Emerging Weed Issues

Rice Winter Grower Meetings 2024

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Outline

- Rice Weeds
  - *Echinochloa walteri* (Walter's barnyardgrass aka coast cockspur)
  - *Bergia capensis* (White water fire)
  - Weedy rice

Walter’s barnyardgrass (Coast cockspur)

Watergrass *(Echinochloa spp.)* in California

- Cause huge yield losses (up to 100% in some systems)
- Most competitive weed complex
- Emerge under both continuously flooded conditions and flushed conditions
- One of the first weed groups in which herbicide resistance was found (in early 2000s)
- Multiple-herbicide resistant biotypes
- Metabolic resistance


Barnyardgrass (*E. crus-galli*)
Early watergrass (*E. oryzoides*)
Late watergrass (*E. phyllopogon)*

Echinochloa walteri (Walter's Barnyard Grass aka Coast cockspur)

- New species to California rice, possibly to California
- Quite certain at this point that it is Walter’s barnyardgrass
  - Confirmed with other weed scientists, but will confirm with a taxonomist
- Present in Texas rice fields
- Can reach heights of over 6 ft tall!
- Robust, large-stemmed plants
- Noticed in California rice fields in 2017

Characteristics

- **Barnyardgrass:**
- Small seed size
- Heads are variably awned, awns are short

- **Late watergrass:**
- Large seed size
- Heads never awned

- **Early watergrass:**
- Large seed size (same as late watergrass)
- Heads are always awned

- **Coast cockspur (Walter's barnyardgrass):**
- Small seed size (barnyardgrass)
- Heads are always awned
- Purple-colored awns

2020 Sample Collection

California Counties	No. of Samples	Percent
Butte	8	12.5
Colusa	6	9.4
Glenn	5	7.8
Sutter	23	36.0
Placer	9	14.1
Yuba	10	15.6
Yolo	3	4.7
Sacramento	0	0

Total Samples: 64

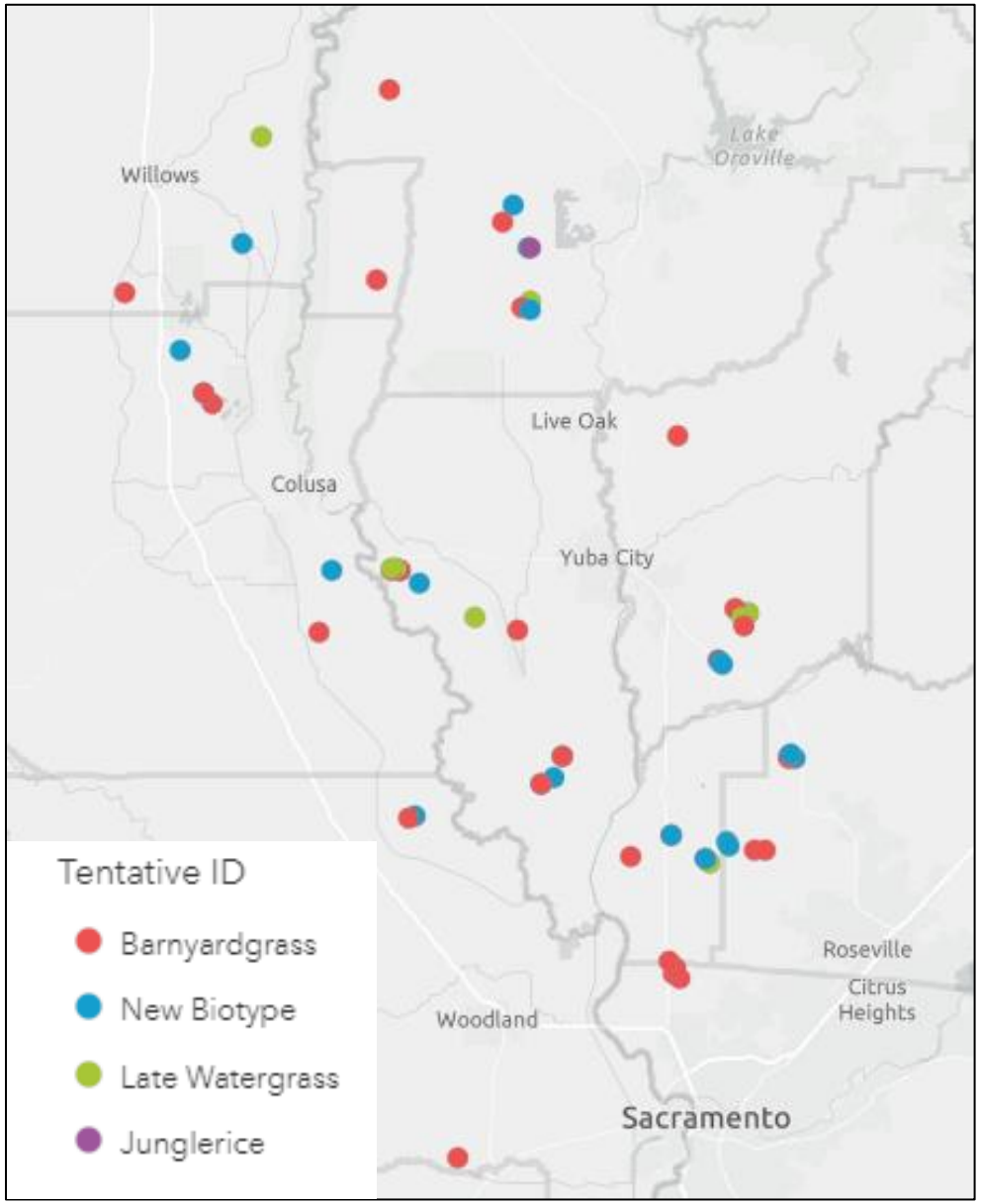


Table 3. Proportion of *Echinochloa* spp. samples suspected resistant to granular formulated herbicides across rice growing counties in California in comparison to a susceptible late watergrass (*Echinochloa phyllopogon)* population.

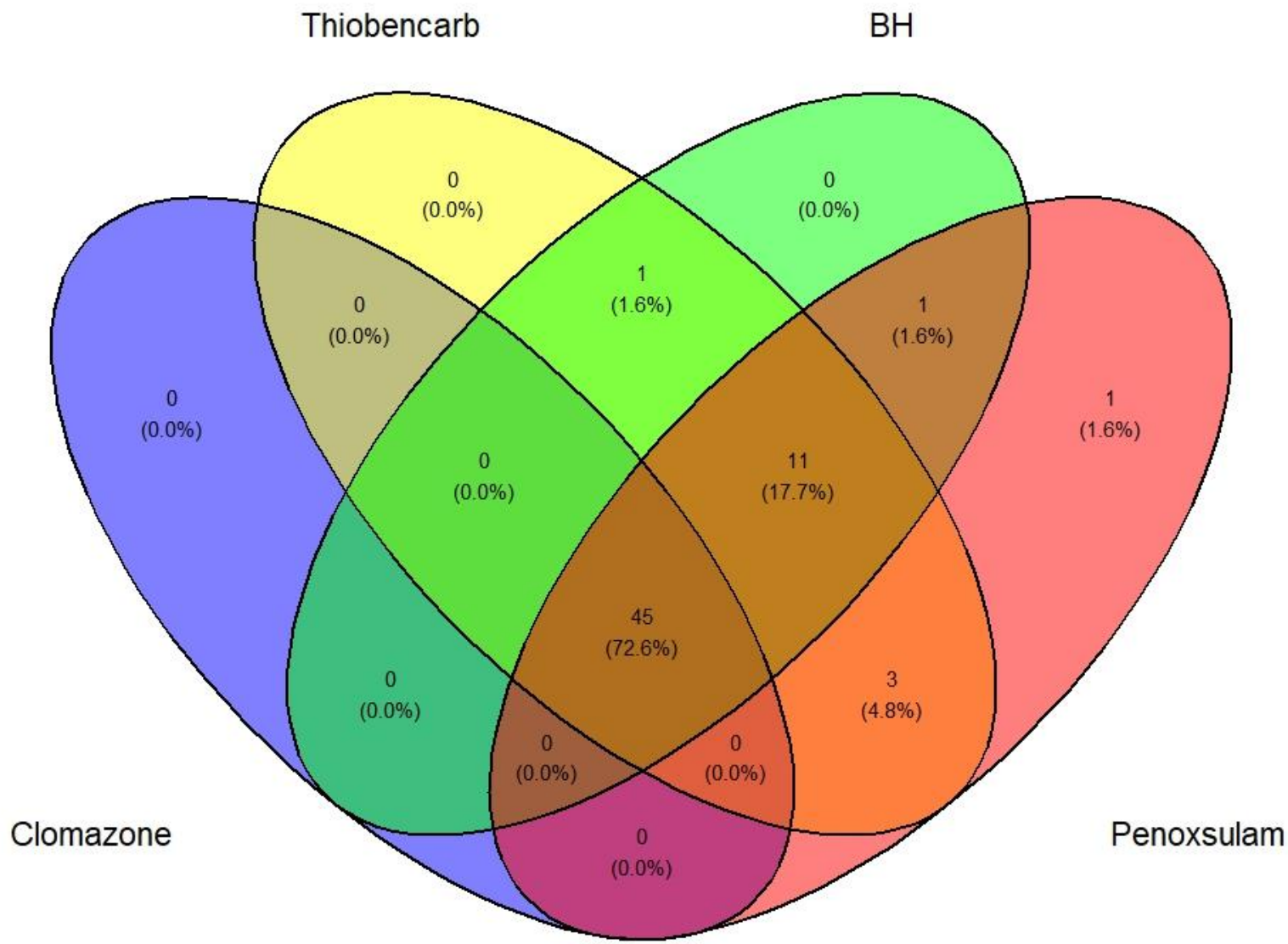
		Granular herbicides										Foliar herbicides							
		Summer					Winter					Summer				Winter			
S. No	Weed Species	Cl	Th	BH	Px	MR	Cl	Th	BH	Px	MR	Cy	Bis	Pr	MR	Cy	Bis	Pr	MR
		%																	
1	Barnyardgrass	70	100	93	97	100	7	73	60	77	80	33	87	17	37	77	63	27	57
2	Junglerice	0	0	50	100	50	50	50	50	50	50	0	50	50	0	0	50	50	50
3	Late watergrass	80	100	100	100	100	20	100	90	90	90	80	90	80	80	100	60	30	70
4	Coast cockspur	80	100	95	100	100	20	95	65	90	95	62	90	29	57	71	71	24	67

Cl, clomazone; Th, thiobencarb; BH, benzobicyclon + halosulfuron; P, Penoxsulam; Cy, cyhalofop; Bis, bispyribac-sodium; Pr, propanil; MR, multiple-resistance

Table 5. Proportion of samples showing different resistance profile categories collected from California rice fields in 2020.

	Granular herbicides								Foliar herbicides							
	Fall				Winter				Fall				Winter			
No of MOAs	BG	JR	LW	CC	BG	JR	LW	CC	BG	JR	LW	CC	BG	JR	LW	CC
	%															
0	0	0	0	0	17	50	0	5	10	50	10	5	13	0	0	14
1	0	50	0	0	10	0	10	5	47	0	10	38	29	100	30	19
2	13	50	0	5	17	0	0	25	37	50	0	33	39	0	50	52
3	17	0	60	15	50	0	70	55	7	0	80	24	19	0	20	15
4	70	0	40	80	6	50	20	10	NA							

BG, barnyardgrass; JR, junglerice; LW, late watergrass; CC, coast cockspur.


Thiobencarb
BH
Clomazone
Penoxsulam
0
(0.0%)
0
(0.0%)
0
(0.0%)
1
(1.6%)
0
(0.0%)
1
(1.6%)
0
(0.0%)
1
(1.6%)
0
(0.0%)
11
(17.7%)
45
(72.6%)
0
(0.0%)
3
(4.8%)
0
(0.0%)
0
(0.0%)
0
(0.0%)

More data coming…

- Best control methods for postemergence treatments
- Tank mixes:
  - Efficacy and phytotoxicity as well as yield data
  - In 2022-2023, conducted experiments throughout the valley
  - Tested:
    - Propanil-based tank mixes
    - Regiment-based tank mixes
- Looking for locations/collaborators for 2024 season

“White Water Fire”

“White Water Fire” (*Bergia capensis*)

- Collected in Butte County on September 19, 2023
- Submitted to the California Department of Food and Agriculture (CDFA) botany lab for identification.
- **First record of the plant in California and possibly the USA.**
- Assigned a temporary Q rating
- Sample was collected from a rice field and was found growing inside the field.
- Not growing on banks or in ditches, it appears the preferable habitat is rice fields and marshy areas.

“White Water Fire” (*Bergia capensis*)

- It looks similar to; redstem (Ammania spp.) but the stem itself is much larger in diameter and less dense.
- Currently, there is little information globally on the plant; how invasive it is and how it impacts rice fields.
- Native to Africa and China, and has been identified in parts of Central America.

“White Water Fire” (*Bergia capensis*)

- Butte County Department of Agriculture surveyed additional rice fields and did not find it in any other locations.
- Common ways of spread is the cultivation of rice. As of this date it has only been found in three checks of one rice site.
- Best management practices: may include roguing field of species prior to harvest and cleaning/sanitizing of equipment post-harvest.

Weedy Rice: New Biotypes

Type 6

- Black-hulled
- Long awns
- Awns reddish before maturity

Shattering	Dormancy	Pericarp Color
High	High	Red

Type 7

- Straw-hulled
- Long awns
- Awns reddish before maturity

Shattering	Dormancy	Pericarp Color
High	High	Red

WR-10

- Straw-hulled
- Medium length awns
- Seed is closer in size to a long-grain

Shattering	Dormancy	Pericarp Color
High	Low	Red

WR-15

- Straw-hulled
- Variable awn length

- Variant of Type 3?
- Awns not exactly the same

Shattering	Dormancy	Pericarp Color
High	High	Red

WR-16

- Black-hulled
- Long awns
- Awns NOT reddish before maturity

Shattering	Dormancy	Pericarp Color
High	High	Red

White Pericarped

- Straw-hulled
- Long awns
- Awns reddish before maturity
- WHITE pericarped

Shattering	Dormancy	Pericarp Color
High	Intermediate	White

Further Research/Extension

- Genetic study on weedy rice
  - Will help determine the source of the new biotypes
- Updating maps
- Names (will be updated)—more news to come
- Photos of the new biotypes as mature plants (not just seeds)
- More extension materials/identification materials

QUESTIONS?