

Controlling Herbicide Resistant Italian Ryegrass, John Roncoroni¹, Caio Brunharo², Bradley Hanson³.

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Sonoma county has become a ‘hot-spot’ for herbicide resistant Italian ryegrass (*Lolium perenne* spp. *multiflorum*). Like most areas in northern California almost 100% of the ryegrass in Sonoma is known to be resistant to glyphosate (RoundUp and others). In 2013, I was contacted by a grapegrower with suspected glufosinate (Rely, Lifeline and others) resistance. I contacted Dr. Marie Jasieniuk Professor Dept. of Plant Sciences at UC Davis who has been working on resistance for assistance. Samples of this population and several other populations in Sonoma and Lake counties were collected as part of a larger project. In greenhouse studies this population was found to not be resistant, but a population near Cloverdale was found to be resistant to Rely.

In spring of 2015 I was contacted by another grower after a sethoxydim (Poast) treatment failed to control a population of ryegrass that was known to be resistant to glyphosate. I contacted Dr. Brad Hanson UCCE Weed Specialist to alert him to the possible resistance. Plants were collected and grown out in greenhouses at UC Davis to collect seed. A subsequent fluazifop (Fusilade) application was made in the vineyard which also failed. Dr. Hanson’s PhD graduate student Caio Brunharo carried out greenhouse experiments to characterize the response of the suspected-resistant population of Italian ryegrass, compared to a previously characterized, susceptible population. Plants were treated with, fluazifop, glufosinate, glyphosate, sethoxydim, paraquat (Gramoxone), clethodim (Clethodim and Select), rimsulfuron (Matrix), and pyroxsulam (not registered in grapes) at various rates for the construction of dose-response curves. A field experiment was also carried out in the affected vineyard to assess the efficacy of sethoxydim (Poast Plus at 2.25 pints/A + COC at 1%) paraquat (Gramoxone SL 2.0 at 4 pints/A + NIS at 0.25%), glufosinate (Rely 280 at 56 fl. oz./A + AMS at 1% + NIS at 0.25%), rimsulfuron (Matrix SG at 4 oz./A + NIS at 0.25%) and fluazifop (Fusilade DX at 12 fl. oz./A + NIS at 0.25%). Based on the greenhouse experiment, the Sonoma population was highly susceptible to clethodim, glufosinate, paraquat, pyroxsulam and rimsulfuron, and had moderate susceptibility to sethoxydim. On the other hand, the quantity of glyphosate and fluazifop necessary to reduce the growth of the Sonoma population by 50% was 126 and 31 times larger, respectively, compared to the susceptible. Validating the results obtained in greenhouse, poor control of the Sonoma population with fluazifop and moderate control with sethoxydim was observed in the field. Conversely, glufosinate, paraquat and rimsulfuron provided excellent (91 to 97%) control of the Sonoma population. These field and greenhouse experiments confirmed glyphosate and fluazifop resistance in the Sonoma vineyard site but indicated that the population was susceptible to glufosinate, paraquat and rimsulfuron. (Above information from ‘A population of Italian ryegrass from Sonoma County California exhibits resistance to fluazifop and glyphosate.’ Brunharo, C., J. Roncoroni, B. Hanson. Abstract submitted to California Weed Science Society, 2017.)

I conducted a trial in the same field to determine what combinations of herbicides could be used to not only control Italian ryegrass, but other common weeds, with a combination of preemergence and postemergence herbicides with glyphosate. These herbicides were:

flumioxazin (Chateau), flazasulfuron(Mission), rimsulfuron (Matrix), indaziflam (Alion), and pendimethalin (Prowl H₂O). A complicating factor for successful control is that Italian ryegrass germinates early in fall with the first rains. This is usually much earlier than most growers in the north coast make their herbicide applications. All treatments (see table 1) controlled ryegrass except Treatment 1 (RoundUp PowerMax 2 qts. /acre) and Treatment 6 (Chateau 6 oz. plus Prowl H₂O 4qts. plus Roundup PowerMax 2 qts. /acres) even though the herbicides in Treatment 6 provided excellent control when mixed with other herbicides. Matrix and Mission, both sulfonyleurea herbicides, are slow acting materials which resulted in lower burndown rating 19 days after application, but produced excellent control when mixed with long-lasting herbicides Alion or Prowl H₂O.

Controlling Sharppoint Fluvellin, John Roncoroni, UCCE Weed Science Farm Advisor.

Sharppoint fluvellin [*Kickxia eglantine*(L.) Dumort.) has gone from what many growers considered a minor nuisance in the northern Napa and eastern Sonoma counties, to a weed that has spread throughout many areas of the state. In some areas the infestation of this annual weed has become so thick that the ‘skeleton’ the plant leaves when it dies in the winter catches so many fallen grape leaves that its keeps much of the herbicides from hitting the soil. This may keep the preemergence herbicide from being incorporated in to the soil and will shield small weeds from being hit by postemergence herbicide making the application ineffective.

We are just beginning to understand fluvellin biology as it relates to its growth in vineyards in northern California. Germination can occur throughout the year, except for the coldest part of winter. Germination that occurs in mid to late summer and throughout the fall is the most important because this comes at a time when little or no weed control is done in the vineyard. Vineyards that are routinely cultivated in the vine row will not have a large fluvellin problem. It is the vineyards that are ‘no-till’ under vine that may see large infestations of fluvellin.

Results: Fluvellin is not a ‘good competitor’, meaning that is less of a problem when weed control is not as effective against other weeds. Long-lasting herbicides are important for fluvellin control because of its extended, late germination period. This trial started on December 15, 2015 in Sonoma county when we used a power backpack blower to remove the fallen grape leaves and some of the fluvellin skeleton from all plots. All plots were then treated with 2 quarts/ acre of Roundup PowerMax + 0.5% ProAMS. Results indicate that a postemergence treatment with glyphosate after leaf drop in late fall or early winter combined with a treatment in late winter (but before bud break) made up of a combination of glyphosate plus a burn-down herbicide plus a long lasting preemergence herbicide provides the best control of fluvellin. Herbicide combinations that included flazasulfuron(Mission) at 2.14oz/acre and rimsulfuron (Matrix) at 4oz/acre provided the best control at 239 days after treatment rating. Flumioxazin (Chateau) at 10oz/acre provided good control but those combinations with 6oz/acre were not successful.

Table 1.

		Ryegrass control			
		February 16	April 14	June 2	
Treated January 28		19 DAT	77 DAT	126 DAT	
		Burndown ¹	Control ²	Control ²	
1	Roundup	2 qt	4	5	4.8
2	Chateau	12 oz	7.8	7.3	8.9
3	Mission	2.85 oz	7.3	9.6	9.9
4	Matrix	4 oz	7	10	10
	Prowl H2O	4 qts			
5	Matrix	4 oz	6	9.8	10
	Alion	3.5 fl oz			
6	Chateau	6 oz	4.8	4.3	5.8
	Prowl H2O	4 qts			
7	Chateau	6 oz	8.3	8.5	9.8
	Alion	3.5 fl oz			
8	Mission	2.14 oz	6	9.5	10
	Prowl H2O	4 qts			
9	Mission	2.14 oz	6	10	10
	Alion	3.5 fl oz			
10	Control		0	4	5.8
All treatments made with 2 qt Roundup PowerMax = 0.5% ProAMS except Control					

¹Burndown rated on 0-10 scale- 0= no phytotoxicity; 10=dead

²Control rated on 1-10 scale- 1= no control; 10=complete control

Table 2.

		Treatment	Rate/Acre	Fluvelin Control ²			Control-New Germination ²
				June 30	Aug 4	Sept 22	Nov 29
		Treated Jan 28		(155 DAT)	190 DAT	239 DAT	307 DAT
1	ROUNDUP P Max	1qt	5.5	5	5.5	7.4	
	CHATEAU	10 oz					
2	ALION	5 fl oz	7	5.9	6.6	9.3	
	CHATEAU	6 oz					
3	ALION	5 fl oz	9.3	7.4	7.6	7.8	
	MATRIX	2 oz					
4	ALION	5 fl oz	9.6	9.6	9	9.7	
	MISSION	2.14 oz					
5	TRELLIS SC	23 fl oz	8	6	5.8	7.9	
	CHATEAU	6 oz					
6	TRELLIS SC	23 fl oz	9.9	8.8	7.8	7.1	
	MATRIX	4 oz					
7	TRELLIS SC	23 fl oz	10	9.6	9.4	9.1	
	MISSION	2.14 oz					
8	CHATEAU	10 oz	9.3	8.1	7.8	7.6	
	PROWL H2O	6 qt					
9	PROWL H2O	6 qt	9.6	8.5	7.5	7.6	
	MATRIX	4 oz					
10	CHATEAU	10 oz	9.7	8.8	8.4	7.3	
	MATRIX	4 oz					
All treatments made with 1 qt Roundup PowerMax and 0.5% v/v ProAMS Dec 15, 2015 All fallen leaves blown from plots and 2qt Roundup PM applied							