

# 2023 Nutrient Management Quicksheet

## Soil Sampling

1. Get a soil test. The soil test should be used in field selection for sugar beet production and also for planning the amount of nutrients needed for optimum production. For organic matter (OM), pH, phosphorus (P), and potassium (K), a soil sample taken to a depth of 6 inches is needed. For soil nitrate-N, a soil sample taken to a depth of 42 to 48 inches is needed. Soil samples that are taken at shallow depths will not provide the best information for N management. The soil sample will also indicate how much nitrate-N is in the soil in cases where extreme movement has occurred to the tile lines.
2. The soil samples should be taken based on the zones defined by the organic matter soil mapper program provided by SMBSC or other zone-based management program. The use of proper zones will reduce the chance of missing an area in the field that is low testing (thus an application that is not enough to optimize root yield and quality) or high testing (this would result in an application of N that is too high for optimum root yield and quality). The more intense the soil sampling, the better chance of a good prediction of N fertilizer needs.
3. The soil nitrate-N test is important for selection of the field to grow high quality sugar beets. If the soil test is greater than 170 lb N/A, then seriously consider a different field for sugar beet production. The nitrogen nutrient recommendation is a total of soil test nitrate-N to 42 to 48 inches + fertilizer N should equal 110 to 150 lb N/A. This range is considered the "Sweet Spot" in the fertilizer N suggestions. The soil sample for nitrate-N should be taken this spring before fertilizer N application. The closer to the growing season the soil sample is taken the better the predictability of the soil test for N needs of the crop.

## Fertilizer Application

1. Nitrogen can be applied on heavy textured non-irrigated soils in the spring pre-plant. There is little need to side dress N on non-irrigated heavy textured soils. Again the 2020 information from research work has shown no advantage to use of a split application of N. Nitrogen application for sugar beet grown on irrigated sandy soils is different; a split application should be done, half just prior to planting and half around the 6 to 8 leaf stage. If the nitrogen fertilizer cannot be applied prior to planting due to time/equipment/labor constraints, apply the nitrogen as a side dress application prior to the 4 to 6 leaf stage.
2. Phosphorus fertilizer application should be based on the Olsen soil test if pH is greater than 7.4 and the Bray P 1 soil test if the pH is less than 7.4. If you have very low, low, or medium soil test P, consider the use of 3 gallons of a liquid starter fertilizer such as 10-34-0 per acre at planting. The use of the pop-up application will help early growth.
3. Potassium is the third major nutrient to consider for a nutrient program. If the soil test is greater than 120 ppm, there is no need to apply K for sugar beet production.
4. There has been little evidence that other nutrients are needed for sugar beet production. If you are growing sugar beets on irrigated sandy soil, boron may be needed. Apply boron with great care. The recommended rate would be 2 lb/A in a broadcast application. Seed application of boron is not recommended. There is no need for boron on heavy textured soils.

## Additional Information

1. A word about N sources that are not fertilizer; particularly manure and alfalfa. If you have a manure application or a previous crop of alfalfa history, follow the above soil testing and guidelines. Do not over apply manure in amount or in frequency in the rotation. Manure will provide a large amount of N through mineralization along with many of the other nutrients needed by sugar beet. With alfalfa, sugar beet should not be grown the first two years after alfalfa is broken out.
2. Prevented plant fields: It is strongly suggested that a good quality soil sample for soil nitrate-N, P, and K be taken and used in developing the nutrient program for the following sugar beet crop. Other things to consider are; a. what fertilizer/manure was applied for the non-planted crop, b. was a cover crop planted, and c. how was the cover crop managed.
3. Finally, plan your nutrient program looking forward more than a year in advance. Do not over fertilize other crops in rotation with sugar beet.

## Fertilizer Recommendations

Phosphate and potash broadcast recommendations for sugar beet grown in the Southern Minnesota Beet Sugar Cooperative growing area.

	Soil test phosphorus, ppm					Soil test potassium, ppm				
	VL	L	M	H	VH	VL	L	M	H	VH
<b>Bray P1</b>	0-5	6-10	11-15	16-20	21+					
<b>Olsen P</b>	0-3	4-7	8-11	12-15	16+	0-40	41-80	81-120	121-160	161+
	----- lb P <sub>2</sub> O <sub>5</sub> /acre -----					----- lb K <sub>2</sub> O/acre -----				
	80	55	35	10	0	110	80	50	0	0

*An important note regarding the nitrogen recommendation: The nitrogen recommendation is a total of soil test nitrate-N down to 48 inches + fertilizer N equal to 110 to 150 lb N/A. If the organic matter soil zone mapper or another zone management tool is used, adjust the nitrogen rates within the "Sweet Spot" according to the soil organic matter. Other factors may also impact where any particular field is within the "Sweet Spot": previous crop, residue management, tillage practice, and manure history.*



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