1067-Z1-2018 **Kamuela E Yong*** (kyong@math.uiowa.edu), Department of Mathematics, 14 MacLean Hall, Iowa City, IA 52242, **Yi Li** (yli@math.uiowa.edu), Department of Mathematics, 14 MacLean Hall, Iowa City, IA 52242, and **Stephen Hendrix** (stephen-hendrix@uiowa.edu), Department of Biology, 143 Biology Building, Iowa City, IA 52242. *Modeling almond pollination by two interacting bee species with cross- and self-diffusion.*

California's almond industry is one of America's top agricultural exports valued at $1.9 billion per year. Successful production of almonds depends on the pollinator services of primarily honeybees, although pollination by wild bees is being investigated as an alternative because ofrecent problems with honeybees. We are modeling pollinator services of honey and wild bees, as well as their interactions in almond orchards. We use the Shigesada-Kawasaki-Teramoto model (1978) which describes the density of two species in a two-dimensional environment of variable favorableness with respect to intrinsic diffusions and interactions of species. We apply the model to almond pollination by wild and honey bees with environmental favorableness based on empirical data measuring the attractiveness of the canopy for honey and wild bees. Using the spectral-Galerkin method in a rectangular domain, we numerically solved the 2D nonlinear parabolic PDE and examine the result of varying the parameters. In addition, we will investigate the inverse problem using empirical data collected on bee density and behavioral observations on their interactions. We hope to determine what circumstances the presence of wild, solitary bees can increase the dispersion of honeybees, thus increasing pollination. (Received September 22, 2010)