

# 2011 Ontario Treatment Recommendations for Honey Bee Disease and Mite Control

## Infosheet

APRIL 2011

This document is intended as a guide for the management of pests and diseases of honey bee colonies in Ontario. It includes detailed recommendations for treatment, monitoring methods and information on the status of pests and diseases in Ontario.

New items in the 2011 recommendations have been highlighted with a “new” icon. For further updates see the apiculture OMAFRA webpage: [www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html](http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html)

Any recommended product is to be used only in accordance with the directions on the product’s label. The users assume responsibility for any risk to persons or property arising from the use of the recommended products.

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Varroa Mite



European Honey Bee



Small Hive Beetle

## SUMMARY

(please see document for more detailed information)

### NOTICE

- **Small Hive Beetle (*Aethina tumida*) has been confirmed in Essex County, Ontario.**

### TREATMENT PRACTICES

- Rotate treatment methods whenever possible for varroa management to prevent the development of resistance in varroa mites. (E.g. Apivar® in spring, followed by a formic acid treatment in fall)
- ***Use particular caution when using temperature dependent treatments above recommended temperature thresholds.***
- Read all labels before applying any disease or mite control products to your colonies.
- Treat all colonies that require treatment in the yard at the same time.
- Respect any withdrawal times for all treatments. Do not use treatments when honey supers are on.
- Monitor colonies before treatment application to see if the treatment is required and then again after the treatment to determine if the chosen treatment was effective.
- The presence of multiple parasites/disease may require treatment below the recommended treatment threshold level(s).
- Oxalic acid should ***only be used as a follow-up treatment*** in the late fall, after a primary early fall treatment of either formic acid or registered conventional chemical product.
- The ***timing*** of treatments and feeding is **VERY IMPORTANT**. Treatments need to be applied before infestations/infections reach damaging levels. Fall feed should be provided before temperatures are too low that the bees can no longer break cluster to access feed.
- Using Ontario-Bred Hygienic Honey Bee Tracheal Mite (HBTM) Resistant honey bee queens in your operation may help colonies resist diseases and pests naturally. However, treatment will still likely be required.
- It is recommended to replace **3 frames in the brood chamber** every year with newly drawn comb or foundation. This practice will help to reduce the level of spores and miticide residues in the hive.

### WINTER MANAGEMENT

- A colony should consist of at least 7-8 frames of bees at the end of the season to ensure survival.
- It is recommended that all colonies in Ontario be ***wrapped for winter***.
- Use 70% sugar syrup for fall feeding. Colonies should be very heavy before going into winter (at least ~70lbs for singles; ~100lbs for doubles).

### RESOURCES

- ***For more information*** on bee disease biology, identification and treatment visit:
  - The OMAFRA Apiculture webpage  
<http://omafra.gov.on.ca/english/food/inspection/bees/apicultu.html>
  - The Honey Bee Disease Control section of the OBA Tech-Transfer website  
<http://techtransfer.ontariobee.com>.

Table 1

<b>Varroosis: Varroa Mite (<i>Varroa destructor</i>)</b>		
<b>Detection:</b> 1. Sticky board 2. Ether roll 3. Alcohol wash (see page 10 for instructions)		
<b>NOTE:</b> If varroa infestation is much HIGHER than threshold levels (see page 11 for thresholds) in the spring and you have ABNORMALLY HIGH LOSSES over the winter, it is advised to check for resistance to conventional chemical product(s).		
<b>Treatment Material</b>	<b>Method of Treatment</b>	<b>Comments</b>
Spring		
Mite-Away II™ (formic acid)  single application pad (250 mL/pad)	Treat all colonies using Mite-Away II™ single application pads, according to label instructions. This treatment is effective for both honey bee tracheal mites (HBTM) and varroa mites.	<b>Note:</b> Mite-Away II™ is no longer a registered treatment. However, the Pest Management Regulatory Agency (PMRA) allow for the continued use of treatment product during a phasing out period.  <b>Note:</b> High temperatures can have a negative impact on colonies when temperature dependent treatments are used.
65% liquid formic acid.  Multiple applications: 30 to 40 ml pad for 2- story colony; 15 to 20 ml for 1- story colony.	Apply one 30 to 40 ml pad for double box or 15 to 20 ml pad for single box / per hive. Place the pad on the top bars close to the brood area. The treatment is to be repeated up to six times at 1 to 10 day intervals as per label instructions.	Ensure that colonies are large enough to have 6 or more frames of brood covered with bees when applying organic acid treatments.  Outside temperature highs should be between 10 to 26°C at time of application. Temperatures above 30°C may cause excessive damage to the colonies.  For complete label instructions and future updates refer to: <b>NEW</b> <a href="http://www.medivetpharmaceuticals.ca//Guidelines/Label%20Formic%20Acid%2065%20percent.pdf">www.medivetpharmaceuticals.ca//Guidelines/Label%20Formic%20Acid%2065%20percent.pdf</a>  <b>Note:</b> 65% liquid formic acid is registered for use in Canada by Medivet pharmaceuticals Ltd.
Apivar®*, Apistan® and CheckMite+™  *Apivar® has been granted Emergency Use Registration by PMRA until June 30th, 2011. Check the OMAFRA and PMRA websites for updates regarding future registration.	Apivar®, Apistan® and CheckMite+™ are registered in Ontario. Use strips according to label instructions.  Dispose of chemical strips according to label instructions.	<b>Note:</b> When using Apivar® ensure that the appropriate number of strips is applied per frames of bees in the colony, 1 strip/5 frames of bees.  Varroa resistant to CheckMite+™ and Apistan® are well established in Ontario.  Be aware of the risk of inadequate varroa control when using conventional chemical products.  <b>Note:</b> Always remove strips from colonies at the end of the treatment period indicated on the product label. Never reuse chemical strips.
Thymovar <b>NEW</b>  Thymovar uses a novel active ingredient (thymol).	Thymovar is fully registered for use in Ontario. Use according to label instructions.  <b>Note:</b> Two consecutive applications of Thymovar must be applied.	Apply when maximum daily temperatures are above 12°C and below 30°C.
Mite Away Quick Strips™ (MAQST™) <b>NEW</b>  May be available through Emergency Use Registration for use in Ontario. Check the OMAFRA website for registration updates: <a href="http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html">www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html</a>	Use according to label instructions.	<b>Note:</b> Brood mortality may occur in the initial stage of treatment.  Apply when maximum daily temperatures are above 10°C and below 27°C.  Colonies should contain at least 6 brood frames covered with bees when using MAQST™.

Table 1 continued

Treatment Material	Method of Treatment	Comments
June		
	Monitor	In June, check all bee yards (at least 5 hives in each) using the monitoring method of your choice to determine if varroa were controlled by your spring treatment.  <b>Note:</b> Refer to Table 9 on page 11 in the Notes section for recommendation if further treatment is necessary.
Late Spring and Summer:		
Honey bee tracheal mite (HBTM) resistant Hygienic queens:	Requeen colonies with new queens from Mite and Disease Resistant Honey Bee stocks.	Check the OMAFRA website ( <a href="http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html">http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html</a> ) or the OBA Tech-Transfer website ( <a href="http://techtransfer.ontariobee.com">http://techtransfer.ontariobee.com</a> ) for the updated 2011 list of Queen and Nuc producers who have tested their stock in the Ontario Mite and Disease Resistant Honey Bee Breeding Program.  Encourage these colonies to raise more drones to help in spreading and maintaining the mite resistant genes.
Drone Trapping: Using frames with drone foundation or without foundation	Insert one to two frames with drone foundation or empty drone comb into the brood chamber. Remove combs containing drone cells from the brood chambers after the cells are capped and before adult drones emerge (approx. 21 days). This will remove a substantial proportion of varroa mites from your colonies. Repeat from spring until the drones are evicted from the colony in early fall and you will get results equivalent to treating with a registered product.	<b>Note:</b> Do not leave drone combs to hatch inside colonies. This will result in the release of a large number of varroa, thereby increasing the mite infestation in the colony.  Drone Trapping instructions can be found in the PUBLICATIONS section of the OBA Tech-Transfer website: ( <a href="http://techtransfer.ontariobee.com">http://techtransfer.ontariobee.com</a> )  <b>Note:</b> Although drone trapping is labour intensive on a commercial scale, it can be used throughout the season to suppress mite infestations, even during the honey flow as no chemicals are used.
Screened bottom board	You need a 1 and 1/2" spacing to have the varroa fall through the screen separated from the bees.	Screened bottom boards - incorporate 8 mesh (8 squares/inch) screens into bottom boards.  <b>Note:</b> Although screened bottom boards <i>may slightly</i> enhance mite drop when used with some treatments they <i>will not substantially</i> reduce mite infestations alone.
August		
	Monitor	In early August, check all bee yards (at least 5 hives in each) using the monitoring method of your choice to ensure that varroa infestations are not above treatment threshold levels.  <b>Note:</b> Refer to Table 9 on page 11 in the Notes section to determine if treatment is necessary.  The bees that form your winter cluster are hatched in late August/ early September. If they are highly infested, they will have sustained enough damage that the colony will not winter properly and will likely die.

Table 1 continued

Treatment Material	Method of Treatment	Comments
Early Fall		
<p>As soon as you remove the honey supers (by mid-September). Treatments applied late in September and October have less ensured efficacy.</p> <p><b>Note:</b> Due to potential efficacy constraints caused by environmental conditions of treatments that are temperature dependent and the potential for resistance in chemical treatments, it is <b>HIGHLY</b> recommended that you <u>monitor</u> after the early fall treatment in order to determine if the treatment was effective or if a follow-up treatment of oxalic acid is necessary.</p> <p><b>REMINDER</b> - It is <b>HIGHLY</b> recommended that the colonies consist of 7-8 frames of bees at the end of the season to ensure successful over-wintering of the hives.</p>		
Mite-AwayII™ (formic acid)	Treat all colonies using Mite-Away II™ single application pads, according to label instructions.	See the top of page 6 for further instructions on formic acid.
65% liquid formic acid.  Multiple applications: 30 –40 ml for 2-story colony; 15-20 ml for 1-story colony.	Same as spring treatment  <b>Note:</b> Refer to the most recent formic acid label for full instructions.	This treatment is good for both HB™ and varroa mites.  Outside high temperatures should be above 4°C at the time of application.  For complete label instructions and future updates refer to: <b>NEW</b> <a href="http://www.medivetpharmaceuticals.ca//Guidelines/Label%20Formic%20Acid%2065%20percent.pdf">http://www.medivetpharmaceuticals.ca//Guidelines/Label%20Formic%20Acid%2065%20percent.pdf</a>
Apivar®, CheckMite+™ or Apistan®	Use strips according to label instructions.  Dispose of chemical strips according to label instructions.	If treating during a period when environmental temperatures are low, ensure the strips are positioned in the colony where the cluster will still maintain contact. <b>Remove all strips after treatment.</b>  Carefully monitor your bees and treat when monitoring results indicate that varroa levels are above the treatment thresholds. <b>See the NOTES section for monitoring methods.</b>
Thymovar <b>NEW</b>	Use according to label instructions.	<b>Note:</b> Two applications of Thymovar must be applied for a complete treatment.
Mite Away Quick Strips™ (MAQS™) <b>NEW</b>	Use according to label instructions.	When possible <b>rotate</b> between treatment products with different active ingredients. This <u>may</u> either keep CheckMite+™, Apistan® & Apivar® effective (for extremely high mite infestations) by preventing the development of <b>resistance</b> to these products or allowing those areas with known resistance to revert back to susceptibility.
Late Fall		
Oxalic acid trickle method	Apply when monitoring indicates treatment is necessary. <b>CAUTION:</b> Oxalic Acid may damage bee brood. Oxalic Acid will <b>NOT</b> control varroa mites in capped brood.  <b>Use only when little or no brood is present.</b> Use only in conjunction with an early fall treatment. <b>DO NOT USE</b> when honey supers are in place to prevent contamination of marketable honey.	<b>SOLUTION METHOD</b> <b>Note:</b> To completely dissolve oxalic acid dihydrate, use warm syrup (NOT HOT) and agitate thoroughly. Dissolve 35 g of oxalic acid dihydrate in 1 litre of premixed syrup made from a 1:1 sugar:water (weight:volume) mixture. Smoke bees down from the top bars. With an applicator (e.g. syringe), trickle 5mL of this solution directly onto the bees between the frames, apply on a cool day when the bees are clustered in the hive. The maximum dose is 50mL per colony whether bees are in nucs or single/multiple brood chambers. Under certain unfavorable conditions, e.g., weak colonies or unfavorable over-wintering conditions, this application method may cause some bee mortality or stress to the colony.  Use Oxalic Acid as a <b>secondary follow up</b> treatment at the time of packing the bees. Oxalic acid should only be used in conjunction with an early fall treatment to assist in killing remaining mites left on the bees.

## FORMIC ACID PROCEDURE

When using Formic Acid, make sure to seal all holes in the hive boxes except the main entrance, which must be left wide open (remove entrance reducers). To prevent danger to yourself, wear protective gear (eye protection, chemical-safe gloves, long-sleeved shirt, and closed toe shoes). Have a container of water handy to wash off any splashes. Be mindful of temperature restraints when using formic acid. **Mite-AwayII™** and **Mite Away Quick Strips™** should be administered when daytime highs are consistently between **10-26°C** and **10-27°C** respectively, while 65% liquid formic acid should be administered when daytime highs are **10-26°C**. If using **Mite Away Quick Strips™**, ensure that the colony consists of a population of bees that covers a minimum of six brood frames.

Table 2

Acarine Disease: Honey Bee Tracheal Mite (HBTM) ( <i>Acarapis woodi</i> )		
If infestation level is 10% or higher, then treat your colonies. If you are using formic acid for varroa treatment, you do not need further treatments for HBTM.		
<b>Detection:</b> Every fall and/or spring, place 150 bees/bee yard OR 50 bees/colony in alcohol and send samples to the diagnostic bee labs. See page 11 for sampling instructions and contact labs for shipping instructions.		
Treatment Material	Method of Treatment	Comments
Spring		
It is better to wait for warmer weather, and until the bees get some brood. On really small colonies, move the brood to the side of the hive and place pad in the middle.		
Mite-AwayII™ (formic acid)  single application pad (250 mL/pad)	Place the Mite-Away II™ single application pad on ½" spacers on top bars. Accommodate another ½" on the top of the pad by using a rim. Leave for 21 days.	<b>Note:</b> Read the label carefully for duration and temperature guidelines  This treatment requires only one application
65% liquid formic acid 35ml multiple application formic acid pad (ensure that a total of 3 pads are applied)	Use one 35ml pad per hive. Place the pad on the top bars close to the brood area.	It is important to apply the pads 3 times, 4 days apart, for HBTM.
Late Spring and Summer		
HBTM resistant queens	Requeen your colonies with queens from HBTM resistant stocks once every two years.	Encourage these colonies to raise more drones to help in spreading and maintaining the resistance genes.
Fall		
After harvesting the honey crop (by mid-September)		
65% liquid formic acid or Mite-AwayII™, same as spring treatment.	Treat as described in the spring treatment after harvesting the honey crop.	If you treated with formic acid in the spring, it will not be necessary to treat again in the fall, unless the HBTM infestation level in the fall samples is 10% or higher.

Table 3

<span style="background-color: yellow; border: 1px solid black; padding: 2px;">NEW</span> <b>Small Hive Beetle (SHB) (<i>Aethina tumida</i>)</b>		
<b>Detection:</b> The larval and adult stages of SHB and damage caused by the larvae of SHB can be observed in the honey bee colony or on exposed hive equipment. See: <a href="http://www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm">http://www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm</a>		
Treatment Material	Method of Treatment	Comments
Throughout Beekeeping Season		
	Best management practices.	<p>Maintain strong, healthy, populous colonies.</p> <p>Take immediate action to address weak or failing colonies. Promptly requeen failing queens. Do not leave dead and exposed equipment exposed.</p> <p>Ensure that colonies do not have large areas of the hive that are not protected by worker bees.</p> <p>Monitor colonies for the presence of SHB, mechanical traps can be used throughout the season.</p>
Spring and Fall		
Honey Bee Colonies - Outside of the nectar flow		
CheckMite+™	<p>Place one CheckMite+™ strip in a SHB trap constructed of corrugated cardboard or plastic. The strip is to be stapled to the corrugated material. Traps should be placed with corrugations facing down so that bees may not access the strip.</p> <p>Place trap on the bottom board, towards the back of the colony.</p>	<p><b>Note:</b> Treatments can not be applied during a honey flow. Do not replace honey supers until 14 days after the strips are removed.</p> <p>Do not treat the same colony with Checkmite+™ more than twice a year.</p> <p>See CheckMite+™ label for full instructions.</p>
Apiary (or bee yard) - Soil Drench		
Permanone® <span style="background-color: yellow; border: 1px solid black; padding: 2px;">NEW</span>	<p>Use a mix dilution rate of 5.3 ml Permanone® in 1 L of water. Apply as a light soil drench application in an area 45 -60 cm wide in front of each hive known to have SHB infestations. Apply in late evening after bees become inactive or for pre-placement cleanup of an apiary, apply to ground surface 24-48 hrs prior to hive placement.</p> <p><b>Note:</b> Apply one application per site in spring and one application per site in the fall, when monitoring determines application is necessary.</p>	<p><b>Note:</b> The active ingredient of Permanone® (Permethrin) is <u>highly toxic to bees</u>. Extreme caution should be taken to avoid contact with bees or hives through spray, spray drift or any residual exposure on any surfaces that bees may contact.</p> <p>Soil drench treatments should only be used in cases of high levels of SHB infestation in yards.</p> <p>The ground where the treatment is applied should be mowed or managed so that the soil is exposed prior to application. Ensure no pooling of drench solution where bees can potentially collect contaminated water. For best beekeeping management practices, hives must be elevated on hive stands and a landing platform attached to the hive entrance.</p>
Extraction Facility		
	Best management practices.	<p>Ensure that no brood is brought into the honey house with honey supers, particularly when managing colonies without queen excluders.</p> <p>Extract honey supers promptly, ideally within two days, no more than four.</p> <p>Clean extracting facilities on a regular basis.</p> <p>Maintain the humidity of hot rooms at ≤50% relative humidity.</p> <p>Store wax cappings in sealed containers.</p>

For more details on small hive beetle treatments, identification, biology and best management practices see the following documents: <http://www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm>

Table 4

<b>American Foulbrood (AFB) (<i>Paenibacillus larvae</i>)</b>		
<b>Control measure:</b> <b>This is a serious, readily transmissible disease.</b> Be aware of the symptoms for this disease! Action should be taken immediately after AFB is found to prevent further spread of the disease ( <b>See Below</b> ). There is <b>NO CURE</b> for AFB. However, several <b>PREVENTATIVE</b> actions can be taken.		
Treatment Material	Method of Treatment	Comments
Spring and Fall		
OXYTET-25-S or OXYSOL-62.5 powdered sugar mix. Follow the label directions for preparation of material.  Label must indicate that the mixture can be used for honey bees.	Treat according to the label on OXYTET-25-S or OXYSOL-62.5 with the powdered sugar mix along the margins of the brood chamber. Be careful not to put powdered mix directly on to open brood. Repeat 3 times at 4-5 day intervals in the spring and in the fall. Stop treating 4 weeks before the main honey flow.	<b>PREVENTATIVE MEASURE:</b> All bee colonies should be treated.  It is not recommended to use the sugar syrup method of application or products such as pollen substitutes as carriers, as this can contaminate honey, is less effective and will promote resistant AFB strains.
Throughout Beekeeping Season		
At <b>any time</b> when colonies show symptoms of AFB (e.g. brown scales and sticky to ropy dead larvae)		
Burn all infected equipment and kill the bees	Burn all frames, bottom boards and bees of infected hives. Scorch empty bee boxes, inner covers and lids. See OMAFRA recommendations or consult with your local bee inspector for further instructions. For instructions on destruction and sterilization: <a href="http://www.omafra.gov.on.ca/english/food/inspection/bees/destructionprotocol.htm">http://www.omafra.gov.on.ca/english/food/inspection/bees/destructionprotocol.htm</a>	Report to your Bee Inspector immediately and ask for recommendations.  Contact: <a href="http://www.omafra.gov.on.ca/english/food/inspection/bees/info_beeinspectors.htm">http://www.omafra.gov.on.ca/english/food/inspection/bees/info_beeinspectors.htm</a> or call: 1-888-466-2372 ext. 63439; <a href="mailto:fpo.omafra@ontario.ca">fpo.omafra@ontario.ca</a>
Treat the rest of the bee yard with OXYTET-25-S or OXYSOL-62.5 powdered sugar mix	Treat all remaining colonies with OXYTET-25-S or OXYSOL-62.5 powdered sugar mix. Repeat 3 times at 4 - 5 day intervals. Stop treating 4 weeks before the main honey flow.	Perform regular inspections on all remaining colonies for any symptom of AFB.
Gamma irradiation	Disinfect contaminated empty hive parts using irradiation. Supers with frames without bees should be placed in containers that are inaccessible to honey bees ("bee tight") for irradiation.	Using 1.2 M rads will completely sterilize the combs and hive parts.  For details, contact Isomedix in Whitby, ON at 905-433-1202.

Table 5

<b>European Foulbrood (EFB) (<i>Mellisococcus pluton</i>)</b>		
<b>Control measure:</b> You do not need to kill the bees as with AFB. Replace infected combs with new non-infected combs or foundations.		
Treatment Material	Method of Treatment	Comments
Spring and Fall		
OXYTET-25-S or OXYSOL-62.5 powdered sugar mix	Treat according to the label on OXYTET-25-S or OXYSOL-62.5 as described for AFB.	<b>Preventative measure:</b> Same as AFB.
At any time when colonies show symptoms of EFB (e.g. brown, twisted larvae).		
	Replace infected combs	Burn or irradiate all removed infected combs as above.
OXYTET-25-S or OXYSOL-62.5 powdered sugar mix	Treat according to the label on OXYTET-25-S or OXYSOL-62.5 as described for AFB.	Treat all colonies with OXYTET-25-S or OXYSOL-62.5 powdered sugar mix. Repeat three times at 4 - 5 day intervals. Stop treating 4 weeks before the main honey flow.
	New queens	Requeen colonies in the bee yard with new queens from Mite and Disease Resistant Hygienic stocks.



**Table 6**

<b>Nosema (<i>Nosema apis</i>; <i>Nosema ceranae</i>)</b>		
<p><b>Detection:</b> Obtain at least 50 adult bees from the front entrance of suspected colonies and send to a bee testing laboratory for diagnosis.</p> <p><b>Note:</b> The new species of nosema, <i>Nosema ceranae</i>, may be a problem throughout the season. Beekeepers should monitor spore levels regularly.</p>		
Treatment Material	Method of Treatment	Comments
Spring		
Fumagilin-B	<p>Feed bees a mix of Fumagilin-B with sugar syrup in spring if you have a high level of infection (&gt; 1 million spores/bee). Protect your Fumagilin-B medicated sugar syrup from direct sunlight when feeding bees.</p> <p>To ensure individual colonies receive the accurate dose of Fumagilin-B, mix as per label instructions and apply using direct-to-colony feeding techniques (bag feeding, pail feeding, etc.)</p>	<p>Replace three empty brood combs from the brood box to reduce the level of nosema and accumulation of acaricides in the wax.</p> <p>Spring feeding with Fumagilin-B is important.</p>
Late Spring/Summer		
	New queens	Requeen colonies when new queens are available
Fall		
Fumagilin-B	Feed bees a mix of Fumagilin-B with sugar syrup as described above.	The fall feeding is also important to protect bees during the winter season and ensure the survival of the colony.

**Table 7**

<b>Chalkbrood (<i>Ascosphaera apis</i>)</b>		
Treatment Material	Method of Treatment	Comments
Spring and Summer		
	New queens	There is no registered chemical treatment for Chalkbrood. Maintain strong, healthy colonies and requeen with queens from Hygienic stocks.

**Table 8**

<b>Sacbrood (Virus)</b>		
Treatment Material	Method of Treatment	Comments
Spring and Summer		
	New queens	There is no registered chemical treatment for Sacbrood. Maintain strong, healthy colonies and requeen with queens from Hygienic stocks.

**Toxicological Information**

**65% Formic Acid:** [http://www.hc-sc.gc.ca/cps-spc/pubs/pest/\\_pol-guide/dir2010-03/index-eng.php](http://www.hc-sc.gc.ca/cps-spc/pubs/pest/_pol-guide/dir2010-03/index-eng.php)

**Oxalic Acid:** [http://www.hc-sc.gc.ca/cps-spc/pubs/pest/\\_decisions/rd2010-12/index-eng.php](http://www.hc-sc.gc.ca/cps-spc/pubs/pest/_decisions/rd2010-12/index-eng.php)

**Thymol:** [http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/\\_prd2010-18/prd2010-18-eng.php](http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/_prd2010-18/prd2010-18-eng.php)

**CheckMite+™:** [http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/\\_pmrl2008-31/coumaphos-eng.php](http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/_pmrl2008-31/coumaphos-eng.php)

**Permanone®:** <http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/food-nourriture/mrl-definitions-lmr/index-eng.php>

## **NOTES:**

- No chemicals should be used in bee colonies when honey supers are on the colony or when any honey is produced for human consumption.
- Read the labels of products carefully before use in the beehives and follow instructions and recommendations. Be sure to respect withdrawal times for all treatments.
- Take all the appropriate safety measures (equipment, clothing) as recommended by the label directions when mixing/applying treatments.
- For diagnostic samples, discuss sampling and shipping methods with the diagnostic bee labs.

## **MONITORING METHODS: VARROA MITE**

### **24 Hour Sticky Board**

Coat a thick piece of paper (38 x 30 cm; filing folders work well) using 50% Vaseline/50% Crisco, Tangle Trap paste or sticky material. Place the coated paper under a screen, on the bottom board for three days.

Count the varroa mites on the sticky board and divide by 3 to obtain an average mite fall per day. The sticky boards can also be left in colonies until you return to the yard on the next trip. This will assure that the mites that drop onto the sticky board cannot return to the bees.

### **Ether Roll**

Place ½ cup of bees (approximately 300 bees), from the brood chamber, in a glass jar. Spray with 3-4 squirts of ether (engine starter fluid). Replace lid and shake for 1 minute. Roll the jar, then count varroa stuck to glass and under lid. Do this in a well ventilated area and wear gloves to minimize contact with the ether.

### **Alcohol Wash**

Place ½ cup of bees (approximately 300 bees), from the brood chamber, into a container with alcohol (windshield washer fluid), shake vigorously. Pour bees onto a screen, over a white tub and vigorously rinse varroa from bees. Count the total number of varroa in tub.

Handheld, easy to use, commercially made mite shaker devices that give effective and fast results are available. Follow the directions given with the shaking apparatus. Contact your local bee supply outlet for availability.

## Varroa Mite Threshold Levels

The following are **treatment guidelines**. These suggested levels will vary depending on colony strength, apiary location and management. The best way to determine the proper timing for treatment solutions is to monitor regularly and compare results.

Table 9. Threshold guidelines for varroa mite levels in May and August.

**NOTE: TREATMENT LEVELS HAVE BEEN LOWERED FROM PREVIOUS RECOMMENDATIONS.**

Treat when varroa levels are  $\geq$  the following:

Monitoring Method	Number of Varroa Mites in May	Number of Varroa Mites in August
Ether Roll	1 mite/100 bees	2 mites/100 bees
Alcohol Wash	2 mites/100 bees	3 mites/100 bees
Sticky Board	9 mites/24hr drop	12 mites/24hr drop

### MONITORING METHODS: HONEY BEE TRACHEAL MITES

Tracheal Mite Threshold Level: Treat when infestation levels are at 10%.

Alcohol Sample: Place approximately 150 bees/bee yard OR 50 bees/colony into a container with alcohol and contact a diagnostic lab.

### MONITORING METHODS: SMALL HIVE BEETLE (SHB)

As of March 2011, the distribution of SHB is restricted to Essex County. However, all beekeepers in Ontario should be on the look out for SHB in their operation as a precaution.

Examine the tops of brood frames (particularly towards the ends of the frames) for the presence of SHB adults immediately after the lid is removed. Adult and larval beetles may also be encountered on the surface of brood frames amongst worker bees. A variety of mechanical traps may be used to monitor for SHB. Consult bee supply outlets for a range of options.

Adult and larval SHB can also be found in dead colonies and exposed colony equipment.

For further details of identification and biology of SHB, see: <http://www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm>

If you suspect that you have SHB in your operation, contact:

1-888-466-2372 ext. 63439; [fpo.omafra@ontario.ca](mailto:fpo.omafra@ontario.ca) or 1-877-424-1300 or [ag.info.omafra@ontario.ca](mailto:ag.info.omafra@ontario.ca)

### MONITORING METHODS: AMERICAN FOULBROOD (AFB)

Examine brood frames as you open colonies. Symptoms of AFB include a scattered brood pattern and cappings with a punctured, sunken, dark and greasy appearance. Infected larvae settle to the bottom of the cell wall in a sunken gooey mass, beige to dark brown in colour. Insert a toothpick into the cell and draw out the contents. AFB will draw out 1/2" and has the consistency of mucous. Check empty cells on brood frames for AFB scales (hardened dark black masses of old dead larvae). **CONTACT YOUR BEE INSPECTOR**

([http://www.omafra.gov.on.ca/english/food/inspection/bees/info\\_beeinspectors.htm](http://www.omafra.gov.on.ca/english/food/inspection/bees/info_beeinspectors.htm))

if you are unsure of your diagnosis of AFB or if you find AFB. Further information about AFB can be found on the OBA Tech-Transfer Website (<http://techtransfer.ontariobee.com>) or in the CAPA Honey Bee Diseases and Pests Publication.

## DIAGNOSTIC BEE LABS:

See the Ontario Beekeepers' Association website: <http://www.ontariobee.com/>

## RECORD KEEPING:

Record keeping is essential to monitoring for pests and disease.

**Example** - Date:

Yard	Colony #	Tracheal Mite %	Varroa Level	Avg Nosema Spores/Bee	Strength: 1 - 3

\*The type and dates of treatments should also be documented in your record keeping.

## **NEW** IMPORTANT DISEASE INFORMATION:

- There is a new pest in the Ontario, the small hive beetle (SHB), *Aethina tumida*. The adult beetle is about 3/16" long, 1/8" wide and dark brown in colour. It has clubbed antennae. The larva looks similar to a wax moth larva, but SHB larva has only 3 pairs of larger pronounced legs and spines along the length of it's body. Also, SHB larva does not spin a cocoon in the hive. Larval SHB attack the developing stages of bees and can kill bee colonies if colonies are not treated.  
**See:** <http://www.omafra.gov.on.ca/english/food/inspection/bees/info-shb.htm>
- These beetles have been found in Essex County, Ontario. They are also present in New York State within 5 km of the Ontario border and in Michigan. Beetles were also confirmed in the province of Quebec along the United States/Quebec border in 2008 and 2009.
- In April 2011, SHB larvae have been found associated with queens originating from Hawaii in the provinces of Manitoba and Alberta. Take particular care when receiving imported queens. Examine queens and packaging for the presence of SHB.
- Inspect your hives for the presence of the small hive beetle. If you suspect SHB in your hives, contact your bee inspector or the office of the provincial apiarist immediately.
- A quarantine area has been established for honey bee colonies and beekeeping equipment for the entire County of Essex and the part of the Municipality of Chatham-Kent lying south-westwards of a line made up of a Town Line Road, Pump Road and Merlin Road (also known as County Road 7) therein, as if these roadways extended continuously from points of intersection with the shorelines of Lake St. Clair and Lake Erie. **See:** [http://www.omafra.gov.on.ca/english/food/inspection/bees/quarantine\\_area.png](http://www.omafra.gov.on.ca/english/food/inspection/bees/quarantine_area.png); <http://www.omafra.gov.on.ca/english/food/inspection/bees/infosheet-shb-quar.html>
- A permit from the provincial apiarist is required for importing bees from anywhere (another province or another country) into Ontario. See <http://www.omafra.gov.on.ca/english/food/inspection/bees/importbees.htm> for details.

## Notes:

### *Author credit*

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