

The Secret Life Of Bees

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HCLC – Feb 2020



Introduction to Bees and Beekeeping (Apiculture)



- Be informed – amazing bee facts
- Different hives used in modern beekeeping today
- Life inside the hive - the magic world of a queen and her hardworking servants
- How do bees make honey
- The vital role that bees play in pollination
- Factors causing massive bee decline
- What we can do to help

Bee Wise

*Go to the bee, thou poet: consider
her ways and be wise.*

—George Bernard Shaw

Aerodynamic flying machine on steroids!



Interesting Bee Facts

- Globally 20,000 species of bees incl. European honey bee (*Apis mellifera*) 1,700 in AU
- Average beehive holds 50 000-60 000 bees
- Foragers collect nectar from 2 - 4.5 million flowers to make 0.45kg of honey
- A single worker bee makes about 1/12 of a teaspoon of honey in her lifetime (she only lives 6-7 weeks).
- Bees pollinate approx. 130 agricultural crops in the US including fruit, nuts, fibre and vegetable crops with an annual economic value between US\$235 and US\$577 billion. (source: Forbes Magazine, Oct 2019).
- 1/3 of the human food supply depends on pollination by the European honey bee (National Resources Defense Council)

Man's relationship with bees

- Apiculture, or beekeeping, comes from Latin, '*apis*' bee and '*cultura*' cultivation through education.
- Apiculture was a common practice in ancient Greece and Rome

- European honeybees *Apis mellifera* were kept in Ancient Egypt 4-5,000 years ago

The Spider Cave in Spain, drawings depict a honey-collecting scene that dates back to Paleolithic times, at least 15,000 years ago

- European honeybees were introduced into Australia in 1822 aboard the *Isabella* to pollinate crops

- In 1852, Lorenzo Langstroth patented a hive with moveable frames that remain the most popular model for hive construction today.



Hive Types



Four common hive types used in modern beekeeping today

Langstroth

Warre

Top Bar

Flow-hive



Langstroth Hive Construction

Telescoping Outer Cover

Inner Cover

Shallow Super

Medium Depth (Western) Super

Queen Excluder

Standard Brood Box

Screen Bottom Board

Hive Stand



Life inside the Hive

Three Types of Comb

Brood comb



(Lower in the hive)

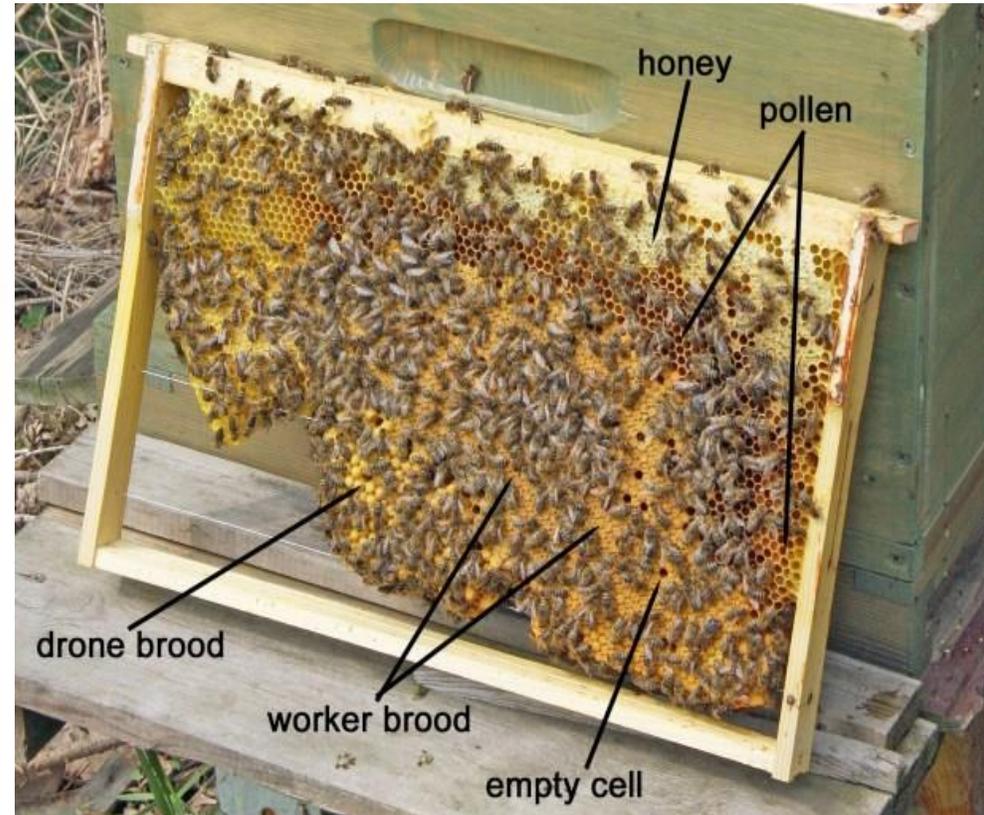
Pollen ("bee bread")



Honey



(Higher in the hive)



Ideal Frame



Capped queen cells / “swarm cells”



Honey Bee Life Cycle

Four distinct stages:

Stage 1: **Egg** (3 days)

Less than 1.7mm in size. Hatches in 3-4 days.

Stage 2: **Larvae** (average 6 days)

Fed by brood nurses 1300 times a day!

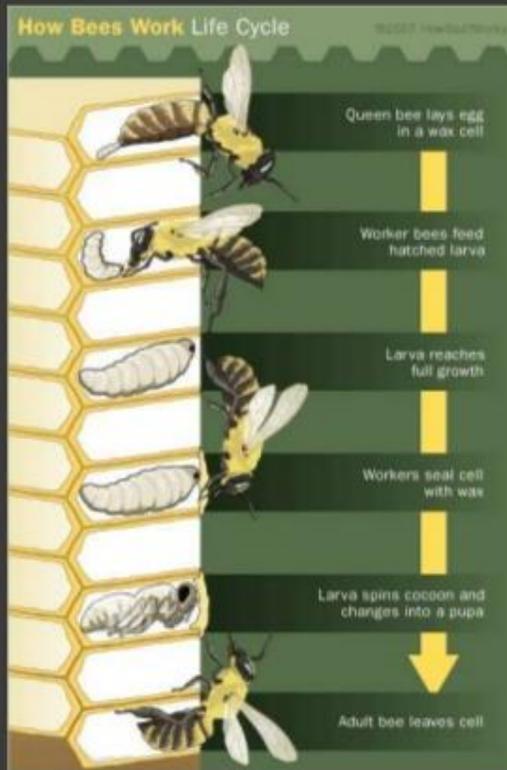
Fed 'bee-bread' = worker/drone

Fed royal jelly = queen

Stage 3: **Pupa** (7-14 days)

Survives on stores of body fat (stored lipids, amino acids, glycogen) that provides fuel for growth and development.

Stage 4: on day 20-21 metamorphosis complete. **New bee** emerging.



The time from egg to bee emerging:

Worker Bee 21 days
Drone Bee 24 days
Queen Bee 16 days



Bee eggs and larva



Bee pupa

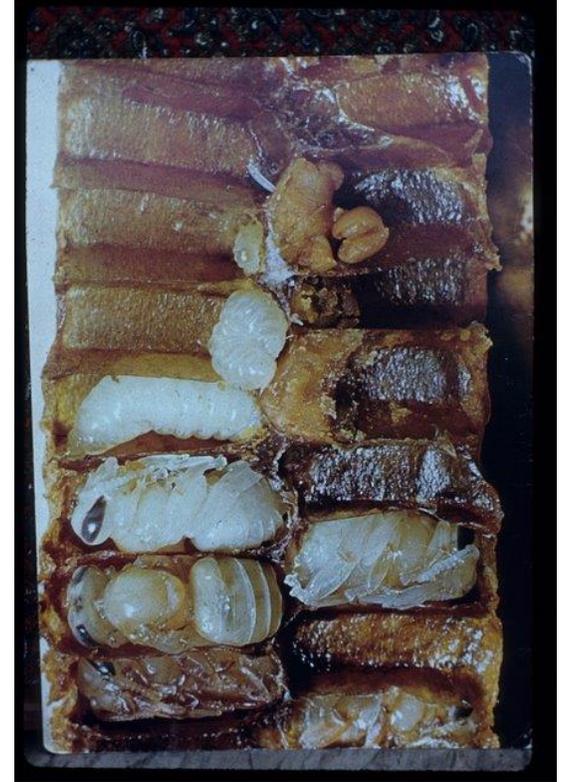
“Here’s looking at you kid”



Bee eggs and larva



Bee pupa



Amazing Time-Lapse Bees Hatching : National Geographic

May 20, 2015



Bees in a typical colony

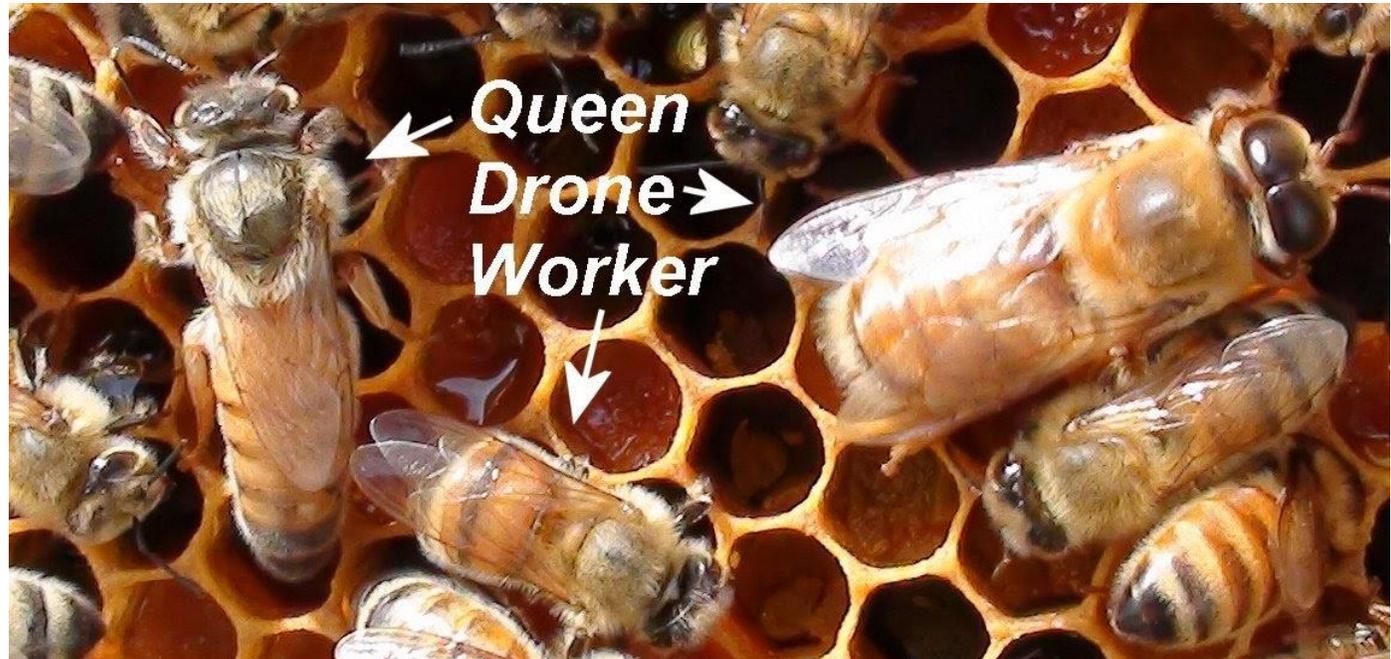
A thriving bee colony consist of:

- 1 Queen\250 drones
- 20,000 female foragers
- 40,000 female house-bees
- 5,000 – 7,000 eggs
- 7,000 – 11,000 pupae being fed
- 16,000-24,000 larvae developing into adults in sealed cells



European/Western Honey Bee

Apis mellifera



Worker bees lifespan: 6-7 weeks



Worker Honey Bees have different jobs according to their age

 1-2 days old: have the job to clean the cells, and they start with the one they were born in. They also keep the brood warm

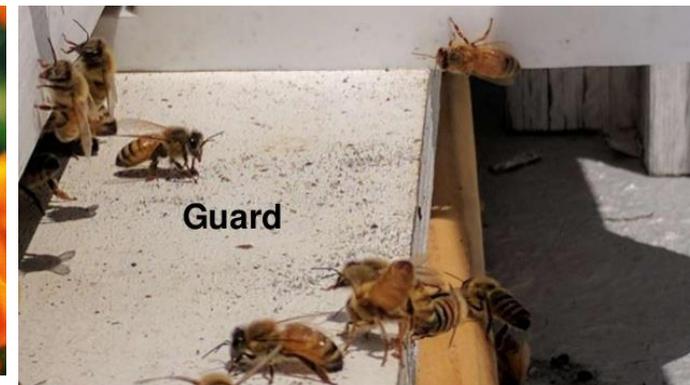
 3-5 days old: their job is to feed older larvae

 6-11 days old: they have the responsibility to feed the youngest larvae

 12-17 days old: they are producing wax, carrying food, building combs and have undertaker duties

 18-21 days old: they are protecting the hive entrance and have guard duty

 From 22 days to the end of their life (at around 40-45 days): they fly from the hive and collect pollen, nectar, water etc.



Honey - Liquid Gold



Did you know?

A 450 gram jar of honey requires 1152 bees to travel 180,246 km and visit 4,5 million flowers. That's 156 km per bee!

Bees start foraging outside the hive at only 3 weeks old. At their most vulnerable due to exposure to pesticides.

Carrying on their legs



the life of the planet

Important role of bees

EarthWatch Institute declared bees as 'the most important living beings on this planet'.

The Science Times, 9 July 2019

Pollination Value:

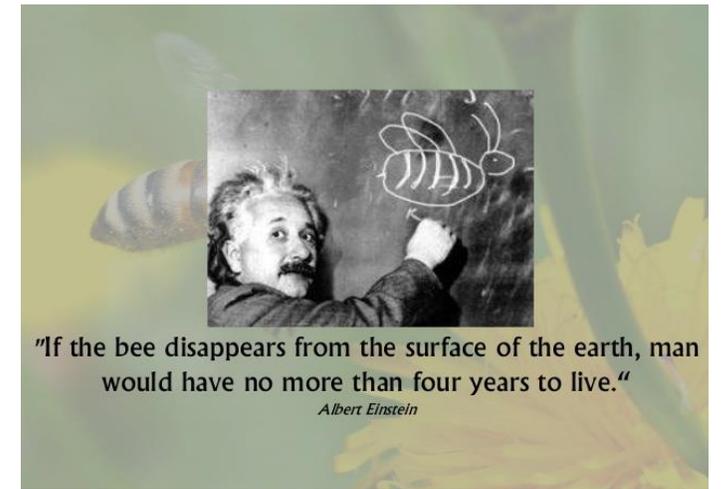
The commercial use of honey bees for pollination improves fruit set, fruit weight, higher yield and quality. Fruits, such as apples, raspberries and peaches store better and for longer when pollinated by honey bees.

Source: Science.org,au "getting the buzz on bees"

Einstein said:

"Remove the bee from the Earth and at the same stroke you remove at least one hundred thousand plants that will not survive."

[Abeilles et fleurs, June, 1965]).



"If the bee disappears from the surface of the earth, man would have no more than four years to live."

Albert Einstein

Manual Pollination in China

The Startling Effect Of Shrinking Bee Populations



Bee collecting POLLEN

The Real Value Of Pollination

“The value of honey bees can not be measured by their ability to produce honey alone – rather; it must include the work bees do for agricultural crops, home gardens and wildlife habitat.”

Nicholas Calderone, PH.D. Cornell University

Plummeting insect numbers threaten catastrophic collapse of ecosystems!
Source: The Guardian, Feb 2019



MASS BEE DEATH LIST

Event Summary - **187 Known MASS Death Events in 38 Countries**

June 2020 - **Tens of Millions** of bees suddenly die in **Croatia**. [Link](#)

May 2020 - **Millions** of bees have died in Rivne, **Ukraine**. [Link](#)

April 2020 - **Millions** of bees drop dead across **Spain**. [Link](#)

April 2020 - Mass die off of bees in Shpakovsky, **Russia**. [Link](#)

April 2020 - Thousands of bees dying in Bursa, **Turkey**. [Link](#)

April 2020 - Thousands of bees die all around Efringen, **Germany**. [Link](#)

March 2020 - **Millions** of bees have died in Quindio, **Colombia**. [Link](#)

February 2020 - **Millions** of bees dead in Chiriqui, **Panama**. [Link](#)

February 2020 - 130 beehives die off 'due to pesticides'

The infographic features a yellow background with a pattern of small icons related to bees and agriculture. At the top left, there is a black shield-shaped icon containing a skull and crossbones above a stylized bee. The main title 'NEONICS' is in large, bold, black letters. Below it, a subtitle reads 'Everything you need to know about how they're killing our bees.' A horizontal line separates this from the next section, which explains that Neonicotinoids are a type of 'NICOTINE-BASED PESTICIDE' used to control pests, but are also very harmful to bees. A small red circle with a slash and a bee icon is placed next to this text. A black arrow-shaped box points to the right, containing the text 'NEONICS HAVE BEEN LINKED TO:'. Below this, three hexagonal panels provide statistics: 1) '40%' of US bee colonies have suffered Colony Collapse Disorder (CCD), with a dotted line and a bee icon showing a path. 2) '90%' decline in number of colonies per hectare since 1962, with five skull and crossbones icons below. 3) '40%' increase in winter colony losses, with a beehive icon crossed out by a red 'X' and a house icon also crossed out by a red 'X'.

NEONICS

Everything you need to know about how they're killing our bees.

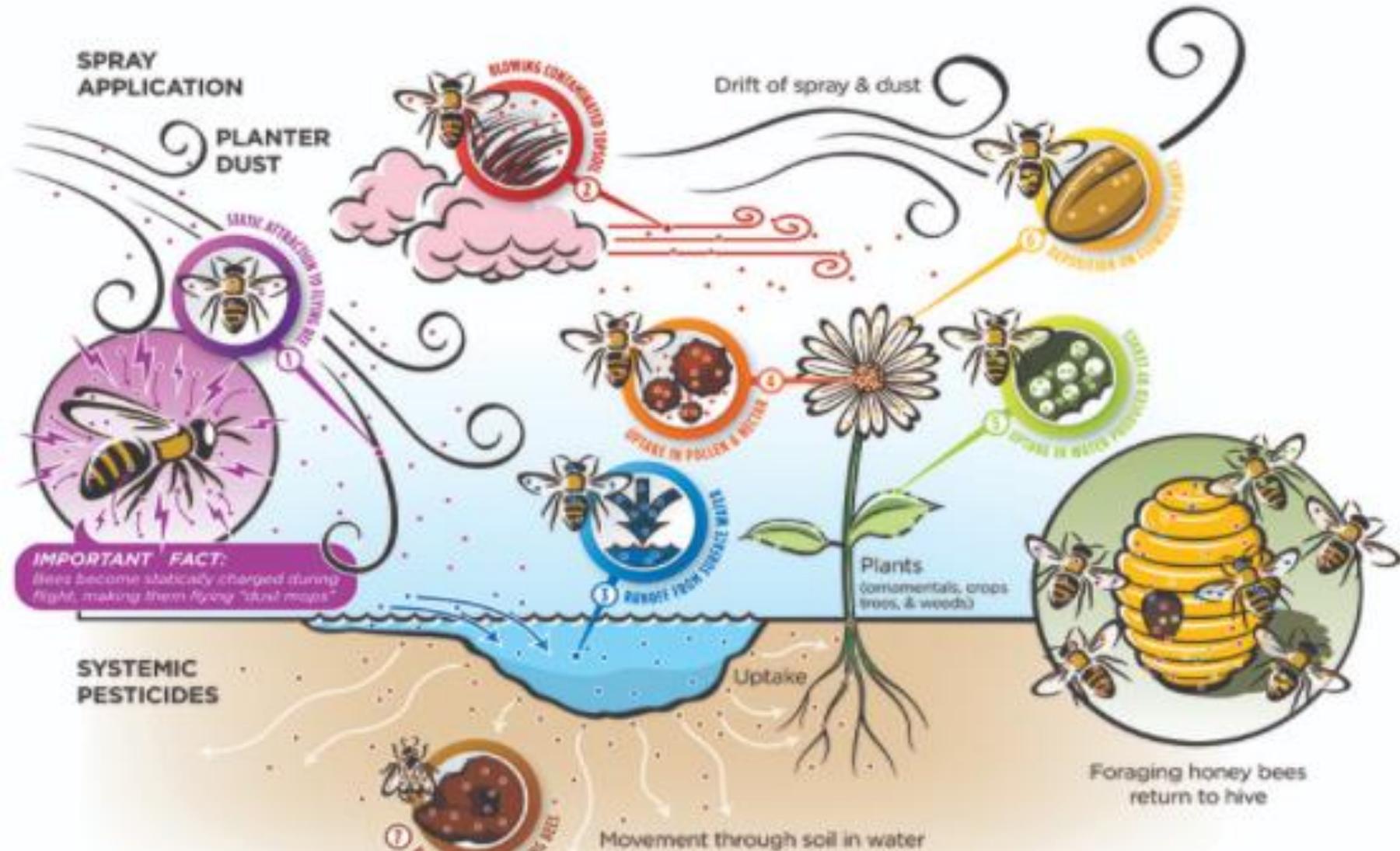
Neonics (neonicotinoids) are a type of **NICOTINE-BASED PESTICIDE** used to control a variety of pests. They're also very harmful to bees.

NEONICS HAVE BEEN LINKED TO:

- 40%** of US bee colonies have suffered Colony Collapse Disorder (CCD).
- 90%** decline in number of colonies per hectare since 1962.
- 40%** increase in winter colony losses.

Source: Science News article, June 2019

Major Routes of Pesticide Exposure for Foraging Honey Bees and Their Transmission to the Hive



“It’s like sending bees to war. Many don’t come back”
Nate Donley, snr scientist for the Centre of Biological Biodiversity



Weather



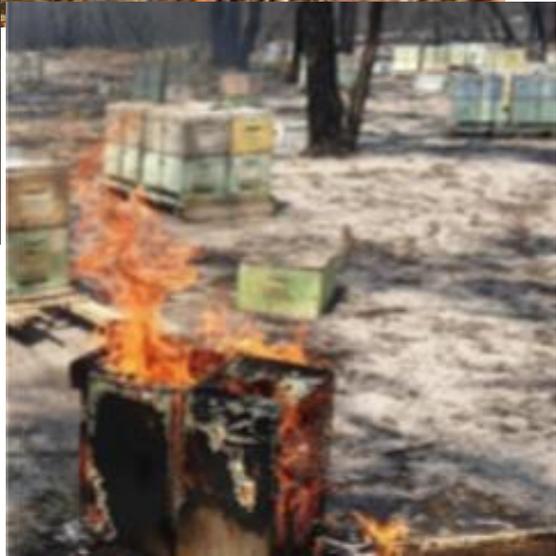
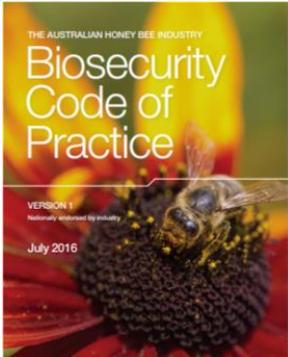
Beekeeping Practices



Pests & Diseases



Nutrition & Habitat

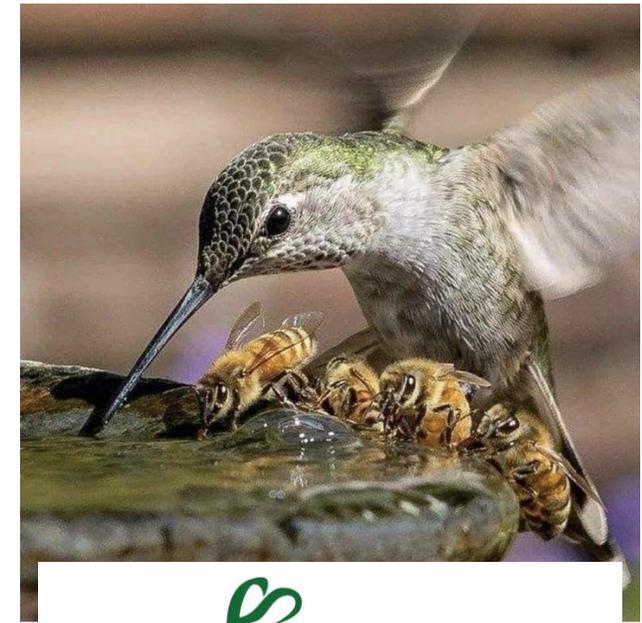


How can we help?

"In excess of 336,000 types of plants are pollinated by bees. We need to make some very serious changes in the next five or six years, because we can't lose these bees." Bee enthusiast and eco-stress physiologist Dr Reese Halter

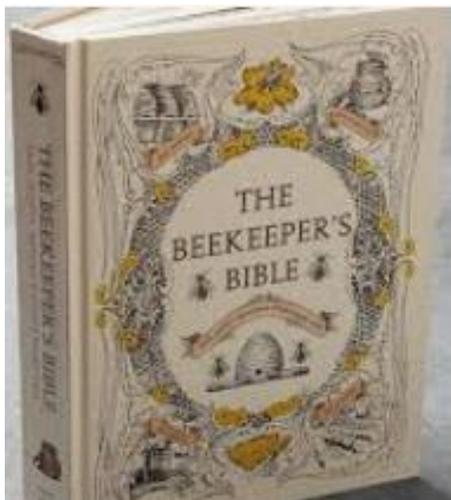
www.agrifutures.com.au 'Australian Beekeeping Guide' and "Bee Friendly Planting Guide'

www.sustainablefarms.org.au 'Powerful Pollinators Planting Guide'




BeeConnected™

BeeConnected is a nation-wide, user-driven smart-phone app that enables collaboration between beekeepers, farmers and spray contractors to facilitate best-practice pollinator protection.



Leading the field in natural crop protection

It's time to start protecting our bees
Our future depends on it

Thank you for your time



www.suburbanbeehive.com

Interested in beekeeping?

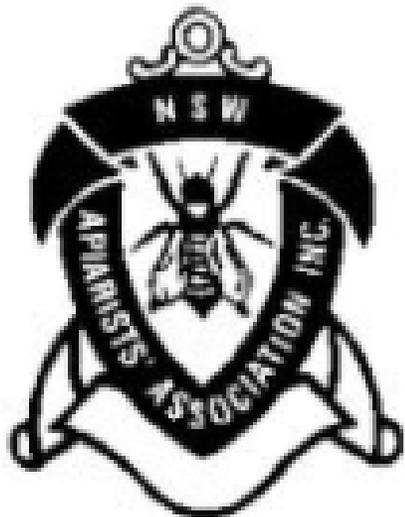
AUSTRALIAN HONEYBEE INDUSTRY COUNCIL INC

ABN 63 939 614 424

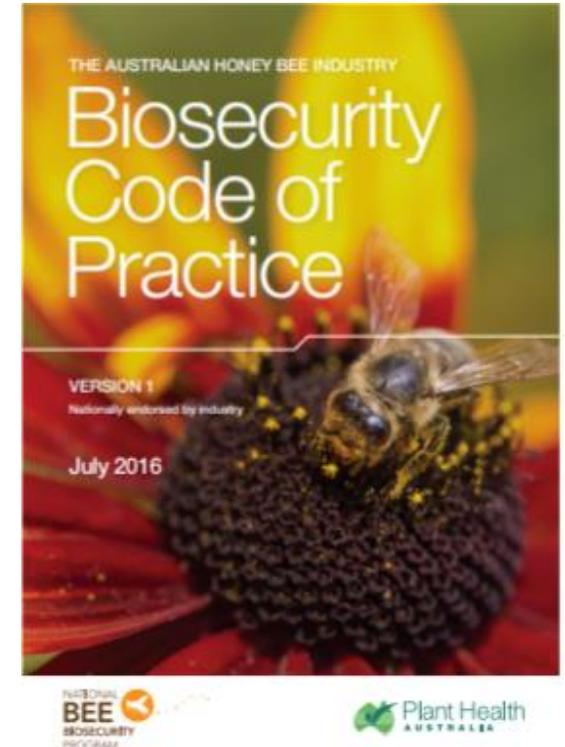


The Australian Honey Bee Industry Council (AHBIC) is the peak industry body for the Australian beekeeping industry working for all within our industry including

honey producers, honey packers, pollinators, queen bee breeders, equipment manufacturers/suppliers



Department of
Primary Industries



Tools and Equipment



Beekeeping Gear

Starter kit:

- 🐝 Hive components
- 🐝 Protective clothing (veil/jacket/gloves)
- 🐝 Smoker
- 🐝 Hive tool
- 🐝 Entrance feeder

