

Effect of Dry Seed+ Application at Planting 1998 on Processing Onion Yields

Michael D. Rethwisch, Charles Poole, Rick Poole and Rudy Pacheco

Abstract

Dry Seed+, a fertilizer/plant growth regulator, was applied to processing onions at planting in the fall of 1998 to evaluate the effect on yields. Yield data obtained June 1999 indicated no effect in this experiment, although this was dissimilar to other trial results. Salt content at the field was thought to have limited yields, and have stressed growing plants, which may have contributed to lack of yield differences noted. Further testing is necessary to further evaluate this product.

Introduction

Acreage of onions destined for processing/dehydration has increased significantly in western Arizona the recent years. Average acreage was 333 acres in La Paz County for the three year period of 1994-1996 and was 1,850 acres in 1999-2000 (Arizona Ag. Stat. Service, 2001). The majority of these acres are in the Parker Valley where slightly over 1,500 acres were harvested in 1998. Average tonnage for the 1998 harvest was 19 tons/acre in the Parker Valley area (1999 BIA Irrigation Report), slightly above the 17-18 tons/acre level that some growers had calculated was the break-even point for processing onion production.

An average yield increase of 7.1% (0.1 tons/acre) with usage of Dry Seed+ (a fertilizer/plant growth regulator applied at planting from Helena Co.) had previously been documented in first cutting of alfalfa following Dry Seed+ application (Rethwisch and McGuire, 1997), but no local data were available for this product on onions. An unreplicated side by side field trial was initiated at planting of processing/dehydrator onions in October 1997 with Dry Seed+ applied to the onion seed. Yield comparison from the treated and untreated plots when harvested in June 1998 indicated that Dry Seed+ increased onion tonnage by 1.082 tons/acre (4.37%).

This experiment was initiated to confirm previous results from the unreplicated trial and further investigate the effects of Dry Seed+ on processing onion yield and quality.

Methods and Materials

Dry Seed+ was added at the rate of 1% (by weight) to 22.75 lbs of onions (variety 'Rogers Foods 51'), mixed thoroughly to ensure thorough seed coverage, and planted in a randomized complete block design with four replications on October 16, 1998. Plots designated as untreated were planted first to avoid any contamination, and onion seed was then vacuumed out of planter boxes. Dry Seed+ plots were then planted. Plots were 8 beds wide (40 inch centers) by 1,275 ft long. Planting rate for the onions was 2.5 lbs/acre and a Planet, Jr. planter with 6 lines/bed was used. Soil types in the field consisted of almost all Glenbar silt loam, with the north edge of the field which ran across the plots being Agualt-Cibola sandy loam.

Plant counts were obtained on June 21, 1999 after onions were topped and prior to digging. Four sites in each plot were used. A 27.5 inch length of bed was measured and onions counted and recorded. Onions were not sized at this time. Plant populations were then calculated and statistically analyzed.

Onions were harvested on June 22-23. Each plot was harvested into individual trailers, trailers with onions weighed, and yields calculated. Although a small sample (5-10 lbs) of onions from each plot was obtained and sent to Rogers Foods (Livingston, CA) for solids content, data were considered confidential by the company and not made available for analysis for this study.

Results

Final plant count for the 1999 harvest were very similar (235,000 and 240,000 plants per acre), and no statistical differences existed for yields (Table 1), although average yield from the untreated plots was slightly higher (18.16 tons/acre) than the Dry Seed+ plots (18.03 tons/acre).

Salt content of the soil site in 1998-1999 may have been the cause for differences in yields between untreated and Dry Seed+ treated onions for the 1998 when compared with the 1999 harvests. The fall 1998 planted field (1999 harvest) contained high amounts of salt which affected yields (average for plots was 25.3 tons/acre = 1998 harvest, 18.1 tons/acre = 1999 harvest) and plant stand. Although a six row Planet Jr. planter was used when planting in the fall of 1998, only four rows of onions were noted on beds when final plant counts were taken after topping and immediately before harvest. Onion numbers were also higher on the outside of the beds than toward bed centers (Table 2), another indication of salts, as salts would move with irrigation waters and accumulate near bed centers. The increased salt load may have also increased plant stress. Plant growth regulator responses are usually more pronounced when plants are growing and are unaffected by stress.

Another possibility for the differences noted between the two harvests is variety. Although the onion variety planted in 1997 was Rogers Foods 50, Rogers Foods 51 was planted in 1998 for the 1999 harvest. Cultivars of the same species can vary in their response to plant growth regulators (Schuch, 1999). The contrasting results from the 1998 and 1999 harvests may possibly be due to different onion varieties. Differences in onion variety responses to plant growth regulators, particularly Dry Seed+, have not yet been investigated, therefore no data is available on this matter.

Additional testing is recommended under better growing conditions to further clarify the role of Dry Seed+ on onion growth and subsequent yields. Previous research has indicated that responses do occur, but the soil parameters which may limit the effectiveness of this product have not yet been quantified.

References

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- Schuch, U. K. 1999. Cultivar choice and plant growth stage influence responses to PGR'S. Plant Growth Regulation Society of America Quarterly. 27(2): 32.
- United States Department of Interior, BIA. 1999. 1998 crop report for Colorado River Indian irrigation project Report No. 55-13F. 2 pp. S. Ward, ed.

Table 1. Plant population at harvest and yields of RF-51 onions treated with Dry Seed+ at planting.

<u>Treatment</u>	<u>Onions/acre¹</u>	<u>Tons/acre¹</u>
Dry Seed +	117,200a	18.03a
Untreated	118,700a	18.16a

¹Means in columns followed by the same letter are not significantly different at the $p \leq 0.05$ level.

Table 2. Onion population (number/ 27.5 inches of bed length) as affected by location in bed.

	<i>West (outside)</i>	<i>W-Central (inside)</i>	<i>E-Central (inside)</i>	<i>East (outside)</i>	Average across rows
	<u>Line 1</u>	<u>Line 2</u>	<u>Line 3</u>	<u>Line 4</u>	
Dry Seed +	5.83	4.52	3.49	6.67	5.13
Untreated	<u>7.25</u>	<u>3.47</u>	<u>4.99</u>	<u>5.07</u>	5.19
<i>Averages</i>	<i>6.54</i>	<i>3.99</i>	<i>4.24</i>	<i>5.87</i>	