Meeting: 1006, Lubbock, Texas, SS 10A, Special Session on Extinction, Periodicity, and Chaos in Population and Epidemic Models

1006-92-189 **Yang Kuang*** (kuang@asu.edu), Department of Mathematics & Statistics, Arizona State University, Tempe, AZ 85287. *A Stoichiometric Discrete Predator-Prey Model: Chaos and Its Implications.*

In the last decade, several theoretical models based on stoichiometric principles as well as field and laboratory experiments have shown that nutritional quality of the prey can have dramatic and counterintuitive impact. For example, the predator can become extinct while having plentiful prey in a completely deterministic system. Another effect is the halt of oscillations that are ubiquitous to predator-prey systems, which happens when bad prey quality drives the system through a saddle-node bifurcation. All the existing models exhibiting these effects are continuous in time. However, in experiments, data are collected on discrete time intervals and many producers in nature have non-overlapping generations. Such scenarios call for discrete equation models. Hence we ask: can novel stoichiometric effects arise in discrete systems? By comparing a continuous stoichiometric model to its discrete analog, we show that stoichiometric impacts of prey quality persist in discrete system. Moreover, not only bad prey quality can pull the system out of oscil lations but also it can halt chaotic dynamics that surfaces in the discrete system. Indeed, chaotic prey population can lead to the extinction of the predator population. (Received February 14, 2005)