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FERTILIZERguide
FG 28
Reprinted January 2000

Bush beans

Western Oregon—west of Cascades

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In the production of vegetable crops, good fertilizer usage is only one of the important management practices, including proper seeding, pest control, adequate irrigation, 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 for vegetable crops should ensure adequate levels of all nutrients. Optimum fertilization is essential for top quality and yields.

Follow recommended soil sampling procedures to estimate fertilizer needs. The Oregon State University Extension Service agent in your county can provide you with soil sampling instructions, soil sample bags, and information sheets.

Recommendations are based on a row spacing of 30 inches. With decreased row spacing, increase fertilizer rates.

Nitrogen (N)

Rates of 50–80 lb N/a generally are recommended where beans are grown on fields having a history of heavy fertilization and intensive culture. Rates of 80–110 lb N/a are recommended where forage legumes or heavily fertilized vegetable crops were not grown the preceding year.

If the application of N plus potash (K_2O) exceeds 90 lb/a, there is danger of seedling injury from the concentration of salt when fertilizer is banded at planting time.

- There is less danger if the row application is split into two bands.
- The danger is aggravated as the band comes closer to the seed.
- The danger is greater with sandy than with finer-textured soil.
- Immediate irrigation at the first sign of burn should reduce further injury.
- There is more possibility of damage to seedlings on acid soils where the pH is below 5.5.

Phosphorus (P)

P fertilizer should be banded at planting for vigorous early seedling growth (Table 1). Locate bands 2–3 inches to the side and 2–3 inches below the seed.

Response is greatest from bands properly placed at 2 inches x 2 inches.

Table 1.—P fertilization rates for bush beans.

If the soil test for P is (ppm)	Apply this amount of phosphate (P_2O_5) (lb/a)
0–15	120–150
15–60	90–120
over 60	60–90

Potassium (K)

Apply K before planting or band it at planting time (Table 2). Amounts above 60 lb K_2O/a should be broadcast and worked into the seedbed.

See statements on fertilizer banding under "Nitrogen."

Table 2.—K fertilization rates for bush beans.

If the soil test for K is (ppm)	Apply this amount of potash (K_2O) (lb/a)
0–75	90–120
75–150	60–90
150–200	40–60
over 200	0

Sulfur (S)

Include 20–30 lb/a of S in the fertilizer program for bush beans. S sometimes is contained in fertilizers used to supply other nutrients such as N, P, and K, but may not be present in sufficient quantity.

Plants absorb S in the form of sulfate. Fertilizer materials supply S in the form of sulfate and elemental S.

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Elemental S must be converted 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.

S in the sulfate form can be applied at planting time. Some S fertilizer materials such as elemental S and ammonium sulfate have an acidifying effect on soil.

The S requirements of bush beans can be provided by:

1. Applying 20–30 lb S/a in the form of sulfate at or prior to seeding.
2. Applying 30–40 lb S/a as fine-ground (finer than 40-mesh) elemental S the preceding year.
3. Applying coarser-ground elemental S at higher rates and less frequently.

Magnesium (Mg)

When the soil test value is below 1.5 meq Mg/100 g of soil or when calcium (Ca) is 10 times more than Mg, apply 10–15 lb Mg/a banded at planting. If deficiency symptoms appear, spray with 10 lb Epsom salts in 100 gal of water/a.

Mg also can be supplied in dolomite, which is a liming material and reduces soil acidity to about the same degree as ground limestone. Mix dolomite into the seedbed several weeks before seeding.

Boron (B)

Responses of bush beans to B applications have not been observed in experiments on growers' fields in western Oregon.

Fields that have received recent heavy B applications should be soil tested for B. If the soil test indicates 2.0 ppm B or above, there is danger of injury to beans.

Zinc (Zn)

The application of Zn has increased the yields of bush beans in the Stayton area, especially on gravelly, dark-colored soils (Table 3).

Table 3.—Zinc application rates for bush beans.

If the soil test for Zn is (ppm)	Apply this amount of Zn (lb/a)
under 1	3–4 banded or 10 broadcast
over 1	0

- When the soil test is below 1 ppm Zn, a response to Zn is expected on all soils.
- When the soil test is between 1 and 1½ ppm Zn, a response to Zn is expected on most soils in the Stayton area.
- Where Zn is required, either broadcast 10 lb Zn/a and work it into the soil prior to planting, or band 3–4 lb Zn/a with the fertilizer at planting time.
- A broadcast application of 10 lb Zn/a should supply Zn needs for 2 or 3 years.

Lime

Experimental work has shown that beans will produce good yields over a fairly wide range of soil acidity.

Apply lime if the soil pH is 5.5 or below, or if calcium (Ca) levels are below 5 meq Ca/100 g of soil (Table 4).

However, possible seedling injury from the band application of fertilizer is less when the soil pH is 5.5 or above. Some Willamette Valley experiments with beans have shown decreased uptake of phosphorus from band applications of phosphorus when the pH approaches 5.0.

Table 4.—Lime application rates for bush beans.

If the SMP buffer test for lime is	Apply this amount of lime (t/a)
under 5.2	4–5
5.2–5.6	3–4
5.6–5.9	2–3
5.9–6.2	1–2
over 6.2	0

The liming rate is based on 100-score lime. Mix lime into the seedbed at least several weeks before seeding. A lime application is effective for several years.

Do not apply lime if the soil pH is above 6.0. Yields were reduced in Willamette Valley experiments when lime raised the soil pH to 6.5.

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.

You can access the above publications, FG 28, *Bush Beans: Western Oregon—West 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 H.J. Mack and T.L. Jackson of the Oregon Agricultural Experiment Station

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Revised April 1983. Reprinted January 2000.