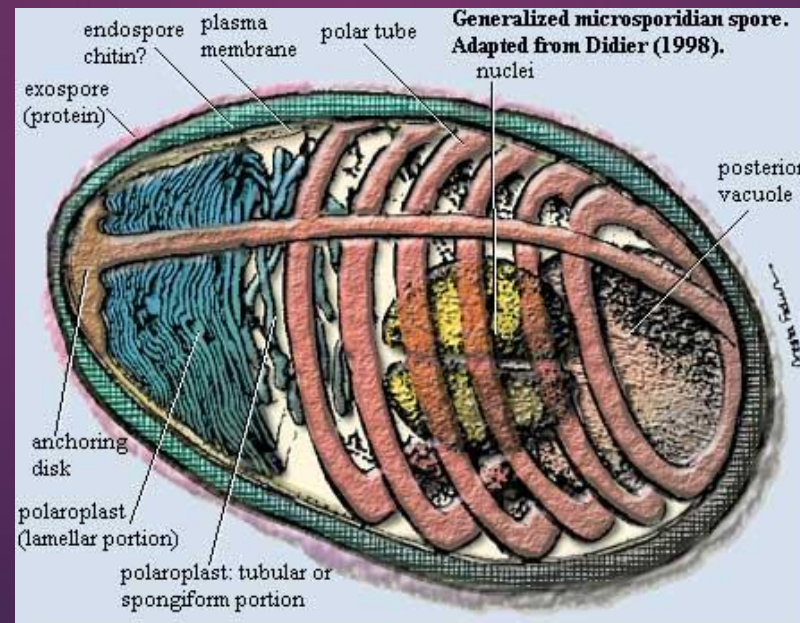
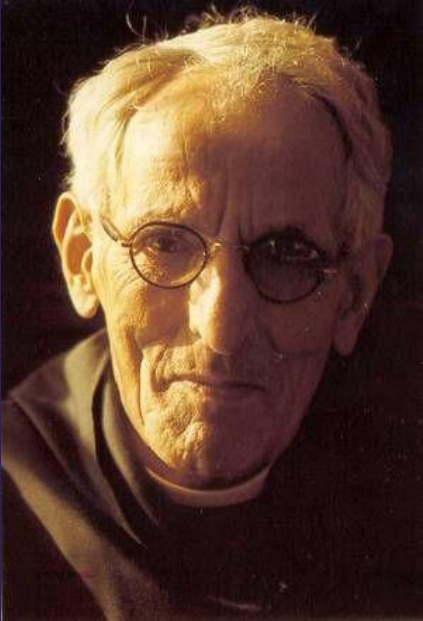


Connemara April 8th 2018

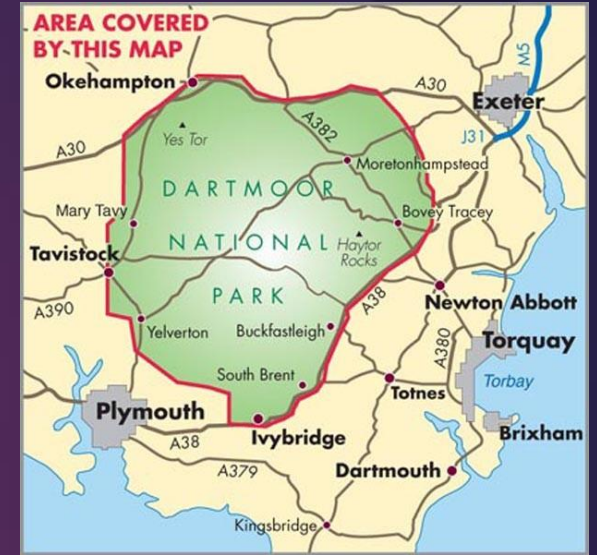
Nosema

Culprit of a Silent Spring?





Successful Beekeeping # supers? Really?

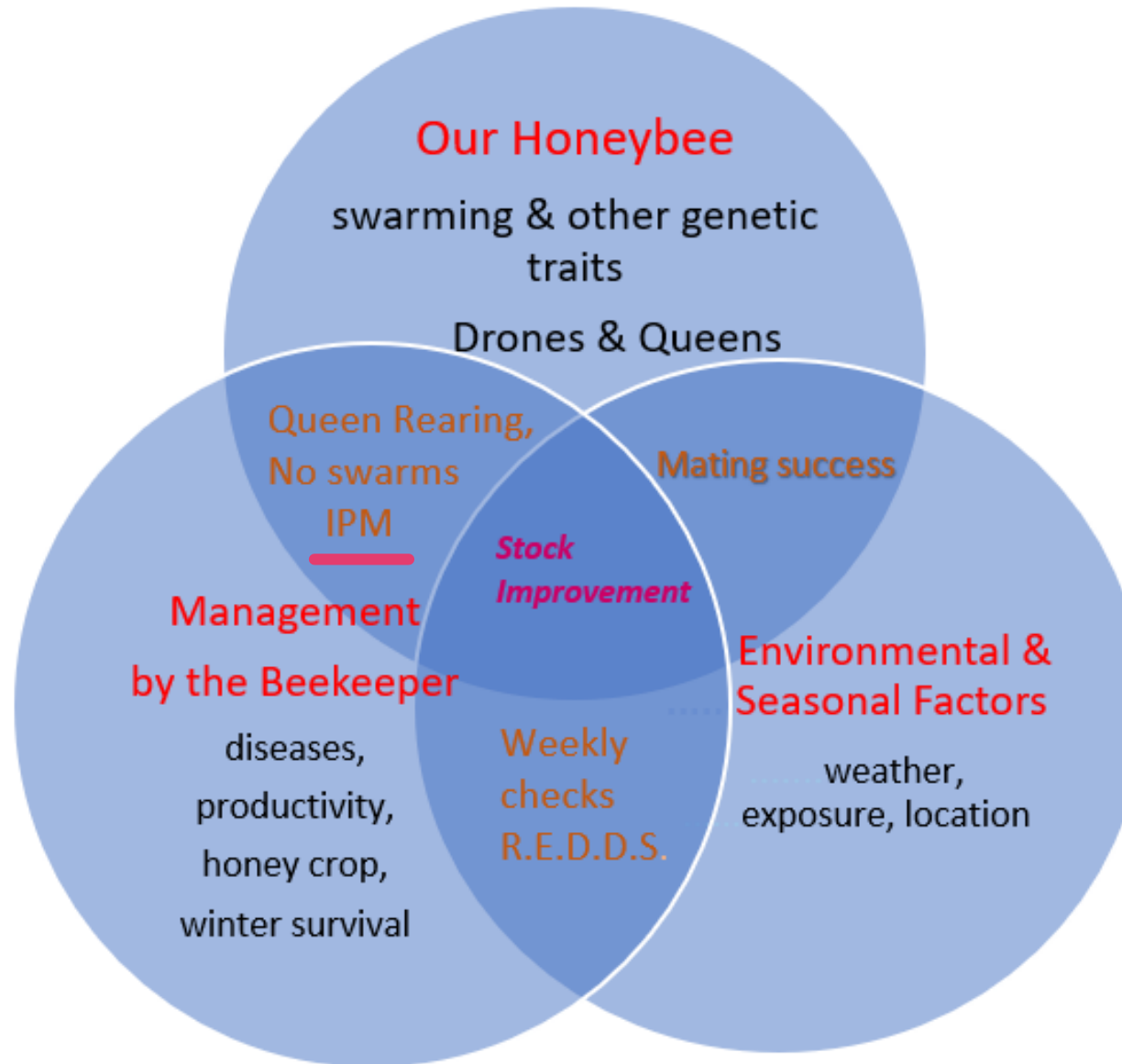


“When all is said and done, success in beekeeping is, in its final analysis, determined by our ability to ensure that EVERY colony is at all times in the best condition to make the most of a honey flow if and when one comes along

BROTHER ADAM

BROTHER
ADAM'S
QUOTE IN
PICTORIAL
VIEW...

AUTUMN IS A
GOOD TIME TO
LOOK BACK
OVER THE
BEEKEEPING
YEAR



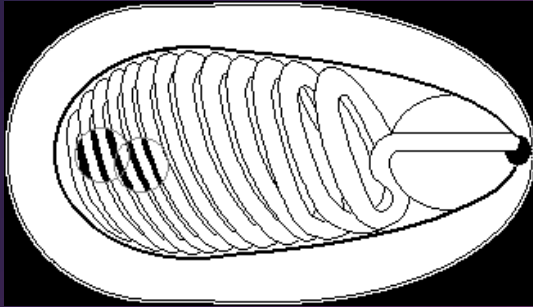
I.P.M.
Integrated
Pest
Management

(It's Prudent to
Monitor)

Describing Disease

1. Regulatory status
2. The organism described
3. Spread, transmission & contributing factors
4. Pathogenesis
5. Clinical signs
6. Diagnosis
7. Control & prevention





Nosema Disease

1 Regulatory status

not notifiable in Ireland

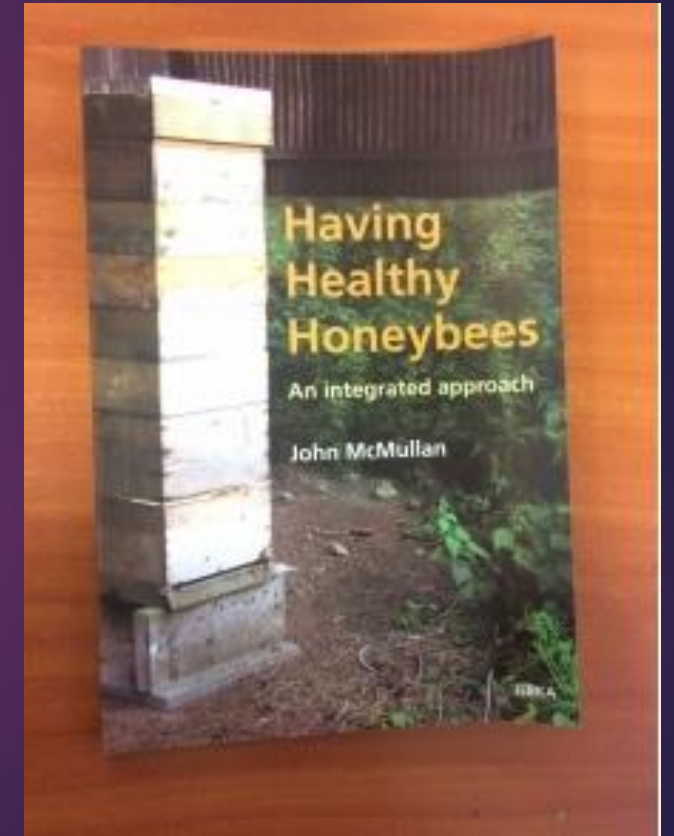
but for e.g. must be reported.. 7days Victoria

2 The organism described 2 species

N. apis 5-7 x 3-4 microns, (one millionth of a metre)

N. ceranae 4 – 4.8 x 2.1 – 2.9 micron

Obligate, intracellular parasite- can only reproduce
Inside a host cell, hijacking host cell energy systems



3. Nosema - spread

3. Spread, transmission & contributing factors

'Cleaner' (young worker) bees pick up spores during their duties. They become nurse bees

Feed spores to each other during trophallaxis

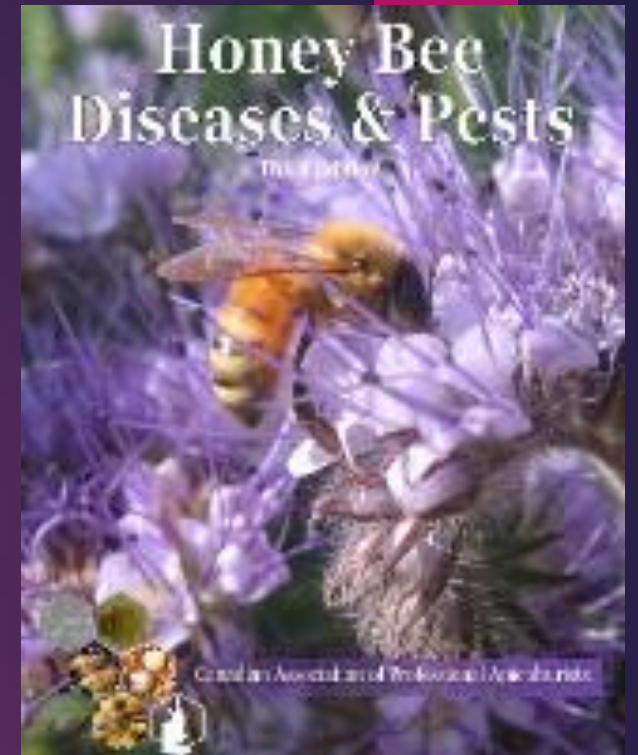
It is an adult disease.

ID50 vary – 390 spores *N. apis*, >3000 *N. ceranae*

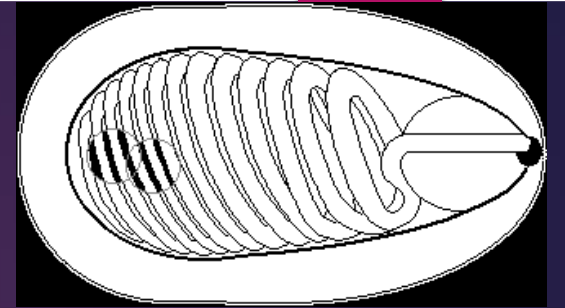
Robbing, drifting

Beekeeper – swapping frames, keeping old frames too long, general lack of hygiene

Spores are tough, can survive over a year/ equipment



4. Nosema pathogenesis



In other words, how does it affect my bees?

1. Ingested spores inside the stomach (ventriculus) germinate by ejecting a harpoon-like structure into the gut lining.
2. Spore contents enter those gut lining cells, multiply and rupture the cell when it is full of new spores

Physical result: dysentery or constipation (Obstruction by spores), **lesions** on the gut wall become an entry point for **other pathogens**

Worker Hypopharyngeal glands (brood food)- atrophy

↔ Larvae not fed. Colony dwindles

Suppression of the immune system (*N. ceranae*)

End result: Bees **life-span** shortened, starve to death because they can't absorb protein. **Infertile queens**

5. Clinical Signs of Nosemosis

Spore loads are highest in late Spring → time to sample is now

If your colony is suffering from high *Nosema* levels, you may see:

1. shortened lifespans of worker bees,
2. pronounced hunger of worker bees (bees begging to be fed by their sisters more often).
3. Colony collapse

Colonies, however, often do not show outward signs of infestation until the colony is already significantly weakened



6. Diagnosis: How to take a sample of bees

Q. Old bee or young bees?

A. Nosema/Acarine = old

Q. Brood?

A. AFB/EFB. Wrap entire comb in newspaper, plastic and post to Mary Coffey. Or 10x10cm brood only

Q. Where do I collect the old bees from?

A. Entrance/peripheral frames (not exclusively drones)

Send to Dr Mary F Coffey, Teagasc Oak Park Research Centre, Carlow





6. Diagnosis

0.5ml water per bee, x400, 30 bees

5 spores in the field of view
= 1,450,000 spores per bee
or 1.45×10^6

Similarly

10 equates to 2.9 million s/p/b

20 equates to 5.8 million s/p/b



<http://scientificbeekeeping.com/the-nosema-twins-part-2-detection-microscopy/>

7. Nosema Control & Prevention I.P.M.

1. Comb renewal & Requeening susceptible colonies.
2. Keep timber hives in good condition, minimise dampness and exposure
3. *Good hygiene: 10% by wt, washing soda solution, rinse gloves and h/tool between colonies.*
4. *Washable gloves.*
5. *Keep the locally adapted Black bee.*
6. *Replace queens annually*
7. *Do not feed syrup too late in the autumn*



Collection
only

7. Nosema Control & Prevention, cont'd

8. Fumigate one year old frames for a week with 80% acetic acid

(100 ml per BBx). Burn/render older frames

9. Scrub timber/polystyrene boxes with 0.5% Bleach solution.

Spores can persist on equipment for >12 months. Blow torch (timber). Freeze material infected with *N. ceranae*

10. don't feed honey from a collapsed colony (Nosema) to another colony / freeze / fumigate first (if at all)

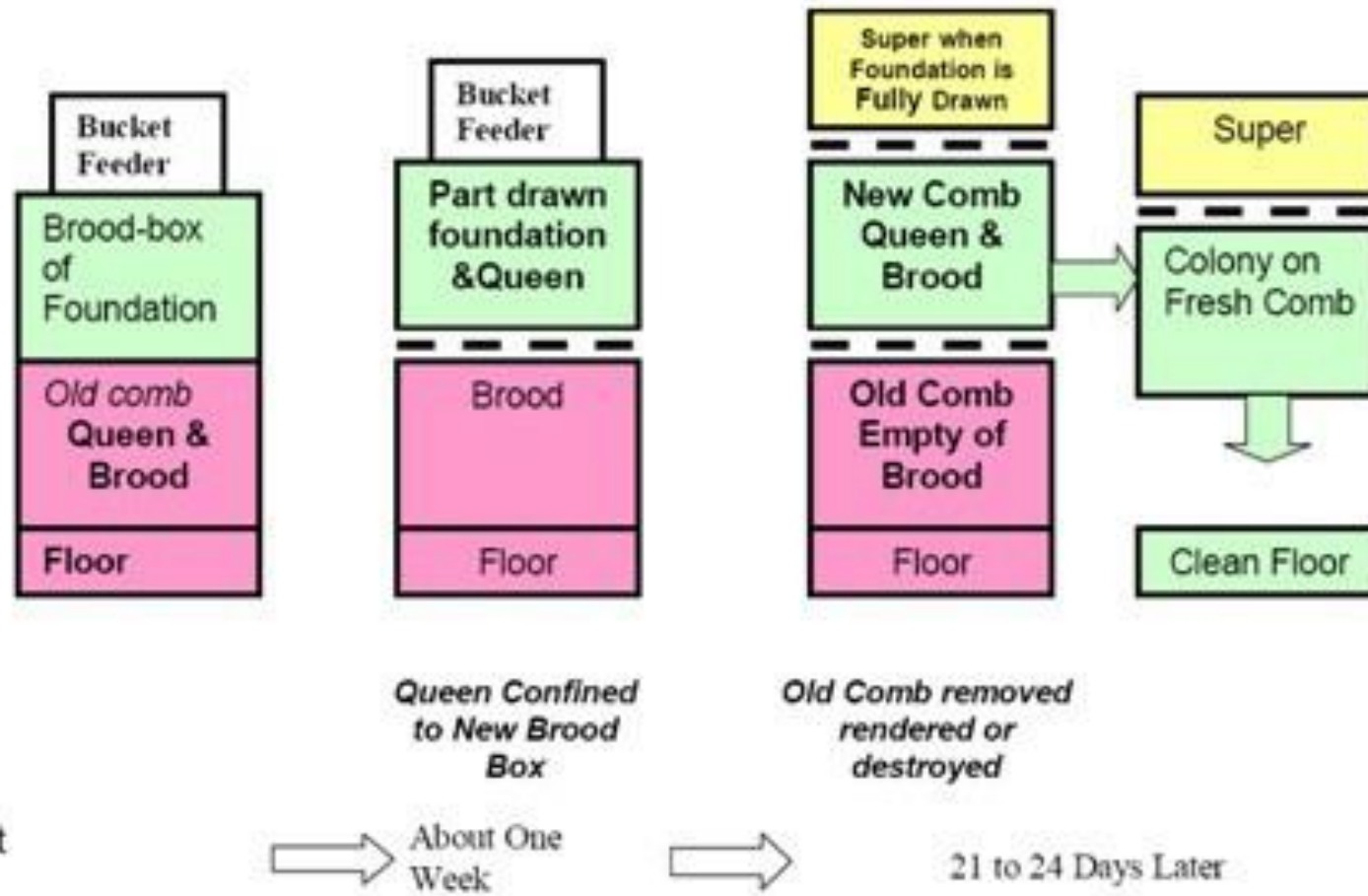
11. Strengthen colonies going into winter by uniting, cull underperforming queens. Place smaller late colonies into poly-nuc boxes

12 Bailey frame change



Collection
only

Bailey comb change



Provide a new entrance with a U-shaped eke above the bottom BBx

Controlling *Nosema*, other remedies

1. Feeding Hive Alive in the autumn

<https://www.hivealivebees.com/>



2. Adding thymol to sugar syrup (Dave Cushman website) *Stock solution: 30gm thymol dissolved in 150 ml of surgical spirit. One teaspoon to a three gallon (imperial) quantity of syrup*

Hazardous

Cuses skin burns, DAMAGES MUCOUS MEMBRANES IF INHALED



The Diutinous* Bee

IPM DONE,

PROLIFIC NEW
QUEENS GOING
INTO WINTER

VARROA TREATED
IF REQUIRED

HEALTHY WINTER
BEES WITH
ENOUGH
RESERVES TO SEE
THEM THROUGH
TO APRIL 1ST!



SUMMER BEE VERSUS
WINTER BEE & THE
IMPLICATIONS OF A
POLLEN RICH FAT
RESERVE
(VITELLOGENIN)

*FEBS LETTERS

VOLUME 584, ISSUE 12,
18 JUNE 2010, PAGES
2496-2503

Keep Records
of the colonies with
good traits & breed from
the best, cull the rest

R * E * D * D * S

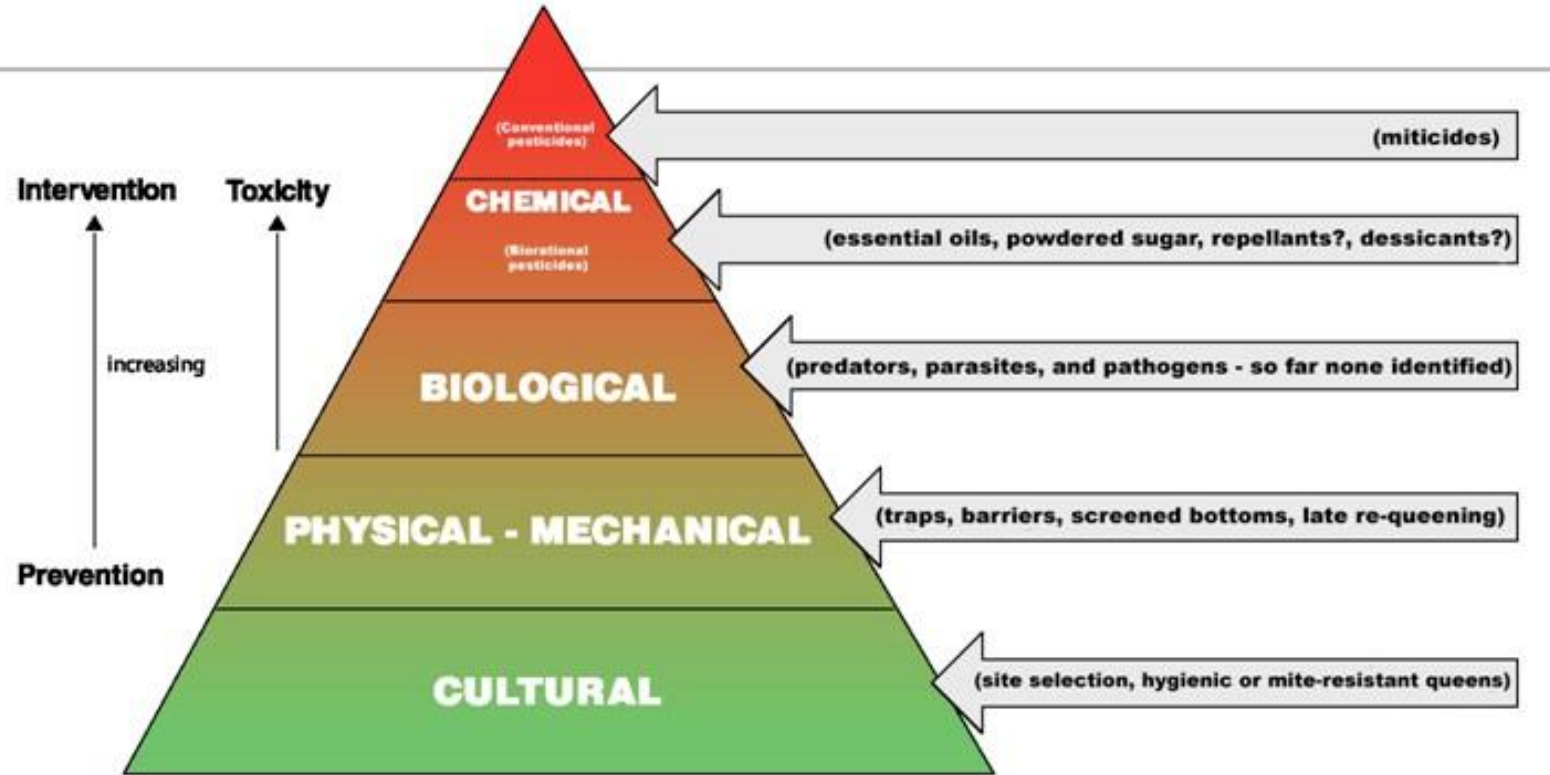
**DOCILITY, STEADINESS, BROOD PATTERN, POLLEN,
SWARM VALUE**

A RATING OF 1 – 5 AT EACH VISIT

Helen Mooney

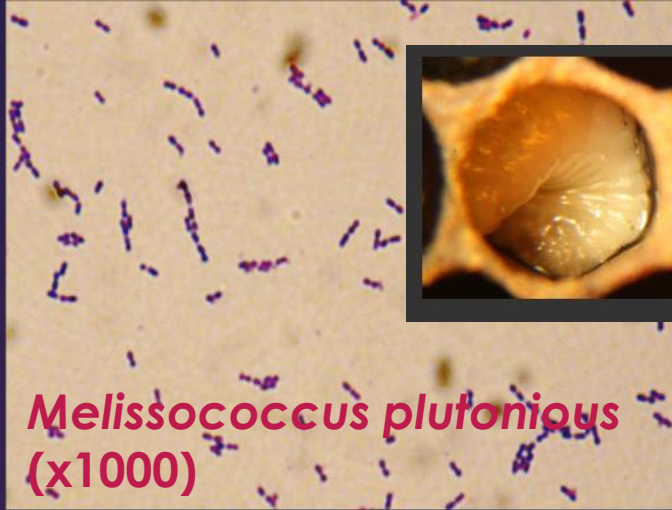
Intervention
should only take
place at the
Economic Injury
Level

Jamie Ellis
Gormanston
2016



Pyramid of IPM Tactics

Honey Bee Mites



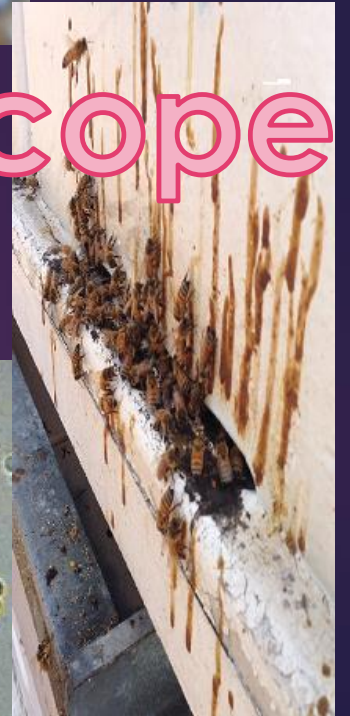
Melissococcus plutonius
(x1000)



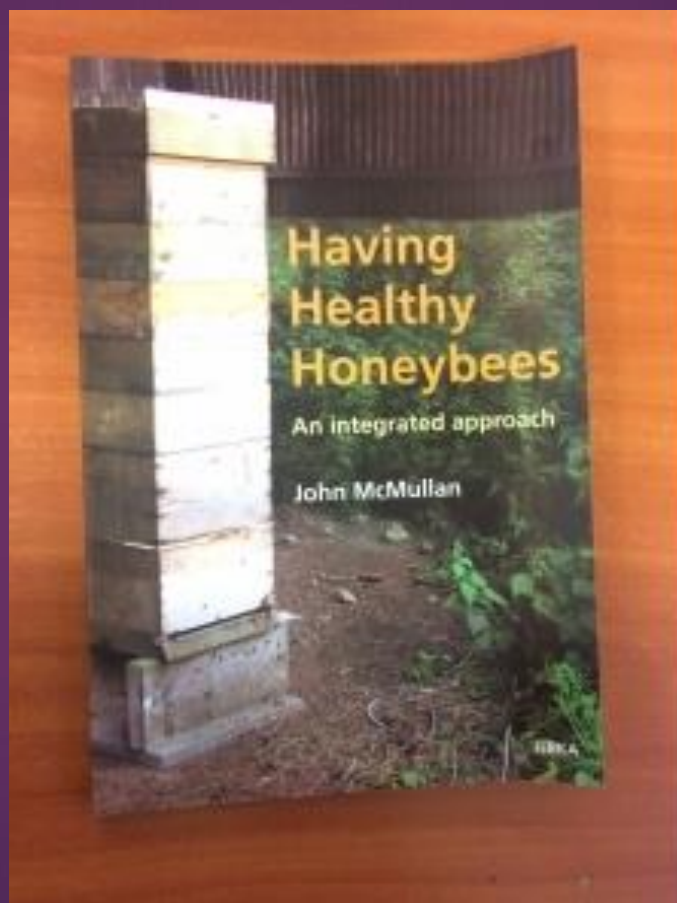
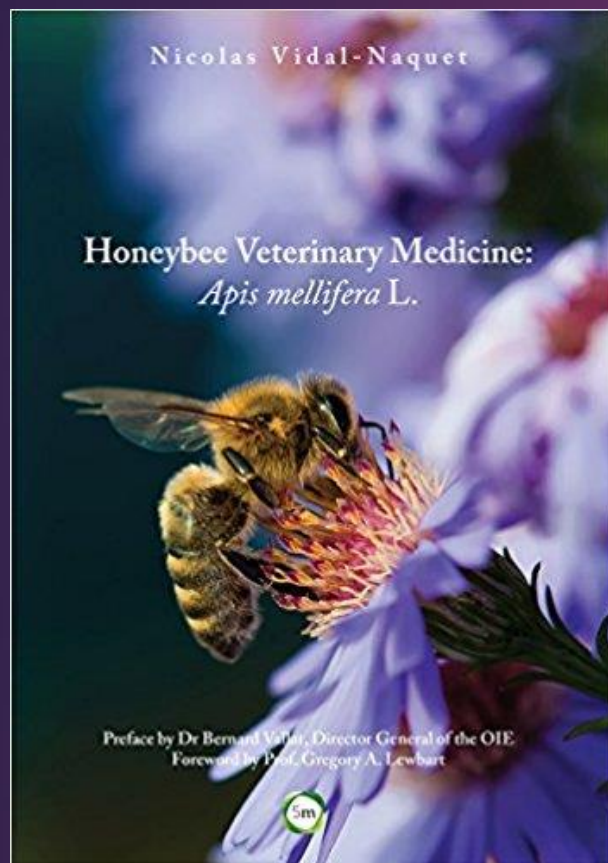
Other uses for a club microscope

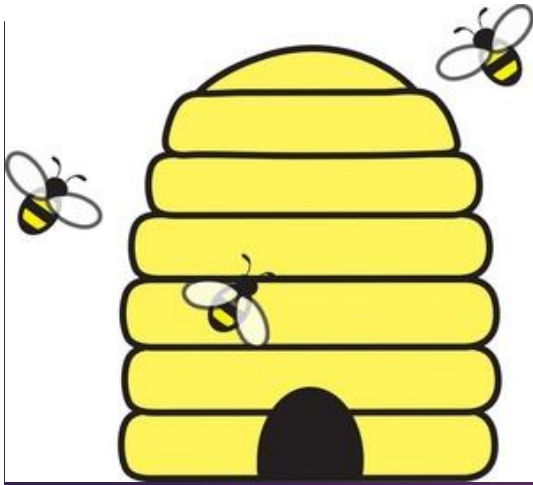


Paenibacillus larvae
showing endospore



Reference Material





Go raibh míle maith
agaibh

