Varroa mite and Small Hive Beetle management: Single brood chamber hive versus double brood chamber hive

Progress report for FNC19-1196

Project Type: Farmer/Rancher
Funds awarded in 2019: $7,965.00
Projected End Date: 02/28/2021
Grant Recipient: Thompson’s Prairie Honey
Region: North Central
State: Indiana
Project Coordinator:

Mikael Thompson
Thompson’s Prairie Honey

Project Information

Description of operation:

We live on a 2 acre homestead and keep 40 beehives, depending on the time of year we also keep hives on 3 other properties.

Summary:

Modern beekeepers have been dealing with large losses of honeybee colonies for several years. The primary cause of these losses has been the Varroa Mite, a secondary cause as of late has been the Small Hive Beetle.

This project will test the ability to prevent the Varroa mite and Small Hive Beetle (SHB) from reaching damaging population numbers in honeybee colonies through the use of single brood chamber management techniques. These techniques will include the use of a break in the brood cycle, the removal and disposal of capped drone brood that contains reproducing Varroa mites, and the use of reduced dosages of three types of commercial mite treatments. This project will also monitor a single brood chamber hive's own ability to manage SHB populations with a high number of bees confined to a smaller space. If these techniques when combined can be shown to sustain the lives of colonies with minimal or no use of chemical treatments, pesticide use will be reduced or eliminated. With an increase in bee health, overwintering losses would decrease resulting in higher profitability due to reduced costs and labor associated with yearly colony losses.

Project Objectives:

1. Determine if Varroa and SHB populations can be better managed in a single brood chamber hive versus a double brood chamber hive.
2. Evaluate the effectiveness of three types of commercial Varroa treatments at reduced dosages

3. Share results and knowledge gained through this project with our local Purdue Extension offices, local and state beekeeping associations and through social media sites.

Research

Materials and methods:

Twenty nucleus colonies will be randomly grouped into 4 test groups consisting of 5 hives per group. Groups will consist of 2 single brood chamber hives, 2 double brood chamber hives and 1 control hive. All single brood chamber hives will be equipped with a queen excluder to confine the queen to the brood chamber. Group 1 will be treatment free, Group 2 will be treated with Oxalic Acid vapor, Group 3 will be treated with Apivar strips, Group 4 will be treated with Formic Acid.

Varroa populations will be monitored three times per year starting in May of 2019. In early September 2019 a mite check will be performed before any Varroa treatments are administered. A final seasonal mite test will be performed after treatments. Mite checks will be accomplished by removing 300 bees from each hive and placing them into a Varroa Easy Check and adding alcohol. The tester will then be shaken causing the mites to separate from the bees and fall through a screen into the bottom of the tester where they will be counted to determine populations with results being documented.

Honey production of each hive will be determined by documenting the number of frames harvested from each hive. Overwinter survival will be monitored and recorded each year. Surviving colonies will be evaluated during the first major hive inspection in April of each year. Strength of surviving colonies will be evaluated by documentation of the number of frames of bees and brood each hive contains. Each hive will receive the same basic management techniques from April through October. These Techniques will include: Supplemental feeding of sugar syrup when necessary, monitoring and treatment of diseases, and dividing of colonies to prevent swarming. Colonies that are divided will be allowed to produce their own queen naturally.

This project started in late May of 2019. The nucs were picked up and divided into their respective groups. Mite checks were performed on May 29th 2019 using an alcohol wash. Mite numbers were low in every colony averaging 1 mite per 300 bees in all 20 colonies. All colonies were fed 1:1 sugar syrup from May 29th until June 17th. At that point all colonies were steadily increasing in numbers and honey supers were installed on all colonies. Mite checks were performed again on June 30th. The results revealed that the mite numbers had increased to an average of 2 mites per 300 bees in 3 of the 5 treatment free colonies, with the mite numbers staying at 1 per 300 bees in the other 2 treatment free colonies. The remaining 15 colonies stayed at an average of 1 mite per 300 bees. A second honey super was added to all colonies at this time.

The hive inspection on July 7th revealed that treatment free colony number 1 was now queenless and a replacement queen was installed in the colony. During this inspection it was noted there were no small hive beetles in any of the colonies. Hive inspections on July 16th revealed that treatment free colonies 3 and 4, as well as Apivar treatment colonies 1 and 5, were now queenless. Replacement queens were placed in all queenless hives on July 18th. Hive inspections were performed on July

29th and it appeared that all replacement queens had been accepted and the colonies were doing fine.

Honey supers were pulled and weighed on August 12th with an average weight of 68 pounds produced per colony. Honey supers were placed back on the hives for winter feed. Mite checks were also performed on August 12th. The treatment free colonies averaged 1 mite per 300 bees and the 15 treatment colonies also averaged 1 mite per 300 bees. All treatment colonies were treated with Apivar strips due to the ambient temperatures being too high for Formic acid treatment. Hive inspections on August 23rd revealed that treatment free colonies 3 and 4 were once again queenless and queen cells were installed.

Hive inspections were performed on Sept. 8th. Hive inspections were performed on Sept. 16th and treatment free colonies 3 and 4 were queenless again and they were terminated at that time. Small hive beetles were observed in 4 of the remaining 18 colonies at this time. Hive inspections were performed on Sept. 23rd and Apivar treatment strips were removed at this time. Mite checks were performed with the following results; The remaining treatment free colonies averaged 1.5 mites per 300 bees, The 15 colonies treated with Apivar had an average of 0 mites per 300 bees.

Hive inspections were performed on Oct. 8th and winter preparations were made on all hives at this time. All remaining colonies are strong and should have plenty of food reserves for the winter. I believe our queen problems were a result of poorly mated queens due to an extremely wet spring. I am giving serious consideration to requeening all surviving colonies in the spring of 2020.

Research results and discussion:

I believe we partially achieved our goal of controlling varroa mites using a reduced dosage of mite treatments. These results were measured with the mite numbers in our alcohol washes.

Participation Summary

2 Farmers participating in research

Educational & Outreach Activities

3 On-farm demonstrations

PARTICIPATION SUMMARY:

10 Farmers

Education/outreach description:

Outlined our project to members of our local bee club and other local beekeepers and gave monthly updates to them. Entering into the second year of our project we will be updating all participants with pictures, short video clips and printed notes and observations.

Learning Outcomes

9 Farmers reported changes in knowledge, attitudes, skills and/or awareness as a result of their participation

Lessons Learned:

We have learned that thinking outside the box and flexibility in management practices are crucial when working on your grant project. The experiences of this grant project have changed our management practices in our other hives. We are in the first year of our project but we are definitely seeing some positive results in overcoming Varroa and SHB problems. The advantages are: you must gain an intimate knowledge of the inner workings of your project. You must learn to be flexible and not be afraid to try different techniques and management practices. The disadvantage is that no matter what, you are still at the mercy of nature. I would tell other farmers/ranchers that I believe there are definitely some positive results that have came out of this project so far and I believe that there are more positives to come from it.

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