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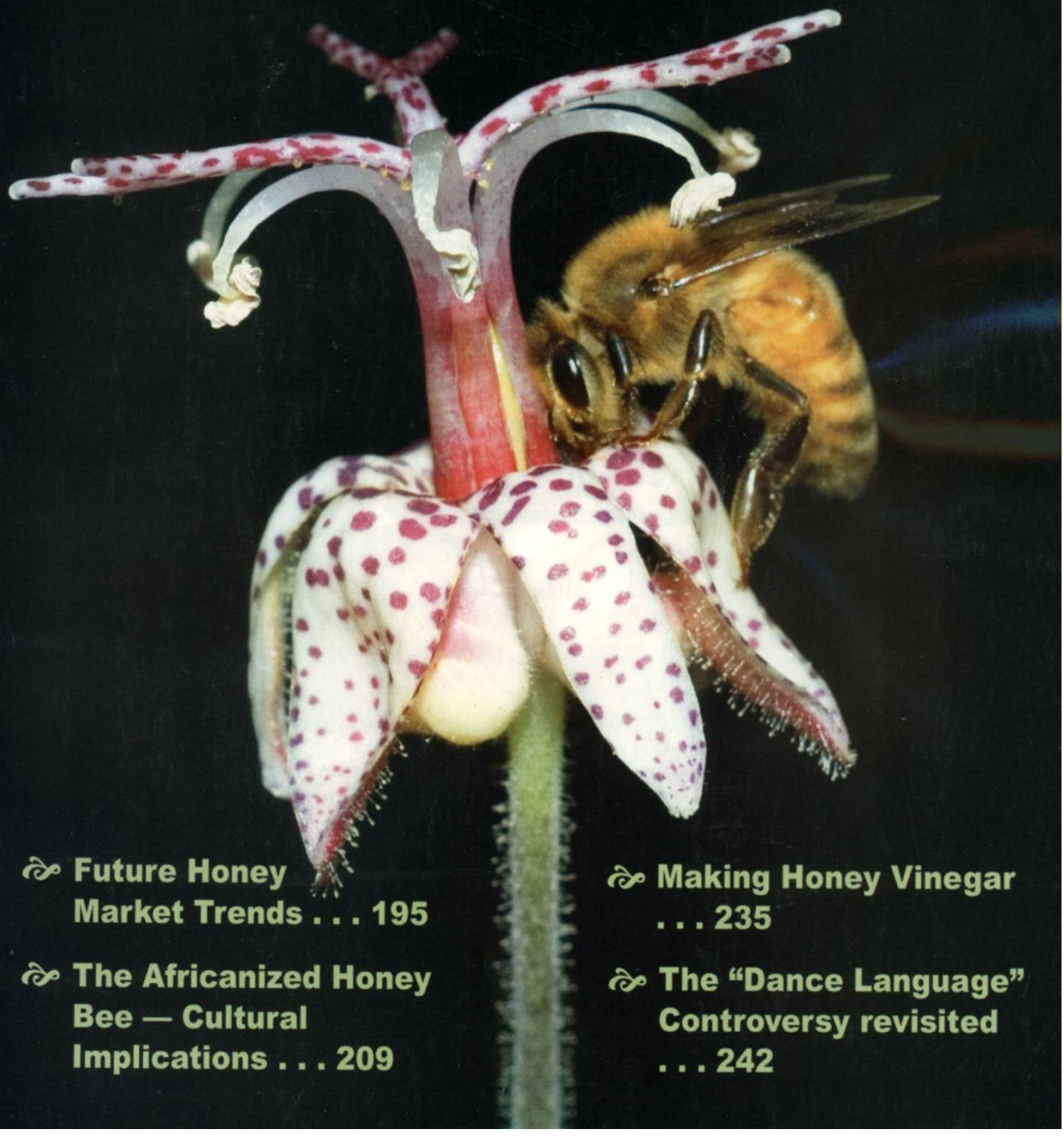

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SARE Grant Helps Fund Package Bee & Queen Breeder Comparison Research

by CRAIG CELLA
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First, I'll give a little introduction about myself—kind of blowing my own horn because no one else will. I bought my first beehives when I was 12 with snow shoveling money (I loved the snow when I was making money from it) and I have had bees as a student of beekeeping ever since. I retired early from a utility company where I worked as a lineman until 1999 and was doing fine working on my farm, but then the Pannsylvania Department of Ag asked if I'd work as a bee inspector. I thought it over and decided what a way to see how everyone else's bees are doing and when Dennis called back two weeks later, I said yes. A few weeks later in early March he asked if I would do the field work with Pennsylvania State University's (PSU) colonies and all I could see were more learning opportunities, so I said yes again.

That was the beginning of looking for answers. It was difficult at first to stay on the research track and not drift over to honey production, but after the first year it was much easier. You cannot do both—you have to draw the line and stay on one side or the other if you want to collect accurate data. No helping the weak, no moving of supers or frames and lots of records. After all these years I feel as though I'm only on page one of a very thick book. Two years ago I applied for a Sustainable Agriculture Research and Education grant through the University of Vermont, Burlington, VT. 05405-0082. My goal was to produce more honey, while using less in-hive chemicals through the use of new comb foundation. I also thought this would help to control swarming thoughout the first season.

I purchased 100 packages from Gardner's Apiaries in Baxley, Ga. After I had paid Mike for them I asked him if he would answer a question honestly for me? He said, "If I know the answer." "How many of these packages will do well for me?" His reply was "to start with 1/3 won't make it through winter, the next 1/3 will with a little help and the other 1/3 will make honey." Remember that statement, it is very important as you'll see by the end of this article. He is the ONLY person I ever met who said it so plainly including all the books and articles I have read. He hit the nail right on the head. I won't argue about it, I have the numbers to back me up and if you are going to tell me how wonderful your queens are - send them out in 2007 and I'll do an honest evaluation. More on this later.

Installing package bees for the SARE grant research

I installed 100 packages for the project, along with 17 overwintered colonies - 50 were placed on new foundation and 50 were on drawn comb. Sugar rolls and sticky boards were used to measure mite levels and virus samples were collected in May, July and September by other Pennsylvania bee inspectors and me. Unfortunately, the virus samples were lost in a freezer problem before they were recorded. All hives were weighed in September and recorded except one location that was lost in a flood the day we had scheduled to weigh. Locations were over a 70 mile spread from mountain top to river bottom farmland, so I had a good variety of pasture. I could give you pages and pages of numbers and charts, but I'll just stick to the meat of the subject: 64 hives swarmed at least once, 27 swarmed at least twice and 21 didn't swarm. I know and you know that packages don't swarm, all we have to do now is teach the bees! There was no difference in the swarming rate between new foundation, drawn comb or over wintered colonies. No difference in ending condition - alive or dead or queenless between locations. The mite counts were almost the same in the hives that never swarmed compared to those that did and new or old foundation didn't have any effect on mite levels. This was disappointing to me because I thought I was on to something. However, it wasn't all in vain because of what I did learn. The top 10% of the hives had an average gain of 135 lbs., while the bottom 10% had only 35 lbs. Now to reinforce what Mike told me. The top 1/3 average gain was 109 lbs., the middle third was at 74 lbs. and the bottom 1/3 came in with an average of 41 lbs. The heaviest hive in the bottom third had a total gain of 58 lbs., which is not enough to overwinter on where I live in central Pa.

Feeding package hives at P.S.U. with a Bob White waterer.

Back in the early 1980s I was walking from an outyard back to my truck when I turned to look back at the yard of 9 hives and started counting which hives made a lot of honey, some honey and no honey. I stood right there and said to myself - Ha! The rule of threes - 1/3 makes a lot, 1/3 makes some and 1/3 makes none and for years I made a joke about it. Well beekeepers, it's not a joke anymore, and I have the figures to prove it.

I've read and had people say that usually the mites won't build up in a package enough the first year to be a problem, but don't bet the farm on it. The winter of 2003 & 2004 was good for us at P.S.U. and we lost very few over winter without any treatment, however, last year was a total wipe out. Keep in mind that these colonies are there for mite research, so they need to allow the mite levels to expand. I lost 95% of mine through the winter and spring. I consider a two-frame cluster of bees as a loss—they just will not develop into a producing colony. With the heavy winter loss and having proven that my ideas on swarm control and new comb versus old comb was wrong I decided not to repeat the same procedures again. Instead, I installed 90 new packages on April 5 and measured the amount of brood with 3 other inspectors on May 10, 2005. All hives were treated the same, so there was only one variable—the queen. Brood production went from 245 sq. inches in the bottom hive to a high of 1000 sq. inches in the top one. This spread is unacceptable to me, but it does help to explain the "rule of threes." There wasn't a grouping of close numbers anywhere in the list, just a steady step-by-step from the bottom to the top. I removed the queens from every other hive on May 28th as a swarm control. I thought the brood would continue to emerge with a new queen and production would continue. Wrong again! They actually produced less honey and still swarmed, only later in the season.

In July I had another idea and that was to make up 3 lb. packages of bees from my own hives, buy 30 queens and see if there was a difference between producers. Simple enough. I ordered 10 from three different producers - Gardners, Norman Bee Farm and Edward Norman Apiaries to be shipped Monday, August 1. I received 10 from Mike on Wednesday and a very nice letter from Norman Bee Farm stating that they had problems because of the heat and couldn't ship. I was disappointed, but I couldn't really get mad, it was one the nicest letters I've ever received. I received the queen from Ed Norman on Monday Aug. 8 - one week in the mail - yes they were shipped on the 1st. People wonder why I don't say much good about the Postal Service. It's the only business I know of where you pay someone to take care of your items and then you have to insure them against the same people breaking them. The more they lose or break, the more they charge for insurance.

Dennis Keeney of Keeney & Ziegler Apiaries in Pennsylvania bailed me out with 20 queens, but the project was already doomed. I had queens caged on the first, the fourth and sixth that had been banked for two weeks. But I went on. I drove out to Keeney's and picked up the queens and along with my other 10, went back to Harrisburg where they were weighed. The range went from .1724 to .2381 grams. I measured the brood on Sept. 8 and again on Sept. 19. On Sept. 8 the brood measured from a low of 110 sq. inches to a high of 850 sq. inches with the same step-by-step pattern as the other hives had in May. Weight of the queen did not have any effect on the amount of brood in each hive nor did who they came from. So once again, I have a very low producer and very high ones with no way to predict which ones will be good.

While I was doing my own bean counting, I had an excellent opportunity to collect some more numbers using P.S.U. bees. I picked up thirty- 3 lb packages of bees for the university near the N.Y. state line on April 27 from a dealer who picked them up in Texas. I don't want to identify in this article where they came from because they were not purchased for the work I used them for and there was no control group, so perhaps everyone's bees would have reacted the same. There were 14 of the Buckfast type and 16 of the Italian race. They were installed on frames left from winter kill and perhaps this contributed to the high virus levels during the summer. However, the one "Kashmir Bee Virus" had not been found in that yard for several years, so that did come in with them. Sticky boards were used for mite counts from the end of the first week and the mites were always present, so they brought them in with them also. But let's get back to the queens. Because I only have 26 numbers, I am going to give them all to you along with the race and you will see the steps of the ladder and it didn't matter which race you bought, there were good ones and bad ones equally distributed from top to bottom.

I=Italians B=Buckfast

No.	Sq. Inches	Breed
1.	1275	I
2.	1230	B
3.	1222	I
4.	1090	B
5.	1070	B
6.	1020	B
7.	1000	I
8.	1095	B
9.	960	B
10.	950	I
11.	940	I
12.	930	I
13.	965	B
14.	960	I
15.	950	B
16.	950	B
17.	875	I
18.	850	B
19.	800	I
20.	790	B
21.	780	I
22.	750	I
23.	725	B
24.	710	I
25.	635	B
26.	570	B

A new trick I learned in 2004 was to place 4 or 5 sheets of newspaper in the super containing the Bob White waterer I use as a bee feeder. It keeps the bees from hanging up on the inner cover and also holds the hive heat in some.

One of my mobile trailer yards used in the S.A.R.E. grant research high up on a hill in the No. 1 bear county in Pennsylvania.

Judgment day of a side-by-side comparison of the different varieties of pumpkins at P.S.U. This is what we need in beekeeping.

If you ended up with either kind at the top of the list, you'd think they were best, but if you had the bottom ones, then they were the worst.

I think the most important thing I learned was what I knew all along about other animals applies to honey bees. Ask any dairy farmer how many good milk cows he will have at the end of their first lactation of 100 heifer calves that he starts with and the answer is always the same - "about half." I asked a race horse breeder how many out of 100 foals will be good? His answer was "three will pay the expenses for the ranch for the whole year." Good bird dog people figure one out of 25 pups will be a champion when breeding champion to champion. Fish breeders figure only 10% should be used as future breeders. Beef cattle people, like myself, plan to save only 1/3 of the heifer calves as future breeders. Hey, isn't that going back to the "rule of threes." I don't think we can expect a queen producer to put their queens into a full colony, evaluate them and save only the top half for shipping to us. You certainly can't take a cow in full production and not milk her for 3 days, she won't come back up until the net lactation. This means we are going to have to do the culling ourselves. You want 25 good queens - buy or raise 50 and cull the bottom half out. Always keep culling the bottom and in time you'll have better bees, but remember how few athletes have offspring that attain the same honors they have won themselves.

Now for the part of this article that I feel is the most important of all. Check on corn production per acre, egg production, hay production or milk production per cow in 1950 and again for the latest year. They shortened the time it takes to raise a broiler chicken one day each year. What advances have we made in honey production over the last 50 years? One thing that the other commodity producers do that we don't do is side-by-side testing. I will refer to corn testing because I am familiar with it and how it is done. In Pennsylvania we have several different locations with varying growing seasons and soil types. I use the information from the test conducted on the farms with soil and weather conditions most like mine. The researchers will plant

many different varieties of corn from different companies and make the research available at the end of the season. Some of the things measured are yield, dry down, and standabilty. I can set at home and study these results and have a good idea what to buy next year. Each time a company has a good one, the competition has to do a little better. Thus, they are always raising the stick on each other and the farmer gains. Testing honey bees is much more difficult because of their nature. I am told you must have at least five colonies in a study to prove anything and since a normal area will support only 20 hives, you are limited to testing from different companies' bees. However, if we took PA, MD, NJ, DE, NY as examples and put four yards in each state, we could test a total of 20 yards with 20 breeders' bees being compared against each other. Each breeder would have 20 hives in the study, but only one at each location.

I do not see us moving forward as an industry until we start some kind of a testing program on a beekeeper's level. There is no real reason at the present for a breeder to spend money on research and development—just keep filling those cages up. I am not running down the breeders, but I think we have to start doing more and one person cannot do it by himself. This would be a wonderful way to compare different lines for mite resistance, temperament, honey production and overwintering etc. The only way I can see this happening is for several association groups to start asking for it to be done. There is grant money available for large projects like this, but you have to ask the right people to do it. In the Mid Atlantic region we have MAAREC which is made up of several universities of which P.S.U. is one of them. They would be an excellent group to oversee a project like this.

To sum up the two years of research, I learned that there is a tremendous difference in queens and we must learn to cull out at least the bottom third or better, the bottom half. New foundation didn't stop swarming or affect the mite levels. I also inspected a lot of hives treated with Api-Life VAR or Formic Acid that were in excellent condition, so perhaps we can move away from the hard chemicals. I used Formic this fall and I haven't had bees look this good for a long time in the fall. They may all be dead next spring, but at least I feel real good about them right now and that's worth something.

I'm also writing another grant for 2006 about dividing all colonies in the spring and reuniting them back after the flow, saving only the better half of the queens. Another part will address the question of feeding in August during a normal 6 week nectar dearth.

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