

# Strawberry Plantlet Propagation for Nebraska Wholesale Nurseries

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Strawberry plants are a fun and popular fruit for home gardens, as well as a high-value specialty crop. As a result, an increasing number of big box stores and garden centers are selling small plants. The fruit itself is definitely a consumer favorite and strawberry plants are considered easy to grow.

Due to production in controlled environments, commercial strawberry production (for berries) can occur year-round leading to the need for young strawberry plants that are ready to flower and fruit. Thus, there is a market for young plants that are ready to flower and fruit.

The following information was developed from 3 years of research at a cooperating nursery. One goal of this research was to develop a strawberry plant production system (using stolons [runners]) that could easily be incorporated into a wholesale nursery's perennial production schedule, thus making strawberry plants available to berry growers and consumers.

## Cultivar Selection and Obtaining Small Plants

The most common commercially available strawberry plants fall into one of three categories: June-bearing, ever-bearing, or day neutral. Which type you choose to grow will depend on whether your goal is one crop of large berries (June-bearing), a more continuous crop of strawberries (day neutral), or two crops (ever-bearing) and whether you are supplying plants to a wholesale field/greenhouse grower, U-Pick operation, or the home gardener. For this field study, day neutral cultivars, Evie-2 and Seascape, and a June-bearing cultivar, Honeoye, were obtained from Nourse Farms (Whately, MA). As the product goal is small plant production from stolons, it is important to note that in general June-bearing strawberries produce the most stolons and ever-bearing cultivars produce the least number of stolons with the day neutral cultivars falling in between.

## Bed Area, Preparation, and Irrigation

Select a field area that is in full sun and is at least partially shielded from the wind but still has good air circulation. Water access for drip irrigation (including a time clock) is necessary, and easy access for tillage and equipment movement in general is important. The size can vary but you need double the area you will initially plant so you can rotate and pasteurize (suggested) one side of the field while you are growing in the other part. In 2 years of our study, 800 sq. ft. (20 by 40 ft.) of a 1600 sq. ft. field was planted.



Figure 1. Half of the field was covered with 6-mil black polyethylene to keep the area weed free and the other half with weed barrier. We used sandbags to secure the poly and weed barrier.

Allow at least 3 months before covering the field and planting in order to collect soil samples. Soil samples should be collected over at least 6 points across and down the field. Samples should be taken at a 6-inch depth and should be tested for pH and electrical conductivity as well as the major and minor nutrient elements. A pH of 6-6.5 is ideal for strawberries. There are a number of soil-test facilities that can handle this analysis. Just be sure to indicate that the crop will be strawberries. Amend the soil according to the soil-test report.

In the portion of the field that is to be planted, create hipped rows (called raised beds/hills) that are 10 to 12 inches tall. Cover this portion of the field with weed barrier and set up driplines down each hipped row such that individual drippers are 12 inches apart (Figures 1 & 2). Row length should be based on the water pressure available to travel completely down the drip lines.

The other portion of the field should be covered with 6-mil black polyethylene to keep the area weed free. If solar pasteurization is desired, clear 6-mil polyethylene could be substituted for the black polyethylene.



Figure 2. Drip line placement with a nozzle (red, black arrow) close to each plant.

## Planting, Fertilizing, Watering, Weeding, and Harvesting Berries

Order crowns in the fall (October) for spring planting. Drip tubing or drip tape with nozzles/openings that are 12 inches apart should be purchased. Weed barrier and 6-mil black polyethylene (or thin clear polyethylene) should also be available/purchased.

Once the soil has been amended (if needed), plant strawberry crowns 12 inches apart in the hipped rows. Be sure to align each plant with a drip nozzle. Fertilize one week after planting and then one month later using strawberry fertilizer 8-12-32 (or a similar fertilizer), applying either 1 tablespoon per plant or the lowest rate on the bag.

Watering in the early morning is best. Plants should be thoroughly watered to a depth of 6 inches frequently (in clay-containing soils at least 3 times per week) and soil should not be allowed to dry out as berry size and shape is related to the amount of water plants receive. Weeding should be done at least once per week to maintain clean rows.

Strawberry plants regardless of cultivar will start to flower and fruit in June. Once flowering has occurred, plants should be checked at least every other day and ripe fruit should be harvested.

In the case of June-bearing and day neutral cultivars, stolons may start appearing as early as late June and should be left on the plant (Figure 3).

## Harvesting Plantlets, Planting, and Cold Storage

Plantlets on the stolons will be ready to be harvested starting in August (Figure 4). In preparation for rooting the plantlets,

- Purchase soilless potting mix (such as a peat:perlite mix with biofungicide and mycorrhizae) and 4-inch square pots with flats to hold them.
- Prepare labels to identify each plant by cultivar, obtain clippers, alcohol, and dipping cup(s).
- Cut plantlets from the stolon and plant such that the crown of the plant is above the mix (Figure 5).
- Use sharp clippers and dip the clippers in alcohol between cutting plantlets off the stolon.
- Move flats to a cool greenhouse preferably with bottom heat to speed rooting.

As it will take about 1 month for plantlets to root, plantlet/stolon harvesting can be based on fall or spring sale date(s).



Figure 3. Stolons (runners) with small plantlets (arrows) on strawberry plants.



Figure 4. Each plantlet should have 3-5 leaves plus rootlets (arrow).



Figure 5. Strawberry plantlets planted in 4 inch square containers containing peat:perlite soilless mix with biofungicide and mycorrhizae.

Water plantlets so that the soil stays moist but not cold. Once rooted, plantlets can be held until other perennials are ready to be put into cold storage for the winter. Strawberry plants only need 200-300 hours of cold temperatures to flower but can be held longer and moved out with other perennials. As with other perennials coming out of cold storage, starting with a cool greenhouse and gradually warming is best (Figure 6).



Figure 6. Small plants were removed from the cooler and set in a cool greenhouse in preparation for shipping.

## Trouble-shooting Nutrient Deficiencies and Diseases

Initial and follow-up soil tests are important as many nutrient deficiencies mimic diseases. Visual observations are also important, and help can be found at Yara CheckIT. This app and its website, <https://www.yara.co.uk/crop-nutrition/strawberries/>, features pictures of nutrient deficiency symptoms as well as advice on possible causes.

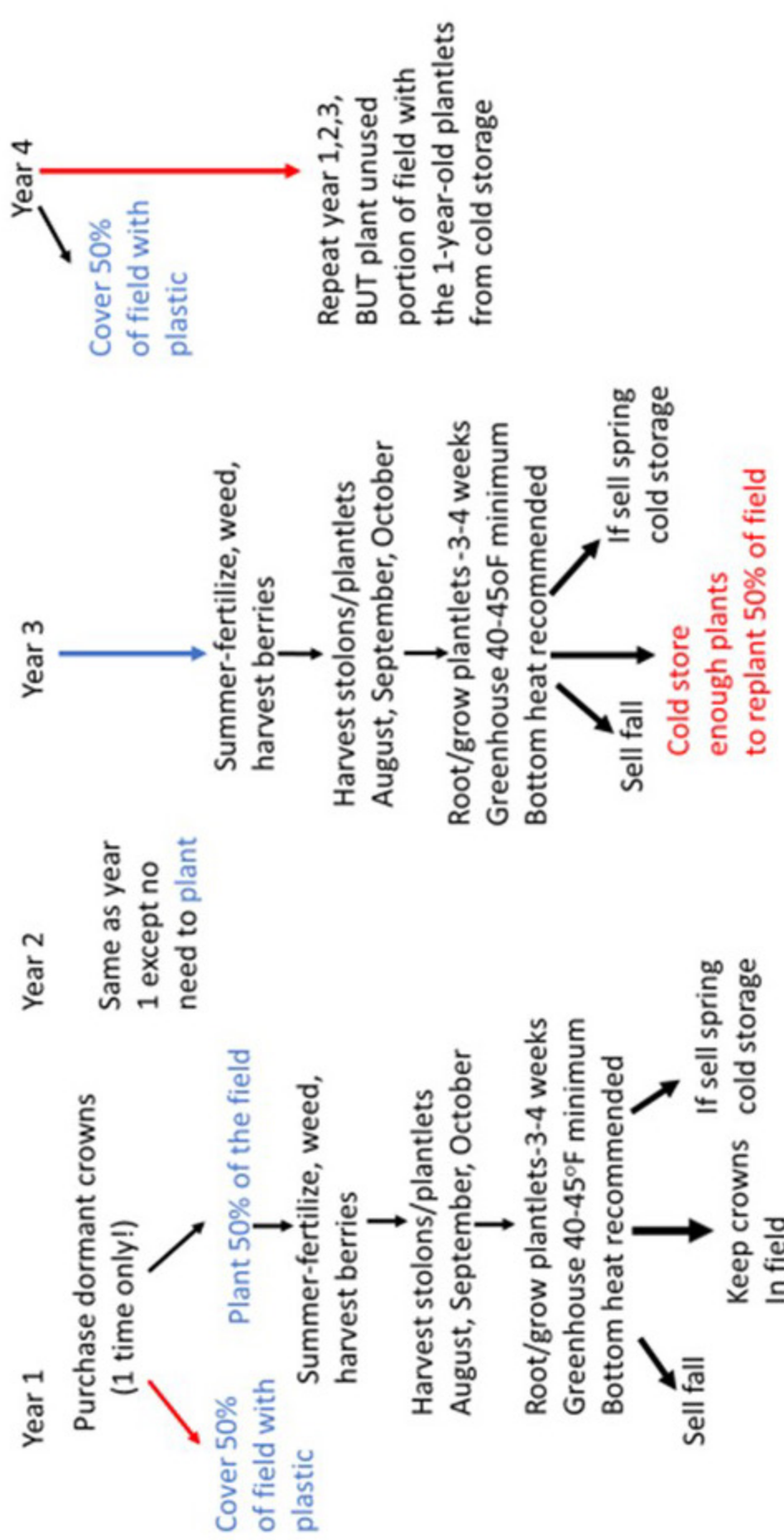


Figure 7. Strawberry plantlet production schematic. This allows for continuous production of strawberry plantlets in a given area. Note: Half of the field remains under thin, clear plastic or 6-mil black plastic for 3 years. Also, mother plants should be removed from the field at the end of year 3. The half of the field that has been planted should be covered with black plastic to keep the area free of weeds or clear plastic, which allows for solar pasteurization, for the next 3 years.

Nitrogen is one of the most common deficiencies as the symptoms can easily be mistaken for leaf spot or scorch fungal diseases (<https://blogs.cornell.edu/berrytool/strawberries/strawberries-leaves-have-spots/>).

If a fungal disease is suspected, UNL's Plant Diagnostic Center can confirm that diagnosis (<https://plantpathology.unl.edu/plant-pest-diagnostic-clinic>).

## Rotation and Growing Scheme

The final flow chart for the production process for growing additional crowns and plantlets is shown in Figure 7. Data backing this final production chart include:

*Year 2020.* Initially, 1600 sq. ft. was planted with large, 2-year-old crowns. Over all 3 cultivars, each crown produced 5 stolons and 13 viable plantlets per plant (one fall harvest). There was a total of 3150 viable plantlets (leaves with root nodules) and 1940 crowns from 250 plants.

*Year 2021.* Planting area was reduced to 20 ft. by 40 ft. (800 square ft.). Using 1-year-old plants (propagated from last season), a total of 1189 plantlets (13 plantlets per plant) and 998 crowns were lifted (started with 90 crowns) per 800 sq. ft. There were three harvest dates for the plantlets. Estimated plantlet wholesale price: \$356.70-\$475.60 or \$0.45-\$0.59 per sq. ft.

*Year 2022.* Planting area was the same using 1-year-old plants, only two harvests, 967 stolons (11 per plant) and 2088 plantlets (23 per plant). Crowns were left in the ground for the next year. Estimated wholesale price: \$626.40-\$835.20 or \$0.78-\$1.04 per sq. ft.

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## References for Field Planting and Growing of Strawberries

There are many good references for growing strawberries. Below are some of the most recent.

- Nourse Farms Planting Guide. 2023. <https://www.noursefarms.com/growing-corner/planting-guide/>
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- Strik, B. E. Dixon, A. J. Detweiler, E. Chernoh, and N. Sanchez. 2020. Growing Strawberries in Your Home Garden. <https://extension.oregonstate.edu/catalog/pub/ec-1307-growing-strawberries-your-home-garden>



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