



B-PLUS

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"SUPERBEE" FOUND!

The long sought after perfect honey bee strain (queen/colony) has been found in my backyard. It out produces any other colony. Has resistance to all known diseases and mites, and doesn't sting. Unfortunately for the rest of you, it is not for sale at any price.

Now that I have gotten your attention via the supermarket tabloid headline and lead, I want to tell you what we all have in our own "backyard."

The honey bee is a genetically variable, highly adaptive species. How else can we account for its presence in just about every habitat. It normally adapts via natural selection to survive in a *particular* habitat. We have found that the African honey bee (AHB) has replaced the European honey bee (EHB) in the tropics because the AHB's genes for reproduction are vastly superior within that particular habitat. The honey bee was not present in the New World before the Europeans coming here about 400 years ago. We brought the EHB to the tropics, but the AHB had been naturally selected for thousands of years for a best fit to that environment. So when the AHB was brought over 30+ years ago it quickly displaced the EHB.

Selection does not have to take place without our intervention. (I say more about how that needs to be done on page 3 .) Certainly we have selected for more gentle bees. Many good beekeepers also select for the strain of bees that best fits their particular place and array of honey plants. We have to consciously select those colonies that do the best within our area **and** management. For example, we may select for a strain that does not put much honey within the broodnest because we always feed them in the fall. Yet if we give that strain to another beekeeper it would fail. The Lonesome Hive originally was "naturally" selected in my backyard as a survivor within my own particular area and management style. Its good genes may be transported to another apiary, or area, but still would have to be selected again to become the superior strain. The U. S. has so many "SuperBees" it is hard to imagine why we keep looking elsewhere, and most of them have been selected for our habitat. The mite resistance story is a perfect example of what is out there in the U. S. honey bee population. If we find a tracheal and varroa mite resistant strain it still means that you must **continue** to select for resistance as well as other traits that you

desire (see page 3). My point is, don't keep looking for the "greener pasture," or SuperBee, as it is right within your own apiary. Just let its genes show.

MITES, Miticur® AND MORE

With the temporary recall of all of the Miticur pesticide strips, beekeepers are asking what are the alternatives, or will the recall only be temporary. Initially it would appear that the recall was due to the apparent toxicity of some strips to honey bees. In the long term we may have to learn to live without amitraz as a control for tracheal or varroa mites. The reasons for this may be twofold. First, there have been some lawsuits filed against Hoechst-Roussell because of the loss of bee colonies. The corporate decision may be just to limit future problems by eliminating the strips for beekeepers. Secondly, the Ninth Circuit Court of Appeals (California) banned cancer-causing pesticides in processed foods. In essence the court ordered the EPA to enforce a 1958 federal law, the Delaney Clause, which forbids cancer-causing substances in processed foods. Amitraz is listed as a Class C carcinogen, and as such it would fall under this ruling. While possible to live with a strict Delaney enforcement, it may be enough to cancel its use in a honey bee colony.

This brings us back full circle as what to do about controlling tracheal mites. Legally, now we have either menthol or resistant bees. Menthol can be effective if used at the proper temperature for a sufficient length of time. The problem in Michigan may be finding that period when there is no honey coming into the hive. Spring would normally be the choice, but I am not sure that this past spring would have produced the desired result. Fall is probably too late to do much about the control since most of the bees would have become infested and go into the winter cluster carrying the mites. A possible alternative would be no later than mid August - just after the summer honey flow. In any event, chemical control has again become a much more clouded picture.

The picture on resistant bees is probably not a lot clearer either. I can't point to a truly resistant strain of bees. Yet when I look at samples of bees from the MSU Apiary that overwintered successfully, there are some encouraging signs. There are some colonies with zero tracheal mites. We have been selecting and purchasing queens that were supposed to be resistant to tracheal mites. Yet we have not seen a very high level of resistance in any particular colony or queen. However, what we may be seeing is a general increase in resistance via the selective mating that has come about because only the resistant colonies have survived. There is some evidence that this may be occurring in other parts of the country. While I was in Mexico recently, doing some African bee research, I asked about tracheal mites. It seems that while tracheal mites were very common a few years ago they are so low as to be a non problem now. Yes, these are African bees but I don't think that matters in this case. It is just natural selection. Such "global" increase in resistance is made possible because only the strong colonies can produce many drones, at least early in the season.

Are there any other alternative chemical controls until we are sure that we have resistance? Not yet. Research is continuing with formic acid and on different formulations of current chemicals to control tracheal mites. Some of these methods show good promise. The problems

with formic acid are at least two. One is its toxicity to the lungs of the handler at very low concentrations. The other is getting it cleared by the EPA. Formic acid needs to be declared a Generally Regarded As Safe (G.R.A.S.) chemical by the EPA. If it were to get this designation it could be registered fairly rapidly. Much the same as menthol was quickly registered. If the EPA does not regard formic acid as G.R.A.S. then it could take a couple of years, or more, to complete the registration process.

SELECTING AND BREEDING HONEY BEES

I have read a paper by D. W. J. Yanke, a New Zealand commercial queen breeder. The article appeared in Dr. M. T. Sanford's **APIS** newsletter. Dr. Sanford had received it via electronic mail. (Communications may be getting better!) The title of the talk by Mr. Yanke was, "Improving Our Bee Stocks: Why It Is So Difficult To Do." It is a very concise article and breaks the problems of breeding honey bees down into eight major headings such as "controlling mating behavior." Under the heading of Maximizing Quantitative Traits, Mr. Yanke hits the nail squarely on the head, and I want to reprint that part of the article here.

MAXIMIZING QUANTITATIVE TRAITS

The characteristics we are trying to improve in honey bees are quantitative traits. These may involve many genes, each contributing only small effect. Compounding this is the fact that these traits are not those of a single breeding individual (the queen) but, instead characterized in a colony composed of many sub-families.

*It is fortunate that many important economic traits such as honey production and winter hardiness in bee populations, even though they are hugely complex, and controlled by a large number of genes, do show good response to selection. However, once these selections cease, any increase in traits which has been achieved is lost very quickly as gene frequencies return to pre-selection balances. Thus, maximizing quantitative traits is a **continuous** process which must be done with great care.*

The emphasis on the word *continuous* was mine. I think this is the one thing in honey bee breeding that is overlooked more than any other process. We forget that the queen has a relatively short life, and is replaced with a daughter that is multiple mated. The drone source could have changed because of a new stock moved in by a neighbor or by a swarm that emigrated into a hollow tree. In genetic terms there would generally be a regression back to the average of the population. There may be certain conditions that could cause a population to stabilize. The African honey bee is probably the best example. I have seen such characters as color essentially stable after about 30 years of selection. **But** for most quantitative characters the continuous selection would be necessary.

It may be that nature could provide for the continuous selection. For example, the pressure from tracheal or varroa mites should push the population toward resistance. However, for most of us we do not wish to wait for that process to go to completion, and we aid or supplement nature. We can do this by raising queens from our best (resistant?) colonies. When we do, we can move the whole honey bee population toward our goal.

TALES FROM THE LONESOME HIVE

Like the rest of Michigan's honey bee colonies, the LH went through a rather wet, cool spring. While the hive seemed to winter fairly well it was not as strong as in previous years. I suspect that the queen is getting old (two years) and is not producing brood like she did. Therefore, I started a division on top of the parent colony to raise a new queen. She was mated. I don't know how since the weather was so cold during the period when she would have normally mated. I suspect that we don't know all of the mating process, especially the mating that occurs during poor weather. In any event I must watch the brood production from this new queen as she may have not mated as often as she would have during good weather. A smaller number of sperm in the spermatheca would mean that she could run out earlier than otherwise.

I replaced the division screen with a queen excluder after the nuc queen was laying well. This week I will unite the broodnests and begin to super. The honey flow is now on. The first super will be a shallow super and then I will replace that super with the cassette half-combs, probably later this week. We could have a good honey flow here in central Michigan if the weather remains hot and dry.

LOOK FOR MITE RESISTANT COLONIES

In previous **B-Plus** articles I have commented that beekeepers have the large number of colonies that are needed to find genetic diversity. The U.S.D.A. and universities only have a relatively few colonies. Thus, if we are to find resistance it will most likely come from this larger gene pool. I think this is coming true in the U. S. We have seen more examples of colonies surviving varroa than appears to have happened in Europe. Why this should be true is not clear. Varroa mites were found in Europe for 20 to 30 years before they recognized what appears to be resistance. It may be that we have more wild (feral) colonies than was present in Europe. It also could be that we have a different strain of the mite than is found in Europe. There is some evidence that this is true since the Europeans say that it takes three years for the mites to kill a colony.

In the U. S. we have had varroa mites kill a colony in less than a year. In any event we keep hearing and seeing evidence of resistance.

The research scientists need your help in finding these resistant colonies. They may be colonies that have survived in trees, or other cavities. They also could be within your apiaries. Keep on the lookout for these survivors. Colonies that have not been treated with any chemical, and yet are found in areas where the mites are found. Sometimes these are colonies that have

escaped the mites for one reason or another. However, if the colonies continue to survive, they must have some mechanism of resistance. If you see or find these colonies let us know about them. We may be able to examine them ,and even breed queens, or use the drones from these colonies, to select for a mite resistant strain. Call either me at 517-353-8136 or Gordon Reyburn at 616-924-4032 with any possible candidate colonies.