

Diffuse Knapweed Control with Herbicides Containing Aminocyclopyrachlor

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Abstract

Diffuse knapweed (*Centaurea diffusa*) is an invasive weed species found infesting grasslands, forests, right-of-ways, and rangelands in central Oregon. Aminocyclopyrachlor is a growth regulator herbicide developed by DuPont Crop Protection[®] that has shown to be effective at controlling a broad range of annual and perennial broadleaf weeds. A field study was initiated in the spring of 2012 near Antelope, Oregon to evaluate the efficacy of using aminocyclopyrachlor when combined with a sulfonylurea or other growth regulator to control diffuse knapweed. The final evaluation performed 365 days after the application showed excellent diffuse knapweed control with aminocyclopyrachlor combined with a sulfonylurea or 2, 4-D. The level of control was comparable to the control provided by Milestone[®] which was used as the standard.

Introduction

Diffuse knapweed is a member of the sunflower family that usually grows as biennial, but can also grow as an annual or a short-lived perennial. Plants grow 1 to 2 feet in height, are prolific seed producers and prefer semi-arid to arid conditions. Diffuse knapweed can become tumbleweed when it dries allowing seeds to disperse over long distances. This effective mechanism of seed dispersal explains why diffuse knapweed is found infesting a variety of environments including grasslands, forests, right-of-ways, and rangelands where it can out-compete native vegetation. Aminocyclopyrachlor is a growth regulator herbicide developed by DuPont Crop Protection[®] that has shown to be effective controlling a broad range of annual and perennial broadleaf weeds. The objective of this study was to evaluate diffuse knapweed control efficacy of aminocyclopyrachlor when combined with a sulfonylurea or other growth regulator.

Materials and Methods

A field study was conducted near Antelope, Oregon during 2012, in a section of rangeland infested with diffuse knapweed. The study design was a randomized complete block design with four replications. Plot size was 10 ft wide by 30 ft long. The area of study was fenced to avoid cattle trample in the plots. Herbicides were applied when diffuse knapweed was at the rosette stage with a backpack sprayer calibrated to deliver 20 gallons of spray solution per acre at 40 psi pressure using XR 8002 Teejet[®] nozzles. Application date, environmental conditions, weed growth stage are detailed in Table 1. Herbicides included in the study included aminocyclopyrachlor + chlorsulfuron (Perspective[®]), aminocyclopyrachlor + 2, 4-D ester and aminopyralid (Milestone[®]) as the comparison standard. Herbicide rates and spray adjuvants are detailed in Table 2. Herbicide efficacy was evaluated 60, 90 and 365 days after treatment (DAT).

Results and Discussion

The 60 and 90 DAT evaluations showed a high level of diffuse knapweed control with the majority of the treatments, but the lowest control was recorded with Perspective[®] at 2.5 oz/acre (Table 2). The difference in control with Perspective[®] at the lower rate was significantly lower when compared to the rest of the treatments during the first growing season after the application. The final evaluation performed in spring of 2013, a year after the applications showed an excellent diffuse knapweed control with all treatments. These results indicate that aminocyclopyrachlor when combined with a sulfonylurea or 2, 4-D can provide excellent diffuse knapweed in central Oregon.

Acknowledgments

The authors would like to thank Norm McKinley from DuPont Crop Protection[®] for supporting this project and Mary and Lowell Forman for their collaboration on the project.

Table 1. Application dates, environmental conditions, and diffuse knapweed growth stage at time of application.

Application Date	4/18/2012
Time of Day	1:00 pm
Air Temperature (F)	55
Relative Humidity (%)	50
Wind Speed (MPH)	11
Wind Direction	W
Weeds Heights	Rosette

Table 2. Diffuse knapweed percent control compared to the untreated check, 60, 90 and 365 days after treatment.

Treatment ¹²³		Rate	60 DAT	90 DAT	365 DAT
1	Perspective® NIS	2.5 0.25	oz/acre % v/v	93 b 92 b	98 a
2	Perspective® NIS	4.5 0.25	oz/acre % v/v	98 a 98 a	98 a
3	Aminocyclopyrachlor 2,4-D Ester NIS	4 1 0.25	fl oz/acre pt/acre % v/v	98 a 98 a	98 a
4	Aminocyclopyrachlor 2,4-D Ester NIS	8 2 0.25	fl oz/acre pt/acre % v/v	97 a 96 a	98 a
5	Milestone® NIS	7 0.25	fl oz/acre % v/v	98 a 98 a	98 a
6	Untreated Check		0 c	0 c	0 b
LSD (P=.05)			3	4	0.1

¹Some treatments included in the study were used for experimental purposes and are NOT currently labeled for public use. Before using an herbicide, make sure is properly labeled for the intended use.

²Abbreviations: DAT - Days After Treatment; NIS - Non Ionic Surfactant.

³Means followed by the same letter are not significantly different.