



High Tunnel Production Series

High Tunnel Strawberry Production in Tennessee

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High tunnels are semi-permanent structures much like greenhouses, except they are passively heated and ventilated, and the crops are grown directly in the soil. Advantages of high tunnels include season extension (both early and late in the season), crop protection, higher yields, quality improvement, and better control of the growing environment. With the interest in high tunnels growing, and the desire to maximize the profit in this high-value space, extending the season of strawberries is a viable option. Planting a crop in the tunnels in late summer allows the berries to get in two cropping seasons — the first in late fall and the second in early spring, often a month before field berries are ready for harvest. This publication is intended to provide tips for off-season production.

Tips or Plugs

First you will need to decide whether to buy plugs or grow your own runner tips. For a new or part-time grower, plugs will be easier to manage, though they will cost a bit more. If buying plugs, make arrangements with a strawberry nursery in late April or early May in order for plants to be ready by September. Tips are more fragile and more susceptible to dehydration. Producing your own tips may seem like a more economical choice, but there is potential to spread disease, like anthracnose, from field to field and year to year. Furthermore, tips will not yield as many berries as the plugs. Therefore, though plugs cost more, they will more than pay for themselves in increased yield at harvest time.

Varieties

For the high tunnel, there are short-day or June bearing varieties adapted to form flowers under warmer conditions. Traditionally, June bearers produce crops within a short window (two to three weeks), however, in the tunnel they will set two crops. ‘Radiance’ and ‘Strawberry Festival’ were both bred at the University of Florida and do well for fall and winter fruiting (Fig. 1) and produce a second crop in the spring.



Figure 1. Fall strawberry harvest.

Day neutral varieties, such as ‘Albion’ and ‘San Andreas,’ produce a smaller crop in the fall and a larger crop in the tunnels in the spring, with overall yields across the fall and spring seasons comparable to the June bearers.

Planting

While the strawberry plants are protected from overhead rain in the tunnels, it is still advantageous to plant the crop on raised beds covered with black plastic. This method will help protect the fruit from soil splash and reduce disease. Raised beds help warm the soil more quickly in late fall and early spring. To maximize bed space, plants are set on a double row with a 12-inch in-row and between row spacing (Fig. 2). Stagger the plants in the rows by setting the first plant on one row 6 inches farther in than on the second row. Target planting date should be the first week of September.

Irrigation

Drip irrigation laid under the black plastic and between the rows of strawberry plants is a must for high tunnel production and will allow for efficient use of water and delivery of fertilizer. Plants will need water immediately after planting for establishment. As the roots and foliage grow, they will require more water. After the fall-winter harvest season is done and winter temperatures set in (January to mid-February), the crop will require very little water. The irrigation schedule will resume in mid- to late February, and as foliage and blossoms develop more water will be required. Actual amounts of water needed will vary according to weather conditions — the hotter and drier the conditions, the more water needed.

Fertilization

A soil test should be taken several months before planting. A target soil pH of 6.0 is desired, and by testing early there will be ample time to adjust if needed. The soil test also will indicate how much potassium and phosphorous to add to the soil. Generally, one-third of the nitrogen (N), half of the potassium (K) and all of the required phosphorous (P) should be applied and incorporated preplant. The remaining nitrogen and potassium can be applied through the drip irrigation throughout the season. A target of 1 pound N per acre per day is required during fruit set.

Insects and Diseases

Since high tunnel environmental conditions are much like a greenhouse, be prepared for greenhouse pests, such as white flies, spider mites and aphids. Gray mold or Botrytis can be an issue in high tunnels, as the warm, moist conditions of the tunnel are ideal for this fungus.

Pollination

Honeybees will not navigate well in the tunnels, as their navigational skills are altered by the change in UV light interception due to the properties of the polyethylene plastic cover on the tunnel. Honeybees will attempt to escape from the tunnel. In order to reap a bountiful fall and early spring crop, bumblebee hives are necessary to supplement pollination. Class C hives should be replaced every four to six weeks during flowering. One hive is needed for each tunnel. Once temperatures warm up in the spring (above 50 F during the daytime), the tunnels can be opened and allow access for natural bumblebee populations as well as wind pollination.



Figure 2. Staggered, double-row of strawberries on raised bed with black plastic mulch.

Harvest

Fall harvest will begin in November and continue until around the end of December. After this initial flush of fruit, temperatures generally become too cold for continued production and plants should rest for three to four weeks. During the rest period, plants should be covered with a double layer of row cover (2 ounces per yard over the top of the berries and 1 1/2 ounces per yard on top of the 2 ounces per yard layer). Remove the row covers in early to mid-February for production to resume in late March or early April.

What next?

After the berries are done producing for the year, they can be removed to allow for a second crop in the tunnels (tomatoes, peppers, melons, etc.). Saving plants from year to year is not recommended, due to the likely occurrence of anthracnose.

For more information and additional resources on strawberry production, visit the Small Fruit Consortium webpage at <http://www.smallfruits.org/Strawberries/Production.htm>. For more information and additional resources on high tunnels, visit the UT Organic and Sustainable Crop Production webpage at <http://organics.tennessee.edu/growers.htm>.

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