



# Can Fall Rye Cover Crop Protect Canola from Flea Beetle Damage?



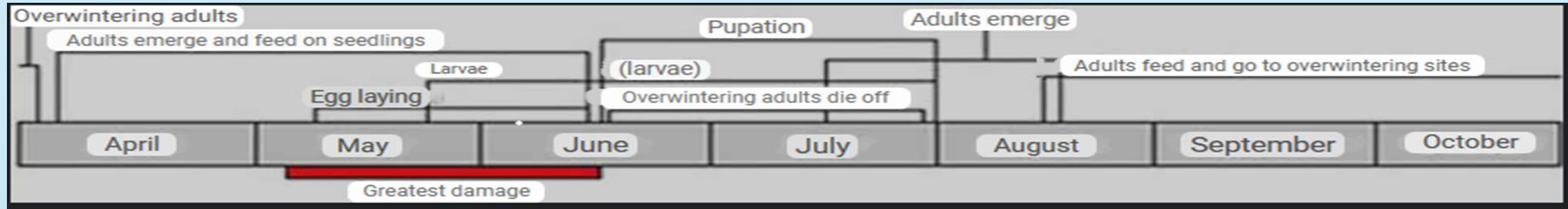
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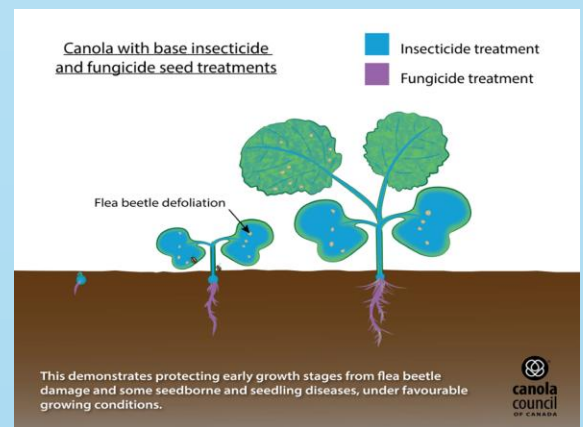


## Introduction

Hungry overwintered adults congregate in the fields with newly emerged canola seedlings where they can cause devastating damage

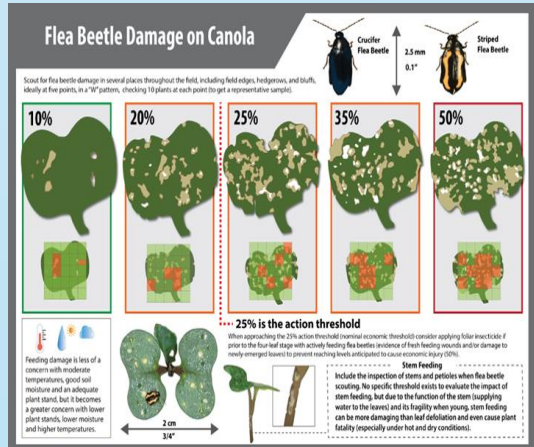


Current control depends on insecticides as a seed treatment and follow-up foliar application when needed



### Treatments 2022

t1 Rye terminated 7 DBP (7 days before planting canola) @7dbpc  
t2 Rye terminated 1 DAP (1 day after planting canola) @1dapc  
t3 Rye terminated at 2-leaf stage of canola @2leaf  
t4 Control - No fall rye cover crop @control



### Statistical Analyses (preliminary)

- Variables: defoliation, abundance of flea beetles and yield
- Separate analyses of variance (ANOVA) per date
- Treatments and blocks will be treated as fixed factors,
- Pairwise comparisons of treatments with Tukey's HSD

## Methods



Figure 1. Map of plots with 5 treatments replicated in RCBD (n = 4) in Carman, Manitoba, during 2023

### Treatments 2023

t1 Rye terminated 7 DBP (7 days before planting canola) @7dbpc  
t2 Rye terminated 1 DAP (1 day after planting canola) @1dapc  
t3 Rye terminated at cotyledon stage of canola @cot  
t4 Rye terminated at 2-leaf stage of canola @2leaf  
t5 Control - No fall rye cover crop @control

### Experimental design

- Roundup ready Canola (DEKALB - DKTF 97 CRSC)
- Rye cover crop AC® Hazlet variety
- Plant stand levels (7.5-inch row spacing for Canola and Fall Rye)
- Canola seed treatment (BUTEO start 480 FS + Prosperevergol + Fortenza® Advanced)
- Planting date of Canola (27 May 2022, 10 May 2023)
- Collecting data period (every week after 50 % emerging of cotyledons until ≤ 4 leaf stage )

Flea Beetles abundance: weekly

- 1 yellow sticky trap / plot

Canola defoliation

- 2 transects per plot, 10 plants assessed visually for defoliation transect
- Plant population assessed weekly

## Results

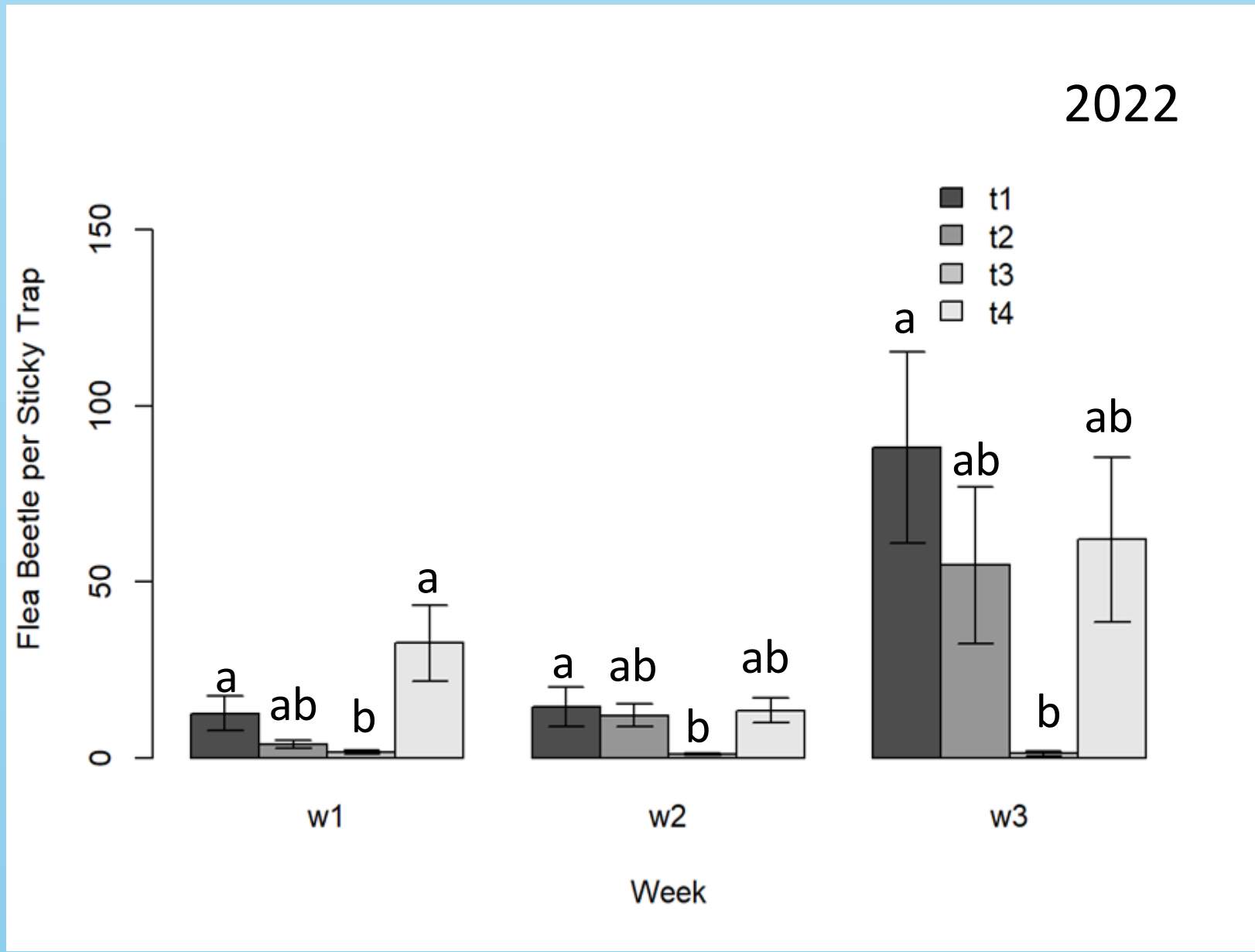


Figure 2. Average number of flea beetles captured / yellow sticky traps each week (w1 = June 13, w2 = June 20, w3 = June 27)

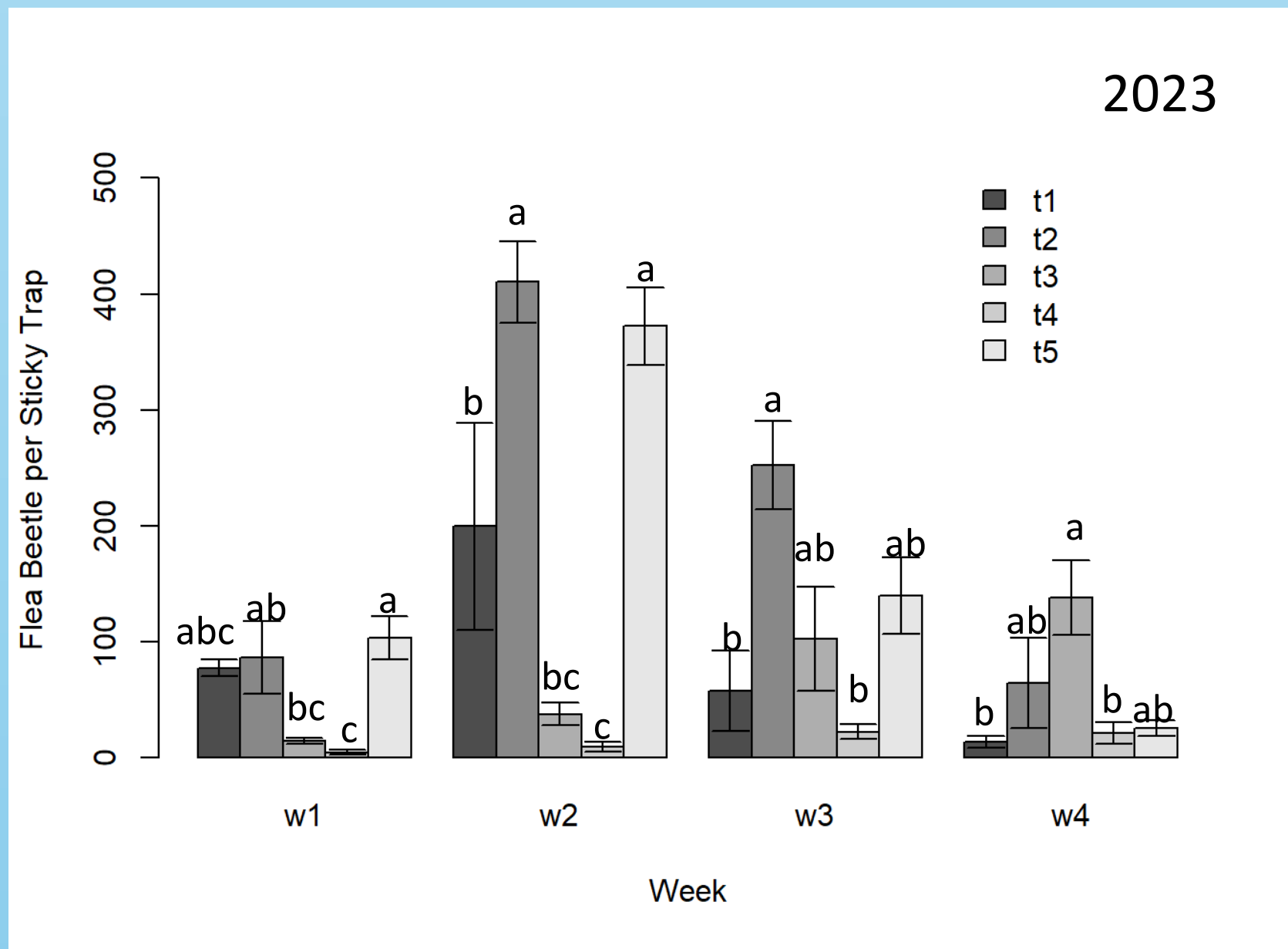


Figure 3. Average number of flea beetles captured / yellow sticky traps each week (w1 = June 2, w2 = June 9, w3 = June 15, w4 = June 23)

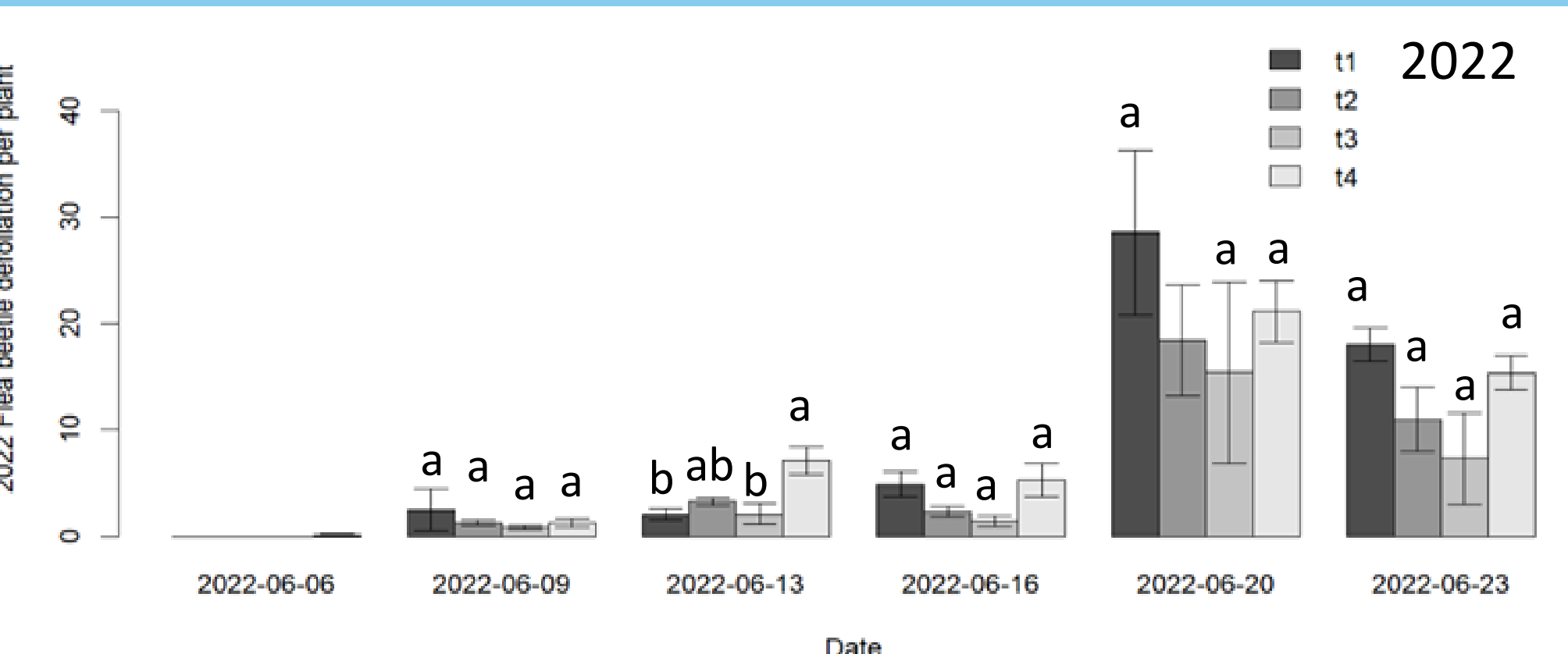


Figure 4. Average defoliation per plant calculated by mean defoliation per cotyledons and first 2 true leaves in 2022

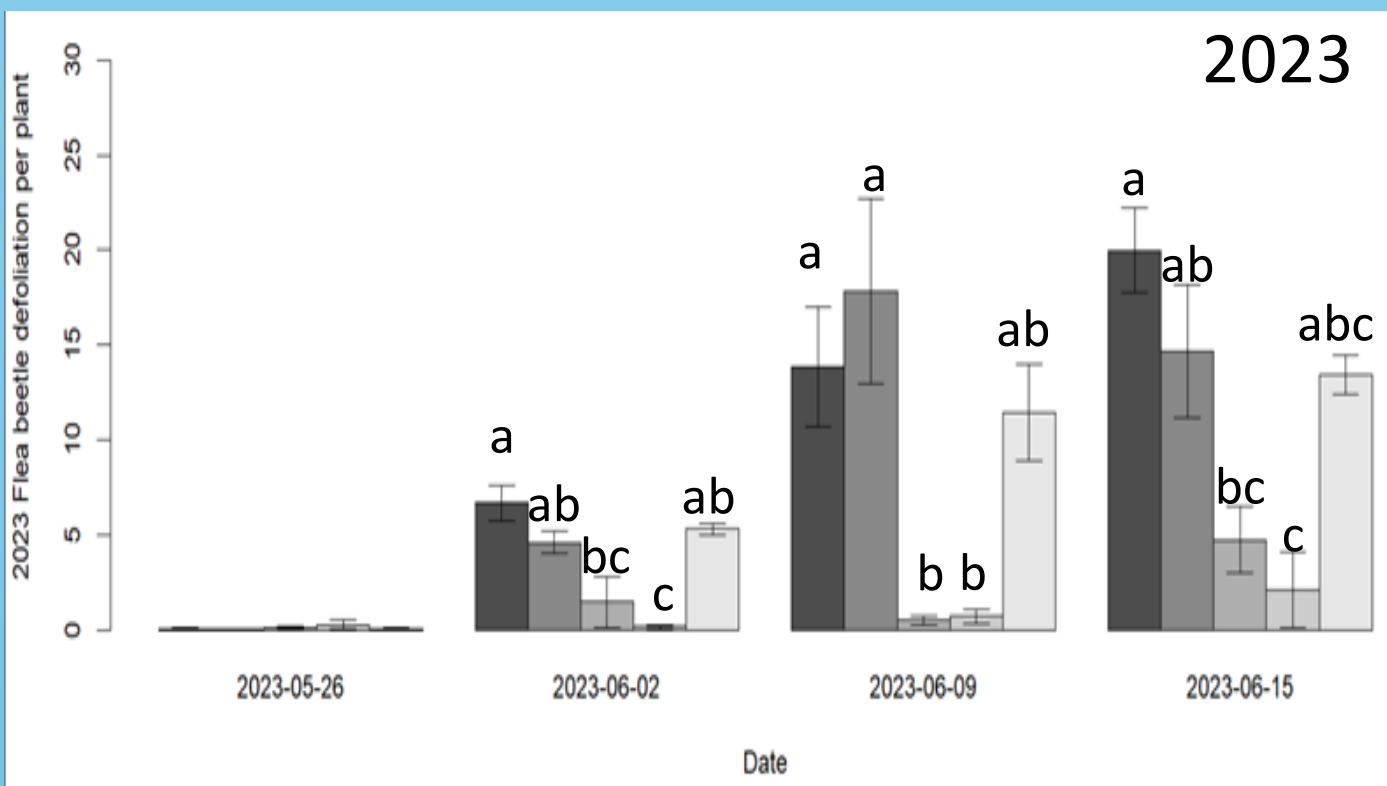


Figure 5. Average defoliation per plant calculated by mean defoliation per cotyledons and first 2 true leaves in 2023

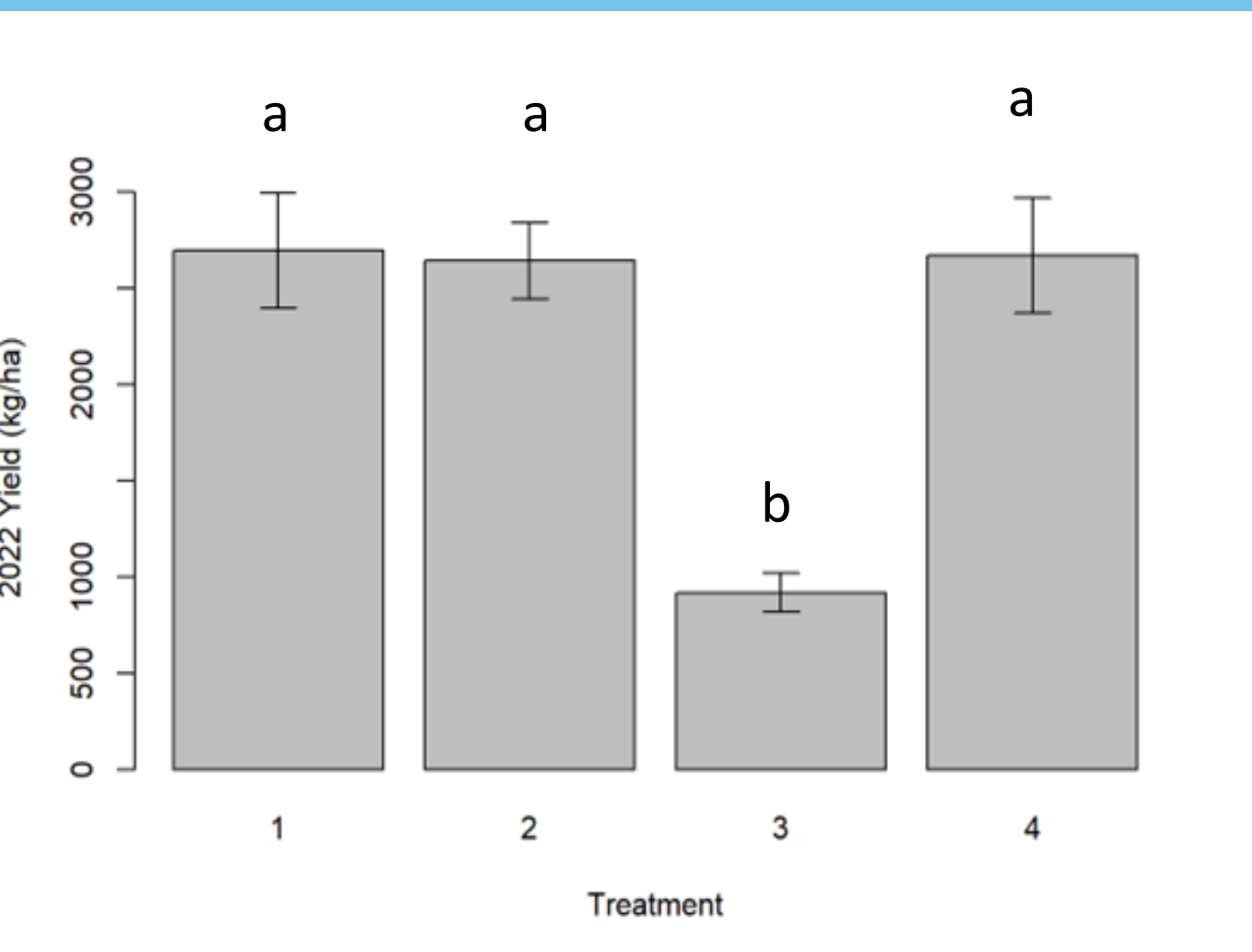


Figure 6. Average yield per treatment for 2022

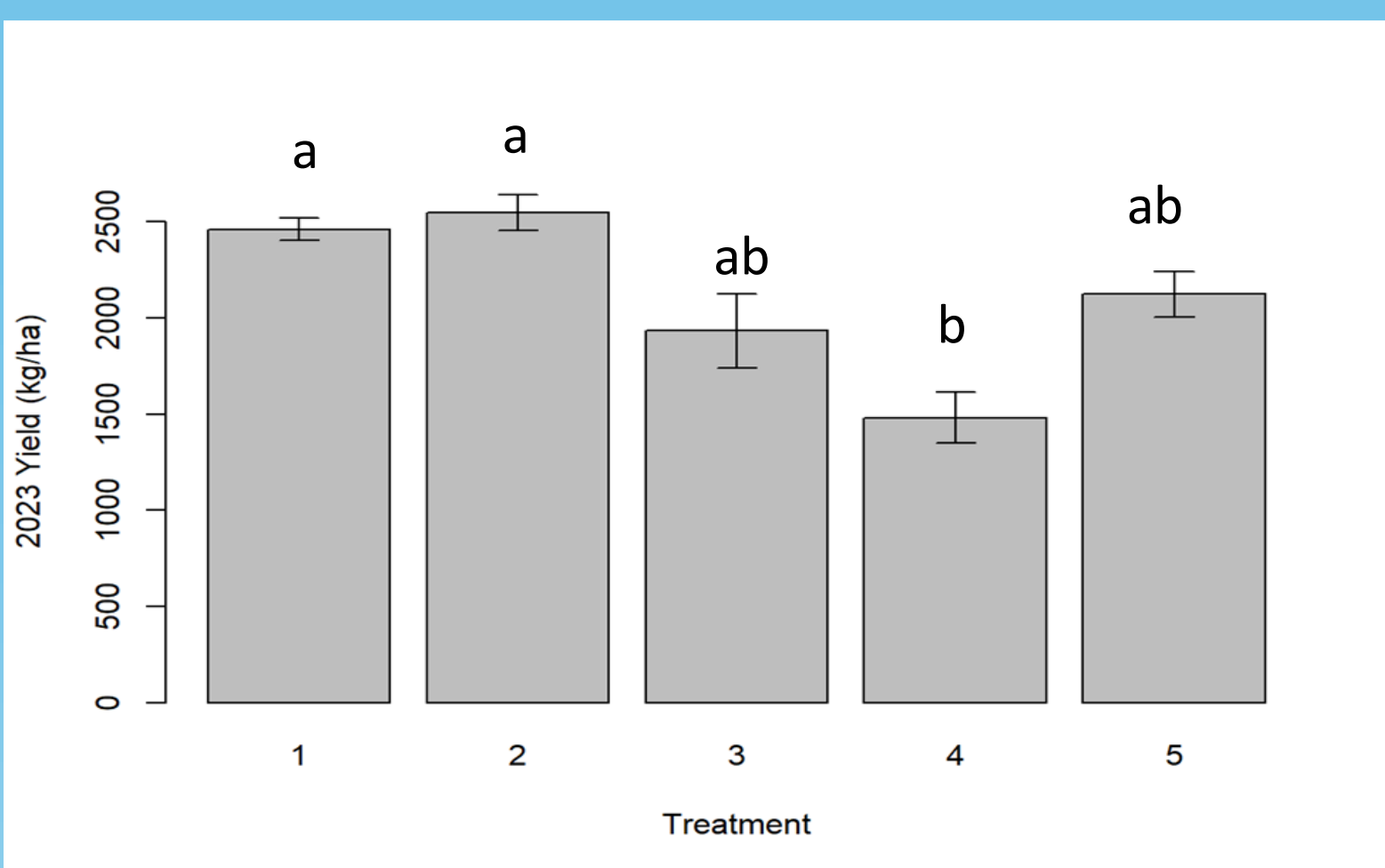


Figure 7. Average yield per treatment for 2022

Yield				
Year	Factor	Df	F value	p value
2022	treat	3, 6	31.958	***
	block	2, 6	6.477	*
2023	treat	4, 11	9.564	**
	block	3, 11	0.149	n.s.

\*\*\* = p < 0.001  
\*\* = P < 0.01  
\* = P < 0.05  
n.s (not significant) = p > 5

Year	Date	Factor	Df	Fb defoliation F value	p value	Fb total F value	p value
2022	9-Jun	treat	3, 12	0.4402	n.s.		
		block	4, 12	0.6972	n.s.		
	13 Jun	treat	3, 12	6.2116	**	4.6478	*
		block	4, 12	0.2806	n.s.	0.2881	n.s.
	16 Jun	treat	3, 12	4.0094	*		
		block	4, 12	1.8248	n.s.		
	20 Jun	treat	3, 12	1.7722	n.s.	4.5069	*
		block	4, 12	6.3954	**	3.3796	*
2023	23 Jun	treat	3, 12	2.6271	n.s.		
		block	4, 12	0.751	n.s.		
	27 Jun	treat	3, 12			5.8681	*
		block	4, 12			4.8733	*
	2 Jun	treat	4, 12	11.4351	***	8.0039	**
		block	3, 12	0.7312	n.s.	1.588	n.s.
	9 Jun	treat	4, 12	10.5574	***	51.1856	***
		block	3, 12	2.8619	n.s.	3.5207	*
2023	15 Jun	treat	4, 12	9.3547	**	6.7991	**
		block	3, 12	0.3277	n.s.	1.0137	n.s.
	23 Jun	treat	4, 12			4.7472	*
		block	3, 12			0.806	n.s.

\*\*\* = p < 0.001  
\*\* = P < 0.01  
\* = P < 0.05  
n.s. (not significant) = p > 5

- In 2022, rye terminated at the 2<sup>nd</sup> leaf stage (T3) showed lower number of flea beetles (Figure 3) and less defoliation (Figure 4), but also less yield (Figure 6)
- Similarly, in 2023, rye terminated at the cotyledon (T3) and 2<sup>nd</sup> leaf stage (T4) showed lower number of flea beetles (Figure 4) and less defoliation (Figure 5), but also less yield (Figure 7)
- Plant density was not affected by treatments in either year (data not shown).

## Conclusions

- A fall rye cover crop can protect canola from flea beetle's damage when overlaps with canola (T3 and T4).
- However, overlapping with canola resulted in big yield penalties when extended to the 2<sup>nd</sup> leaf. Lower yield reduction was observed in the treatment with rye terminated at the cotyledon stage.
- Future work should focus on 1) finding the sweet spot for terminating fall rye, and 2) finding cover crops that can protect the canola from flea beetles and not reduce the yield.

## Acknowledgements

Field crews from Lawley and Costamagna labs  
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