



## **Impact of Common Herbicide Applications on Non-Target Woody Plants**

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### **Summary**

Established in 2006, these trials quantify potential damage to traditional non-target woody plants receiving individual plant leaf sprays containing Tordon 22K (picloram), Surmount (picloram + fluroxypyr) or Remedy (triclopyr) + Reclaim (clopyralid). These are the most commonly used broadcast herbicides for control of pricklypear and mesquite on Texas rangeland.

In general, 1 and 2 years after treatment the most vulnerable species to all of the spray mixtures was flameleaf sumac. All 3 treatments produced 100% control 2 years after treatment.

With the exception of flameleaf sumac, none of the treatments resulted in significant rootkill of the non-target woody plants (whitebrush, greenbriar, lotebush, agarito and ephedra) 2 years after treatment.

In general, Surmount produced the greatest defoliation across most species 1 and 2 years after treatment, while Remedy + Reclaim produced the least.

## **Problem/Introduction**

Damage to non-target woody species is often a concern when using broadcast applied herbicides for rangeland weed and brush control. This is especially true when rangeland is managed for wildlife as compared to livestock.

The most common broadcast herbicide sprays used on Texas rangelands include Tordon 22K or Surmount for pricklypear control, or a spray mixture containing the herbicides Remedy + Reclaim for mesquite control. Data quantifying damage to non-target woody species such as lotebush, agarito, elbowbush, etc. from these basic herbicide sprays are almost non-existent.

## **Objectives**

The objective of these herbicide trials is to quantify the damage to specific non-target woody species following the application of commonly used leaf sprays for control of pricklypear and mesquite on Texas rangelands.

## **Materials/Methods**

Table 1 provides the county, ranch, non-target species evaluated and date of application for this series of herbicide trials. Individual plant leaf sprays were used to mimic the effect that might be obtained following aerial herbicide applications to either pricklypear or mesquite. Treatments applied included Tordon 22K and Surmount at 1% concentrations, and a mixture of ½% Remedy + ½% Reclaim. All treatments used a water carrier with the addition of a 90% non-ionic surfactant (½% concentration). Hi-Light Blue Dye was added to each treatment at a rate of 1/3 oz/gal of spray mix. The dye was used to mark sprayed plants and to insure proper spray coverage of the leaf canopy.

Applications were made using backpack sprayers with spray wands tipped with X-8 adjustable conejet nozzles. All foliage on the target plants were sprayed to wet, almost to the point of dripping.

These treatments should be considered “worst case” scenarios, as compared to typical aerial broadcast applications. Individual plant leaf sprays deliver significantly higher concentrations of herbicide as compared to aerial broadcast sprays.

**Table 1. Location, Non-Target Species Evaluated and Date of Establishment.**

<b>County</b>	<b>Ranch</b>	<b>Species</b>	<b>Date Established</b>
Jones	Mitch Hall	Lotebush	5/24/06
Coke	Waldon Millican	Lotebush	5/31/06
San Saba	Richard Bode	Lotebush	7/18/06
Sterling	Bill Foster	Agarito	7/5/06
McCulloch	Guy Phillips	Agarito	7/17/06
Taylor	Bob O'Neil	Flameleaf Sumac	6/28/06
Brown	Running A	Flameleaf Sumac	7/12/06
Callahan	Williams	Whitebrush	7/6/06
Llano	Haverlah	Whitebrush	7/14/06
Runnels	C J Robinson	Ephedra	7/19/06
Burnet	4 J	Elbowbush	7/13/06
Menard	Kniffen	Elbowbush	7/26/06
Mills	Lindsey	Greenbriar	8/3/06

## **Results/Discussion/Economic Impact**

### One Year After Treatment

In general, one year after treatment, the most vulnerable species to all of the spray mixtures was flameleaf sumac (Table 2). This species was defoliated 86% to 100%, depending on the treatment used. Many plants appeared killed.

Lotebush was significantly defoliated (12% to 95%) by sprays containing Tordon 22K and Surmount, but less sensitive to sprays containing Remedy + Reclaim. No plants were completely killed.

Whitebrush exhibited moderate but extremely variable defoliation (2% to 65%) across the three treatments. In general, Surmount and Tordon 22K caused more damage as compared to the mixture of Remedy + Reclaim. No plants were completely killed.

Agarito, ephedra, and greenbriar were relatively resistant to the herbicides used (0% to 27% defoliation).

### Two Years After Treatment

Plants defoliated 100%, 2 years after treatment were assumed to be killed. When the herbicide trials were re-evaluated 2 years after treatment, all 3 treatments resulted in 100% control of flameleaf sumac (Table 3). No whitebrush, greenbriar, agarito or ephedra were killed by the herbicide treatments. Lotebush proved to be relatively resistant to all the herbicide treatments except at the Coke County site. At this location Tordon 22K and Surmount killed 10% and 45% respectively, of the treated plants, although none were killed by these same herbicides at the San Saba and Jones County sites.

Two years after treatment, Surmount in general continued to produce the highest defoliation across most species, while Remedy + Reclaim produced the least.

It should be remembered this data represents worst case examples as compared to aerial applications. Individual plant leaf sprays at these concentrations treat the target species with total spray volumes and herbicide levels many times greater than aerial applications.

**Table 2. Percent defoliation 1 year after treatment. There were no significant differences (95% confidence level) between the treatment means for a specific species.**

Species	County	% Defoliation 1 YAT		
		Remedy + Reclaim	Tordon 22K	Surmount
White Brush	Callahan	2%	7%	3%
	Llano	18%	65%	65%
	Average	10%	36%	34%
Flame Leaf Sumac	Taylor	100%	86%	100%
	Brown	90%	90%	90%
	Average	95%	88%	95%
Greenbriar	Mills	0%	15%	70%
	Burnet	20%	70%	85%
	Average	10%	43%	78%
Lotebush	Coke	83%	50%	95%
	San Saba	8%	12%	40%
	Jones	2%	87%	95%
	Average	31%	50%	77%
Agarito	Sterling	27%	20%	30%
	McCulloch	9%	3%	7%
	Average	18%	12%	19%
Ephedra	Runnels	NR	NR	NR

**Table 3. Percent defoliation and percent kill 2 years following treatment. There were no significant differences (95% confidence level) between the treatment means for a specific plant.**

Species	County	% Defoliation 2 YAT			% Kill 2 yat		
		Remedy + Reclaim	Tordon 22K	Surmount	Remedy + Reclaim	Tordon 22K	Surmount
White Brush	Callahan	42%	44%	64%	0%	0%	0%
	Llano	71%	46%	88%	0%	0%	0%
	Average	57%	45%	76%	0%	0%	0%
Flame Leaf Sumac	Taylor	100%	100%	100%	100%	100%	100%
	Brown	100%	100%	100%	100%	100%	100%
	Average	100%	100%	100%	100%	100%	100%
Greenbria r	Mills	15%	25%	55%	0%	0%	0%
	Burnet	20%	70%	85%	0%	0%	0%
	Average	18%	48%	70%	0%	0%	0%
Lotebush	Coke	26%	53%	90%	0%	10%	45%
	San Saba	28%	23%	43%	0%	0%	0%
	Jones	51%	63%	61%	0%	0%	0%
	Average	35%	46%	65%	0%	3%	15%
Agarito	Sterling McCulloch	58%	58%	50%	0%	0%	0%
		11%	5%	6%	0%	0%	0%
	Average	35%	32%	28%	0%	0%	0%
Ephedra	Runnels	NR	NR	NR	0%	0%	0%

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