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**Glenn F Webb\*** ([glenn.f.webb@vanderbilt.edu](mailto:glenn.f.webb@vanderbilt.edu)), Mathematics Department, Vanderbilt University, NASHVILLE, TN 37343, and **Pierre Magal** and **Yixiang Wu**. *An Environmental Model of Honey Bee Colony Collapse Due to Pesticide Contamination.*

A model of honey bee colony collapse is developed based on the contamination of forager bees in environmental regions contaminated with pesticides. An important feature of the model is the daily homing capacity each day of foragers bees. The model consists of difference equations describing the daily homing of uncontaminated and contaminated forager bees, with an increased homing failure of contaminated bees. The model quantifies colony collapse in terms of the fraction of contaminated bees subject to this increased homing failure. If the fraction is sufficiently high, then the hive falls below a viability threshold population size that leads to rapid disintegration. If the fraction is sufficiently low, then the hive can rise above the viability threshold and attain a stable population level. (Received January 21, 2020)