

Performance Evaluation of Different Strains of Honeybees in the Northeast FNE03-490

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The major goal of this project was to try and identify specific strains of honeybees- which are commercially available to beekeepers- and will also perform optimally in the Northeast. The crucial benchmark being survival, i.e. over wintering. There are obviously, numerous factors, many of which are inter-related , that ultimately affect a colony of bees ability to survive. I looked at some of these influences on a limited basis (pest and disease presence); however, due to the limited scope of this project, survival/mortality was the key factor.

I currently farm on a part-time basis, which consists of production of a small acreage of vine crops, hay and straw. In addition, I have an apiary consisting of about 100 beehives which are used for honey production and pollination services in the Pioneer Valley of Massachusetts.

The project consisted of the following. Package bees were ordered from Georgia in order to insure uniformity and a set arrival date for all the packages. Selected queens were ordered from different queen breeders with shipping dates that coincided with the arrival of the package bees. The queens consisted of the following: four each of five different strains. 4 Italians ( 2 from Hardeman in Georgia, 2 from Strachan in California), 4 Russians (2 from Hardeman in Georgia, 2 from Strachan in California), 4 SMR (2 from Jester in Arkansas, 2 from Bee Happy in California), 4 Minnesota (2 from Jester in Arkansas, 2 from Honey Land in Florida), and 4 New World Carniolans (2 from Strachan in California, 2 from Bee Happy in California). The New World Carniolans, SMR, and Minnesota strains were selected because they are “relatively” new to commercial beekeeping, but have shown indications of potentially advantageous traits.

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Italians are kind of tried and true and have been used by beekeepers for years, thus providing an additional element for comparison.

The package bees and queens all arrived on a timely basis with the exception of the Jester queens. Apparently the Jester breeders were experiencing a long stretch of poor weather and the queens were having difficulty going on mating flights. I attempted to hold those packages, waiting for Jester queens, with caged queens until the desired ones arrived, but it appears that this and the delay led to problems with those hives in the long run.

The packages were placed and the queens introduced into hives which consisted of all new equipment, i.e.(bottom board, bottom screen, deep hive body, inner cover, outer cover, and new undrawn wax coated plastic frames). New equipment was used for two reasons, the first was to ensure that all the hives started at the same point and secondly so no diseases or parasites were introduced from an outside source. Each hive was given a two gallon pail feeder with a 50-50 ratio of water and sugar, to help get them started.

This particular spring (2003) the weather consisted of prolonged periods of cold and wet weather, which certainly seemed to hinder the build up of all of the hives, with some being more severely affected than others. The Jester hives appeared most affected due to the delayed queen introductions, in hind sight, I probably should have introduced other queens initially and requeened when the desired queens arrived, however, at the time I had no good indication as to when that would occur, so I held them hoping the queens would arrive sooner than they did.

As the season progressed the bees seemed to get on track, expand, and build up as expected, with slight to moderate variations. An additional deep super was placed on all of the hives as expansion continued into the summer. Two hives required an additional honey super (1 Strachan-New World Carniolan and 1 Honey Land-Minnesota) later in the summer. By the time fall rolled around three hives had been lost due to apparent queen related problems. (Hardeman - Russian,

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Jester-Minnesota, and Jester- SMR) Ultimately 17 hives were prepared for the winter and no chemical treatments of any kind were used. Internal examinations of the hives showed no signs of typical brood diseases i.e., American or European foulbrood, chalk brood) or signs of nosema. Sticky boards placed under the bottom hives screens revealed no noticeable differences between the hives with regard to varroa mites, with little to no signs of a population being present. In the spring of 2004, ten hives had survived and come through the winter. Consisting of: 2 Italians (1 Hardeman, 1 Strachan), 3 New World Carniolan (2 Strachan, 1 Bee Happy), 1 Russian (Hardeman), 2SMR ( Bee Happy), and 2 Minnesota ( Honey Land) It appears that the overwhelming reason for the demise of the seven hives over the winter was due to starvation. All food reserves had been exhausted in these hives with no signs of disease or parasites. Once again, internal, sticky board, and external observations revealed no discernable levels of disease or parasites. I had intended to send bee samples to the Bee lab in Beltsville, MD to try and ascertain the type and levels of diseases and parasites present, but opted not to when no evidence was found in the fall or again in the spring. I believe the fall or the spring of the second season would be more advantageous, given the fact that potential problems would have time to develop or not as the case may be, early on or during the first year certain problems that might develop haven't had time to build up or take hold.

The fact that an inadequate level of food, caused the demise of those hives unable to overwinter was quite evident. The reason or reasons are more difficult to pinpoint. Many factors played a part and once again were probably inter related as opposed to being isolated events. The wet cool spring delayed early season build up. The ability of some bees to forage better and under less favorable conditions. Building comb is done better by certain bees. Bee population levels during specific times of the season are often variable. Some strains "shut down" early in the late summer and early fall as external food source begin to dry up, while others carry larger populations later into the season with the result of consuming greater quantities of food. Also in the spring there is population variation as some bees tend to buildup very rapidly toward the end of winter and early spring, while others are slower to attain large populations. Finally, the ability to be food thrifty, (overwintering on small amounts of stored food) which can be related to

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population levels but not exclusively.

It is a little difficult to draw a set of hard conclusions from this project. What I can say is that, great care was taken to provide a consistent level playing field from which to evaluate the different queens. Based on the key criteria (overwintering survival) the New World Carniolans performed the best with 75% survival, there was a cluster in the middle with the Italians, SMR, and Minnesota hives with a 50% survival rate, and the Russians performed the worst with only a 25% survival rate. It must be noted however, that the Russian, SMR, and Minnesota sets went into the winter with only three hives each, due to the earlier losses, but they were losses none the less. I feel the late arrival of the Jester queens played some part in this, but to what extent it is impossible to tell, other than to note that two of the hives that failed to make it even to the end of the season were from that group.

The sample size and the single season of observation, were probably the areas, had they been increased which could have provided more information. The advantage of the sample size used was that it did allow for all of the hives to be in the same beeyard which was necessary from the standpoint of foraging equality. Better data could be obtained if multiple sets like the one describe, were placed in various locations, but that was not within the scope or budget of this particular project. It should also be noted that under normal management practices certain things would have been done which were not done here, because of the need to maintain a level playing field. Mainly, hives showing problems could have been requeened, and many of the hives which were lighter than desirable could have been fed or given extra honey supers from other hives before going into the winter. On the other hand, the logic of the project comes from the standpoint that all the bees had an equal opportunity: to reproduce, draw new comb, collect food, and overwinter on what stores they had managed to put away, and those that succeeded were the goal.

Final conclusions: It appears beneficial to track the performance of different bee strains because variation does exist between different queen strains which are commercially produced for resale. I must add however, that although I was looking for a strain or strains that appeared to be

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superior and certainly the New World Carniolans look pretty good, that it would be a little short sighted at this point to eliminate the other strains from further consideration, based solely on this one project. By selecting bees which “consistently” perform better in a specific region and under a particular individual’s management practices, beekeeping operations over the short and long term should improve and become more profitable and efficient. Beyond that, the bees that perform best ( in this case New World Carniolans), should be used to do some queen breeding locally, using both purchased queens and the survivor stock on hand. Hopefully by sharing or trading queens with other local beekeepers to maintain a large gene pool a local or regional queen breeding network can begin to take shape in the Northeast. This is the direction I intend to take and I’m certain some measure of economic gain will result in my beekeeping operation and for others who pay similar attention to the details. Selecting desirable bee strains will not only aid a beekeeper in their ability to maintain their desired number of hives, it could also provide some supplemental income by raising queens and nucs to sell on the side. In plain language it’s pretty simple, dead bees don’t produce honey, provide pollination services, and are becoming increasingly expensive and difficult to replace.

The outreach portion of this project will be ongoing. I’m submitting some articles, both locally and to Bee Culture Magazine, which hopefully will get some attention. I’ll also continue to work with collaborators and the Eastern Apicultural Society of which I’m a member to spread this information and continue to work in this area. I feel that with the current high levels of interest in developing hardier bees, that it will be feasible to set up a local queen breeders group, from which we can all learn from each other, to help maintain beekeeping as an economically viable agriculture activity in the Northeast. Certain challenges facing beekeepers seem to remain over time , like decreasing amounts of available labor and beeyard locations, while others seem to pop up out of nowhere and are becoming increasingly common as globalization continues, mites and the small hive beetle, being recent examples. I feel beekeeping isn’t a lot different than other small businesses from the standpoint that the future will force us to become increasingly nimble and dynamic. Unfortunately, the other alternative would be to join the likes of inferior bees and cease to exist all together.

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Articles where submitted to:  
BeeCulture Magazine  
Daily Hampshire Gazette (newspaper)  
The Republican (newspaper)

These were all emailed to the editors. I haven't seen them in print yet. If you would like copies of them I can forward them to you.

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