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## G73-8 Fertilizing Sugar Beets (Revised June 1978)

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## Fertilizing Sugar Beets

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Management practices which provide an adequate, but not excessive, supply of plant nutrients are essential for high yields of high quality sugarbeets in western Nebraska. Yields of 22-28 tons per acre at 16 to 18 percent sugar can be attained most years with good management.

### Nitrogen Recommendations

The amount of nitrogen available in the root zone of the sugarbeet plant affects both yield and quality. Too little nitrogen prevents maximum tonnage, and too much decreases sugar percentage and quality. Field experiments have shown that the sugarbeet plant can utilize nitrate-nitrogen from depths of 6 feet or more. Therefore, it is important to measure and take into account the amount of nitrate-nitrogen in the complete root zone before applying fertilizer nitrogen.

Rainfall or irrigation may leach soluble nitrogen from the plow layer. Therefore, soil tests from plow layer samples alone do not accurately predict the amount of nitrogen needed. This is further complicated by differing irrigation practices.

Applied fertilizer should be considered a supplement to available soil nutrients. About 225 pounds of nitrogen are necessary for maximum tonnage of sugar, whether nitrogen is applied as fertilizer or is available as residual-soil-nitrate within the rooting zone.

Soil samples from the surface to a depth of 6 feet are necessary for the most accurate prediction of nitrogen needs. These samples should be collected to obtain a plow-layer sample (0-8 inches), a sample from 8 to 24 inches and a

sample from each 2 foot increment below 24 inches. Collect composite cores from at least 15 places in the field for the surface sample and from 8 to 10 places for the deeper samples. More than one set of samples may be necessary from some fields if parts of the field differ in slope or soil characteristics such as color, sandiness or in previous crop.

Nitrogen recommendations based on soil tests for residual nitrate in a 6 foot profile and on organic matter content of the plow layer sample are shown in the following table. Most soils in western Nebraska contain 1.0 to 1.6 percent organic matter.

Table 1. Nitrogen fertilizer recommendations.

Soil test Nitrate-N	Soil organic matter - %			
	0-1.4	1.5-1.7	1.8-2.1	2.2+
lb/A 6 ft	Pounds of N per acre to apply			
0-5	195	185	175	165
6-25	175	165	155	145
26-45	155	145	135	125
46-65	135	125	115	105
66-85	115	105	95	85
86-105	95	85	75	65
106-125	75	65	55	45
126-145	55	45	35	25
146-165	35	25	0	0
More than 166	0	0	0	0

When adverse weather reduces yield prospects, nitrogen fertilizer rates can be adjusted if split applications are used. This is especially important when fertilizing for high yields and on

coarse-textured soils with low-water-holding capacity. However, all nitrogen should be applied before July 1 on medium and fine-textured soils and before July 10 on coarse-textured soils to avoid reduced sugar percentage and quality.

It is recommended that manure not be applied for beets. Much of the nitrogen from manure is released in the latter part of the season and tends to retard sugar accumulation. Manure when available, is recommended for other crops. When alfalfa precedes the sugarbeet crop, and/or if manure is applied, it must be noted on the soil sample information sheet so that adjustments can be made. The following table can be used as a guide for an average situation.

Many soils in the beet producing areas are now at levels above 35 ppm soil test phosphorus. This means that no phosphate fertilization is needed for any crops grown on soils with these high levels. In fact, preliminary evidence indicates that phosphate fertilization on soils with levels greater than 35 ppm may result in decreased beet tonnage. On the other hand, adequate phosphorus fertilization is essential for optimum yields on low phosphorus soils.

**Table 2. Guide for adjusting nitrogen recommendations.**

Previous crop or treatment	Lb N/A to subtract from recommendation
Alfalfa	50
Manure, with bedding, per ton	5
Manure, feedlot run, per ton	7

**Table 3. Phosphorus recommendations.**

Phosphorus soil test level <sup>a/</sup>	Phosphate application rate lb P <sub>2</sub> O <sub>5</sub> /acre
0-5 ppm (v low)	100
6-15 ppm (low)	80
15-25 ppm (medium)	0
25 ppm (high)	0

<sup>a/</sup> Phosphorus test - Bray P-1

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LEO E. LUCAS, DIRECTOR

Phosphorus contents of many soils in the beet producing areas are now at very high soil test levels. This means that phosphate fertilization is not necessary in many instances. Soils which still need phosphorus fertilization can be identified and properly fertilized by following the recommendations in Table 4.

Potassium soil test level <sup>a/</sup>	Potash to apply lb of K <sub>2</sub> O/A
0-39 ppm (v low)	120
40-74 ppm (low)	80
75-124 ppm (high)	40
125 ppm (high)	0

<sup>a/</sup> Potassium test - Exchangeable  
recommendations in Table 3.

Most Nebraska soils are capable of supplying adequate potassium for maximum sugarbeet production. Less than 5 percent of the soils in the state would be expected to need potassium and less than 1 percent in the beet growing areas. Soil tests measure exchangeable and soluble potassium, which is readily available for the plant.

### Micronutrient Recommendations

Micronutrients applied to sugarbeets rarely increased yields or sugar content in experiments conducted over several years. Zinc has increased yields in a few experiments where the soil zinc content was shown to be low by soil test.

**Table 5. Rate of zinc to apply to sugarbeets.**

Soil test zinc soil test level	Zinc to apply lbs Zn/A
Very low & low	10-15
Medium	0
High	0

<sup>a/</sup> Zinc recommendations are based on inorganic forms such as zinc sulfate.

File Under: FIELD CROPS  
F-1, Miscellaneous Crops  
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