



National Bee Unit

Preparing Honeybee Colonies for Winter

January 2020

The importance of preparing colonies to enter the winter in a healthy state, with an adequate supply of young healthy bees and stores, cannot be over-emphasised. The beekeeping year starts here, so a colony overwintered in good condition ensures that it is fit for purpose in the following spring. Winter colony loss investigations, both in the UK and across Europe, have clearly shown links between colony deaths and the viruses, particularly deformed wing virus, which are associated with *Varroa* infestations. This highlights the importance of effective and timely *Varroa* control. Feedback from beekeepers over the years cites starvation as another major cause of winter losses. This sheet gives guidance to help beekeepers overwinter colonies successfully.

Timing

Winter preparation is usually done after the removal of the last honey crop of the year, coinciding with any varroacide treatments that may be required. This date will vary with the apiary location but is normally from early to mid-August. However, with late flows from crops such as Heather and Himalayan balsam it may be later, and if so, particular care must be taken with respect to *Varroa* levels and control. For instance, it may be necessary to apply a short-term treatment to reduce the population of *Varroa* prior to colonies working late flows. Other methods can be used to help keep *Varroa* levels low if a beekeeper prefers not to treat with chemicals. Further information can be found in the NBU 'Managing *Varroa*' leaflet.

Check each colony to ensure:

1. Queen-right.

It is better to overwinter colonies with young healthy queens, as they are less likely to die or become drone layers. Also, the brood nest of a young healthy queen is likely to be bigger later in the season than that of an old queen, thus helping to ensure an adequate replacement of the older worker bees. This is particularly important as those older bees will not have such large 'fat bodies' as they will have been feeding brood and will therefore

not live for so long. They may also have shorter lives because of the pathogens associated with *Varroa* infestations and other bee problems. Colonies that go into winter with too few young bees are likely to dwindle rapidly in the spring. To remain productive, honey-producing colonies should be headed by queens no more than two years old. Queens with desirable traits can be kept to a greater age for breeding purposes, and many beekeepers maintain these in nucleus colonies.

2. Disease free

Check each colony for signs of brood and adult bee diseases. Remedial action or culling should be undertaken as appropriate. If the disease found or suspected is statutorily notifiable, i.e. European or American foulbrood, you must inform your local Bee Inspector or the National Bee Unit Office. Beekeepers should know the signs of these diseases and inspect colonies for foulbrood and other bee diseases throughout the season, as a minimum specifically once in the spring and once in the autumn. If colonies are small, find out why. If they are pest and disease free, they can be united and re-queened, but be wary of uniting a poorly performing colony with a stronger one – there may be underlying disease in the weaker colony that is then passed on to a healthy one. If diseased, remedial action can be taken, but culling may be the best option. Further information about brood diseases can be found in the NBU leaflet ‘Foulbrood Disease of Honey Bees and other common brood disorders’.



Fig 1. Overwintering colonies in the snow.

3. Pest free

Check each colony for the exotic pests Small Hive Beetle and *Tropilaelaps*. If you suspect they are present you must inform your local Bee Inspector or the NBU. Further information can be found in the NBU Leaflets 'The Small Hive Beetle' and '*Tropilaelaps*: parasitic mites of honeybees'.

4. *Varroa* numbers are below the treatment or damage threshold of 1,000 mites.

Varroa must be kept below the damage threshold. If beekeepers are not monitoring *Varroa* mite levels it is important that varroacides are used during mid-August rather than delaying treatments until September or October. This is because the bee brood population in a colony reduces significantly during July and August, whilst the *Varroa* population is doubling every 3 to 4 weeks. As winter bees are developing in late August and early September, it is important that the virus infections associated with *Varroa* are not triggered or transmitted to them. This population principal is illustrated in the graph below. If your bees forage on late crops you should monitor infestation levels and use bio-technical control methods in early summer, such as comb trapping. With proper *Varroa* management in early summer mite populations will be below the damage threshold during these late flows. It is useful to bear in mind that once *Varroa* numbers are high and viruses have been transmitted to much of the colony, the damage has already been done. Further details can be found in the NBU Leaflet 'Managing *Varroa*'.

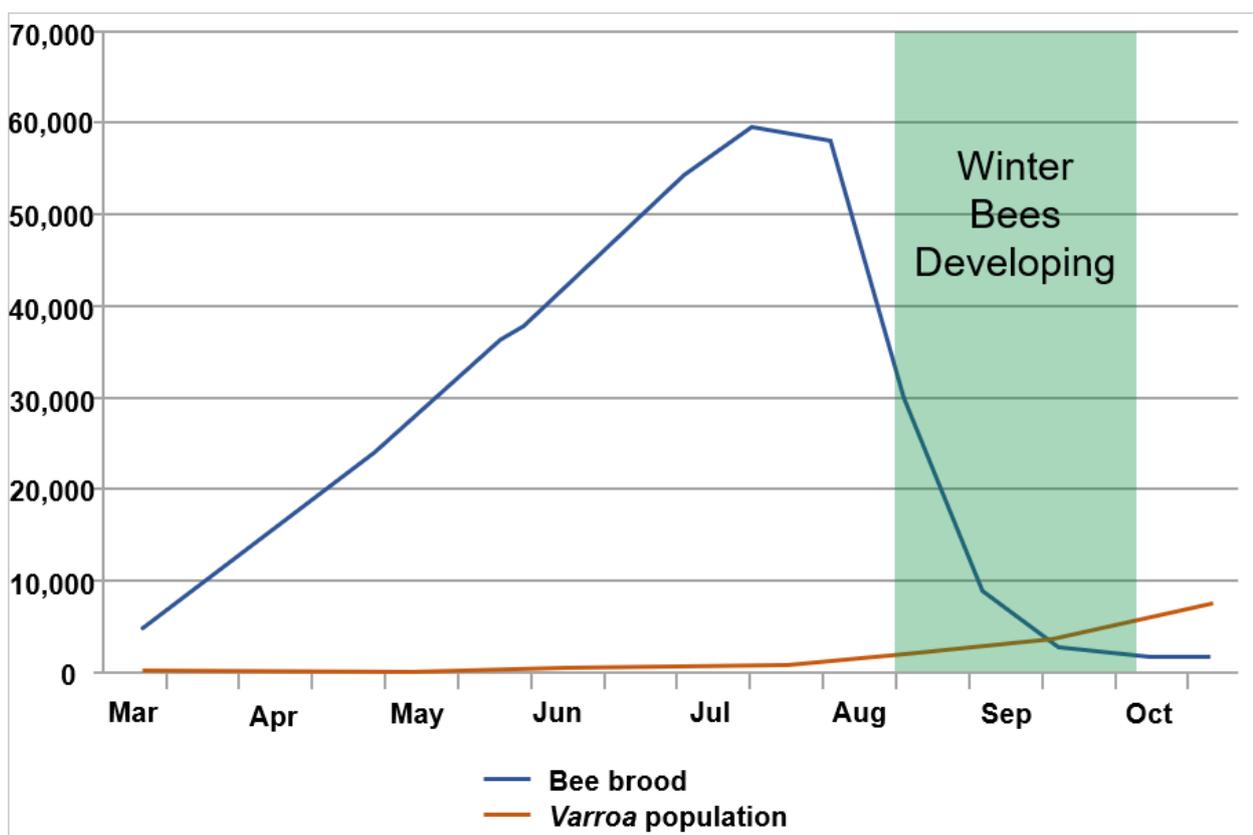


Fig 2. *Varroa* population growth in relation to bee brood

5. Sufficient stores

The amount of stores required by a colony varies with the strain of bee. It is generally considered that a honey bee colony requires about 16 – 20 kg of honey to safely feed it through the winter. Larger hives headed by prolific queens may require more. When full a BS brood frame contains about 2.3 kg of honey, so assess the existing colony stores and feed the required balance using winter strength sugar syrup, i.e. 1 kg of white granulated sugar to 630 ml of water (2:1 pounds to pints in imperial). Sugar syrup can be fed to supplement honey stores or as a substitute for them. Watch out for robbing bees as this can be a problem particularly in late summer. Feed in the evening and clear up any spills to help prevent this. Depending on locality, prevailing weather conditions and colony size your bees will be unable to process syrup to store it properly beyond mid-October. If there is insufficient honey stored on combs by the end of October, you may have to rely on fondant as a backup. Colonies also require ample pollen to overwinter successfully, especially to rear brood. Ensure that your overwintering bees have access to good quality pollen crops both at the end of the season and early in the following season or consider feeding them pollen supplement or pollen substitute.

6. Hive in sound condition, waterproof and well ventilated

Apiary sites need choosing carefully to ensure that they have good access in all weather, firm but well drained ground, sunny, not in a frost pocket and with good air circulation. Damp rather than cold kills bees so check hives, especially roofs, to ensure rain is shed away. It is best to ensure that your hives are off the ground on suitable stands. If your apiary site is not vulnerable to windy conditions, and you are using open mesh floors, they can be left with the floor inserts out.

Redistribute hive parts. Individuals' personal preferences play a large part in the configuration of hive components for the winter. Some, who normally manage their colonies on double brood or brood and a half, will consolidate the nest area to a single brood box using the opportunity to remove old combs with little on them. Some will place the supers below the brood box – an arrangement that often results in an empty super by the Spring and with the queen laying in the warmer top box. Some will transfer a small colony to a polystyrene nucleus hive. Whatever your preference it is advisable to concentrate on two essentials:

- Remove the queen excluder to avoid a situation where a winter cluster goes through the excluder after stores leaving the queen behind who perishes from the cold and starvation.
- Moderate the volume inside the hive by using dummy boards or similar to reflect the size of colony so that it is not struggling to warm up a large space.

7. Protected from vermin

Fit mouse guards to prevent access by small rodents, which often nest in hives during the winter. In some areas green woodpeckers can damage hives, so if this is a known problem in, or near your apiary, place a simple cage of chicken wire around and over the hive, at least 300 mm from the hive walls to prevent damage whilst permitting bees to fly.



Fig 3. Chicken wire is placed around the hive to serve as woodpecker protection.

Monitor throughout winter

Once you have taken every precaution to ensure your colonies survival leading up to winter, it is important to remember to still monitor them during the cold months. This is particularly essential for those hives that were strong throughout the year and went into winter vigorously too. Once they have stored all their food for winter, there are several methods that can be employed to monitor your hives.

Hefting the hive

At the end of autumn when you have finished feeding, go around and heft your hives to gauge the weight of the brood boxes. This is the weight you want to try and maintain throughout the winter and if it is getting particularly light, then chances are that you will need to feed them fondant. It is advisable to heft your hives every other week. Around December, giving your bees a block of candy (fondant) for Christmas won't hurt either.

Opening the hive

When opening the hive, you are only doing so to make a quick assessment of the cluster in relation to the stores of food. Do they have enough food? If so, are they isolated from it? This inspection should only take around 20 seconds – don't hang around. It is better to a quick check for stores even when cold than find a dead colony that has starved in the spring. The use of 'glass quilts' or polycarbonate crown boards instead of plywood ones help with checks of the colony without letting out all the heat.



Fig 4: Use of transparent crown board to check on the colony in winter. Photo Phil Khorassandjian

What do you mean by are my bees isolated from food?

Even when a colony has plenty of food, they may become isolated from it and end up starving. This happens when colonies move towards one end of the brood box and consume all the stores. Remote from the rest of the stores and unable to move in very cold conditions because they are in a tight winter cluster, they will starve very quickly. Sometimes a short period of warm weather leads to the winter cluster breaking up and when it re-forms as temperatures drop it might be away from the stored honey.

Guard against this by checking inside the hive every other week if weather permits. Either re-distribute combs with honey so that they are adjacent to one side of the nest or give them fondant placed directly over the nest area.

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