

Aquarium fishes are more aggressive in reduced environments, a new study finds

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An angry glare from the family goldfish might not be the result of a missed meal, but a too-humble abode. Fish in a cramped, barren space turn mean, a study from Case Western Reserve University has found. Ornamental fishes across the U.S. might be at risk, all 182.9 million of them.

"The welfare of aquarium fishes may not seem important, but with that many of them in captivity, they become a big deal," said Ronald Oldfield, an instructor of biology at Case Western Reserve. Why, then, has the welfare of pet fishes been overlooked among the scientific community?

Oldfield is the first to scientifically study how the environment of home aquariums affects the aggressive behavior of ornamental fishes. The results are published in the online *Journal of Applied Animal Welfare Science*, volume 14, issue 4.

Oldfield compared the behavior of Midas [cichlids](#) (*Amphilophus citrinellus*) in a variety of environments: within their native range in a crater lake in Nicaragua, in a large artificial stream in a zoo, and in small tanks of the sizes typically used to by pet owners.

The study focused on [juvenile fish](#) to remove aggressive behavior related to mating. Also, resources such as food and shelter were removed prior to observation to eliminate direct competition.

Along with environment size, Oldfield tested the complexity of an environment and the effects of number of fish within tanks.

The addition of obstacles and hiding places using rocks, plants, or other similar objects can increase the complexity of the aquarium environment.

He found that an increase in tank size and complexity can reduce harmful aggressive behaviors, and make for healthier fish at home.

Oldfield quantified aggressive behavior as a series of displays and attacks separated by at least a second. Displays are body signals such as flaring fins. An attack could be a nip, chase, or charge at another fish.

In aquariums, these behaviors can lead to injury and in extreme cases to death.

Aggressive behavior was not correlated with small-scale changes in either group size or habitat size alone. However, a significant difference was observed in environments sufficiently large and complex: fish spent less time exhibiting [aggressive behavior](#).

"This more natural environment elicits more natural behaviors, which are more interesting to observers", Oldfield said.

And, for the fish themselves, their lives can be vastly improved with these simple changes to their environments.

"If we are going to try to create a society as just as possible, we need to do everything we can to minimize negative effects," Oldfield said.

But why should anyone beyond fish enthusiasts care about fish behavior?

Minimizing negative effects extends beyond the treatment of ornamental fishes. Interactions between humans and other species could apply.

Humans have intimate relationships with a variety of fishes. They provide food and sport for many people. Some are used for decoration, and others are well-loved pets or may become addicting hobbies.

Additionally, conditions for animals in the rapidly growing field of aquaculture and on factory farms are issues of contention.

Oldfield is not trying to support any extreme agendas. "I'm not trying to ban human use of animals— I just think that if we are going to interact with them then we should be as informed as possible."

Relatively simple fish behavior can also serve as a basic model for more complex behaviors.

In the future, Oldfield said, "This study might help us to better understand how human behavior changes when people are placed in different social environments." Violence in prisons might be linked in part to the smaller space and reduced stimuli.

Until then, the 182.9 million ornamental fishes in the United States may benefit from this study. The family goldfish can swim in peace, enjoying the remodeled space.

Provided by Case Western Reserve University

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