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Sugarbeet yield and recoverable sucrose response to intensive nutrient management.

Michigan sugarbeet (*Beta vulgaris* L.) nutrient management recommendations include 157-179 kg N ha with an initial 45 kg N ha applied at planting to promote canopy closure. While individually added inputs associated with yield gaps were previously investigated, synergistic influences when combined with a standard N program (SN) within an integrated management perspective have not been explored. This study investigated sugarbeet root yield and recoverable sucrose response to different fertilizer strategies along a stepwise increase in management intensity. In 2022, SN treatment averaged 90.1 Mg ha, 148.4 kg Mg^{-1} and 13,327.9 kg ha^{-1} in root yield, recoverable sugar per ton and recoverable sugar per hectare, respectively. The addition of in-furrow P negatively impacted root yield and recoverable sugar by -15.5 Mg ha and - 2,325.7 kg ha, respectively. In 2023, pre-plant broadcast lime, in-furrow P, and intensive management (combining all individual inputs) increased root yield by 13.7, 11.9, and 13.2 Mg ha, respectively. The intensive management and pre-plant broadcast lime increased recoverable sugar per Mg by +7.1 and +8.4 kg Mg, respectively, while also improving recoverable sugar per hectare by +2,329.8 and +2,278.0 kg ha, respectively. In-furrow P increased sugar per hectare by 2,186.3 kg ha. The inconsistent root yield and recoverable sucrose response to marketed inputs accentuate the importance of pre-plant soil analysis, in-season weather monitoring, and the use of disease models for developing a climate-smart agricultural system.