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Improving Nitrogen Management in Pacific Northwest Sugarbeet Production

Nitrogen (N) management is critical in sugarbeet production to optimize yield and quality. Although, past research has been critical to improving and understanding sugarbeet N nutrition, continued research is needed to evaluate evolving varieties and management practices. From 2005 to 2010, studies from 14 locations (14 site-years) were conducted by agronomists from The Amalgamated Sugar Company (TASCO) and scientists at the USDA-ARS Northwest Irrigation and Soils Research Laboratory to evaluate the effect of N supply (fertilizer N + spring soil residual N [Nitrate N (NO₃-N) + Ammonium N (NH₄-N)]) on sugarbeet production in the Pacific Northwest. At each site-year, the effect of various levels of N supply on estimated recoverable sucrose (ERS) yield, root yield, sucrose concentration, brei nitrate concentration, and nitrogen use efficiency (NUE) were assessed. Nitrogen supply significantly affected ERS yield for 6 of the 14 site-years. For the 8 non-responsive sites, the maximum ERS yield was assumed to be the lowest N supply. The average nitrogen requirement (Nr) at maximum ERS yield across all site-years was 2.25 kg N Mg⁻¹ beet (5 lbs N ton⁻¹ beet) and ranged from 1.4 to 3.7 kg N Mg⁻¹ beet (2.8 to 7.4 lbs N ton⁻¹ beet). Thirteen of the 14 site-years had an Nr at or below 2.8 kg N Mg⁻¹ beet (5.6 lbs N ton⁻¹ beet), substantially less than current recommendations of 3.5 to 4.0 kg N Mg⁻¹ beet (7 to 8 lbs N ton⁻¹ beet). Nitrogen requirements can be reduced in the Pacific Northwest sugarbeet production area compared to past recommendations resulting in reduced N fertilizer applications and significant cost savings.