

Friday Rice Breakout Session

Benefits of Insecticide Seed Treatments

Adult Rice Water Weevil Damage and Control

Michael Stout, LAES & LCES (interim)

Marty Frey, RA, Rice Research Station

Lina Bernaola

Emily Kraus

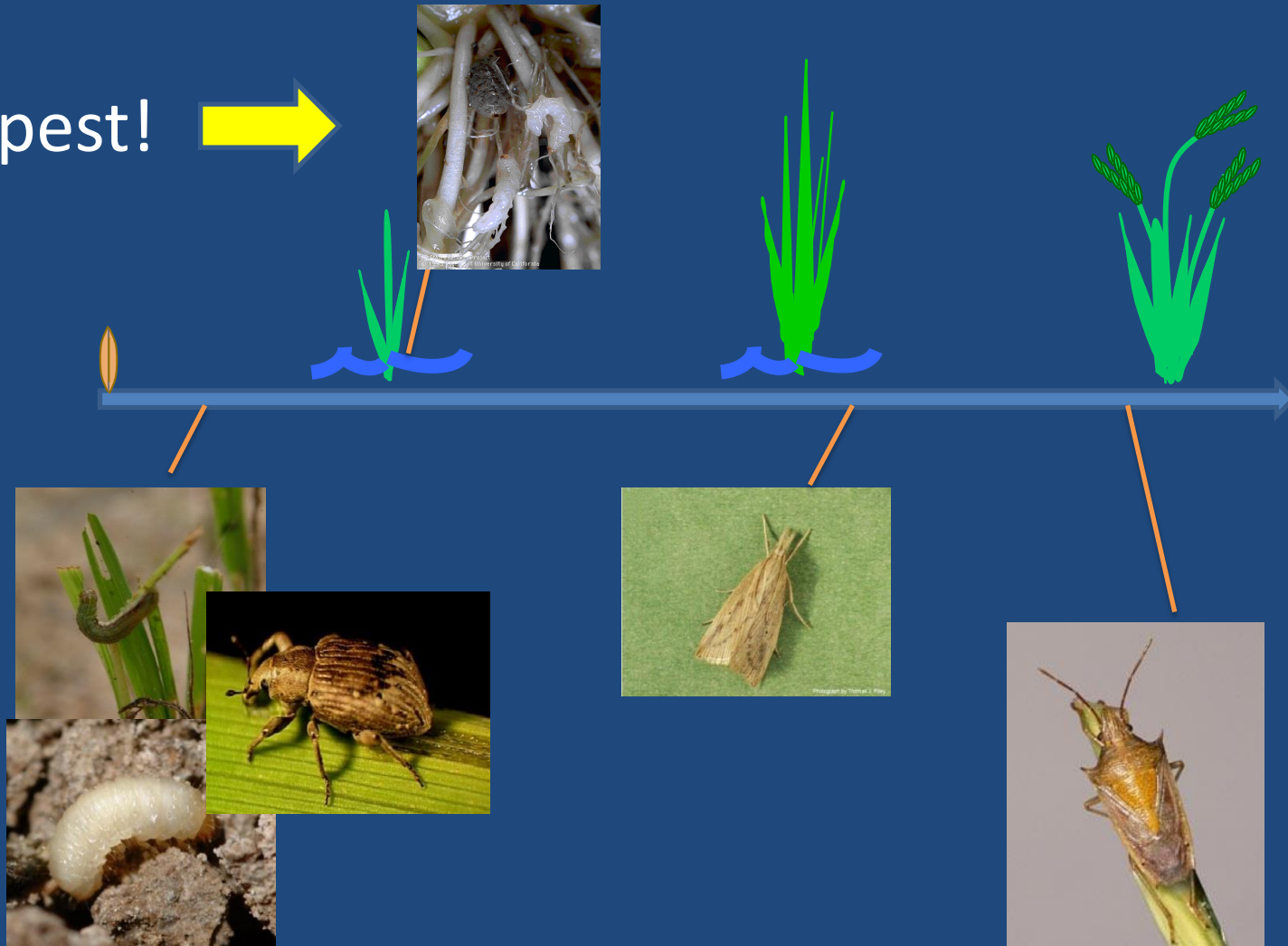
Srinivas Lanka

Nathan Mercer



Insect pest complex in Louisiana rice

Key pest! →



Insecticides for weevil control – we've come a long way!

Granular insecticide

Furadan



Foliar insecticides

Seed treatments

Pyrethroids

Belay

Dermacor

CruiserMaxx
NipsitInside

How can the quality of our insect management programs be maintained and improved?

- ❖ Goals: Increase cost effectiveness; take proactive steps against resistance and regulatory action
- Keep the insecticides we have!
 - Understand and document benefits
- Use insecticides only when needed
 - Characterize injury-yield relationships
- Integrate more tactics into program
 - Investigate alternative tactics

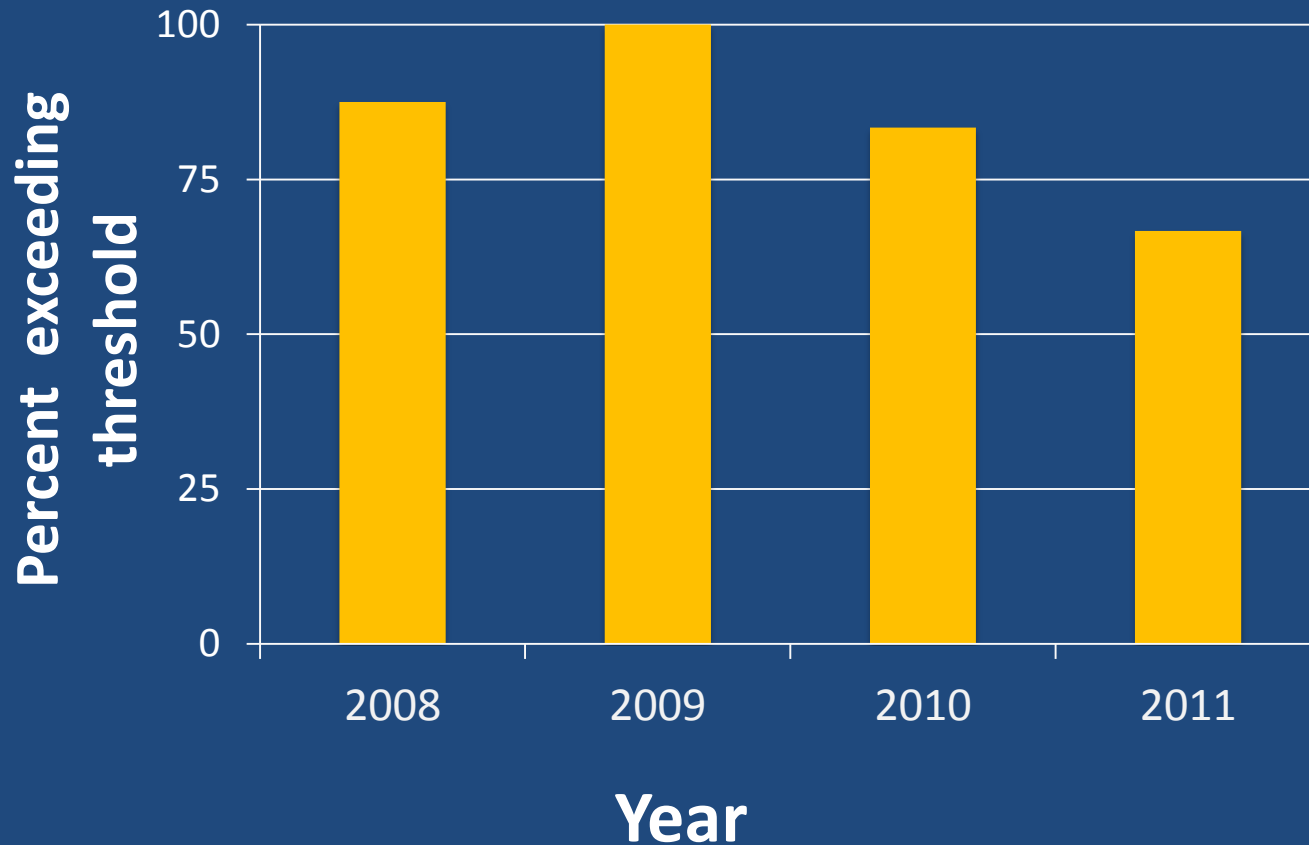
I need your input on future directions
for Entomology research!

Benefits of seed treatments

- Provide prophylactic control of most consistent, serious pest-the rice water weevil
- Neonicotinoids (Cruiser and Nipsit) may help alleviate stress in plants and promote emergence
- Yield benefits (in addition to benefits from elimination of insects)?
- Control of minor/sporadic pests
- Less impact on crawfish

Proportion of untreated rice with weevil infestations that exceeded threshold, 2008-2011

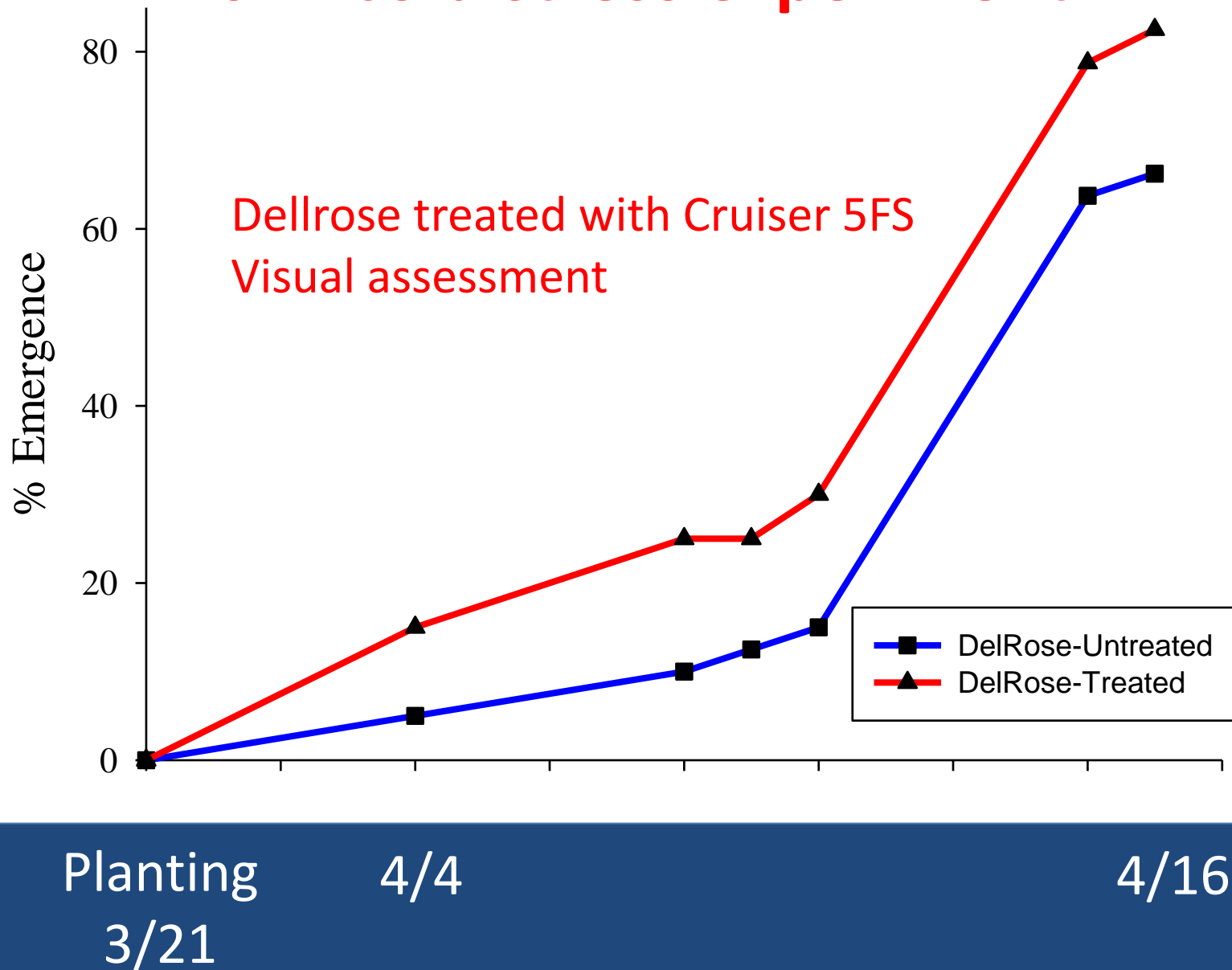
Threshold = 3 larvae per core, ~\$15 loss per acre
Average weevil density = ~11 larvae per core sample



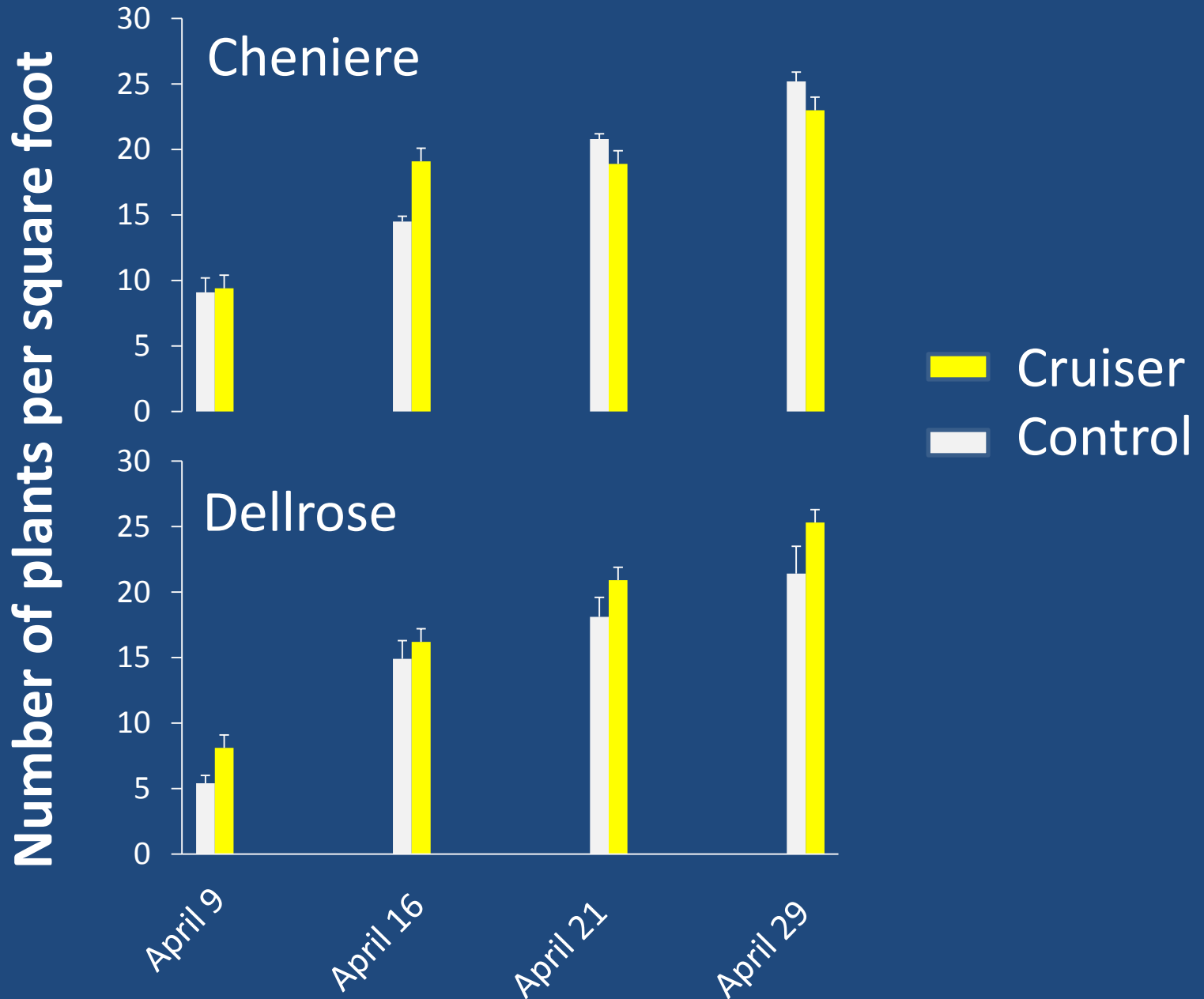
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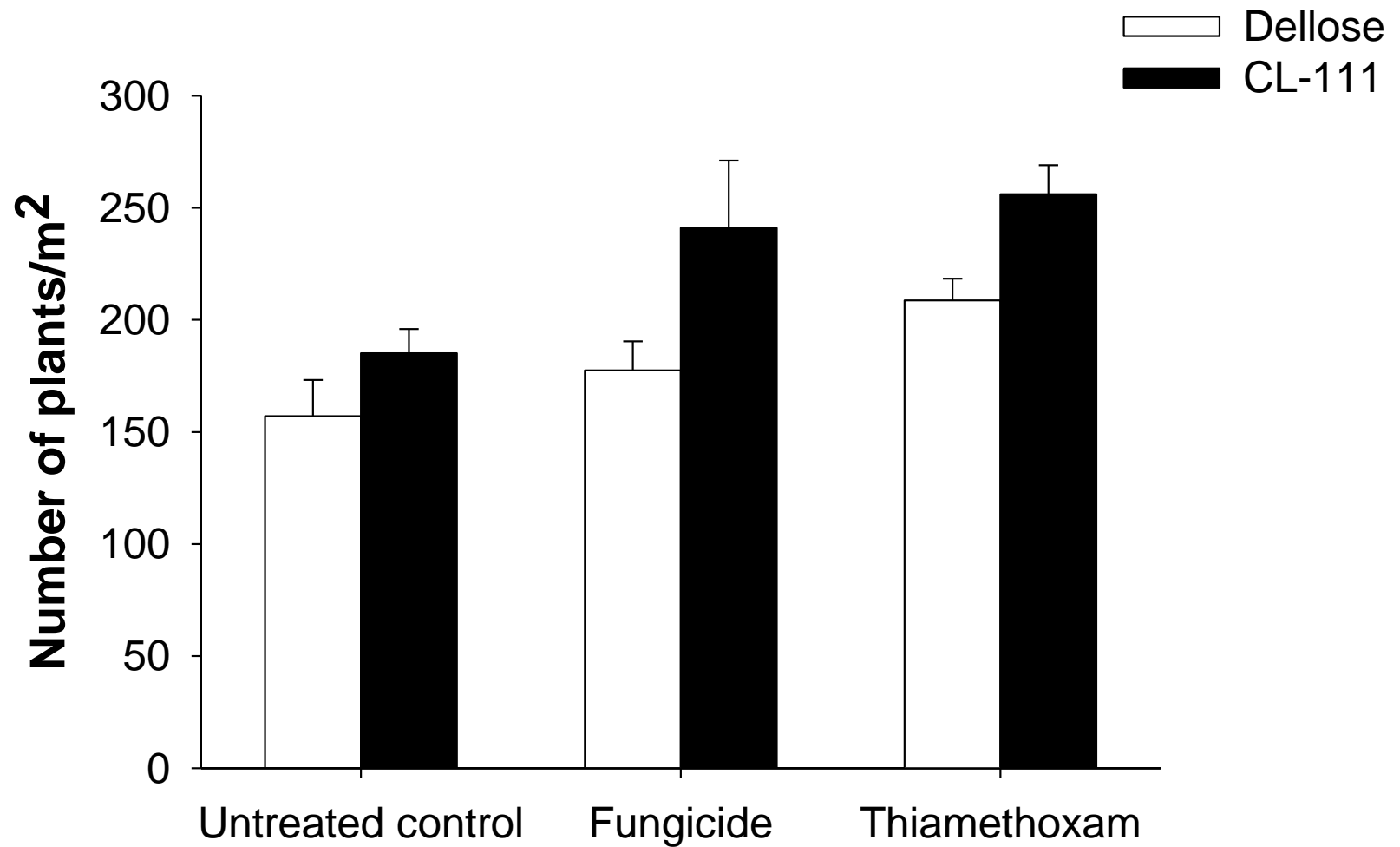
2014 cold stress experiment



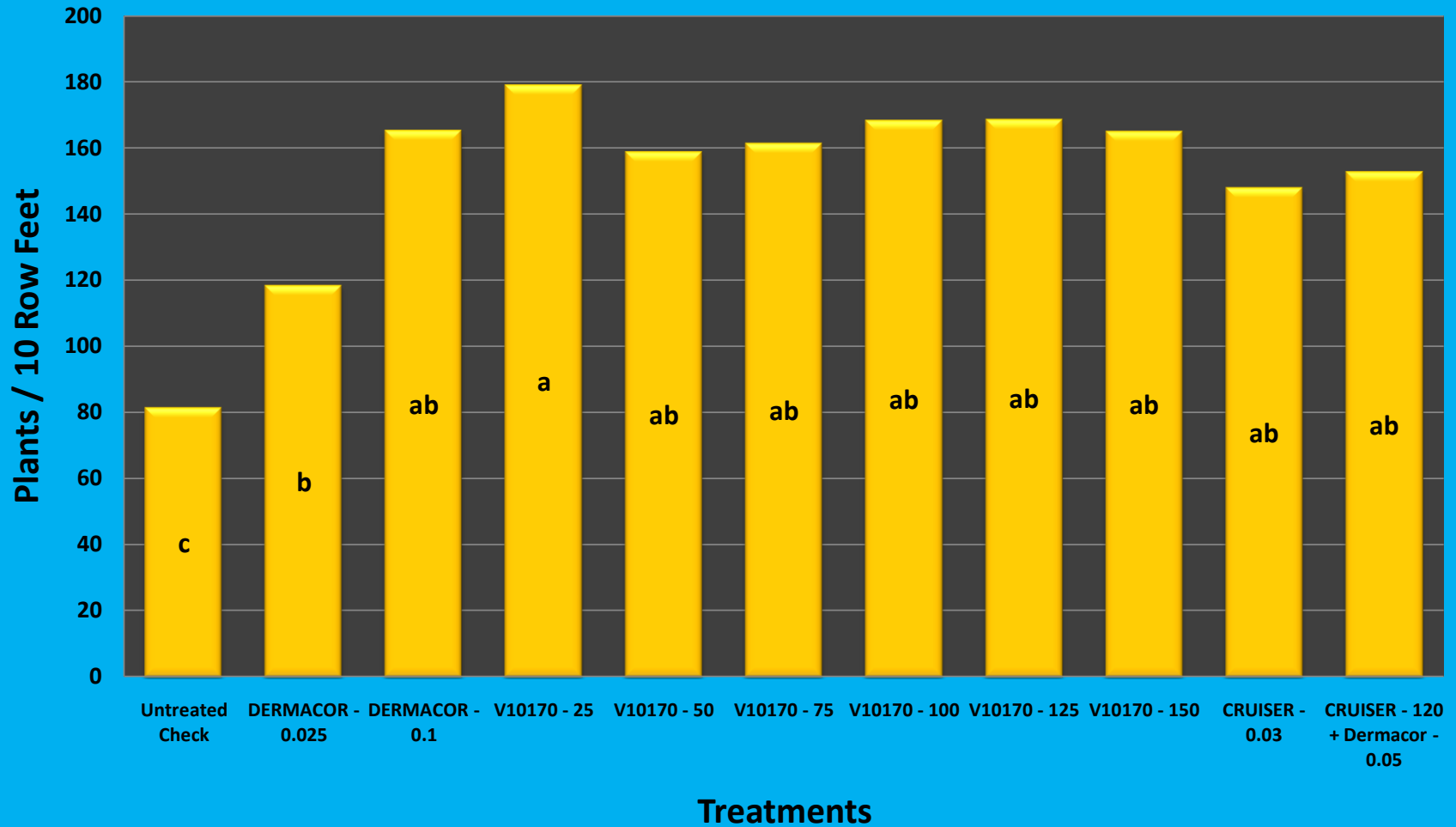
2014 - Effects of Cruiser on stand counts in cold weather



2011 experiment - stand counts



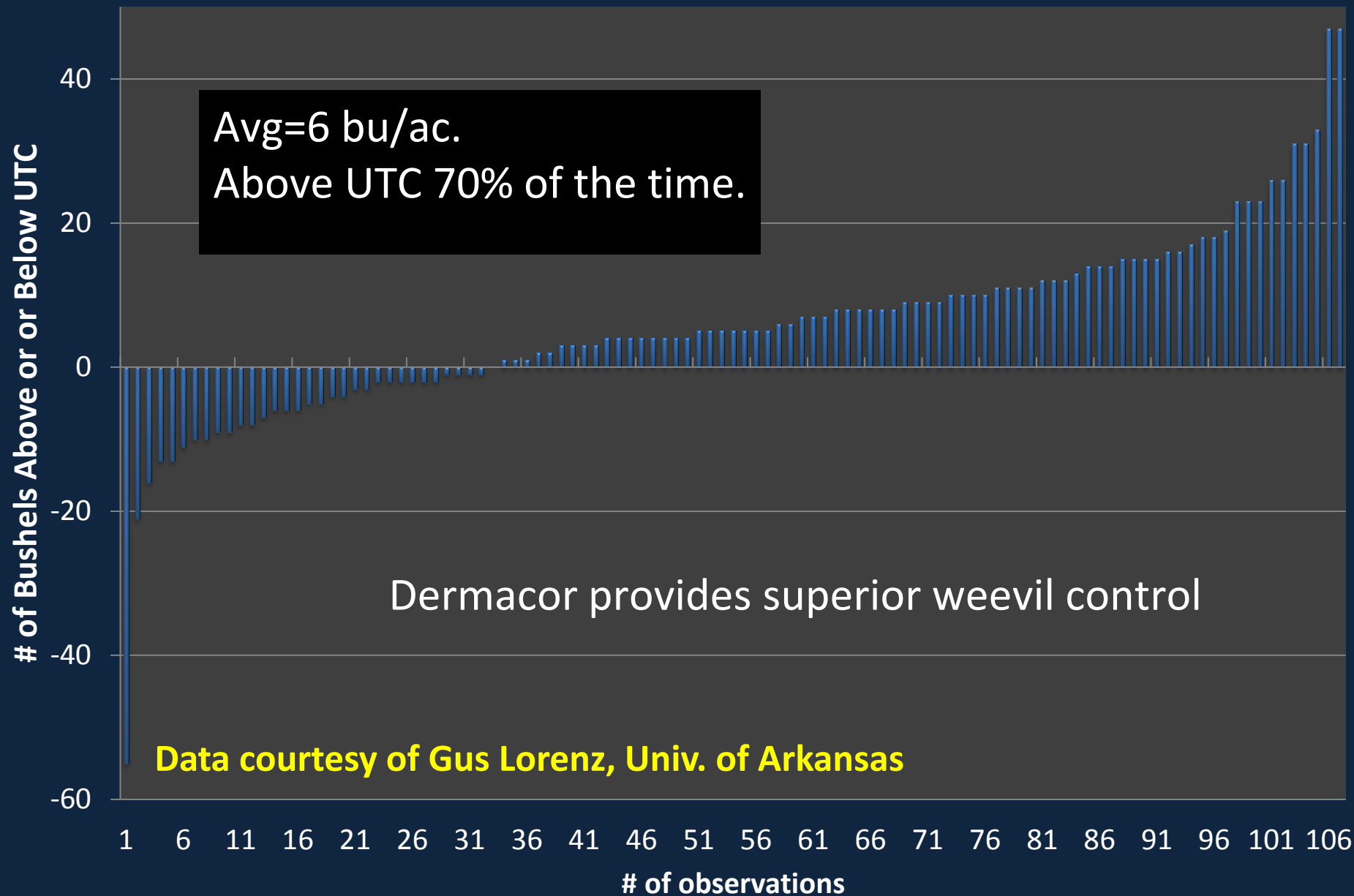
Prairie County, Rice Seed Treatment 2- Plant Stand Count - (Prairie Co.)



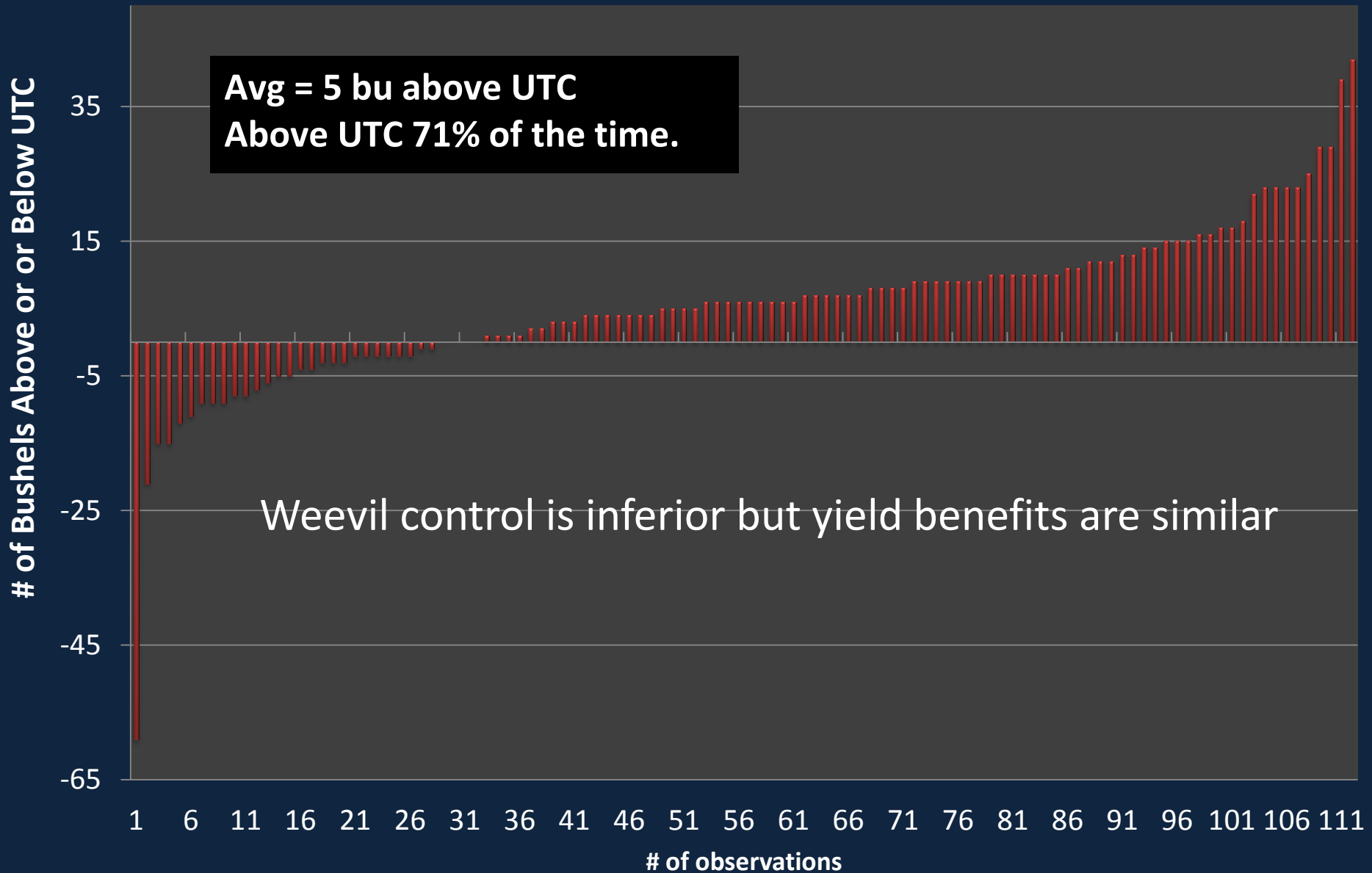
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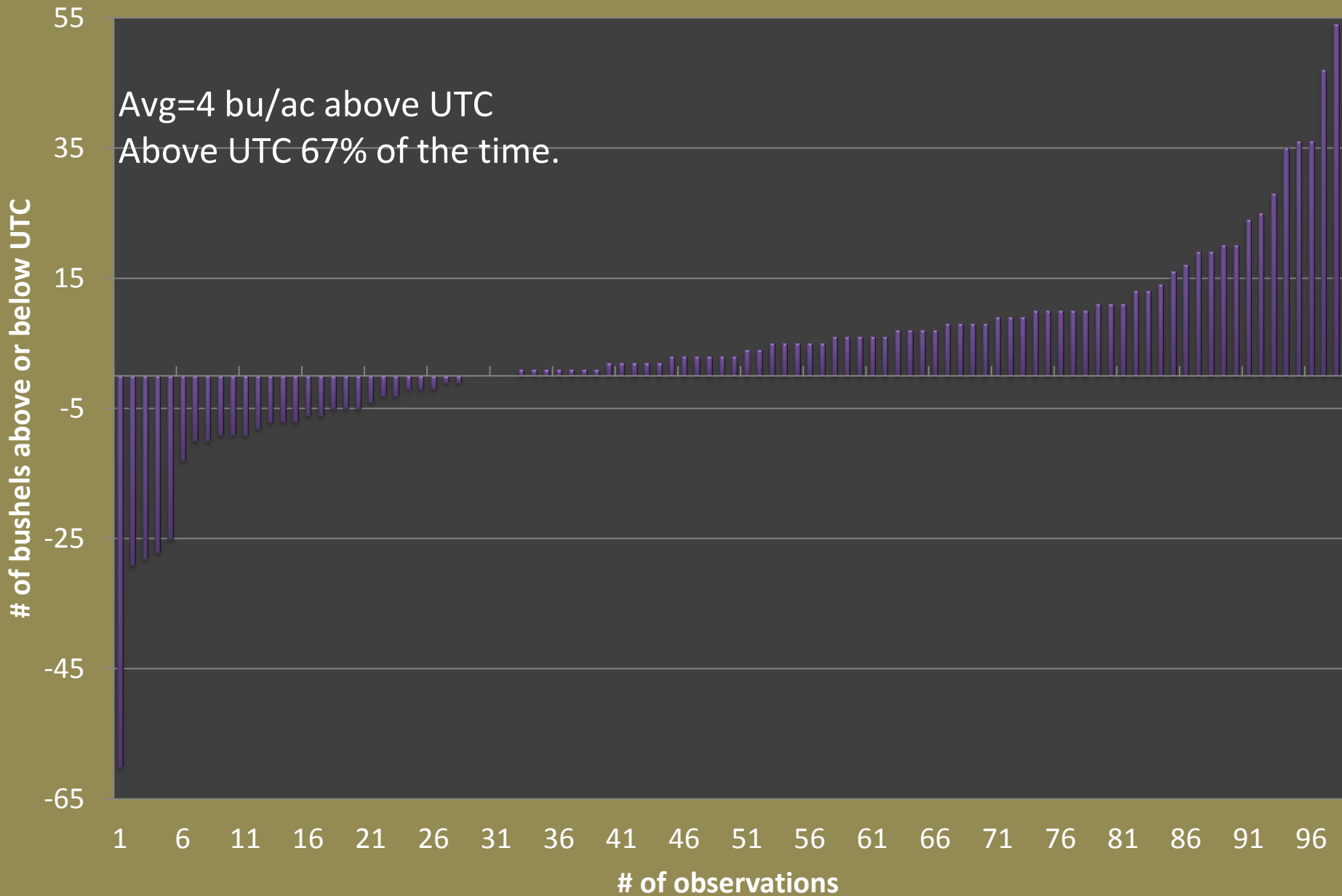
(2007-2011) Summary of Yield Increase Above or Below UTC When Using Dermacor Insecticide Seed Treatment



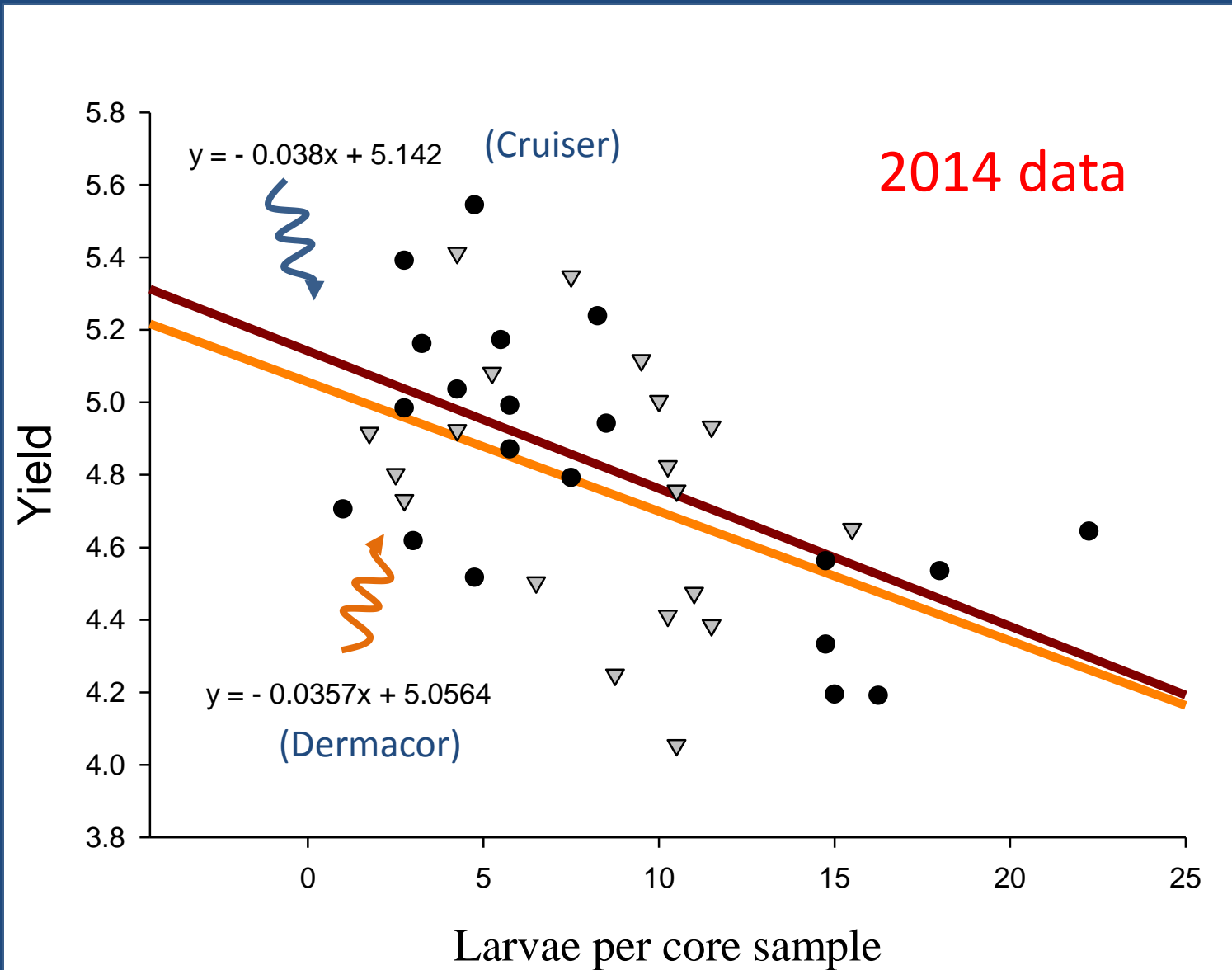
(2007-2011) Summary of Yield Increase Above or Below UTC When Using Cruiser Insecticide Seed Treatment

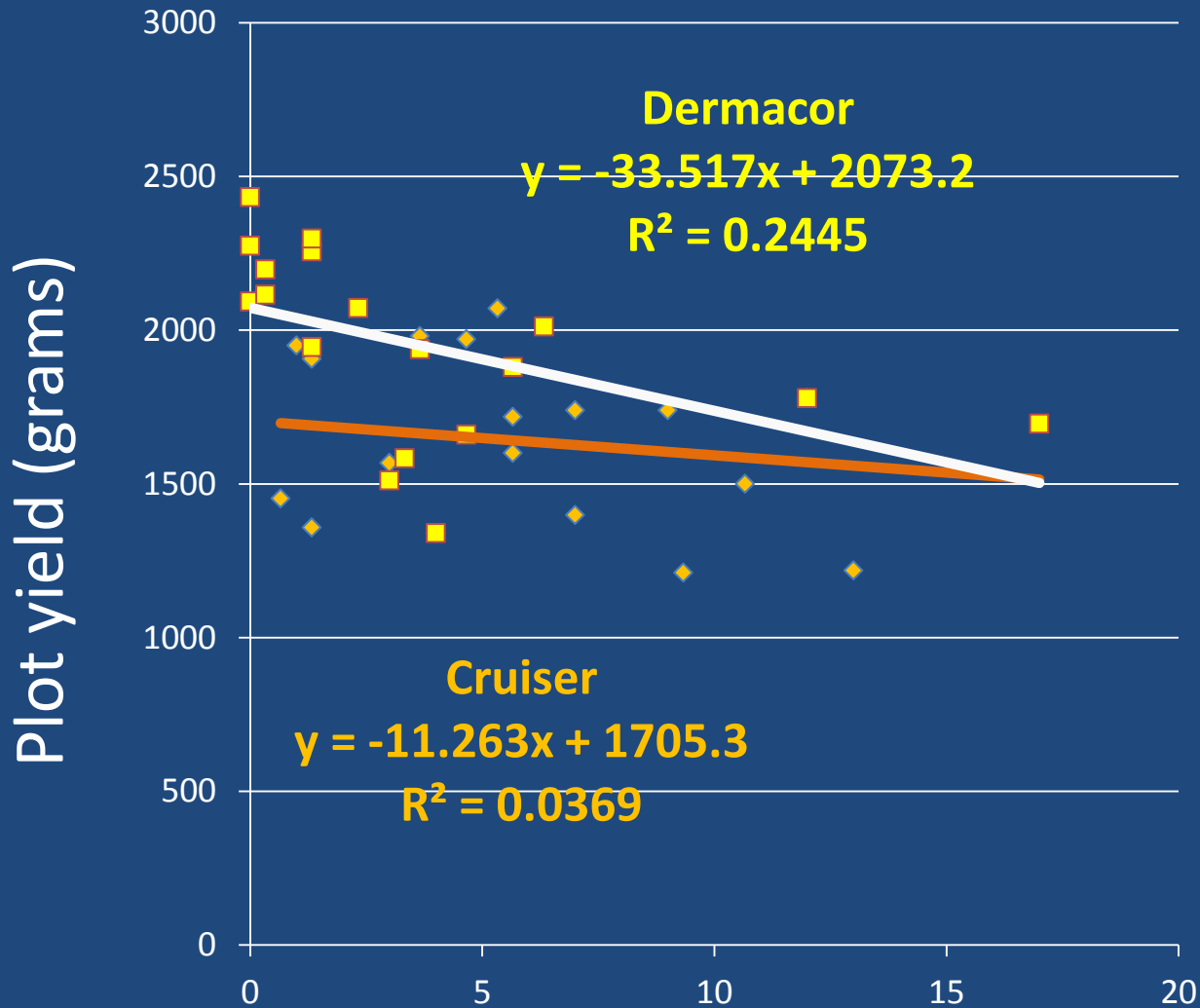


(2007-2011) Summary of Yield Increase Above or Below UTC When Using NipsIt Insecticide Seed Treatment



Does the relationship between weevil density and yield differ among Cruiser- and Dermacor-treated rice?





2011 data

Rice water weevil density (larvae per core)

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Spectra of activity

Cruiser/Nipsit

Dermacor X-100

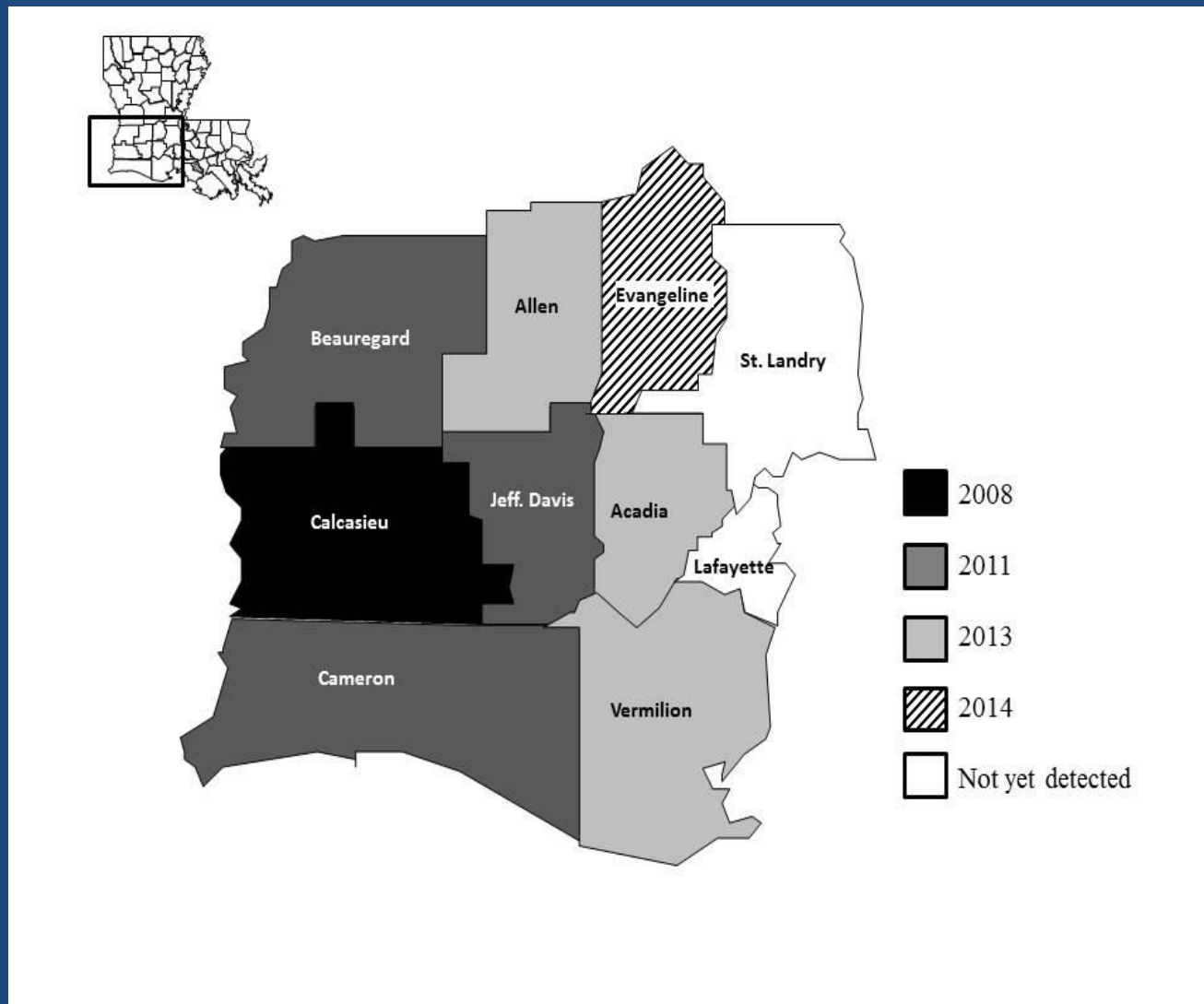


Colaspis – Cruiser and Nipsit suppress

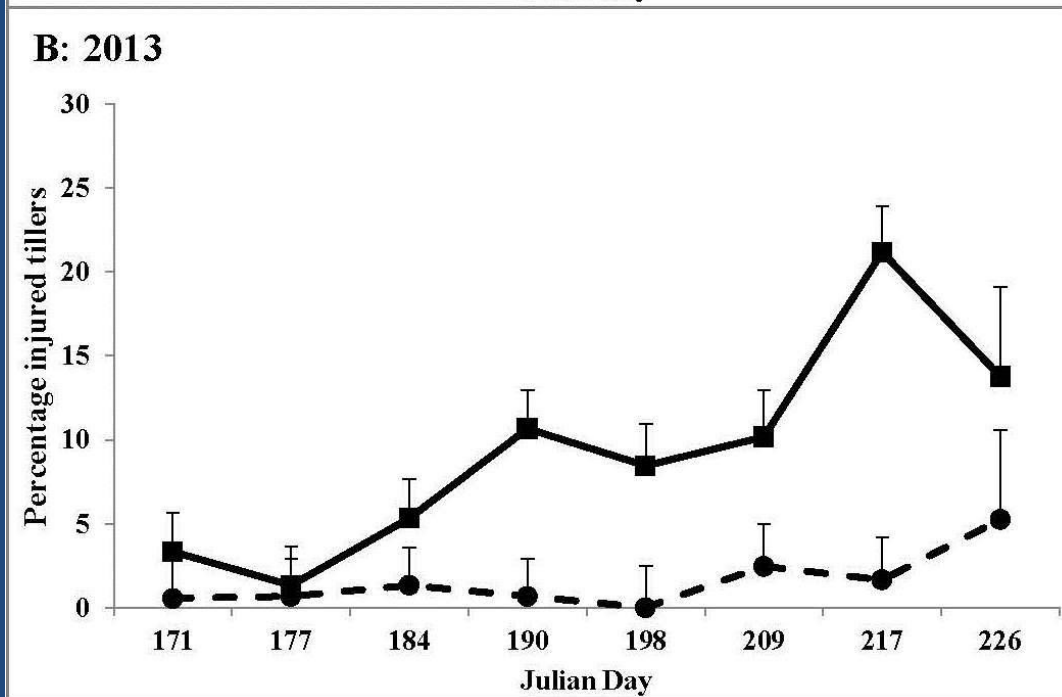
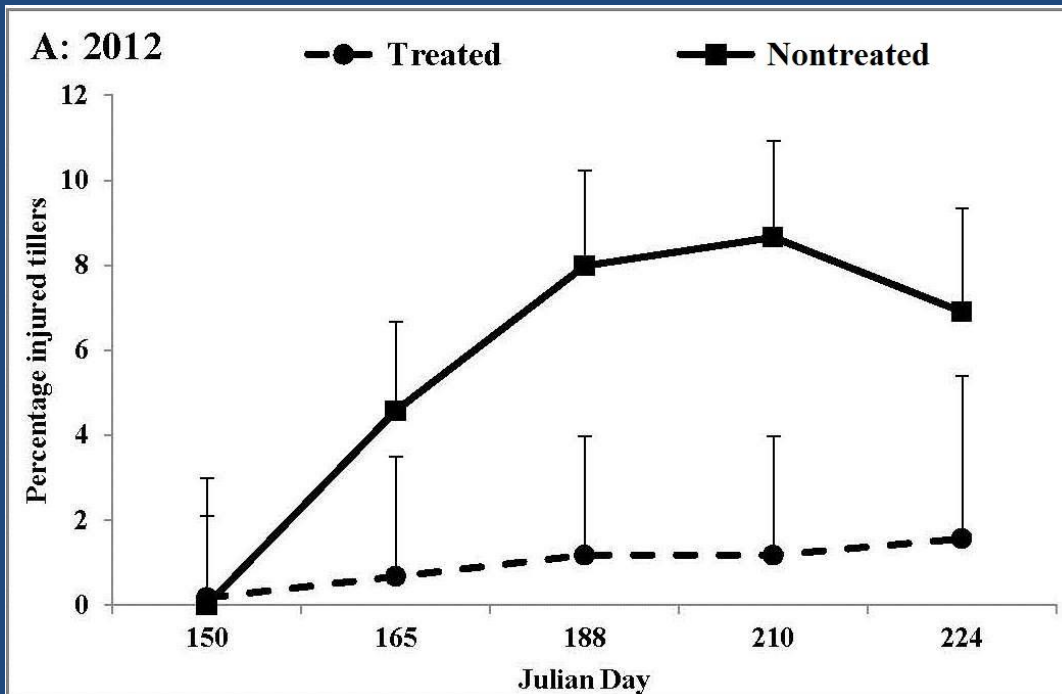


Photographs courtesy of
Gus Lorenz

Stem borers – Dermacor suppresses



From Wilson and Stout (2014)



Effect of
Dermacor on
stem borer
injury – from
Blake Wilson et al.,
in press

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Benefits of foliar insecticides

- Cheap
 - Only approach available for some pests (stink bugs) or when seed treatments are not effective
 - Use only when needed, avoid unnecessary insecticide applications
 - Can be as effective as seed treatments if timed correctly
- ❖ Effective use of foliar insecticides requires understanding of injury – yield relationships

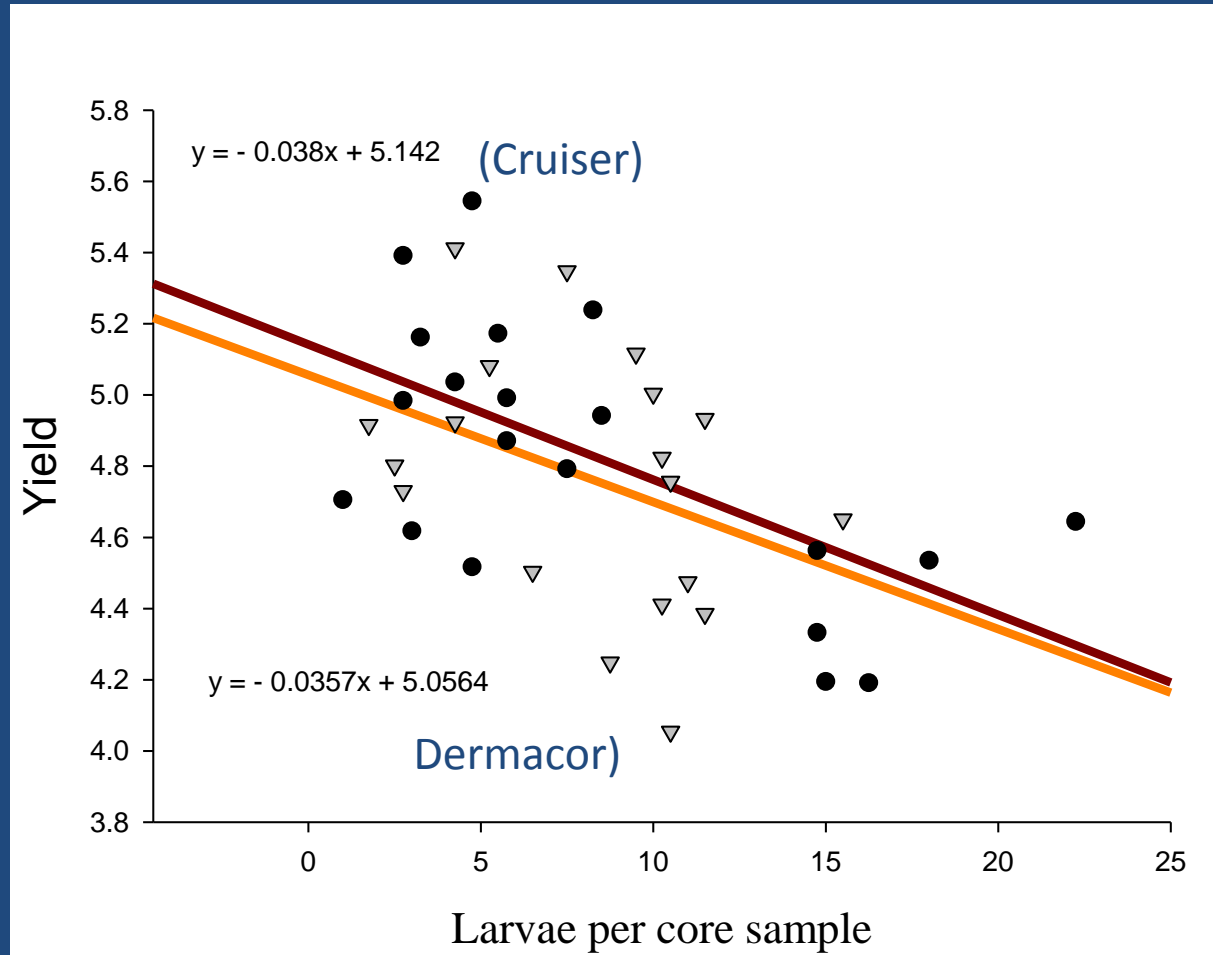
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Benefits of foliar insecticides

- Reduced costs
 - Only approach available for some pests (stink bugs) or when seed treatments are not effective
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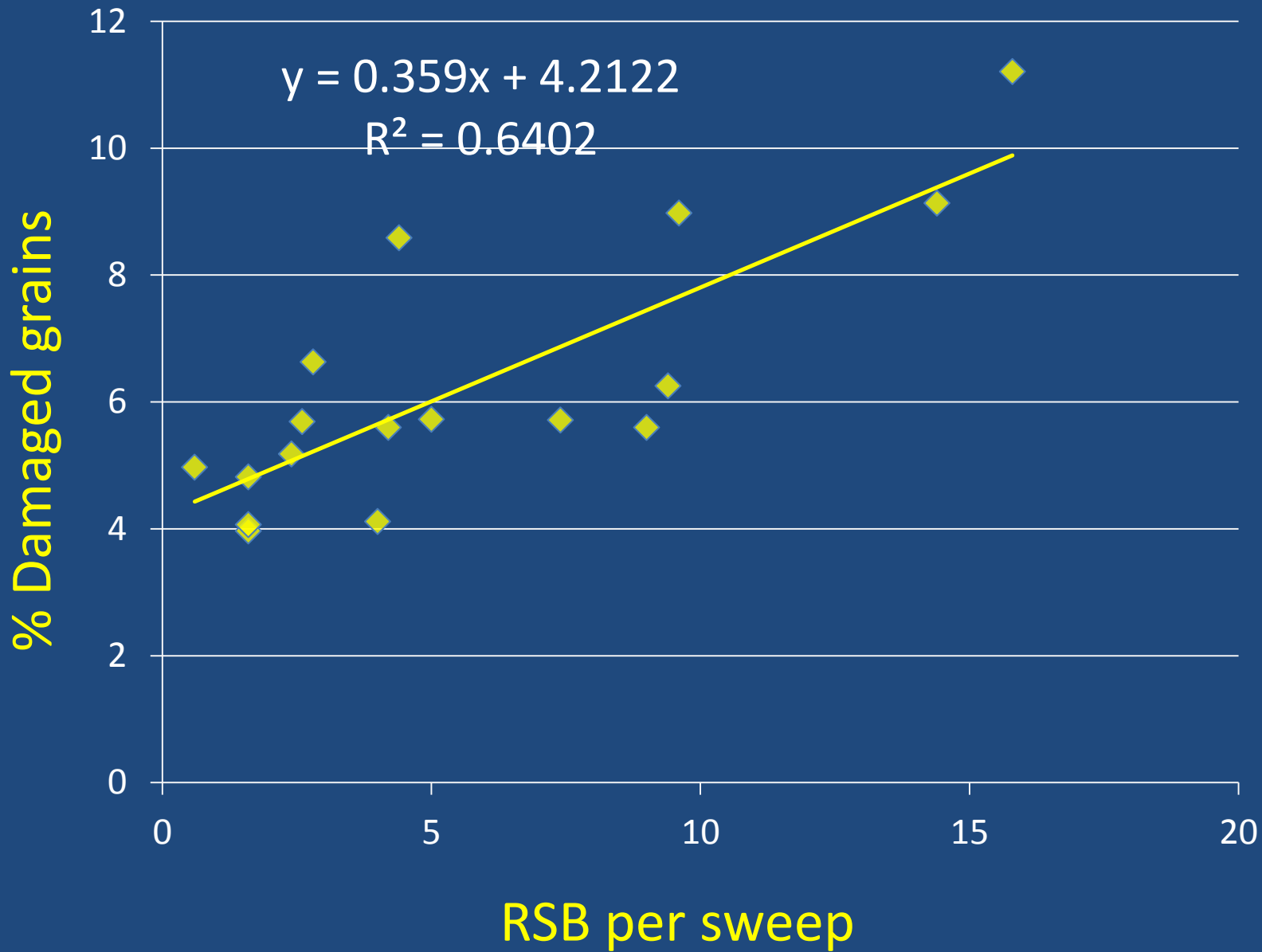
Each weevil larva causes ~0.7% yield loss
Each larva “costs” ~\$5.00 per acre



Stink bug density-damage experiment

- Vary stink bug pressure using insecticides
- No insecticide, high rate every 3 days, low rate every 6 days
- Monitor stink bug densities w/ sweep net
- Harvest, shell rice
- Evaluate damage—brokens, pecky, pecky brokens





Integrating other tactics into management programs

Method	Percent who used:				
	2008, La.	2009, La.	2010, La.	2011, La.	2012, La.
Delayed flood	13	25	19	15	20
Early planting	18	31	25	23	39
Drained field	43	37	30	20	18
Dermacor X-100	17	51	63	53	64
CruiserMaxx	N/A	N/A	19	26	36
Pyrethroid impregnated on fertilizer	21	27	30	10	10
Treatment with Trebon	9	8	3	3	0
Foliar spray of pyrethroid	36	31	31	15	13
Foliar pyrethroid spray	39	45	34	16	20
Treatment with Trebon 3G	20	13	4	1	0
Nothing	6	2	1	4	0

Integrating other tactics into management programs

- Early planting!
- Are delayed and shallow flooding feasible tactics for weevil management?
- Plant resistance

Alternative tactics: plant resistance research

- Characterize resistance of currently grown varieties against rice water weevil, stem borers, sheath blight: what varieties have the best “pest package”
- Development of weevil-resistant varieties
- Are hybrids tolerant of weevil and stem-borer injury?
- Can we increase resistance or tolerance with silicon or other fertilization approaches

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What about adult rice water weevils?

- Feed on leaves of rice plants, cause scarring
- Generally not considered damaging
- But what if adults are present in high numbers?
- No data, but:
 - **Rice is very tolerant of leaf injury!**
- Tactics: Early planting, foliar insecticides

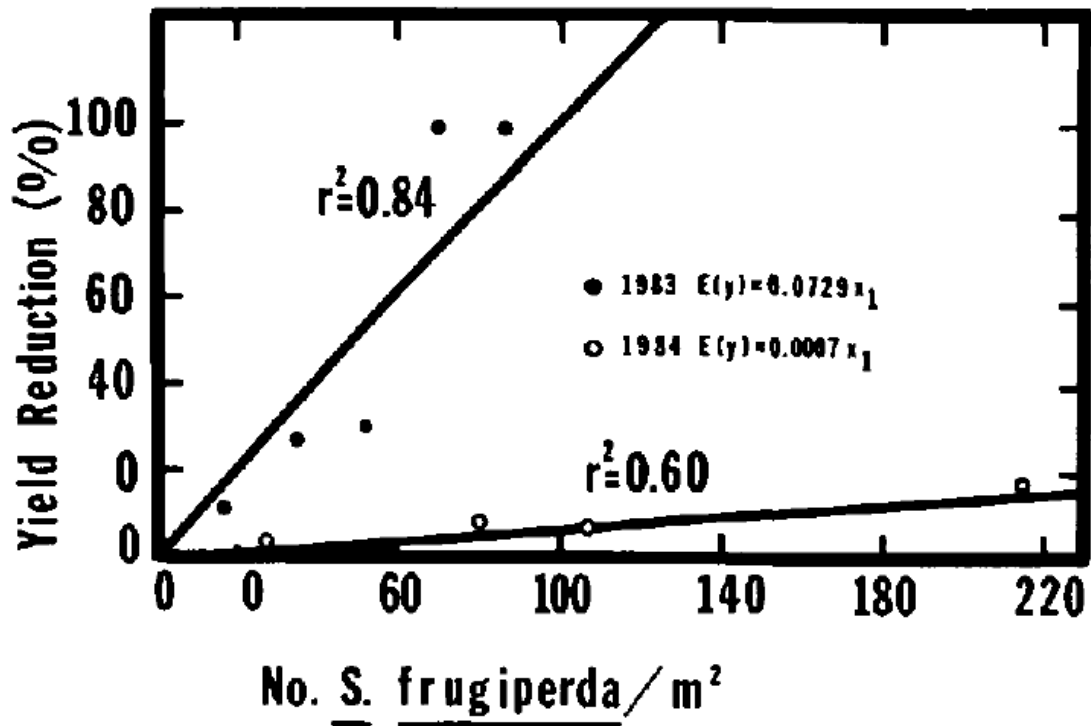


Fig. 1. Regression of *S. frugiperda* larval density and percent rice yield reduction, Crowley, La., 1983-84.

1983

No yield loss until > 33.5% defoliation

1984

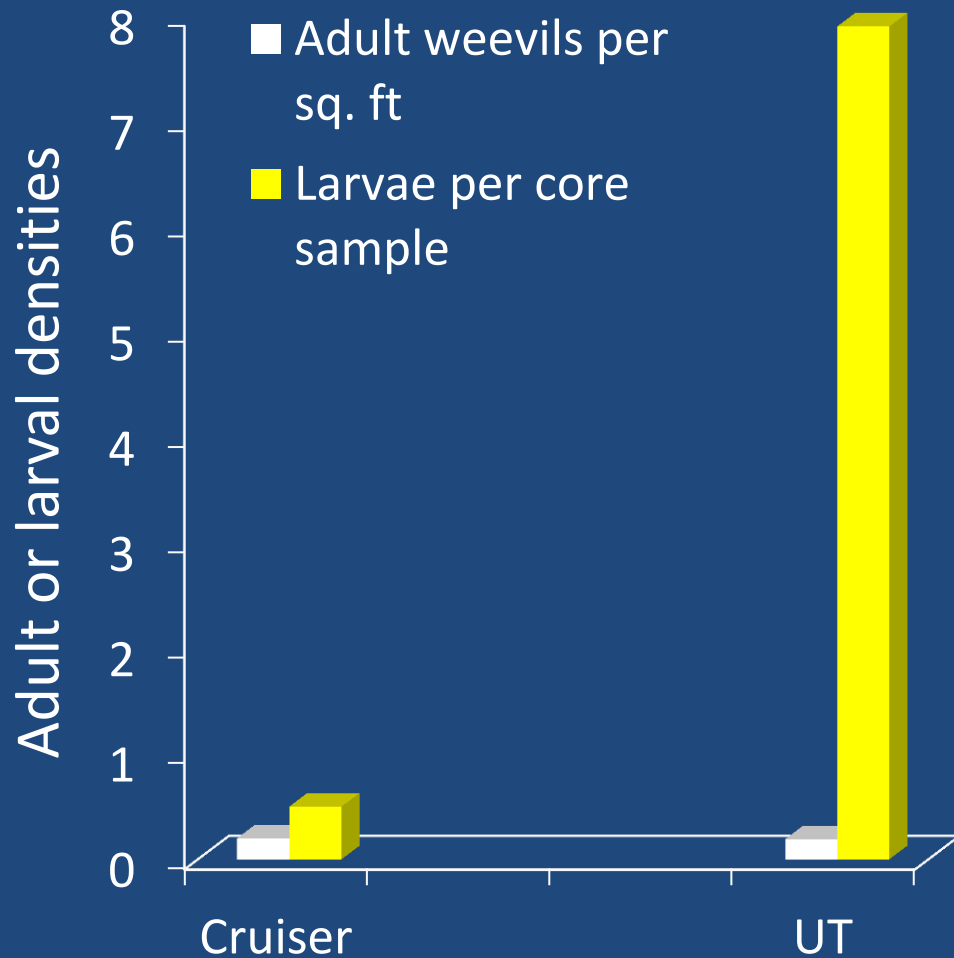
No yield loss until > 40% defoliation

What about adult rice water weevils?

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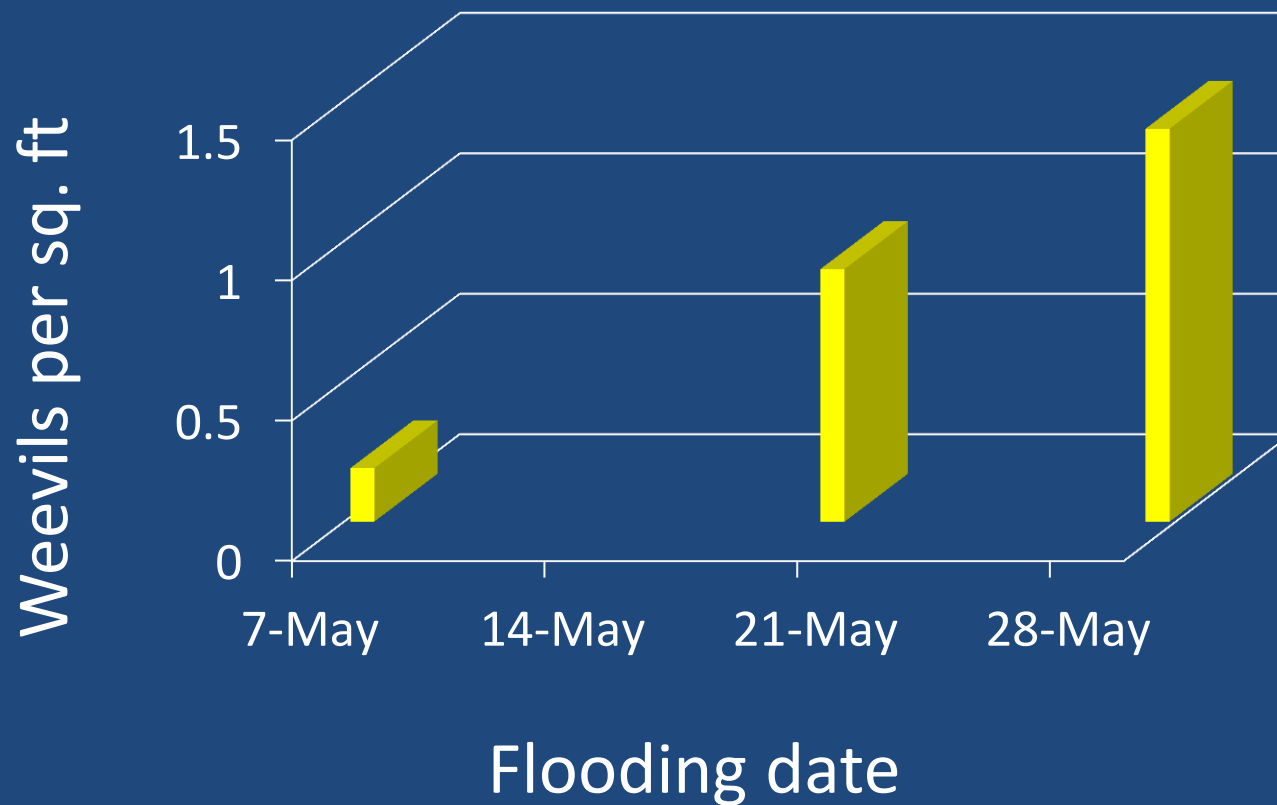
Adult densities not good predictor of larval densities

Cruiser does not appear to reduce adult densities



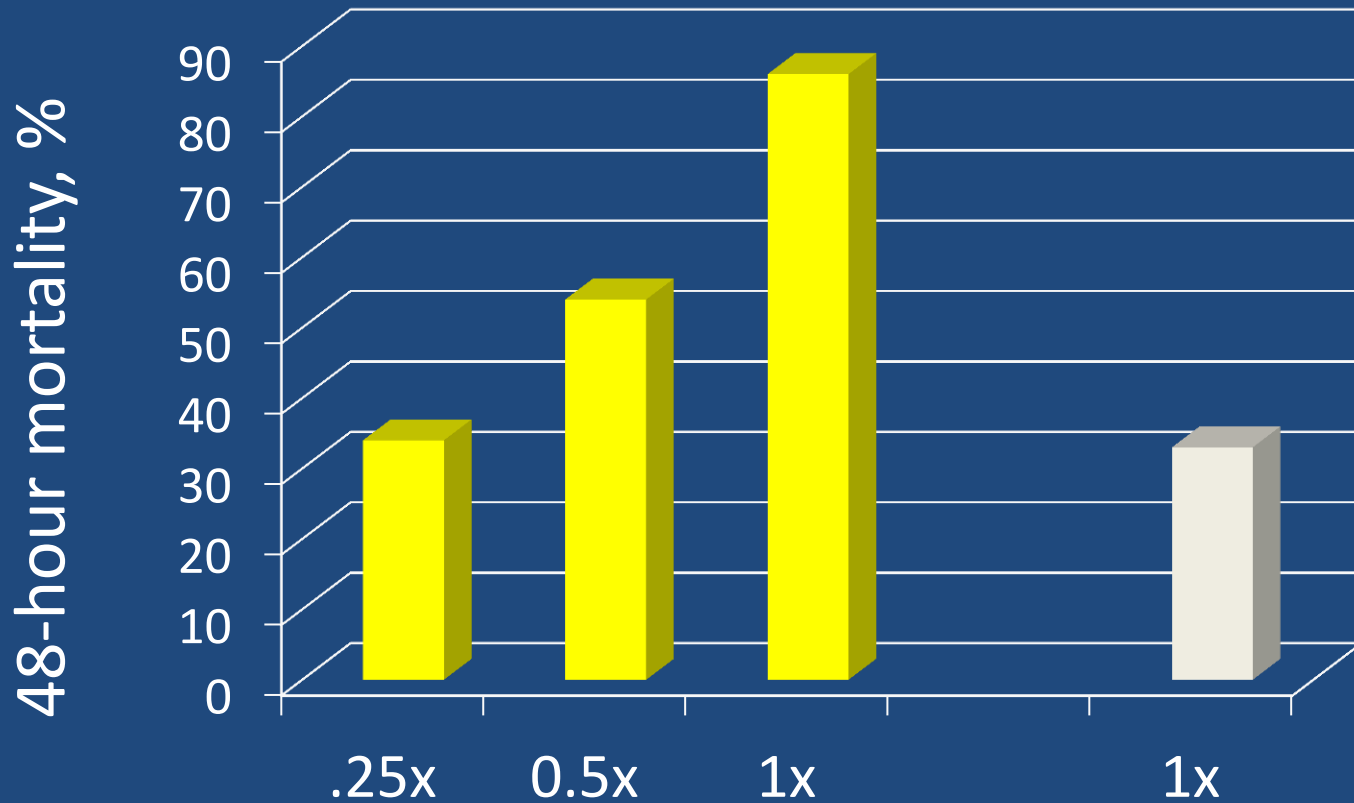
Planted April 1
Flooded May 7
Adults sampled for two weeks
Larvae sampled ~1 mo after flood

Adult weevil densities are higher at later planting/flooding dates



Adults placed on leaves 2 hr post-spray

Mortalities of adults 48 h after placing on leaves



Belay rate
(x = 4.5 fl oz per A)

Karate, 0.03 lbs AI /A

Questions or feedback?

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Office: (225) 578-1837

What about combinations (of Dermacor + neonicotinoid , seed treatments and foliar)?

- No evidence so far that these will help with weevil management (if Dermacor is used, weevil control is almost always satisfactory)
- Will increase spectrum of pests controlled

Integrated management of stem borers

Cultural controls

Early planting

Stubble

management

Weed

management

Host plant resistance

Better: CL161, hybrids, Bengal

Worse: Cocodrie

Insecticides

Dermacor

Pyrethroids

(scout for adults, egg masses, larval feeding lesions)

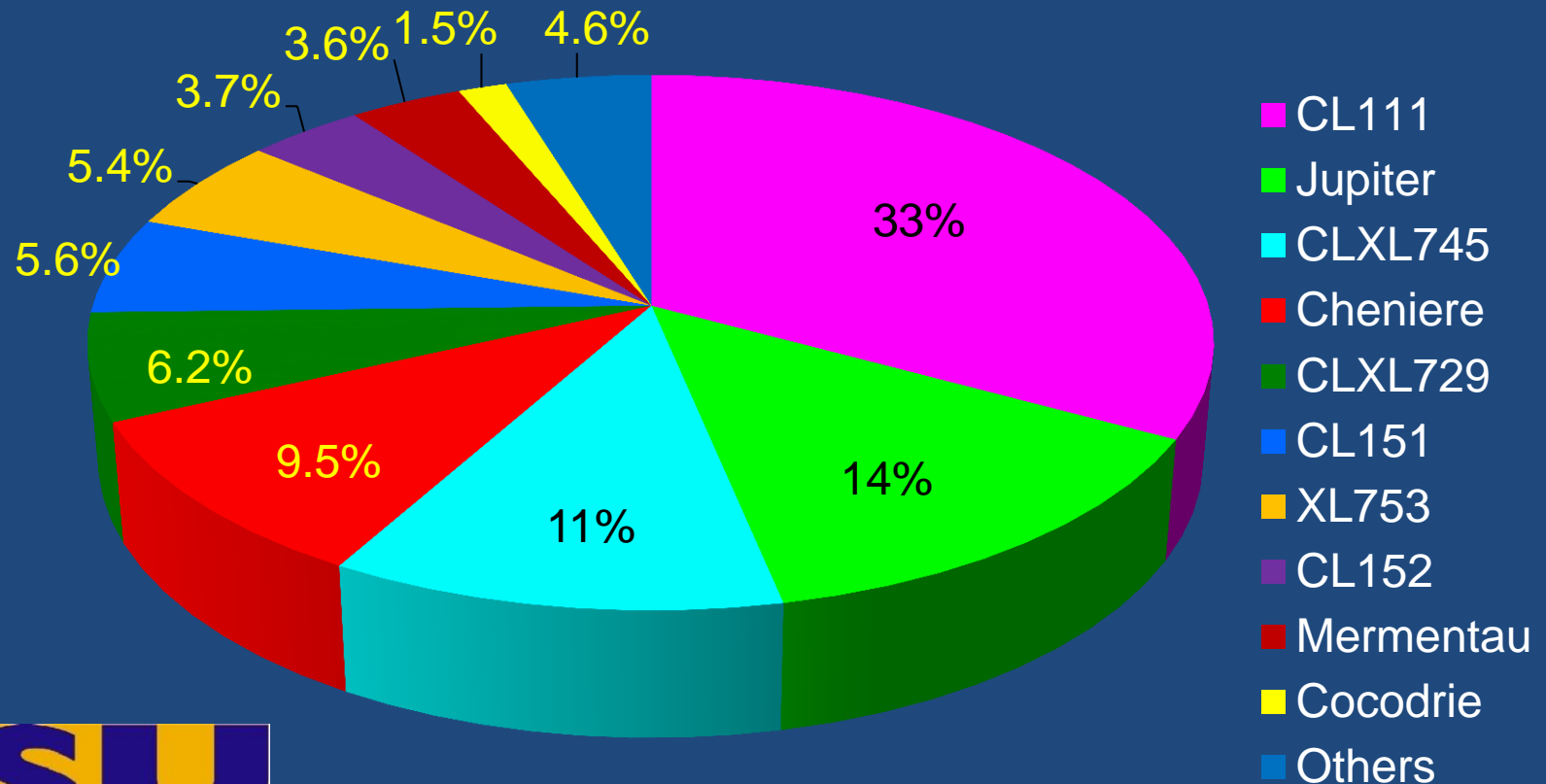
Seeding rate effect on seed treatment efficacies

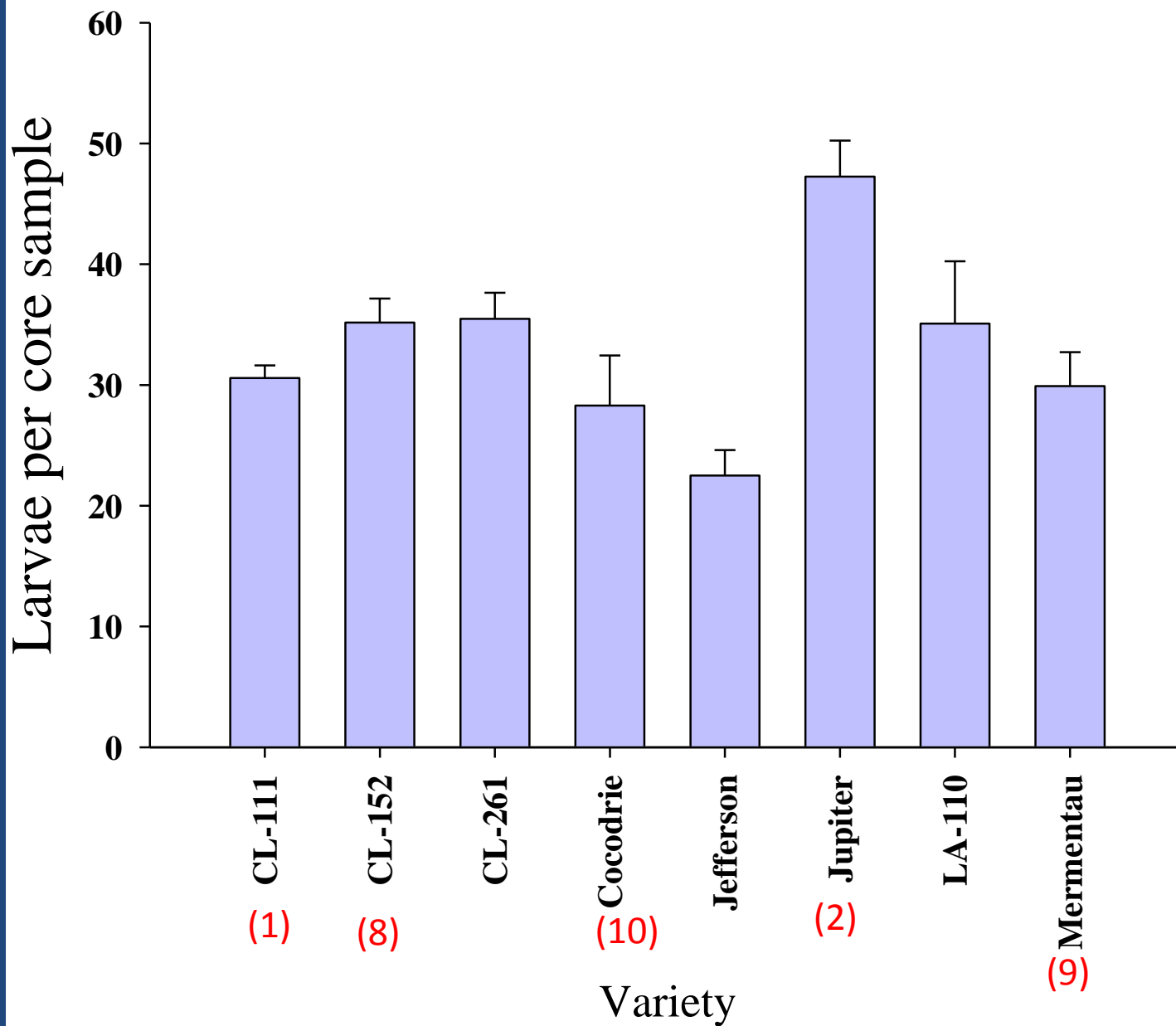
	% reduction in rice water weevil larvae at seeding rate:		
	30 lbs/A	60 lbs/A	90 lbs/A
Cruiser	27.2 %	32.9 %	41.4 %
Dermacor	61.7 %	76.3 %	79.4 %

Insecticides and crawfish

- There are crawfish restrictions on all rice insecticide labels:
 - “Do not use Belay insecticide-treated rice fields for the aquaculture of edible ...crustaceans”
- This has been interpreted in different ways in the past
- I am not a lawyer
- The relevant science:
 - all insecticides toxic to crawfish
 - pyrethroids more toxic than neonicotinoids & anthranilic diamides
 - pyrethroids must come in contact with crawfish to kill them

Top 10 Varieties by Acres Grown in Louisiana in 2014





Top 10 Varieties by Acres Grown in Louisiana in 2013

