

Strawberry

Introduction

To many, nothing says summer like the first local ripe strawberries of the season. A versatile fruit, strawberries (*Fragaria* spp.) can be consumed fresh, frozen, or in processed foods. Growers able to provide the earliest crop of these popular berries will often have the marketing edge.

Marketing

The quality of Kentucky-grown strawberries is far superior to berries that are shipped in. There is a strong market for local berries, particularly near population centers. A large proportion of the strawberries grown in Kentucky are currently sold on a U-Pick basis. Other marketing options include roadside stands and local grocers. Farmers markets, produce auctions, Community Supported Agriculture (CSA) shares, and restaurants are also outlets for strawberries. Some producers are using crop surpluses to produce jams and jellies for local sale.

Market Outlook

Fresh strawberry consumption in the U.S. increased from 4.9 pounds per capita in 2000 to 6.5 pounds per capita in 2008. The increasing demand for strawberries has kept fresh market prices relatively stable. According to the U.S. Census of Agriculture, strawberry acreage in Kentucky increased approximately 60 acres between 2002 and 2007. 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 product.



Production Considerations

Site selection

For best results, select a site with deep, sandy loam soil well supplied with organic matter. Clay

soils can produce a good crop if the site has been prepared to drain well and has added organic matter. Fields with heavy perennial weed pressure should not be planted to strawberries. Avoid fields that have been in potatoes, tobacco, peppers, eggplants, or tomatoes due to potential problems with Verticillium wilt. Strawberries need to be located on ground higher than the surrounding area to reduce the chance of spring frost damage. A water supply needs to be available nearby since irrigation is a necessity for commercial production. Many growers install overhead sprinklers since this system can also be used to help prevent frost and freezing injury.

Cultivar selection

Strawberries are commonly grouped as either June-bearing, everbearing, or day-neutral. June-bearing

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varieties have been grown in Kentucky for many years. They are typically planted in early spring and blossoms are removed during this first season to encourage runner establishment. A full crop is harvested during the second and subsequent seasons. June-bearing varieties produce flowers under short day conditions.

Everbearing and day-neutral strawberries are very similar under Kentucky conditions. Both produce few runners and flower buds develop regardless of the day length. They typically yield three crops during a season: a moderate spring crop, a summer crop of small berries, and a heavier fall crop. Total season-long yields, however, are similar to those of June-bearing strawberries. The fall crop depends on having a cooler summer for obtaining good fruit size and yields. During the first year of establishment, blossoms are removed so that only a fall crop is produced.

Commercial growers should select well-adapted cultivars that have the necessary disease and pest resistance for their locale. Consideration should also be given to the qualities in demand by the intended market.

Planting and maintenance

Strawberries are generally grown in Kentucky using the perennial matted row system of production. The annual plasticulture production system is gradually being adopted by Kentucky growers and a separate profile has been developed for this system. Plasticulture production requires a high initial cash outlay and a grower must be an exceptional manager to succeed.

The best time to plant strawberries in Kentucky is early spring; as soon as the ground can be worked in March or early April. Approximately 5,000 vigorous, disease-free mother plants will be required per acre. Removing blooms the first season is necessary to encourage the early production of runner plants in June-bearing cultivars. Blossoms on everbearing/day-neutral

varieties are removed until July during the establishment year. These plants are then allowed to produce a full crop in subsequent seasons.

A strong colony of bees is recommended to pollinate one acre of strawberries. A protective straw mulch is applied when plants become dormant in late fall and is removed the following spring. Following a post-harvest renovation program will maximize profits and yields, as well as prolong the life of the planting. Most commercial fields in Kentucky produce marketable fruit for two to three seasons, with weed problems as the primary reason for terminating a planting.

Pest management

Insect pests include strawberry clippers, sap beetles, spittlebugs, strawberry rootworm, eastern flower thrips, and tarnished plant bug. Insect pests not only affect yields, but they can drive away U-Pick customers. Botrytis blossom blight and fruit rot, various fungal leaf spots, leather rot, Verticillium wilt, and red stele are diseases that can affect strawberries. Kentucky strawberries generally do not require an extensive spray program for diseases and insects if disease resistant varieties are used. Other pests include birds and deer, which can cause serious damage in some sites.

Harvest and storage

The harvest season for strawberries begins in May and lasts 2 or 3 weeks. 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 through the first commercial year of production requires approximately 100 hours

per acre. Harvest, beginning with the second year, will require 525 hours per acre for fields where pickers are hired and approximately 125 hours per acre for U-Pick operations.

Economic Considerations

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. In addition, strawberries must be established for a year before harvest, with no returns generated in that first year. The cost of establishment is assumed to be \$3,250. Expenses during the production years (years 2 to 4) are approximately \$4,000 (U-Pick) or \$6,620 (hired harvest).

The returns to labor and management for strawberries can be nearly as high as for tobacco, and even greater for growers who produce high yields. 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. Conservative estimates represent the University of Kentucky's statewide average cost and return estimates (2009).

IRRIGATED, HIRED PICKER

<i>Pessimistic</i>	<i>Conservative</i>	<i>Optimistic</i>
\$1,605	\$2,992	\$4,088

IRRIGATED, U-PICK

<i>Pessimistic</i>	<i>Conservative</i>	<i>Optimistic</i>
\$2,720	\$4,555	\$6,888

Selected Resources

- Kentucky Strawberry Profitability Estimated Costs and Returns (University of Kentucky, 2008)
<http://www.uky.edu/Ag/cdbrec/strawberries.pdf>
- Strawberry Production in Kentucky, HO-16 (University of Kentucky, 2007)
<http://www.ca.uky.edu/agc/pubs/ho/ho16/ho16.pdf>
- Midwest Small Fruit and Grape Spray Guide, ID-94 (Midwest Fruit Workers Group, 2010)
<http://www.hort.purdue.edu/hort/ext/sfg/>
- Midwest Small Fruit Pest Management Handbook, Bulletin 861 (Ohio State University, 2004)
<http://ohioline.osu.edu/b861/index.html>
- 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
- Strawberries: Organic and IPM Options (ATTRA, 2007)
<http://attra.ncat.org/attra-pub/strawberry.html>

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