

# Los Lunas Plant Materials Center Alkali Muhly Herbicide Trial Progress Report

Study Number: NMPMC-T-0704-RI

Location: LLPMC– Field 12

In 2006, the Los Lunas Plant Materials Center released Westwater germplasm alkali muhly (*Muhlenbergia asperifolia*) that is also known as scratchgrass. Alkali muhly is a warm-season, native perennial sod grass, which may be prostrate or erect, and can spread vegetatively by slender rhizomes. Westwater germplasm was collected in a damp arroyo bottom near the Westwater Spring in San Juan County, New Mexico at an elevation of 5,200 feet. Alkali muhly is a common riparian grass found throughout the United States except for the southeast. Alkali muhly is an excellent soil stabilizer because it is strongly rhizomatous and grows in moist-to-wet, sandy-to-clay and neutral-to-alkali soils.

Since collecting the Westwater germplasm alkali muhly in 1993, the LLPMC has been evaluating its potential as a plant release for forage and seed production. To conduct these evaluations, the LLPMC was required to install field plantings of alkali muhly at the Center. In order to pass field certification program standards and regulations, the field plantings had to be kept free from weeds. As methods of weed control, the LLPMC employs hand weeding, mechanical devices and chemicals. All three methods were used to keep weeds out of the alkali muhly plantings at the LLPMC.

As a chemical means, the LLPMC relies on the Phenoxy-Carboxylic (2,4-D\*\*) group of herbicides used to control weeds, especially perennials such as bindweed and nightshade. These types of herbicides are selective, systemic plant growth regulators that are rapidly absorbed by the plants. The use of this type of herbicide controls or kills most broadleaf plants, but it is not normally harmful to grasses, unless used at an unacceptable rate. The LLPMC applied 2,4-D herbicide to alkali muhly in order to control broadleaf weeds which had become established in the planting. The 2,4-D herbicide was applied using recommended timing and application rates for the weed species being controlled.

The application of the herbicide to the weed species had the anticipated effect and control and did help in their control in the planting. The unintended effect of the application became evident on the alkali muhly in less than 30 days. The alkali muhly plants where the spraying had been completed were noticeably injured by the chemical. The grass plants were yellowing and growth was noticeably diminished. The application of a 2,4-D type chemical to alkali muhly did stop top growth and the plants appeared dead. The planting where no chemical had been applied was not injured and continued to have healthy and vigorous plant growth. The field was checked periodically for the rest of the growing season and it was observed the chemically treated areas did resume growth, presumably by using root regeneration. However, it was noted no seed stalk production was found on the treated areas at the end of the growing season.

With the knowledge of the possibility of injury by this type of chemical to the alkali muhly, the LLPMC has maintained its production fields by using only hand hoeing or mechanical cultivation. In 2006, with the release of Westwater germplasm, the LLPMC made seed available to the commercial seed industry in order to facilitate the production of larger quantities of the

alkali muhly seed by these growers. The commercial industry could then provide their seed to customers seeking to use alkali muhly for revegetation efforts. The LLPMC is well aware of the needs of the commercial seed industry to produce large quantities of quality seed by the most economical means possible. The use of pesticides in this process is a high probability and the LLPMC is aware of the problems associated with trying to produce a weed free seed crop hampered by not being able to use certain herbicides.

In 2007, the LLPMC decided to study this production problem and did initiate a herbicide trial on a small established field of alkali muhly. The field has been in production since 1999 and weeding has been done by hand hoeing or mechanical cultivation up to 2007. Seed has been harvested from this field and the planting has received optimum growing conditions for the production of healthy and vigorous plants. The herbicide trial was designed to evaluate types of herbicides that may be used on alkali muhly, for the control of broadleaf weed species. The LLPMC used the 2005, 21<sup>st</sup> edition of the Greenbook Crop Protection Reference as a source reference for herbicides that are available for use on grass seed production fields other than the phenoxy-carboxylic class of chemicals. Herbicides were selected that control or kill broadleaf weeds, especially the perennials bindweed and nightshade.

The 2007 study is a simple observational type evaluation of the herbicide applications and with photographs taken at random times during the study. The study involved using two replications of three herbicides, Distinct, Banvel, Paramount and a non-treated control plot. The Table 2 lists the herbicides that were applied, rates of applications, and date of application for the 2007 trial.

**Table 2: Chemical Control of alkali muhly**

<b>Product name and Manufacturer</b>	<b>Rate per acre<sup>1</sup></b>	<b>Date of Application</b>
<b>Distinct</b> , sodium salt of dicamba BASF <sup>3</sup>	6 ounces	4/30/2007
<b>Banvel</b> , dimethylamine salt of dicamba Micro Flo Company LLC <sup>3</sup>	2 pints	5/9/2007
<b>Paramount</b> , quinclorac BASF <sup>3</sup>	7 ounces	9/7/2007

Visual observations were completed for each plot following treatment. Table 3 lists treatment plots with dates of observation.

**Table 3: Treatment and Observation Dates**

<b>Herbicide and Treatment</b>	<b>2007date of visual observation</b>
Distinct* 6 oz/ac	6/7, 7/13, 8/06, 9/07, 10/09
Banvel* 2 pints/ac	6/7, 7/13, 8/06, 9/07, 10/09
Paramount* 7 oz/ac	9/07, 10/09
Control	6/7, 7/13, 8/06, 9/07, 10/09

After evaluation of the plots on 8/6/2007, all plots were mowed to remove seed stalks from the weed species in order to prevent seed production in the field. The mowing did remove some of the alkali mulhy seed inflorescences, but not any forage production. The mowing was required in order to keep weed species regeneration to a minimum.

The following descriptions are the results from the herbicide spraying:

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<sup>1</sup> The herbicides were mixed with water in a tractor mounted boom sprayer applying 33 gallons of water per acre.

## June 6, 2007

- **Control plots** - The control plots contained alkali muhly with approximately 5 inches of forage growth. No seed production was found in either plot. Bindweed in plots had begun to produce flowers and plants were growing vigorously. Plots contained other grass species and several broadleaf and grass weed species including, little barley and nightshade.
- **Distinct plots** – The alkali muhly in the Distinct herbicide plots had forage with approximately 2 inches of growth and the majority had lost its green color and looked to be moderately damaged by the herbicide. The broadleaf weed species were brown and looked to have a good positive result from the application.
- **Banvel plots** – The alkali muhly in the Banvel plots was also affected by the herbicide application and most of the plants were light green to a yellowish green and forage was approximately 2 inches tall. The broadleaf weed species forage had turned brown and was severely damaged by the herbicide.

## 7/13/2007

- **Control Plots** – The alkali muhly had started to produce seed stalks and forage production appeared to be very vigorous and healthy. Forage in the control plots was approximately 6 inches in height. Broadleaf weed species in the plots was also vigorous and flower production was noted on the two most prevalent species, bindweed and nightshade.
- **Distinct Plots** - The alkali muhly had started to produce new forage in the plots. The new forage being produced appeared to have less volume than can be seen in the untreated control plots and the color of the plants was a lighter shade of green. The forage in the Distinct plots was approximately 3 inches in height. No new growth of the broadleaf weed species was observed in these plots.
- **Banvel Plots** – The alkali muhly in the banvel plots had returned to a healthy green color and the forage was approximately 5 inches in height. No new growth was seen from any broadleaf weed species in the Banvel treated plots.

## 8/06/2007

- **Control Plots** – The control plots have abundant seed stalk production and plants are healthy and forage is approximately 8 inches in height. The bindweed and nightshade in the plots are flowering and forage production is excellent.
- **Distinct Plots** - The alkali muhly in the Distinct plots was approximately 5 inches in height and a small amount of seed stalk production is occurring. The alkali muhly forage appears to still be a lighter shade of green when compared to the control plot color. The bindweed and nightshade have begun to grow again and some flowering was noted on both species.
- **Banvel Plots** – The alkali muhly in the Banvel plots was approximately 7 inches in height and forage production looks healthy. A few seed stalks were found in the Banvel plots, but seed production appears to have been dramatically delayed by the herbicide application, when compared to the control plots. The bindweed and nightshade which are dominant broadleaf weed species are once again actively growing and have started to flower.

## 9/07/2007

- **Control Plots** – The alkali muhly in the control plots has excellent seed production and forage has matured. The bindweed and nightshade are actively growing in the plots and would have produced a good amount of seed, if not for the mowing completed on August 6<sup>th</sup>.
- **Distinct Plots** - The alkali muhly still has not returned the vigorous green growth that can be seen in the control plots and seed stalk production has been greatly reduced when compared to the untreated control area. Forage height has not increased from the 5 inches found during the August observations. The bindweed and nightshade are actively growing in the plots and seem to have the potential to try and produce seed again.
- **Banvel Plots** – Seed stalk production of the alkali muhly in the Banvel plots appears to be about three quarters to what can be found in the control plots, but seed development may have been delayed by the herbicide. The alkali muhly forage in the Banvel plots has not changed from the August observations. Bindweed and nightshade are actively growing in the plots and some flowering was observed in the plots, but has decreased since the August evaluation.

**10/09/2007**

- **Control Plots** – The alkali muhly seed is maturing and production appears to be very good. Bindweed and nightshade are still growing, but are beginning to end growth for the season.
- **Distinct Plots** – The alkali muhly in the Distinct plots had produced a fair amount of seed stalks and seed could be developed, depending on the first frost. Forage production in the Distinct plots appears to be less than half of what can be seen in the control plots and still does not appear to be healthy.
- **Banvel Plots** – The alkali muhly does not look much different from the September observations and seed maturity does appear to have been delayed by the herbicide application when compared to the control plots. Seed maturity may not be completed prior to the first hard frost of the season. Forage production may be a little more than half of what is seen in the untreated control plots. The bindweed and nightshade in the plots was still growing, but plants are mature and growth is ending for this season.
- **Paramount Plots** - Herbicide was applied to the plots on September 7, 2007. The plots had no herbicide applied until September, and forage production of the alkali muhly was equal to the untreated control plots. Seed production also appeared to be equal to that found in the control plots. The forage of the broadleaf weeds in the plots had turned brown and all looked dead or dying. The broadleaf weed species had been mowed on August 6, 2007 and this prevented weed seed production in these plots. The amount of weed growth in the Paramount plots will be evaluated in the spring of 2008, before any new Paramount applications.

This trial was an observational evaluation of three herbicides for use on alkali muhly in order to help produce weed free growing conditions during seed production. The use of herbicides allows seed producers to alleviate the need for hand removal of weeds, which can be time consuming and labor intensive. No data was collected from this study that can be used for statistical analysis.

In 2008, the LLPMC hopes to continue this trial using expanded data collection material. It will be very useful to include evaluations of specific effects on the alkali muhly after herbicide applications. These could include, but not be limited to the amount of seed and forage production after herbicide applications. The evaluation could also involve data collection on how well the herbicides are controlling or eradicating certain weed species.

\*\*The LLPMC does not endorse any brand or company name of the chemicals involved in this trial.