Control of Roundup Resistant Junglerice in Almonds

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Junglerice (*Echinochloa colona*) is a non-native annual grass common in agricultural areas throughout California. It has been reported to be resistant to glyphosate (Roundup) in Sacramento Valley of California. Preliminary greenhouse tests confirmed a high level of glyphosate tolerance in seed send in for testing. An experiment was conducted in a mature almond orchard, located on the Price Farm, to assess junglerice control. This orchard site was located near Durham, California; the grower claimed to have junglerice which was historically not controlled by glyphosate. The orchard utilized solid set sprinklers for irrigation.

Experimental plots were arranged in a randomized complete block. Individual plots were 14 ft. wide by 14ft. long, and replicated 4 times. Treatments were applied on June 4, 2008, using a CO_2 powered backpack sprayer. A 4-nozzle spray boom was used, equipped with 8002 flat-fan nozzles, with pressure set at 30psi. Final spray volume was 20 gallons per acre. Ammonium sulfate (2 % by weight) was added to all treatments to counteract hard water. Junglerice at the time of treatment, ranged from 4 inch diameter up to 12 inches in diameter, with the larger plants flowering and some setting seed. The entire plot area was irrigated the day following application. Visual evaluations of junglerice control were made at 1, 2, 4, and 6 weeks after application, using a 0 (no control) to 100 (complete death) scale.

At one week after treatment (June 11), junglerice control was only 14% in plots treated with Roundup WeatherMax at 1.5 lb ae/a (Table 1). Adding either Poast or Chateau to Roundup did not improve junglerice control at one week after treatment, but adding both Poast and Chateau improved control at one week by 20%. Rely 200 alone or in combination with Roundup also provided 20 to 25% more junglerice control than Roundup applied alone. The best treatment at one week was Gramoxone Inteon alone or in combination, which resulted in nearly 100% junglerice control.

At two weeks after treatment, junglerice control with the Roundup treatment was still just 14%. Poast applied alone was also providing only low (18%) levels of control. However, the combination of Roundup plus Poast resulted in nearly 40% better junglerice control than either product applied alone. Adding Chateau or Matrix to Roundup or Roundup combinations did not appear to improve junglerice control at two weeks after treatment. Rely 200 with or without Roundup was still providing about 40% control, which was similar to what was seen at one week after treatment. Gramoxone treatments were the most effective treatments on junglerice, providing nearly 100% control at two weeks after treatment.

At four weeks after treatment, Roundup alone or with Chateau or Rely 200 was only providing about 15 to 30% junglerice control. Poast alone or in combination was finally providing acceptable (69 to 74%) control. Junglerice control declined at four weeks after treatment on the plots treated with Gramoxone alone, as new seedlings began to emerge. Adding Matrix or Poast plus Matrix to Gramoxone treatments resulted in good initial control of the junglerice and residual control from the Matrix, which prevented further emergence.

At six weeks after application, the Roundup, Chateau, and rely 200 treatments were still only providing 28% or less junglerice control. Junglerice control in plots where Poast was applied continued to improve, with the exception of the Poast plus Roundup plus Chateau treatment. The rapid control (most likely from the Chateau) observed on these plots at one and two weeks after application may have prevented the translocation of the Poast, and thus the lack of increased control at six weeks after application. Junglerice control in the Gramoxone alone plots also continued to decline, but when Matrix was added, the control was still nearly 100% at six weeks after application.

The grower over-sprayed the entire plot area following the six week evaluation, preventing further evaluations.

In summary, Roundup alone would not be an effective treatment in situations where glyphosate resistant junglerice was present. Applications made earlier in the season may have resulted in better junglerice control with Roundup, since many of the junglerice plants were larger than the recommended size (9 inches – 32 oz) on the Roundup WeatherMax label. Neither Chateau nor Rely 200 were effective in controlling junglerice and thus would not be useful for managing this weed. The addition of Poast can help to control the junglerice, but Roundup would still be needed to control the weeds other than the grasses. Gramoxone was effective against established junglerice, but a residual material would help to improve residual weed control.

Table 1. Junglerice control (%) relative to herbicide treatment and evaluation date.

	11-Jun	18-Jun	3-Jul	18-Jul
Roundup 1.5lb	14	14	15	18
Roundup + Poast 0.375 lb	26	56	80	92
Poast 0.375 lb	2	18	72	97
Roundup + Poast + Matrix 1 oz	16	44	90	98
Poast + Matrix	5	32	69	89
Roundup + Chateau 5.1 oz	16	18	18	28
Roundup + Poast + Chateau	34	68	74	72
Gramoxone 1.0 lb	100	100	86	82
Gramoxone + Matrix	95	98	96	97
Gramoxone + Poast + Matrix	99	99	98	98
Rely 200 1.0 lb	41	48	28	20
Rely 0.75 lb + Roundup	35	36	22	21
Rely 1.0 lb + Roundup	42	40	28	20
Untreated	0	0	0	0
LSD .05	11	18	18	14