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Population dynamics between parasitoids and their hosts have been studied for decades and several mechanisms causing population cycles were discovered. Here we develop a stage-structured model with negative binomial predation to explore possible mechanisms causing population cycles. The permanence of the model and local stabilities of equilibria are studied. The conditions for Hopf bifurcations of the model are obtained. In this talk, some numerical simulations is also going to be presented to support the theoretical results. As a part of our on-going project, we next will discuss the mechanisms of population cycles of a specific host-parasitoid system in our lab by comparing the model predictions with lab data. (Received February 01, 2015)