

MAQS® Beehive Strip

An innovative contribution to control *Varroa*



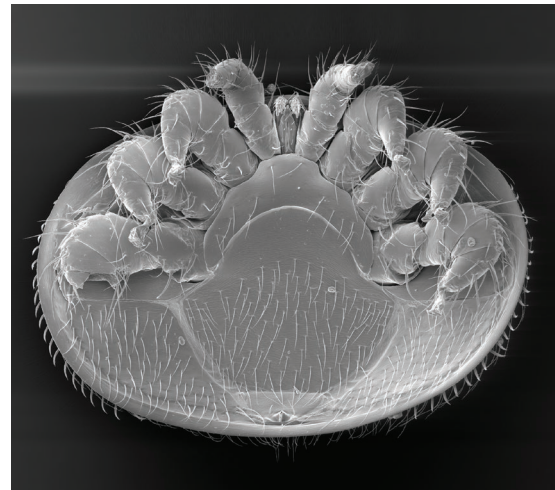
Honey bees are important for agriculture, and it is in the interest of the entire agricultural sector to support healthy bees. While it is essential that agricultural practices – including crop protection – are compatible with beekeeping, additional aspects such as bee diseases need to be addressed as well. The parasitic varroa mite is one of the most important causes of weakening bee colonies. MAQS® Beehive Strip, an innovative way to control the varroa mite, is currently being introduced in Europe. In this roll out, BASF is supporting the Canadian company NOD Apiary Products to develop, register and market the strips. Both companies are confident that this innovative solution can improve the situation for bees and beekeepers.

Honey bee health in Europe

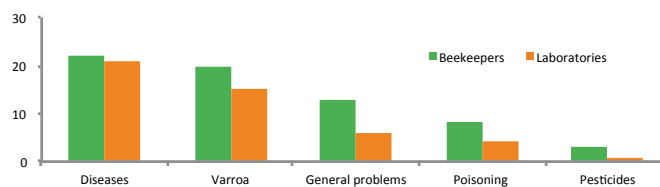
One of the most important pests affecting honey bees is the parasitic mite *Varroa destructor*, an invasive mite that originated in Asia. In addition to the direct impact that this mite has on developing and adult bees, it also transmits and amplifies other diseases such as Nosema and numerous viruses. Leading scientists consider that most colonies affected by Varroa, if left untreated, will suffer damages or collapse within a few years (Rosenkranz et al, 2010).

How do beekeepers in Europe protect their bees from *Varroa*?

- Using veterinary medicines like synthetic acaricides or “soft” acaricides (organic acids and essential oils)
- Partial or total destruction of heavily infested bee combs



Causes for honey bee colony losses



based on EURL survey, 2010 (PLoS ONE 8(11): e79018. doi:10.1371/journal.pone.0079018)

How many veterinary medicines are available to European beekeepers?

According to the latest edition of the Heads of Medicine Agencies EMA (March 2013) and the UK Veterinary Medicines Directorate VMD (July 2013), there are an average of 4 registered medicines per country in Europe. This number varies from zero or one up to 10 products. Most countries have between two and six products registered. However, some of those available products have the same active substance, which limits the real options available to beekeepers.



BASF contribution to MAQS® Beehive Strip

The Canadian company NOD Apiary Products developed an innovative formulation of formic acid that controls the *Varroa destructor*.

BASF provides

- resources and experience in bee research and registration
 - compounds such as formic acid and BASF's certified compostable polymer ecoflex®
- and also cooperates with NOD Apiary Products to bring this innovative product to the European market. As the registration for veterinary medicine products in Europe is complex and diverse, this requires ongoing financial, organizational and registration support.

Development of MAQS® Beehive Strips

1997	2009	2010	2011	2013	2014
NOD Apiary Products was formed.	Development of MAQS® Beehive Strips with ecoflex® and formic acid from BASF.	Cooperation agreement to register MAQS® Beehive Strips in the EU.	Registration of MAQS® Beehive Strips in the U.S.	MAQS® Beehive Strip obtained a marketing authorization as a veterinary medicine in the UK and the process to obtain marketing authorizations in further EU countries started.	The Mutual Recognition Process for additional 16 EU countries should be finalized.

Our Partner NOD Apiary Products

NOD Apiary Products is a Canadian company formed in 1997 by beekeepers in Canada. The founders of NOD saw formic acid as the active ingredient most likely to be able to be developed into a practical, sustainable miticide. Based on the experiences with other beekeeping products, the development of MAQS® Beehive Strips started in 2009 with BASF's support.

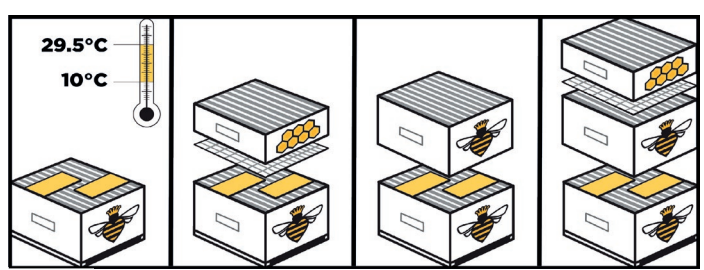
MAQS® Beehive Strip for *Varroa* control

MAQS® Beehive Strip is a novel formulation based on a saccharide gel covered with BASF's biodegradable and compostable polymer ecoflex®. This allows for the controlled release of the active substance formic acid.



Why is MAQS® Beehive Strip important for beekeepers?

- Formic acid kills the *Varroa* mites under the capped brood, where they reproduce and damage the developing bees. Formic acid is a natural part of honey, and it does not contaminate the wax. No resistance has been observed.
- MAQS® Beehive Strip technology allows for controlled release of formic acid. Its formulation is convenient and easy to use, giving beekeepers a flexible and reliable tool.



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