

# **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<sup>®</sup> that has shown to be effective at controlling a broad range of annual and perennial broadleaf weeds. A field study was conducted near Antelope, Oregon to evaluate the efficacy of using aminocyclopyrachlor when combined with a sulfonylurea or other growth regulator to control diffuse knapweed. Preliminary results indicate that aminocyclopyrachlor, when combined with a sulfonylurea or 2, 4-D, has the potential to effectively control Diffuse knapweed. High levels of knapweed control were observed 90 days after treatment for all treatments, with values of 96 percent and up. All treatments will be further evaluated in the spring of 2013, to determine diffuse knapweed control one year after application.

## **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<sup>®</sup> 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 with 4 replications. Plot size was 10 feet wide by 30 feet 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<sup>®</sup> nozzles. Application date, environmental conditions, weed growth stage are detailed in Table 1. Herbicides included in the study included aminocyclopyrachlor + chlorsulfuron (Perspective<sup>®</sup>), aminocyclopyrachlor + 2, 4-D ester and aminopyralid (Milestone<sup>®</sup>) as the comparison standard. Herbicide rates and spray adjuvants are detailed in Table 2. Herbicide efficacy was evaluated 30, 60 and 90 days after treatment (DAT).

## Results and Discussion

The 30 DAT evaluations showed a high level of diffuse knapweed control, near 99 percent with all treatments except Perspective<sup>®</sup>, which when applied at 2.5 ounces per acre showed 83 percent control (Table 2). Although, diffuse knapweed control with the lower rate of Perspective<sup>®</sup> showed improvement in subsequent evaluations with a 92 percent control 90 DAT, the difference in control when compared to the rest of the treatments remained significant. All treatments will be further evaluated in the spring of 2013 to determine diffuse knapweed control one year after application. These preliminary results suggest that aminocyclopyrachlor when combined with a sulfonyleurea at the highest tested rate or 2, 4-D has the potential to effectively control diffuse knapweed.

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

|                       | A       |
|-----------------------|---------|
| Application Date      | 4/18/12 |
| Time of Day           | 1 PM    |
| Air Temperature (F)   | 55      |
| Relative Humidity (%) | 50      |
| Wind Speed (MPH)      | 11      |
| Wind Direction        | W       |
| Weed Heights          | Rosette |

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

| Treatment <sup>123</sup> |                          | Product Rate |            | 30 DAT | 60 DAT | 90 DAT |
|--------------------------|--------------------------|--------------|------------|--------|--------|--------|
| 1                        | Perspective <sup>®</sup> | 2.5          | oz/acre    | 83 b   | 91 b   | 92 b   |
|                          | NIS                      | 0.25         | % v/v      |        |        |        |
| 2                        | Perspective <sup>®</sup> | 4.5          | oz/acre    | 99 a   | 98 a   | 98 a   |
|                          | NIS                      | 0.25         | % v/v      |        |        |        |
| 3                        | Aminocyclopyrachlor      | 4            | fl oz/acre | 99 a   | 98 a   | 98 a   |
|                          | 2,4-D Ester              | 1            | pt/acre    |        |        |        |
|                          | NIS                      | 0.25         | % v/v      |        |        |        |
| 4                        | Aminocyclopyrachlor      | 8            | fl oz/acre | 99 a   | 97 a   | 96 a   |
|                          | 2,4-D Ester              | 2            | pt/acre    |        |        |        |
|                          | NIS                      | 0.25         | % v/v      |        |        |        |
| 5                        | Milestone <sup>®</sup>   | 7            | fl oz/acre | 99 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      |

<sup>1</sup>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

<sup>2</sup>Abbreviations: DAT - Days After Treatment; NIS - Non Ionic Surfactant

<sup>3</sup>Means followed by the same letter are not significantly different