

# EFFICACY OF GLYPHOSATE FOR CONTROLLING CERCOSPORA LEAF SPOT ON SUGARBEET

Mohamed F. R. Khan<sup>1</sup> and Randy Nelson<sup>2</sup>

<sup>1</sup>Extension Sugarbeet Specialist, North Dakota State University & University of Minnesota

<sup>2</sup>Research Technician, Plant Pathology Department, North Dakota State University

## INTRODUCTION AND OBJECTIVE

In 2008 some sugar cooperatives will begin commercial cultivation of Roundup Ready sugarbeet. Research on wheat has indicated that Roundup (glyphosate) can reduce leaf rust (caused by *Puccinia triticina*) development (Anderson and Kolmer, 2005). The objective of this research was to determine if the application of glyphosate to Roundup Ready sugarbeet could reduce the development of Cercospora leaf spot caused by *Cercospora beticola* Sacc.

## MATERIALS AND METHODS

Field trial was conducted at Foxhome, MN in 2006. Field plots comprised of six 30-foot long rows spaced 22 inches apart. Plots were seeded with a Roundup Ready sugarbeet cultivar on 25 April. Terbufos (Counter 15G) was applied modified in-furrow at 12 lbs/A during planting to control sugarbeet root maggot (*Tetanops myopaeformis* von Röder; Diptera: Otitidae). Plots were thinned manually at the 6-leaf stage to 41,580 plants per acre. Weeds were controlled with recommended herbicides, (Khan 2006) and hand weeding. Plots were manually inoculated (4.5 lbs/A) with infected sugarbeet leaves on 21 June.

The experimental design was a randomized complete block with four replicates. The treatments included 1) untreated control; 2) Eminent 125 SL (App 1)/ Super Tin 80 WP (App 2) and Headline 2.09 EC (App 3); 3) Roundup WeatherMAX (5.5 lbs/gal glyphosate) + ammonium sulfate (App 1-3). Treatments were applied to the middle four rows of plots using a four nozzle hand held sprayer operated at 20 psi with 8002 nozzles at 4 mph to deliver 10 gpa of spray solution. Treatments were applied on 27 July, 10 and 24 August. Cercospora leaf spot severity was rated on the KWS scale of 1 to 9 (1= no disease; 3= all outer leaves displayed typical symptoms; 9= all outer leaves dead, regrowth of new leaves) prior to harvest. Plots were defoliated mechanically and harvested using a mechanical harvester on 3 October. The middle two rows of each plot were harvested and weighed for root yield. Twelve to 15 random roots from each plot, not including roots on the ends of the plot, were analyzed for quality at the American Crystal Sugar Company Quality Tare Laboratory, Moorhead, MN. The least significant difference (LSD) test was used to compare treatments when the F-test for treatments was significant ( $p=0.05$ ). The data analysis was performed with the ANOVA procedure of the Agriculture Research Manager, version 6.0 software package (Gylling Data Management Inc., Brookings, South Dakota, 1999).

## RESULTS AND DISCUSSIONS

The application of Roundup WeatherMAX + ammonium sulfate resulted in significantly poorer disease control and less recoverable sucrose, root yield and sucrose concentration, and significantly higher sucrose loss to molasses compared to the treatment of conventional

fungicides (Table 1). There was no significant difference among parameters tested between the untreated control and Roundup WeatherMAX + ammonium sulfate. The results indicate that Roundup WeatherMAX + ammonium sulfate do not provide effective control of Cercospora leaf spot when applied as a fungicide.

## REFERENCES

Khan, M. 2006. 2006 Sugarbeet Production Guide. North Dakota State University and University of Minnesota Extension Services, pp. 24-55.

Anderson, J. A. and J.A. Kolmer, 2005. Rust control in glyphosate tolerant wheat following application of the herbicide glyphosate. Plant Dis. 89, 1136-1142.

Table 1. Cercospora leaf spot control using conventional fungicides and glyphosate at Foxhome in 2006.

| Treatment and rate/A  | App. interval<br>(days) | CLS* | Recoverable Sucrose<br>(lb/A) | Root yield<br>(t/A) | Sucrose concentration<br>(%) | Sucrose loss to molasses<br>(%) |
|---|-------------------------|------|-------------------------------|---------------------|------------------------------|---------------------------------|
| Eminent 125 SL 13 fl oz / Super Tin 80 WP 5 oz / Headline 2.09 EC 9 fl oz | 14                      | 2.3  | 7786                          | 29.7                | 14.6                         | 1.30                            |
| Roundup WeatherMAX 1.33 pints + ammonium sulfate 6 lbs/100 gal water      | 14                      | 8.5  | 5275                          | 23.6                | 12.9                         | 1.55                            |
| Untreated control   |                         | 8.5  | 5116                          | 23.3                | 12.7                         | 1.55                            |
| LSD (p=0.05)  |                         | 0.2  | 732                           | 2.7                 | 0.8                          | 0.11                            |

\*Cercospora leaf spot measured on KWS scale 1-9 (1 = no leaf spot 9 = dead outer leaves, inner leaves severely damaged, regrowth of new leaves).