Farm Production & Practice

Ministry of Agriculture and Fisheries

Beekeeping
Establishment and Management
An Introduction

Before starting beekeeping, think carefully about whether it will be a suitable hobby or small business. Outlined here are factors affecting this decision, and some background to beekeeping in NZ.

Decision Making

Beekeeping is a specialised farming operation, and requires both skill and a high work input. A period of enthusiasm followed by a lack of interest may lead to hives becoming neglected. This represents a waste of capital and may result in excessive swarming, which in turn leads to distressed neighbours and more aggressive bees. Neglected hives can harbour diseases, which unless eradicated will spread to nearby hives.

Consider these points before deciding to start beekeeping:

Seasonal workload: Spring and summer are the busiest seasons for beekeepers. Work must be done when the bees require it, and not when it is convenient for the beekeeper. Even a short delay at times can mean the loss of a season's production, or even the death of the colony.

Physical fitness: Beekeeping is heavy work, as full-depth boxes of honey can weigh up to 40 kg when filled. Heavy lifting is especially uncomfortable for anyone dressed in protective clothing on a hot day. Working the hives requires a lot of bending and stooping, which can aggravate back problems.

Stings: It is impossible to keep bees without being stung. To begin with everyone reacts to stings with sharp pain, reddened swelling, and persistent itching. These symptoms usually lessen over a period of time as more stings are received, but the initial pain is always as great.

People who develop other symptoms such as swelling, itching, or blotchiness of the skin away from the actual sting, or who have problems with breathing, should discuss this with a doctor before keeping bees.

Eyesight: Good eyesight is necessary for close examination of brood for diseases and detection of eggs.

Obtaining Bees

Beekeeping can be an expensive hobby, so it is wise to gain some experience before getting any bees. Working with a beekeeper or taking part in beekeeping clubs can be a useful way of doing this. Enrol in a local polytechnic or community college beekeeping course if one is available.

It is better to begin with two bee colonies than with one. This will enable comparisons to be made between the hives, and it is useful to have two should one become queenless. From two hives, numbers can be increased as experience, knowledge, time, and money permit.

There are several different ways to start beekeeping:

Nucleus colonies: These are small colonies that consist of several frames (often four) containing bees, brood, food stores, and a queen. Nucleus colonies are installed in standard hive equipment after purchase, and this is an additional expense.

The colony can be transferred direct from the parent hive into the new equipment if the vendor is nearby. Otherwise it may be transported some distance in wooden or disposable waxed cardboard nucleus box.

The vendor must have a permit from MAF to sell bees. This does not guarantee that the hives are disease free, but notifies MAF of the transaction and assists in its disease monitoring programme.

Existing hives: Second-hand hives may be advertised in beekeeping journals, local newspapers, or through beekeeping clubs. Have an experienced beekeeper check any second-hand hives to see that they have sound woodware, good combs, a strong colony, and are disease free. The vendor must also have a MAF permit to sell the hives.

A second-hand hive in good condition and strong in bees would probably cost the same as the equivalent new equipment without bees.

Swarms: A bee swarm is a cluster of bees which leaves the hive with a queen to establish a new colony. Many beekeepers start hives by catching swarms. They are a free source of bees, and capturing them prevents the bees from becoming a nuisance. However, there are two disadvantages with catching swarms:

- The bees may carry spores of American foulbrood (*Bacillus larvae*). This disease affects the developing bees, but cannot be seen on adult bees (AgLink FPP 124).
- Large swarms usually contain an old queen, and may be an aggressive strain, so they usually need prompt requeening.

To start bee colonies from swarms, advertise in the local newspaper during spring, or leave your name and address

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Information Services, MAF, Private Bag, Wellington, NZ

at a MAF office (so that contact may be made if a swarm is reported).

Feral colonies: "Wild" or feral colonies of bees are those that have become established in a place other than a standard beehive. The bees can be transferred to a hive, but this is a messy and often difficult task and should only be attempted by those experienced in bee management and disease diagnosis.

Feral colonies can harbour American foulbrood, so those that are not transferred to frame hives should be destroyed. (See Aglink FPP 392 for details.)

Package bees: These consist of a quantity of bees (often 1 kg) and a queen, sold in a ventilated container. Starting colonies with packages is fairly difficult and should only be done as a last resort.

Hive Equipment

Many different types of bee hives are used overseas, but the Langstroth type is the most common. It is used exclusively in New Zealand and because of this all standard equipment is interchangeable.

Hive equipment is designed around the principle of the "bee space", a 6–9 mm gap which bees use as a passage way. Smaller spaces are closed up with propolis, and combs are built in larger cavities. The bee space principle means that all hive equipment must be made exactly to standard dimensions.

Hive equipment is made in New Zealand by several different manufacturers and can be purchased in kitset form. The use of the three-quarter depth hive body is recommended over the much heavier full-depth.

Protective Clothing

It is essential to have enough protective clothing to be able to manage bees with confidence. People wearing inadequate protective gear are likely to receive a lot of stings and be put off beekeeping altogether.

The quantity of equipment needed depends on the strain of bees, the weather conditions, and the confidence and ability of the beekeeper.

Smoker: Competent use of a bee smoker is essential to handling bees. Smokers of various sizes are available from bee equipment stockists, but the larger-sized models are recommended as being easier to keep going.

Fig 1: Working a hive.

Hive tool: A hive tool is used for prising apart the frames and boxes of the hive. A broad screwdriver or stiff paint scraper can be used for this purpose, but a proper hive tool is better.

Veil: This should be made of stiff wire mesh so it stands well off the face. Black mesh is easier to see through than a lighter colour. Veils can be bought or made, and should be worn over a hat with a stiff wide brim.

Overalls: The best clothing to prevent bees from gaining access to the body is a pair of overalls. Any colour except blue is satisfactory, but white is coolest to wear. Overalls should have zip fronts and have the side vents and pocket openings sewn up.

Boots: Ankles are very vulnerable to bee stings and should be protected with gumboots or short boots and puttees. Do not wear thick woolly socks as bees become trapped in the fibres and start stinging.

Gloves: Leather beekeeping gloves with gauntlets are the best type, although cheaper alternatives will suffice. Later on, as confidence grows, the gloves may be dispensed with and armlets used to prevent bees crawling up the sleeves.

Locating Hives

Hives should be situated in a sunny sheltered locality where food is available for part of the year. Maximum sun is important, particularly in winter. Adequate air circulation is also important, so do not locate the hives in a frosty hollow.

Make sure that any apiary site is not flood prone and is fenced against stock. It is most convenient to have vehicle access all year round.

The maximum size of an apiary depends on the nectar and pollen sources in the area and personal preference. When an apiary has expanded to about 20 hives, or pollination work is involved, consider establishing another apiary.

Most farmers are happy to have hives on their property. Beekeepers do not normally pay for the use of sites, although gifts of honey ensure good public relations are maintained. Be sure to have the consent of the owner and the occupier of the land, and discuss the actual location of the hives so there is no conflict with other farm activities.

Aglinks FPP 537 and FPP 535 have more information on locating hives, and FPP 538 contains special precautions that should be taken when keeping bees in cities or towns.

Registering Apiaries

Every place where bees are kept must be registered with MAF as an apiary. This applies even if only one hive is kept for home use, and it is done to help MAF control serious bee diseases. Apiaries can be registered by contacting any MAF office, and there is no charge for this service.

Registered beekeepers are sent a hive inspection statement every spring, which must be completed and returned to MAF by the end of November. Apiaries away from a beekeeper's home must be identified with a code number that is supplied by MAF.

A permit is needed before hives are shifted to any new site (other than a beekeeper's registered apiaries) or before any hives are sold.

Seasonal Management

How often hives should be checked depends on time of year, type of season, the management practices adopted, and many other factors. A good beekeeper anticipates activities and is prepared to act quickly. Correct timing is important for good bee management and is often the difference between success and failure.

Spring is the most important time of the beekeeper's year. Hives must get enough attention at this time otherwise the honey crop will be reduced or non-existent. The main crop of surplus honey is gathered over summer, and this time is less busy than spring for those with a small number of hives.

In autumn the workload is relatively light, as hives are prepared for winter. Winter is a quiet period and is used to prepare new hive equipment for the coming season.

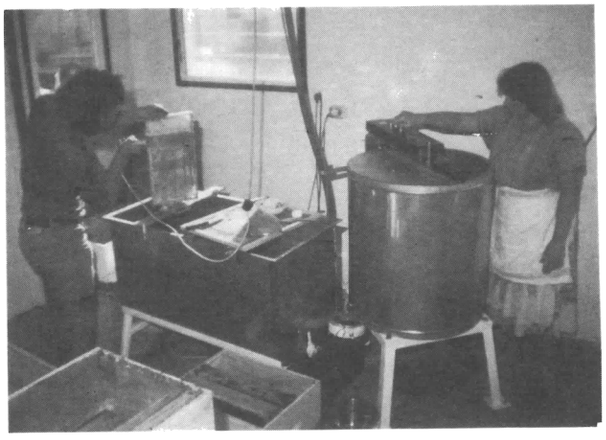

Fig 2: Interior of a small to medium sized honey house.

The summary below outlines seasonal activities.

Spring:
- Check hives for feed and disease.
- Check stored combs for wax moth.
- Cull old combs.
- Control weeds in apiaries.
- Prepare hives for queen-raising programme.
- Start queen-raising programme.
- Control swarming.
- Check state of combs in hives.
- Continue re-queening programme.
- Add first honey boxes in some areas.
- Fit foundation into comb honey supers.

Summer:
- Check results of re-queening.
- Add honey boxes to hives.
- Prepare honey house and equipment.
- Disease check if honey removed.
- Extract honey.
- Continue to add honey boxes to hives.
- Check stored combs for wax moth.
- Remove comb honey.
- Raise autumn queens.
- Make nuclei.
- Control wasps.

Autumn:
- Extract honey.
- Re-queen with own or purchased queens.
- Check for American foulbrood.
- Winter down hives.
- Process honey.
- Dispose of honey crop.
- Sort surplus combs.
- Store combs and fumigate for wax moth.
- Control wasps in apiaries.
- Control weeds in apiaries.

Winter:
- Render down wax.
- Make up hive equipment for new season.
- Check hives after storms.
- Check equipment for new season's work.

Product Options

Many different products can be obtained from bee colonies, and each requires certain skills and specific processing equipment. A combination of end products is produced from most beekeeping operations.

Extracted honey: This is the main crop obtained by New Zealand beekeepers. Honey is stored by bees in beeswax combs. Beekeepers remove these from the hive, the honey is spun out of them, and the combs are re-used the following season. Extracted honey is produced to some extent by most beekeepers, even those specialising in other products.

Honey yields are determined by many factors, including the availability of nectar sources, weather, and the beekeeper's skill. An 'average' crop might be 35 kg/hive or 3.5 tonnes/100 hives, although crops can vary from 0–10 tonnes/100 hives.

Specific equipment is needed for the extraction and packing of honey. If it is intended for sale, the operation must be carried out in premises which are registered with the local council and comply with the requirements of the Food Hygiene Regulations 1974. Honey processing facilities are expensive to set up, but there are several cheaper alternatives to building a new "honey house":
- An extracting facility could be built on a co-operative basis by several beekeepers.
- An existing shed and plant could be borrowed.
- A commercial beekeeper may extract the honey on a contract basis, the owner of the honey paying a charge per kilogram or per box of honey. Honey and wax remain the property of the producer.

Honey can be sold through various outlets. Bulk sales are usually made to co-operative or private honey-packing firms for later sale in retail packs. Bulk honey is shipped in 20 litre tins or 200 litre drums.

Many beekeepers pack their own honey and sell it on the local market, either direct or through retail outlets. There are restrictions on labelling and the size and type of container used for retail packs of honey. These are contained in the Food and Drug Regulations 1973.

Comb honey: Honey may also be sold as whole comb, i.e. without being extracted. The two forms of comb honey are:
- Section comb honey, in which small wooden or plastic frames contain a small comb of honey.
- Cut comb honey, where similar-sized portions are cut from a comb and packaged in plastic containers.

Comb honey can be processed with minimal equipment and is worth more than the same weight of extracted honey. On the other hand, hives produce less comb honey than extracted honey, and more skill is required by the beekeeper. Comb honey is usually produced in conjunction with extracted honey, so extracting facilities are still necessary.

Wax: Beeswax is produced by bees to make combs for the storage of honey or pollen and to contain the brood or developing bees. A certain amount of wax is harvested by a beekeeper in normal operations, no matter what main crop is being produced.

Honey is stored by bees in combs which are sealed with a wax capping. The cappings must be removed before the honey can be extracted, and are the main source of wax. About 16 kg of cappings wax is obtained per tonne of honey extracted. Wax is also obtained from rendering down damaged combs (about 0.5 kg/hive/year) and scrapings of extra wax from hive equipment (about 0.5 kg/hive/year).

The beeswax is melted down and run into moulds. The resulting blocks of wax can be converted into comb foundation for the beekeeper's use, or they can be sold to a beekeeping supply firm or a polish or cosmetic manufacturer.

Pollen: Collected from flowers by bees, pollen is stored in the hive for use as food. In some areas it may be harvested by the beekeeper and sold as an extra hive product.

Pollen is not extracted from combs. It is collected by placing a pollen trap on the hive entrance which removes pollen from the bees as they return to the hive. This does not totally deprive the bees of pollen, as only a small proportion of the incoming pollen is actually collected. Pollen trapping is not possible in areas where pollen sources are not abundant.

Trapped pollen must be collected at least 1–2 times a week from the hive, and can be stored in a deep freeze. It is then dried and cleaned of foreign debris before sale to health food wholesalers or retail shops.

Pollination: Fruit and seed crop growers require the services of strong hives over the flowering period to achieve good blossom set. This is a different arrangement from having a permanent apiary on a property, as hives are moved in only

for the flowering period and are later removed.

The crops being pollinated are often not particularly beneficial to bees, and using a hive often reduces the honey crop. A rental fee is paid by the grower for the use of hives over the flowering period, and this may be an extra source of income for the beekeeper.

Many owners of small blocks are interested in beekeeping for pollination purposes. Effective pollination of crops during the flowering period requires good hive management all year round. Because hives situated in an orchard permanently are not effective pollinating units, the pollination hives will have to be kept on another site and moved into the orchard only during blossom time. It is much cheaper (and easier) to rent hives for orchard pollination than to keep bees solely for pollination purposes.

Bees: Queen bees and small nucleus colonies can be sold for extra income. This is most profitable near urban areas where there is a demand from hobbyist beekeepers and can be a good source of extra income.

Other products: Occasionally there may be demand from the health food trade for other apiary products such as propolis, royal jelly, and bee venom. Producing these is highly skilled and very labour intensive, and the present uncertain market and prices make such ventures risky.

Bee Diseases

New Zealand has one serious bee disease, American foulbrood or AFB. The disease is caused by a bacterium *Bacillus larvae*, which is extremely infectious and long lived. No drugs capable of killing all stages of the bacterium are known, so infected colonies must be destroyed by fire and a MAF office notified. AFB incidence is low and can be kept that way by adherence to simple preventive practices (Aglink FPP 124.)

Information on overseas bee diseases not yet present in New Zealand is available in Aglink FPP 428.

Economics

Financial returns depend upon the management skills of the beekeeper, the season, the area in which the bees are kept, and the crop produced. Figures in table 1 are approximate only and apply to a 50-hive honey-producing unit run as an adjunct to another business.

TABLE 1: INCOME OF A 50-HIVE HONEY-PRODUCING UNIT

		($)	
Income			
Honey:	35 kg/hive = 1750 kg at $1300/tonne (net)	2275	
Wax:	1.5 kg/hive = 75 kg less 9 kg converted to foundation = 66 kg at $4.50/kg	297	
			2572
Expenditure			
Sugar		225	
Queens		210	
Vehicle		250	
Replacement hive equipment		260	
Insurance		50	
Extracting fee 12¢/kg		210	
			1205

Net before administration $1367 or approximately $27/hive.

These figures cannot be scaled up to provide information about a larger business. No financial or administrative charges have been taken into account, as it is assumed that these are borne by the main business. No capital expenditure on a honey house and processing equipment has been considered.

Further Information

References: Other AgLinks and books for further reading are listed below.

FPP 124: Brood Diseases/In Honeybees/Significance and Control.
FPP 196: Wasps/Social Species/Description and Control.
FPP 392: Honey Bees/Swarms and Feral Colonies/Eradication.
FPP 428: Honey Bees/Overseas Diseases and Pests/Features and Potential Damage
FPP 529: Beekeeping/Nectar and Pollen Sources/Summer, Autumn, Early Winter.
FPP 530: Beekeeping/Nectar and Pollen Sources/Winter, Spring, Early Summer.
FPP 532: Beekeeping/Pollen Production/Collecting and Processing.
FPP 533: Beekeeping/Pollen Production/Pollen Trap Design.
FPP 534: Beekeeping/Beeswax/Production and Processing.
FPP 535: Beekeeping/Apiary Sites/How to Prevent Drifting.
FPP 536: Beekeeping/Wax Moth/Life History and Control.
FPP 537: Beekeeping/Apiary Sites/Selecting and Planning.
FPP 538: Beekeeping/Urban Areas/Management to Prevent Nuisance.

Practical beekeeping in New Zealand, by A. Matheson. NZ Government Printer (in press).

Nectar and pollen sources of New Zealand, by R. S. Walsh. Published by the National Beekeepers' Association.

The hive and the honey bee, published by Dadant & Sons (USA).

Guide to bees and honey, by Ted Hooper. (U.K.)

Apicultural advisory service: MAF provides an advisory service for beekeepers on all aspects of apicultural practice, including disease diagnosis. Officers of the apiculture section (called either apicultural advisory officers or apiary instructors) are situated at Gore, Oamaru, Christchurch, Nelson, Palmerston North, Tauranga, Hamilton and Auckland. They have available AgLinks and other pamphlets on beekeeping.

National Beekeepers' Association: Beekeepers are encouraged to join the National Beekeepers' Association (NBA). Membership is compulsory for those owing 50 hives or more, and others may join on payment of an annual subscription. The quarterly magazine *New Zealand Beekeeper* is sent free to all members, and NBA branches run monthly meetings and occasional field days. Enquiries should be made to National Beekeepers' Association, PO Box 4048, Wellington.

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