

Weedy Rice Research

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Winter Grower Meetings 2020

Field Survey: 2019

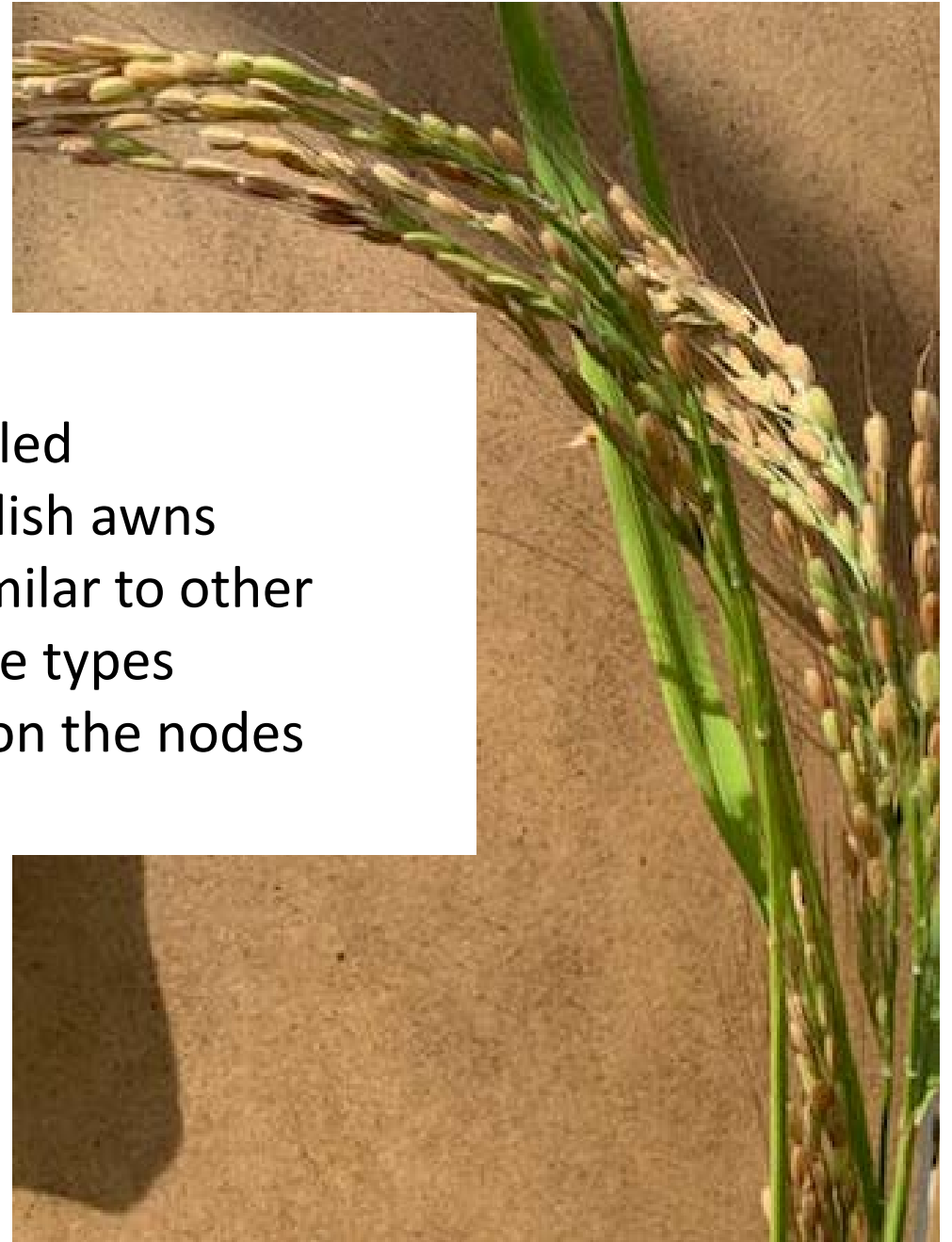
By the end of the season, we had a total of:

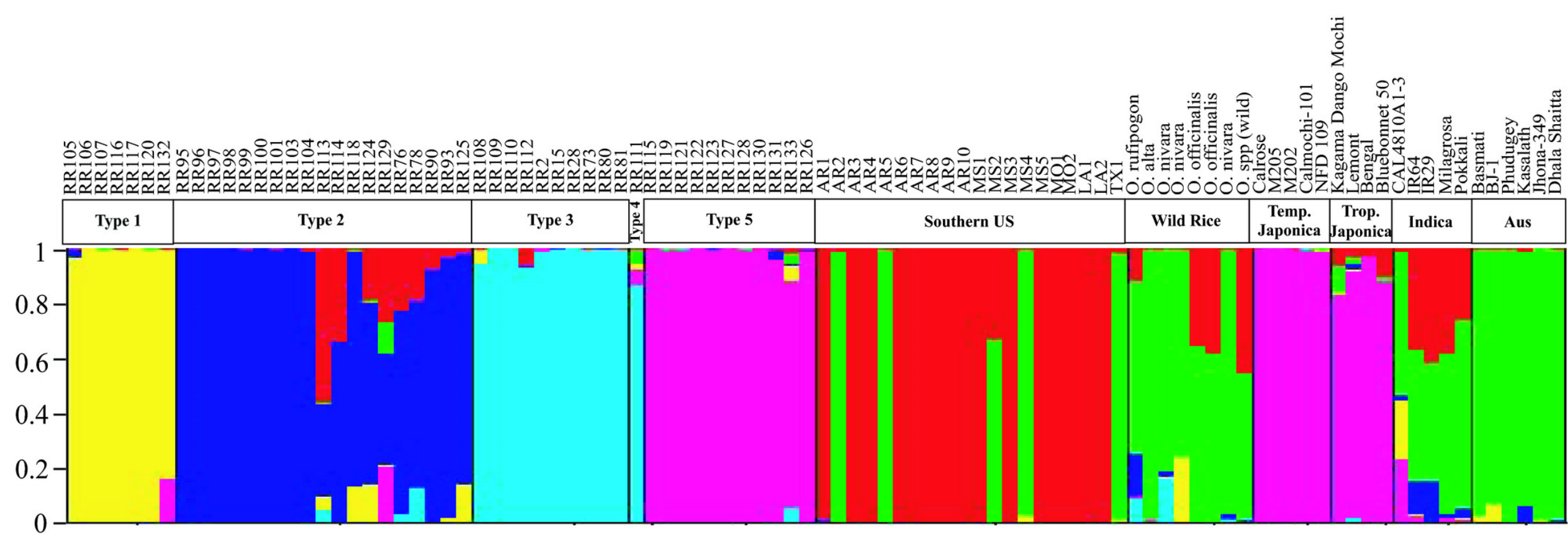
- 3 new sites (Placer, San Joaquin, Sutter)
- 1 previous grower with 2 additional biotypes (total of 4 found at this set of fields), including new type (7)
- New biotype (type 7)



Type 7:

- Straw-hulled
- Long reddish awns
- Height similar to other weedy rice types
- No color on the nodes





- Type 1 cluster: genetic contributions from *O. nivara*, one *indica* rice variety, and some Type 2 weedy rice individuals.
- Type 2: individuals show admixture with strawhull weedy rice from the southern United States, *indica* rice, or wild rice species.
- Type 3 and Type 4 rice: minor contributions from wild rice
- Type 5 weedy rice: cluster genetically with both tropical and temperate *japonica* rice

Weedy Rice Growth Potential

Biotype	<i>M-206</i>	1	2	3	4	5
Plant Height (cm)	106.5 <i>b</i>	155.0 d	146.5 d	130.2 c	92.3 a	124.7 c
SE	1.6	4.8	2.7	4.7	1.5	1.7
Tiller Number	11.4 <i>a</i>	18.2 ab	11.5 a	23.8 bc	26.8 c	18.4 ab
SE	1.1	0.8	1.2	2.4	2.4	1.9
Panicle Number	11.2 <i>a</i>	18.4 b	14.5 ab	33.0 c	29.1 c	16.8 ab
SE	1.1	0.9	1.2	3.0	3.1	2.0
Total Panicle Weight (g)	35.23 <i>a</i>	49.54 a	35.59 a	41.44 a	39.37 a	32.64 a
SE	4.51	3.68	4.97	5.51	5.43	4.61
Yield per Plant (g)	29.76 <i>ab</i>	44.06 b	30.30 ab	32.53 ab	24.99 a	28.01 ab
SE	3.84	2.96	4.27	4.59	3.55	4.12
Fresh Biomass (g)	90.58 <i>ab</i>	166.64 c	116.58 b	132.41 bc	48.88 a	120.23 bc
SE	7.75	10.66	14.18	17.27	6.66	10.29
Dry Biomass (g)	24.77 <i>ab</i>	49.43 c	35.26 b	36.04 bc	13.51 a	36.16 bc
SE	2.10	3.03	3.52	4.51	1.56	3.70
Root Dry Biomass (g)	19.05 <i>ab</i>	43.79 b	22.57 ab	37.31 b	12.63 a	47.09 b
SE	2.79	9.73	5.34	10.72	3.59	17.04
100 Seed Weight (g)	2.62 <i>c</i>	2.00 a	2.78 d	2.54 bc	2.45 b	2.48 b
SE	0.03	0.01	0.03	0.02	0.03	0.03

Summary

- Type 1 and 2 tallest, Type 4 shortest
- Type 3 and 4 greatest number of tillers and panicles
- Type 1 significantly higher yielding than other types
- Types 1 and 3 significantly higher biomass than M-206
- Type 4 lower biomass than M-206
- Type 1, 3, and 5: large root biomass compared to M-206
- Type 4: Root biomass much smaller than M-206
- Type 1 significantly lower 100-seed weight

Weedy Rice Field Experiment

Location: UC Davis Plant Sciences Field

Experimental Setup

- 2018: Established weedy rice populations in the field
 - Biotypes 1, 2, 3, and 5
 - Not enough seed for Biotype 4
- 2019: Started experiment
 - Conventional Flood
 - Rotation (Rice-Sorghum-Rice)
 - Stale Seedbed



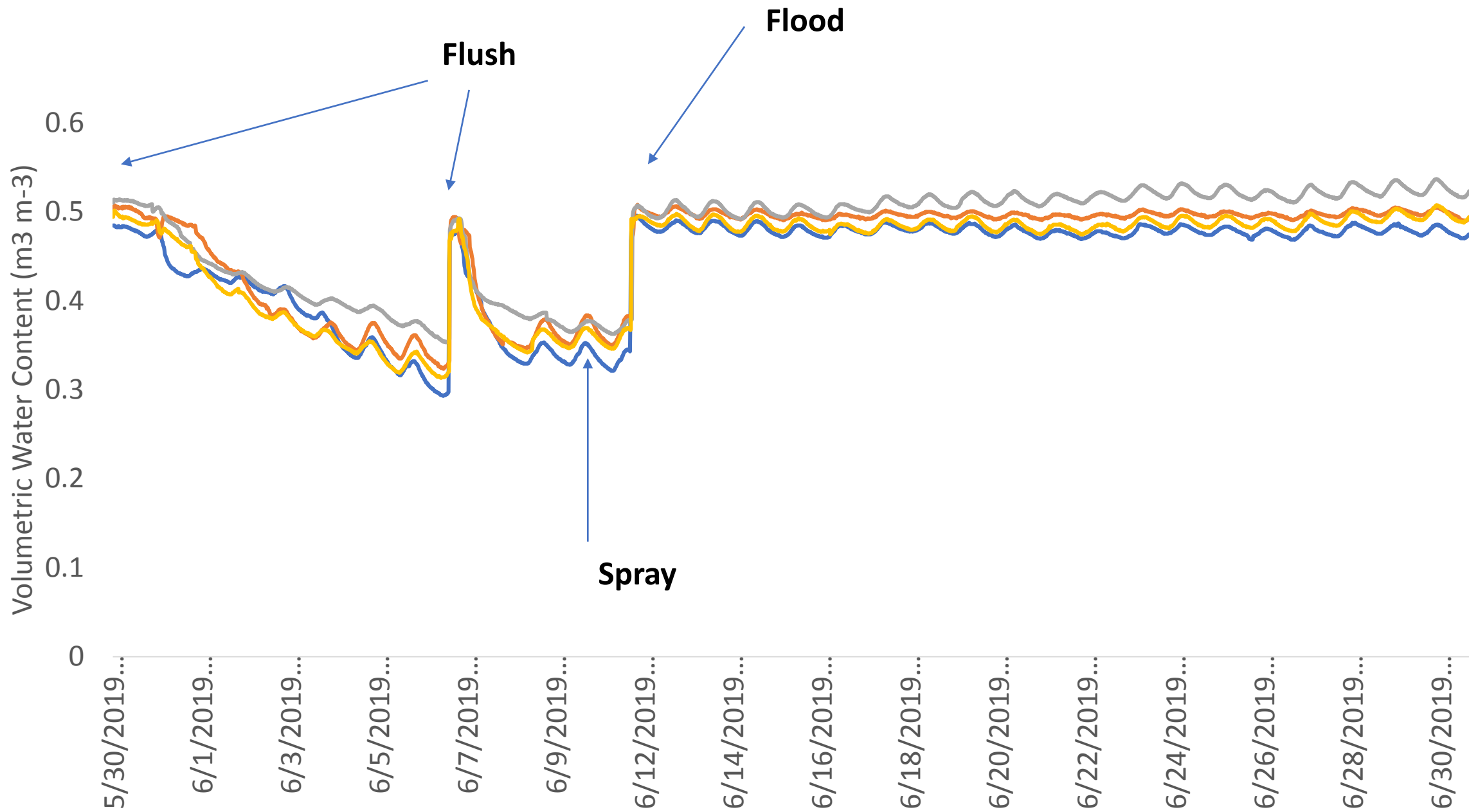


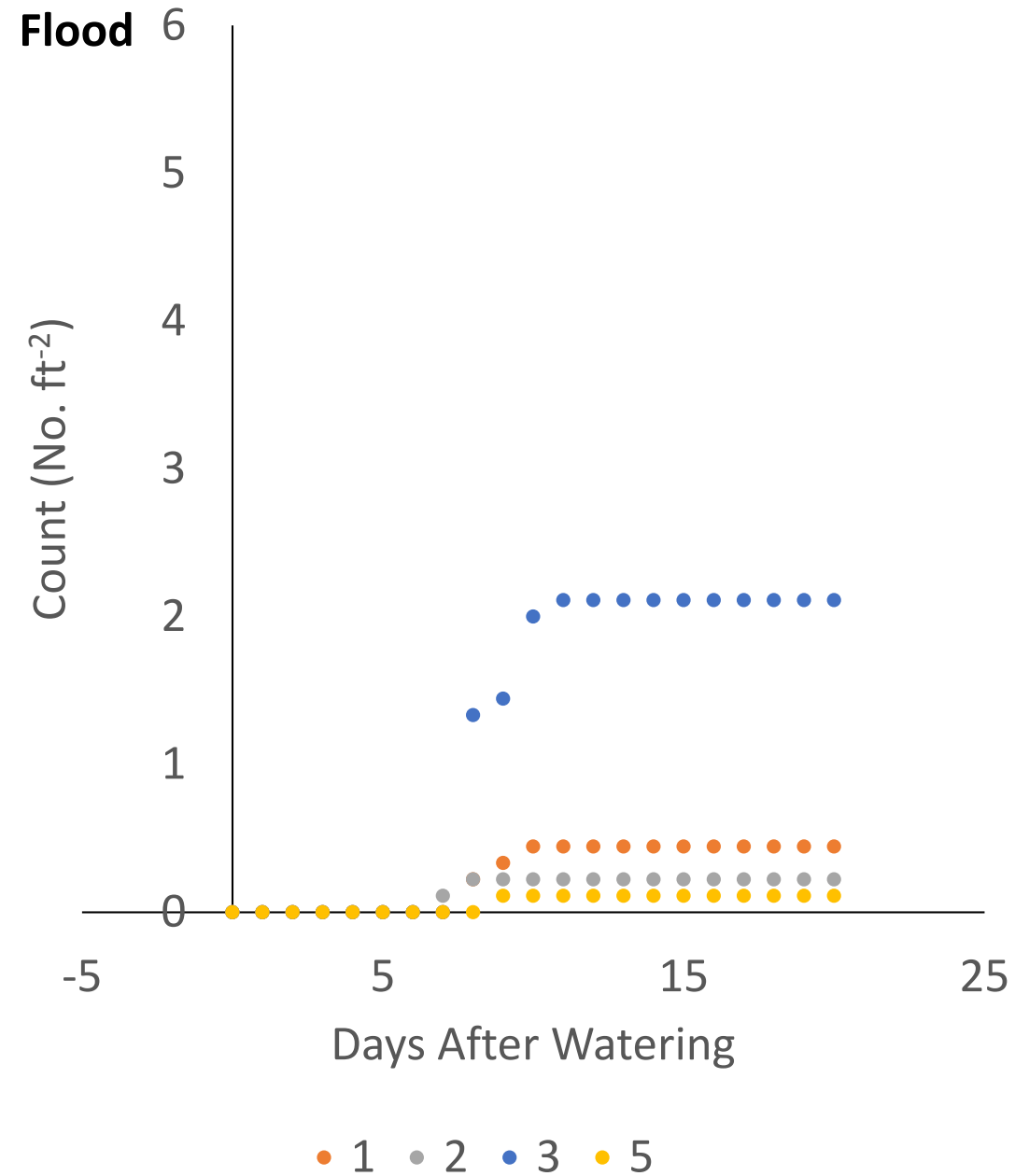
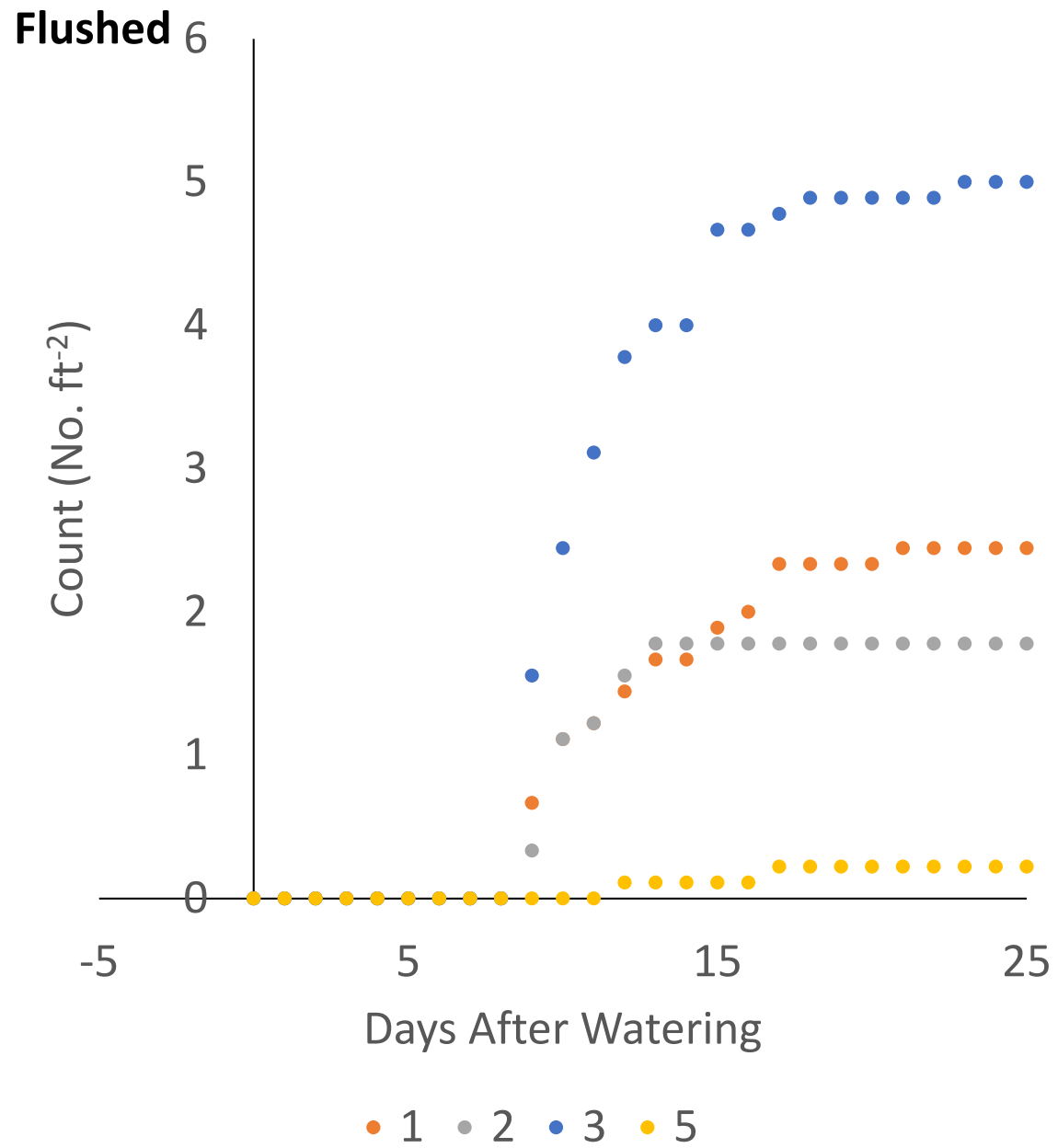
Treatments

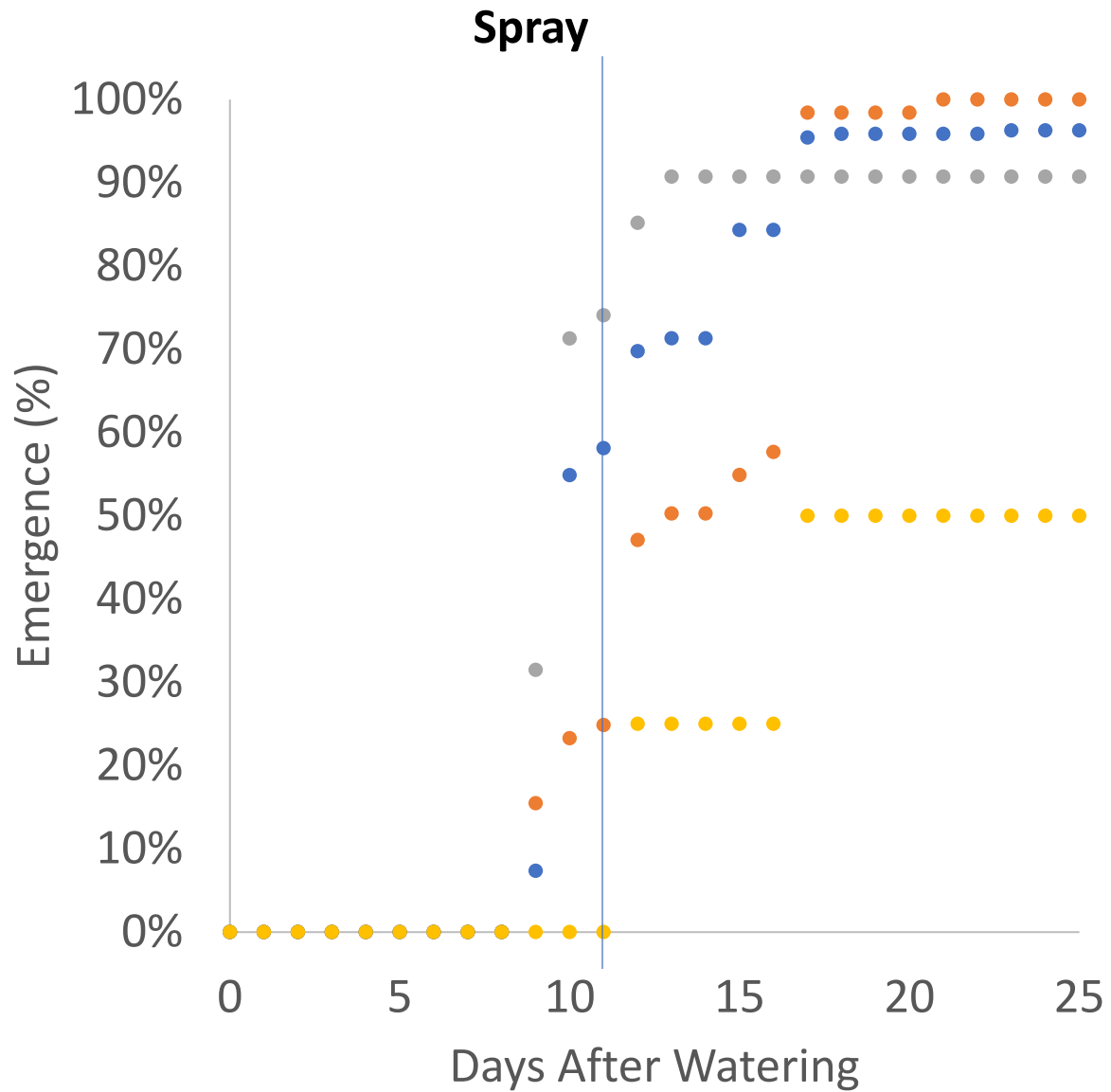
- Stale Seedbed:
 - Flushed: 5/30/19
 - Flushed again: 6/7/19
 - Sprayed glyphosate: 6/10/19
 - Flood up: 6/12/19
- Rotation:
 - Continuous flood applied: 6/12/19
- Control:
 - Continuous flood applied: 6/12/19
- Seeded with M-105 at 150 lbs/A
- Nitrogen: 150 lbs/A (urea)



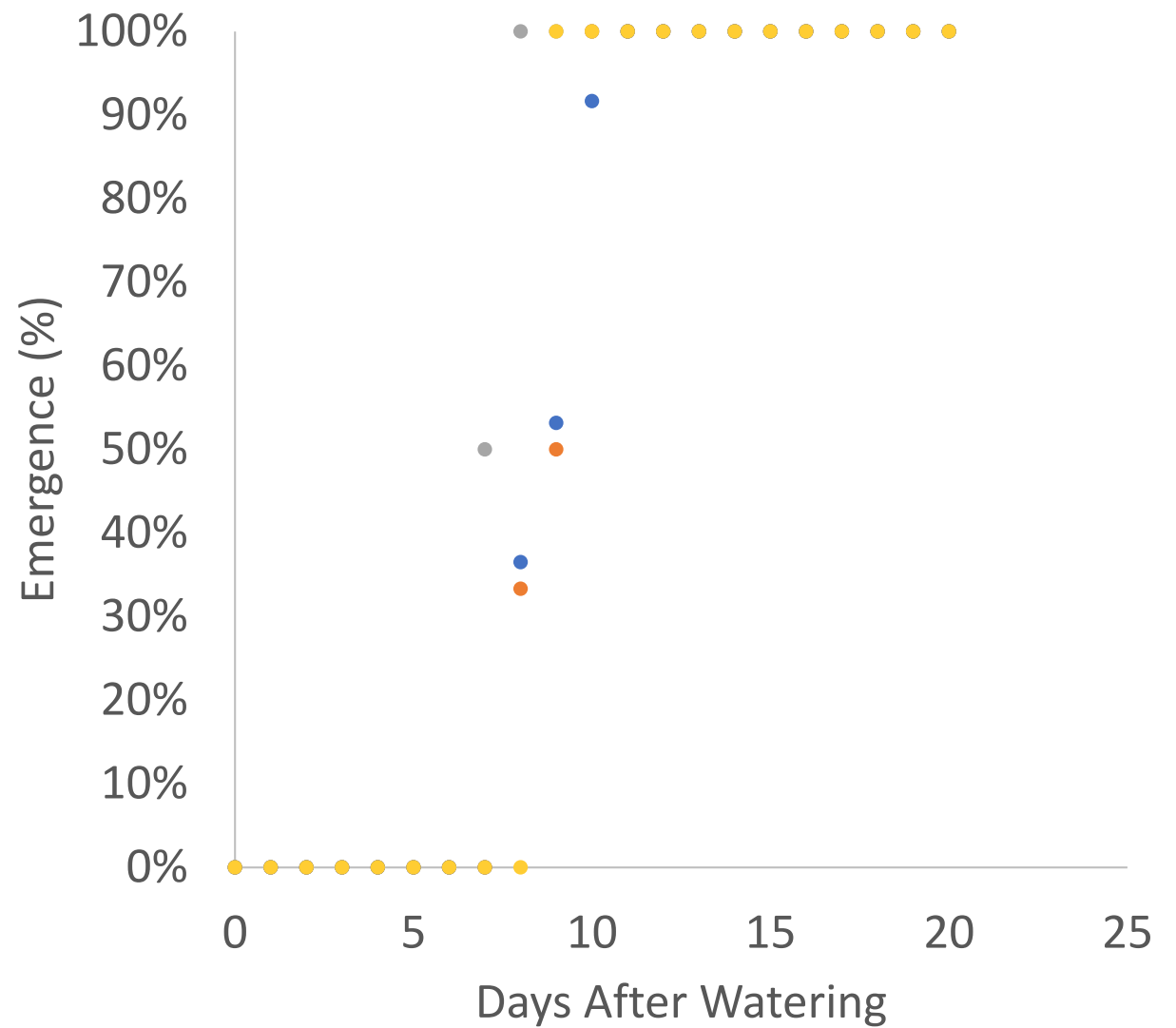








● Biotype 1 ● Biotype 2 ● Biotype 3 ● Biotype 5



● Biotype 1 ● Biotype 2 ● Biotype 3 ● Biotype 5

Stale seedbed

- Sprayed 11 days after field was flushed:
 - Type 1: 25% control
 - Type 2: 75% control
 - Type 3: 58% control
 - Type 5: 0% control
- Needs to be repeated (will repeat next year), and validated in the field, if possible

Summary

- Stale seedbed (flushed):
 - Emergence started around 9 days
- Flood:
 - Emergence started around 8 days
- Will re-calculate with Growing Degree Days (to see if there is any real difference)
- About twice as many plants per square foot emerge under flushed conditions, compared to flooded





		TILLER NUMBER	DRY WEIGHT (G)	PANICLE COUNT	TOTAL PANICLE WEIGHT (G)	PER PANICLE WEIGHT (G)	SEED WEIGHT (G)
Stale Seedbed	M-105	8	11.5	6	14.3	2.5	12.1
	Type 1	16	24.4	16	35.3	2.2	30.6
	Type 2	19	41.3	19	55.7	3.6	45.5
	Type 3	17	25.8	16	32.2	1.9	27.4
	Type 5	13	26.2	10	26.4	2.6	23.1
Rotation (Rice)	M-105	12	22.2	11	30.3	3.0	26.6
	Type 1	20	33.4	20	48.4	2.6	38.0
	Type 2	20	49.4	20	54.3	3.3	46.3
	Type 3	33	46.9	32	55.3	1.7	47.3
	Type 5	12	19.8	12	25.4	2.0	22.2
Control (Flood)	M-105	10	17.4	10	23.0	2.9	20.4
	Type 1	16	20.9	15	33.4	2.0	27.0
	Type 2	13	24.8	13	33.8	2.4	25.5
	Type 3	25	30.3	24	40.2	1.6	34.7
	Type 5	6	9.7	5	13.9	2.1	10.9

Preliminary Results: Harvest

- M-105 more competitive under flooded conditions
- Type 3 also more competitive under flooded conditions
- Type 5 generally less robust than other types across treatments, does best under dry-seeded conditions
- No clear trends for other biotypes
- Colder temperatures in continuously flooded check may be impacting rice growth and development

Spot Spray Herbicide Update

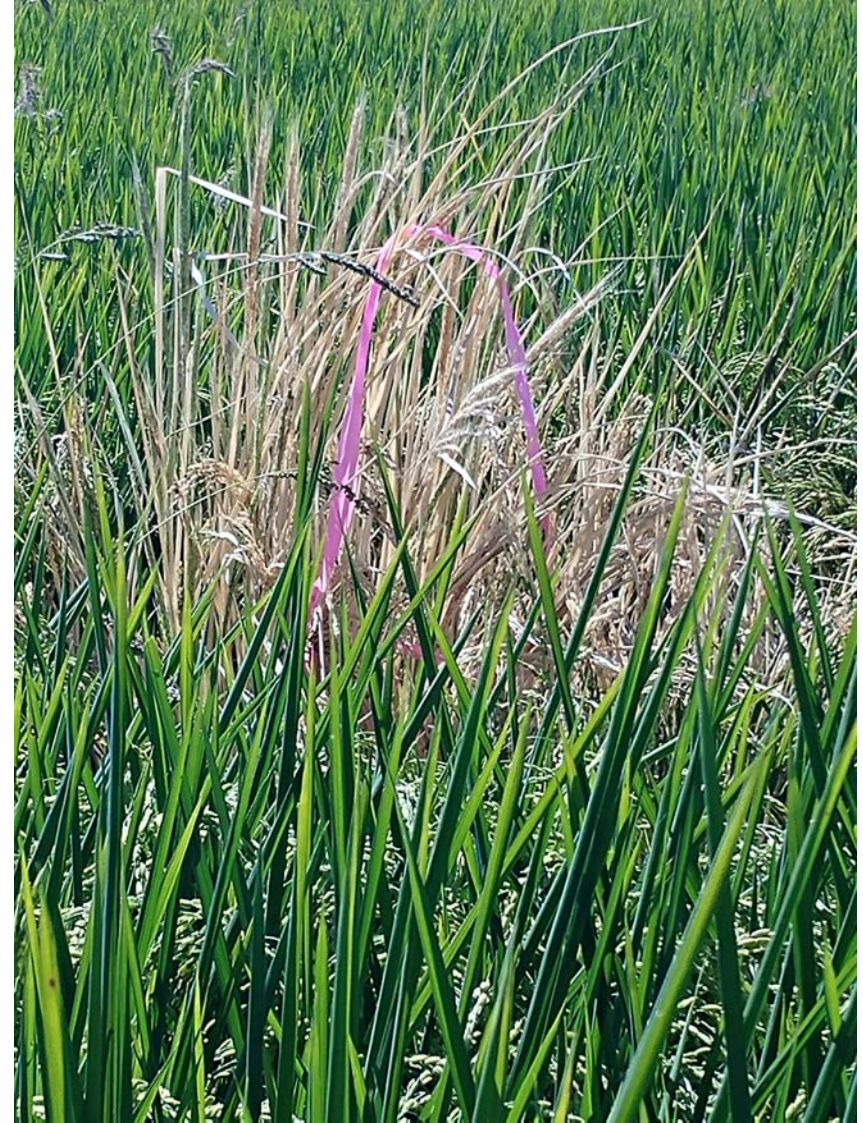
- Initially looked at clethodim as a Section 18
 - DPR did not agree with emergency justification
- Switched to glufosinate as a Section 24(c)
 - EPA eliminating the tolerance on rice
 - Basic registrant will not support Section 18

Potential New Option?

Collaboration with Jim Cook, CCFS (field testing)

- Already registered to be used in rice in California
- Field testing completed in one field (Type 3)
 - Efficacy was ok (did not completely kill plants)
 - May have been too close to heading
- Testing in greenhouse this winter to determine timing

1 Week After Spraying



Questions?