

BEEKEEPING 102

Surviving the 1st year.

Improving the odds to overwinter?

A little entomology

BASIC BEE BIOLOGY

Egg to Emergence

- Worker (21 day)
- Drone (24 day)
- Queen (16 day)

Egg to Emergence (graphic)



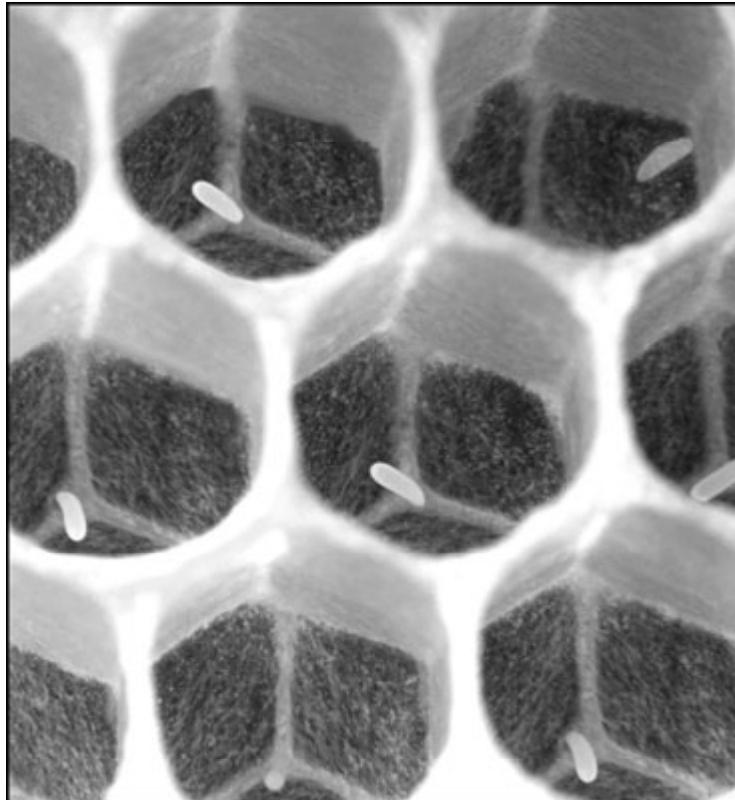
Eggs in cells

Usually not this easy to see!

- Put sun at your back, shining right down the cell.

- Swivel the frame around and look for a moving shadow!

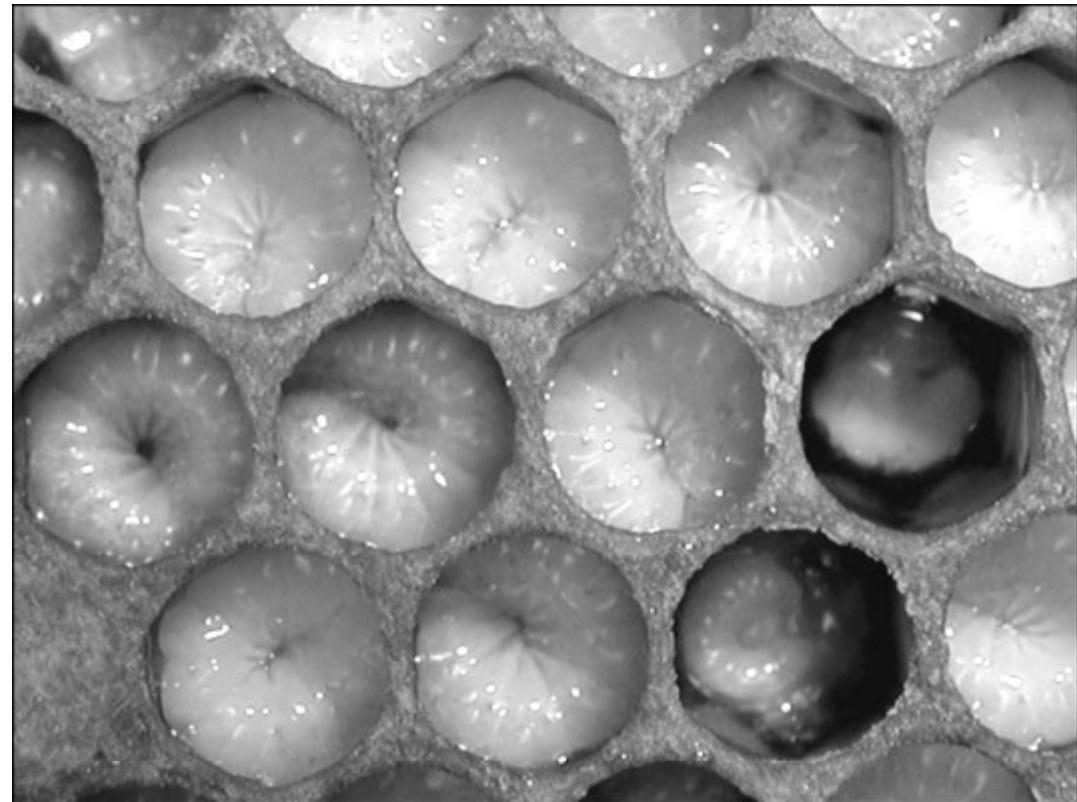
- Look for one egg, centered in the cell.



Larva in cells

Various stages, from just bigger than the egg to filling the cell. (In this picture, they are older!)

-Note smaller larva are swimming in bee-food.



Covered Brood

Note the:

- Oval (round) covered brood patch.
- Honey in the corners.
- Pollen (can't see it) in the margin.
- (Do you see any drone brood?)

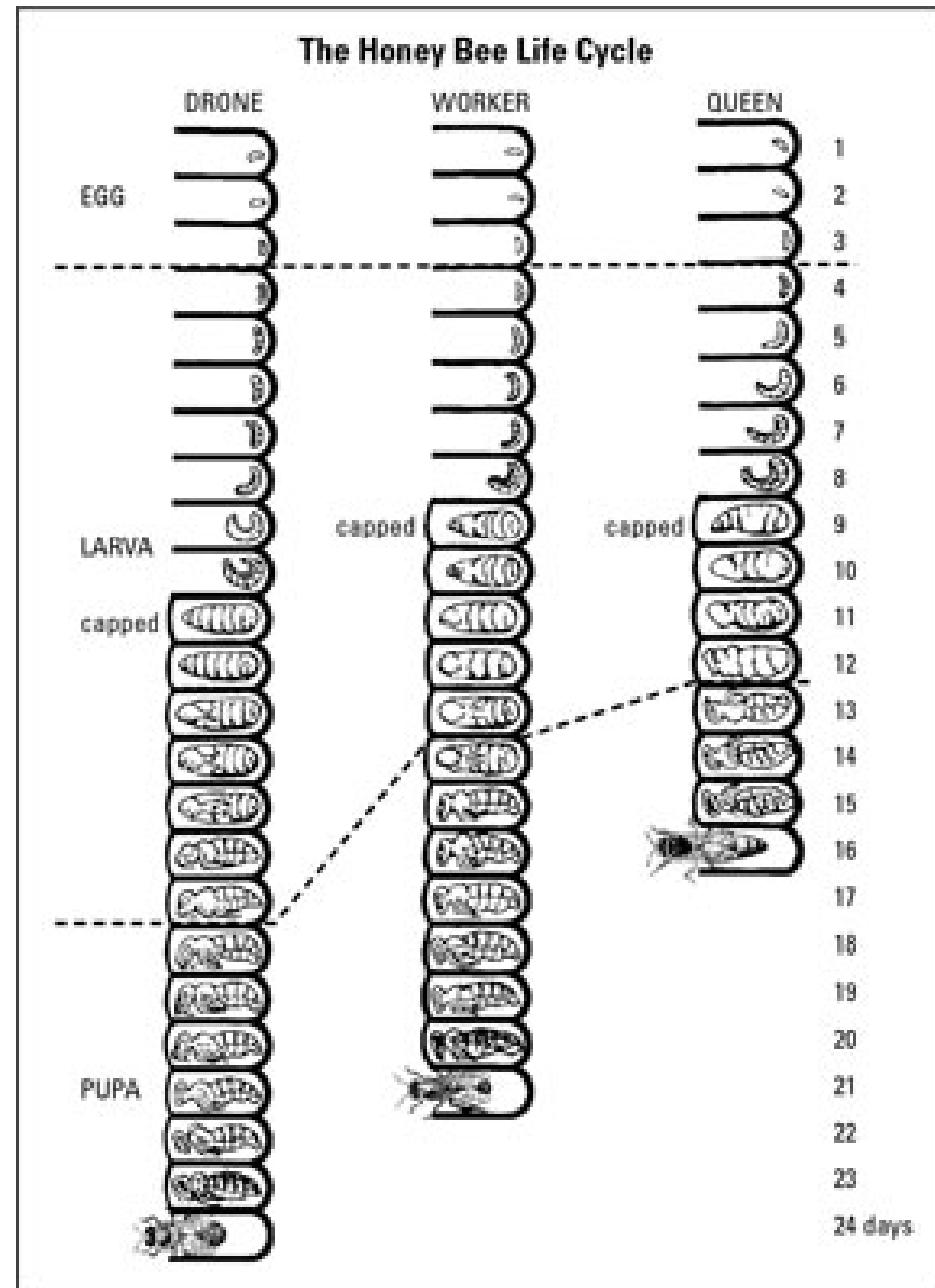


Egg to Emergence

Drone (24 day)

Worker (21 day)

Queen (16 day)



Emergence to Forager

- Cleaning
- Feeding & Servicing
- Fanning & ventilation
- Nectar & Pollen transfer
- Wax making
- Guarding
- Orientation & off to Foraging

Emergence to Royalty

- Kill competition (right after emergence)
- Hardening (4-5 days)
- Orientation flights (1-2 days)
- Mating Flights (2-3 days with up to 20 drones)
- Egg laying (starts in 3-5 days, takes up to 21 days to be fully developed)

Queen Emergence



Queen cups – various stages



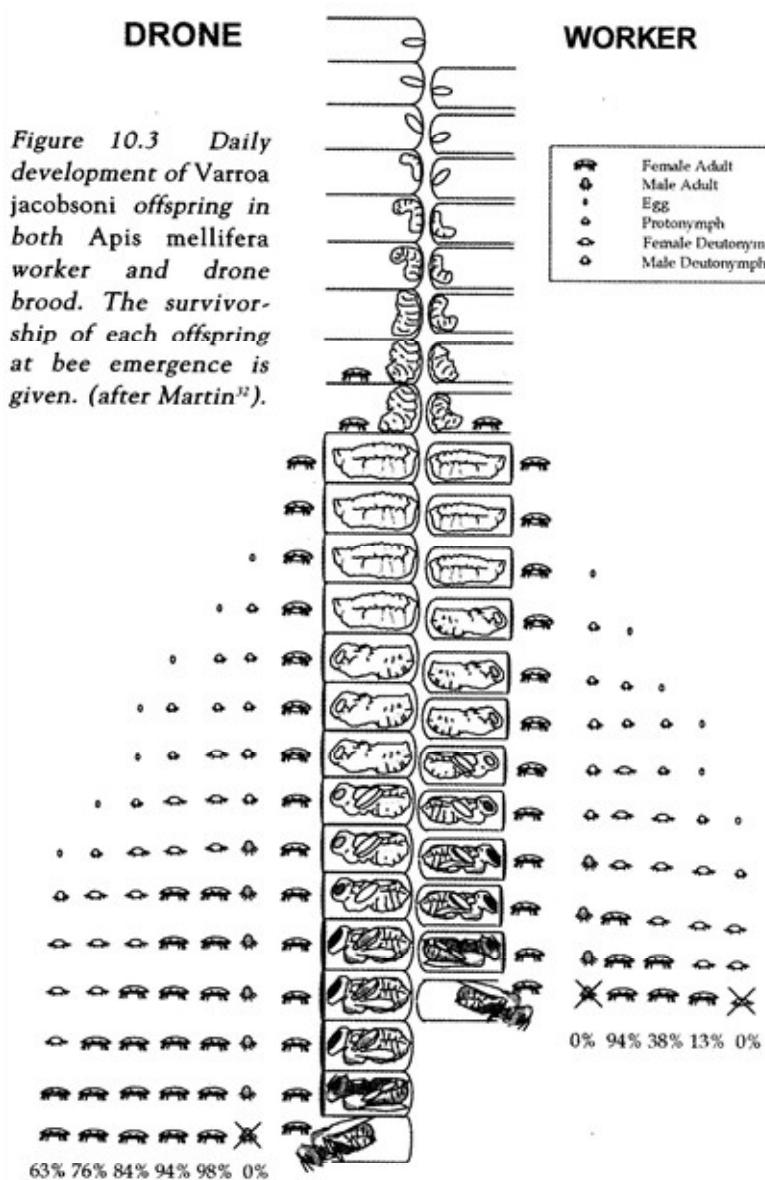
Drones

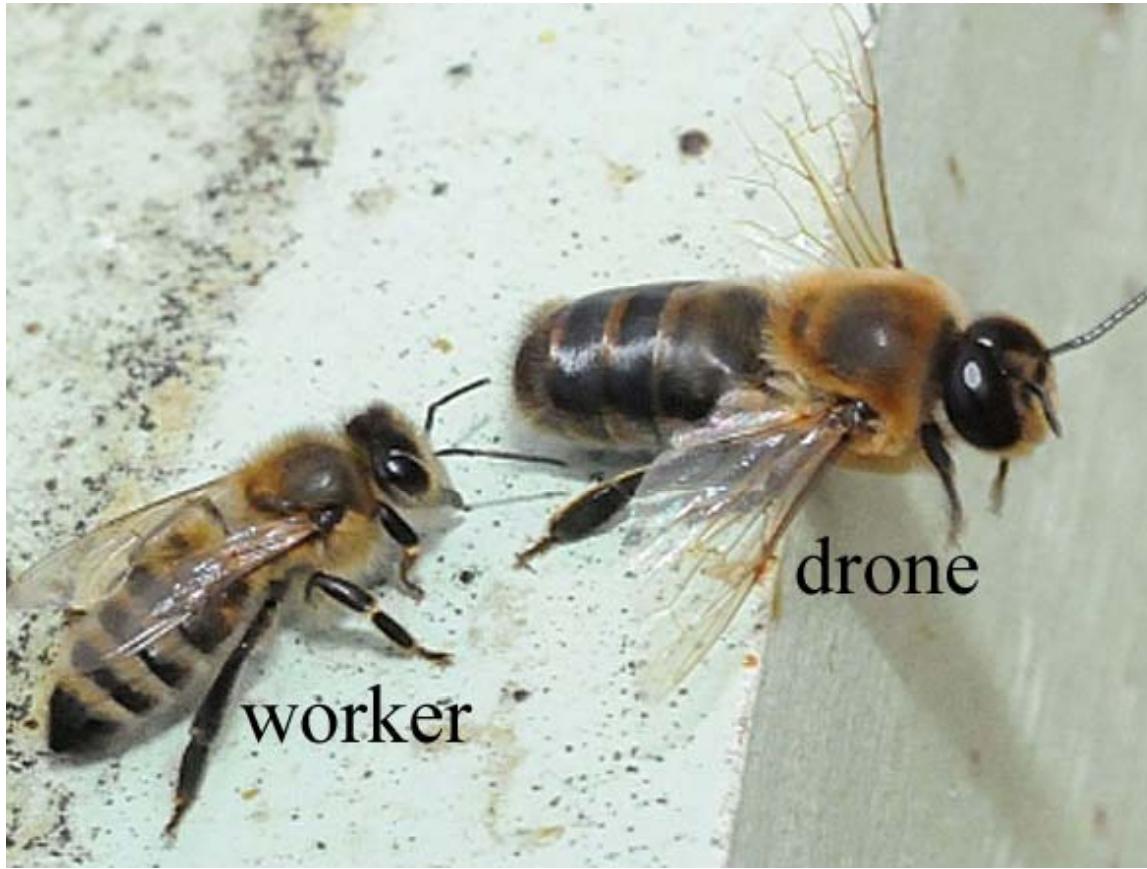
- 10 to 14 days to sexual maturity.
- Spends afternoons in DCA (Drone Congregation Areas)
- Must be fed, does no work.
- Dies in mating with queen.
- Kicked out when food stores are short (autumn dearth.)



Drones and mites

Because of the longer time 'under the cap', drone comb produces more mites. This graphic illustrates that where worker larva may produce up to three mites, drone larva can produce up to FIVE!



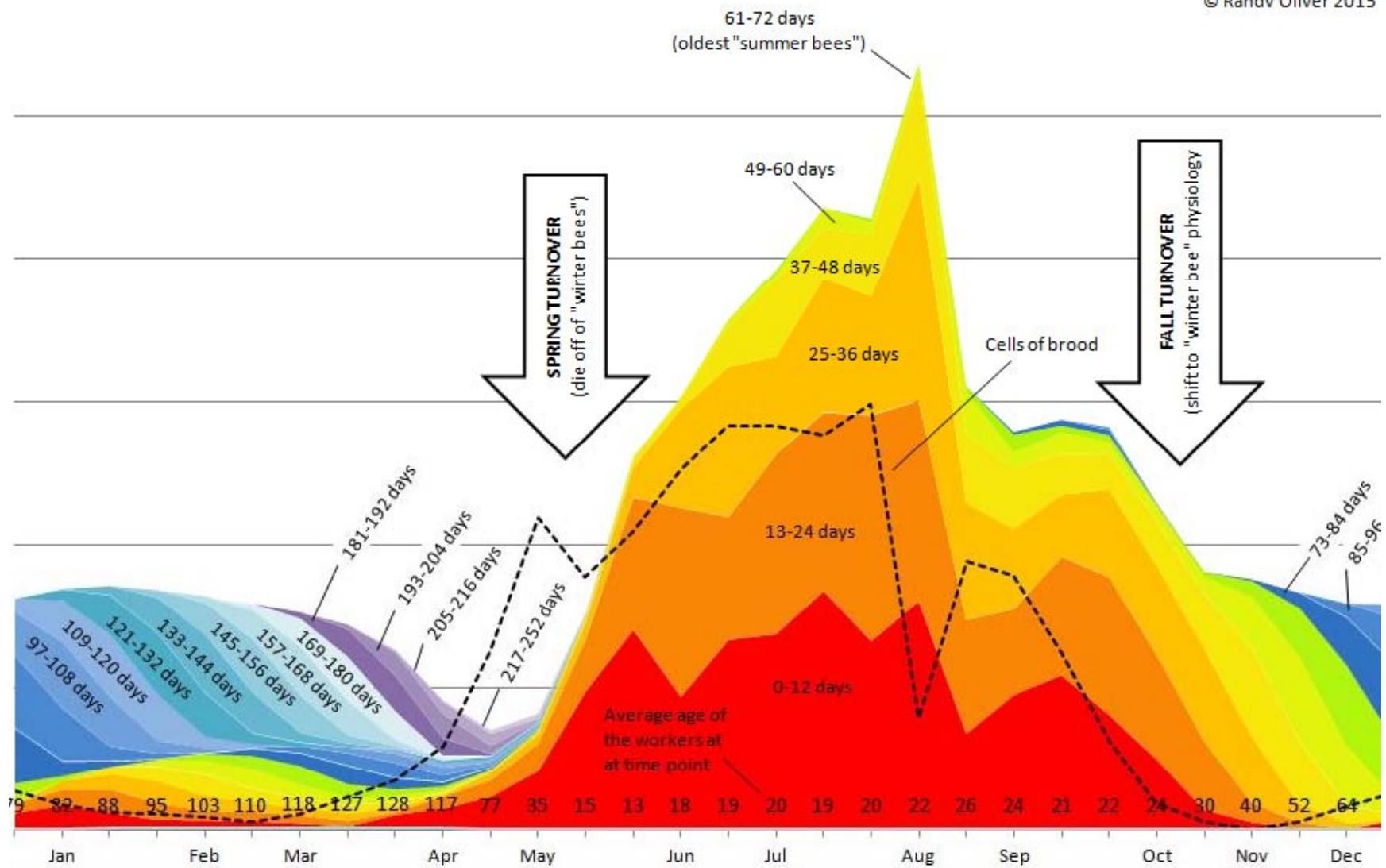


Drone comparison

Note the square 'butt' and big eyes. The eyes are clearly seen when looking down on a frame of bees.

Age Class Distribution of Workers Over the Year Manitoba, Shed Wintered

© Randy Oliver 2015



Break ? Questions on entomology?

Enough about the bees....

ON TO EQUIPMENT!

Things to hold bees – various types.

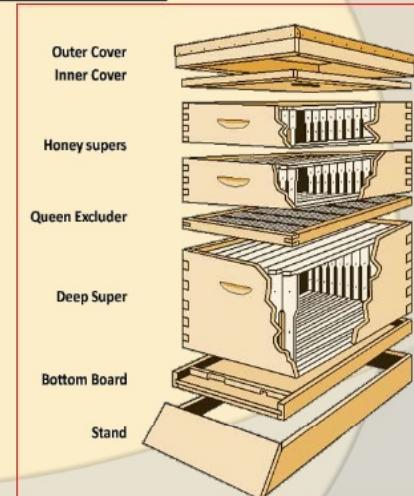
HIVE TYPES

Langstroth



Typical moveable hive

- It is a six type:
 - (a) Stand
 - (b)Bottom board
 - (c)Brood chamber
 - (d)Super
 - (e)Inner cover
 - (f) Top Cover



Top Bar Hive (TBH)



Observation Window for Long Lang

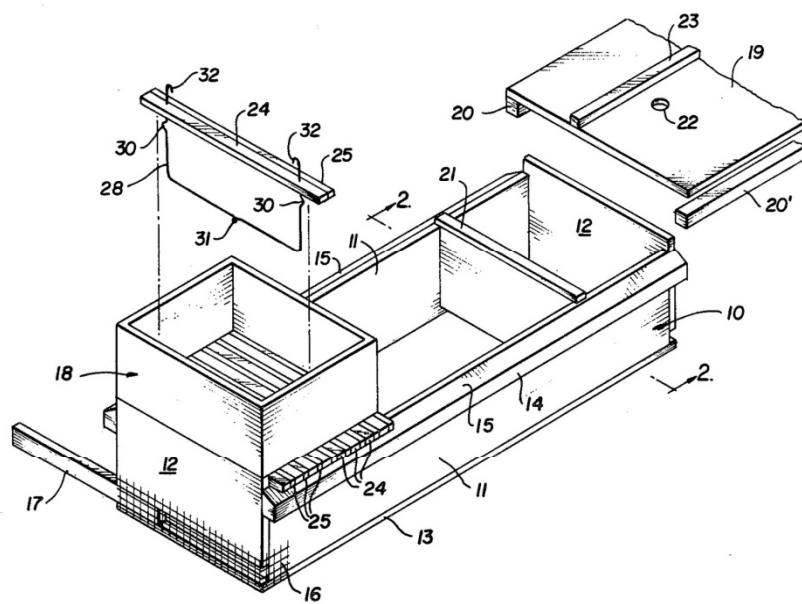


Warre Hive (look for ‘hat’)



Variants (TBH)

CJ will talk to this shape



TBH with langstroth super



‘Illegal’ designs

ToBee hive



Egg hive



Things for the beekeepers protection and comfort.

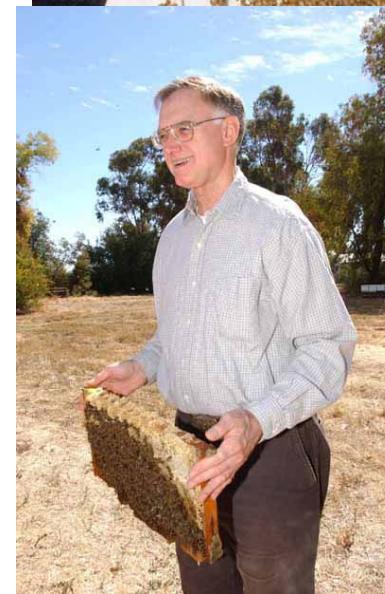
VEILS TO SUITS

How much gear do you need?

Full suit



Nothing at all



Dennis Riggs

Can I just use my screwdriver?

HIVE TOOLS

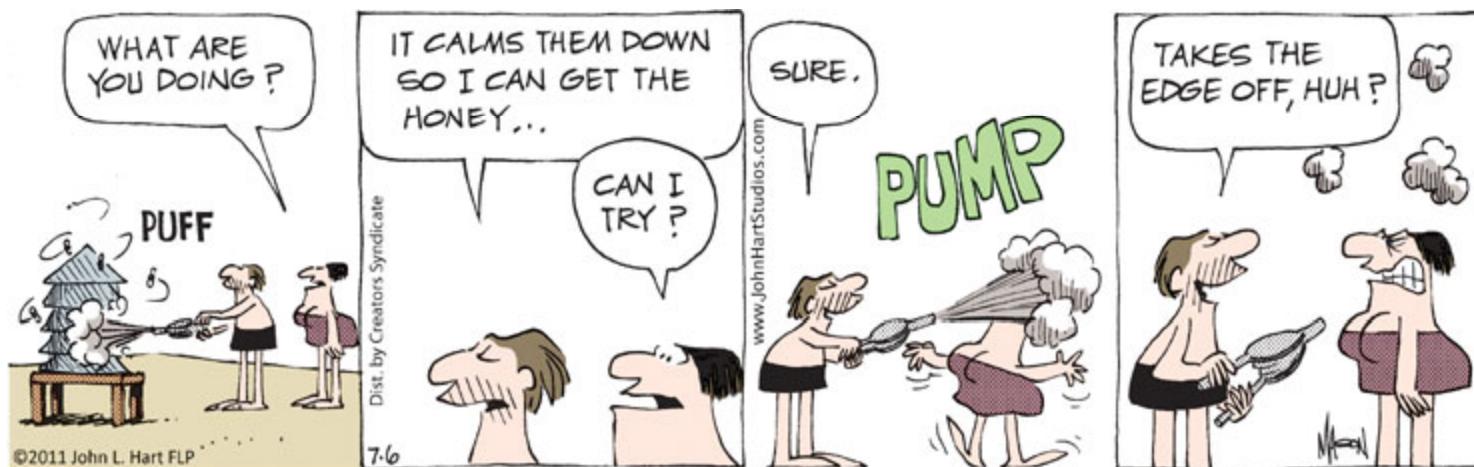
Hive tool(s)



How to use a hive tool

- Twist, don't pry, between frames.
- Pull up, not down to lift boxes.
- ...and look between boxes to see if you need to pry frames down!
- Clean after every use – HOT dish-soapy water and a 'green scrubbie'.
- (I sharpen the angled end to scrape stingers.)

Smokers



How to light your smoker

- Put in something to light (newspaper, a little dry fuel).
- Get the thing REALLY lit !!
- NOW add more fuel.



Once it is lit – add fuel.

Don't 'pack' or there will be no 'draft'.

Fuels:

- Pine needles
- Pine shavings (bedding)
- Pellets
- Cotton (raw, knit)
- Burlap
- Grass (burns to fast & hot)

Cool smoke may require a 'wet grass' topper.

A well lit smoker can smolder for an hour or more!



SaulCreekApiary.com



When to clean your smoker

In need of help



After a bit of cleaning



But do it often..

You want this.

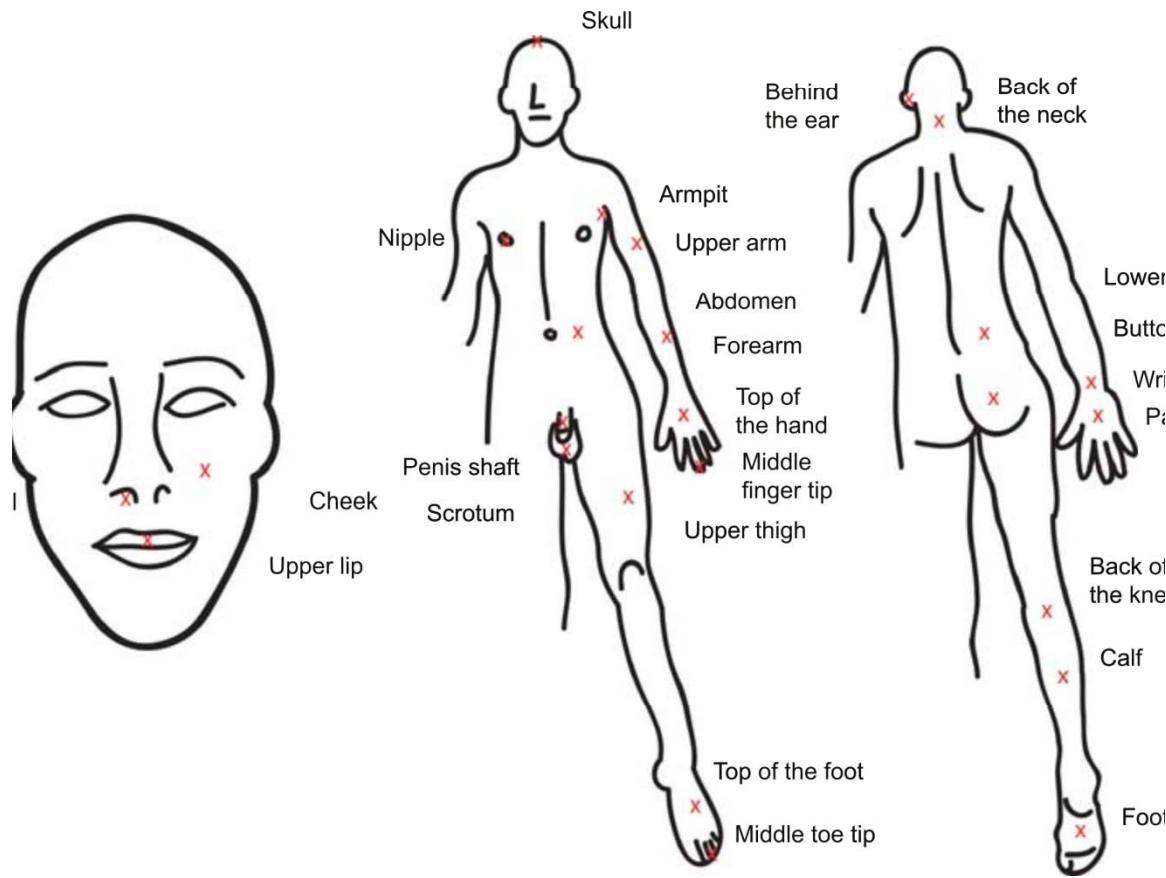


...not this!



Ok, I think I got stung

STINGS



WHERE you get stung counts.

See the chart on the next page.

Pain.xlsx

	A	B	C	D
1	Average pain ratings.			
2	Body location		Pain rating	
3	Medical terminology	Layperson terminology	Average rating	Standard deviation
4	Anterior vertex	Skull	2.3	0.6
5	Third distal phalanges (foot)	Middle toe tip	2.3	0.6
6	Proximal humerus, dorsal aspect	Upper arm	2.3	0.6
7	Buttocks	Buttock	3.7	0.6
8	Dorsal aspect of leg	Calf	3.7	0.6
9	Posterior trunk, lumbar region	Lower back	4	1.7
10	Anterior aspect of proximal thigh	Upper thigh	4.7	1.2
11	Anatomic wrist, ventral aspect	Wrist	4.7	0.6
12	Foot, plantar surface	Foot arch	5	1.7
13	Distal arm, dorsal aspect	Forearm	5	n.a.
14	Popliteal fossa	Back of the knee	5	1
15	Posterior neck, cervical region	Back of the neck	5.3	1.2
16	Postauricular	Behind the ear	5.3	1.2
17	Hand, dorsal aspect	Top of the hand	5.3	1.2
18	Foot, dorsal aspect	Top of the foot	6	1
19	Abdomen	Abdomen	6.7	0.6
20	Third distal phalanges	Middle finger tip	6.7	0.6
21	Nipple	Nipple	6.7	0.6
22	Axilla	Armpit	7	0
23	Buccal aspect of face	Cheek	7	0
24	Hand, anterior aspect	Palm	7	0
25	Scrotum	Scrotum	7	0
26	Body of penis, dorsal aspect	Penis shaft	7.3	0.6
27	Tubercl of superior lip	Upper lip	8.7	0.6
28	Anterior nares	Nostril	9	0

Record keeping

What happened the last time you visited?

How strong was the hive?

Were there any anomalies?

How do you keep track?

- Handouts available on the webpage:
- <https://drive.google.com/drive/folders/0Bz4vHqKIF5DLWmZ1NjJhQUZhTDg?usp=sharing>
- -or-
- <https://goo.gl/6M5vS7>

Keep it clean. Every time.

COMB MANAGEMENT & HIVE MANAGEMENT

How to read a brood comb

A discussion of take-aways from
Randy's talk last week.

- Brood quality
- Pollen
- Honey
- Open (built) comb
- Pattern recognition

Why a story board tells you more than just ‘crap falls out of a hive’.

TELL ME A STORY, DADDY !

Tell me a (mite) story.

Post mite treatment - north



Post mite treatment - south



Tell me a (brood) story

Offset brood nest



Brood caps –v- honey caps



Tell me a (detailed) story

So, this is a real dirty story board.

What do you see?

-Mites?

-Capings?

-Pollen?

-Bee parts?

-Wax moth?

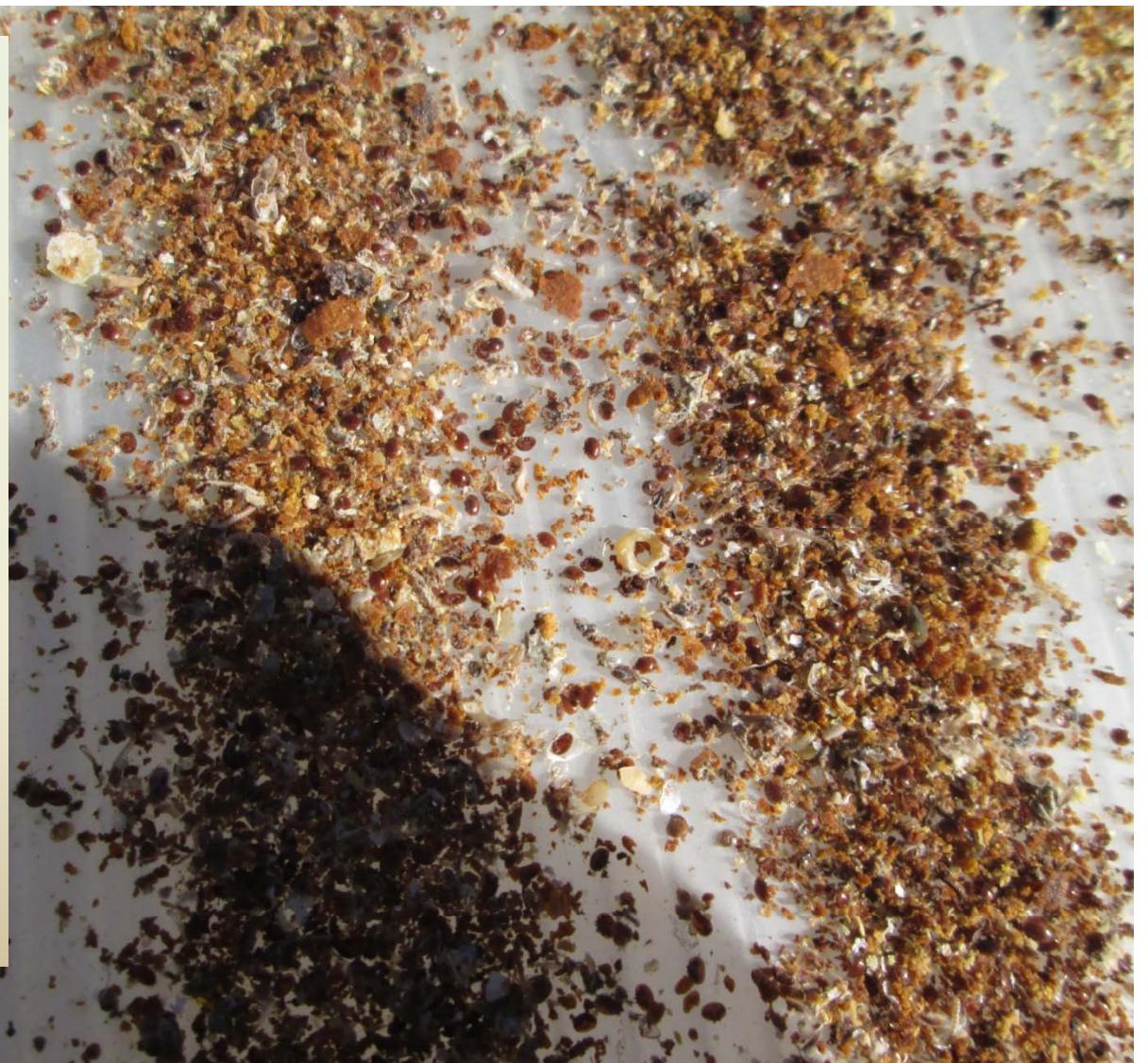
-Ants?

What does all this tell you?

-Is this a spring picture?

-Is there robbing?

-Are they eating or storing food?



Tips for various situations

HIVE MANIPULATION AND MANAGEMENT

Clean up burr comb on each entry.

Clean from top of frames



Worst case, no frames.



Bee Gentle with your hive!

"My No-Sting Secret is.... Fluid Motion"

Bee Culture Jan 2012, p69

"Move as though you are practicing Tai Chi—no sudden movements."

[Scientificbeekeeping.com /first-year-care-for-your-nuc/](http://Scientificbeekeeping.com/first-year-care-for-your-nuc/)

Disclosure: Yes, I have used that moniker.

Joggingbuddha.net/beek



Package installation

Keeping bees through the year



Not covered in the class, due to time.
But good information!

February

- Existing Colonies
 - Check for healthy brood and a good laying pattern
 - Check for stored food
- New Colonies
 - Order packages
 - Order equipment
 - Plan & Clean

March

- Existing Colonies
 - Remove robbing screens open restrictors
 - Check for adequate space for expanding the brood nest
- New Colonies
 - Build equipment
 - Paint
 - Plan
 - Pick your sites

April

- Existing Colonies
 - Adequate space for expanding the brood nest is critical
 - If new frames, feed sugar syrup to promote comb building
- Split strong colonies
- Plan queen rearing
- Monitor mites (treat)

- New Colonies
 - Install packages, pick up nucs, check queen quality, feed light syrup

May

- Existing colonies
 - Continue to examine the combs for adequate space for significant brood rearing
 - Split strong colonies
 - Check for adequate store of honey and pollen
- New colonies
 - Install packages
 - Continue to feed light syrup
 - Check frames are being drawn out properly
 - Monitor space and queen laying pattern

June

- Existing Colonies
 - Monitor honey production
 - Monitor mites and respond accordingly
 - Split strong colonies
 - Add cluster bees
- New Colonies
 - Likely add a super
 - Monitor mites and respond accordingly
 - Check frames are being drawn out properly
 - It's unlikely honey can be extracted from the first year colonies

July

- Existing Colonies
 - Be sure there is adequate space for nectar and honey
 - Keep the brood combs empty of honey for brood rearing
 - Remove cluster box from beneath brood chamber
 - Do not split colonies
- New Colonies
 - Add space as needed
 - Monitor queen laying pattern
 - Start monitoring amount of adult bees

August

- All Colonies
 - Remove boxes of comb that are not likely to be filled
 - Treat for mites
 - Winter bees are being reared now and have to be healthy to get through the winter
- Existing Colonies
 - Harvest the honey if the flow is practically over

September

- Rearrange the combs
- Some time during the month forage will dry up – dearth
- Robbing will start (mid – August in Davis)
- Hives should be opened for the shortest possible to prevent robbing
- Hives should be equipped with robbing screens



Late Fall/Winter: Oct to Jan

- Feed heavy sugar syrup to colonies that are light on honey stores
 - Avoid Boardman feeder!
- Provide a little bit of hive top ventilation
- Check amount of adult bees
- Clean up old equipment
- Check occasionally to see that covers have not been blown off
- Read and plan for next year

Why they go hungry in the middle of summer, and what happens.

SUMMER DEARTH

General & Year-round

Things that matter all year

- Feed
- Protect

Practice good Animal Husbandry

Feed and care for a hive of bees much like you would any other pet or farm animal. Keep it healthy & well fed.

- Avoid this!
- Small hive. Starved and chilled



02/25/2017 13:09

Robbing

Langstroth



TBH



How to recognize robbing

Things you will experience:

Pissed off hives.

'Back-door man'

Torn honey frames

What not to do:

Open a hive in the dearth.

Leave frames of honey out and open.

Spend too much time in a hungry weak
hive in late summer.

Install 'robbing screens'.

- Fighting bees tumble and roll—sometimes on the landing board, sometimes in the air.
- Dead bees lie on the landing board or on the ground in front of the hive.
- Robbing bees can often be seen examining all the cracks and seams in a hive, even at the back and sides.
- Robbing bees are often accompanied by wasps that are attracted to the dead bees as well as the honey.
- Some of the bees in the fray may appear shiny and black. This appearance is created when the bees lose their hair while fighting. Both attackers and defenders may have this appearance.
- Robbing bees never carry pollen on their legs.
- Robbing bees often sway from side to side like wasps, waiting for an opportunity to enter the target hive.
- Pieces of wax comb may appear on the landing board as the robbers rip open new cells.
- Robbing bees are louder than normal bees.
- Because robbing bees are loaded down with honey when they leave the target hive, they often crawl up the wall before they fly away and then dip toward the ground as they take off. This may not be immediately obvious, but if you study them for a while, you can see it.
- honeybeesuite.com/stealing-honey-bee-on-bee-robbery/

Entrance Reducers

- Should be utilized in Spring and Fall
- Can help regulate airflow which helps climate control in the hive
- Prevents robbing



Robbing screen & damage

Robbing screen after install



Ripped open honey stores



Fall and winter management

- How to determine if a hive is strong 'enough'.
- How to combine hives.
- How and why to reduce the opening.
- Plan for water drainage.
- Provide the bees with a wind break
- Ventilated quilts
- Feeding dry sugar
- Provide for an upper entrance and good ventilation.



Mechanics of ventilation in the hive.

How and why happens.

VENTILATION

How condensation happens in the hive

During the summer

During the winter

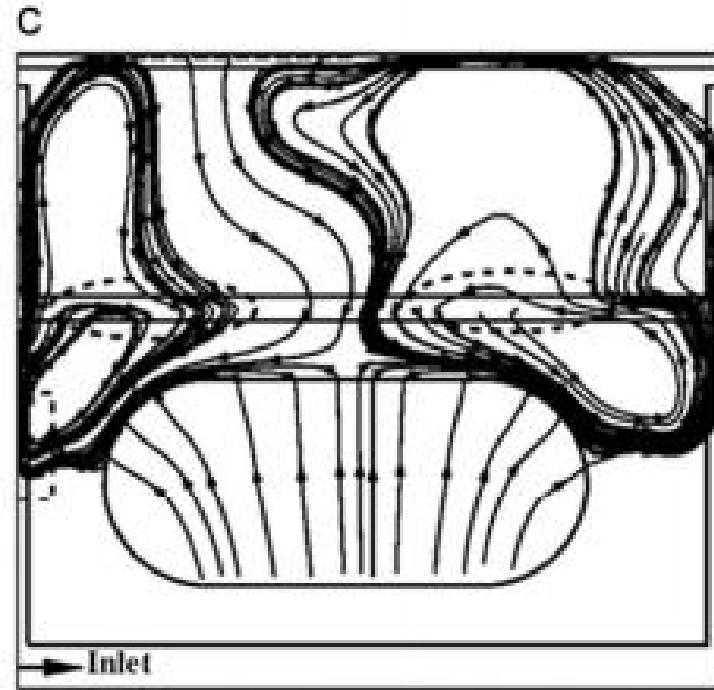


Fig. 13. Plot of path lines introduced at different locations inside the bee cover volume. dotted line indicates regions where vortices that occupy much of the bee space in th

vapor which are produced in the bee cover volumes as a result of honeybee metabolism and transported away from there by the flow through the bee cover. The recirculating wake like vortices above the bee covers in the space between the frames in the honey super are the influence of mass transfer. They are

How to know when (and IF !!) to harvest

HARVESTING

Capped Honey

using an extractor

crush & strain



Swenson Hives and Honey Bees

Learning from failures

And turning them into survival.

PEST MANAGEMENT

Be mindful of spiders



General Philosophies

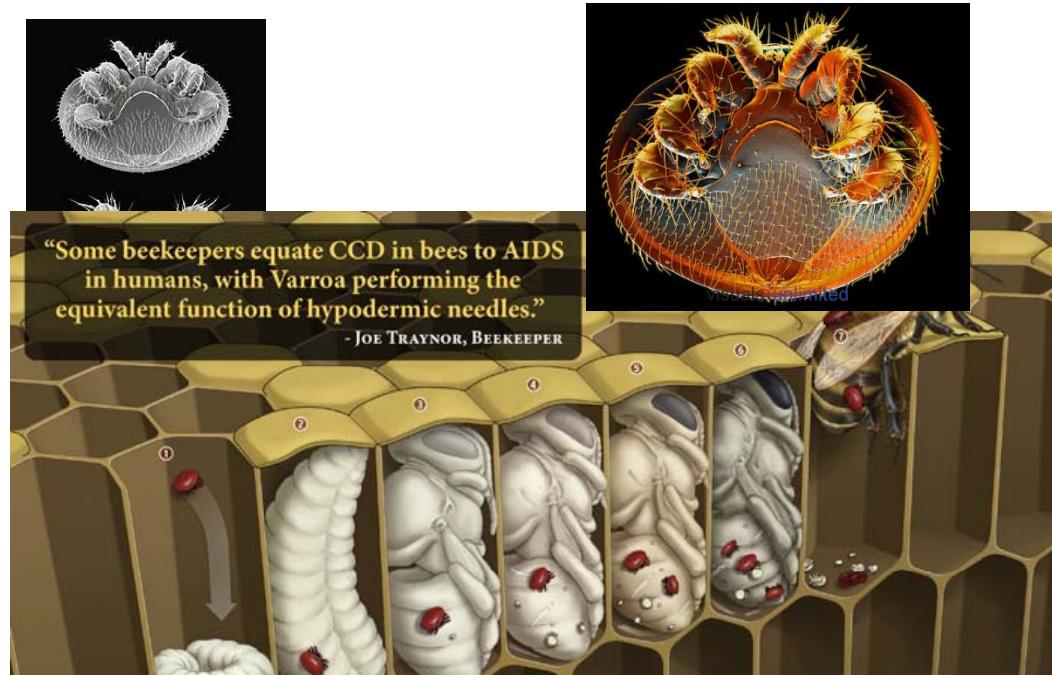
Hard, Soft, and Organic Chemicals

IPM

natural beekeeping

Treatment Free,

Other methods?



Mites

Do I have them?

How to measure.

How to do a mite wash

other sample methods

What to treat with? (w/ or w/o super)



Wax moths

Do I have them?

How to stop them.

How clean up frames



Greater Wax Moth Tunnels



SHB & 'Shield bug' instar

Know the difference

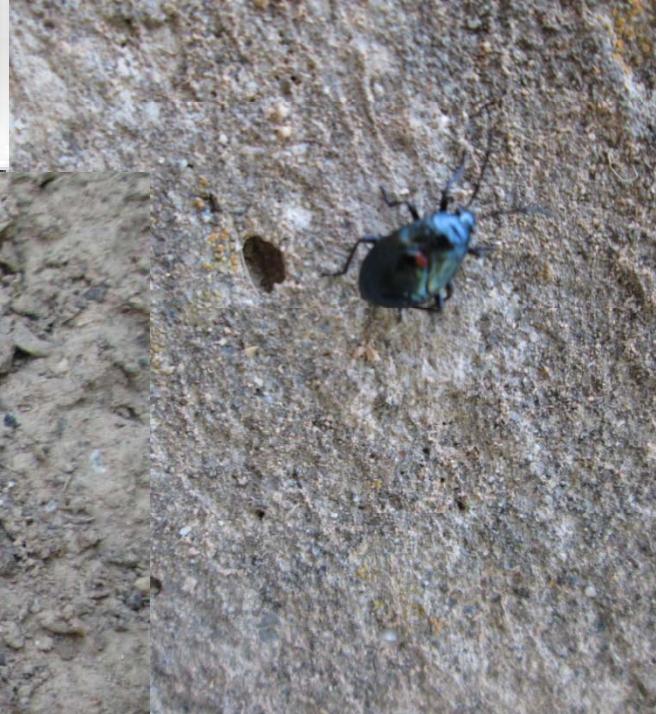
Small Hive Beetle - *Aethina tumida*
fruit beetle - *Carpophilus lugubris*



Do I have them?



How to stop them.



How clean up frames



Ants

Do I have them?

How to stop them.



4 legged Critters

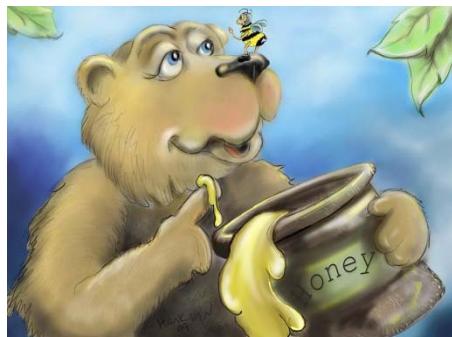
Do I have them?

How to stop them.



The Bear in the china closet

The fantasy



The reality



Bear Proofing



Queens for Pennies (by R.O.)

[http://scientificbeekeeping.com/queens
-for-pennies/](http://scientificbeekeeping.com/queens-for-pennies/)

Not covered in class – read fer yerself!

BEYOND 'BEEKEEPER'

What's next

Support a bee friendly environment

Be active in the bee club

Share your knowledge

Read and learn

Ask questions

Take advantage of the resources
available to you.

Few of the bigger vendors



- Dadant



- Mann Lake



- Brushy Mountain



Bee Culture

The Magazine of American Beekeeping

Eastern Apicultural Society of North America, Inc. (EAS) Master Beekeeper Program
Washington State Beekeepers Association Master Beekeeper Program
Oregon State University Extension Master Beekeeper Program
Texas Master Beekeeper Program
South Carolina Master Beekeeper Program
California Master Beekeeper Program
Cornell University Master Beekeeper Program
University of Montana Master Beekeeper Program
Ohio State Beekeepers Certified Master Beekeeper Program
Virginia State Beekeepers Association Master Beekeeper
University of Missouri Master Beekeeper Program
University of Georgia Master Beekeeper Program

MASTER BEEKEEPER?

QUESTIONS?

Some other things

Here are some things we can cover if we have time.

- Hive Scale.
 - hive.joggingbuddha.net
- Queen breeding.
- Gim-cracks.
 - Plastic QE & proplis trap
 - Spacers
 - toys
- Smoker fuels (freebee)
- Web (forums, edbbk-Map)
- You as a scientist.

Contact info

El Dorado Backyard Beekeepers

<http://www.eldoradobeekeepers.com/>

- Jim Jakim
 - jjjakim@gmail.com
 - 916.304.5859
- Chuck Jachens
 - cjachens@gmail.com
 - 916-261-6756