

California: State Rice Outlook and Research

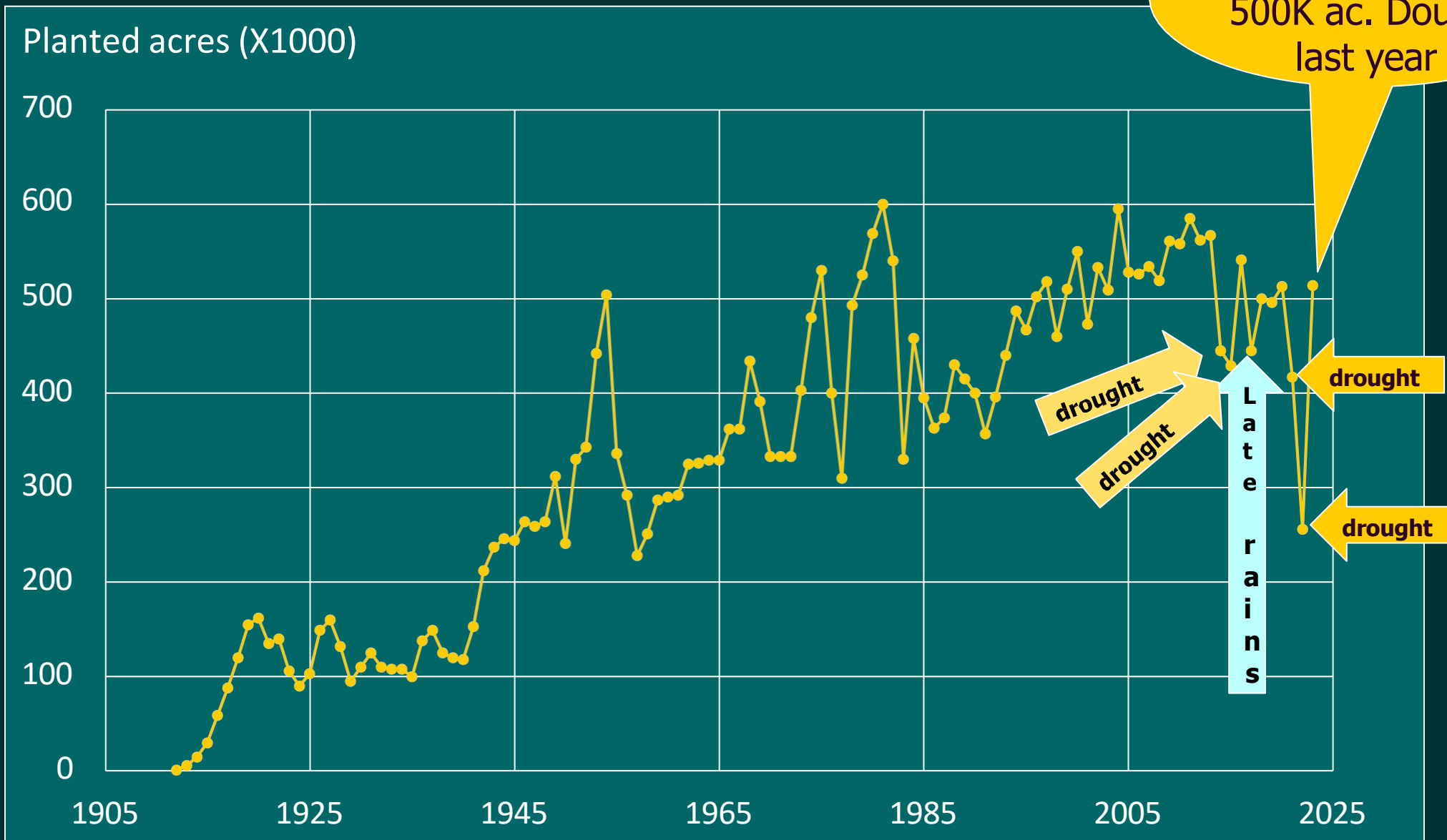
Bruce Linquist and Dustin Harrell
Rice Outlook Conference
Palm Springs, CA
December 7, 2023



California Cooperative Rice Research Foundation, Inc
Rice Experiment Station

UC DAVIS
DEPARTMENT OF
PLANT SCIENCES

Planted acres



Back to above 500K ac. Double last year

drought

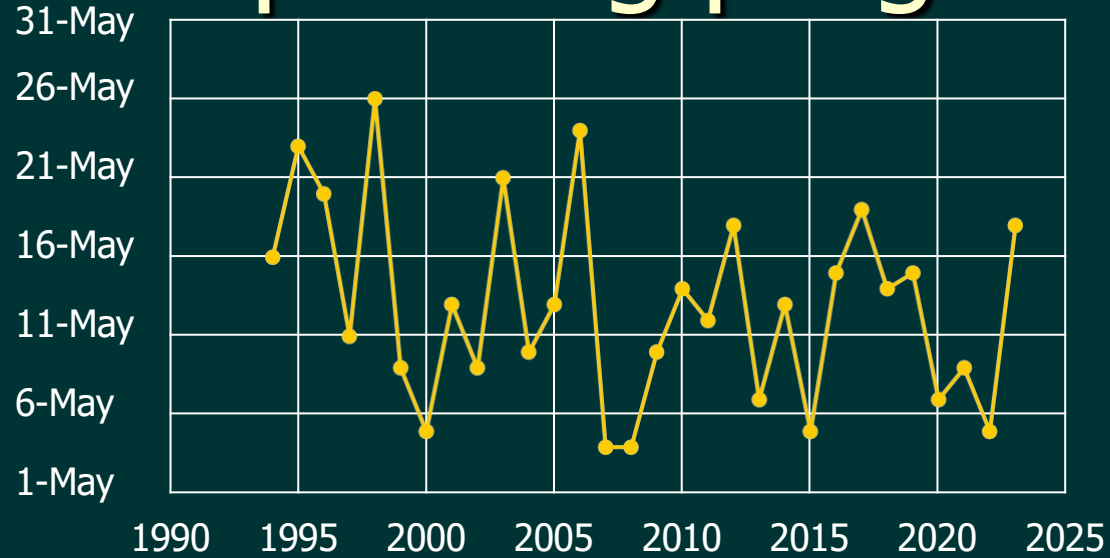
drought

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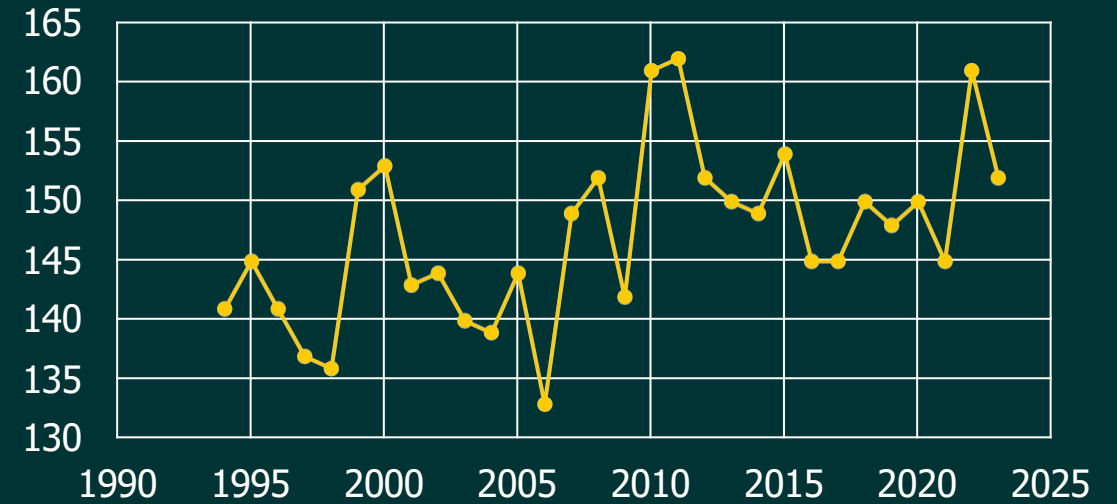
drought

drought

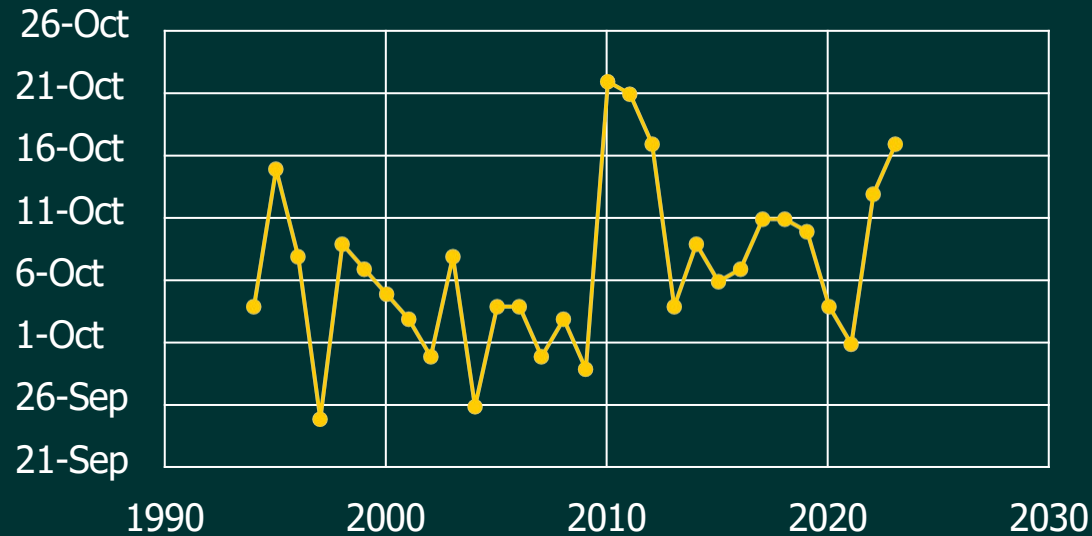
50% planting progress



Season length (days)



50% harvest

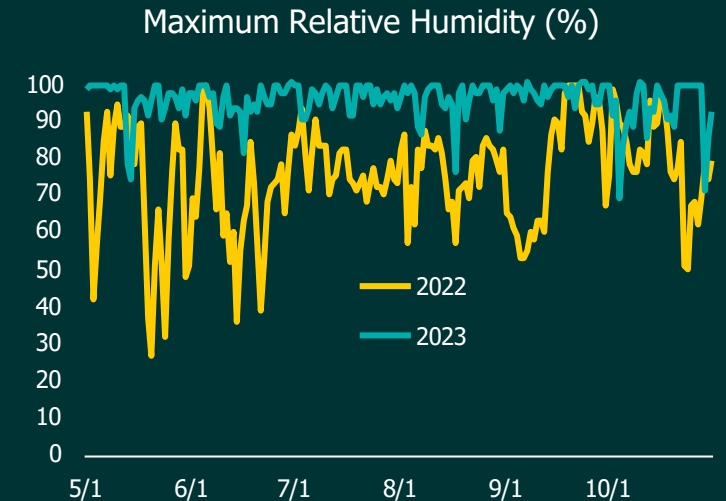


Why a long season?

- Late planting
 - early May rains
- Late harvest
- Longer duration
 - More M-211
 - Rains during harvest
 - Cool fall/no N winds
 - Lodged rice

2023 Season (cont)

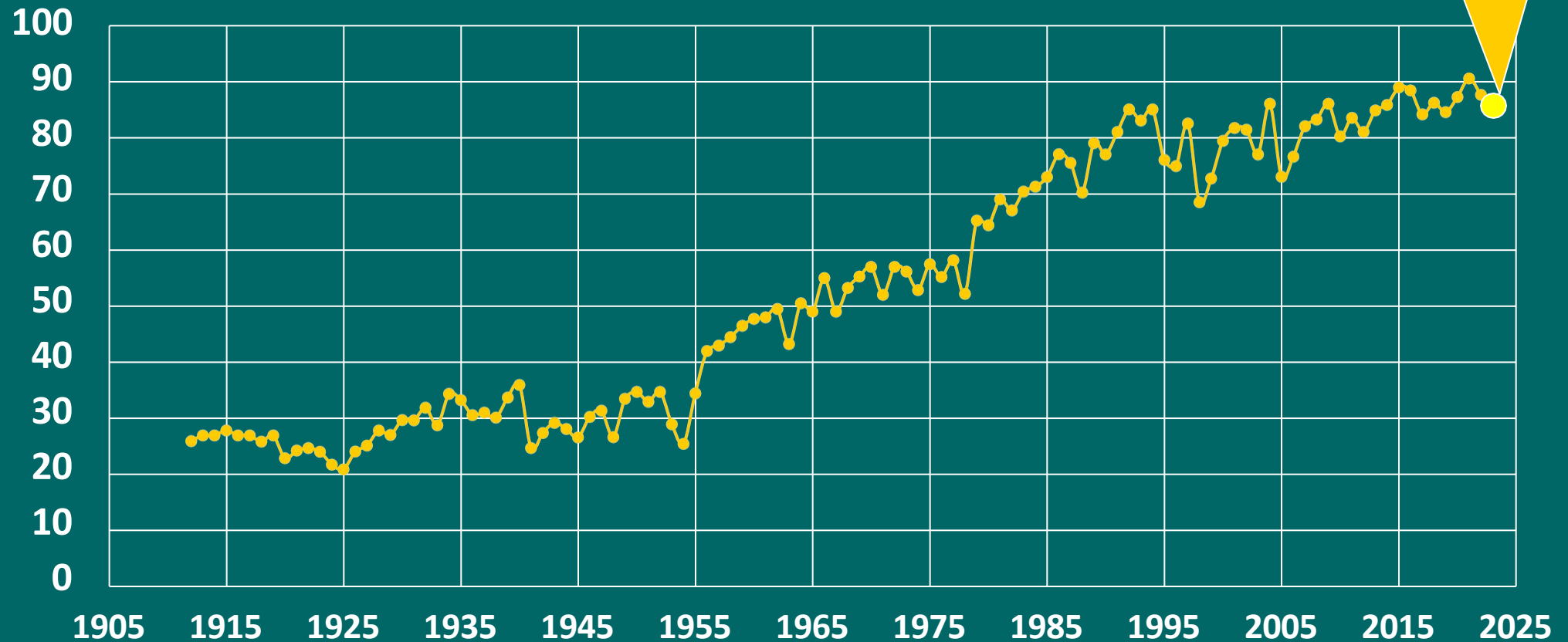
- A lot of rice was planted on fields that were fallowed in 2022
 - This lead to some challenges in managing N fertilizer
 - May have resulted in lodging
- Quality:
 - Early harvest was good; late harvest the quality was down
- Disease:
 - Blast pressure higher than normal (humidity)
 - Most in NW of valley but also in other areas
 - Blast on dry-seeded fields
 - Bakanae and kernel smut also at higher than normal
 - Rice stem diseases – low to average
- Insect pest
 - Some rice seed midge pressure (seems to be on increase)
 - Armyworm - limited damage
- Weeds
 - Average – a lot of watergrass



California rice yields (1912 to 2022)

Guessing 2023
yields will be
86 cwt (2022
was 87.6 cwt)

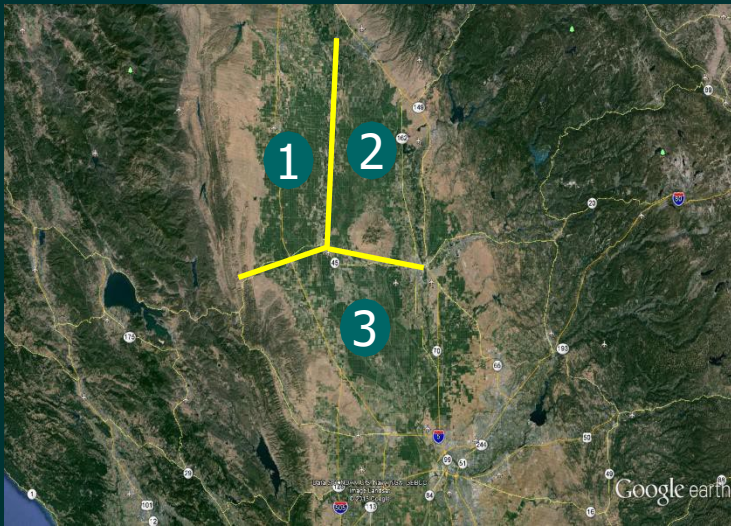
Rice yields (cwt/ac)





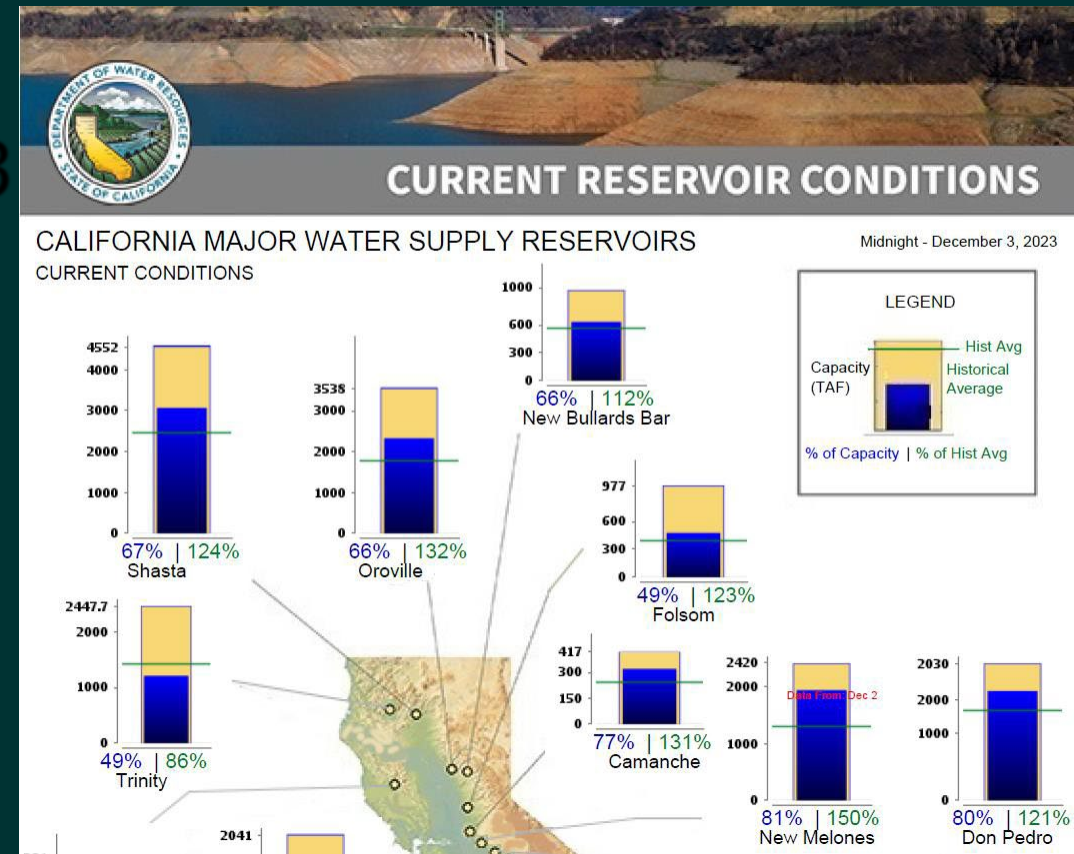
Yield Contest

- Range: 107.2 – 132.5 cwt/ac
- Winners
 - Region 1: Seth Fiack
 - 111.6 cwt/ac; M-211
 - Region 2: Kurt Richter
 - 132.5 cwt/ac; M-105
 - Region 3: Ethan Driver
 - 125.9 cwt/ac; M:211



2024 Outlook

- As of Dec 4:
 - Reservoirs: above normal
 - Shasta (124%); Oroville (132%)
 - High rainfall/snow pack in 2022/23
 - Rainfall: low
 - 27 - 48% of normal
 - Snowpack: low
 - 19 – 33% of normal





Research

Susceptible Population

Your Sample

LWG-15-LB

Untreated
Clincher CA
Abolish 8 EC
Granite SC
Regiment CA

LWG-15-04

Untreated
Clincher CA
Abolish 8 EC
Granite SC
Regiment CA



Evaluation of herbicide programs and new herbicides

- New herbicides in the pipeline
 - Pyraclonil (Zembu)
 - Tetflupyrolimet (promising grass control)
 - Vantek, pendimethalin formulation for water seeded rice
 - Oxyfluorfen on Roxy rice
 - GWN-10723, a new broad spectrum herbicide
 - Oxaziclomefone
 - Cliffhanger (Benzobicyclon)
 - Clethodim and glufosinate for weedy rice spot treatments



Kassim Al-Khatib & Whitney Brim-DeForest



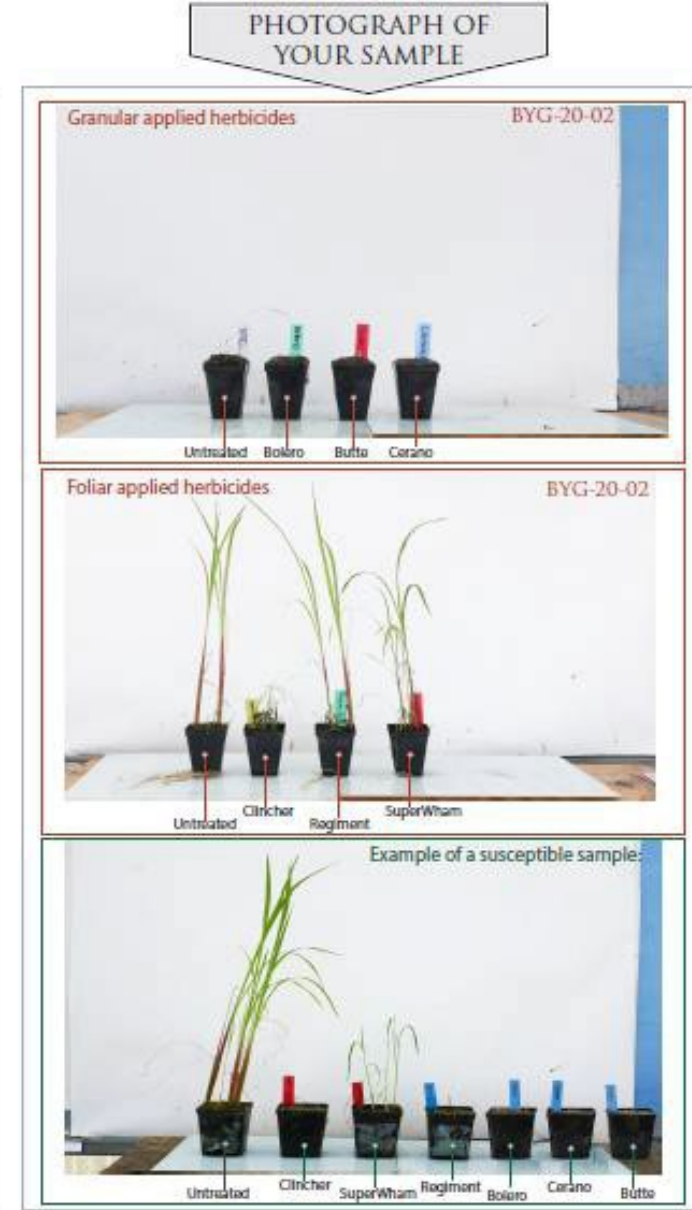
Herbicide resistance

- Study mechanisms of resistance
- Testing program for growers
 - 70 samples tested in 2022
 - Resistance tested for all potential herbicides
 - New insights into resistance

Kassim Al-Khatib & Whitney Brim-DeForest



HERBICIDES TESTED	RESISTANCE STATUS
VLCFA inhibitor Bolero® thioencarb	Your sample is NOT resistant. NO All tested samples are susceptible.
HPPD inhibitor + ALS inhibitor Butte® benzobicyclon + haloxyfuron-ester	Your sample is NOT resistant. NO 96% of tested samples are susceptible.
Pigment synthesis inhibitor Cerano® 5MEG clomazone	Your sample is NOT resistant. NO 97% of tested samples are susceptible.
ACCase inhibitor Clincher® CA cyhalofop-butyl	Your sample is MAY BE becoming resistant. YES 23% survival rate on tested samples.
PS II inhibitor SuperWham® propanil	Your sample is resistant. YES 96% survival rate on tested samples.
ALS inhibitor Regiment® CA bispyribac-sodium	Your sample is resistant. YES 99% survival rate on tested samples.



HERBICIDE RESISTANCE TESTING FORM

Name of user: Rice/Ale. Indrakh Date of collection:

Field/Size Information: GPS Coordinates, Township, Section, Range, Missouri, Nearest Road, Waterbody / Outlet, Size of the field, 250 acres, Percentage of field that is susceptible to resistance, 25, Who was the resistance suspected in this field, 2018

Herbicide used: Bolero Butte Cerano Clincher Regiment SuperWham

Resistance: Susceptible Resistant

Please mark the resistance location on the map.

Please draw a brief map of field with location of sampling.

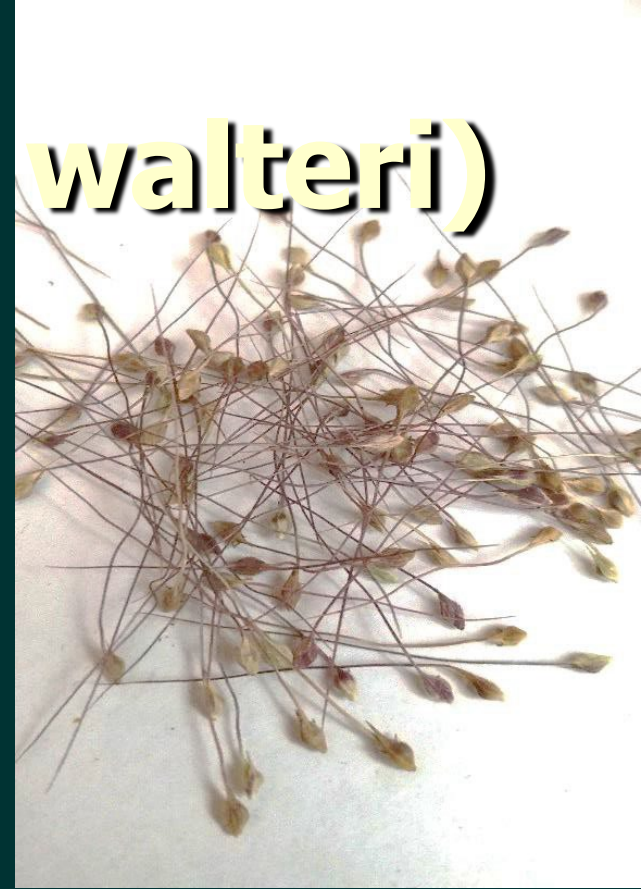
Water Management: Irrigation Conventional Conservation Other

General Principles of Herbicide Resistance Management

- Apply integrated weed management practices. Use multiple herbicide sites-of-action with overlapping weed spectrums in rotation, sequences, or mixtures.
- Use the full recommended herbicide rate and proper application timing for the hardest to control weed species present in the field.
- Scout fields after herbicide application to ensure control has been achieved. Avoid allowing weeds to reproduce by seed or to proliferate vegetatively.
- Monitor site and clean equipment between sites.
- When resistance to an herbicide develops there may be resistance to all herbicides with the similar mode of action.

Source: Herbicide Resistance Action Committee

New Watergrass (*Echinochloa walteri*)



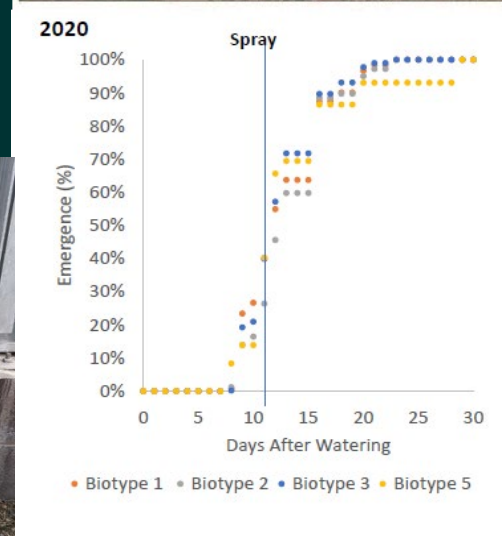
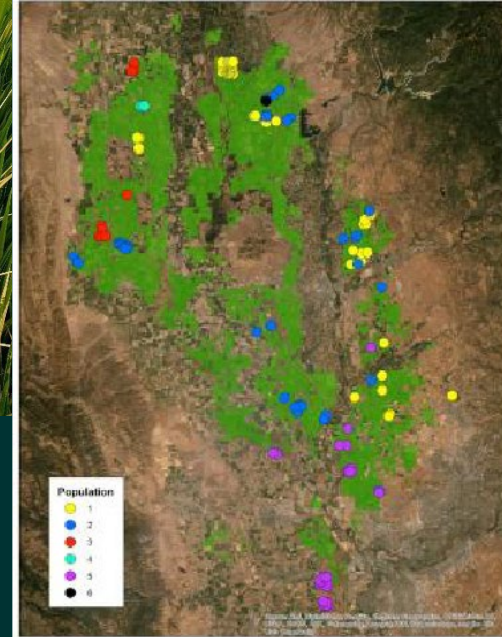
- Large and very competitive
 - Grows up to 6' tall
- Shows widespread resistance to herbicides. Best controlled with:
 - Cerano (50% of samples) / SuperWham/Stam (76% of samples)





Weedy rice

- Identified 11 biotypes
 - One is white pericarped
- Characterizing new biotypes
 - Phenotyping
 - Germination/ emergence
 - Seed bank longevity
- No indication of expanding acreage
- On going field research efforts to manage
 - Monitoring populations
 - Stale seedbed
 - Herbicides (SUPRESS)



Chemical/biological control for pests and diseases

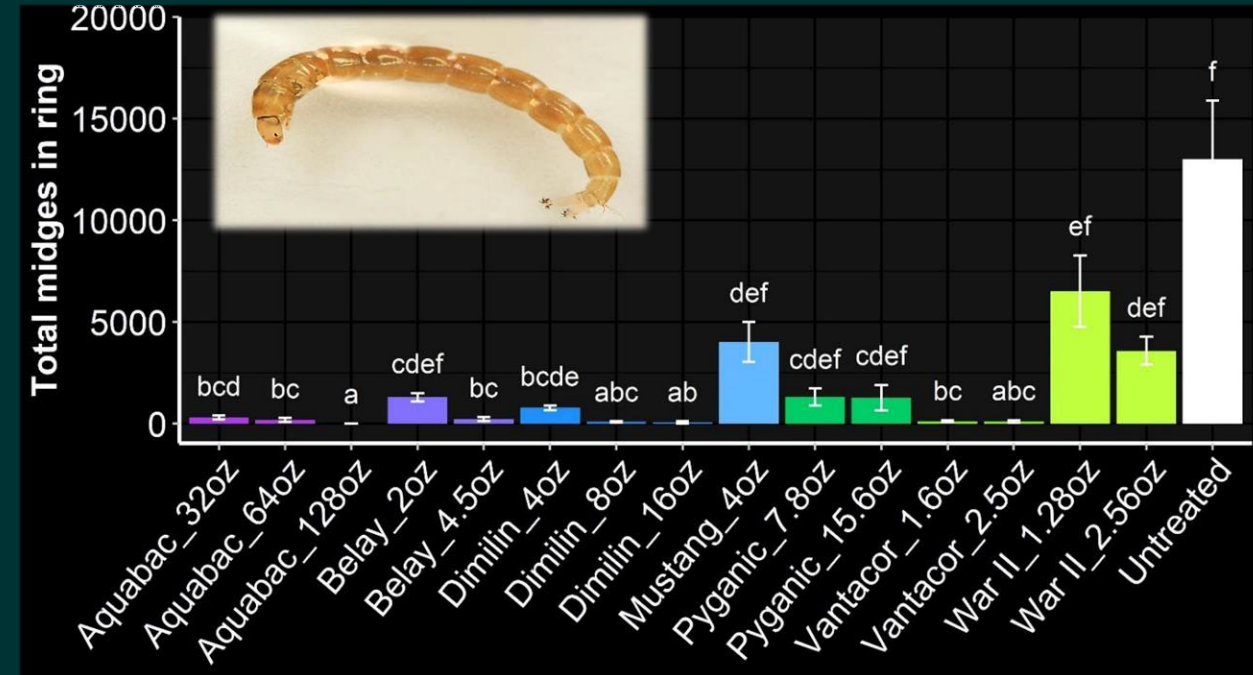
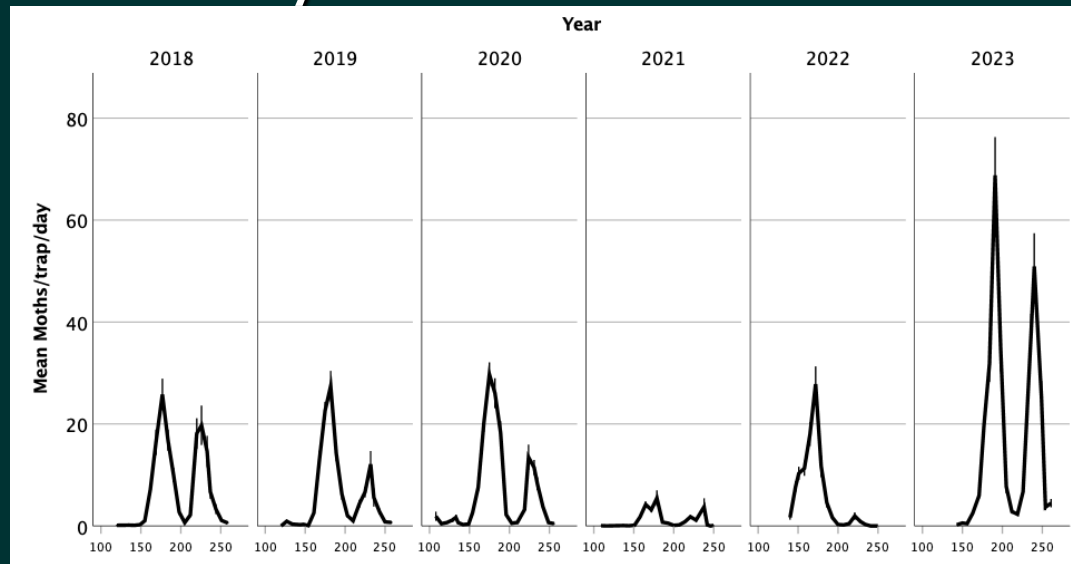


Luis Espino



Ian Grettenberger

- Chemical/biological control for a range of pests
 - Tadpole shrimp
 - Rice Seed Midge
 - Armyworms



Chemical/biological control for pests and diseases



Luis Espino

- Diseases
 - Aggregate sheath spot
 - Stem rot
 - Blast
 - Kernel smut
- Varietal susceptibility
- Response to various chemical treatments





Cropping systems



Bruce Linquist

- Nitrogen management in fields coming out of fallow compared to rice after rice
 - Yields, soil N fractions and disease incidence vary
- “No-till” water-seeding into fields that were fallow in previous year and worked up (stale seedbed)
- “No-till” dry-seeding
 - stale seedbeds (previous year fallowed)
 - Various straw mgmt. treatments

Yield Response to Nitrogen



Cover crops



Whitney
Brim-DeForest



Bruce
Linquist



Kosana
Suvočarev

- Establishment and growth of cover crops
- Cover crop species
- Water use by cover crops



Rice Experiment Station Overview 2023



Dustin Harrell

धारrell@crrf.org

(530) 868-5481 (office)

(530) 774-3874

www.crrf.org



Rice Experiment Station Team

Dustin Harrell
Director

Emily Schaff
Executive Asst.

Teresa De Leon
Medium Grain

Nirmal Sharma
Long Grain

Frank Maulana
Short Grain

Gretchen
Zaunbrecher
Dir. Genetics Lab



Far West rice



LSU
UC / RES 4



Univ. Illinois
Noble Research Inst.



K State
Noble/LSU



ULL / TTU / TAMU
13 years LSU

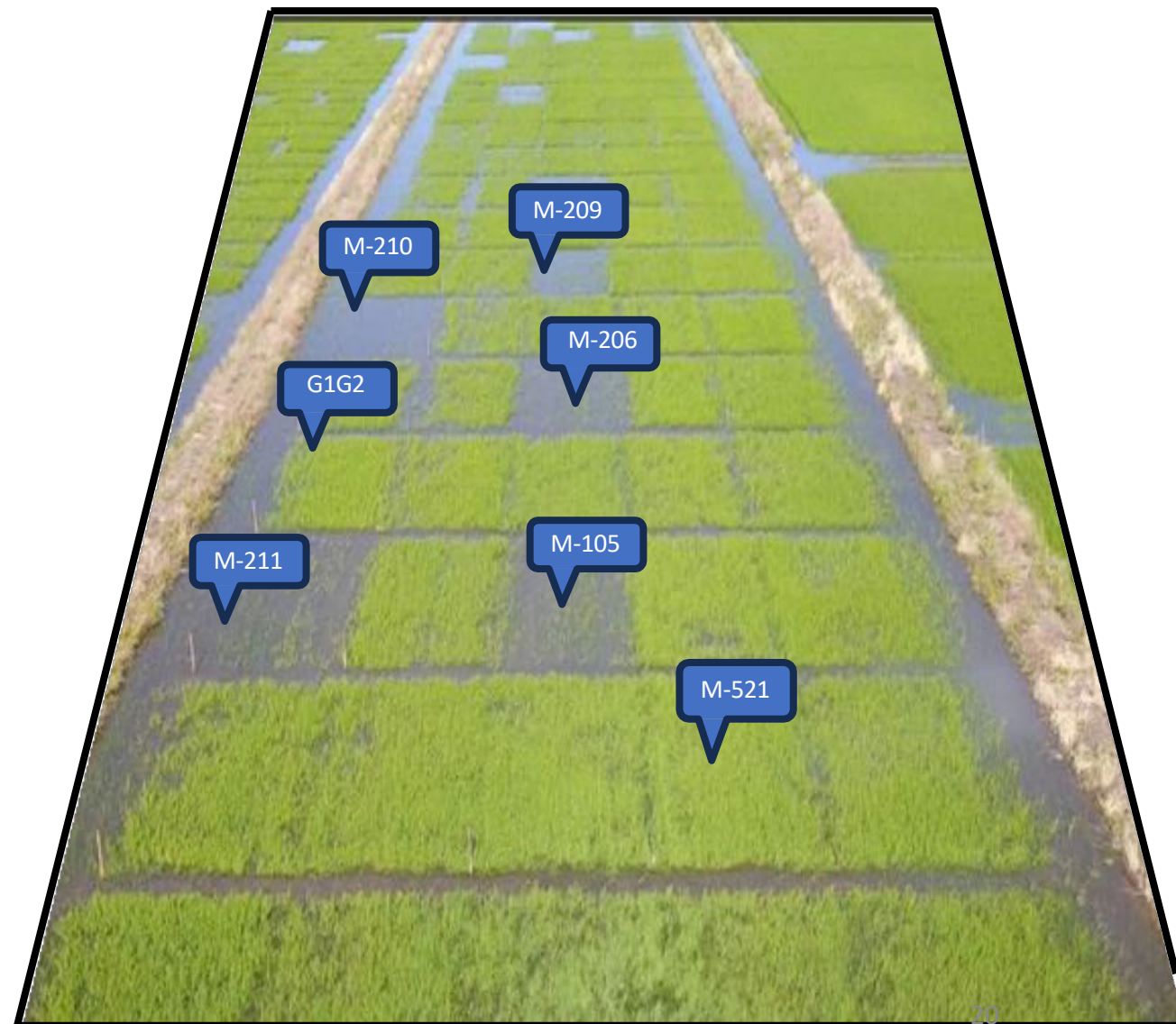
PROMISING ROXY LINES

Roxy-AYT FIELD (J2-B)

Planted 5/17/2023

Photo@37 dap (6/23/23)

23 ID	Yield (lbs./a)	MC	Seedling Vigor	Days to 50% to HDG	Height (cm)	Lodging (%)
23Y4180	10327	23	4.9	81	102	0
23Y4191	10279	22	4.9	80	98	0
23Y4170	10214	25	4.9	83	103	0
23Y4174	10145	22	5.0	79	100	3
M-521	9952	24	4.9	81	97	20
M-206	7308	24	3.1	82	101	0
M-105	5071	24	0.0	83	100	0
M-211	2841	15	0.0	82	95	3
M-209	2560	15	0.0	83	94	2
M-210	2174	14	0.0	83	90	0
MEAN	8282	23	4.1	81	99	14
5%LSD	2639	4	2.1	3	8	35
CV	19.7	10.1	31.6	1.9	5.0	156.6





ROXY seed increase
Nov 21 – approximately 4-leaf

20Y4033, PROMISING FRAGRANT CALROSE

(RM3850= M-206*2//A-202/M-206G7-3)

2021-23 SW Average	M-206	20Y4033
Grain Yield (lb/a)	8,706	8,585
Harvest MC, %	17	18
Seedling Vigor	4.8	4.8
Days to 50% Heading	88	87
Lodging Potential	39	56
Height (cm)	97	101
Panicle Blanking- SJ, GH (%)	1, 5	1, 2
Stem rot resistance	Sus (4.2)	Mod Res (2.7)
2023 Grain Data		
Milling Yield at 18-22MC	67% / 70%	62% / 71%
Total Whiteness	133	139
Vitreous Whiteness	125	127
Average Length	5.68	5.75
Average Width	2.45	2.53
L/W	2.32	2.27
1000-grain weight (g)	20.66	21.54
ChalkyKernel %	2.1	2.8
Taste value	70	71
Protein	7.3	7.3
Moisture	13.8	13.2
Amylose	19.5	19.6



18Y2070, Promising Arborio Rice

89Y235
Arborio-type

Arborio

18Y2070
ARBORIO TYPE

- 12% Yield advantage over 89Y235, 100% over Arborio
- With better milling yield than Arborio
- With smooth (glabrous) leaves and grains

18Y2070 Cooking and Eating Quality Review

Trait	Score scale	Calamore	Arborio-1 (Arborio)	Arborio-2 (18Y2070)	Arborio-3 (89Y235)
Raw rice appearance	1= unacceptable, 3= acceptable, 5= preferred/desired	3.9	3.5	3.5	3.9
Aroma during cooking	1= unacceptable, 3= acceptable, 5= preferred/desired	3.7	3.3	3.5	3.6
Appearance after cooking	1= unacceptable, 3= acceptable, 5= preferred/desired	4.3	3.6	4.1	3.6
Cooked rice texture/mouthfeel	1= unacceptable, 3= acceptable, 5= preferred/desired	4.2	3.6	4.4	3.5
Cooked rice flavor/Taste	1= unacceptable, 3= acceptable, 5= preferred/desired	4.1	3.6	4.3	3.4
Arborio rice market acceptability	1= unacceptable, 3= acceptable, 5= preferred/desired	3.8	3.4	4.4	3.4
Average Total Score		24.0	21.0	24.1	21.0
# of Chef Participants		20		8	

“Calamore had more savory aroma than Italian Arborio.”

-Dawn Yanagihara, R&D / Editor

“Shiny white, al dente, kept shape. Tasty. Longer cook time than standard arborio, but great flavor/ texture.”

-Neal Harden, Chef, AbcV, NYC

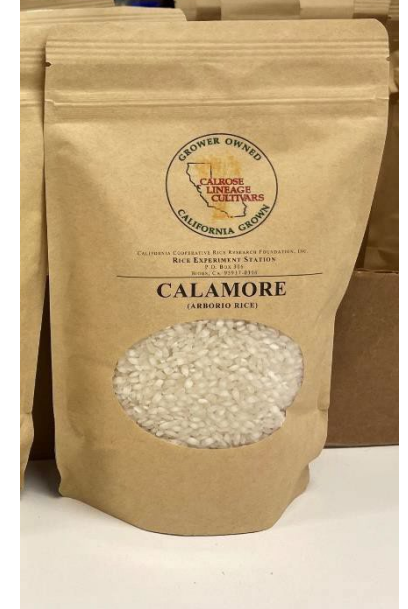
“cooked rice favor had umami to it.”

-Bill Telepan, Metropolitan Museum of Art, NY

“holds a good al dente, sweet, nutty finish when cooked with veg stock.”

-Bruce Logue, BoccaLupo, GA

“nice floral nose, more aromatic than standard. Great flavor, deep rich rice starch and earthy flavor. Much more interesting/ compelling rice flavor than the standard arborio.” -Nick Anderer, Anton’s, NYC





The mission of the California Cooperative Rice Research Foundation

Our primary mission of CCRRF at the California Rice Experiment Station (RES) is development of improved rice varieties of all grain and market types to sustain high and stable grain yield and quality with minimum environmental impact for the benefit of California rice growers.

[Read More](#)

RES Rice Varieties



Interactive Map of Rice Trials and Current Rice Data for 2023

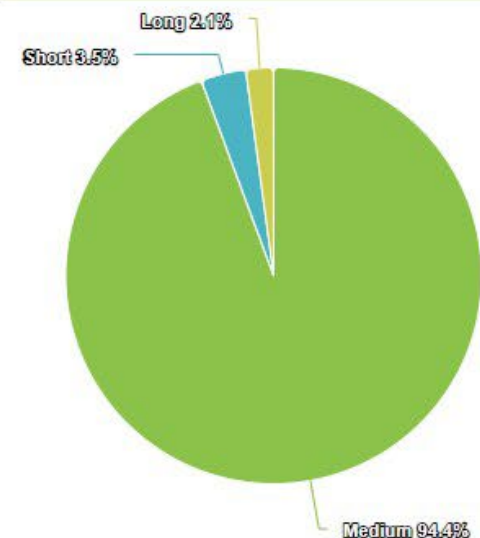
Rice Variety Trials by CA Locations



Estimated Rice Acreage Totals

Grain Type	Year	CA Est. Acres	% Acres
Medium	2023	485,000	94.4%
Short		18,000	3.5%
Long		11,000	2.1%
Total		514,000	
Medium	2022	218,000	85.5%
Short		30,000	11.8%
Long		7,000	2.7%
Total		255,000	

Estimated Rice Acreage by Grain Type



Rice Production and Trends of CCRRF Varieties

Rice Production of CCRRF Varieties from 2022-2023

[View Production Data](#)

Trend in CA Acreage of Small, Medium, and Long Grain Varieties

[View Trend Data](#)

RES Rice Variety Profile

[Performance](#) | [Grain Attributes](#) | [Paddy, Brown and Milled Grains](#)

Centennial Video





Rice Variety Trials By California Locations

Location: Rice Experiment Station

Rice Variety Trials by CA Locations

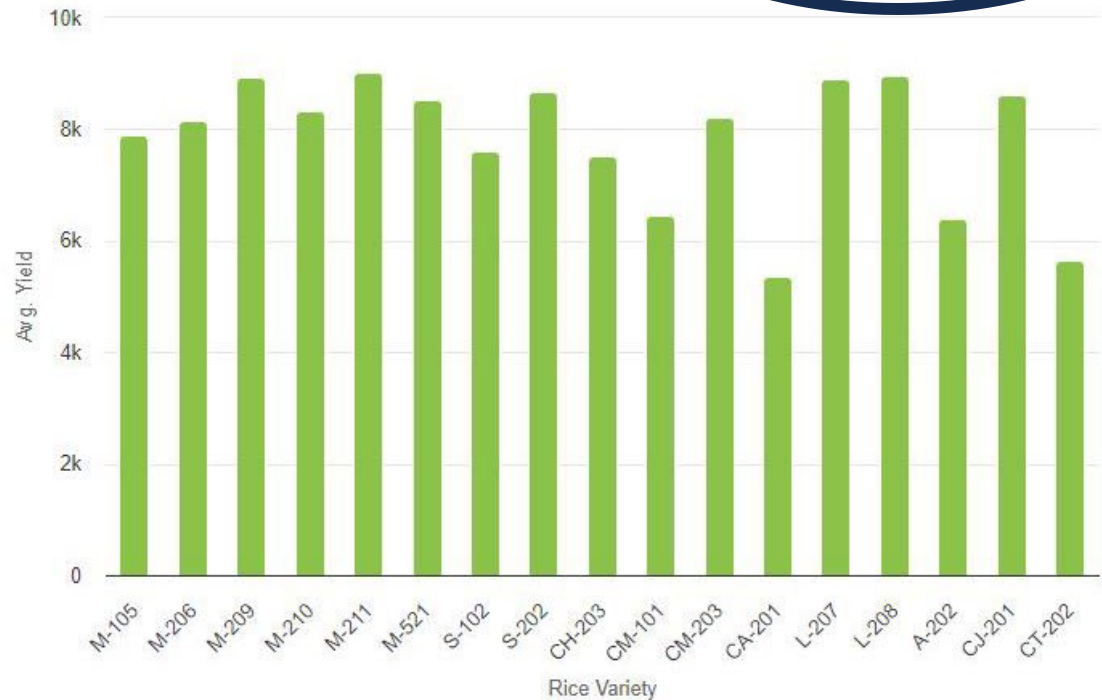
Currently Viewing Year:

2023



RICE MAP

Click on any Trial
Rice Location



Foundation Seed Portal

- Seed rice growers will have online account with the ability to:
 - Request foundation seed allocation from CCIA

Request Your Seed Allocations

Request for: **Tom McClellan**

In order to request your seed allocations, please complete all questions and click the "Add Variety" button to add a seed variety into your requested allocations. When finished adding varieties, please click the "Submit My Request" button.

Variety	Type	Requested Foundation Seed Allocation (cwt)	Source	Actions
M-105	Available	100	RES	Edit Delete
M-206	Available	N/A	Other	Edit Delete
L-205	Retired	N/A	RES	Edit Delete

[Add Variety](#)

In addition to making your variety requests, please answer the following questions regarding licensing and fees.

* Required Fields

Signing Agreements

Who will be signing the Warranty and Disclaimer? *

Tom McClellan

Who will be signing & paying the License Agreement? *

Farmers Rice Cooperative

Paying Fees

Who will be paying for Allocation? *

Tom McClellan

[Submit My Request](#)

Foundation Seed Portal

- Seed rice growers will have online account with the ability to:
 - Request foundation seed allocation from CCIA
 - Receive allocation correspondence from CCIA
 - Accept or modify allocation

Confirm Seed Allocations

Request for: **Tom McClellan**

Based on your request, the allocations listed below have been assigned and pending your approval below.

Variety	Type	Assigned Foundation Seed Allocation (cwt)	Source	Cost (cwt)	Total
M-105	Available	100	RES	\$50.00	\$5,000.00
M-206	Available	N/A	Other		
L-205	Retired	N/A	RES		\$2,009.00

Please confirm below if you would like to accept the assigned seed allocation (s). If accepted, we will send notifications to your inbox for signing agreements, additional license fees, and/or paying any deposits? *

- Yes, I accept this allocation.
- No, I wish to cancel or change this allocation

Please provide any information here with regards to cancelling or changing this allocation.

Submit

Foundation Seed Portal

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 - Receive allocation correspondence from CCIA
 - Accept or modify allocation
 - Sign warrantee & Disclaimer form; licensing agreements

Sign Warranty & Disclaimer

Warranty and Disclaimer for purchase of rice seed from Rice Experiment Station.


The California Cooperative Rice Research Foundation, Inc. (CCRRF) produces, processes, and sells a limited quantity of **seed** of public rice varieties annually as a service to the California rice industry. This seed is produced, processed, and labeled at the Rice Experiment Station (RES) in accordance with California standards for seed certification. Seed certification standards are established and monitored by California Crop Improvement Association. Purchasers of RES foundation, registered, or certified seed should read and understand the following Warranty and Disclaimer. [CCRRF recommends treatment of this seed to control bakanae disease.](#)

CCRRF expressly represents and warrants only that the seed it sells in the bulk containers conforms to the label and applicable standards for rice seed certification within recognized tolerances and as stated in the Articles of Registration. It is expressly agreed that CCRRF makes no other warranty, expressed or implied, with respect to the seeds distributed, or to the crop produced therefrom, or to the incidence of off-type (variants) in future generations. Purchaser remedies under this warranty are limited exclusively to replacement of non-conforming seed or the cost thereof. Incidental and consequential damages are expressly excluded. This warranty is the sole warranty and representation made by CCRRF.

The purchaser accepts the seed subject to the warranty contained herein and further acknowledges that prior to placing his signature hereon has read and understands the contents of this warranty and disclaimer.

Name	Date
Tom McClellan	11/15/2023

Signature of Purchaser
Use your mouse or keypad to sign within this box.



Yes, I agree to this warranty & disclaimer.

Submit

Foundation Seed Portal

- Seed rice growers will have online account with the ability to:
 - Request foundation seed allocation from CCIA
 - Receive allocation correspondence from CCIA
 - Accept or modify allocation
 - Sign warrantee & Disclaimer form; licensing agreements
 - Pay deposits/balance

Pay Seed Deposit

California Cooperative Rice Research Foundation, Inc. (CCRRF)
Payment for Certified Classes of Seed

Bill To
Tom McClellan
123 someplace address
Richvale, CA 12345

Email
email@email.com

Phone
(530) 123-4567

Variety	Type	Assigned Foundation Seed Allocation (cwt)	Source	Cost (per cwt)	Total
M-105	Available	100	RES	\$50.00	\$5,000.00

Deposit Due: \$500.00 (10%)

A deposit of 10% is due for your assigned seed allocation. Please choose below to pay the deposit or full balance. *

- Pay 10% deposit
 Pay the full balance now

Payment Amount

\$500.00

Billing Information

Street Address *

Address Line 2 *

City *

State *

Zip *

Please select a method of payment. *

- Pay with Credit Card (#% Fee) or ACH Bank Account (No Fee)
 I prefer to pay by check

Credit Card

US Bank Account

Cardholder Name

Search for you Bank

Submit

Rice Experiment Station Variety Update 2023

Dustin Harrell

dharrell@crrf.org

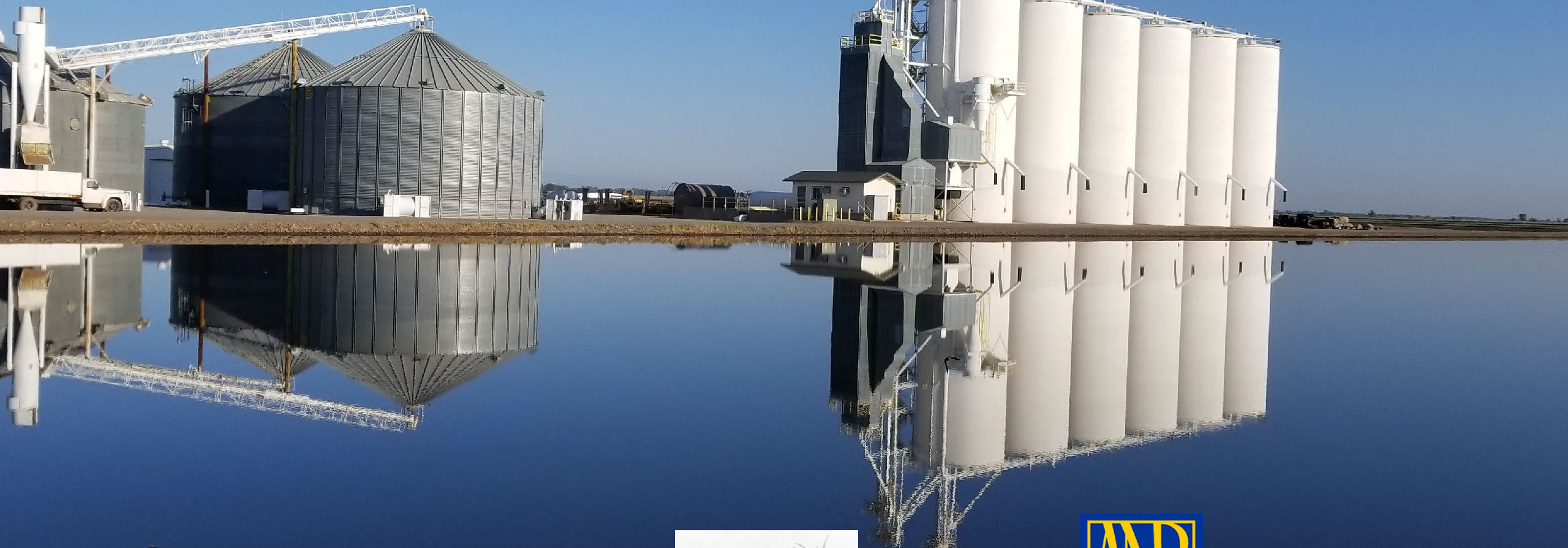
(530) 868-5481 (office)

(530) 774-3874



Field Day August 28, 2024

Thank you



California Cooperative Rice Research Foundation, Inc
Rice Experiment Station

