

FERTILIZING SUGARBEET

NITROGEN & QUALITY: Sugarbeet quality is dependent on the sucrose content in the roots and the level of impurities that must be removed during sugar refining. Production of high quality sugar is especially important to growers who are paid based on extractable sugar delivered to the factories

Proper nitrogen fertilizer use increases both root and sugar yield. However, excessive nitrogen increases impurities and decreases sugar content. More precise nitrogen management within each crop in a sugarbeet rotation will help prevent over-application and buildup of nitrogen in the subsoil.

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NITROGEN FERTILIZER USE GUIDELINES: Southern Minnesota Beet Sugar Cooperative
110 lb. N/A for 4' depth soil sample or 80 lb N/A for 2' depth soil sample.

- Nitrogen fertilizer recommendations are similar for **American Crystal Sugar Company** and **Minn-Dak Farmers' Cooperative** Use 130 lb N/A and 100 lb N/A when sampling to 4 ft. and 2 ft. soil depth, respectively. See page 5.
- 65 lb/Acre of nitrogen is required in the 0-2 foot soil depth to maximize early season crop growth, yield and quality. This amount is needed regardless of the quantity of residual soil nitrogen found below 2 feet.

Guidelines for Adjusting Nitrogen Recommended for Crops Following Sugarbeet

Reduce N by 60-80 lb/Acre next season on areas of green sugarbeet tops.

- Reduce N by 20-30 lb/Acre next season on areas of yellow-green sugarbeet tops.
- Do not reduce N in zones within sugarbeet fields with yellow foliage.

Managing N throughout the Rotation Using Precision Agriculture Techniques

Lower residual N levels can be achieved prior to sugarbeet through a rotation managed with precision ag techniques. Residual nitrate levels can be examined site-specifically through either grid or zone-based soil sampling. Use of a composite pre-sample can be used to determine the likelihood of significant spatial variability in nitrate levels.

Choose grid soil sampling if field history is unknown, if fertility is high, when the field has a history of manure applications, when two or more fields have been merged together, or if phosphate levels are particularly important.

Choose zone soil sampling if yield monitor or remote imagery reveals pattern relationship with landscape, if there is no history or manure use, if the field has a history of relatively low P rates, or if mobile nutrient levels, particularly nitrate, are required.

Nitrogen, Phosphate and Potassium Recommendations for Sugarbeet

Nitrogen		Phosphorus					Potassium			
		-----P Soil Test Levels (ppm)-----					---K Soil Test Levels (ppm)--			
		VL	L	M	H	VH	VL	L	M	H
Soil N + fertilizer N needed*	†Bray-1	0-5	6-10	11-15	16-20	21+	0-40	41-80	81-120	121+
	Olsen	0-3	4-7	8-11	12-15	16+				
lb/a 2'	lb/a 4'	-----P ₂ O ₅ , lb/a-----					-----K ₂ O, lb/a-----			
100 †		80	55	35	10	0	110	80	50	0

* Subtract the amount of NO₃-N in the top 2 feet of soil or top 4 feet of soil from these figures to determine the amount of N fertilizer to apply.

**NOTE: Before making available in excess of 130 lb of soil plus fertilizer N to your beet crop, consult with your agriculturalist, extension agent, or university specialist.

†Use the Olsen P test on soils with pH greater than 7.

‡ Southern Minnesota Beet Sugar Cooperative recommends 80 and 110 lb N/A for 2 ft. and 4 ft. sampling, respectively.

Sugarbeet is a crop that is especially responsive to banded P placement. It is also a crop that is especially sensitive to fertilizer salts, so any banded starter fertilizer with the seed must be used at low rates. The following table summarizes recent broadcast and banded P research results:

Guidelines for Sugarbeet Fertilization with P.

Soil Test Level

Olsen, ppm	Bray, ppm	Recommendations
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16+	21+	Apply no P fertilizer
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8-16	11-20	Use either 3 gpa 10-34-0 seed-placed or recommended broadcast P rate. Use 3 gpa
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<8	<11	10-34-0 seed-placed and 40 lb/a P ₂ O ₅ broadcast. (3 gpa 10-34-0 produces yields equal to recommended broadcast P rates).
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Following the above guidelines for the use of fertilizer P should address issues of fertilizer input savings with the use of banded P and maintenance of soil test P important to other rotational crops.

Micronutrients

It is rare for sugarbeet to respond to the use of micronutrients. Before using micronutrients on an entire field, try a test strip to determine a possible need.

Fertilizer Application: All P and K recommendations in the fertilizer recommendation table are listed as the amount to be broadcast. It is recommended that on low-to-medium testing soils, P fertilizer be applied before the deepest tillage operation. On soils testing high and very high, shallow incorporation of these rates is adequate. Caution with seed applications should be exercised. Applying greater than five pounds per acre of N+K₂O in contact with the seed can reduce plant stand emergence.

Common starter phosphorus fertilizer sources and maximum amounts suggested for seed application

Source	Name	Dry or Liquid	Maximum amount to apply	Phosphate supplied lb/acre
10-34-0	Ammonium Poly Phosphate (APP)	Liquid	4 gal/acre	16
18-46-0	Diammonium Phosphate (DAP)	Dry	28 lbs/acre	13
11-52-0	Monoammonium Phosphate (MAP)	Dry	45 lbs/acre	24

ROW WIDTHS AND PLANT POPULATIONS

Row width of 22 inches is recommended in Minnesota and North Dakota. Research in the Red River Valley, Michigan, and irrigated beet growing areas indicates 400-600 pounds of sugar per acre are lost as row widths increase to 28 or 30 inches. Higher, more uniform plant populations are easier to establish on narrow rows. Growers interested in row widths greater than 22 inches must consider the anticipated advantages against lower yields per acre.

A good sugarbeet plant population at harvest should be about 175 to 200 uniformly spaced plants per 100 ft. of row. This population should produce very good yields of high quality sugarbeet.

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PLANTING RATES & SEED SPACING - 22" ROWS

Inches between seed	6	5.5	5	4.5	4	3.5
No. of Seeds per/Acre	47,520	51,840	57,024	63,360	71,280	81,463

For 30-inch row multiply all table values by 0.73.

For 26-inch row multiply all table values by 0.85

For 28-inch row multiply all table values by 0.79.

For 24-inch row multiply all table values by 0.92