

COMPARISON OF CERCOSPORA LEAF SPOT CONTROL WITH FUNGICIDES USING CONVENTIONAL AND AIR-ASSIST SPRAYERS

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INTRODUCTION AND OBJECTIVE

Cercospora leaf spot, caused by the fungus *Cercospora beticola* Sacc., is the most economically damaging foliar disease of sugarbeet in Minnesota and North Dakota. In order to control Cercospora leaf spot growers apply fungicides using aerial or ground applications. Recently, some growers in the Red River Valley have begun using air assist sprayers instead of conventional sprayers for ground applications. The air assist sprayer uses high velocity air to atomize the spray solution and forces the droplets towards the target plants.

The objective of this research was to compare Cercospora leaf spot control with fungicides applied by a conventional nozzle sprayer and an air-assist sprayer equipped with Shear Guard nozzles from Spray-Air Inc.

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 sugarbeet cultivar from Betaseed resistant to Rhizomania and susceptible to Cercospora leaf spot 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) on 21 June using dried infected sugarbeet leaves.

The experimental design was a randomized complete block with four replicates. Fungicides were applied with water volumes of 10 and 15 gpa using conventional and air assist sprayers and an untreated control was included. The conventional sprayer was operated at 40 psi with 8002 nozzles at 4 or 6 mph to deliver 15 or 10 gpa. The air assist sprayer was set to deliver 15 or 10 gpa at 4 mph using 20 inches of air. Treatments were applied to the middle four rows of plots on 20 July, 3 and 16 August using Eminent 125 SL at 13 fl oz/A; Headline 2.09 EC at 9 fl oz/A and Super Tin 80 WP at 5 oz/A.

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, East Grand Forks,

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

Cercospora leaf spot disease pressure was high during the season resulting in a CLS rating of 8.5 on the untreated control at harvest (Table 1). All treatments receiving fungicides resulted in higher recoverable sucrose, root yield and sucrose concentration, and significantly lower CLS ratings compared to the untreated control. Comparing treatments with the same volume of spray solution, the air assist sprayer generally resulted in slightly better disease control but no consistent yield advantage compared to the conventional sprayer. However, the air assist treatment at 15 gpa resulted in a significantly lower CLS rating and significantly higher recoverable sucrose per acre compared to the 10 gpa spray solution treatment for both the air assist and conventional nozzle sprayer. The data suggest that better disease control and higher recoverable sucrose are obtained using fungicide in the higher volume of water.

REFERENCE

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

Table 1. Cercospora leaf spot control at Foxhome in 2006 using conventional nozzle and air assist sprayers.

Treatment and water volume/ A	App. interval (days)	CLS*	Recoverable Sucrose		Root yield (t/A)	Sucrose concentration (%)	LTM** (%)
			(lb/A)	(lb/T)			
Air assist 15 gal	14	3.8	8192	249	32.9	14.1	1.55
Conventional nozzle 15 gal	14	4.1	7258	230	31.6	13.4	1.65
Air assist 10 gal	14	4.3	6872	227	30.3	13.1	1.63
Conventional nozzle 10 gal	14	4.5	7110	236	30.1	13.6	1.58
Untreated control		8.5	5960	209	28.5	12.2	1.60
LSD ($p=0.05$)		0.4	945	27	3.7	1.2	0.23

*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).

**LTM: Sucrose loss to molasses.