

Year Two: Understanding the Effects of Bifidobacterium infantis on Honeybee Gut Parasite Nosema ceranae

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Honey bees are extremely important, performing about 80 percent of all pollination worldwide. Their population has been rapidly declining at an alarming rate. Multiple studies have shown lack of nutrition as the leading cause of honey bee colony collapse. Various nutrients have been tried to improve their gut health with inconclusive results. Our project was aimed to feeding the hives with Bifidobacterium infantis, an active bacterial human probiotic. We also wanted to assess its therapeutic effect on highly virulent gut parasite Nosema ceranae which is linked with colony collapse in some countries. Our hypothesis predicted a positive effect of study probiotic on overall bee "health" and reduction of prevalence and intensity of the Nosema count. Based on the previous year's observations, 8 hives were set up: 4 were fed a dose of 500,000,000 CFU bacteria mixed in sugar solution and 4 control hives that were fed plain sugar solution. Bi-weekly observations were recorded for 6 weeks during winter months. The findings were tabulated and statistically analyzed with Student t-test with two samples. B. infantis significantly reduced hive nosema count and increased honey weight, bee and brood population with p value < 0.05. Contrary to Fumagillin, an anti-Nosema agent that causes midgut epithelial degeneration, our probiotic solution not only resulted in Nosema reduction but also improved honey bee gut health. This pilot field study results are promising. If further studies confirm our results, B. infantis probiotic could potentially be used as a safe and effective anti-Nosema agent in future.

Awards Won: