

Weedy Rice in California: Current Status and Research Updates

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Weedy Characteristics

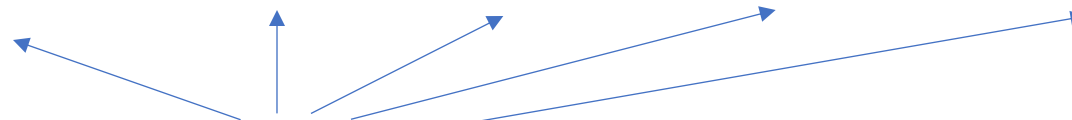
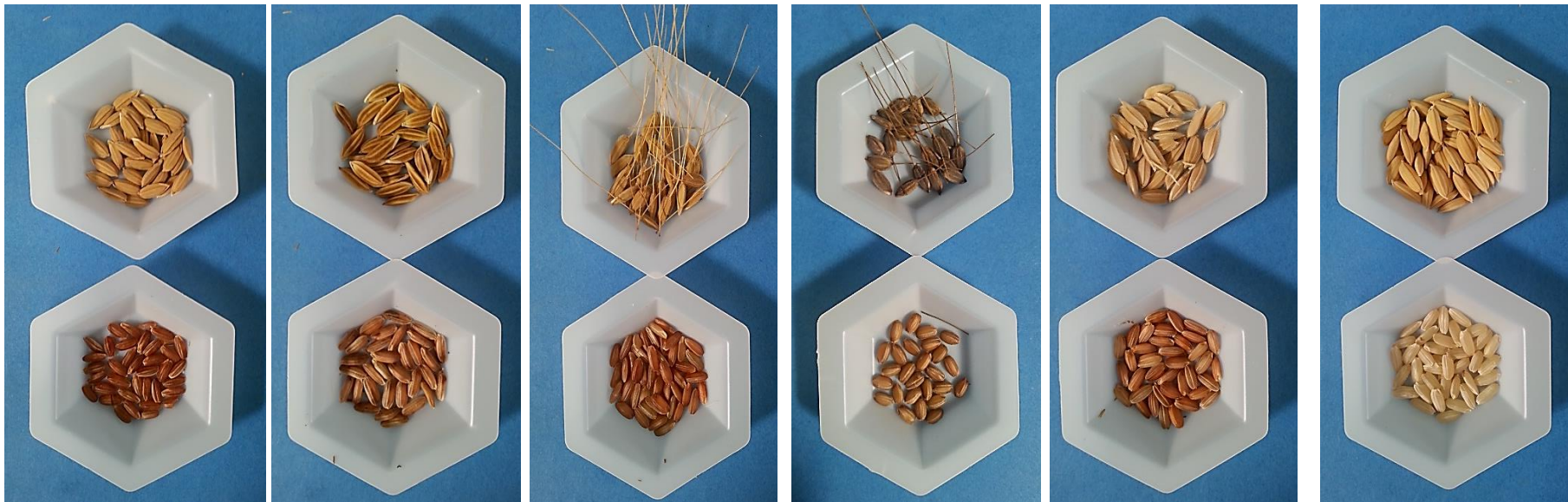
- **Domestication syndrome:**
 - Seed shattering
 - Seed dormancy (ability to remain viable in the soil)



Weedy Characteristics

Red pericarp = red bran

M-206 =
Cultivar



Weedy rices

Why is it important to control weedy rice?

Can impact quality

- In white rice, extra milling required
- In brown rice, has to be sorted out

Can affect yields

- Shatters
- If heavily infested, can reduce yields:
 - 70% at rates of 40 plants per m²
 - 42% at 8 plants per m²

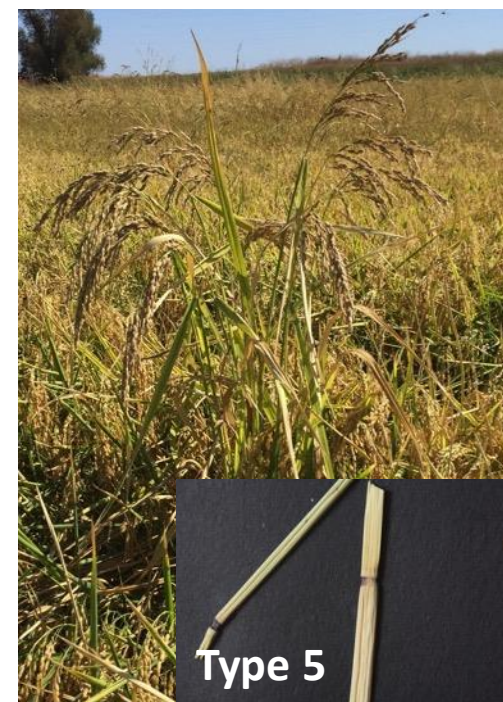
Same species as rice!

- Herbicides ineffective
- Only one herbicide recently found for spot-spraying: SUPRESS
- Requires cultural management



Field in Arkansas. Image from:
<https://www.bio.umass.edu/biology/sites/imladris.bio.umass.edu/biology/files/gbi-images/weedyredricefield.jpg>

- 13,000 acres found infested since 2016



Field Survey (grower/PCA submitted): 2020

By the end of the season, we had a total of:

- New sites: Sutter (Type 1), Yuba (Type 1), San Joaquin (Type 1)
- Previous growers with new types:
 - Yuba
 - Butte (2 growers)
- Questionable types:
 - Yuba, Sutter (similar type at both sites, short grain, awned, but white pericarp)
 - Yuba, Sacramento (long grain, red pericarp)
- Several concerns from Timothy Blank regarding seed fields

Field Survey (grower/PCA submitted): 2021

- Lots of calls in 2021, but the vast majority were not weedy rice (not red pericarp, non-shattering). Many were off-types or varietal contaminants.
- Preliminary findings:
 - 1 previously-infested ranch in Yuba County with Type 5
 - 3 new ranches infested in Glenn County (2 with Type 5, and 1 with Type 1),
 - 2 new unknown locations (Type 2 and Type 3) (submitted by seed company)
- All will be re-inspected next year for exact acreage and survey of surrounding fields (continuing with CRC survey)

Seed Fields (from Timothy Blank, CCIA)

- As a percent of each program, detections of red rice are much higher in the QA program.
- Types 1, 2, 5, 6, & 7 RR observed in seed fields in 2021. All fields with RR detections were rejected. 3 out of 10 occurrences suspected to originate from seed source (one Koshihikari lot and one A-201 lot).

Seed Fields (from Timothy Blank, CCIA)

Program	Applied acres (includes 'Inspection Only')	Approved acres	Rejected w/ RR	% Rejected of Applied acres	# Apps	# Apps w/ RR	% of Apps w/ RR
Certified	26,881	23,720	670	2.5%	355	7	2.0%
Q.A.	1,108	839	269	24.3%	29	3	10.3%
Total	27,989	24,559	939	3.4%	384	10	2.6%



Weedy Rice Survey 2020



Purpose

- Track spread to surrounding fields
 - Sanitation
- Gauge effectiveness of cultural practices:
 - Roguing
 - Certified seed

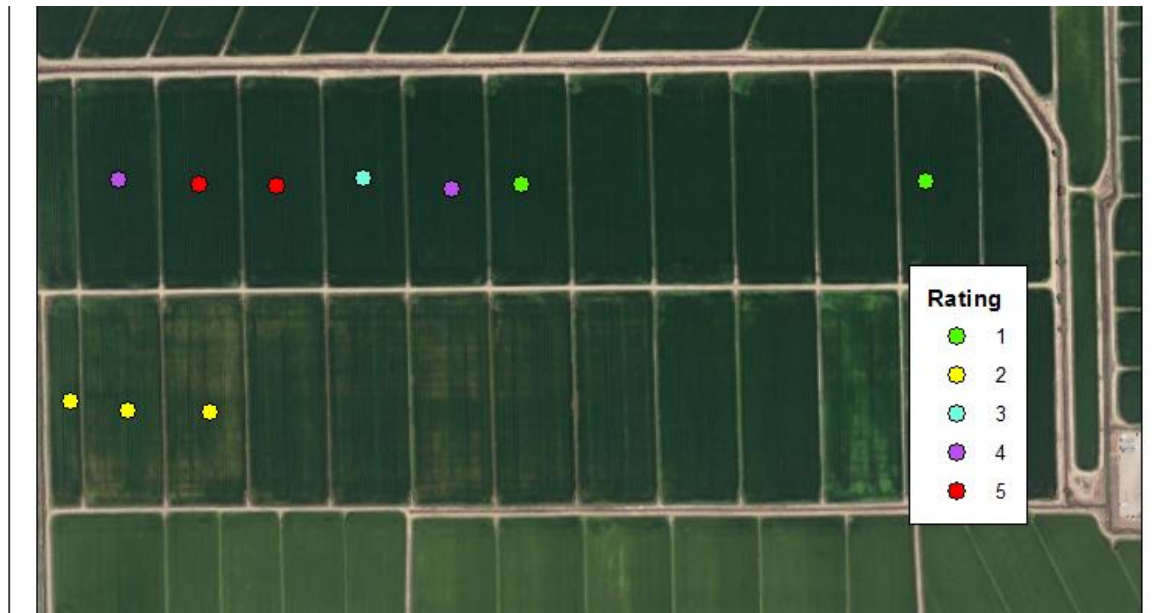


- Surveyed almost all known infested fields found since 2016 (approximately 11,000 acres)
- Surveyed all fields around known infested fields
- Applied a rating scale
- Better assessment of actual infested acreage and severity of infestation

Infestation Rating	Infestation Level per basin
0	No plants
1	<10 individual plants
2	>10 individual plants
3	Less than 5 patches of plant
4	5 or more patches
5	10-25% of basin infested
6	>25% of basin infested

Weedy Rice Status in California

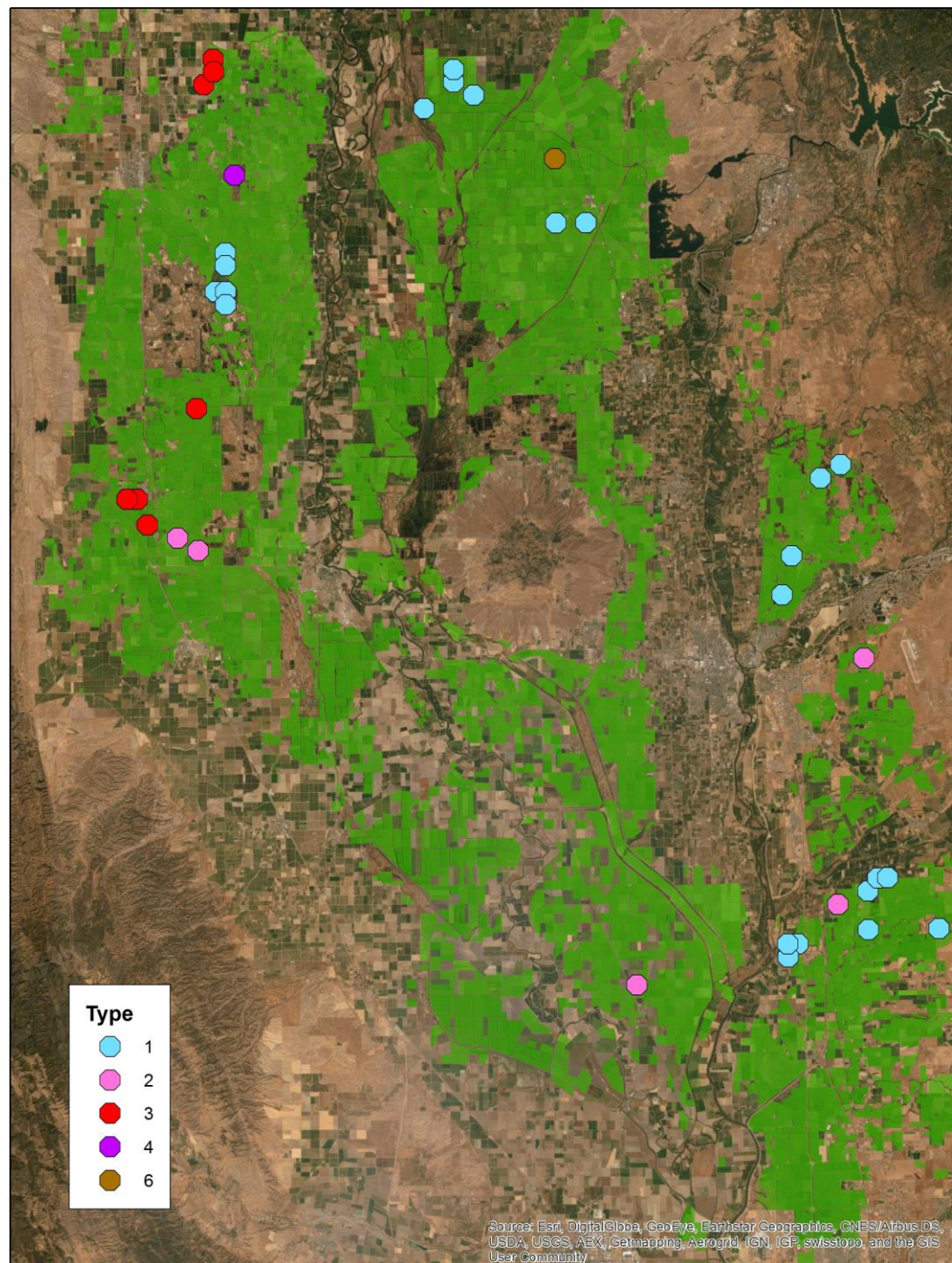
- Weedy rice locations inspected and rated during summer of 2020 – 11,000 acres inspected
- Better to consider infested BASINS



Counties	Surveyed (ac)	Infested (ac)	Infested (%)
Butte	1823	430	23.59
Glenn	1155	388	33.59
Colusa	1226	330	26.92
Yuba	1666	415	24.91
Sutter	3318	642	19.35
Placer	305	32	10.49
San Joaquin	0	N/A ^a	N/A ^a
Sacramento	0	N/A ^a	N/A ^a
Yolo	1288	0	0.00
Total	10781	2237	20.75

Biotypes (2020)

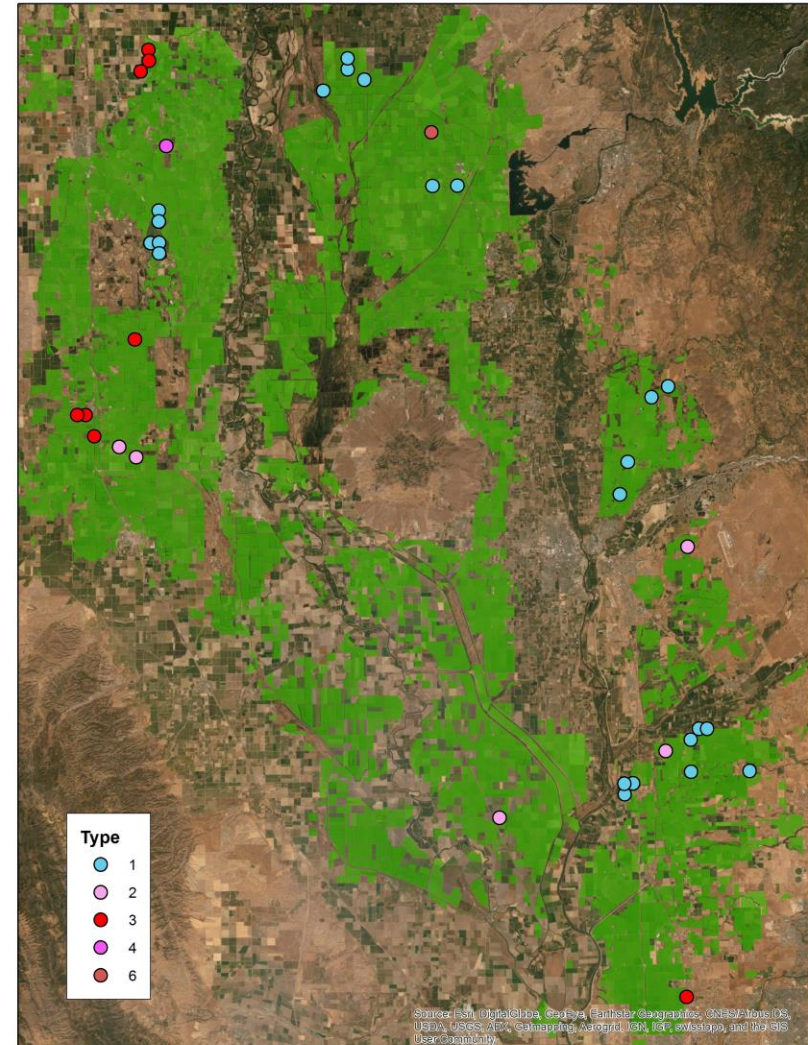
Biotype	Acres	%
1	1220	54.54
2	692	30.93
3	292	13.05
4	13	0.58
5	0	0.00
6	20	0.89
7	0	0.00
Total	2,237	100%



Infestation Level	(ac)	% of Infested	% of Total
		Acres	Acres
0	8544	N/A	79.3
1	472	21.1	4.4
2	612	27.4	5.7
3	777	34.7	7.2
4	234	10.5	2.2
5	142	6.4	1.3
6	0	0.0	0.0
Total Uninfested	8544	N/A	79.3
Total Infested	2237	100.0	20.7

Weedy Rice Survey 2020

- Overall, infested area has stayed constant for the past 2-3 years
- Fields infested with Type 5 in the past seem to be clean
 - Switch to certified seed in 2019



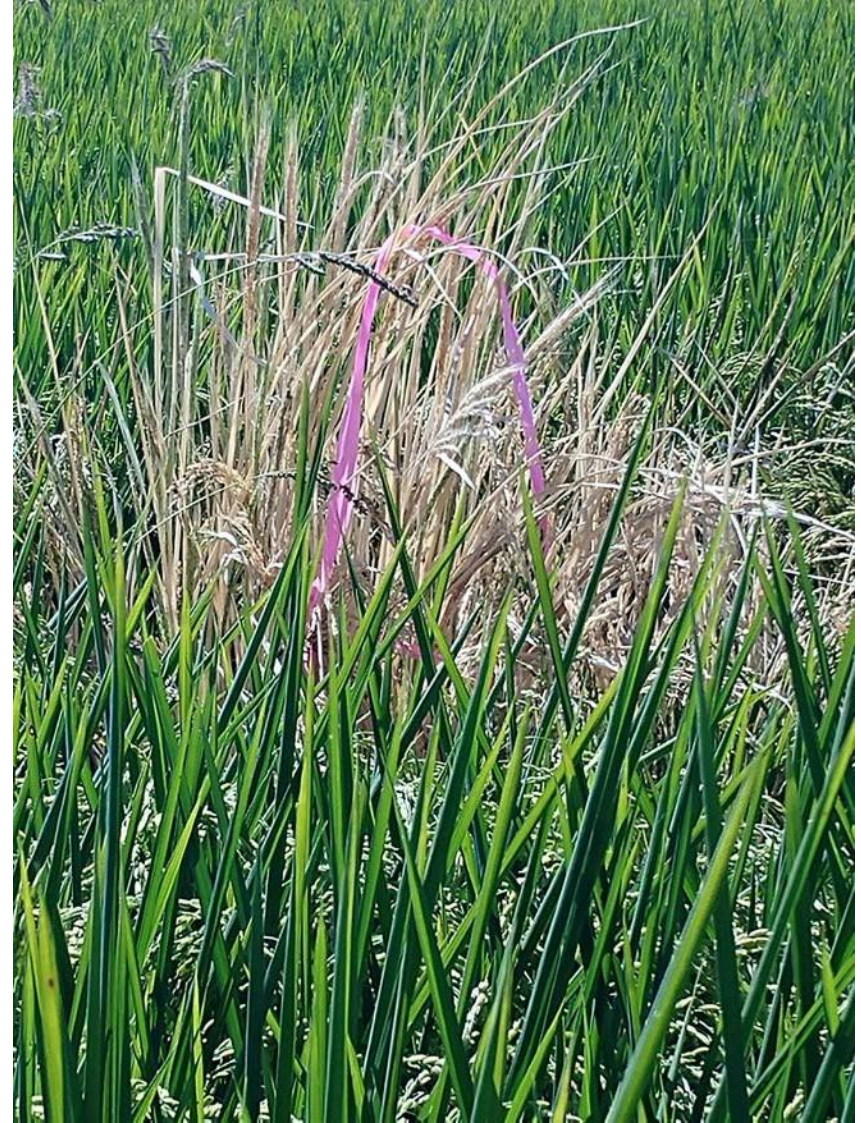
Conclusions


- Out of rice acreage in California (500,000 acres) only about 2273 acres was found infested with weedy rice in 2020
- No spread to surrounding fields
- Number of infested basins were reduced by 80% on average from previous years
- Reductions could be due to better surveying techniques, eradication efforts, and/or a combination of both
- The survey will be conducted again in 2025, but we are conducting yearly updates

SUPPRESS Herbicide for Spot Spraying Weedy Rice



2019: 1 Week After Spraying: plants still recovered



A photograph of a field of tall, green grass. In the center-left, a white marker is visible. A text box is overlaid on the right side of the image. The background shows a line of trees and a fence under a clear sky.

2020: 1 week after spraying
Application timing was earlier,
plants seem to have
completely died

	Visual Rating % Control			
	Early Timing		Late Timing	
	7 DAT	14 DAT	7 DAT	14 DAT
M-206	100	100	100	100
Biotype 1	100	100	100	100
Biotype 2	100	100	100	100
Biotype 3	100	100	100	100
Biotype 5	100	100	100	100



SUPPRESS for Spot Spraying (2022)

- For use in weedy rice spot spraying, SUPPRESS is an option
- Label does not allow for application when there is standing water in the field.
- Field will need to be drained before application.
- Application timing: after the last grass herbicide has been applied, but before the weedy rice has started to flower (generally no earlier than 60 days after seeding).
- Reflooding is recommended within 48 hours of application to reduce the germination of additional weeds, unless the field can remain drained until harvest.

SUPPRESS for Spot Spraying (2022)

- Follow label rate: do not go off-label, even for spot spraying
- Current maximum label rate is 9% solution of SUPPRESS in 100 gallons of water per acre
 - **9 gallons product/acre**
- If label can be amended to accommodate higher rates, information will be forthcoming

Acknowledgements

- California Rice Research Board
- UC Davis Agronomy HQ and Staff
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QUESTIONS?