

Queen Performance Issues – A Help Sheet. By Roger Patterson.

These guidance notes are to help beekeepers overcome the problems of queen failure during the active season.

Introduction

In the early years of the 21st century many beekeepers have experienced unexplained and unexpected problems with queen performance. Similar problems have also been seen in other countries. They will all occur naturally but at a very much lower level than is currently seen.

Many colonies are unexpectedly being found queenless or with failing queens, even in the active season when there shouldn't be a problem. The reasons have not yet been fully researched and it seems possible there may be several causes, or combinations of causes, some possibly being beyond the control of individual beekeepers. Queen failure is often blamed on bad weather, but in many instances the weather is perfect when queens have mated, or should have mated. As this is a new phenomenon no information will be found in books, and the purpose of these guidance notes is to help beekeepers overcome the problems by prevention, or colony management techniques.

Those that have come into beekeeping in the 21st century will not know the success levels beekeepers used to enjoy, but will accept what they have experienced themselves. Perhaps this is one of the reasons why the problems are not recognised or accepted by some beekeepers.

What are the problems?

There are basically three issues and they may be connected.

1. Queens “disappearing”

These are usually queens that have been laying what appears to be perfect brood, and often they have been laying for some time. There is sometimes evidence that egg laying slows down, but not always. Sometimes there are emergency queen cells, but often not, tending to suggest that the queen goes off lay for a few days before “disappearing”. If emergency cells are not built then obviously the colony becomes hopelessly queenless, and will need help from the beekeeper to survive.

2. Supersedure

Natural supersedure usually happens late in the season, when anything from 1-3 queen cells (usually the lower) are normally built. It is quite rare for supersedure to occur during the active season. The normal life expectancy of a prolific queen is 2-3 years, and a non prolific queen 4-5 years before being superseded. It is now common for young queens to be superseded in their first season, even when laying what appears to be perfect brood, and often before the first brood is sealed. It is not often noticed by the beekeeper due to the time of year, lack of inspections, or the Q/C's are missed because they are often on outside combs that may not be inspected. Supersedure cells can be mistaken for swarm cells and be removed by the beekeeper, and may result in the queen going on to become a drone layer if she is not replaced.

3. Queen cells not resulting in mated queens.

This is often associated with poor weather during the time mating should occur. There has however been a large increase in mating failure, even when the weather has been good. There are a growing number of instances where queens haven't developed in the cells, or if they have they have been deformed in some way, usually their wings, and are unable to fly. Because many beekeepers are not able to check their colonies regularly they assume the queen has emerged, and been lost on her mating flights.

These problems are not confined to home mated queens, as there have been many reports of failure with imported queens. All queens can be affected, however they are reared.

What can you do, and what do you need to know?

In giving the following advice it is assumed the beekeeper knows the life cycle of the queen and workers, and can work out the consequences of any action taken.

Some of these suggestions will be considered good practice and should be done as a matter of course.

- Fully understand what should be happening in the colony and note anything abnormal. It may not appear significant at this inspection, but it may at the next.
- Check all colonies on a regular basis for disease, especially *varroa* mite count and both types of *nosema*, and take action where necessary.
- Keep hive records. There are a number that can be downloaded from the web, or you can design your own. Many are far too complicated for the average beekeeper, so use something simple. Make sure you can record that both eggs and queen are present, and the state of the brood. A simple record sheet is available on this website <http://www.wgbka.org.uk/Record%20Sheet.pdf> together with guidance notes on its use.
- At every inspection check for the presence of eggs and make a greater effort to see the queen.
- Clip and mark queens. Colonies can swarm leaving one supersedure cell that may not have been noticed. If a queen is clipped there is less chance of a swarm being lost, and a possible nuisance to someone else. If you mark a queen you will know if the queen you see is the one that was there at the last inspection.
- Keep good queens for as long as possible. There is no point in replacing a good queen with one that might fail. This goes against normal advice, but the non prolific “native types” should normally last for three or four years without losing colony productivity.
- Keep a spare colony or nucleus so you have a spare queen and/or brood that can give instant help to a colony, without depleting another honey producing colony.
- If a queen is being replaced try to keep her until her replacement is performing well. This can easily be done in a nucleus.
- Learn how to tell the age of eggs and larvae in case you need to know how long the queen has been off lay or missing.
- Make sure you can identify swarm, supersedure, and emergency queen cells. Do not rely on the positions some books will tell you they will be found in, as this is unreliable. In general three and less will be supersedure, six or more will be swarming. Emergency are built on existing worker larvae.
- The removal of supersedure cells usually results in the building of more. Experience has shown the queen may go off lay and/or “disappear”, leaving the colony hopelessly queenless. The best option is to clip the queen, reduce the Q/C’s to one, and let nature take its course. Leaving two can still result in a swarm.
- Be aware that a colony can swarm on supersedure and emergency cells.
- If you raise your own queens even by using natural Q/C’s, then aim for at least 2-3 times the number you need.
- If possible get queens to emerge in cages such as the “hair curler” type. You can then check to see if the wings are deformed.
- Queens that have been mated in mini-nucs when introduced to full colonies will often result in supersedure cells being built. These can be removed until the queen gets up to speed. This may be overcome by introducing the queen to a nucleus first. If the bees continue to build Q/C’s then there is a problem with the queen.
- When you expect the queen to be taking her mating flights (about 5 days after emergence) check a circle of about 20ft on the ground around the colony for a small group of bees about the size of a golf ball. If found, this could contain a virgin queen with deformed wings.

- In normal circumstances a queen should come into lay 8-20 days after emerging, depending on circumstances. It has now become common for queens not to start laying for 4 weeks even in good weather, so if you are sure there is a queen there be patient.
- Inspect your colonies on a regular basis i.e. 7-8 days with unclipped queens, and 12-14 with clipped queens. Some of the problems can happen quickly, and you need to deal with the colony as early as possible.
- Inspect EVERY frame in a broodchamber and lightly shake the bees off to avoid missing hidden Q/C's. Very often one, or possibly two supersedure cells are built on outer combs, and sometimes on frames with no other brood. Do this even if the queen appears to be laying well.
- Nuclei and small colonies should be inspected for Q/C's, even if the queen is young and you would not normally expect to see Q/C's.
- If emergency queen cells are found it could mean the queen has "disappeared". You will need to take a decision on your course of action. If you leave them the colony could swarm. Depending on the circumstances probably the best thing to do if you had other Q/C's available would be to cut out all emergency cells and replace with a swarm or supersedure cell. Look at the age of the brood and try to work out when the queen stopped laying, and record it. There may be a delay between the queen stopping laying and emergency cells being started.
- If there is no unsealed brood or emergency cells during the summer (and assuming there is plenty of food) check to see if the queen is there. If you can't find her either give a "test" comb or a sealed queen cell. If the bees destroy the queen cell then a queen is present. The use of a test comb on occasions has become unreliable, as often emergency cells are not built when the colony is obviously queenless.
- If queens go off lay during the summer they often lay a significant number of drones in worker cells, or become total drone layers when they start laying again. This should not happen, and should be taken as a sign there is trouble on the way.
- Look for a significant amount of drone brood in worker cells. Young queens will sometimes lay drone eggs in worker cells for a week or so before settling down, but after that there should be no more than the odd few. If you get, say, four per comb side then keep an eye out for other problems at future inspections such as "disappearing".
- If only one colony is kept and it goes queenless you will need help from another one. Try to keep two colonies as a minimum, so you don't need the help of another beekeeper if you have a problem.
- If you practice drone brood culling check the level of mites before destroying, and leave it if the level is low. A high level of parasitised drones in an area will affect the quality of mating, but we need to maintain a healthy drone population.
- It is good policy to have one frame of total drone brood in a broodchamber, but you must be alert to the fact that varroa are attracted to drone brood and you will need to uncap it regularly. If the level is high then freeze the comb for a couple of days and replace it with an empty one. This will help keep the number of healthy drones up, and in the control of *varroa*.
- Avoid buying bees in the autumn or winter unless there are good reasons to do so. A colony with a failed queen is worthless.
- It is now common for queens in swarms to quickly fail. This may be because the colony the swarm came from had swarmed on supersedure cells. Check regularly for several weeks after hiving.
- If a colony has a problem after the end of September it is probably better to unite it to another one.

Before inspecting a colony have a look at the record to find out what you should see. Unless there is a good reason you know about the following should not be seen during the active season:-

- Supersedure cells
- Emergency cells
- Drone brood in worker cells
- Total drone layer
- Queenless colony
- Queen gone off lay

With these and other problems facing a colony of bees we must all be better beekeepers than our forebears were. We must fully understand what should happen in our colonies, and address any problems from a position of sound knowledge.

Due to the nature of the problems, and research, this sheet may be regularly updated.

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