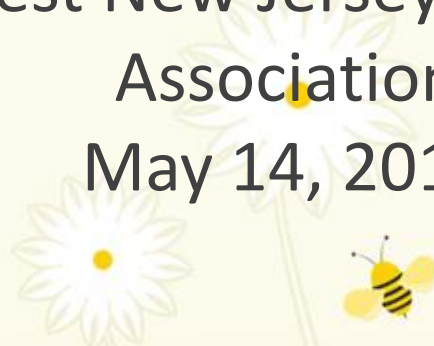


Varroa Management Using Drone Brood Removal

Bob Kloss

Northwest New Jersey Beekeepers
Association

May 14, 2011

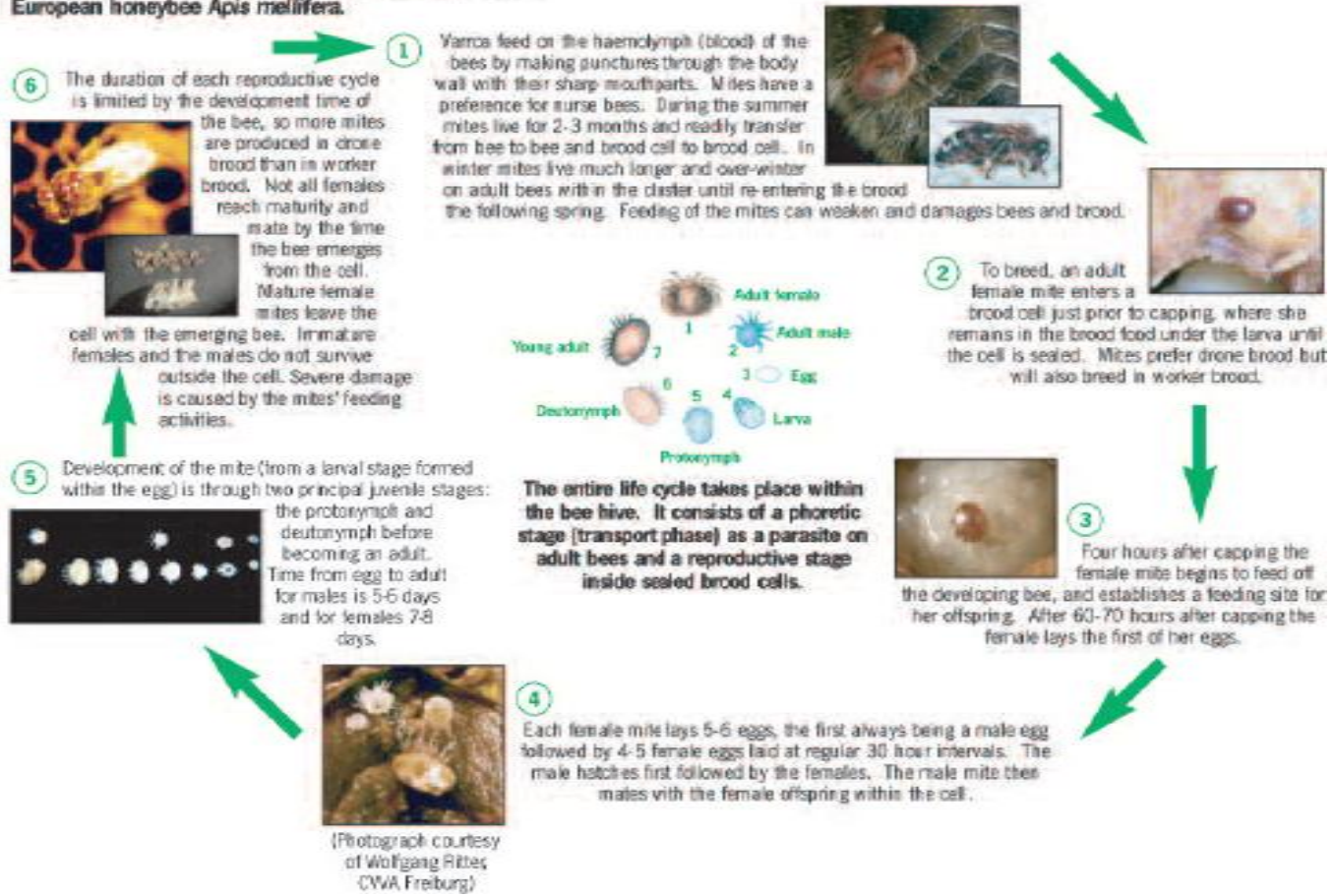


Integrated Pest Management (IPM)

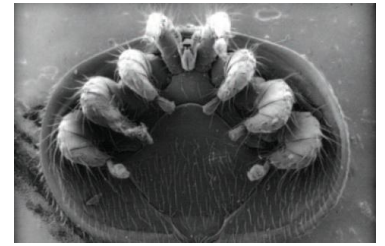
- Multifaceted approach to dealing with pests
- Integrate many different management techniques, including physical or mechanical, biological, chemical
- NOT eradication:
 - Determine tolerable levels of pest populations and permit pests to exist below these levels
 - Use the least invasive, injurious or toxic control methods first
- **LOOK BEFORE YOU TREAT!**

Varroa Life Cycle

Life cycle of the Varroa mite (*Varroa destructor*) in the European honeybee *Apis mellifera*.



Varroa Facts



- Female mites prefer drone brood 10 to 1 over worker brood
- Varroa reproduces poorly in worker brood: 3 times more successful in drone brood
- Average number of female mites developing:
 - Worker cell: 2.2
 - Drone cell: 4.4
- Summer mites manage 2 reproductive cycles
- Mites enter drone cells on days 8 & 9
- At 5% drone brood, 50-60 drone cells produce as many mites as 1,000 worker cells

Taken from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Bee Math

Caste	Hatch	Cap	Emerge		
Queen	3 ½ days	8 days (+/- 1 day)	16 days (+/- 1 day)	Laying	28 days (+/- 5 days)
Worker	3 ½ days	9 days (+/- 1 day)	20 days (+/- 1 day)	Foraging	42 days (+/- 7 days)
Drone	3 ½ days	10 days (+/- 1 day)	24 days (+/- 1 day)	Flying to DCA	38 days (+/- 5 days)



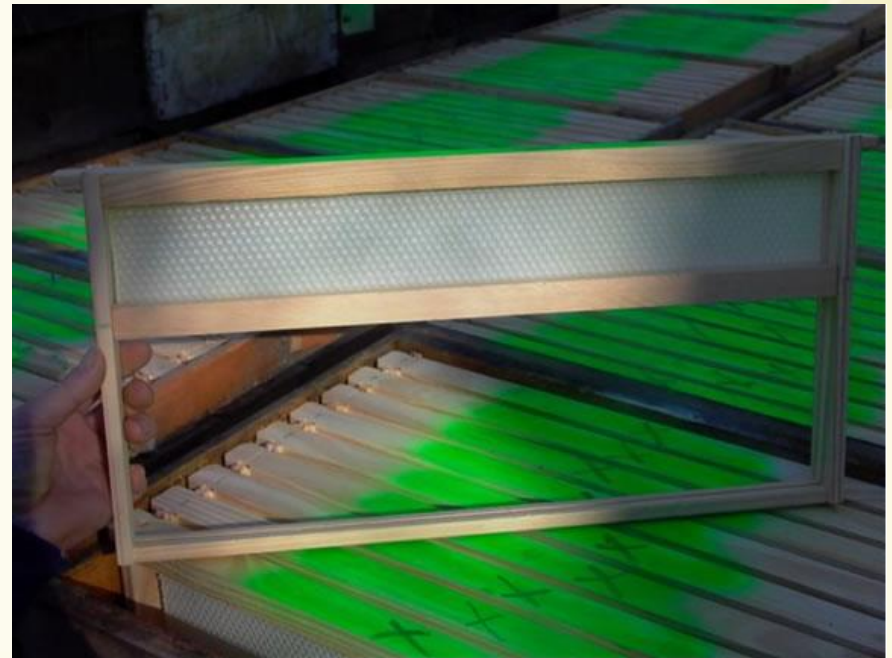
From: Bush, Michael. "Bee Math." www.bushfarms.com. Copyright Michael Bush, 2006. Web. 11 May 2011. <<http://www.bushfarms.com/beesmath.htm>>.

Drone Frames

Plastic Drone Trap Frame



Oliver Drone Trap Frame



Photos from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Using Drone Trap Frames

- Assume 2 deep brood boxes
- Week 1 – Place drone trap frame in bottom box, position 3 or 8
- Week 3 – Place drone trap frame in top box, position 3 or 8
- Week 5 – Remove drone frame & cut out drone pupae from bottom box; return frame to deep
- Week 7 – Remove drone frame & cut out drone pupae from top box; return frame to deep
- Repeat every two weeks

When to Use

Treatment	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Screened Bottom Board												
Drone Brood Removal												
Artificial Swarm												
Comb Trapping												
Apiguard/formic acid												
Bayvarol/Apistan												
Lactic/oxalic acid												

Table from: Department for Environment, Food and Rural Affairs, (defra). "Managing Varroa." www.defra.gov.uk. Crown Copyright, 2005. Web. 11 May 2011. <<https://secure.fera.defra.gov.uk/beebase/>>

Drone Frames at 4 Weeks



Photos from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Removing Capped Brood



Photo from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Drone Frames - End of Season



Photo from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Benefits

- French study*: Drone trapping 4 times in a season reduced mites by 25%
 - Honey production did not suffer
 - Controlled swarming
- ‘Manage’ where the colony builds drone comb

* Cited in: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

Drawbacks

- Labor intensive
- Exerts constant selection against mites that prefer drone brood
 - Need to breed for VSH behavior
- Don't forget to remove the frames at 4 weeks or you will be breeding mites!

Other Benefits - Wax



Photo from: Oliver, Andy. "Biotechnical Methods II - The One-Two Punch@ Scientific Beekeeping." *Scientific Beekeeping*. Randy Oliver, 12/25/08. Web. 11 May 2011. <<http://scientificbeekeeping.com/fighting-varroa-biotechnical-tactics-ii/>>.

More Benefits - Bird Food



Photo courtesy of NWNJBA member Roger Gares