

1154-37-2173

Md Nazmul Hassan* (hassan.du.math@gmail.com), 401 University oaks Blvd, College station, TX 77840, and **Angie Peace**. *Mechanistically derived toxicant-mediated predator-prey model under Stoichiometric constraints.*

Studies in ecological stoichiometry highlight that grazer dynamics are affected by insufficient food nutrient content (low phosphorus (P)/carbon (C) ratio) as well as excess food nutrient content (high P:C). Contaminant stressors affect all levels of the biological hierarchy, from cells to organs to organisms to populations to entire ecosystems. Eco-toxicological modeling under the framework of ecological stoichiometry predicts the risk of bio-accumulation of a toxicant under stoichiometric constraints. In this paper, we developed and analyzed a Lotka–Volterra type predator-prey model which explicitly tracks the environmental toxicant as well as the toxicant in the populations under stoichiometric constraints. Analytic, numerical, slow-fast steady-state and bifurcation theory is employed to predict the risk of toxicant bio-accumulation under varying food conditions. In some cases, our model predicts different population dynamics, including wide amplitude limit cycles where producer densities exhibit very low values and may be in danger of stochastic extinction. (Received September 17, 2019)