Spotted knapweed Control with Herbicides Containing Aminocyclopyrachlor

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Abstract

Spotted knapweed (*Centaurea maculosa*) is an invasive weed species that spreads rapidly and aggressively invading pasture, rangeland and fallow land. 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 conducted near Madras, Oregon to evaluate the efficacy of using aminocyclopyrachlor when combined with a sulfonylurea or other growth regulator to control spotted knapweed. Preliminary results indicate that aminocyclopyrachlor, when combined with a sulfonylurea or 2, 4-D, has the potential to effectively control Spotted knapweed. Evaluations made 90 days after treatment showed high levels of control with all treatments, with values of 97 percent and up.

Introduction

Spotted knapweed is a biennial or short-lived perennial member of the sunflower family. This invasive weed species spreads rapidly and aggressively invading pasture, rangeland and fallow land. Spotted knapweed is a prolific seed producer and the seeds can remain viable in the soil for more than five years, becoming the seed source for re-infestations after vegetative plants have been eliminated. Plant roots also exudates allelophatic compounds that affect the growth of desirable vegetation. Aminocyclopyrachlor is 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 spotted knapweed control efficacy of aminocyclopyrachlor when combined with a sulfonylurea or other growth regulator.

Materials and Methods

A field study was initiated 6 miles northwest of Madras, Oregon during 2012, in non-crop land infested with spotted knapweed. The study design was a randomized complete block with 4 replications. Plot size was 10 feet wide by 30 feet long. Herbicides were applied when spotted 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 and 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 30, 60 and 90 DAT.

Results and Discussion

The 30 DAT evaluations indicated a higher level of spotted knapweed control with aminocyclopyrachlor + 2, 4-D ester and Milestone® when compared to Perspective® (Table 2). In subsequent evaluations 60 and 90 DAT, differences in spotted knapweed control among treatments was only significant for Perspective® applied at 2.5 ounces per acre, with 83 percent

control (the lowest control recorded). All treatments will be further evaluated in the spring of 2013, to determine spotted knapweed control one year after application. These preliminary results suggest that aminocyclopyrachlor when combined with a sulfonylurea at the highest tested rate or 2, 4-D has the potential to effectively control spotted knapweed.

Acknowledgments

The authors would like to thank Norm McKinley from DuPont Crop Protection® for supporting this project and Mr. Floyd Paye for his collaboration on the project.

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

	A
Application Date	5/8/12
Time of Day	11 AM
Air Temperature (F)	66
Relative Humidity (%)	48
Wind Speed (MPH)	3
Wind Direction	NNW
Growth Stage	Rosette

Table 2. Spotted knapweed percent control compared to the untreated check, 30, 60 and 90 days after treatment.

	Treatment[1][2][3]	Product Rate		30 DAT		60 DAT		90 DAT	
1	Perspective®	2.5	oz/acre	88	b	85	b	83	b
	NIS	0.25	% v/v						
2	Perspective®	4.5	oz/acre	91	b	94	a	97	a
	NIS	0.25	% v/v						
3	Aminocyclopyrachlor	4	fl oz/acre	98	a	98	a	97	a
	2,4-D Ester	1	pt/acre						
	NIS	0.25	% v/v						
4	Aminocyclopyrachlor	8	fl oz/acre	99	a	99	a	98	a
	2,4-D Ester	2	pt/acre						
	NIS	0.25	% v/v						
5	Milestone®	7	fl oz/acre	98	a	98	a	98	a
	NIS	0.25	% v/v						
6	Untreated Check			0	c	0	b	0	b
	LSD (P=.05)			5		7		8	

[1]Some 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.
[2]Abbreviations: DAT, Days After Treatment; NIS, Non Ionic Surfactant.
[3]Means followed by the same letter are not significantly different.