

A wide-angle photograph of a large agricultural field, likely a strawberry field, showing rows of young plants in black plastic mulch. The rows are straight and recede into the distance under a clear blue sky. A dense line of trees is visible in the background.

Weed Management Updates

Nathan Boyd



Emergence Patterns of Broadleaf Weed Species

Sudip Regmi

Major Broadleaf Weed Species

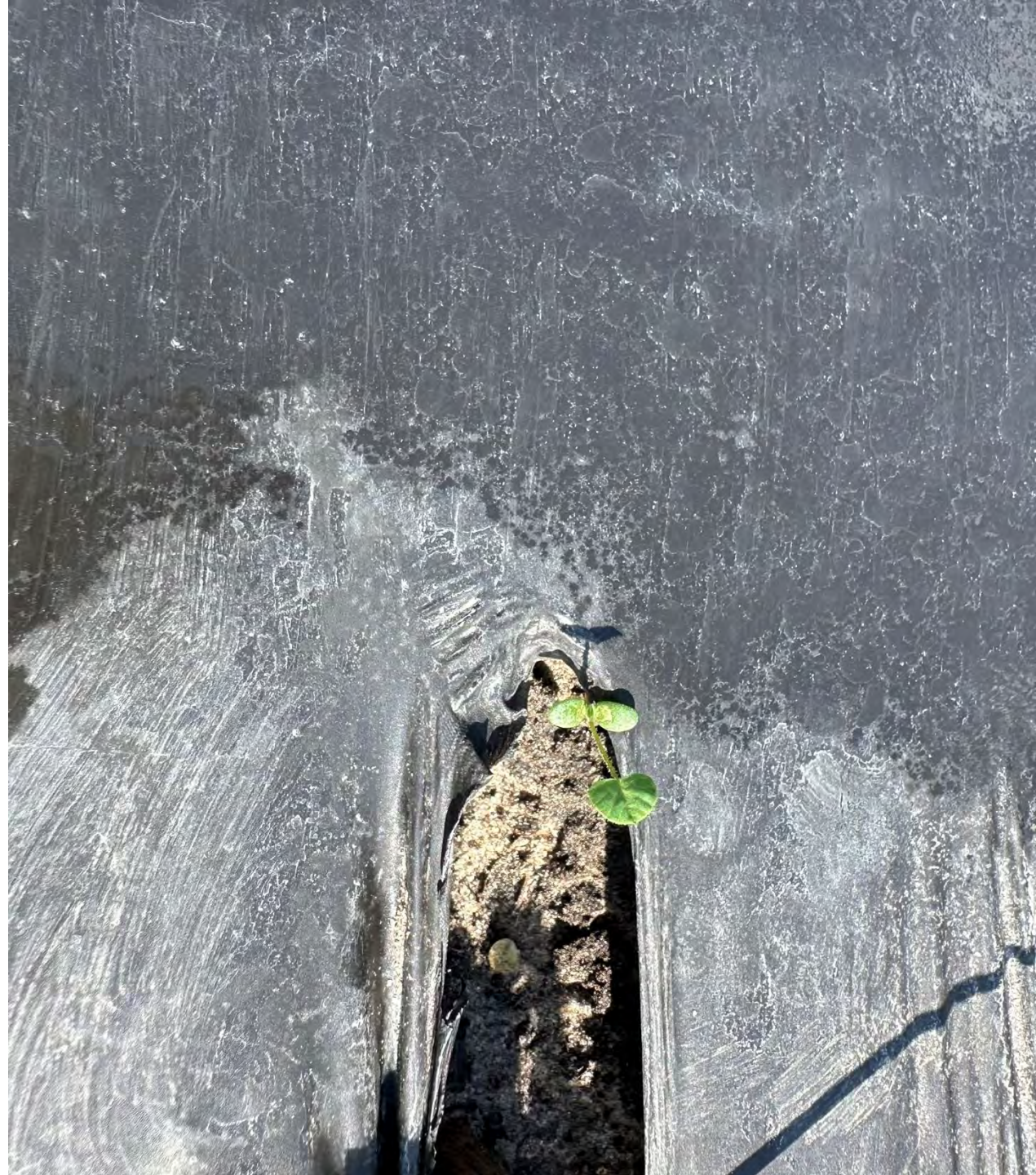


Carolina Geranium

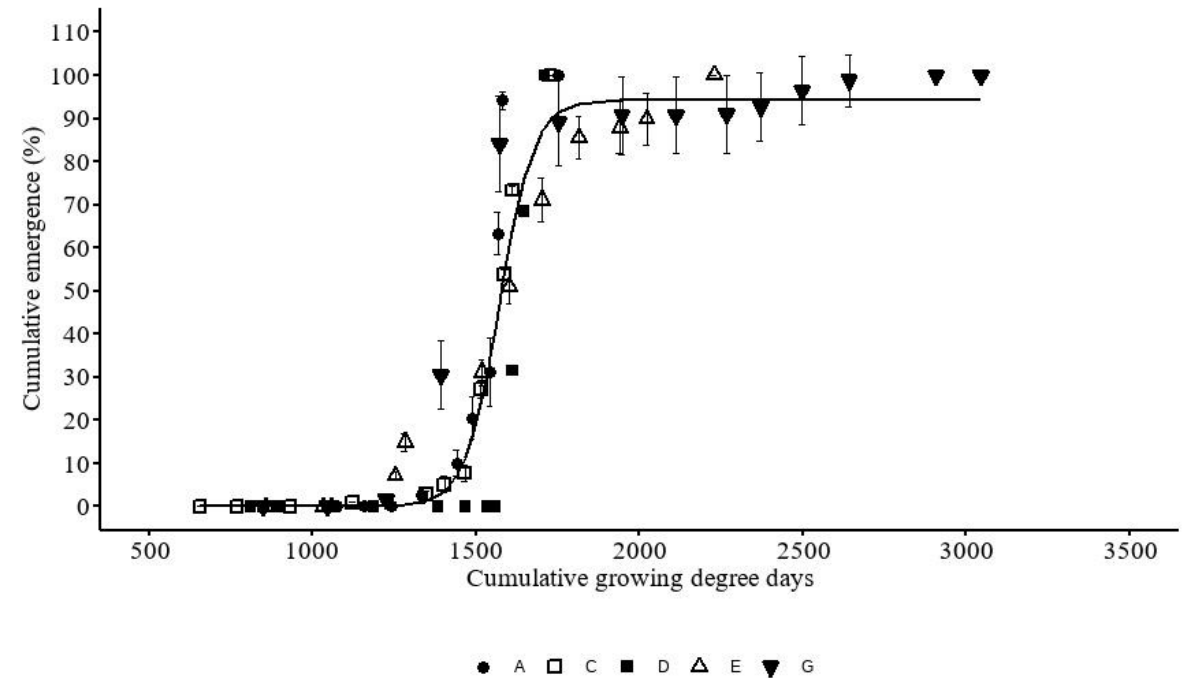
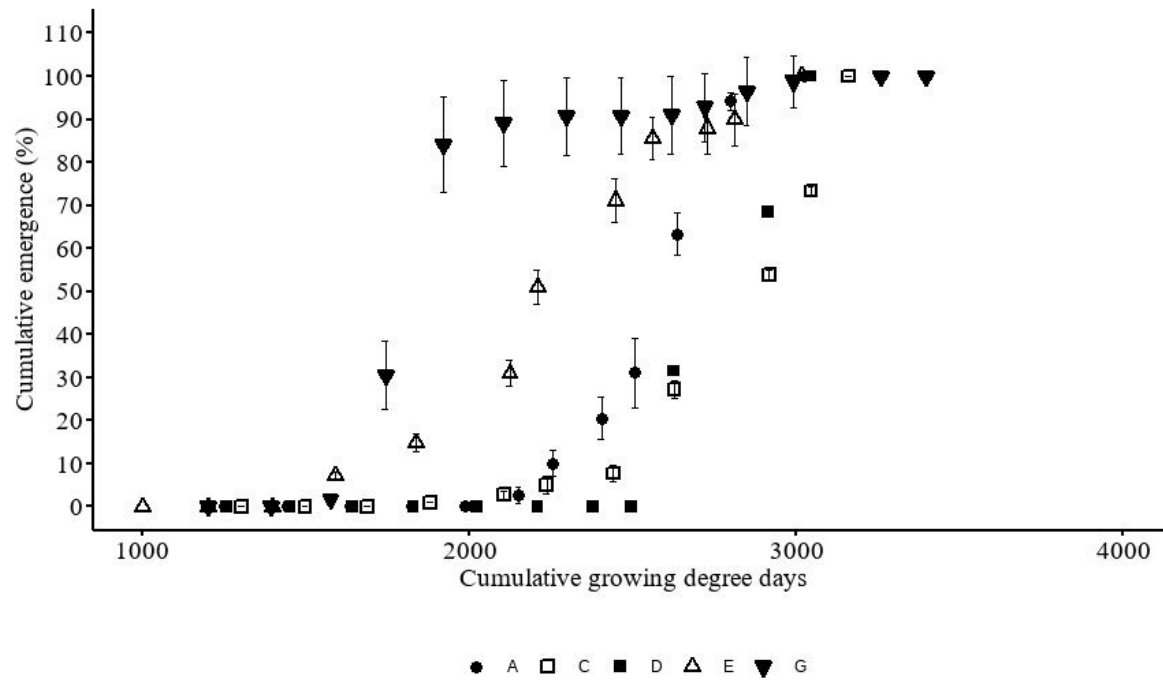


Black Medic

Both appear in row-middle and transplanting holes of bed tops



Carolina Geranium emergence models



Emergence Timeline in Bed-top

Cumulative Emergence	10%	50%	90%
Timeline	Early-Mid November	Late-November	Mid-December

Important Notes:

1. Row-middle emergence appears **a week earlier compared to bed-top**.

Take Home Message

- Emergence timing can be accurately predicted across years and locations.
- Postemergence herbicide applications around **late November or first week of December** could be effective for broadleaf weed species in strawberry.

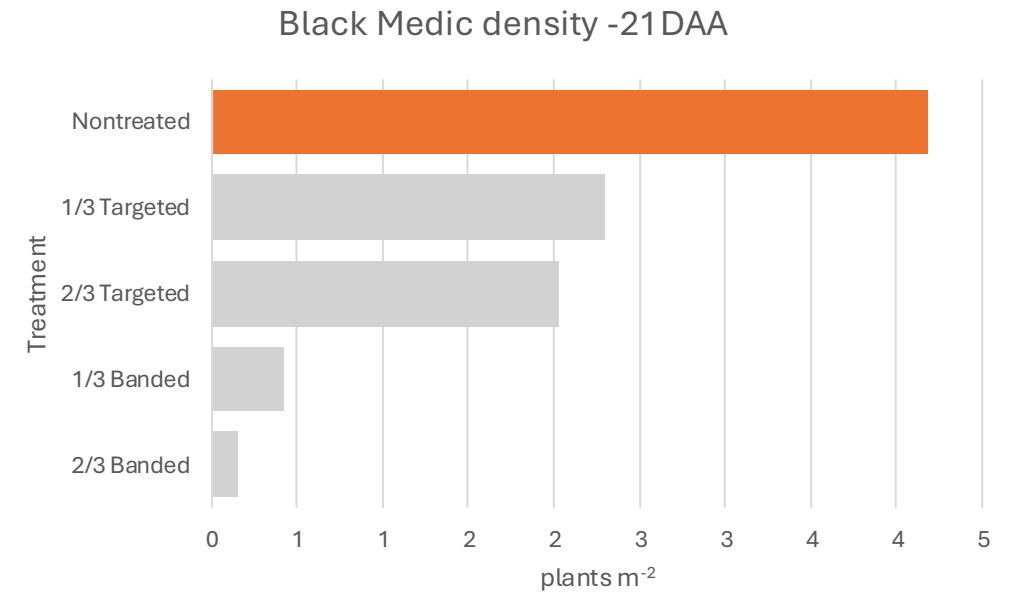


Targeted Broadleaf Weed Control

Ana Buzanini and Renato Furlanetto







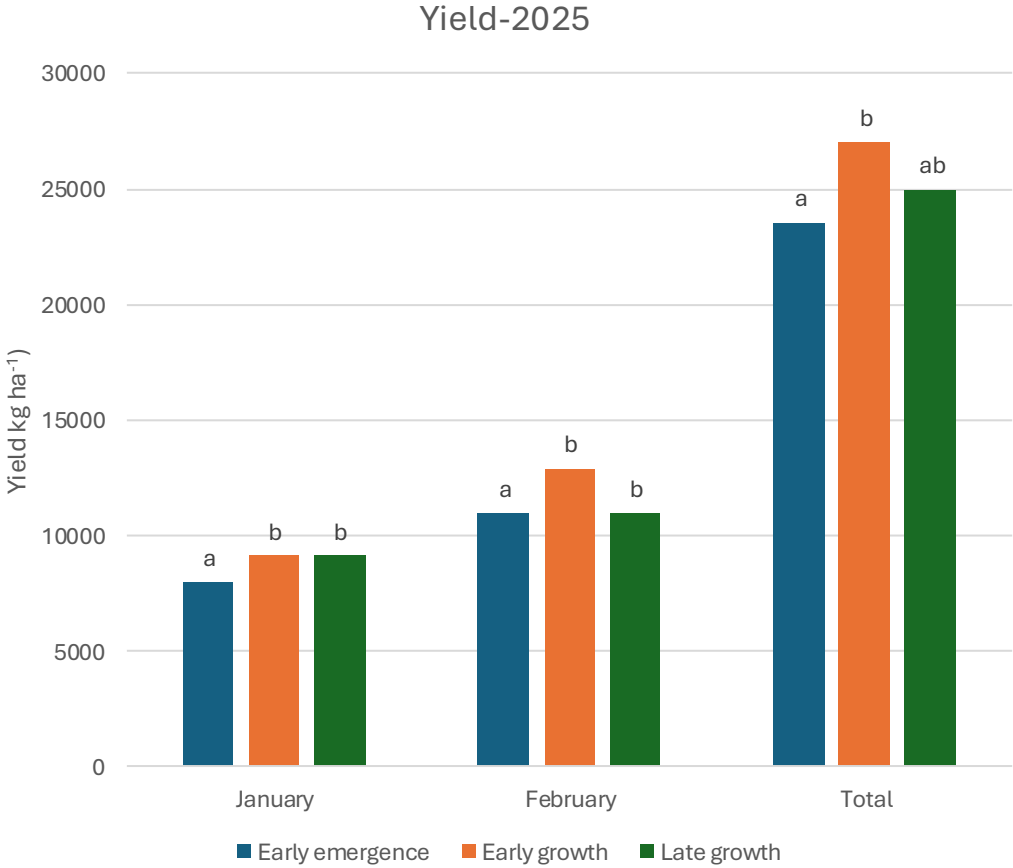
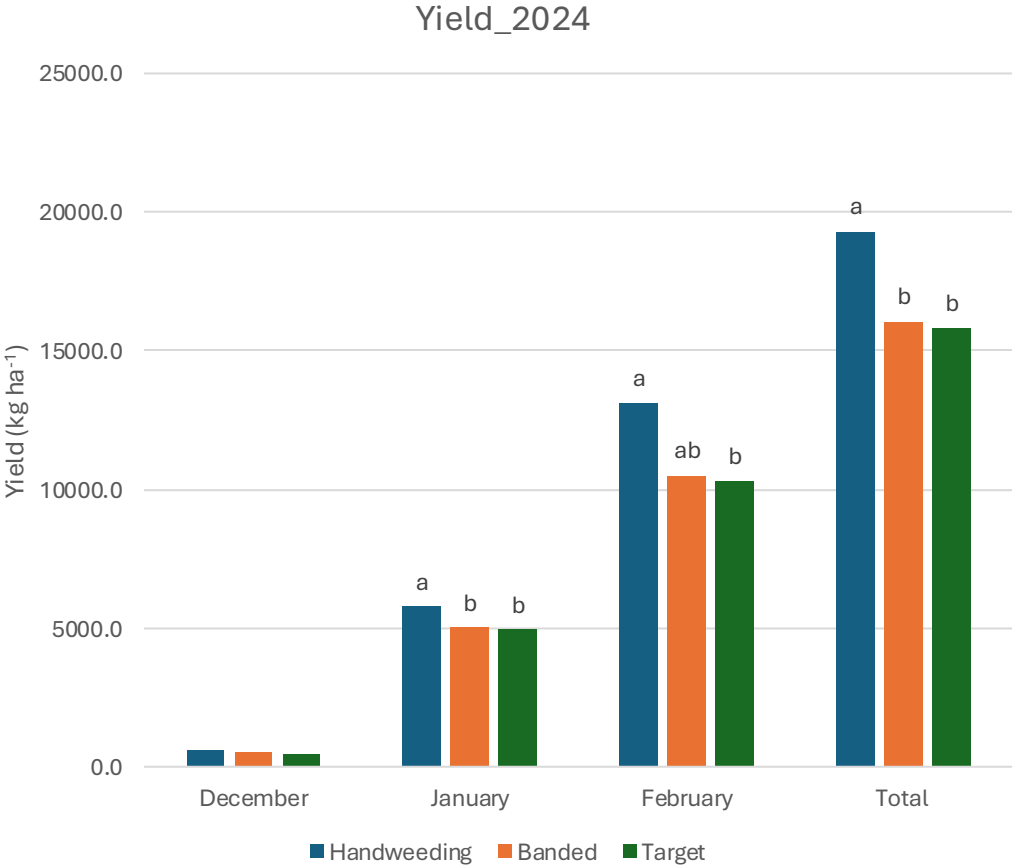
1/3=5.3 oz/ac

2/3=10.6 oz/ac



The damage caused by the herbicide (the curly leaves) did not cause a reduction in the number of fruits or yield

How does the method or application time affect the yield?



Effects of Stinger on Carolina geranium

Early emergence- Mid-season

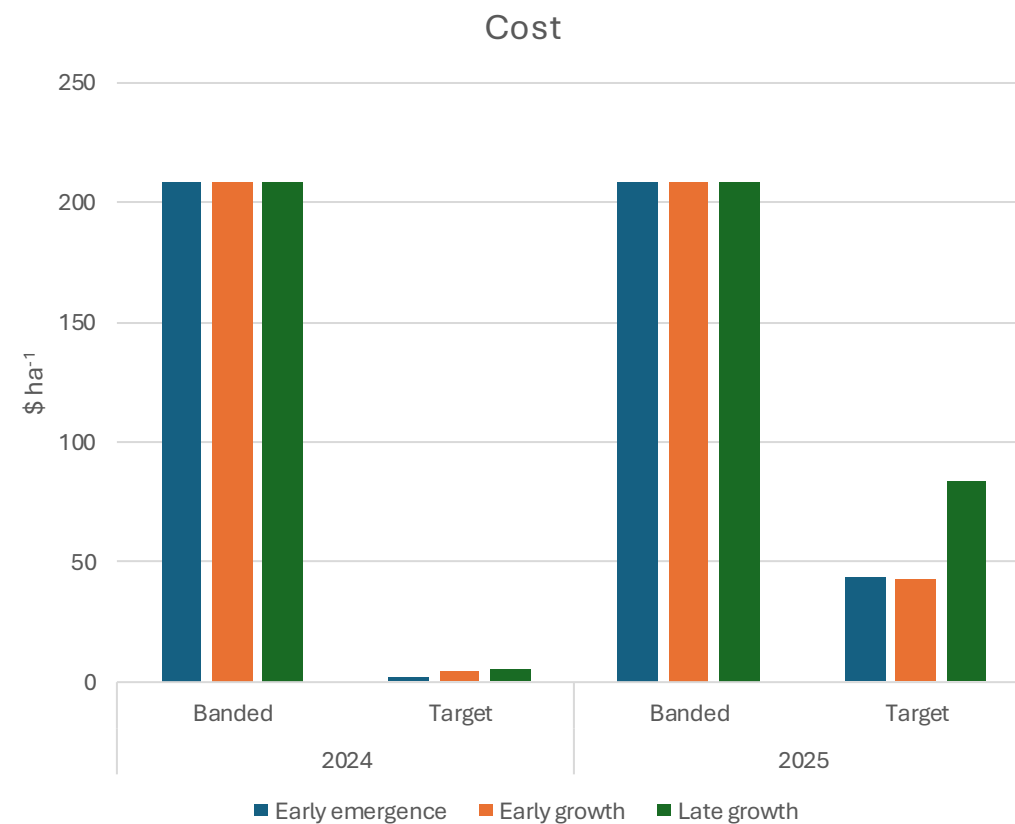
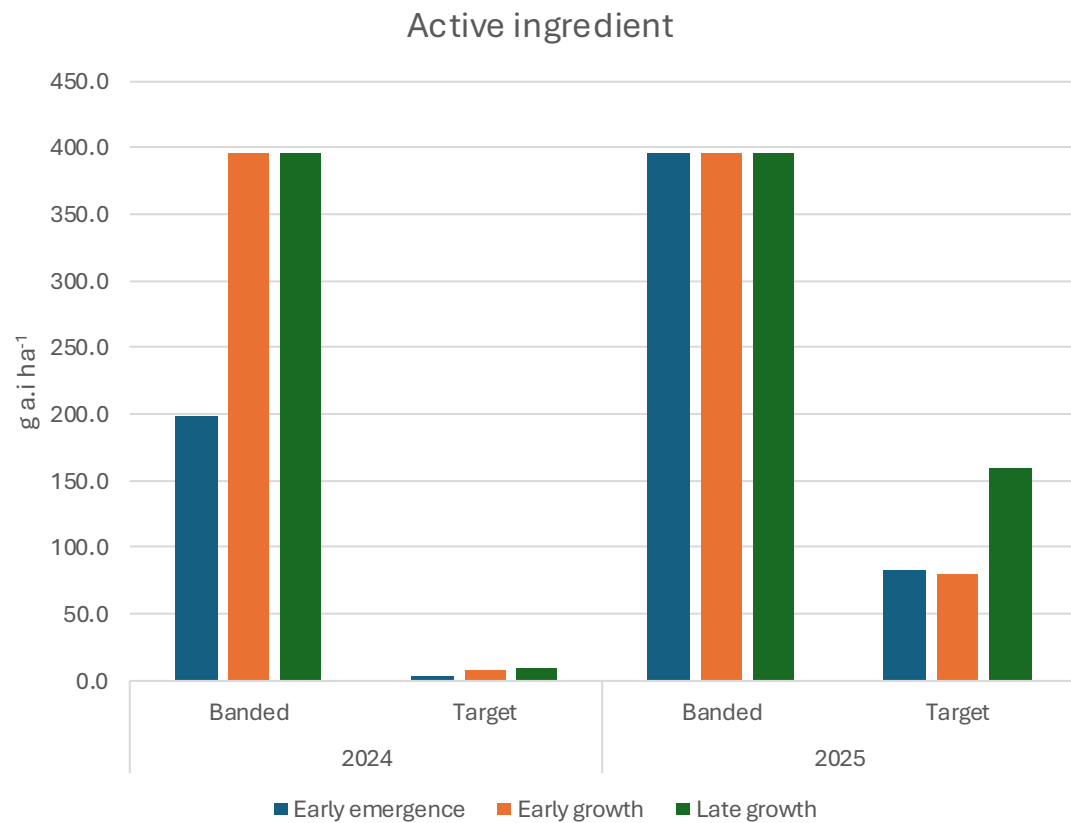


Early growth-Mid-season



Late growth-Mid-season





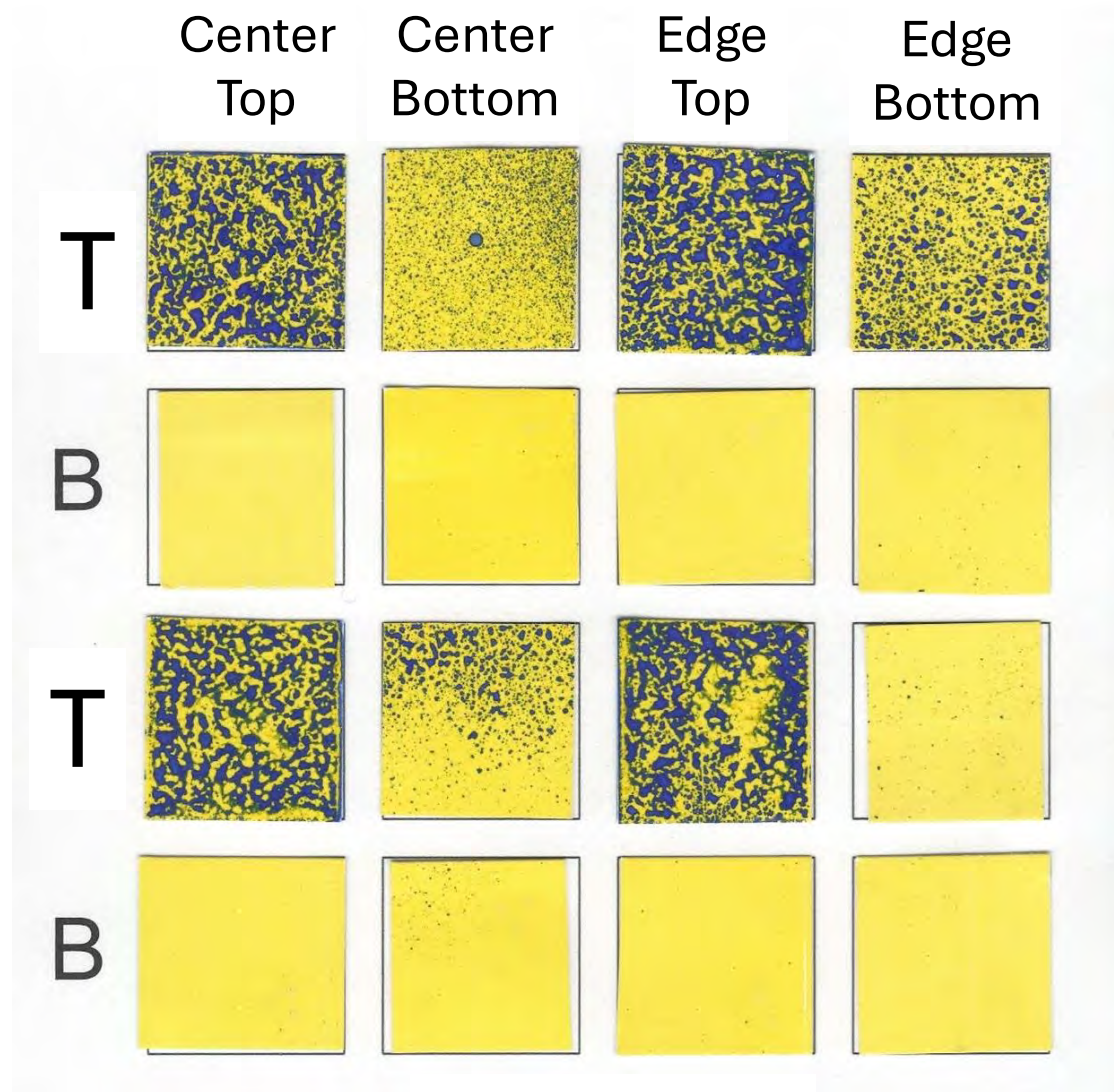
Problems to be solved:

- nozzle angle – for a better spray coverage
- Camera angle- for a better detection under the canopy

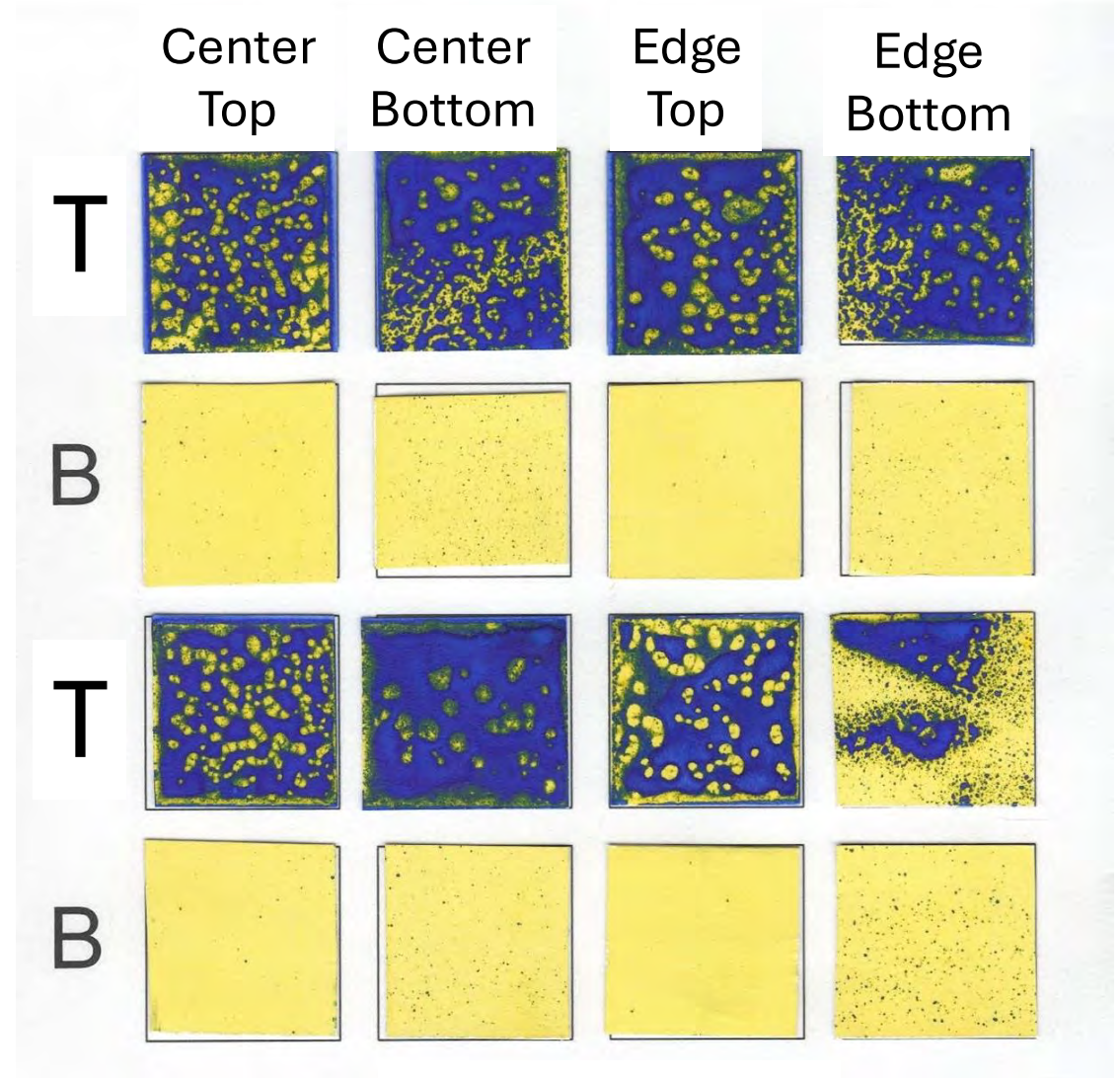




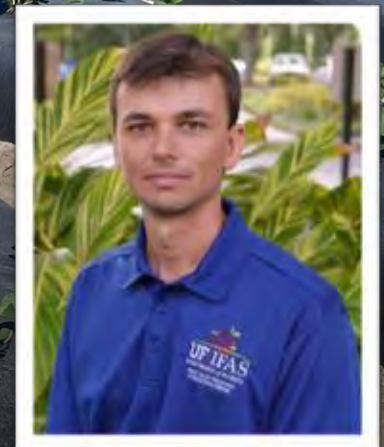
Spray Penetration Through the Canopy



40 GPA



100 GPA



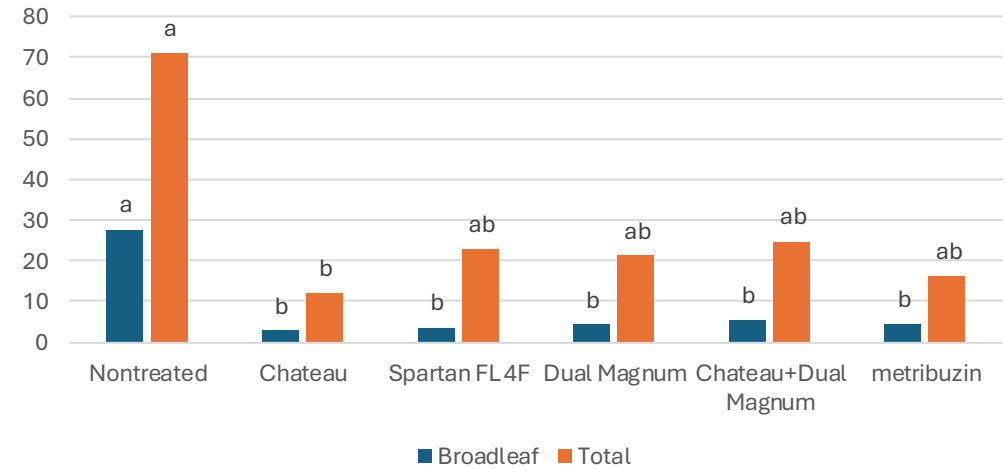
Row Middle Weed Management

Ana Buzanini and Renato Furlanetto

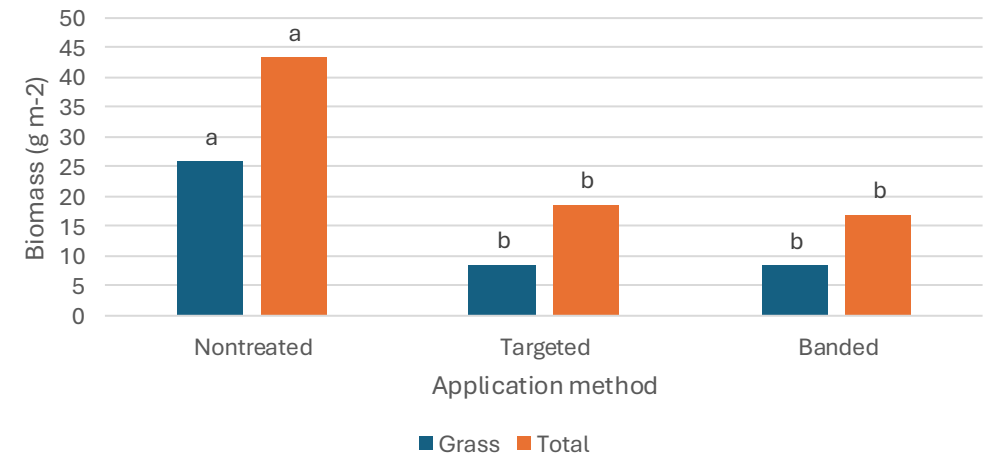
Row middle trial

- 5 preemergence herbicides applied at the beginning of the season
- Glyphosate applied after 35 days – Banded versus targeted
- No differences were observed for nutsedge

Biomass- Preemergence effect



Biomass -Method effect



Preemergence Herbicides in Row Middles



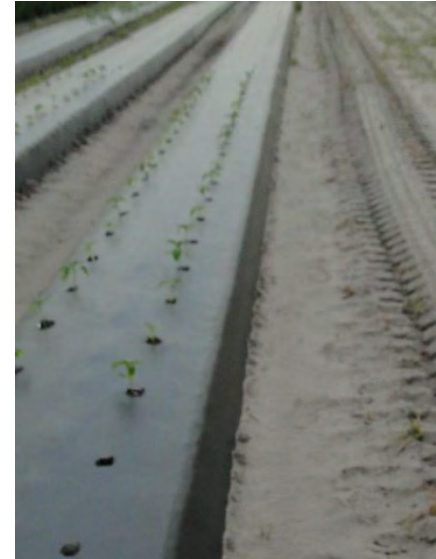
Nontreated



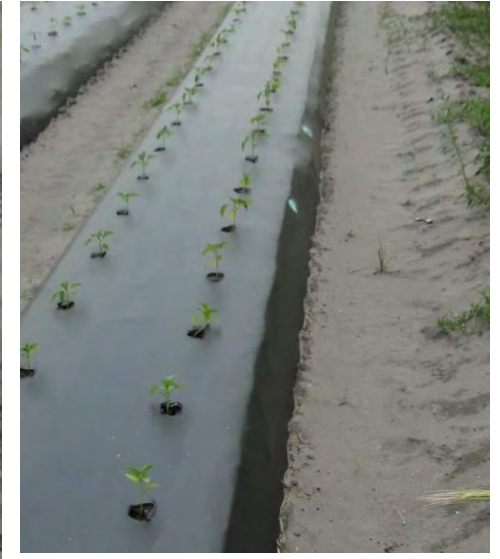
Chateau



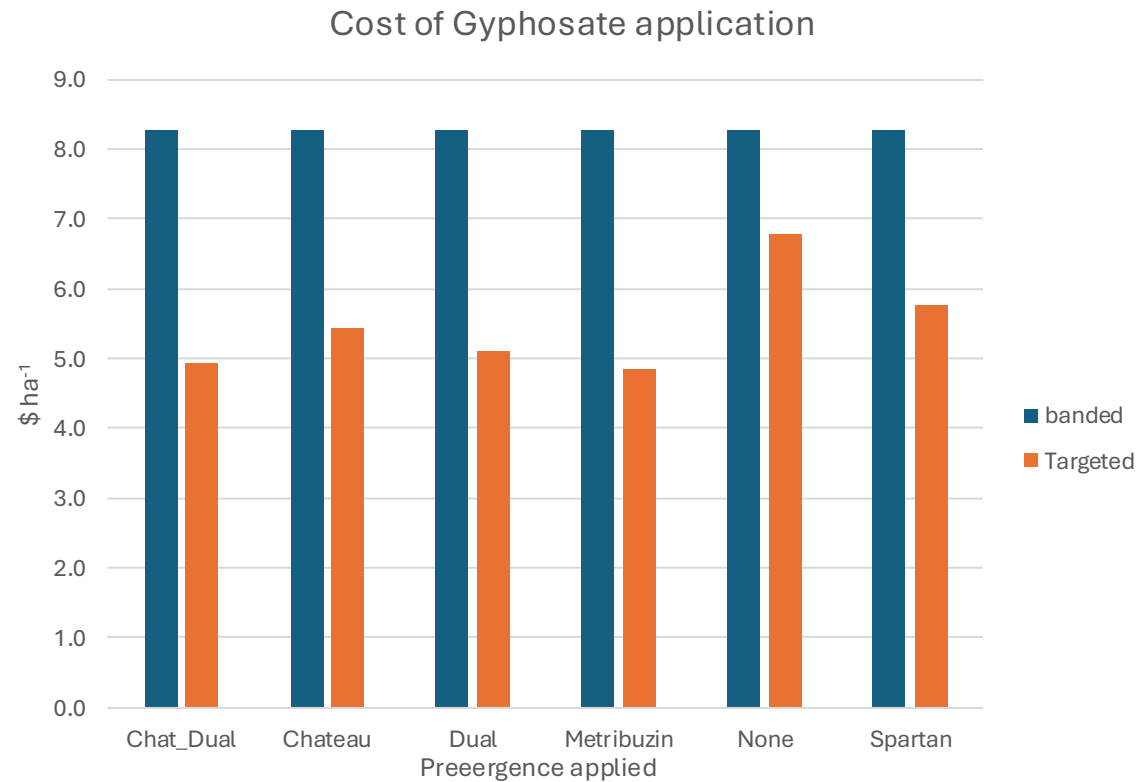
Spartan



Dual
Magnum



Chateau
+Dual



- Effective PRE herbicide followed by targeted glyphosate = ~41% savings
- No PRE with targeted glyphosate alone= ~18% savings

Next Steps: Targeted Herbicide Applications in Strawberry

Bed-top + row-middle treatments | precision, penetration, and commercial scalability

Field targets: bed tops + row middles

NEXT ACTIONS

1

Evaluate PWM for variable-rate application

Quantify duty-cycle response and dose control for bed tops and row middles.

2

Optimize nozzle orientation + cameras

Test angles, heights, and camera placement to improve penetration and avoid crop injury.

3

Modularize for commercial expansion

Build plug-and-play spray, sensing, and control modules that scale to grower platforms.

Outcome: robust targeted spraying workflow that reduces off-target herbicide exposure while preserving strawberry crop safety.



Mapping Weed Populations

Alex Rodriguez



AI-Powered Weed Mapping

1. Data collection



2. AI weed detection



3. Weed maps generation

Tractor-Mounted System



Field Robot System



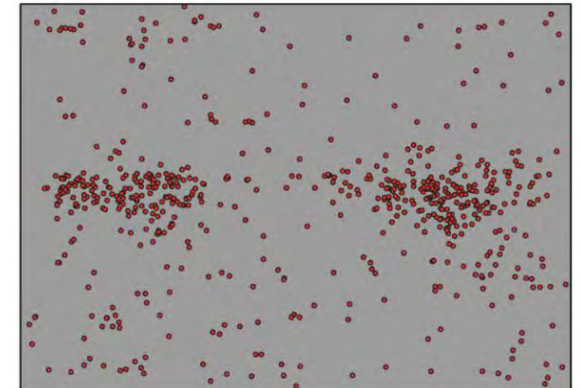
Fallow period



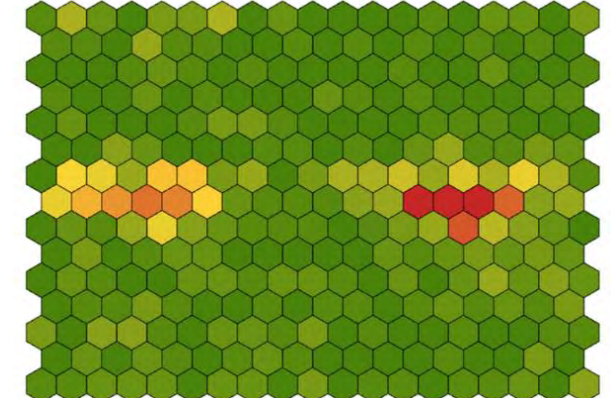
Growing season



Weed population map

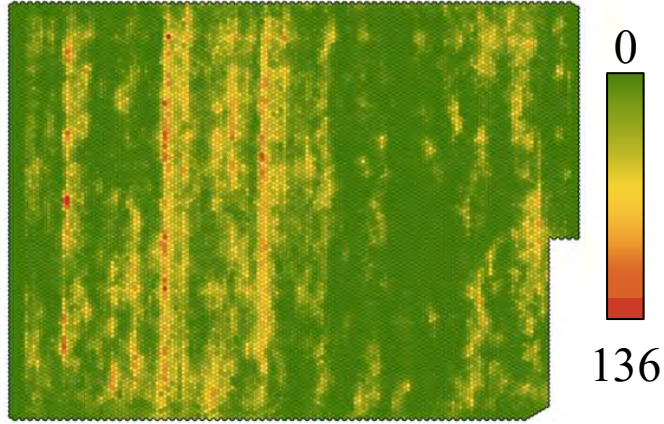


Weed density map



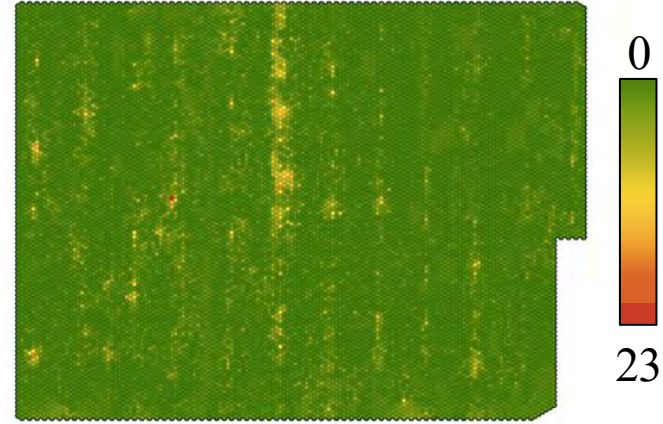
How patchy is purple nutsedge during the fallow period?

August 2023



250,177 nutsedges detected

August 2024



9,870 nutsedges detected

Hot Spot Analysis

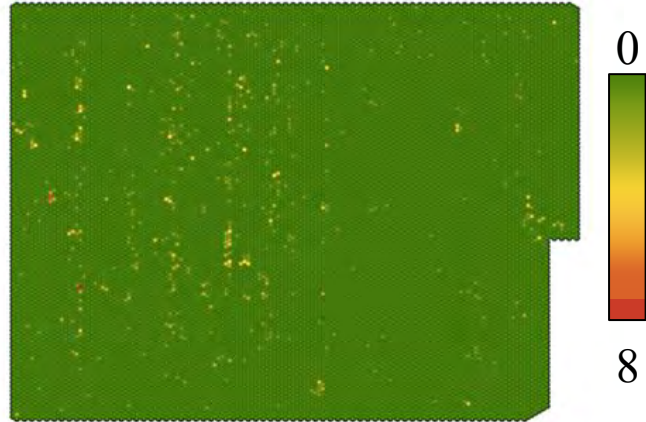


 Nutsedge hotspots (areas with significantly higher density)



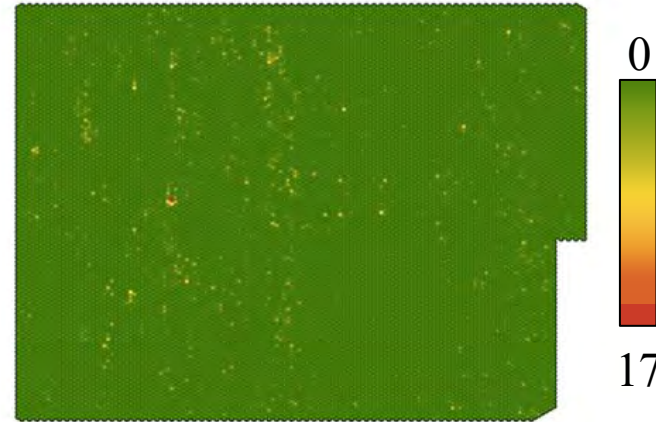
How patchy is purple nutsedge during the **growing season**?

November 2023



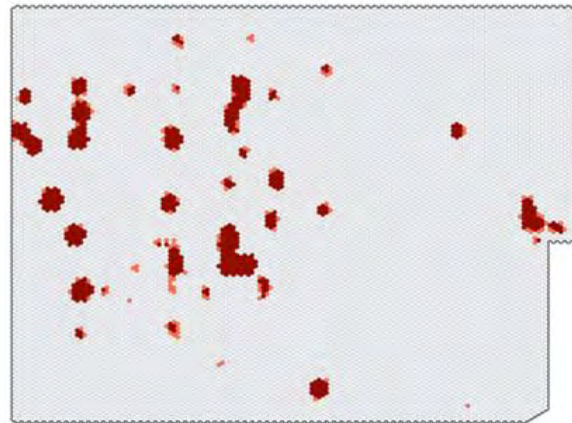
667 nutsedges detected

November 2024



1,338 nutsedges detected

Hotspot Analysis

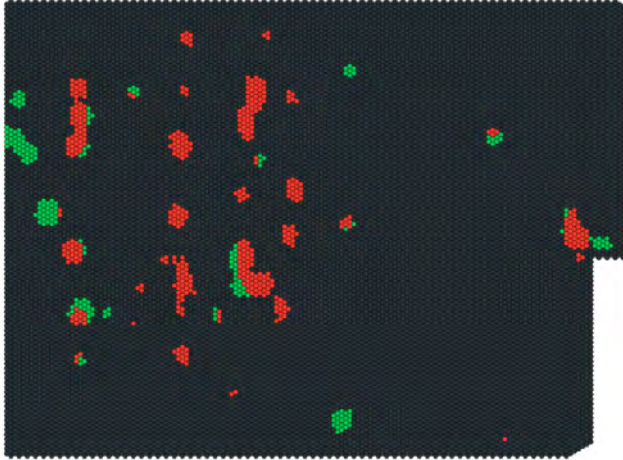


 Nutsedge hotspots (areas with significantly higher density)



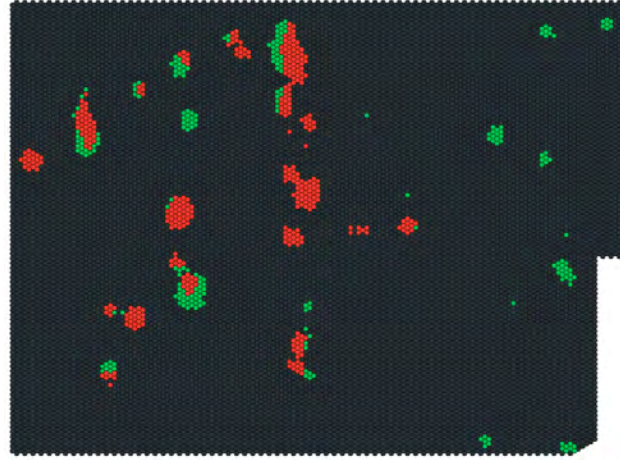
Do hotspots occur in the same locations over time?

Fallow-Crop Stability (2023)



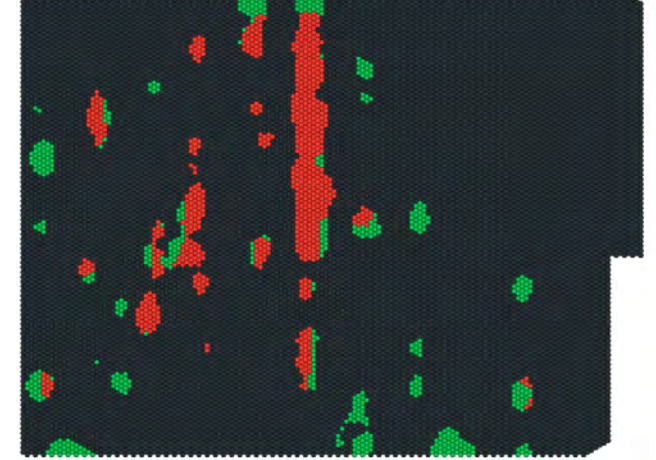
71% of hotspots carried over from the previous period

Fallow-Crop Stability (2024)



62% of hotspots carried over from the previous period

Fallow-Fallow Stability (2023-2024)



59% of hotspots carried over from the previous period



Recurring hotspot



Non-recurring hotspot

Key Takeaways

- Nutsedges occur in patches, often aligned with irrigation lines and tillage patterns.
- Most hotspots persist across periods, but new smaller hotspots can emerge.
- Stable hotspot locations create opportunities for site-specific management.
- Long-term mapping combined with predictive modeling is needed to forecast where hotspots will occur the following season.

Acknowledgements

GCREC Weed Science Lab



- Special Thanks
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 - Collaborating growers

