

Mississippi State Report



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Delta Research and Extension Center
National Center for Alluvial Aquifer Research

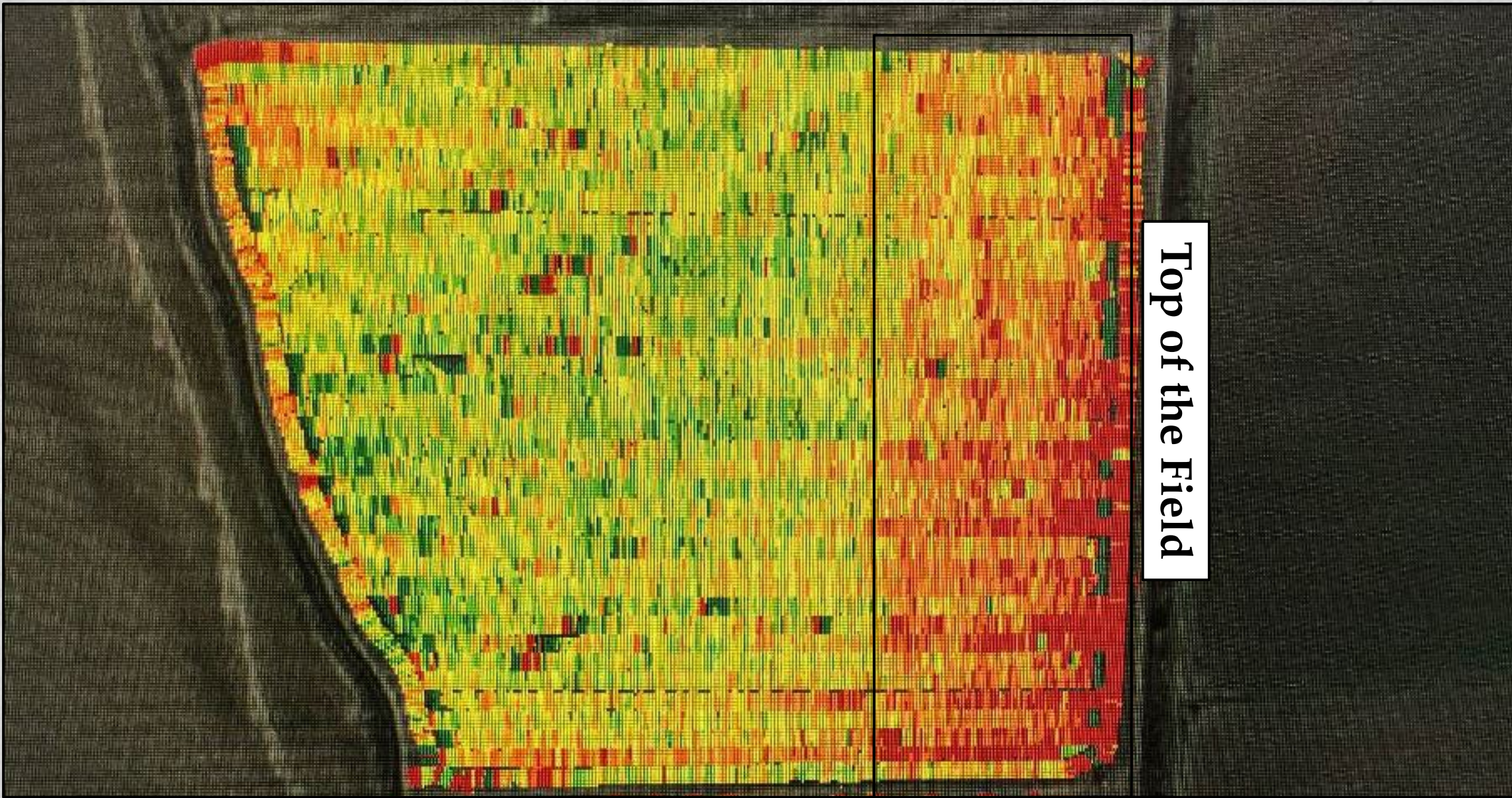
Determining an Irrigation Management Plan in a Furrow Irrigated Rice Production System

Anna Smyly



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Top of the Field



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Study Set-Up

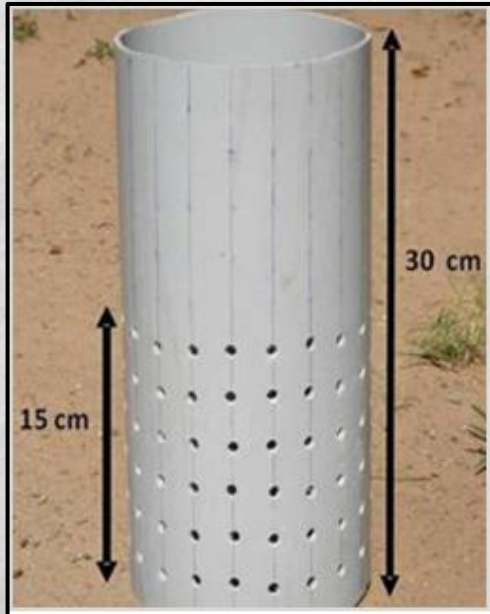
Experimental Design: RCB; 4 treatments, replicated 3 times

- Trt. 1: Irrigating everyday
- Trt. 2: Irrigating every 3 days
- Trt. 3: Irrigating every 5 days
- Trt. 4: Irrigating every 7 days



Data Collection Tools

Pani-Pipes®



Precision
King AgSense
Sensors



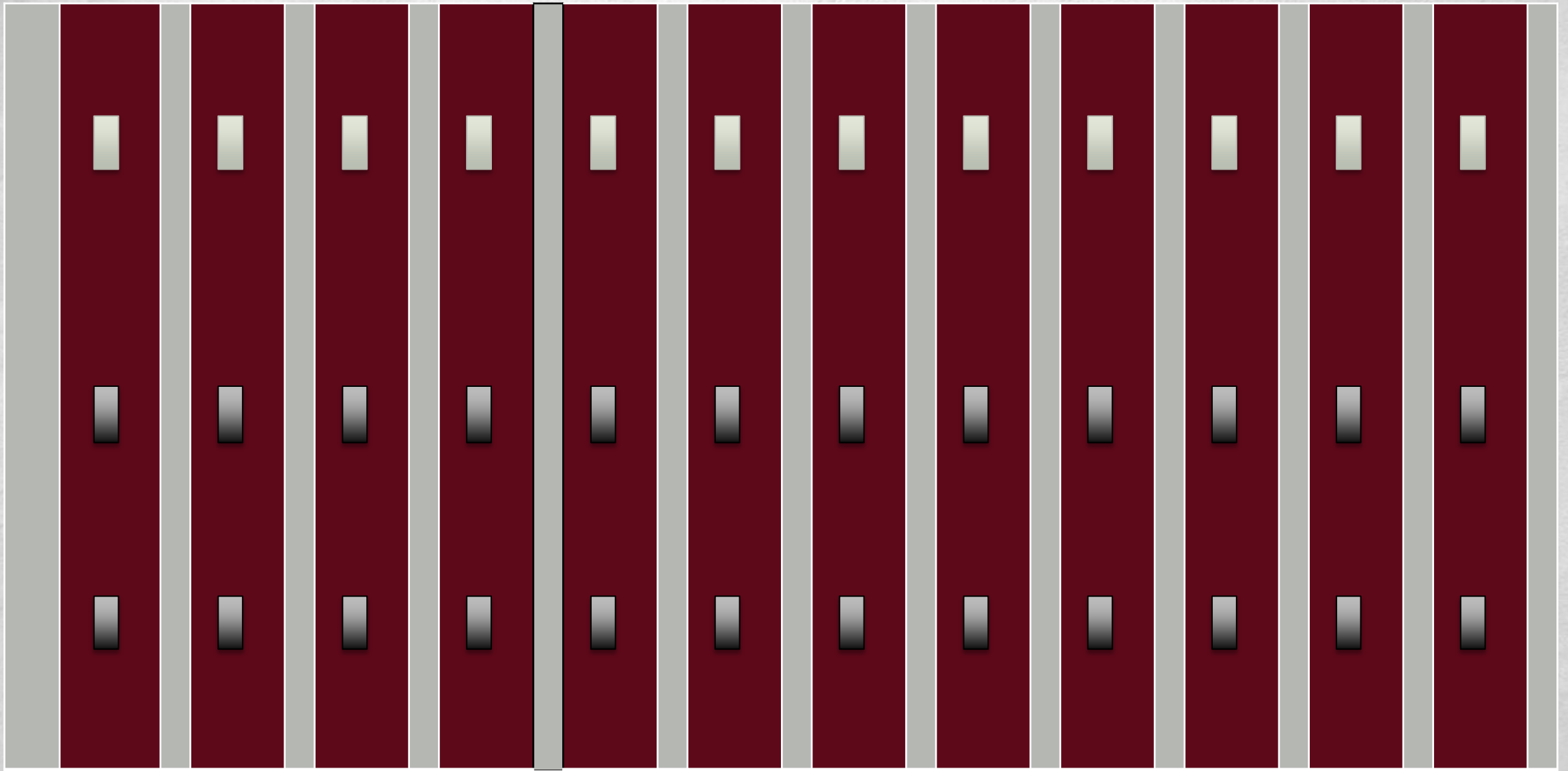
WaterMark®
Soil Moisture
Sensors®



Flowmeter



TOP OF THE FIELD



BOTTOM OF THE FIELD



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Table. Average rice grain yields (bu ac⁻¹) in 2021, 2022, and 2023 for each irrigation frequency treatment.

TRT	2021	2022	2023
EVERYDAY	152 a	158 a	180 a
3 DAYS	144 b	146 a	164 ba
5 DAYS	143 b	147 a	149 bc
7 DAYS	140 c	157 a	144 c



Table 5. 2023 combined average rice grain yield for the top, middle, and bottom zones of each irrigation frequency treatment; A) Everyday, B) Every 3 Days, C) Every 5 Days & D) Every 7 Days. Numbers followed by the same letter are not significantly different at $\alpha = 0.05$.

A. Everyday Treatment

Zone	Yield
Bottom	193 a
Middle	182 b
Top	162 c

B. Every 3 Days

Zone	Yield
Bottom	177 a
Middle	165 b
Top	147 c

C. Every 5 Days

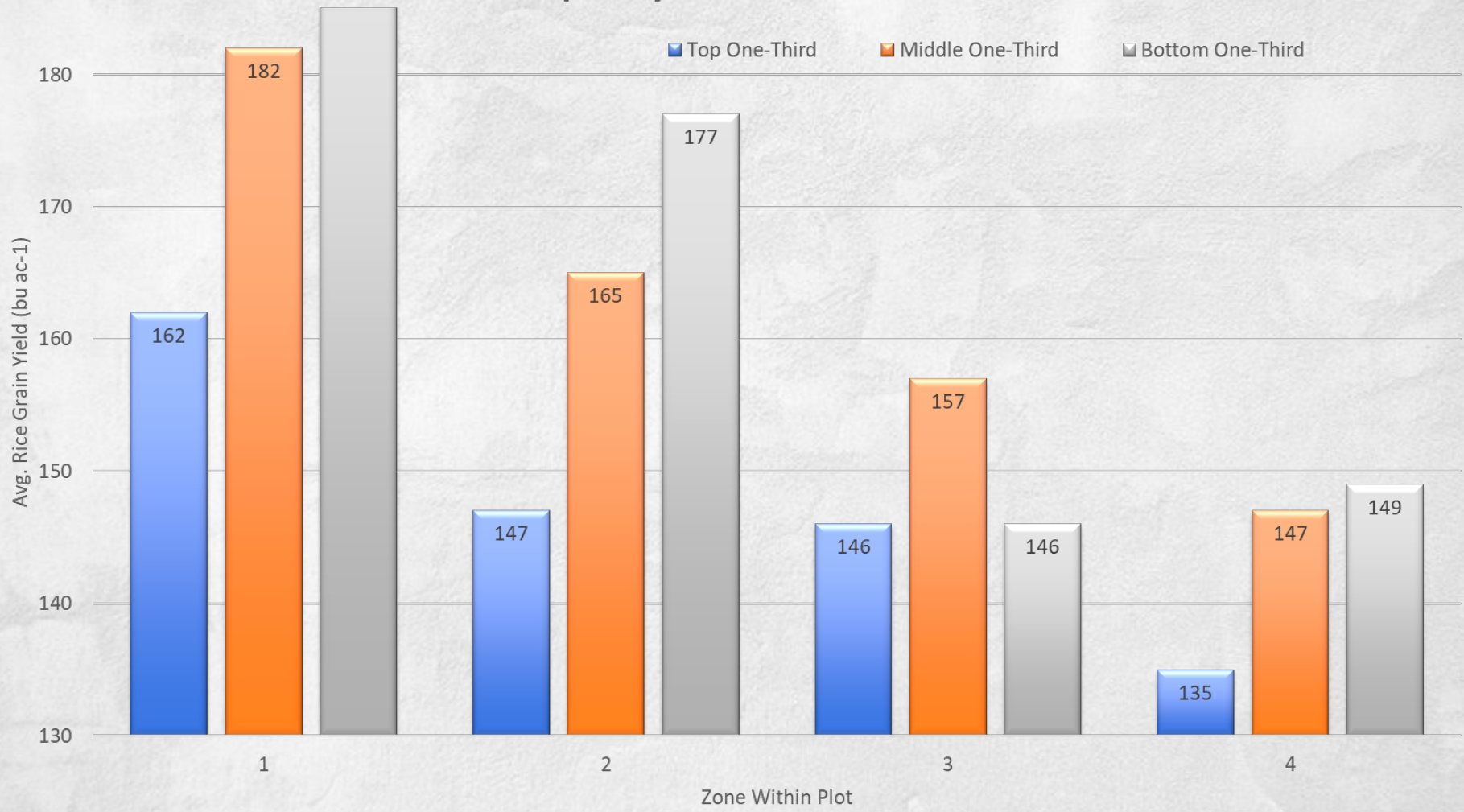
Zone	Yield
Middle	157 a
Bottom	146 b
Top	146 b

D. Every 7 Days

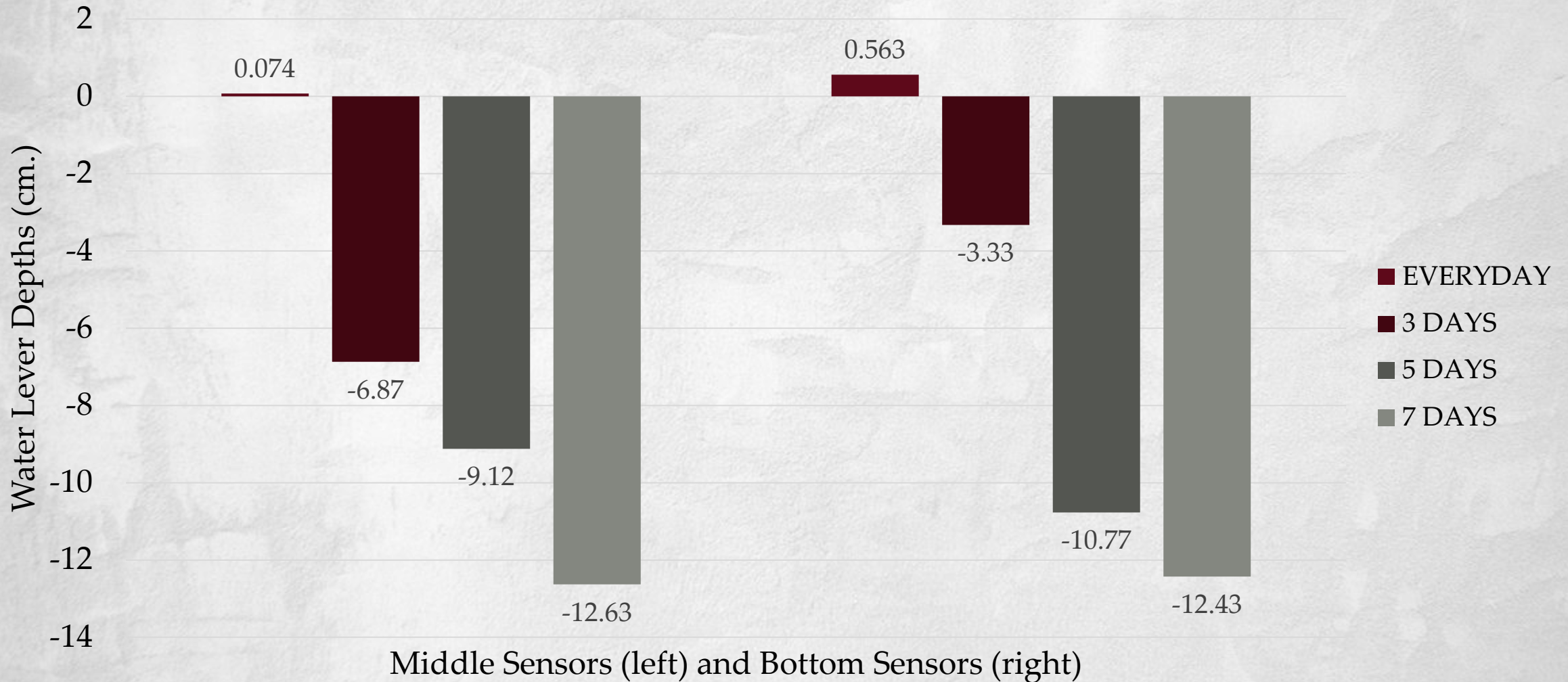
Zone	Yield
Bottom	149 a
Middle	147 a
Top	135 b



Average rice grain yield (bu ac⁻¹) of the 3 zones within each irrigation frequency treatment in 2021.



Average water level depths in centimeters for the middle and bottom sensors for each irrigation frequency treatment in 2023.

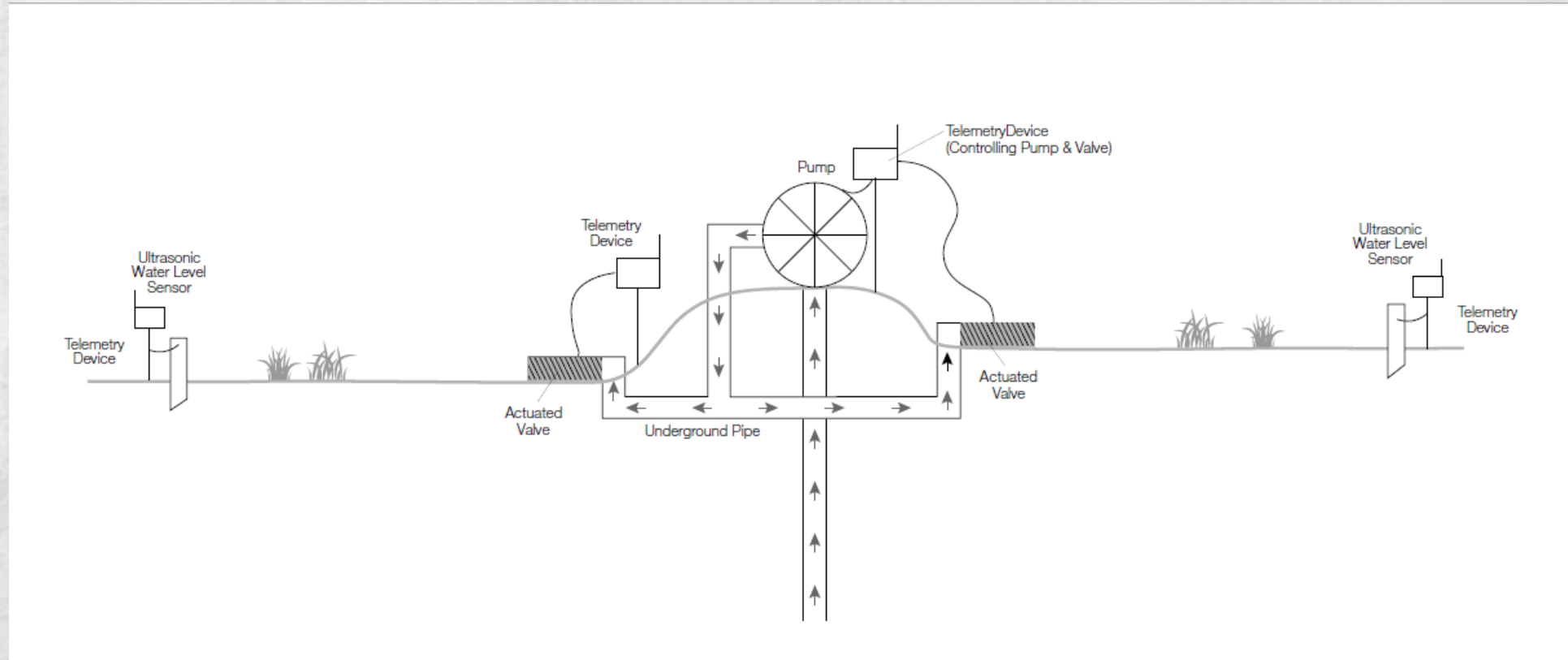


Tailwater Recovery On-Farm

- Patented tailwater recovery irrigation uses less water than common flooded-field rice
- More consistent ground saturation, and possibly less nitrous oxide produced

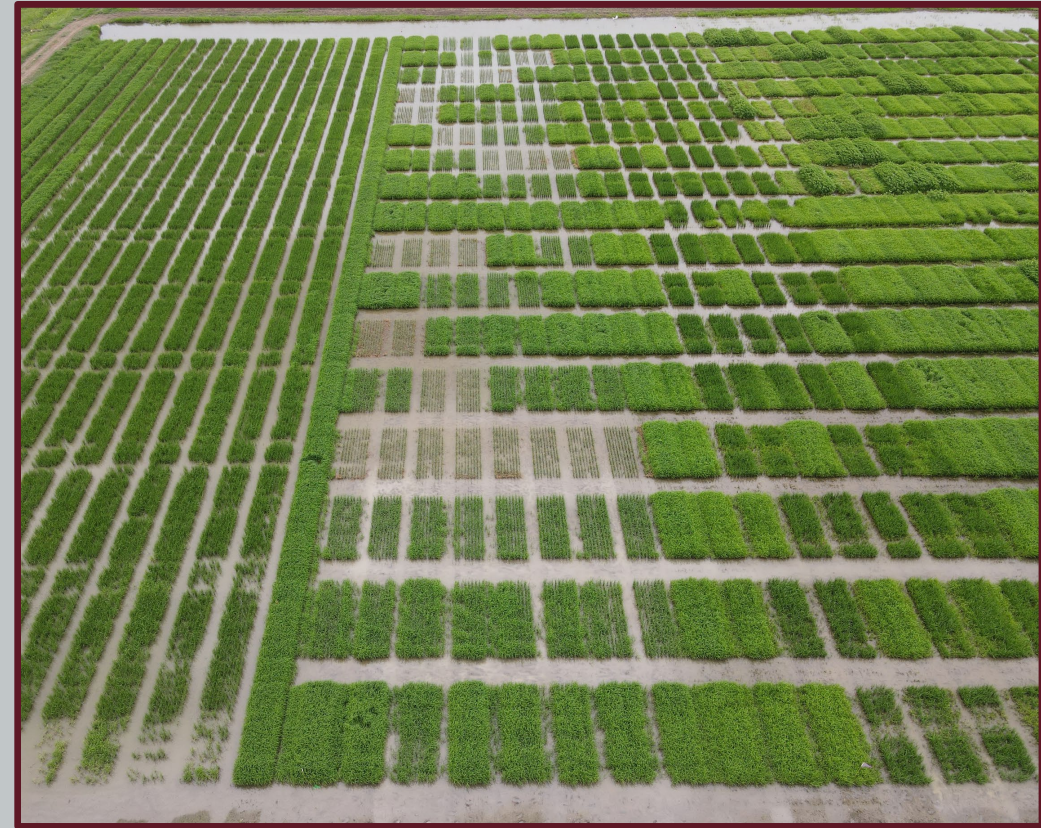


Rice Automation Schematic



2023 Weed Control Issues

- Italian ryegrass control
- “Non-traditional” weed species pre- and/or post-planting
- Poor grass control in all crops
- Weed management in furrow-irrigated rice
- Off-target herbicide movement
- Tank contamination/misapplication

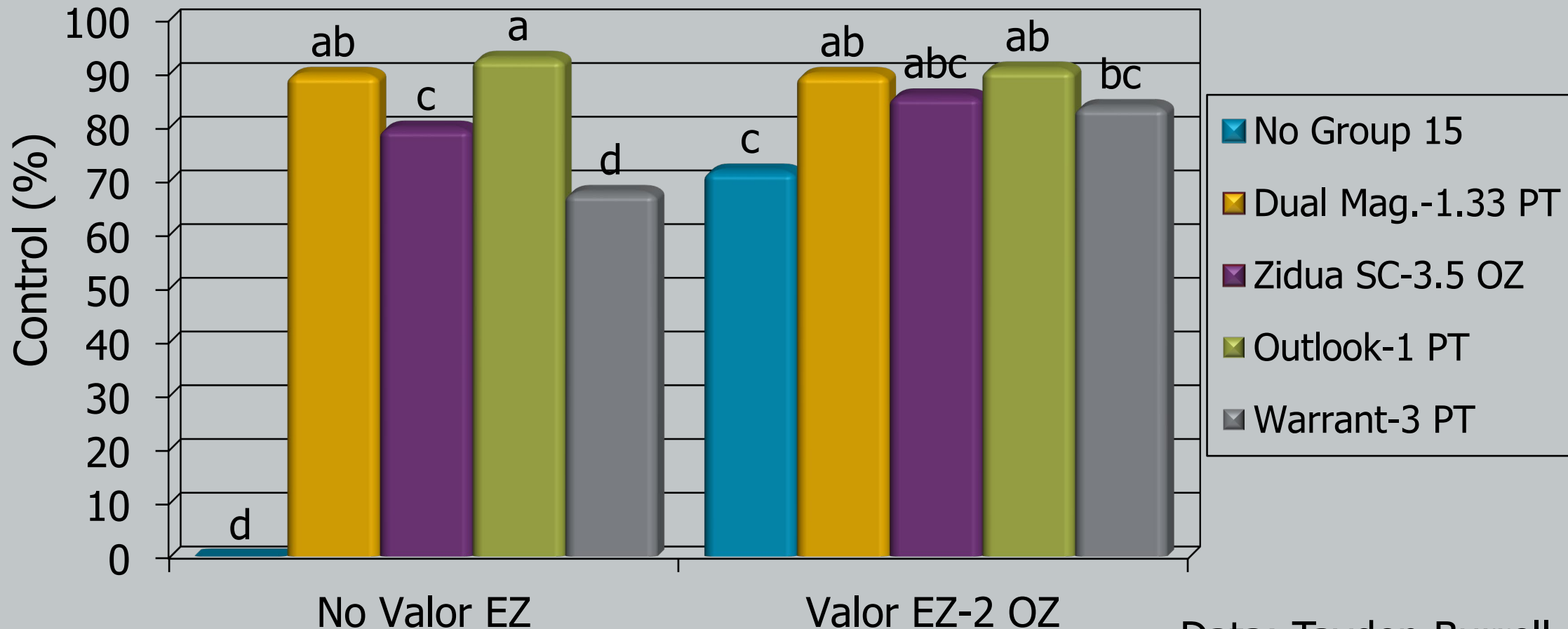


Italian Ryegrass Control



Italian Ryegrass Control

Italian ryegrass control 100 d after application of fall-applied residual herbicides in 2022 and 2023



Data: Tayden Burrell



Italian Ryegrass Control



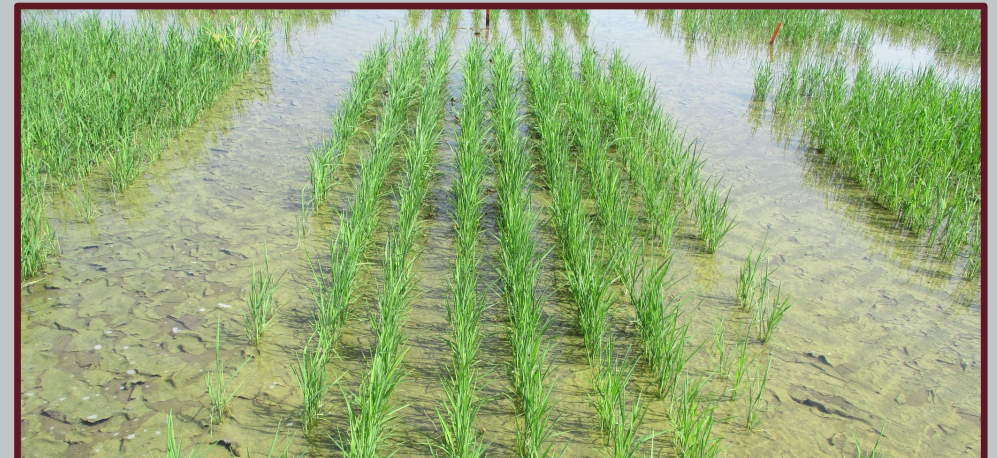
Nontreated



Warrant



Command

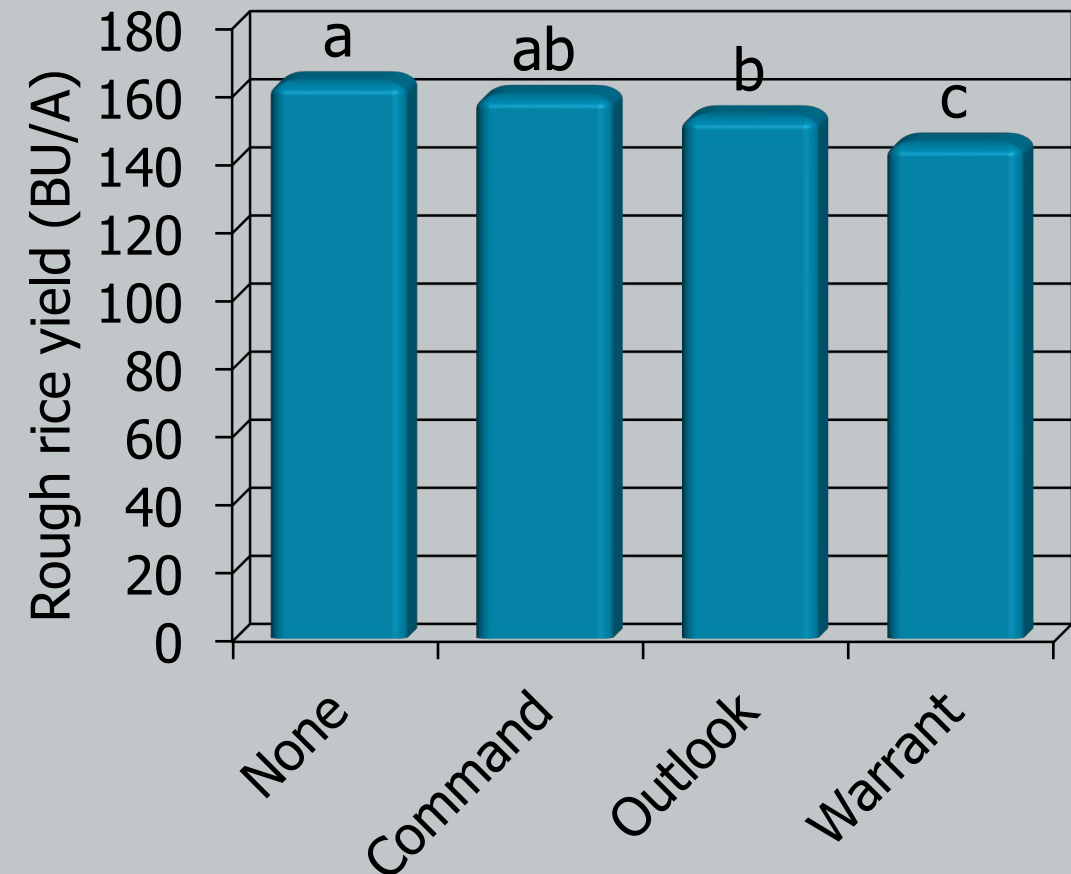
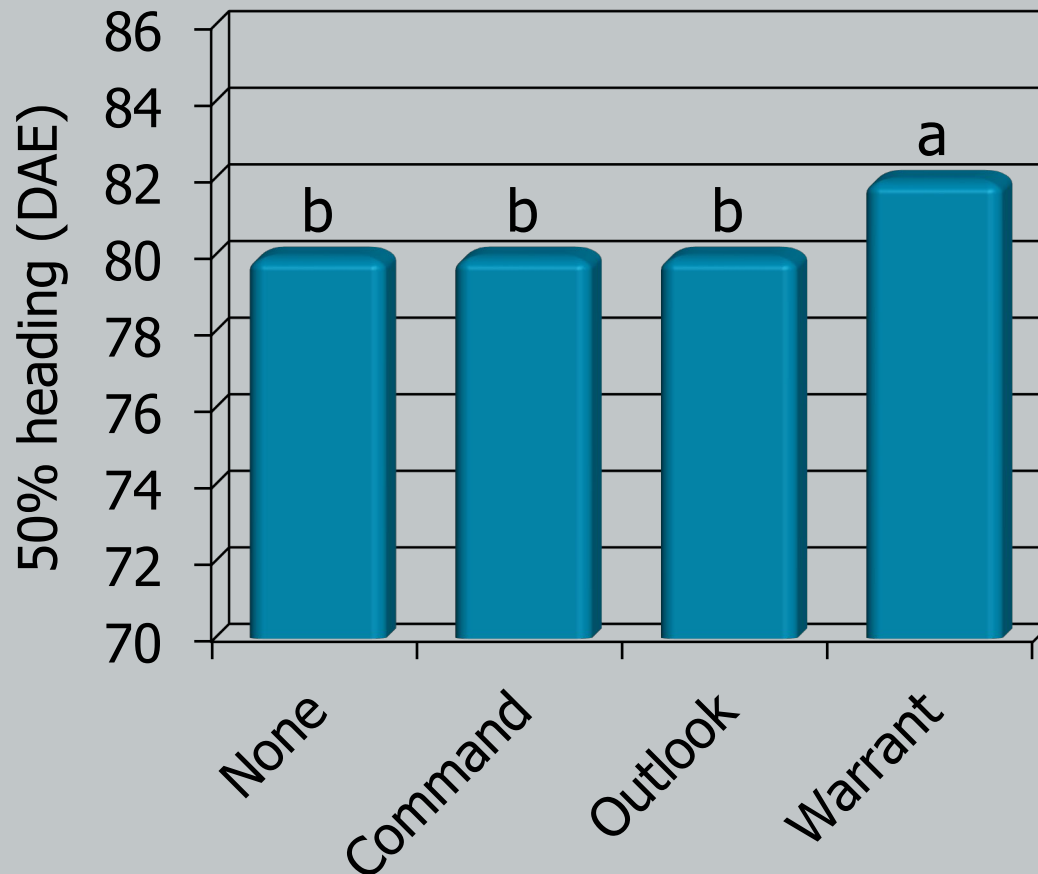


Outlook



Italian Ryegrass Control

Rice maturity and yield following fall-applied residual herbicide mixtures in 2022 and 2023



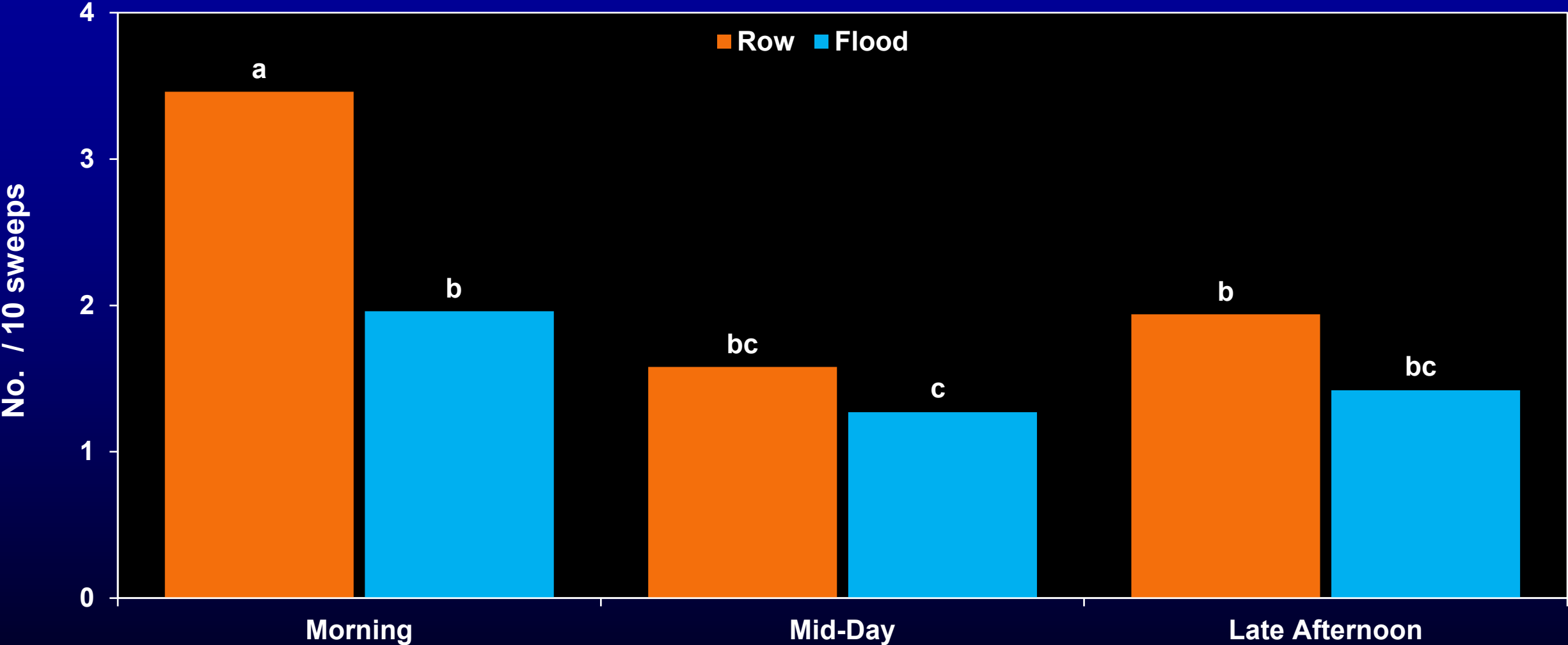
*Data pooled over two application rates (1 and 2x), two levels of Valor EZ mixture, and four siteyears.



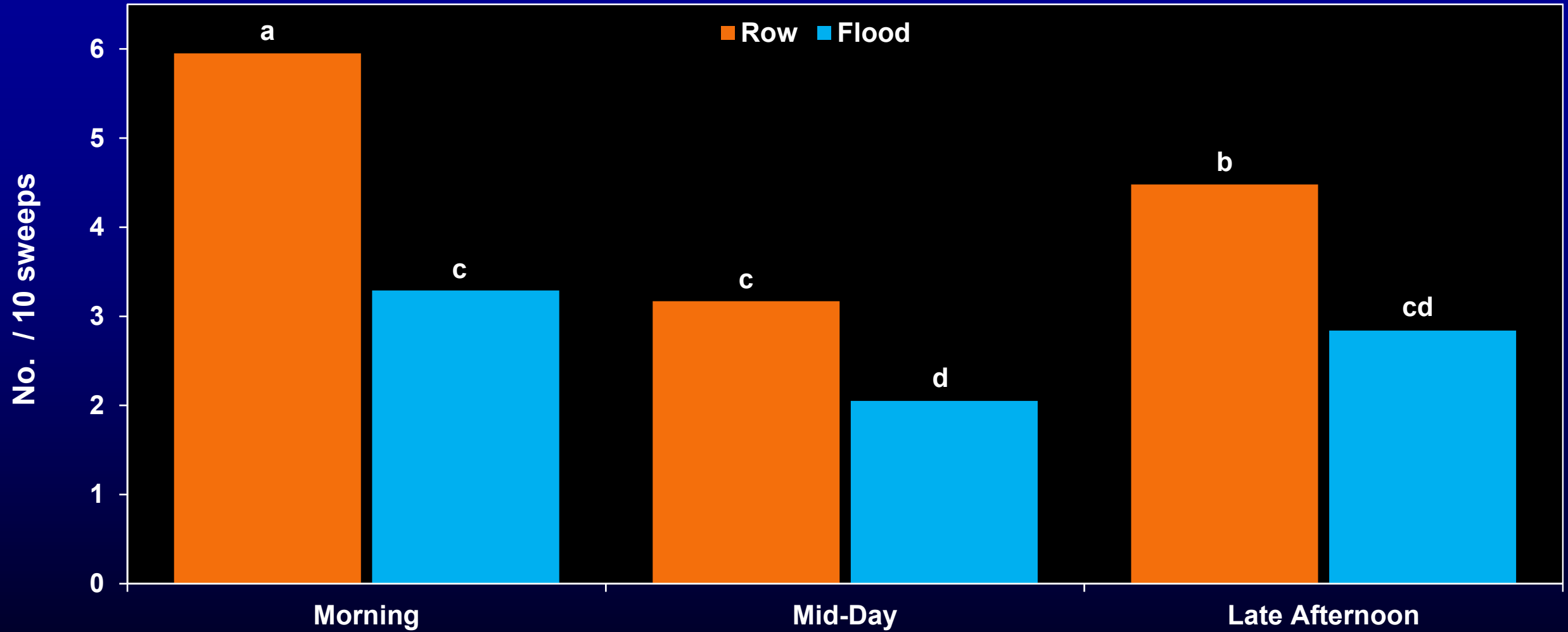
Rice Stink Bug



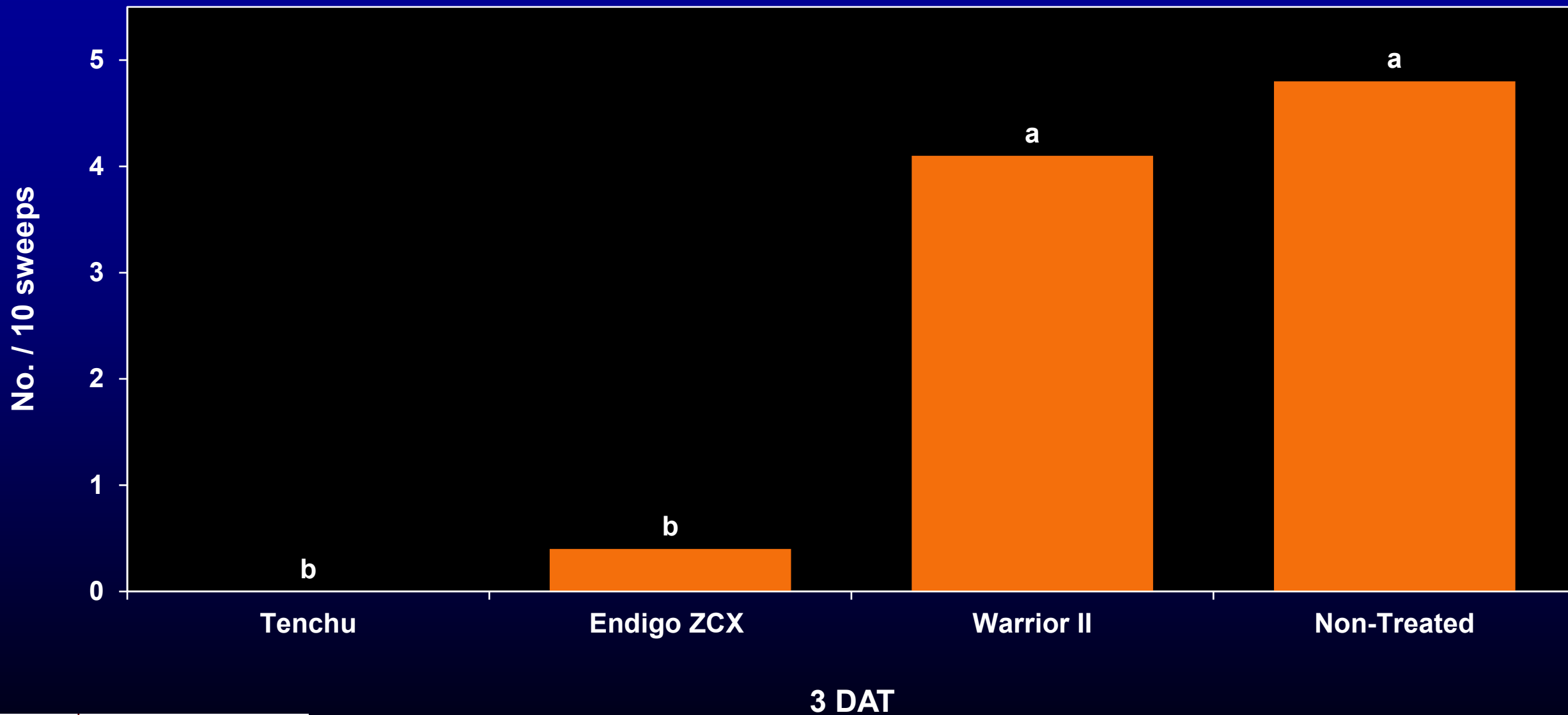
Rice Stink Bug Sampling - Nymphs



Rice Stink Bug Sampling - Total

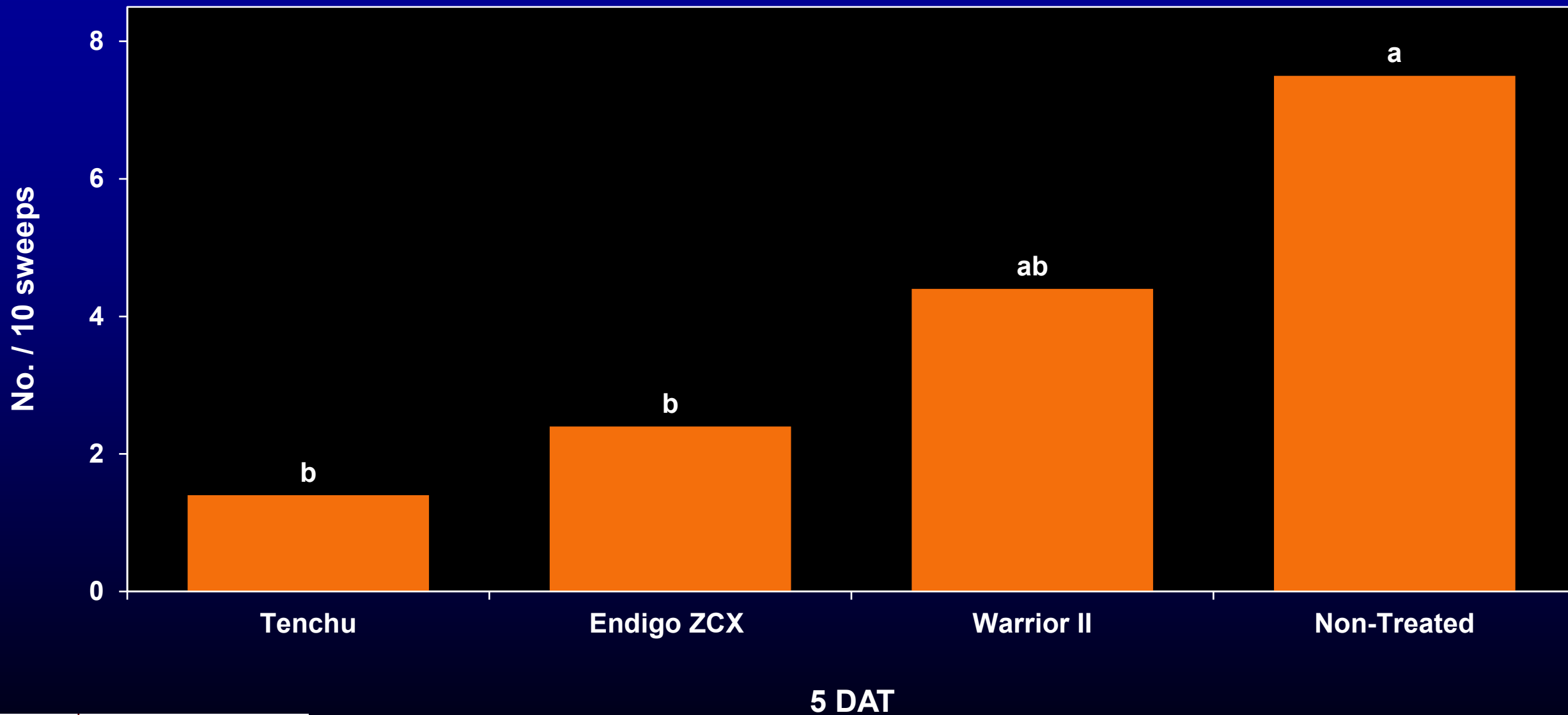


Insecticide Performance Against Rice Stink Bug



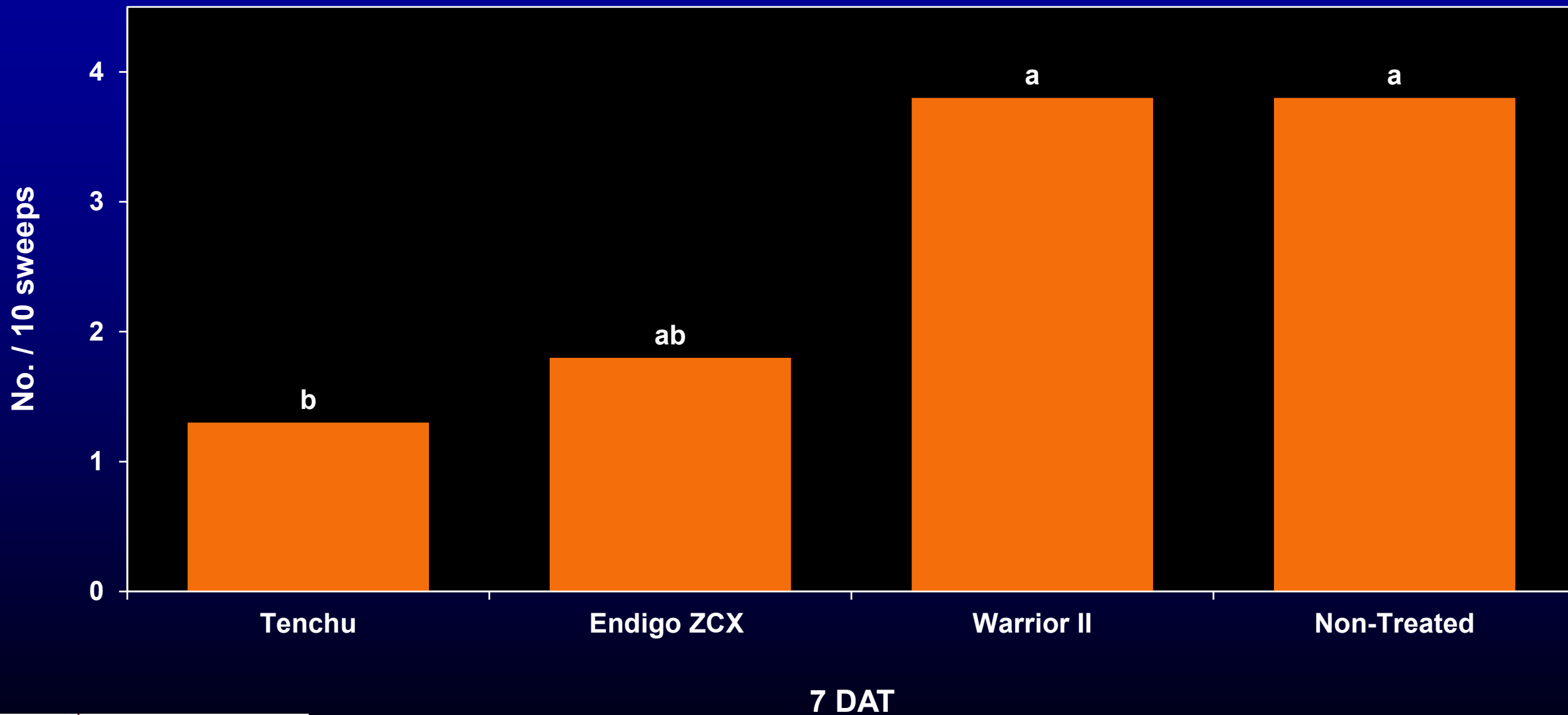
3 DAT

Insecticide Performance Against Rice Stink Bug



5 DAT

Insecticide Performance Against Rice Stink Bug



7 DAT

Rice Stink Bug Insecticides

- **Pyrethroids** **Will they work?**
- **Malathion** **Can you find it?**
- **Tenchu** **Can you find it?**
- **Endigo ZCX** **Will it be available?**

Mississippi Rice Outlook

2023 USA Rice Outlook Conference
December 6-8, 2023



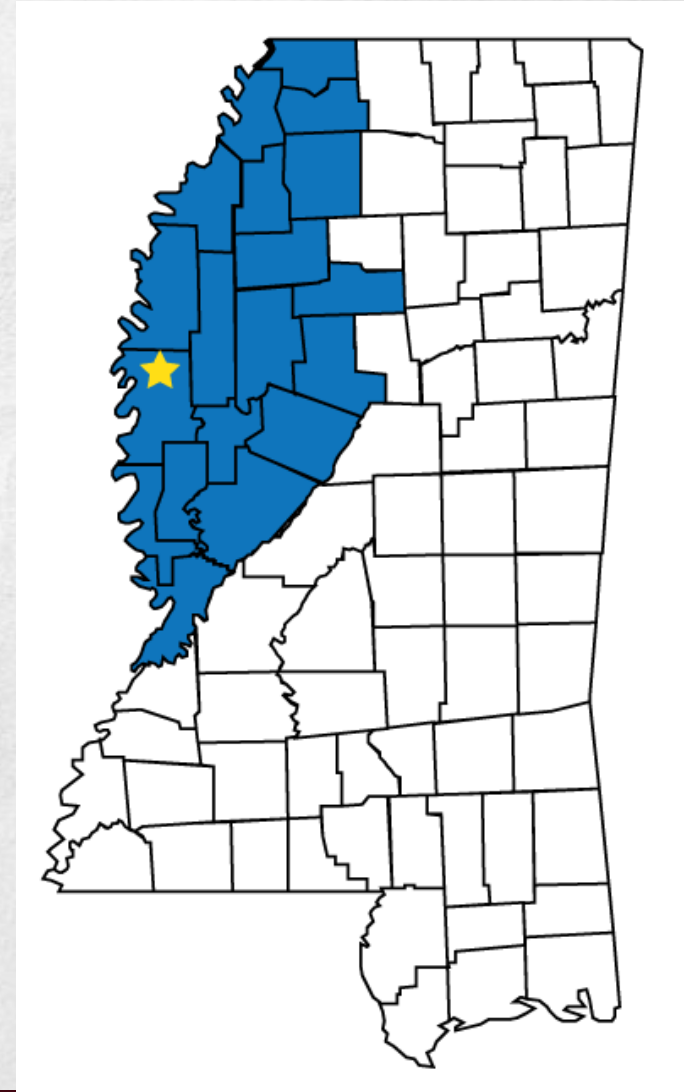
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DEPARTMENT OF
AGRICULTURAL ECONOMICS

Mississippi Rice Acres

- 119,637 acres of rice in 2023
- Up from 84,524 acres in 2022
- All rice in Mississippi grown in Delta Region



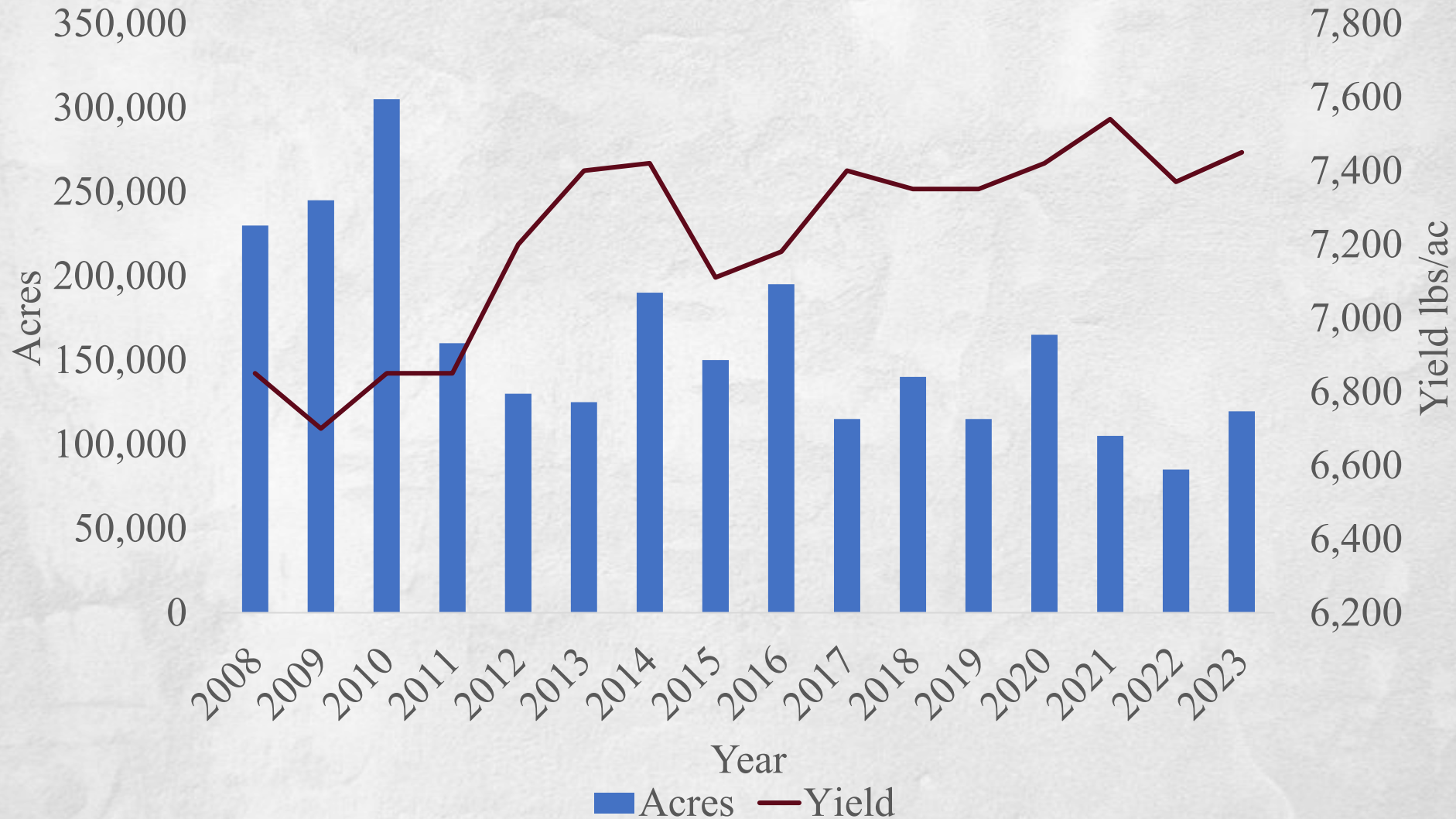
Mississippi Rice Acres

Table 1. Mississippi County Rice Acres 2022 vs 2023

County	2022	2023	Change
Bolivar	23,500.02	27,412.12	3,912.10
Coahoma	4,481.51	9,440.62	4,959.11
DeSoto	769.78	1,887.45	1,117.67
Grenada	232.99	54.66	(178.33)
Holmes	154.18	417.17	262.99
Humphreys	397.54	2,731.34	2,333.80
Issaquena	271.11	368.21	97.10
Leflore	4,792.56	5,564.63	772.07
Panola	5,759.36	6,128.27	368.91
Quitman	6,772.75	9,705.66	2,932.91
Sunflower	8,179.45	11,141.59	2,962.14
Tallahatchie	4,967.04	7,363.57	2,396.53
Tate	947.94	801.54	(146.40)
Tunica	18,671.02	31,724.94	13,053.92
Washington	4,668.70	4,895.62	226.92
Total	84,565.95	119,637.39	35,071.44



Mississippi Rice Acres and Yield



MSU Rice Cost of Production Estimates – 2024 Crop Year

- MSU produces yearly Enterprise and Planning budgets using MSU Budget Generator
- Survey Mississippi companies to determine costs of herbicide, pesticide, fertilizer, equipment, etc
 - Survey August-October
- Multidisciplinary team develops budgets based on common production practices/recommendations



MSU Rice Cost of Production Estimates – 2024 Crop Year

- Rice budgets for conventional, conventional hybrid, Clearfield, Fullpage hybrid and Provisia types.
- Budgets for irrigation systems
 - contour levee, straight levee, straight levee multi-inlet, and zero grade systems.
 - 20 different rice budgets
- Costs will vary for each producer
- Available at agecon.msstate.edu



Budget Changes

Table 2. Change in income, expenses, and net returns from 2023 to 2024

Change in	Conventional				
	Conventional	Hybrid	Clearfield	Fullpage	Provisia
Total Income \$/ac	-\$174.40	-\$196.20	-\$174.40	-\$196.20	-\$170.04
Direct Expenses \$/ac	-\$11.90	\$28.82	\$8.00	-\$2.97	-\$2.24
Fixed Expenses \$/ac	\$29.44	\$28.64	\$28.64	\$28.64	\$28.64
Total Expenses \$/ac	\$17.54	\$57.46	\$36.64	\$25.67	\$26.40
Net Returns \$/ac	-\$191.94	-\$253.66	-\$211.04	-\$221.87	-\$196.44



Break-evens

Table 3. Break-even prices and yield for rice systems

Item	Conventional				
	Conventional	Hybrid	Clearfield	Fullpage	Provisia
Total Expenses \$/ac	\$1,160.59	\$1,244.42	\$1,239.97	\$1,306.91	\$1,208.02
Budget Yield bu/ac	160	180	160	180	156
Break-Even Price \$/bu	\$7.25	\$6.91	\$7.75	\$7.26	\$7.74
Budget Price \$/bu	\$5.66	\$5.66	\$5.66	\$5.66	\$5.66
Break-Even Yield bu/ac	205	220	219	231	213



2024 Outlook

- Rice acreage increased in 2023
- Higher costs and lower rice prices projected to lead to lower net returns for producers in 2024
- Government payments likely to stay low for 2024
- Rice acreage not expected to increase in 2024



Thank You For Your Support

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