

## **Master Beekeeper Program, Certified Beekeeper Study Guide:**

### **Background,**

The first thing an interested person should do when considering becoming a beekeeper is to buy a recommended book and READ IT.

The second thing and the third things are nearly simultaneous:

2. Take a beekeeping class from a local club or cooperative extension

3. Buy *{or you arrange to borrow }* your own protective clothing ( suit, jacket, veil, gloves, ) so that you can go into an apiary with mentors, teachers, and experienced beekeepers to learn. You cannot expect these things to be provided for you; Nor should you expect the mentor to be liable for your discomfort or injury if you are not prepared. Often these things are provided on a one-time introduction basis; but following that it would be the responsibility of the perspective beekeeper to arrange to have.

Whether you choose to use this protective gear going forward on your own is up to you. In the meantime, the distraction of your not being properly protected from stings is an extreme disadvantage to the learning process.

The fourth thing a perspective beekeeper should do is to join and participate, as much as they can, in their local and state beekeeping associations. The ability to converse and observe more experienced beekeepers in a multitude of venues is invaluable experience. ( club & members bee yards; public presentations; club meetings, mentors, etc.)

The Master Beekeeper Program offered by the NCSBA is also a valuable tool towards achieving both knowledge and pleasure from beekeeping.

The progression through the MBP levels provides a structure which encourages continuing education. Beekeeping is both an art and a science. To understand the science behind any endeavor will provide the tools necessary to be more successful. The more we understand why things 'work', the better we are able to help 'make them work'.

There are four levels of the NCSBA Master Beekeeper Program.

Those are CERTIFIED BEEKEEPER, JOURNEYMAN BEEKEEPER, MASTER BEEKEEPER, and MASTER CRAFTSMAN. Each has their own requirements necessary for completion. ( These can be found on the NCSBA website )

The first level is CERTIFIED BEEKEEPER.

There are TWO parts to achieving the CERTIFIED BEEKEEPER certificate from the North Carolina State Beekeepers' Association. The state association is certifying that you ARE a BEEKEEPER. To do this, the Certified Beekeeper Candidate must demonstrate both academic ( book ) knowledge AND apiary ability.

To complete this level, one must pass a WRITTEN EXAM of true/false and multiple choice questions with a passing grade of 70%; AND must pass a PRACTICAL EXAM that is administered by a previously documented MBP participant ( Certified, Journeyman, Master or Craftsman ), and who is a current NCSBA member. There is a FOUR MONTH minimum beekeeping experience before the Practical Exam can be administered.

To facilitate studying for the Written Exam, please review the following Certified Level Study Guide:

To facilitate preparing for the bee yard Practical Exam, please review the form ( see link ) that is used to administer/proctor this portion.

When you feel you are ready to take the exam, contact someone at your local club, OR contact a member of the MBP Committee.

## **CERTIFIED LEVEL WRITTEN EXAM STUDY GUIDE**

### NCSBA: ( North Carolina State Beekeepers Association:

Since you are here in North Carolina, you should know about the state beekeeper's association.

You should know:

How long it has been in existence

That it is the largest state beekeepers association in the USA

That it is a resource for information and comradery that will benefit both your beekeeping experience and expertise - By offering many programs that encourage your involvement, enjoyment, and continued education.

What the various programs and opportunities are within the organization and within N.C.

(zoo, state fair, Master Beekeeper Program, Golden Achievement Program, Certified Honey Producer Program, annual judged contests for hive products and more )

### HISTORY of BEEKEEPING and HIVE PRODUCTS:

How long has man been harvesting honey (and other products) from honeybees?

What are some of the various ways that they kept bees?

What list of products is obtained from a bee hive?

What are those products used for?

What are some of the ways that man used bees and bee products in the past?

What is the primary importance of the honey bee?

What is Bee Space?

Who is Rev. L.L. Langstroth, and what is he most known for?

Who are Charles Dadant and A. I. Root?

What inventions have modernized beekeeping?

When did honeybees arrive in the Americas?

What major events occurred in the US that regulated or changed methods of beekeeping?

What major events occurred in N.C. that regulated or changed methods of beekeeping?

### RACES OF BEES

What are the various types of bees throughout the world?

What are the races of bees that are kept and what are their characteristics?

What makes an Africanized Bee different from the European ( or "western" ) honey bee?

What threats or difficulties do Africanized bees pose to the USA and NC?

What can be done about Africanized honey bees? ( NC response )

### FORAGING and POLLINATION

What is pollination? Be generally familiar with parts of a flower.

How do bees differ from other insects in relation to pollination capabilities?

What are the benefits of apiculture to agriculture?

What crops are dependent on honey bees for pollination?

What crops benefit from bee pollination, but do not require bees to set fruit?

What crops do not require bees at all to pollinate?

What are the differences between a hobbyist beekeeper; a sideliner; and a commercial operation?

What do the commercial operations do throughout the year?

## ANATOMY:

What are the two sexes of honey bees in a colony?

What are the two castes of honey bees in a colony?

What is haploid? What is diploid? ( *taught, but not tested* )

What are the 4 stages of honey bee development?

How are they different from one another?

What is the purpose of each stage?

What is the length of development time for each individual type – by stage?

What are the different segments of the bee?

What primary structures (organs and glands) are located in each segment?

What are their functions?

What are the different sensory structures of an adult bee?

Know the primary functionality of the body parts and organs, and general location of:

Circulatory system

Respiratory system

Digestive and excretory systems

Reproductive system

Sensory (how do bees see/hear/smell/taste/feel?)

## DRONES:

What is the sex of a drone bee? Are they haploid or diploid?

What is the primary function of drone bees?

How do they differ in appearance and function from the queen and the workers?

What is a drone's development time?

How long does a drone live?

What happens to drones in the winter?

Do drones feed themselves? Do drones make wax, bee bread, or honey?

## WORKERS:

What is the sex of the "worker bees" in a colony? Are workers haploid or diploid?

How is the worker different from a queen?

Do workers have ovaries? Can they lay eggs?

What are the various tasks of the worker bee; and at what age do they generally perform these tasks?

How long does a worker bee live? ( in the summer? / in the winter? )

What do bees forage for outside of the hive?

How do they transport what they forage upon?

Where are foraged items stored within the hive?

What changes, if any, do the bees make to the items they forage for?

## QUEEN:

What is the sex of the queen? Is a queen haploid or diploid?

How does she differ in appearance from a drone or a worker bee?

How is a queen produced? When does a colony produce a new queen, and why?

What is a swarm cell? What is a Supercedure cell? Where, when, and why are they in the hive?

How, where and when do bees mate?

What is the approximate life length of a queen?

Approximately how many eggs does a queen lay a day ( during brood build-up )?

## BROOD:

What is meant by "brood"?

Where is brood generally found in the hive? What does healthy larvae look like?

What are the three stages of development prior to emerging as a young adult bee?

How does a brood cell become capped?

How does the covering of brood cells differ from the covering on honey or pollen appear?

Why?

Composition?

What does brood eat? How?

GLANDS: Hypo pharyngeal, Nasanov, Wax and Sting Glands

*The remainder of the glands likely should be taught, but the Certified Candidate is not tested on those*

## PHEROMONES

### COMMUNICATION:

Dancing / Piping /Pheromones ( *taught but not tested* )

### Bee Activity / colony as an organism

What is meant by “superorganism”?

How far do bees fly when foraging? Mating?

How much forage area is necessary to support a colony of bees?

Bee Nutrition: what does pollen provide? What does nectar provide?

Does it take more effort of the workers to make honey or wax?

What are the following bee activities? How do they impact hive management? What can a beekeeper do to minimize negative impacts?

What is swarming?

What is Supersedure?

What is absconding?

What is a laying worker?

What is a drone-laying queen?

What is robbing?

What is drifting?

Temperatures/Weather:

At what temperature do honey bees decline to leave the hive? Fly?

What are the effects of sunny vs. cloudy days? Wind or no wind? Humidity? Rain?

What are safe weather conditions to do a hive inspection?

## HONEY

## BEE

## MANAGEMENT:

Where do honey bees live in nature? What materials do they use to construct their hives?

Why is honey comb built the way it is? Bee space / shape / location / composition

Does one strong colony make more or less honey than two colonies each half the size? Why?

You should have a general knowledge of making “splits”, combining colonies, discouraging swarming, robbing, drifting, and absconding.

### HIVE EQUIPMENT:

What components are there in a modern hive? What is the purpose of each piece being considered for use?

What standard protective clothing and tools might a beekeeper use?

### SITE SELECTION: (including Good Neighbor practices, rules & regulations )

What are some considerations when deciding where to place a bee yard?

Which direction should the hive opening(s) face? Why?

What are some unfavorable conditions to consider when placing a bee yard?

How might a beekeeper overcome unfavorable conditions?

What laws exist regarding keeping bees where you intend to place your apiary?

### OBTAINING BEES:

Where might you obtain bees from?

Know NCDA&CS apiary inspection service agency – department of Plant Industry.

Know NC “licensed to sell bees”.

Know the procedures to install a package of bees, with a new queen.

Know how to introduce a new queen to an established colony.

### HIVE MANIPULATION:

Know how to light a smoker, and keep it lit for the duration of a normal hive inspection.

What is the proper technique for opening a hive?

What are some beekeeper procedures that minimize colony damage, defensiveness, and encourage colony well-being?

What beekeeper behaviors should be avoided?

How should frames be manipulated?

Where should they be placed if removed from the hive?

How should a hive be put back together?

What can be done to minimize burr comb?

### STINGING:

Why do bees sting? What happens to the bee once it has stung?

What should one do if stung in the bee yard? - If a bee gets inside a veil?

Know how to remove a stinger.

What reactions to bee sting are normal? What reactions to bee sting are life threatening?

What should be done in response to a normal reaction? ... a serious life-threatening reaction?

### SEASONAL MANAGEMENT:

What colony activities can be expected of the bees at the various times of year in your area?

#### SPRING:

Inspection / Feeding / Equipment Manipulation, and why? / Safe Weather Conditions for hive manipulation.

Describe honey flow / 70 % "rule" / ratio of sugar to water in feeding/ pollen patties

#### SUMMER:

Honey Harvesting, storage, and distribution

How does one go about harvesting honey?

How much honey, and when should it be extracted from the colony?

Moisture content of honey. What happens if it is higher or lower than the recommended or legal requirements?

What types of honey are there? How does the choice of type of honey effect the decision on what type of equipment to use on a hive?

What cleanliness and food safety procedures should be incorporated in the extraction and 'bottling' of honey? Are there rules and regulations that govern this activity?

What equipment might be used for extracting and 'bottling' honey?

How does a mechanical extractor work?

What is a honey gate?

Concerning Labels:

Are there laws and regulations governing what is required on a label?

What are recommendations for labels?

Why do some honey labels state that it is unsafe to feed honey to infants?

What should be done with any equipment or frames from which honey was extracted?

#### FALL:

What is winter-prep? When should winter-prep activity be initiated?

Treating bees for pests in the fall – how and why?

Fall re-queening vs spring re-queening

Fall brood build-up

Equipment considerations

Feeding bees ( ratio of sugar to water )

#### WINTER:

Clustering characteristics

Ventilation requirement

Protection from inclement weather

Inspecting hives during winter

## IPM: Integrated Pest Management

Define it. How and why is it useful to beekeepers?  
Pesticide legalities of labels, and usage.

## PESTS of the HONEY BEE

(Varroa Mites, Tracheal Mites, Greater Wax Moth, Small Hive Beetle...and...  
Ants, Yellow Jackets, Mice, Bear, possibly others?)

Know the various pests

Know how to check for tolerable thresholds of pest infestation.

Know the cause of the introduction to the colony of these pests

Know the life cycle of the pests

Know the symptoms of infestation by pests & the effect on the colony of bees.

Know what can be done to eliminate, or reduce the presence and effect of pests.

## DISEASES of the HONEY BEE

(AFB, EFB, Nosema, Sacbrood, Chalkbrood, Deformed Wing Virus, Paralysis Virus)

Know the various diseases.

Be aware of what causes the various diseases

Know the symptoms of the various diseases; when and where to look for them

Know the effect the diseases have on the colony

Know the treatment or beekeeping activity to eliminate, relieve, or prevent the diseases.

*At the Certified Level of the MBP, it is expected that you will know of the possible treatments; but are not expected to know the chemical names and specific requirement or limitations of each treatment. Those aspects are applied to the expectations for Journeyman, and even more so for the Master Beekeeper levels. It is anticipated that you would seek advice from a mentor or other resource, in addition to knowing that it is a legal requirement to follow all label directions.*

## NON-DISEASE colony disorders

Chilled Brood / Starvation / Pesticide Exposure

Know how to recognize them, and what can be done to prevent, relieve, or remedy them.

CCD – know the symptoms, what to do – who to contact, what the difference is from other bee activity (such as absconding )

## **RECOMMENDED REFERENCES:**

Internet:

The NCSBA website: [www.ncbeekeepers.org](http://www.ncbeekeepers.org)

The NCDA&CS website: ( for apiary inspection, food handling information, pollinator programs; and pesticides)

<http://www.ncagr.gov/plantindustry/Plant/apiary/apiarymp.html>

<http://www.ncagr.gov/fooddrug/>

<http://www.ncagr.gov/pollinators/index.htm>

<http://www.ncagr.gov/SPCAP/pesticides/>

Scientific Beekeeping: [www.scientificbeekeeping.org](http://www.scientificbeekeeping.org)

Or other Agriculture Departments of major Eastern U.S. Universities (ie: Cornell, Florida, Maryland )

## BOOKS:

Beekeeping for Dummies : Howland Blackiston: ISBN: 978-1-118-94546-9 ( also as an –E –Book )

First Lessons in Beekeeping: Keith Delaplane: ISBN: 978-0-915698-12-7

Honey Bee Biology and Beekeeping: Dewey M. Caron ( and Lawrence Connor ) ISBN:978-1-878075-29-1

The Hive and The Honey Bee: Dadant Publication ( 2010 printing ) : ISBN: 0-91-915698-09-9

The Hive and The Honey Bee: Dadant Publication ( 2015 revision ): ISBN: 978-0-91-915698-16-5

## PERIODICALS:

American Bee Journal : Dadant Publishing

Bee Culture: A. I. Root Publishing