SARE GRANT FNE00-308
FINAL REPORT, NOVEMBER 2001
TWO COLONY HIVE PRODUCTIVITY TRIALS

Introduction

This is the final report for a Year 2000 Sustainable Agriculture Research and Education (SARE) Grant which was meant to compare the production and profitibility of the Two Colony Hive with the standard ten frame hive commonly used in the beekeeping industry in this country. The two colony hive was developed by the recipient of this grant during the 1980's but experimentation was suspended after moving back to New York and pursuing a different career. The two colony hive differs from the standard hive since it has a vertical partition in each bee box and two entrances, one on each side of the hive. Even though it is not much different in appearance from a standard hive and uses the same standard frame inside, two seperate and distinct clusters of bees occupy occupy each beehive. Whereas a standard hive contains ten frames in each box, the two colony hive also contains ten frames but with five frames on each side of the divider board; standard bee hives are 16 ¼" wide while two colony boxes are 18" wide. In theory, the two colony hive should offer some definite advantages over the standard hive which was developed by Lorenzo Langstroth in the 1850's. Since each cluster of bees only occupies half the space, this hive should overwinter better since each cluster has a smaller space in which to keep warm; each cluster should also benefit from the heat being produced on the other side of the divider board. Spring buildup should be shortened considerably since each cluster of bees only has to fill up ten frames before a two story beehive is totally accupied; normally boxes above the second story are harvested by beekeepers for surplus honey. Perhaps the greatest advantage of the two colony hive is that it can be used for nucleus hive production for sale to other beekeepers. Three to five frames of bees with a queen can be sold from each side of the hive in Spring; both sides can then be requeened with either a purchased queen or a queen cell.

In the year 2000, Two Colony equipment was manufactured in cooperation with the Wood Technology Department of SUNY Morrisville. Some experimentation was done in 2000 but the results were inconclusive since the hives were stocked too late in the season and the bee yard that these hives were placed in did not have a good honey flow.

In the Year 2001, this project focused its attention on a comparison of wintering, nuc production and pollination, and honey production between these two types of hives.

Wintering

In early December of 2000, the hives located in my best wintering yard were inspected. It was noted that there were 17 standard bee hives in this yard and 23 ½ (47 clusters) two colony hives alive at that time. All of these hives had queens which were raised during the year 2000. The winter of 2000/ 2001 was a particularly brutal winter for New York beekeepers. Here in Central New York, the Syracuse meteorologists reported that we only missed having the record snowfall by 0.2 inches of snow. Spring was very slow in coming. Beekeepers located in the Northeast had very poor overwintering. Just about everyone reported losses over 50% with many beekeepers reporting losses of 90%. Of the hives located in the yard in question, 8 stnadard hives overwintered successfully while 33 cluters made it in two colony equipment. This amounts to 47% overwintering for the standard hives compared to 70% overwintering for the two colony equipment.

Sales of Bee Products

In early Spring in New York, there are two ways to make money from bees available to this beekeeper. One method is the sale of nucleus hives (nucs) to other beekeepers. Nucs consist of three, four, or five frames of brood covered with bees along with a queen. The other method is the movement of bees to orchards for pollination. Because both of these thing happen in a short amount of time, the beekeeper must choose to make money by either method but not both with an individual hive. In my case, two colony hives were used for nuc production while the standard hives were sent off to pollination. Two colony hives are particularly well suited to nuc production since each side of the hive can produce a nuc and be restarted with a single frame of brood and a queen cell. Because each cluster only has to grow to ten frames before it begins producing a surplus (as opposed to 18 or 20 frames with a standard hive), it can still produce nucs and a respectable honey crop within the same season. All eight of the surviving standard hives were sent

to apple pollination. Pollination fee was $35 per hive, cost of truckking was a conservative $2 per hive. At that rate these hives made $264. 19 nucs were sold from the surviving 33 clusters from the two colony hives; these nucs were sold for $40 each. At $1.50 per frame, the 95 frames which were sold would be valued at $142.50. Net return was: $760 minus $147.50 = $512.50. The return on the original 17 standard hives was $15.53. The return on the original 23 ½ two colony hives was $21.81. Each surviving standard hive brought in $33 while each surviving two colony hive averaged $31.06. Perhaps the lesson to be learned from this exercise is that pollination is the beteer way to make money with your bees in the Spring.

Honey Production

For the comparison of honey production, twelve two colony hives were tested in the same bee yard with twelve standard hives. In all cases newly started hives with young queens were used. Generally, the standard hives were produced by converting two colony hives to standard hives when it was found that only one queen had successfully mated. In this way, both the standard hives and the two colony hives were started using the same number of brood frames. At the start of the test, though, three of the standard hives were the strongest hives in the test because these hives had been dead outs which were restocked earlier in the Spring. At the start of the test the bees were moved to a good bee yard in an area of high lime soils which would normally produce a good honey crop. The bees were moved to the location on July 3rd; normally the best honey flow starts there around July 1 with basswood leading into knapweed and clover. Only the three best standard hives were built up to full strength. All of the hives were supered in anticipation of a honey flow on the morning of July 4. The honey flow which followed was decent but not ideal because of dry conditions. Production was measured by weighing honey supers before and after extracting with a platform scale. The results are as follows:

	Standard Hives	Two Colony Hives
Top Producers	One @ 80.5 lb. Four best hives averaged 68.375 lb./ hive	Three averaging 154.7 lb./ hive Plus Two averaging 103 lb./ hive
The Dogs	Eight averaging 23.4 Lb./ hive	Seven Averaging 46.1 lb./ hive
Total production	460.5 lb.	993 lb.
Average/ hive	38.375 lb.	82.75 lb.

The two colony hives in this test produced almost 2.2 times the amount of honey as the standard hives. This result actually exceeded the expectations of the author of this study. This result can possibly attributed to the fact that the honey flow was not all that good and a higher proportion of honey collected went to hive maintenance for the standards hives. It is my guess that the results would be less disproportionate under a very good honey flow.

Conclusions, Advantages and Disadvantages of the Two Colony Hive

We can fairy safely conclude from this study that Two Colony Hive exhibits better overwintering characteristics and is a much better honey producer under a moderate honey flow. The two colony hive also made more money in the spring by virtue of the fact that more of them made it through the winter. The spring of 2000 was not greatest for selling nucs since the bees had very little time to build up during April. I expect that I will actually get better at producing nucs with each succeeding year. In most cases a two colony hive will not bring in higher pollination fees then a standard bee hive. Usually beekeepers are paid on the number of bee hives, but in some cases the orchardist will actually pay on the strength of the bee hives.

The two colony hive is not for everyone, however. It is very well suited to an operation where nucs are being sold and young queens are being used. It is a well known fact that one year old queens are more prone to swarming then young queens. The two colony hive will reach an overcrowded condition lending it to swarming much quicker than a standard hive. This is not the bee hive for a "let alone" beekeeper, but is well suited to an operation with a high level of management. Another disadvantage for the two colony hive is that the woodenware needs to be cut fairly precisely. The divider board needs to be a hair shorter than the rest of the box so that lids and hive bodies don't rock as propolis builds up but it is surprising how small a space a worker bee can squeeze through. Poorly built two colony hives will only have one cluster of bees a couple of months after the honey flow is over. Two colony hives also don't lend themselves to palletization for moving but would have no problems in an operation using booms for loading the hives.

On the recommendation of the people administering my SARE grant, I limited the size of the experiment to the twelve standard hives versus twelve two colony hives. I've found that this is a very manageable experiment. For this reason, I will continue the experiment with the same twenty-four hives into the 2002 season. I believe that it will be interesting to see additional results from a another growing season which will probably have different weather conditions than the season which preceded it.

OTHER GRANT DETAILS

Personnel

Classified Ads were run in both bee journals during March and April under Help Wanted. This strategy actually produced a good number of responses. I decided to hire an individual who lived in nearby Syracuse since I would not have to deal with housing the individual. This person was a school teacher who was taking a leave of abscence. Though Joe indicated that he was interested in working full time for the summer, in practice he was only interested in a part time job for the first half of the summer. Once again, my best worker turned out to be my sixteen year old nephew who is hungry for dollars. My seventeen year old son also did some work also. My daughter assembled 100 frames but was rather wild with the staple gun so I didn't encourage her. Much of the work with the teenagers was done on a piece work basis since oftentimes I was at my own job when they were working. My neighbor's sons have also indicated an interest in working so I may be on my way to solving my labor problem. Cost of labor was cost shared on a 50-50 basis with the SARE grant Cost of labor for the 2001 season was 1494.91 and totaled 1978.45 for both seasons of the grant. This was well short of the maximum of $6,600 which was originally expected but certainly I am not the first person to have trouble finding help in Agriculture.

In Kind Services

I was committed to contributing 160 hours of my time as an in kind service. 73 hours were documented during year 2000. An additional 104 hours are documented with this report for 2002; additional hours could have been documented but it didn't seem necessary.

Equipment match

All of the lumber and hive bodies were purchased as was proposed in the original grant. 2,200 deep frames were purchased, another 300 were already on hand. 1,500 sheets of foundation were purchased. All of these frames were assembled. I currently have 1000 frames on hand for which I will buy foundation in 2002. $2,176 was spent on frames and foundation even though I had expected to spend $2,800 in the original grant application. I have also documented another $1,131.66 in expenses which I did not anticipate with the original application.

Outreach

Much of the first part of this final report will be used as the basis of an article which will be submitted to the American Bee Journal and Bee Culture magazine. I am deliberately continuing the experiment so that bee researchers or industry types can see results first hand if they are interested. In mid-October I applied to the New York State Department of Agriculture & Markets for a grant to produce and sell this bee equipment under the 2001 Food And Agriculture Research And Development program. My proposal seems like a good fit for their program but we'll see whether funding continuesafter the sudden problems which New York has now encountered after September 11. In any case, I'll continue improving on my warehouse built in 2000 and will increase my capacity to produce this equipment.