

MASTER BEEKEEPER CERTIFICATION PROGRAM

Master Level

WASHINGTON STATE
BEEKEEPERS ASSOCIATION

SYLLABUS*

FORMULATED BY THE MASTER BEEKEEPER CERTIFICATION COMMITTEE OF
THE WASHINGTON STATE BEEKEEPERS ASSOCIATION
REVISED, 20

WASHINGTON STATE BEEKEEPERS ASSOCIATION MASTER BEEKEEPER CERTIFICATION PROGRAM

MASTER LEVEL SYLLABUS

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*Definition of syllabus (Webster): Summary outline of a discourse, treatise, course of study or examination.

Where trade names are used no discrimination is intended and no endorsement by the Washington State Beekeepers Association or the Cooperative Extension Service

History of the MASTER BEEKEEPER Program

By the WSBA Master Beekeeper Certification Committee

Washington beekeepers now have the opportunity to follow a course of study, fieldwork, service and examination that can lead to certification as MASTER BEEKEEPER. Achievement of this honor will represent the ultimate in our goal: "Education and Recognition".

Three levels of expertise constitute the Master Beekeeper Program:

The first level, **Apprentice**, was described at the 1985 Annual Meeting and revised by the WSBA Master Beekeepers Certification Committee in 2007.

The second level, **Journeyman**, was described and made available at the 1986 Annual Meeting. The entire program, as planned by the Committee, was published in an article prepared by Dan Mayer and Dick Hunger, in the March 1986 American Bee Journal. It was revised and upgraded in 2008.

Details of the **Master** level were first completed in October 1987 and this syllabus represents the revised requirements for the Master Program, 2010.

The WSBA Master Beekeeper Certification Committee wants all Master Beekeepers to maintain a high standard of expertise, knowledge and service to the Beekeeping industry. However, we do not want the Master Level to be so difficult that no one attempts it or completes it. So we have devised these requirements with the hope that a high degree of knowledge and expertise is maintained while encouraging more Journeyman Beekeepers to start working toward the Master level and complete the requirements.

REQUIREMENTS FOR MASTER BEEKEEPER CERTIFICATION

- I. You must be a certified Journeyman Beekeeper before beginning the Master level.
- II. You must have at least 6 years experience in beekeeping in addition to the 2 years required to become a Journeyman.
- III. You must accrue 2,000 points from the following categories to attain the Master certification. All of these points must be accrued **after** the date of your Journeyman certification with the exception of Category #2, #3A, #6A, #7, #20, #25A and #27(see below).

Category #1 (Required)

You must earn a minimum of 700 points, and a maximum of 1000 points by a combination of oral presentations a literature search or research paper on the categories as listed below. At least four of the topic categories (A-H) must be covered by the breadth of the work satisfying category #1 requirements. At least three papers, and two oral presentation are required. The remaining requirements for category #1 may be either presentations or a papers. Each paper or oral presentation must be accompanied by a score sheet (see addendum) for documentation. To obtain the 100 points, a grade of 75 will be the lowest passing score for your papers and oral presentations.

Topics:

- A. Bee Biology
 - i. Races, genetics, anatomy, pheromones, queen rearing and genetic selection. 100 points
- B. Bee Behavior
 - i. Swarming, pheromones, navigation, honey and pollen collection. 100 points
- C. Pests and Diseases
 - i. Diseases, parasites, pests, pesticides, and enemies 100 points
- D. Apiary Management
 - i. Inventions, splits, combines, best-practices, pest barriers, queen rearing, and apiary management plans. 100 points
- E. Pollination and other commercial services 100 points
- F. Honey, pollen, and propolis
 - i. Composition, sources, traits, and marketable forms 100 points
- G. Products of the hive
 - i. Includes selection of source material, preparation, and scoring of honey, wax, mead, and products cooked using honey 100 points

- H. Any other subjects of interest pertaining to beekeeping.
- i. The subject must be approved by 3 members of the MB committee 100 points.

Paper Guidelines

- All paper submissions require a written and approved proposal to the candidate's coordinator. Proposal should contain a preliminary list of sources to be cited in the paper.
- Paper should be at least 1,000 words (or an appropriate combination of words and detailed illustrations/diagrams where applicable by topic).
- Papers should be formatted for standard 8.5 x 11-inch paper.
- Papers should be double spaced, and use a legible font (e.g. Times New Roman). Whatever font you choose, the Committee recommends that the regular and italics type styles contrast enough that they are recognizable one from another. The font size should be 12 pt. Pages should be numbered.
- Papers should include a bibliography.
- If you have any endnotes, include them on a separate page before your Bibliography page. Entitle the section Notes.
- If paper is to be submitted to a journal, the journal's guidelines for submissions will supersede these.

Presentation Guidelines:

- All presentation submissions require a written and approved proposal to the candidate's coordinator. Proposal should contain a preliminary list of sources to be cited in the paper, as well as the group the presentation is intended for.
- Presentation should be targeted for 1 hour to a group of beekeepers including intermediate levels of experience.
- Presentations should be interactive and provide enough time for Q&A.
- Presentations should be accompanied by a handout or outline to all audience members complete with a list of cited works.
- Presentations should be submitted to the coordinator with a slide deck, or video recording for dispersal to other clubs and members of the committee.

In addition to the points earned in Category #1, you may accrue your remaining points from the categories listed below:

Category #2:

Attend a WSBA approved university course in beekeeping such as the one given at Simon Fraser University. 300 points

(The course could be taken at any time during the beekeeper's career; however, there must be a certificate of achievement, a report card with a passing grade, or other evidence of learning. The points will not be counted unless the Master Beekeeper Committee has accepted the evidence and the beekeeper has passed the Journeyman level.)

Category #3 and #3A:

#3: Hold an office in a local association for one year. **#3A:** Hold an office in the WSBA association for one year. This includes being a newsletter editor, on a local association board of directors, or committee member for one year. **#3B:** Be a found officer in a new local beekeeping association affiliated with the WSBA and see it through the first year.

#3: 50 points (maximum 150 points)

#3A: 100 points (maximum 300 points)

#3B: 150 points (maximum 150 points)

Category #4:

Attend a Washington State Beekeepers (State or Joint Oregon State or WAS) Convention 25 point/yr (maximum 100 points)

Category #5:

Teach the entire course of basic beekeeping to those in the WSBA Apprentice Beekeeper Program. (the subject matter of the 10 lessons contained in the WSBA Apprentice Booklet) 100 points/yr (maximum 300 points)

Category #6 and #6A:

#6: Mentor certified Apprentice beekeepers who are studying in the WSBA Journeyman Beekeeper Certification program. (You must document your time spent mentoring either before a general association meeting or at some other time) 30 points/yr (maximum 90 points)

#6A: Teach the entire course of the WSBA Journeyman Beekeeper Certification program to a class of at least 5 Apprentice beekeepers. The subject matter will include all 10 lessons/tests contained in the WSBA Journeyman Handbook.

70 points/yr (maximum 210 points)

Category #7:

Serve as a member of the WSBA Master Beekeepers Certification Committee 50 points/yr (maximum 200 points)

Category #8:

Attend a WSBA approved seminar or workshop on a particular subject in beekeeping (such as queen rearing, migratory beekeeping, or WSBA field day) 25 points (maximum 50 points)

Category #9:

Give or teach a WSBA or local association seminar or workshop on queen rearing, migratory beekeeping, or artificial insemination 25 points (maximum 75 points)

Category #10:

Enter a beekeeping product, which you have obtained from your own apiary, in a county or state fair and win a ribbon. 10 points/yr (maximum 40 points)

Category #11:

Give an oral presentation to any beekeeping association in the US about a particular beekeeping subject. (Must be different from the oral presentation required in Category #1) 30 points (maximum 90 points)

Category #12:

Put on a workshop or laboratory demonstration for any beekeeping association in the US about a particular beekeeping subject. 40 points/workshop (maximum 120 points)

Category #13:

Take an approved class on artificial insemination taught by a person who is experienced and approved by the WSBA Master Beekeeper Certification Committee. 50 points (maximum 50 points)

Category #14:

Take a WSBA approved class or work at least 1 year with an approved experienced beekeeper who does queen rearing, package bee production, or pollen production. 25 points per class (max. 50 points)
100 points for 1 year's work (max 100 points)

Category #15:

Work at least 1 calendar year with a WSBA approved, experienced beekeeper in migratory beekeeping. 100 points for 1 year of work (maximum 100 points)

Category #16:

Visit a school and give a talk or demonstration to students on beekeeping. 20 points (maximum 60 points)

Category #17:

Design and build a tool or device that benefits the beekeeping industry. This tool or device must not be something available from a beekeeping supplier. It must be unique and should be useful to commercial and/or non-commercial beekeepers. 25 points (maximum 100 points)

Category #18:

Produce mated queens for your local beekeeping association. 2 points for every queen donated or sold for \$5 each(maximum 40 points)

Category #19:

Judge honey products at a county or state Honey Show or Beekeeping Display.

30 points (maximum 30 points)

Category #20:

Receive the WSBA Beekeeper of the Year Award

200 points

(The award may be earned anytime during a beekeeper's career; the points will be counted toward the Master level after Journeyman certification)

Category #21:

Shows or demonstrates a proficiency in diagnosis of Honey Bee Diseases. This can be done by giving a lab or demonstration at a local bee association meeting or workshop. The use of a microscope is required. You must be proficient in dissecting a bee and identifying the presence of Tracheal mites. You must also demonstrate your ability to determine Varroa mite infestation by either the ether roll or powdered sugar roll technique. You must read and be able to demonstrate knowledge included in the Handbook by the US Department of Agriculture "Diagnosis of Honey Bee Diseases" which can be obtained at the following website:

<http://www.ars.usda.gov/is/np/honeybeediseases/honeybeediseases.pdf>

200 points

Category #22:

Operates as a migratory beekeeper for at least one year. (100 hives or more)

50 points per year (maximum 100 points)

Category #23:

Operates as a commercial queen producer. Grafts, mates and sells at least 100 queens.

50 points per year (maximum 100 points)

Category #24:

Maintains 100 hives or more for an entire year

50 points per year (maximum 100 points)

Category #25 and #25A:

#25: Lobby at the city or county level for or against ordinances that affect the beekeeping community.

25 points per time (maximum 100 points)

#25A: Lobby at the state capitol or present to the representatives in Olympia your concerns for the beekeeping industry in our state

50 points per time (maximum 250 points)

Category #26:

Extract honey for a beginning beekeeper who does not have an extractor

25 points per beekeeper (maximum 50 points)

Category #27:

Points awarded by the WSBA Certification Committee for a particular service or recognition. These points are awarded on an individual basis and the number of points is determined by the committee.

Number of points determined by Committee

Documentation:

Those who are doing the scoring and documentation of points from the above categories must get approval to be your association representative from the WSBA Master Beekeepers Certification Committee. All points must be signed or initialed by this approved representative (see scoring and documentation sheets).

After you are certified a Journeyman, you are responsible for obtaining a representative designated below who will represent and guide you toward Master certification. Only the committee members listed below, any WSBA certified Master Beekeeper, or any person so designated by the committee can represent you and/or may score and certify documentation. We have attempted to make the Master Level accessible, yet difficult enough that only those beekeepers with a dedication to the advancement of their skill and knowledge of beekeeping will be motivated to devote the necessary time to this program. They shall stand tall among their peers and be respected by all.

For the current members of the Master Beekeepers Committee, please refer to the Washington State Beekeepers Association website.

SAMPLE Proposal (to be included before each paper)

Master Beekeeper Course: Category #1

By: Dick Hunger

Date: May 29, 1987

Name: Subject #F: Poisoning of Honey Bees

Title: Spray Damage to Honey Bees While Pollinating Cabbage

PROPOSAL:

1. Discuss the life cycle of a cabbage and how hybrid varieties are made.
2. Chemical spray requirements. Show pictures of blooming plants, and aphid infestation and a pod borer at work.
3. Note "Special Presentations" requiring judgment from the applicator; e.g. temperature effect on toxicity, warm evenings when bees are clustered on the outside of the hive, etc.
4. The neighboring field hazard.
5. Visit with growers, chemical supplier and applicator to discuss bee poisoning.
6. Review "Bee Poison Report"

REFERENCES

Am Bee Jour 85: 178-207

Am Bee Jour 86, 441

1986 Am Bee research Conf Abstracts no. 3, `4, and 23. Page 827 86 ABJ

The Hive and the Honey Bee, 1975 ed., pages 663-6906

ABC and XYZ of Beekeeping, 1983 ed., page 506-511.

1987 PNW Insect Control Handbook, pages 19-25.

WREP 115 How to Reduce Bee Poisoning from Pesticides

Dave Bromels: Crop dusting and spraying

Willard Cox: Wolfkill chemical Salesman

Diagnosis of Acarine Disease (Tracheal Mite)
Prepared by the Washington State Department of Agriculture
April, 1991

Acarine disease is caused by the endoparasitic mite, *Acarapis woodi* (Tracheal Mite). The mite lives in the anterior thoracic tracheae; therefore, a positive acarine diagnosis should be made in the laboratory with the aid of a microscope.

SAMPLE COLLECTION

Samples should consist of 25 - 50 bees per colony, from at least 5% of the colonies in each apiary (1 to 5 apiaries). Alternatively sample 5% of total apiaries and 5% of colonies in selected apiaries. Recently dead, dying or freshly killed bees are preserved in 70% alcohol. Older dead bees are sometimes useful if they are firm enough to slice for diagnosis. Samples from each of the colonies in one apiary may be combined into a master sample bottle and sent to the lab. Be sure the alcohol level in the bottle completely covers the bees.

Diagnostic Procedure

Grasp the bee between thumb and forefinger and remove the head and first pair of legs. Then using a scalpel or razor blade, cut a thin transverse section from the anterior (forward of the wings) face of the thorax in such a way as to obtain a disc. Place all discs from the sample in a vial containing a 10% solution of potassium hydroxide (KOH) and allow to sit for approximately 24 hours. The potassium hydroxide dissolves the muscle and fat tissue leaving the trachea exposed. By replacing the potassium hydroxide with water, or for better results alcohol, the disc trachea suspension can be examined under a dissecting microscope. Use a microscope optical setting necessary to sufficiently detect any mite infestation or scarring of the trachea as a result of such infestation. Healthy tracheae appear transparent without any mite content. Focus through the tracheae to see individual mites. Heavy mite infestations result in tracheae that have brown or black blotches. A compound microscope is usually not necessary to see the honey bee tracheal mite.

Diagnosis of Acarine Disease (Varroa Mite)
Prepared by the Washington State Department of Agriculture
July 2000

DETECTION OF EXTERNAL MITES

External mites of the species *Acarapis destructor* (Varroa Mite) occur anywhere on the external surface of the bee, particularly on the ventral side of the head capsule where the head connects to the thorax.

Diagnostic Procedure

Ether roll

This technique is a rapid and efficient detection method in the field and minimizes the handling, shipping, and time-consuming procedures associated with shaking adult bees in alcohol or other solvents that best require a laboratory. Collect 200 to 300 bees in a jar and anesthetize them with ether delivered from an aerosol can (this aerosol product is sold in auto-parts stores as an aid to start engines). A 1 to 2 second burst of aerosol is adequate. Roll the jars lengthwise for about 10 seconds. The majority of mites dislodge from their hosts and adhere to the inside wall of the jar. To complete the process, deposit the bee sample on a white surface and spread it around. This should cause any remaining mites to fall onto the white substrate. The bees should be immediately emptied from the jar because the mites tend to stick to them if left in the jar for more than a few minutes. The bees can be washed if a more precise count is desired.

Powdered sugar method

Reported to be more efficient than the ether roll method, this method does not require bees to be killed. Use a wide-mouth, pint or quart canning jar. Set aside the metal ring from the two-piece lid; discard the metal sealing lid. Cut a circle of #8-mesh hardware cloth to fit inside the ring. Collect 200-300 bees in the jar (one cup). Through the #8-mesh lid, add enough powdered sugar to the jar to coat the bees, about 1 teaspoon to 1 tablespoon. Roll the jar around to distribute the sugar, allow the jar to sit for a few minutes, then invert it, and shake it over a piece of paper to recover the mites. The mites and sugar will pass through the mesh, so dump the mites on a clean sheet of paper and count them. A brief shaking will usually recover 70 percent of the mites; if you persist a little longer, 90 percent can be recovered (Ellis 2000). On a windy day, you might want to dump the mites on a piece of paper inside a plastic 6" x 10" x 12" dishpan to prevent the mites from blowing away.

Nosema Analysis Method
Prepared by the Washington State Department of Agriculture
April 23, 1987

MATERIALS UTILIZED

Inoculation loops (1 uL)
Disposable pipettes
Forceps
Mortar and Pestle (2)
Small stem funnels
Glass centrifuge tubes (15ml capacity)
Test tube stand
Hemocytometer (4x10 mm counting chamber) with cover slip
Wash bottles
Data forms

METHOD

Preparation of Samples and Counting Procedure

Intestines of 25 honeybees being dissected for tracheal mite analysis were removed by carefully dissecting the stinger apparatus from the abdomen, taking care not to remove the intestinal tract. The intestine was then pulled with the forceps through the resulting opening in the abdomen and cut between the crop and the stomach. The rectum was removed from the intestine and the latter placed in alcohol in a four-dram vial with a neoprene stopper and labeled with the sample number for storage. At the time of Nosema spore analysis, the sample was placed in a mortar with several milliliters of water and ground with a pestle until a uniform homogenate was prepared (approximately 30-60 seconds). The homogenate was then poured into a 15 milliliter centrifuge tube, the mortar and pestle washed with small amounts (1-2 ml) of water from a pipette to ensure spore transfer and the rinse added to the homogenate. Water was added to the homogenate in the centrifuge tube to a final volume of ten milliliters. The homogenate was then shaken for 30 seconds to ensure uniform spore suspension and a sample taken immediately by immersing an inoculating loop in the suspension and transferring the sample to a hemocytometer counting chamber with the cover slip in place by holding the loop next to the cover slip-hemocytometer interface and allowing the liquid to flow into the chamber by capillary action, leaving any large particulate matter on the loop. More than one transfer was often needed to fill the chamber, depending on the delivery volume of the loop. The filled hemocytometer was placed on the stage of a compound microscope and the grid examined at 400x magnification for spores. Best results

were obtained using a compound microscope at 200x with a phase contrast setting of 40.

The following criteria were used for spore counting:

1. If few spores were present, entire grid (400 smallest squares in the center) were examined and the number of spores recorded on the data form as number of spores/grid.
2. If many spores were present, 5 blocks (16 smallest squares in the center = 1 block) one on each grid corner and one in the middle, were counted and the spore number obtained multiplied by 5 to yield number of spores/grid. Record on the data form.
3. Conversion of spores/grid to spores/bee:
 $\text{Spores/grid} \times 4000 = \text{Spores/bee}$

EQUIPMENT WASHING PROCEDURE

All glassware including the hemocytometer was well washed, rinsed and allowed to dry. A non-detergent liquid was used to avoid the possibility of scratching the hemocytometer grid surface and cover slip. In addition to washing and rinsing, the hemocytometer chamber and grid were rinsed with 95% ethyl alcohol from a wash bottle to provide a final cleaning and to promote drying.

SOURCES OF ERROR

1. The time interval between shaking the final volume of homogenate and sampling is crucial to the accuracy of the counting procedure, since suspended spores uniformly distributed in the homogenate after shaking will begin to settle out of the suspension. No more than 30 seconds should elapse between the time mixing is finished and the time the sample is taken with the inoculating loop. Otherwise, the result could be a lower spore count than what would be represented in the suspension.
2. Proper rinsing of the mortar and pestle after grinding and pouring the homogenate into the test tube are important to the accuracy of the spore count, since spores may be retained on the glass surfaces. Several washes of the one milliliter of water would be preferable to one washing of 3-5 ml water.
3. Filtration of the homogenate. Use a filter of sufficient size to remove intestine particles but allow the spores to pass through.