



Varroa Mite Management Options for Atlantic Canada

Important

This publication was compiled by representatives from the Atlantic Tech Transfer Team for Apiculture (ATTTA) using information from the Pest Management Regulatory Agency of Health Canada, and specific pesticide labels. This information is continuously changing and therefore it can cease to be current and accurate. Pesticide labels are the best source of information and should always be consulted prior to using a product. The label is the best source of information on registered uses, rates, withdrawal information, compatibility with feeding and honey production, toxicity, and other special information on its effective and safe use. By printing this publication, ATTTA does not offer any warranty or guarantee, nor do they assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide (miticide) mentioned in this publication.

Warnings

This publication is meant to be used as a reference for possible varroa mite control options. Where there are multiple brand names of a specific active ingredient registered in Canada, ATTTA has only listed a few for

reference purposes and as such does not endorse one brand over another. If you have purchased a generic product not specifically mentioned in this guide which has varroa mite on the label, always follow that product label. If any information in this or any other publication conflicts with the information on the label, always use the label recommendation. If you have an old label, your pesticide supplier should be able to provide you with the newest label. You are legally responsible for the safe use of miticides you purchase. This means the safe transport and storage of these materials, the label rates used, and the safe disposal of containers.

Monitoring for Varroa Mite

Monitoring for varroa mite should be carried out twice per year, at the very minimum (e.g. spring and late summer/early fall). To determine if a treatment worked, monitoring post-treatment is recommended.

For information on how to accurately monitor varroa mite levels, check out ATTTA's *Summer Disease and Pest Monitoring in Honey Bees* fact sheet (<http://www.perennia.ca/wp-content/uploads/2016/04/Summer-Disease-and-Pest-Monitoring.pdf>).



Funders and Contributors:

Bleuets NB Blueberries

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Avoiding Acaricide or Product Resistance

Treatment products should be rotated to avoid mites developing resistance to a miticide. Synthetic miticides should not be used more than once in a 12-month period. For example, if Apivar® is applied in the fall, it should not be used the following spring.

Treatment Options for Varroa Mites

Miticide	Treatment period	Withdrawal period/ Pre-harvest interval	Pros and Cons
Formic acid (65% liquid) Season: -spring or fall	Multiple applications: 30-40 mL on pad for 2 chambers (note: use two small pads in place of one larger pad if larger pads are difficult to find) 15-20 mL on pad for single chamber -apply up to 7 times in 3-5 day intervals Single application: 250 mL on pad in a pin-pricked perforated bag for 21-30 days	-should not be used during honey flow	Pros: -natural treatment -inexpensive -kills phoretic and developing mites -also controls tracheal mites -no withdrawal period Cons: -requires multiple applications -colonies must be strong (6 frames of brood covered with bees – no nucs) -hive entrances must be fully open but screen bottom board closed -cannot use in conditions exceeding 30 °C (optimal temperature range 10-26 °C) -dangerous: corrosive and volatile -corrosive to ferrous metals -cannot be applied during honey flow
Thymovar® Season: spring or fall Mfr.: Biovet AG	Single chamber: -1 wafer (cut in half) for 3-4 weeks then removed, and another wafer (cut in half) for 3-4 weeks Double chamber: -1 wafer, uncut, per brood chamber, two rounds of 3-4 weeks	-cannot use while honey supers on	Pros: -natural treatment -no withdrawal period -safer to use than organic acids Cons: -does not kill varroa mites under capped cells (reason for two rounds of 3-4 week applications) -cannot be applied when temperatures exceed 30°C -expensive -long treatment period

Miticide	Treatment period	Withdrawal period/ Pre-harvest interval	Pros and Cons
<p>MAQS™ (46.7% formic acid)</p> <p>Season: spring, summer or fall</p> <p>Mfr.: NOD Apiary Products</p>	<p>14-day application: -1 strip on top bars in hive for 14 days, replaced by another strip for an additional 14 days. Place between brood chambers if a double hive.</p> <p>7-day application: -2 strips on top bars in hive for 7 days</p>	<p>-30 days between applications (for 7 day treatment) -can be used during honey flow with supers on but feeding with MAQS™ strips in is not recommended</p> <p>Pre-harvest interval: greater than two weeks to avoid unfavourable tasting honey despite formic acid naturally present in honey</p>	<p>Pros: -natural treatment -inexpensive -kills phoretic and developing mites -can be applied in spring or fall -slow release: can be applied during honey flow -7 day treatment does not require multiple applications</p> <p>Cons: -colonies must be strong (6 frames of brood covered with bees – no nucs) -cannot feed with MAQS™ strips in (except for barrel feeding) -hive entrances must be fully open but screen bottom board closed -do not use in conditions exceeding 33 °C (optimal temp range 10-29 °C) -best used in spring and early fall -corrosive to ferrous metals</p>
<p>Apistan® (10% fluvalinate)</p> <p>Season: spring or fall</p> <p>Mfr.: Wellmark International</p>	<p>-1 strip per 5 frames of bees in each brood chamber -minimum 6 week treatment (maximum 8 weeks)</p>	<p>-no withdrawal period but cannot be in hive while honey supers on hives</p>	<p>Pros: -kills developing and phoretic mites -does not require multiple applications -no withdrawal period</p> <p>Cons: -expensive -cannot be applied during honey flow -minimum 10 °C outdoor temperature -pyrethroid; possible resistance -lipophilic</p>
<p>Bayvarol® (flumethrin)</p> <p>Season: spring or fall</p> <p>Mfr.: Bayer</p>	<p>-4 strips per brood chamber -treatment period of 6 weeks (42 days)</p>	<p>-cannot use while honey supers on</p>	<p>Pros: -kills developing and phoretic mites -does not require multiple applications</p> <p>Cons: -may show cross-resistance with Apistan® -expensive -cannot be applied during honey flow -lipophilic</p>

Miticide	Treatment period	Withdrawal period/ Pre-harvest interval	Pros and Cons
<p>Apivar® (3.3% amitraz)</p> <p>Season: spring or fall</p> <p>Mfr.: Véto-Pharma</p>	<p>-1 strip per 5 frames of bees -minimum 6 week treatment (maximum 8 weeks)</p>	<p>-cannot use while honey supers on -14-day withdrawal period: remove strips 2 weeks before placing honey supers</p>	<p>Pros: -kills developing and phoretic mites -does not require multiple applications</p> <p>Cons: -expensive -cannot be applied during honey flow -withdrawal period -minimum 10°C outdoor temperature -formamidine; possible resistance -lipophilic -metabolite 2,4 dimethyl formamidine found in wax and honey</p>
<p>Checkmite+® (10% coumaphos)</p> <p>Season: spring or fall</p> <p>Mfr.: Bayer</p>	<p>-1 strip per 5 frames of bees -minimum 6 week treatment (maximum 45 days)</p>	<p>-cannot use while honey supers on -14-day withdrawal period: remove strips 2 weeks before placing honey supers</p>	<p>Pros: -kills developing and phoretic mites -does not require multiple applications</p> <p>Cons: -expensive -cannot be applied during honey flow -withdrawal period -minimum 10°C outdoor temperature -organophosphate; possible resistance -lipophilic</p>
<p>Formic Pro™ (14 day or 20 day treatment)</p> <p>Season: spring, summer or fall</p> <p>Mfr.: NOD Apiary Products</p>	<p>-14 day: place 2 strips, staggered, across tops of frames in lower brood chamber, near the centre of the box. Leave approximately 2 inches between strips and allow 4 inches between strips and ends of box. -20 day: place 1 strip across tops of frames centre of lower brood chamber. Ten days later, remove the first strip and replace with a second strip.</p>	<p>-allow a minimum of one month between applications -can be used during honey flow with supers on but feeding with Formic Pro™ strips is not recommended.</p> <p>Pre-harvest interval: greater than two weeks to avoid unfavourable tasting honey despite formic acid naturally present in honey</p>	<p>Pros: -natural treatment -inexpensive -kills phoretic and developing mites -can be applied in spring or fall -can be applied during honey flow -14 day treatment doesn't require multiple applications</p> <p>Cons: -colonies must be strong (6 frames of brood covered with bees - no nucs) -cannot feed with Formic Pro™ strips in (except for barrel feeding) -hive entrances must be fully open but screen bottom board closed</p>

Miticide	Treatment period	Withdrawal period/ Pre-harvest interval	Pros and Cons
Oxalic acid (dribble) Season: -early spring for packages -summer for swarms -late fall for all hives	-mix 35 g of oxalic acid dihydrate in 1 L of 1:1 sugar syrup (treats 20 colonies) -trickle 3-5 mL between each frame (max 50 mL per hive) directly on top of bees	-should not be used during honey flow or when brood present	Pros: -inexpensive -natural treatment -can be applied to swarms and packages of bees Cons: -colony should be broodless (may harm open brood and does not kill developing mites under capped brood) -only late fall treatment for established colonies -must open hive to apply -may require multiple applications -dangerous: corrosive -best used to supplement early fall treatment e.g. formic acid
Oxalic acid (vapour) Season: late fall	-1 g of oxalic acid dihydrate per deep hive super -vapourize in sealed hive for 2-3 minutes, remove vapourizer and keep hive sealed for additional 10 minutes	-should not be used during honey flow or when brood present	Pros: -inexpensive -natural treatment -do not have to open hive to apply treatment -can be used on swarms and packages Cons: -colony should be broodless (may harm open brood and does not kill developing mites under capped brood) -only late fall treatment -may require multiple applications -dangerous: corrosive; vapours harmful when inhaled -best used to supplement early fall treatment e.g. formic acid

Integrated Pest Management

There are numerous natural and synthetic chemical treatment options available to control varroa mites in addition to alternative or complementary non-chemical means of control. Beekeepers are encouraged to practice Integrated Pest Management (IPM) in an effort to mitigate the development of miticide resistance. The following cultural and physical control methods are available to beekeepers.

Drone trapping

Varroa mites reproduce greater numbers of offspring in drone cells due to the longer developmental time of drone pupae. Honey bee colonies rear the highest number of drones in the late spring and early summer. Beekeepers can exploit the varroa mite's preference for drone brood as a means of cultural control by culling frames of capped drone brood in May and June. This process is advantageous as it is an alternative to chemical control but it can be time consuming for those who manage many hives. Strict timelines must be followed for drone trapping to be effective to avoid raising unwanted

numbers of drones and mites. Furthermore, dedicating one frame's worth of space to raising drone brood results in less space the colony could use to rear worker brood or store food.

Screened bottom board

Bottom boards with screens are available as alternatives to solid bottom boards and are a useful IPM tool. Removable sticky boards can be placed beneath the screen and left for a period of time to monitor the number of mites that die and fall to the bottom of the hive naturally or as a result of a treatment. These sticky bottom boards can couple as both a monitoring technique and a means of controlling mite populations by trapping mites to a sticky board that may otherwise crawl back onto bees. Screened bottom boards on their own will not adequately control varroa mite but they can be used in conjunction with other treatments.

References

Health Canada (<http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>)

Honey Bee Diseases and Pests. 3rd Edition. Canadian Association of Professional Apiculturists.

Ontario Treatment Recommendations for Honey Bee Disease and Mite Control (<http://www.omafra.gov.on.ca/english/food/inspection/bees/2014-treatment.htm>)
Recommendations for Management of Honey Bee Diseases and Pests in Alberta 2014-2015 ([http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/prm13239/\\$-FILE/2014-recommendations.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/prm13239/$-FILE/2014-recommendations.pdf))

2017 Recommendations for Administering Antibiotics and Acaricides to Honey Bees (<https://www.gov.mb.ca/agriculture/crops/production/pubs/administering-antibiotics-and-acaricides-to-honey-bees.pdf>)

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