

SHALLOW FALL FUMIGATION ON WEED CONTROL IN SUGAR BEET

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INTRODUCTION

Fumigation with metam sodium can be an effective way to manage nematodes and weed seeds in sugar beets. Metam sodium is also effective in reducing weed populations. This study was initiated to see if a lower rate of metam sodium (20 gallons/acre) applied in the top 2-3 inches of the soil could be effective in reducing weed populations in sugar beet.

MATERIALS AND METHODS

Metam sodium (Vapam HL) was applied by simulated chemigated at a rate of 20 gallons/acre on November 11, 2006. Senninger mini-wobbler heads were placed 5 feet apart on 5-foot upright PVC pipes down the center of each plot. The entire study was plumbed so that applications could be made to the four replications of the metam sodium treatment at the same time. Pressure regulators (10 lb) were used in all feed lines for each plot to standardize water pressure. Products were applied in 600 gallons of water applied over a 25-minute period (approximately 0.22 inches/acre of water). This amount of water penetrated approximately 3 inches down from the soil surface.

The number of weeds per square foot was estimated on April 11. All visible weeds were counted in ten 1-ft² quadrats in each plot. Kochia (*Kochia scoparia* (L.) Schrad.), blue mustard (*Chorispora tenella* (Pall.) DC.), bur buttercup (*Ranunculus testiculatis* Crantz), and Russian thistle (*Salsola iberica* Sennen) were all observed.

Yield and quality evaluations were not possible for this study. The site was selected for its high density of kochia. Unfortunately, irrigation water could not be arranged early in the season after planting. The trial was planted, but had to be abandoned after weed data were taken due to the lack of water

RESULTS AND DISCUSSION

Kochia, bur buttercup, and Russian thistle weeds were significantly reduced by shallow fall fumigation with metam sodium (Table 1). Kochia populations were very high in untreated plots (269 plant per square foot), but were reduced 88% by metam sodium. Bur buttercup was completely controlled. Populations of Russian thistle were very low and lambsquarter was not found in the plot.

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This same trial was conducted in the fall of 2005 and growing season of 2006. At the 2006 location we did not have significant kochia pressure, but the hairy nightshade population was very large in the untreated (92/ft²) compared to the metam sodium treatment (11/ft²). Some control of lambsquarter was also observed, but populations were generally low. One surprising find in 2006 was a significant yield increase with metam sodium (45.7 tons/acre compared to 41.4 tons/acre in the untreated). Unfortunately we were not able to grow the crop in 2007 so we could not measure if yield would have been increased.

Shallow fall fumigation with metam sodium effectively reduced kochia and bur buttercup populations in 2007 and hairy nightshade and lambsquarter populations in 2006. Sugar beet yield was significantly increased in 2006 but could not be measured in 2007. With the advent of Roundup Ready sugar beets, the need for metam sodium for weed control is not as important as it was in previous years. However, shallow fall fumigation with metam sodium may still be an economically viable control measure. If yields could be increased enough to pay for the fumigation operation, then fewer weeds would emerge in the spring. This could be beneficial for herbicide resistance management. Fewer weeds exposed to Roundup will decrease the rate of Roundup resistance developing.

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Table 1. Effect of shallow fall fumigation on the number of weeds per square foot in the spring prior to sugarbeet planting. Weed populations were counted on April 11, 2007.

Treatment	Kochia	Mustard	Bur buttercup	Lambsquarter	Russian thistle
Untreated Check	269 a	13 a	19 a	0 a	1 a
Metam sodium (20 GAL/A)	33 b	5 a	0 b	0 a	0 b
LSD (P=.10)	127.4	10.7	4.5	0.2	0.3
Standard Deviation	76.6	6.5	2.7	0.1	0.2
CV	50.84	69.56	28.09	180.53	52.04
Treatment Probability (F)	0.0223	0.1753	0.0024	0.6376	0.0267

Means followed by same letter do not significantly differ (P=.10, LSD).

Mean comparisons performed only when AOV Treatment Probability (F) is significant. Significant values are bolded.