

GREENHOUSE CUCUMBERS



By
Charles W. Marr

European cucumbers are a popular greenhouse crop, producing fruits that weigh about 1 pound and grow 12 to 14 inches long. The fruits are uniformly dark green in color and mild in flavor and have a thin, tender skin that does not require peeling. In contrast to American cucumbers, European varieties set and develop fruit parthenocarpically (without pollination) resulting in fruits that are seedless. Standard cucumbers cannot be grown in a greenhouse because bees are needed for pollination.

Varieties. European varieties vary in flowering habit (most have only female flowers, but some have both male and female), plant vigor, fruit shape and length, and productivity. Gynoecious varieties (100 percent female blossoms) generally are more productive and produce fruits with smoother skins than the monoecious type (having both female and male flowers). However, the latter are more vigorous and produce fruit of better size and quality. Both types produce an excessive number of female flowers, so some flower “pruning” may be needed. Recommended varieties include Toska 70, Sandra and Fidelio, which offers excellent powdery mildew resistance. Check with seed companies for greenhouse varieties.

Cultural Practices

Temperature. The cucumber is a warm-season plant and grows rapidly at 75 to 85°F temperatures. Minimum temperatures should be no lower than

65°F and daytime temperature should not exceed 85 to 90°F.

Growing Media. Greenhouse cucumbers may be grown in soil, in bag culture, or in rockwool. Good soil drainage is essential to avoid a build-up of soluble salts, which can damage plant roots. Light sandy loam soils are preferable. Growing in bag culture or rockwool is generally more costly than growing in soil, and control of the nutritional program is more critical.

Plant Production. Start plants in a commercial seed-starting mix using 2- to 4-inch pots or containers. Because of the high cost of European cucumber seed, plant one seed per pot. Keep the mix moist but not wet and at 80°F until emergence; after emergence maintain a minimum temperature of 65 to 70°F. Transplant when the plants reach the three to four true leaf stage, approximately two to three weeks from seeding.

Plant Spacing. Trellised greenhouse cucumber plants need 4 to 6 square feet per plant for good production. Plant double rows 2 feet apart and leave a walkway about 3 feet wide. Plant spacing within the row will vary from 18 to 24 inches.

Fertilization. Greenhouse cucumbers grow very quickly and should never lack water or nutrients. It is recommended that a soil sample be collected and analyzed for soil pH, phosphorous, and potassium.

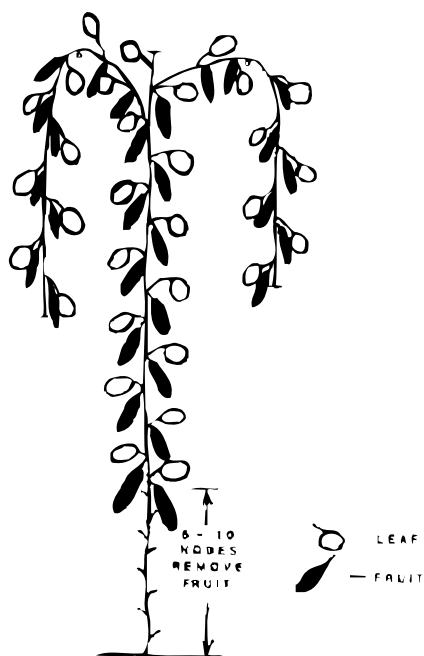
In a soil system, apply all the potassium and phosphorous needed and a small amount of nitrogen before planting. A general recommendation (per acre) is 50 pounds of nitrogen (N), 150 pounds of phosphorous (P_2O_5), and 250 pounds of potassium (K_2O). The acre recommendation can be divided by 40 for 1,000 square feet. Any micronutrient deficiencies indicated by a soil analysis should be corrected by incorporating minor element materials into the soil before planting. During crop growth, the most important element needed is nitrogen. It should be injected in the irrigation water during each irrigation using soluble fertilizer materials such as potassium nitrate (13 percent N), calcium nitrate (16 percent N), or ammonium nitrate (33 percent N). During the first few weeks after transplanting, apply 5 to 10 pounds of nitrogen per acre per week, gradually increasing to 25 to 30 pounds per acre per week during fruit production.

Training. Plants are trained by intertwining the main stem with a vertical piece of polyethylene twine suspended from a horizontal, overhead support wire 6½ to 7 feet above the plant rows. The string is anchored to the base of each plant with a loose, non-slip loop knot.

Most growers prune the plants using an umbrella system (Figure 1). It is important to maintain a proper balance between vegetative growth and fruit load to achieve maximum production of marketable fruit. Maximum production requires regular removal of shoots and female flowers.

Excessive fruit set results in poorly shaped, unmarketable fruit, whereas excess foliage may interfere with plant management and pest control practices and result in undesirable, pale-colored fruit. *Shoot pruning* is employed to limit vegetative growth and flower development, control the form of the plant, and stimulate continued shoot and flower initiation. *Flower and fruit pruning* is used to control the location and limit the number of fruits on the plant and to remove misshapen and otherwise unmarketable fruit. The amount of pruning needed will vary with variety and plant vigor.

Continued flower initiation depends on continued production of vegetative shoots and leaf axils and may occasionally require major pruning and fruit removal to stimulate vegetative growth. All deformed fruit should be removed as soon as noticed.



Steps in training with the umbrella system:

1. Remove flower buds on the main stem up to 30 inches from the base of the plant (or approximately 8–10 nodes).
2. Remove side shoots from the lower 2 feet of the main stem.
3. Above 2 feet on the main stem, prune lateral shoots to one leaf.
4. Main-stem fruit will develop at the base of each leaf. More than one fruit may begin to develop at each node. Some growers thin these to a single fruit, but it may be more practical to leave all young fruit attached, because more than one may mature.
5. Top (cut) the main stem at one node above the support wire at 6½ to 7 feet above the soil surface. Secure the stem to the wire with a string or Twistem to prevent it from sliding down the plastic twine.
6. Train the top 2 or 3 lateral runners over the support wire, and tip them when they reach 3 feet from the ground.
7. Tip all secondary shoots to 1 leaf.

Diseases. Serious diseases of European cucumbers include cucumber and watermelon mosaic, gray mold, powdery mildew, and rootknot nematodes. Mosaic viruses are transmitted by aphids and can be introduced into the greenhouse from infected alternate host plants by this insect. Exclusion or control of aphids is important in controlling virus diseases.

Gray mold is associated with high humidity. Adequate ventilation and air circulation in the greenhouse are important in controlling this disease. Removal of the lower leaves and use of an appropriate fungicide are helpful in the prevention and control of gray mold.

Powdery mildew is a foliar disease that can cause serious reduction in productivity. Techniques for controlling gray mold also help in controlling powdery mildew. The use of resistant varieties is recommended.

Insects. In addition to virus diseases transmitted by aphids, other troublesome insect pests include the white fly, serpentine leaf miner, and two-spotted mite. Care should be taken to prevent introducing these pests into the greenhouse environment. Control of weeds in and around the greenhouse site is helpful in avoiding these pests. Extension personnel can recommend chemical control measures for these disease problems and insect pests.

Harvesting and Handling. Fruits should be harvested when they are well filled out and show only slight ribbing. The most desirable fruits are 11 inches or longer and average $\frac{3}{4}$ to 1 pound. During peak production, fruits need to be removed three or four times a week. Use a knife or pruner to avoid damaging vines and fruit. Handle carefully to minimize damage to the thin skin. A healthy plant should produce 24 to 30 marketable fruits.

Because of their thin skins, European cucumber fruits lose moisture rapidly and soften unless pre-



cautions are taken. Short-term storage is possible by covering fruits and storing them in a cool, moist area. Fruits that must be held for more than a few hours should be wrapped in clear plastic film and stored at high humidity (90 to 95 percent) and 50 to 55°F. Do not store at temperatures below 45°F.

References

- “Greenhouse Cucumber Production,” Johnson, H. and G. Hickman, 1984, Publication No. 2775. Cooperative Extension, Univ. of California, Berkeley, CA 94720.
- “Cucumbers,” Grower Guide No. 15, 1980. Grower Books, 49 Doughty St., London, WCIN 2BR.
- Growing European Seedless Cucumbers, Staver, W.A., 1978, Publication No. 78-053, Information Branch, Ministry of Agriculture and Food, 801 Bay St., Toronto, Ontario, Canada M7A 1A5.
- American Greenhouse Vegetable Growers Association, P.O. Box 9797, Colorado Springs, CO 80932 (Newsletter).
- Greenhouse Vegetable Newsletter, J.C. Fisher, Vegetable Crops Advisor, Research Station, Harrow, Ontario, N0R 1G0.



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