

Basic characteristics of honey bees & Food sources


B.S.A.E. Winfridus Bakker



THE Beekeeper's Handbook

THIRD EDITION



This is to Certify that 
The Bakker Family
is a Member of the
Northwest Arkansas
BEEKEEPERS' ASSOCIATION
Dues Paid to JANUARY 2010
mel 32
Secretary

**DIANA SAMMATARO AND
ALPHONSE AVITABILE**

Foreword by **ROGER A. MORSE**

Illustrations by Diana Sammataro and Jan Propst





Short History

- ❑ Honey bees were imported by European colonists in the early 1600.
- ❑ Bees have been producing honey for at least 150 million years.
- ❑ There are \pm 211,600 beekeepers & \pm 3 million bee colonies in the US.
- ❑ The U.S. per capita consumption of honey is 1.31 lbs.
- ❑ The honey bees gather nectar in $>$ than 300 floral sources in the US.
- ❑ A bee colony needs protein (pollen), energy (nectar) & a good water source for reproduction & survival.
- ❑ Many new “synthetic” flower varieties do not produce pollen or nectar.
- ❑ Bees are “flower stable” meaning that on each day they visit only 1 certain flower till nectar supply runs out.
- ❑ Bees are insects and the temperature determines the degree of activity.
- ❑ They are most active between 60°F to 90°F, winds $<$ 15 miles/h & sunny.



1-Some characteristics – Hive config.

A typical honey bee colony consist of:

- ❑ 1 Queen: Mother of all the bees in the colony, she is distinctively longer.
- ❑ ± 300 Drones (♂♂) they are larger with big eyes.
- ❑ ± 65.000 Nurse/Worker bees (♀♀). They are doing all the colony's work.
- ❑ The hive has 1 or 2 brood boxes where the queen lays eggs & super boxes for honey storage. They are separated by a queen excluder.
- ❑ Brood box has 9 or 10 frames, supers have 9 frames.
- ❑ Within the frames bees produce wax comb composed of hexagonal cells.
- ❑ It takes the equivalent of 8 lbs. of honey to make 1 lb. of wax.
- ❑ If disturbed, bees will normally chase you about 50 feet (15 m).
- ❑ A honey bee can reach the speed of 15 miles/hr (24 km/hr).
- ❑ Drawn-out foundation is a very valuable asset for the beekeeper.



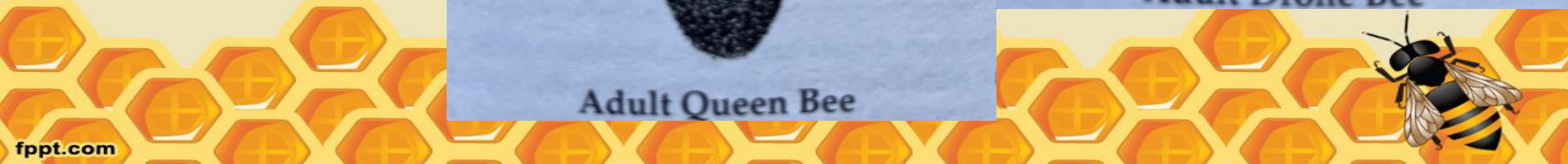
Adult Worker Bee



Adult Queen Bee



Adult Drone Bee









Area a worker bee can cover = 12.5 miles²

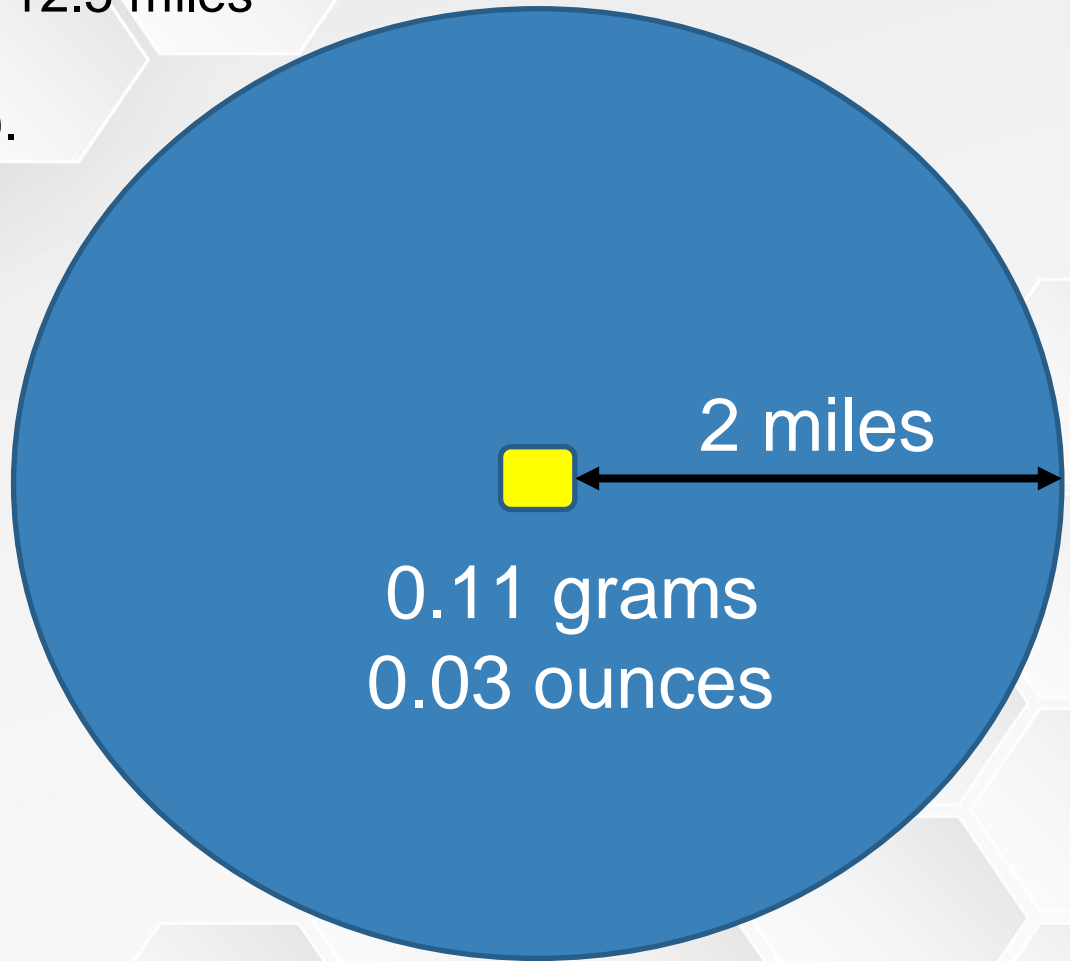
Bee weight = 0.11 grams

Speed = 15 miles/hr (24 km/hr).

2 miles covered in 8 minutes.

Resources:

Nectar, pollen & water



2-Some characteristics - Queens

- ❑ A hive has only 1 queen at the time.
- ❑ Without a queen the hive is disorganized & when no off-spring can be made the hive slowly dies out.
- ❑ When no queen is present, bees become lazy & sting more often.
- ❑ A queen bee can lay 1,500 to 2,000 eggs / day.
- ❑ One brood frame has per frame 6400 cells *10 frames = 64,000 cells.
- ❑ 40% of frames with nectar & pollen leaves 38,400 cells.
- ❑ An egg size is 1/16 inch (1.6 mm).
- ❑ When a hive swarms the queen takes mainly nurse bees with her.
- ❑ When the honey bees are rearing brood, the temperature inside the hive is 95°F (35°C).
- ❑ During winter the cluster is around 85°F (29°C).



3-Some characteristics – Nurse bees

- ❑ Young bees are called nurse bees for 1st 3 weeks.
- ❑ They take care of the brood (feeding and capping cells), the queen & produce wax to make the wax foundation.
- ❑ To produce the wax foundation fairly high temperatures are needed.
- ❑ When nurse bees are 2 weeks old the maximum production of wax can be expected.
- ❑ Bees sweat the wax and they hang in rows on the frame, giving the wax to the next bee in the row.
- ❑ Cells are not horizontal & have an upward inclination to the entrance of $\pm 20^\circ$ to avoid that the fresh honey runs out.
- ❑ After more nurse bees are born the older ones become worker bees.
- ❑ This means venturing outside the hive foraging for pollen, nectar & water.



4-Some characteristics – Worker bees

- ❑ Worker bees are not capable of reproduction.
- ❑ They spend most of their time outside the hive during daylight hours.
- ❑ A worker bee weighs 0.1 g. This means in 1 lb. go 4500 bees.
- ❑ Per flight a bee can carry 0.025 g (25 mg) of nectar.
- ❑ For 1 lb. of nectar 18,200 trips are needed.
- ❑ Worker bees must tap \pm 2 million flowers to make 1 lb. of honey.
- ❑ The av. worker bee makes 1.5 teaspoons of honey in her lifetime.
- ❑ A honey bee visits between 50-100 flowers during one collection trip.
- ❑ A honey bee colony needs an \emptyset of 40-60 lbs of honey to survive winter.
- ❑ Worker bees will live for around 4 to 8 wks.
- ❑ They can sting other insects repeatedly but with thick skinned mammals the barbed sting gets stuck, & rips out intestinal tract of the bees .



4-Some characteristics - Drones

- ❖ Drones are present for only 3 to 4 months of the year.
- ❖ When the hive becomes very full, the presence of a lot of drones is the first sign for swarming.
- ❖ Drones are lazy eaters without a sting,
- ❖ They eat all day and do not work at all,
- ❖ Staying inside the hive when it is cold & wet outside & going outside when it is sunny and nice.
- ❖ After the reproduction phase is over the drones are booted out of the hives.
- ❖ Drones are produced from unfertilized eggs.
- ❖ These drone larva's are fed very well and why drones are larger in size with large eyes & very strong wings. They are excellent flyers. Their weight is 0.19 g.

Knowledge of our plants is crucial

- ❑ Success of beekeeping is defined by location.
 - ❖ Supply of nectar & pollen, over supply & water.
- ❑ Obtain knowledge in relation to nectar/pollen producing plants & trees.
- ❑ Many flowers are nectar less others self pollinators.
- ❑ Cross pollination has been added by nature to have cross breeding in the same plant species.
 - ❖ Self pollination > susceptible.



Anise Hyssop (*Agastache foeniculum*)



Type of plants & the most important ones

- ❑ There are 15,000 flowering plants in North America but only 200 are interesting as nectar producers.
- ❑ The family of the Leguminosae, as are the acacias, clovers, alfalfa, sweet clover and locust are the most important plant species in this group for our honey bees.
- ❑ Plant enough of a certain plant and stage flowering during spring, summer & autumn.

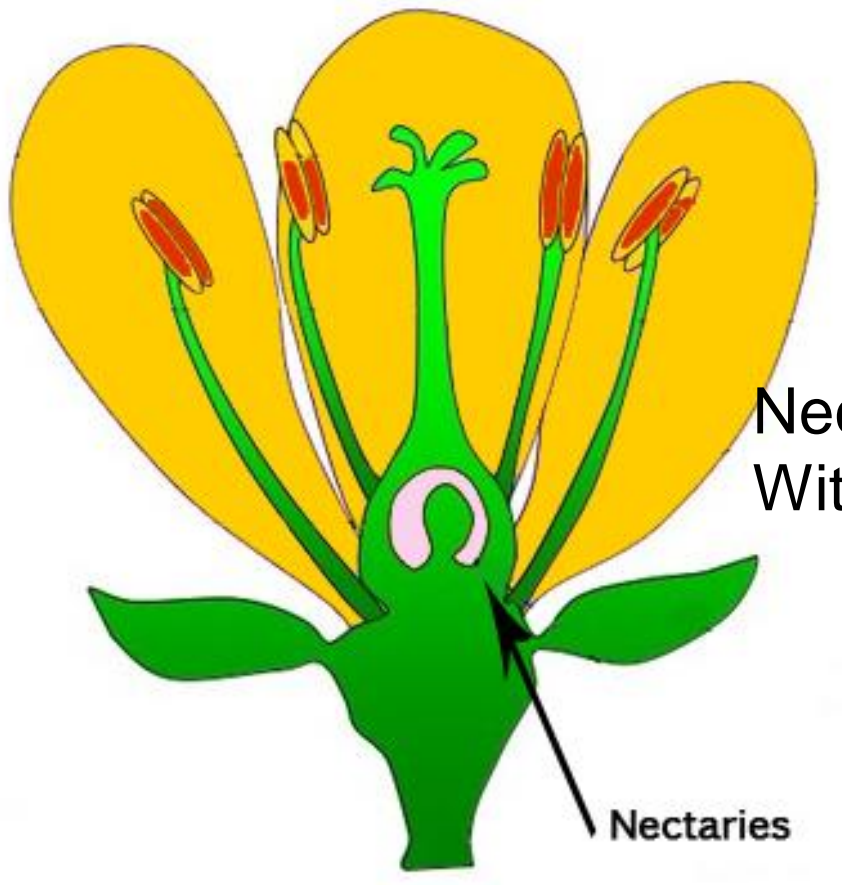




1-Nectar & flowers

- ❑ Nectar secretion by plants has as purpose to attract a gamma amount of insects for cross pollination purposes.
- ❑ Cross pollination in 19% happens by the wind, the other 81% by insects.
- ❑ From the insects $\pm 73\%$ is done by bees, 21% by bumble bees and 6% by the other insects.
- ❑ In a great many plants, nectar is secreted at a fleshy ring nectaries at the base or the top of the ovaries.





Nectar is excreted under pressure.
Without water there is no or little nectar.



Echium vulgare
Blue weed
Viper bugloss



2-Nectar & flowers

- ❑ Temperature has the highest influence on nectar secretion always in interaction with RH and soil moisture.
- ❑ White clover produces most nectar when temperature is between 80 and 90°F.
- ❑ Cool or cold nights followed by warm days will produce highest amount of nectar flow.
- ❑ During a sunny day sugar is made in the leaves and is stored in the form of starch in the chloroplast.



3-Nectar & flowers

- ❑ During the night with lower temperatures the starch is moved out of the leaves in form of glucose or dextrose (grape sugar).
- ❑ If conditions are not right (soil, temperature, humidity) plants that in one region produce abundantly nectar can be nectar less in other areas.
 - Test the soil for pH and main nutrient levels: N, P, K.





General plant/flower objectives

- Know the pH and type of soil.
- Spring frost resistant.
- Flower for at least 4 weeks.
- Have flowers in different times of spring, summer, autumn.
- Good honey quality with low granulation rate.
- Fairly good cold & drought resistant.
- Grows under wide range of pH (6 to 8).
- Deer resistant.





Plants/trees that should do well in NWA

- Clover (Spring)
- All kind of fruit trees (Crab apple, Rash berries, Plums).
- Anis Hyssop bush (*Agastache foeniculum*) - Late spring.
- Ohio Spider Wort (Spring into Summer).
- Vitex Agnus Castus (Chaste tree) - Summer.
- Echimium Vulgare (Blue weed or Viper Bugloss) -Summer.
- Goldenrods - Autumn period.



Ohio Spider Wort







Final comments

No legacy is more worthwhile than improving the world, with planting trees, taking care of our environment & working with nature, like our marvelous [honey bees](#).

Winfridus Bakker

