

1145-34-3016

Vardayani Ratti*, 6188 Kemeny Hall, Hanover, NH 03755, and **Peter Kevan** and **Hermann Eberl**. *Mathematical Model of Honeybee Colonies Infested with Diseases*.

The western honeybees (*Apis mellifera*) are vanishing. Recent years have seen honeybees in distress, with up to 35% of colonies breaking down annually. There is no single cause that is believed to be responsible for the colony losses. In this talk, a mathematical model for the honeybees-varroa mites-virus complex is presented in which, based on division of labour, the bee population is divided into two categories: hive bees and forager bees. The model consists of ordinary differential equations for the dependent variables: uninfected hive bees, uninfected foragers, infected hive bees, number of mites overall, and of mites carrying the virus. In this talk, I will discuss the interplay between disease propagation and division of labour in a honeybee colony. I will also present the role of swarming in colony losses. The model focuses on Acute Bee Paralysis Virus and is studied with analytical and computational techniques. We use well established methods for autonomous systems to study the stability of equilibria. Using computer simulations, we investigate whether the results of the autonomous case carry over to the case where the coefficients are functions of time. (Received September 26, 2018)