# Pest Control in Crops Grown in Northwestern New Mexico, 2011

Annual Data Report 100-2011

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Cooperative Extension Service • College of Agricultural, Consumer and Environmental Sciences

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## INTRODUCTION

Weeds cause more total crop losses than any other agricultural pest (Arnold, 1981–2008; Hall et al., 1995; Currie, 2004; Lorenzi and Jeffery, 1987). Weeds reduce crop yields and quality, harbor insects and plant diseases, and cause irrigation and harvesting problems (Chandler et al., 1984; Lorenzi and Jeffery, 1987; Currie, 2005; Massinga et al., 1999, 2003). As a result, weeds reduce the total value of agricultural products in the United States by 10 to 15% (Lorenzi and Jeffery, 1987). Estimated average losses during 1975 to 1979 in the potential production of field corn, potatoes, and onion ranged from 7 to 16% in the Mountain States Region, which includes New Mexico (Chandler et al., 1984). San Juan County ranks first in potato production, fourth in alfalfa production, and second in corn production among all New Mexico counties (New Mexico Agricultural Statistics, 2007).

An estimated 90% of all tillage operations are for weed control (J.G. Foster, personal communications, 2005–2007). Herbicides can reduce the number of required tillage operations and can be used where cultivation is not possible, such as within crop rows or in solid-seeded crops. With increasing fuel and labor costs, herbicides are often more economical than other methods of weed control.

Many herbicides are approved for use on crops grown on medium- and fine-textured, high-organic soils. Little information is available, however, regarding their effectiveness and safety on low-organic, coarse-textured soils that are common to northwestern New Mexico.

The Environmental Protection Agency (EPA) has become more stringent with regard to research data required for pesticide approval. Thus, it has become critical that state Agricultural Science Centers work closely with commercial companies developing new pesticides in order to obtain the research data required by the EPA. This cooperation will benefit the agricultural industry of the state and assist EPA pesticide registration.

Before 1980, the use of herbicides in northwestern New Mexico was limited. Most growers were still using 2,4-D in corn for broadleaf weed control, while annual grasses were left in check. In alfalfa, burning winter annual mustard and downy brome with propane was not uncommon. An herbicide field-screening program has provided essential information on the activity of new and old herbicides on crops grown in northwestern New Mexico (Arnold, 1981–2008).

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As new land on the Navajo Indian Irrigation Project comes under cultivation, weed and insect problems are varied and may change with each successive crop. It is only through continued research that the demand for reliable information on the use of pesticides in northwestern New Mexico can be met.

I wish to express my sincere appreciation to the following companies for providing technical assistance, products, and/or financial assistance: Bayer CropScience, BASF, E.I. DuPont, Gowan, BLM/FFO, FMC, Monsanto, Dow AgroSciences, Navajo Agricultural Products Industry, Pioneer Hi-Bred, Syngenta Crop Protection, and Southwest Seed.

## PEST CONTROL GRANT FUND

### Pest Control Management Objectives

Determine efficacy of registered and non-registered pesticides for control of weeds in agricultural crops grown in northwestern New Mexico.

## Monsanto, Broadleaf Weed Control in Spring-Seeded Roundup Ready Alfalfa

### Introduction

Seedling alfalfa requires effective broad-spectrum weed control for successful establishment; however, few herbicides are registered for postemergence broadleaf weed control. Pursuit, Raptor, and recently Roundup applied to Roundup Ready alfalfa have been registered for broadleaf weed control in seedling alfalfa. Field trials were conducted to evaluate broadleaf weed control of Roundup applied alone or in combination with other selected herbicides.

### Objectives

- Determine efficacy of Roundup applied alone or in combination for control of broadleaf weeds in Roundup Ready spring-seeded alfalfa.
- Determine alfalfa yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of Roundup Ready alfalfa (DeKalb DKA41-18RR) and annual broadleaf weeds to postemergence applications of Roundup applied alone or in combination with other selected herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with three replications. Individual plots were 10 ft wide by 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Alfalfa was planted at 20 lb/ac with a Massey Ferguson grain drill on May 23. Preemergence treatments were applied on May 24 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soils had a maximum and minimum temperature of 75 and 60°F. Postemergence treatments were applied on June 14 and June 28 when seedling alfalfa was in the 2nd to 3rd trifoliate leaf stage and weeds were small (less than 2 in.). Air temperature maximum and minimum during postemergence applications was 86 and 50°F. One postemergence treatment of Roundup PowerMAX was applied on June 28 when seedling alfalfa was in the 5th to 6th trifoliate leaf stage and weeds were 4 to 6 in. tall. Air temperature maximum and minimum during this postemergence application was 95 and 66°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were rated visually for crop injury and weed control on June 14. Preemergence followed by sequential postemergence treatments were rated visually for weed control on July 13. Postemergence treatments were rated for crop injury and weed control on July 13. Alfalfa was harvested with an Almaco self-propelled plot harvester on August 22. A grab sample was taken from each plot to determine protein content and relative feed value. Results obtained were subjected to analysis of variance at $P = 0.05$.

### Results and discussion

**Weed control and injury evaluations:** Results of crop injury and weed control evaluations are given in Tables 1 and 2. On June 14 both Sharpen and Warrant applied preemergence at 2.5 and 48 oz/ac caused crop injury ratings of 11 and 6, respectively. All treatments except the weedy check gave good to excellent control of redroot and prostrate pigweed, black nightshade, and common lambsquarters. Russian thistle control was poor with Sharpen and Warrant applied preemergence at 2.5 and 48 oz/ac. Roundup PowerMAX applied postemergence on June 28 at the 5th to 6th trifoliate leaf stage caused an injury rating (stunting) of 9 on July 13. On July 13 all treatments except the weedy check gave good to excellent control of all broadleaf weeds (Table 2).

**Yield and protein content:** Results of yield, protein content, and relative feed values are given in Table 3. The weedy check had the highest yield during the first cutting of 3.5 t/ac. Relative feed value and percent protein content were 6 to 75 and 1.5 to 7.9 percentage points higher in the treated plots as compared to the weedy check, respectively.

## BASF, Broadleaf Weed Control in Field Corn with Preemergence Followed by Sequential Postemergence Herbicides

### Introduction

Many herbicides can be used in sequential treatments. These trials are preemergence herbicides followed by sequential postemergence treatments. If weeds escape the preemergence treatment, a postemergence treatment may then be used to assist in weed control.

### Objectives

- Determine efficacy of selected herbicides for control of annual broadleaf weeds in field corn.
- Determine corn yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of field corn (Pioneer PO231HR) and annual broadleaf weeds to preemergence followed by sequential late postemergence herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with four replications. Individual plots were four 30-in. rows 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Field corn was planted with flexi-planters equipped with disk openers on May 10. Preemergence herbicides were applied on May 11 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soils had a maximum and minimum temperature of 67 and 59°F. Postemergence treatments were applied on June 13, when field corn was in the 3rd to 5th stage and weeds were small (less than 2 in.). Air temperature maximum and minimum during postemergence applications was 84 and 55°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were rated visually for crop injury on June 13 and weed control on June 13 and July 12. Preemergence followed by sequential postemergence treatments were rated visually for weed control on July 12. Stand counts were made on June 13 by counting individual plants per 10 ft of the third row of each plot. Field corn was harvested on November 14 by combining the center two rows of each plot using a John Deere 4420 combine equipped with a load cell. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations:** Crop injury evaluations and stand counts are given in Table 4. Weed control evaluations are given in Tables 4 and 5. There was no crop injury and there were no significant differences among treatments for stand count (Table 4). On June 13 all treatments except the weedy check gave excellent control of redroot and prostrate pigweed, black nightshade, and common lambsquarters. Russian thistle control was poor with Sharpen plus Prowl $H_20$ and Zidua applied at 2 plus 32 and 1.5 oz/ac (Table 4). On July 12 all treatments except the weedy check gave excellent control of black nightshade and common lambsquarters. Preemergence applications of Verdict, Balance Flexx, Sharpen plus Prowl $H_20$, and Sharpen plus G-Max Lite applied at 12 and 10, 3, 2 plus 32 oz/ac followed by a sequential postemergence application of Roundup PowerMAX at 22 oz/ac gave poor control of redroot pigweed. Prostrate pigweed control was excellent with all treatments except Verdict applied preemergence at 12 oz/ac followed by a sequential postemergence treatment of Roundup PowerMAX at 22 oz/ac and the weedy check. Verdict, Sharpen plus Prowl $H_20$ applied preemergence at 12 and 10, 2 plus 32 oz/ac followed by a sequential postemergence treatment of Roundup PowerMAX at 22 oz/ac gave poor control of Russian thistle. Zidua applied preemergence at 1.5 oz/ac gave poor control of Russian thistle (Table 5).

**Crop yields:** Yields are given in Table 5. Yields were 154 to 211 bu/ac higher in the treated plots as compared to the weedy check.

## Bayer CropScience, Broadleaf Weed Control in Field Corn with Either Preemergence or Postemergence Herbicides

### Introduction

Controlling annual weeds in corn usually is a two pass program with a preemergence followed by a postemergence herbicide. With increasing cost of herbicides and application, this study was to evaluate season-long control of annual broadleaf weeds with either preemergence or postemergence herbicides.

### Objectives

- Determine efficacy of selected herbicides for control of annual broadleaf weeds in field corn.
- Determine corn yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of field corn (Pioneer

PO231HR) and annual broadleaf weeds to either preemergence or postemergence herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with four replications. Individual plots were four 30-in. rows 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Field corn was planted with flexi-planters equipped with disk openers on May 11. Preemergence treatments were applied on May 12 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soils had a maximum and minimum temperature of 65 and 60°F. Postemergence treatments were applied on June 13 when field corn was in the 3rd to 5th leaf stage and weeds were small (less than 2 in.). Air temperature maximum and minimum during postemergence applications were 84 and 55°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters infestations and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were rated visually for crop injury on June 13 and for weed control on June 13 and July 13. Postemergence treatments were rated visually for weed control on July 13. Stand counts were made on June 13 by counting individual plants per 10 ft of the third row of each plot. Field corn was harvested on November 15 by combining the center two rows of each plot using a John Deere 4420 combine equipped with a load cell. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations:** Stand counts and injury evaluations are given in Table 6. Weed control evaluations are given in Tables 6 and 7. On June 13, Corvus applied preemergence at 5.6 oz/ac in combination with either atrazine or sharpen at 16 and 2.5 oz/ac had the highest injury rating of 6. All treatments except the weedy check gave excellent control of broadleaf weeds (Table 6). On July 13 preemergence treatments of Corvus plus Sharpen, Verdict plus atrazine and Bicep II Mag applied at 5.6 plus 2.5, 15 plus 16 and 48 oz/ac and postemergence treatments of Capreno alone or in combination with atrazine applied at 3 and 3 plus 16 oz/ac gave excellent control of redroot pigweed. Prostrate pigweed and black nightshade control was good to excellent with all treatments except the weedy check, Verdict plus atrazine applied preemergence at 15 plus 16 oz/ac, and the postemergence treatment of Roundup PowerMAX applied at 22 oz/ac. Preemergence treatments of Verdict plus atrazine and Bicep II Mag at 15 plus 16 and 48 oz/ac and postemergence treatments of Halex GT and Roundup PowerMAX applied at 58 and 22 oz/ac gave poor control of Russian thistle. Common lambsquarters control was marginal with the preemergence treatment of Verdict plus atrazine applied at 15 plus 16 oz/ac and the postemergence treatment of Roundup PowerMAX applied at 22 oz/ac (Table 7).

**Crop yields:** Yields are given in Table 7. Yields were 130 to 207 bu/ac higher in the herbicide-treated plots as compared to the check.

## Bayer CropScience, Broadleaf Weed Control in Field Corn with Preemergence Followed by Sequential Postemergence Herbicides

### Introduction

Many herbicides can be used in sequential treatments. These trials are preemergence herbicides followed by sequential postemergence treatments. If weeds escape the preemergence treatment, a postemergence treatment may then be used to assist in weed control.

### Objectives

- Determine efficacy of selected herbicides for control of annual broadleaf weeds in field corn.
- Determine corn yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of field corn (Pioneer PO231HR) and annual broadleaf weeds to preemergence and preemergence followed by sequential postemergence herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with three replications. Individual plots were four 30-in. rows 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Field corn was planted with flexi-planters equipped with disk openers on May 10. Preemergence herbicides were applied on May 11 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soil had a maximum and minimum temperature of 67 and 59°F. Postemergence treatments were applied on June 13, when field corn was in the 3rd to 5th leaf stage and weeds were small (less than 2 in.). Air temperature maximum and minimum during postemergence applications was 84 and 55°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were rated visually for crop injury and weed control on June 13. Preemergence followed by sequential postemergence treatments were rated visually for weed control on July 12. Stand counts were made on June 13 by counting individual plants per 10 ft of the third row of each plot. Field corn was harvested on November 14 by combining the center two rows of each plot using a John Deere 4420 combine equipped with a load cell. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations:** Crop injury evaluations and stand counts are given in Table 8. Weed control evaluations are given in Tables 8 and 9. There was no crop injury from any of the treatments (Table 8). On June 13, all treatments except the weedy check gave excellent control of prostrate pigweed, black nightshade, and common lambsquarters. Sharpen at 2.5 oz/ac gave poor control of redroot pigweed and Russian thistle. Corvus or Balance Flexx plus atrazine applied preemergence at 3 oz/ac in combination with atrazine at 16 oz/ac gave excellent control of Russian thistle (Table 8). On July 12 Corvus plus atrazine applied preemergence at 3 plus 16 oz/ac followed by sequential postemergence applications of Laudis, Ignite, Roundup PowerMAX, and Capreno at 3, plus 16, 22 oz/ac and Balance Flexx applied preemergence at 3 oz/ac followed by a sequential postemergence application of Capreno at 3 oz/ac gave excellent control of all broadleaf weeds (Table 9).

**Crop yields:** Yields are given in Table 9. Yields were 167 to 200 bu/ac higher in the herbicide-treated plots as compared to the check.

## DuPont Crop Protection, Broadleaf Weed Control in Field Corn with Preemergence Followed by Sequential Postemergence Herbicides

### Introduction

Many herbicides can be used in sequential treatments. These trials are preemergence herbicides followed by sequential postemergence treatments. If weeds escape the preemergence treatment, a postemergence treatment may then be used to assist in weed control.

### Objectives

- Determine efficacy of selected herbicides for control of annual broadleaf weeds in field corn.
- Determine corn yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of field corn (Pioneer PO231HR) and annual broadleaf weeds to preemergence and preemergence followed by sequential postemergence herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with four replications. Individual plots were four 30-in. rows 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Field corn was planted with flexi-planters equipped with disk openers on May 10. Preemergence herbicides were applied on May 12 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soil had a maximum and minimum temperature of 65 and 60°F. Postemergence treatments were applied on June 13, when field corn was in the 3rd to 5th leaf stage and weeds were small (less than 2 in.). Air temperature maximum and minimum during postemergence application were 84 and 55°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were rated visually for crop injury and weed control on June 13. Preemergence followed by sequential postemergence treatments were rated visually for weed control on July 13. Stand counts were made on June 13 by counting individual plants per 10 ft of the third row of each plot. Field corn was harvested on November 15 by combining the center two rows of each plot using a John Deere 4420 combine equipped with a load cell. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations:** Crop injury evaluations and stand counts are given in Table 10. Weed control evaluations are given in Tables 10 and 11. On June 13 Lumax applied preemergence at 96 oz/ac and the weedy check were the only treatments that did not cause significant crop injury (Table 10). All treatments gave excellent control of redroot and prostrate pigweed, black nightshade, and common lambsquarters. Rimsulfuron plus mesotrione applied preemergence alone or in combination with thifensulfuron at 1 plus 4.5 oz/ac plus 0.5 oz/ac gave poor control of Russian thistle (Table 10). On July 13 Lumax applied preemergence at 96 oz/ac and followed by a sequential postemergence treatments of Roundup PowerMAX applied at 32 oz/ac gave good to excellent control of redroot pigweed. Prostrate pigweed control was poor with rimsulfuron plus mesotrione applied preemergence at

1.5 plus 4.5 oz/ac. Rimsulfuron plus mesotrione applied alone at 1 plus 4.5 oz/ac or in combination with either thifensulfuron or atrazine at 0.5 and 32 oz/ac gave poor control of black nightshade. Rimsulfuron plus mesotrione plus atrazine applied preemergence at 1 plus 4.5 plus 32 oz/ac and Lumax applied preemergence at 96 oz/ac both followed by a sequential postemergence treatment of Roundup PowerMAX at 32 oz/ac gave excellent control of Russian thistle. All treatments except the weedy check gave excellent control of common lambsquarters (Table 11).

**Crop yields:** Yields are given in Table 11. Yields were 68 to 205 bu/ac higher in the herbicide-treated plots as compared to the check.

## Bayer CropScience, Broadleaf Weed Control in Grain Sorghum with Preemergence Followed by Sequential Postemergence Herbicides

### Introduction

Postemergence herbicides are most effective if applied when the weeds and grain sorghum are small. If weeds are not controlled, weeds then become difficult to control with grain sorghum growth being restricted. This trial was to examine the efficacy of preemergence followed by sequential postemergence herbicides applied to grain sorghum and weeds, and to evaluate their effect on crop injury and grain sorghum yields.

### Objectives

- Determine efficacy of selected herbicides for control of annual broadleaf weeds in grain sorghum.
- Determine grain sorghum yield and tolerance to applied herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of grain sorghum (Pioneer, DKS 53-67) and annual broadleaf weeds to preemergence followed by sequential postemergence herbicides. Soils were a Doak silt loam with a pH of 7.4 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a randomized complete block with four replications. Individual plots were four 30-in. rows 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Grain sorghum was planted with flexi-planters equipped with disk openers on May 31. Preemergence treatments were applied on June 2 and immediately incorporated with 0.75 in. of sprinkler-applied water. Soil temperature maximum and minimum during application were 70 and 69°F. Postemergence treatments were applied on June 28 when grain sorghum was in the V5 leaf stage and weeds were less than 4 in. in height. Air temperatures, maximum and minimum for postemergence applications were 95 and 66°F. Black nightshade and redroot and prostrate pigweed infestations were heavy and common lambsquarters infestations and Russian thistle infestations were moderate throughout the experimental area. Preemergence treatments were evaluated for crop injury and weed control on June 28. Preemergence followed by sequential postemergence treatments were evaluated for weed control on July 28. Grain sorghum was harvested on November 17 by combining the center two rows of each plot using a John Deere 4420 combine equipped with a load cell. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations:** Crop injury evaluations are given in Table 12. Weed control evaluations are given in Tables 12 and 13. There were no crop injury symptoms from any of the treatments for both rating periods. One June 28 all treatments except the weedy check gave excellent control of redroot and prostrate pigweed, black nightshade, and common lambsquarters. Atrazine applied preemergence at 32 oz/ac gave poor control of Russian thistle (Table 12). On July 28 atrazine plus Buctril applied at 16 plus 16 oz/ac gave poor control of redroot pigweed. All treatments except the weedy check gave excellent control of prostrate pigweed, black nightshade, and common lambsquarters. Russian thistle control was poor with the preemergence application of Guardsman Max applied at 48 oz/ac (Table 13).

**Crop yields:** Yields are given in Table 13. Yields were 57 to 125 bu/ac higher in the herbicide-treated plots as compared to the weedy check.

## Dow AgroSciences, Jim Hill Mustard Control in Winter Wheat

### Introduction

Jim Hill mustard (tumble mustard) is a troublesome weed in winter wheat. If not controlled they can decrease wheat yields and interfere with harvest operations. Field trials were conducted to evaluate the control of Jim Hill mustard by selected herbicides in winter wheat.

### Objectives

- Determine efficacy of selected herbicides for control of Jim Hill mustard in winter wheat.
- Determine winter wheat yield and tolerance to applied selected herbicides.

### Materials and methods

A field experiment was conducted in 2011 on a Wall sandy loam with less than 0.5% organic matter at Farmington, NM, to evaluate the response of winter wheat and Jim Hill mustard (tumble mustard) to postemergence herbicides. The experimental design was a randomized complete block with three replications. Individual plots were 10 ft wide by 30 ft long. Treatments were applied with a compressed air backpack sprayer calibrated to deliver 30 gal/ac at 35 psi. Winter wheat (var. Promontory) was planted in 18-in. rows at 100 lb/ac with a Massey Ferguson grain drill on September 12, 2010. Eighteen inch row spacings were used to ensure mustard pressure. Treatments were applied on March 30, prior to winter wheat at Feekes 6 growth stage. Air temperature maximum and minimum during treatment application was 57 and 28°F. Other postemergence treatments were applied on April 28 when winter wheat was approximately at the Feekes 9 growth stage. Air temperature maximum and minimum during treatment application was 52 and 29°F. On March 30 and April 28 Jim Hill mustard heights were less than 4 and greater than 8 in. in height. Jim Hill mustard infestation was heavy throughout the experimental area. Crop injury and weed control evaluations were made on May 23. Winter wheat was harvested with a John Deere 3300 combine equipped with a load cell on July 28. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Weed control and injury evaluations**: Results of crop injury and weed control evaluations are given in Table 14. On May 23 there were no crop injury symptoms from any of the treatments. Banvel, and BASF 8100H applied at 4, 2, and 2.2 oz/ac in combination with Harmony GT XP at either 0.3 or 0.6 oz/ac, Olympus, Maverick and Axial applied at 0.9, 0.66 and 16.4 oz/ac gave poor control of Jim Hill mustard (Table 14).

**Yield:** Results of yield are given in Table 14. Yields were 7 to 33 bu/ac higher in the herbicide-treated plots as compared to the weedy check.

## DuPont Crop Protection, Cool Season Native and Non-Native Grass Response to MAT 28

### Introduction

In the San Juan Oil and Gas Producing Basin of northwest New Mexico, it is estimated that approximately 20,000 to 30,000 acres of disturbed lands created by oil and natural gas drilling will need to be re-vegetated during the next 10 years. Most herbicides used today injure grass seedlings during germination followed by future replanting. A field trial was conducted to determine MAT 28 injury to seedlings and permanent grass stands.

### Objectives

- Determine yield of selected non-native and native cool-season grasses to MAT 28 applied alone or in combination with other herbicides.

### Materials and methods

A field experiment was conducted in 2011 at Farmington, NM, to evaluate the response of selected non-native and native cool-season grasses to MAT 28. Soils were a Doak silt loam with a pH of 7.5 and an organic matter content of less than 0.5%. Soils were fertilized according to New Mexico State University recommendations based on soil tests. The experimental design was a split plot with rangeland grasses as whole plots and herbicide treatments as sub plots. Individual plots were 6 ft wide by 30 ft long. San Luis slender wheatgrass, Manchar smoothbrome grass, Rimrock Indian ricegrass, HyCrest crested wheatgrass, Oahe intermediate wheatgrass, Lune pubescent wheatgrass, Potomac orchardgrass, and Fawn tall fescue were planted on August 18, 2009, at 8, 8, 6, 8, 10, 9, 5, and 15 lb pls/ac (pure live seed), respectively. MAT 28 was applied preemergence at 4 oz/ac on August 25 and 26, 2009-2010, and was immediately incorporated with 0.75 in. of sprinkler-applied water. All other treatments were applied postemergence with a non-ionic surfactant at 22 oz/ac on April 22 and 28, 2010-2011. Preemergence treatment soil maximum and minimum temperatures on April 22 and 28, 2010-2011, were 94 and 72, and 80 and 72°F, respectively. Air temperature maximum and minimum temperatures for the postemergence treatments on April 28, 2011, were 77 and 48°F. Grass stand establishment ratings for 2011 were similar to 2010 (data not presented). Plots were harvested with an Almaco plot harvester on June 9, 2011. Only 2011 grass green weight yield in lb/plot will be presented. Results obtained were subjected to analysis of variance at P = 0.05.

### Results and discussion

**Grass yield:** Grass green weight yields are given in Table 15. MAT 28 applied preemergence at 4.0 oz/ac yielded significantly less grass per plot as compared to the other treatments. Oahe intermediate wheatgrass, Fawn tall fescue and Luna pubescent wheatgrass were the highest-yielding grasses (Table 15).

**Table 1. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Spring-Seeded Roundup Ready Alfalfa, June 14; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments | Rate (oz/ac) | Crop Injury[a] (%) | Weed Control[a,b] (%) Amare | Amabl | Solni | Saskr | Cheal |
|---|---|---|---|---|---|---|---|
| Sharpen | 2.5 | 11 | 92 | 92 | 88 | 43 | 98 |
| Warrant | 48 | 6 | 100 | 100 | 96 | 43 | 98 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | 2 | 4 | 1 | 6 | 5 | 3 |

[a]Based on visual scale from 0 to 100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 2. Control of Annual Broadleaf Weeds with Preemergence, Preemergence Followed by Sequential Postemergence, and Postemergence Herbicides in Spring-Seeded Roundup Ready Alfalfa, July 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments[a] | Rate (oz/ac) | Crop Injury[c] (%) | Weed Control[c,d] (%) Amare | Amabl | Solni | Saskr | Cheal |
|---|---|---|---|---|---|---|---|
| Roundup PowerMAX + AMS | 22 + 3 lb/ac | 0 | 100 | 100 | 95 | 100 | 100 |
| Roundup PowerMAX + AMS[b] | 44 + 3 lb/ac | 9 | 100 | 100 | 100 | 100 | 100 |
| Sharpen/Roundup PowerMAX + AMS | 2.5/22 + 3 lb/ac | 9 | 85 | 100 | 86 | 100 | 100 |
| Raptor + Select Max + MSO + AMS | 5 + 9 + 24 + 3 lb/ac | 0 | 100 | 100 | 80 | 100 | 100 |
| Butyrac + Roundup PowerMAX + AMS | 64 + 22 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Raptor + Roundup PowerMAX + MSO + AMS | 5 + 22 + 24 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Pursuit + Roundup PowerMAX + MSO + AMS | 4 + 22 + 24 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Prowl $H_20$ + Roundup PowerMAX + AMS | 32 + 22 + 3 lb/ac | 0 | 100 | 100 | 90 | 86 | 100 |
| Roundup PowerMAX + Select Max + MSO + AMS | 22 + 9 + 24 + 3 lb/ac | 0 | 100 | 100 | 99 | 100 | 100 |
| Warrant/Roundup PowerMAX + AMS | 48/22 + 3 lb/ac | 3 | 100 | 100 | 100 | 100 | 100 |
| Warrant + Roundup PowerMAX + AMS | 48 + 22 + 3 lb/ac | 0 | 100 | 98 | 98 | 82 | 100 |
| Raptor + Prowl $H_20$ + MSO + AMS | 6 + 32 + 24 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Pursuit + Prowl $H_20$ + MSO + AMS | 6 + 32 + 24 + 3 lb/ac | 0 | 100 | 100 | 98 | 100 | 100 |
| Raptor + Prowl $H_20$ + Roundup PowerMAX + MSO + AMS | 6 + 32 + 22 + 24 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Pursuit + Prowl $H_20$ + Roundup PowerMAX + MSO + AMS | 6 + 32 + 22 + 24 + 3 lb/ac | 0 | 100 | 100 | 100 | 100 | 100 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | 1 | 4 | 1 | 2 | 1 | 1 |

[a]First treatment applied preemergence followed by a sequential postemergence treatment, and AMS, MSO denote ammonium sulfate and methylated seed oil, respectively.

[b]Treatment applied postemergence on June 28.

[c]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[d]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 3. Yield, Protein, and RFV of Spring-Seeded Roundup Ready Alfalfa, from Herbicide Applications of Preemergence, Preemergence Followed by Sequential Postemergence, and Postemergence Herbicides, August 22; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments[a] | Rate (oz/ac) | Yield[c] (t/ac) | RFV[d] (%) | Protein Content (%) |
|---|---|---|---|---|
| Roundup PowerMAX + AMS | 22 + 3 lb/ac | 2.3 | 188 | 22.8 |
| Roundup PowerMAX + AMS[b] | 44 + 3 lb/ac | 2.4 | 198 | 23.7 |
| Sharpen/Roundup PowerMAX + AMS | 2.5/22 + 3 lb/ac | 2.9 | 154 | 17.3 |
| Raptor + Select Max + MSO + AMS | 5 + 9 + 24 + 3 lb/ac | 2.3 | 167 | 21.3 |
| Butyrac + Roundup PowerMAX + AMS | 64 + 22 + 3 lb/ac | 2.3 | 186 | 22.0 |
| Raptor + Roundup PowerMAX + MSO + AMS | 5 + 22 + 24 + 3 lb/ac | 2.3 | 163 | 20.7 |
| Pursuit + Roundup PowerMAX + MSO + AMS | 4 + 22 + 24 + 3 lb/ac | 2.2 | 202 | 23.5 |
| Prowl $H_20$ + Roundup PowerMAX + AMS | 32 + 22 + 3 lb/ac | 2.8 | 134 | 17.7 |
| Roundup PowerMAX + Select Max + MSO + AMS | 22 + 9 + 24 + 3 lb/ac | 2.3 | 156 | 19.1 |
| Warrant/Roundup PowerMAX + AMS | 48/22 + 3 lb/ac | 2.3 | 181 | 21.7 |
| Warrant + Roundup PowerMAX + AMS | 48 + 22 + 3 lb/ac | 2.9 | 133 | 17.4 |
| Raptor + Prowl $H_20$ + MSO + AMS | 6 + 32 + 24 + 3 lb/ac | 2.4 | 176 | 21.8 |
| Pursuit + Prowl $H_20$ + MSO + AMS | 6 + 32 + 24 + 3 lb/ac | 2.3 | 185 | 22.3 |
| Raptor + Prowl $H_20$ + Roundup PowerMAX + MSO + AMS | 6 + 32 + 22 + 24 + 3 lb/ac | 2.2 | 178 | 22.3 |
| Pursuit + Prowl $H_20$ + Roundup PowerMAX + MSO + AMS | 6 + 32 + 22 + 24 + 3 lb/ac | 2.3 | 187 | 22.4 |
| Weedy check | | 3.5 | 127 | 15.8 |
| LSD 0.05 | | 0.3 | 38 | 3.6 |

[a]First treatment applied preemergence followed by a sequential postemergence treatment, and AMS, MSO denote ammonium sulfate and methylated seed oil, respectively.

[b]Treatment applied postemergence on June 28.

[c]Tons/ac based on a 20 percent moisture basis.

[d]RFV denotes relative feed value.

**Table 4. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Field Corn on June 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Stand | Crop | Weed Control[a,b] | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rate | Count | Injury[a] | Amare | Amabl | Solni | Saskr | Cheal |
| Treatments | (oz/ac) | (no.) | (%) | (%) | | | | |
| Verdict | 12 | 25 | 0 | 100 | 100 | 100 | 96 | 100 |
| Lumax | 64 | 23 | 0 | 100 | 100 | 100 | 94 | 100 |
| Balance Flexx | 3 | 24 | 0 | 98 | 100 | 100 | 100 | 100 |
| Sharpen + Prowl $H_20$ | 2 + 32 | 24 | 0 | 94 | 99 | 100 | 67 | 100 |
| Sharpen + G-Max Lite | 2 + 32 | 23 | 0 | 100 | 100 | 100 | 99 | 100 |
| Verdict | 10 | 24 | 0 | 100 | 100 | 100 | 94 | 100 |
| Zidua | 1.5 | 25 | 0 | 100 | 100 | 100 | 51 | 100 |
| Zidua + Verdict | 1.5 + 10 | 23 | 0 | 100 | 100 | 100 | 99 | 100 |
| G-Max Lite | 40 | 24 | 0 | 100 | 100 | 100 | 84 | 100 |
| Weedy check | | 23 | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | ns | | 2 | 1 | 1 | 12 | 1 |

[a]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 5. Control of Annual Broadleaf Weeds with Preemergence Followed by Sequential Postemergence Herbicides in Field Corn on July 12; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Weed Control[b,c] | | | | | |
|---|---|---|---|---|---|---|---|
| | Rate | Amare | Amabl | Solni | Saskr | Cheal | Yield |
| Treatments[a] | (oz/ac) | (%) | | | | | (bu/ac) |
| Verdict/Roundup PowerMAX + NIS + AMS | 12/22 + 10 + 5 lb/ac | 13 | 68 | 100 | 42 | 100 | 221 |
| Lumax/Roundup PowerMAX + NIS + AMS | 65/22 + 10 + 5 lb/ac | 91 | 100 | 100 | 95 | 100 | 272 |
| Balance Flexx/Roundup PowerMAX + NIS + AMS | 3/22 + 10 + 5 lb/ac | 23 | 94 | 100 | 92 | 100 | 230 |
| Sharpen + Prowl $H_20$/Roundup PowerMAX + NIS + AMS | 2 + 32/22 + 10 + 5 lb/ac | 45 | 96 | 100 | 71 | 100 | 234 |
| Sharpen + G-Max Lite/Roundup PowerMAX + NIS + AMS | 2 + 32/22 + 10 + 5 lb/ac | 50 | 98 | 100 | 90 | 100 | 267 |
| Verdict/Roundup PowerMAX + NIS + AMS | 10/22 + 10 + 5 lb/ac | 12 | 95 | 99 | 50 | 100 | 226 |
| Zidua | 1.5 | 83 | 96 | 100 | 13 | 100 | 227 |
| Zidua + Verdict | 1.5 + 10 | 96 | 99 | 100 | 98 | 100 | 273 |
| Zidua + Verdict/Roundup PowerMAX + Status + AMS | 1.5 + 10/22 + 5 + 5 lb/ac | 95 | 100 | 100 | 99 | 100 | 277 |
| Verdict/Zidua + Roundup PowerMAX + Status + AMS | 10/1.5 + 22 + 5 + 5 lb/ac | 99 | 100 | 100 | 100 | 100 | 278 |
| G-Max Lite/Status + AMS | 40/5 + 5 lb/ac | 72 | 99 | 100 | 98 | 100 | 262 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 67 |
| LSD 0.05 | | 10 | 3 | 1 | 8 | 1 | 17 |

[a]First treatment applied preemergence, then a slash followed by a sequential postemergence treatment; NIS and AMS denote a non-ionic surfactant and ammonium sulfate, respectively.

[b]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[c]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 6. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Field Corn on June 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Stand | Crop | Weed Control[a,b] | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rate | Count | Injury[a] | Amare | Amabl | Solni | Saskr | Cheal |
| Treatments | (oz/ac) | (no.) | (%) | (%) | | | | |
| Corvus + atrazine | 5.6 + 16 | 25 | 6 | 100 | 100 | 100 | 100 | 100 |
| Corvus + Sharpen | 5.6 + 2.5 | 24 | 6 | 100 | 100 | 100 | 100 | 100 |
| Balance Flexx + atrazine | 6 + 16 | 24 | 0 | 100 | 100 | 100 | 100 | 100 |
| Lumax | 48 | 24 | 0 | 100 | 100 | 100 | 100 | 100 |
| Harness Xtra | 48 | 24 | 0 | 100 | 100 | 100 | 100 | 100 |
| Verdict + atrazine | 15 + 16 | 23 | 0 | 100 | 100 | 100 | 100 | 100 |
| Bicep II Mag | 48 | 25 | 0 | 100 | 100 | 100 | 99 | 100 |
| Weedy check | | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | ns | 1 | 1 | 1 | 1 | 1 | 1 |

[a]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 7. Control of Annual Broadleaf Weeds with Either Preemergence or Postemergence Herbicides in Field Corn on July 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments | Rate (oz/ac) | Crop Injury[b] (%) | Weed Control[b,c] (%) Amare | Amabl | Solni | Saskr | Cheal | Yield (bu/ac) |
|---|---|---|---|---|---|---|---|---|
| Corvus + atrazine | 5.6 + 16 | 6 | 79 | 99 | 100 | 100 | 100 | 242 |
| Corvus + Sharpen | 5.6 + 2.5 | 6 | 99 | 98 | 100 | 100 | 100 | 247 |
| Balance Flexx + atrazine | 6 + 16 | 0 | 33 | 100 | 100 | 100 | 100 | 268 |
| Lumax | 48 | 0 | 79 | 98 | 100 | 80 | 100 | 263 |
| Harness Xtra | 48 | 0 | 50 | 91 | 100 | 82 | 100 | 250 |
| Verdict + atrazine | 15 + 16 | 0 | 99 | 60 | 77 | 73 | 80 | 251 |
| Bicep II Mag | 48 | 0 | 88 | 95 | 100 | 58 | 100 | 263 |
| Capreno + COC + AMS[a] | 3 + 38 + 2.5 lb | 0 | 95 | 99 | 100 | 100 | 100 | 277 |
| Capreno + atrazine + COC + AMS[a] | 3 + 16 + 38 + 2.5 lb | 0 | 97 | 99 | 100 | 100 | 100 | 278 |
| Halex GT + NIS + AMS[a] | 58 + 10 + 2.5 lb | 0 | 40 | 92 | 100 | 78 | 100 | 242 |
| Roundup PowerMAX + AMS[a] | 22 + 2.5 lb | 0 | 15 | 47 | 81 | 33 | 81 | 201 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| LSD 0.05 | | 1 | 7 | 6 | 3 | 5 | 2 | 16 |

[a]Treatments applied postemergence; COC, AMS, and NIS denote crop oil concentrate, ammonium sulfate, and non-ionic surfactant, respectively.

[b]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[c]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 8. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Field Corn on June 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments | Rate (oz/ac) | Stand Count (no.) | Crop Injury[a] (%) | Weed Control[a,b] (%) Amare | Amabl | Solni | Saskr | Cheal |
|---|---|---|---|---|---|---|---|---|
| Corvus + atrazine | 3 + 16 | 25 | 0 | 100 | 100 | 100 | 98 | 100 |
| Balance Flexx + atrazine | 3 + 16 | 23 | 0 | 100 | 100 | 100 | 97 | 100 |
| Lumax | 48 | 24 | 0 | 100 | 100 | 100 | 36 | 100 |
| Harness Xtra | 48 | 24 | 0 | 100 | 100 | 100 | 40 | 100 |
| Verdict | 15 | 24 | 0 | 100 | 100 | 100 | 73 | 100 |
| Verdict | 12 | 25 | 0 | 88 | 100 | 100 | 30 | 100 |
| G-Max Lite | 48 | 24 | 0 | 100 | 100 | 100 | 70 | 100 |
| Sharpen | 2.5 | 24 | 0 | 38 | 100 | 100 | 33 | 100 |
| Weedy check | | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | ns | | 3 | 1 | 1 | 16 | 1 |

[a]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 9. Control of Annual Broadleaf Weeds with Preemergence Followed by Sequential Postemergence Herbicides in Field Corn on July 12; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Weed Control[b,c] | | | | | |
|---|---|---|---|---|---|---|---|
| | Rate | Amare | Amabl | Solni | Saskr | Cheal | Yield |
| Treatments[a] | (oz/ac) | (%) | | | | | (bu/ac) |
| Corvus + atrazine/Laudis + MSO + AMS | 3 + 16/3 + 38 + 2.5 lb | 97 | 100 | 100 | 99 | 100 | 266 |
| Corvus + atrazine/Ignite + AMS | 3 + 16/22 + 3 lb | 99 | 100 | 100 | 99 | 100 | 270 |
| Corvus + atrazine/Roundup PowerMAX + AMS | 3 + 16/22 + 3 lb | 90 | 100 | 100 | 90 | 100 | 274 |
| Corvus + atrazine/Capreno + COC + AMS | 3 + 16/3 + 38 + 2.5 lb | 100 | 97 | 100 | 100 | 100 | 268 |
| Balance Flexx + atrazine/Laudis + MSO + AMS | 3 + 16/3 + 38 + 2.5 lb | 86 | 99 | 100 | 100 | 100 | 255 |
| Balance Flexx + atrazine/Ignite + AMS | 3 + 16/22 + 3 lb | 18 | 92 | 100 | 62 | 100 | 252 |
| Balance Flexx + atrazine/Roundup PowerMAX + AMS | 3 + 16/22 + 3 lb | 20 | 95 | 100 | 92 | 100 | 259 |
| Balance Flexx + atrazine/Capreno + COC + AMS | 3 + 16/3 + 38 + 2.5 lb | 100 | 100 | 100 | 100 | 100 | 265 |
| Lumax/Touchdown Total + AMS | 48/24 + 2.5 lb | 96 | 100 | 100 | 18 | 100 | 270 |
| Lumax/Halex GT + NIS + AMS | 48/58 + 10 + 2.5 lb | 100 | 100 | 100 | 86 | 100 | 268 |
| Harness Xtra/Roundup PowerMAX + AMS | 48/22 + 2.5 lb | 40 | 86 | 100 | 46 | 100 | 256 |
| Verdict/Status + AMS | 15/2.5 + 2.5 lb | 30 | 94 | 100 | 92 | 100 | 249 |
| Verdict/Status + AMS | 12/2.5 + 2.5 lb | 11 | 94 | 100 | 70 | 100 | 241 |
| G-Max Lite/Status + AMS | 48/2.5 + 2.5 lb | 86 | 96 | 100 | 26 | 100 | 265 |
| Sharpen/Status + AMS | 2.5/2.5 + 2.5 lb | 11 | 90 | 100 | 43 | 100 | 249 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 74 |
| LSD 0.05 | | 11 | 3 | 1 | 22 | 1 | 17 |

[a]First treatment applied preemergence then a slash followed by a sequential postemergence treatment; MSO, COC, NIS, and AMS denote methylated seed oil, crop oil concentrate, non-ionic surfactant, and ammonium sulfate, respectively.

[b]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[c]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 10. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Field Corn on June 13; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Stand | Crop | Weed Control[a,b] | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rate | Count | Injury[a] | Amare | Amabl | Solni | Saskr | Cheal |
| Treatments | (oz/ac) | (no.) | (%) | (%) | | | | |
| Rimsulfuron + mesotrione | 1.0 + 4.5 | 25 | 18 | 99 | 100 | 100 | 57 | 100 |
| Rimsulfuron + mesotrione | 1.5 + 4.5 | 23 | 23 | 100 | 100 | 100 | 58 | 100 |
| Rimsulfuron + mesotrione + thifensulfuron | 1.0 + 4.5 + 0.5 | 24 | 22 | 99 | 100 | 100 | 58 | 100 |
| Rimsulfuron + mesotrione + atrazine | 1.0 + 4.5 + 32 | 24 | 22 | 99 | 100 | 100 | 99 | 100 |
| Rimsulfuron + mesotrione + atrazine | 1.5 + 4. 5+ 32 | 24 | 24 | 100 | 100 | 100 | 99 | 100 |
| Rimsulfuron + mesotrione + atrazine + thifensulfuron | 1.0 + 4.5 + 32 + 0.5 | 24 | 17 | 97 | 100 | 100 | 94 | 100 |
| Lumax | 96 | 25 | 0 | 100 | 100 | 100 | 99 | 100 |
| Weedy check | | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | ns | 5 | 2 | 1 | 1 | 6 | 1 |

[a]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

## Table 11. Control of Annual Broadleaf Weeds with Preemergence Followed by Sequential Postemergence Herbicides in Field Corn on July 13; NMSU Agricultural Science Center at Farmington, NM, 2011

| | | Weed Control[b,c] | | | | | |
|---|---|---|---|---|---|---|---|
| | Rate | Amare | Amabl | Solni | Saskr | Cheal | Yield |
| Treatments[a] | (oz/ac) | (%) | | | | | (bu/ac) |
| Rimsulfuron + mesotrione | 1.0 + 4.5 | 50 | 90 | 73 | 16 | 99 | 184 |
| Rimsulfuron + mesotrione | 1.5 + 4.5 | 35 | 78 | 85 | 15 | 100 | 193 |
| Rimsulfuron + mesotrione + thifensulfuron | 1.0 + 4.5 + 0.5 | 74 | 91 | 78 | 51 | 99 | 185 |
| Rimsulfuron + mesotrione + atrazine | 1.0 + 4.5 + 32 | 28 | 91 | 99 | 82 | 100 | 169 |
| Rimsulfuron + mesotrione + atrazine | 1.5 + 4.5 + 32 | 26 | 89 | 97 | 90 | 100 | 140 |
| Rimsulfuron + mesotrione + atrazine + thifensulfuron | 1.0 + 4.5 + 32 + 0.5 | 26 | 88 | 79 | 51 | 100 | 159 |
| Rimsulfuron + mesotrione + atrazine/ Roundup PowerMAX + AMS | 1.0 + 4.5 + 32/32 + 2 lb/ac | 25 | 99 | 97 | 83 | 100 | 183 |
| Rimsulfuron + mesotrione + atrazine/ Roundup PowerMAX + AMS | 1.5 + 4.5 + 32/32 + 2 lb/ac | 45 | 93 | 100 | 96 | 100 | 184 |
| Rimsulfuron + mesotrione + atrazine + thifensulfuron/Roundup PowerMAX + AMS | 1.0 + 4.5 + 32 + 0.5/32 + 2 lb/ac | 36 | 92 | 98 | 82 | 100 | 183 |
| Lumax | 96 | 88 | 98 | 100 | 78 | 100 | 270 |
| Lumax/Roundup PowerMAX + AMS | 96/32 + 2 lb/ac | 90 | 99 | 100 | 98 | 100 | 277 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 72 |
| LSD 0.05 | | 6 | 3 | 3 | 4 | 1 | 26 |

[a]First treatment applied preemergence, then a slash followed by a sequential postemergence treatment; AMS denotes ammonium sulfate.

[b]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[c]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

## Table 12. Control of Annual Broadleaf Weeds with Preemergence Herbicides in Grain Sorghum on June 28; NMSU Agricultural Science Center at Farmington, NM, 2011

| | | Crop | Weed Control[a,b] | | | | |
|---|---|---|---|---|---|---|---|
| | Rate | Injury[a] | Amare | Amabl | Solni | Saskr | Cheal |
| Treatments | (oz/ac) | (%) | (%) | | | | |
| Guardsman Max | 48 | 0 | 99 | 100 | 100 | 93 | 100 |
| Cinch ATZ | 48 | 0 | 98 | 99 | 100 | 94 | 100 |
| Atrazine | 32 | 0 | 99 | 100 | 99 | 82 | 100 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD 0.05 | | ns | 2 | 1 | 1 | 9 | 1 |

[a]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters.

**Table 13. Control of Annual Broadleaf Weeds with Preemergence Followed by Sequential Postemergence Herbicides in Grain Sorghum on July 28; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Weed Control[b] | | | | | |
|---|---|---|---|---|---|---|---|
| | Rate | Amare | Amabl | Solni | Saskr | Cheal | Yield |
| Treatments[a] | (oz/ac) | (%) | | | | | (bu/ac) |
| Huskie + atrazine + AMS | 13 + 16 + 1 lb/ac | 98 | 99 | 100 | 100 | 100 | 110 |
| Huskie + atrazine + AMS | 16 + 16 + 1 lb/ac | 98 | 100 | 100 | 99 | 100 | 109 |
| Huskie + AMS | 13 + 1 lb/ac | 87 | 88 | 95 | 90 | 100 | 117 |
| Atrazine + Buctril | 16 + 16 | 66 | 93 | 100 | 100 | 100 | 77 |
| Huskie + atrazine + AMS | 16 + 16 + 2 lb/ac | 100 | 100 | 100 | 100 | 100 | 134 |
| Huskie + atrazine + AMS | 10 + 16 + 2 lb/ac | 100 | 100 | 100 | 100 | 100 | 122 |
| Guardsman Max | 48 | 100 | 100 | 100 | 79 | 100 | 139 |
| Guardsman Max/Huskie + AMS | 48/13 + 1 lb/ac | 100 | 100 | 100 | 100 | 100 | 124 |
| Cinch ATZ | 48 | 100 | 100 | 100 | 100 | 100 | 121 |
| Cinch ATZ/Huskie + AMS | 48/13 + 1 lb/ac | 100 | 100 | 100 | 100 | 100 | 145 |
| Atrazine/Huskie + AMS | 32/13 + 1 lb/ac | 100 | 100 | 100 | 100 | 100 | 142 |
| Weedy check | | 0 | 0 | 0 | 0 | 0 | 20 |
| LSD 0.05 | | 2 | 3 | 2 | 2 | 1 | 31 |

[a]First treatment applied preemergence followed by a slash, then a sequential postemergence treatment; AMS denotes ammonium sulfate, and all other treatments were applied postemergence.

[b]Amare = redroot pigweed, Amabl = prostrate pigweed, Solni = black nightshade, Saskr = Russian thistle, and Cheal = common lambsquarters, and based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

**Table 14. Control of Jim Hill Mustard in Promontory Winter Wheat on May 23; NMSU Agricultural Science Center at Farmington, NM, 2011**

| | | Crop | Weed Control[c,d] | |
|---|---|---|---|---|
| | Rate | Injury[c] | SSYAL | Yield |
| Treatments[a] | (oz/ac) | (%) | (%) | (bu/ac) |
| BASF 8100H + Harmony GT XP + NIS | 4.4 + 0.3 + 20 | 0 | 94 | 68 |
| Banvel + Harmony GT XP + NIS | 4 + 0.3 + 20 | 0 | 65 | 65 |
| BASF 8100H + Harmony GT XP + NIS[b] | 2.2 + 0.6 + 20 | 0 | 68 | 64 |
| Banvel + Harmony GT XP + NIS[b] | 2 + 0.6 + 20 | 0 | 68 | 67 |
| Powerflex + NIS + AMS | 3.5 + 20 + 1.52 lb/ac | 0 | 99 | 66 |
| Pyroxsulam + Cloquintocet + NIS + AMS | 2 + 20 + 1.52 lb/ac | 0 | 100 | 61 |
| Olympus + NIS | 0.9 + 20 | 0 | 78 | 65 |
| Olympus Flex + NIS + AMS | 3.17 + 20 + 1.52 lb/ac | 0 | 89 | 76 |
| Maverick + NIS | 0.66 + 20 | 0 | 43 | 52 |
| Axial | 16.4 | 0 | 28 | 55 |
| Harmony GT XP + 2,4-D ester + NIS | 0.6 + 6 + 20 | 0 | 96 | 68 |
| Harmony GT XP + 2,4-D ester + Uran | 0.6 + 6 + 384 | 0 | 96 | 72 |
| Harmony GT XP + 2,4-D ester + Uran | 0.6 + 4 + 768 | 0 | 97 | 78 |
| Harmony GT XP + 2,4-D ester + Uran | 0.6 + 4 + 1152 | 5 | 96 | 71 |
| Weedy check | | 0 | 0 | 45 |
| LSD 0.05 | | | 5 | 8 |

[a]Treatments applied prior to Feekes 6; NIS, AMS, and Uran denote non-ionic surfactant, ammonium sulfate, and urea ammonium nitrate, respectively.

[b]Treatments applied prior to Feekes 9.

[c]Based on a visual scale from 0-100, where 0 = no control or crop injury and 100 = dead plants.

[d]SSYAL = Jim Hill mustard (tumble mustard).

**Table 15. Yield of Grasses to MAT 28 Alone or in Combination with Other Herbicides on June 9; NMSU Agricultural Science Center at Farmington, NM, 2011**

| Treatments[a] | Rate (oz/ac) | SLSW | MSM | RIR | HCCW | OIW | LPW | POG | FTF[d] | Treatment means herbicides[c] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | lb/plot | | | | | | | | |
| MAT 28 | 1.0 | 23.4 | 58.6 | 10.5 | 59.9 | 108.6 | 116.6 | 32.6 | 74.0 | 60.5[ab] |
| MAT 28 | 2.0 | 21.5 | 60.1 | 11.6 | 45.5 | 110.3 | 116.0 | 32.8 | 77.9 | 71.9[a] |
| MAT 28 | 4.0 | 21.7 | 37.7 | 10.1 | 23.9 | 112.6 | 105.8 | 33.5 | 67.6 | 51.6[b] |
| MAT 28 + Telar | 2.0 + 0.5 | 17.8 | 60.1 | 9.4 | 55.5 | 100.9 | 118.6 | 33.4 | 74.6 | 58.8[b] |
| MAT 28 + Escort XP | 2.0 + 0.33 | 17.0 | 59.6 | 7.0 | 45.3 | 98.1 | 113.2 | 39.2 | 78.0 | 57.2[b] |
| MAT 28[b] | 4.0 | 3.8 | 10.4 | 9.9 | 29.1 | 51.9 | 102.4 | 19.9 | 49.3 | 34.6[c] |
| Milestone | 7.0 | 22.3 | 60.9 | 12.4 | 55.0 | 115.0 | 114.7 | 34.7 | 79.5 | 61.8[ab] |
| Untreated | | 22.3 | 63.2 | 15.1 | 69.5 | 96.0 | 130.2 | 33.6 | 76.2 | 63.2[ab] |
| Treatment means grass[c] | | 31.2[e] | 51.3[d] | 10.7[f] | 47.9[d] | 99.2[b] | 114.7[a] | 32.4[e] | 72.1[c] | |

[a]Treatments applied with a nonionic surfactant at 22 oz/ac.

[b]Treatment applied preemergence on August 28, 2010.

[c]Means followed by the same letter are not significantly different as determined by the LSD test at 0.05.

[d]SLSW = San Luis slender wheatgrass, MSM = Manchar smoothbrome grass, RIR = Rimrock Indian ricegrass, HCCW = HyCrest crested wheatgrass, OIW = Oahe intermediate wheatgrass, LPW = Luna pubescent wheatgrass, POG = Potomac orchardgrass, and FTF = Fawn tall fescue.

*Funds provided by the USDA through the Hatch Program and the State of New Mexico through general appropriations, and various chemical companies.*

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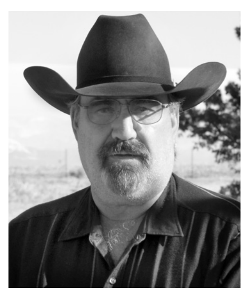

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**February 2013** **Las Cruces, NM**