



UCCE Master Gardeners
of El Dorado County

BEEKEEPING

Why you should consider keeping
bees!
by
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BEEKEEPING HISTORY

- Beekeeping is an ancient craft!
- It has been known since the time of the Ancient Greeks including Pliny and Aristotle.
- Beekeeping is mentioned in both the Bible and the Koran.
- First record of someone keeping bees is in Spain about 6,000 BC.

BEEKEEPING HISTORY

- “Believe it or not bees are one of the oldest species of domesticated animals. Archeologists have found evidence of beekeeping or apiculture, in the Middle East dating back more than 5,000 years.”

• -Mother Earth News

BEEKEEPING

- “More than 125,000 (and growing) people in the US alone keep bees. Anyone interested in nature can’t help but be fascinated by those buzzing yellow bundles of energy and the exotic world they inhabit, with all its weird rituals and incredible efficiency.”

• -Mother Earth News

WHY SHOULD YOU KEEP BEES?

- Wild honey bees are being wiped out by urbanization (destruction of habitat), pesticides, parasitic mites and collection processes which destroy the hive. The world no longer has a self sustaining wild honey bee population and without “the little golden folk” crops such as almonds could not be commercially grown and possibly be lost forever.

AGRICULTURE

- Why is bee keeping important to agriculture, lets begin with pollination!
- There are 3 types of pollination
 - -Self pollination
 - -Wind pollination
 - -Insect pollination

AGRICULTURE CONT'D

- According to the USDA:
- “Bee pollination is responsible for \$15 billion in added crop value, particularly for specialty crops such as almonds and other nuts, berries, fruits and vegetables. About one mouthful in three in the diet directly or indirectly benefits from honey bee pollination.”

Produce Department with Bees!



No Bees For Pollination!



Some Urban Bee Legends

- 1. All bees live in hives, are social and have queens, workers and drones.
- 2. All bees make honey.
- 3. All bees sting.
- 4. Bees die after they sting you.

WHAT IS A BEE?

- Bees are insects from the family Apidae
- The word bee is a common name for a winged, flower feeding insect with branched body hairs.

CHARACTERISTICS OF THE BEE

- Dependent on pollen as a protein source and on flower nectar or oils as an energy source
- Most bees have branched or feathery body hairs that help in the collection of pollen
- Honey bees produce honey from flower nectar

CHARACTERISTICS CONT'D

- 20,000 species of bees are known worldwide
- Bees range in size from tiny 2 mm (0.08 inches) to rather large 4 cm (1.6 inches)
- Colors range from black, gray, red, metallic green or blue and of course bright yellow!

HONEY BEE CROPS

- Beeswax
- Propolis
- Royal Jelly
- Pollen
- Venom
- Honey!
- Bees

California Bees

- In California we have 1,600 species of native bees. They include:
 - Leafcutting bees
 - Sweat bees
 - Digger bees
 - Mining bees
 - Mason bees
 - Carpenter bees
 - Cuckoo bees

SOCIAL STRUCTURES

- Diverse.
- Bees range from solitary, to parasitic to semi-social to complex social structures.
- Honey bees form complex social structures.

BEE 'SUBFAMILIES'

- Family Apidea
- Subfamilies:
 - Apinae – which includes 19 tribes i.e. honey bees, bumblebees, stingless bees, orchid bees, digger bees and other tribes; the majority are solitary but honey bees, stingless bees and bumblebees are eusocial or colonial.

BEE 'SUBFAMILIES'

- Xylocopinae
 - This subfamily includes carpenter bees, are mostly solitary, although they tend to be gregarious and there are a few eusocial species. Most nest in plant stems or wood.
- Namadinae
 - This subfamily includes cuckoo bees and 31 genera in 10 tribes which are all cleptoparasites in the nest of other bees!

SWEAT BEE

- relatively common except in Australia
- wide range of social development
- generally nest in the ground either singly or with several egg laying 'queens'



BUMBLE BEE TRIBE: Bombus

- fifty species known in the US
- close relative to honeybees
- they can control their body temp.
- they are important pollinators



FRANKLIN'S BUMBLE BEE

- Has the smallest known range of the bumble bees.
- May be extinct, last known sighting of this bee was in 2006!



MASON BEE TRIBE: Megachilidae

- Common in the western US
- Very effective pollinators
- They fly in cool or rainy weather unlike honey bees



Carpenter Bees

- Beneficial Insect
- Nest in tunnels, target untreated wood
- Excellent, efficient pollinators



Wool Carder Bee



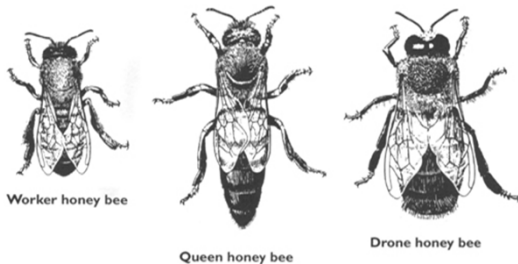
APIS MELLIFERA

- 6 recognized species of honey bees:
 - European Honey Bee
 - Indian Honey Bee
 - Koschevnikov's Honey Bee
 - Dwarf Honey Bee
 - Andreniform Dwarf Honey Bee
 - Giant Dwarf Honey Bee

HIVE STRUCTURE

- Queen – reproductive female
- Workers – non-reproductive females
- Drone – males

WORKER, QUEEN, DRONE



WORKER, DRONE, QUEEN



THE QUEEN

- She is the most important bee in the hive, your queen keeps order, lays the eggs, determines the overall health, temperament and productivity of the colony.
- She even influences how hygienic her daughters are toward mites and disease.

THE QUEEN (2)

- She is the only sexually productive female in the hive and is responsible for the entire population in an hive.
- Her life span is from 1-5 years.
- She can lay more than 1,500 eggs per day during the busy time of the hive.

REQUEENING A HIVE

- Queen is best for 1-2 years
- Many beekeepers requeen on average every 2-3 years, some every year
- Your queen supplier is critical
- Often a home grown queen performs better than a commercial queen (Superseding)

QUEEN CELLS



Queen cups at the bottom of the frame. D. Heskes drawing



Capped queen cell. L. Waters from Demier 1998

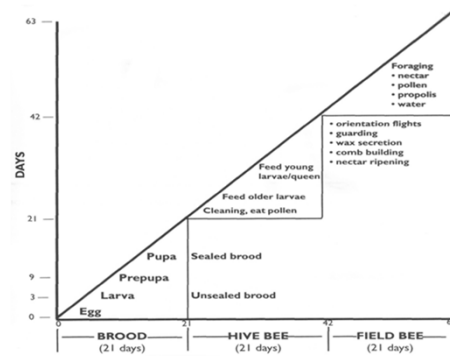


Queen cell emerged. L. Waters from Demier 1988

THE WORKERS

- The most numerous members of the hive.
- They are non-reproductive female bees who progress thru a variety of jobs during their lifespan.
- They perform all functions of the hive except for egg laying.
- Depending on the season when they are born their lifespan is 6 weeks to 6 months.

WORKER JOBS



THE DRONES

- Males
- Drones only purpose is to mate with a queen after which they die.
- They are prevalent in the spring and summer.

THE HIVE

- Bees are not truly domesticated, if they find the conditions you provide to their convenience they may decide to stay if however they find your provisions inadequate in some way they will follow their genetic programming and search for new quarters referred to as swarming.

Langstroth Hive



Warre Hive



Horizontal Hive



Horizontal Hives



COMPONENTS OF THE LANGSTROTH HIVE

- Hive stand
- Bottom board
- Brood chambers
- Queen excluder
- Honey supers
- Inner cover
- Telescoping cover



EQUIPMENT FOR BEEKEEPING

- A bee suit or light colored clothing
- A bee hat with veil
- Smoker
- Hive tool
- Bee brush

BEE SUIT

- This is me in my bee suit. It's not recommended for the fashion conscious!



BEE SUIT

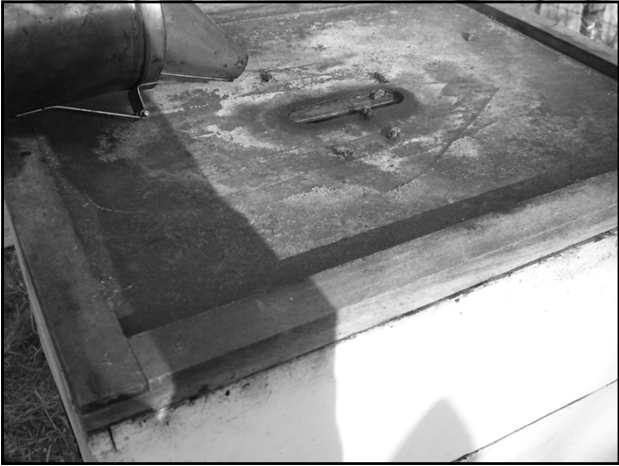
- I am fully suited up with my veil, gloves and smoker. The suit can be replaced with light colored clothing and rubber bands at the ankles and wrists.

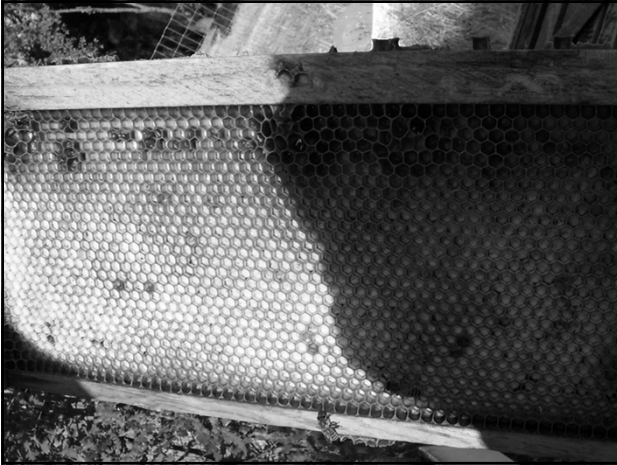


TOOLS

- Bee brush
- Hive tool







WORKER BEE EMERGING



DISEASES OF BEES

- American Foulbrood
- European Foulbrood
- Nosema
- Varroa mite
- There are a few others but these are the most serious in the USA.

Varroa Mite

- Serious malady
- External parasite
- Found everywhere honey bees are found
- All bee keepers should assume they have this mite



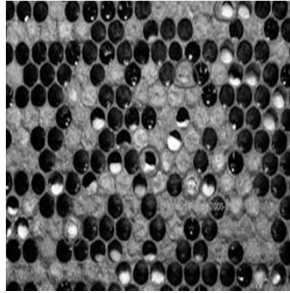
American Foulbrood

- ***Paenibacillus (Bacillus) larvae***
- Spores are carried by adult bees which are not affected
- Spores are highly resistant to heat, desiccation, and chemical disinfectants



European Foulbrood

- Considered a stress disease
- *Melissococcus* (*Streptococcus*) *pluton*
- Most prevalent in spring and early summer



Nosema

- Protozoan which invades the digestive tract of adult bees
- *Nosema apis* or *Nosema ceranae*
- Bees may defecate in or on the outside of the hive rather than the field



COLONY COLLAPSE DISORDER

- CCD is a relatively new phenomenon in the US, first reported in October 2006.
- Currently does not have a recognizable underlying cause.
- This is not the first time colony losses have been recorded: there are at least 3 separate mentions of honey bee disappearances: 1880's, 1920's and the 1960's.

COLONY COLLAPSE DISORDER

- Use of pesticides particularly neonicotinoids, a nicotine derived systemic pesticide has been particularly tested as a cause of colony collapse disorder in conjunction with the protozoan Nosema.

WHAT CAN YOU DO?

- Plant a bee garden!
- Plant masses of plants in the same area.
- Plant a variety of flowers which will bloom at different times thru the year.
- Do not use pesticides.
- Tend your garden less!

GARDEN FLOWERS FOR BEES

- Asters (Aster/Callistephus)
- Sunflowers (Helianthus/Tithonia)
- Salvia (Salvia/Farinacea-Strata/Splendens)
- Bee balm (Monarda)
- Hyssop (Agastache)
- Mint (Mentha)
- Thyme (Thymus)
- Poppy (Papaver/Eschscholzia)
- Bachelor's buttons (Centaurea)
- Cosmos (my personal favorite!)

NATIVE PLANTS

- If you want to attract native bees to your property plant the following native plants:
- California Poppy
- Manzanita
- California redbud
- Hollow leaf Lupine
- Toyon
- Western dogwood
- California coffeeberry

RESOURCES

Classes can be found at:
El Dorado Backyard Beekeepers
www.eldoradobeekeepers.com
Sacramento Beekeeping Supplies
www.sacramentobeekeeping.com
(916) 451-2337
Dadant & Sons, Inc
www.dadant.com
Randy Oliver
www.scientificbeekeeping.com

REFERENCES

- www.xerces.org
 - Conservation of invertebrates and their habitat; has a wonderful newsletter called 'Bumble Watch' and an excellent free publication to download called: 'Conserving Bumble Bees'; also has a reference book: "Attracting Native Pollinators"
- www.eldoradocnps.org
 - Excellent organization for growing native plants to encourage native bees.

REFERENCES

- <http://publicgarden.ucdavis.edu/public-garden/drought-resources>
 - This is a UC Davis arboretum site that includes some wonderful landscaping plans for your yard. I have some copies of the wildlife attracting garden from that site plus there are some wonderful lists of native and drought tolerant plants.

Tips For Successful Beekeeping

1. Join a local beekeeping association.
2. Attend a training class, beginning and intermediate.
3. Read lots of beekeeping books and magazines.
4. Find a mentor!
5. Have fun!