

# Southern Arizona Beekeepers Meeting

DATE: 5.10.2017

LOCATION: Eckstrom Library @ 22<sup>nd</sup> Street and Columbus

ATTENDEES: (37 people) Jaime de Zubeldia, Lucas Schvindt, Will Fitz,

FACILITATOR: Will Fitz  
Sign in and Introductions –

Discussion Topic - Honey Bee Nutrition (Power Point presentation)

## 1) Nutrition in Honey Bees

- a) Bees need the same essentials as humans and other living animals; i.e. carbohydrates, proteins, fats, vitamins, minerals and water. The essentials for bees are carbohydrates (primarily from nectar) and proteins (primarily from pollen).
- b) Carbohydrates are sugars, starches and cellulose. This is the source of their energy. Adult worker bees consume primarily nectar from flowers, which contains the sugars glucose, sucrose and fructose. Nectar is typically 20% sugars and 80% water.
- c) Honeybees store nectar in the crop, which is abdomen. It is regurgitated into the cells and stored as honey, or transferred to other bees. Once the nectar goes into the midgut it cannot be regurgitated.
- d) Honeybees convert nectar to honey by converting sucrose to glucose and by evaporation. Honey is typically 80% sugars and 20% water. This high concentration of sugar prevents yeasts and bacteria from growing. There may be spores in the honey, however they cannot reproduce at this high concentration of sugars.
- e) Proteins are long chains of amino acids, of which there are 20 various acids. All proteins are a long chain made up of these 20 amino acids in various combinations and concentrations. There are 10 essential amino acids for bees, which are arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and valine. Bees cannot synthesize these amino acids. The ratio of these particular amino acids in nutrition is essential. Bees require protein for larval growth and development, immune response, flight, muscle growth and maintenance and queen egg production. Most protein is required during the larval stage.
- f) Protein is primary and almost exclusive source of protein for bees. Pollens vary in their protein content and amino acid profiles. Will posted a slide of the various desert pollens with their amino acid profiles and the protein concentration of each. Of those listed creosote is the highest at approximately 15% protein, and prickly pear is lowest at approximately 7% protein.

- g) Diversity of pollens is essential. Monocultural farming is nutritionally difficult or even fatal for bees.
  - i. Forager bees collect pollen and mix with nectar from their crops and then store in their corbicular baskets on their back legs. They unload these pollen pellets into cells, where it is stored as “bee bread”. Bee bread can last several months, it is a mixture of honey and pollen that preserves the pollen temporarily for later consumption. Pollen can be frozen to slow down the degradation of pollen (protein breakdown).
- h) Nurse bees (2 – 10 days of age) consume the mass of pollen and then produce a protein rich jelly. They do this in the hypopharangeal gland located in the head. This gland atrophies after this and they can no longer produce jelly. These young bees are essential to hive health as they are the bees who feed the larva and the drones and queen. Bees when first out of cell (0-1 days) do not eat pollen, nor do bees who are older than 12 days of age.

## 2) Supplemental Feeding -

- a) Reasons to feed honeybees
  - i. Setting up new colonies (splits, package bees, nucs)
  - ii. Build up population in established hives before honey flows and/or pollination contracts
  - iii. Stimulate comb production
  - iv. Keep hives from starving due to dearth
  - v. Assist hives in surviving irregular or extreme weather patterns (drought, cold, failed bloom)
- b) Dietary components of supplemental feeding
  - i. Carbohydrates – syrup which is a liquid, or fondant / candy which is solid. In southern Arizona use as 1:1 ratio by weight for syrup. This is equal parts water and sugar. No need for higher ratio of sugar to water, as 2:1 is only needed in climates which have a severe or long winter. Use cane sugar or high fructose corn syrup (HFCS). Do not use brown sugar as it contains molasses which can cause dysentery in bees. Some discussion of whether beet sugar is harmful.
  - ii. Protein – pollen patties, pollen powder or pellets. Pollen substitutes contain brewers yeast, soy protein, dehydrated egg yolk, and/or powdered milk. Pollen can be collected from own hives during pollen season, frozen and fed back to bees during dearth. Pollen thus collected should be kept frozen and dry. Studies have shown that substitute pollens are inferior to real pollen and bee hives cannot be maintained indefinitely on artificial protein sources.
- c) Open feeding vs In Hive feeding – Both have pros and cons

- i. Open feeding can consist of sugar water in bottles or feeders and pollen powder or pellets in a tub accessible to all bees in beeyard. Pros – this is easy and low labor intensive, does not require opening hives. Cons – diseases can be easily shared if there are multiple hives. Neighboring bees or feral bees can easily be attracted to your feeders, especially if you have a small or confined bee yard. These should be placed at some distance from the hives. (Will does open feeding only in winter, Monica open feeds all hives in dearth, not just weaker hives.)
- ii. In hive feeding can consist of buckets, troughs, bottles, Boardman feeders in the hives, and pollen patties placed on the frames or pellets in dishes in hive bodies. Pros – avoiding other bees. Cons – labor intensive, have to open hives, disturbs bees, can induce hive robbing in weak hives, increases habitat for small hive beetles and wax moths.

### 3) Forage and Feeding in Desert Southwest

#### a) Tucson and southern Arizona bloom schedule

- i. January and February – African sumac, London rocket (weed), dandelion, rosemary. Recommend feeding syrup and pollen to stimulate brood growth
- ii. March – Palo Verde, fairy duster, citrus, stone fruit trees, globe mallow, creosote. May need syrup if nights are cold.
- iii. April – Palo Verde, mesquite, cat claw, creosote, various non native garden plants. Feeding not needed
- iv. May – Palo Verde (begins to taper) mesquite, cat claw, prickly pear, saguaro. Feeding not needed.
- v. June – Desert willow, mesquite, cat claw, prickly pear, saguaro. Mid June the dearth begins. Hives need to be fed, especially strong hives to sustain them. Feed both syrup and pollens until monsoon begins.
- vi. July and August - Desert willow, Texas ranger (good pollen, no nectar), tamarisk (produces a greenish, odd tasting honey). Bees may feed on prickly pear and s other cactus fruit, producing red colored bees, honey and nectar. Feeding is dependent or summer rains. If dearth feed both syrup and pollen, also need to provide water and shade for hives.
- vii. September - Good rains can produce a second mesquite bloom.
- viii. October and November -- Desert broom, and diverse other wild flowers, rabbit brush, brittle brush, mistletoe. Feeding dependent on pollen flowering.
- ix. December – nothing blooming, dearth! Feeding is essential

Question and Answer period –

1. What causes red pollen? Dandelion is reddish orange.

2. How many trips does each forager make? Can make 10-20 trips dependent on distance from hive
3. What is website and password? Website is SOUTHERNAZBEEKEEPERS.ORG, password is b33k33p3r.
4. What differentiates queen larva from worker larva? Queen is fed only royal jelly for full lifetime, workers get mix of jelly and pollen.
5. Resources – Randy Oliver at SCIENTIFICBEEKEEPING.COM, he writes for American Bee Journal. Has a 6-7 part article about colony life cycle that is excellent.
6. Discussion of treatments for varroa mites – oxalic acid fumigation, HopGuard, Amatrax - recommended that we have meeting addressing treatment for mites and other pests.

Next meeting will be June 14, 6:00 pm at Columbus Eckstrom library.