

EFFICIENT NITROGEN MANAGEMENT FOR SUGAR BEETS

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INTRODUCTION

Sugar beets with excessive or deficient N status are disadvantageous to growers and processors. Beets that are nitrogen deficient can have reduced tonnage and reduced total recoverable sugar yields. Sugar beets with excessive N supplies can have enhanced plant top growth and reduced sugar content, hence lower than optimal yields. Furthermore, beets grown with excess N may contain high levels of nitrate and ammonium that interfere with factory efficiency and sugar recovery.

Dangers of over fertilization with N has increased growers' interest in being conservative with nitrogen applications. Only part of the nitrogen requirement (determined by soil tests and yield goals) could be applied. The remaining nitrogen plant requirement may or may not be applied depending on whether strong N deficiency symptoms develop. If N deficiency occurs after the crop canopy is closed, how should supplemental N be applied and how much N is necessary to correct the deficiency symptoms?

ABSTRACT

Nitrogen rates and application methods were studied in 1989, 1990, and 1991 to correct mid-season N deficiencies in sugar beets. Plant nitrogen status was determined by beet petiole nitrate-N. Nitrogen application methods included foliar urea ammonium nitrate (URAN), granular broadcast urea, and three furrow irrigation water run URAN application strategies (entire, middle, or end of the irrigation set). Nitrogen application rates included 0, 20, 40, 80, and 120 lb N/acre as URAN.

The most effective supplemental N strategy to correct petiole nitrate deficiencies was N applied during middle of the irrigation set. The URAN was turned on when the water had advanced 30 percent of the distance through the field and turned off at 90 percent advance. Water run URAN at 20 to 40 lb N/ac resulted petiole nitrate increase of 700 ppm per 10 lb N applied when petiole nitrates were deficient.