FERTILIZERguide
FG 68
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Vine crops

Cucumbers, melons, squash, pumpkins

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Good management practices are essential if optimum fertilizer responses are to be realized. These practices include 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, yields, and returns.

Follow recommended soil sampling procedures to estimate fertilizer needs. The OSU Extension Service office in your county can provide you with soil sampling instructions, soil sample bags, information sheets, and a list of analytical laboratories serving Oregon (EM 8677).

Recommendations in this fertilizer guide are based on a row spacing of 60 inches.

Nitrogen (N)

Hand harvest

Nitrogen can be preplant incorporated, banded at planting, or topdressed when vines begin to run. Rates of 80–150 lb N/a are suggested in fields intended for hand-harvested plantings of slicing cucumbers, pickling cucumbers, squash, melons, and pumpkins. The lower rates of N should be applied when legumes were grown the preceding year or a green manure crop is incorporated into the soil prior to planting. Broadcast and incorporate preplant N with tillage. N topdressed when vines begin to "run" and later can be incorporated with an irrigation

Machine harvest

For machine-harvested fields of pickling cucumbers, a single preplant application of 60–150 lb N/a is recommended. N applications should be adjusted to plant type. Apply 60–100 lb N/a when indeterminate varieties are grown. Increase the N rate to 80–150 lb N/a when semi-determinate or determinate varieties are planted.

Although plant populations are much higher in machine-harvested fields than in hand-picked plantings, the machine-harvested fields have a much shorter production period, generally being harvested once, destructively. Fields intended to be hand-picked several times before a machine harvest should have plant populations and nitrogen rates as for hand-harvested plantings.

If a band application of N plus potash (K_2O) exceeds 50 lb/a, there is danger of seedling injury from the concentration of salt when fertilizer is banded near the seed at planting time.

There is less danger of seedling injury if two bands are used instead of a single band. The danger is aggravated as the band comes closer to the seed, and is greater with sandy soil than with finer textured soil. Immediate irrigation at the first sign of burn should reduce further injury. There is greater possibility of damage to seedlings on acid soils where the pH is below 5.5.

Phosphorus (P)

Phosphorus fertilizer should be banded at planting for vigorous early seedling growth. Bands should be located 2 inches to the side and 2 inches below the seed. See Table 1.

Table 1.—P fertilization rates for vine crops.

If the Bray 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	0–90

In some areas, a phosphoric acid solution of 1 part acid and 2 parts water, sprayed in a 1- to 2-inch wide band directly over the seed row reduces crusting, improves phosphorus nutrition of the crop, and increases yield. The benefit of this treatment is most likely to occur with early plantings on cool soils.

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Many vegetable crops show an early-season growth response to banded P fertilizers regardless of P soil test. Grower and field representative experience for each field situation should be used to determine the P application rate when the soil test for P exceeds 60 ppm.

Potassium (K)

Potassium for both hand- and machine-harvested fields should be applied before planting or banded at planting time. Amounts above 40 lb K_2O/a should be broadcast and worked into the seedbed (Table 2). See statements on fertilizer banding under "Nitrogen."

Table 2.—K fertilization rates for vine crops.

If the soil test for K is (ppm)	Apply this amount of potash (K_2O) (lb/a)
0–75	100–150
75–150	60–100
150–200	40–60
over 200	0

Sulfur (S)

Include 20–30 lb S/a in the annual fertilizer program for vine crops. 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. 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. Applications of elemental S in cool, wet spring weather may not provide adequate early-season S.

Sulfur 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.

Magnesium (Mg)

When the soil test value is below 1.5 meq Mg/100 g of soil, apply 10–15 lb Mg/a banded at planting. If Mg deficiency symptoms appear, spray with 10 lb Epsom salts in 100 gal of water/a. Magnesium deficiency in vine crops will be noted first on lower or older leaves as yellowing of tissue between veins.

Magnesium also can be supplied in dolomite, which is a liming material that will reduce soil acidity. Dolomite should be incorporated into the seedbed at the rate of 1–1½ t/a.

Boron (B)

Growth and yield responses to boron fertilization are uncommon. When applying B, use 2 lb/a. Boron should be applied uniformly to the field as a spray or broadcast. Never band B fertilizer.

Zinc (Zn)

Zinc deficiencies are uncommon in Willamette Valley soils. When the soil test is below 1 ppm Zn, a response to Zn is expected, and 4 lb Zn/a should be included in the fertilizer band.

Lime

Experimental work has shown that vine crops will produce good yields over a fairly wide range of soil acidity. Lime applications are suggested when the soil pH is 5.6 or below, or when calcium (Ca) levels are below 5 meq Ca/100 g of soil. Optimum pH is between 5.8 and 7.0.

The rate of lime application can be estimated from Table 2.

Table 2.—Lime application rates for vine crops.

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.

Lime applications should be broadcast, preferably in the fall, and incorporated into the seedbed. Do not plow lime down leaving the surface soil unlimed. Mix lime into the soil at least several weeks before planting. A lime application is effective for several years.

Some soils may have a fairly high SMP buffer value (over 6.5) and a low pH (below 5.5). This condition can be caused by the application of acidifying fertilizer. In this case, the low pH value is temporary, and the pH of the soil will increase as the fertilizer completes its reaction with the soil. This temporary acidity from fertilizer is encountered following recent applications of most N fertilizer materials. Acidifying fertilizers also have a "long-term" acidifying effect on soil, which is cumulative and leads to lower SMP buffer readings.

Sandy soils to which fertilizers have not been applied recently sometimes record low pH and high SMP buffer values. In such cases, a light application of 1–2 t /a of lime should suffice to neutralize soil acidity.

For acid soils low in Mg (less than 1.5 meq Mg/l00 g of soil), 1 t/a of dolomite lime can be used as an Mg source. Dolomite and ground limestone have about the same ability to neutralize soil acidity.

FG 52, *Fertilizer and Lime Materials,* which is available from your county office of the OSU Extension Service, provides additional information about lime.

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.

To order copies of the above publications, send the complete title and series number, along with a check or money order for the amount listed (payable to Oregon State University), to:

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World Wide Web

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

You can access the above publications, as well as FG 68, *Vine Crops: Cucumbers, Melons, Squash, Pumpkins,* our Publications and Videos catalog, and many other publications via our Web site at **eesc.orst.edu**

Other publications

Lorenz, O.A., and D.N. Maynard, 1988. *Knott's handbook for vegetable growers.* 3rd ed. John Wiley & Sons, Inc., Somerset, NJ.

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