Texas Tech University - Department of Mathematics and Statistics
Seminar in Applied Mathematics

Concurrent nutrient and contaminant stressors in predator prey systems

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ABSTRACT. Bioaccumulation of toxicants in aquatic food chains can pose risk to ecosystem conservation as well as wildlife and human health. Ecotoxicological modeling aims to predict how contaminants cycle through aquatic food webs. There is increasing evidence that considering resource stoichiometry and nutrient availability will improve risk assessment protocols in ecotoxicology. We develop and analyze stoichiometric aquatic food chain ODE models that investigate co-occurring nutrient and contaminant stressors, in order to improve our understanding of the processes governing the trophic transfer for nutrients, energy, and toxicants. Scenarios of Somatic Growth Dilution, where predators experience a greater than proportional gain in biomass relative to toxicant under high nutrient concentrations are observed. Equilibria stability and bifurcation analysis are discussed. These modeling efforts offer insight on the importance of elemental food quality in ecotoxicological testing protocols for assessing risk of exposures to toxicants.