



NSW Agriculture

# Removing honey from the hive

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## INTRODUCTION

One of the main reasons for keeping honey bees is to harvest the honey that bees store in their hives. The ability of honey bees to store vast quantities of this sweet substance has attracted human interest for thousands of years.

Each floral source of nectar collected by honey bees gives a specific natural delicate flavour and aroma to the honey produced from it.

The need to retain this quality product as near to that which honey bees have created is the prime aim of a beekeeper in the process of removing, extracting and storing honey.

## HOW HONEY IS PRODUCED

The process starts when field bees collect quantities of nectar from flowering plants and return to the hive. This nectar is stored in the honey sac where an enzyme, called invertase, is added to the nectar. Invertase enables the nectar, primarily a sucrose solution, to be converted to a mainly levulose and dextrose solution.

The nectar collected by field bees is stored in wax cells in the hive where it is converted into honey. During this process the moisture content is reduced to 14–21%. When the honey is ripe, bees cap the cells with beeswax. The higher the humidity or colder the climate, the more difficult it is for house bees to reduce the moisture content.

Honey with a moisture content over 21% is likely to ferment and destroy the product.

## WHEN TO TAKE HONEY FROM HIVES

The question is whether the honey is mature enough to be harvested.

Normally a frame of honey three-quarters capped with wax can be considered for removal. One test to determine the ripeness of the nectar/honey is to hold an uncapped comb containing

honey on its side and give it a good sharp shake. If there is any loose nectar, wait until the ripening process is completed.

## HOW MUCH HONEY TO TAKE

When taking honey from hives it is essential to leave bees with sufficient honey to satisfy their needs. Bees require honey for a number of reasons.

- Honey is the main energy source for the bees' survival — without it, they will perish.
- Worker bees consume honey to stimulate wax glands in their abdomens. Beeswax is then used to construct and build cells in which to store further honey and pollen and to raise larvae, and to cap cells full of ripe honey.
- Bees are insects and thus cold blooded. To remain active they need to create heat which is largely done by the consumption of honey. This enables bees to maintain the brood nest temperature and develop larvae at a constant temperature of 34–35°C, and for the bees to cluster during the winter.

It is not uncommon for a hive to be left without sufficient stored honey to survive winter. In this case the colony starves and dies.

With these points in mind, consider how much honey is on the hive in relation to:

- The strength of the hive — a strong hive requires far more stored honey for its survival than a weaker colony.
- Time of year — a hive going into winter needs a reasonable amount of stored honey to enable it to survive to early/mid-spring, which may be a four to five month period. In mid-spring a hive may actually benefit by having its honey removed to act as a deterrent against swarming.

- Other floral prospects — what other honey sources are available after this honey is removed? If the colony is in the middle of a reasonably good honey flow, taking a large proportion of the honey off the hive is advisable. Even if the honey flow is finishing, another may be anticipated with reasonable assurance straight away and in this case removal of the bulk of the honey is still worth considering.

If further honey flows are not likely in the immediate future, it may be wise to anticipate the worst and leave ample stored honey on the hive. This may or may not mean you can remove honey. For instance, if you had two full supers of honey and a brood box, it would be reasonable to remove at least one box (super) of honey at any time of year, if it had ripened properly.

### **HONEY FROM BROOD NESTS**

Removing honey from a brood nest is not conducive to a quality product because:

- Honey in and around the brood nest is often much darker as the dark brood combs discolour the honey.
- Dislodged brood and larvae in the extraction process is likely to contaminate the honey.

If honeycombs are to be taken out of brood nests they must be free of brood, or first be placed above a queen excluder to allow all the brood to fully hatch before extraction takes place. If possible, keep this honey separate from your main extraction because of its darker colour.

### **FLORAL HONEYS**

It may be possible to collect a pure floral honey from one source. If you anticipate a varietal honey and want it to be as pure as possible, it may be necessary to strip off all the honey in the supers and place empty combs on the colony. Any honey collected and eventually extracted from that moment on will be from the floral source the colony is working. This is sometimes practised on citrus honey flows to obtain as pure a honey crop as possible from this source. Citrus honey is very light and has a very distinct citrus flavour. As a consequence, it can attract a premium price in its pure form.

### **QUEEN EXCLUDERS**

The use of queen excluders offers beekeepers a much more efficient way of removing honey from the hive. If the brood nest is confined to the brood box (usually only one box) then any combs above this should be free of the possibility of any brood or larvae — a potential contaminant in the extraction process.

Queen excluders allow beekeepers, particularly commercially-orientated ones, to remove honey with the least possible disturbance to the brood nest.

### **METHODS OF REMOVING HONEY**

To remove honey from a hive, what options do we have? There are a number of possibilities, depending on the time of year, whether bees are robbing or not, how many hives there are, and their location.

The methods currently used are brushing and shaking bees from each comb, removing the super of honey and letting bees fly and walk out, using escape boards and using bee blowers. Beekeepers will need to determine what is most appropriate to their circumstances.

#### **Shake and brush**

The shake and brush method, used mainly by amateur beekeepers, aims to separate bees from their honey frames. This method requires each frame to be removed, given a shake (either back into the bee box or at the entrance), then any excess bees brushed off the comb. With practice, the quick shake can be a very efficient way to dislodge the bees from their comb.

If a brush is used, it should be clean and used only for the purpose of brushing bees off honeycombs. This ensures that it does not contaminate your honey with other substances. You may need to carry fresh water with you so that you can wash the brush if it becomes sticky with honey.

After each honeycomb is cleaned of its attached bees, the comb is placed in an empty box kept within reach. This box needs to be kept off the ground on a honey pallet so that no dirt or sticks adhere to the bottom of the frames.

Disadvantages are that the method is rather slow and can stir the bees up if the beekeeper is inexperienced. Also, leaving the hive open too long may cause stress to the brood and encourage robbing by other bees. Robbing will mean an end to honey gathering until the bees settle down.

The advantages are that individual frames that are completely ripe can be removed, leaving those that still contain ripening nectar. The shake and brush may be very suitable for beekeepers with only a small number of hives or who do not use queen excluders.

#### **Let them drift**

In some conditions removing the top box of combs and placing the whole box on its end on the lid will allow the bees to walk and fly out. This may take a number of hours. I have taken honey off this way on a winter honey flow and the method works very well under certain conditions.

The main problem is robbing. If robbing is even slightly suspected then this method should not be attempted, although I have heard of honey supers being removed near dusk and placed on the lid of each hive. Then, at dawn, come back before the bees begin to fly.

If the bees do not leave the honey super quickly enough shake, brush or blow the remaining bees out before removing the box of honey. Some beekeepers think this method works better if the supers of honey are removed in the early morning before the young bees come above the queen excluder. This method cannot be used if the weather is wet or windy — the risk of contaminating the honey is too great.

### **Escape boards**

Escape boards work by allowing bees to get from one side of a board to the other without returning, thus emptying the super of bees. The boards are inserted between the super of honey to be removed and the next super. They are usually left on overnight, although some apiarists believe that two nights are better for clearing the bees. It can also be sufficient to leave the boards for three to four hours if you are willing to shake, brush or blow off the excess bees that do not clear from the top box.

Normally a hive is under-supered well before the top box is removed for extraction. The box (which is usually more than half-full of honey) is removed and a super with empty combs is placed on the brood box, then the partly-full super is replaced. To use an escape board just before removing the honey, the top super, once full, is again lifted and the escape board is inserted.

If a large number of hives are to be processed, either under supering or inserting escape boards, this is best treated as a two-person job.

Escape boards work better during cooler weather, particularly when placed on a hive overnight. In hot weather they are sometimes slow to work and, in some cases, bees are smothered in the top box.

This may be overcome to some degree by using butterfly entrances. The board is placed between the empty and full super of honey on top and the butterfly entrance is left open on the board, allowing bees to leave the box of honey, both through the escapes into the box underneath and through the butterfly entrance directly outside the hive body. This allows bees to clear reasonably quickly. These butterfly entrances can easily be closed if robbing becomes a problem.

There are many variations in the design of escape boards. The principle is always the same;

they act as a one-way board. All of them probably work in the right circumstances, but experiment with the various designs available to find one that suits you.

### **Notes on escape boards**

- Bees do not leave the honey supers at all if there is brood or larvae in the combs.
- Bees are unlikely to leave uncapped or ripening honey.
- Escape boards tend to reduce robbing in the apiary.
- Supers and lids must be in good condition to prevent entry of robbing bees.
- Put escape boards on your load of supers before returning to the extraction shed. They continue to clear bees from boxes without allowing them to re-enter or rob boxes already removed.
- A major disadvantage is the requirement in most cases for two trips to the apiary — once to put the escape boards on and then to remove the box of honey and escape board.
- Occasionally, a bee escape will become clogged, preventing bees from exiting.
- When used properly, escape boards cause the least disturbance within the apiary and colony, and are strongly recommended for backyard hives for this reason.

### **Blowers**

Devices used to blow bees from supers of honey have been used successfully for some time. They require the box of honey to be removed and placed on its end, either on the lid of the same hive or on a neighbouring hive.

The blower is then used to blow the bees off their combs. This is done by working from the back of the hive and blowing the bees to the front of the hive.

The blower nozzle is angled slightly up and directed between each frame in turn. Starting from one side of a super, each frame is given a blast of air, blowing from the bottom bar end of the box, through the top bars. The frames are prised apart to enable the jet of air to reach the clustering bees. Once the box is cleared of bees, it is immediately removed and covered up to prevent entry by returning bees.

At this stage, the use of escape boards has the major benefit of continuing to clear any excess bees still in the boxes. If the air jet is strong it is advisable to blow the bees out of the combs with an upward movement. In some cases bees which were blown downwards have been damaged.

Blowing bees during cold weather also causes problems for the bees. It is possible for them to chill before finding their hive and die overnight. Avoid using bee blowers during very cold weather or late in the afternoon.

The use of adequate protective clothing during this operation will certainly speed up the process because bees are more likely to sting when a blower is used. Blowers tend to be noisy, which is more of an annoyance to the operator than to the bees. Test blowers before buying one to make sure the one you choose is quiet. Be aware of the fire risk — blower motors get hot and may start a blaze.

A variation on the use of bee blowers is gaining in popularity: the bees are blown off the combs while still on their hive. This is done by tilting the bee blower at about a 15° angle between frames. Each gap between frames is blown from one direction, then the other. The angle seems to make the bees run down towards the queen excluder. To be able to do this, the hives must be three or more decks high. When bees are blown down from the top, the super is removed and the surplus bees, adhering to the bottom of the frames, are blown off.

The advantage of this technique is that bees are not blown all over the place. Most are confined to the beehive and when the super is removed it is virtually empty.

## **FROM THE HIVE TO THE EXTRACTOR**

Be aware of the possibility of contaminating the honey when the honeycombs have been removed from the hive. Placing combs and supers of honey onto pallets, on the truck or next to the hive, will assist in keeping grass, dirt, sticks and small rocks from sticking to the combs. Cover the boxes to prevent re-entry of bees into the boxes.

If the honey needs to be transported to an extracting plant, cover the load with escape boards or a tarp to prevent dust and bees from entering the boxes. If using dusty roads, be sure to cover the honey boxes securely.

Avoid taking honey off during wet weather. Rain on the combs will only increase the moisture content in the honey. Honey attracts and absorbs water very readily. If there is threat of rain, cover all supers with a waterproof covering.

Avoid windy weather. Wind carries dust and dirt. Exposing the honeycombs in any way may lead to contamination. Working bees during windy weather is also very uncomfortable for you and the bees.

Be aware of any other contaminants. If using antibiotics to treat hives for European Foulbrood disease, ensure you do not remove the honey from these hives for at least eight weeks, preferably longer. It is better to remove any honey before treatment.

Be aware of agricultural sprays. Many pesticides now have a low toxicity to bees, but even so, nectar and pollen from sprayed sources may result in some form of residue in the honey. When working horticultural or flowering broad acre crops that have been sprayed with anything, clearly label any honey from this source and inform the packing plant of the potential risk.

In some cases, honey will ferment in the hive. Fermented honey can be very detrimental to bees' health and must be removed from the hive. Extract this honey but keep it separate from your other honey. Notify a packer to see if they can use it, and if not, discard the honey in a responsible manner.

With care, honey can be removed with minimal or no contamination. Remember, honey is a valuable substance. Anyone who extracts honey for human consumption has a responsibility to ensure they take every step necessary to keep the product as pure and clean as possible.

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