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Mihiri De Silva, Lubbock, TX 79409, and **Sophia Jang*** (sophia.jang@ttu.edu), Lubbock, TX 79409. *Deterministic and stochastic modeling of phytoplankton-zooplankton interactions.*

We present deterministic and stochastic three-compartment mathematical models of interactions between non-toxic phytoplankton (NTP), toxin producing phytoplankton (TPP), and zooplankton to investigate various mechanisms upon population coexistence. In these models, mutual interference between predator zooplankton and avoidance of TPP by zooplankton are considered. Our analytical findings for the deterministic models indicate that mutual interference of the zooplankton can stabilize the interactions. Numerical simulations with parameter values taken from existing literature are performed to illustrate complexities of the population interactions and to validate our analytical findings. For the parallel models of Ito stochastic differential equations, we apply the Euler-Maruyama numerical method to approximate the models and to investigate probability distributions of the plankton populations. It is concluded that randomness of the environment can make the populations more likely to go extinct. (Received February 07, 2018)