49th Tobacco Workers Conference – Louisville KY - January 21, 2020 – Paper 27

University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

Comparison of Insecticides for Flea Beetle Control in Dark Tobacco

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Flea Beetles

- Present in tobacco fields every year, but populations vary naturally
- Populations usually highest in earliest set fields following mild winter
- Damage = pin holes, can slow growth if feeding in bud of small plants
- Rarely a problem on mature tobacco, but there were several cases of severe fleabeetle infestation after topping in 2018.
  - Natural variability in populations?
  - Resistance to residual insecticides at transplanting?

Residual Insecticides at Transplanting for Flea Beetle Control

Insecticide	Application Method
Admire (imidacloprid)	**Tray Drench or Transplant Water**
Platinum (thiamethoxam)	**Tray Drench or Transplant Water**
Durivo (Platinum + Coragen)	Transplant Water
Verimark (cyantraniliprole)	Transplant Water
Orthene (acephate)	Transplant Water

Flea Beetle Thresholds/Treatment Guidelines

Stage of Growth	Threshold for Foliar Treatment
First 2 weeks after transplanting	4 or more fleabeetles/plant
2 to 4 weeks	10 or more
More than 4 weeks	60 or more

General treatment thresholds for standard dark and burley tobacco.
Treatment guidelines for cigar wrapper tobacco would be sub-threshold levels.

Options for Foliar Fleabeetle Control

Insecticide	Rate/A	PHI
Orthene 97	½ to 1 lb/A	Depends on buyer
Actara 25WDG	2 to 3 oz/A	14 day
Assail 30SG	2.5 to 4 oz/A	7 day
Admire Pro	1.4 oz/A	14 day
Voliam Flexi	2.5 to 4 oz/A	14 day
Belay	3 to 4 oz/A	14 day
Exirel	13.5 to 20.5 oz/A	7 day
Besiege	5 to 10 oz/A	40 day
Warrior	1 to 2 oz/A	40 day
Capture	3.5 to 8.5 oz/A	Layby

2018 Flea Beetles

- Fleabeetles normally stay at sub-threshold levels following applications of Admire or Platinum at transplanting

- In 2018, late-season fleabeetles exceeded threshold levels on some KY/TN farms following Admire or Platinum at transplanting
  - Populations were variable with high populations on some farms and normal, low populations on other farms

- Foliar applications were made but 2 applications were required to get acceptable control

- 2018 fleabeetle experience, and increased interest in cigar wrapper production prompted 2019 research trials

2019 Flea Beetle Insecticide Trial

- UKREC, Princeton KY
- Dark tobacco – KT D17LC transplanted June 3
  - 40” rows, 32” plant spacing = 4900 plants/A
- No Admire Pro used to increase fleabeetle populations
- Plots 4-rows, 40 ft. long, RCBD with 4 replications
- Fleabeetle levels monitored weekly in plots

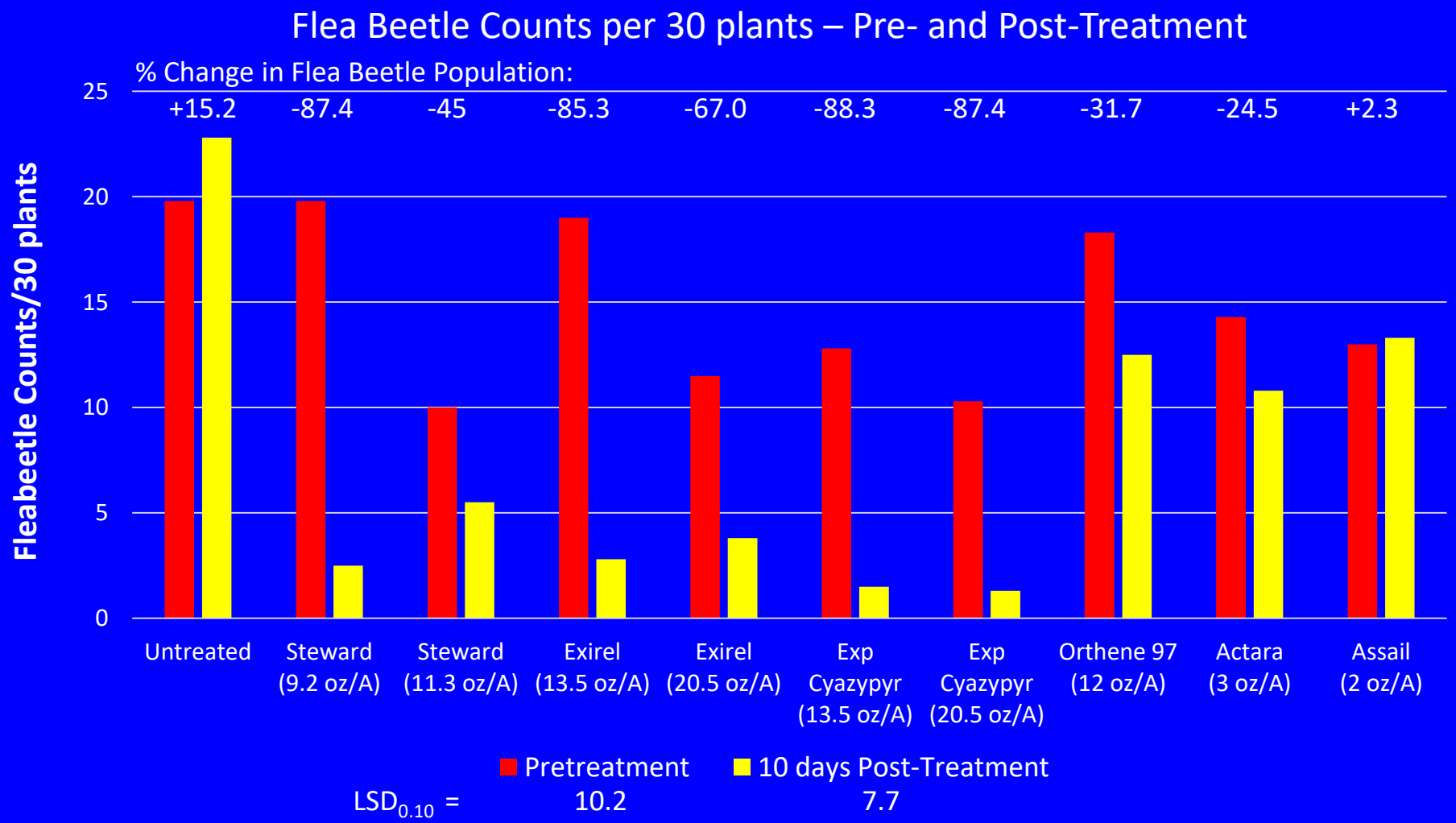
2019 Fleabeetle Treatments

Trt	Treatment	Rate/A	Timing
1	Untreated	-	-
2	Steward (indoxacarb)	9.2 oz/A	At threshold
3	Steward (indoxacarb)	11.3 oz/A	At threshold
4	Exirel (cyantraniliprole)	13.5 oz/A	At threshold
5	Exirel (cyantraniliprole)	20.5 oz/A	At threshold
6	HGW86-R050-957 (exp. cyan)	13.5 oz/A	At threshold
7	HGW86-R050-957 (exp. cyan)	20.5 oz/A	At threshold
8	Orthene 97 (acephate)	12 oz/A	At threshold
9	Actara (thiamethoxam)	3 oz/A	At threshold
10	Assail (acetamiprid)	2 oz/A	At threshold

*All applications made at threshold as broadcast spray at 15 gal/A and 22 psi using 12X hollow cone nozzles.

2019 Flea Beetle Insecticide Trial

UKREC, Princeton KY



2019 Flea Beetle Insecticide Trial

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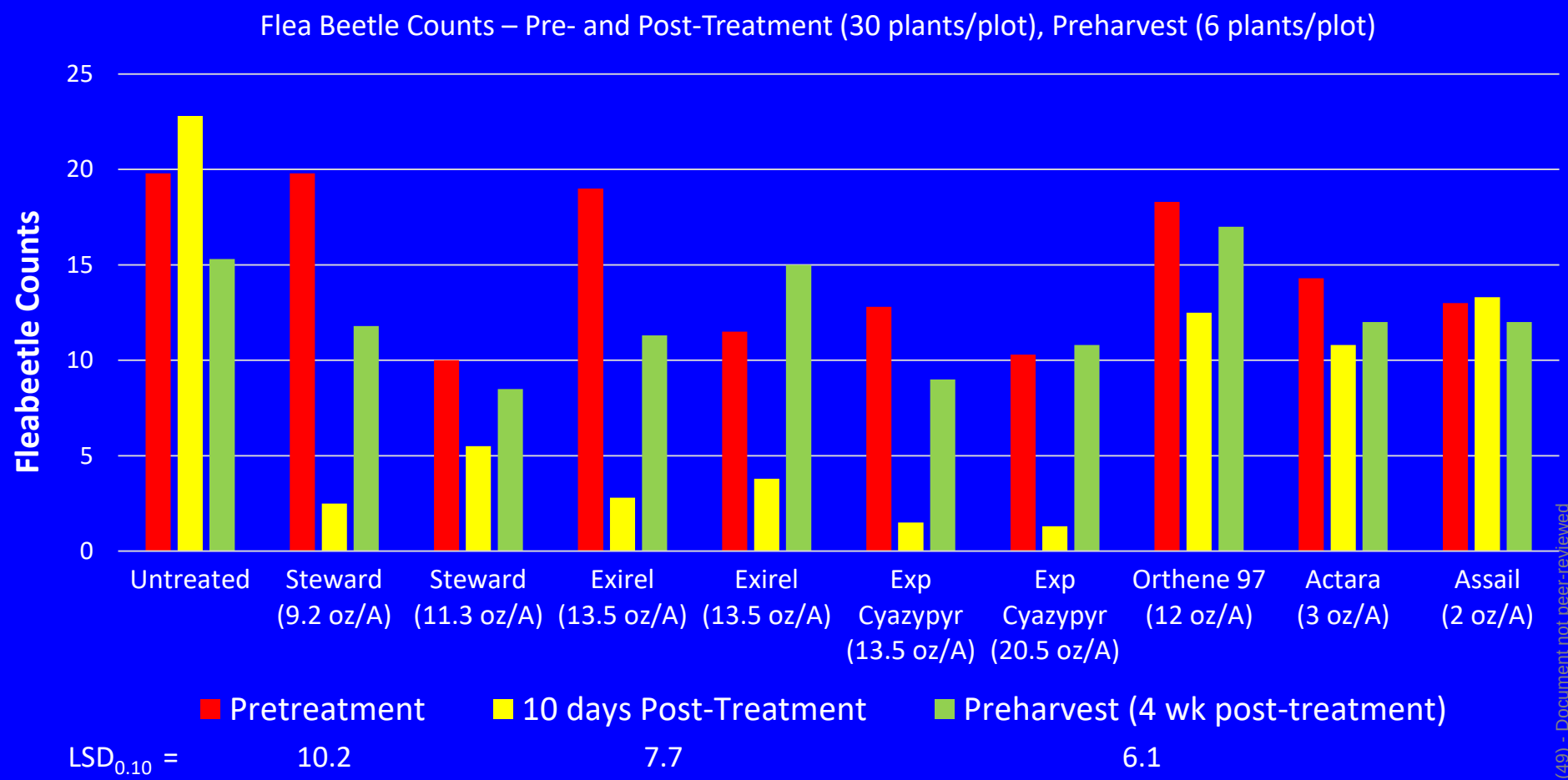
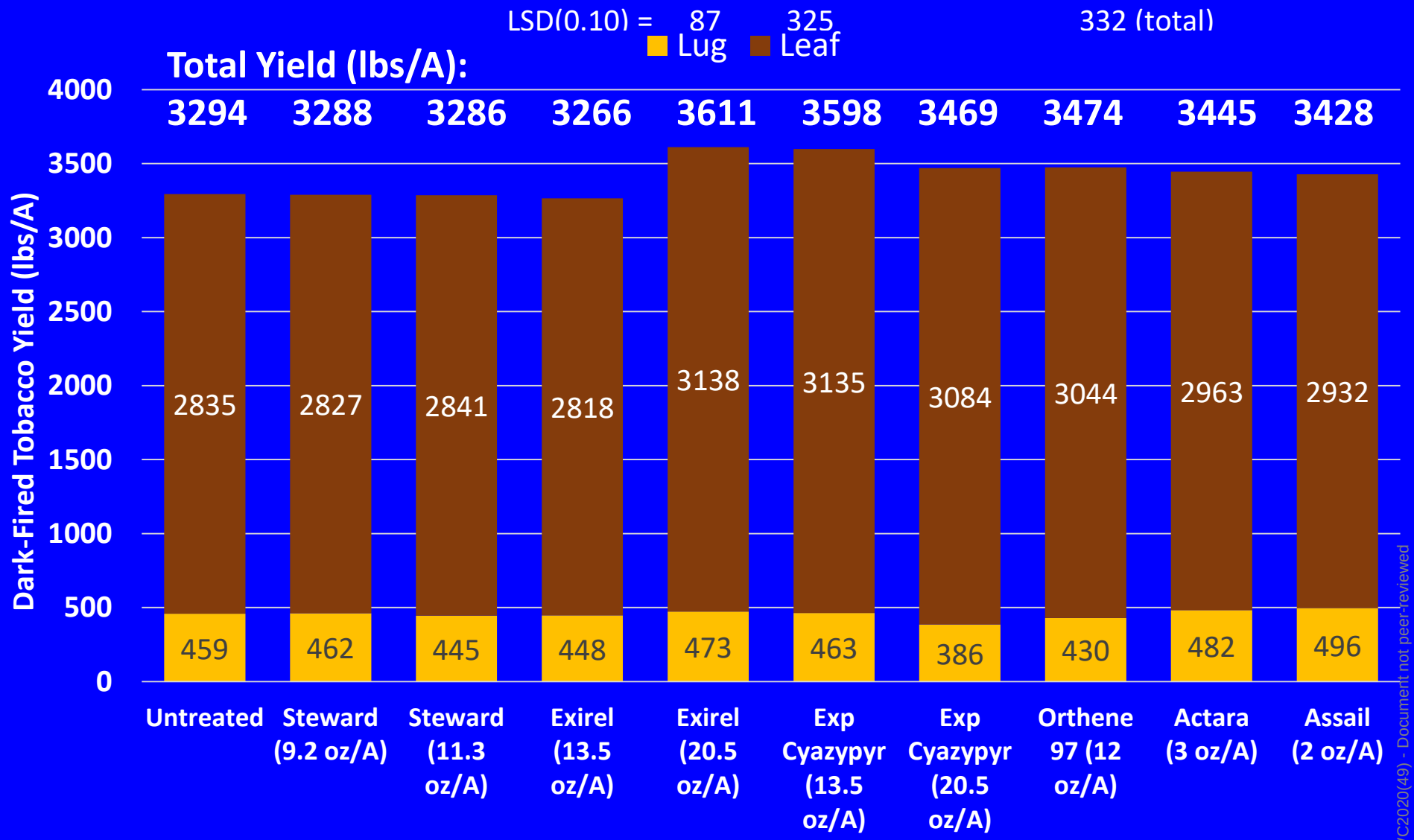


$LSD_{0.10}$ = 10.2 7.7 6.1

Dark-Fired Yield from Insecticide Treatments

UKREC, Princeton KY - 2019



Summary of Field Trial

- Flea beetles difficult to count – variability
- Surprisingly low flea beetle counts without Admire
- Treatment application made 65 days after transplanting, still at sub-threshold levels
- Disappointed with the control achieved
  - Orthene, Actara, Assail – 32% control or less
- Best control at 10 days after treatment from Exirel and HGW86
  - Fleabeetle populations increased by 4 weeks after treatment
- Concerned about 15 gal/A spray volume being too low?
- No real differences in yield between treatments.

Response of Tobacco Flea Beetles to Admire in Kentucky

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Tobacco Workers Conference

Louisville, KY

Jan 21, 2020

Tobacco flea beetle
Epitrix hirtipennis
(Coleoptera: Chrysomelidae)

Collection of Tobacco flea beetles and leaves

- Tobacco flea beetles were collected from untreated plots in 2019 field trial on September 10, 2019
- Beetles were placed in a cooler and transported to laboratory.
- Undamaged tobacco leaves were collected and transported to the laboratory

Tobacco flea beetle
Epitrix hirtipennis
(Coleoptera: Chrysomelidae)

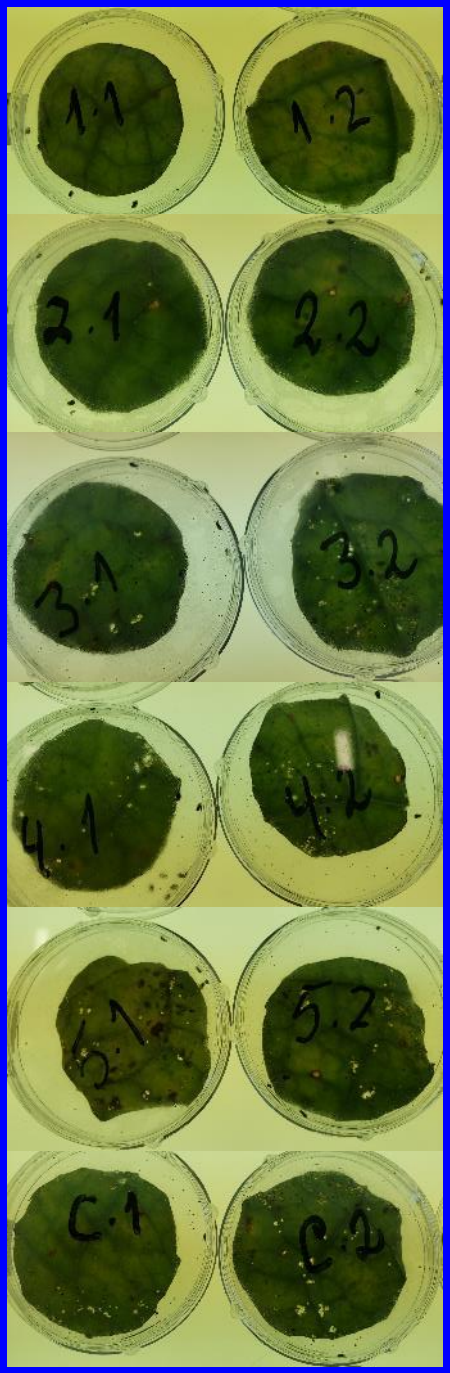
Imidacloprid solution

- The rate of Admire Pro represents a field rate of 1.0 fl oz/A.
- Solutions were prepared on aliquots that represent 5 different concentrations of imidacloprid as shown below:

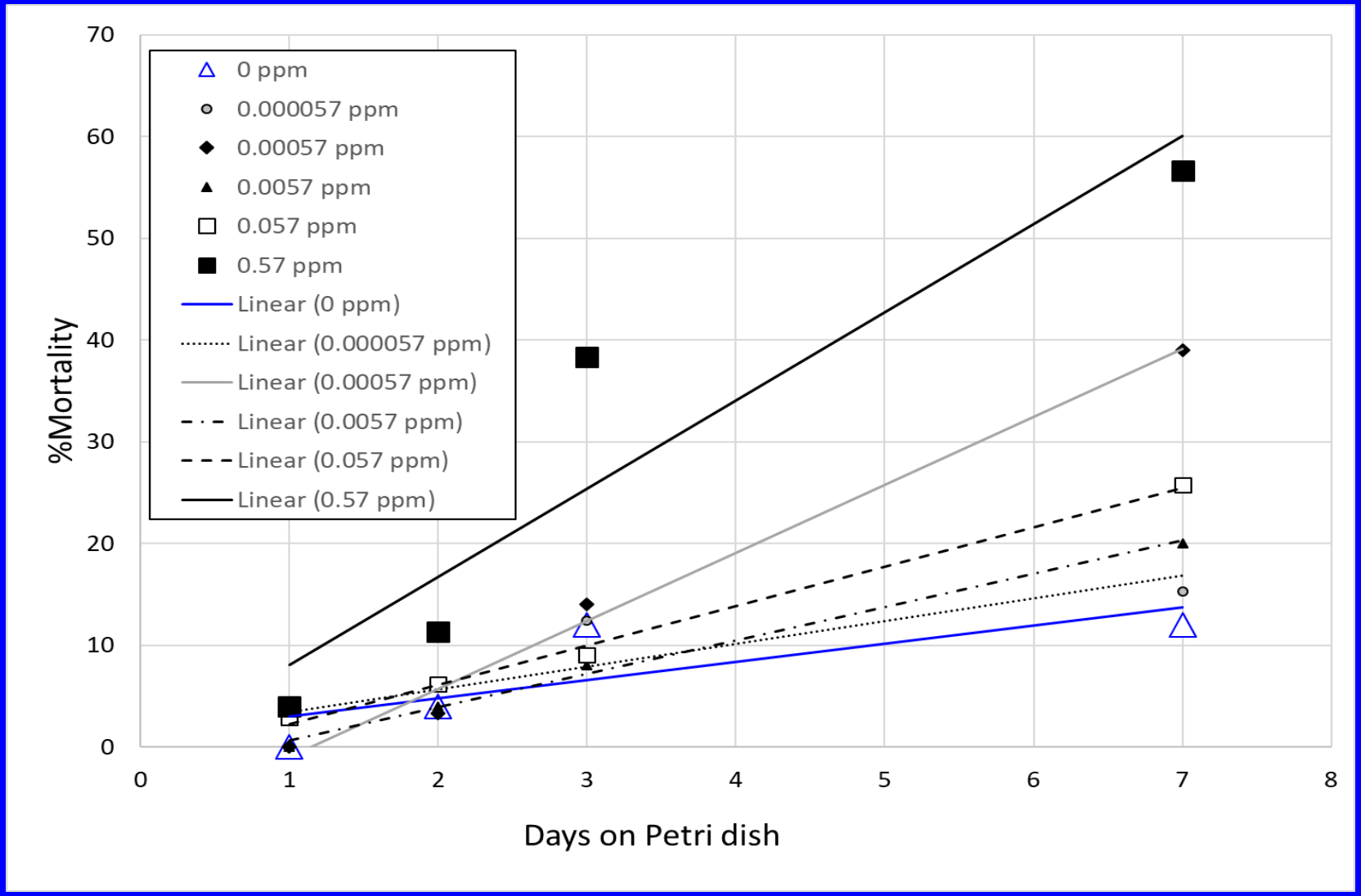
ppm a.i. of imidacloprid
$5.73x10^{-1}$
$5.73x10^{-2}$
$5.73x10^{-3}$
$5.73x10^{-4}$
$5.73x10^{-5}$
Control

Tobacco Flea Beetle
Set up of Lab Bioassay

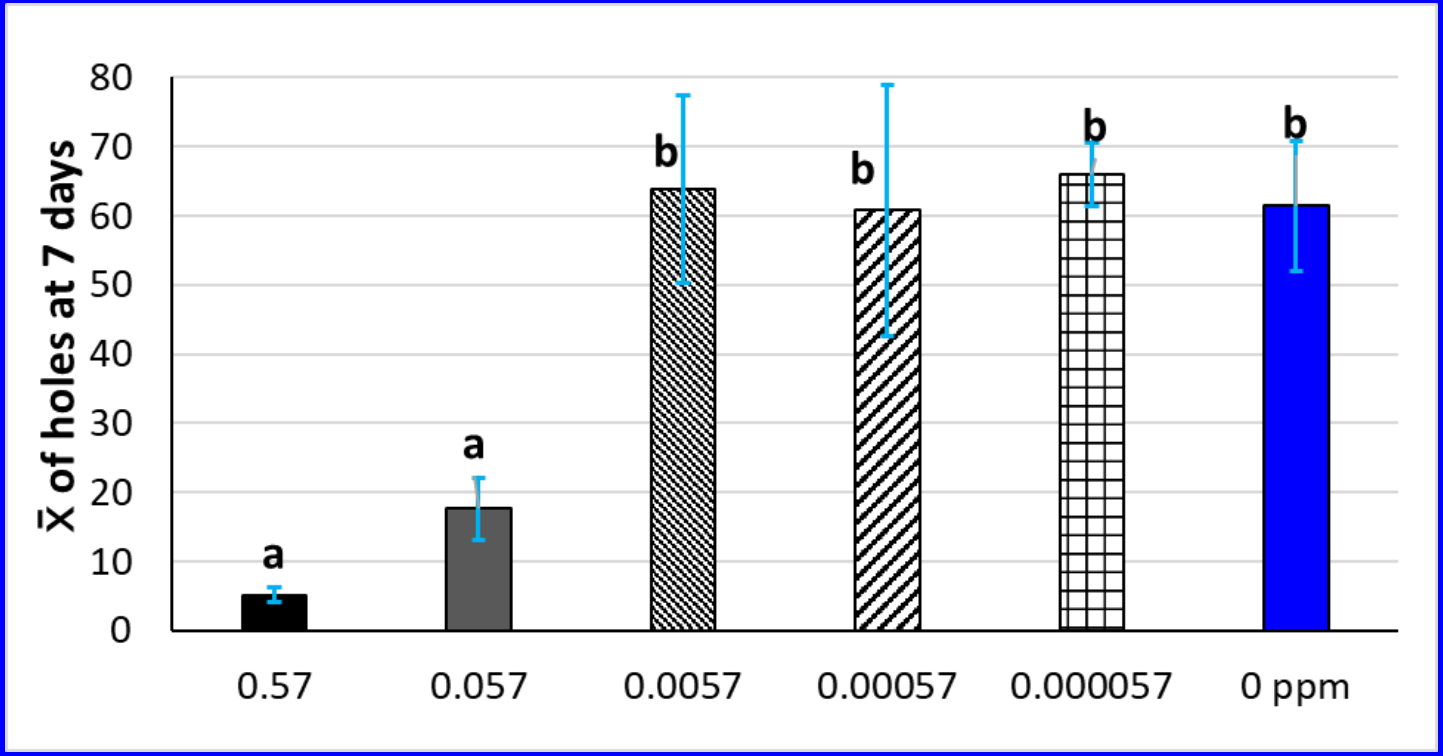
- 3-cm diameter leaf disks were prepared
- Leaf disks were dipped for 5 seconds in a solution
- Five leaf disks per solution were prepared (5 replications)
- Then, leaf disks were air dried and placed in a 5-cm petri dish
- Once air dried, 5 to 7 flea beetles were placed in each disk
- Mortalities of tobacco flea beetles were tallied at 1, 3 and 7 days
- Number of holes cause by tobacco flea beetles were evaluated a 7 days



Flea Beetle Mortality from Imidacloprid



Feeding Damage caused by Tobacco Flea Beetle



Significant differences found after ANOVA and Fisher's LSD comparisons of means $F_{5,24}$= 6.77 and p <0.001

Summary of Lab Study

- Mortalities of tobacco flea beetles did reach the highest peak (55%) at 7 days with the highest imidacloprid dosage
- Surprised at low flea beetle mortality at 7 days.
- Feeding at the two largest dosages were significantly reduced compared with the control.
- More studies needed on additional flea beetle populations.

Summary

- Additional field and laboratory studies needed.
- Plan to repeat 2019 field study:
  - Additional treatments
  - Higher spray volume?
- Repeat Admire lab study with additional flea beetle populations from additional locations.

Questions?

- Appreciation to FMC Corporation for funding and support of the field portion of this research.