Healthy Bees. Healthy Planet.

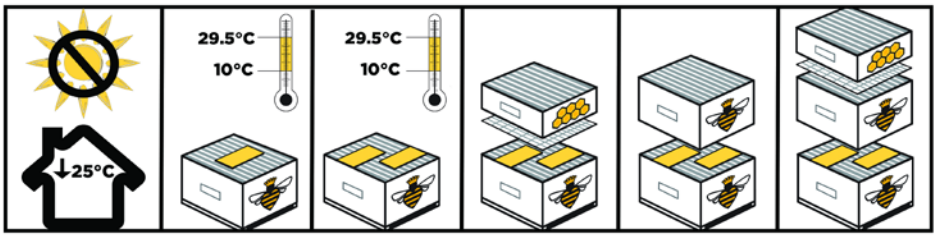
May 2013

Mite Control with Mite Away Quick Strips® (MAQS)
Avoiding Resistance, High Pathogen Build-up & Queen Management, Canada

With *MAQS* beekeepers can treat at the most beneficial times because the treatment can be applied with or without honey supers on the hives. Mite resistance to the A.I. (formic acid) is not expected to occur. Timely treatment can protect both key bee populations from varroa and tracheal mites: **Summer bees** for the honey crop; and the **winter bees** that will make up the overwinter cluster. Most colonies handle treatment with *MAQS* without difficulty and the invigorated colonies surge forward; however it is a powerful, acute, transparent treatment: background colony health issues, such as queen frailty, may be exposed. See reverse.

Natural queen supersedure typically occurs in the spring or in August. The timing of a 7-day treatment with *MAQS* can be part of ensuring fit queens, as well as a tool for mite control, working with the natural, bee-identified best times. Queen cells seen pre and post treatment should be left in place, to become the young, locally raised and mated queens going forward. Alternatively, beekeepers can replace queens with the stock of their choice. Below are quick reference tools: a *Best Practices Check List and Storage & Application Options Pictogram.*

Success with MAQS®: **Best Practices** Check List				
Target Goals Populations/Practices	**When (Canada)**	**Dose Options Recommended**		
Varroa Level Assessment (IPM)	Monitor through the season ☐	Alcohol wash or sugar shake ☐	Sticky Board ☐	
Summer Bees: Honey Crop	Spring: Fresh pollen reared nurse bees present (4 weeks after 1st natural pollen) ☐ **Treat:** Typically May	Full dose (2 strips) ☐	Or: 1-strip every 6 to 8 weeks ☐	
Winter Bees: Overwintering	Starting mid-August **Treat:** sooner better than later to keep viruses down and to allow time for natural queen supersedure that may occur. ☐	Full dose (2 strips) ☐		
Good food reserves:	Always	Spring ☐	Summer ☐	Fall ☐
Ventilation full width of hive:	During treatment ☐			
Brood area check:	One month after treatment. ☐			
Always take the time to read and follow the label.				



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Info Sheet: Mite Control Impact on Queen, Drone & Colony Health

Varroa destructor is the #1 threat to honeybees. The varroa themselves don't actually kill the bees; they amplify pathogens, such as viruses. This occurs in queens and drones as well as workers. Last year, 2012, was a perfect-storm year for high virus build-up before the end of summer: for best results treatment typically needed to be done before the end of August.

Beekeepers now have access to many tools to manage mite levels, yet all treatment products have side effects and constraints on their use. With the alternative products the side effects are readily seen; with the conventional products they may be hidden for a period of time. Beekeepers need to weigh the risks and benefits of each option when adopting a varroa control strategy. Education is key: the chart below lists a number of studies available from the research community. Studies on *Mite Away Quick Strips® are* available at: http://www.nodglobal.com/research.html. Studies regarding resistance to conventional active ingredients such as fluvalinate, flumethrin, coumaphos and amitraz were not included, as the risks from colonies crashing when resistance emerges are well known.

Study Title	Year, Institution	Key Relevant Points Quoted
Viruses		
Dead or Alive: Deformed Wing Virus and *Varroa destructor* Reduce the Life Span of Winter Honeybees.	2012, Swiss Bee Research Centre, Switzerland. *Applied and Environmental Microbiology*, p.981-987	*V. Destructor is the major driver of colony mortalities… related to a chronic reduction in honeybee lifespan…(due to) DWV in bee tissues when winter bees are produced.*
Localization of deformed wing virus infection in queen and drone *Apis mellifera L.*	2006, INRA, Université Montpellier II, France; Penn State University USA. *Virology Journal* 2006 3:16.	*DWV infection …. spread in the whole body, including queen ovaries, queen body fat and drone seminal vesicles.*
Deformed wing virus: replication and viral loads in mites (*Varroa destructor*)	2009, Institute for Bee Research, Germany; Ruhr University, Germany. *Journal of General Virology* (2009), 90, p. 463-476	*The results support the correlation between viral replication in mites and the morphologically deformed bees.*
Viruses Associated with Ovarian Degeneration in *Apis mellifera L*. Queens.	2011, Swiss Bee Research Centre, Switzerland; Université Montpellier II, France; Montpellier SupAgro, France; Queen's University Belfast, Northern Ireland; Swedish University of Agricultural Sciences, Sweden. *Plos ONE*, V.6, Issue 1	*Egg laying deficiencies were found in all age classes (1 to 3 years). Presence of viruses in queen ovaries (were) associated to follicle degeneration ….. a new pathological condition of honeybee queens …. consists of extensive lesions ….. these lesions were found associated with large numbers of empty ovarioles…*
Mating Conditions		
Effects of Honeybee Queen Weight and Air Temperature on the Initiation of Oviposition.	1987, Agriculture Canada Research Station, Alberta. *Journal of Apiculture Research* 26(2) p.73-78.	*1396 Queens were tracked. The majority of the queens commenced laying after periods of daily (high) temperature below 25ºC. …… Many queens started to oviposition within 24 hours after the first warm day (21ºC) following a period of maximum daily temperature below 20ºC.*
Effects of Acaricides, negatives and positives.		
Evaluation of Secondary Effects of some Acaricides on Apis mellifera I. (Hymenoptere, Apidas): Acetylcholinesterase and Glutathione S-Transferase Activities.	2008, University of Annaba, Algeria. *European Journal of Scientific Research*, V.21, No.4. p.642-649.	*Acaricides tested: flumethrin, amitraz, thymol, and thymol blended with essential oils. Bees are exposed to toxic stress when acaricides, especially synthetic ones, are used as treatments in hives.*
Effects of coumaphos on queen rearing in the honey bee, *Apis mellifera*	2004, United States Department of Agriculture, ARS. *Apidologie* v.35 (2004), p.605–610	*The current research clearly demonstrates that miticide residues in wax have the potential to adversely affect queen health*
Survival of Honey Bee (Hymenoptera: Apidae) Spermatozoa Incubated at Room Temperature from Drones Exposed to Miticides.	2008, Virginia Polytechnic Institute and State University. *Journal of Economic Entomology*, v.101, No.4. p.1081-1087	*The exposure of drones to coumaphos during development and sexual maturation significantly reduced sperm viability. Coumaphos should not be used in colonies where drones are produced.*
The effects of Formic Acid Gel on Drone Production.	1999, United States Department of Agriculture, ARS. *American Bee Journal*, April, 1999, p.304-307	*Formic acid treatment did not adversely affect drone weight, or the weights of mucus glands or seminal vesicles. Indeed, formic acid treatment resulted in surviving drones having a higher average number of spermatozoa (>40%). Half the number of drones were produced.*
Indoor winter fumigation with formic acid does not have a long-term impact on honey bee (Hymenoptera: Apidae) queen performance.	2008, University of Manitoba, Canada. *Journal of Apiculture Research*, v.47(2) p.108-112	*Whether a long term "low" concentration or a short term "high" concentration was used, surviving queens were as productive as untreated wintered queens.*