

# Dear Larry –

## Local Queens/Local Nucs

Two somewhat related communications arrived in my email and I am using them as the basis for this month's article. Thanks to David and Pam for sharing their questions with *Bee Culture* readers.

### *Breeding from my best queen*

*Hi Larry, how are you? I was at your CT queen-rearing course this past summer and enjoyed it very much. I have spent all summer planning on raising queens next year and observing my colonies for positive traits. I had a quick question for you if you do not mind. I typically run around 10 hives and was wondering your thoughts on breeding solely from my best queen. If I requeened all hives with daughters from a single queen will this result in too many diploid drones eventually? Since I have so few hives, doing my own queen rearing from several hives may be counter productive when trying to develop local traits. I guess a better way to put it is, I want to breed from my best hive, but am wondering if the only way to reduce the chances of diploid drones would be to graft from several colonies, thus reducing the overall effort of strengthening the stock when I only need nine cells. I hope this makes sense and would greatly appreciate your advice. Thanks for your help, – Dave*

David C. Mosher  
East Windsor, CT. 06088

Dave,

Thanks for the comments. Let me break down your question into several parts. That way we can look at this from a complex way as well as simply as possible.

Simple answer: Go ahead, graft from your best colony and re-queen the other nine colonies with one queen's daughters. Since you are in a part of the country where there are plenty of beekeepers, we will make the assumption that you have a pretty diverse drone population in the East Windsor area, and the final colonies will be influenced by the many drones each daughter queen sexually encounters. With the average queen mating with 13–20 drones, and a few with 40 to 60 mates, your resulting colonies will represent a sample of the many drones found within a three to six mile radius of your apiary.

Keep in mind what I covered in the class: that individual virgin queens are very unlikely to mate with drones from their colony or a colony from the same apiary. This seems to be part of the honey bee species mechanism to minimize inbreeding, which is part of your question. While there are always exceptions, most of the queens will find drones from a several-mile radius of the apiary. It seems unlikely to me that any 10-colony beekeeper is going to see a problem with inbreeding, especially in Connecticut.

From a more analytical perspective, I would ask you a few questions:

1. Are the 10 queens from the same or a different source? If they are all sister queens from packages or nucleus hives, then they are probably closely related unless you have intentionally purchased from unrelated sources. You will continue to have closely related queens, and they may all be pretty good or pretty bad, depending on the season and the one colony you select. You are reducing diversity by grafting from one queen, and they could be good, bad or you may not see any change.

2. Do you plan to expand your colony numbers? Larger beekeepers who graft from just one breeder queen often regret the decision – beekeepers with hundreds or thousands of colonies. Why? There is no single answer, but the genetic diversity issue is probably the most important part of the issue. Even if you picked the top two queens out of 10, you would reduce the risk of getting a poor stock in your operation due to some genetic fluke. I have heard of queen producers generating upwards of 50,000 daughter queens from one grafting mother. While worthy of some sort of award, it may not be for best use of intelligence. This represents a huge risk genetically. True, if the queen is fantastic, there could be a large number of really great colonies. But what if there is something genetically defective with the queen mother of 50,000 daughters? Then the result may not be very good!

Breeders are going more and more to closed population bee breeding programs designed to stabilize a number of queens, say 30 to 50, and instrumentally mating them with a syringe filled with sperm collected from hundreds of drones from the same queens, and mechanically mixed to maintain diversity. The risk of inbreeding is reduced dramatically, and the closed population may be maintained for a human generation without much decline in vigor or increase in the level of inbreeding.

All colonies express some spotty brood as a function



*Would you graft all your daughter queens from one colony, maybe this one? Photo provided by David Mosher*



of the haploid/diploid sexual mechanism. This is usually five percent or less of the brood in a worker frame. The missing cells are where the sex alleles for the worker are the same, causing a diploid drone. Bees remove these drones during their early larval stage, explaining why you have some missing cells on every frame.

3. You are a young beekeeper, so do you imagine you will graft from just one colony every year for the next 50 years? If you also become famous for your queens, will you sell or give away a thousand queens, queen cells, or virgins, every year because you find peace and contentment by doing this wonderful thing?

Now the mathematics changes quite a bit, since you are probably saturating the area with the same genetic information as you are grafting from. Inbreeding suppression develops when you have a very close pedigree within the same bloodline. Very quickly you should expect to see an increasing number of empty brood cells in sealed brood, a reflection of you bee breeding from a single or closely related stock, plus the implied saturation of the area with drones that are functionally gametes of the queen. Pretty powerful genetic trouble.

Avoid this problem by bringing in new stock every year. Put it in the drone side of the mating by evaluating colonies and promoting drone production if you like what you see. Inhibit drone production if you are not impressed, or need to look for an entire season. These new queens could be from another Connecticut or New England beekeeper who has been working toward a regional, adapted, mite resistant bee, from a wild bee tree, or a selective purchase of a queen from a bee breeder.

Or all these options. Even with 10 colonies you are able to make observations, and determine the best colonies. Welcome to bee breeding!

### Local Guild produces nuclei hives for members

Hello Dr. Connor,

*Pam Fisher of the Beekeepers Guild of Southeast Virginia here. I wrote to you last year about your article supporting local queen and nuc production. You probably get so many email messages that you don't remember mine, but I wrote to you because your article was very timely for me – a group of local beekeepers, including me, had just left a traditional beekeepers association and established our new guild because we felt that we were not getting anywhere trying to advocate sustainable beekeeping practices . . .*

*Now it is a year later and I am happy to report that our guild has not only survived, we've doubled in size. And we have remained true to our sustainable tenets by producing local state-inspected nucs for every one of our members who requested them. It was no small feat after we graduated a class of 85 beginning beekeepers from our first bee school, more students than we had members!*

*With the recent news of the discovery of Africanized bees in Georgia, the leading producer of bee packages for our area of the U.S., I feel vindicated in urging our members to eschew the immediate gratification bee packages for the better survival rate of nuclei. Yes, they had a little wait while we produced the nucs, but now the reward is two-fold: stronger colonies and no Africanized bees.*

*Just as with local food, there is a powerful incentive for a local nuc producer to provide only the best to his cus-*

*tomers; he will see the customer again at meetings and have to answer for his product. We paired our new beekeepers with experienced beekeepers through a structured mentor program and as a result, most new beekeepers were quite successful with their nucs. I feel that it also kept the nuc producers from selling anything sub-standard to a new beekeeper since they knew that an experienced beekeeper would be helping to install and maintain the new colony.*

*As a result, our new beekeepers have a wonderful attitude of wanting to repay the kindness shown them by their mentors and nuc producers; they want to produce nucs for next year's new beekeepers to keep the cycle going. So I just wanted to let you know that a local sustainable nuc program worked for us in its first year and that the goodwill that it generated will expand the program in years to come.*

*Thank you very much for your articles supporting local queen rearing and nucleus colony production. They were the inspiration that we needed this first year to keep going when we wondered if we could ever pull it off!*

Sincerely,  
Pam Fisher

*Beekeepers Guild of Southeast Virginia  
The VA Commonwealth's first beekeeping guild  
<http://beekeepersguild.org/>*

Dear Pam,

You have identified two key points here – the importance of mentoring and local reliance for nucleus hives. I know that this represents a huge change in thinking for many beekeepers. The idea of ONLY getting local nucleus hives is revolutionary for a vast majority of beekeepers, especially those who have relied on Sunbelt package bees in the past.

My experience with Sunbelt packages in 2010 will be remembered as the year of my \$216 packages – so many colonies had queens that were poorly mated and produce drones within a monthly, developed European foulbrood, or had failed supersedures that I ended up with a lot of



*Mentor Bob Montcalm of the beekeepers Guild of Southeast Virginia (in helmet), instructs students Debbi Torres and Jim Doubler.*





Virginia nucleus hives are made from Virginia colonies and Virginia based queen producer.

colonies being stacked up to take the Winter losses in the Fall. It is a three to one reduction over the season and I paid \$72 per package (ironically, to increase the number of bees I had for support hives for bee breeding). Maybe in a better year (in the Sunbelt states) I would have done far better than I did. But with African genes in Georgia, Texas, California and other states I agree with you and your group that NOW is the time to develop local queen rearing and nucleus production.

There is a huge financial incentive for suppliers to support the resale of package colonies to local beekeepers. There is no secret about this. Tens of thousands of package colonies are sold at a profit to new and existing beekeepers. These suppliers need to ask if they want to be

known as the beekeeper who brings in African genes.

Mentors are key to this program. There will be a discussion about this at the Federation meeting of the Joint meeting in Galveston, TX in January. As part of the Sixth Serious Sideliner Symposium, I have several folks talking about developing a Country-Wide Master Beekeeper program. My position is that for such a program to work effectively we need to have a fantastic method of teaching the teachers (mentors, trainers, coaches, master beekeepers, etc) in all parts of the country.

With the flood of new beekeepers, there is an enormous demand for training and education, as you report with 85 new beekeepers in your group. Having more students than the club has members is becoming a routine challenge for a lot of groups. And while history says that this swell in interest will fade, many of the people getting into bees and beekeeping are better educated, better informed, and more diverse than I have ever seen. There are all sorts of partnerships: married couples, same-sex couples, intergenerational relationships between grandparents and grandchildren and a lot more. I think this will generate a longer level of interest over the future.

Going to the use of nuclei (nucs) does delay delivery to the beekeeper, but as you stated, this results in a stronger colony and reduces the chance of African genes in the colonies. Recently I worked with colonies from Texas packages that were pretty peppery, to be polite. They demonstrated the veil banging and long term following associated with African bees. These were 2010 packages. These reports increase more and more as I travel the country.

### The Challenge

You will face the ultimate challenge of maintaining this program, keeping interest levels high and insuring that every new beekeeper gets the best possible nucleus and queen you can provide. I hope you have a good team to help you, since this sort of effort will suck you dry as a member of a voluntary organization. **BC**

*After talking about Bee Sex in the City to New York City beekeepers in early December, I will be getting ready for the International Joint meeting in Galveston, TX. Join us at the Sixth Serious Sideliner Symposium in early January. Is that S to the fourth power? Hope to see you there!*



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