Summer Management and Swarm Control.

Why do bees swarm?

Swarming is their only natural means of increase and is essential to the survival of the species. Some bees are much more prone to swarming than others (Carniolans are reputedly bad) and regular inspections are needed in order to control swarming.

Why do we need to control swarming?

In my view there are two main reasons:-

- To avoid a loss of honey.
- To avoid causing a nuisance to the general public.

When a colony swarms around half the bees decamp with the swarm. That is some of the later honey crop gone.

The vast majority of people are afraid of bees. It does the image of beekeeping no good at all if swarms decide to take up residence in some awkward place such as a building and become a nuisance. We are living in an increasingly more populated corner of an island and are managing creatures that have a well known defence mechanism. Most other stock are usually restrained in some way by a fence, tether or similar, but bees are not. In my view it is very irresponsible to own bees then let them swarm almost at will, leaving someone else to sort the problem out.

There are many methods of controlling swarming. They range from the simplest to very complicated, some requiring either extra standard equipment or purpose made gadgets. Most also result in having bees on more frames or in more units than you started with, and that is not always desirable.

Being practical, I find that the simplest ways are usually the best. I have always used a method of controlling swarms that uses no extra equipment and does not divert the attention of the colony from honey production. With a slight modification extra queens can be raised for requeening other colonies, giving you an opportunity to improve your bees.

Understanding what is happening

It is absolutely no use attempting any method of swarm control unless you are fully aware of what is happening in the colony. This is one of what I call the “basics” and must be learnt first. Unfortunately, we so often hear of someone trying to perform an operation such as artificial swarming when they don't know what the bees are trying to do in the first place. If you get something wrong you could end up with a swarm and casts, or have a queenless colony, none of which was in the original plan.

When a queen is first mated she starts producing a pheromone called queen substance, and throughout her life the amount produced, or strength of it decreases. A pheromone is simply a chemical stimulus and is all the beekeeper needs to know. Queen substance is taken from the queen by worker bees and transmitted throughout the hive via the transfer of food between bees. It must be very strong and quickly distributed, because within half an hour of a queen being removed, the whole colony knows she is missing, simply due to the supply ceasing. It appears that when the amount of queen substance per bee reduces to a certain level the colony prepares to swarm (or supersede the queen if later in the season). This explains two things, firstly, why a colony

headed by an older queen is considered more likely to swarm, secondly, that larger colonies are more likely to swarm because there are more bees to share the same amount of queen substance.

There are other situations that appear to trigger swarming that may in some way be related to the above. These include overcrowding and overheating. In my opinion bees often swarm because the beekeeper has or hasn't done something to trigger it, but you won't find that reason in books!

It is well known that less prolific bees are usually less inclined to swarm. I have never seen a reason put forward, but logic suggests to me that the queens heading smaller colonies do not wear themselves out, and as a result their queen substance stays stronger for a longer time. As colonies are slightly smaller there are less bees to share it.

There is such a thing as a "Supersedure Bee". These rarely prepare to swarm and as the name suggests tend to supersede their queens, usually after 4-5 years. These tend to be selected over many years by serious beekeepers and perhaps should be encouraged rather more than imported queens.

The term "Swarm Control" implies that the beekeeper should be in control. The only way this can be done successfully is by understanding what is happening and to work with the bees, not against them. Any manipulation should be done knowing what the bees response is likely to be, and what to expect on your next inspection.

The first move should be the simple one of learning the life cycle of a queen. The second is to recognise the approximate age of eggs and larvae. For this reason, it is good policy to practice when the bees aren't preparing to swarm, so you are prepared when they do.

The life cycle of the queen

In all calculations below Day 0 is today Day 2 is tomorrow and so on.

Day 0 Egg laid

Day 3 Egg hatches into larva

Day 8/9 Cell sealed

Day 15/16 Queen emerges.

Due to timing and conditions it is safer to allow a day either way. Occasionally bees seem to have the ability to vary the normal process.

What happens when a colony swarms?

The following is what will happen in normal circumstances with an unclipped queen. Bees occasionally depart from this timetable but if they do, there is usually some help from the weather or the beekeeper!

Stage 1

Day 0 First egg laid in queen cell. Everything centres on this and throughout it must be assumed that this is the most advanced at all stages. A succession of eggs are laid in queen cells, giving the possibility of queens emerging over several days.

Stage 2

Day 8 or 9 (depending on what part of the day the egg was laid). The first queen cell should be sealed. The swarm will depart at any time after this and usually will only be delayed by bad weather.

Stage 3

Day 15/16. The first virgin queen emerges from her cell and one of two things will happen,

1. She will destroy her captive sisters and take over the colony, or more likely……..

2. She will depart with another smaller swarm called a cast, leaving the next queen that emerges to either depart with another cast, or destroy her captive sisters and take over the colony, and so on.

All swarm control methods are based on the above and is why the beekeeper should know what the bees are doing and be aware of what to expect. It is no use at all "leaving it until tomorrow" the bees won't.

All beekeepers should learn the timetable above, and before attempting any method of swarm control. It is usually a lack of this basic knowledge that results in chaos and failure.

You will see from the above why inspections are necessary every nine days or less with unclipped queens. This can be extended to 14 days with clipped queens, as even if the swarm issued you would not lose your flying bees. As the queen is unable to fly she would fall to the ground, and either climb back into the hive or be lost. The important thing is that you haven't lost a swarm, and somebody else hasn't got a chimney full of your bees.

Don't be fooled by those who tell you that if you use young queens, double brood boxes, give the bees plenty of foundation, and clip your queens you will prevent swarming. In their own ways they may be helpful in the short term, but you will still have the problem.

My approach

Swarm control is part of my basic management, so I am able to deal with it instantly if the need arises. I do not need to panic and dive into my shed to find a lot of equipment that I haven't got (because I have several colonies trying to swarm), or trying to manipulate a colony with a smoker in one hand and a hive tool in the other, whilst reading a book, and with all my fingers crossed!!.

The method I describe below I have used successfully for well over 50years. It is the same now I only have about 25 colonies as when I had 130. It was taught to me by a man called George Wakeford, who was the best handler of bees I have ever seen. Although the method was used by the older beekeepers, it is rarely used nowadays, simply because it isn't taught. It is the simplest of methods, easy to understand, doesn't involve colony increase (although it could) and doesn't need any extra equipment. Whatever I do I tend to keep simple, as I find it much easier to adjust something that has gone wrong. Although not George Wakeford's idea, I have named it the "Wakeford Method", so it has identification.

I believe that swarming should be in the mind of the beekeeper all the time. My method of management assumes that all colonies will swarm, even if they eventually don't. I have done as much as I can to keep the swarming urge to a minimum before the event by breeding from queens that are less inclined to swarm, siting hives in the shade, and giving the colonies enough super space. If you are going to store supers you may as well do it on the hive, as the bees have difficulty filling them when they are in the shed. I clip all my queens as soon as they start laying, so my inspections are normally every 14 days, and my beekeeping is geared to this.

I find that most other swarm control methods are quite complicated and little more than fire fighting exercises. Perhaps this is why so many beekeepers have so much trouble. How whole books can be devoted to such a simple subject is beyond me.

The "Wakeford method"

If occupied queen cells are found during an inspection the following route is taken.

If you find queen cells, then remove all, including those with eggs. This requires bees to be shaken off frames, to avoid missing any. Clip the queens wing if you can find her. Add one or two supers if available. If there are any sealed cells it is possible that the bees have attempted to swarm, so it would be helpful to find out if the queen has been lost or returned to the hive. Search for her and if you don't find her in the hive she may be under

the floor, or around the hive on the ground surrounded by a small knot of bees, usually about the size of a golf ball. If you can't find her it doesn't matter, as there are still eggs and larvae available the bees can make emergency cells with. An inspection of eggs and their condition will give you a clue e.g. if there are no eggs then the queen was lost more than 3 days ago. This is where learning to tell the age of eggs and larvae is helpful. Close the colony down and examine them in 6-7 days. You should then be confronted with one of the three following situations:-

1. The original queen is laying and there are no queen cells. Your actions have satisfied them.

Action. Revert to 14 day inspections. If queen cells are found at later inspections, then do the same again.

2. Queen gone and several queen cells, none of which should have emerged because you didn't leave any sealed ones. As you removed the swarm cells last time there will probably be some emergency cells.

Action. Cut out all queen cells bar one good one. If there are any worker larvae young enough to be built into emergency cells you might have to check in about 3 days. If you leave more than one queen cell the colony will probably swarm with the first queen to emerge.

3. Queen still present or only recently departed, and queen cells.

Action. I assume that the colony has made up it's mind to swarm and the only sensible thing is to deal with it as below. The continual cutting out of queen cells in my experience does more harm than good and doesn't solve the problem.

Day 0 At this inspection

- Find the queen and remove her. If you can't find her then look outside. You must know where she is, as the continual laying of eggs will cause problems later.
- Remove all sealed queen cells, leaving some unsealed ones.

Reason

- The colony is unable to swarm until a virgin queen has emerged. This is a minimum of 7 days and can be extended by destroying the older unsealed cells.

Day 4 (Optional)

- If you couldn't find the queen you can check. If there are eggs you will need to find the queen.

Day 7

- A clipped queen that was missed at the Day 0 inspection is likely to have been lost by now.
- Remove all queen cells bar one swarm cell which should emerge and take over the colony. If you cut out most of the queen cells at the last inspection there will probably be emergency cells, all of which should be removed.

Reason

- Any worker larvae are now too old to be turned into emergency queen cells
- The oldest cells should be within a day or two of emerging.
- This should ensure that there is only one possible queen and she has been selected by you. In turn she should mate and start laying.
- You must make sure there are no emergency cells. If there are, the chances are that the colony will swarm with your selected queen and possibly leave a poor queen to take over. This can only be the result of the original queen not being removed early enough.

Day 28 ish.

An inspection should find a laying queen ready for you to clip and mark. If so, you have got over the swarming problem, and have a good young queen.

For those who have unclipped queens the above will have to be adjusted.

Variations

A colony that is preparing to swarm is in an ideal state to raise queens and will respond to any normal queen raising method.

If the colony preparing to swarm is not one of your best you can substitute a Q/C from a better colony that is also preparing to swarm.

If the colony that is attempting to swarm is good, then you could use any Q/C's to requeen other colonies or make nuclei. You would have to keep a check of their individual ages though.

Note

The colony has had a 3-4 week break in brood rearing and an obvious saving in food as there is no brood to feed. You will need to make sure there is enough super space. If there is little space in the supers, the bees will put stores in the brood chamber and will need somewhere to put it when the new queen starts laying.

The break in brood rearing could be used as an aid to controlling varroa. As there is no brood all the mites would migrate onto bees. It is beyond this leaflet but if the timing was right a frame of unsealed brood (preferably drone) that was prepared in another colony could be placed in the brood chamber. After a short while most of the varroa mites would enter the cells and become trapped. The frame could then be removed and put in a freezer for a week.

My observations and suggestions

- In order to find all queen cells, it is safer to shake or brush the bees off all the combs.
- I have never experienced that *gently* shaking a frame has damaged queen cells, but to be safe don't shake combs with Q/C's on that you want to keep, brush or smoke instead.
- Some books will tell you that queens stop laying some time before swarming. Don't rely on it!
- If you keep your brood combs in good condition there will be less odd places for bees to hide queen cells.
- Bad bees tend to do the unexpected and mess up your plans and timings. Out with them!
- Queen cell cups are built throughout the summer in all colonies. They are only a problem after the queen lays in them. Their removal does no good whatsoever.
- A drawing pin on the top bar of a frame over a queen cell is useful for marking those you want to keep. Use different colours for different ages or reasons. If you have no drawing pins handy, then use a small twig or matchstick and push it through the comb immediately above the Q/C
- Look round the edges of frames for queen cells, especially the bottom, as I have seen some almost horizontal. This is often worse in WBC's where the bees rarely build comb to the bottom of the frame. Don't be shy, if it looks doubtful cut it out. It is at worse only one bee but could be the loss of several thousand.
- It seems to me that there is some relationship between the swarminess of a strain and the amount of queen cells produced. I reckon that 10-12 is the dividing line in my bees. Under that and I am happy to use them to raise queens to head my colonies, over and I wouldn't unless it was all I had available.
- Good viable queen cells should have a dimpled appearance. Any smooth ones are usually suspect and should be avoided, but remember that freshly sealed Q/Cs are smooth, the bees dimpling them as they

get older. Long queen cells are usually caused by the larva dropping away from the royal jelly, and due to malnutrition are useless.

- Some books will tell you that you will perpetuate the urge to swarm by using swarm cells. I believe this has come about by some writers copying others. It could have been so easy to breed from that colony before they started to build queen cells, if it was thought they were a good colony. It is not the impulse under which the cell was built, but the traits of the bees that are being perpetuated.
- In general, colonies swarm between mid morning and mid afternoon, but this can't be relied upon.
- A colony will not normally build emergency queen cells if there are several natural ones, but this is unreliable, so it is worth checking.
- It is very difficult to find a virgin queen. They are often very active and can be anywhere in a hive. They will run over the top of worker bees where fertile queens rarely do.
- A fertile queen will normally be on a frame of brood, unless the bees are "runners", in which case they could be anywhere, including outside the hive.
- Fertile queens will move away from light, so when removing a frame look on the dark side first.
- In a good honey flow a colony will fill a super in a week. As I am working on 14 day inspections I must give more room than those working on 7-9 day inspections. Remember that nectar that has just been brought back to the hive has 4-5 times the volume it will have only a day or two later. It is better to give too much room, rather than not enough. This is no problem, as combs will keep in better condition on a colony than in a shed.
- It is unlikely that a worker larva more than 3 days old (i.e. egg laid 6 days ago) can be turned into a queen.
- A swarm will not normally issue if they are not leaving a sealed queen cell behind. On a few rare occasions I have had bees swarm without leaving sealed queen cells behind.
- It is possible for a swarm or cast to have more than one virgin queen in it.
- If you open a colony and one or more queen cells have emerged you can never be sure that a swarm hasn't gone. If it has, it is likely to have taken all the emerged virgins with it, as they are relying on one of the remaining cells to produce a queen. If you cut out all the remaining queen cells assuming there is a virgin queen in the hive, your colony may end up queenless. In this case release all the queens that you can. Even if there is more than one virgin queen in a hive, they will not swarm if there is no queen cell left behind. This is what was referred to in the old books as a "Pulled Virgin"
- A colony that is queenless but with queen cells will not always give the usual roar of a queenless colony
- A queen raised under the swarming impulse will be as good physiologically as you will get. She has been fed as a queen from the start.
- It seems that once sealed queen cells have appeared it is much more difficult to dissuade a colony from swarming.
- The books tell us it is unlikely that a colony will swarm with a current years queen. This is unreliable due to the current problems with queens.
- It is often said that an egg when laid is usually perpendicular to the base of the cell and gradually leans over until it is flat on the base of the cell when it hatches. This is very unreliable and has been disproved.

- When a queen emerges it is always from the end of the cell. Cells broken down by worker bees will always be chewed away from the side. This helps you determine what has happened.
- An older sealed queen cell can be gently cut round the top with a sharp knife and the contents inspected. It can be put back gently and smoothed over with the fingers to make it stick.
- When a queen emerges she chews a ring around the end of the cell that has previously been thinned by the worker bees from the outside. This forms a hinged lid. It is very common for a worker to go inside to clean the residual royal jelly out, the other bees often replace the lid giving the appearance of a sealed cell. The lid is never as strong as an unemerged cell and for this reason all sealed cells that are left should be touched gently on the end to check. One that only has a dead worker in it will easily lose its lid.
- Bees are generally predictable but will occasionally do things totally unexpected and without an obvious reason. One example is that on a couple of occasions a very high percentage of my colonies have decided to make preparations to swarm within a couple of days of each other. In one of those cases most of them decided to give up within a couple of days of each other as well. It is very difficult to explain this, as it appeared to be the result of external forces.

NOTE

These notes are based on what bees should normally do. Since about 2000 I have highlighted a problem in getting queens mated and laying properly, the details of which can be found elsewhere. To date there has been little research into the possible causes, but indications are that it is a global problem. Until it is solved it would be unwise to dispose of queens that are laying well until their replacements have proved themselves.

Among the problems I have experienced are queens “disappearing”, superseding soon after commencing laying, and laying a significant percentage of drone eggs in worker cells.

There are a growing number of colonies that appear to be swarming without leaving queen cells. What they are probably doing is swarming on supersedure cells. These are often found on the outside combs, and only one or two of them. As the outside combs are rarely fully inspected the Q/C’s are missed. Until recently supersedure cells were a rarity during the swarming season.

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