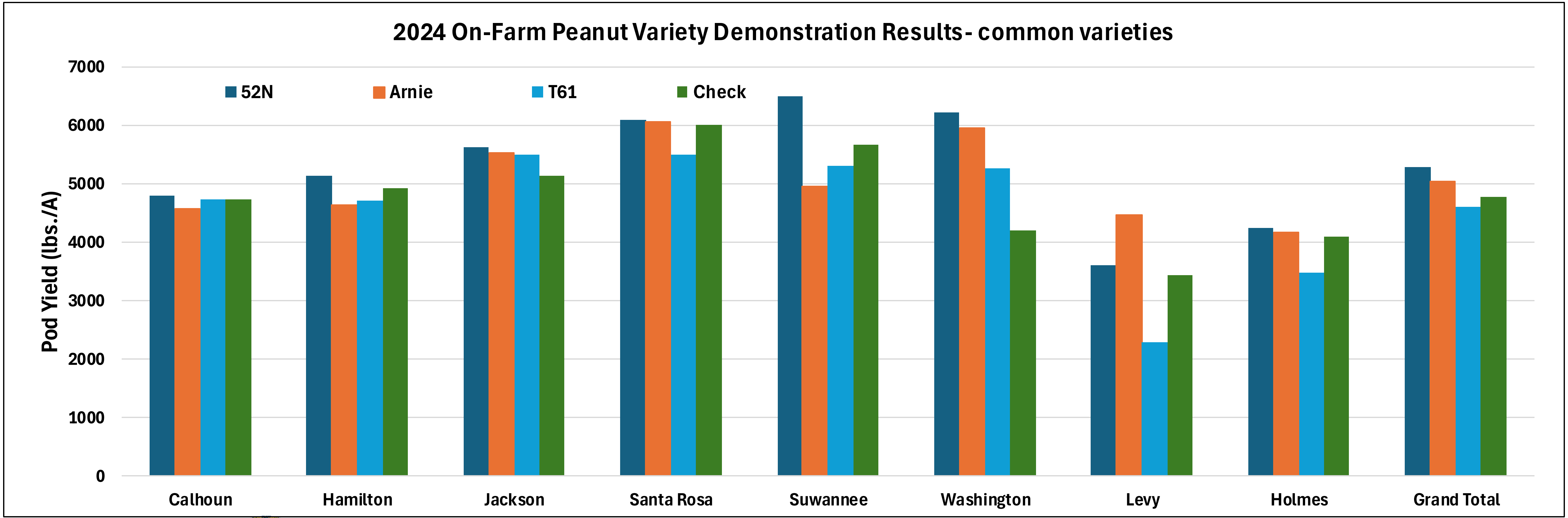
Peanut Checkoff – Your dollars working for you

Peanut Variety Evaluations in Florida

Barry L. Tillman with agents: Keith Wynn, Kalyn Waters, Daniel Leonard, Mark Mauldin, Mark Warren, Raymond Balaguer, Guilherme Morata, and Ethan Carter

Marianna, Citra, Jay and Live Oak small plots; Eight county locations for on-farm demonstrations

Continued; Years of Funding - 18



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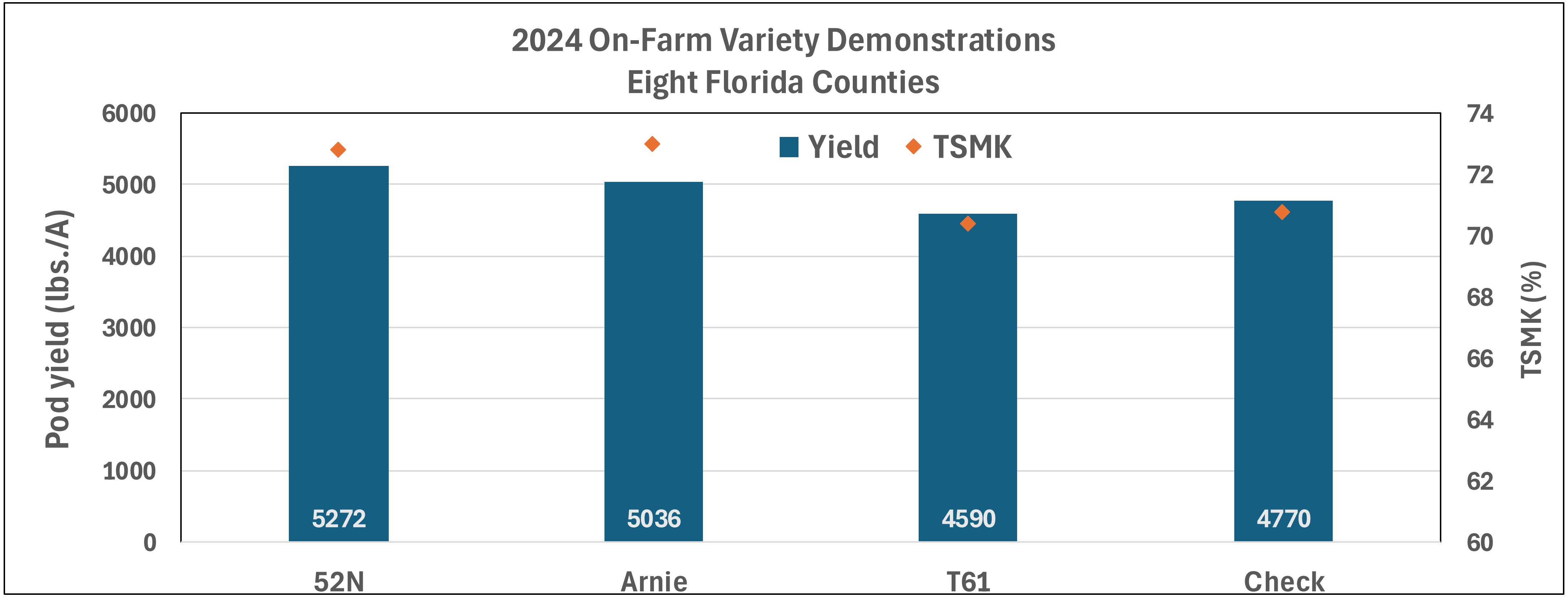


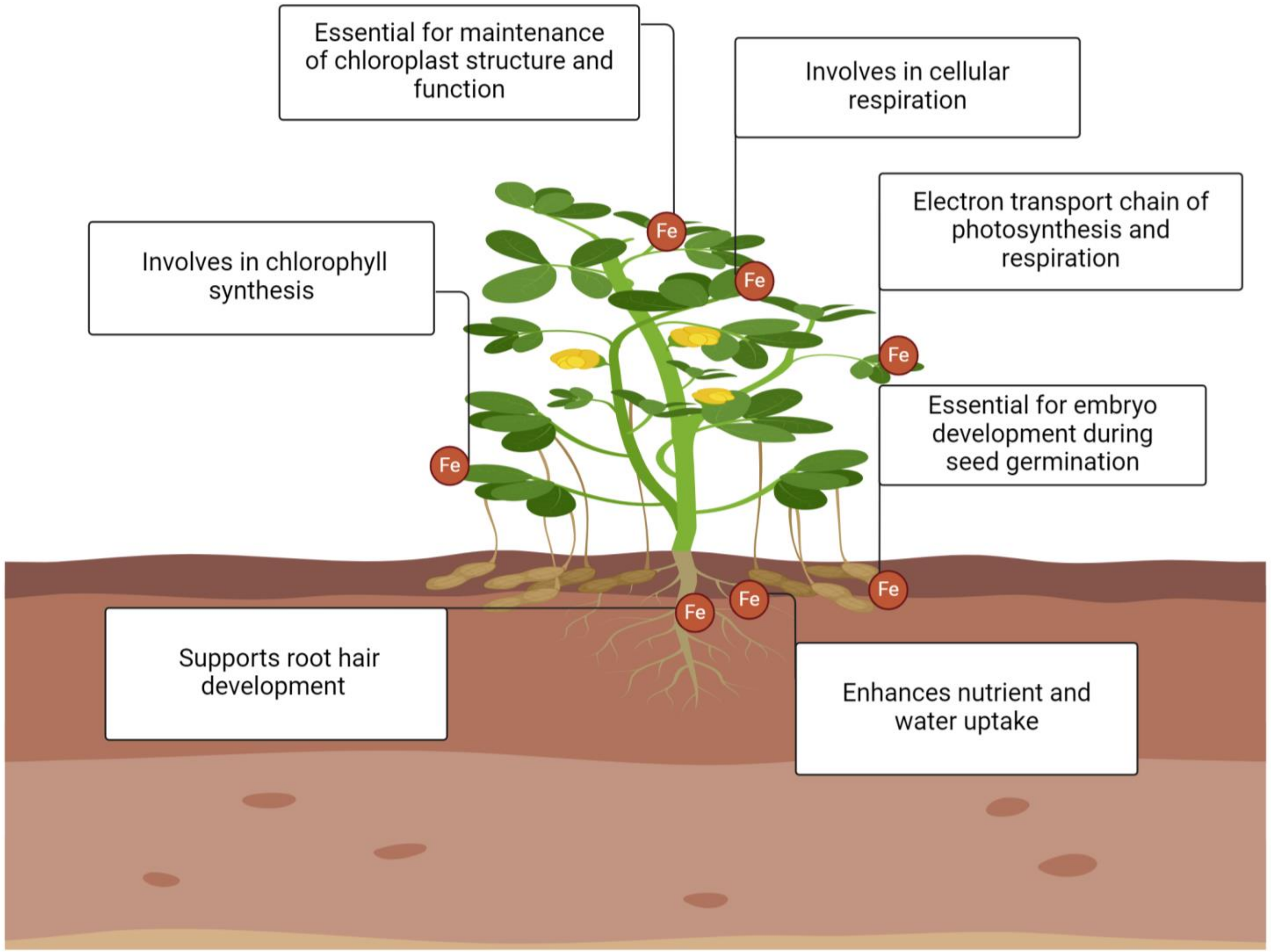
Peanut Advisory Council - Winter Meeting
January 13, 2025

Investigating efficacy of chelated iron application methods on peanut yield, quality, and nutrient uptake

Shivendra Kumar and Sudeep Sidhu

UF | IFAS Extension
UNIVERSITY of FLORIDA

Importance of Iron In Plants



Iron is absorbed by roots as Ferrous (Fe^{2+}) and Ferric (Fe^{3+})ions

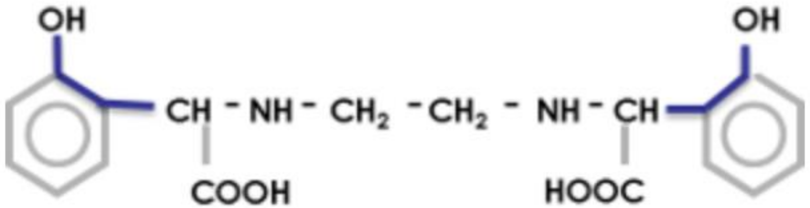
Chelated Iron: Fe-EDDHA

EDDHA or **ethylenediamine -*N*,*N'*-bis(2-hydroxyphenylacetic acid)**

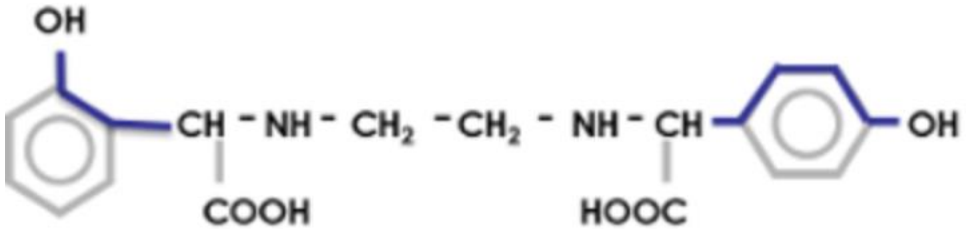
- **Two phenolic rings**
- **Two amino groups**
- **Two carboxyl groups**

Fe-EDDHA

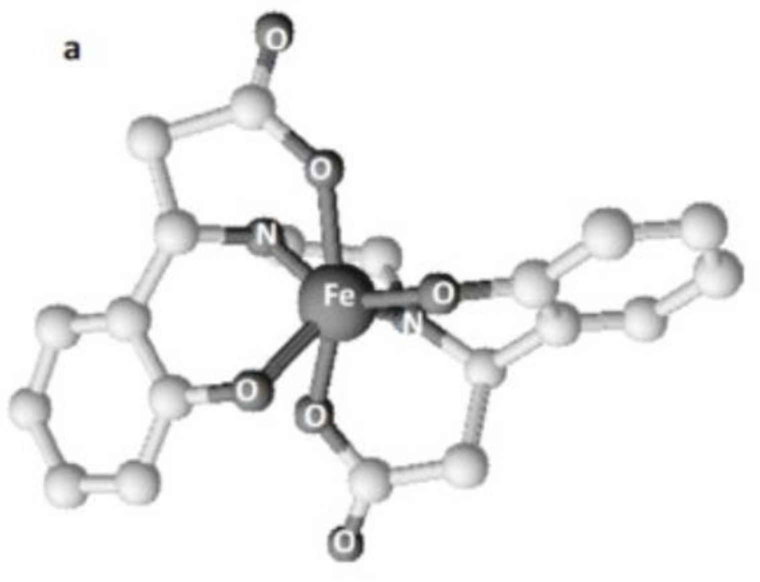
- **Hexavalent ligand**
- **Increased stability of Fe**
- **Improved availability in high pH soils**



ortho-ortho



ortho-para



Chelated Iron Treatments

- **Treatment 1- Control (NO Chelated Iron)**
- **Treatment 2- Chelated Iron- banded (5 lb/ac)**
- **Treatment 3- Chelated Iron in-furrow (5 lb/ac)**
- **Treatment 4- Chelated Iron spray (1.5 lb/ac/week)**
- **Treatment 5- Chelated Iron Spray (2.5 lb/ac/week)**

Influence of cereal rye management and herbicide programs on weed control in peanut

Gregory MacDonald; Olumide Samuel Daramola; Ednaldo Borgato

UF IFAS UNIVERSITY of FLORIDA

Wrens Abruzzi rye planted at 75 kg ha^{-1} November

Terminated 14 or 28 d before peanut planting by spraying glyphosate at 1.1 kg ai ha^{-1}

Rolled or standing rye cover crop

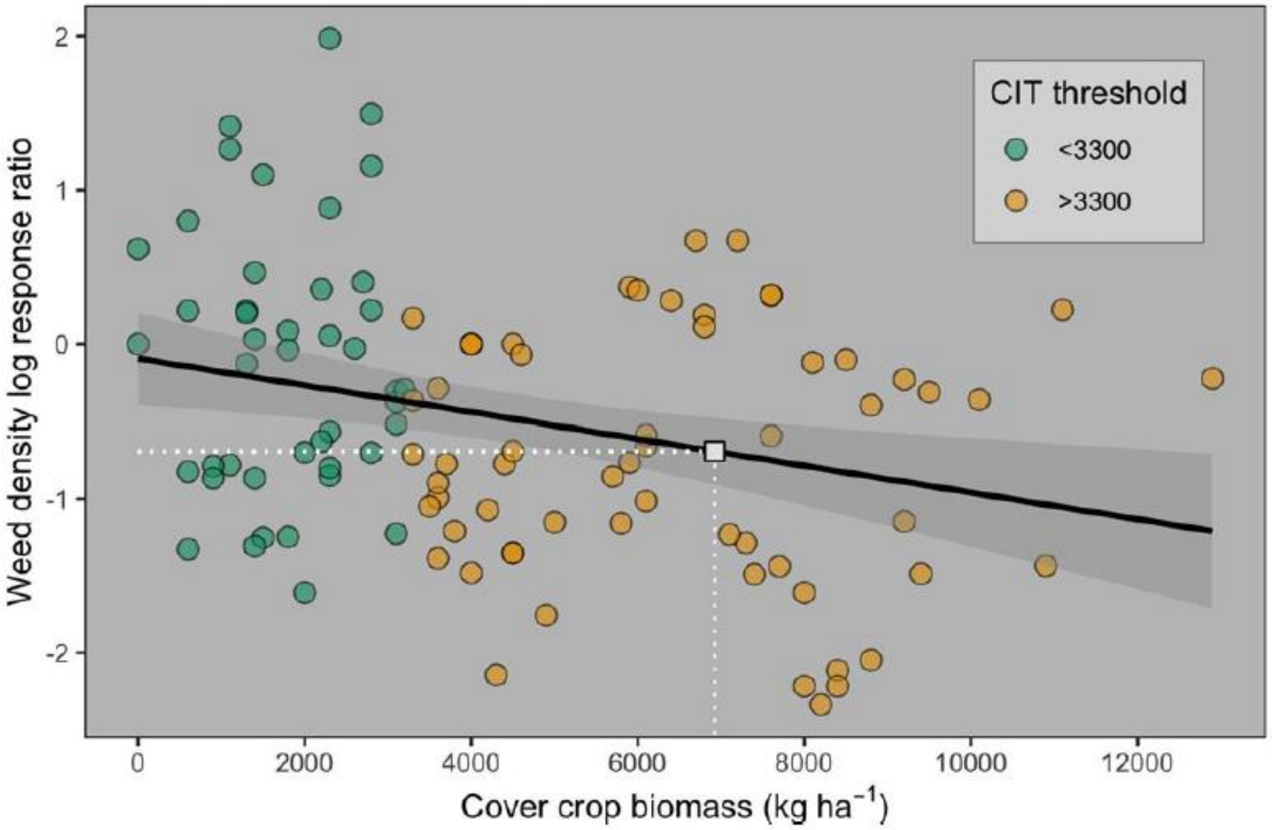
Objective

Evaluate ways to use rye cover for effective weed management in peanut

- termination timing
- rolled or standing
- combined with pre & post herbicide programs
  - Non-treated control
  - PRE+EPOST+MPOST
  - PRE+MPOST
  - EPOST+MPOST
- weed control

Termination timing:

CIT: conditional inference tree



More biomass = Less weeds

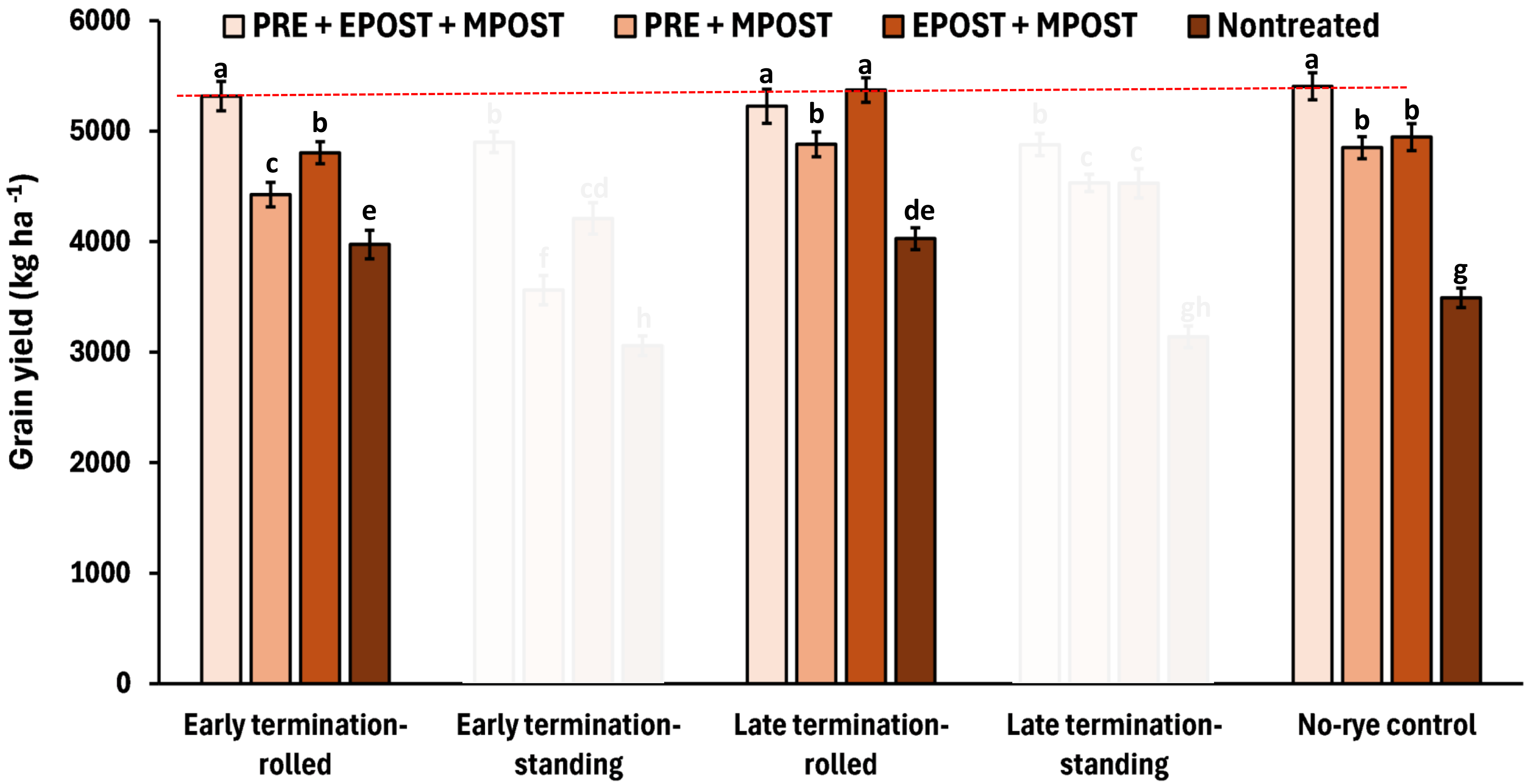
At least 3300 kg ha^{-1} of cover crop biomass for weed suppression

7000 kg ha^{-1} provides 50% weed suppression

Weisberger et al. 2023

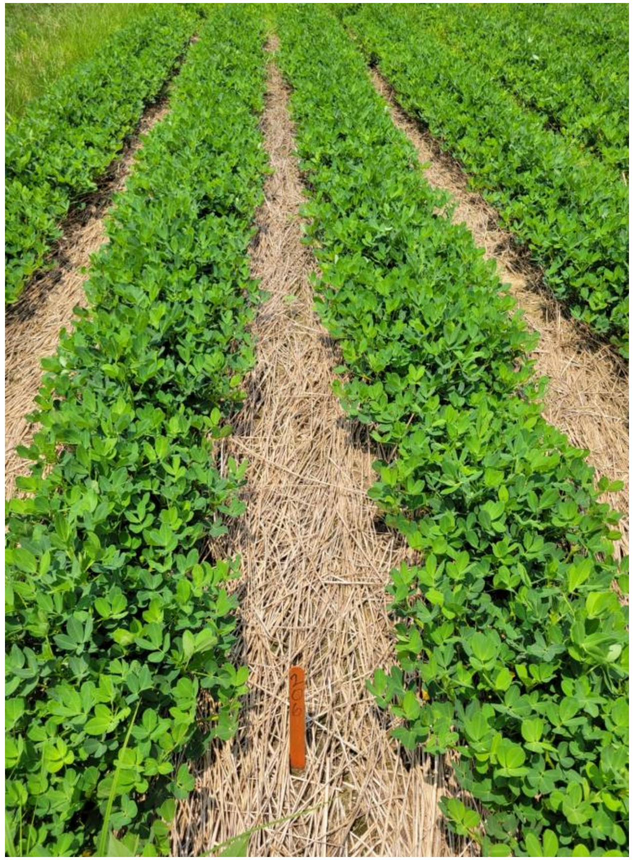
Termination method:

No yield reduction with rolled rye



Results: Cereal rye termination management - 6 WAT

Standing rye + fluridone



Rolled rye +   fluridone

Fluridone

Peanut was better established with rolled rye
Rolled rye did not impact yield

Addition of residual herbicides:

Greater weed control during the season

A few recommended programs:

Preemergence	Early postemergence	Mid postemergence
Fluridone	**Paraquat + *S*-metolachlor**	**Imazapic + Dimethenamid-*P***
Flumioxazin	**Skip**	**Acifluorfen + Dimethenamid-*P***
Skip	**Imazapic + Dimethenamid-*P***	**2,4DB + *S*-metolachlor**
Nontreated		

Conclusions and implications for management:

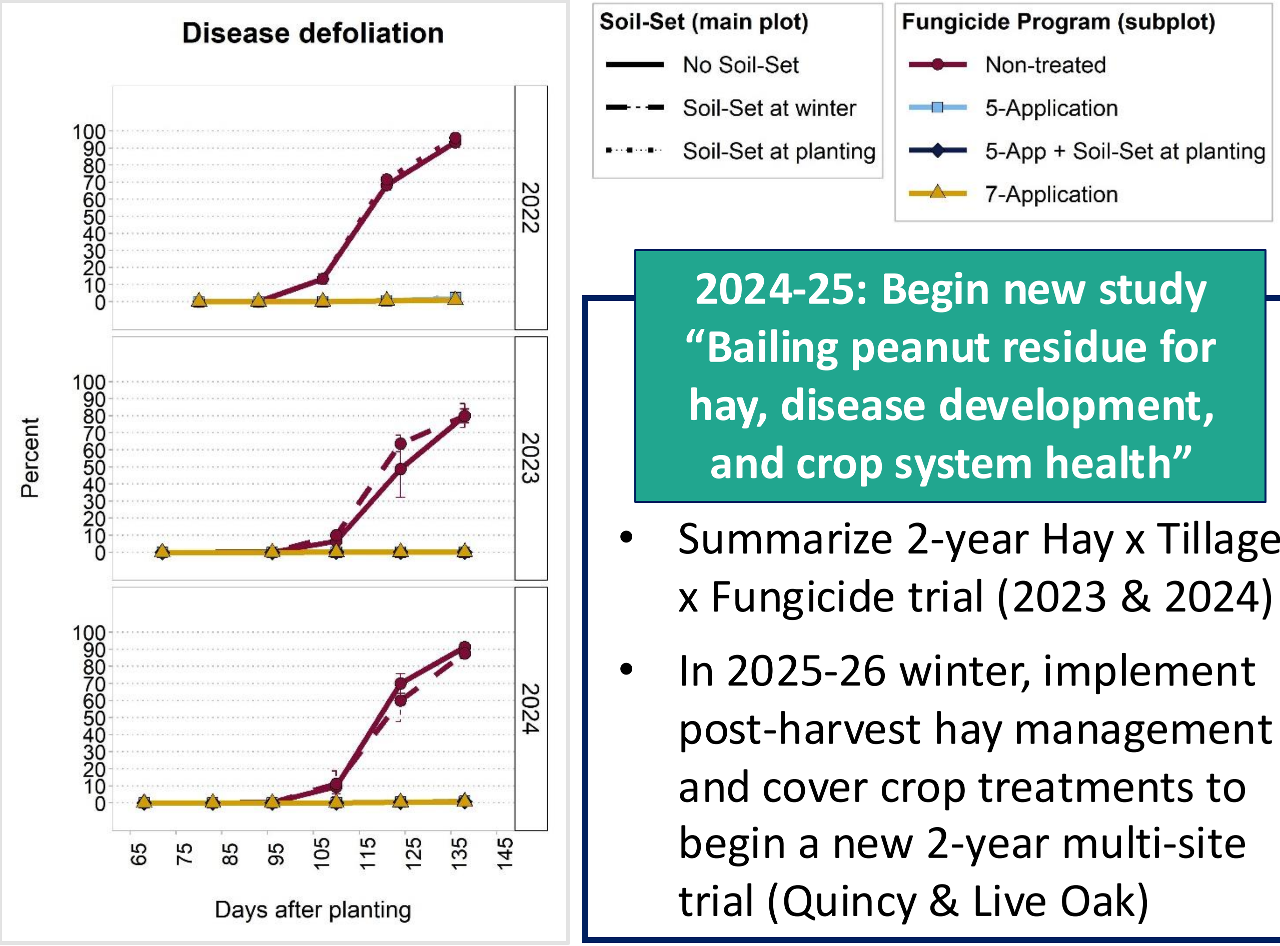
- Delaying termination can provide greater biomass and weed suppression, including large seeded weeds
- Rye terminated late and rolled did not compromise yield, whereas **planting into standing rye did**
- Residual herbicides play an important role in weed control, and overlapping is important for control throughout the season
- Rye cover crop should be used as a component of IWM and not a stand-alone replacement of herbicide

Reducing peanut leaf spot pathogen survival by improving soil microbial health and accelerating breakdown of host tissue and pathogen inoculum

Ian Small, Rebecca Barocco (UF/IFAS North Florida Research and Education Center – Quincy)

2023-24: End of 3-year study (Soil-Set® x Fungicide)

- *Objective*: To evaluate treatments that promote the breakdown of peanut tissue residue between seasons to reduce initial pathogen inoculum within fields
- *Primary findings for Soil-Set®* :
  - No effect on leaf spot diseases
  - No effect on yield in fungicide treated plots
  - Reduced yield loss by average of 1,011 lbs/A in non-treated plots but only in 2024 season
- *Conclusion:* Soil-Set® was not effective as a tool for peanut disease management as applied in a conventional management system in this study.
- More research is needed to evaluate soil microbial stimulants for integrated management systems.

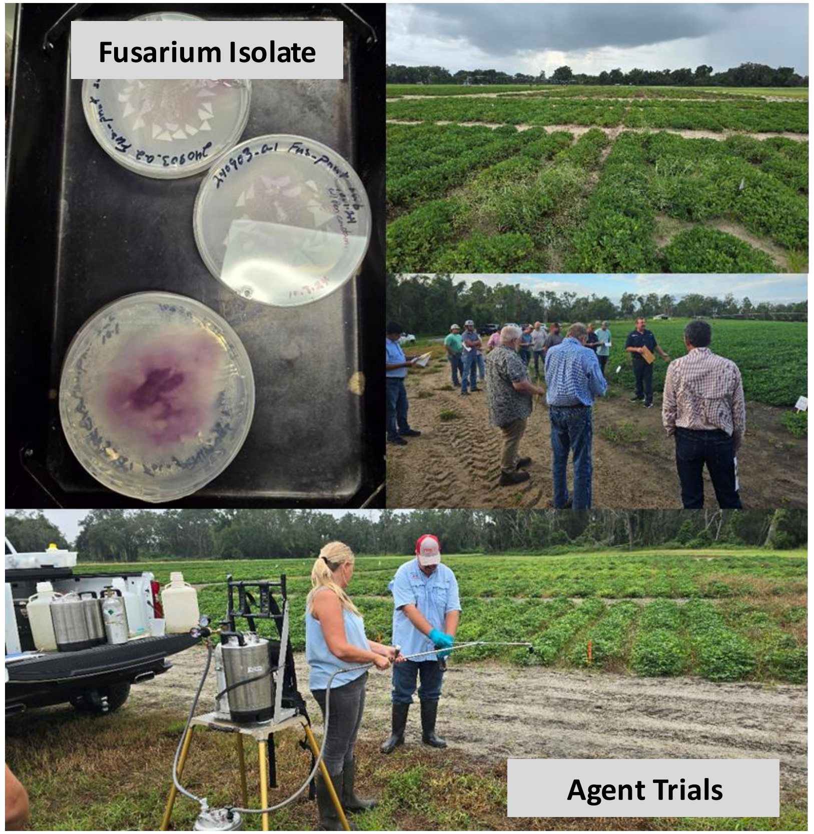


2024-25: Begin new study "Bailing peanut residue for hay, disease development, and crop system health"

- Summarize 2-year Hay x Tillage x Fungicide trial (2023 & 2024)
- In 2025-26 winter, implement post-harvest hay management and cover crop treatments to begin a new 2-year multi-site trial (Quincy & Live Oak)

Evaluating new and existing fungicide inputs for leaf spot control in multiple environments

Nicholas S. Dufault, Keith Wynn, Ethan Carter
Citra, Live Oak and Marianna Florida



OBJECTIVES:

- Compare fungicide programs at multiple locations
- Examine location specific programs
- Exam the effects of variety on disease management with fungicides
- Compare programs over multiple years

Researchers will also monitor for soilborne diseases and collect isolates (i.e. *Fusarium* sp.) when appropriate.

All programs reduce disease but vary depending on the disease.

- •Using a resistant variety can achieve similar reductions with 1–2 fewer fungicide sprays.
- •Avoid using same FRAC codes sequentially, even if mixed.
- •Knowing the exact disease is very important.

Effective Fungicides:

- •**Elatus** and **QoI fungicides** work very well against rust.
- •**Provost Silver** reduces early leaf spot.
- •**Provysol** is good fungicide options.
- •**Lucento** should not be used consecutively with Elatus sprays

Outcomes

- Collected peanut Fusarium isolate
- Findings used at Agent training and for disease ID
- Reports & papers submit Feb. 2025
- Blog post Oct. 2024

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Effects of Landscape Structure on Thrips Population Dynamics and Tomato-Spotted Wilt Virus

Isaac L. Esquivel

NREC-Quincy

New Project; Year of Funding # 2

Objectives

Obj. 1: Monitoring thrips populations through the season using yellow sticky cards (YSTs).

- **174** and **423** YSTs were placed on each side of **10** and **14** grower fields across **4** and **7** counties in 2023 and 2024, respectively.

Obj 2: Within field distribution of thrips populations and TSWV incidence.

- 245 and 312 within-field thrips samples were taken across 2023 and 2024.
- 60 and 72 within-field TSWV ratings were taken across 2023 and 2024.

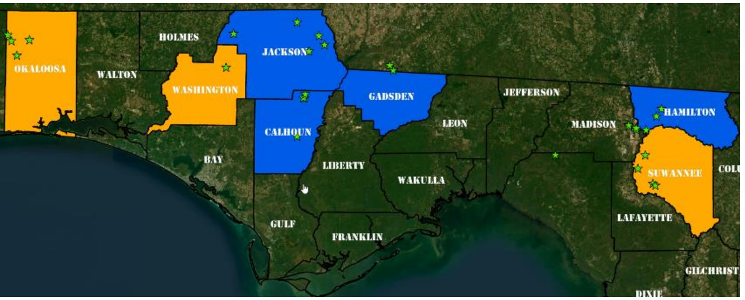

Figure 1. Counties sampled in 2023 (Blue) and 2024 (Blue + Orange) along with grower farms displayed as green stars.

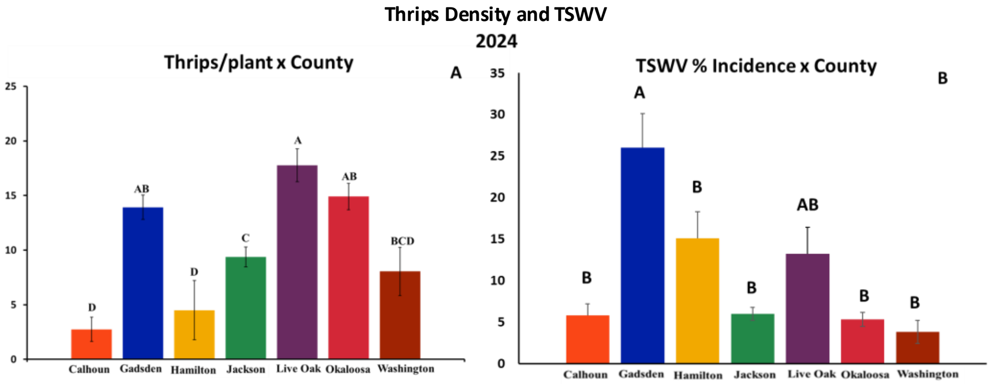

Figure 2. Thrips density (A) and TSWV (B) incidence across counties for the 2024 growing season.

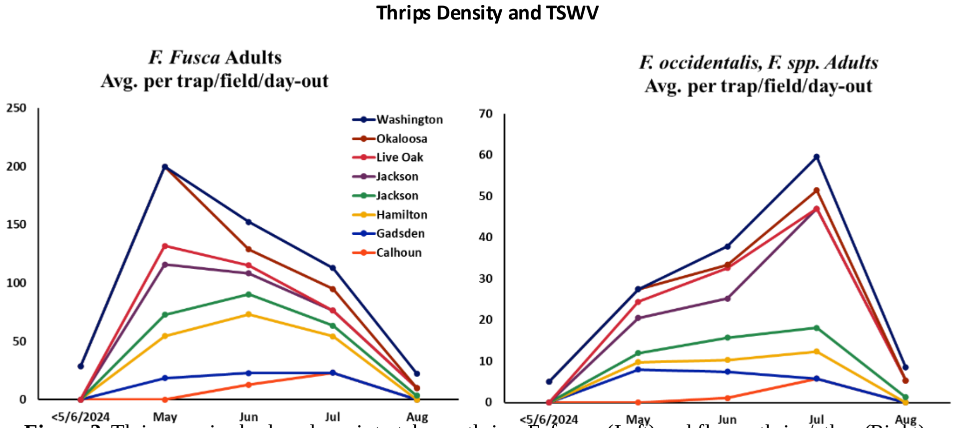

Figure 3. Thrips species broken down into tobacco thrips, F. fusca, (Left) and flower thrips/other (Right).

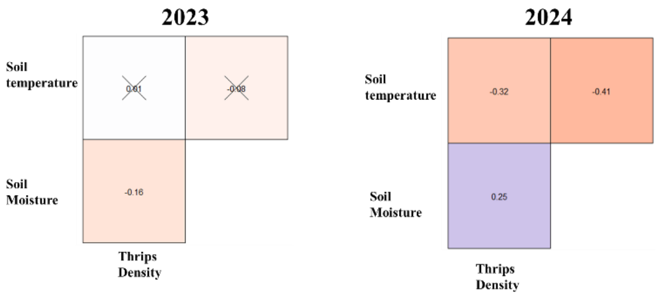

Figure 4. Correlation matrix between soil moisture, soil temperature and thrips density for the 2023 (left) and 2024 (right) growing seasons.

Findings/Outcomes/Outputs

Obj. 1:

- ~7,080 (2023) and 28,892 (2024) thrips were collected from YSTS.
- Tobacco thrips peaked early may and slowly declined into august while flower thrips and others peaked in July and decreased.

Obj 2:

- Thrips density and TSWV incidence varied significantly across the panhandle. However, the trend was different than 2023.
- There is a slight negative correlation between soil moisture and thrips density in 2023 but was positive in 2024.
- There was no correlation between soil moisture and thrips density in 2023 but there was a modest negative one in 2024.

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Geospatial artificial intelligence for high-throughput assessment of peanut leaf spot severity with unmanned aerial vehicle and high-resolution satellite multispectral imagery

Chang Zhao[1], Zhou Tang[1], Greg MacDonald[1], Barry Tillman[1], Ian Small[2], and Nicholas Dufault[2]

Agronomy Department[1],

Department of Plant Pathology[2]

UF/IFAS, University of Florida

Research Objectives

- The main objective of the project is to develop a geospatial artificial intelligence (AI)-based tool for automated quantification and visualization of peanut leaf spot disease severity.

  - Develop an accurate UAV-based **deep learning** model for peanut leaf spot disease assessment.

  - Compare deep learning models based on **high-resolution satellite images and UAV images** for peanut leaf spot disease assessment.

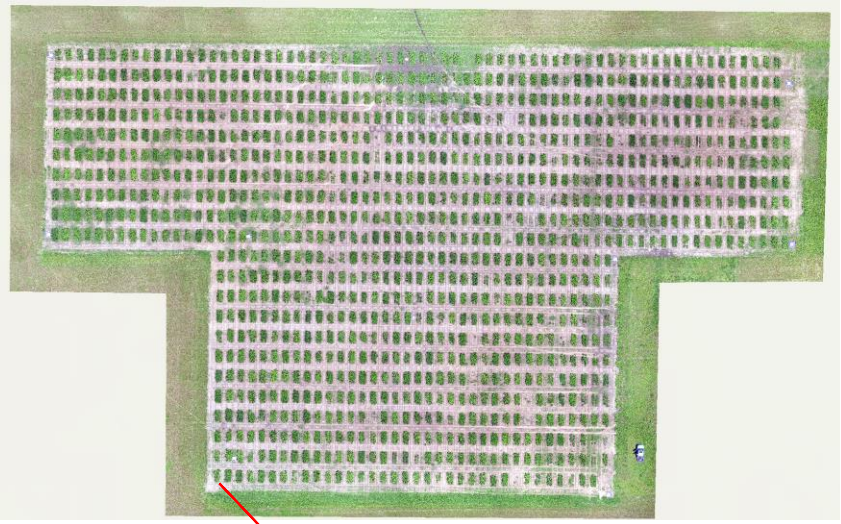
  - Create a **web GIS tool** tailored for peanut breeders and producers to visualize spatiotemporal patterns of disease occurrence.

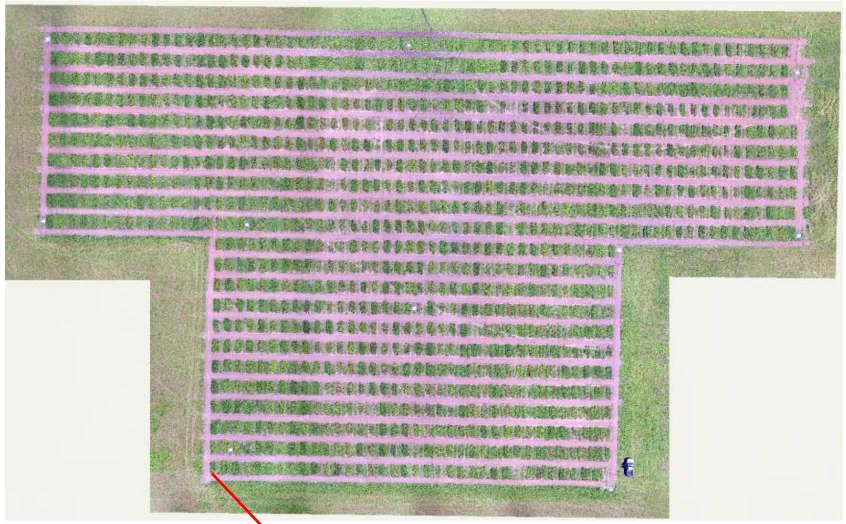
Field UAV imagery overview

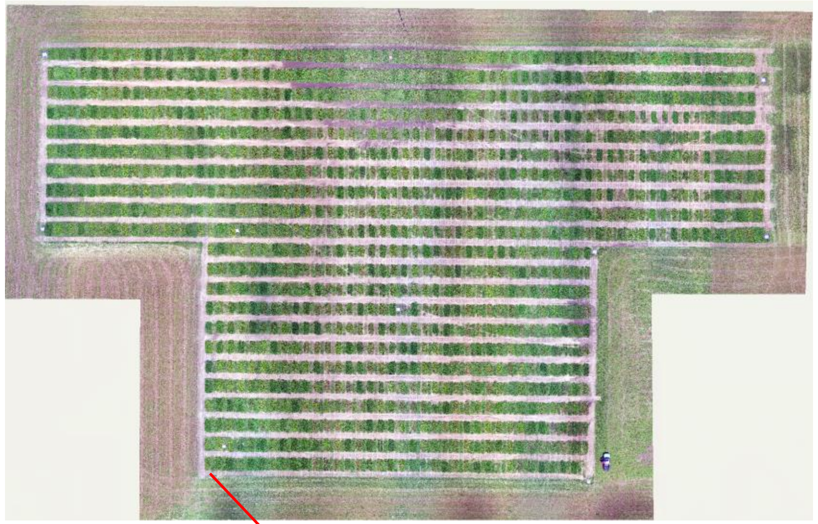
Aug 04, 2022

Aug 25, 2022

Sep 02, 2022



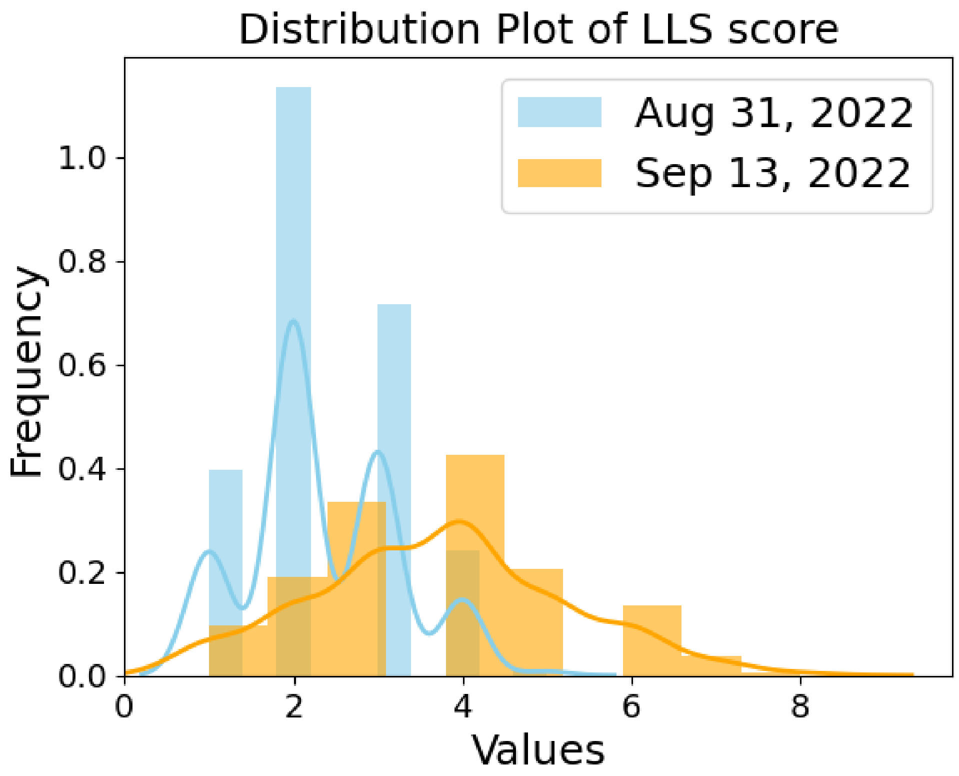




Citra, FL

Late Leaf Spot field score summary

FL1:10	Mean	Max	Min	Median	Std
Aug 31, 2022	2.24	5	1	2	0.88
Sep 13, 2022	3.73	8	1	4	1.46



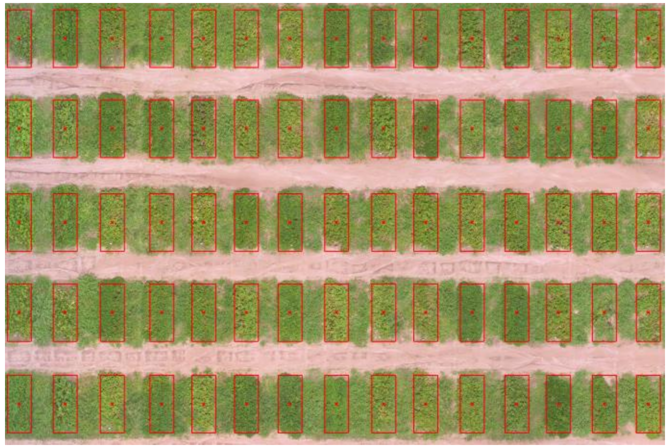
Plot #136 #222 #3

FL1:10 1 4 7

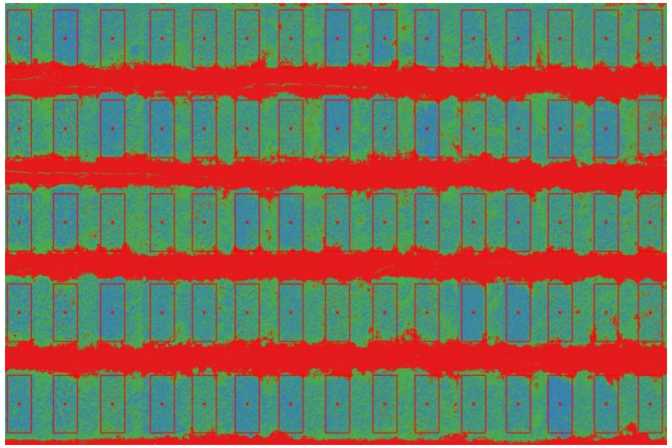
UAV image analysis pipeline

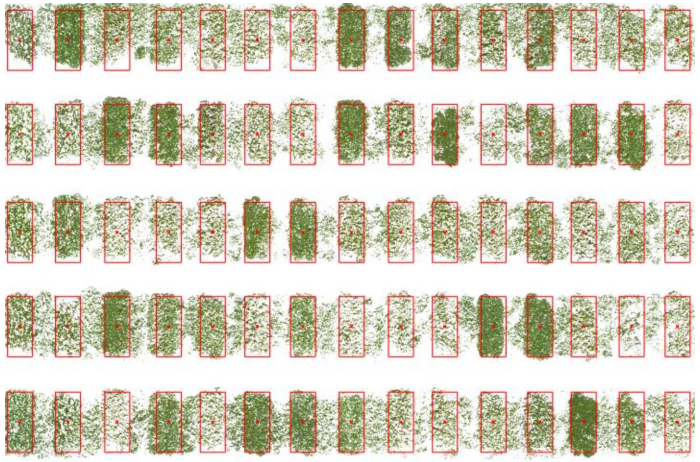
Raw UAV tiff

Draw AOI



K-Means to select interesting pixels





Segmentation

var	row	col	area_all	area_veg	ch_0	ch_0_std	ch_1	ch_1_std	ch_2	ch_2_std	ch_3	ch_3_std
unnamed_16	1	3	13172	9882	98.8370775	21.4414753	121.2712	22.6386286	52.1812108	19.9162542	255	0
unnamed_51	1	10	13172	3244	103.682799	21.3574663	118.26603	23.1329816	51.5194205	20.0336168	255	0
unnamed_17	2	3	13172	4545	107.927173	21.9903914	118.385699	22.8984118	46.1744878	20.4348615	255	0
unnamed_52	2	10	13172	4824	104.943823	25.4869889	115.353648	27.2262977	43.3895807	22.0862106	255	0
unnamed_18	3	3	13172	7810	102.380154	21.3845539	123.866069	22.559876	51.709268	20.7034494	255	0
unnamed_53	3	10	13172	10402	96.7252451	21.5098935	122.156412	22.6322525	57.5591884	20.4589267	255	0
unnamed_19	4	3	13172	9180	98.4458606	22.3291043	121.277778	23.097604	54.7324174	21.5323188	255	0
unnamed_54	4	10	13172	5548	103.912581	23.9196662	119.141132	25.0124933	47.784991	21.9355515	255	0

Plot-level multispectral bands and vegetation indexes

Next plans

SkySat 0.5 meter/pixel

Develop an accurate UAV-based deep learning model for peanut disease rating.

Compare deep learning models based on Skysat imagery and UAV images for peanut plant disease rating across 3-4 peanut trials in Northern Florida.

Create a web GIS tool tailored for peanut breeders and producers to visualize disease spatiotemporal patterns.

Assessing Peanut Breeding Lines for Resistance to Peanut Root-knot Nematode

Zane Grabau and Barry Tillman
Gainesville (ZG), Marianna (BT)

Nematode Control; New Project; Year 1 of Funding

Rationale

- Good resistance available, no low oleic cultivars
- Screen Tillman library for candidates
  - Multi-year project
- **End goal: Commercial cultivar**

Greenhouse trial

- 39 breeding lines with TifNV background and RKN markers
  - Resistant and susceptible check
- Planted week of January 6
- Terminate late April (RKN infection)
- Use to screen for field trial

Field trial

- UF-Citra field inoculated with RKN
  - Live Oak and Quincy backups
- Up to 39 lines + checks
- Based on performance/seed #
- RKN infection, galling, yield

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Development and validation of IPM tools for peanut farmers in the Florida Panhandle: host plant resistance in peanut breeding lines and snail management

Silvana V. Paula-Moraes, PhD
Entomology

Associate Professor
West Florida Research and Education Center/IFAS/UF

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Obj 1) Documentation of the seasonality and risk of snail infestation to peanut cultivation in the region as an IPM tool for planting decisions

Bulimulus bonariensis (Gastropoda: Bulimulidae)

- Invasive snail - West Indies
- 2009 - first reported in Jacksonville Florida
- 2018 – detection in Jay, FL

Eggs buried under surface of the soil

Consume of calcium for shell growth

Build protective membrane

Aggregative behavior at night

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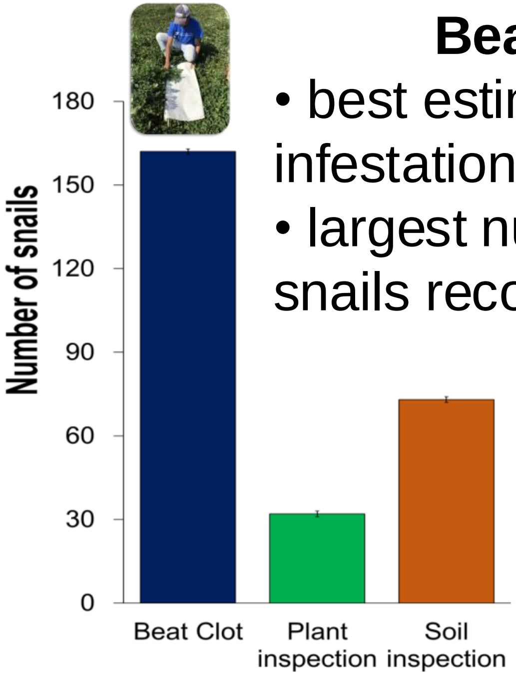
Previous Results:

Sampling techniques

beat cloth

Plant inspection

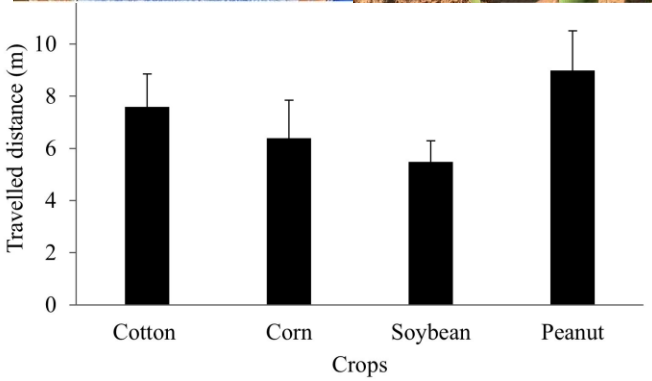
soil inspections

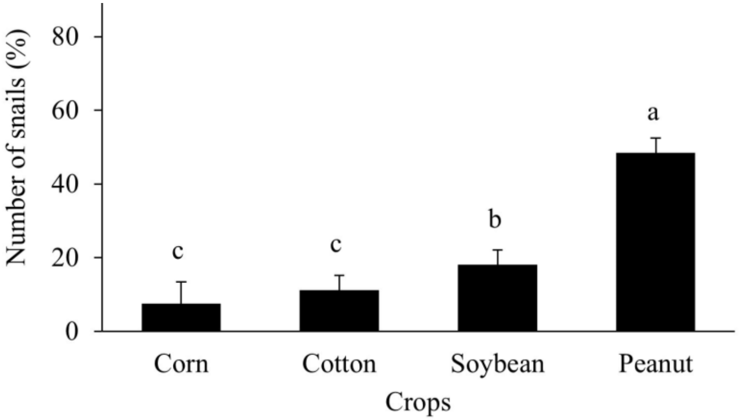


Beat cloth

- best estimation of snail infestation
- largest number of snails recovered

Snail dispersal and traveled distance in field crops

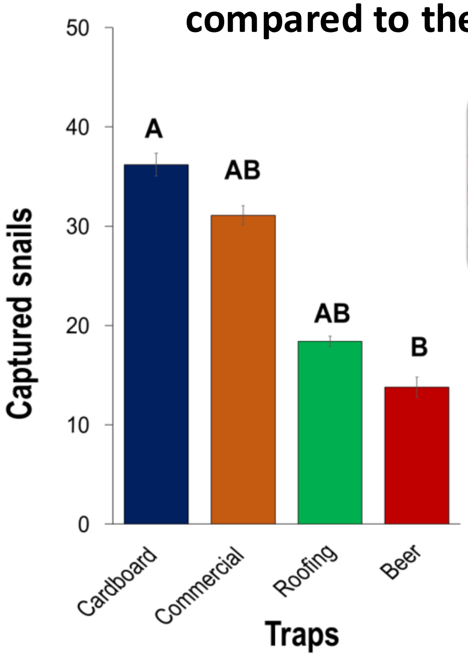


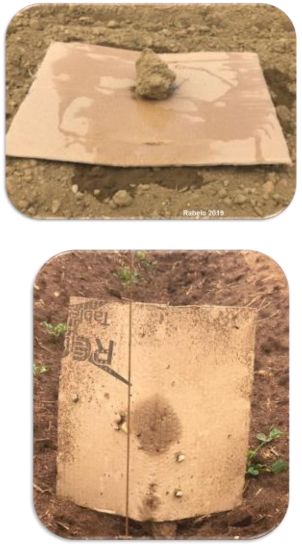


Trapping methods

Roofing shingle | Commercial bait | Water bottle pitfall with beer

Cardboard trapped the most snails compared to the other traps





Rabelo, M., Dimase, M., Paula-Moraes, S.V. 2022

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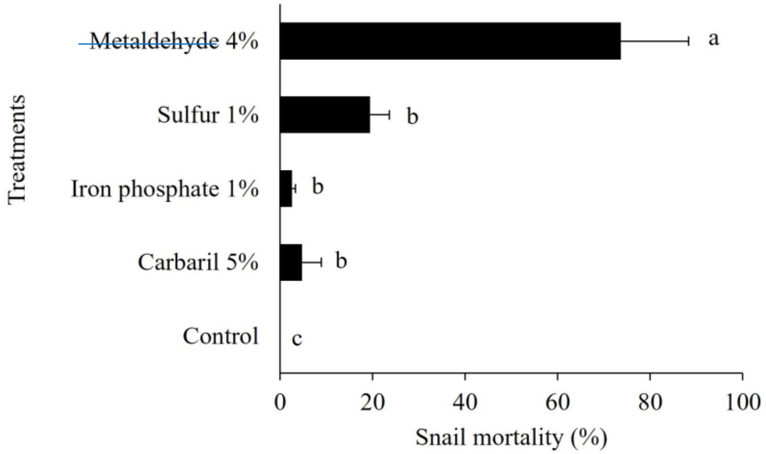
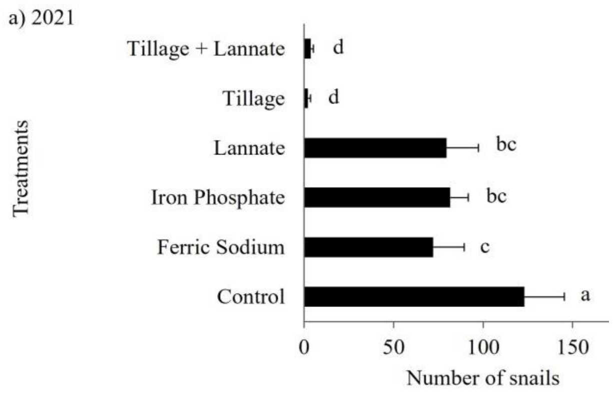
Previous Results:

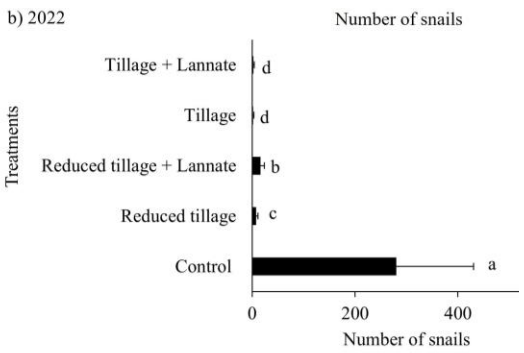
Chemical control

artificially infested with adults

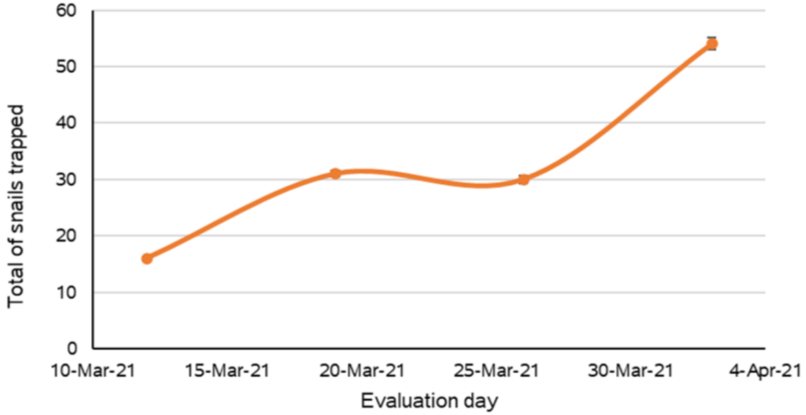


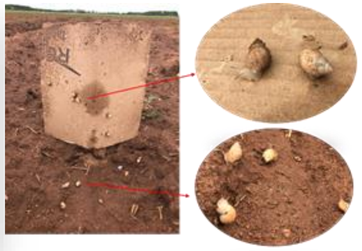
Chemical + Cultural control



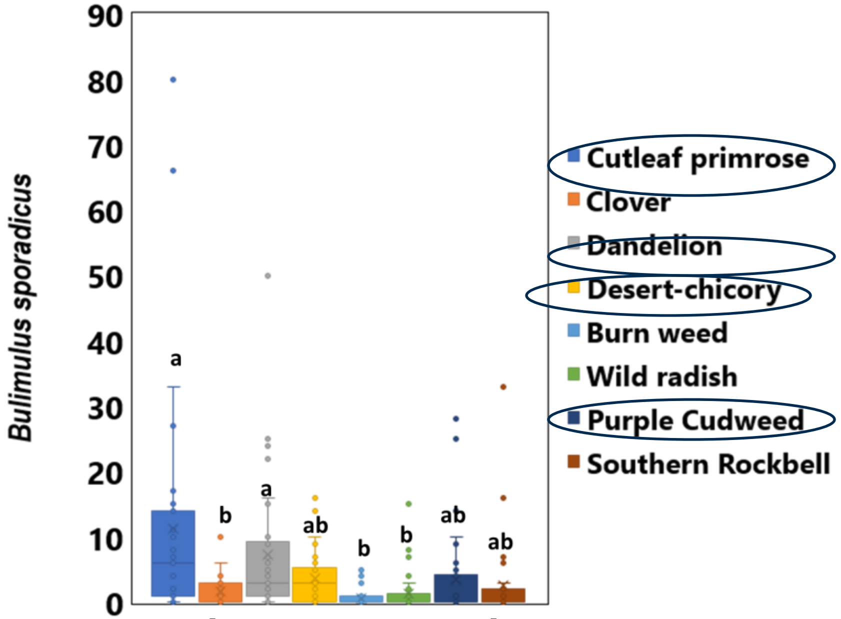


Obj 1) Documentation of the seasonality and risk of snail infestation to peanut cultivation in the region as an IPM tool for planting decisions





Cutleaf evening primrose



Winter weeds

Dandelion

Purple cudweed

Rabelo, M., Dimase, M., Paula-Moraes, S.V. 2022

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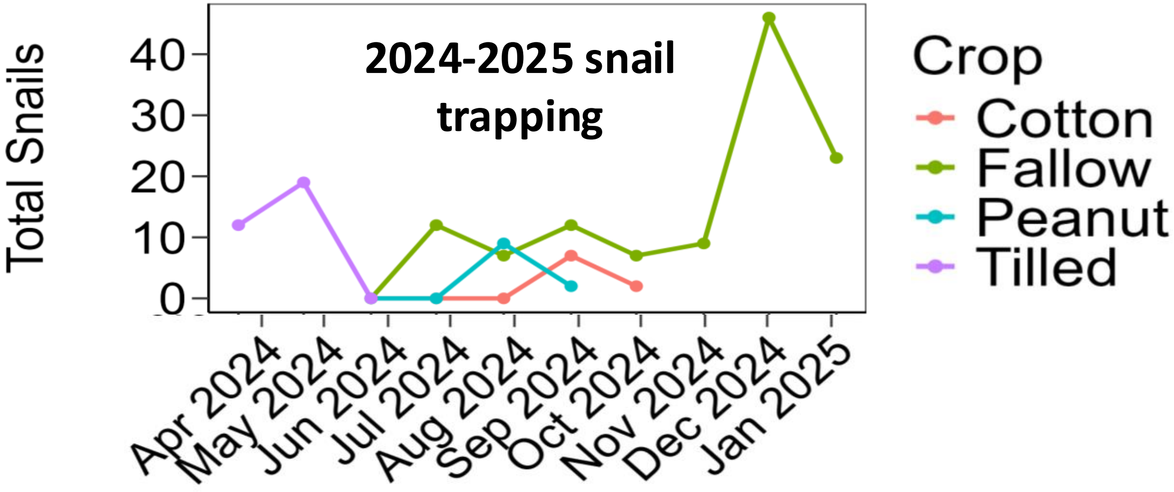
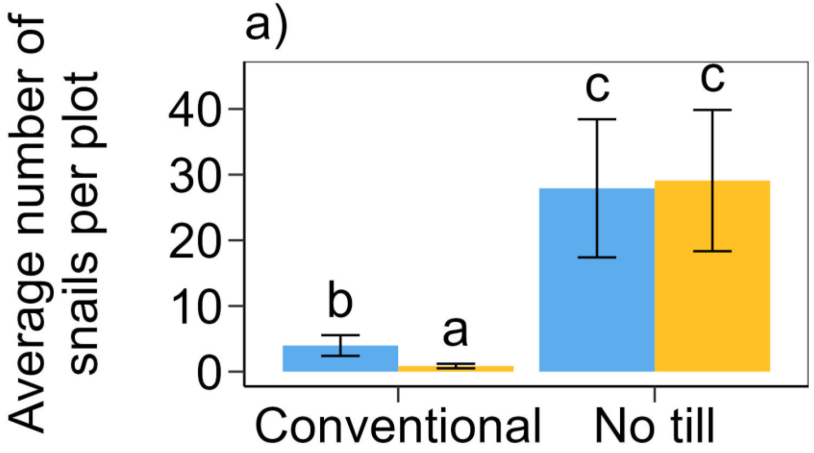
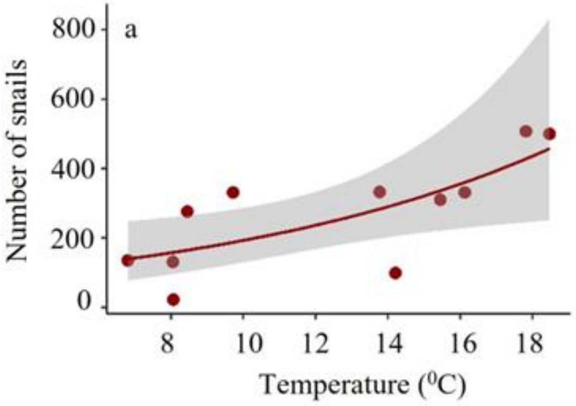
Obj 1) Documentation of the seasonality and risk of snail infestation to peanut cultivation in the region as an IPM tool for planting decisions

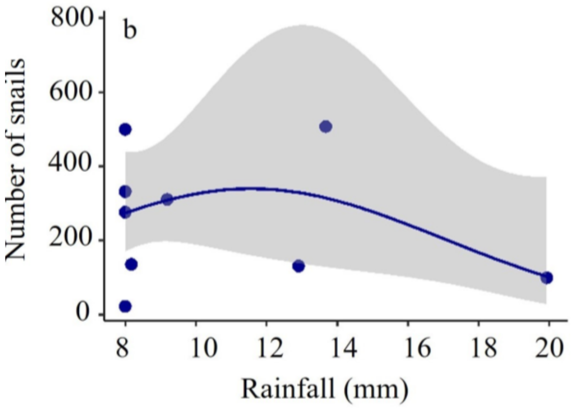




Influence of tillage and calcium fertilization on the snail infestation

Calixto, E.S., Singh, H., Paula-Moraes, S.V. 2024.





Effect of the temperature and moisture on abundance of trapped snails

Conclusions for planting decision:

- Conventional tillage + dolomitic lime reduced snail populations compared to other treatments
- Cardboard trapping indicate level of field infestation

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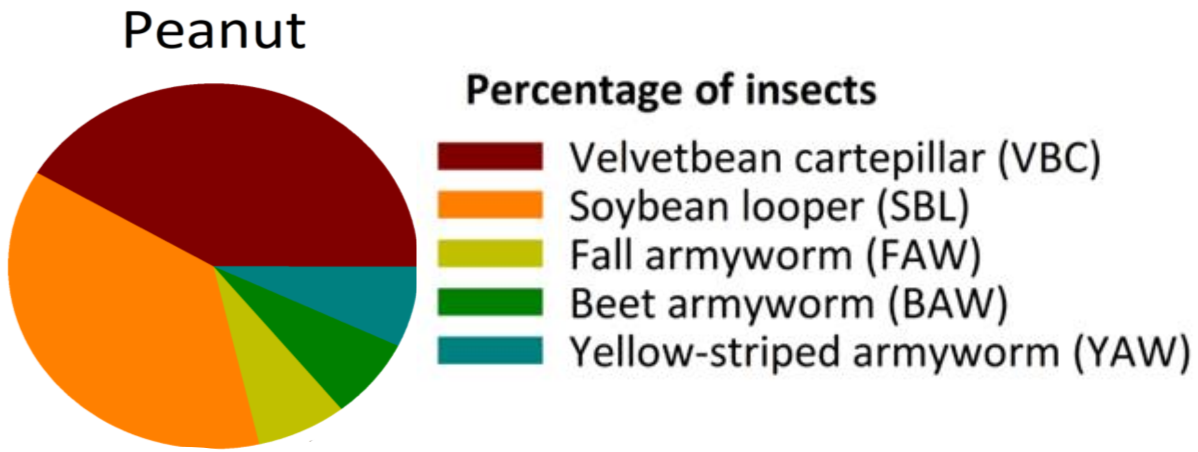
Obj 2) - Screening of UF elite breeding lines with host plant resistance to lepidopteran pests to promote the development of commercial cultivar with demand for less insecticide use.



Soybean looper (SBL)

- Hard pest to kill
- SBL eggs deposited on the lower canopy
- Larval distribution in the peanut canopy

2nd instar - lower

3rd & 4th instar - upper canopy

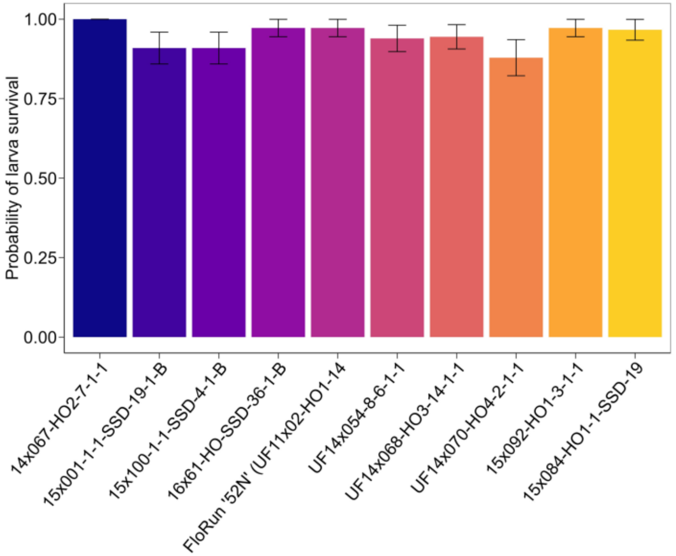
6th instar - middle canopy

UF14x054-8-6-1-1 | UF14x068-HO3-14-1-1 | UF14x070-HO4-2-1-1 (Arnie) | 15x092-HO1-3-1-1 | 15x084-HO1-1-SSD-19

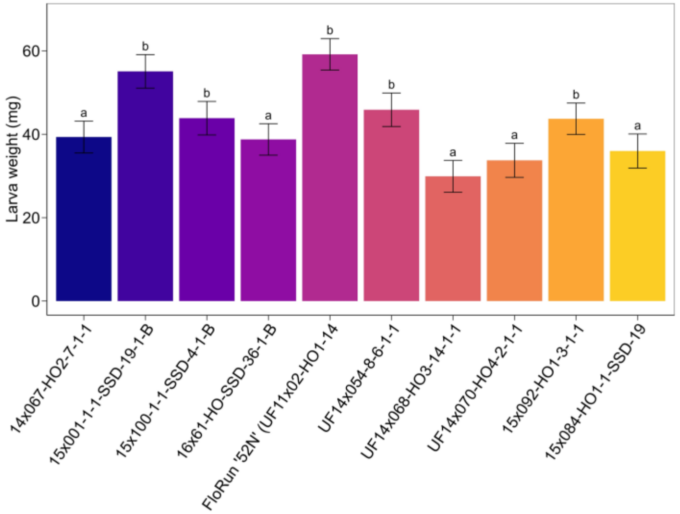
14x067-HO2-7-1-1 | 15x001-1-1-SSD-19-1-B | 15x100-1-1-SSD-4-1-B | 16x61-HO-SSD-36-1-B | FloRun '52N' (UF11x02-HO1-14

Unpublished data

Obj 2) - Screening of UF elite breeding lines with host plant resistance to lepidopteran pests to promote the development of commercial cultivar with demand for less insecticide use.



Probability of survival of SBL feeding on 10 peanut breeding lines.



Larva weight of SBL feeding on the 10 peanut breeding lines.

Unpublished data

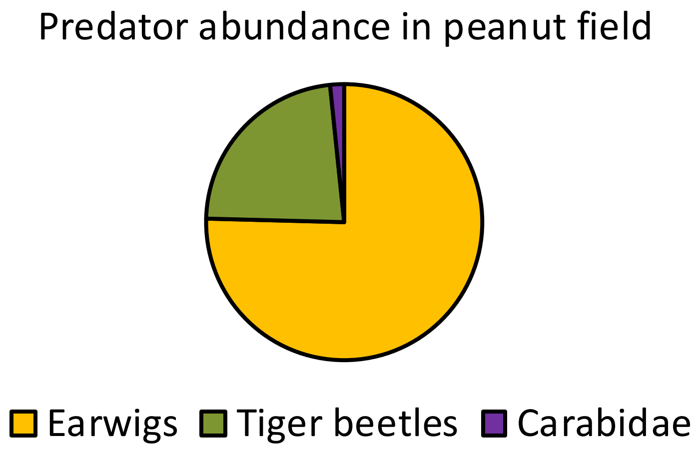
Findings:

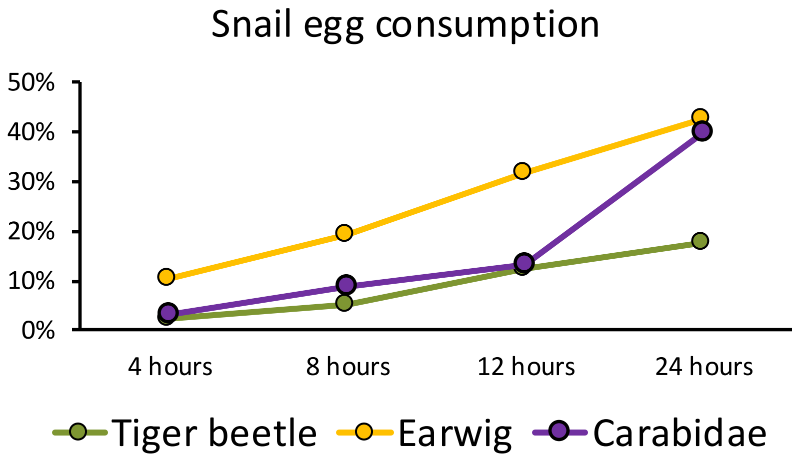
- Populations of snail increase by the end of winter
- Trapping with cardboard – level of field snail infestation
- There are sources of host plant resistance to SBL in UF elite peanut breeding lines

Questions?

Silvana Paula-Moraes
paula.moraes@ufl.edu

Investigating biological control options for the invasive snail *Bulimulus sporadicus* - Xavier Martini, Isaac Esquivel



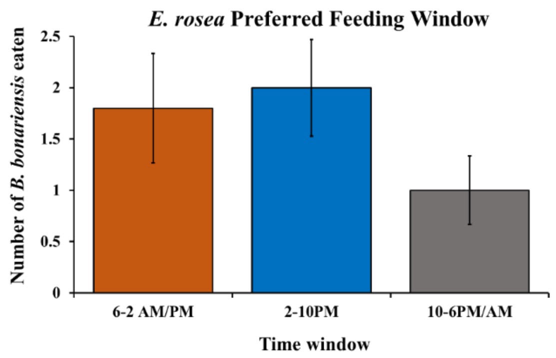



Earwig


Tiger beetle


Carabidae

We are investigating the parasitism rate of flesh fly snail parasite on *B. sporadicus.*




Rosy Wolf Snail

Agronomy Department
3105A McCarty B, Gainesville, Fl