

**The Three Fs: Filaree, Fluvellin, Fleabane  
(Actually The Two Fs and a W: Filaree, Fluvellin and Willowherb)**

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I will begin with an explanation of the title. While ‘Filaree, Fluvellin, Fleabane’ are all problem weeds and it makes an intriguing title, hairy fleabane [*Conyza bonariensis* (L.) Cornq.] is not yet established as a serious weed of vineyards in California’s North Coast vineyards where I conduct my research. Conversely, Panicle willowherb [*Epilobium brachycarpum* C. Presl] is well established in this area.

Several weeds have become established in vineyards due to the changing management practices adopted by a majority of growers in the North Coast (mainly Napa and Sonoma, but also Lake, Mendocino, Solano and Yolo). The change from heavy cultivation (French plow or disk) under the vines every year, to much lighter cultivation, or in many cases to ‘no-till’ and a dependence on glyphosate, or ‘Roundup only’ has changed the species that make up the major weed problems in vineyards.

I will summarize three experiments that effect the population of these weeds. The first experiment conducted in the winter of 2008 shows the effect of accumulated grapes on herbicide efficacy and resulting reduction in control of filaree [a combination of two species: Whitestem filaree (*Erodium moschatum*) and redstem filaree (*Erodium cicutarium*)] and panicle willowherb. The experiment was conducted in a mature Merlot grape vineyard in Rutherford, Napa County, California. Initially eight sets of paired treatments were established (One paired plot was eliminated because the vines in the plot were recently replanted allowing more sunlight to reach the ground, unlike the other plots). Each plot was 4 vines (24 feet) long. The pair treatments were: 1. Leaves in vine row removed; or 2. Leaves in vine row left in place. The grape leaves in the leaves removed plots were raked by hand within 1 hour before herbicide application. All plots were then treated with 10 oz of Chateau(flumioxazin) +24 oz Roundup(glyphosate) (product on a per acre basis)using a OC02 Off -center nozzles sprayed from both sides of row.

Table 1.	March 1		June 12	
% Leaf Cover	% Filaree Cover		% Willowherb control	
	Raked	Not	Raked	Not
60	5	50	100	70
50	7	30	100	50
50	15	40	90	40
40	3	20	90	50
40	5	10	100	70
33	1	15	90	70
25	5	20	100	70
AVE	8.30%	28%	96%	60%

The left column denotes the percentage of area under the vine covered by grape leaves. This area was determined visually in a .5 by 1 meter area. The amount of weed cover or control (filaree and willowherb) was also determined by visual evaluation. Due to the time of year, biology of filaree, and postemergence nature of the Roundup plus Chateau application, filaree was evaluated by percent coverage. Willowherb was evaluated 180 days after application and was evaluated on percent control.

Weed control in all raked treatments was improved in each paired plot. The differences were greater in the plots where raking was compared with the highest percent leaf cover. Because this operation, done commercially with sweeper or blower, would increase equipment costs, and possibly an additional pass through the field and may not be warranted at leaf cover percentages at 30 % and below.

In a second trial conducted in 2011 at the UC Davis Oakville Research Station to test several herbicides for their ability to control fluvellin (*Kickxia elatine*).

Treated 12/8/11		3/8/12		5/22/12		7/9/12		8/7/12			
Treatment <sup>1</sup>	Rate <sup>2</sup>	FLU		OA <sup>3</sup>	FLU <sup>4</sup>		OA	FLU		OA	FLU
1.UTC		9.75		1.0	9.25		6.75	8.88		4.75	7.25
2.Rely 280 ( glufosinate)	2 qt	8.0		5.0	7.0		4.50	5.75		6.75	7.5
3.Roundup WM ( glyphosate)	2 qt	7.25		6.25	6.75		4.25	4.75		7.0	9.88
4.Trellis ( isoxaben)	1 lb	9.75		7.50	9.63		8.25	9.25		7.0	8.75
5.Chateau( flumioxazen)	12 oz	10.0		8.75	9.25		8.50	8.50		6.25	7.0
6.Goal 2X (oxyflourfen )	3 qt	9.37		6.50	6.25		5.63	5.88		3.75	4.75
7.Shark ( carfentrazone)	2 oz	7.25		6.0	6.5		5.0	5.0		8.25	9.5
8.Venue (pyraflufen ethyl)	4 oz	7.25		5.5	6.25		5.0	5.75		7.75	9.5
9.Zeus (sulfentrazone)	12 oz	7.87		6.5	7.25		5.0	5.25		3.5	3.75
10.Matrix (rimsulfuron)	2 oz	8.25		7.5	7.25		4.50	4.75		2.75	2.75
11.Alion (indaziflam)	5 oz	9.87		8.25	8.75		7.38	7.50		6.50	6.75

<sup>1</sup> All treatments, except Rely 280 were applied with added 2 qt/acre Roundup Weather Max.

<sup>2</sup> Rate is in amount of product per acre.

<sup>3</sup> OA = Overall weed control rating on a 1-10 scale (1 no control; 10- complete control)

<sup>4</sup> Flu = Fluvellin weed control on a 1-10 scale (1 no control; 10- complete control)

This trial was conducted in an area of the Oakville research station not planted to grapes. Applications were made to plots 10ft x 10ft with a 3 nozzle boom using 8002 XR nozzles

delivering 30 GPA. The area was heavily infested with fluvellin. Fluvellin was present but not actively growing at the time of application. All treatments except Rely 280(glyphosate) contained 2 qts/acre of Roundup WeatherMax (glyphosate) for postemergence activity. Treatments 2, 3, 7, and 8 (all postemergence only treatments) were reapplied on July 10, 2012)

Because fluvellin is capable of germinating very late in the growing season it is important that preemergence treatment last long enough to control germination. The purpose of this trial is to determine which of the preemergence herbicides can control fluvellin throughout the season and which postemergence treatments are the most effective.

Fluvellin appears to germinate best in clean (no weed growth), warm soil. Practically this means that if a grower uses a preemergence herbicide to provide weed control the herbicide must last throughout the season, or make a second postemergent application, to insure that the fluvellin is controlled.

Analyzing the results show that Trellis (isoxaben), Alion (indaziflam) and Chateau (flumioxazin) were the best preemergence herbicides in this trial, providing nearly season-long control. It is interesting that the untreated control plot had almost no fluvellin which equates to control equal to, or better than, both the Alion and Chateau treatments. This is true because of the abundance of other weeds, especially annual fescue that was established in this area. Fluvellin does not grow well in areas where there are other competitive plants growing. I feel this is due first to competition, and to the fact that the soil will be cooler longer into the season when compared to ‘clean’ soil.

The third study is a preliminary evaluation of a long-term study comparing three weed control methods: 1. Cultivation; 2. Postemergent weed control only; 3. Post+premergence herbicide treatment. Future evaluation may include measuring water penetration and other differences between the three treatments. This study is being conducted at the UC Davis Oakville Research station in a vineyard that has been treated with a tank mix of post+ preemergence herbicide for the last five years. This is important because of the demonstrative differences in weed composition in the three treatments within one year.

Percent ‘hits’ in transect <sup>1</sup>							
Treatment	Willowherb	Blando Brome	Bristly Oxtongue	Zorro Fescue	Fluvellin	Field Bindweed	Bur Clover
Cultivate	2.2	23.0	0.7	51.8	0.4	1.7	3.3
Glyphosate	29.3	1.9	6.5	0.8	7.8	0.3	0.2
Glyphosate + Chateau	0.7	0	0	0	0	4.0	0

<sup>1</sup> Ratings are based on average of 4 replications of the percent of transect hits recorded every 6 inches for 128 feet directly under the vinerow of the middle row of each 3 row plot

Treatments were applied by a commercial management company using a Clemens (cultivator) and ATV applicator using a single OC02 nozzle for herbicide application. Cultivation was done on December 5, 2011 and May 2, 2012. The herbicide applications were made December 14, 2011. The postemergence only treatment was Roundup (glyphosate) 2

quarts/acre of product and the post + preemergence treatment was Roundup at 2 quarts + Chateau (flumioxazin) 10 oz/acre of product.

Readings taken with a transect in the middle row of the three row plots (126 ft- read every 6 inches) show that the composition of weeds has quickly changed. Willowherb is by far the most prevalent weed in the glyphosate only treatment, with fluvellin being the second most abundant. The grasses Blando Brome and Zorro fescue were predominate in the cultivated plot with willowherb and fluvellin found in only 2.2 and 0.4% of the points respectively. In this trial there were almost no weeds in the post + preemergence treatment. These preliminary results show that there is a major difference in weed composition after only one year after changing weed management practices and that acceptable weed control for multiple years with preemergence herbicides does not necessarily mean that a grower can switch to a postemergence herbicide and expect any residual control.