FERTILIZERguide
FG 62
Reprinted January 2000

Sweet corn

Eastern Oregon—east of Cascades

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Good management practices are essential if optimum fertilizer responses are to be realized. These practices include adequate irrigation, use of recommended varieties, selection of adapted soils, weed control, disease and insect control, good seedbed preparation, proper seeding methods, and timely harvest.

Because of the influence of soil type, climatic conditions, and other cultural practices, crop response from fertilizer may not always be predicted accurately. Soil test results, field experience, and knowledge of specific crop requirements help determine the nutrients needed and the rate of application.

The fertilizer application should ensure adequate levels of all nutrients. Optimum fertilization is essential for top quality and yields.

Plant Population

The fertilizer applications suggested in this guide are based on a population of 20,000 plants/a. Where the plant population exceeds 20,000/a, increase fertilizer rates by 10 percent for each additional 5,000 plants/a. Similarly, reduce fertilizer rates for populations less than 20,000/a.

An irrigation when corn is 12–18 inches (30–45 cm) high will ensure most efficient utilization of banded fertilizer.

Follow recommended soil sampling procedures to estimate fertilizer needs. Your county Extension agent can provide you with soil sampling instructions, soil sample bags, and information sheets.

Nitrogen (N)

Sweet corn requires a good supply of available N. An optimum response to N fertilization depends on adequate irrigation.

Part (40–60 lb/a) of the N should be banded at planting time—the remainder may be applied before planting and/or during the growing season before tasseling.

If the band application of N exceeds 60 lb/a (65 kg/ha), there is danger of seeding injury from the concentration of salt.

Fertilizer salt injury can be reduced by using two rather than one fertilizer band, not banding too close to the seed, and by irrigating immediately at the first sign of crop injury. Salt injury is likely to be greater in sandy soil compared to finer textured soil and in dry soil compared to moist soil.

The urea or diammonium phosphate forms of N may cause seedling injury if banded close to the seed at planting, especially where the soil pH exceeds 7.0.

The amount of N fertilizer required depends on the following factors: the preceding crop, the N carryover from the previous crop, the amount and type of residue to be plowed under, and possible leaching losses due to overirrigation.

The following fertilizer recommendations are for mineral soils with low organic matter content.

N fertilizer rates based on soil test

The amount of residual N in the soil varies considerably.

A soil test for nitrate-N (NO_3-N) helps in evaluating the N carryover from the previous crops in the case of mineral soils with low organic matter content.

Take soil samples for NO_3-N following a growing season and prior to the application of N fertilizer.

Take soil samples from the 0- to 2-foot (0- to 0.6-m) and 2- to 5-foot (0.6- to 1.5-m) soil depths on deep soils. The soil samples should consist of soil cores removed from the entire 0- to 2-foot and 2- to 5-foot depth of soil. On soils shallower than 5 feet, take soil samples from 0 to 2 feet and from 2 feet to the expected rooting depth.

Soil test results for N are reported in ppm. One ppm N in a 1-foot depth of soil equals about 4 lb N/acre (Table 1).

Table 1.—N quantities according to soil depth.

Soil depth		Soil test NO_3-N		
(ft)	(m)	(ppm)	(lb/a)	(kg/ha)
0–2	0–0.6	4	32	36
2–5	0.6–1.8	3	36	40
		Total	68	76

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The total NO_3-N soil test values are used to estimate the N fertilizer requirement as indicated in Table 2.

Table 2.—N fertilization rates according to total soil test values.

NO_3-N Soil test (lb/a)	N Application (lb/a)[1] After nonlegume crop[2]	After beans and peas[3]	After productive alfalfa, clover
0	200	160	140
40	160	120	100
80	120	80	60
120	80	40	20
160[4]	40	0	0
200[4]	0	0	0

[1]These application rates are suggested for silt loam, loam, and clay loam soils. For sandy soils, increase the application rates by 40 lb N/a.
[2]When straw is incorporated after September 1, increase the N fertilizer rate by 30–50 lb/a.
[3]After beans and peas and low-producing alfalfa and clover.
[4]For early plantings into cool soil, apply 20–30 lb N/a in a 2-inch x 2-inch band.

If the soil test value for NO_3-N is less than 2 ppm in the 0–2' soil depth, apply a minimum of 30 lb N/a (35 kg/ha) regardless of the soil test value for N below 2'. This application is to ensure adequate initial growth of plants.

Phosphorus (P)

P is essential for vigorous early growth of seedlings. All of the P should be banded 2" to the side and 2" below the seed at planting. (See Table 3.)

Table 3.—P fertilization rates for sweet corn on mineral soils.

If the soil test for P is (ppm)	Apply this amount of phosphate (P_2O_5) lb/a	kg/ha
0–10	90	100
10–20*	0	0

*For early plantings into cool soil, apply 20–30 lb P_2O_5/a in a 2-inch x 2-inch band.

Potassium (K)

Broadcast K and plow it down before planting (Table 4).

Table 4.—K fertilization rates for sweet corn.

If the soil test for K is (ppm)	Apply this amount of potash (K_2O) (lb/a)	(kg/ha)
0–100	120–180	135–200
100–200	60–120	65–135
over 200	0	0

Sulfur (S)

S requirements will vary with soil texture, leaching losses, and the soil parent material. S frequently is contained in fertilizers used to supply other nutrients such as N, P, and K and may be present in irrigation water, which can be tested for S content.

Plants absorb S in the form of sulfate. Fertilizer materials supply S in the form of sulfate and elemental S. Elemental S must convert to sulfate in the soil before the S becomes available to plants. The conversion of elemental S to sulfate usually is rapid for fine-ground (less than 40-mesh) material in warm, moist soil. Apply elemental S the year preceding the crop using finely ground (less than 40-mesh) material.

Elemental S is a strong soil acidifier.

S in the sulfate form can be applied at planting time (Table 5).

Table 5.—S fertilization rates for sweet corn.

If the soil test for SO_4-S in the 0- to 2-ft soil depth is (ppm)	Apply this amount of S* Loamy soil (lb/a)*	Sandy soil
0–2	10–20	40–60
2–5	0	20–40
5–8	0	0–20
over 8	0	0

*When the irrigation water contains more than 2 ppm of S, additional S fertilizer probably is not required.

Zinc (Zn)

Sweet corn has a relatively high requirement for Zn. An application of Zn is suggested when the Zn soil test value is below 0.8 ppm.

Where Zn is required, either 10 lb/a (10 kg/ha) of Zn should be broadcast and worked into the soil prior to planting, or 3 to 4 lb/a (3 to 4 kg/ha) of Zn should be banded with the fertilizer at planting time. An application of 10 lb Zn/a should supply Zn needs for 2 or 3 years.

To correct Zn deficiency during the growing season, thoroughly wet plants with a solution containing 1 lb (0.5 kg) Zn in 50 to 100 gal (190–380 liters) of water.

Lime

Responses of sweet corn to lime have not been observed in eastern Oregon; however, where the soil test pH value is less than 5.5, a lime application is suggested. Measure soil pH prior to application of fertilizer.

On sandy soils where soil acidity is most prevalent, 1 ton of dry 100-score lime raises the pH about 1 unit. In most instances, 1 to 1½ t/a (2.2–3.4 metric ton/ha) of lime respectively will raise soil pH about one unit.

Mix lime into the seedbed at least several weeks before seeding. A lime application is effective for several years.

The liming rate is based on 100-score dry lime.

Manure

Animal manures contain variable amounts of all plant nutrients. All of the nutrients in manure are not completely available the first year. Table 6 gives the approximate average content of some nutrients in fresh animal manures.

Table 6.—Approximate average content of some nutrients in fresh manures.

Kind of Manure	Nutrient and water content (%)			
	Water	N*	P_2O_5	K_2O
Dairy	87	0.5	0.16	0.44
Beef	82	0.65	0.43	0.53
Poultry	73	1.30	1.02	0.50
Hog	84	0.45	0.27	0.40
Sheep	73	1.00	0.36	1.00
Horse	60	0.70	0.25	0.60

*About 50 percent of the N is available the first year.

Losses of N sometimes exceeding 50 percent can occur during manure storage or following application to the surface of the soil. N loss is least when fresh manure is spread and worked into the soil immediately.

Further information on the use of manure is available from your county Extension office.

For More Information

How to Take a Soil Sample ... and Why, EC 628, by E.H. Gardner (revised 1997). No charge.

A List of Analytical Laboratories Serving Oregon, EM 8677, by J. Hart (revised 1997). No charge.

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Fertilizer and Lime Materials, FG 52, by J. Hart (reprinted 1997). No charge.

You can access the above publications, as well as FG 62, *Sweet Corn: Eastern Oregon—East of Cascades*, our Publications and Videos catalog, and many other publications via our Web site at **eesc.orst.edu**

This guide is based largely on the results of experiments conducted by Washington State University and on observations of growers' fields.

Published August 1979. Reprinted January 2000.