



**Beekeeping - Certificate III
Participants Learning Guide**

RTE3320A Remove a honey crop from a hive



Australian Government

**Department of Agriculture,
Fisheries and Forestry**



**Australian Honey Bee
Industry Council**

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What this learning guide covers

This learning guide will help you meet the requirements of the unit of competency:

- *RTE3320A Remove a honey crop from a hive*

It covers work up to and including loading full supers of honey for transport to the extracting facility.

You may also wish to undertake the following additional units of competency which are relevant to this part of the process:

FDFCORFSY2A Implement the food safety program and procedures

FDFCORQAS2A Implement quality systems and procedures

FDFOPTHCP3A Participate in a HACCP team

FDFZCSCIP2A Clean equipment in place

FDFZCSCS2A Clean and sanitize equipment

RTC2016A Recognise plants

RTC2301A Undertake operational maintenance of machinery

RTC2307A Operate machinery and equipment

RTE2157A Open and reassemble a beehive

RTE3321A Extract honey

Resources you will need for this unit

For this unit of competency, you should have:

- Participants Learning Guide (this booklet)
- Participants Assessment Worksheets
- standards for extracting honey, such as those included in B Qual or B-Safe
- an experienced beekeeper or someone to help you
- tools and equipment:

- bee blower
- bee brush
- butterfly entrances fitted to escape boards
- escape boards
- fresh water
- loading equipment
- ropes and or straps to tie the supers
- means of transport for honey-filled frames to extracting facility
- bee net to cover the load
- queen excluders
- spare boxes
- tarpaulins or other waterproof coverings
- bee smoker
- hive tool
- drip trays
- super cracker
- bee-proof overalls and gloves
- ear protection
- boots
- sun hat
- bee veils
- sunscreen lotion.

The Participants Learning Guide is designed to introduce the topics and to provide you with some practical and written activities which will allow you to develop both your knowledge and skills in each area.

The Participant Assessment Worksheets include activities that you will be completing as part of your formal assessment for this unit.

Please record as much detail as you can as your responses to these activities will form part of your assessment.

You will need to send the Participants Assessment Worksheets to your assessor. Check with your assessor to find out if they need you to submit this Participants Learning Guide as well.

Important safety note

If this is the first time you are removing a honey crop from a bee hive, ask an experienced beekeeper to show you what to do and be on hand to help you in case you get into trouble or need an extra pair of hands.

Introduction to this unit

In this unit, you will learn about:

- preparing to remove honey
- removing honey from the hive.

Before you start this training you should be confident about your skills to:

- judge ripeness of the nectar
- carry out safe manual handling
- use PPE
- work with and around bees.

You should know about:

- food safety requirements
- indicators of ripe nectar and adequately filled cells
- methods to remove bees from hives.

Why this task is important

Honey is removed to:

- provide you with an income
- as an aid to colony management, for example to control swarming usually in the spring
- give the queen more space for brood by removing combs in the brood nest that are full of honey in spring and summer
- deal with the potential for honey fermenting in the combs – if the bees had difficulty ripening honey and went into winter with thin honey, that honey could absorb moisture over the winter and ferment. In spring, if the bees tried to eat this fermented honey it could kill them, so it should be extracted and disposed of in a safe way, e.g. burying.

1. Preparing to remove honey

All beekeepers look forward to removing a honey crop as it is the main reason most beekeepers keep bees.

To be able to get combs full of honey, much prior hive management must have taken place. You will need to use your understanding of flora and to be able migrate your hives to the best floral conditions for honey production. Pollen production is also important as the pollen collected by the bees builds up the colony strength so the colony has sufficient worker bees. Their task is to collect the nectar from the nectaries of blossoms and convert it into honey by adding an enzyme to the nectar that changes the sugars and reduces the moisture content of the original nectar.

Before removing a honey crop, you need to check:

- tools and equipment
- PPE
- OHS hazards
- food safety requirements
- site quarantine or biosecurity
- other risks
- the ripeness of the honey in the cells
- factors affecting honey quality
- factors affecting how much honey you can remove
- factors affecting when you should remove honey.

Deciding when to remove honey

The decision about when to remove honey is not an easy one for the beekeeper, whether the hives are kept in one place or moved from bee site to bee site. Some things to take into consideration include:

- what future honey prospects are likely to be
- whether you can migrate your colonies to another potential honey flow

- are other species about to flower that have the potential to yield nectar and pollen.

Be cautious! Only take combs of honey that have two-thirds of the cells capped with a wax seal. Bees place a wax seal over the cell when the nectar has had sufficient moisture removed by the bees so it won't ferment and has been converted to honey.

It is best to leave some honey on each hive so it won't starve. This is especially important if you are unsure how much more nectar is likely to be available to the colonies in the coming weeks.

Hives going into winter should have one full depth super of capped honey.

Strong hives will need more honey than weaker ones to survive the winter.

Placing empty combs on hives stimulates the bees to collect more, if the flora is still producing.

How to tell if your bees are still collecting nectar

- Flight of the bees.

If bees are flying actively it is an indication nectar is available.

- Bees landing short of the entrance with enlarged abdomens.

When full, the honey sac in the abdomen of the worker enlarges. Bees that are collecting nectar are heavy so they can have trouble landing.

- You can catch and squeeze the bee's abdomen then she will regurgitate the nectar through her mouth and you can taste the sweet nectar.

- Remove some combs and shake them sideways over the frames in the box.

If the nectar is fresh and unripened it will easily shake out. You will also see fresh wax being produced to cap the ripened nectar in the cells.

- Bees fanning

At night the bees fan so much to ripen the nectar that they make a strong noise. You also will observe bees fanning at the hive entrances.

- Robbing

If you open a hive or expose honey and bees rob it is a sign the nectar flow is finishing.

- Observe bees on the blossom

If they spent time with their tongues sucking up nectar, the flow is still on. If they fly quickly from flower to flower, it is not a good sign.

- Look at the blossoms

Look at how many unopened flowers remain to judge how long the species providing the nectar is likely to keep flowering.

- Get some of the blossoms and hit them on the windscreen of your vehicle.

If the flow is still on, you should be able to see nectar on the glass. This also will tell you if other insects are in the blossoms competing with the bees for the nectar and pollen.

Insects likely to be found on flora include bud weevils, thrips, Rutherglen bugs, stick insects, gum moths and bud gall. You can remove the bark of the eucalypts *Angophora* and *Corymbia* during the day and may observe Bogong moths; these moths feed at night and leave an odour that repels bees during the day.

- Climatic conditions can stop eucalypts and ground flora suddenly from yielding nectar.

If rain occurs when most gum species are flowering, a nectar flow will stop. Ground flora prefers humid weather. Spotted Gum needs cold nights and warm days to yield honey.

Check for and deal with OHS hazards

Some OHS hazards that you may encounter include:

- airborne and soil-borne micro-organisms
- bee stings
- chemicals and hazardous substances
- dust
- holes and slippery and uneven surfaces

- incorrect manual handling
- noise
- snakes and spiders
- sharp hand tools and equipment
- solar radiation
- livestock or wildlife in or near the bee site or on access roads.

Food safety and quality considerations

Preventing contamination or tainting

Use smoke sparingly and don't use smoker fuel that has a strong odour or has been in contact with pesticides.

Direct exhaust fumes from blowers away from the air intakes of the bee blower so the fumes are not blown on to the honey.

Prevent frames coming into contact with the ground by using inverted lid to sit supers on.

Cover supers top and bottom to prevent robbing, contamination of honey from dust, rain and insects while transporting.

Remove any physical contamination from frames of comb by brushing and scrapping.

Queen excluders are an advantage as they separate honey from brood.

Other risks of contamination may come from dust and dislodged brood.

Withholding periods

If you feed antibiotics to your bees, check the label on the label of the antibiotic for the withholding period for honey. This means that you must not sell the honey for the time specified on the label.

If your hives are ready for extracting, it is better to extract the honey before to feeding the antibiotic.

Small hive beetle

Small hive beetles lay eggs in the hives and on the combs. Once bees are removed these eggs can hatch within two days. The resulting larvae can make the honey unmarketable.

If you observe small hive beetle adults in the hives when removing the combs, the honey must be extracted within two days.

Water content

Harvest only ripe honey, ensuring that at least two-thirds of each comb is sealed. Moisture content must be low enough to avoid fermentation. Aim for less than 18% moisture.

Cleaning and sanitising

Use clean water for washing hands.

Maintain truck or vehicles that you use for carrying honey supers in a clean condition.

If using brushes for brushing bees from the combs, wash the brushes regularly in clean water to prevent contamination.

Maintain hive components in a clean condition.

Drip trays, the trays must be food-grade and clean at all times.

Record your activities.

Floral risks

Honey from some floral sources can pose risk due to alkaloids. Honey packers know the species that are a risk and use less than 20% of such honey in blends. Therefore it is important that when you are selling honey, that you identify the floral type.

Avoid areas of rhododendrons to minimize the risk of grayantoxins.

Grayantoxins can cause vomiting, drooling, diarrhoea, weakness and depression of the nervous system. The most severe cases usually lead to a coma and then death due to the collapse of cardiovascular system. However it is unlikely that Australian beekeepers will be producing rhododendron honey!

American foulbrood

Honey extracted from American foulbrood-affected hives must be labelled to ensure it is not used in pre-packed honey, even though it poses no human health risk. It can be used for processing (cooking). Make sure that it is not kept anywhere where bees can rob it and so pass on the risk of AFB.

2. Removing honey from the hive

Weather

Avoid removing honey on windy, wet days, when there are high temperatures or excessive humidity and on days of high fire danger.

In times of high fire danger, check with your nearest fire station or police to see if you can use your smoker.

Techniques for removing honey

The method you use is up to you and it is often determined by field conditions and time of the year.

The super or supers of honey to be removed must be free of brood; bees will not leave brood and supers must be bee-proof to prevent robbing by robber bees.

Re-supering

If a flow is still 'on' when you come to remove the supers full of honey, you can replace the full supers with ones with empty combs.

As the intention is to have bees covering all the combs, you will need to judge the strength of the colony to decide whether you need to replace the full supers with more or fewer empty ones. If only a few frames are full, then you can replace them with empty combs for the bees to refill.

If the replacement supers or frames have been fumigated with Phosphine to control wax moth, then they must be aired with forced air for two days before placing them on the hive. If ventilation is poor, then air them for five days before use to prevent adult bee mortality.

Methods to remove bees from combs

Bee blowers

Blowers consist of a motor-driven impeller that generates a stream of air along a plastic pipe or hose with a restricted outlet.

Several designs are available with 2 stroke or 4 stroke engines, or electric-powered, using a portable generator. Some are on wheels, other hand-held, or strapped to your back.

How to use a bee blower

The super of ripe honey is removed from the hive and placed on its end on top of the hive, with the top bars facing the direction of the hive entrance.

Stand behind the hive, with the bottom bars of the frames facing you, direct the air generated by the blower between the frames to dislodge the bees.

Blow each gap between the frames in one direction and the other so both sides of each frame is clean of bees. Direct the air to the top of the frame and also to the bottom of the frame to blow the bees out.

The bees generally fly when blown from the super but care must be taken not to tread and squash them on the ground. If you do, those that survive will soon start stinging your ankles!

Once the bees are removed the super can be loaded onto the vehicle or stacked near the hives for loading later onto the vehicle. Place the first super removed onto a drip tray and cover the top to prevent bees re-entering.

During the operation use sufficient smoke to control the bees.

Benefits

These are popular with commercial beekeepers as only one trip is required to the apiary.

Bee blowers remove bees uninjured from supers.

Drawbacks

Bees are more likely to sting you when a bee blower is used.

Blowers can be very noisy, can get hot and could start a fire.

As exhaust smoke could contaminate honey, ensure the bee blower is in good condition to avoid excess exhaust smoke.

Escape boards

The bee escape board is basically a one-way device set into a board that is placed below the super or supers of honey to be cleared of bees. Various designs of bee escapes are available for placing on the board and it is common to use four, each one in a corner of the board.

How to use escape boards

The full super or supers are removed and empty ones placed on the hive.

Place the escape board, with its holes facing up, on the top of the empty super.

The full super or supers are then placed on top of the escape board. The bees go through the holes in the escape board into the empty super.

Some escape boards are fitted with a butterfly entrance that can be opened if bees are not robbing and the weather is hot. This allows the bees to escape quicker from the full supers of honey.

Leave the escape boards on the hives overnight so the bees will move out of the super(s) of honey. If some bees remain, you can blow, shake or brush them from the combs.

Benefits

This method causes minimal disturbance to the hives compared to other methods. It is ideal for removing honey in backyard situations as the bees are unlikely to sting.

Escape boards can be used as covers for transporting supers of honey; this allows any stray bees that have been left in the supers to escape.

Drawbacks

Escape boards require two trips to the apiary.

You need enough escape boards for all hives in the apiary.

In hot weather, bees can smother from over-heating.

Drifting

This is a very popular method used by experienced commercial beekeepers when bees are not robbing.

How to use drifting

Supers of ripe honey are removed from the colonies and placed on their ends on the lid of the hives.

The bees will leave the supers in about half an hour, so by removing all the full supers in a load, by the time the task is completed, your supers are free of bees.

If any bees remain they can be blown out or shaken.

Benefits

Requires only one trip to the apiary.

Under the right conditions, if bees are not robbing, this is a very efficient quick method of removing bees from supers full of honey.

Drawbacks

You cannot use this method if bees rob.

Shake and brush bees

How to do this

Remove the frame from the super of ripe honey.

Shake the bees from the frame by holding the frame by the top bar lugs and shaking the frame so the bees fall onto the ground at the hive entrance.

Brush any excess bees off the comb. The brush should be clean and not used for any other purpose.

Repeat for each frame.

Wash the brush if it becomes sticky with honey in clean water.

Place the frames free of bees into a super placed on an upturned lid or drip tray within easy reach and place a lid on the box so bees can't enter.

With shallow supers, some beekeepers shake the whole super of combs to free them of bees without removing the combs. You can do this by holding the hand holds of the super and shaking it so that the bees on the combs fall at the hive entrance.

Benefits

This is an ideal method for removing bees from a few supers.

Drawbacks

This is more labour-intensive than other methods.

Transport

Remove the supers and either stack them together in the apiary to be loaded as a batch or load them as each one is removed.

Place the stacks of supers full of honey on drip trays (often called 'honey pallets'). Then place a cover on top to keep the load free from dirt, bees and water; a lid, a drip tray or an escape board placed so that bees can escape from the stack would make a suitable cover.

Some beekeepers also cover loads of honey with bee nets as an added safeguard.

Secure the load with ropes or straps.

Extract the honey quickly, preferably the next day.

Biosecurity reminder!

Because there is an interchange of material between hives when you remove and replace frames and supers, you must keep records of this movement and be aware of the disease risks.

Always check brood nests before removing honey, especially if you have any concerns about the health of a colony.

Final activities and assessment

Now that you have completed all the activities in this Learning Guide, take some time to practice removing a honey crop under a variety of commonly encountered working conditions.

When you are ready, you can complete the assessment tasks that are listed in the Participants Assessment Workbook for this unit of competency.

Useful references

Bee Agskills: A Practical Guide to Farm Skills, 2007, NSW Department of Primary Industries

The Bee Book: Beekeeping in Australia, 2nd edition, 2005, Peter Warhurst and Roger Goebel, Queensland Department of Primary Industries and Fisheries available from <https://www.publications.qld.gov.au/>, or phone 1800 801 123.

B-Qual <http://www.b-qual.com.au/>