

SUGARBEET YIELD RESPONSE AND NITRATE LEACHING AS INFLUENCED BY NITROGEN MANAGEMENT IN SEMI-ARID CLIMATE

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ABSTRACT

Fertilizer nitrogen (N) in irrigated sugarbeet production needs to be optimized to simultaneously increase yield and reduce nitrate leaching. In addition to adjusting N rate and application timing, there are available fertilizer technologies such as controlled- or slow-release N which may be beneficial for beet yield and reducing potential nitrate leaching. However, there are limited studies assessing the effectiveness of such fertilizers for sugarbeet in a semi-arid climate. The two-year experiment was initiated to evaluate the effects of controlled-or slow-release N fertilizer on beet yield and nitrate leaching in irrigated sugarbeet at the University of Nebraska Panhandle Research and Extension Center, Scottsbluff in 2020. Twelve N treatments with four replications were laid out in randomized complete block design. The treatments included three N fertilizers: polymer coated urea (PCU; Duration) and urea with urease and nitrification inhibitors (INH; Uflexx) and granular urea applied at different rates and timings (PCU and INH at 80% and 100% of recommended N rate, both applied all at planting; urea at 50%, 80%, 100%, and 125% of N rate applied all at planting and urea at 100% of N rate split-applied between planting and six weeks after planting). The 100% recommended N rate was 170 lbs N/acre. Water samples were collected periodically using suction-cup lysimeters installed at five feet depth in selected plots and analyzed for nitrate-N. The results showed that there were no significant yield differences among fertilized plots when all N treatments, including N rate, split N, and N fertilizers were compared. Advanced N formulations such as Duration and Uflexx reduced potential nitrate leaching compared to granular urea.