



**RUSSIAN QUEEN BREEDERS ASSOCIATION**  
GENERAL INFORMATION REGARDING THE INCEPTION OF THE  
STOCK MAINTENANCE AND SELECTION PROGRAM

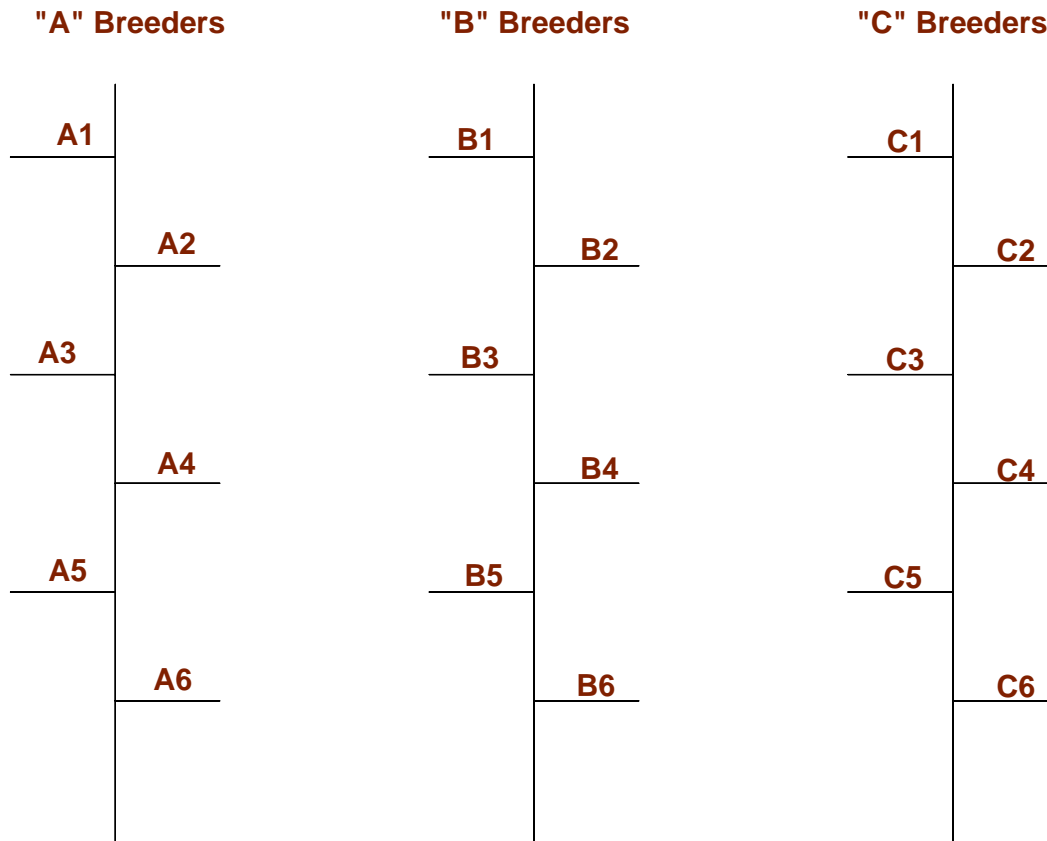
*February 28, 2007*

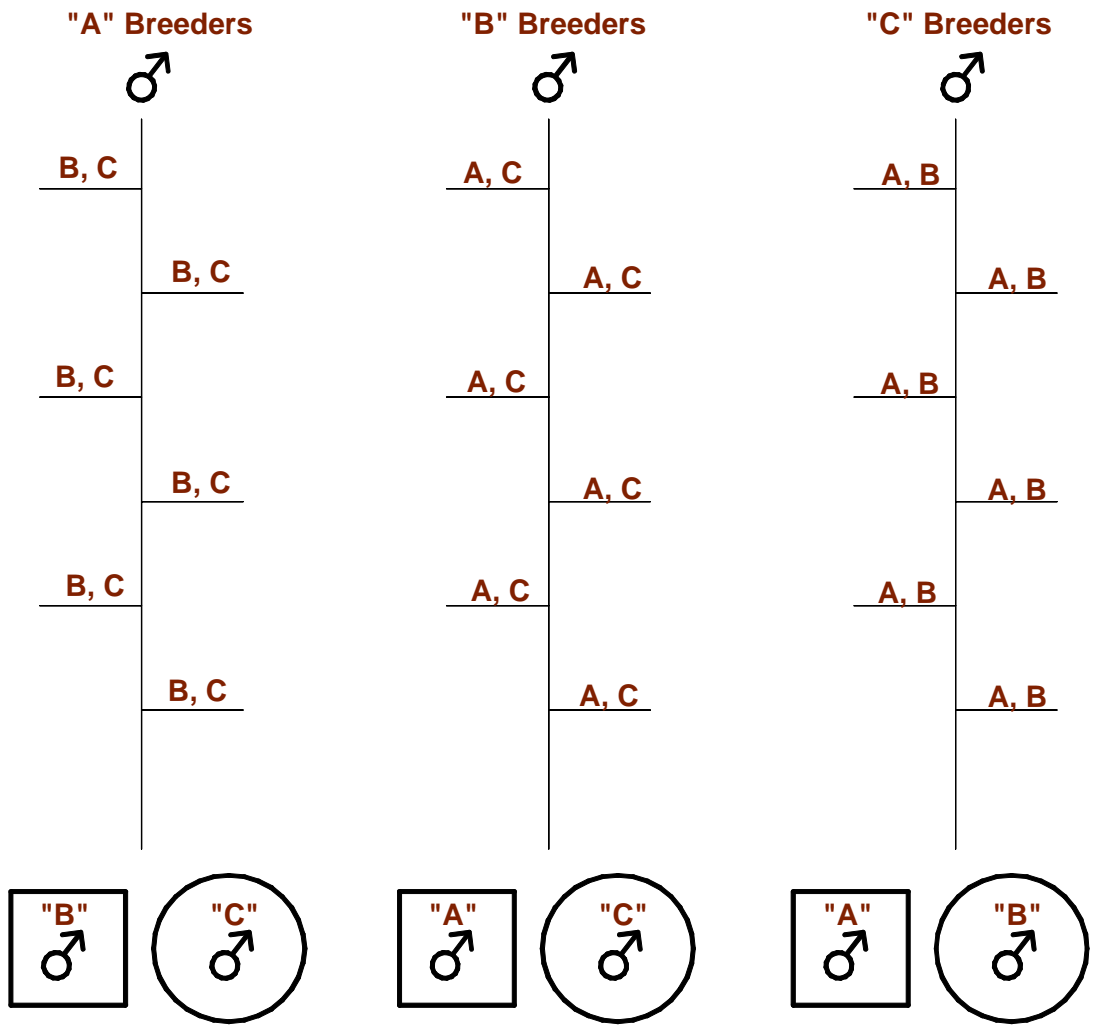
Since we don't know how many active participants we will have in the beginning, we are going to illustrate the plan with an *assumed* number of 18 participating cooperators. What follows is a generalized plan to be refined as more concrete numbers are available

The Russian Queen Program at the Baton Rouge Bee Lab is maintaining and selecting 18 queen lines, divided into 3 groups of 6 lines each: "A"(White), "B"(Lt. Blue), "C"(Neon Yellow). Individual lines are identified by double color dots. Group "A" is White-Blue, White-Purple, White-Orange, White-Red, White-Green & White-YellowBlue. Group "B" is Blue-DkBlue, Blue-Red, Blue-Orange, Blue-Tan, Blue-White & Blue-Yellow. Group "C" is Yellow-White, Yellow-Orange, Yellow-Green, Yellow-Purple, Yellow-DkBlue & Yellow-Yellow. These colors will come into play a little later in this plan.

The 18 *assumed* participating cooperators will be placed in 3 breeder groups. This way, diversity will be maximized. For example, 3 cooperators geographically close will be assigned to different groups. This will help keep lines and stock from becoming regionally specific.

**YEAR #1: 2007**



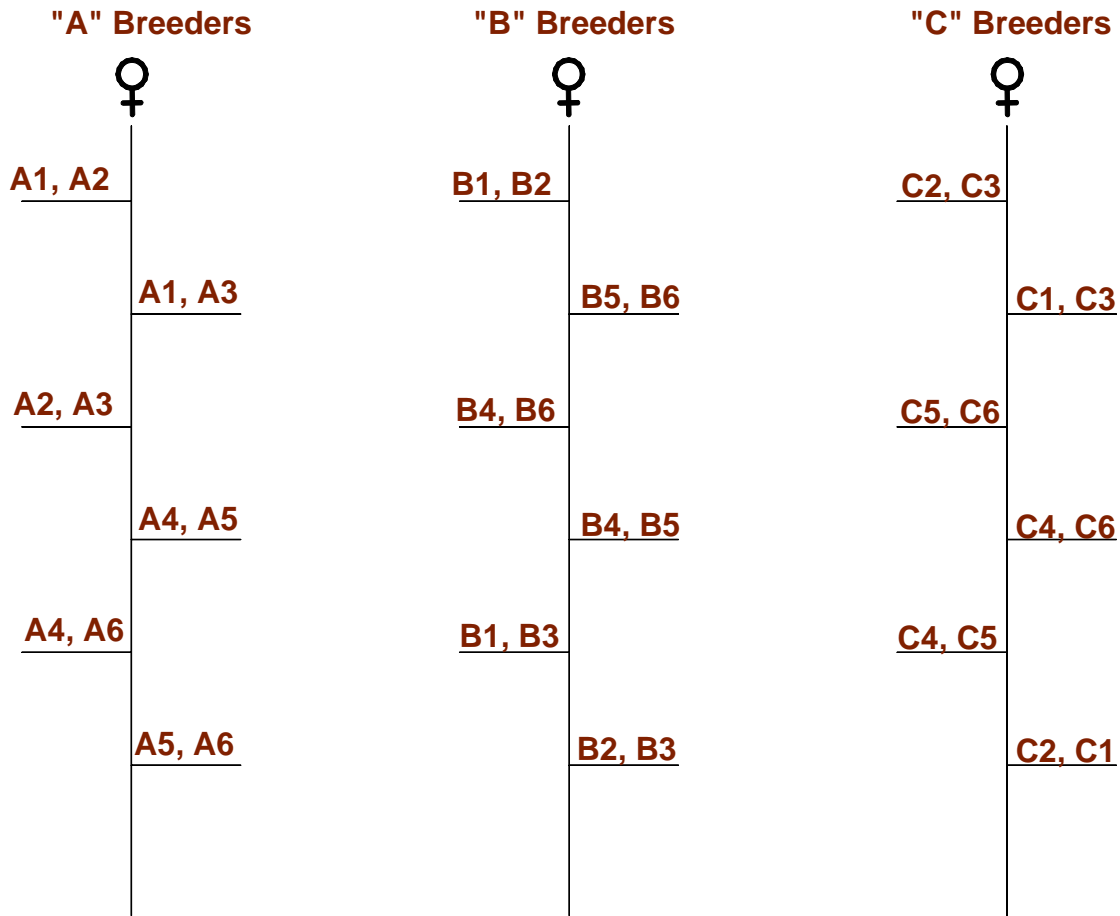


- Group "A" cooperators will receive "B" & "C" drone source breeder queens from Charlie Harper, the CRADA holder.
- Group "B" cooperators will receive "A" & "C" drone source breeder queens from Charlie Harper, the CRADA holder.
- Group "C" cooperators will receive "A" & "B" drone source breeder queens from Charlie Harper, the CRADA holder.

All cooperators will graft from their drone source breeder queens and set up drone production yards. Ideally 40 to 60 colonies will be established, if possible, in group yards. This will form the initial drone pool. The new queens can be mated with existing drones in the individual outfits, as the F1 drones will be Russian. The queens should be marked at least according to group: "A"(White), "B"(Lt. Blue), "C"(Neon Yellow).

Cooperators will conduct normal colony management with the addition of introducing drone comb for increased drone production. Drone source colonies should not be treated with coumaphos or fluvalinate as these chemicals affect sperm viability.

**YEAR #2: 2008**



- Group "A" cooperators will receive 2 breeder queens from Charlie Harper, the CRADA holder. One queen from each of 2 "A" lines. These now become "**Your**" lines to evaluate and eventually select.
- Group "B" cooperators will receive 2 breeder queens from Charlie Harper, the CRADA holder. One queen from each of 2 "B" lines. These now become "**Your**" lines to evaluate and eventually select.
- Group "C" cooperators will receive 2 breeder queens from Charlie Harper, the CRADA holder. One queen from each of 2 "C" lines. These now become "**Your**" lines to evaluate and eventually select.

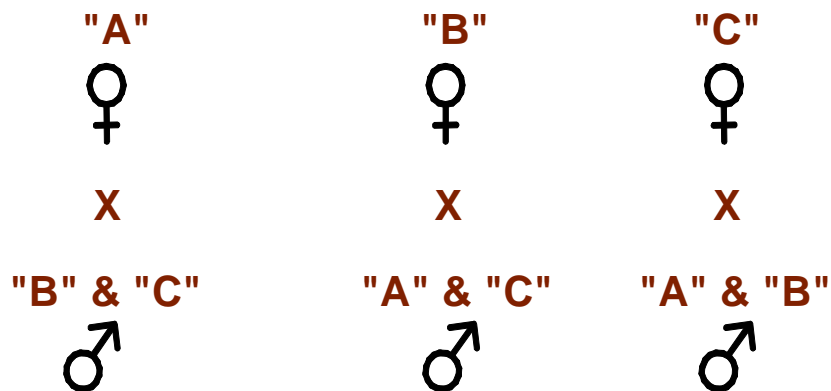
Cooperators will graft from their new breeder queens, mate the virgins to the drones of their Russian drone pool (Year #1: 2007), and set up queen evaluation yards. A minimum of 60 colonies will be established per line (minimum 120 colonies). **Queens must be marked and clipped** to be able to properly identify queens later on.

Additionally, all the cooperators will graft, mate, mark, clip and send 2 daughter queens from each of “their” lines (line 1 = 34, line 2 = 34, total = 68 queens) to all the other cooperators. They will receive a total of 68 queens in return from the other cooperators. These 68 queens will be the drone sources for Year #3: 2009, and replace the drone sources used in Year #2: 2008.

Colonies will be managed, maintained and evaluated across the year by the cooperators. **No Chemical treatment will be used on evaluation colonies. If the colony is in danger of imminent collapse it is to be taken out of the test.**

At the end of Year #2: 2008, the cooperators maintaining, managing and evaluating the next sequential breeder queen release group (in this case group “A”) will compare their selected lines and decide as a group “A” committee which two lines (“A”) will serve as the 2009 breeders. Grafting mothers for the production of “Sale queens” will be the same queens as those distributed as drone sources. These queens will serve both purposes.

All program cooperators will receive a total of 68 selected breeder queens from the other cooperators in the program. That is: 18 cooperators x 2 lines each x 2 queens per line = 68 queens. These are Year #2: 2008, selected breeders to be used as drone sources in Year #3: 2009. Among those 68 queens are the designated breeder queens (2009 = “A”) slated for making the Russian production queens for release to the industry in ‘09. The 68 queens received from the cooperators will be a pool of selected “A”, “B” and “C” queens. These queens need to be segregated in yards by group and are the drone sources for mating new queens. Care must be taken to ensure that appropriate drone lines are used with the respective queen lines hence the segregation of yards by group (“A” queens x “B” & “C” drones).



**YEAR #3: 2009**

In Year #3: 2009, cooperators will graft from “THEIR” selected breeder queens, mate the virgins to the drones of their new Russian drone pool (Year #2: 2008), and set up this year’s queen evaluation yards. Again, a minimum of 60 colonies will be established per line (120 total). **Queens must be marked and clipped** to be able to properly identify queens later on.

Additionally, all the cooperators will make and send 2 selected mated, clipped and marked queens from each of “their” lines (line 1 = 34, line 2 = 34, total = 68 queens) to all the other cooperators. They will receive a total of 68 queens in return from the other cooperators. These 68 queens will be the drone sources for Year #4: 2010, and replace the drone sources used in Year #3: 2009.

Colonies will be managed, maintained and evaluated across the year by the cooperators. **No Chemical treatment will be used on evaluation colonies. It the colony is in danger of imminent collapse she is to be taken out of the test.**

At the end of Year #3: 2009, the cooperators maintaining, managing and evaluating the next sequential breeder queen release group (in this case group “B”) will compare their selected lines and decide as a group “B” committee which two lines (“B”) will serve as the 2010 breeders. Grafting mothers for the production of “Sale queens” will be the same queens as those distributed as drone sources. These queens will serve both purposes

In year #3, 2009 cooperators will finish evaluating the selection colonies in their lines. They will graft from one to three of the best colonies in each line and produce the next generation of queens for their continued line selection. They will establish 120 colonies with the new queens and begin the selection process on them. Cooperators will also produce two queens of each line for all other cooperators for the establishment of new drone yards from the selections of everyone in the program.

In subsequent years this same cycle will repeat

## Year #1: 2007

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### As a commercial beekeeper

Buy "B" Breeder Queens  
from CRADA holder



Graft and Sell "B" Production  
queens or whatever

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### As a cooperator

- Receive Group appropriate drone source breeders
  - Graft and set up drone source yards according to group (40 - 60 or more colonies)
  - Drone colonies should **NOT** be treated with coumaphos or fluvalinate as these chemicals affect sperm viability.
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## Year #2: 2008

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### As a commercial beekeeper

Buy "C" Breeder Queens  
from CRADA holder



Graft and Sell "C" Production  
queens or whatever

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### As a cooperator

- Receive 2 Group appropriate breeder queens from the CRADA holder. These are now "Your" lines
  - Graft and set up queen test yards. Minimum 60 colonies per line = 120 colonies in at least 2 yards
  - Manage, maintain, evaluate and select the best queen from each line  
**NO TREATMENT OF EVALUATION COLONIES. IF SHE NEEDS TREATMENT SHE IS OUT OF THE TEST.**
  - Produce 2 mated, marked and clipped daughters from each selected queen. Line 1 = 34, Line 2 = 34, Total 68 queens
  - Send 2 mated queens (clipped and marked by group and line) from each line to the other cooperators, after grafting and setting up your test yards.
  - Receive 68 mated, marked & clipped breeder queens. Of these, 60 queens are this year's drone sources. Eight designated "A" queens are next year's production queen breeders (they can also serve as drone sources for "B" and "C" queen matings)
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## Year #3: 2009

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### As a commercial beekeeper

Receive "A" Breeder  
Queens from Program



Graft and Sell "A" Production  
queens or whatever

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### As a cooperaterator

- Graft from own selected lines for new year queen maintenance, evaluation and selection. Set up queen test yards. Minimum 60 colonies per line = 120 colonies in at least 2 yards
  - Manage, maintain, evaluate and select best queen from each line  
**NO TREATMENT OF EVALUATION COLONIES. IF SHE NEEDS TREATMENT SHE IS OUT OF THE TEST**
  - Produce 2 mated, marked and clipped daughters from each selected queen. Line 1 = 34, Line 2 = 34, Total 68 queens
  - Send 2 mated queens (clipped and marked by group and line) from each line to the other cooperators, after grafting and setting up your test yards.
  - Receive 68 mated, marked & clipped breeder queens. Of these, 60 queens are this year's drone sources. Eight designated "B" queens are next year's production queen breeders (they can also serve as drone sources for "A" and "C" queen matings)
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### Selection of Breeder Queens:

Selecting queens from a group should follow some generally universal procedures.

**There will be no chemical treatment of evaluation colonies. If the colony is in danger of collapse, she will be taken out of the test.**

**Varroa mites:** Their resistance to varroa is a chief benefit of the stock. However, it can become reduced or even lost if selection pressure is not maintained for resistance to varroa. While there are many approaches, generally a measure of mites per adult bees is a good one. However, to use this successfully the measurement must be of the change in mites per bee over time. In order to do this, individual colonies must be measured when the new test queens are installed (mites at the beginning). Try to use colonies or splits that do not have a recent history of treatment. In order to have a good test the colonies should start with a few mites. A year later, colonies must again be evaluated for mites per bee (mites at the end) (number of mites at the end minus the number of mites at the beginning is divided by the number of mites at the

beginning). That is: (End - beginning)/beginning). This gives an estimate of mite population growth. **In order to do this individual test colonies must be numbered.**

There are three methods that could be used. Ether roll, sugar shake or washing. Each has advantages and disadvantages. We will do a separate sheet on these.

**Honey production:** Honey production measurement is very important. First, the stock must produce good crops. Second, many traits such as brood disease resistance, good pollen foraging, good brood rearing and on and on all underlie honey production. Some measurement of the crop from each test hive that can be roughly converted to pounds is necessary. Weigh supers or count full frames that you remove when you take the crop. Write the number down along with the colony number. We mark supers with colony numbers and then write down weights when we get to the honey house. It saves confusion in the bee yard. Pre-mark the supers and then go ahead and do the beekeeping.

**Tracheal mites:** Some but not all Russian colonies are resistant to tracheal mites. Northern beekeepers can generally trust that overwintered colonies that end up producing lots of honey will be resistant. Easy enough for them. Others might be in an area that they think they would want to do a direct measure. Some people cut bees and count infested bees. However, it might be that for everyone, the better colonies are probably resistant. It is something for the group to discuss. The ARS bee lab in Beltsville has a service unit that will do dissections for tracheal mites. Small samples (20 or 30 bees) could be taken from all colonies under selection during a time when tracheal mites are most likely to be prevalent (late fall or early spring). The samples could be labeled by colony and frozen. Later in the cycle when breeder queens are being selected based on varroa mites and honey production, samples from the 12 or so candidate queens could be gotten from the freezer and sent for analysis to make sure that the colonies did not show indications of tracheal mite susceptibility. They promise a 3 day turn around.

**Other traits:** On occasion the lab program has used additional traits. If a colony was too objectionable because of stinging, it was not used. Generally, the more traits you add, the less likely your selection will make progress. When other traits are used it should only be a rare event. Since this is a group effort, consulting the group before you select an additional trait would be helpful.

### **The actual process**

1. Set up the test colonies with marked and clipped queens. Keep track of your lines by using additional paint or by having them in separate yards.
2. Number the colonies.
3. Scoop worker bees and determine mites per bee. Create a record sheet.
4. Keep the bees through winter and a nectar flow.
5. Take the honey crop and measure honey by colony and put the honey numbers on the record sheet.

6. Choose the top 6 colonies for each line based on honey production. Go back to those colonies and verify that the marked, clipped queen is still there. For the colonies that still have a marked, clipped queen, do another determination of mites per bee. Do the mite population growth calculation for these colonies.
7. Choose the top four queens in each line based on a combination of high honey and low mites. If you are not sure, some discussion with others, perhaps on a group net forum, will help out.
8. Graft from the top two queens in each line. You chose extras because queens die. If one does, just go to the next one down the list.

**Note:** The bee yard a colony is in affects its honey production and mite levels. The lab uses a fancy statistical procedure to level the playing field. You can do the same thing by working according to the yard. If you have two yards of one line, just choose the top two in each yard. It does not matter that one yard did better than the other one. It only matters that they were the best in their yard. There are lots of combinations of lines and yards. The more complex the system you use, the more records you will need.

### **The Physical setup**

The following description and graphic serve as a model for a queen breeding physical setup. For this plan, numbers of drone colonies will support about 1800 mating nucs. Those of you who have the resources to do so are encouraged to expand the number of drone source colonies to better saturate your queen mating yards with selected drones.

- A. Your nuc mating yard should be in a centralized area where you can surround it with selected drones.
- B. Drone source colonies should be placed a ¼ mile but no more than a ½ mile from the nuc yard. Place a minimum of 20 selected drone source colonies in each of 4 yards. Make sure that the drone yards can “surround” or “ring” the mating yard in order to have selected drones coming in from all directions (i.e., North, South, East, West).
- C. This is a selective breeding program, hence care must be taken to ensure that the appropriate drones for the particular queen lines being mated are used. You might have up to 18 queen lines from 3 groups in your system. The drone source colonies that are from the same group as the queens you are mating must be held in out yards far enough from the nuc yard so they will not be an influence in the matings. These out yards should be a minimum of 1 mile distant, but preferably further.
  - If you are mating “A” group queens - you move “B” & “C” selected drone colonies into your drone ring yards. Your “A” drones remain in out yards.
  - If you are mating “B” group queens - you move “A” & “C” selected drone colonies into your drone ring yards. Your “B” drones remain in out yards.
  - If you are mating “C” group queens - you move “A” & “B” selected drone colonies into your drone ring yards. Your “C” drones remain in out yards.

D. You will be maintaining, evaluating and selecting queens in addition to your queen mating activities. These queen selection yards will also have drones that may be a factor in the selective matings. The queen selection yards can be used to your advantage by being placed in such a way as to be a buffer zone defense from feral or unselected drones.

This is a model. As a model it points the way to how the program can be in each operation. You will want to adapt this model to your outfit and your resources. You may be able to increase the number of your selected drone source colonies to the extent that you can surround your mating yard. You may be able to move your nuc yard to a relatively isolated area. There are many ways to accomplish this program successfully. There will be opportunities to ask the technical advisors, or other more experienced members of the program, for pointers, advice and input.

