Flash Formic for the Control of Varroa Mites

Project No.: **08-POLL6-vanEngelsdorp**

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Objectives:

Objectives are to test the efficacy of flash formic acid treatment for the control of *varroa* mites at high temperatures.

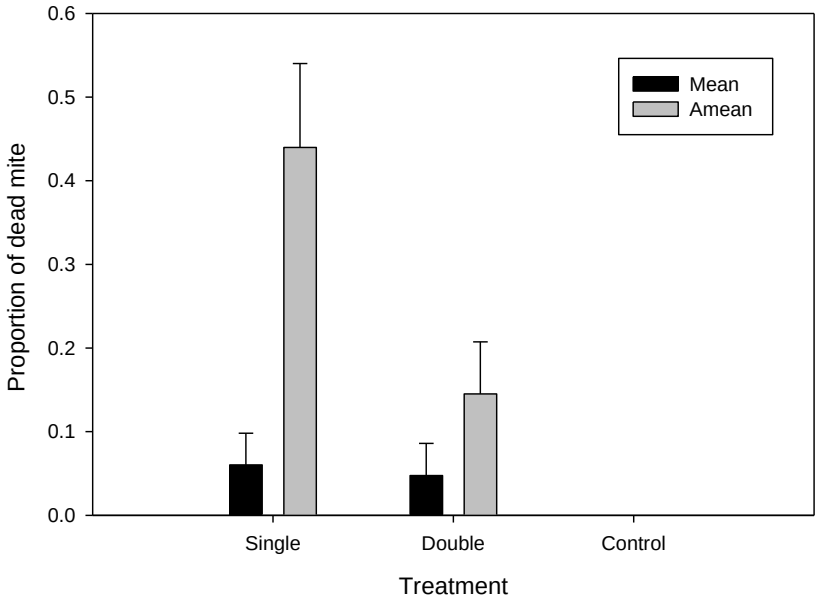
Interpretive Summary:

This is an interim report as the second trial has just been completed and data analysis continues.

In the first trail MITEAWAY II was applied onto colonies for ~ 17 hours at temperatures above the labeled rate (~24^{O}C). The formic acid product was placed on colonies composed of one or two chamber brood nests.

This trail documented a dramatic increase in the number of dead mites in infested cells (**Figure 1**), indicating its success as a miticide for mites not on the adult bees. Despite this mortality the total mites in treated colonies seemed to have increased over the treatment period (**Figure 2**). This counterintuitive finding suggests that those mites surviving treatment were somehow damaged, preventing them from reinfesting cells. To test this theory we are presently examining varroa killed by formic under cappings with an electron microscope to see if any damage to mite sensory hairs can be seen (**Figure 3**). Further, another trial was initiated in Maryland and mite levels were quantified for a longer period of time. A reduction of mite levels in colonies treated with formic acid for ~24 hours and for the labeled period of 21 days was documented (**Figure 4**). None of the treatments in trail 1 (**Figure 5**) or trial 2 (**Figure 6**) had an adverse effect on brood.

Figure 1: Proprtion of dead Mites per worker brood cell
Trail 1



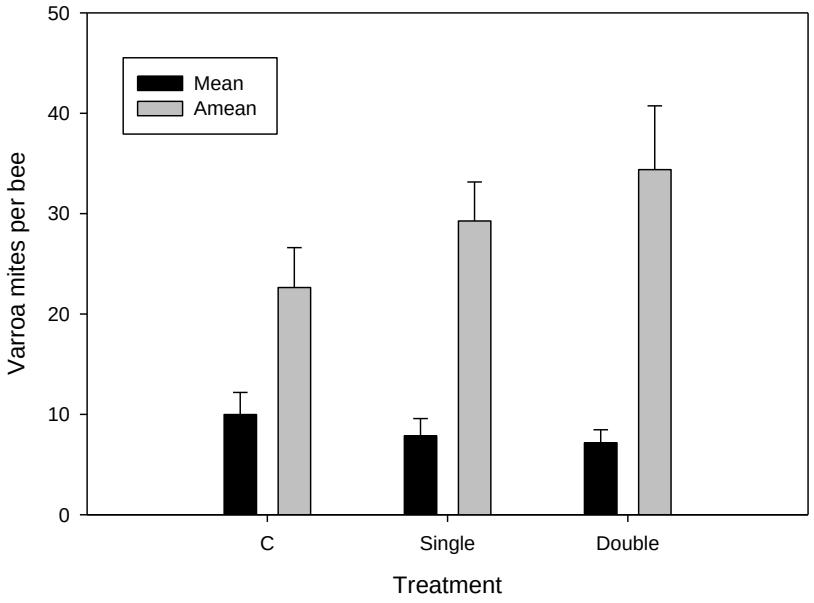
Single= single brood box

Double = double brood box

Mean = mean level before treatment

Amean = Mean level after treatment

Figure 2: Mites per Bees
Trail 1



c = control

Single= single brood box

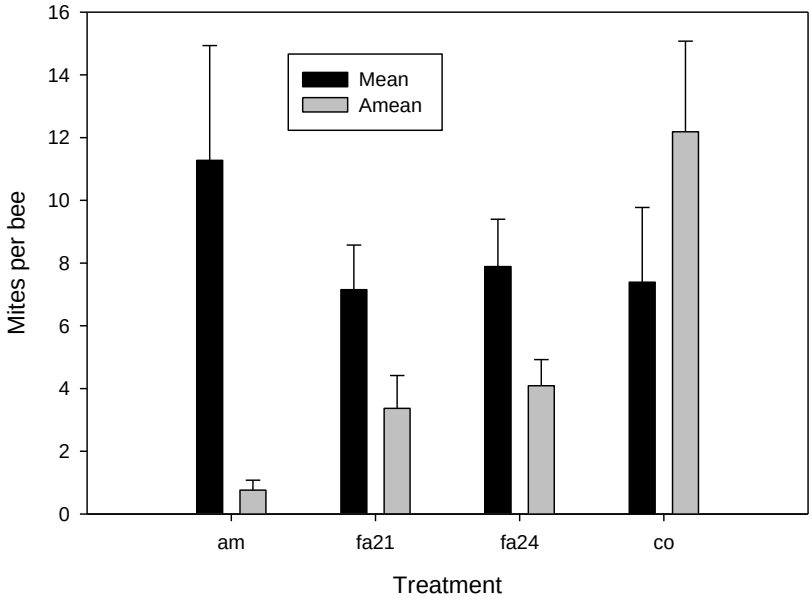
Double = double brood box

Mean = mean level before treatment

Amean = Mean level after treatment

Figure 3: EM photo of Varroa mite sensory hairs

Figure 4: Mites per bee
Trail 2



am = Amitraz treatment (positive control)

fa21 = formic acid 21 days

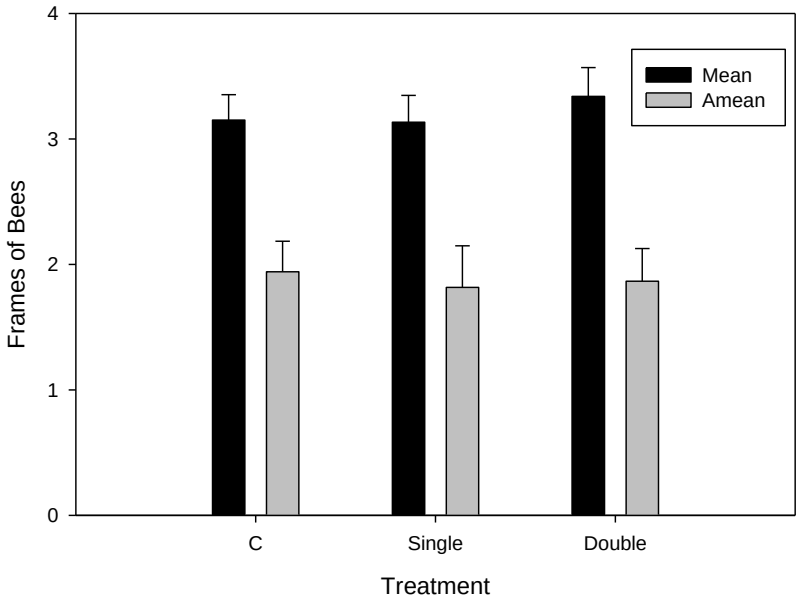
fa24 = formic acid 24 hours

co = control

Mean = mean level before treatment

Amean = mean level after treatment

Figure 5: Frames of Brood
Trial 1



c = control

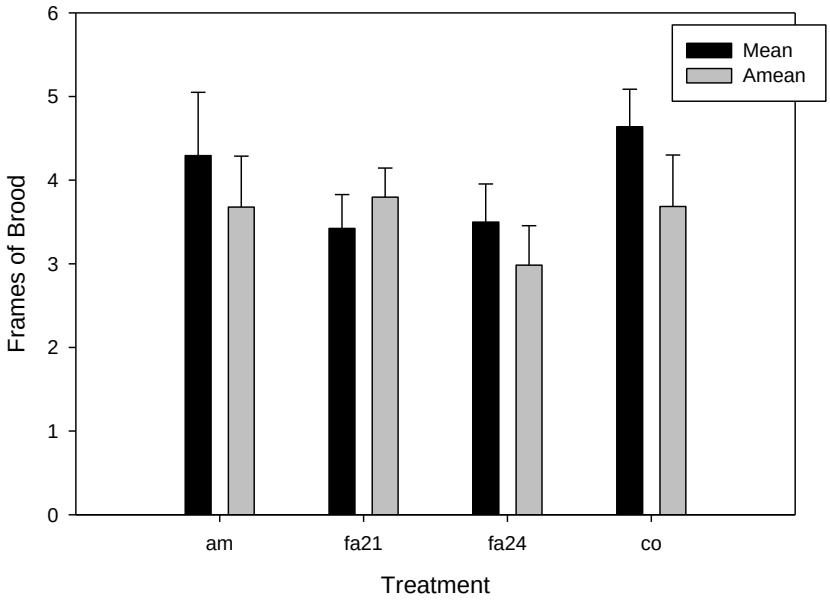
Single= single brood box

Double = double brood box

Mean = mean level before treatment

Amean = Mean level after treatment

Figure 6: Frames of Brood
Trail 2



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