1109-34-146 **Yun Kang*** (yun.kang@asu.edu), Science and Mathematics Faculty, 6073 S. Backus Mall, Wanner 301G, Arizona State University, Mesa, AZ 85212, and **Krystal Blanco** and **Talia Davis Kang**. *Disease dynamics of Honeybees with Varroa destructor as parasite and virus vector.*

We propose a honeybee-mite-virus model that incorporates (1) interactions between honeybee and its parasitic mite; (2) four virus transmissions: among honeybees, from adult honeybees to phoretic mites, from reproductive mites to honeybee brood, and from honeybees to phoretic mites. Interesting findings from our analytical work include (a) In the absence of mite and virus, the honeybee experiences Allee effects generated by the internal organization of honeybee including division of labor. Thus, initial conditions are essential for the survival of the colony; (b) In the absence of virus, the honeybee and mite population can have fluctuated dynamics, which may lead to catastrophe event where both honey bee and mite go extinct suddenly. This dynamical property is inherited by the full honeybee-mite-virus model; (c) In the absence of mite, the disease dynamics has only equilibrium dynamics. Our results show that virus infection may prevent the extinction of honeybee under certain conditions; (d) In the absence of health mite, the infected honeybee population is more likely to be persistent. Our study suggests that the synergy effects of the parasitic mite Varroa destructor and the related virus infection in honeybee may be a cause for Colony Collapse Disorder (CCD) of honeybee. (Received January 28, 2015)