

Bifenthrin as an endocrine disruptor: using *in vivo* techniques to link exposure to sex determination disturbance in zebrafish

Paige C. Mundy, Bruce Draper, Richard Connon

Bifenthrin is a commonly used pyrethroid insecticide, and is an endocrine disrupting contaminant in fish. Known to have downstream estrogenic effects and the ability to feminize sex ratios in certain fish species, the goal of this project is to causally link exposure to bifenthrin to alteration in the sex determination process in fish. Bifenthrin can activate estrogen receptors (ERs) *in vitro*, but it has so far not been possible to test its activity directly *in vivo* because the presence of endogenous estrogen confound determining a primary vs. secondary effect. As a result, it is also possible that bifenthrin has additional, non-ER-dependent targets along the hypothalamic-pituitary-gonadal (HPG) axis that were previously unable to be isolated. Thus, using loss-of-function mutant analysis and a transgenic ER reporter line, I plan to 1) determine *in vivo* if bifenthrin directly activates ERs, consequentially altering sex determination in the absence of endogenous estrogen, and 2) define alternative targets of bifenthrin within the HPG axis independent of ER activation. Using zebrafish as a model species, the results will reveal valuable knowledge of endocrine disruption mechanism applicable to wild fish populations and humans at risk from exposure to this environmentally relevant insecticide.