

Identifying cultural and chemical controls to manage *Tropilaelaps* mites in honey bee colonies

Léna Barascou¹, Dan Aurell¹, Heather Broccard-Bell², Pichet Praphawilai³, Bajaree Chuttong³, Geoff Williams¹

¹Dept of Entomology and Plant Pathology, Auburn University

²NOD Apiary Products Ltd, Trenton, Canada

³Dept of Entomology and Plant Pathology,

Chiang Mai University, Thailand

Introduction

- *Tropilaelaps mercedesae* mite: an emerging global parasitic threat to western honey bees *Apis mellifera*¹
 - It reproduces rapidly within capped brood cells¹ (wax-sealed cells containing immature bees). Incapable of feeding on adult bees²
 - Vector of honey bee viruses, contributing to colony decline¹
- Effective management strategies are needed

Objective: Evaluate two practical cultural (brood break) and chemical interventions (formic acid) for *T. mercedesae* control under field conditions.

Experimental Design

Treatment groups



Formic Acid



Brood Break + Formic Acid



Brood Break



Control

- Brood Break (BB): brood (developing bees) frames removal to induce a starvation period of the mite
- Formic Acid (FA): 1 single pad of Formic Pro™, extended-release product, left for 21 days

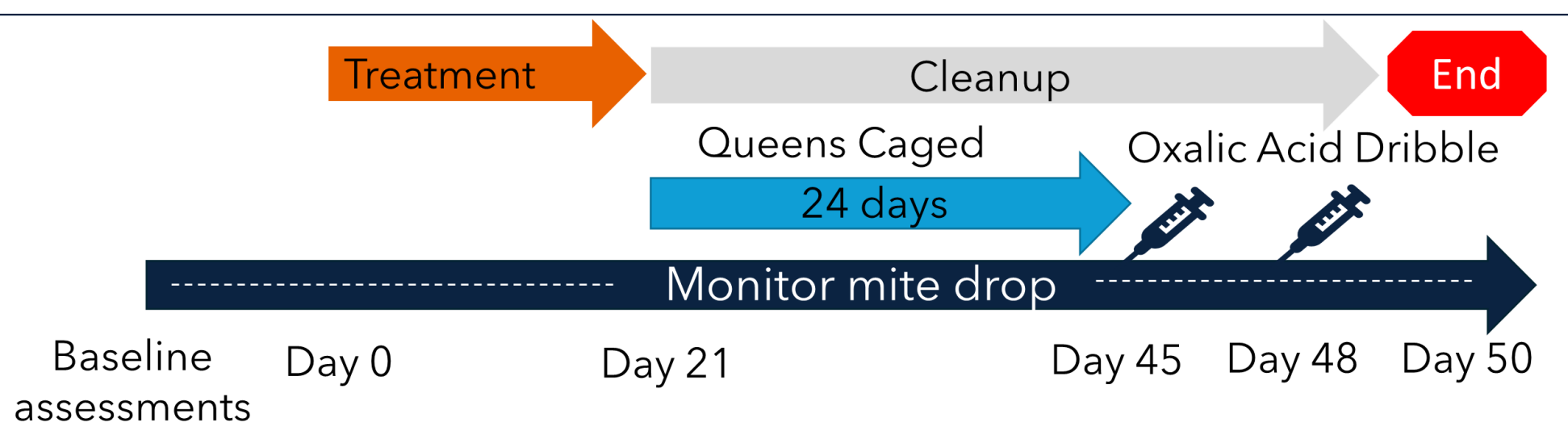


Fig 1. Timeline for the treatment period, where Day 0 started on Oct. 13. Cleanup treatment consisted of a 24 day-period of queens caging, following by two successive applications of oxalic acid dribble, separated by 3 days.

Response Variables

- **Colony assessments:**
 - Visual estimates of adult bees, open/capped brood, honey/nectar, pollen (% coverage of each frame)³
 - Dead bee traps - honey bee mortality
- **Mite infestation:**
 - Alcohol washes⁴ - mites on ~300 bees
 - Sticky boards⁴ - mite fall (every 3 days)
 - Uncapping and inspection of 200 capped brood worker cells

Results

- Control colonies had significantly greater *Tropilaelaps* worker brood infestation on Day 21 than the other treatments (Fig 2)
- No differences in bee population between control and FA colonies
- FA colonies had significantly greater mite drop over time than the other treatments



Fig 2. *Tropilaelaps mercedesae* infestation of *Apis mellifera* worker brood. Mean percentage (\pm 95% CI) of capped worker brood cells infested among treatment groups on each experimental day. For each time point, different letters indicate significant differences. Different letters within timepoints indicate statistically significant differences between means ($\alpha \leq 0.05$).

Discussion

- Not all mites are eliminated in all treatment groups, but brood interruption and formic acid treatment represent effective strategies for reducing *Tropilaelaps* mite populations.

References (Link)

Fundings

USDA Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE



Alabama Agricultural Experiment Station
AT AUBURN UNIVERSITY

Contact information: leb0195@auburn.edu