

# Evaluation of Two Velpar® Formulations on Alfalfa, 2005

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## Abstract

*Two formulations of Velpar® (DF, L) were evaluated over multiple alfalfa varieties to compare the potential phytotoxic effects this product. Treatments were made April 15, with yield and stem data collected on May 10. Both Velpar® formulations resulted in yellowed alfalfa within three days of application, with symptoms disappearing by 21 days post treatment. Yield data indicated increased yields from alfalfa treated with Velpar®, due to increased numbers of stems. The reason for the stem increase associated with Velpar® usage is unknown.*

## Introduction

Velpar® herbicide (active ingredient = hexazinone) is a herbicide registered for usage on forage alfalfa that is considered to be highly effective in many parts of California, but labeling prohibits low desert valley alfalfa due to concerns with crop injury from previous low desert experimentation (M. Reid, DuPont Corp., pers. comm.). Recent experimentation on alfalfa during winter months had noted no crop injury (Tickes, unpublished), initiating interest that under certain environmental conditions that Velpar® may be an extremely useful alfalfa herbicide in the low desert. As two formulations of the product exist, it may be possible that the formulation may affect crop response.

This experiment was initiated to compare and document the potential phytotoxic effects of the two formulations of Velpar® herbicide applied to multiple alfalfa varieties during the spring under low desert conditions.

## Methods and Materials

An alfalfa field with 10 alfalfa varieties that was in its fifth year of production using bedded production practices was located near Blythe, CA. Varieties in the field included UC Cibola, Mecca III, SW 9628, SW 9500, SW 9301, WL 525HQ, WL 625 HQ, WL 711WF, Highline, and Sedona. Plots were six foot wide by 245 foot long, allowing at least 8 beds of each alfalfa variety to be treated. Alfalfa had been cut the week prior to application, with hay raked and poised to be baled at time of application. This allowed three slightly different heights of alfalfa to be to be present at time of application, with these being the tallest in beds 1 and 8 of each variety (no alfalfa placed on bed tops due to swathing/raking activities), beds 2-3 and 6-7 (initial placement of several days when alfalfa was swathed until raking, very little regrowth) and beds 4-5 (some regrowth, and then alfalfa had been raked on top). A single measurement of alfalfa regrowth was made from each bed in the experiment. Average height across all beds was 4.1 inches (range of 1.75-7 inches) when treatments were applied the morning of April 15, 2005, and represented regrowth of about 2.5 inches.

Two formulations of Velpar® were used in this experiment, Velpar® L (2 lbs a.i./gallon) and Velpar® DF (75% a.i. by weight). Amount of active ingredient per acre was the same for both treatments (0.5 lb/acre). Velpar® was applied with a backpack sprayer calibrated to deliver 20 gpa with a seven ft. wide boom and four T-Jet 8002 flat fan nozzles. High temperatures on April 15-17 were 93-94°F, with clear conditions were prevalent. Temperatures for April 15-22 averaged 87.6°F for highs and 49.1°F for lows.

Visual observations were made on a daily basis for the first seven days after applications were made, and weekly thereafter. A one foot square of alfalfa was harvested (May 10) just prior to next commercial harvest by placing a 12 inch x 12 inch square (internal size) on top of a bed and hand cutting all stems within the square with a scissors at the previous harvest height) This was done in three locations (beds 1, 8; 2-3,6-7; 4-5) in each variety for each treatment, with stems then placed in paper bags for drying in a laboratory oven. Number of stems/sq. ft. were recorded to document if Velpar® treatments affected this growth parameter. After drying for several days, alfalfa was weighed and dry weights recorded. Data were then analyzed.

## Results

Treatments caused a yellowing of alfalfa foliage, with initial slight yellowing not noted until about 24 hours after application, with increased visibility of this change in coloration noted for the next several days, resulting in a very visible yellowing of alfalfa foliage on all varieties. Treated foliage 'greened up' between 14 and 21 days post harvest. By time of harvest on May 10, a casual observer would not have been able to note the treated plots, although they appeared to be slightly shorter (although stem heights were not measured) with plant tops not quite as dark green in coloration as surrounding alfalfa. Oldest leaves had some edge drying due to Velpar® treatments.

Alfalfa treated with either Velpar® L or DF resulted in numerically more dry matter/sq. ft. at each of the three bed locations sampled than untreated alfalfa (Table 1), although these individual one square foot samples did not result in statistical differences. Slightly more alfalfa hay was noted from Velpar® DF than Velpar® L at the 1 & 8 bed locations, although the Velpar® L treatment had more hay than the DF formulation at the other bed locations. Dry matter from alfalfa treated with the Velpar® DF formulation was very similar to that of untreated alfalfa at the 2-3, 6-7 bed sites.

Statistical differences did exist when analyses were executed for total dry weight for three square feet (Table 1), with the Velpar® L treatment (118.3 g) resulting in 15.6% more hay than the untreated check (102.3 g). Hay yields noted from the Velpar® DF treatment were intermediate (111.9 g) between the Velpar® L and the untreated check.

Noted differences in hay yields appear to be somewhat correlated with numbers of alfalfa stems, as alfalfa that had been treated with Velpar® DF had significantly more stems/ft<sup>2</sup> than the untreated check at beds 1, 8 and beds 4-5 (Table 2). The Velpar® L treatment had significantly more stems/ft<sup>2</sup> at the beds 2-3, 6-7 locations (69.8) than the untreated check (55.2). Both Velpar® formulations had significantly more stems (minimum of 21.3%) than the untreated check when total stems for three square feet were analyzed.

The reason for this increase in stem production is unknown. It may be a plant growth response of alfalfa to the chemistry which allowed more buds on the crown to initiate stem growth. As stem and yield data were only obtained for one cutting, it is unknown if similar results would occur in subsequent harvests.

A number of factors still need to be evaluated to ascertain the limits of Velpar® usage before this product can be used safely in alfalfa production in low desert valleys of Arizona and California. These factors include the time of year and related temperature at application (cooler in early spring and winter than summer) and/or surfactants as these factors and interactions could potentially affect Velpar® activity. The current label (for areas where Velpar® usage is allowed on alfalfa) requires plants to be at least one year old with a well established root system, free from stress, healthy and vigorous. Alfalfa in this experiment was entering its fifth year of production and therefore had very developed and larger root system than alfalfa less than two years of age. Alfalfa growing during the early spring and winter would also be much less likely to be stressed due to high temperatures than alfalfa production associated with mid-summer conditions in low desert production areas.

## Acknowledgements

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**Table 1. Mean dry matter average weights (grams/square foot) after treatments with Velpar<sup>®</sup> L or DF on April 15, 2005, Blythe, CA.**

Treatment	Amount/ acre	Bed location			Total (g/3 ft <sup>2</sup> )
		1, 8	2-3, 6-7	4-5	
Velpar <sup>®</sup> L	1.0 qt	36.2a	43.5a	38.5a	118.3a
Velpar <sup>®</sup> DF	0.67 lb	37.7a	38.3a	35.9a	111.9ab
Untreated	-----	34.1a	37.0a	31.3a	102.3 b

Means in columns followed by the same letter are not statistically different at the  $P \leq 0.05$  level (Fisher's LSD test).

**Table 2. Mean number of alfalfa stems per square foot after treatments with Velpar<sup>®</sup> L or DF on April 15, 2005, Blythe, CA.**

Treatment	Amount/ acre	Bed location			Total/ 3 sq. ft.
		1, 8	2-3, 6-7	4-5	
Velpar <sup>®</sup> L	1.0 qt	57.3ab	69.8a	56.4ab	183.9a
Velpar <sup>®</sup> DF	0.67 lb	60.7a	67.5ab	61.7a	189.3a
Untreated	-----	47.7 b	55.2 b	48.8 b	151.5 b

Means in columns followed by the same letter are not statistically different at the  $P \leq 0.05$  level (Fisher's LSD test).