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PRODUCT HISTORY

WHAT IS THE DIFFERENCE BETWEEN MITE-AWAY II. MAQS AND THE MITE AWAY QUICK STRIPS?

Mite-Away II was a 21-day formic acid product registered for a short period of time in Canada and the United States. It is no longer available for purchase, however if product is found, it is safe and effective to use. There is no difference between MAQS and the Mite Away Quick Strips, MAQS is simply an abbreviation. The European brand name for the Mite Away Quick Strips is MAQS Beehive Strips.

The strips that I am using now seem to be a different formulation than 2 years ago, what has changed?

There have been no formulation changes to the Mite Away Quick Strips since registration in 2011. We have however changed our distribution strategy to minimize the time the product spends in storage and to maximize the shelf life for our distributors and customers.

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<u>PLANNING A TREATMENT</u>

WHY AND WHEN SHOULD I USE MITE AWAY QUICK STRIPS?

Mite Away Quick Strips should be used as part of an Integrated Pest Management (IPM) program to control viruses. Monitor Varroa levels and treat when economic thresholds (ratio of mites to bees) are reached. Economic thresholds vary by region and season; check with local advisors. Allow a minimum of one month between applications for full dose treatments, and follow up every 2 to 6 weeks with single strip applications throughout the beekeeping season

HOW CAN I BEST PREPARE MY BEES FOR TREATMENT?

Keep your bees well fed and monitor mite levels to keep viruses under control. Higher bee death may be observed in colonies with high virus levels. If necessary, feed your bees before treating with MAQS.



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WHY SHOULD I USE AN INTEGRATED PEST MANAGEMENT PROGRAM (IPM) INSTEAD OF TREATING WHEN I START TO SEE ISSUES?

An IPM includes protocols for regular mite checks and treatments, as well as colony nutrition. If beekeepers see Deformed Wing Virus (DWV), Parasitic Mite Syndrome (PMS) and/or Idiopathic Brood Disease ('snot brood'), it may be too late. Mites reproduce exponentially, and high infestations can quickly take over and crash a colony, especially when bee populations decline in the fall.

WHAT ARE THE TEMPERATURE GUIDELINES FOR MITE AWAY QUICK STRIPS?

Outside daytime temperature highs should be between 10°C - 29.5°C (50°F - 85°F) on day of application. Excessive temperatures (>33°C) (>92°F) during the first three days of treatment may cause excessive brood mortality and queen loss.

IS IT TOO COLD TO TREAT?

Use MAQS when daytime temperatures are above 10°C or 50°F. As the bees play an active role in moving the formic acid vapour throughout the hive, it's important they not be in cluster.

CAN I FEED OR WORK THE BEES DURING THE 7-DAY TREATMENT PERIOD?

Do not disturb colonies during the 7 day treatment period. Barrel feeding is acceptable because it is external and does not interfere with affairs inside the hive.

PERSONAL PROTECTIVE EQUIPMENT (PPE) & HANDLING

WHAT TYPE OF PROTECTIVE CLOTHING SHOULD I WEAR WHEN WORKING WITH MITE AWAY **QUICK STRIPS?**

Applicators and other handlers must wear coveralls over a long-sleeved shirt, long pants, socks and shoes, acid resistant gloves (PVC, neoprene, or nitrile), and protective eyewear. Always have rinse water available.

STORAGE

HOW SHOULD I STORE MAQS PAILS?

MAQS has specific storage requirements to keep it fresh and easy to use for the full year prior to expiry.



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MAQS must be stored below 25°C (77°F) and out of direct sunlight. Store in a dry place in the original container in a well-ventilated area, away from sulphuric acid, oxidizing agents, and sources of ignition. Keep the container tightly closed. Once the sachet (inner packaging) is opened, use the strips immediately.

WHAT IS THE SHELF LIFE FOR MAQS?

MAQS has a one-year shelf life when stored as per label. Each product pail has an expiry date printed on the label, after which it is no longer legal for use. Check pail expiry date before purchase.

WILL FREEZING THE STRIPS EXTEND THE SHELF LIFE?

No. It is a violation of federal law to use MAQS past the expiry date. Freezing does not lengthen the shelf life, but cold temperatures do keep the product fresher throughout its one-year shelf life.

HIVE TYPE & SIZE

I ONLY WANT TO TRY MAQS ON A FEW HIVES IN MY APIARY. IS THIS OK?

No. MAQS should be used to treat all colonies in the apiary at the same time to prevent re-infestation. If you are wanting to test the product on a small number of colonies, prepare the colonies in a separate yard for this purpose. Bees have an average foraging radius of 3km (1.8 mi), so know your beekeeping neighbors and encourage them to treat with MAQS at the same time.

CAN I TREAT MY NEWLY SPLIT NUCS, IF THEY CONTAIN ONLY 4 OR 5 FRAMES OF BEES?

Nucleus box designs vary and most do not have the ventilation required for MAQS use, even for a half dose (1 strip) treatment. Without a full bottom entrance (full width of a full size hive, 1/2" high), hive ventilation during treatment is compromised. MAQS should only be applied on single or double brood chamber standard Langstroth equipment or equivalent (e.g. Dadant, British National). The Honey bee colony cluster must cover a minimum of 6 brood frames (approximately 10,000 bees). If you move your nucs into full size brood chambers and allow them time to expand to a full six frames, you can then treat with MAQS. Always remember to wait 24 hours after working your bees to treat with MAQS.

HOW DO I KNOW IF MY HIVE TYPE IS SUITABLE FOR USE WITH MAQS?

MAQS should only be applied on single or double brood chamber standard Langstroth equipment or equivalent (e.g. Dadant, British National). Entrances must be fully open, the full width of the hive and



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13mm (0.5") in height. Other hive designs have not been thoroughly tested and may not support the ventilation requirements for a successful MAQS treatment.

I USE POLYSTYRENE BEEHIVES IN MY OPERATION, CAN I USE MAQS WITHOUT MELTING MY BEEHIVES OR HAVING SOME OBSCURE CHEMICAL REACTION?

NOD tested pieces of polystyrene and there was no indication that contact with formic acid caused any melting or chemical reaction. Some polystyrene hives require modifications to the hive entrance size in order to meet the label requirements.

VENTILATION

SHOULD I CLOSE OFF ALL ENTRANCES EXCEPT THE FULLY OPEN BOTTOM ENTRANCE?

Ventilation is critical when using MAQS. A fully open bottom entrance, 13 mm (0.5") in height and full width of the hive, are the minimum ventilation requirements. Having additional entrances does not seem to affect the efficacy of the treatment. Close off screen bottom boards for maximum efficacy. Do not consider open screen bottom boards as 'ventilation', as bees draw air to ventilate the colony through the front hive entrance.

HOW CAN I ADJUST MY HIVE CONFIGURATION TO MAKE IT SUITABLE FOR MAQS?

- If a hive design has an entrance where there are internal obstructions between the landing board and the brood chamber, the brood chamber can usually be tipped back to meet the hive entrance requirements. Wedges can be used to hold the brood chamber in place. Because the floor directly under the brood chamber is not solid (often slats), there may be a decrease in efficacy.
- For hives with floors with permanently reduced entrances the second brood chamber can be set back by 1.3mm or 1/2" to create an entrance the full width of the hive during the treatment.
- It is recommended to place an empty honey super on the hive to give the bees room to expand the cluster. There is no loss in efficacy. It is also recommended when treating in late summer and early autumn, to treat while the last honey super is still in place.
- If a bottom board has brood chamber support rims that are less than the minimum 13mm (.5") height, shims (tapered wedges) can be inserted under the lower front corners of the brood



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chamber to increase the entrance opening to a minimum of 13mm (0.5") to comply with the label.

SHOULD I LEAVE THE SCREEN BOTTOM OPEN OR CLOSE IT OFF?

Randy Oliver (www.scientificbeekeeping.com) ran a trial with screen bottom boards and published the results in the February 2011 issue of American Bee Journal. There was a 4% to 5% reduction in efficacy compared to colonies treated in hives with solid bottom boards. However, both open screen and solid bottom boards saw over 90% drop in mite loads. Mesh floor/screen bottom boards should be closed off to prevent formic vapours from dumping out. Bees are not built to move air up through a screen, so open mesh floors should not be considered as additional ventilation. The bottom hive entrance must be fully open during treatment.

APPLICATION & PRODUCT SPECIFICS

WHY DO I NEED TO PLACE THE STRIPS ON TOP OF THE BOTTOM BROOD CHAMBER? WHY **NOT THE TOP?**

MAQS works as a fumigant in the hive and can most effectively penetrate brood caps, where mites reproduce, when strips are placed closest to the brood rearing zone.

WHEN I REMOVE THE OUTER PLASTIC WRAP, SHOULD I PEEL THE INNER PAPER WRAP OFF OF THE GEL?

No. DO NOT REMOVE THE OUTER PAPER WRAPS. The white eco-paper wrap works as a wick to control the formic acid vapour release. Without controlled release, formic acid vapour releases much faster and can overdose a colony.

If paper wraps are removed, do not go back into the hive. Unwrapped gel strips act like a formic flash treatment, so most vapours are released within the first few hours after application. Going back into the hive will only further disrupt the colony and be harder on the bees. It is best to leave the bees to settle for the full 7 days.

THE LABEL SAYS TO AVOID DISTURBING THE COLONY AT TIME OF APPLICATION. CAN I DO A FULL COLONY EXAM AND THEN TREAT IMMEDIATELY, OR SHOULD I WAIT AND COME BACK TO TREAT?



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The bees need to have their affairs in order at treatment time. When running trials, we discovered that the colony assessments were best done 3 days in advance of the application. If the colonies were taken apart, assessed, reassembled and then treated, we noted some absconding and an increased risk in queen loss. After an exam, it is best to wait at least 24 hours before applying MAQS.

ON THE PRODUCT LABEL IT STATES: "THIS PRODUCT IS CORROSIVE. DO NOT ALLOW PRODUCT TO CONTACT METAL SURFACES." ARE THE STRIPS SAFE TO USE WITH METAL QUEEN EXCLUDERS?

Formic Acid vapours are corrosive to ferrous metals, but not to aluminum or most stainless steels. Some queen excluders get a white powder on them and will show rust around the edges over time. Plastic excluders are not affected.

WHY DOESN'T MAQS DEVELOP RESISTANCE?

Formic acid has been used by beekeepers for many years without any signs of resistance. The exact reason for this has not yet been scientifically proven.

HOW DOES MAOS PENETRATE BROOD CAPS?

MAQS is a brood treatment and because 80% of the mite population is found under the brood cap, the strips are placed directly on the top bars of the brood chamber. While the bees fan the vapours, the formic acid molecules are small enough to penetrate the thin wax capping layer and the cocoon of the developing baby bee to reach the mites. Most other miticides kill phoretic mites on adult bees by contact. Bees must brush up against or walk over an impregnated strip or gel solution.

WHAT IS THE EFFICACY OF EXPIRED PRODUCT?

It is a violation of federal law to use expired product. When product expires, it does not lose efficacy, it loses its controlled release. The eco-paper wrap on the outside of the strips begins to breakdown and causes the formic vapours to be released faster, which can cause excessive brood, bee and queen loss. Please check expiry dates before purchasing and treating. Dispose of expired product per the label.

HONEY SUPERS & RESIDUE

CAN I TREAT WITH HONEY SUPERS ON? WHY DOES MAQS NOT LEAVE RESIDUE IN THE **HONEY?**



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Formic acid is an organic acid that naturally occurs in honey. MAQS controls the vapour release of formic acid throughout the 7-day treatment period. By the end of treatment, formic acid levels in the hive reflect what naturally occurs in honey, when applied as per label.

DO I NEED AN EXTRA HONEY SUPER ON WHILE TREATING, OR CAN I TREAT WITHOUT ONE IN PLACE?

No, you do not need to have a honey super on during treatment. However, it is recommended to place an empty honey super on the hive to give the bees room to expand the cluster. There is no loss in efficacy. It is also recommended when treating in late summer and early autumn, to treat while the last honey super is still in place.

FEED & FORAGE

WILL THE BEES CONTINUE TO FORAGE DURING THE TREATMENT?

Yes, the bees continue to forage.

CAN I FEED DURING TREATMENT?

No, feeding of any type that comes in contact with the hive (frame, hive-top feeder) is NOT recommended during treatment. Barrel feeding is acceptable. For optimal success with MAQS, ensure your bees are well nourished before treatment.

BROOD, BEES AND QUEEN HEALTH

WHAT IS THE IMPACT OF MAQS ON THE BROOD?

Any brood damage that occurs is quickly reversed as the queen is laying throughout the cluster area by day 7. There are often lots of eggs by day 4, and regular MAQS users note that gueens lay throughout the treatment. The field bees continue to collect pollen throughout the treatment, so there are good protein reserves when the larvae need feeding. More brood mortality may be observed in colonies with high virus loads.

CAN I REDUCE THE DOSE?

In North American markets, Mite Away Quick Strips is registered with 2 treatment options. In New Zealand, only 1 treatment option (Option 1: 7 DAY) is registered.



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Option 1: 7-Day treatment

Lay two strips, staggering them so they lay flat and across the full width of the brood chamber, with approximately 2 inches between strips and 4 inches between the ends of the brood chamber and the outer edges of the strips. Follow the Application Options pictogram.

Add a honey super with frames at time of application if necessary to provide adequate space for strong colonies to expand, or if a honey flow is expected. It is acceptable to have queen excluders in place.

Allow a minimum of one month between applications. Do not mix with other miticides.

Option 2: 21-day treatment

On Day+0: Lay one strip across the frames in the center of the brood chamber. Follow the Application Options pictogram.

Add a honey super with frames at time of application if necessary to provide adequate space for strong colonies to expand, or if a honey flow is expected. It is acceptable to have queen excluders in place.

On Day+14: Apply a second single strip as described above. The application of the second strip may be delayed if weather conditions at day +14 do not allow for treatment. The second strip must be applied as soon as weather conditions permit to complete treatment.

Monitor your mite levels throughout the beekeeping season. High mite infestations may require more than one treatment.

No studies have been completed on nucleus colonies.

I'VE HEARD THERE CAN BE ISSUES WITH QUEEN HEALTH WHEN USING FORMIC ACID. IS THIS TRUE?

During dearth periods, when ambient temperatures are above 29.5°C (85°F), there is an elevated risk of queen loss, supercedure, or delay in egg laying. Treatment should be postponed until temperatures drop or nectar flow resumes. Formic acid will initially disturb colony activities and may, within one day of application, result in queen rejection or slight increase in adult bee mortality. Some brood mortality may occur in the initial stage of treatment. Colony activity should return to normal by the end of treatment. Do not destroy queen cells that may be observed prior to, or post treatment. Supercedure, even if thought to be set in motion by treatment, is a natural process, and should be allowed to proceed for the



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health of the colony. Verify colonies are queen-right one month after treatment. Mother and daughter queens present post treatment is not uncommon.

COMMON OBSERVATIONS

VIRUS LEVELS

Formic acid highlights pre-existing colony weaknesses. If mite levels exceed local economic thresholds, chances are the virus loads within the colonies are elevated. This can affect the queen's capacity to mitigate the treatment. By following an Integrated Pest Management (IPM) program, colonies can effectively manage mite levels and virus loads.

IT LOOKS LIKE MOST OF THE BEES ARE BEARDING OUT ON THE FRONT OF THE HIVE. IS THIS **NORMAL?**

It is normal for the bees to beard out for the first few days, especially under warmer conditions. See the University of Hawaii photos in their report from 2009, found at: http://nodglobal.com/research-articles/

To help prevent excessive bearding, add an empty honey super with frames to the top of the hive during treatment. This will give the bees space to move up, away from the strips, instead of out on the front of the hive.

I SEE SOME DEAD BEES AT THE ENTRANCE OF MY HIVE, WHAT IS HAPPENING?

There may be an observed increase in adult bee mortality in the first three days after application of between 1 and 2 cups. Remember, natural loss of bees occurs at about the same rate as egg laying. With the treatment the bees may not be able to perform cleaning duties as quickly as usual.

IT STATES ON THE LABEL, SPENT STRIPS DO NOT NEED TO BE REMOVED AFTER TREATMENT. DO THE BEES EAT THE SPENT MAQS?

Honey bees do not eat the strips. Bees are simply carrying out their house cleaning activities by expelling pieces of the strips from the hive, which then naturally decompose in the environment. Strips can be removed from the hive at the beekeeper's convenience.

IS IT TRUE THAT STRONGER COLONIES SEEM TO HAVE MORE VARROA THAN WEAKER **COLONIES?**



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Larger bee colonies have higher mite levels. The more bees, the more mites. Strong hives often rob weaker, varroa infested hives. If after treating with MAQS your strong hives still have a significant mite load, it may be an indicator your bees may be robbing out neighboring infested colonies.

I JUST FINISHED TREATING BUT MY MITE DROP IS VERY HIGH, WHAT IS GOING ON?

MAQS works by penetrating the brood cap to kill mites where they reproduce. The majority of mites (80%) in a hive are found under the brood caps feeding on the developing bees. After a treatment, phoretic mites (mites found on adult bees) have dropped, however mites killed under the brood caps will drop as baby bees emerge from their cells. To get a more accurate mite count, wait a full brood cycle, or 16+ days after treatment.

DISPOSAL

THE BEES CHEWED UP SOME, BUT NOT ALL OF THE STRIPS. HOW DO I DISPOSE OF THE SPENT STRIPS?

The leftover spent strips will compost over time. They can be handled the same way as any other organic yard waste material. The strips can stay in the hive after day 7 as they are no longer releasing formic acid into the hive. The strips can be removed at the beekeeper's convenience, post treatment and composted.

I HAVE SOME UNUSED STRIPS: HOW AND WHERE DO I CORRECTLY DISPOSE OF THEM?

Unused strips need to be taken to your local hazardous waste facility.

For disposal of unused, unwanted, or damaged product: contact the manufacturer or the National Pesticide Information Center at 800-858-7378 (www.npic.orst.edu).