Best Management Practices (BMP) for Ontario Beekeepers' in Advance of Winter

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Infosheet

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Successful over-wintering in modern beekeeping requires thorough management of honey bee colonies.

There are serious stressors that can severely harm or kill a honey bee colony. What happens during the regular season (pests, environmental stressors and how bee colonies are managed) will impact the survival of honey bee colonies during winter.

Since 2007, the levels of winter mortality of honey bee colonies in Ontario have increased and on average have been above acceptable levels (>15 per cent). *It is more important than ever for beekeepers to do everything they can to control the factors that can be addressed through best management practices.*

Honeybee colonies wrapped for winter

Varroa mite

Dead bees on bottom board of a colony

Populous honeybee colony

There will always be some winter loss in any beekeeping operation however, the key is keeping this level of winter loss as low as possible, ideally below 15 per cent.

Ontario is fortunate to have some of the best data and regional, applied research, including those generated by the Townsend Lab, University of Guelph and Ontario Beekeepers' Association's Technology Transfer Program (TTP). Based on this data and research, treatment thresholds for varroa mites have been established for the spring and fall, and detailed information on colony management is available. This supports recommendations so that beekeepers can make the right management decisions backed by science.

With cold weather approaching, there are many steps beekeepers can take to get colonies properly prepared for winter.

Core Best Management Practices (BMPs)

There are core requirements for honey bee colonies going into winter. Beekeepers should implement the following best management practices for overwintering in order to ensure the highest proportion of their honey bee colonies survive into spring:

1. Ensure honey bee colonies have sufficient feed stores for winter:
   - Going into winter, colonies should weigh at least 31.9 kg/70 lbs (single brood chamber) to 45.4 kg/100 lbs (double brood chamber).
   - A full sized colony typically requires 15 L (4.0 gallons) of supplement feed.
   - Colonies need to be fed early, immediately after fall honey crop is removed and before it gets too cold for the bees to access the feed. This is important as when it gets too cold (about 13° C/55°F, including other factors such as rain and wind), bees can no longer move outside the colony or inside and can no longer access the feed.
   - Colonies should be fed thick syrup (either 2:1 sugar/water or 70 per cent sucrose). This is important because it is hard work for the bees of the colonies to concentrate the sugar feed so that they can store it for winter. Thick syrup requires less work (i.e. less time and energy) from the bees.

A bee colony can starve to death even with sufficient food stores, if the cluster of bees gets separated from the food stores during a prolonged cold period, or if the cluster ends up in the wrong location within the hive. Providing sufficient food stores will minimize the chances of starvation for a healthy populous colony.

2. Ensure honey bee colonies are populous going into winter:
   - Seven to eight frames of bees in a full sized colony are ideal in most of the colder regions of Ontario; some beekeepers may have success with smaller sized colonies wintered as nucleus colonies, particularly in regions of Ontario with milder winters.

   The population of the colony in winter is mostly set at the beginning, with worker bees dying throughout the winter. A large cluster of bees will be able to keep warm without using as much energy and feed. This is because the bees actually use their own bodies as insulation in the cluster. The more populous the colony, the more likely it is to make it to spring.

3. Monitor pest and disease levels (particularly varroa). This involves regular inspection of brood chambers. When it comes to pest and disease monitoring, winter management really starts in *summer*.
   - Monitor varroa mite levels in mid-summer (starting July) and late summer or early fall (last week of August to the first week of September).
   - Monitor varroa mites before and after treatments in representative colonies in the bee yard to determine if the treatments have worked. If the treatments have not worked, you will need to immediately choose a strategy (treatment) that will lower your mite levels. Consult with the OBA's TTP or the Apiary Program with the Ministry of Agriculture, Food and Rural Affairs.

4. Manage varroa mite levels in honey bee colonies during the beekeeping season and ensure that they are below treatment thresholds in advance of winter, starting in late summer (see Further Resources for 2014 treatment recommendations and other details).
   - If varroa mite levels require treatment, choose the appropriate, legally registered treatment for varroa mites.
   - Treat early. It is crucial that varroa levels are low in late summer and early fall. If higher varroa levels (3 per cent or greater in an alcohol wash) persist into fall, the bees that are raised for winter will be weakened, and the colony will go into winter in poor health, even after the varroa are controlled.
   - Apply treatment recommendations according to label instructions.
   - Be mindful of limitations of treatments including:
     ◊ varroa mites resistant to treatments (Checkmite++™ and Apistan®);
     ◊ timing — some treatments take weeks to lower the varroa mites;

- ◊ number of applications — for treatments with multiple applications; it is only a partial treatment if you have not done all the applications;
- ◊ position of miticide strips (eg. Apivar®) — always place the strips in the center of the brood nest. The strips must be in contact with the bees for the full treatment period in order to effectively reduce varroa. This is particularly important during cooler temperatures. If the strips are placed at the ends of the colony rather than in the middle, the bees will cluster tightly and may lose contact with the strips ; and
- ◊ temperature sensitivity — formic acid and thymol based products are not as effective at cooler temperatures and can impact colonies at high temperatures.

- Ensure varroa infestation levels are less than 3 per cent (standard alcohol wash) by Oct 1st. Good resources include:
  - ◊ 2014 Treatment Recommendations;
  - ◊ "Varroa Mite —Sampling and Monitoring Infestation Levels" infosheet (see below). for other methods of mite monitoring;
  - ◊ "Integrated Pest Management for Beekeeping in Ontario" manual, published by the OBA's TTP, www.ontariobee.com/outreach/manuals-books-dvds; Integrated Pest Management Workshop offered by the TTP (see contacts below). These workshops are offered throughout the province and cover management for pest and diseases in great detail. Beekeepers at any skill level and experience should consider taking them.

5. Wrap or insulate honey bee colonies for winter. In general:
   - place material (paper, cardboard, insulated plastic, Styrofoam, wooden boxes with wood shavings, etc.) on or around the exterior of the hive for insulation/windbreak;
   - reduce the entrance of colony; and
   - provide upper ventilation with the insulation for excess moisture and CO_2.

6. Maintain good documentation:
   - Register your honey bee colonies and apiaries with the Ministry of Agriculture, Food and Rural Affairs annually;
   - Look for new pests and diseases (for example small hive beetle or SHB) and report any of these to the Apiary Program (See Apiary Inspector contacts below);
   - Document colony surroundings, including crops and agricultural practices, and be in good communication with local growers who may be using pesticides. Keep records whenever possible, including photos, video and written descriptions with dates.
   - Report:
     - ◊ atypical losses of honey bee colonies and colony decline to the Apiary Program; and
     - ◊ pesticide incidents to the Pest Management Regulatory Agency (519-826-2895)**.**
   - Maintain detailed records on colony management (treatments, movements, purchases, disease monitoring, etc.).

In addition:

- Know your local Apiary Inspector contact information for any regulatory requirements and serious bee health issues;
- Review the Ontario Treatment Recommendations for Honey Bee Disease and Mite Control on an annual basis as these documents are regularly updated;
- Be familiar with updates from the TTP for the latest information on bee health and advisory;
- Register for a workshop through TTP or the Townsend House Centre for Honey Bee Research;
- Consult the updated TTP "Ontario Beekeeping Manual" and "Integrated Pest Management for Beekeeping in Ontario".

Additional Resources

For a list of Apiary Inspectors in Ontario visit
www.omafra.gov.on.ca/english/food/inspection/bees/info_beeinspectors.htm

Infosheets on honey bee health

- Introduction to Honey Bee Pests and Diseases in Ontario
  www.omafra.gov.on.ca/english/food/inspection/bees/intro-bee-pests.htm
- 2014 Ontario Treatment Recommendations for Honey Bee Disease and Mite Control
  www.omafra.gov.on.ca/english/food/inspection/bees/2014-treatment.htm
- American Foulbrood - Biology and Diagnosis
  www.omafra.gov.on.ca/english/food/inspection/bees/afb-biology.htm
- American Foulbrood - Prevention and Management
  www.omafra.gov.on.ca/english/food/inspection/bees/afb-mgmt.htm
- Varroa Mite - Biology and Diagnosis
  www.omafra.gov.on.ca/english/food/inspection/bees/varroa-biology.htm
- Varroa Mite - Sampling and Monitoring Infestation Levels
  www.omafra.gov.on.ca/english/food/inspection/bees/varroa-sampling.htm
- Small Hive Beetle
  www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm
- Small Hive Beetle Treatment Recommendations
  www.omafra.gov.on.ca/english/food/inspection/bees/info-shb-treatment.htm
- Destruction Protocol for Honey Bee Colonies Found with American Foulbrood (AFB)
  www.omafra.gov.on.ca/english/food/inspection/bees/destructionprotocol.htm
- Honey Bee Pest and Disease Images
  www.omafra.gov.on.ca/english/food/inspection/bees/honeybeepestphotos.htm

Technology Transfer Program (Ontario Beekeepers' Association)
Workshops, extension and educational materials:
Email: ttp@ontariobee.com
Website: www.ontariobee.com/outreach/ttp
Phone: 519-836-3609

Townsend House Honey Bee Research Centre, University of Guelph

- Workshops on beekeeping, courses and educational materials:
  www.uoguelph.ca/honeybee/education-events.shtml

Pest Management Regulatory Agency (PMRA)
To report suspected pesticide incidents call 519-826-2895

For general inquiries
Toll Free: 1-877-424-1300
Local: 519-826-4047
E-mail: ag.info.omafra@ontario.ca

For technical information
Paul Kozak, Provincial Apiarist
Email paul.kozak@ontario.ca
Phone: 519-826-3595 or Toll Free at 1-888-466-2372 Ext. 519 826 3595

Registration of honey bees with the Ontario Ministry of Agriculture, Food and Rural Affairs
Questions regarding registration: 519-826-3534; apiary@ontario.ca