

# Mite Away Quick Strips™ (MAQS™), Improved Single Application Formic Acid

*Submitted by Les Eccles, OBA Tech-Transfer Program*

NOD Apiary Products Limited, best known for their now unavailable 250 ml formic acid pad product Mite-Away II™, has successfully registered their new formic acid product Mite-Away Quick Strips (MAQS™); making it legal for use in Canada. The use of formic acid as a treatment for varroa mites requires specific application methods to obtain its benefits, and reduce the risks associated with formic acid application. MAQS™ claims to have additional benefits over other formic application methods which include:

- Biodegradable: bees will remove leftover material and eliminate the need to return and remove treatment materials.
- Kills varroa mite under capped brood
- Can be used during warm temperatures and during a honey flow
- No rim or extra equipment necessary
- Kills most mites in first 3-4 days of treatment



The Technology Transfer Program, which works as education and research extension specialists for the Ontario Beekeepers' Association, performed a two year (2010-2011) study to verify the claims made for MAQS™. Both years looked at the performance of

MAQS™ during the summer (July) and fall (Sept) in southwestern Ontario. These are their results:

## Summer Trials

Because this application occurred during the honey flow, honey supers were in place. This is an important point to consider since efficacy of formic acid applications can greatly differ with the space inside of a colony. Observations were taken on these colonies to assess the rate of mite drop, total mite drop, effect on bees, queens and brood, and MAQS™ ability to kill mites under the capped brood.



Under the MAQS™ treatment, the vast majority of the mites dropped in the first three days. In total MAQS™ increased the amount of mite drop in colonies 300% compared to control colonies. Under capped brood, MAQS™ killed approximately 80% of the mites; this is a unique characteristic of the MAQS™ product compared to other formic acid treatments that require brood to hatch and kill mites as they emerge from cells.

Observations were made to identify concerns related to formic acid applications that can have an effect on queens and brood, especially during warm daytime temperatures (>27 C). Between the two years, an approximate 20% queen loss was observed in colonies treated with MAQS™ compared to control colonies that lost only 3% of queens from natural supercedure. Damage on brood was observed in approximately 50% of colonies; which is typical of 250 ml single application formic acid treatments. Bee mortality was 5x higher in colonies treated with MAQS™ compared to control colonies during the trial period. However, it should be noted that control colonies began to crash

## MAQS™ continued...

soon after the trial because no varroa control was applied. This is the compromise factor often associated with aggressive formic acid treatments.

### Fall Trials

One comparative difference with the fall trials was the application of Mite-Away II™ alongside MAQS™ in order to compare a similar style application (single application) of formic acid; even though Mite-Away II™ is no longer available. The idea is to confirm differences in claims from MAQS™ as an improved product and identify its advantages or disadvantages to a similar product. 2010 used single brood chambers and 2011 use evenly distributed single and double brood chambers.



MAQS™ and Mite-Away II™ performed well with 95% and 97% control in 2010 and 87% and 74% control in 2011 respectively. The slight difference in years could be related to the overall sensitivity to environmental factors related to formic acid, however the impact of environmental differences seem to be reduced for MAQS™.

In the fall there was no evidence of increased queen mortality between MAQS™, Mite-Away II™, and control colonies. However, similar to summer trials, approximately 50% of colonies treated with MAQS™ and Mite-Away II™ exhibited brood damage. This effect in the fall often concerns beekeepers, because this brood provides young bees that maintain the colony through the winter.

Observations of varroa mites under capped brood during the fall trials confirmed the claim that MAQS™ is an improved product in that it has the

ability to kill mites under capped brood. 100% of mites examined under capped brood treated with MAQS™ were dead, compared to only ~30% treated with Mite-Away II™. This could account for improved consistency in efficacy for MAQS™ compared to Mite-Away II™.



Those that are familiar with Mite-Away II™ or 250 ml formic acid pads, know that a special rim is required to elevate the space between the brood chamber and the inner cover, in order to provide space for these large pads. MAQS™ was designed to eliminate the need for a rim therefore requiring less material and labour to apply the treatment. However it is important to tape/plug any holes between boxes, inner covers or in worn equipment, to prevent the formic acid vapours from escaping too quickly; this does not include the entrance which should be left completely open. Following the label for application methods is extremely important to ensure consistent efficacy; using safety equipment such as gloves and respirators is still required.

MAQS™ was designed and tested by NOD under the environment of southern Ontario, and the TTP's results are consistent with claims made by NOD. However, more testing should be applied in other environments, especially more northern environments, to ensure the application methods for MAQS™ performs with consistent results. Overall, the registration and tested results of MAQS™ has provided a new and innovative tool to beekeepers, allowing the choice to integrate this product into their IPM program.

