

SARE GRANT RESEARCH PRODUCES BIG RESULTS IN TWO-COLONY HIVE TRIALS

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Probably most beekeepers are not aware of SARE grants (Sustainable Agriculture Research and Education) as a means of funding farmer driven research. These grants are available from the U.S. Department of Agriculture through one of the land grant colleges in four different regions in the United States. SARE grants fund research in all branches of farming. Previous beekeeping grants have focused, among other things, on methods of controlling acarine and varroa mites. A Year 2000 Farmer/Grower grant that I received funded grass roots research that compared the productivity and profitability of two-colony hives vs. standard Langstroth hives.

The two-colony hive used in this experiment was developed during the 1980s while I was living and working in California. All brood chamber hive bodies have 3/4 inch thick divider boards and five frames on either side of the divider board. These hive bodies are 18 inches wide rather than the 16 1/4 inch width of the standard Langstroth hive body. Two clusters of bees are able to grow upward in the two-colony hive independently of each other. Theoretically, since each cluster only occupies half of the room that a cluster in a standard hive occupies, the two-colony hive should be twice as productive as a standard hive.

The productivity trials that I conducted went from the years 2000 to 2004. I conducted comparisons of overwintering, spring income, and summer honey production between two-colony hives and standard hives.

Overwintering

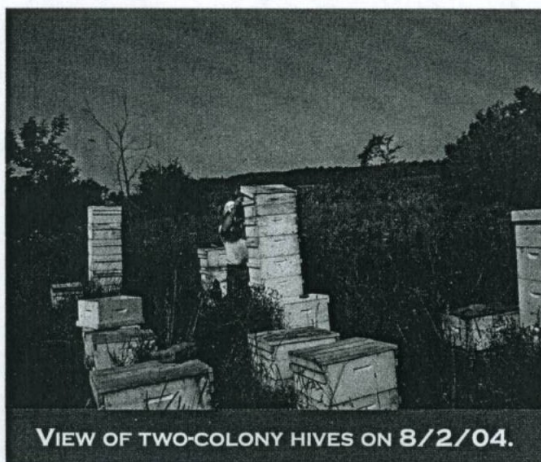
I was able to compare overwintering success of two-colony hives and standard hives in the spring of 2001, 2002, and 2003. In all three years, I was comparing hives that all had queens less than one year old that had been raised during the previous growing season. The following table shows the year-by-year results.

| Year | # Standard Hives | # Clusters Overwintering | # Two Colony Hives | # Clusters Overwintering |
|------|------------------|--------------------------|--------------------|--------------------------|
| 2001 | 17 | 8 | 24 | 33 |
| 2002 | 12 | 10 | 12 | 22 |
| 2003 | 9 | 9 | 15 | 21 |

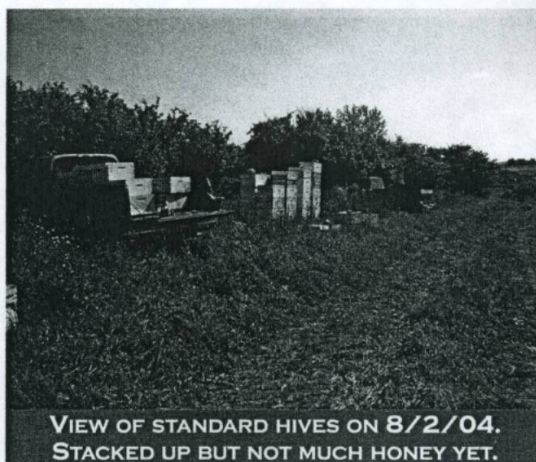
A total of 51 two-colony hives brought 76 clusters of bees through those winters, while 38 standard hives overwintered 27 clusters. The two-colony hives overwintered 74.5% of their clusters, while the standard hives overwintered 71% of their clusters. More importantly, though, each two-colony hive brought an average of 1.49 clusters through the winter compared to 0.71 clusters for the standard hive.

Spring Income

Spring income was also compared during 2001, 2002, and 2003. My bee operation makes money in two ways during the spring: By selling nucs to other beekeepers and by sending bees to apple pol-



VIEW OF TWO-COLONY HIVES ON 8/2/04.



VIEW OF STANDARD HIVES ON 8/2/04.
STACKED UP BUT NOT MUCH HONEY YET.



VIEW OF TWO-COLONY HIVES, STANDARD HIVES IN BACKGROUND. 8/2/04



USING FRAMES OF BROOD TO MAKE NUCS FROM TWO-COLONY HIVES IN MA

lination. The two-colony hives were used to produce nucs, while the standard hives did the pollination. The results from these years are listed in the following table:

| Year | Standard Hive | Two-Colony Hive | % Increase |
|------|---------------|-----------------|------------|
| 2001 | \$15.53 | \$21.35 | 37% |
| 2002 | \$29.17 | \$90.58 | 211% |
| 2003 | \$44.89 | \$51.60 | 15% |

Two-colony hives could have done better in 2001, but I was late getting my classified ads into the bee journals. The two-colony hives did so well in 2002 because the winter of 2001/ 2002 was very mild and pollen came in early. Not only did I sell nucs from these hives, but I was also able to sell additional brood to beekeepers who were buying queens from other sources. The standard hives did very well in 2003 because I had 100% overwintering success with the standard hives that year.

Honey Production

Though this experiment began in the year 2000, I did not have any meaningful results that year. Hives were constructed in the spring and were not stocked until June, a month later than would have been optimum. During 2001, 2002, and 2003 two-colony hives that had been used to make nucs for sale were subjected to increasingly tough competition against standard hives. In 2004, 2 two-colony hives were not used to make nucs for sale and were compared against the best standard hives in my operation. Honey production was measured by weighing honey supers before and after extracting; the difference between these numbers is the

amount of honey extracted. Cappings wax is included in the results. The results are listed on the following table:

| Year | Standard Hive Average/ # Hives | Two-Colony Hive |
|------|--------------------------------|-----------------|
| 2001 | 38.4 lb. avg. / 12 hives | 82.75 lb. avg. |
| 2002 | 63.9 lb. avg. / 9 hives | 66.8 lb. avg. |
| 2003 | 152.8 lb. avg. / 6 hives | 51.9 lb. avg. |
| 2004 | 151 lb. avg. / 8 hives | 357 lb. avg. |

In 2001, I compared a dozen two-colony hives to a dozen standard hives. Five frame nucs had already been sold from the two-colony hives and they had been requeened with queens from the standard hives. By the time these hives were moved to the summer yard in early July, everything was still only a month old. In 2002, most were ready for their second hive body. In 2003, most were ready for their third hive body. In 2004, most were more than twice as strong as either side of one colony hives.

In 2002, the experiment was run in a similar manner to the 2001 experiment, except that the standard hives were even stronger than the previous year. Two of the standard hives were two-colony hives when they were moved to the summer yard.

In 2003, the two-colony hives were treated the same as the standard hives, but this time they were compared to full standard hives. While the two-colony hives were only one month old in early July, all of the standard hives were already beehives. Plus, I actually picked out some of the best standard hives for the test.



LOOKING IN TOP SUPER OF TOP-PRODUCING HIVE 8/2/04. I TOOK 150 LBS. OFF OF THAT HIVE ON

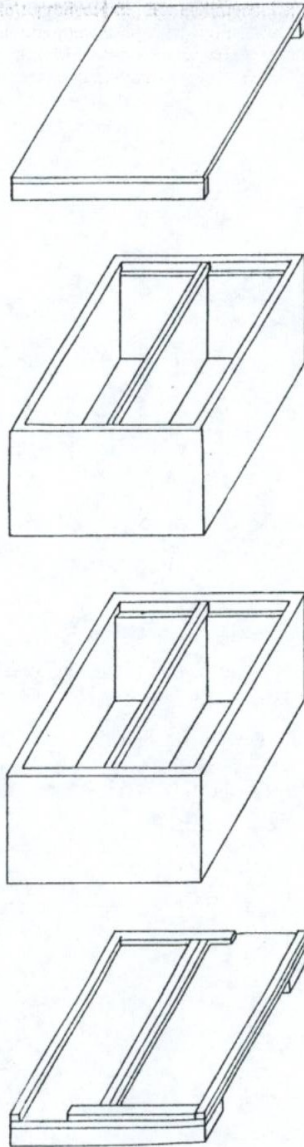


In 2004, my intention was to run two-colony hives at full strength throughout the honey-producing season. Even though I did not advertise in the bee journals, I still had many requests for nuc sales. I really overcommitted to selling nucs and had only 2 two-colony hives left at full strength for the experiment. These two hives were compared against the best standard hives in my operation. The year 2004 was a below average year for honey production in Central New York; by the end of July, it looked to be a real disaster. Production picked up during August and early September. The two-colony hives produced surpluses of 370 ½ lbs. and 344 lbs. Surplus production from the eight best standard hives in my operation averaged 151 lbs. The best production by a standard hive in this bee yard was 188 lbs. and the best production of all of my standard hives was 216 lbs.

To my knowledge, the world record that is being claimed for a single hive in one season is 404 lbs. This record was set in 1974 by Ormond and Henry Aebi of Santa Cruz, California. In their book, *Mastering the Art of Beekeeping*, the Aebis state that the previous record was 300 lbs. by A.I. Root of Medina, Ohio in 1895. The Aebis were quite happy that they once again surpassed the previous record when one of their hives produced 310 lbs in 1976. Though I do not know what methods the Aebis used to measure their surplus, I believe that I was able to make a good run at these records using only two hives during a below-average year in my best bee yard.

Conclusions

Through the course of this experiment, I believe that the two-colony hive has shown good potential for bringing bees through the winter, as well as producing brood in the spring and honey during the summer. It could actually turn out to be more than twice as productive as a standard hive, but more testing is needed before any such claims can be made. In most cases, I have used these hives to produce and sell nucs that have one-year-old queens, but it would probably be more profitable to just run



TWO-COLONY HIVE DIAGRAM.

them for honey production. By selling nucs, though, I was always working with young queens, a definite advantage. The two-colony hive requires a higher level of management and will swarm readily if you're not paying attention. It may not be that attractive to a beekeeper who does not raise queens since he would need to purchase twice as many. All in all, though, I believe that this SARE-funded experiment has shown that the two-colony hive can be a very profitable addition for a beekeeper with the right skills.

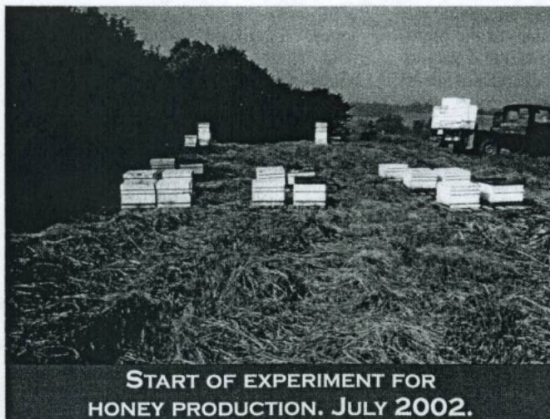
The Missing Link

I have been using zinc queen excluders manufactured by Kelley Company to separate the brood chambers from my honey supers. These excluders are just a little bit too narrow and leave a gap on one side or the other. This has not been a big problem for me since the queens haven't gone above the excluder anyway. At times, I have also used duct tape to add an extra piece of sheet metal to my zinc excluders. A wider zinc excluder with more metal on each side and no additional holes would be a big advantage since standard hive bodies could then be used for honey supers. I know that this will work because a beekeeper for whom I worked, Shannon Wooten of Palo Cedro, California, uses excluders and honey supers above his two-sided eight-frame nuc boxes. The bees from the two different sides mix in the honey supers without a problem.

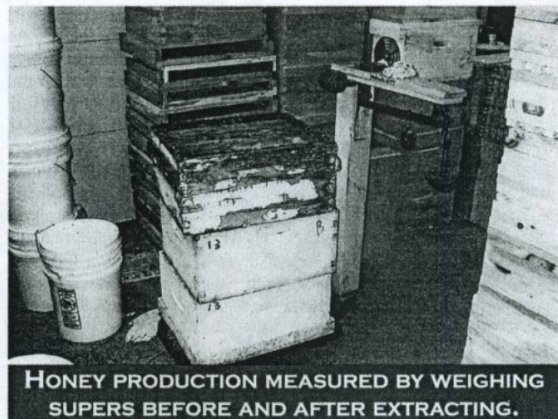
Future Research

A conference sponsored by SARE in Vermont that I attended this past October turned out to be a great networking opportunity. As a result, Maryann Frazier, of Penn State Cooperative Extension, has applied for a SARE Partnership Grant to continue research on the two-colony hive. If this application is successful, two-colony hive trials will be conducted at three locations in 2005 and 2006.

If you would like more information about the two-colony hive or an electronic version of the final report for my SARE grant, you can contact me at: Johnstonsbees@hotmail.com.



START OF EXPERIMENT FOR HONEY PRODUCTION. JULY 2002.



HONEY PRODUCTION MEASURED BY WEIGHING SUPERS BEFORE AND AFTER EXTRACTING.