OP-144 [Bee Health]

The use of "Magnetto", a tool for fast capturing of queens, dramatically improves and simplifies ecological Varroa treatment based on organic acids

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Background
Varroa destructor has been devastating honey bee colonies and held the beekeeping world in its grip ever since it spread across the globe some 40 years ago. In absence of a definite solution, organic acids, such as Formic Acid and Oxalic acid have emerged as the most promising natural treatment options. The widespread use of oxalic acid for varroa treatment is hampered by its low efficacy in presence of brood. In contrast, formic acid penetrates brood cells but the exposure to formic acid leads to increased queen losses.

Problem Description
The central hypothesis presented herein is that the ability to quickly capture queens significantly improves organic acid based Varroa treatment practices and makes them more attractive to beekeepers.

Methodology
Field tests with two experimental groups, one for oxalic acid and one for formic acid treatment were performed using Magnetto, our recently developed magnet-based tool for fast queen capturing. After queen capturing with Magnetto, the queens for the oxalic acid group were caged to induce brood free states followed by oxalic acid treatment via dribbling. In contrast, the hives in the formic acid group were subjected to a shock treatment with formic acid, immediately after removing queens with Magnetto and queens were re-introduced 24 or 48 h later.

Results and Conclusions
In a test of 60 hives, Magnetto allowed to find metal plate tagged queens in > 90% of hives in less than 4 minutes. Formic acid treatment after queen removal was well tolerated by the workers. Re-introduction of queens after 24 h did not result in increased queen losses (< 5%), as typically observed for formic acid treatment. Both methods provided treatment efficacies of 96% (oxalic acid) and 95% (formic acid).

Practical Implications for Beekeepers
Magnetto was proven to simplify and improve the treatment efficacy of organic acid based Varroa Treatment by eliminating the crucial bottle neck: the ability to quickly find and remove or cage/ring the queen as a preparation for the treatment. Magnetto reduces the hazard of formic acid treatment by allowing a temporary removal of queens before treatment.

MAGNETTO

PATENT PENDING

Use of „Magnetto”, a novel tool for fast capturing of queens, and its implications for Varroa Treatment

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The idea behind MAGNETTO (1)

The Queen is THE MOST IMPORTANT ANIMAL in the hive

- the only perennial animal in the hive
- the only reproduction competent female
- performance determines overall hive performance
- performance deteriorates with age
- behaviour affects overall behaviour (swarming)

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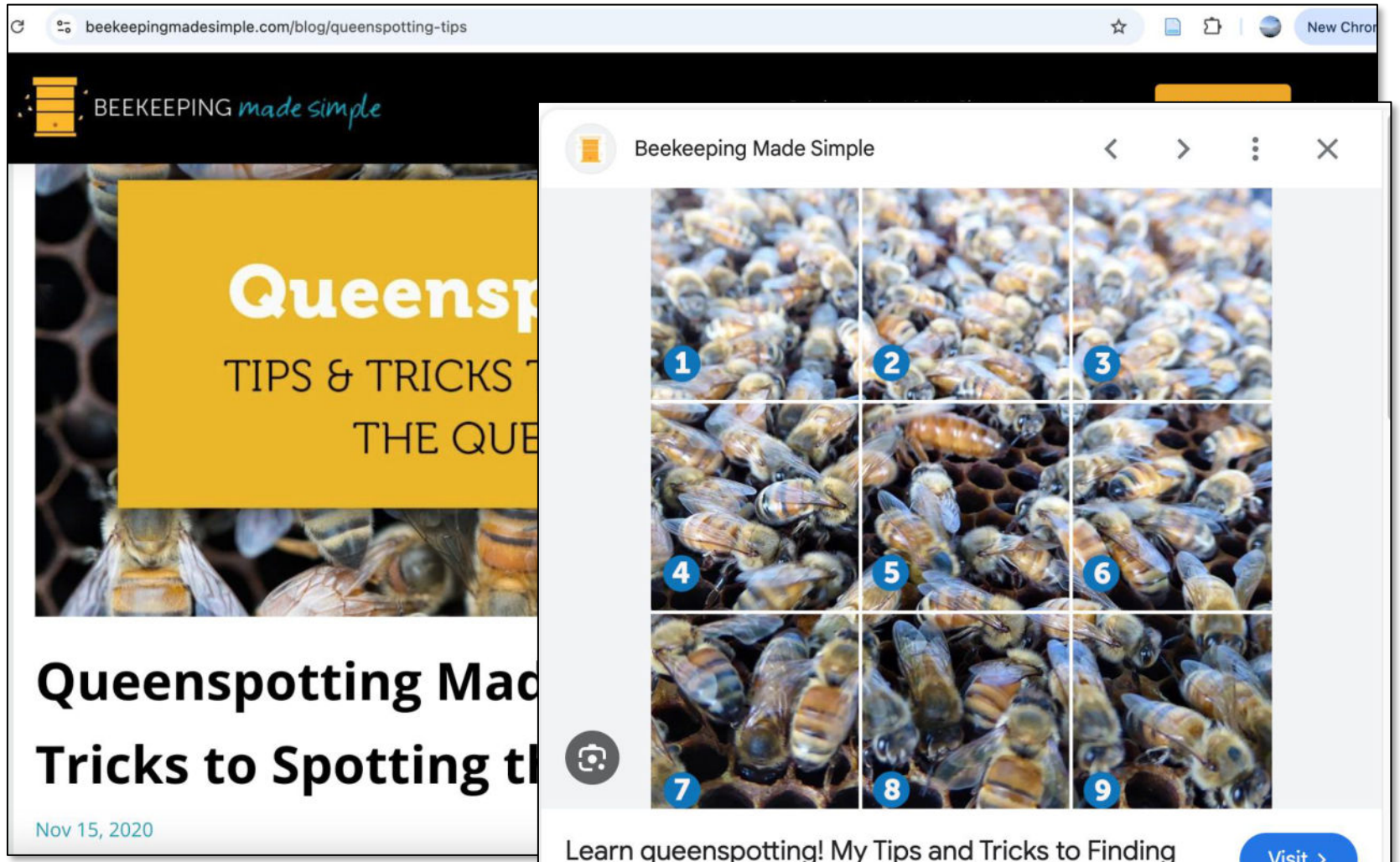
The Problem is finding the Queen

– but not only



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The idea behind MAGNETTO (2)

A tool for quickly finding, catching & removing the queen will have many advantages for beekeeping

- fast and easy requeening
- efficient swarm control
- intentional broodstop
- improved varroa treatment with oxalic acid
- improved varroa control with formic acid

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Components of MAGNETTO

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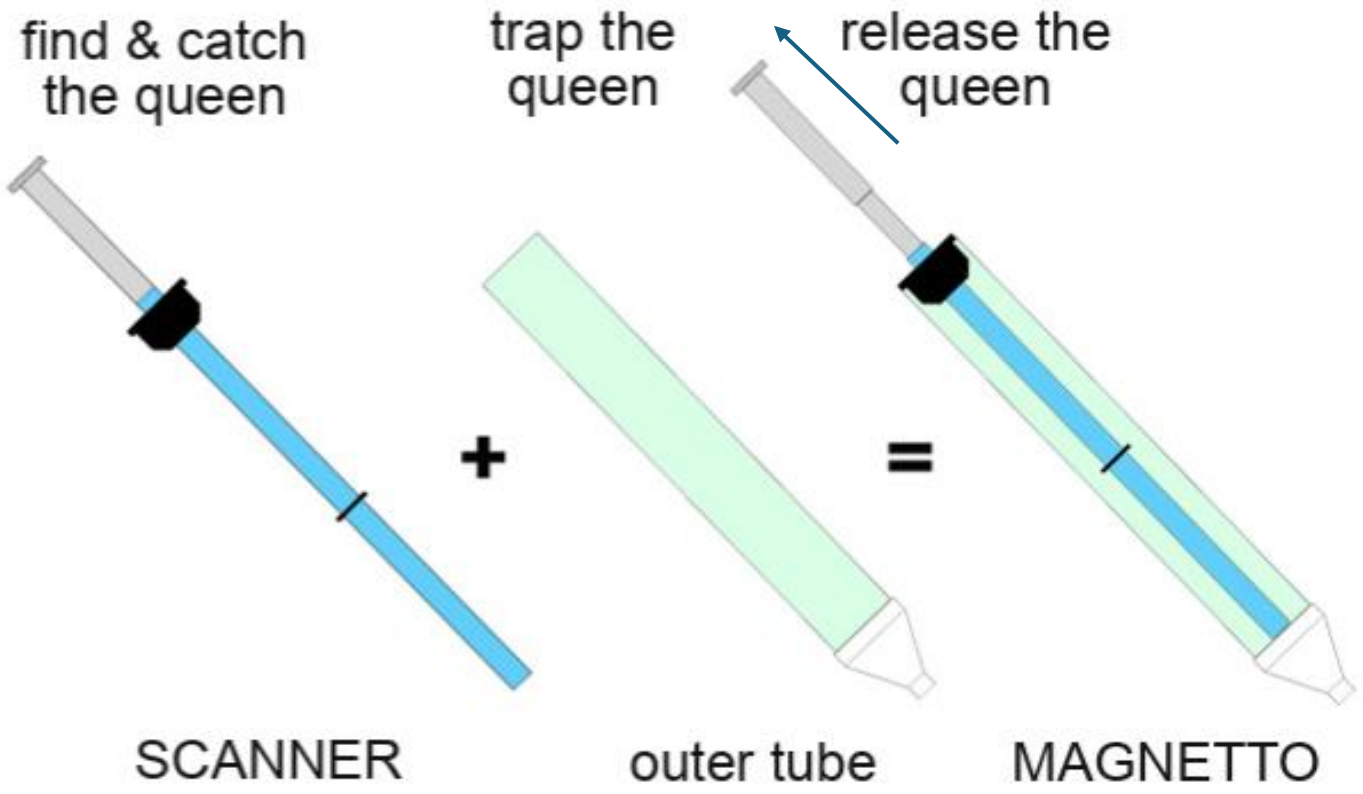
A magnetic scanning device, with an integrated mechanism to release the queen into a cage.



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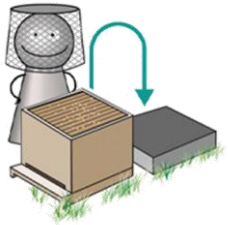
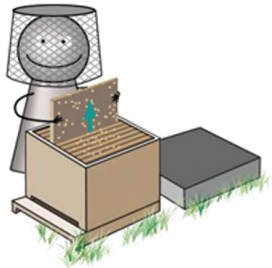
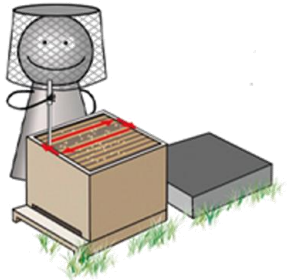
Finding, Catching & Caging with MAGNETTO



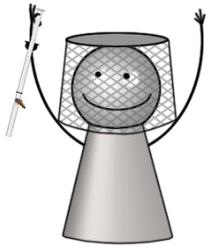
Open hive



Remove one frame

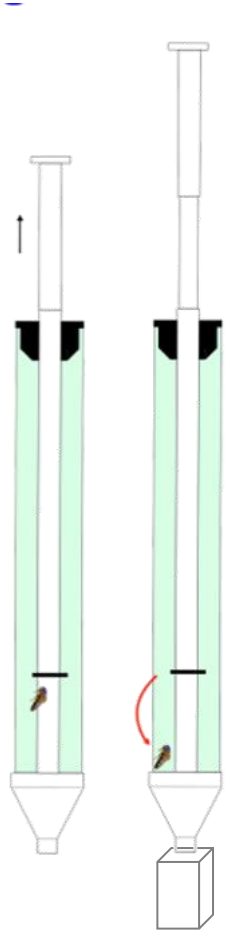


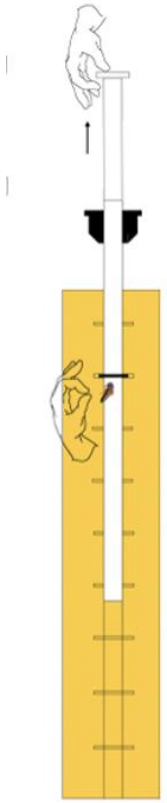
Scan with scanner



Remove queen

2 Release mechansisms





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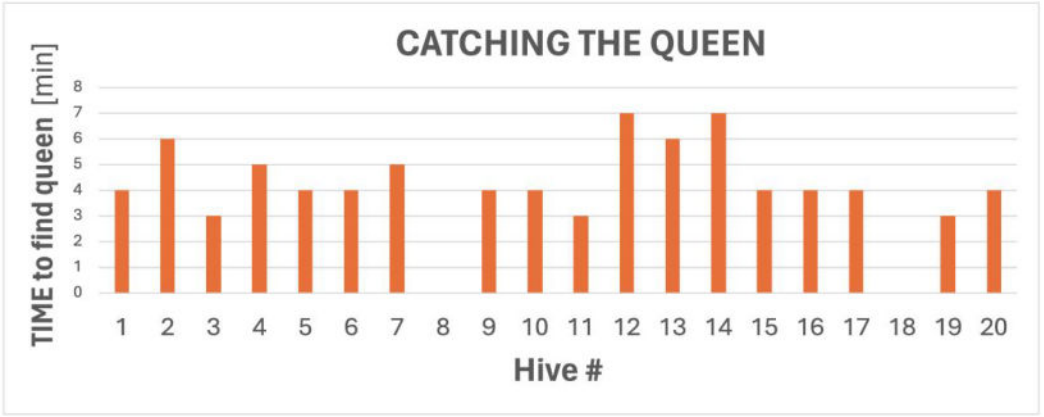
Validating the system – functional field tests

1. 20 Queens were tagged with ferro-magnetic tags

2. Catch & Cage experiments were performed



Magnetto allows to find and capture a queen from a strong hive within 5 minutes on average with a success rate of 90%.

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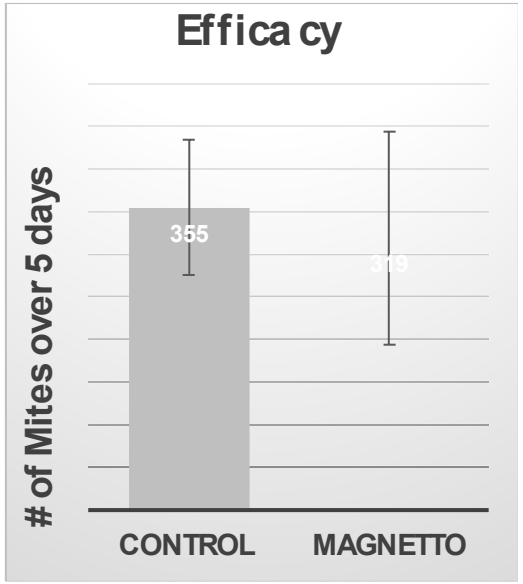
Varroa Treatment with Oxalic acid &

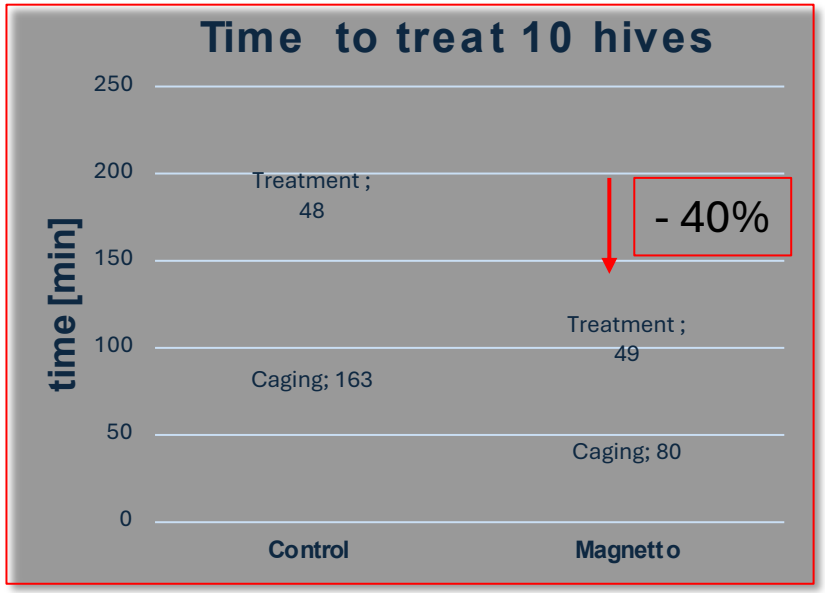
MAGNETTO

Procedure

i) catch & cage the queen with **Magnetto**
ii) put the caged queen back into the hive
iii) leave queen caged for at least 25 days
iv) treat hive with oxalic acid
v) release queen

Results





Magnetto leads to a time saving of 40% on Varroa Treatment with queen caging and oxalic acid

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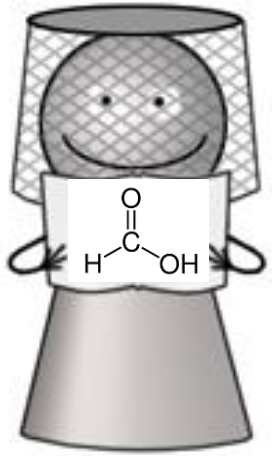
Varroa Treatment with Formic acid & MAGNETTO

The Pros

Formic acid is a unique tool

- small enough to kill mites in brood cells
- very high efficacy
- fast – 1 x application
- useful for other pathogens



The Cons

What´s the catch ?

- 5 – 20% queen mortality

Goal: use Magnetto to eliminate the weakness of queen mortality

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Varroa Treatment with Formic acid & MAGNETTO

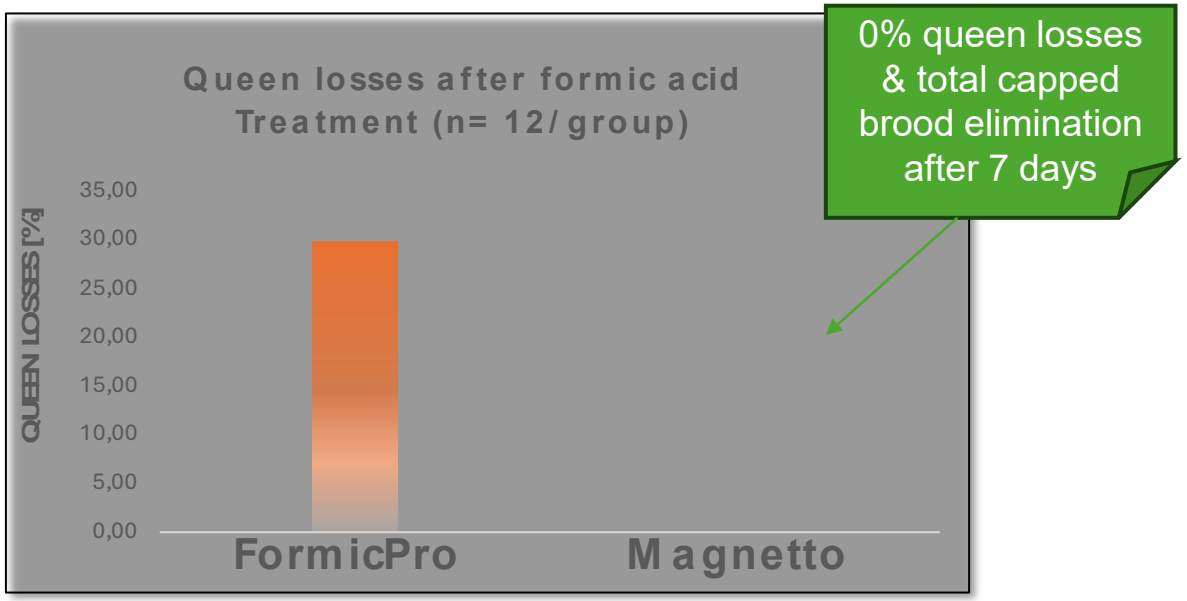
Procedure

i) catch & remove the queen with **Magnetto**

ii) Perform shock treatment with formic:
1x 40 ml /hive for 24 h in Apidea applicator

iii) re-introduce the queen with cage after 24 h

Results



With Magnetto a Varroa Treatment using formic acid without queen losses is possible within 24h.

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MAGNETTO

INVERTO FIX

SyrupMaster series

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