

Mass trapping of adult sugar beet root maggot flies using pheromone-lure-baited bucket traps



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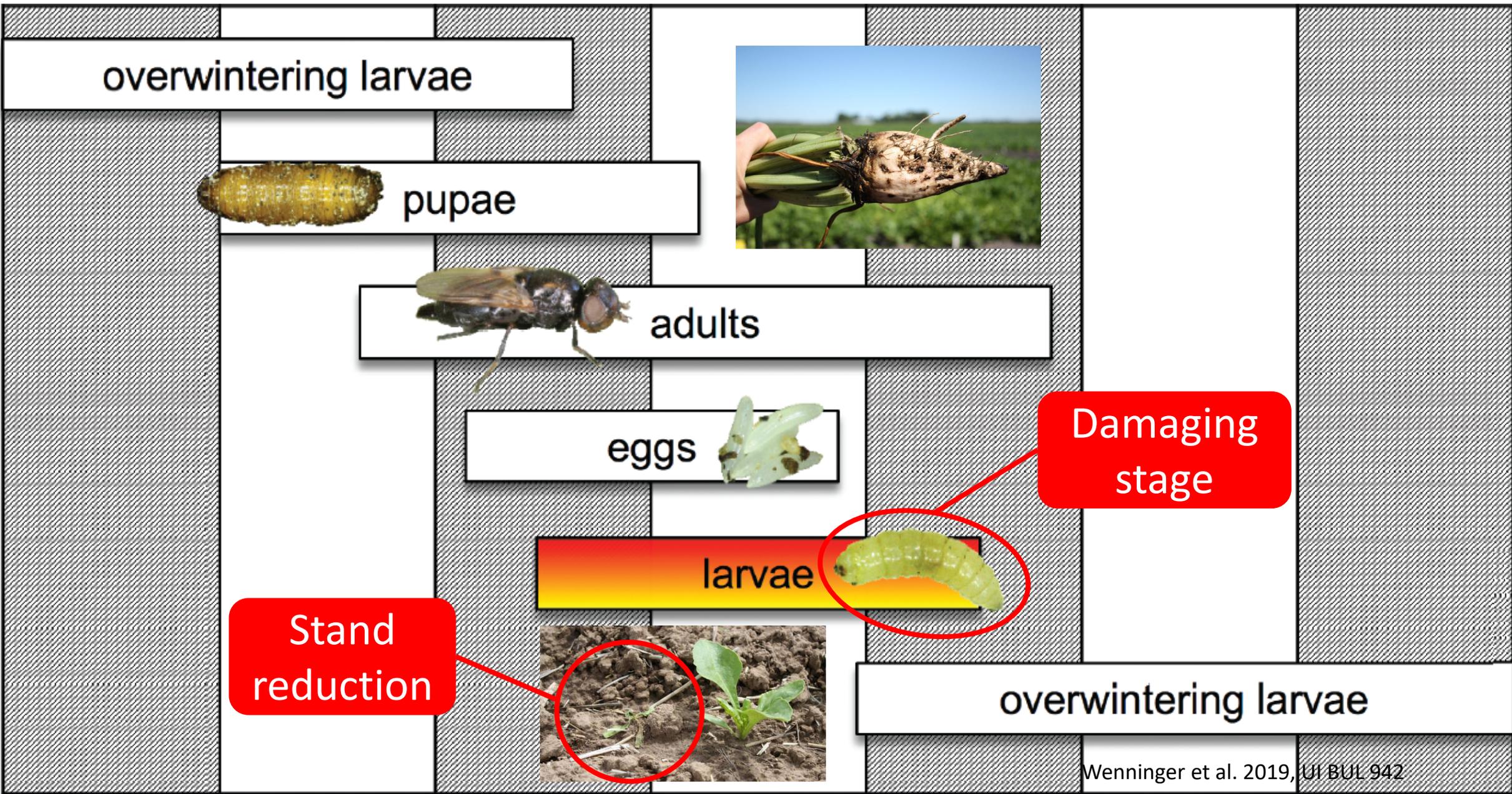


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Sugar beet root maggot

- *Tetanops myopaeformis* (Diptera: Ulidiidae)
- Larval feeding scars roots and reduces yield
- Largest yield loss from stand reduction





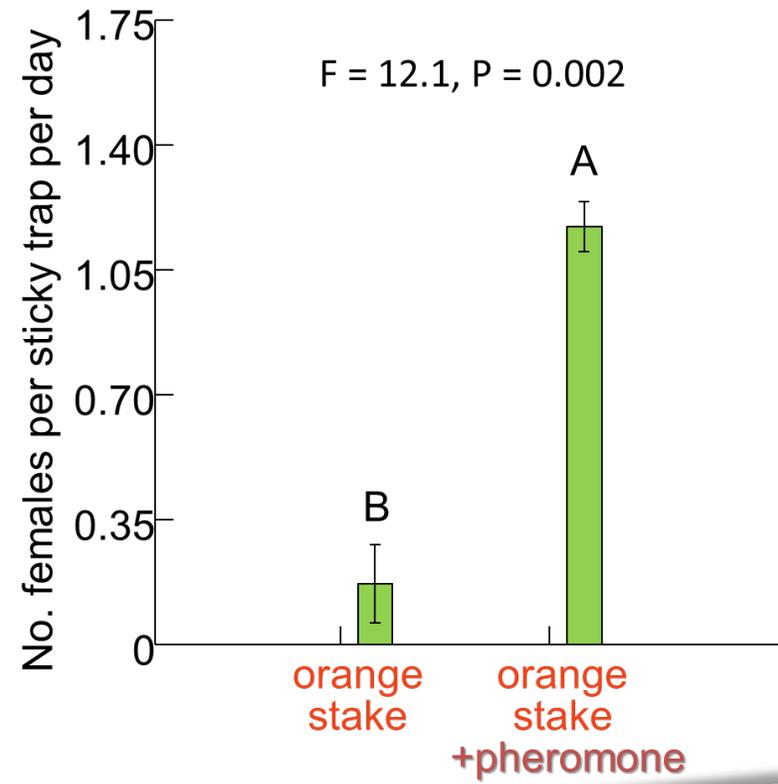
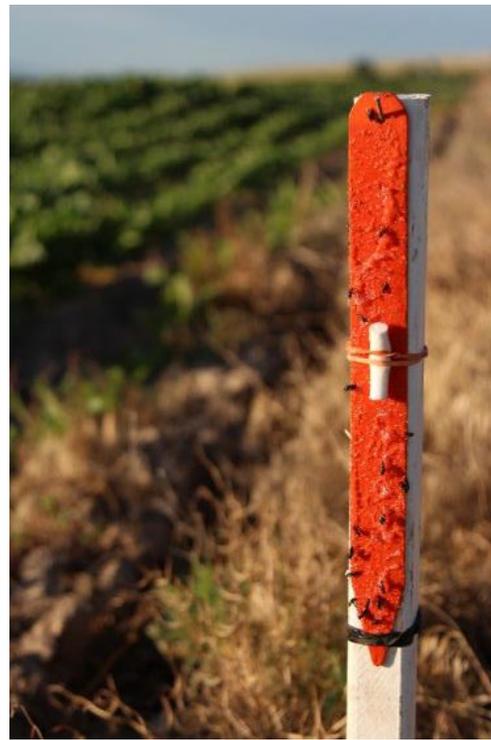
March	April	May	June	July	August	Sept.
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Wenninger et al. 2019, UI BUL 942

Management of SBRM

- Dependent on organophosphates and carbamates
 - Insecticide resistance
 - Worker and environmental safety concerns
 - Food Quality Protection Act of 1996





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Aggregation Behavior and a Putative Aggregation Pheromone in Sugar Beet Root Maggot Flies (Diptera: Ulidiidae)

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Abstract

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Optimizing a pheromone lure for the sugar beet root maggot fly, *Tetanops myopaeformis*

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Key words: aggregation pheromone, pheromone traps, sticky traps, monitoring, lekking, *Beta vulgaris*, Diptera, Ulidiidae, lure, sugar beet root maggot, *Tetanops myopaeformis*

Management tools with SBRM pheromone?

- Updating action thresholds with pheromone-baited traps
- Mass trapping
 - include visual cues
 - improve trap capacity
 - improve lure longevity



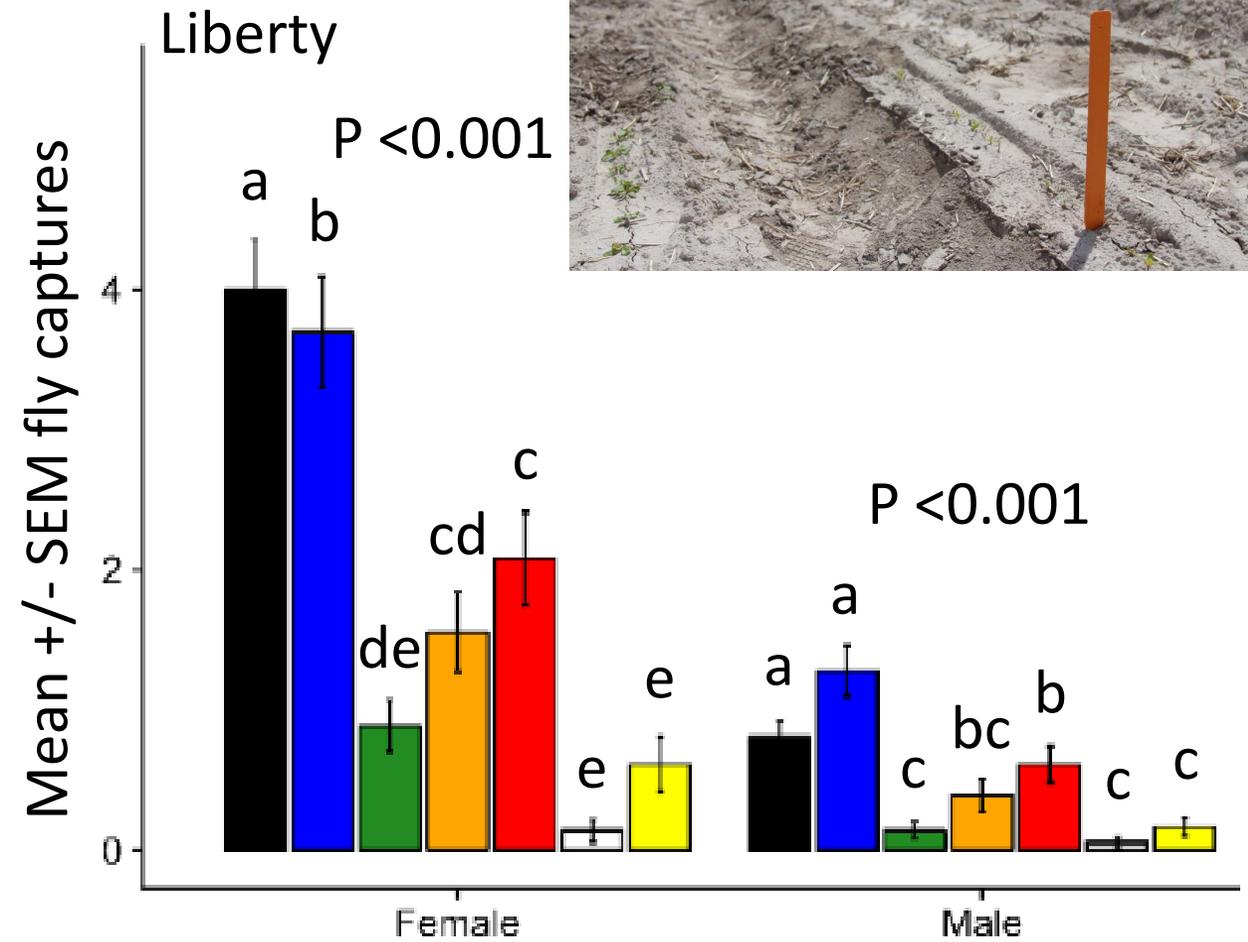
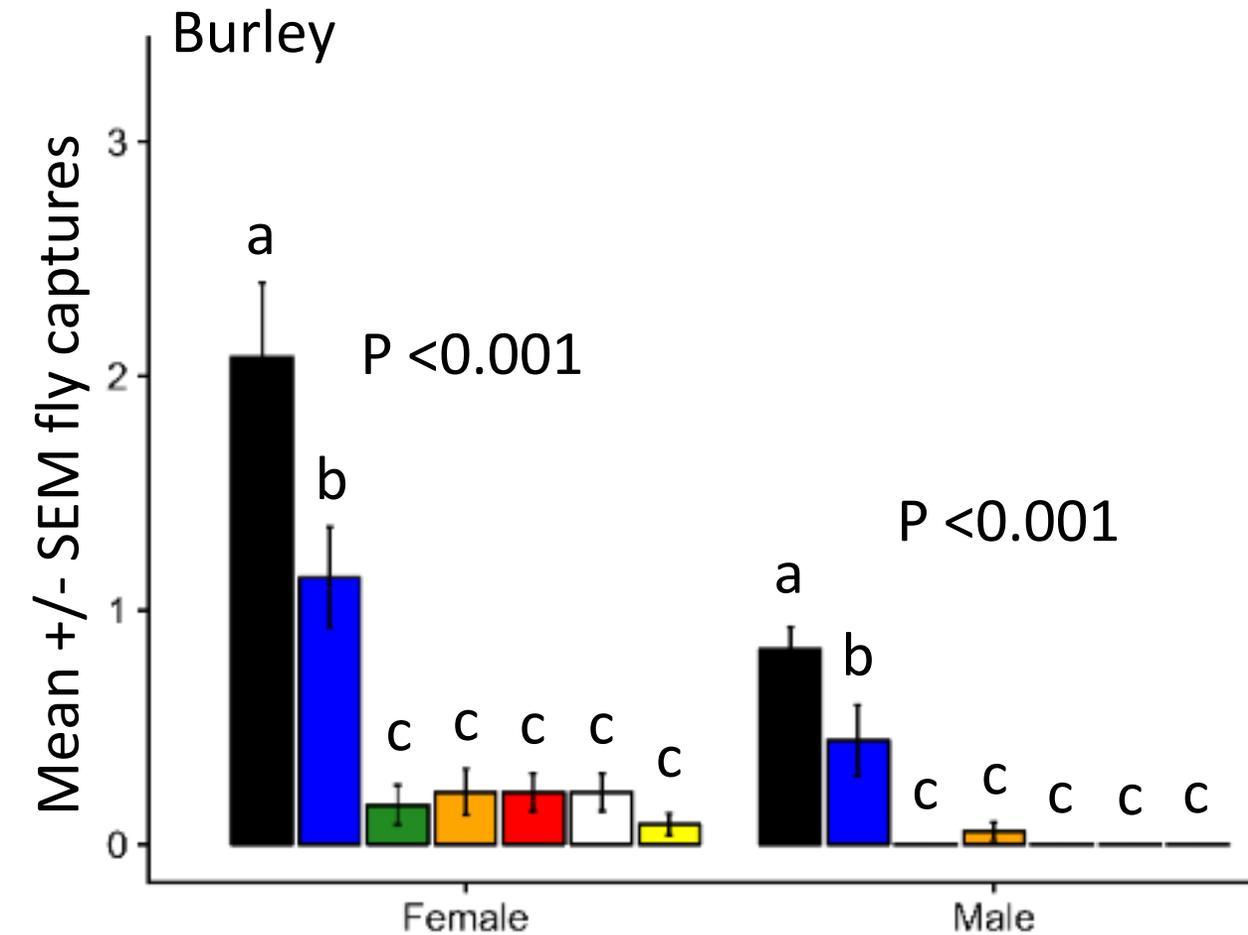
Trap color

- Red, orange, and **black** reported to be attractive
- Worth revisiting
 - reflectance spectra
 - female / male differences?
 - statistical analysis



Color	% captures relative to Black
Red	110.6
Orange	107.8
Blue	92.7
Brown	91.6
Green	88.1
Yellow	79.1
White	70.2
Silver	67.9
Unpainted	61.8

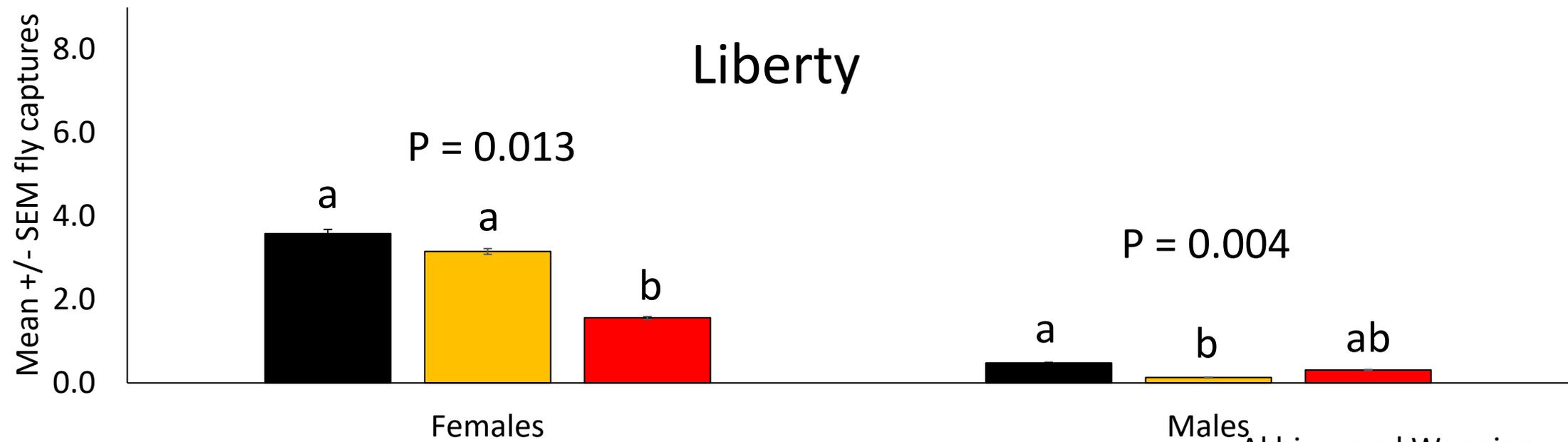
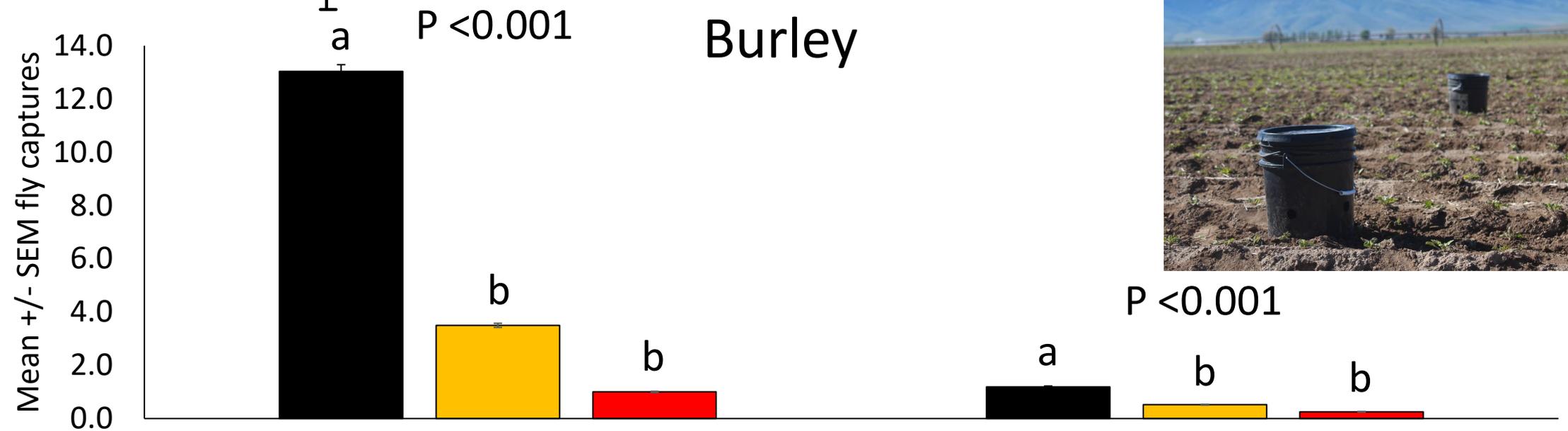
Color attraction



Blickenstaff and Peckenpaugh 1976: red ≈ orange ≈ black stakes

Akhiwu and Wenninger, in prep.

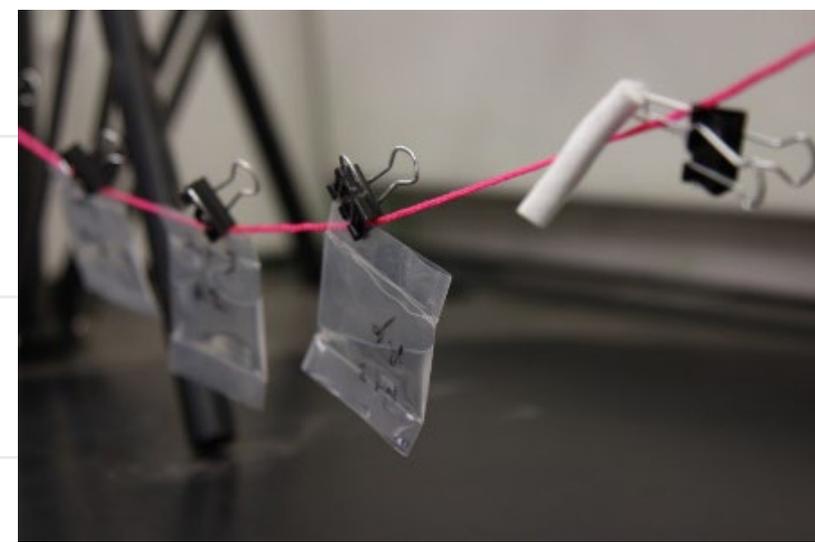
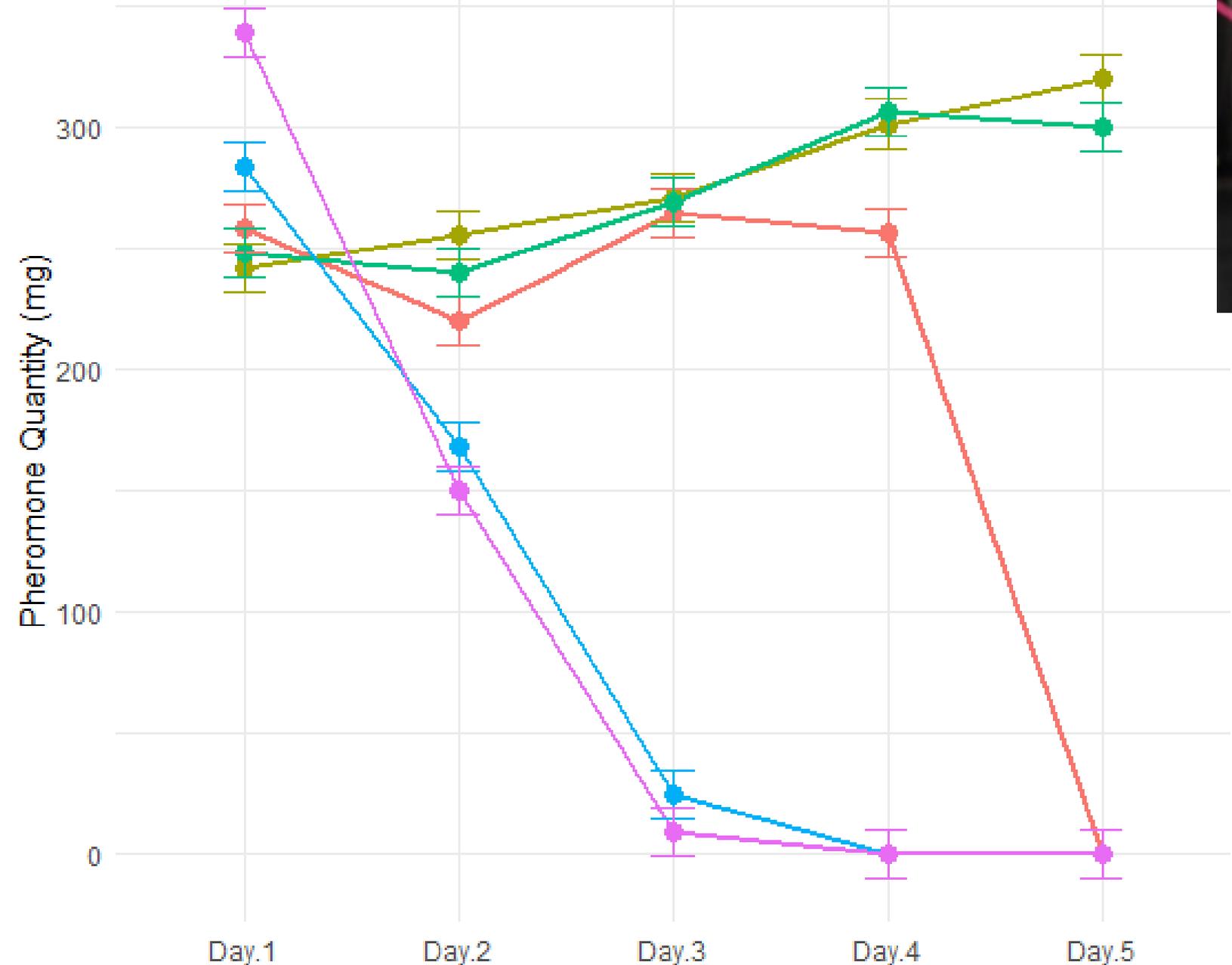
Bucket traps



Season-long average fly captures, 2023

	Females	
Location	 Bucket	 Stake
Burley, site A	264	114
Burley, site B	189	58
American Falls, site A	343	154
American Falls, site B	252	140

Lure longevity



- 0.5 mil 1000 mg
- 0.5 mil 1500 mg
- 0.5 mil 2000 mg
- 0.5 mil 500 mg
- Dental wick 500 mg



Akhiwu and Wenninger, in prep.

Management tools with SBRM pheromone?

- Mass trapping

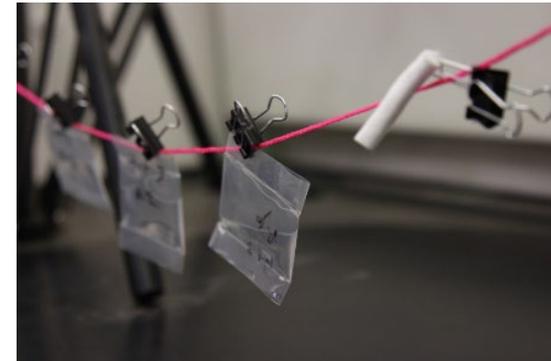
☑ -include visual cues



☑ -improve trap capacity



☑ -improve lure longevity



Mass trapping experiments

- Compare sugar yields:
 - I. Non-treated check
 - II. Aldicarb (AgLogic)
 - III. Mass trapping



Year	Site	Treatment	ERS (lb/acre)	
2023	American Falls A	Aglogic	14,239	A
		Mass Trapping	14,067	A
		Check	12,943	B
		P-value	0.004	
2023	American Falls B	Aglogic	13,793	AB
		Mass Trapping	14,076	A
		Check	12,845	B
		P-value	0.035	
2023	Burley A	Aglogic	19,640	A
		Mass Trapping	19,386	A
		Check	18,505	B
		P-value	0.001	
2023	Burley B	Aglogic	18,306	AB
		Mass Trapping	19,490	A
		Check	15,667	B
		P-value	0.049	
2024	Burley A	Aglogic	10,498	
		Mass Trapping	11,126	
		Check	9,735	
		P-value	0.073	
2024	Burley B	Aglogic	13,616	
		Mass Trapping	14,026	
		Check	12,655	
		P-value	0.565	



Akhiwu and Wenninger, in prep.

Conclusions

- Black = attractive to females
- Bucket traps = effective, high capacity
- Polyethylene lures = long lasting, consistent release rate
- Mass trapping \approx aldicarb in protecting sugar yield from SBRM

Future work

- Confirm efficacy at field scale
- Optimize / reduce labor needed
 - Determine minimum traps per field
 - Determine optimum trap spacing
 - Extend lure longevity
 - Refine / simplify trap?



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