwater sculpins (Family Cottidae) are native to the eastern U.S.

All freshwater sculpins have a similar size and shape. They are typically less than six inches in total length, and have large, flattened heads and very large mouths with fleshy lips. The pectoral fins are greatly expanded, and, in general, the sculpins resemble the marine sculpins, scorpionfishes, and sea robins, to whom they are related. All of the freshwater sculpins are cryptically colored, and, as its name implies, the Mottled Sculpin has blotches of tan, brown, yellow, and black covering its body.

Mottled Sculpins have a wide but discontinuous distribution. They range from northern Georgia and Alabama to Canada in eastern North America, and throughout the northern Rockies to the west. They are not found in the central parts of North America. Sculpins are most abundant in clear, rapidly flowing freshwater streams, and are usually found in association with trout, dace, and other fish requiring clean water and low temperatures.

Sculpins are bottom-dwellers, and seldom swim more than a few centimeters above the substrate. They are most commonly found resting beneath flat rocks. They are carnivorous, and prey primarily on insect larvae, crustaceans, and fishes. Field studies show that small sculpins prefer mayfly nymphs and small worms. Larger individuals tend to eat caddisflies, crayfish, larger worms, etc. Smaller sculpins are quite commonly eaten by larger individuals in this highly cannibalistic species. Eggs are also cannibalized during the breeding season. Although trout fisherman sometimes accuse sculpins of preying on trout eggs and fry, repeated investigations have disproven this, and demonstrated that the reverse is actually true: sculpins may be a preferred prey of trout.

Mottled Sculpins breed in early spring. In Virginia, breeding can be expected in early March; more northerly populations may not breed until the end of June, depending on water temperatures. The breeding season begins when adult males occupy cavities beneath rocks on the streambed. Males darken considerably so that their heads become jet black and their dorsal fins become outlined in reddish-orange. Males are pugnacious during the breeding season, and defend

their burrows from any intruders. During this period, females swell with eggs. Fully gravid females look as though they will burst, and the outline of the individual eggs may be seen through the tightly stretched abdominal wall. Males seldom leave their burrows, but will swim out several inches to meet a female. The male sometimes "barks" at the female, and commonly shakes his head violently and elevates his gill covers. Occasionally, males will bite a female's fins, or even take a female's head entirely into their mouths. This does not appear to injure the female, though.

After the initial encounter, both male and female move into the male's burrow. Courtship continues, and usually includes head-shaking and gill-cover elevation accompanied by fanning of the pectoral fins. Courtship may be very brief, or may continue for several hours. It typically occurs after dark, though daytime spawning is not uncommon. Courtship ends when both fish turn upside-down and press their abdomens against the ceiling of the male's burrow. Eggs are laid in one or more bursts, and all of the eggs of a single female are deposited in one hemispherical mass. Eggs are large (2-3 mm diameter) and a single mass may cover one to two square inches of ceiling. Eggs are initially gelatinous, but the egg masses harden and become quite tough in less than an hour. After spawning, the female either leaves the nest or flees; large males are quite capable of eating smaller females.

Male sculpins remain at their nest after breeding. They fan their eggs, aerating them and keeping them free of silt. They defend their eggs against invertebrate predators and against their cannibalistic neighbors, and occasionally eat some of their own eggs. While the significance of this parental cannibalism is debatable, it does occur both in the wild and in captivity. Females breed only once per year but males are polygamous, and may mate with more than a dozen females during a single season. Oviposition is quite synchronous in the wild and virtually all of the females in a single population typically spawn during a two- or three-week period. Larger males are the preferred mates; small males typically have fewer egg masses in their nests.

After about three weeks of development, the eggs hatch and the fry drop to the bottom of the nest. At this time, the fry have clearly visible yolk sacs, and are about 5 mm long. Males continue to fan and defend their offspring until the yolk sacs are absorbed and the fry disperse from the nest, usually about two weeks after hatching. Breeding males commonly spend as long as two months at their nests, leaving only for brief feeding trips.

Sculpins can be maintained in coldwater aqquaria. They are not normally found in streams with temperatures above about 62°F (17°C), and can survive water as cold as 32°F, providing it's still liquid.

They should be kept over a cobbled, rocky substrate with plenty of hiding crevices, especially if small and large individuals are housed together. Tank water should be kept in motion if possible, and should always be very clean. Live food is mandatory; a diet of small earthworms, stream insects, small minnows, etc. is ideal. Spawning is dependent on a combination of photoperiod and temperature, and is most practically stimulated by following natural light and temperature cycles. Chilling units are highly recommended for those interested in long-term maintenance, but short-term observations of spawning can be very rewarding. Wild-caught fish that are already in reproductive condition will breed readily in unheated tanks. Flower pots or flat rocks make suitable nests, and the entire courtship and spawning sequence can be easily observed if a flat rock is simply propped against the side of the tank.

Eggs are susceptible to fungal infection, and should generally be medicated. Fungus is greatly reduced if temperatures are kept low (about 50°F, 10°C) and water is highly oxygenated. Egg mortality will be minimized if all sculpins except the guardian male are removed from the tank. Fry require live food in increasing sizes as they grow. They should be started on brine shrimp larvae or some other active prey of that size.

Sculpins offer challenge to the aquarist and reward to those who maintain them. Their polygamous breeding habits and paternal care are their most interesting behavioral traits, though they make a fine addition to the coldwater aquarium community even if they are not bred. Anyone interested in keeping temperate species should definitely consider this fish.

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