Bee Yard Biosecurity

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Biosecurity is a set of measures designed to reduce the risk of pests and disease transmission to and among livestock. While it is common to discuss and think about biosecurity practices in most areas of livestock, we don't usually do so when it comes to beekeeping.

Managing bees is very different from other livestock.

No other livestock moves on as large a scale as hives do. The parent hives for most of the nucs and packages brought to Maine have spent time in California, Florida, Georgia, New York, or any number of other states before being sold in Maine. Unlike other types of livestock, bees cannot be contained in fences. It is impossible to keep your bees in your yard and bees "from away" out of your yard. Unlike other animals, bees are more likely to move between hives and apiaries when diseased or nutritionally stressed. Can you imagine if every time pigs were hungry, they would walk over to another farm, harass and kill the pigs living there, steal all the food and bring it back home? Because of these and many other characteristics unique to beekeeping, beekeepers should be extra vigilant about biosecurity.

Not having a biosecurity plan can be costly.

Diseased/stressed hives often have lower bee populations which produce less honey. Pests like wax moths, small hive beetles and rodents can damage and destroy equipment, adding to replacement costs. It takes more money and time (labor) to treat sick or stressed hives than it does healthy hives. Finally, replacing colonies that are killed by pests and disease can really add up!

Evaluate your risks.

A good biosecurity plan should aim to prevent the spread of pests and disease (a) into our apiaries from other places, (b) between hives within our apiaries, (c) between apiaries we own, and (d) to other apiaries/hives managed by other beekeepers.

The first step in developing a biosecurity plan is to evaluate your risk. In general, most of our risks are from us moving between yards, other beekeepers that visit our apiaries, and purchasing equipment and bees. Think about the different pests and pathogens we have in beekeeping and consider where they can enter your operation.

Here are some questions you can ask to get you started on evaluating risk: Where do you purchase equipment? If you purchase used equipment, do you get it inspected? Where do you purchase you bees? Do you know their pests and disease history? Have they been inspected? Do you collect swarms or cut outs? Do you extract your own honey, or do you have someone else do if for you? Do you borrow an extractor from someone else? Do you work with other beekeepers? Could they bring in pests/disease on their tools or hands? How do you move and store equipment? What hygienic measures to you take between yards? Do you ever wash your bee coat and gloves? Are there points during the

year when your bees are more stressed or susceptible to disease? Do you have problems with robbing? How many other beekeepers are in your area? How tidy are your bee yards? Do you have a lot of old bee equipment and debris around?

Develop a plan.

Now that you have evaluated your risks, it's time to develop a plan to reduce those risks. Most biosecurity plans focus on three elements: eliminating sources of infection into your operation, limiting disease and pest spread within your operation, and paying attention to the susceptibility of your hives.

Reduce incoming sources of infection.

Other Beekeepers: Visitors to your apiaries can carry pests and pathogens into your yard on their vehicles, on their person, or on tools/equipment they may bring with them. Find ways to limit people and vehicle traffic around your hives. Provide extra tools (smokers, hive tools, etc.) for visiting beekeepers to use and don't allow them to bring outside tools or equipment. If a visiting beekeeper works bees bare handed, ask that beekeeper to wash their hands before working in your hives. If they work bees using gloves, ask that they use disposable gloves. It is also good practice to ask beekeepers who come to work in your apiary refrain to from working other bees for day or two before entering your apiary and/or wash their suit before entering your apiary.

Bees and Equipment: Thoroughly vet sources of equipment, supplies, and bees. Only purchase used equipment and bees that have been inspected and issued a health certificate by an apiary program. When buying bees from other people, ask about their system for monitoring and managing disease. If possible, sterilize incoming equipment before use. Isolate new and arriving bees and equipment, and do not mix into your operation until you are sure that they are safe. Installed swarms/cut-outs you collect from outside your apiary on new foundation and isolate those colonies in an out-yard before introducing them into your primary apiary. That way any honey (and potential pathogens) they carry with them is used in comb production and not stored in comb which can be later fed to brood.

Bees and Pests from Neighboring Apiaries: Bees "visiting" from neighboring apiaries can be a source of pest and pathogen introduction into your yard. Pests like small hive beetles, wax moths and rodents can be drawn to yards with lots of debris so keep areas around hives neat and tidy. Never leave burr comb and hive scrapings about the apiary. Carry a bucket with you to collect the waste in. Dispose of it at the end of the day. Open feeding can also attract bees from away. Never open-air feed honey or syrup. This includes letting bees have open access to frames after extracting honey. Always feed bees using internal or top feeders. Store used equipment so bees from neighboring apiaries, rodents and pests can't access it. Implement practices to prevent robbing and make your hives less attractive to bees from "away". This can include maintaining strong colonies, reducing entrances, installing robbing screens, and removal of weak colonies.

Limit spread of pests and diseases within your operation.

Wash and Clean: Wash hands with soap and water between each yard. Use hand sanitizer when washing is not possible. Use washable boots and disposable gloves, when possible, especially when dealing with diseased or problem hives. Clean, wash, and disinfect smokers, hive tools, and other apiary

equipment. Keep multiple hive tools on hand so you can easily switch to a clean tool between yards or after visiting a sick hive. Besides cleaning the obvious sources of potential contamination, it is also important to think about sanitizing places where you can "drag" pathogens around all day (phones, steering wheels, door handles, etc.).

Keep a Tidy Bee Yard: Do not leave wax/propolis scrapings or old unused equipment laying around the apiary. These materials can attract wax moths, rodents, small hive beetles and other pests. Retire or fix damaged bee boxes. All those extra openings allow pests easier access to your hives. Replace old, black comb with new foundation. Old comb can be a reservoir for pathogens, parasites, and pesticides. Clean up dead-outs as soon as you find them. If you cannot clean up a dead-out hive right away, make sure you close all entrances until you are able to do so. If that hive died of a disease, you do not want other bees to rob out the resources, spreading the disease to other parts of your apiary.

Honey Extraction: Some pathogens can spread through honey, so it is important to think about the biosecurity of your honey extraction practices. If you have someone else extract your honey for you, it is important to ask about their sanitizing practices. Do they clean extracting equipment between different beekeepers? Daily? Never? If you are borrowing a club or friend's extractor always sanitize the extractor before you use it and return it cleaned and sanitized.

Reduce Robbing and Drifting: Robbing is where one hive steals the resources (honey) from another hive. Often strong hives steal resources from weak hives. If the weak hive is diseased, robbing bees will bring back infected honey to their healthy hive, spreading that disease. You can reduce robbing by maintaining strong colonies, reducing entrances, supplementally feeding using inside or top feeders, installing robbing screens, and removing or boosting weak colonies.

Drift occurs when a foraging bee returns to the wrong colony. Since she is carrying resources (nectar, pollen, resin, water) she is accepted into the colony. Over time, drift can lead to significant variations in colony strength and increase the potential for the spread of diseases and parasites within an apiary. You can reduce drift by painting hives different colors and/or with different designs. Special attention should be made to hive placement relative to other colonies and objects (trees, bushes, building, etc.) in the landscape as these can offer navigational aids to foraging bees and limit drift. Hives all one color, placed in a straight line and facing the same direction are more likely to have drifting problems than those that are differently colored and marked, in a curved line with entrances facing different directions.

Maintain a Quarantine Out-Yard: Not only are quarantine yards great for isolating new hives and collected swarms (see above), but quarantine yards are also great for isolating sick, diseased, or problem hives.

Inspect Your Hives: It is usually easier to fix a problem when it is caught earlier and hasn't spread throughout your apiary. You will never know if your hives have a problem unless you look in them. During inspections, always inspect the brood in the hive. Symptoms of many problems and diseases will show up in the brood first. Brood in a healthy colony has a uniform appearance with few interruptions of the brood pattern. Healthy larvae are pearly white and the pupal cappings should appear convex, not perforated or greasy. Larvae should move and roll when prodded. There should not be an offensive odor. When one or more of these criteria is not met, the colony needs further inspection and

evaluation. If in doubt, check in with your apiary inspector and/or send in a sample to the USDA Beltsville Bee Research Laboratory for analysis.

Pay Attention to Frame Movement Between Hives: Moving frames of honey between hives to equalize food stores is a common practice in beekeeping. Unfortunately, beekeepers don't always determine if the hives are disease or pest free before they start swapping frames between hives. This can spread disease or pests within your apiary.

Another common practice is to add a frame of brood and associated nurse bees to boost the population of a struggling/weak hive. If the hive is struggling from a disease, don't swap the frame you removed from the healthy donor hive with the frame you removed from the sick hive. Dispose of the diseased frame and fill the empty spot in the healthy donor hive with a new frame.

Take Notes: Keep track everything you do in your apiary. Document when you get new hives, when and where you collect swarms, where/when you buy equipment, when you treat your hives for varroa mites, when you inspect, what you saw when you inspected, your queen status, etc. There is no detail too small. Future you will thank past you for taking good notes.

Reduce susceptibility.

A weak or stressed hive will be more susceptible to pests and disease than a healthy, strong hive. Make sure your hives have consistent, good nutrition and are queenright. If a hive is weak but otherwise healthy, boost it with a frame or two of nurse bees and brood from another healthy hive. Identify times of high risk or stress and consider practices to improve health during these times. For example, if you consistently have problems with robbing during the summer dearth, put robbing screens on your hives at the start of the dearth, don't wait until after you start seeing robbing activity. Finally, never let varroa levels reach damaging levels. Besides spreading viruses, varroa mites damage the immune response of bees they feed on making your bees more susceptible to other diseases and pests.

Thinking about biosecurity is often not a priority for beekeepers but doing so will save you a time, effort, money, and heartache in the future. Eliminating risks for our bees can seem like a daunting task but you can start small. Focus on practices that are easily changed or improved in the short term with the goal of working on the harder changes in the future. You don't have to try and fix everything right away. Taking the time to create and implement a biosecurity plan can reduce your overall costs, increase the productivity of your hives, and can help protect the health of your bees as well as bees throughout the country.