



New Zealand, 2019



“Organic”

What does it mean?



Organic is NOT treatment free, or scientific neglect!

- Optimize productivity and fitness within any agro-ecosystem [soil organisms, plants, livestock and people]
- Develop enterprises that are sustainable and harmonious with the environment.
- Maintain biological diversity within the system
- Provide attentive care that promotes the health and meets the behavioral needs of livestock.



Pillars of Organic Beekeeping

- ⊗ Nutrition
- ⊗ Genetics
- ⊗ Integrated Pest Management
- ⊗ Innovative solutions



Nutrition

- Recognize that nutritional needs vary
- Protein vs. Carbohydrates



What do Legos & Pollen have in common?

The **essential amino acids for honeybees**

are: arginine, histidine, isoleucine, leucine,

lysine, methionine, phenylalanine,

threonine, tryptophan and valine (De

Groot, 1953).





Pollen Sources and Amino Acid Contents

Quantity \neq Quality

3kgs of pollen at 20% crude Protein

=

2 kg pollen at 30% crude Protein



Fat Bees vs. Skinny Bees - Doug Somerville

Protein Content in Pollen:

- > 20% protein = Poor
- 20-25% protein = O.K.
- 30% protein = Excellent



High Quality Pollen

- *Brassica napus* - ('Greenlandica' Brassica)
- *Malus domestica* - (Braeburn) Apple
- *Pyrus communis* - Pear
- *Prunus hirtipes* - Cherry blossom
- *Raphanus raphanistrum* - Radish



Poor Quality Pollen

- *Fagopyrum esculentum* - Buckwheat
- *Hebe salicifolia* Koromiko - Hebe
- *Helenium flexuosum* - Purple-headed sneezeweed
- *Helianthemum nummularium* - Rockrose
- *Viburnum tinus* - Laurustinus



Vitellogenin- Bee Batteries

- Allows bees to store and recycle protein
- It is stored in the “Fat Body” organs in the head and the abdomen
- Adequate protein builds the “Fat Body” organs



Bee batteries cont.

Recycled from Forager to Nurse to Larvae

Poor quality/no pollen = no vitellogenin = malnourished bees

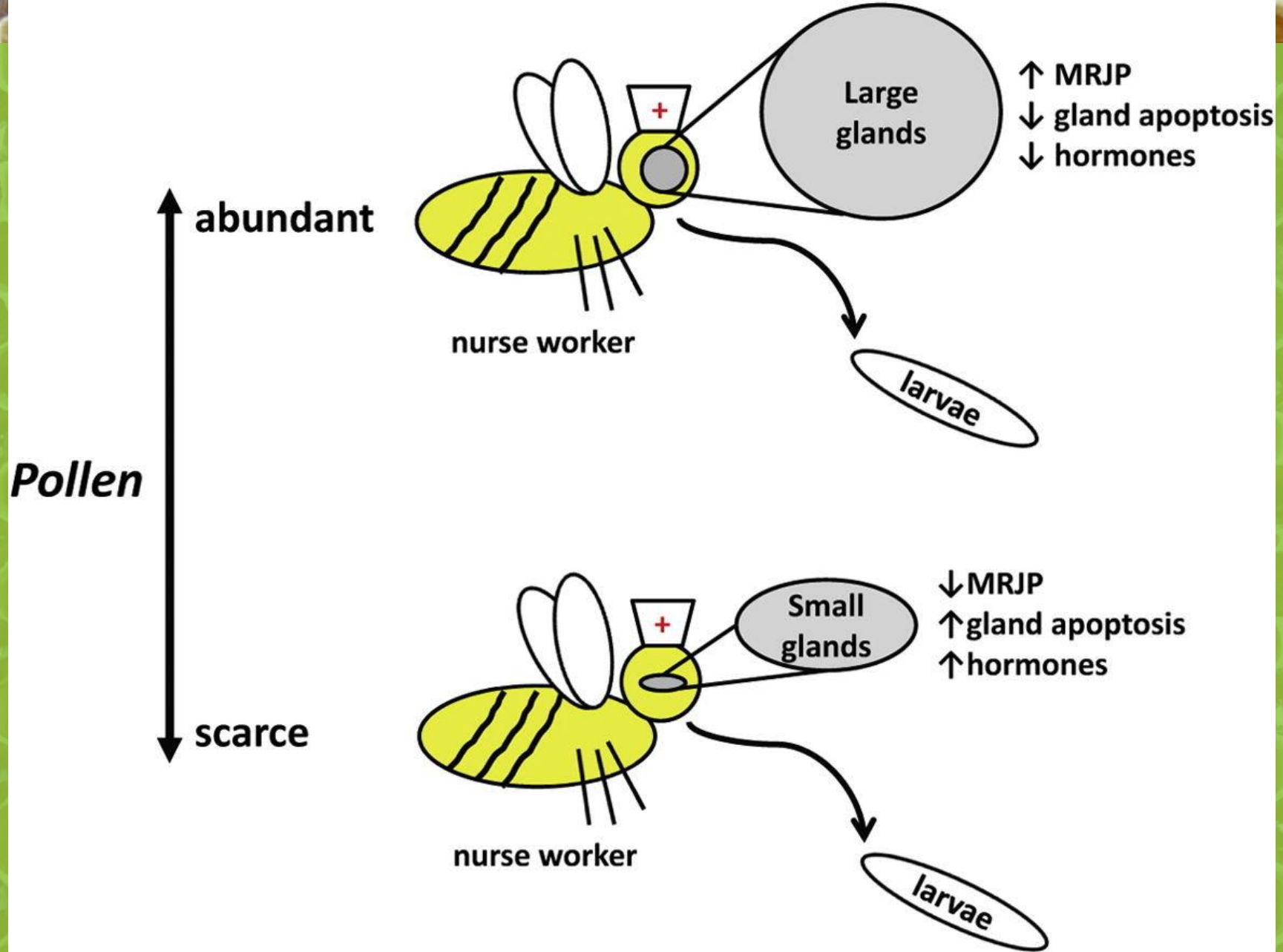
A strong hive can consume **7.7 kg** of pollen per week to maintain themselves.



Protein and Vitellogenin

SO protein influences:

- Lifespan
- Drone brood production
- disease resistance
- overall colony productivity.
- Pesticide detoxification
- Water loss
- Temp. Regulation
- Nutrient storage
- Nutrient Mobilization
- Metabolic Activity
- Growth, development, metamorphosis





Improving available Protein

Protein supplement patties

- Do-it-yourself recipes

Commercial powders & pre-formed patties

- Convenience
- Calculated nutritional needs
- Cost factor

Amino acid supplements used in syrup

- Temperature sensitive
- Timing



Negative Synergistic Compounds

- Pesticides
- Herbicides
- Fungicides



Carbohydrates

Natural carbohydrate = nectar = sucrose

Bees turn sucrose into fructose and glucose

Carbohydrates Stimulate

- The Queen to lay
- Give foragers energy
- Energy to maintain hive temperature
- Energy to fan wings for honey ripening



Organic Sugar

Ratio of 1:1 sugar to water = stimulation

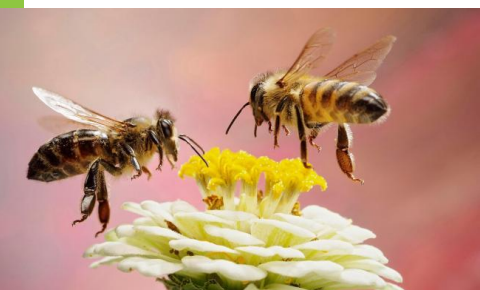
2:1 ratio sugar to water = storage

To be used by beekeepers during dearth times



The Family Tree should not grow straight up

- Genetic diversity promotes hybrid vigor.
- Hybrid vigor is defined as “the tendency of a cross-bred individual to show qualities superior to those of both parents.”
- Better disease resistance.
- Higher survival rates.
- Promotes rapid adaptability and quick recovery from catastrophes.



Considerations when choosing breed

Italian

- Production (Quality/Quantity)

Carniolan

- Location
- Temperament

Russian

- Disease Resistance

Buckfast

- Reproductive Rate

African

- Swarming Rate
- Environmental Resilience

German

	Italian	Carniolan	Buckfast	Russian	German	Caucasian
Gentleness	Moderate	High	Low-Mod	Low-Mod	Low	High
Spring Buildup	Good	Very good	Low	OK	Low	Very low
Over-wintering Ability	Good	Good	Good	Very good	Very good	OK
Excess Swarming	OK	High	Low	OK	OK	Low
Pollination	Moderate	High	Moderate	Moderate	Low	High
Honey Production	Very good	Good	Good	OK	OK	Low
Wax & Propolis Production	Low	Low	Low	OK	OK	High

HONEYBEE BREEDS



Honeybees are usually selected for their positive traits which are passed down from the queen & the drones she mated with. There are pros & cons for each breeds' traits. These breeds are the most common in the United States.

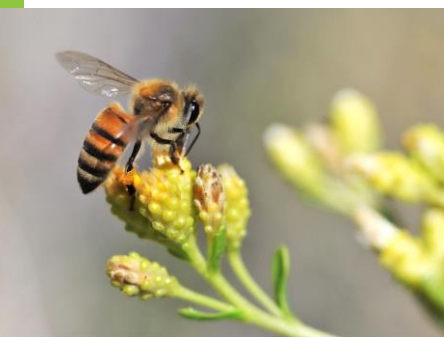


TRAIT	AFRICAN	BUCKFAST	CARNIOLAN	CAUCASIAN	CORDOVAN	ITALIAN	RUSSIAN
CALM ON COMBS	1	10	8	10	7	5	5
DEFENSIVE BEHAVIOR	10	1	1	1	1	2	7
EARLY BUILD UP	10	8	10	6	5	8	10
FORAGES EARLY	5	10	10	1	5	5	10
HONEY COLLECTION	10	10	10	10	10	10	10
HONEY STORAGE	1	10	10	8	8	10	5
NOSEMA RESISTANT	10	5	6	1	5	5	5
POLLEN COLLECTION	5	5	10	5	5	5	5
PROPOLIS COLLECTION	5	5	2	10	5	5	5
TENDENCY TO SWARM	10	2	5	2	5	2	7
TRACHEAL MITE RESISTANT	8	10	8	3	5	5	9
VARROA RESISTANT	10	3	4	3	3	3	5
WINTERS WELL	1	10	10	10	5	10	10

1 = Low Tendency for Trait

10 = High Tendency for Trait





Unique Attributes

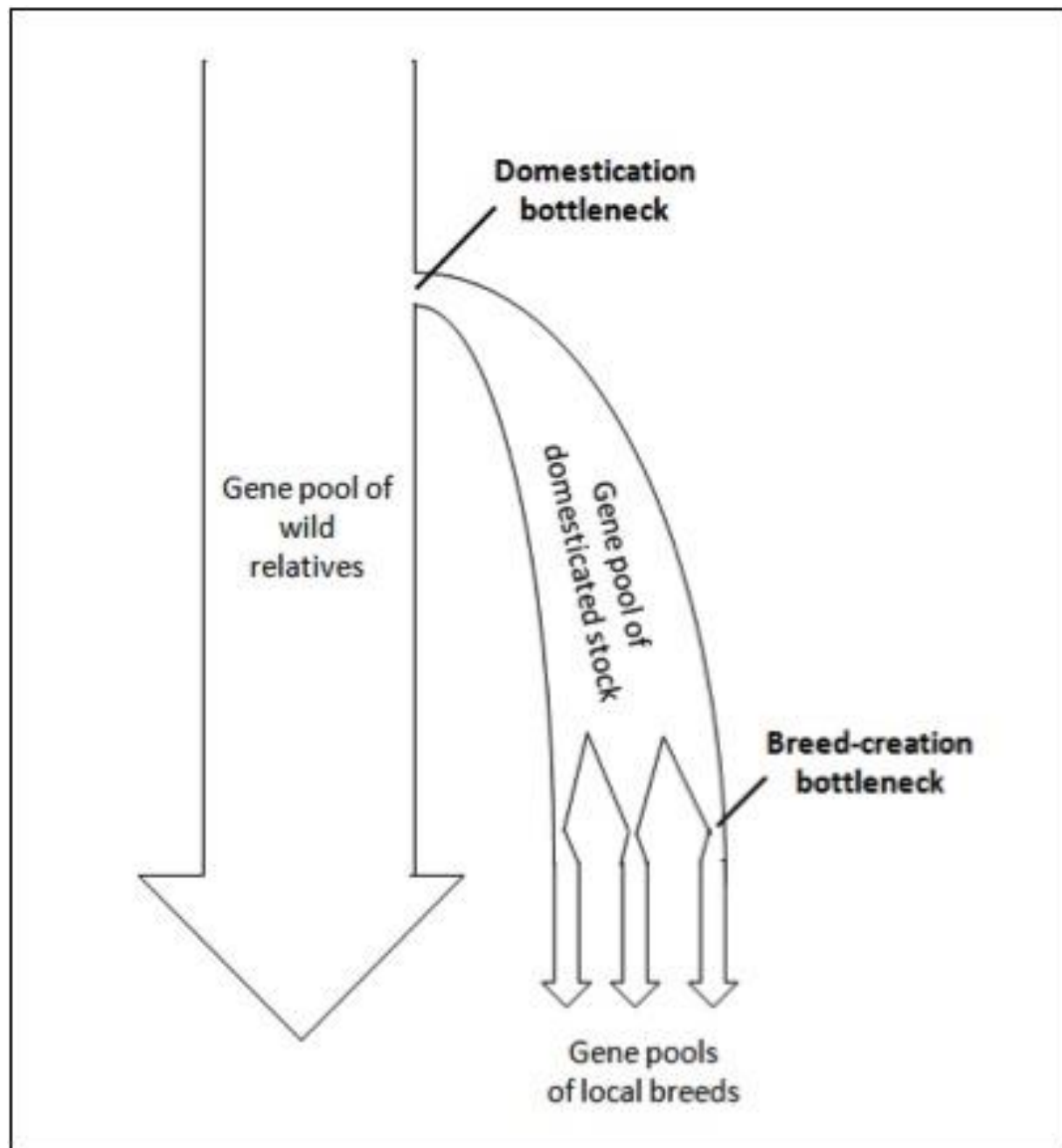
Carniolan - Very long tongue, very gentle, swarmy

Italian - Prolific brood, very gentle, not swarmy, robbly, trouble with natural pests

Russian - Not gentle, not prolific brood, natural defense against some diseases,

Buckfast - Resilient against natural parasites, not swarmy, prolific honey producers, somewhat aggressive

African - Originally from Brazil, forage from younger age, prolific honey, fast reproduction, more resistant to Varroa, highly aggressive and not suitable for urban areas or novice beekeepers.



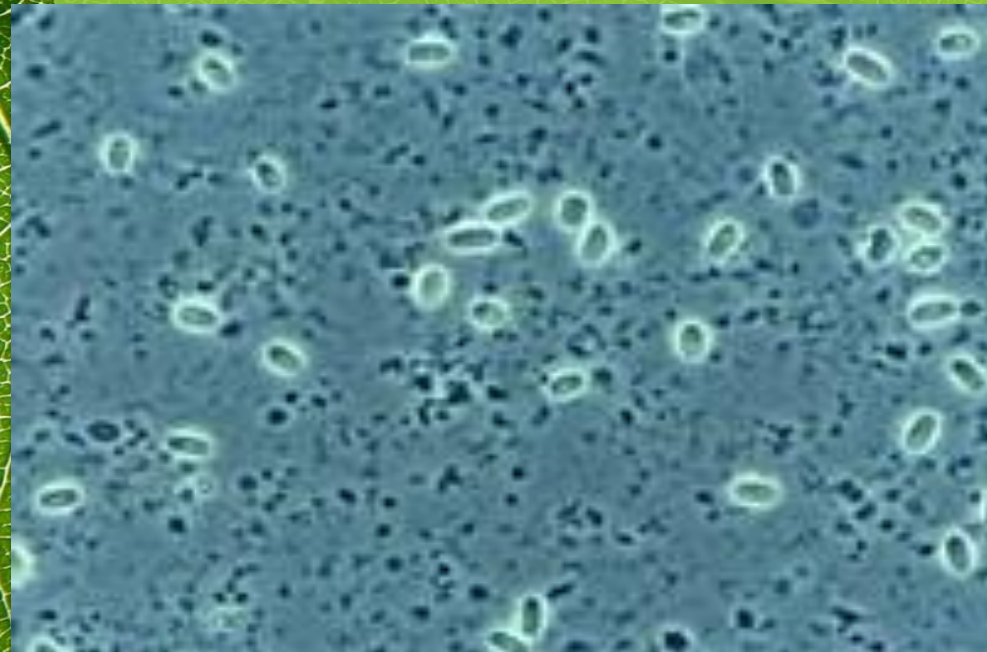


Integrated Disease and Pest Management

Know your enemy

Prevention is the best cure!!

Nosema Apis and Nosema Ceranae



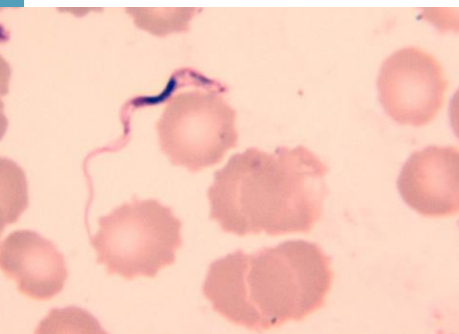


Zeolite 20 microns fed in syrup solution caused a significant decline in *Nosema c.* spore counts day ten through day forty.

Trypanosomatidae:



Lotmaria Passim



Trypanosomatidae

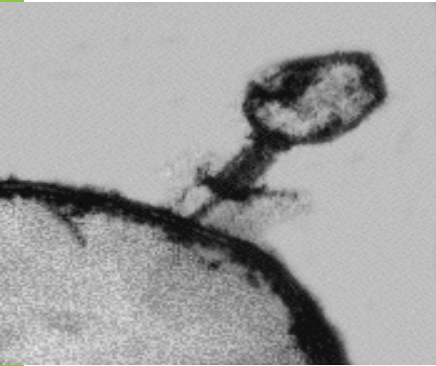
- Tryp infection and nosema concurrent
- Parasites attach reproduce and line the hindgut of the bee
- Occlusion of the gut prevents the bee from absorbing nutrients and damages the lining

American Foul Brood



Caused by **Paenibacillus larvae**

- Spotty brood
- Dark brown larvae sunk to the bottom of the cell (scale in brood cell)
- Possible rotting smell
- Moisture on sunken and sealed brood
- Ropy residue in cell (2cm + in length)
- Highly contagious



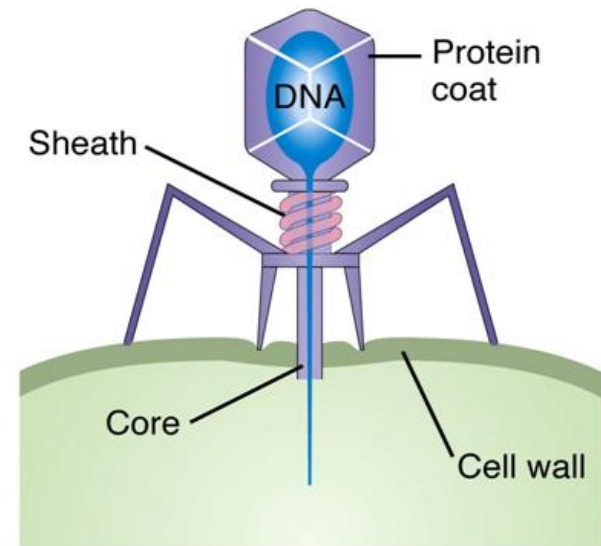
Management of AFB

- Prevention is the best cure
- Do not supplement with honey
- Treatment can include burning infected hives and equipment.
- Bacteriophages



Bacteriophages

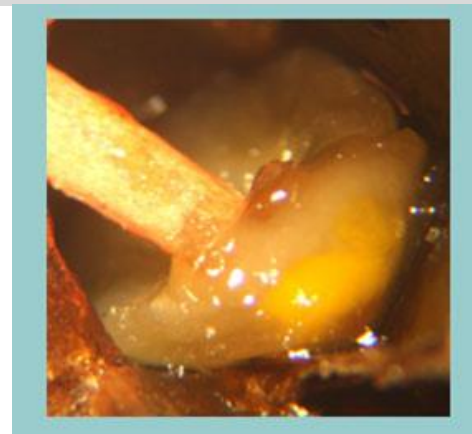
- A virus that can infect a specific bacterium
- Mostly found in soil and seawater
- Resistant to antibiotics





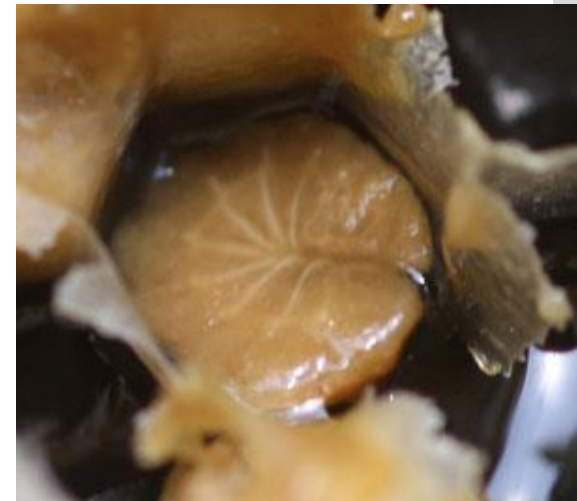
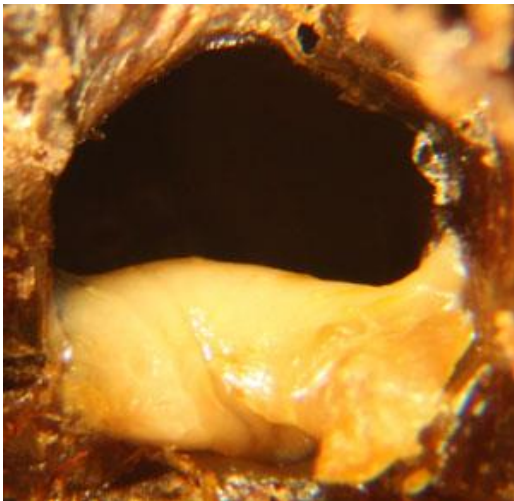
European Foul Brood

Brown - yellow upward curled larvae that look melted, dried out or rubbery.



Problematic when nectar is sporadic or when there are few Nurse Bees to feed larvae

Spotty brood pattern





Management of EFB

- Consistent nectar flow
- Re-queening to outproduce bacteria
- No frame exchanging between hives
- Some countries require burning infected hives.

Some non-organic treatments include:

Shook swarm + antibiotics



Small Hive Beetle

- Have yet to reach New Zealand
- Prominent threat
- Fouls honey with excrement
- Destroys wax by burrowing
- Destroys pollen stores



What Pest are you treating?





Melittiphis

- Lives in and eats pollen
- Not known to be responsible for any diseases
- Can be damaging to a weak hive with too little pollen



Braula Coeca

- “Bee Louse” (actually wingless fly)
- But it doesn’t do anything except steal food from worker bees
- Damaging, since they burrow through the comb
- Susceptible to most miticides
- Use chemical camouflage to hide from the bees and their hygienic behavior



Tropilaelaps

- Mini-mite... about ½ the size of Varroa
- Only found in Asia currently
- Specifically prefer brood
- Rapid reproduction rate and rapid range expansion
- Brood break is best management... if they don't have brood for three days, they will die
- Vector for disease = compromised immune system



Tropilaelaps management

- Formic acid - effective treatment
- Powdered sulfur - timing critical to success of treatment
- Both of these had a negative impact on adult bees and uncapped brood, sulfur much worse
- Colony division showed control over the Tropilaelaps population
- This is an emerging worldwide threat.



Varroa Destructor

- Vector for disease
- Down regulates the immune system on a genetic level
- Destroys the protein stores (consumes vitellogenin)
- Creates multiple generations of unhealthy bees



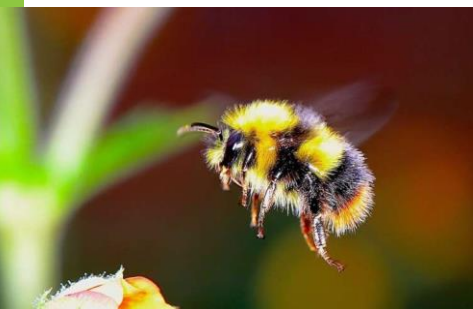
Identification and Management



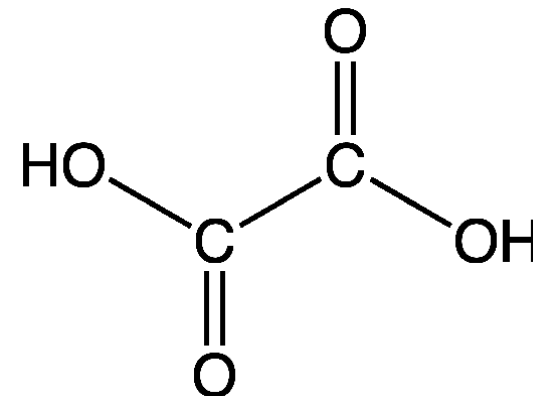


Why use natural treatments?

- ⦿ Prevent Resistance in Pests
- ⦿ Avoid contaminants in honey



Oxalic Acid



Vaporization

- Temperature control?
- Dose?
- Time?
- Labor
- Power source
- Price

Remember that this is an acid. Keep baking soda mixed with water on hand to neutralize.



Oxalic Dribble

- Do it yourself
- Commercial preparations available
- Safe during honey flow



Oxalic with Shop Towels

- Do it yourself
- Commercial preparations
- Safe during honey flow

My working formula for OA/gly towels	Per towel*	Per roll of 55 towels**	Per half roll***
Oxalic acid dihydrate (99.6% purity)	12 g	672 g	336 g
Water	10 mL	560 mL	280 mL
Vegetable glycerin (food grade)	13 mL	728 mL	364 mL

*For a Scott Shop Towel—I haven't experimented with other towels that may differ in absorption.

**The per-towel formula x 56 to account for the amount of solution absorbed by the center cardboard roll.

***Cut in half crosswise with a kitchen knife.





Formic Acid

- Safe during honey flow
- Do it yourself
- Commercial preparations
- Kills mites under capped brood
- **Temperature Dependant!***
- **Calm Bees!***

* Critical to the success of the treatment



Oregano Extract

- Oregano Oil mixed with syrup
- 2-3 applications every ten days
- Do NOT apply during nectar flow
- Use gloves
- Cost prohibitive per hive



Thymol

- Various methods of application:
 - Vegetable oil
 - Alcohol
 - Vaseline
- Use gloves and face masks
- Effective Treatment
- Not for use during honey flow



Think Outside The Box

- Old ways will not open new doors.
- Integrated problems require critical thinking and improved practices for success.

So do you believe that Organic Beekeeping is an option for 2019?

Thank you!
Any questions?

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