



Dyce Laboratory for Honey Bee Studies

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THE Bee-Files

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Sampling for Laboratory Diagnosis of Honey Bee Mites and Disease

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Like all living organisms, honey bees are susceptible to a wide variety of parasites and pathogens, including mites, protozoans, fungi, viruses and bacteria. Generally, these conditions are self-limiting; however, some will kill your colonies and others will render your equipment unusable. The first line of defense against parasites and pathogens is you - the beekeeper. Adhering faithfully to sound disease management practices will reduce the chance of your bees contracting or disseminating American foulbrood (AFB) and other bee diseases. However, from time to time, you will be confronted with diseased brood or symptoms of disease in adult bees. It is essential that you accurately identify these conditions so that you can take the proper action. Missing, or misdiagnosing, a case of AFB can result in the rapid spread of this disease to your other colonies. You will eventually find yourself having to destroy a lot of expensive equipment. If you are unsure of a diagnosis, you should seek help from a beekeeper with the necessary expertise, or you can have a sample of the suspected disease analyzed at a laboratory. In this fact sheet, procedures are outlined for obtaining samples of diseased brood and adult bees for laboratory analysis.

DIAGNOSTIC SERVICE

The USDA-ARS Bee Research Lab in Beltsville, MD provides mite and disease diagnostic services for beekeepers worldwide. The Bee Research Lab gives highest priority to brood and adult samples submitted in support of federal or state emergency operations. Second priority is given to brood samples associated with possible abatement action. Third priority is given to samples of adult bees required for the issuance of moving permits. Fourth priority goes to examination of adult bees for informational purposes.

SAMPLE COLLECTION PROTCOLS

Brood Samples:

The Comb Sample

The best sample for diagnosis of brood disease is a piece of comb containing as much diseased brood as possible. Cut a 2" x 2" (minimum) square of comb from the suspected equipment. Include as much dead or discolored brood as possible. Wrap the sample in a paper towel or newsprint and package loosely in a heavy cardboard box for shipment. Do Not send samples with honey or nectar. Do Not wrap the sample in foil, wax paper or other material that will encourage decomposition and growth of molds. Be sure to assign a unique identifying number to the sample and to include your name, address and a brief description of the problem in a letter placed in the envelope.

The Smear: If you are unable to cut out a section of comb, you may still be able to obtain a diagnosis if you can submit a sufficient quantity of diseased material. Using a flat, wooden toothpick, remove as much material as possible from one suspected cell and place it on a 2" x 4" rectangle of paper. Include the toothpick, as it may contain a considerable

amount of diseased material. Fold the paper carefully to cover the sample. Place the sample in a coin envelope and then in a regular envelope. Be sure to assign a unique identifying number to the sample and to include your name, address and a brief description of the problem in a letter placed in the envelope.

Adult Samples

Samples of adult bees may be submitted for diagnosis of tracheal mites and viruses. You must specifically request which test you require when submitting adult bees.

The adult sample for mite diagnosis

Priority is given to pooled apiary samples. If you have a large number of bees crawling in front of your hives, collect about 100 - 150 of them. Otherwise, collect a total of 100 - 150 bees from combs. Collect an equal number of bees from each colony. Do not collect dead bees. Place the bees in a leak-proof plastic bottle of 1 pint volume or less with a screw-cap lid (1-1/2 turns or more). Add enough 70% isopropanol (rubbing alcohol), ethanol, or methanol to completely cover the bees. Seal the bottle tightly and tape around the cap/bottle junction to prevent the cap from coming loose and to prevent any alcohol from leaking. Place the bottle in a plastic bag with a zipper-like seal (e.g. Zip-lok), and pack the sample in a sturdy cardboard box surrounded with enough absorbent material to soak up all of the alcohol in the event of a leak. Be sure to assign a unique identifying number to the sample and to include your name, address and a brief description of the problem in a letter placed in the envelope. Send only one sample per package. You must write one of the following on the outside of the package, depending on which alcohol you used as a preservative:

FLAMMABLE LIQUID - 70% ISOPROPANOL - FLASH POINT 70.5 oF / 21.1 oC
DOMESTIC SURFACE MAIL ONLY

FLAMMABLE LIQUID - 70% ETHANOL - FLASH POINT 55.6 oF / 13.1 oC
DOMESTIC SURFACE MAIL ONLY

FLAMMABLE LIQUID - POISON - 70% METHANOL - FLASH POINT 50.0 oF / 10.0 oC
DOMESTIC SURFACE MAIL ONLY

Note: Commercial enterprises submitting samples in alcohol must follow stricter U.S. DOT regulations. Contact your local U.S. DOT office for complete instructions. Generally, the easiest way for a commercial enterprise to ship specimens stored in alcohol is to use a U.S. DOT authorized packing/shipping agent.

The adult sample for virus diagnosis

Adult bees crawling in front of the hive and unable to fly are often a sign of viral infection. Send at least 100 bees that are dying or crawling in front of the hives. Dead and decayed bees are not satisfactory for examination. Bees to be examined for viruses should be loosely wrapped in a paper bag, paper towel, newspaper, etc. and sent in a mailing tube or heavy cardboard box. Do not use alcohol. Avoid plastic bags, aluminum foil, waxed paper, tin, or glass. Be sure to assign a unique identifying number to the sample and to include your name, address and a brief description of the problem in a letter sent with the sample.

Always inspect used equipment before purchasing. It is a major source of disease transmission. If there are no bees present, carefully inspect the bottoms of the cells for dark, blackened afb scales. Be sure to inspect any dead brood remaining in the comb.

MAILING ADDRESS

Send all samples to:

U.S. DEPARTMENT OF AGRICULTURE
Bee Disease Diagnosis
Bee Research Laboratory
Building 476, BARC-E
Beltsville, Maryland 20705



RECOMMENDED BOOKS

Shimanuki H and DA Knox (1997) Summary of control methods. In Honey bee pests, predators, and diseases. 3rd edition. (ed. Morse and Flottum), Cornell University Press, Ithaca, NY

Shimanuki H, Knox DA, Furgala B, Caron DM and Williams JL (1992) Diseases and pests of honey bees. In: The Hive and the Honey Bee (ed. J. Graham). Dadant and Sons, Hamilton, IL

Honey Bee Diseases & Pests. 2nd edition. Canadian Association of Professional Apiculturists, University of Guelph, Guelph, Ontario, Canada

