

Name\_\_\_\_\_KEY\_\_\_\_\_

## EAS Master Beekeeper Written Exam 2022

### Short Answer: (3 points each)

1. Why is Reverend Lorenzo Langstroth considered the Father of American Beekeeping?

He was the first to develop the moveable frame beehive which took into account bee space. This allowed for the non-destructive harvest of honey frames.

2. Describe two ways honey bees use water in the colony.

Bees use water to thermoregulate the hive, specifically to cool it, to dilute thick honey and also to help with food ingestion.

3. How does the queen determine cell size and whether to lay a worker or drone egg?

The queen determines the size of the cell by measuring it with her forelegs before she enters the cell.

4. Compare the lifespan of winter bees versus summer bees in the northeastern US.

Summer bees live about 4-5 weeks whereas winter bees live ~ 5 months

5. What are some reasons why a colony would be throwing adult drones out of the colony in mid-summer?

The colony is experiencing a dearth and don't have the food reserves.

6. What is robbing? Describe three signs that robbing is occurring.

Robbing is the invasion of other bees into a usually weaker colony to get resources.

This happens during times of dearth.

Defensive colony

Cloud of bees

Absence of nectar

7. What is a drone laying queen and describe two scenarios that could lead to a drone laying queen.

A drone laying queen can only lay drone or unfertilized eggs.

Never was mated= virgin

Ran out of sperm

Faulty reproductive tract

8. What are two other hive products besides honey and wax? How are they made? What are they used for in the hive? Can humans use them?

Propolis- plant sap collection- sealing cracks and as a natural antimicrobial

Bee venom- secretions from the poison gland to ward off threats. Humans can harvest the venom for desensitization and other ailments.

Royal jelly- produced by nurse bees from two glands in the head. It is made to feed future queen larvae and is mass provisioned for each queen cell.

Pollen/bee bread- plant male gametes collected by foragers as a main source of protein. Bee bread is fermented pollen. They can be used as a nutritional supplement.

9. Name three factors that would stimulate the collection of pollen in a colony.

Low reserves

The presence of brood

Available resources

10. Besides floral source name 3 factors that can influence the flavor of honey.

Heating

Sugar concentration

Water content

11. What is the main antibacterial component of Manuka honey? How do honey producers rate the potency of Manuka honey?

Methylglyoxal or MGO- comes from dihydroxyacetone (DHA)

UMF- Unique manuka factor

12. What is the difference between Apiguard® and Apivar® chemically and in application?

Apiguard is thymol based and is applied via gel which volatilizes off

Apivar's main ingredient is amitraz which is impregnated into a plastic strip

**True and False: (1 point each)**

1. Varroa mites sense their environment using sensory hairs, not eyes. T or F
2. The highest levels of Nosema infection are found in the late Fall. T or F
3. There is no registered chemical tool to manage chalkbrood in the US. T or F
4. Honey bee swarms always have a mated queen. T or F
5. Adult honey bees only have a pair of eyes. T or F

6. In the fall the older drones are evicted first. T or F
  
7. The major component of virgin queen and worker bee mandibular glands is 10-hydroxy-2-decenoic acid. T or F
  
8. The major component of a mated queen's mandibular gland is 9-hydroxy-2-decenoic acid. T or F
  
9. Buckfast honey bees were bred by Moses Quimby and show resistance to tracheal mites. T or F
  
10. Pollen loads are not limited by weight but rather by volume. T or F
  
11. Nectar producing trees will produce nectar every year. T or F
  
12. Nectar secretion continues after pollination and fertilization. T or F
  
13. Ovary development in workers and queens is inhibited by queen pheromone T or F

**Fill in the blanks: (1 point each)**

1. Honey bees find the sugar, sucrose the most attractive in choice tests.
  
2. One way to help reduce the swarming impulse is to split.
  
3. Beekeepers must make sure there is always between 10 and 20 pounds of honey on the colony at all times.
  
4. Typically a medium super of honey weighs 45 pounds.

5. Healthy honey bee larvae should be \_\_\_\_\_ **white** \_\_\_\_\_ in color.
6. In the United States the Apiary Inspection program was established to detect and eradicate \_\_\_\_\_ **AFB** \_\_\_\_\_ in colonies.
7. Symptoms of \_\_\_\_\_ **sacbrood** \_\_\_\_\_ include stretched out fluid filled larvae.
8. One characteristic of honey is that it can absorb moisture from humid air or lose moisture in dry air. The term for this is \_\_\_\_\_ **hygroscopic** \_\_\_\_\_.
9. A ring of foam in a honey jar indicates \_\_\_\_\_ **air bubbles** \_\_\_\_\_ during the extraction process.
10. It is important to top of any candle molds because beeswax shrinks ~ \_\_\_\_\_ **20%** \_\_\_\_\_ going from a liquid to a solid.
11. The \_\_\_\_\_ **stigma** \_\_\_\_\_ is the floral structure that must be active and ready to accept conspecific pollen grains in order for pollination to occur.

**Multiple choice: (2 points each)**

1. \*Topochemical olfactory sense refers to a worker bee's ability to
  - a. turn on immune genes involved in social immunity
  - b. **use their paired antennae to locate the direction of an odor**
  - c. have anti-viral and bacterial properties
  - d. act as physical barrier against the elements
  - e. coat the interior of a honey bee hive cavity



- b. American Foulbrood
  - c. European Foulbrood
  - d. Phorid flies
  - e. answers a, b and c
8. What color class would Buckwheat honey belong to
- a. Water White
  - b. Light Amber
  - c. White
  - d. Dark Amber
  - e. Golden
9. Foragers will stop flying if wind speeds exceed
- a. 5 mph
  - b. 3 mph
  - c. 10 mph
  - d. 20 mph
  - e. 25 mph
10. The malpighian tubules are part of the excretory system and are responsible for
- a. Producing acids
  - b. Making primary urine
  - c. Maintaining ionic balance
  - d. Producing frass
  - e. Answers b and c
11. When a worker bee ingests nectar or pollen it is filtered by the \_\_\_\_\_ and moved to the ventriculus
- a. Proventriculus
  - b. Malpighian tubules
  - c. Ventricular cells
  - d. Gastric caeca
  - e. Answers b and c
12. If you see nice pearly larvae and freshly laid eggs you can assume the queen has been there as recent as \_\_\_\_\_ ago.
- a. 5 days
  - b. 4 days
  - c. 3 days
  - d. 2 days
  - e. 1 day



**Essays: Pick two (8 points each)**

1. You have been keeping bees and selling your local honey at the nearby farmers market for over a decade. You get all sorts of questions about your honey, but the most difficult one to answer is if and how your honey will help with pollen allergies. How do you answer someone who asks you if there is a correlation between local honey consumption and pollen allergy relief?
2. Often times people associate beekeeping with conservation and helping the environment, part of the 'Green Movement'. Do you agree? Can you explain why some people don't agree and feel that keeping and managing honey bees is hurting the environment?
3. You are visiting a fellow beekeeper and they want to show you the new field they planted to create forage for their honey bee colonies. You walk out behind the house and see a field full of Japanese Knotweed. As part of the Pennsylvania Master Gardeners you know that this is a noxious, invasive plant. How would you approach your fellow beekeeper friend about the dangers associated with this plant? What would you say if they rebutted and argued that it is a wonderful nectar source and a sought after varietal honey?
4. You were talking with a fellow beekeeper who works in a lab at the University. They were telling you that honey bees are now considered omnivores. What do they mean by this? I thought they just ate floral rewards which would make them vegetarians?