Whangarei Bee Club Inc.

BEE BASICS for the Novice Beekeeper

- Wasp like Bees first appeared during the Cretaceous period about 130 million years ago.
- About 120 million years ago, the Honey Bee developed its morphologies specifically to collect pollen and nectar such as increased fuzziness, pollen baskets, longer tongues, and colonies (Hives) to store supplies.
- The earliest record of Honey Bees and people interacting is a rock painting found in Spain - about 6000 to 8000 years old.
- Ancient Egyptians, Roman and Greeks valued honey for food and medicinal use and understood the importance of bees.
- Jars containing honey have been found in the Pyramid tombs of the Pharaohs and was still edible.
- In 2007, archaeologists discovered 30 intact hives made of mud and straw at a site in Israel dated from ninth or tenth century BC to the time of King Solomon - who understood the importance of bees and honey - as recorded extensively in the Bible.
- Pagans and Vikings fermented honey to create Mead, an alcoholic drink believed to have fertility properties.
- Newlyweds drunk Mead for the first month (moon) – thus “Honeymoon”
- Mead was being produced long before wine from grapes was discovered.
- Generally, Flora produces Pollen to fertilise and thereby perpetuate its species. Many also have Nectar for food to entice insects who incidentally carry Pollen from one plant to the next – thereby achieving the necessary pollination.
- Without this pollination, most Flora would cease to exist.
- About one mouthful in three and nearly ¾ of the diversity of our daily food is directly attributed to Bee pollination.
- The Food and Agriculture Organisation of the United Nations (FAO) 4 estimates that of the primary 100 crop species, which provide 90% of food worldwide, 71 of these are Bee pollinated.
- There are approximately 20,000 varieties of bees. The Honey that we know is produced by Honey Bees of the genus *Apis,* of which there are 7 main varieties. New Zealand at one time had up to 28 species of Native Bees most of which were either solitary or lived in small colonies. They are rarely found today.
- New Zealand Law requires all bee keepers to be registered, the location of the hives identified, and annual AFB reports submitted.
- A Hive consists of a Queen, male bees called Drones and female bees who are the Workers.

- Only the Queen is fertile and involved in egg laying. In a 50,000 strong Hive there will only be a few hundred Drones.
- Drones are the larger fertile males (with no sting), hatched from unfertilised eggs. Female workers (non reproducing) are hatched from fertilised eggs.
- The Queen can lay both fertilised and unfertilised eggs at her discretion. The eggs and subsequent larvae are called 'Brood'. From egg to adult Worker Bee hatching takes about 21 days. Drones take a few days longer to hatch from special enlarged cells.
- The Queen will ultimately determine the characteristics of the hive. It is therefore most important to know it's origin and to ensure a strong, healthy, non-aggressive and highly productive Queen.
- Most bees in New Zealand used by New Zealand bee keepers are based upon the Italian 'blonde' variety.
- The Drones main duty is to fertilise new Queens and help maintain the constant temperature of the hive at 34 - 36°C which is the optimum temperature for the Queen to lay and for Brood development.
- Leading up to full Honey Flow (late Spring), a Queen will produce her own body weight in eggs laying 1500 to 2000 eggs each day. If she does not, then the Hive will accelerate a plan for her replacement.
- Newly hatched female workers are "Household Bees" and will, for about the first 18 days of their lives, tend to everything that happens inside the hive. This involves cell cleaning and capping the Brood, Queen tending, feeding the hatched larvae, making honey, comb building, food handling, ventilating to control hive temperature and guarding.
- They will then graduate to become Foragers who go out and collect Nectar, Water and Pollen, and also Scouts who, having found new food sources for the Foragers, return to the hive and communicate the direction and distance to the new food source by their 'waggle dance'.
- Honey Bees also produce Propolis by collecting tree or plant resin, then mixing it with bee enzymes, and sometimes beeswax, to make a powerful antimicrobial.
- Propolis is used by honey bees to line the inside of nest cavities, repair honey combs, seal small cracks from the hive, and reduce the size of the hive entrance. Most important of all is using the anti-bacterial, antiviral, and anti-fungal effects of Propolis to protect the colony.
- At any one time only about 20% of the hive population will leave the hive daily as scouts and foragers.
- But the entire population of the hive will leave every few days to defecate. They will not foul the hive. They will fly in an approximate 300 metre circle around the hive and drop a sticky dot of orange substance about the size of a matchhead. This can be a major annoyance to neighbours – and a nuisance sufficient for local Councils to order the removal of the offending hives from the area.
- Honey Bees communicate information with body movements (waggle dance) and Pheromones.
- An average total life of a Honey Bee is approximately 4 to 5 weeks. Once becoming Foragers, most bees will then die of wing failure - especially in high windage areas. Their wings simply wear out and they do not make it home.
- In its entire lifetime, one bee will produce about 1/12th of a teaspoon of Honey and may visit up to 1400 flowers every time she leaves the hive.
- Queens start as normal eggs that the Hive decides to isolate, protect and provide extra food to, including Royal Jelly - a very special substance. The Hive may decide it needs a new Queen because the old one

is not laying sufficient eggs or is laying too many Drones, or the hive is getting too large and needs to be split.

- A Queen can live for around three years although most bee keepers particularly commercial - replace the Queen every year – the young Queen being the most prolific egg layer.

- Several Queen Larvae are tended in enlarged cells. The first task of the first virgin Queen bee to emerge is to kill all other Queen larvae - eliminating competition. Unlike the workers, the Queens sting is not barbed. It is believed that a Hive can have only one Queen.

- A new sexually mature virgin Queen will take a series of 'nuptial' mating flights and will be followed by up to 20 Drones in flight – only the strongest will get to mate. From hatching she has 10 days to carry out her nuptial flights. The Queen then returns to the hive for good, and spends the rest of her life within the hive producing eggs at the rate of approximately 200,000 per year.

- It is usually the old Queen that Swarms taking around 10,000 to 20,000 workers and a few drones to find a place to start a new hive. The Honey Bees in this Swarm are generally non aggressive but will sting if they feel threatened. They will bivouac temporarily until they find a permanent home.

- Unlike Wasps, a Honey Bee sting is barbed and cannot be withdrawn. It therefore tears out of the Bee and the Bee dies. Honey Bees sting only in defence if they feel that they or their hive is threatened, or if they are hurt. The sting from the disemboweled Bee will continue to pump venom into the wound for between 30 to 60 seconds. It is best removed by 'scratching' it out with a fingernail.

- Honey Bee Venom is a complex cocktail of protein chemicals which for most people is not dangerous but can in rare cases cause an allergic reaction. The act of stinging releases pheromones which alert and recruit other Bees to join the attack.

- Beekeepers will puff smoke over the hive to mask this pheromone - thereby calming the Bees. An experienced Bee Keeper can gently take a Swarm and introduce it into a new Hive of his choice. This Starter Hive is called a 'Nuc' – consisting of just one box. (see items below marked *).

- As the Queen produces more Brood and the hive expands, more Supers are added and can be stacked 6 or 8 high in wind protected areas.

- In the natural world, the Comb that holds the Honey and Brood is created by the bees from wax (Bees Wax) extruded from their body segments.

- *In managed hives, wood or plastic Frames are used to assist this process. These 'Frames' are kept in a series of stacked boxes called 'Supers' or sometimes "Brood Boxes'.

- These "Supers' are standardised rectangular boxes (usually 'Full' or ¾ high') without tops or bottoms and stacked one on top of another. This ensures that both boxes and frames are interchangeable and that the Frames (usually 9 or 10 per Super) remain relatively easy to remove, inspect and replace without rolling and possibly killing the bees.

- The Honey is extracted from the Frames by a centrifuge. It is usually slightly warmed beforehand to increase its viscosity for ease of extraction. Honey should not be refrigerated.

- A Honey Bee cannot live outside a hive overnight. It will die if it fails to make it back to the hive.

- A Forager will calculate the food it requires to take for a known return journey from the hive as told to it by the Scout. It returns carrying Nectar and Pollen - but with no food fuel left for itself. If it encounters strong headwinds it may run out of food before reaching its hive and die.

- The Foragers go to the area found by the Scouts. They return with the Nectar and/or Pollen they were instructed to collect. The Bee will fly the shortest distance to obtain the highest concentration of nectar and pollen.

- A range of 3.5 kilometres is not unusual but up the 6 kilometers can be flown for a good food source.

- The Honey Bee uses its 6mm tongue to lap up the Nectar which it stores in a special Honey Stomach.

- On returning to the hive, the bee will hand the Nectar to the 'Household Bees' who will regurgitate the Nectar many times over adding an enzyme called "Invertase" - gradually reducing the moisture content until it becomes Honey - which it then stores in the Comb or Frame.

- With the Honey deposited into the honeycomb cells, the workers and drones fan air across the front of the cells with their wings until the moisture content of the honey drops below 18%. The cells are then 'Capped' (sealed).

- Honey Bees also collect pollen in sacks on their legs and carry it back to the hive. The pollen is used as a protein source necessary during Brood-rearing. Also known as Bee Bread.

- In full Honey Flow in the summer, an active hive can contain up to 70,000 Honey Bees.

- In winter their numbers decrease enormously due to the management structure of the Queen and will reduce to what is called a 'Winter Nuc' - which has the primary objective of condensing the hive area to survive the winter and to keeping the Queen and Brood warm at 34 - 36°C.

- The hive temperature is the single most important aspect of the hive performance. If the Queen and Hive get cold - then everything can spiral downhill to "Hive Collapse".

- During autumn, the Queen will banish the Drones from the hive to die - to conserve winter food.

- The Queen will then often stop laying until the spring – this again being dependent upon Hive temperature and the influx of nectar indicating ongoing food to support expansion of the hive.

- It can take 75,000 loads of nectar to produce 450 grams of Honey. Honey Bees may travel as far as 88,000 kilometers and visit more than two million flowers to gather enough Nectar to make this amount of Honey. A Forager effectively works herself to death.

- In some locations, an active hive can produce up to 150kg of Honey a year. Typically it is 20 – 40kg surplus honey per hive in Northland. If too much Honey is taken off the hive the bees could starve over winter. In this case sugar/sugar syrup will need to be fed to them periodically.

- Honey Bees are the only insects that produce a food consumed by humans.

- World consumption of Honey is around ½ million tons**.** China, the USA and Argentina are the world leaders in the production of Honey.

- Honey is usually only harvested for about 3 months of the year when flora is ready to be pollinated and the Honey Flow is at its maximum.

- Honey is hygroscopic. It adsorbs atmospheric water. If Honey reaches a moisture content of over 18 - 20% then fermentation can begin. The first process of Mead production is when 'wet' honey interacts with naturally occurring yeasts.

- Honey, and in particular Manuka Honey, is recognised by the Medical Profession for its amazing healing properties – being able to kill many types of bacteria.

- ‘Bees-wax’ is used extensively for commercial and cosmetic purposes. About 10,000 tons are used annually.

- A colony of 50,000 Honey Bees produce about 250 grams of Bees-wax a day in ideal conditions. No one has been able to force Bees to produce this wax nor can it be made synthetically.

- Deforestation and general habitat loss, intensive industrial agriculture practices, chemical sprays (particularly hormonal) and certain GE practices, have caused Honey Bee populations all over the world to decline.

- Although the Varroa mite and the diseases that follow can be chemically controlled, New Zealand, unlike some other countries, does not allow chemical treatment for AFB. AFB in one cell in one frame must by Law have that entire bee colony destroyed - the hive and contents burned and a report made to the relevant governmental authority (AFB PMP Management Agency). Information is still being gathered to determine the causes of Colony Collapse Disorder.

- All of the above have practically wiped out wild Honey Bee colonies in New Zealand. Our Honey Bee survives today courtesy of bee keepers.

- No pollination means a failure of crops and Flora – and also the Fauna that in turn depend upon that Flora for food.

- Einstein is reported as saying – “*with the demise of the Honey Bee mankind has three years to live on earth”.* Somewhat alarmist perhaps…

- It is gradually being realised that the Honey Bee that has been systematically abused and taken for granted for millennia is one of the greatest assets to mankind and now desperately needs our help to survive – so that we and other Fauna can in turn survive.

  PLEASE NOTE: The Bee Basics information above is intended as a generalisation for ‘Starter’ information purposes only. It is not intended to state definitive facts. Although every effort has been made to provide accurate information, expert opinions differ and it is generally accepted that despite having a lifetime of knowledge - there is still a lot to learn about the Honey Bee.

Commonly used abbreviations:

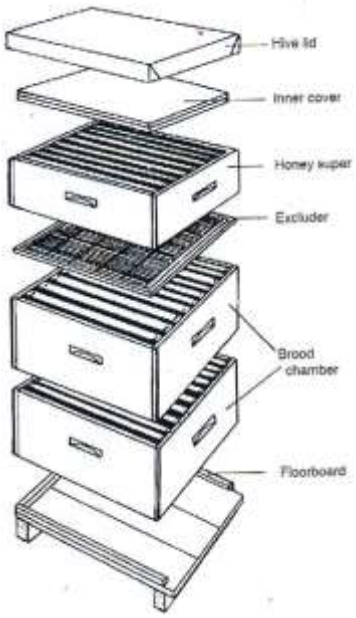
ApiNZ:	Apiculture New Zealand (replaced National Beekeepers Association NZ)
MPI:	Ministry for Primary Industries (replaced MAF)
PMS:	Parasitic mite syndrome
DECA:	Disease Elimination Conformity Agreement
NZFSA:	NZ Food Safety Authority is now part of MPI
CCD:	Colony collapse disorder
AFB:	American Foulbrood
AFB PMP:	Pest management plan for AFB. This is the work AsureQuality used to do which is now done in-house by the AFB Management Agency.
EFB:	European Foulbrood
EU Status:	European Union status – refers to compliance with EU regulations for honey, storage and transportation.

Hive terms:

Super:	Wooden box that frames are placed in. Most common sizes are full depth and ¾ depth, but also ½ depth and a few jumbo
Robbing:	Situation where bees from another hive or wasps try to rob a weaker hive of its honey
Sugar syrup:	Mixture of white sugar and water in different strengths, used to feed bees
Honey flow:	Season when nectar is abundant and the bees are making honey in the hive. Main honey flow in Northland is from early December to late February.
Base or floorboard	The board on which the hive sits which is also the bees entry to the hive
Queen Excluder	A plastic or metal mesh layer that goes between the supers that allows to workers into the higher boxes for honey deposits but excludes the larger Queen from laying there.
Frames	The plastic or wood honeycomb plates. Usually 9 per super.
Feeder	The tray that contains sugar syrup for feeding.

Entrance reducer - sometimes called a ‘mouse guard’, restricts the entrance to the hive base board to reduce the risk of robbing and help keep the hive warm in winter.

Varroa treatments	There are several treatments for the Varroa Mite from oils to chemicals. These should be alternated to avoid the Varroa mite becoming resistant to any one of them.


Hive lid
Inner cover
Honey super
Excluder
Brood chamber
Floorboard