

## 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.

**NITROGEN FERTILIZER USE GUIDELINES: Southern Minnesota Beet Sugar Cooperative – 100 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
<b>Soil N + fertilizer N needed*</b>	†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 <sub>2</sub> O <sub>5</sub> , lb/a-----					-----K <sub>2</sub> O, lb/a-----			
100 †	130**	80	55	35	10	0	110	80	50	0

\* Subtract the amount of NO<sub>3</sub>-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 100 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
16+	21+	Apply no P fertilizer
8-16	11-20	Use either 3 gpa 10-34-0 seed-placed or recommended broadcast P rate.
<8	<11	Use 3 gpa 10-34-0 seed-placed and 40 lb/a P <sub>2</sub> O <sub>5</sub> broadcast. (3 gpa 10-34-0 produces yields equal to recommended broadcast P rates).

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+K<sub>2</sub>O 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