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Aijun Zhang* (zhangai@tigermail.auburn.edu), University of Louisiana at Lafayette, Department of Mathematics, Lafayette, 70504, and **Azmy Ackleh, Istiaq Hossain** and **Amy Veprauskas**. *Long-term dynamics of discrete-time predator-prey models: Stability of equilibria, cycles, and chaos.*

In the talk, we will discuss the dynamics of two discrete-time predator-prey models. The first model described the interaction of unstructured predator and prey populations, while the second model considered how this interaction may change when the prey population is negatively impacted by a toxicant and is able to evolve in the response to the toxicant. This latter model incorporated an additional dimension to the model, an evolving phenotypic trait representing the mean toxicant resistance possessed by the prey population. Firstly, we establish conditions for the persistence and (local asymptotic) stability of the equilibria of two discrete-time predator-prey models. Secondly, we explore the long-term population and evolutionary dynamics of these models, including global stability of equilibria, existence of cycles, and chaos. Finally, we perform numerical studies to the existence and stability of cycles, and generate bifurcation diagrams which show the evolutionary model may exhibit chaotic behavior. (Received August 30, 2019)