CFAES

SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

MONDAY, APRIL 1, 2019 | 11:00 A.M. | HEFFNER 128

GRADUATE EXIT SEMINAR

Tiffany Atkinson

Living in a Haze: Direct and Indirect Impacts of Turbidity and Diet on an African Cichlid Fish

Advisor: Dr. Suzanne Gray

Acute and chronic turbidity exposure can have sublethal or lethal impacts on fishes, through both indirect and direct effects, and has been found to influence reproductive and survival traits of some fish species. I used a combination of field and laboratory studies to examine the effects of elevated turbidity on a sexually dimorphic African cichlid fish (*Pseudocrenilabrus multicolor victoriae*), found across divergent environmental gradients (e.g. dissolved oxygen, turbidity). I investigated if within-population variation in diet and male nuptial coloration were associated with turbidity on a microgeographic spatial scale. Because many cichlid fish depend on dietary carotenoids (red and yellow pigments) for their reproductive displays and other physiological mechanisms, we were interested if fish were consuming different diets across divergent environments. I found that fish from mostly clear waters ate a higher proportion of plant material (high carotenoid concentrations) and males were more colorful than fish found at turbid locations, indicating that *P. multicolor* can show variation in diet and reproductive coloration within a single population. In the laboratory study, I used a rearing experiment to investigate the effects of turbidity level (high/low) and dietary carotenoid concentration (trace/low) on reproductive traits of *P. multicolor*. We also investigated acute and chronic turbidity exposure on swimming performance. I found that turbidity and carotenoid diets had differential effects on male and female reproductive traits: with male coloration and gonadosomatic index being positively influenced by chronic turbidity and trace-carotenoid diets and female size being negatively influenced by only chronic turbidity. I also found that chronic turbidity did not influence swimming performance, while acute turbidity improved swimming performance. This study emphasizes that the impacts of turbidity varies due to several circumstances including: concentration, duration of exposure, species, and sex. By further investigating the effects of turbidity as a stressor on reproductive and survival traits of fish found across both extremes, we can further our understanding of the mechanisms contributing to persistence of fish facing human-induced environmental changes.

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