

Honey Bee Health

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Topics to be Covered

- Description of a healthy colony
- Things that can commonly go wrong
 - Queens
 - Workers
 - Brood
 - Poisoning (mostly pesticides)
- Things that can be done to help

When Things Go Right

- One healthy queen
- 10,000 to 45,000 worker bees
- 100 to 1,000 drones (seasonally)
- Clean, fresh water
- Adequate clean, fresh, incoming nectar and pollens
- Adequate stored honey and “bee bread” (fermented pollens)

Honey Bee Queen and Retinue



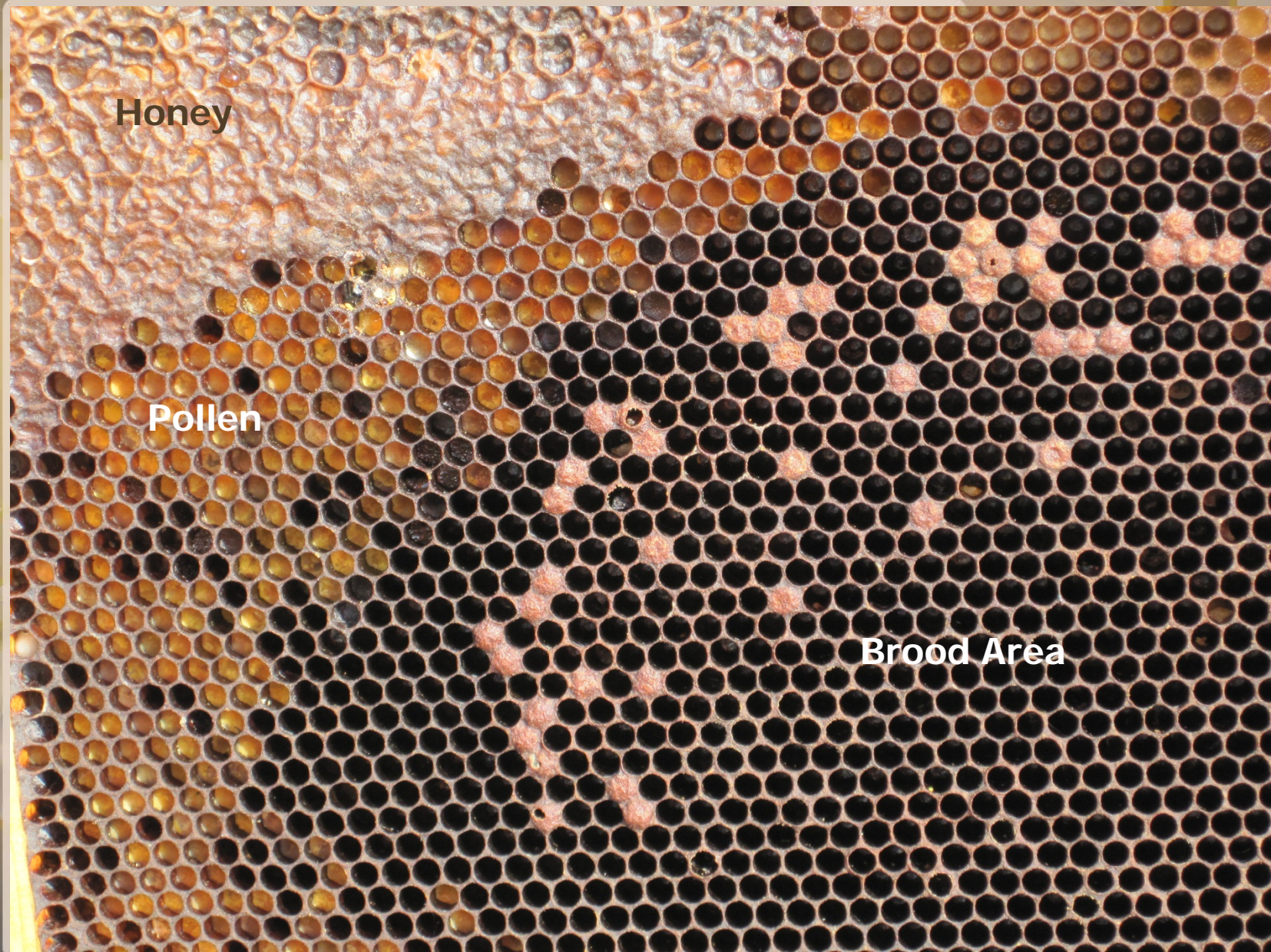
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Frame of Honey Bees



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Normal Use of Combs



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Queen Problems

- Reduced lifespan
 - Text books say up to 5 years
 - Many commercial queens useless in six months
- Microbial infections
 - Intestinal – *Nosema* spp.
 - Whole body – RNA viruses
- Poisoned
 - Toxicants picked up from the environment
 - Often she is protected by having to pass the toxicant through so many bees before it gets to her

Worker Bee Problems

- **Malnourished**

- Require a mix of varied pollens to meet nutritional needs
- Require an acre-equivalent of bloom, daily, to meet nutritional needs
 - One cell honey + one cell pollen = one bee
 - 50 square mile foraging area
- Results in smaller body size; shorter lifespan; compromised immune system; compromised detoxification system
 - Immune and detoxification systems not as robust as in fruit flies or mosquitoes

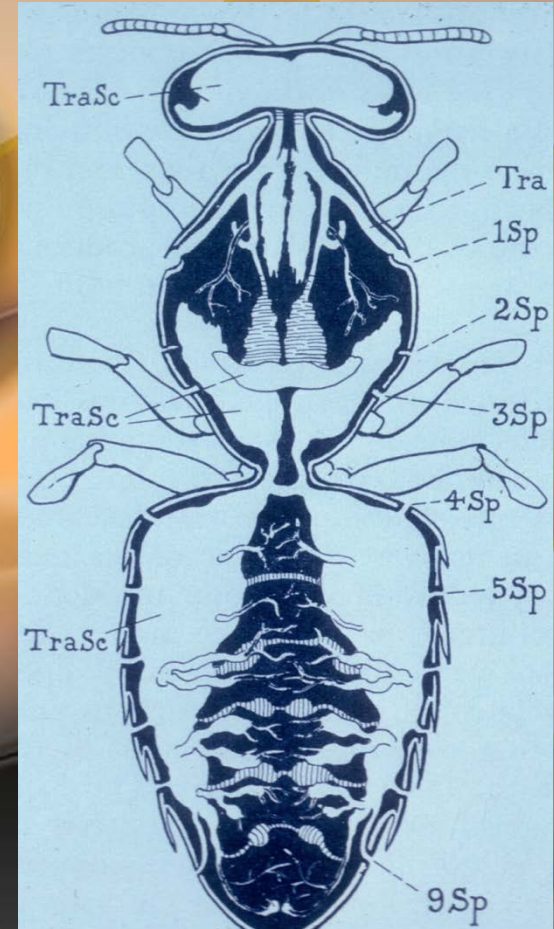
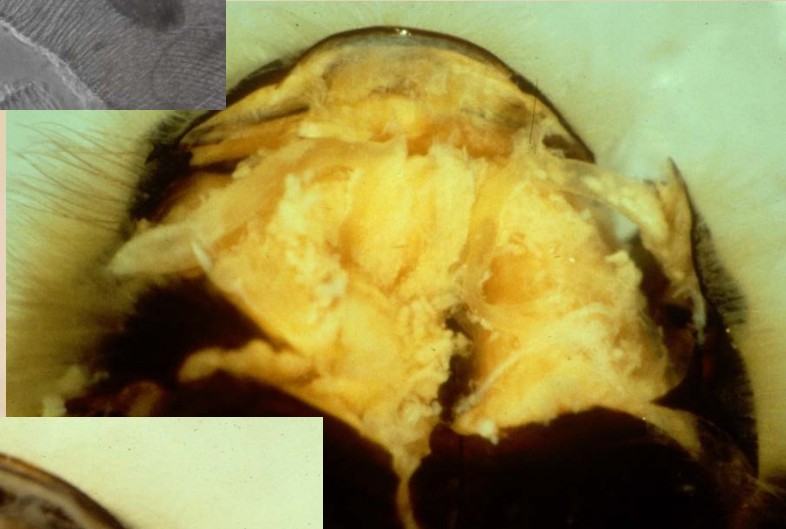
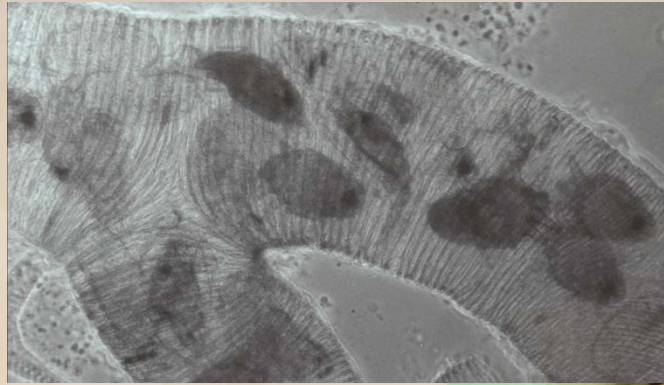
Worker Bee Problems

- **Infected larvae**
 - Bacterial diseases
 - Bacterial diseases controlled by antibiotics
 - Fungal disease
 - Chalkbrood – no cure
 - Virus diseases – no cure
- **Infected adults**
 - *Nosema* spp.
 - Disrupt digestion
 - Medication available
 - RNA viruses – no cure

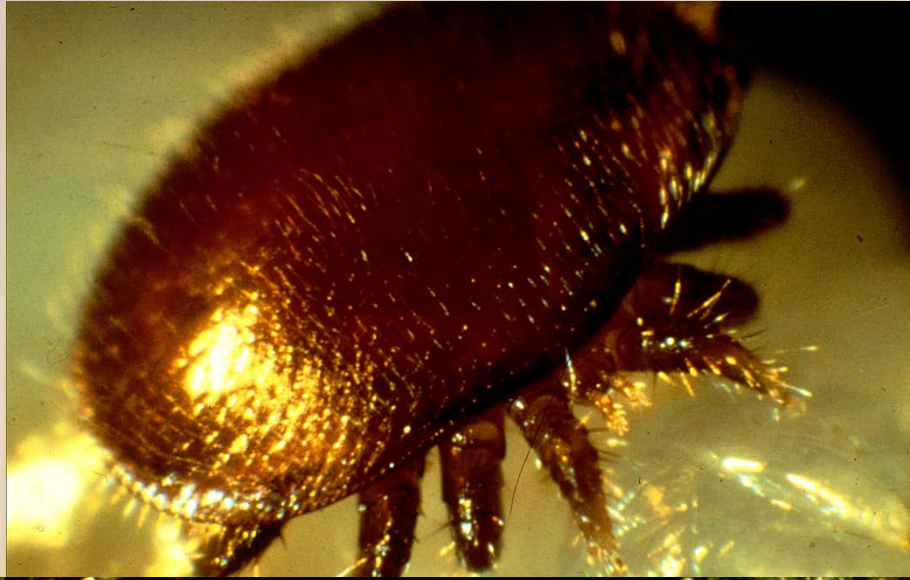
Worker Bee Problems

- Infested adults
 - Tracheal mites (*Acarapis woodi*)
 - Live in adult breathing tubes
 - Ignored, now (menthol fumigation)
 - Varroa mites (*Varroa destructor*)
 - Ectoparasite of adults and pupae
 - Mite feeding results in smaller adult bees; reduced life-span; reduced royal jelly production; compromised immune system

Tracheal Mite



Varroa Mite



Colony Problems

- Poisoning

- Pollen from California buckeye, death camas, corn lily, and locoweeds
- Pesticides applied in hives
 - Menthol; fluvalinate; amitraz I (10%); coumaphos; sucrose octanoate; thymol jell; thymol wafer; beta acid extract of hop; formic acid; amitraz II (??%); amitraz III (3.33%)
- Pesticides applied to crops
 - Fungicides
 - Can disrupt larval development, especially when tank-mixed with insect growth regulators

Tilt®/Turismo® Poisoning



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Colony Problems

- **Poisoning**
 - **Insecticides**
 - Rapid-acting (pyrethroids)
 - Slower killers (chlorohydrocarbons, organophosphates, and carbamates)
 - Systemics (Syston, Di-Syston, acephate)
 - Short-term double kill
 - Neonicotinoids - imidacloprid, clothianidin, thiamethoxam, dinotefuran

Colony Problems

- **Neonicotinoids**
 - Acute toxicity from direct hits and wet residues
 - Sublethal effects are “bones of contention”
 - Lethal oral dose for adult bee = 192 ppb
 - Agricultural residues 4-10 ppb
 - Root system-treated trees can have 500-550 ppb in nectar (*Eucalyptus*)
 - 1 ppb “slows down” queen and workers in observation hives
 - Work is being conducted on ppt exposure

Preventing Bee Poisonings

- Do not expose pollens and pollen-collecting bees to pesticides
- With a number of crop plants the bees remove the pollen by mid-afternoon
- Moving hives might work
 - Honey bees know where they used to live
 - Have to be put right back there
- Covering bees is chancy
 - Overheating is a real concern

Helping Honey Bees

- Provide a source of clean water in the shade
 - Honey bees prefer trickling water
- Plant bee-attractive plants that bloom across the active season
 - Late summer/fall is the most critical time
- Know what pesticides to use around bees
 - PNW 591

Homemade Watering Device



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Honey Bee/Pesticide Publication

How to Reduce Bee Poisoning from pesticides

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Photo: Ramesh Sagili

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