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Amarillo Blvd. West, Amarillo, TX 79106. Effect of different irrigation regimes on sugar beet
growth in a disease stressed field.

A study was conducted to evaluate the effect of frequency and amount of irrigation on disease development in sugar beets. The objective of the study was to determine the optimum irrigation regimes for the highest yield and percent sucrose in a soilborne pathogen infested field. There were three main irrigation treatments: a Low Energy Precision Application (LEPA) system where 100%, 75% and 50% of the full rate of the pivot system (800 gpm) was applied, a LEPA system with on/off valves in which the plots were irrigated at different frequencies, including every time, every other time, and every third time the grower irrigated, and a system in which the canopy was irrigated from above with 100%, 75%, and 50% the full rate of the sprinkler system. During the season, the following measurements were taken: top fresh weight, top dry weight, root fresh weight and number of beets per meter. Soil moisture was measured every foot, to a depth of six feet using a hydroprobe moisture gauge. At harvest, root yield, number of beets per meter, disease index, percent sucrose, and stand counts were determined. The highest percent sucrose (13.5) and lowest disease indices were in plots irrigated at different frequencies. Based on three 25 ft. subplots replicated four times, sugar beets irrigated every other time had the highest yields, while sugar beets that were irrigated every third time had the lowest yield. The highest disease index and lowest percent sucrose occurred in plots irrigated at the full rate. There were no significant differences in sugar beet net weight or disease index among the treatments where different amounts of water were applied. However, in the treatments irrigated the least there was a significantly higher percent sucrose than in those irrigated at the full rate. These results indicate that disease losses can be reduced and yields increased with improved irrigation management.