

BEHAVIOR OF FUNDULUS CHRYSOTUS AND FUNDULUS OLIVACEUS IN A CAPTIVE ENVIRONMENT

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In this study, two of the more common *Fundulus* species found in southern Alabama were observed for various behavioral traits: the Golden Ear Killifish (*Fundulus chrysotus*) and the Blackspotted Topminnow (*Fundulus olivaceus*).

Specimens of each species were collected from different habitats and placed together in 30-gallon aquariums. Each aquarium contained about 10 of each species. The observation tanks were reconstructed to simulate typical habitats.

Fundulus chrysotus

When observed in the wild, *F. chrysotus* was usually more social than *F. olivaceus*. At each of the *F. chrysotus* collecting sites, four or five could be seen in various parts of the shallow stream. The groups usually consisted of one dominant male, one or two large females, and three or four juveniles of undetermined sex.

In the aquarium, *F. chrysotus* behaved differently. Males would become territorial, with occasional fin displays, intensification of color, and mock fights, though no really ferocious behavior was evident. The males would also swim in tight circles around each other, but without actual nudging or biting.

Spawning behavior was somewhat surprising. Although most aquarists or researchers would provide yarn mops for spawning, these fish had a natural-looking habitat; they all but ignored the plants (*Ruppia* spp.--hairgrass--and *Egeria* spp.). The fish mainly deposited the eggs into the gravel or sandy substrate.

The males were always eager to spawn in the early parts of the day, usually within the first two hours after the lights went on. In the particular spawning group observed, there were 10 fish--three males, five definite females, and two unsexed juveniles.

The males would usually pick the same spawning sites daily. Each male would advertise his site and intentions by assuming a head-down stance and "scratching" against the substrate. The receptive females approached the site and settled to the substrate. The male would then rise above the female and circle. The male would then assume an alongside position and repeat the process. This would go on for various lengths of time. Usually, once disturbed by another tank inhabitant, the male would cease for the day. Occasionally, however, the process would begin anew during other parts of the day. This activity was never observed during the dark hours.

In defending their territories diligently, the males--more than likely unintentionally--also defended the deposited eggs.

Fry were raised in the tanks with the parents. The juveniles occasionally preyed on them. As the fry increased in size, it was noticed that the juveniles stayed together in small schools.

Fundulus olivaceus

The second species in this study was anything but social. *F. olivaceus* is found in low frequency in the wild. It usually inhabits rivers and streams. On occasion, large males have been observed keeping an open territory of three square meters. Males seldom tolerate females in the wild, except during morning or evening spawning activities. In the aquarium, however, this fish loses its wild traits, and becomes less aggressive. When spawning approaches, though, the males start to reveal their wild, aggressive traits. Unlike the mock battles of *F. chrysotus*, conflicts involving *F. olivaceus* can be quite nasty. The males will approach each other head-on, and exhibit flaring opercula and gular areas--very similar to cichlid or betta behavior. They will then begin to slap and bite each other's flanks until one backs down. This activity continued for up to three hours on one occasion.

The *F. olivaceus* spawning group consisted of three males and seven females. During the non-spawning times, the males fed and swam together without incident. The females seemed to key this activity to spawning time, and would await the attention of a male to launch the spawning activity.

Again, this species surprisingly chose to spawn over gravel rather than plants. The male would follow the female and gently close in and force the female toward the gravel. They would assume an S-shaped curve and leave the substrate at the same time.

This activity never lasted very long, usually only about 15 minutes.

When fry were observed, they were removed from the aquarium. The adults would prey upon them whenever they could find them.

Although this study was not very scientific, it did introduce some new information as to the behavior and natural history of these two *Fundulus* species.

The fry predation by *F. olivaceus* could probably be attributed to the fact that the adults were not accustomed to the presence of smaller fry. In the wild, the eggs and fry would be deposited far downstream from the original spawning site by the fast to moderate-flowing rivers and streams that *F. olivaceus* inhabits. This is not the case for *F. chrysotus*; fry and the juveniles have been observed in somewhat close proximity to the

adults. This can probably be attributed to the slow or standing waters which *F. chrysotus* like to inhabit.

The difference in habitats could also explain the differences in territoriality. Since *F. chrysotus* is found in small to moderate ponds, bogs, and creeks, it is accustomed to encountering its species very often. Since *F. olivaceus* inhabits rivers and creeks, there is a wider distribution of the species, and encounters usually bring about conflict.

The most interesting observation made was that both species chose to spawn over gravel rather than over plants. In the past teaching of hobbyists, it is a rather common idea to use floating mops for spawning these fish. Perhaps this could be the reason for low egg yields. Since both species willingly spawned in captivity, it would probably be wise to use a bowl containing gravel as the spawning medium.

Both the studied species proved suitable for the captive environment, though *F. olivaceus* should have a little more space. This is probably true for two other related species, *Fundulus notatus* and *Fundulus euryzonus*.