

Plasticulture Strawberries

Shawn Wright¹ and Matt Ernst²

Introduction

There is always a market for fresh, local strawberries (*Fragaria* spp.), and growers able to provide the earliest crop often have the marketing edge. For growers willing to make the investment in time and resources, the annual plasticulture system may allow the grower to have berries about one month sooner than growers using the traditional matted row system. Plasticulture production can either be used as a stand-alone enterprise or as part of a diversified operation.

Marketing

Early crops can attract consumers earlier in the season, helping retain customers throughout the year. Direct markets such as on-farm retail markets, roadside stands, farmers markets, and community supported agriculture (CSA) may provide the greatest premiums to producers of early crops. Smaller wholesale volumes of early season strawberries could also be marketed to restaurants, local groceries, and through produce auctions. Many strawberries grown in Kentucky are sold on a U-Pick basis, and plasticulture strawberries could begin the U-Pick marketing season earlier.

Market Outlook

U.S. fresh strawberry use has increased from between 4 to 5 pounds per capita in the early 2000s to almost 8 pounds per person in 2012. Consumption increases are due, in part, to the increased availability of fresh strawberries all year from



global sources. This increasing quantity demanded supported stronger wholesale fresh strawberry prices in the early 2010s, helping producers match higher costs of production. In 2012, about 220 acres of strawberries were harvested in Kentucky. While small fruit producers nationwide are experiencing a decline in the demand for U-Pick berries, there is an increasing demand for an already-picked local product. Locally produced strawberries are plant-ripened and full flavored, which can support their appeal to consumers.

Production considerations

Site selection

The annual plasticulture system can be used on sites that are appropriate for matted row production, but a sandy loam soil works best for building and shaping the 8-inch raised beds that are critical for success. Avoid fields that have recently been in potatoes, tobacco, peppers, eggplants, or tomatoes



¹Shawn Wright is a Horticulture Specialist at the University of Kentucky.

²Matt Ernst is an independent contractor with the Department of Agricultural Economics.

due to potential problems with *Verticillium* wilt. A reliable water supply needs to be available for injection of fertilizers in the early spring and some growers will use water for frost protection. More growers are relying on floating row covers for frost protection.

Cultivar selection

Chandler and Camerosa are two of the most common varieties used in this system. Standard eastern varieties do not work as well because of their long dormancy period. It is worth looking at varieties that perform well for growers in North Carolina, Virginia, Florida and California.

Planting and maintenance

This system begins in early July when the grower orders runner tips or plugs from a grower. A few growers are looking at cutting their own runner tips from stock plants but it is very important that the stock plants and tips are disease free. For most of Kentucky a planting date of September 10 to September 20 is recommended. You will want 4-week-old plug plants to take to the field, so plan accordingly when ordering planting material.

In early August, raised beds are formed with a bed-shaper designed specifically for deep plasticulture beds (28 to 30 inches wide on top, 8 inches tall) using 60-inch-wide 1.25 mil plastic film. On heavy soils it may be helpful to make a pre-bed prior to the final plastic laying. Drip tube is placed under the plastic at the same time the plastic is laid. One-half of the recommended nutrients can be applied prior to bed forming, and the remainder is usually injected at weekly intervals beginning in the spring after row cover removal.

In late October or early November the beds are covered with floating row cover. The optimum weight is dependent on winter weather. University of Kentucky researchers are testing multiple applications of lighter weight fabric, but a good “standard” is 1.25 ounces per square yard.

Pest management

Anthracnose can be a problem in plasticulture strawberries and growers should carefully examine

runner tips or plugs and treat as needed. Botrytis blossom blight and fruit rot is always a concern in strawberries, regardless of the production method. Soil-borne diseases, such as leather rot, do not tend to be a problem in plasticulture systems as long as the beds are high enough to prevent splashing soil from contacting susceptible tissues. Insects have not been a significant problem in Kentucky; however, growers should still scout for pests and be prepared to treat if needed. The Spotted Wing *Drosophila* is now present in the state and has the potential to be a serious pest. At this time, we believe that for plasticulture production the fly populations will not build up rapidly enough to be a problem. Crop rotation and integrated pest management (IPM) practices will help the grower remain profitable by inhibiting soil-borne diseases and nematodes. The Midwest Small Fruit Pest Management Handbook is an excellent resource for identifying diseases and insects. Refer to the Midwest Grape and Small Fruit Spray Guide for current pesticide recommendations. Other pests include Canada geese, deer, and slugs, which can cause serious damage in some sites.

Harvest and storage

The harvest season begins in early to mid-May and can last for up to 5 weeks if more than one variety is planted and the weather remains cool. Only fully colored strawberries at their peak of flavor should be harvested since quality will not improve after harvest. Refrigeration will be needed for berries that are stored for a few hours or longer. Strawberries are usually sold in pint and quart plastic or fiber pulp containers.

Labor requirements

Labor requirements for strawberry production compare favorably with those for tobacco. Establishment and harvest requires approximately 300 to 500 hours per acre, depending on whether growers produce their own plugs from runner tips or buy plug plants.

Economic considerations

The investment for annual plasticulture strawberry is higher than for matted row production because of the recurring cost of the plants; however, there is

the potential for greater yield and a higher return per unit than for matted row berries. The investment for strawberry production can initially be high primarily due to the costs of land preparation, planting, and the installation of an irrigation system. Row covers for frost protection and pest control, especially where deer control is required, are additional costs. One way to recover additional costs of plasticulture production is to follow the strawberry crop with another crop on the plastic to capture residual nutrients and distribute costs of the plastic over more than one enterprise.

Total costs will vary with production volume and will usually exceed \$15,000 per acre. Since returns can vary depending on actual yields and market prices, the following per acre returns to land and management estimates are based on three different economic scenarios. These estimates assume that the costs of depreciable materials (such as row covers, irrigation equipment, and deer fencing) are evenly distributed over 4 to 5 years. It may take one or more seasons to generate adequate income to cover such costs; producers able to produce more than one crop on the plastic could recoup these costs more quickly. Summer squash or melons are two crops with which growers have had success following strawberries.

HIRED PICKER

<i>Pessimistic</i>	<i>Conservative</i>	<i>Optimistic</i>
\$(1,180)	\$4,230	\$10,655

U-PICK

<i>Pessimistic</i>	<i>Conservative</i>	<i>Optimistic</i>
\$(970)	\$5,520	\$12,390

**Parentheses indicate a negative number, i.e. a net loss*

Selected Resources

- Kentucky Strawberry Profitability Estimated Costs and Returns (University of Kentucky, 2014) <http://www.uky.edu/Ag/CCD/strawberryreturns.pdf>

- Midwest Small Fruit and Grape Spray Guide, ID-94 (University of Kentucky et al., 2015) 1.7 MB file http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/ID-94.pdf
- Midwest Small Fruit Pest Management Handbook, B-861 (University of Kentucky and Midwest Fruit Workers Group, 2004) <http://ohioline.osu.edu/b861/index.html>
- Strawberry Production in Kentucky, HO-16 (University of Kentucky, 2007) <http://www.ca.uky.edu/agc/pubs/ho/ho16/ho16.pdf>
- Hill System Plastic Mulched Strawberry Production Guide for Colder Areas (Virginia Cooperative Extension, 2009) <http://pubs.ext.vt.edu/438/438-018/438-018.html>
- Midwest Strawberry Production Guide, B-926 (The Ohio State University, 2006) <http://ohioline.osu.edu/b926/>
- Southern Region Small Fruit Consortium: Strawberries (Clemson University, North Carolina State University, Virginia Tech, University of Arkansas, University of Georgia, University of Tennessee) <http://www.smallfruits.org/Strawberries/index.htm>
- Southeast Regional Strawberry Integrated Management Guide (Southern Region Small Fruit Consortium, 2010) http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2010/2010StrawberryIMGFinal_Nov12.pdf
- Southeast Regional Strawberry Plasticulture Production Guide (North Carolina State University, University of Georgia, and Clemson University, 2005) <http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2005culturalguidepart1bs1.pdf>
- Strawberries: Organic and IPM Options (ATTRA, 2007) <http://attra.ncat.org/attra-pub/strawberry.html>
- N.C. State University Strawberry Budget (Interactive Excel worksheet) <http://strawberries.ces.ncsu.edu/strawberries-budgets/>

Reviewed by Brad Bergesford, Horticulture Specialist, The Ohio State University; John Strang, Extension Specialist, University of Kentucky; and Beth Wilson, Pulaski County Extension Agent, University of Kentucky
Photo by Thom Harker, The Ohio State University

March 2014

For additional information, contact your local **County Extension** agent

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin.