

Sierra Cascade Intensive Forest Management Research Cooperative Proposal 10-02
Fluroxypyr (Vista XRM)

Principal Investigator: Ed Fredrickson

Title: Vista XRT Conifer Tolerance and Manzanita Control

Year Approved: 2010

Executive Summary:

Vista XRT (fluroxypyr) is a newly registered chemical to California and forestry. The active ingredient fluroxypyr has been around since the late 1908's. It is a growth regulator herbicide similar in action to triclopyr with several unique characteristics. The main one being fluroxypyr having a greater conifer tolerance compared to triclopyr. The second is that fluroxypyr is very effective in controlling manzanita.

A limited amount of development work was done in the late 1980's and early 1990's with fluroxypyr in forestry. The results showed a potential for conifer release "over the top" applications. Conifer tolerance was good overall, but varied with geographic location. All of the early conifer tolerance and efficacy work on manzanita was with application in either April or June, timings not typical for usual conifer release. Further tests need to be done in a more typical timing for aerial release applications, such as late August or early September. The other concern is that since its conception, the formulation of fluroxypyr has changed significantly. This change in formulation may increase conifer tolerance but could decrease efficacy on a waxy-leaf species such as manzanita.

The significance of a herbicide that could be applied over the top of conifers to release seedlings from evergreen brush cannot be overstated. The potential cost savings of being able to release plantations with aerial applications rather than ground directed treatments is dramatic. Fluroxypyr is currently labeled for aerial release in pine plantations. Applications at a more typical time for release should provide an even greater degree of tolerance than previous studies have shown. Based on previous data, there may be the potential for an early season release window.

The stated objective of this study is to evaluate the effect of Vista XRT rate and timing on manzanita control and tolerance of ponderosa pine and Douglas-Fir with "over the top" broadcast applications. The study is a trial that will look at several application rates and timing of application to define the conifer tolerance of Vista XRT.

The study site should be a two or three year old conifer plantation with a manzanita brush component. Plans are to look at ponderosa pine and Douglas-fir tolerance to the herbicide treatments; however, plot size is limited and it may be hard to find a plantation with enough of each species for a

good sample size. The study site should be chosen and laid out by August 2010. The study design will be a completely randomized block design with four replications. At least four seedlings of each species must be present in each plot to provide a valid sample size if both ponderosa pine and Douglas-fir are included. For a pine only trial, 8 seedlings per plot would be a minimum.

Two spray timings will be utilized in this study (late August 2010 and April 2011 – or as soon as the site opens in the spring prior to bud-break). Treatments will include: Vista XRT alone at 0.25, 0.5, and 1.0 lbs. a.i./acre; Vista XRT at 0.25 and 0.5 lbs. a.i./acre plus Garlon 3A at 0.5 lbs. a.i./acre; and a control. No surfactants will be added to the treatments. All applications will be applied at 10 gallons per acre. At treatment, conifer caliper and height will be measured on all conifers as well as initial manzanita percent cover. Post-treatment evaluations will take place at the end of the season in 2011 and 2012. Percent crown and stem reduction will be evaluated for manzanita; conifer evaluations will consist of caliper and height measurements and an ocular rating of damage.

2010: The study site is located on property owned and managed by Sierra Pacific Industries approximately 5 miles southwest of Burney, California. Elevation is approximately 4500 feet. Slope is between 0 and 10 percent. The site was clearcut and planted to a mix of ponderosa pine, Douglas-fir, and white fir. The site was initially treated with Velpar DF as a site

preparation treatment. Seedlings were two years old at the time of treatment. Study plot size is 12 feet by 72.6 feet (0.02 acre). A minimum of three ponderosa pine and Douglas-fir were in each plot.

The plots were sprayed on September 3, 2010. All treatments were applied with a 12 foot backpack boom sprayer and all plots were sprayed with one timed pass. Initial measurements of caliper and height for all conifers within the plots were recorded at the time of treatment.

The trial was evaluated on October 21, 2010. No conifer growth had occurred since treatment, therefore only ocular evaluations were conducted. Percent foliar brownout was evaluated for greenleaf manzanita, gooseberry, ponderosa pine, Douglas-fir, and white fir where it was present. White fir was not a part of the study but it did occur in the majority of the plots. Tolerance was evaluated for white fir, but the results are anecdotal and any statistical analysis would be invalid. Terminal and lateral bud damage was assessed for all conifers on a scale of 0 to 10 with 0 being no damage and 10 being dead. Results were taken only seven weeks after treatment and are preliminary. Full treatment effects will not develop until the end of the 2011 growing season.

Brownout: Results are presented by species. **Manzanita** percent brownout was very low for all treatments (10 to 16 percent) which is typical of fall treatment application evaluations done in the same season as treatment (Table 1). However, all treatments were significantly different from

the control. There were no significant differences between treatments. Manzanita showed a very slight rate response for Vista XRT alone at 0.25, 0.5, and 1.0 lbs. a.i./acre and for the tank mixes with Garlon 3A, however the results are not statistically significant at this time. Generally, the tank mix treatments provided slightly better control than Vista XRT alone. **Gooseberry** showed a strong rate response for treatments with Vista XRT alone at 0.25 and 0.5 lbs. a.i./acre, but no further increase was noted when rates were increased to 1.0 lbs. a.i./acre. No rate response was seen in the tank mix treatments with Garlon 3A and results were similar to those seen in the 0.5 lbs. a.i./acre Vista XRT alone treatment. In general, initial percent brownout was high for all treatments on gooseberry.

Conifer damage was minimal at this time (Table 1). **Ponderosa pine** percent brownout was under 10 percent for all treatments. There was a rate effect for treatments with Vista XRT alone and with the tank mixes with Garlon 3A up to 0.5 lbs. a.i./acre. Increasing rates of Vista XRT alone to 1.0 lbs. a.i./acre showed no further increase in damage. Damage was slightly higher from treatments including Garlon 3A compared to Vista XRT alone. Analysis of variance showed a significant difference in percent brownout for all treatments compared to the control with the exception of the lowest rate of Vista XRT by itself. Due to the limited data range at these early evaluations, the significance of these results appears to be an artifact. **Douglas-fir** percent brownout was under 10 percent for all treatments. As with ponderosa pine,

there was a rate effect for treatments with Vista XRT alone and with the tank mixes with Garlon 3A up to 0.5 lbs. a.i./acre. Increasing rates of Vista XRT alone to 1.0 lbs. a.i./acre showed no further increase in damage. No difference in damage was seen between Vista XRT alone and tank mixes with Garlon 3A. There were no significant differences from the control with any of the treatments. **White fir** seems to be tolerant to Vista XRT treatments alone up to 0.5 lbs. a.i./acre. Slight damage occurred at the 1.0 lbs. a.i./acre Vista XRT rate alone and with the tank mixes with Garlon 3A. However, these results are observational only.

Bud Damage: Results are presented by species (Table 2). **Ponderosa pine** showed little to no bud damage for treatments with Vista XRT alone up to 0.5 lbs. a.i./acre and the low Vista XRT rate when tank mixed with Garlon 3A. Very minimal damage occurred to buds with the high rate of vista XRT tank mixed with Garlon 3A and the 1.0 lbs. a.i./acre rate of Vista XRT alone. **Douglas-fir** showed virtually no bud damage on either the terminal or lateral buds for any treatment. **White fir**, like Douglas-fir, showed little bud damage for any of the treatments.

Early results seem to indicate fairly good conifer tolerance for most treatments. It appears that ponderosa pine and Douglas-fir have similar tolerances to Vista XRT by itself. Douglas-fir appears to have more tolerance to treatments that include Garlon 3A. Any speculation on long-term vegetation control would be premature at this time. Full treatment effects on

vegetation will not be present until the end of next season. It appears that gooseberry is highly sensitive to all treatments tested, however, long-term control is not established.

Full data sets for this study are available at the Co-op manager's office in Redding.

Table 1 Percent Brownout Data Seven Weeks After Treatment

	Manzanita	Gooseberry	Pine	Doug F	W. Fir
Treatment	% Brownout	% Brownout	% Brownout	% Brownout	% Brownout
Vista 0.25	10.	76.3	0.8	0.3	0.0
Vista 0.5	11.3	95.0	2.5	2.3	0.0
Vista 0.25 + 0.5 Gar 3A	15.0	95.0	4.3	1.8	12.5
Vista 0.5 + 0.5 Gar 3A	16.3	93.8	6.8	2.5	5.0
Vista 1.0	16.3	100.0	3.5	1.5	6.7
Control	0.0	0.0	0.0	0.0	0.0

Table 2 Terminal and Lateral Bud Damage By Species. 0 = No Damage; 10 = Dead

	PP Term	PP Lateral	DF Term	DF Lateral	WF Term	WF Lateral
Treatment	Bud Dam.	Bud Dam.	Bud Dam.	Bud Dam.	Bud Dam.	Bud Dam.
Vista 0.25	0.0	0.0	0.0	0.0	0.0	0.0
Vista 0.5	0.0	0.3	0.0	0.0	0.0	0.0
Vista 0.25 + 0.5 Gar 3A	0.0	0.0	0.0	0.0	0.0	0.0
Vista 0.5 + 0.5 Gar 3A	0.5	0.5	0.0	0.3	0.0	0.0
Vista 1.0	0.5	0.3	0.0	0.0	0.3	0.0
Control	0.0	0.0	0.0	0.0	0.0	0.0