



CUCUMBERS (*Cucumis sativus*)

Producing cucumbers in a protective structure, such as a greenhouse or high tunnel, offers a much improved environment for growth. This improved environment allows for higher marketable yields, extended harvest periods, and reduced pest pressure. Trellising and pruning, along with an uninterrupted supply of water and nutrients, are necessary to produce the quality fruits demanded in today's marketplace. This need to prune, however, is a major labor cost for many farms, and is a weekly chore that many growers fall behind on during the height of the growing season. 'Demeter's unique, "low-prune" habit offers a significant improvement over more "standard" types, greatly reducing the need for consistent pruning once the plants have begun to set fruit.

KEY TRAITS FOR GREENHOUSE GROWING:

Varieties must have certain characteristics in order to be successful in a greenhouse setting. Please refer to our article [Cucumber Types and Terminology](#) for additional information for selecting cucumbers based on type. In addition to its unique plant habit, 'Demeter' is also:

- **Parthenocarpic:** Parthenocarpic varieties produce fruit without pollination; those fruit are also seedless. If you do not intend to provide some sort of pollinator, like honey bees, it is necessary to use parthenocarpic varieties because greenhouses exclude pollinators and other insects to prevent cross-pollination of seeded and seedless varieties.
- **Gynoecious:** Gynoecious varieties bear almost all female flowers, and so produce the highest number of fruits—this trait aids in receiving a higher return-on-investment for using tunnel space.
- **Disease Resistant:** A strong disease-resistance package keeps a plant producing for a long season. Of the number of diseases that can present themselves, powdery mildew is one of the most common in greenhouse cucumbers. 'Demeter' has intermediate resistance to powdery mildew, along with cucumber mosaic and cucumber vein yellowing virus, and high resistance to Scab.

CULTURE:

Cucumbers require a warm, well-drained soil with a pH of 6.8–7.2. High fertility levels along with sufficient and consistent irrigation will keep the plant producing over a long season—12–16 weeks of harvest is not uncommon. As cucumbers are sensitive to the cold, laying plastic mulch in advance to planting will warm the soil and suppress weeds.

TRANSPLANTING:

Three to four weeks before your intended transplant date, sow 1–2 seeds per cell in 50-cell plug trays, ½ inches deep. Maintain temperatures at 80–85°F/27–29°C until seedlings emerge—using a heat mat can aid in maintaining consistent temperatures.

After germination, keep temperatures at 73–76°F/23–24°C during the day, and a minimum of 70°F/21°C at night.

Plants are ready to transplant 3–4 weeks after sowing, when they have 2–4 true leaves. Place seedlings in greenhouse soil or grow bags. A common plant spacing is 2 rows per bed, with 12–18" between plants, but this may vary depending on variety, climate, disease pressure, and pruning methods. Make sure to only transplant when soil or ambient greenhouse temperatures rise to 65–70°F/18–21°C. Grafted plants can typically tolerate cooler soil temperatures. For the first week after transplanting, maintaining both day and nighttime temperatures in around 75°F/24°C helps to

promote rapid foliar and root growth. At fruit set, lower nighttime temps at about 65°F/18°C and begin monitoring plants to manage them towards season-long productivity.

TRELLISING:

For best results in a greenhouse environment, pruning and trellising the plants is a necessity. Not only does this allow for quality fruit production, it also uses the limited space of a covered growing structure in a more efficient manner. Proper trellising also helps provide adequate air flow to prevent disease issues.

Many types of trellis systems may be employed by different growers, but to best take advantage of Demeter's "low-prune" plant habit, we recommend using a system where the vines are pruned to a single leader, much like you would for indeterminate tomatoes. This method requires a strong wire suspended 6–8 feet above the greenhouse floor. The wires may be supported by the roof trusses and attached to the end walls running the length of the greenhouse. Roof purlins may also be used to hang the trellis strings. Individual strings should be hung from the wire for each cucumber plant. The strings are then tied or attached with tomato clips to the base of each stem just above the soil surface, or secured with a single overhand knot. As the plants grow, either attach more clips or wrap the stems around the string. Always wrap the string in the same direction to avoid unraveling and the plants falling down. Also be aware of any developing fruit to avoid wrapping the string over them.

PRUNING:

There are two common pruning techniques used for string trellising greenhouse cucumbers: 1) "Lower and Lean" or "Lower-and-Coil" and 2) the "Umbrella" method. We recommend the "Lower-and-Lean", or "Lower-and-Coil" system when growing Demeter, to best make use of its unique reduced suckering trait. These two systems also work best for growers who plan to grow their greenhouse cucumbers over an extended growing season. The Umbrella method, which relies on the plants developing side shoots later in the season, does not work well with Demeter.

"Lower-and-Lean" requires the use of a spooling tool (e.g. Rollerhooks) that hang a spool of string from the top wire and allow for the easy unrolling and extension of the trellis over the course of the growing season. As the plant grows up the string,

remove all the lateral buds (also called side-shoots, or suckers), leaving the top of the plant unpruned in case the main leader is damaged. Pruning the lateral buds allows the plant to direct its energy to producing fruit rather than an abundance of foliage. Leaves should also be removed up to just below the level of the next harvestable fruit, for similar reasons. Once the vine has reached the top wire, the string can be let down from the spool, lowering the top of the cucumber plant back below the wire. As the plants are lowered, the hooks on which they hang should also be slid along the top wire, causing the plants to "lean" in the direction you are moving the hooks. This allows for the plant to continue to grow over a long season, without having to top the plants or losing plants in the rafters of the greenhouse. Beds with two rows of plants should have each row lean in the opposite direction of one another. As the plants continue to grow in length, they will eventually wrap around the end of the bed and lean back up the opposite row.

A variation on this technique is called the "Lower and Coil," method, where rather than sliding the hooks and leaning the plants, as the vines are lowered and carefully coiled in loops around the base of the plant. Care must be taken in this method to avoid the looping lower vines from sprawling into the pathway, or getting overly tangled with one another, and it is especially important to keep up with the pruning of suckers and lower leaves to avoid a mess of broken foliage at the base of the plant that would invite pests and disease.

Growing 'Demeter' in either a "Lower and Lean" or "Lower-and-Coil" system requires a slight adaptation to the instructions outlined above. Initially, when the plants are young (before they begin to set fruit), treat them as you would any standard variety: as the plant grows up the string; remove all the lateral buds, leaving the top of the plant unpruned in case the main leader is damaged. However, once the plants start to produce fruit, they will shift from a vegetative phase to a more generative one, and the plant habit will begin to change. The plants will produce fewer and fewer side-shoots, and the side shoots that are formed will be reduced in size and will mostly self-prune. The plants will still need to be clipped to the trellis as they grow, and lower leaves will still need to be removed as the plants are lowered, but the labor needed to prune the plants will be significantly lessened. At this point we also recommend occasionally checking the plants to remove the

occasional 'standard' side shoot that does still form, but these should be minimal.

For more information on Demeter, watch at [Johnnyseeds.com/demeter-video](https://johnnyseeds.com/demeter-video)

DISEASES:

Prevent the occurrence of disease by practicing crop rotation, managing pests that spread disease, removing debris, controlling humidity and choosing disease-resistant varieties. The best defense against disease is varieties with genetic resistance.

Powdery mildew presents itself on the leaves as irregularly shaped, white, powdery spots. This symptom can progress to the point of the leaves turning yellow and dying. The best method of prevention is to select disease-resistant varieties, but powdery mildew thrives in the humidity of a high tunnel, so ensure your structure is well ventilated.

Mildew Cure®, MilStop®, and OxiDate® may provide some measure of control.

PESTS:

Within the greenhouse or high tunnel, biological controls, such as predatory mites, are an effective option for spider mites and thrips, especially if released before pest issues arise. For squash bugs and cucumber beetles, PyGanic® and Safer® Insect Soap may be effective controls. Cucumber beetles can act as a vector for bacterial wilt. The use of yellow sticky traps may provide some control against cucumber beetles. As 'Demeter' is fully parthenocarpic, and does not need pollinators to produce fruit, consider screening in your greenhouse, to exclude insect pests entirely.

HARVEST AND STORAGE:

Pick fruits at least 3 times a week once the plant begins bearing. Keep cucumbers for up to 2 weeks by refrigerating at 50–55°F/10–13°C and 95% relative humidity

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