

CHRISTENSON, D. R., G. M. ZINATI and M. B. BUTT. Crop and Soil Sciences Department, Michigan State University, E. Lansing, MI 48824. Evaluation of a system for making nitrogen recommendations for sugar beets in Michigan.

The optimum rate of nitrogen for sugar beets across a large number of trials is 70 lb per acre, yet growers use an average of 100 lb. However, for a given field the optimum rate may be different from either rate. A spring nitrate test has been developed. Unfortunately, this method does not consistently predict the correct rate either. This paper compares the spring nitrate test with a general rate of 100 lb N/acre. A linear response plateau model was fit to recoverable sugar data from 36 single replicate trials conducted in 1989 and 1990. This response and plateau slopes were determined by linear regression. The plateau had a significant negative slope. A penalty for over- or under-fertilization compared to the optimum rate was calculated 16 trials conducted in 1991 and 1992. The economic values used were: \$0.15/lb sugar; \$0.18/lb nitrogen; \$3.40/ton for trucking; 250 lb recoverable sugar/ton for a 20 ton crop. The cost for over-fertilization was \$1.14/pound of excess nitrogen, while the cost for under-fertilization was \$0.47/pound of nitrogen under applied. The general rate over-fertilized 9 sites, under-fertilized 5 and was correct on 2. The spring nitrate test over-fertilized 7 sites and under-fertilized 9. However, the average cost of both over- and under-fertilizing for the general rate was \$37/acre while that for the spring nitrate test was \$25/acre across the 16 sites. While using the spring nitrate test is not as accurate as desired, it does provide an alternative for growers to decrease their losses from nitrogen fertilization.

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