Slaying the Destructor, Part II: Dosage Optimization and Effects of Oxalic Acid on Honeybee Hives

Llaneras, Emily

The Varroa destructor mite is a honeybee parasite that has plagued beekeepers for decades by causing health decline of honeybee populations, and inevitable colony collapse (if left untreated). This parasite is currently becoming resistant to many traditional treatments, making hive maintenance progressively harder. Fortunately, Oxalic Acid (OA) treatment has been found to be effective at increasing mite mortality, along with providing many useful benefits. Two fairly new application methods for OA treatment include passive vaporization and active fogger, neither of which have been extensively researched to determine their effects on hives. In this study, different dosage levels of passive vaporization and active fogger applications were compared to determine effectiveness and dosage optimization; honey samples were tested to determine absorption; and beneficial hive fungi were observed to determine growth inhibition caused by OA. Five hives were tested: one control hive, two Vaporization hives (2g and 3g), and two Fogger hives (2.5% and 5% concentrations). After analyzing experimental results using a two proportion Z-test, all treatment hives produced a higher mortality rate than the control ($p<0.0001$), passive vaporization was better than active fogger ($p<0.0001$), and higher dosage levels were more effective than lower ($p<0.0001$). There was some absorption of the acid into honey, and no significant growth inhibition of the beneficial hive fungi. With this information, beekeepers will be better informed to make decisions about treatment choices in order to effectively protect their hives and honeybees in the battle to “slay the destructor” and save their colonies from potential collapse.

Awards Won: