

Nova Scotia Small Hive Beetle Response Plan

Small hive beetle (SHB) *Aethina tumida* Murray is an emerging pest of the European honey bee *Apis mellifera* L. As of 2017, SHB has not been identified in honey bee hives within the province of Nova Scotia. Its status as a reportable pest with the Canadian Food Inspection Agency, and potential to harm colony health, cause honey crop losses, and damage equipment contributes to its inclusion in the list of reportable pests in the province. In summer of 2017 SHB was detected at multiple locations in New Brunswick including within flight range of NS bee yards. This plan outlines initial responses of the NS Department of Agriculture in preparation for the possibility of SHB detection in NS.

Surveillance

The Provincial Apiculturist and inspectors routinely perform inspections when bees are sold, exported or in response to a complaint. Inspectors evaluate hive health and look for the presence of any reportable diseases as identified in section 11 of the *Bee Industry Regulations*.

As part of best management practices producers are encouraged to routinely inspect hives to evaluate bee health and look for any evidence of reportable diseases as identified in section 11 of the *Bee Industry Regulations*. The presence of any of these pests or diseases must be immediately reported to the Provincial Apiculturist. At all times, beekeepers should use good biosecurity practices to avoid introducing or spreading pests and pathogens.

Beekeepers with colonies located in at-risk areas or regions potentially affected by SHB are encouraged to use traps and perform frequent inspections of hives and yards to look for signs of SHB.

Summer 2017 surveillance includes the Provincial Apiculturist working with beekeepers in at-risk areas to monitor for SHB using traps. Approximately 50 traps will be distributed to monitor for presence of SHB within a 20km distance from the NB border. An additional 50 traps may be used by the Provincial Apiculturist to provide adequate coverage in other at-risk areas.

Surveillance Activities:

- Prepare communication asking beekeepers to self-identify bee yard locations in at-risk area.
- Distribute SHB traps to beekeepers for bee yards in at-risk areas and instruct on trap use and frequent inspections of hives for signs of SHB.
- Communications to industry as a reminder to maintain good hive health through proper maintenance and biosecurity.
- Reminders to industry of the duty to report any reportable pest or disease to the Provincial Apiculturist as described in Section 16 of the *Bee Industry Act*.
- To facilitate communication response, develop “canned” media release(s) to address the identification of SHB (or other pest/disease) in the province with CNS.

Identification and Communication

Upon identification of a suspected SHB affected site(s) by a producer, the Provincial Apiculturist must be notified as described in section 16 of the *Bee Industry Act*.

To confirm and evaluate severity of SHB infestation the following steps will be taken:

- Samples will be collected to confirm life-stages and a portion of samples will be sent to a diagnostic laboratory for species confirmation.
- Possible origins of the infestation will be investigated.
- Recent hive movement will be identified for identification of other potentially affected sites.
- Beekeepers with yards within 3 kilometers will be notified and supplied with traps to monitor for SHB.
- Bee yards within a 3 km radius of affected bee yards will receive inspection of brood for 10% of hives in each yard and 100% of top bars by Provincial Inspectors.

Industry Inspectors who have participated in SHB Inspection Programs in ON and NB from 2016-2017 may be contracted to assist with inspections as needed

When an inspector confirms the presence of SHB, the Provincial Apiculturist will provide notification of the confirmed presence of SHB to: 1) Minister of Agriculture; 2) Canadian Food Inspection Agency; 3) Atlantic Technology Transfer Team for Apiculture; 4) respective Provincial Apiculturists; 5) Nova Scotia Beekeepers Association; and registered beekeepers in Nova Scotia. Should SHB be identified in Nova Scotia, beekeepers with yards within 3 kilometers will be notified and supplied with traps to monitor for SHB.

Quarantine & Detainment

The Minister of Agriculture has the power to designate Bee Quarantine districts as outlined in section 6 of the Bee Industry Act. These quarantine districts prohibit the movement of bees or beekeeping equipment into or out of the defined area except in accordance with a permit issued by the Minister.

Following confirmation of SHB, recommendations will be made to the Minister regarding parameters for quarantine districts in response to SHB risk and taking into consideration individual yards and regions.

Section 11(1d) of the Bee Industry Act gives inspectors authority to detain bees or beekeeping equipment at a specific location and for a defined period of time. Hives may be kept at their original location or moved to a second location to allow for appropriate control of a pest or disease. Whenever possible, detainment of hives affected by SHB will be at their original location to minimize risk of spreading the pest to other sites until depopulation can occur.

Detainment orders may remain in effect within a quarantine zone established by the Minister to reduce risk of spreading SHB or any other pest or disease.

Affected yards (where SHB is confirmed or believed to be present) may be released from detainment following 2 follow-up brood inspections of all hives in each yard with no SHB identified. Inspections will take place a minimum of 4 weeks apart and include visual examination of hive covers, bottom boards and minimum 3 brood frames per chamber.

The Provincial Apiculturist will notify owners of imported hives found to be infested with SHB to notify of intent to pallet wrap and return affected hives within 72 hours.

Eradication and Management

Under section 11 of the *Bee Industry Act*, inspectors may issue orders to address any pest or disease in bees or beekeeping equipment, either confirmed or on reasonable grounds.

Upon detection of SHB in Nova Scotia, efforts should be focused on controlling and eradicating SHB so as to prevent SHB from reproducing and becoming established in this Province. Eradication focuses on depopulation of infested hives and subsequent destruction of equipment (in most cases). Where freezing hives is the chosen method of depopulation, destruction of equipment may not be necessary. If the beekeeper will not voluntarily destroy affected hives, the Provincial Apiculturist may order destruction and carry out if necessary at the beekeeper's expense.

Eradication efforts will cease when the pest becomes established (overwinters) and population is too great and widely spread for eradication to be feasible. However, efforts to control SHB through management practices should continue indefinitely.

Management of Affected Yards

The following biosecurity Best Management Practices (BMP's) will be recommended to the beekeeper. These include:

- Install SHB traps in all hives.

- Requeen or unite queenless hives as soon as possible.
- Cull weak or infested colonies.
- Provide adequate room to prevent swarming, but do not over super colonies – minimize the amount of comb not covered in bees.
- Keep the apiary free of wax debris such as broken frames or wax cappings or scrapings – burn on site, or store in sealed containers (freeze for 48h prior to processing).
- Ensure dead bees and unused equipment are not left exposed in the yard.
- If visiting a SHB+ bee yard, or location with greater risk of harbouring SHB, visit this site last.
- Keep vehicle windows and doors closed when visiting affected bee yards. Park minimum 10m away and preferably behind an obstruction from bee yard and walk in. Inspect the exterior of the vehicle prior to leaving. Wash the vehicle at the nearest car wash before returning to other bee yards.
- Do not carry excessive equipment into the yard. Take only what you need. Visually inspect everything before leaving the yard.
- Before leaving a bee yard and prior to entering a vehicle, conduct a thorough inspection of your bee suit and veil for insects. Shake vigorously. Bag apparel and freeze for 48 h.
- Flame hive tool before leaving the yard.
- Honey may be extracted onsite and can be removed from the location in sealed containers. Extraction equipment must be thoroughly cleaned and visibly free of SHB before being removed from the location.
- Alternatively, honey supers may be frozen on site for 48 h before being removed for extraction at another facility.

Depopulation Methods

Depopulation of infested hives should take place within 2 business days of confirmation of SHB. Depopulation method options include use of diesel fuel, dry ice, or freezing. To conduct depopulation (reference: Destruction Protocol for Honey Bee Colonies Found with American Foulbrood, 2010, OMAFRA):

Block the entrance to affected hives with crumpled newspaper or burlap and seal all cracks in the hive to avoid having bees fly out during the killing process. Duct tape, pallet wrap or small pieces of newspaper may be used to block these cracks.

Diesel

- remove the lid, inspect underside for SHB and set aside.
- Sprinkle diesel fuel over the entire cluster of bees in the colony.
- If necessary, split the chambers and add diesel to the lower chamber as well.
- Recommended amounts of diesel to be used are between 300-500 millilitres for a one- or two-story hive or 1 litre for a three- or four-story hive.
- Replace the lid firmly so that bees do not escape for a minimum of 10 minutes
- After 10 minutes, check to see if all adult bees are immobilized. If bees are not immobilized, additional treatment can be repeated with enough diesel fuel to wet the remaining adult bees.

Dry ice

- Wear heavy duty plastic gloves and face protection appropriate for working with dry ice.
- Remove the outer lid and inspect underside for SHB. Set aside. Inner cover need not be removed if it is perforated.
- Place a shallow super on top of the hive and bucket enough dry ice to nearly fill $\frac{3}{4}$ of the super.
- Replace cover and apply pallet wrap to the entire hive (or pallet of hives).
- Dry ice can be obtained from Praxair in Dartmouth. 24 h notice may be required for large orders.

Freeze

- hives should be wrapped several times with plastic pallet wrap to ensure no insects can escape.
- Apply strapping to ensure boxes will not shift during transport.
- Moves hives to a walk-in freezer for at least 48h.

Destruction Methods

Orders to destroy equipment will normally include destruction of frames, covers, and bottom boards. Beekeepers may decide to destroy hive boxes, as well, if these have been contaminated by diesel during the depopulation process. The goal is to destroy those parts of the hive that may harbor SHB or have been damaged by their activity.

The Nova Scotia Department of Natural Resources issues daily burning restriction notifications between March 15th and October 15th. If hives are to be destroyed by burning, provincial and local restrictions must be confirmed before proceeding. If conditions do not allow for burning, hives may be incinerated. The Provincial Apiculturist has information to arrange for this to be done.

To proceed with burning:

- Take necessary safety precautions. It is recommended to have a fire extinguisher on hand as well as a shovel and water for extinguishing flames in easy reach.
- Select a site far enough away from healthy hives, fences, and buildings to avoid unintended fires. Keep in mind that bee hive fires can be aggressive and burn two- to three-times the height of the stack.
- Avoid windy conditions
- Clear the area of any combustible material
- Dig a hole large enough to contain the fire, about one metre in diameter (or larger if several hives are to be destroyed) and at least 30 centimetres deep. The bottom should slope to provide a sump for unburned honey so that it does not choke the fire.
- Start the fire using rolled-up newspaper and dried twigs or kindling to create a small blaze. Once under way, begin selecting frames that are relatively free of honey and prop them in an A-frame over the blaze. As the beeswax melts and ignites, fire intensity will increase. Add frames a few at a time, taking care to ensure that the fire does not become too intense.
- Use caution to not add too many frames at one time. Diesel fuel remaining on the frames could cause an explosion with the potential to cause human injury and accidental fires. Never use diesel fuel to accelerate the fire.
- If diesel-fuel soaked material must be ignited, it is recommended to make a diesel fuel trail leading about 2 metres from the hole containing the material to be burned. A screwed-up piece of newspaper should then be lit and used to ignite the end of the diesel fuel train.
- Burn all combs from affected hives
- Frames with honey should be gradually added around the edge of the fire rather than on top of it. Full frames of honey may douse the flames. Honey may not completely burn unless there is sufficient other material to fuel the fire.
- Burn all bottom boards, lids and floorboards. These can be angled into the pile on the edge of the hole leaving a wind tunnel to assist burning.
- Burn any other parts of the colony that have diesel fuel on them.
- Supervise the fire as long as it continues to burn. This may take as long as four to five hours for a three- or four-box hive.
- When the fire has burned down to embers, the remains should be fully covered with the soil removed from the hole. Replace grass sod if appropriate.
- All other parts that do not have diesel fuel on them (boxes, inner covers, hive lids, and queen excluders) must be well flamed with an open flame (propane torch) before allowing exposure to honey bees again).