

Effect of Gypsum on Lettuce in Marana, 1988

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ABSTRACT

Gypsum was applied preplant on spring lettuce at rates of zero, 2 tons per acre, and 4 tons per acre. There were no significant differences in carton yields or in carton weights. Post-harvest soil analyses showed that the application of four tons of gypsum per acre significantly increased the calcium and magnesium levels in the saturated paste solution. There were no significant effects of gypsum application on ESP and SAR values, nor in pH or sodium concentrations.

INTRODUCTION

The history of this test site did not indicate particular problems with high sodium levels in the soil or with water infiltration. However, there was interest in finding out whether a gypsum application could benefit spring lettuce if heavy fertilizer applications had led to soil permeability problems.

MATERIALS AND METHODS

The test site is at the southwest corner of the intersection of Central Arizona Project aqueduct and Avra Valley Road in Marana. The previous crop was upland cotton; the soil type is Tubac clay.

Gypsum was applied in 60-foot wide swaths across the field, aligned with the crop rows. Application rates were zero (check), 2 tons per acre, and four tons per acre. The experimental design was a randomized complete block with 4 replications.

Yield data were taken by measuring off 50-foot lengths of row, and then counting and weighing the lettuce cartons packed by a trio (two cutters and one packer) as they made their 4-row pass through the 50-foot long area in the center of the plot.

Soil samples were taken post-harvest and analyzed for pH, electrical conductivity, Na, Ca, Mg, exchangeable sodium percentage, and sodium absorption ratio.

RESULTS AND DISCUSSION

Carton yields per acre showed no significant response to gypsum applications at the 95% level of probability, though the 2 tons per acre treatment had the highest numerical yields (Table 1). Carton yields varied greatly within the plots; this undoubtedly contributed to the high coefficient of variation (Table 1).

Average carton weights were not significantly different (Table 1). The market price was low at the time, and the harvest crews were selecting only the heaviest heads. Because of this, carton yields per acre varied more than carton weights. This selective harvesting technique could have masked any treatment differences. The trend

in the yield data of the untreated plots yielding the least and the 2 t/a treated plots yielding the most is consistent with results from other similar gypsum experiments with different test crops.

Table 1. Carton yields per acre and average carton weights of lettuce with gypsum applications, Marana, 1988.

Gypsum Application --Tons per Acre--	Carton Yields --per Acre--	Avg. Carton Weight -----pounds-----
2	621a*	50.8a*
4	523a	50.9a
Check	506a	49.7a
Coefficient of Variation	26.3%	3.1%

*Means followed by the same letter within a column are not significantly different at the 95% level of probability.

Applying 4 tons of gypsum per acre significantly increased the Ca and Mg levels in the saturated paste solution (Table 2). The ESP and SAR values decreased slightly with gypsum application although these decreases were not significant at the 95% level of probability. Applying 4 tons per acre of gypsum also appeared to increase salinity levels to a point where they may be a concern. The pH level or sodium concentration in the saturation extract were not effected. Gypsum applications exceeding 2 t/acre per year are probably not beneficial unless a severe sodium problem exists and extensive pre-season leaching can be done.

CROP HISTORY

- Planting: Greenbud on November 15, 1987.
- Fertilizer: Preplant application of 500 lbs/acre 11-53-0;/ one sidedressing of UN 32 at 35 gallons per acre; and a second side-dressing of CAN 17 at 35 gallons per acre.
- Water: 3.5 acre feet of pump water.
- Insecticide: Four times for beet armyworm and cabbage loopers.
- Harvest: First cutting on April 1, 1988.

Table 2. Soil test levels in soils receiving differing rates of gypsum at Marana, 1988.

Gypsum Rate	pH	EC	Na	Ca	Mg	ESP	SAR	
Tons/A		ds/m	-----mg/l-----					
0	7.8a*	2.9a*	185a*	198a*	46a*	3.2a*	3.1a*	
2	7.8a	2.8a	163a	228a	48a	2.5a	2.6a	
4	7.7a	4.1a	198a	374b	74b	2.3a	2.5a	

*Means followed by the same letter within a column are not significantly different at the 5% level of probability.

ACKNOWLEDGEMENTS

This experiment was made possible by the support and cooperation of George Scott and Kevin Cannata of Cactus Distributors. Pinal Gypsum donated and applied the gypsum.