Supplying Phosphorus for Sugarbeet Production with 10-34-0 Banded with the Seed—Marshall County

Cooperator: Earl Reopelle
Nearest Town: Argyle or Alvarado, Minn.
Soil Type: Colvin-Fargo clay
Tillage: Fall chiseled and spring field cultivated
Previous Crop: Spring Wheat
Variety: Beta 6600
Planted: May 8, 2003
Row Width: 22"
Fertilizer: Nitrogen fertilizer was applied in the fall of 2002 to meet University of Minnesota N recommendations based on the soil test nitrate-N level in a 4 ft deep soil sample. Phosphorus fertilizer as applied at various rates and sources in randomly selected plots as part the treatment structure of the experiment.
Herbicides: Micrortrates applied three times from June 2 – June 19 and consisted of a mixture of Betamix, UpBeet, Stinger, Select, and MSO.
Harvest Date: October 6, 2003
Experimental Design: Randomized complete block with four replications

Purpose of Study:
The objective was to determine the effect on sugarbeet root yield and quality of 3 gals 10-34-0 A⁻¹ applied in the seed furrow at planting and compared that effect to that of various broadcast phosphorus fertilizer rates and increased rates of 10-34-0.

Results:
Earlier experiments on loam soils have shown that the application of 3 gals 10-34-0 A⁻¹ in furrow with the seed resulted in sugarbeet root yields equal to or exceeding those of broadcast P fertilizer applied at University of Minnesota recommended rates. Applying P fertilizer in addition to the 3 gal A⁻¹ 10-34-0 as either broadcast P fertilizer or additional amounts of 10-34-0 has never increased sugarbeet root yields above those achieved with 3 gals A⁻¹ 10-34-0 alone.

The soil at the Reopelle farm was a fine textured clay soil with a fall soil P test level of 4 ppm. Banded rates of 10-34-0 increased sugarbeet root yield compared to the check with no P fertilizer applied (Fig 1). There was no difference in sugarbeet yields among treatments with 10-34-0 applied at various rates.

Three gals 10-34-0 A⁻¹ banded in the seed furrow at planting resulted in root yields similar to that achieved with high rates of broadcast P fertilizers (Fig 2). Additional rates of broadcast P with 3 gals 10-34-0 A⁻¹ did not improve root yields compared to 3 gals 10-34-0 A⁻¹ alone. Maximum sugarbeet root yields were obtained with either 3 gals 10-34-0 A⁻¹ or with 45 to 60 lbs P₂O₅ A⁻¹ broadcast. Though 3 gals 10-34-0 A⁻¹ only applies about 12 lbs P₂O₅ A⁻¹, root yields were not improved with additional amounts of P fertilizer either as increased rates of 10-34-0 in the furrow (Fig 1) or with broadcast P fertilizer (Fig 2).

There was no difference in net sugar concentration among any of the treatments. Net sugar averaged about 16.2% across all treatments.

Fig 1. Sugarbeet root yield response to varying rates of 10-34-0 fertilizer banded in the furrow with the seed at planting time. Columns with the same letter at the top were not significantly different (LSD=0.05)

Fig 2. Sugarbeet root yield response to various rates of broadcast P fertilizer with and without 3 gals 10-34-0 A⁻¹ applied in the seed furrow at planting.

Funding:
Minnesota and North Dakota Sugarbeet Research and Extension Board

For additional information:
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