

Under One Roof

Beehive Management During the Swarming Season in a single hive

By: - Nick Withers

Every beekeeper wishes to be in control of their bees. He will wish for strong healthy hives at the start of the honey flow (whenever that is) so that he can get the best possible honey crop. He will not wish for his colonies to increase in number in an uncontrolled fashion or for swarms of bees to be lost as they take control of the agenda.

In most districts in Britain there is a 'main' honey flow in late June and July and colonies should be at their peak by mid June to exploit it fully. Unfortunately the period immediately before the main flow, generally the months of May and June, is the swarming season. This is the period, at the best time of year from the bees' point of view, when honeybee colonies follow their natural instincts and reproduce by swarming. In nature all colonies of honeybees can be expected to swarm every year, just as most other wild creatures, e.g. frogs, seagulls, badgers breed every year.

Swarming is the division of the colony into two (or more!) parts, with each part having many less bees than the original complement. Coming just before the main flow there is little chance (an early swarm may be OK) for worker bee numbers to recover sufficiently to collect a decent surplus of honey. Usually swarming results in almost complete absence of a crop from the affected hive.

The beekeeper can influence the situation in three ways and take control of it with two of them. If he gets it right he can keep his colonies in one piece during the vital swarming season and reap the rewards by getting his expected honey crop.

The first way is to minimise the factors known to trigger swarming off. He can minimise crowding by giving supers early and ensure all his hives have young queens. He can also buy or breed queens from parent lines with a good reputation for 'non swarming'. These measures, however, are merely influences for the better and in no way guarantee positive results!

The second way is to observe colonies for signs of swarming and then take control of the situation in a way that keeps all the bees together and maintains the colonies' growth prior to the honey flow. There are many methods of doing this but the best involve replacement of the swarming queen with a newly mated one, thus minimising the likelihood of any further attempt to swarm. Dealing with colonies after they have started swarming preparations is called swarm control.

The third way is to pre-empt the start of swarming by using a method of management that prevents it. Again there are many methods and again the best involve getting the colonies headed by new young queens. These methods are called swarm prevention.

The following pages give details of swarming natural history and some methods of prevention and control. A feature is that all the operations keep the bees in a single hive, albeit with two entrances at times. I have used these methods for swarm control and dealing with swarms for about 10 years. I have not used the similar method for swarm prevention but it seems to be a well tested system in its own right.

Natural History of Swarming – Colony Reproduction

What happens	Comments	Further Reading
Colonies grow rapidly in Spring, fuelled by winter stores at first, then the spring flow. The growth is to get enough bees for successful swarming.		'Honeybee Ecology' by Thomas D Seeley and 'The Biology of the Honey Bee' by Mark L Winston give thorough accounts of natural swarming and supersedure.
Swarming triggers: Crowding (brood nest especially) Less queen pheromone poor pheromone distribution	Queen pheromone suppresses queen cell raising and swarming preparation by worker bees. Queens produce less pheromone as they age. As a result hives with older queens swarm more readily. Crowding disrupts pheromone distribution among the bees	
Swarming preparations: Queen cells produced Changes to worker behaviour less foraging, more resting gorging honey less brood rearing queen fed less	Production of queen cells is the first sign of swarming for the beekeeper. The changes in worker behaviour may show up as a less active hive than normal. The effect is to conserve the workers' working life and 'prime' them for wax production in the new nest to be built by the swarm. Starving the queen lightens her ovaries so she can fly with the swarm.	
Timetable for parent hive or nest: Day 1. 1 st eggs laid in queen cups Day 8. 1 st cells sealed Day 8+ swarm issues (prime sw) Day 16 1 st virgin queen emerges Day 16+ VQs destroy sealed cells and fight each other until one left. OR: Day 16+ workers keep VQs in cells	The start of swarming may be fairly ill defined. Some workers may let the queen lay in Q cups, only for other workers to eat them. Queen cell development will proceed when there are enough workers 'turned on' to swarming. Swarms may be delayed several days in bad weather, even to the time when VQs are ready to emerge. Workers feed the VQs they trap in their cells. The size of the colony helps decide if there will be casts.	Winston (chapter 4) describes the development of queens, workers and drones.

Natural History of Swarming – Colony Reproduction

What happens	Comments	Further Reading
<p>and protect cells from emerged VQs. One or two more swarms (casts) emerge.</p> <p>Day 21+ remaining queen mates and heads new colony in old nest.</p>	<p>No (more) casts will be produced if there no more queens yet to emerge.</p> <p>Hive colonies are sometimes unnaturally big at the time of swarming and may produce too many casts, leaving a colony unlikely to survive.</p>	
<p>What the swarm does:</p> <p>Swarms usually emerge around the middle of a fine day and cluster nearby. Scout bees then go searching for a new home in such places as hollow trees, chimneys and unoccupied hives. They dance on the surface of the cluster to indicate a good site and get other bees to go and look. When all the scouts agree on the best site the swarm flies off and enters the new nest.</p>	<p>Swarms use the same round or waggle dances to find a new home as they do for directing foragers to food sources. They are very much attracted to places where bees have lived before and will readily occupy and renovate combs left by a deceased colony. This has survival value despite the disease risk because it saves them the energy of building new comb. Swarms will choose fairly small cavities to nest in if they can, with enough room for about 45lbs of stores for the winter. The large space provided by a brood box and several supers is not what they choose naturally.</p>	<p>'Communication Among Social Bees' by Martin Lindauer, and also Seeley give accounts of how swarms find a home.</p>
<p>The new nest:</p> <p>The swarm then works very hard to build new combs from scratch, raise new worker bees and collect nectar and pollen to supply the demand and create a reserve of stores.</p>	<p>Swarming is a risky business for wild bees. On average only 25% of prime swarms in forests survive their first winter whereas 75% of established nests get through.</p>	<p>Seeley</p>

Reducing the Likelihood of Swarming, Examining Colonies in the Swarming Season

What to do	Why/comments	Further Reading
Have young queens in your hives. Re-queen regularly, have queens from the previous season if possible.	Queen pheromones suppress queen rearing behaviour in worker bees. Young queens produce more pheromone and suppress queen rearing and swarming more effectively	Winston describes the production and distribution of queen pheromones including the effects crowding may have on its distribution among workers.
Prevent crowding, give super space early and ensure the brood box is not congested or contains too much unused stores.	Crowding, especially of the broodnest, is accepted as an important trigger to swarming. It may be that disturbs the transmission of queen pheromone among workers.	
Obtain and maintain a good strain of bee with low swarming tendency.	If you are making your own judgement on this do not rely on the results of a single season.	
Inspect hives weekly during May and June to check for signs of swarming.	7 days is convenient for most. The 9 days often quoted is actually quite risky.	
<p>Inspection Routine (double brood chamber):</p> <p>Open hive down to Q excluder</p> <p>Smoke over excluder and pause</p> <p>Separate boxes and tip top box to see bottom of frames. Smoke bees away if necessary.</p> <p>Check for swarm cells:</p> <p>none – close up</p> <p>empty Q cups – close up</p> <p>Q cups with eggs – check again in 5 days or start control procedure</p> <p>Q cups or cells with larvae – start swarm control procedure</p>	<p>The ‘tip test’ is a good, quick way of checking for swarming. It is said to work better with a shallow as the top brood box.</p> <p>Note that the excluder is not separated from the top box unless a full inspection is needed.</p> <p>The idea of smoking from above is to encourage the queen into the lower box where she will be needed if swarm control has to be done.</p> <p>Q cups with eggs may well not lead to swarming just yet, but a re-check after 5 days will tell if the cells are developing before a swarm is lost.</p> <p>If you are doing a full inspection and find the queen, put aside the frame she is on in a nuc box to save having to look again should Q cells be found.</p>	LE Snelgrove in ‘Swarming, its Control & Prevention’ claims complete reliability for the ‘tip test’ when the upper box is a shallow and near complete reliability when 2 deeps are used.

Two Queen Method of Swarm Control

What to do	Why/comments	Further Reading
<p>Equipment needed:</p> <p>Essential</p> <p>A piece of metal mesh to pin over a crown board feed hole.</p> <p>A means of giving a rear entrance (3 strips of wood to raise the box on 3 sides).</p> <p>Optional</p> <p>A swarm board with mesh covered hole and entrance.</p> <p>A spare crown board for the top.</p>	<p>The mesh allows bees to contact and feed each other but not to pass between the two parts of the hive. This allows a queen's presence to be felt in both parts. Its effectiveness is shown by it always being spotlessly clean.</p> <p>Pieces of mesh, drawing pins and strips of wood are very simple things to keep with you when doing swarm checks.</p>	
<p>Day 1:</p> <ol style="list-style-type: none"> 1. Set the top box aside. 2. Check the bottom box for the queen. 3. Examine the queen cells in the top box; destroy any already sealed. If necessary search for the queen and move her to the bottom box. 4. Swap boxes, top box with QCs on floor, bottom box with queen aside. 5. Put on excluder, supers and crown or swarm board. Pin mesh over feed hole. 6. Arrange entrance to the rear and put on the original bottom box and roof. 	<p>This procedure can be done with a single brood box colony by providing a second box and sorting the combs between the two.</p> <p>You destroy any cells already sealed to give you 7 clear days before the next manipulation.</p> <p>There can be a snag if there are many QCs on the bottom bars of the top box and the floor is shallow. The flying bees will return to the box with the QCs, now on the floor, and the box with the queen with the rear entrance will become depleted. The bees will soon tear down the QCs in this box. The lower box will have plenty of bees to complete the QCs satisfactorily.</p>	
<p>Day 7:</p> <ol style="list-style-type: none"> 1. Open hive and take off everything down to and including the excluder. 2. Put the crown or swarm board with mesh 	<p>The bees in the upper box will have lost the urge to swarm and the queen should be laying normally. The first queen cells will be approaching emergence.</p> <p>Re-arranging the boxes like this gets the flying bees</p>	

Two Queen Method of Swarm Control

What to do	Why/comments	Further Reading
<p>on the bottom box with queen cells and turn round 180° so the floorboard entrance faces the rear. Arrange the entrance above the mesh board to the front.</p> <p>3. Put on the box with the queen, excluder, supers and roof.</p>	<p>back with the queen and the box with QCs depleted of bees to prevent casts being produced when queens emerge.</p> <p>Returning bees will have to climb a little to get to the front entrance and any foragers from the top rear entrance will drift down to the new rear entrance at the bottom.</p>	
<p>Day 14 on: Resume routine inspections of the upper box with the queen at 7 day intervals.</p>	<p>The queen once again has a strong colony to supply pheromone to and in due course further swarm preparations might be expected. Very soon however, a virgin queen will be in the bottom box and the hive will have two queens and two sources of pheromone. Once the new queen has mated swarm preparations become very unlikely.</p>	
<p>Day 28+: Check lower box for laying queen. Check food and number of bees if you wish to keep the lower division going. Reinforce if necessary.</p>	<p>The new queen should be laying within 3 weeks of emergence.</p>	
<p>When you wish: Remove the old queen and unite.</p>	<p>Ideally, wait until the new queen has some of her own workers emerged.</p>	
<p>Variations: Day 7: Take 1 or more nuclei from the lower box with queen cells. Use some of the QCs in mating nucs prepared from another hive.</p>	<p>The decisions you make here will depend how good you think the swarming queen is and whether you wish to use this line or another for re-queening or increase.</p> <p>The 'straight' procedure will give you a new queen who is the daughter of the one who's colony swarmed. If she was young (2nd year) or the colony had other bad</p>	<p>'A Simple Two-Queen System' by Ron Brown describes another way of starting and operating a two-queen system.</p>

Two Queen Method of Swarm Control

What to do	Why/comments	Further Reading
<p>Destroy QCs and introduce QC or queen from another source. Destroy QCs, introduce a frame of eggs and leave a further 10 days. Day 28+ Unite with excluder between to make a true 2 queen colony.</p>	<p>characteristics you should consider the options to raise a queen of a different strain. If she was good you should consider the options to raise more than one queen.</p>	
<p>Advantages:</p>	<p>Very little additional equipment is required, especially to start with. When doing routine checks you only need to carry the pieces of mesh and a simple means of making an upper rear entrance. The whole operation is completed on the one hive stand. With restricted space this is an advantage and you do not have to provide extra roofs or floors.</p>	
<p>Disadvantages:</p>	<p>Unlike the artificial swarm method, it does not result in you getting the bees to draw out foundation into new comb. This method does not lend itself to incorporation into an integrated strategy of <i>Varroa</i> control because it does not result in a brood-less period in the main brood nest. The artificial swarm does, or can do, and combs of drone brood can be used to trap nearly all the mites in the colony.</p>	<p>The website: www.xs4all.nl/~jtemp/dronemethod authored by Johan Calis and others has two methods of Varroa control using drone comb trapping in conjunction with artificial swarm techniques.</p>

Dealing with a swarm (or a Taranov swarm)

What to do	Why/comments	Further Reading
Equipment needed: As for the swarm control method plus a box of foundation.	Swarms are excellent at drawing foundation and no opportunity should be missed for getting them to do so.	
Day 1: 1. Take the swarm in the usual manner. 2. Go through the swarmed hive and destroy all sealed QCs. 3. Reassemble the hive and pin mesh over the crown board or fit a swarm board. 4. Place a box of foundation on top and arrange a <u>side</u> entrance. 5. Hive the swarm in the top box and feed.	The Taranov method makes you a swarm you can hive like a natural swarm. In effect you are forcing the bees to swarm a day or two early. Unlike the box with the queen in the control method the swarm will have many foragers which must re-orientate to the front entrance on day 7. Using a side entrance makes this possible.	Donald Sims in 'Sixty Years with Bees' describes the Taranov method.
Day 7: 1. Dismantle the hive down to the original brood chamber with the QCs. 2. Turn round with the floor to give a rear entrance. 3. Place the mesh board and swarm next giving a front entrance. 4. Put on the excluder, supers and roof.	This is essentially similar to the swarm control method. Turning the bottom box round loses bees to the front entrance and makes issue of a cast unlikely. The swarm is reinforced and should do even better.	
Day 28+: Check that a new queen is laying in the old brood chamber. Unite when appropriate.	After uniting you can take away old combs and sort the boxes so the colony will winter on the new combs drawn by the swarm.	
Variations:		

Dealing with a swarm (or a Taranov swarm)

What to do	Why/comments	Further Reading
As for swarm control		
Advantages and disadvantages:	Similar to The swarm control method except that you do get to get foundation drawn into new comb.	

Two Queen Method of Swarm Prevention

What to do	Why/comments	Further Reading
<p>When to start: The hive must have built up well and have plenty of bees and a good-sized broodnest spread across both brood boxes.</p>	<p>You should gauge a time when the colony has benefited from the rapid growth of the spring build-up and looks to you it could prepare to swarm soon. Early on the ratio of bees to brood is low and it would be unwise to split the colony.</p>	<p>Sims describes a <u>management method</u> in his book called the Wilson method that is very similar to this procedure. It was investigated by the BBKA in the 50's and reported on by Wedmore (details in the book).</p>
<p>Day 1: 1. Check through the hive and ensure there are eggs in the upper box. 2. Ensure the queen is in the lower box. 3. Rearrange the hive as for Day 1 of swarm control, the queen in the box at the top of the hive with a rear entrance and the brood with eggs with the normal entrance at the bottom.</p>	<p>This is an almost identical procedure to the swarm control method. The only differences are in timings to suit raising queens from eggs. The queen cells will of course be emergency cells but with a good number of eggs available good quality queens will be reared.</p>	
<p>Day 10: Rearrange as for day 7 of swarm control. The bottom box, now with QCs close to emerging is below the mesh board and has its entrance facing the rear. The box with the queen is next, with forward entrance the excluder and supers above.</p>		
<p>Day 17 on: Resume regular inspections of the top box. The new queen in the bottom box should be laying by about day 31.</p>		

Two Queen Method of Swarm Prevention

What to do	Why/comments	Further Reading
<p>Variations:</p> <p>Day 7: Destroy QCs and introduce QC or queen from another source. Destroy QCs, introduce a frame of eggs and leave a further 10 days.</p> <p>Day 10: Take 1 or more nuclei from the lower box with queen cells. Use some of the QCs in mating nucs prepared from another hive.</p> <p>Day 31+ Unite with excluder between to make a true 2 queen colony.</p>		
Advantages:	As for swarm control.	
Disadvantages:	As for swarm control plus: This may be an effective way to ensure you always have young queens but by doing so you do not get to assess your queens through a complete season. If you want to evaluate potential breeding stock you should evaluate queens at least through their first complete season and preferably until they swarm or supersede.	