

# Beginning with bees

Congratulations you have begun the first step in one of the few hobbies were you can taste the golden rewards of your own and your workers efforts, as well as having a hobbies that gets you outside on a nice sunny day and one were people will leave you alone while you are with the bees. Unless they are another beekeeper.

**But first ask yourself these questions**

**1) Are you or members of your household allergic to bee stings?**

Reactions to bee stings range from a swollen sore area around the site of the sting to severe life-threatening events. If you don't know or unsure of your allergy status, contact your local GP to arrange an allergy test. This most important as most of the time you will be working alone with your bees and irrespective of how quiet your bees are there is always one out to sting you.

**2) Are you capable of lifting heavy loads?**

Bee equipment is heavy to lift and move around, a 8 frame full depth box of honey will weigh approx 22 Kg's, the design of the hive means a lot of bending over, twisting and moving equipment may cause back injury or aggravate existing injuries.

**3) Do you have a suitable site for keeping your bees?**

Do you have a site for your beehives were the bees will not disturb the neighbours or the other normal activities around your household? In paddocks cattle rub up against the hive knocking it over. Horses are inquisitive and when they get stung they kick out, knocking the hive over. More on siting hives later.

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### Recommended reading

"Beekeeping in Victoria", published by the Victorian Dept of Agriculture

(Out of print so try your local library or another beekeeper)

Or "Beekeeping for Dummies" from your local book retailer or your local equipment supplier

### Local and State regulations for the keeping of bees

Your local government authority may have regulations for the keeping of bees in their area or within the town boundaries. Check with your local shire.

All beekeepers must be registered with the Bee registrar and their number, normally the first letter of your surname and a 3-digit number, displayed on their beehives.

There is a registration form and a copy of the regulations in your information pack.

### The Insect

The oldest recorded bee is a fossilised bee from the cretaceous period, (146 to 74 million years ago). It was during this time that flowering plants were thought to have evolved on earth. During this time, a species of hunting wasp took a liking to nectar and further evolution gave us bees. Even today, the differences between some Australian natives bees and wasps can only be distinguished under the microscope. But getting back to the start, this bee is named *Trigona prisca* and is similar to the present day *trigona* species. The oldest *Apis* type recorded is from the lower Miocene period (22 - 25 million years ago). Its size is approximately the same size as the modern honeybee and resembles *Apis dorsata*. Evolution and the advance and retreat of glaciers during the various ice ages has lead to geographical splits and the evolution into the main species that we have today, some of which are listed below. *Mellifera* and *cerana* may have shared a common ancestor but time and evolution have split them and while all of the *Mellifera* races can interbreed the two base parents can no longer, even by artificial insemination. Of the entire *Apis* genuses that we mainly hear about, the main four are listed below.

1) ***Apis florea*** (Little honey bee) Builds single comb nest in the open in low bushes unsuitable for apicultural use

2) ***Apis dorsata*** (Giant honeybee) Builds single comb nest in the open, on the underside

of branches in high tree canopies and the underside of rock ledges.

A

large very aggressive bee. Home range is the Indian sub-continent,

south

of the Himalayan Mountains and east through the tropics including

parts

of Melanesia

3) ***Apis cerana*** (Eastern honey bee) Similar to, but not as productive as, *mellifera* but

forms smaller colonies. This bee normally built its hive in low small

trees /

shrubs and is used in apiculture. Natural range is the same as *Apis dorsata*, and includes Japan.

4) ***Apis mellifera*** (Western honey bee) The range of the species covers Europe, north

to Sweden, east to the Ural Mountains and eastern Iran and all of

Africa.

Of the 24 sub species or geographic races the main ones used in

Australia

are listed below.

***A.m. ligustica*** *Italian honeybee*

- *appearance* golden yellow rings
- *Home range* south of the European alps including the Italian peninsula
- Quiet on the frame. Builds up rapidly in late spring and the queen will keep laying until late in the season provided that honey is coming in. Suitable for long continuous honey flows from late spring onwards. Will rapidly deplete stores during interrupted and intermittent honey flows and may need feeding. Not satisfactory in hot humid climates or hard winters. Does not forage as far as some of the other races. Hybrids with darker races have been reported to be more vigorous.

***A.m. carnica*** *Carniolan*

- *home range* Slovenia and Austria.
- Closely related to the *A.m. ligustica*, though slightly larger and darker with the golden yellow bands replaced by dark bands.
- They are noted for their gentle manner on the comb and the sparing use of propolis good for early spring honey flows. Brood builds up rapidly in spring followed by a slow decline and early cessation of brood rearing in autumn. It will survive hard winters with a small cluster.

***A.m. caucasica*** *Caucasian*

- *general appearance* is hard to distinguish from *A.m. carnica* except by morphometric examinations.
- *Home range* the mountain ranges of the Caucasus to the eastern end of the black sea in Anatolia.
- Slow spring build up reported to be best during long slight nectar flows, unable to cope with short heavy flows. Heavy user of propolis. Poor resistance to nosema.

***A.m. mellifera*** *Dark European honey bee.*

- *Home range* central Europe from the Pyrenees in the south, including the island of Corsica, to the Ural mountains in the east. North to southern Sweden including England and Ireland.
- Reported to forage over greater distances than the Italians; makes abundant use of propolis

Australia has two species of native bee who form social colonies but neither species lives south of Bega in NSW. Apart from one reported social species of native bee that lives in the Victoria that has not been sighted for 50 years. The local native bees that you see in your garden are solitary bees and not suitable for honey production. Blue banded bees are benign studied for glasshouse tomato production.

When bee keepers think about re-queening hives thoughts turn to which breeder has the best queens at the best price, but how much thought is put into the breed of bees and the locality in which they are going to be situated. This may be a bit hard for the migratory beekeeper, but where hives are situated at a home base and are not going to be moved about it may be applicable to choose another queen other than the standard one everyone uses.

## In the Hive

**Castes** There are three castes of bees that make up a healthy beehive.

### Queen



The only fertile female in the hive, she sets the tone of the hive and depending on the drones she has mated with, the genetic disposition of the following generations of workers. On being born her first job is to locate the other queen cells and sting the occupants to death. She is the only bee with a smooth sting, in the hive, and can sting more than once. Once she has established her dominance of the hive the new queen will mate and commence laying. During her wanderings over the combs, the queen inserts her head into an empty cell inspecting it for cleanliness and measuring it with her front legs. The slight size difference will determine whether it is a drone cell or worker cell. She will then lay an unfertile egg to raise a drone and a fertile egg to raise a worker. The only time that the queen leaves the hive is to mate on the wing with the fastest drones in the drone congregation area. The only other time she may leave the hive is to swarm with a third to half of the bees from her hive. This process normally occurs in spring and after the hive has raised new queen cells and the have grown and started to pupate. Occasionally hives may send of a second swarm, of reduced size, in summer. This is known as a second cast.

### Drone



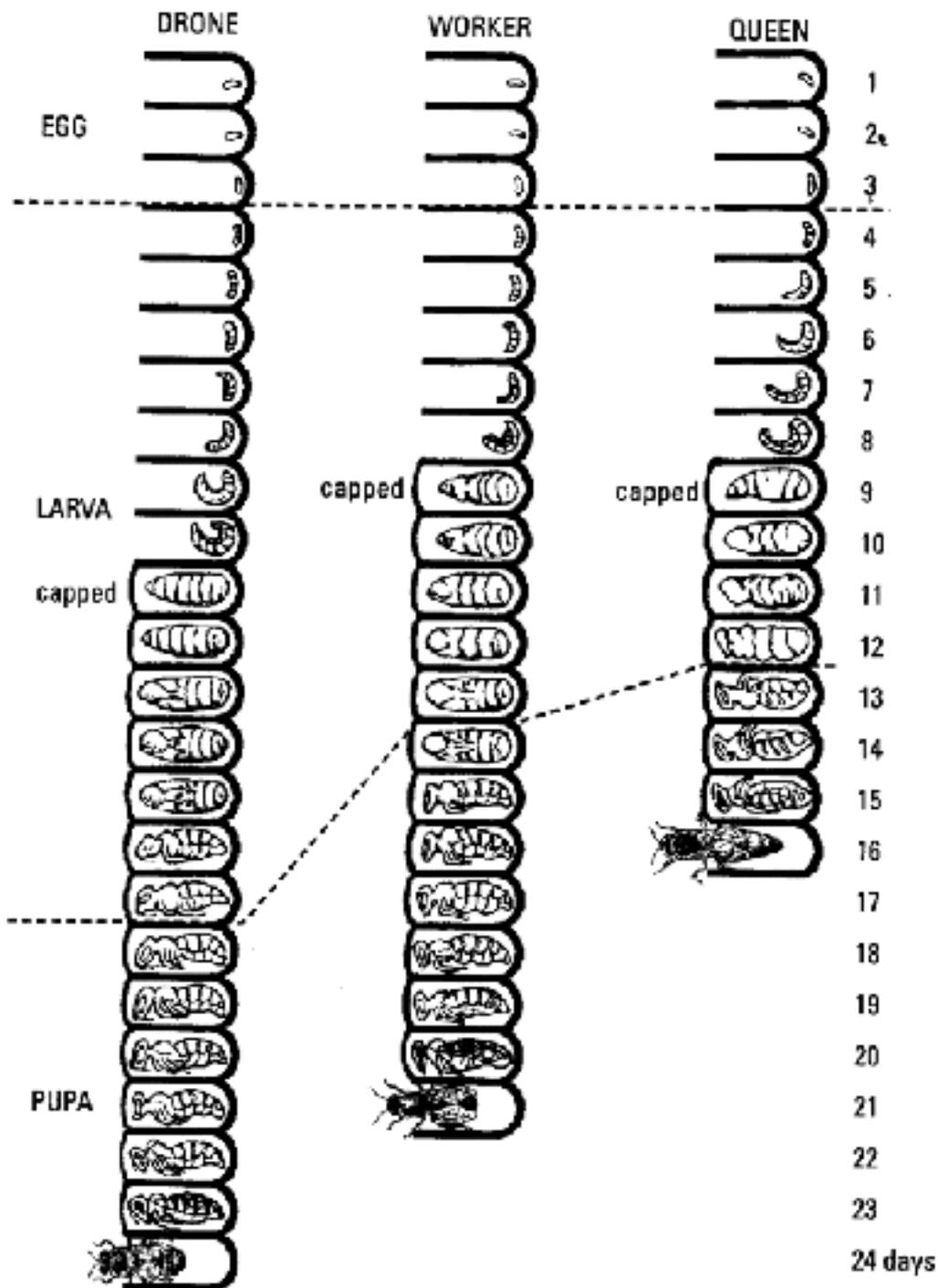
A male bee with a limited life span. Raised early in spring their sole purpose is to mate with the queen. Drones from all of the hives in the neighbourhood congregate in a central area. The queens then head into this area when searching for a mate. Mating is done on the wing and as a reward the queen retains his genitalia causing his death. At the beginning of winter the drones are starved and driven from the hive to die in the cold. In the spring the hive raises a new batch of drones.

### Worker



A unfertile female whose lot in life is to clean the hive and build comb when first born, when suitable her duties change to foraging out in the field for water, nectar and pollen. Her life span is dictated by her wings. When she can no longer fly due to frayed wings she is kicked out to die in the cold. Should she use her barbed sting in defence of the hive the internal damage caused by her sting being ripped out brings about her death. Should the hive lose its queen some workers may lay eggs but they will be infertile eggs and only develop into drones.

### The Honey Bee Life Cycle



## Diseases and Pest of honey bees

American Foul Brood	}	
European Foul Brood		
Chalk Broad		
Nosema		
Small Hive Beetle	}	Refer Dept of Ag handout
Wax Moth		
Varroa Mite		
Tracheal Mites	}	

If you suspect a disease in your apiary contact your local apiary inspector for guidance and a glass slide.

To take a sample. First clearly print your registration number and date on the slide and the plastic holder for the slide. Using the wooden end of a clean matchstick take a scrapping out of the bottom of the suspect comb. Place a 5 – 10mm smear on the slide and place in protective cover. Forward to your apiary inspector or Gribbles as soon as possible.

### Ants

Ants will attack beehives, particularly small sugar ants. These ants are small enough to use the lid vents to get into the honey supers. The bees will crowd the vent trying to block the ants or when under constant attack the bees will seal the vent completely with propolis. For the home apiary place ½ bricks in ice cream containers, stand the hive on the bricks and then fill the containers with water. These small ants may also nest in the hive lid between the metal lid and the masonite cover.

### The Equipment

#### Protective equipment

Irrespective of how quiet your bees are there will always be one out to sting you. And while you are in the learning phase it is easy to upset the bees and increase the likely hood of getting stung. Bees can be very sneaky when angry, they will crawl up your ankles so track suit pants or overalls with elastic cuffs are a must. They will also crawl up sleeves and into loose gloves so sleeves with elastic cuffs and gauntlet style gloves are highly recommended. Any were they can feel skin, in goes the sting.

**Gloves** leather gloves of the gauntlet type with elastic cuffs

**Veils:** veils should have a tight fit around a hat and if tucked in jumpers or overalls, an old tea towel should be loosely wrapped around your neck, first.

**½ and full suits** These are good as they enclose the body and face with cloth and mesh and incorporate elastic cuffs as well as being easily to get into and out off. . While a good investment, for the beginner a tracksuit, a straw hat, soft veil and gloves will suffice.

**Lid**

seals the top of the hive normally with 4 vent holes to vent excess moisture and heat

**Frames**

Hold sheets of wax which encourages the bees to build in straight lines and makes it easy to remove comb for inspections and robbing

**Boxes or supers**

Wooden shell for holding the frames

**Queen excluder**

Fits between the brood box and the honey supers, keeps the queen down in the brood box

**Brood box**

Bottom box where the queen lives and brood ( bee grubs) are raised

**Base**

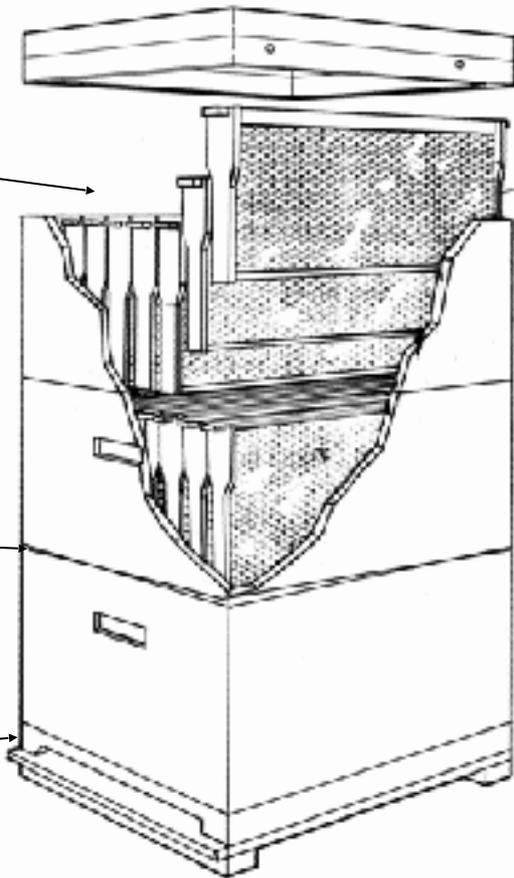
Weather proof bottom which the hive stands on.

**Cleats**

Holds the hive up of the ground

**Holding it all together**

To hold the hive together two main methods are used, A "Em" lock and galvanised strap, which clamps the whole lot together. Or spring clips which clamp the individual supers, lid and base together, alternatively were the hive is in a permanent position and can't be knocked over by children and animals a couple of bricks can be used to keep the lid in place.



**Assembling the equipment**

The biggest destroyer of bee keeping equipment is moisture, aided by bad construction. Generally all parts should be given a wood preservative treatment (Except for frames). The joints should be painted before the article is assembled with the exception of supers that are going to be wax dipped after assembly. Finally the components should be painted with an undercoat and a second coat of good quality paint

**Lid** A wooden rim with a Masonite and tin cover or a sheet of weathertex, fitted to the top to weatherproof it. Four vent holes are drilled in the rim to allow moisture and excess heat to escape in summer. During winter tape over two of the holes on the windward side to help conserve heat in the hive. A grill is fitted across the vent holes to prevent the bees and predators from using it to access the hive. Grills fitted over the vent holes should be fitted on the outside of the rim. If fitted

to the inside of the rim spiders fill the holes with web blocking the hole and defeating its purpose.

The second type of lid is called a telescopic lid, which fits over the top of the hive and slides down.

**Supers** Normally made out of 22mm pine, all though any timber can be used, the joints need to be well made and the end grain sealed before assembly unless they are going to be wax dipped. The corner joints can either have a rebated or dovetail joint. Rebated joints are cheaper to machine hence the box is cheaper to buy while dovetail does give a stronger corner joint. Supers normally hold 8 or 10 frames. There are standard depths known as Full depth, WSP or manley , Ideal, and half depth. The bottom box of the hive were the queen resides is also referred to as the brood box. and is normally a full depth box.

**Frames** A light wooden frame with cross wire that holds a sheet of foundation wax, this reduces the amount of wax building that the bees have to do and gets them building in straight lines allowing for easy removal and replacement in the hive. Frames come in standard sizes to match the supers. Frames also come with a wooden frame and a plastic sheet of foundation, or the complete frame and foundation sheet moulded as one piece. Stainless steel or galvanised wire is run through the frame and embedded into the foundation wax sheet to hold the sheet in place. To prevent the wire cutting into the wood and the wire becoming slack small metal eyelets are placed in each hole before the wire is threaded through it, or a large staple for the wire to rest is placed next to the hole.

**Bases** made of pine or weathertex having to cleats underneath to keep the hive off the ground and a 10-mm riser around three sides of the rim to create an opening for the bee to enter/exit the hive. For hive in a stationary position, a landing strip may be added to the front of the entrance. In areas which have cold winters or problems with European wasps. The fourth side can be closed in to help keep the hive warm, or the bees less area to defend if under attack.

### **Foundation wax sheets**

A thin wax sheet with a hexagonal pattern pressed into it. Fitted onto the frame to get the bees building in straight lines and reduces the amount of wax that the bees have to make. The bees normally start drawing the comb out in the middle of the frame.

Foundation is attached to the frame by passing a 12-volt current through the wire on the frame, which heats the wire melting the wax around the wire. The current is cut and the wire is held in place until the wax solidify's around the wire.

If the current is held on to long the wire will melt through the sheet. The second method is to use a spur wheel embedder. The embedder presses the wire into the wax sheet and mounds it around the wire holding the sheet onto the wire.

### **Tools**

**Smoker** A metal container for holding smoldering material, with a puffer to blow air in the bottom which pushes a stream of smoke out of the cone fitted in the top. Material used should produce a cool sweet smelling smoke. Some of the most common being gum leaves, pine needles, bark from string bark gum trees or hessian,

**Hive tool** Tool with a knife edge on one end for splitting the supers or frames the other end has a hook and rebated edge which is used for jacking the 1<sup>st</sup> frame up.

**Bee brush** long haired brush for removing the bees from the frames

**Electric embedder**

Spur wheel embedder

Crimping tool

Uncapping knife

### **Purchasing second hand equipment**

If planning to buy second hand equipment, ask “ were are the bees? Or What was the disease status of the bees.” If the owner doesn’t know why the bees died out. Treat the equipment as suspect and refrain from buying it of have it irradiated before use.

### **Finding the bees**

#### **Swarm collection**

The cheapest way to find your first lot of bees, but care needs to be exercised

1) to get the bees into the hive and established.

2) it takes two weeks to for the bees to become established in the hive and the bees to reveal their disease status and temperament.

To get the bees into the hive place a super with the centre two frames removed on a base underneath the swarm ball. Give the branch a sharp rap causing the bees to fall into the super, once the swarm has started to move onto the frames place the two remaining frames in the hive and let them settle by themselves. **DO NOT PUSH THE FRAMES DOWN.** Place the lid on the hive. If it is possible, leave the hive in position until after dark, any bees returning to the swarm will find their way into the hive.

**Nucleus hives** a nucleus hive consists of a small box lid and base built to hold 4 frames. When supplied it should contain four frames covered with bees and a new queen. The queen should be from good quiet bees.

### **Hive products**

**Honey** The product of the bees drying the moisture out of the nectar and mixing enzymes with it, when the honey is at the right moisture content the bees store it in the honey comb.

**Pollen** Collected from the flower visited by the foraging bees. For a healthy diet the bees need a mix of nectar and pollen. Pollen can be collected by the beekeeper using a pollen trap. Basically this a covered Entrance to the hive with a course screen which the bees returning from the field must walk across. As they do they knock the pollen balls of their rear legs. The pollen balls are then collected in a container underneath the entrance. The pollen must be collected daily and dried before it is stored otherwise it will go mouldy. This product may be dangerous to some people with allergies

**Wax** is produced by the bees when they are 12-18 days old from small glands on the under side of their abdomens, this is a very energy intensive activity requiring five to eight times as much honey to produce the equivalent amount of wax. When combs are extracted, if undamaged they can be returned to the hive, the bees will then do minor repairs, clean and refill them. Because less wax production is required it means more honey for you. Old dark comb and the cappings should be drained of honey, and then can be melted down to reclaim the wax.

To reclaim the wax. For the small bee keeper place the cappings in a old pair of pantyhose, in side a plastic ice cream container with 25mm of water, place in the micro oven and heat on the power lowest setting until the wax has just melted.

Squeeze out the pantyhose and discard, the wax will solidify in and then can be removed from the container and washed with plain cold water to remove any honey. If you over heat the wax it will turn dark. Wax treated properly should have a bright clear colour, ranging in colour from pale yellow to dark orange.

**Propolis** Produced by the bees to seal any gaps or holes in the hive and to reinforce the frames by gluing them together and to the box where the frame lugs sit in the rebate. It can be produced by placing a special mat in the top of the hive and lifting the lid with a matchstick to let in light. which the hive will try and seal out. The mat can be removed and propolis recovered.

Royal Jelly Produced by the bees from  
This product may be dangerous to some people with allergies

## Hive Operations

Hive inspections

Spring inspection

On a sunny day without cold winds

Observe the hive, are the bees out flying?

Are their brown spots on the front of the hive which may indicate nosema

External condition of the hive, paint chipped or cracked?

Joints opening up?

Weight the hive

Immediately on opening hive inspect underneath the lid for small hive beetle

Are there honey stores? If low on stores feed with sugar syrup.

In the brood box

Is there honey stored in the top corners of the frames

Is there pollen stored on the frames

Have seen the queen

What sort of brood pattern is she laying

Clean the bottom board .keeping a eye out for small hive beetle.

If adding a queen excluder and super to the hive.

Take two frames of capped brood out of the brood box, shake the bees off.

Inspect for queen cells and place the frames in the middle of the super to be added. Place the two fresh frames on the outside of the brood box. Place queen excluder and super on hive with a lid

Adding supers

Taking off honey

Packing hives down for winter

At the start of the cooler weather rob the bees for the last time this season and reduce triples back to singles or doubles. This reduces the volume of the hive that the bees have to heat. Care must be exercised not to remove too much honey as the bees will require it if there are no winter flowering species and prolonged periods of cold wet weather. Generally four full frames is sufficient. This also the time to move the hive mat from the top super down to the top of the brood box.

For hives with wide entrances close in the Entrance to approx 75mm

Winter is not the time for opening hive and inspecting the bees as the loss of heat from the hive may chill the young brood, and cause the bees to expend a great deal of energy and hence food stores to build the hive back up to the correct

temperature. But it doesn't mean we neglect the hive. Checks to do at the start and during winter.

- 1) Check the weight of the hive when you have packed them down for the winter. This will roughly indicate the amount of store the bees have. If the hive is light or lighter than the last time you checked you will need to feed the bees to get them through the winter.
- 2) On a sunny day are some of the bees flying and returning bees carrying pollen from winter flowering species. This may indicate that they have found something to forage on.
- 3) Do the bees have a clean source of water? The bees require water to dilute the stored honey and this reduces the incidence of them sucking moisture from the neighbours washing and fouling it.

The biggest threat of starvation occurs at the end of winter when spring flowering hasn't started yet and the bees are building up numbers in the hive.

Re-queening

### **Honey operations**

Extracting honey

Storage

Selling honey

### **Honey Flora**

Bees produce honey from the excess nectar they collect in the field, but not every flower produces nectar and for a healthy diet the bees require a mix of pollen and nectar.

Some plants produce a surplus of nectar to the point of it dripping out of the flowers but produce little or no pollen eg Ironbark, so bees working this source may be feeding with a pollen patty to remain healthy. Acacia sp, the wattles, produces a lot of pollen and no nectar.

Which leads us into the variations that nature provides. During prolonged drought where there is little sub soil moisture, trees may flower but produce no nectar. On a nice sunny day some species may produce a good honey flow but should a cold wind occur the trees stop nectar production. Rain occurring while gum trees are flowering will cut the blossom of the trees stopping honey flow.

Light drizzly rain is picked up by the bees and may contaminate the honey ripening in the uncapped honeycomb causing it to ferment.

For a list of honey producing plants refer to the GAA hand out