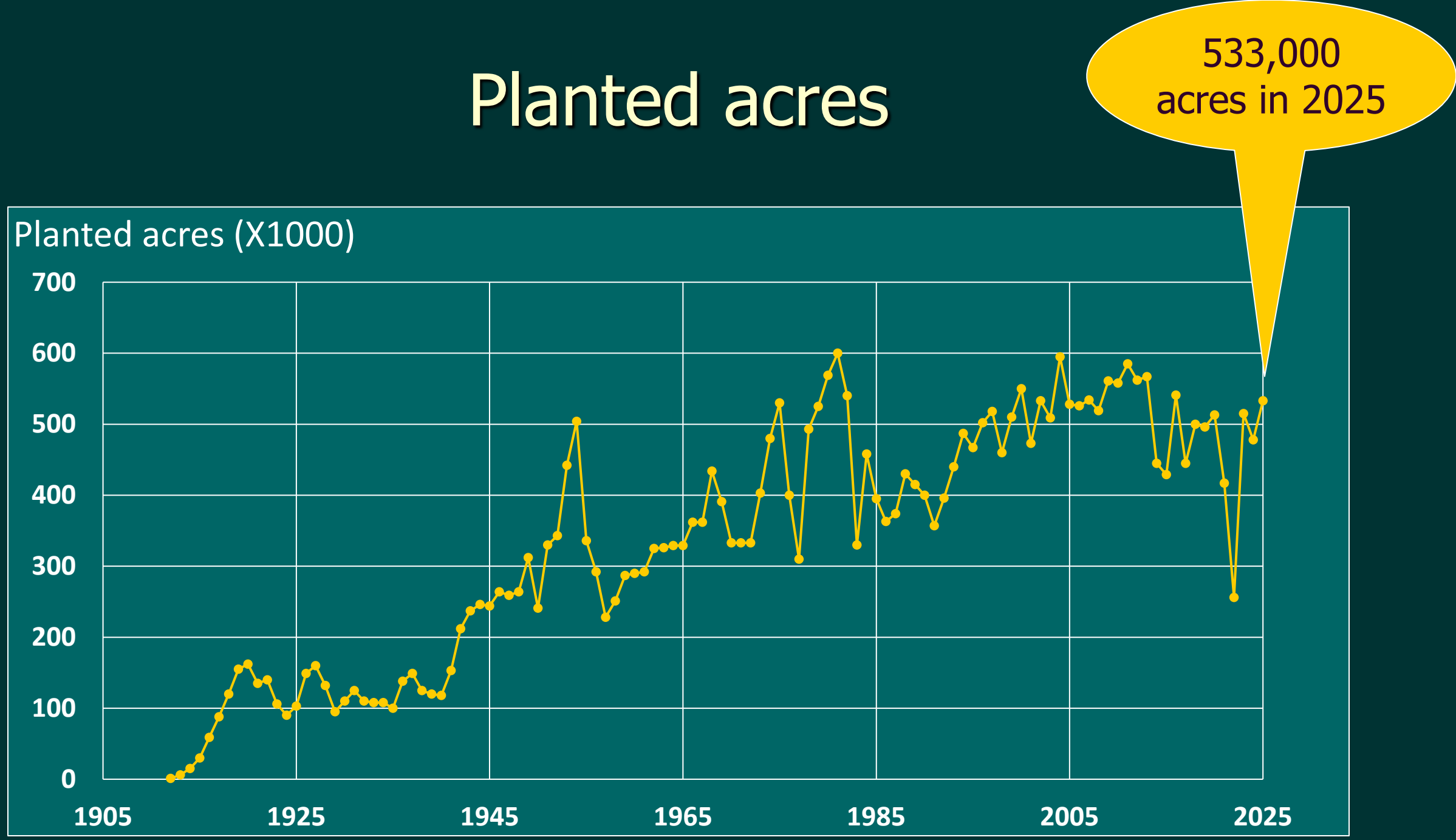
California: State Rice Outlook and Research

Bruce Linquist and Dustin Harrell
Rice Outlook Conference
New Orleans, LA
December 7-9, 2025

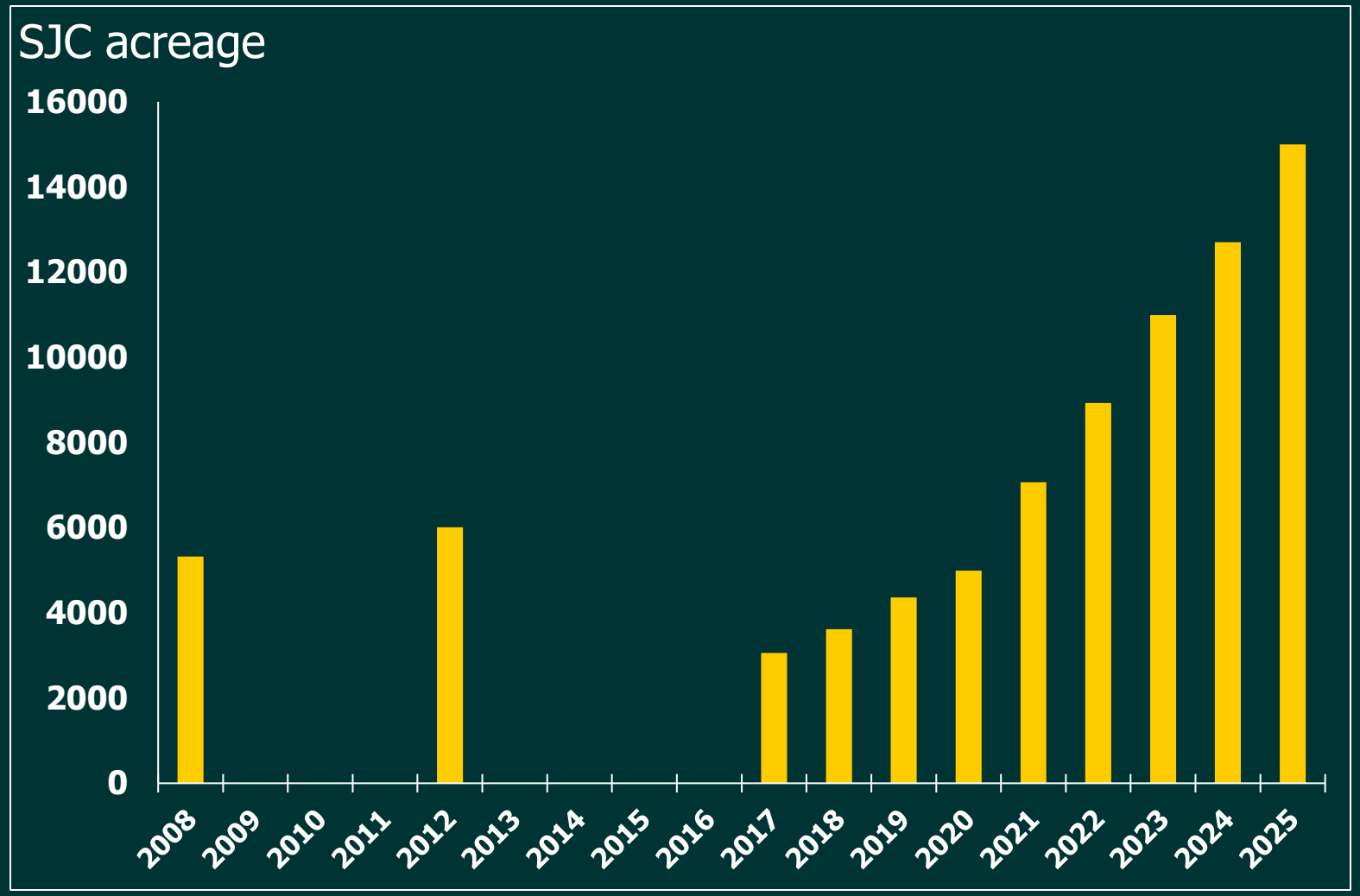
California Cooperative Rice Research Foundation, Inc
Rice Experiment Station

UC DAVIS
DEPARTMENT OF PLANT SCIENCES

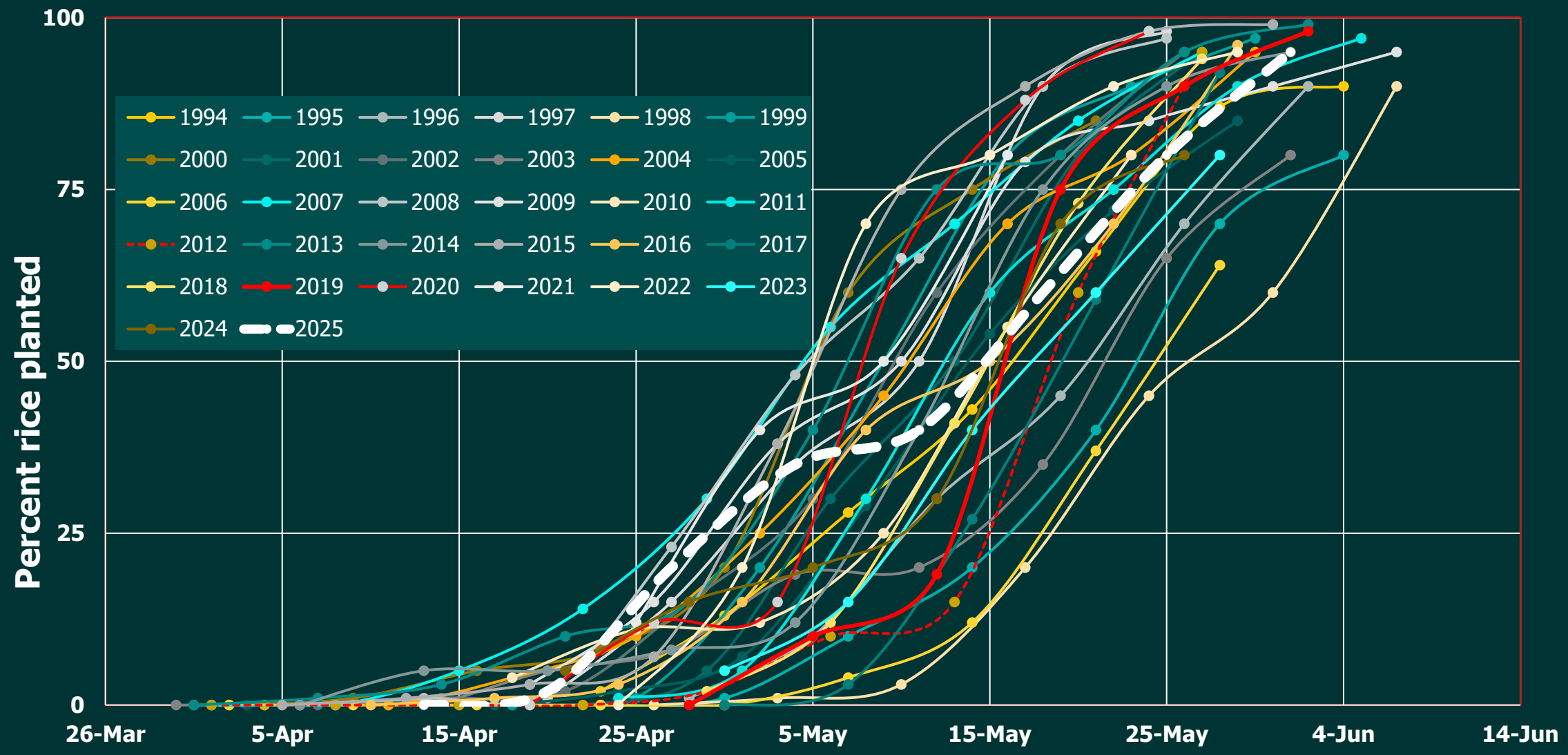
Planted acres



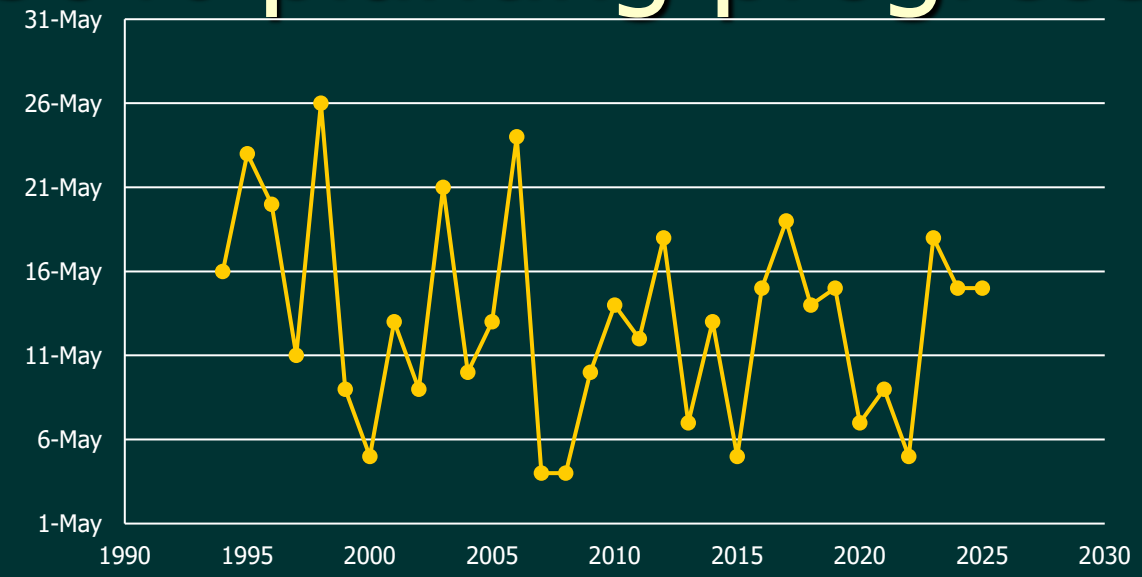
San Joaquin county rice acreage: small but growing



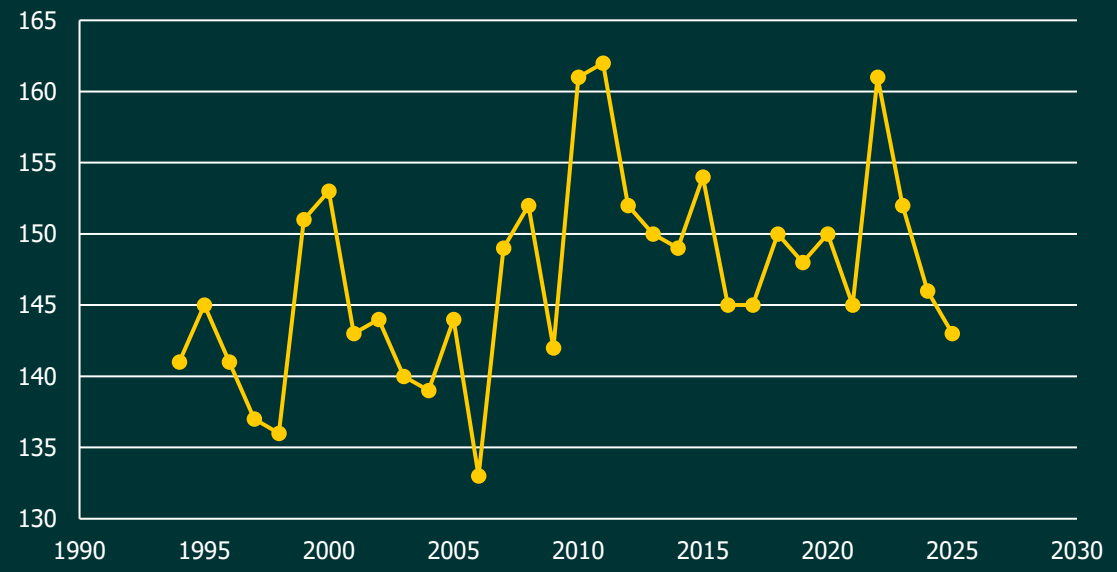
2025: early start & late finish



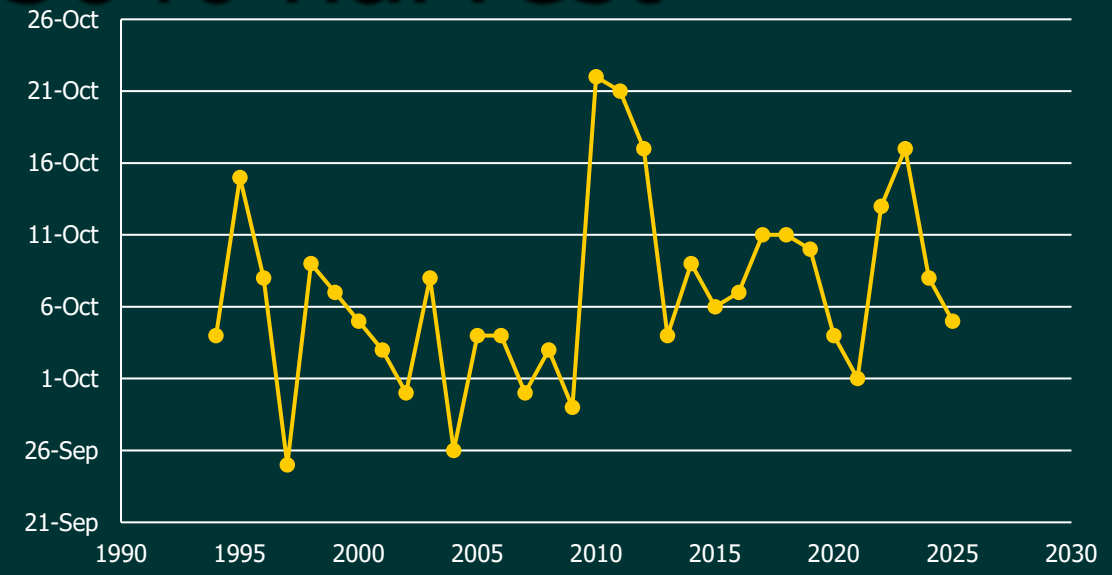
50% planting progress



Season length (days)



50% harvest

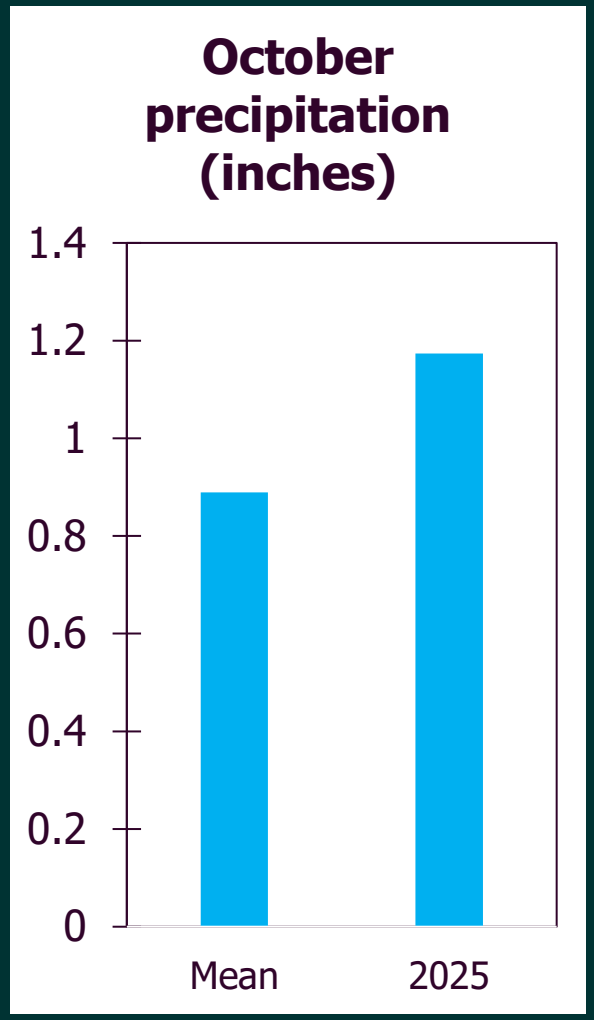


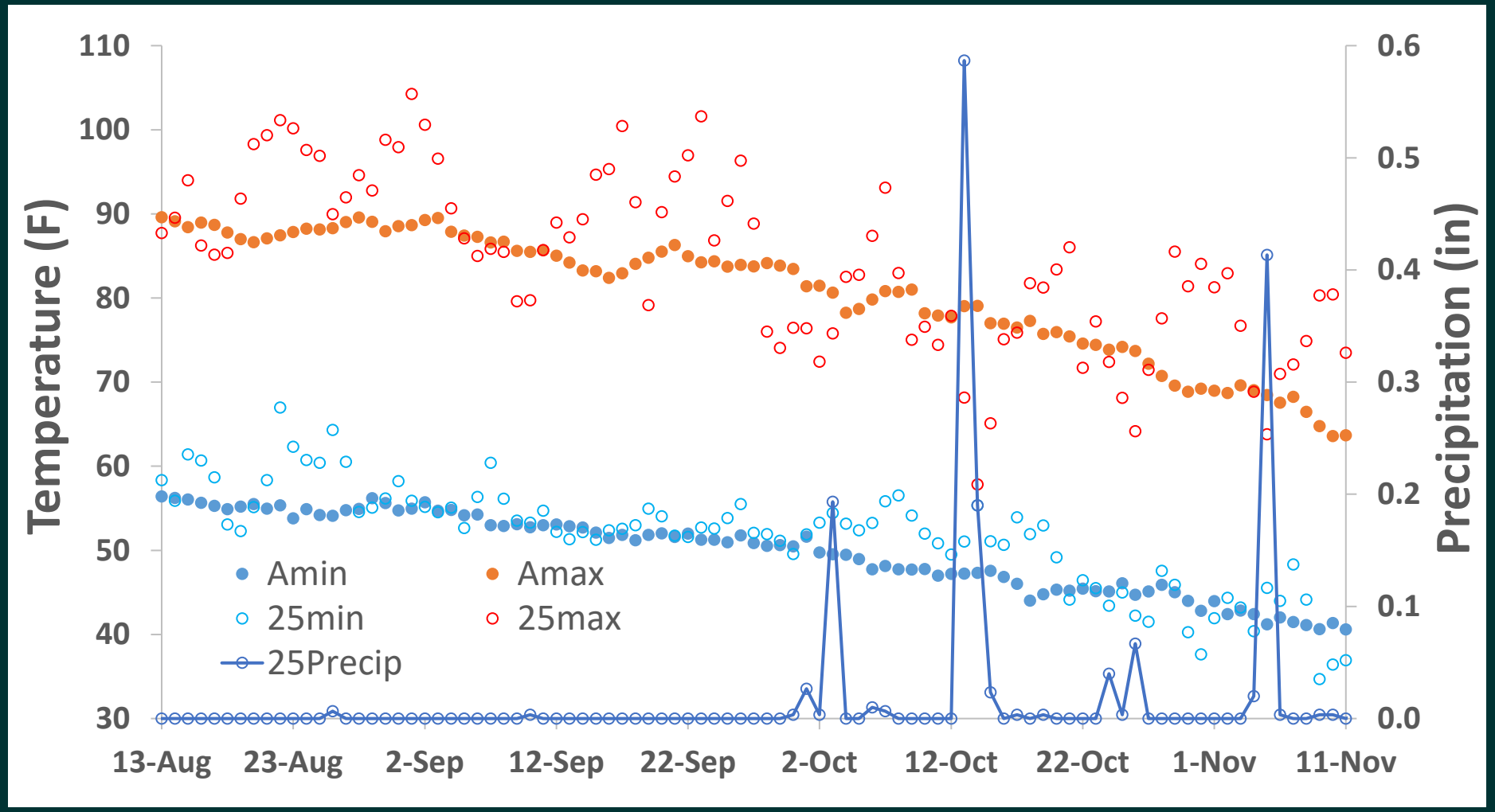
- 50% planting was delayed by a few days
- 50% harvest and average season length-Normal
- A lot of late harvested rice due to later planting and Oct rain.

2025 Season (cont)

- 2025 climate
  - Mild summer
  - Warm grain fill period
  - Oct rain
- A number of fields harvested very late (into early Dec)
- Yields
  - Early harvest yields were high.
  - Later harvest yields were lower
- Quality:
  - Low head rice yields

Grain drying period:
Fluctuating warm : wet and cool



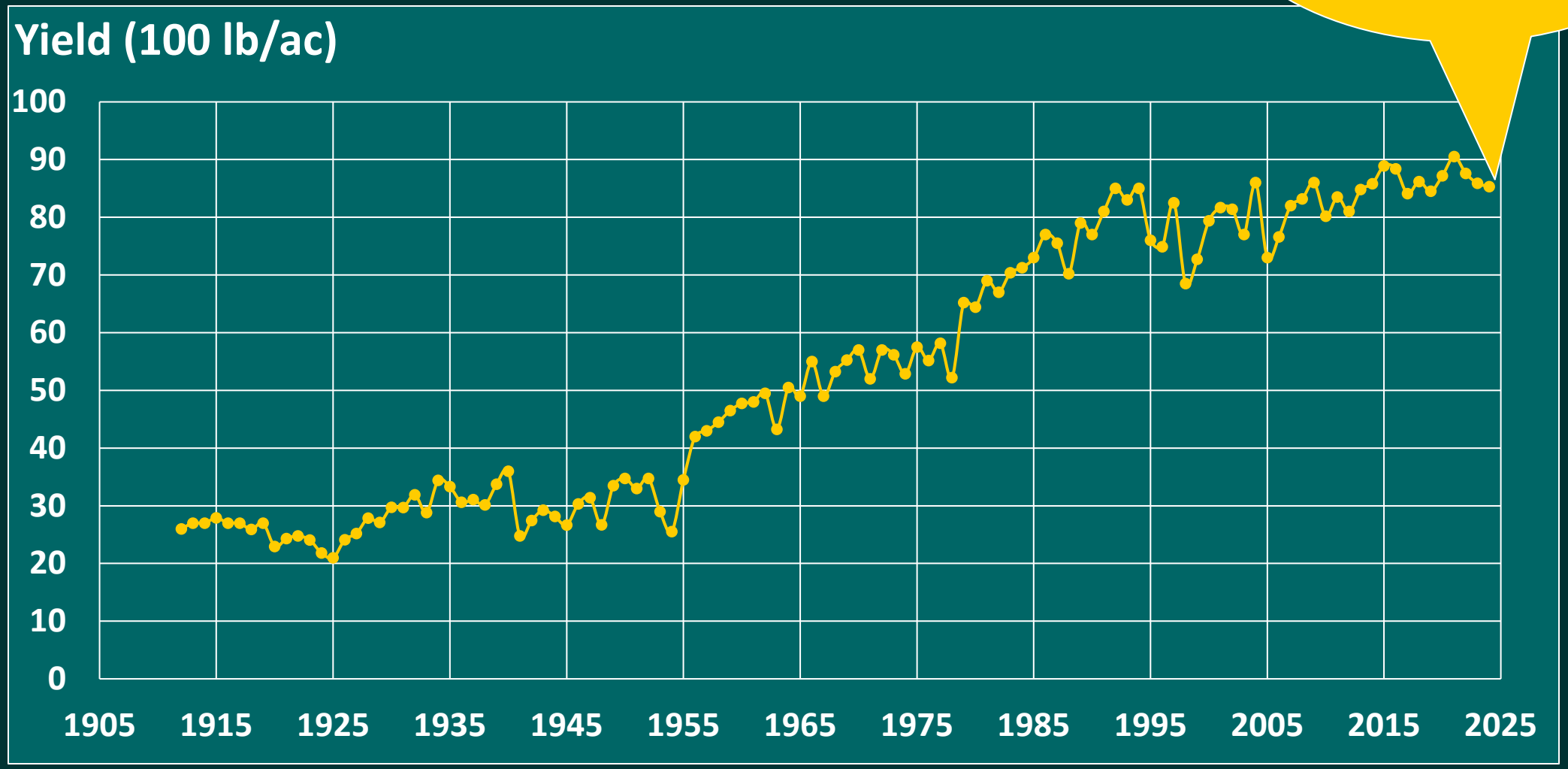


2025 (cont)

- Late harvest
- Disease:
  - Bakanae has been on the increase.
  - Blast: limited primarily to NW valley
  - Other diseases were limited.
- Pests
  - Tadpole shrimp: High pyrethroid (Warrior) resistance. Mostly seen on West side
  - Higher than normal armyworm - but not bad
- Weeds
  - Walter’s barnyard grass has high resistance (70+ samples for weed screening)
  - Ludwigia-found in Placer county

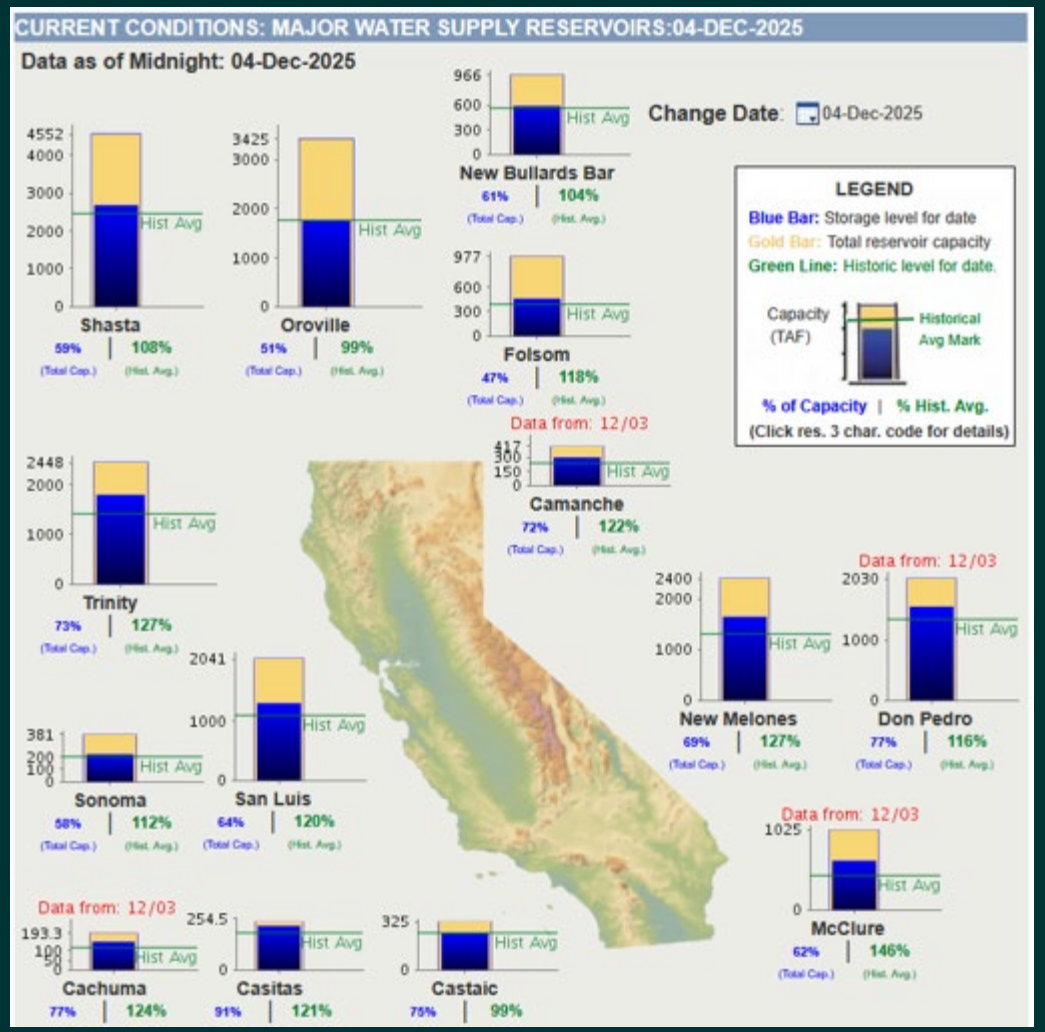
California rice yields
(1912 to 2024)

Guessing 2025 yields will be 86 cwt (2024 was 85.3 cwt)



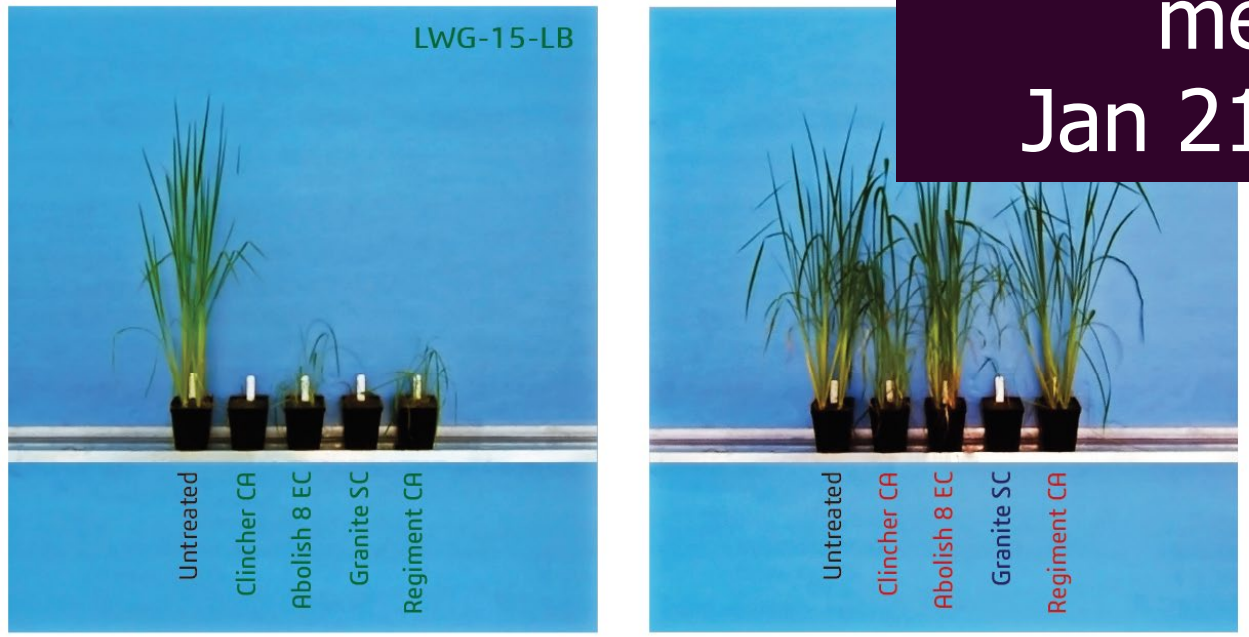
2026 Water outlook

- As of Dec 5:
  - <u>Reservoirs:</u> at or above normal
    - Shasta (108%); Oroville (99%)
  - <u>Rainfall:</u> above normal
    - wet Oct/Nov
  - <u>Snowpack</u>: well below normal



Research

UCCE Winter grower meetings
Jan 21-23, 2026



California Rice Research Board

Kassim Al-Khatib & Whitney Brim-DeForest

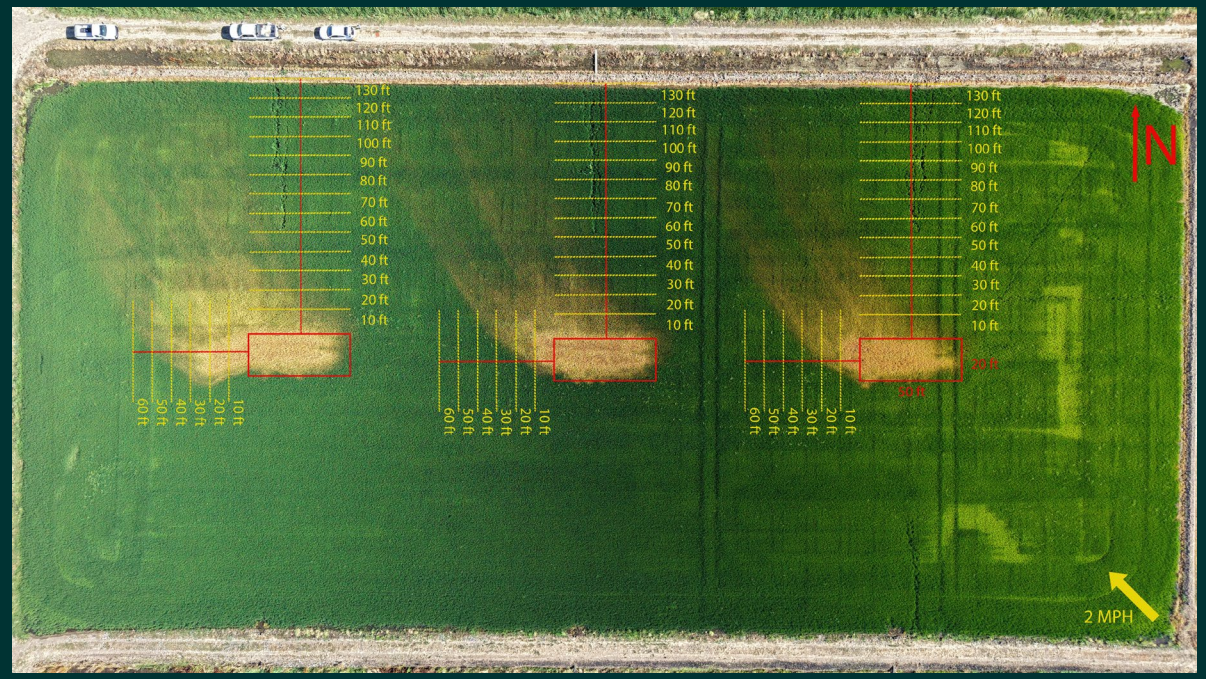
Evaluation of herbicide programs and new herbicides

- New herbicides being evaluated or optimized
  - Pyraclonil (Zembu): improving efficacy
  - Tetflupyrolimet (Keenali) promising for grass control
  - Vantek, pendimethalin formulation for water seeded rice
  - GXP: good grass control including sprangletop
- Herbicides for control of Walter's barnyard grass (*E. walteri*)
- Alternatives to two propanil applications
- Weedy rice management
- Drone

Kassim Al-Khatib

Drone-based herbicide applications

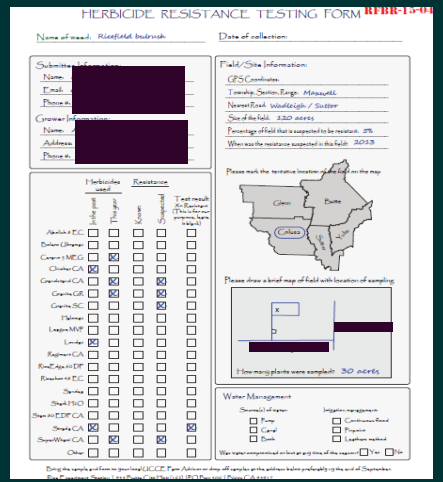
- Efficacy compared to ground applications
  - Evaluating
    - Spray volume
    - Drone flight height
  - Very promising results in terms of control
- Off target drift - significant
  - 2 mph winds
  - Drone 6.5 ft above canopy



Herbicide resistance

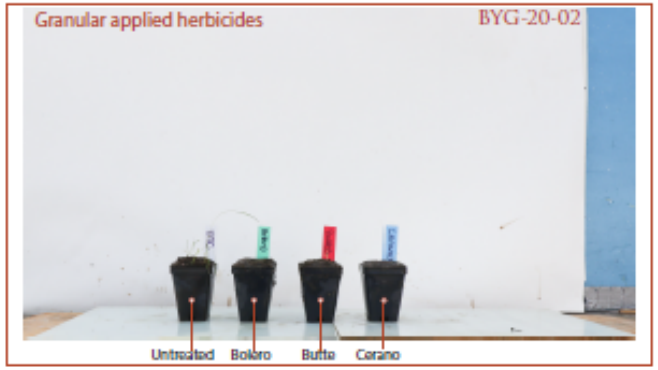
- Study mechanisms of resistance
- Testing program for growers
  - 40-100 samples tested per year
  - Resistance tested for all potential herbicides
  - New insights into resistance

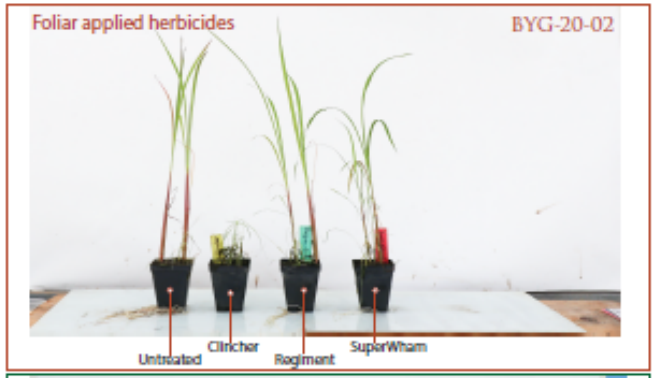
Kassim Al-Khatib & Whitney Brim-DeForest

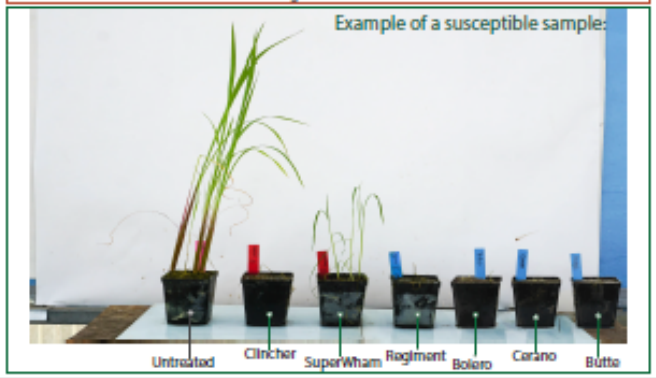


HERBICIDES TESTED	RESISTANCE STATUS
VLCFA inhibitor Bolero® thiobencarb	Your sample is NOT resistant. NO All tested samples are susceptible.
HPPD inhibitor + ALS inhibitor Butte® benzobicyclon + halosulfuron-methyl	Your sample is NOT resistant. NO 96% of tested samples are susceptible.
Pigment synthesis 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.

PHOTOGRAPH OF YOUR SAMPLE







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.

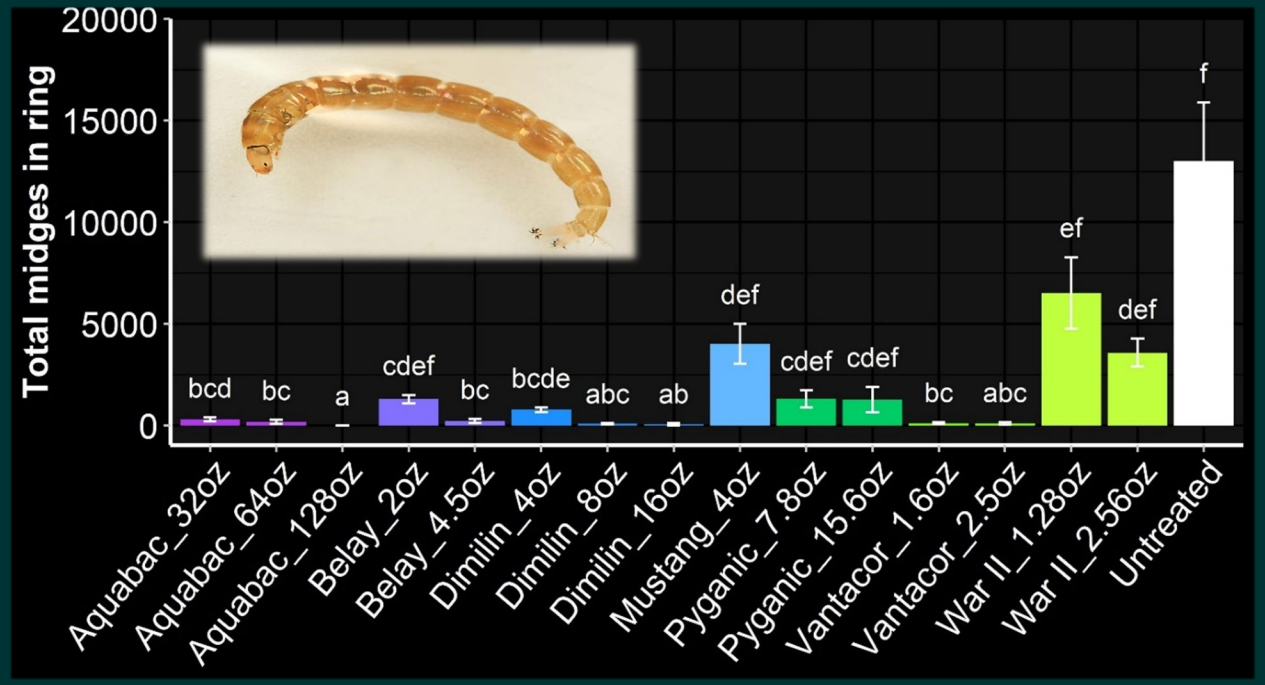
Source: Herbicide Resistance Action Committee

Chemical/biological control for pests

Luis Espino

Ian Grettenberger

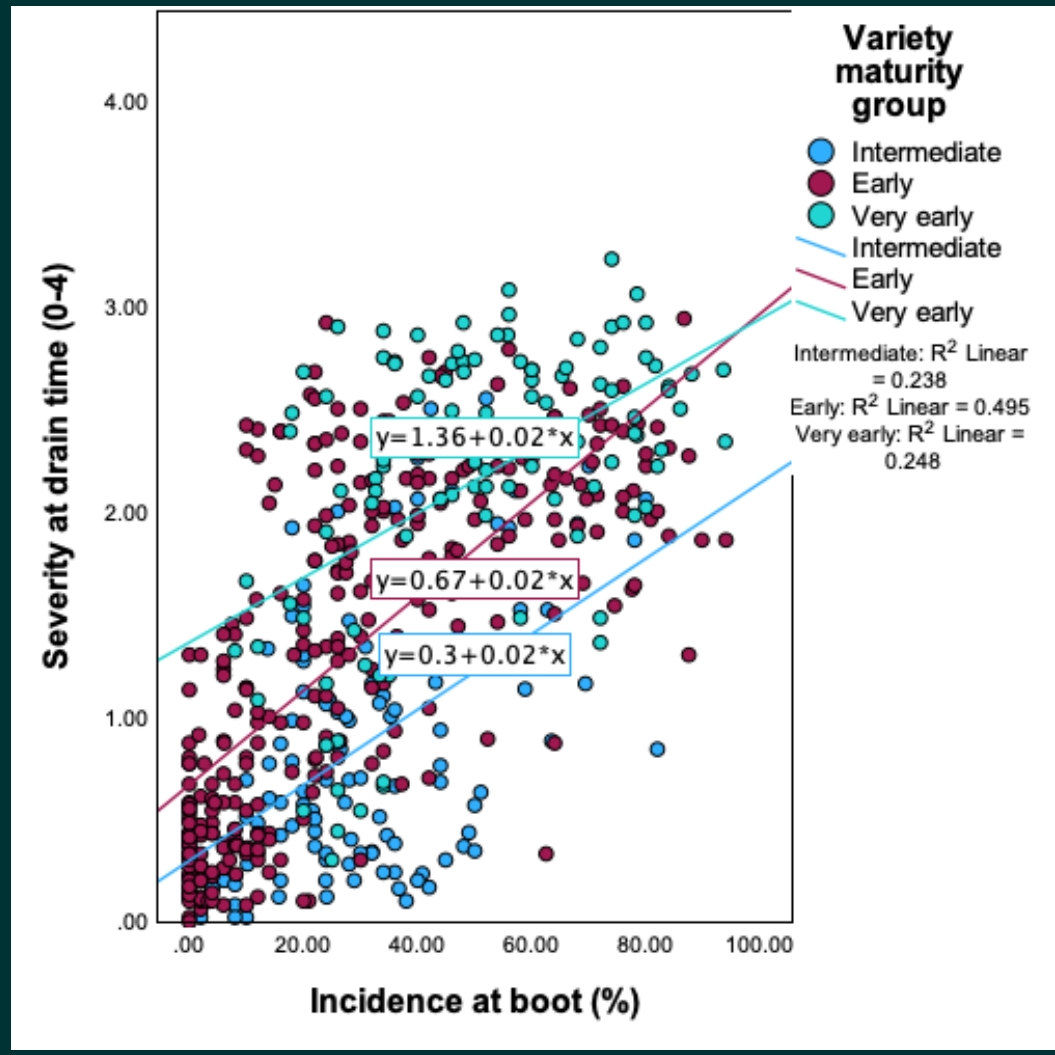
- Tadpole shrimp
  - Treatment and scouting
  - Seeing some pyrethroid resistance
- Rice Seed Midge
  - Treatment
- Armyworms
  - Monitoring



Luis Espino

Chemical/biological control for diseases

- Diseases
  - Stem rot
    - Improved scouting tools
    - Varietal susceptibility
  - Blast
    - Monitoring
    - Isolate collection
  - Kernel smut
    - Chemical control
- Emerging diseases
  - Bakanae



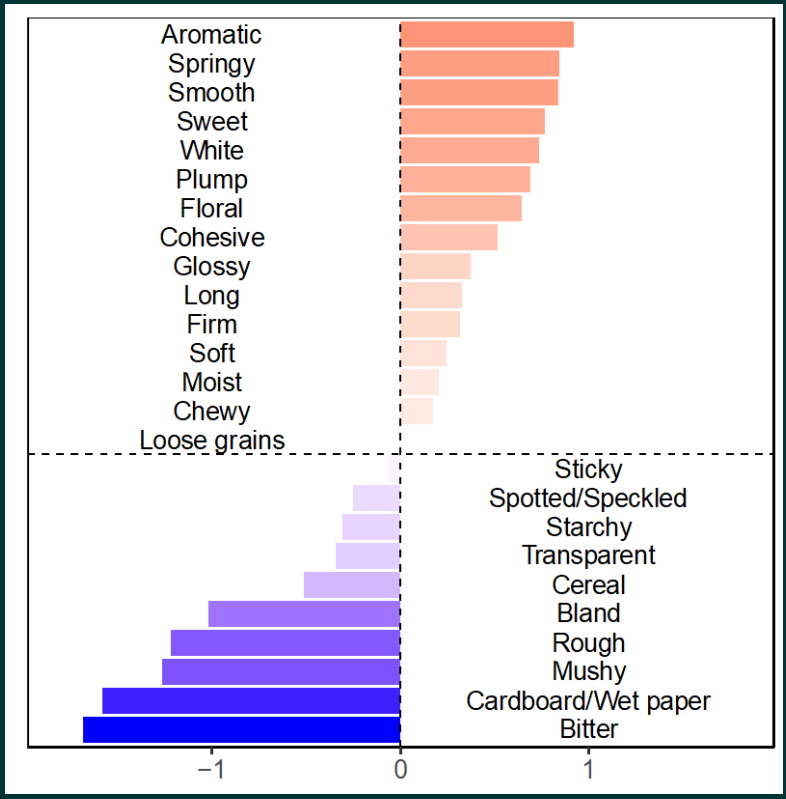
Bruce Linquist

Cropping systems

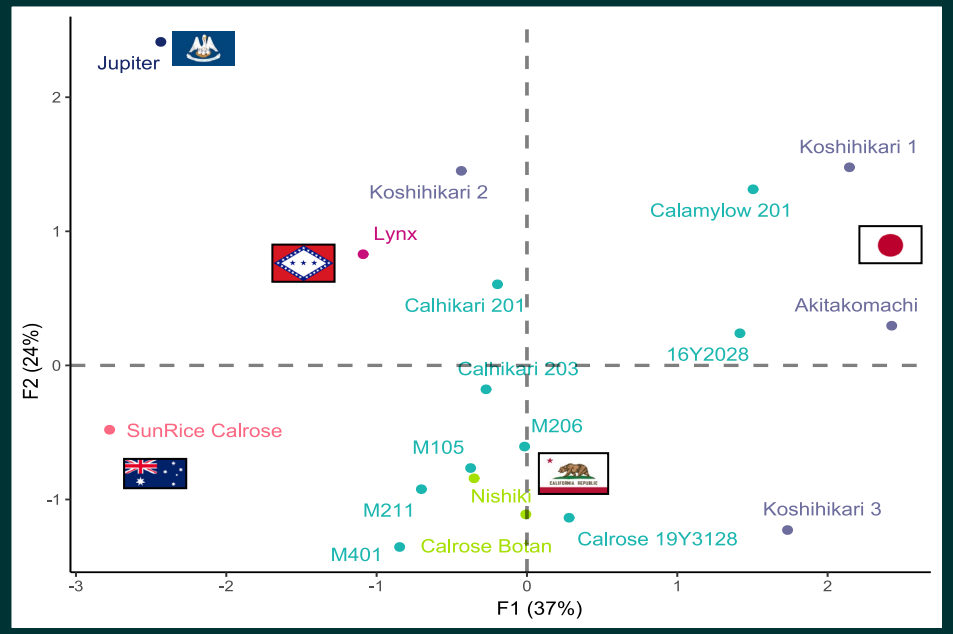
- No-till opportunities
  - "No-till" dry-seeding
    - stale seedbeds (previous year fallowed)
    - Various straw mgmt. treatments
  - Very promising results (on station and on-farm)
    - Yields, ability to plant early, water savings
- N x variety response
  - Yield, lodging, quality
- Updating degree day model

Jean-Xavier Guinard

Sensory profiling of CA varieties



- In collaboration with the RES
- Quantifying sensory properties and consumer acceptance of CA varieties using:
  - Sensory descriptive analysis
  - Instrumental measurements of color, flavor and texture
  - Consumer tests
- Medium, short, long and specialty varieties



Rice Experiment Station Overview 2025

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2026 Available Foundation Seed

Long grain: L-207, L-208, CJ-201, A-202

Medium grain:

- M-211, M-105, M-206, M-209, M-210, M-401
  - M-212 (2 potential candidates)
- M-521 (research seed only)
  - AM-201, Calamore-201

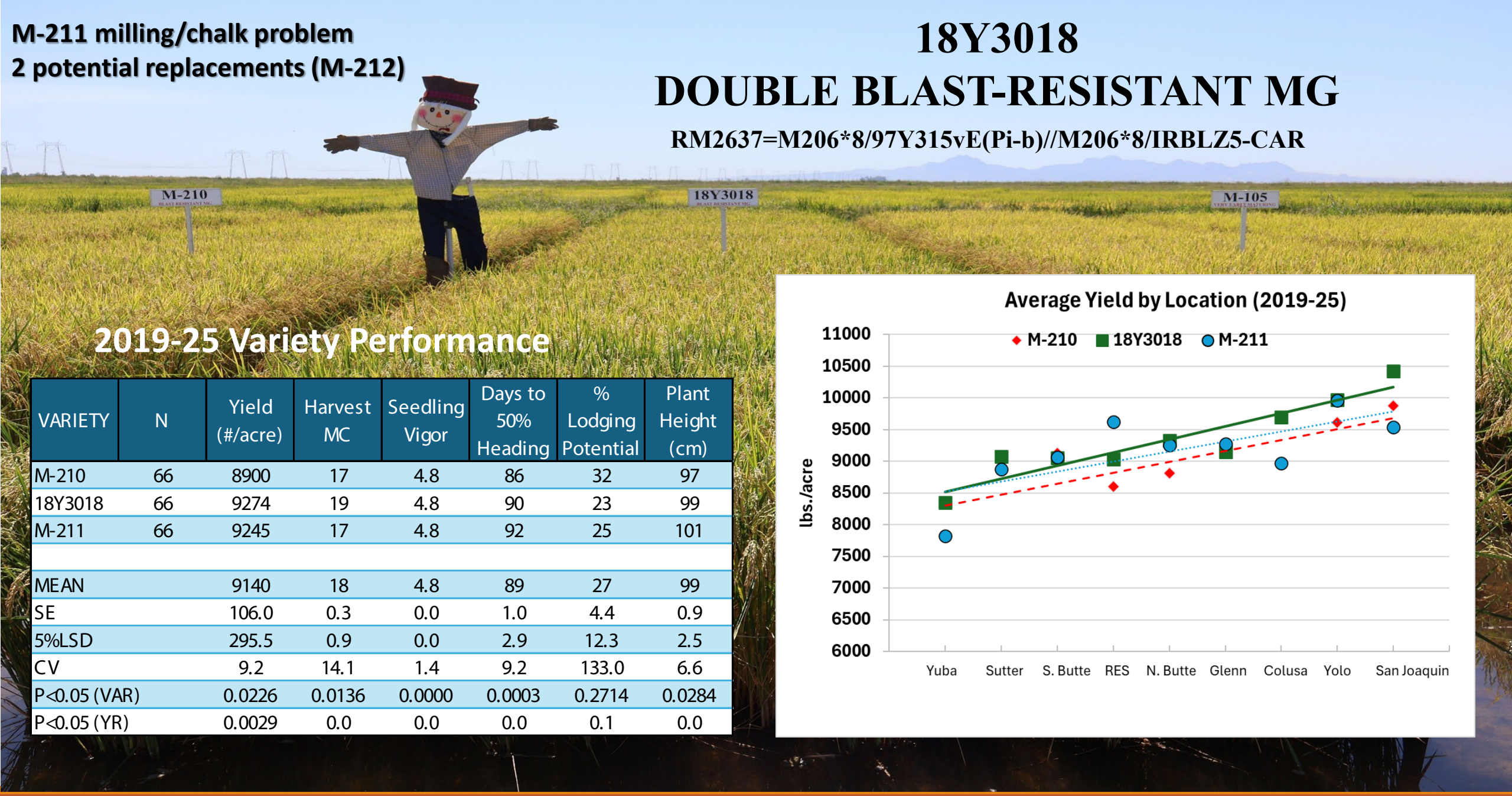
Short grain :

- S-102, CM-203, CH-201, CH-203, Calamylow-202

M-211 milling/chalk problem
2 potential replacements (M-212)

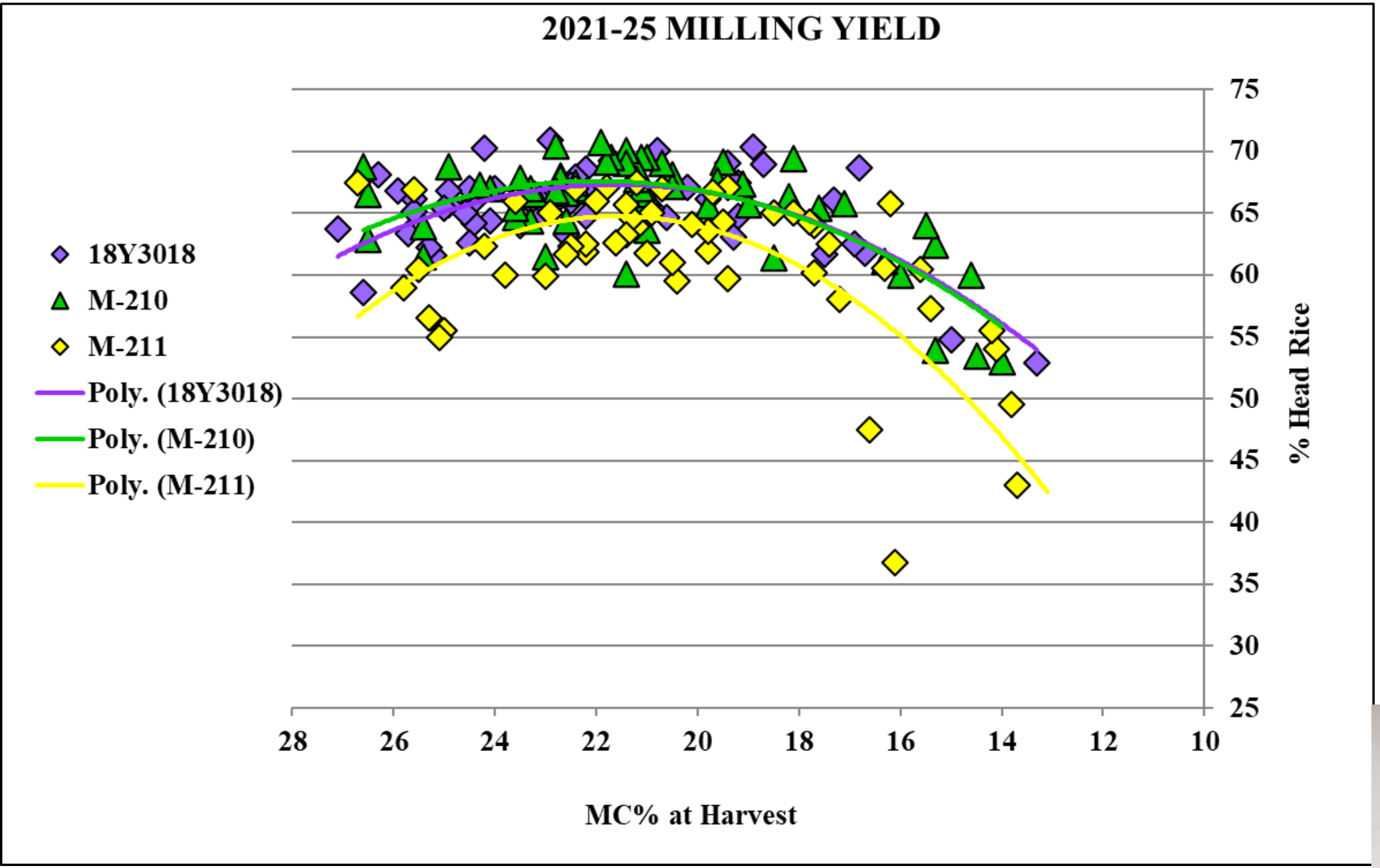
18Y3018
DOUBLE BLAST-RESISTANT MG

RM2637=M206*8/97Y315vE(Pi-b)//M206*8/IRBLZ5-CAR



2019-25 Variety Performance

VARIETY	N	Yield (#/acre)	Harvest MC	Seedling Vigor	Days to 50% Heading	% Lodging Potential	Plant Height (cm)
M-210	66	8900	17	4.8	86	32	97
18Y3018	66	9274	19	4.8	90	23	99
M-211	66	9245	17	4.8	92	25	101
MEAN		9140	18	4.8	89	27	99
SE		106.0	0.3	0.0	1.0	4.4	0.9
5%LSD		295.5	0.9	0.0	2.9	12.3	2.5
CV		9.2	14.1	1.4	9.2	133.0	6.6
P<0.05 (VAR)		0.0226	0.0136	0.0000	0.0003	0.2714	0.0284
P<0.05 (YR)		0.0029	0.0	0.0	0.0	0.1	0.0



18Y3018 has improved milling over M-211 (mills like M-210)

16Y2028, a high-yielding, non-pubescent low amylose short grain rice

Year	ID	Grain yield (lbs./acre, 14% MC)	%Yield adv. over CA-201	Seedling vigor (1-5)	Days to 50% heading	Plant height (cm)	Lodging (%)
2019	16Y2028	9,400	34	5.0	78	110	72
	CA-201	7,000		4.8	80	96	48
2020	16Y2028	9,419	28	4.8	87	102	62
	CA-201	7,330		4.9	80	94	45
2021	16Y2028	9,274	38	5.0	90	95	47
	CA-201	6,706		5.0	90	88	41
2022	16Y2028	8,498	34	4.8	90	101	68
	CA-201	6,345		4.8	90	92	48
2023	16Y2028	8,630	31	4.9	85	108	75
	CA-201	6,601		4.8	84	97	56
2024	16Y2028	8,838	37	4.8	83	107	73
	CA-201	6,461		4.8	82	99	51
2025	16Y2028	9,272	35	4.7	85	103	48
	CA-201	6,875		4.9	85	96	45
Mean	**16Y2028**	**9,047**	**34**	**4.9**	**85**	**104**	**64**
	CA-201	**6,760**		**4.9**	**84**	**95**	**48**

CA-201

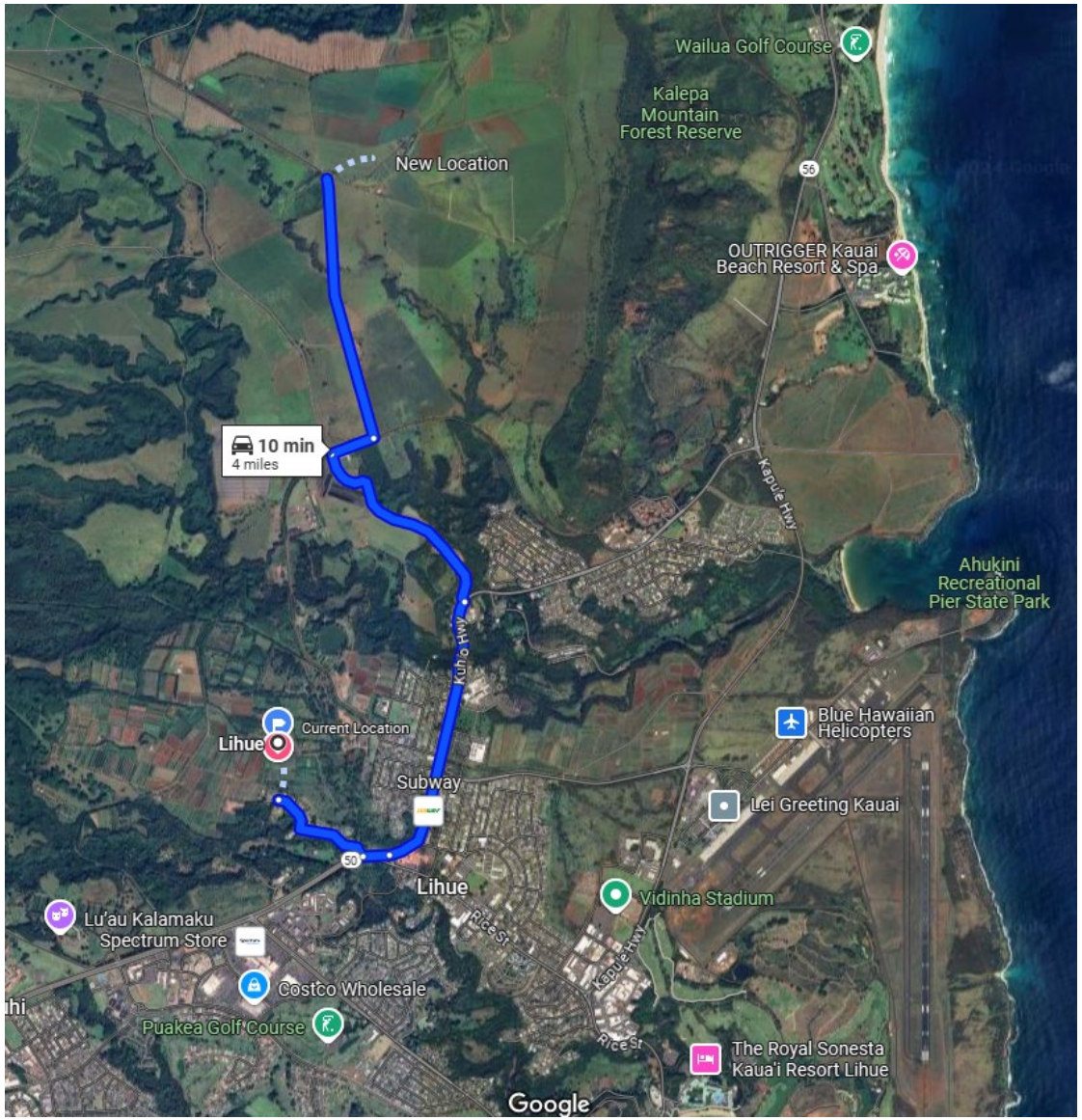
16Y2028

2025 Hawai’i Nursery Update

New Location in 2025

- Losing current lease Dec. 2025
- Will need to: find/secure/relocate/level fields/secure water access at new location before Oct. 2025 planting


Wainiha
Princeville
Kalihiwai
Kilauea
Hanalei
Hono'Onapali Natural Reserve Area
Nā Pali Coast State Wilderness Park
Moloa'A Forest Reserve
Kealia Forest Reserve
Anahola
Koke'e State Park
Halelea Forest Reserve
Na Pali-Kona Forest Reserve
Ka Pele
Alaka'i Wilderness Preserve
Kauai
KAWAIHAU
Kapa'a
Lihue-Koloa Forest Reserve
Wailua Homesteads
Wailua
Wailua River State Park
Hanamaulu
Lihue
Waimea
KEKUPUA
NAWILIWILI
Pakala Village
Kaumakani
Hanapepe
Kalaheo
Eleele
Koloa
POIPU
Google


Wailua Golf Course
Kalepa Mountain Forest Reserve
New Location
56
OUTRIGGER Kauai Beach Resort & Spa
10 min
4 miles
Kapule Hwy
Ahukini Recreational Pier State Park
Kuhio Hwy
Current Location
Lihue
Blue Hawaiian Helicopters
Subway
Lei Greeting Kauai
50
Lihue
Vidinha Stadium
Lu'au Kalamaku Spectrum Store
Rice St
Costco Wholesale
Puakea Golf Course
The Royal Sonesta Kaua'i Resort Lihue
Google


Field 1
300' x 110' (0.75 A)
Field 2
300' x 110' (0.75 A)
Field 3
300' x 120' (0.83 A)
F1 /Herbicide Testing
Field
105' x 107' (0.26 A)

Cut "Custom Operations" budget by 53% in 2025
($19,008 less than 2024)
4 licensed at RES

Spray Drone

- DJI Agras T50
  - $18,000 drone
  - $15,000 batteries and accessories
- 10 gal capacity
  - 2-20 GPA/A
  - Dry Fertilizer application
- Legal Process:
  - FAA Registration
  - FAA Permit
  - FAA Part 107 drone license
  - FAA Part 137 Commercial Applicators License
  - DPR Arial Applicators Drone Apprentice License
  - Drone Insurance Policy

Upcoming dates in 2026

- Winter grower meetings
  - January 21-23
- Rice Production Workshop
  - March 18-19
- Field Day
  - August 26

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UC DAVIS
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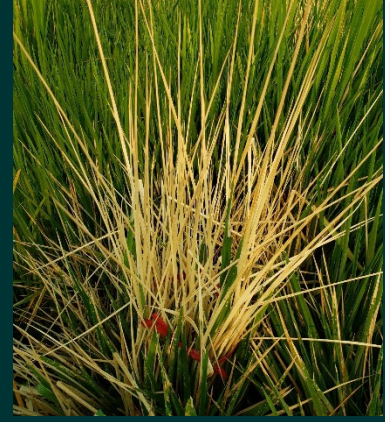
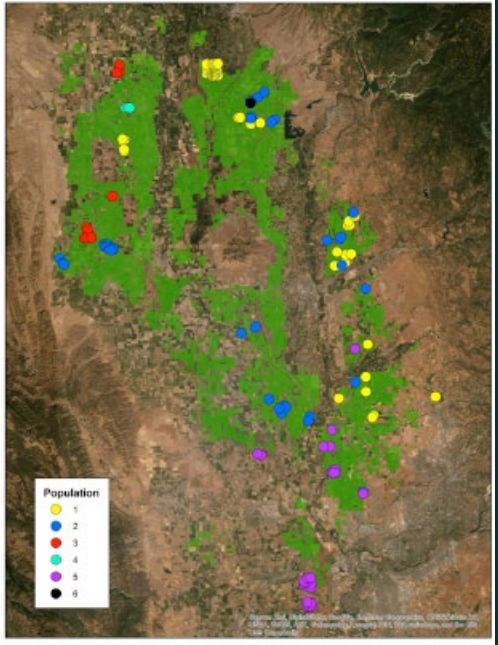
Weedy rice





- Biotype ID and characterization
  - Phenotyping
  - Germination/ emergence
  - Seed bank longevity
- Monitoring populations
  - No indication of expanding acreage
- On going research efforts to manage
  - Stale seedbed
  - Herbicides to control