Saving the Honey Bee from Varroa destructor Using RNA-Interference

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Over 1/3 of the world's crops are pollinated by honey bees. Without them, many wildflowers and trees won't get the pollination they need, and agricultural expenses will skyrocket. Over the past 50 years, honey bees have been facing extinction. A parasitic mite, native to Asia, called Varroa destructor threatens to wipe out honey bees from North and South America, Europe, Russia, and Africa. Every year, the domestic honey bee population decreases by 44%, and the feral honey bee population is almost nonexistent. The Varroa destructor destroys colonies within a few months, spreading disease and viruses, and feeding off adult and larval honey bees. It spreads easily from one colony to another, and the bees have no defense against it. Unless action is taken quickly to solve this, the honey bees will go extinct. This project develops a solution to the honey bee crisis that will cause not only the protection of the honey bees, but also the eradication of Varroa destructor from non-native lands. In this project, soaking vectors with dsRNA inserts have been and initial lab studies show potential. The targeted genes, ATP6, ND1, and CYTB, all have to do with vital mitochondrial functions involving ATP synthesis. The silencing of these genes via RNA-interference is lethal to the Varroa destructor. Currently, research hives are being established for use in field testing with RNA-interference this summer. It is presumed that the RNA-interference treatment can be fed to the honey bees and passed from the bees to the mites causing a lethal effect on the mite without harming the bee.

Awards Won:
Second Award of $2,000
ASU Rob and Melani Walton Sustainability Solutions Service: Award of $1,000
Arizona State University: Arizona State University Intel ISEF Scholarship
University of Arizona: Tuition Scholarship Award