

Weed Control with ROXY Rice Production System

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Herbicide Resistant Weeds in California Rice Fields

| Common name | Trade name | MOA |
|-------------------|-------------------|-------------------------------------|
| Bensulfuron | Londax® | ALS inhibitor |
| Bispyribac-sodium | Regiment® | ALS inhibitor |
| Halosulfuron | Sandea® | ALS inhibitor |
| Imazosulfuron | League | AL inhibitor |
| Orthosulfamuron | Strada | ALS inhibitor |
| Penoxsulam | Granite® | ALS inhibitor |
| Benzobicyclon | Butte | HPPD inhibitor |
| Carfentrazone | Shark H2O® | PROTOX inhibitor |
| Clomazone | Cerano®, Bombard® | Carotenoid biosynthesis inhibitor |
| Cyhalofop-butyl | Clincher® | ACCase inhibitor |
| Pendimethalin | Prowl H2O® | Tubulin inhibitor |
| Propanil | Stam®, SuperWham® | Photosystem II inhibitor |
| Thiobencarb | Abolish®, Bolero® | VLCFA (Very long chain fatty acids) |
| Triclopyr | Grandstand® | Synthetic auxin |

Observed Resistance to One, Two, Three, Four or Five Modes of Action for each Rice Weed Species

| Weed Species ^a | Total | ------%----- | | | | |
|---------------------------|-------------|--------------|-----|-------|------|------|
| | Sample s | One | Two | Three | Four | Five |
| BYG | 155 | 8 | 16 | 37 | 26 | 1 |
| LWG | 106 | 5 | 10 | 12 | 10 | 37 |
| EWG | 42 | 17 | 62 | 5 | 2 | 0 |
| ST | 103 | 39 | 4 | - | - | - |
| SF | 188 | 9 | 72 | 18 | 1 | - |
| BR | 18 | 33 | 6 | - | - | - |
| RS | 13 | 77 | 8 | - | - | - |

^aBYG, barnyardgrass; LWG, late watergrass; EWG, early watergrass; ST, bearded sprangletop; SF, smallflower umbrella sedge; BR, ricefield bulrush; RS, redstem

Roxy Rice Production System

- ROXY RPS® is based on herbicide tolerance and this is not a herbicide resistant technology
- ROXY RPS® will be launched in CA rice market and is an exclusive partnership between CRRF and Albaugh, LLC
- ROXY RPS® herbicides have been submitted for registration with the EPA with a concurrent review process with the CA DPR
- ROXY® Trait confers tolerance to Oxyfluorfen herbicide – Albaugh will have the only registered Oxyfluorfen herbicide (ALB2023) for use in the ROXY RPS®
- The ROXY RPS will position the use of ALB2023 as a base weed control herbicide that can be combined with other herbicide modes of actions for resistance management
- ALB2023 will be applied at rates of 1.0 – 2.0 pt/acre applied pre-flood and pre-plant in water seeded rice
- Good rice crop safety
- Excellent weed control with weakness on sprangletop and Rice bulrush

| Treatment # | Product and Rate |
|-------------|-------------------------------|
| 1 | ALB 2023 (1.0 pt/A) |
| 2 | ALB 2023 (1.5 pt/A) |
| 3 | ALB 2023 (1.75 pt/A) |
| 4 | ALB 2023 (2.0 pt/A) |
| 5 | ALB 2023 (2.25 pt/A) |
| 6 | ALB 2023 (2.0 pt/A) fb |
| | Granite GR (13 lbs/A) |
| 7 | ALB 2023 (2.0 pt/A) fb |
| | Grante GR (13lbs/A) |
| | Grandstand CA (0.5 pt/A) with |
| | NIS (0.25% v/v) |
| 8 | Alb 2023 (2.0 pts/A) fb |
| | Grante GR (13lbs/A) & |
| | Loyant (2 pt/A) with |
| | Clincher (11 floz/A) with |
| | MSO (0.5 pt/A) |
| 9 | Butte (7.5 lbs/A) fb |
| | Grante GR (13 lbs/A) & |
| | Grandstand CA (0.5 pt/A) with |
| | NIS (0.25% v/v) |
| 10 | Untreated control (UTC) |

14 DAS

| | Crop injury (%) | | | |
|-------|------------------------|-------|-------|-----------|
| Trtmt | blch | chlor | stnt | stand red |
| 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 6.25 | 0 |
| 3 | 0 | 0 | 8.75 | 0 |
| 4 | 0 | 0 | 11.25 | 0 |
| 5 | 0 | 0 | 16.25 | 0 |
| 6 | 0 | 0 | 13.75 | 0 |
| 7 | 0 | 0 | 10 | 0 |
| 8 | 0 | 0 | 3.75 | 0 |
| 9 | 0 | 0 | 3.75 | 0 |
| 10 | 0 | 0 | 0 | 0 |

Final Yield for all treatment groups

| Treatment # | lb/ac | Treatment # | lb/ac |
|-------------|----------|-------------|----------|
| 1 | 6937.541 | 6 | 9696.047 |
| 2 | 8280.022 | 7 | 8871.931 |
| 3 | 7893.363 | 8 | 9249.925 |
| 4 | 8598.514 | 9 | 7997.192 |
| 5 | 7734.148 | 10 | 4987.954 |

Roxy Rice



Untreated control



ALB 2023 2 pt/A