Wintering Fertilized Queens in Banks (1986)

Gilles Ratia

First published in Abeilles & Fleurs (n°357) April 1986 Copyright©

Doctor Alfred Dietz, from America, was invited to Paris by the French Association of Queen Breeders and Bee Breeding Centers (A.N.E.R.C.E.A.) to give a conference on the theme of "Wintering Fertilized Queens in Banks".

The conference started in the morning in the laboratory at Museum of Geology and Natural History with a session titled, "Venomous Animals" and continued in the afternoon in the Paleontology amphitheater, which is located in an imposing 150-year-old building with a decidedly Jules Vernian look. Mr. Pierre Robaux welcomed participants warmly while signing copies of his book "Varroa and Varroatosis".

Over thirty devotees, mostly professional breeders, were able to follow the subject, thanks to skilled translations by Raymond Borneck (President of Apimondia) and Marie-Anne Mignot, a beekeeper who has already visited Mr. Wilbanks' (a predestined name) set up in Claxton, Georgia, USA.

Wilbanks owns 5000 hives and produces 30 000 to 40 000 fertilized queens per year, package bees, as well as wintering 3 to 5 000 fertilized queens. The business employs around a dozen people full-time, who are helped by Alfred Dietz's students during the high season.

What is the purpose of a queen bank?

- as temporary storage during the high season while waiting to send off newly mated queens
- to minimize storage costs out of season
- to absorb unsold stock in autumn...
- ...so that they will be ready to put on the market early the following year, at a higher price
- to control production to match market variations, climatic conditions, and even deal with canceled orders.

Mr. Wilbanks' installations for wintering over 3 000 queens Apis mellifica ligustica (Italian) consist of:

1. A purpose-built dark building, fitted with a bee-escape leading to the outside, insulated, and heated to 15°C, with little importance given to the level of humidity (this is in fact controlled by the daily feeding). The aim is to prevent at all costs the formation of a

winter cluster. Trials carried out by putting queen banks on populated brood boxes outside all led to failure due to the cold. Inside the building there are 14 hive sites each with its own bee-exit to the outside, kept to a narrow 1.5 cm to prevent draughts. On the outside the entrances are painted in different colours to avoid drifting.

2. Each brood box is given a selection of frames, some empty, others full of honey and pollen and three special frames. There are no frames containing brood, open or sealed, nor any queens moving over them freely.

Each special frame is divided into three levels each containing two rows of boxes placed back to back. If we add up, 10 x 2 x 3 x 3 x 2 we arrive at the amazing sum of 360 queens living together in a bank made up of two Langstroth brood boxes: a veritable empire which defies all the honeybee's natural habits. Each queen has a 2.5cm diameter abode fitted with an entrance hatch on one side and a fixed mesh grill on the other with 2.5 mm^2 holes (important to prevent the intrusion of the wax moth *GaIleria mellonela*) through which the bees look after her, as she lives alone without attendants, feeder, or the slightest piece of comb.

Method

Two kilos of young bees are needed to populate a bank on a single Langstroth brood box and four or five kilos when using two brood boxes. A fresh supply of worker bees has to be added at regular intervals as there is neither a laying queen nor a supply of open or sealed brood, this should be done at a rate of 700 to 800 grams of bees twice a month. The only real inconvenience of the Wilbanks-Dietz method remains the fact that in winter, there is no other alternative than to sacrifice colonies to maintain optimum population levels in the queen banks. This requires frequent and complete visits. Feeding should be carried out on a permanent but moderate basis with a 50% sugar mix supplemented with Fumidil B (preventative treatment against Nosema disease). There is no need for added nitrogen in the food as the queens' ovaries are not required to function in the banks. Once the food storage frames are full, they should be replaced by empty ones.

A queen bank fills up gradually, as the young queens are fertilized. Queens of different ages, strains and even races (to be proved!) can live together in a bank. They are removed to meet orders. This results in a highly flexible system. But, despite all the attention, losses of about 5 to 20% still occur. These are almost entirely due to the following phenomenon: the queens stored on the upper edge of the frame, for some inexplicable reason, have a lower life expectancy than their sisters in a central position.

This situation is easy to discern by observing the varying density of nurse bees at each cage. The dead queens are no longer visited and those that are dying have a lowered power of attraction, no doubt due to a reduction, both in quantity and quality and/or even type of pheromones diffused. Their cages are easy to pick out, there is less movement around them and their imminent death seems certain. This type of selection of the fittest is no doubt less severe under natural conditions (ie one queen per colony).

At the end of wintering, the queens are removed to fill orders and are shipped in Benton-style cages with seven or eight attendants from their own queen-bank. This allows them to travel under top conditions. A Wilbanks' shipment to Argentina once took six weeks and on arrival the queens did not appear to have suffered, but all the same, it would be better not to extrapolate as to the quality of their egg-laying. About twenty years ago, another technique became popular in the USA. It consisted of several "Benton" cages shipped in a package of bees (a sort of mini-bank of migratory bees), but it was abandoned for economic reasons: the system of special returnable boxes worked badly.

So, that about sums up this relatively easy-to-set up queen bank method.

An interesting point to remember, this system has been used with Italians *Apis mellifica ligustica*, Carniolans *Apis mellifica carnica* and seems suitable for Caucasians *Apis mellifica caucasica*. But it still needs to be tried out with our local black bees *Apis mellifica mellifica*. Don't forget that 90% of any success rate will be due to how well you ensure your building remains at 15°C, to maintain large populations of young bees, and the type of mesh you use for making the queen cages.

On an anecdotal level, our American friends have managed to keep virgin queens in this type of bank for six months. Nothing was then done with them, and one can guess why. As to the worth of these "banked" queens, Doctor Dietz didn't satisfy our curiosity. The methods of experimentation are, of course, highly valuable scientifically, but their interpretation lacked appropriate and rigorous statistical methods. The banked queens were apparently tested after wintering with normal queens in double hives: the control bees were therefore placed under the same environmental influences. There was no evidence of any difference between the two groups. In our humble opinion, this needs to be investigated in greater depth. Although in our own experiments, using similar techniques but on a smaller scale, we didn't find any difference either, it remains a field open for further exploration.

For the really keen, another article on our personal experiences of this subject will follow at a later date. We looked into the work undertaken by Smith, Butler, Foti, Walsh, Griffin and Woodrow, plus that of the Australians and New Zealanders, before setting up a system with a 72% success rate entirely based on Itarp Emmet's methods. This took place in the climatic conditions of south-west France and using *Apis mellifica mellifica*. The particularity of this system: no heating, queens with a section of comb for laying and no outside supply of bees, but it must be admitted, only a tenth of the Wilbanks' storage capacity.

Next month the rest of Alfred Dietz's lectures will deal with intensification techniques for queen breeding: making optimum use of starters and finishers.

Gilles Ratia