

Chapter 5

Autumn and winter management: feeding of bees

5.1 Moving bees: the heather flow

Foraging worker bees have accurately memorised the site of their home. If it is moved more than about 1 metre (3 feet), they will not be able to find it and will cluster on the old site when they return, become chilled at night, and die.

The only exception (apart from when they swarm) is that if their home is moved more than about 5 km (3 miles), they will be in completely unfamiliar territory where they are forced to re-learn everything, and will not return to their old home. Hence the rule for moving bees — “Less than 3 feet or more than 3 miles”. When nuclei are set up in the home apiary it must be remembered that by this mechanism they will lose most of their foraging workers, retaining only the young nurse bees, who will gradually mature into foraging workers with a new base. Apart from their small size, this is why such nuclei are weak in guard bees and tend to be robbed by other colonies unless they have small entrances, easy to guard.

The main blossom honey month around Dunblane and Stirling is July, and unless they can forage on Himalayan Balsam, a fairly new arrival in this area, after the end of July, there is little for the bees at low level. However the ling heather on the upland moors provides plentiful and much-prized heather honey in good seasons, and going to the moors in August is often well worth while provided you have strong stocks of bee to take there. Weak stocks make little of it.

The first step in going for this honey is to obtain permission to place your bees on the moor. Dunblane and Stirling Beekeepers have a long-standing arrangement to be allowed to place bees on Sheriffmuir, and if you sign up for that, it is an easy option.

Prudence then demands that you go there a week or so before you move the bees to reconnoitre and prepare hive stands. The last week in July is the best time for this. Moving hives single-handed is perfectly possible, but it is much easier with two who can use a pair of hive-carriers between them.

For long moves such as are made to the heather over distances greater than three miles, motor transport is obviously needed. On the day *before* the move, the hive boxes should be arranged with adequate empty super storage space above, but with enough stores in the hives to ensure that the bees do not starve if the weather turns bad. The crown board should be replaced with a travelling screen of perforated zinc or wire mesh to give complete top ventilation. The boxes should then be securely fastened together with ratchet straps, or by nailing battens to them, or by some other method. Whatever method is used, it must also ensure that both the floor and the screen board on top are secure. Means should also be laid ready for the final shutting of the hive entrances. A strip of foam rubber is extremely effective and is less trouble than the traditional wooden entrance block. Then the hive roofs should be replaced on the hives and the bees left to fly until the actual time of the move.

Next evening, as soon as the bees have stopped flying, the hive entrances should be closed and the roofs removed to give top ventilation through the travelling screens. In hot weather a powerful stock completely enclosed without adequate ventilation can in its panic quickly raise the temperature inside the hive above the melting point of beeswax. The bees and brood will then be engulfed and drowned in the collapsing mess of honey combs.

Hives are then loaded up for transport ready to be driven to the new site. There is much to be said for leaving the actual move until early morning since placing of the bees on the heather site can then take place with dawn breaking, rather than with the sun setting to leave you to blunder about in the dark. Place ALL the hives on site before releasing ANY. You must aim to have this completed before 10 a.m. at the latest. Then put on your protective clothing and quickly open each hive, immediately replacing the roof so that the flying workers do not cluster on top of the screen and become trapped. Then leave the bees to settle.

A later visit can be made and warm packing placed above the travelling screen to conserve heat. Bees at the heather are notoriously ill-tempered so be prepared!

The return from the moors is just the same operation in reverse, but is less fun as the days are shorter by September, the weather is usually worse, and if you have been successful the hives are much heavier.

5.2 Removing honey

Once a honey super is full and the cells are capped it is ready for harvest and may be removed. A glance inside heavy supers will show when this is so. If the honey is even in part from the Oil Seed Rape crop, and you wish to extract it by spinning, it is vital to take it off promptly, since this particular honey granulates very quickly and very hard in the comb. If you leave it too long, you will have no option but to break up the combs and soften the honey again with gentle heat, or else to sell or use the honey as honey in the comb. It is worth while emptying and replacing supers if they are filled before the last flow, and of course this should be done before moving to the heather. Note however that you must at all times ensure that you leave on the hives a sufficient reserve of honey to tide them over a few weeks of bad weather when they cannot forage for more. As was said earlier, bees in their active summer mode use much more food than when they are clustered for winter, and can quickly starve if this precaution is not observed.

To remove a super, lift it off the hive, replace all the other boxes if it was not the top super, place the crown board on next with two Porter bee-escapes fitted into the two feed holes, or instead use another type of clearer board. Then put on the full super and finally the travelling screen to make the super bee tight apart from the way down through clearer board. Then replace the roof. In twenty four hours almost all the workers in the full super will have gone down through the clearer board to re-join the queen and the rest of the colony and the super can be removed without further disturbance of the colony. Do not wait longer than this, or the honey may start to granulate in the comb, or robber bees may find a way in and remove the honey. Also if Porter escapes are left on the hive too long, the bees will jam the springs with propolis rendering them ineffective, or else, if another type of clearer board is in use, the bees will learn how to get back through the maze and will rob out the honey.

When Porter escapes are removed, and feeding is not going on, the holes in the crown board should be covered with pieces of scrap wood, or something else convenient, to prevent the bees from accessing the space under the roof and building wild comb there, which would make it difficult to lift the roof off.

5.3 Uniting stocks

It is often desirable to unite together two stocks, particularly in autumn, so that a weak stock need not be wintered. If a young queen has been raised in a nucleus, this is the way to use her to replace an

older queen, particularly one that has been involved in swarming.

Bees from different stocks will fight one another if indiscriminately mixed, so precautions must be taken.

The job is most easily done if no honey supers are involved and the best time is in the autumn after all these have been removed. The stock with the new queen must be housed in a full-sized brood box able to sit above the original hive. It does not need to have all the space in the box filled with empty combs if it was a nucleus, but the last comb should have a dummy outside it, the combs being packed to one side of the box.

If the stock being re-queened is not queenless, the queen to be replaced must be found and destroyed, preferably in the early afternoon, and then all left quiet until sunset. At sunset, quietly and with as little disturbance and smoke as possible, remove the roof and crownboard from the now queenless stock, and cover it with a single sheet of newspaper, which can be secured with drawing pins if it threatens to blow away.

Then take the roof quietly off the other stock, but leave the crown board on. Lift its box away from its floor and place it gently on the newspaper, taking care not to tear it, but squaring the boxes together. Then replace a roof and leave them alone for a week.

The bees will chew their way through the newspaper and unite peacefully, as their scents will be mingled by the time they can get at one another. A mess of chewed up newspaper outside the hive entrance next day is a sign of success.

After a week combs may be readjusted as you please between one or two boxes to give good wintering conditions.

If uniting when honey supers are on, then the excluder should be placed *above* the supers when the old queen has been destroyed, and the newspaper should be laid on it or under it. At the readjustment a week later, the new queen with her brood nest should be moved below the supers and united with the other nest, and the normal pattern restored. It may be necessary at that time to remove a few emergency queen cells from the old brood nest, since the new queen was so widely separated from it for a week that bees below may have started queen cells.

5.4 Feeding bees

If remaining stores are inadequate in September, or if stores are short in spring, or if a swarm is hived, bees should be fed with sugar syrup.

Feeders for feeding syrup are of several types. A *contact* feeder consists of a jar or pail with a lid perforated by several small holes. Inverted over a hole in the crown board it will be slowly emptied by the bees as long as the holes are small enough to allow a partial vacuum to form in the pail so the feed doesn't all run out at once. It must be protected by an empty super which holds the roof clear.

Much more rapid feeding is achieved by various patterns of *rapid* feeders of which the best and most capacious are the overall Miller and Ashforth designs that need no super to house them. I regard many of the other patterns as rather footling. Bees will take down and store in one or two days a 3 kg feed from an Ashforth feeder which allows stores to be rapidly brought up to an adequate level and ripened by the bees in September. The principle of all these feeders is that the bees are allowed access to the surface of the syrup through a narrow slot, so that they don't fall in and drown themselves. Those rapid feeders in which the round access hole has a plastic cup over it must *always* have the cup in place when they are given to bees, since otherwise they are a lethal death-trap for the bees.

For spring feeding or the feeding of a swarm, such rapid feeding is less desirable, since it is not the aim to fill the combs then with sugar syrup, or the queen's laying room may be restricted. Feeding smaller amounts over a longer period is then better, and a contact feeder is probably best.

If bees are found by a quick glance under the crown board in mid-winter to have eaten their way up through their stores, *solid* food must be given in contact with the bees, since they will not enter a feeder at that time of year, and any syrup given will not be ripened, but ferment and give the bees dysentery. The traditional solid feed is candy made from sugar, for which a recipe is given in the

Appendix to this chapter. Alternatively Archie Ferguson's trick with sugar bags may be used. That too is described in the Appendix. Special bee fondant can also be purchased, and makes an excellent late feed. It can be left in its plastic bag, with an access hole cut in the lower side in contact with the bees.

The solid feed must be placed in direct contact with the bees at the top of the cluster, either by placing it over the feed hole in the crown board if the bees are under that hole, or by removing the crown board and placing the candy directly over the bees. If the latter technique is used, then the feed should be covered with an old piece of blanket or an old jumper to keep heat in, and if necessary an empty super placed between the cluster and the crown board.

5.5 Preparing bees for winter

During September all colonies should be prepared for winter. Weak stocks should be united with others so that all have large enough worker populations to form viable clusters. If possible all should be headed by queens under three years old.

Every colony should have its stores checked and be fed if necessary to bring the weight of sealed stores up to at least 15 kg (30 lb) and preferably 20 kg (40 lb).

If any honey supers are being left on over winter be sure to *remove the queen excluder*, so that the queen can move up with the cluster if necessary. The workers will not abandon the queen and will stay down and starve with her if she cannot get up.

Make sure all hives are water-tight and will not blow over and that they are not rocking on their stands. Bees dislike a hive which moves when they are sleeping. Also be sure each hive slopes from back to front a little, to help any rain-water that blows in at the entrance to drain out again. If an open mesh floor is in use, this is not such a necessary precaution, as water will drain out through the open mesh.

By the first week of October fit *mouse-guards* to all the hive entrances. Mouse-guards can be bought and are fairly cheap. They should be pinned securely across the hive entrances with drawing pins. Alternatively a closely fitting entrance block can be used, provided its entrance slot is NO MORE THAN 6 mm ($\frac{1}{4}$ in) HIGH. The bees thoroughly dislike these operations at the hive entrance, so wear your full protective clothing while you do it, and have the smoker going and use it as necessary, or you will bodge the job.

If mice get into a bee-hive in winter they can very effectively kill it by eating the combs — honey, wax and brood. They will also eat the bees. They then nest, as they find a warm dry beehive an ideal nesting box, and they will then produce more mice to trouble you next year.

5.6 Managing bees in winter

Managing bees in winter is for the most part best done by leaving them alone. However every two to three weeks certainly from December on it is prudent to check that they still have enough food. This is particularly important if the colony is small and/or was light on stores in autumn. With experience the weight of stores can be well assessed by "hefting" the hive — i.e., lifting each of two opposite sides gently in turn an inch or so and gauging the weight. If you are not confident about this, then a quick peep under the crown board (with your veil on!) can tell you a lot. If no bees are to be seen, then either all is well and the bees are still well down, or they are already dead (let's hope not!) and there is nothing to be done. If the bees are visible on top of the frames, they are short of food and must be given candy or fondant as described above. After feeding with this starts, it must be checked every 2 to 3 weeks, and topped up as necessary. A few pounds spent on feed is money well spent to keep the bees alive.

There are some *Varroa* treatments best carried out in mid-winter, but that will be covered in Chapter 6.

5.7 The end of winter

The period when bees are in greatest danger of starvation in Scotland is from February till the end of April. Meteorological Spring starts on March 1st and astronomical spring at the spring equinox on March 20th or 21st, and in some seasons it is true that by that time early sources of pollen such as snowdrop, crocus and dandelion are available, and if gorse is in bloom and/or the willow catkins are out and also the weather is fine, the bees will be replenishing their honey stores with fresh nectar. But not too many years ago we had a spring in Dunblane when we had a major snow-fall at the beginning of April which did not thaw till the start of May. The start of spring for the beekeeper is determined by the thermometer, the anemometer and the rain gauge and not by the calendar.

Early checks described in the section on preparing for winter will ensure that all stocks have enough stores to last till mid-February, but with queens starting to lay again then, and cluster temperatures being raised, the last of the stores can melt away as fast as the snow is thawing on the ground.

In March, even if it is cold, each colony's food supply must be regularly checked, but unless the weather is really warm this must still be done without inspecting the combs.

Hefting, once you have practised it a number of times becomes a good way to check the stores of those hives which have not needed fondant or candy, so do that regularly to develop the skill.

Also as described above, if candy or fondant has been provided over the cluster, a quick check of the cake(s) of candy or bag of fondant, with veil on and the crown board briefly lifted if necessary, will show whether it is nearly all eaten, and more can be supplied if necessary.

If the weather is starting to warm up you might consider putting on a feeder to feed spring syrup. See the Appendix to this chapter for feed recipes. Do not over-feed syrup at this stage, or you will encourage the bees into excessive early activity which is self-defeating, and more importantly you will clog up with syrup all the empty cells in the brood frames where the queen should be starting to lay, and you will make the bees feel the hive is congested very early. This is likely to encourage early swarming which you do NOT wish. A maximum of 2 to 3 kg of sugar as syrup should allow the bees to survive until the weather warms up, unless the spring is very late and cold. Be prepared for that however, and if you have to feed candy or fondant again, then do it. Bees without food die, and cannot be resurrected. Be especially watchful if a warm spell is succeeded by a return to winter weather which happens all too often in Scotland.

Any hive where bees are not "up" by mid-March should on the first reasonably warm day be investigated by lifting combs up till the bee cluster is found. If it is a small living cluster and has got trapped below an area of empty comb there is danger of *isolation starvation*, so somehow you must get candy or fondant into contact with them urgently, even if that means wedging it somehow between combs, maybe removing an end comb. On any occasion when the crown board is briefly lifted, it is always reassuring if at least one inquisitive live bee pokes its nose up to show they are still alive.

If they are dead, the sooner you clean up the mess, the better!

However if you keep watching and feeding as necessary, then when spring finally does arrive you will find at your hive one sunny day the welcome sight of many busy workers bringing in abundant fresh pollen, and on that nice warm day you can do the all-important spring inspection to launch the new active season.

Appendix — recipes for bee feed

Recipes for sugar syrup

3 kg (about 6 lb) of ordinary granulated sugar to one kettleful of water (about 1.75 litres or 3 pints) makes a plentiful feed for autumn use. Put the sugar into a plastic pail with a snap-on lid or other convenient receptacle. Bring the water to the boil and pour it over the sugar. Stir till the sugar is dissolved, snap on the lid and take the feed to the bees. The actual quantities can be varied to suit the capacity of your feeder, but keep to these proportions.

For spring use or for feeding a swarm, syrup with half that concentration of sugar is more appropriate.

Recipe for candy

Ingredients

- White granulated sugar — 5 measures by volume.
- Water — 1 measure by volume.

or

To each 1 kg of sugar use 180 ml of water,

or

To each 1 lb of sugar use 3 fluid ounces of water.

Equipment

- Cooking stove.
- Thick bottomed saucepan of adequate capacity.
- Wooden spoon.
- Disposable moulds to receive candy.

Method

- Prepare the moulds for the candy. Small ice cream tubs, or halves of discarded small cardboard soft drink cartons, or sheets of A4 paper with the edges folded up by about half an inch and stapled to make shallow trays are all satisfactory. These will be used to give the candy to the bees and are usually discarded afterwards.
- Place the sugar and water in the saucepan, bring to the boil slowly while stirring with the wooden spoon to prevent the mixture from “catching”.
- Boil vigorously for *three minutes exactly* stirring occasionally.
- Remove the saucepan from the heat, and if possible cool it rapidly, say in a sink partly filled with cold water, while *beating the mixture vigorously with the wooden spoon*.
- As soon as the mixture starts to thicken, turn it out into the moulds and let it set.

Archie Ferguson's method with sugar bags

Buy a few bags of sugar. Without opening the bags, dip them briefly in cold water and let them dry and harden. The timing of the dipping in cold water is critical. Too short a time and the sugar fails to harden, too long and the sugar melts into a syrupy liquid. The time needed depends on the quality of the bag.

Remove the crown board and place an empty super over the hive. Tear away the paper from one side of the hardened bags, and lay them gently over the cluster of bees. Cover them with an old blanket and over all place the crown board and roof. The bees will eat their way up through the crystallised sugar as though it were candy.

Commercially prepared bee food

There are now on the market commercially prepared syrup made with inverted sugar for feeding bees which is reportedly more easily digested by bees, and fondant to be used in place of candy. These are both excellent for the bees, and do not involve any additional preparation by the beekeeper.

It is up to you to decide whether the price to be paid for these as compared with the price you have to pay for ordinary granulated sugar makes their use worth-while for you.