

Neonicotinoid Education & Research

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Impact of Treated Seed on Plant Stands

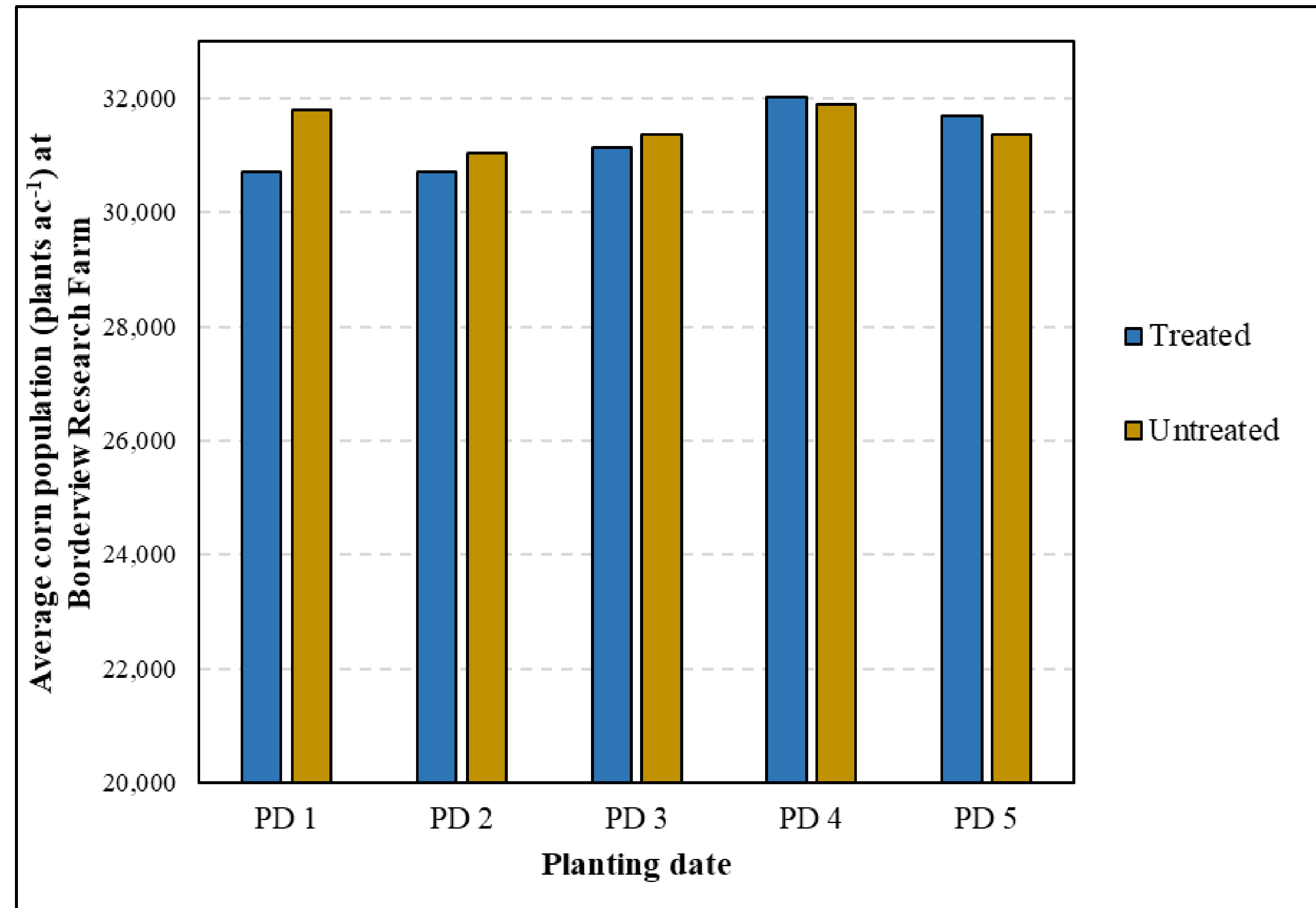
- **Borderview Research Farm: Year 1**

- Replicated trial
- Two treatments: treated and untreated
- Five planting dates (6th eliminated due to planting error)
- Soil & crop measurements

Planting date number	Planting date
PD 1	10-May
PD 2	16-May
PD 3	26-May
PD 4	1-June
PD 5	9-June
PD 6	16-June



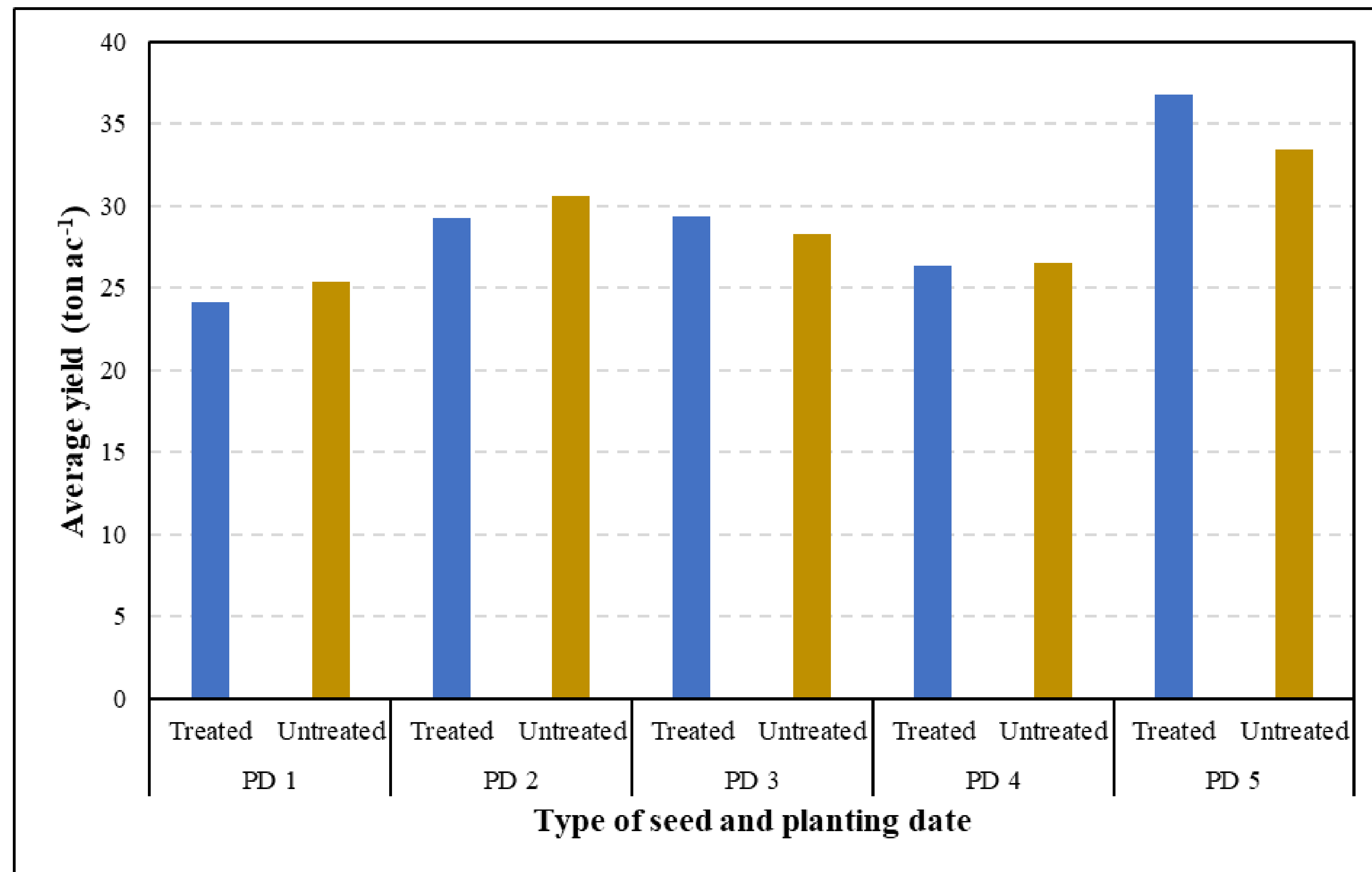
Impact of Treated Seed on Plant Stands



No statistical difference in corn populations between treated and untreated corn seed.



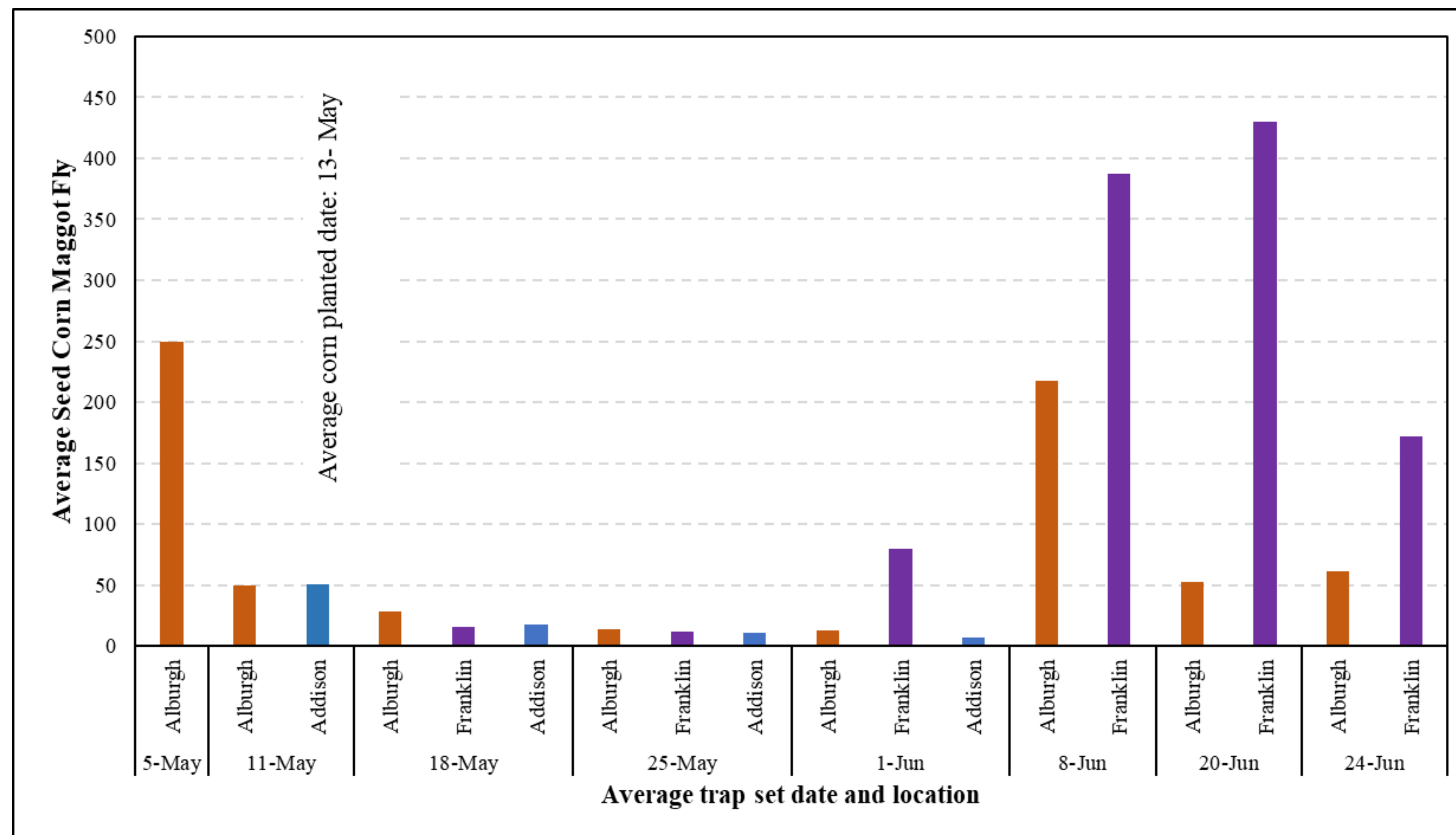
Impact of Treated Seed on Yields



No statistical difference in corn yields between treated and untreated corn seed.



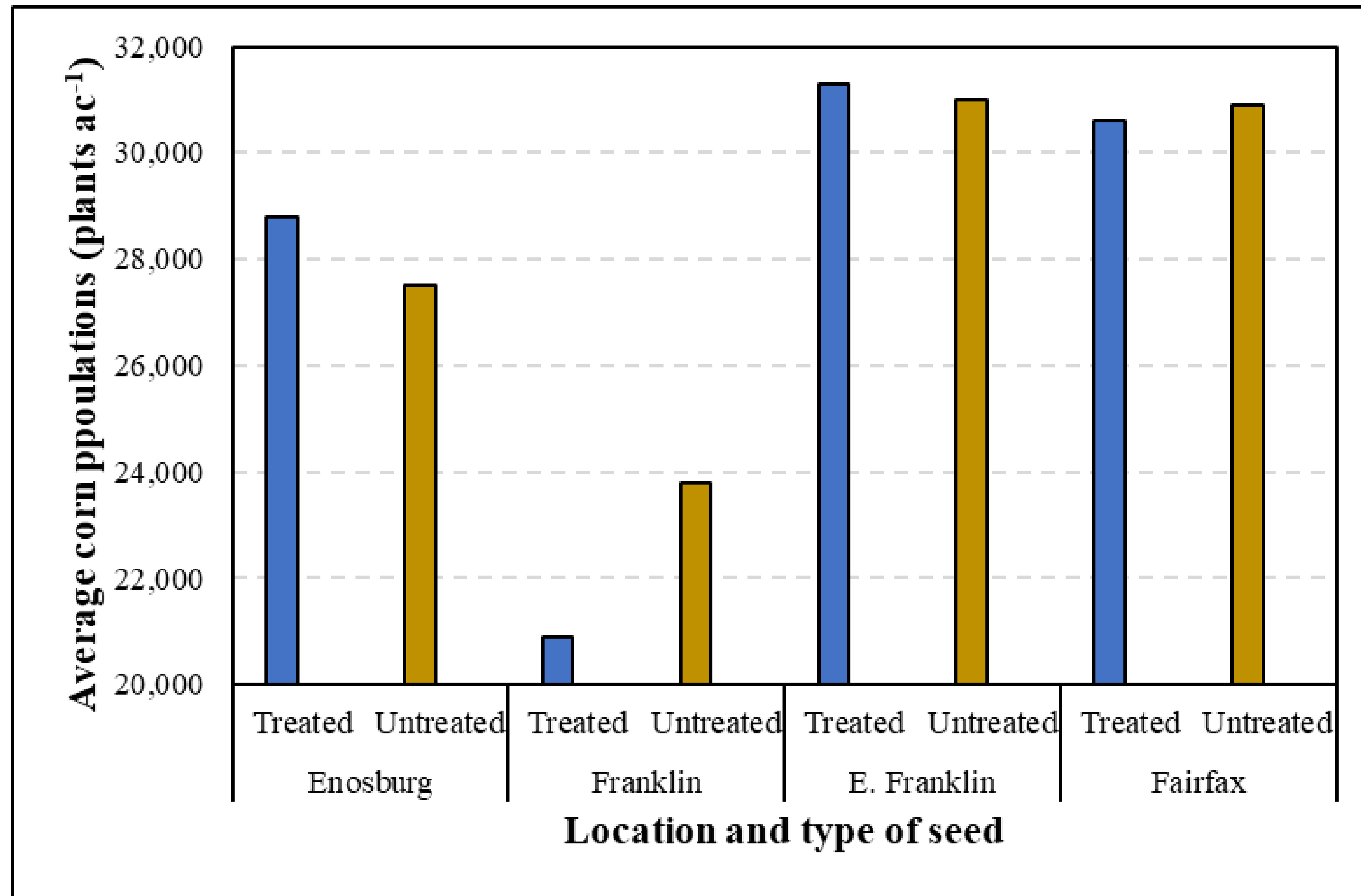
Corn Seed Maggot Flies



Seed corn maggot flight recorded on 8-Jun. Did this impact the corn yield at this planting date?



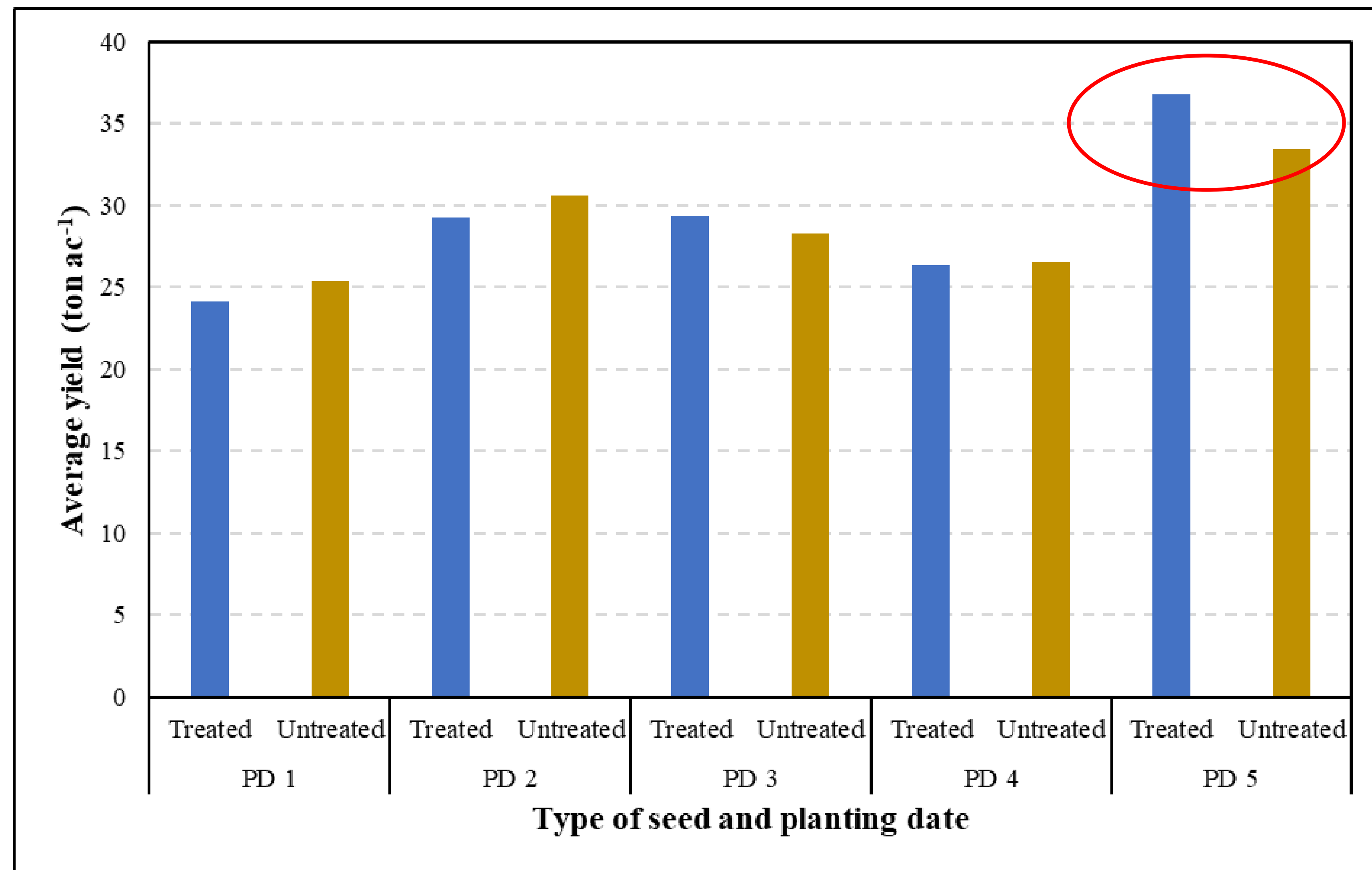
Impact of Treated Seed on Plant Stands



On-farm sites (one planting date) observes some differences in populations; however, related to bird damage and dry conditions at planting.



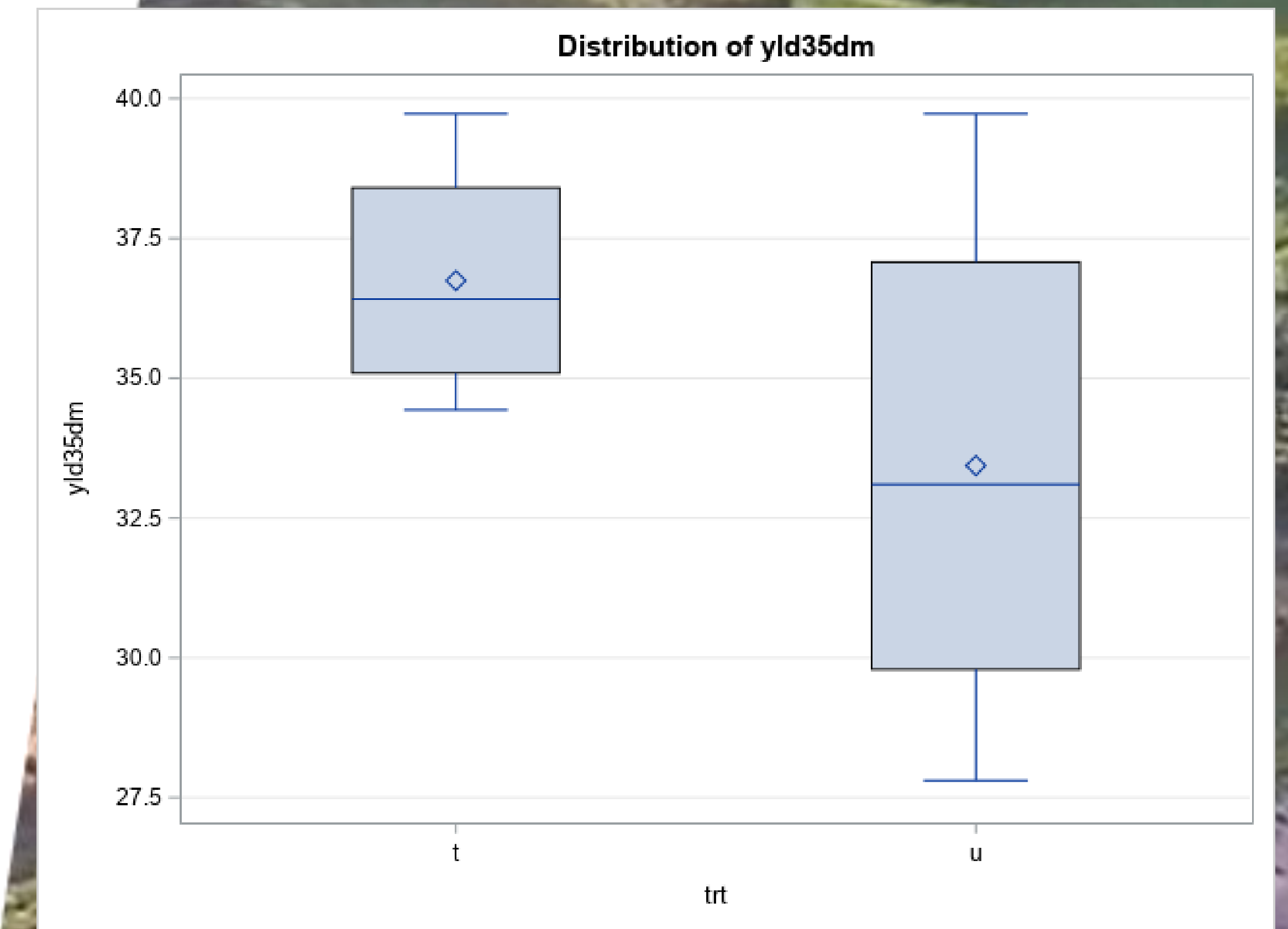
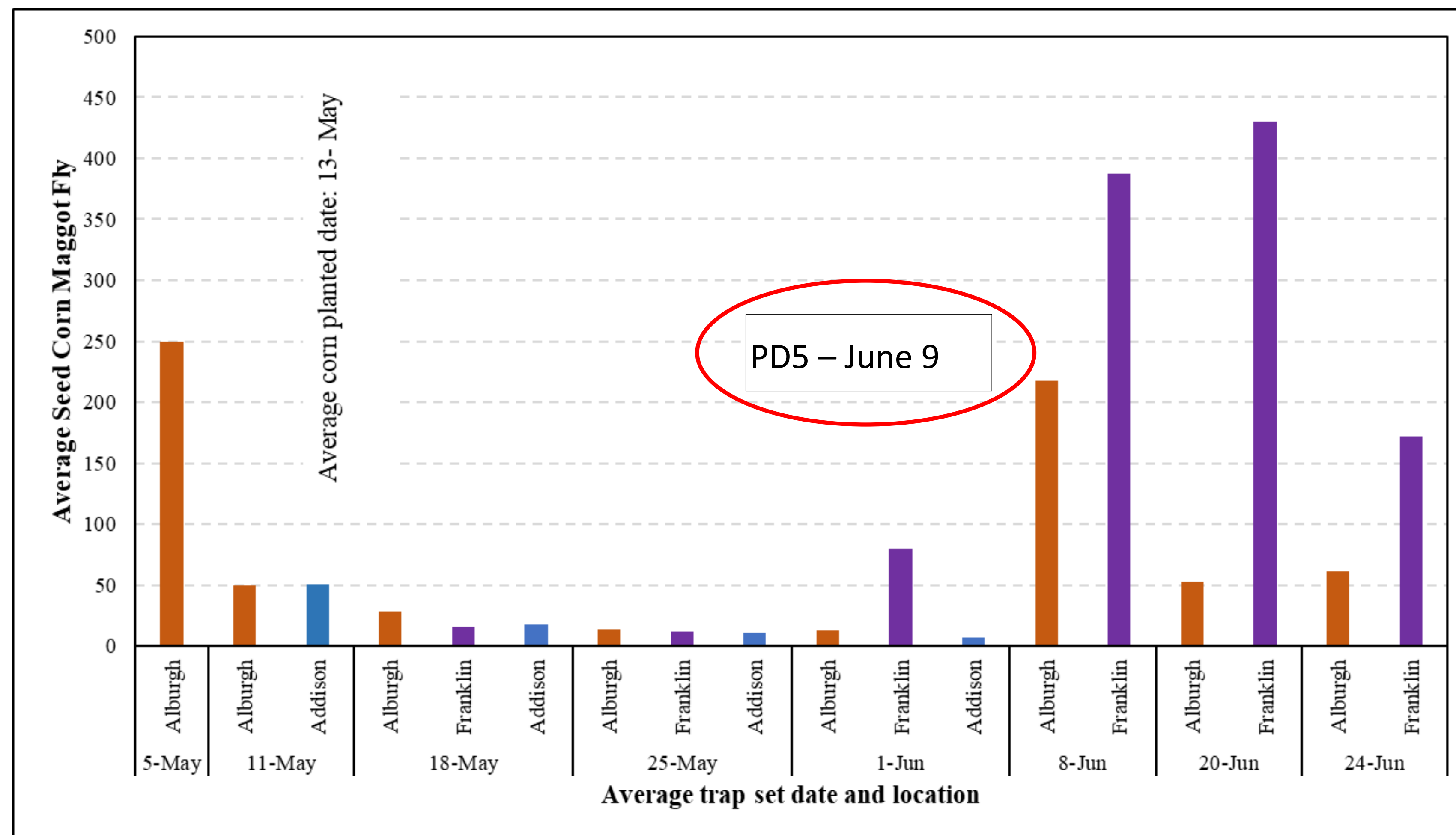
Impact of Treated Seed on Yields



What about planting date 5? This is a 4-ton yield difference!

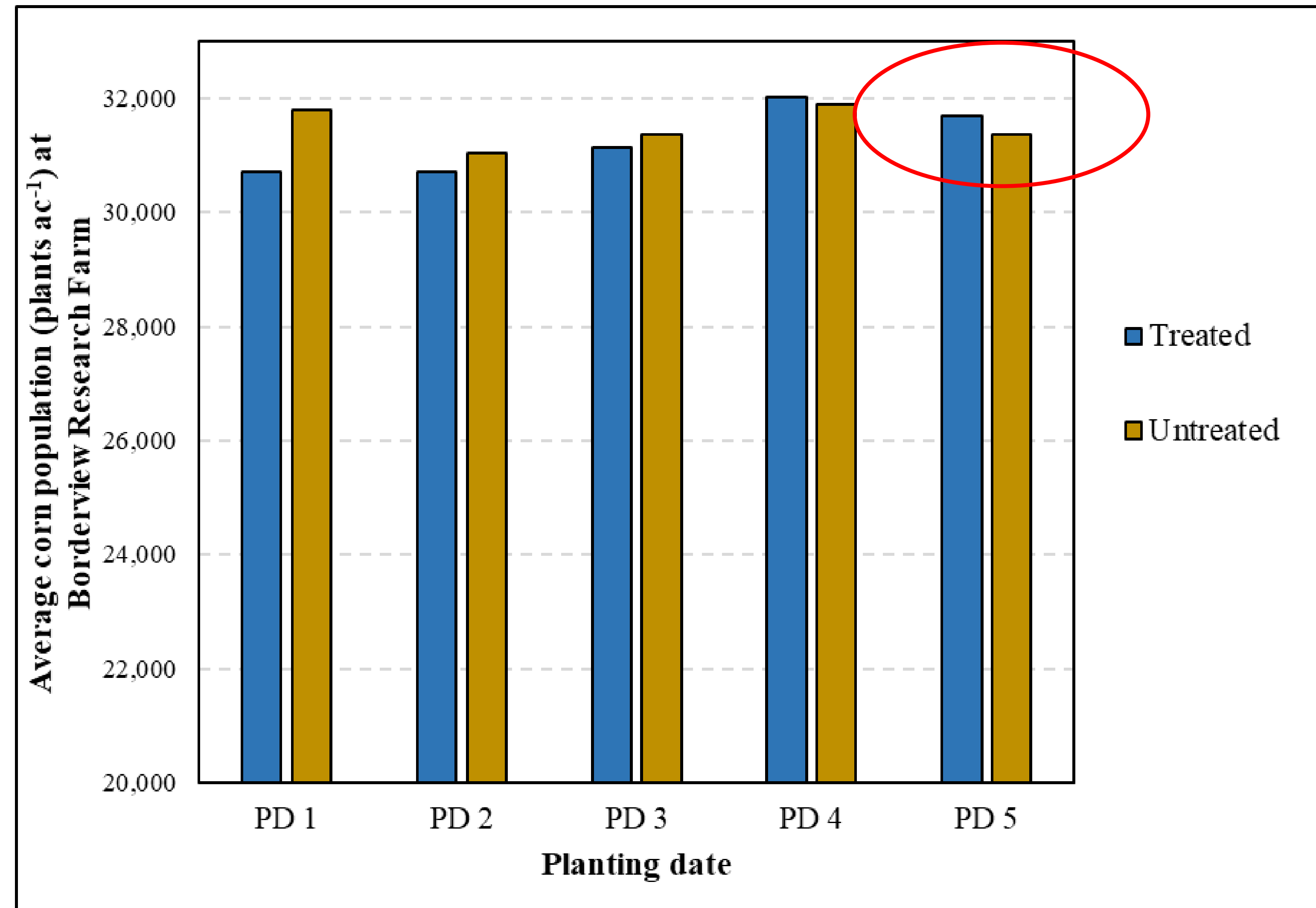


Corn Seed Maggot Flies

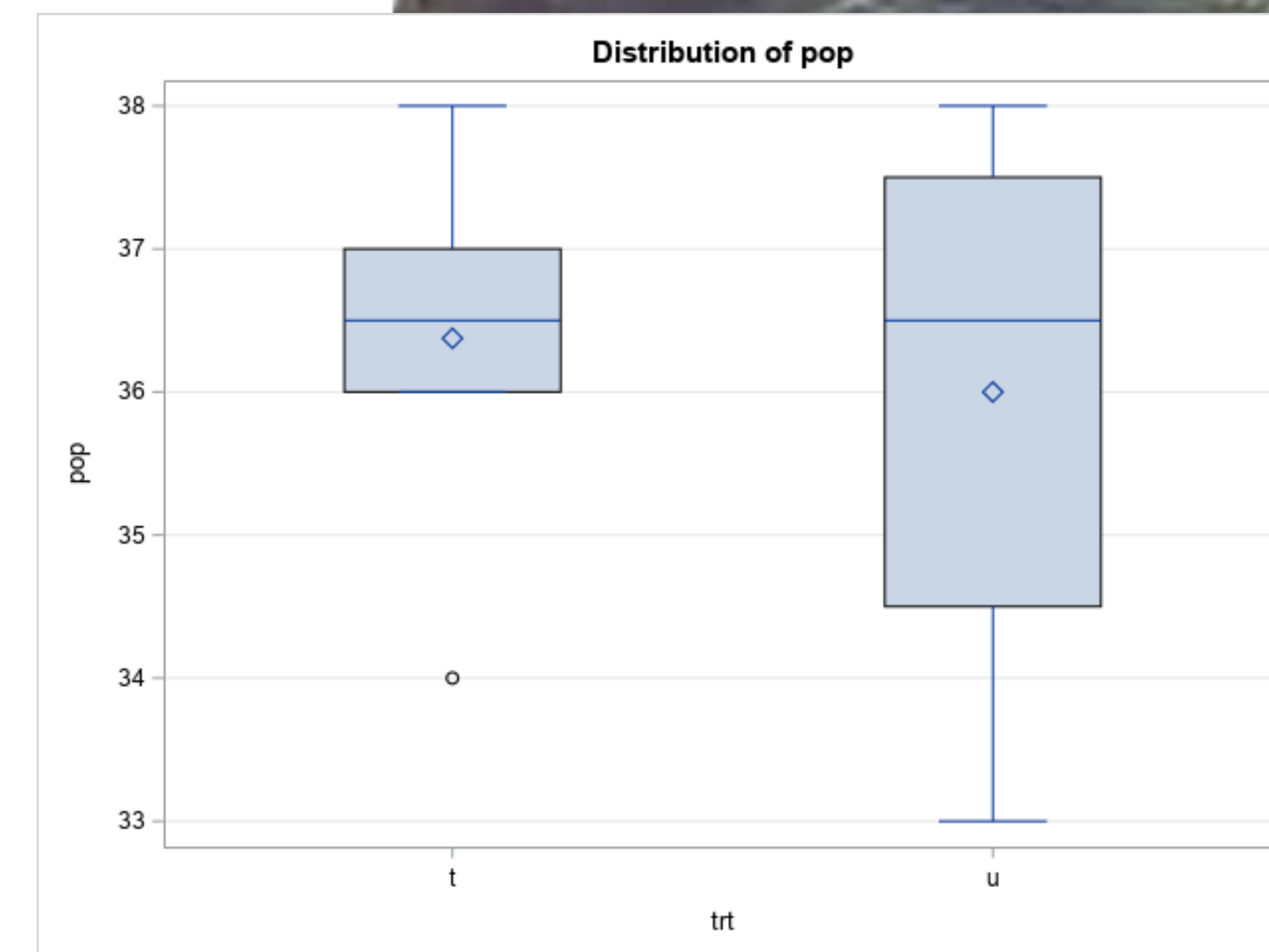


Seed corn maggot flight recorded on 8-Jun. Did this impact the corn yield at this planting date?

Impact of Treated Seed on Plant Stands



No statistical difference in corn populations between treated and untreated corn seed.





Frequency and concentration of clothianidin at different soil depths prior to corn planting, Alburgh, VT, 2023.

Soil type: Benson rocky silt loam, over shaly limestone

Crop history: No direct use of neonicotinoid seed treatments in 15 years. Previous crops include hemp grain & fiber, summer annuals, milkweed.
Equipment for planting same as corn in some cases.

	<i>0 - 2.5 in.</i>		<i>2.5 - 6 in.</i>	
	Detects [†]	Average concentration [‡]	Detects	Average concentration
	%	ppb	%	ppb
Pre-plant (9-May)	0	n/a	75	6.0

[†] The number of samples with concentration greater than reporting limit (2.0 ug/kg or ppb) divided by total number of samples (n=4), reported as a percentage of samples where analyte was detected.

[‡] Average concentration of samples where concentration was greater than reporting limit.



Frequency and concentration of clothianidin in soil 41 days after planting , Alburgh, VT, 2023.

Soil type: Benson rocky silt loam, over shaly limestone

Crop history: No use of neonicotinoid seed treatments in 15 years
Previous crops include hemp grain & fiber, summer annuals, milkweed

	<i>0 - 6 in.</i>	
	Detects [†]	Average concentration [‡]
	%	ppb
41 days after planting	100	11.3

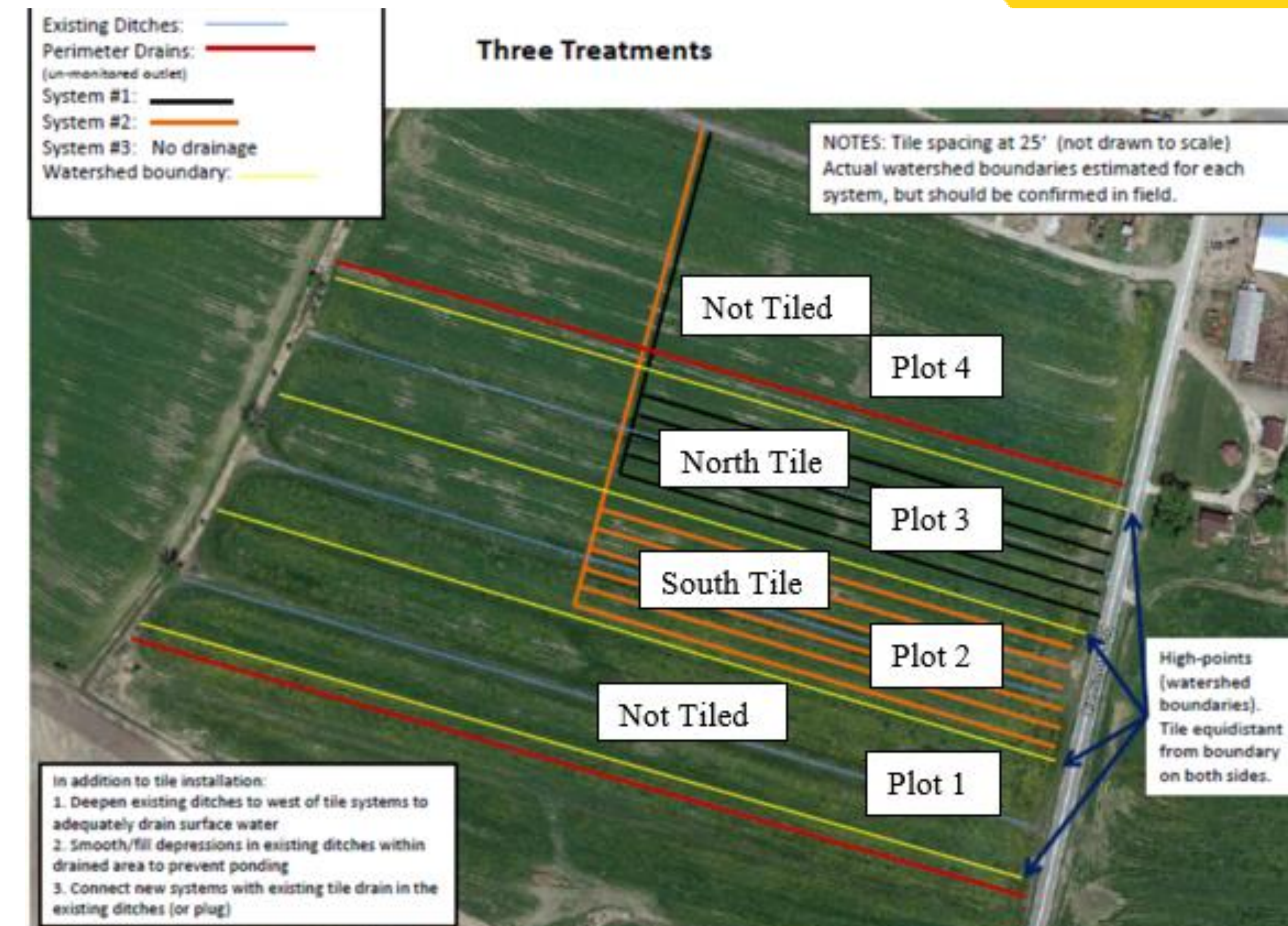
[†] The number of samples with concentration greater than reporting limit (2.0 ug/kg or ppb) divided by total number of samples (n=4), reported as a percentage of samples where analyte was detected.

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Scope of Work: VAAFMM & LCBP

- **Discovery Acres**

- Assess the impact of management methods on water quality (N&P).
- Neonicotinoid movement in surface and subsurface water.



Frequency and concentration of clothianidin at different soil depths prior to corn planting & , St. Albans, VT, 2023.

	<i>0 - 2.5 in.</i>		<i>2.5 - 6 in.</i>	
	Detects [†]	Average concentration [‡]	Detects	Average concentration
	%	ppb	%	ppb
Pre-plant	87.5	3.95	43.4	4.65
187 DAP	86.0	5.06	75.0	4.45

Soil type: Covington clay, poorly drained.

Crop history:
3rd year of corn silage with cover crop

Historic use of neonicotinoid treated seed

Previous crop- alfalfa

[†] The number of samples with concentration greater than reporting limit (2.0 ug/kg or ppb) divided by total number of samples (n=16), reported as a percentage of samples where analyte was detected.

[‡] Average concentration of samples where concentration was greater than reporting limit.



Frequency and concentration of clothianidin in soil after planting, St. Albans, VT, 2023.

	<i>0 - 6 in.</i>	
	Detects [†]	Average concentration [‡]
	%	ppb
37 days after planting	94.0	3.72
120 days after planting	94.0	4.20

Soil type: Covington clay, poorly drained.

Crop history:
3rd year of corn silage with cover crop

Historic use of neonicotinoid treated seed

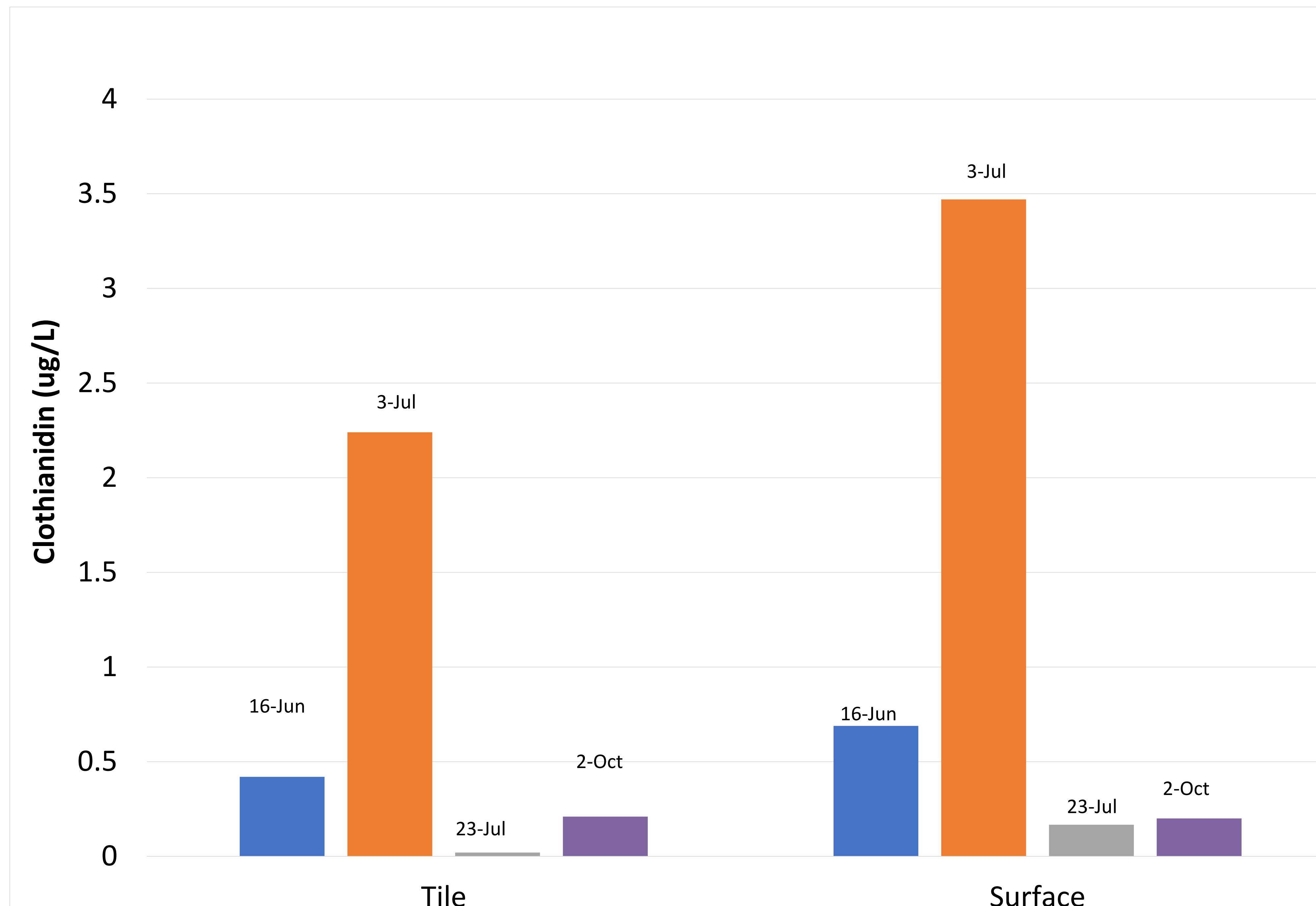
Previous crop- alfalfa

[†] The number of samples with concentration greater than reporting limit (2.0 ug/kg or ppb) divided by total number of samples (n=16), reported as a percentage of samples where analyte was detected.

[‡] Average concentration of samples where concentration was greater than reporting limit.



Concentration of clothianidin in Tile & Surface water post corn planting, St. Albans, VT, 2023.



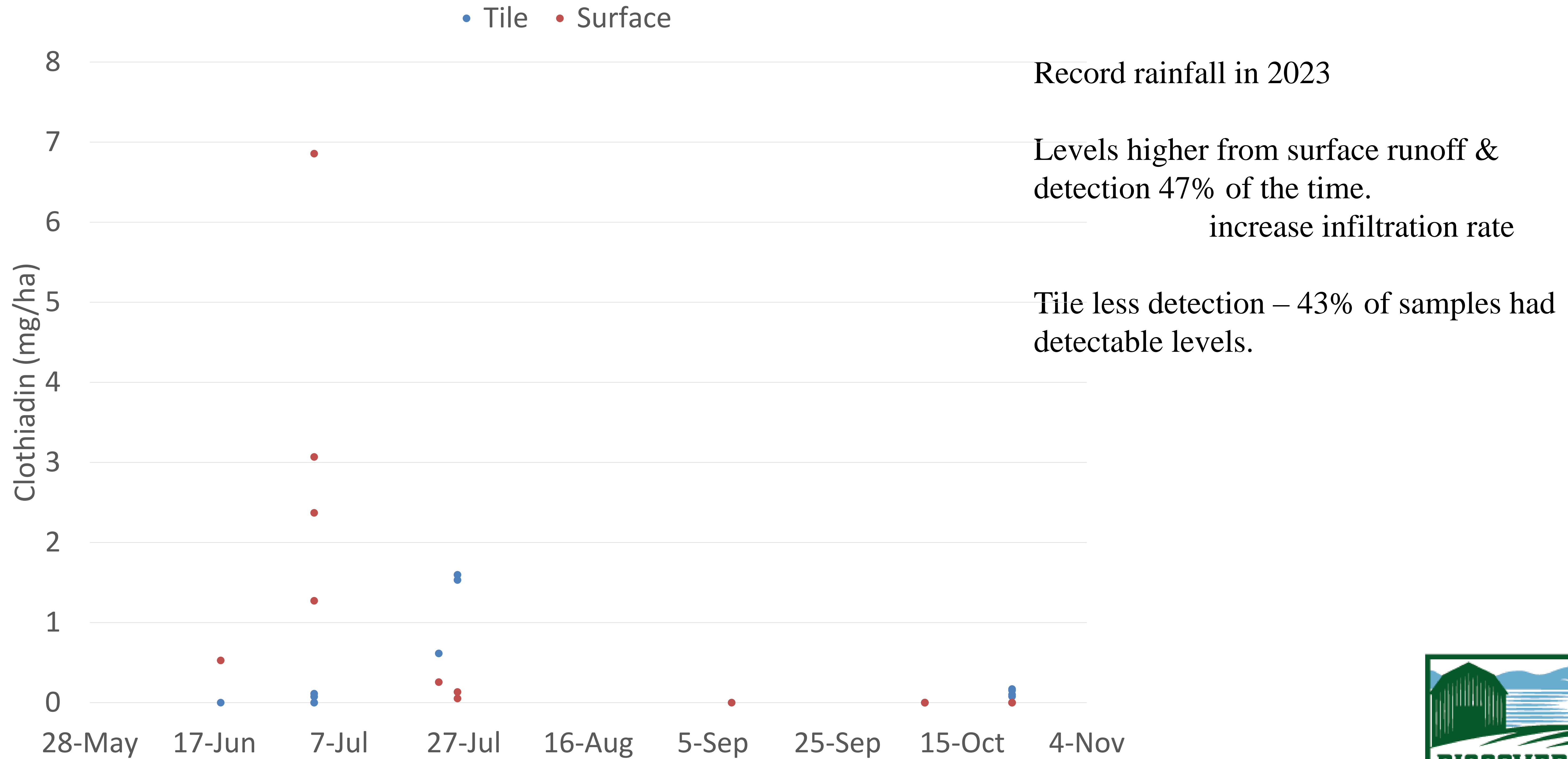
Samples with concentration greater than reporting limit (0.0500 ug/L).

*This is not the loading rate just concentrations from single samples taken from surface or tile when there was water moving off from surface or out of the tiles.



EXTENSION

Loading of clothianidin in Tile & Surface water post corn planting, St. Albans, VT, 2023.





2023 - VT

- Grubs & Wireworms Build Up in Sod Years of Rotation
- Conducive Systems in Vermont

The background image shows a close-up of a young corn seedling in a field. The soil is dark and appears moist. A large, pale, segmented maggot fly larva is visible on the soil surface near the base of the seedling. The seedling itself is small and green, with a few leaves emerging. The overall scene is dimly lit, suggesting an overcast day or a shaded area.

Cultural Controls

- There are no rescue treatments other than re-planting
- Cultural practices that speed germination and plant emergence will help reduce crop losses
- Delaying planting until soil is warm allows for rapid germination and early seedling growth
- Maggot flies are attracted to decaying vegetation
 - plowing in sod, green manures or animal manures at least two to three weeks in advance of planting is recommended
- Maggot populations are generally higher after a legume (e.g., beans) is incorporated into the soil than where a grass is incorporated.
- Conservation tillage can result in lower seedcorn maggot populations
 - plant residues occur mainly on the surface of the soil rather than being incorporated into the soil where decomposition occurs.

Tillage, Cover Crops and Seedcorn Maggot

- 2-year study cover crops and tillage (Hammond 1990)
 - Cover crops and residues dramatic effect on populations.
 - Highest in alfalfa followed by rye, soybean residue, and corn residue lowest
 - More maggot with living versus dead residue
 - No-tillage no enhancement of populations
- 2-year study evaluating cover crops (Hammond, 1993)
 - Spring tillage of cover crops or green living organic matter increased maggot damage.
 - Wait 2.5 to 3.0 weeks following incorporation.
- 12-year study evaluating tillage practices (Hammond, 1997)
 - No-till with little disturbance had few adults
 - Chisel plow slight increase
 - Plowing and disking highest levels

Research in 2024

- **Discovery Acres – continue soil and water evaluation**
- **On-Farm – Year 2**
 - Monitor pests/pest flights
 - Compare treated and untreated seed
 - Evaluate new fluency agents
- **Borderview Research Farm: Year 2**
 - Repeat planting date x seed treatment study
 - Add in additional seed treatments (diamides & Spinosad)
 - New trial to evaluate dust mitigation
 - New trial to evaluate cover crop, no-till, and manure

