



Onions

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Introduction

Onions (*Allium cepa*) are a cool-season biennial crop typically grown as an annual. Dry bulb onions are harvested after the leaves have died back and the bulbs have fully matured. Green bunching onions are harvested while the leaves are still green and before the bulbs have developed. The terms 'scallion' and 'spring onion' are sometimes incorrectly used interchangeably for green onions. Scallions are onions that completely lack bulb formation, while spring onions have bulbs somewhat more developed than green onions.

Marketing

Marketing options for Kentucky-grown onions include farmers markets, community supported agriculture (CSA) shares, restaurants, and roadside stands. Wholesaling through produce auctions and to local food retailers is also an option. Onions are sold as green onions, fresh onions and dry (storage) onions. Green onions can be marketed in late spring to lengthen the onion season.

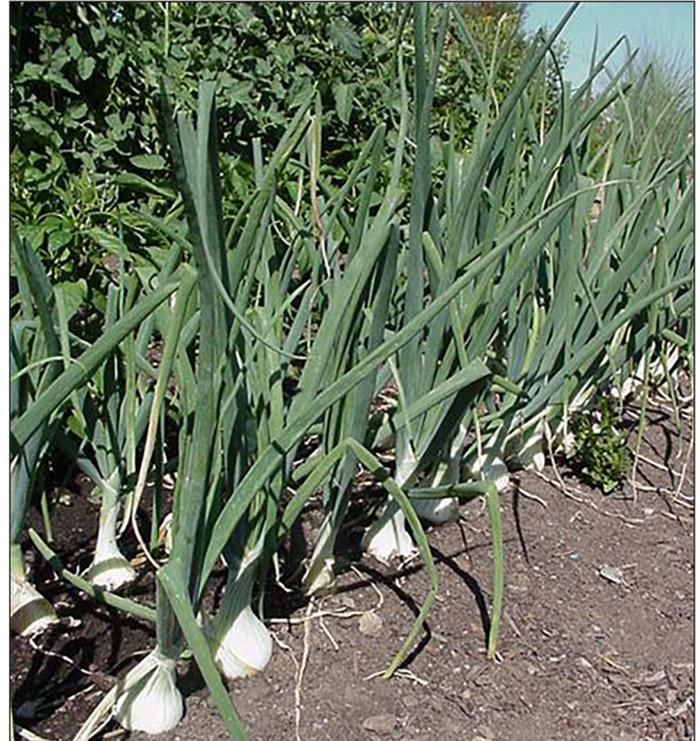
Market Outlook

Onions are among the most widely consumed vegetable crops in the U.S. Onion use increased during the 1990s because of greater sweet onion production. According to the USDA, fresh onion use averaged 21 pounds per person from 2004 to 2008. Fresh onion usage declined to 18.5 pounds from 2013 to 2015, likely reflecting lower supply from drought-stricken California. Kentucky producers and local markets reported solid demand for high-quality fresh onions, through the 2016 season.

Production considerations

Site selection and planting

A site located in full sun with well-



drained soil is essential for good onion production. Onions prefer a soil high in organic matter with a soil pH between 6.0 and 6.8.

Onions can be grown from seeds, sets or transplants. Most producers rely on either transplants or sets for commercial planting. An onion set is a small, dormant bulb that will produce a larger bulb once it is planted. Onion transplants are started from seed in a greenhouse or in ground beds approximately 12 weeks prior to planting in the field.



Green bunching onions are grown from sets planted by mid-March, while bulb onions are commonly started from transplants. Depending on plant spacing, 50,000 to 120,000 onions are planted

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per acre. Because onions have poorly developed root systems, plants will require supplemental moisture via irrigation. Critical periods for irrigation are transplant establishment and bulb expansion.

Cultivars

Onion cultivars are classified as either long-day, short-day, or intermediate-day types, depending on the day length required to initiate bulb formation. Intermediate types perform well at Kentucky's latitude.

Bulbs vary in color (red, yellow, and white), shape (round or flattened), and flavor (sweet or pungent). Many fresh market consumers are looking for sweet onions similar to the popular Vidalia onions. The short-day varieties that are often grown in the Vidalia region of Georgia are not suitable for production in Kentucky, as they will bulb prematurely in the spring. However, other sweet, mild varieties bred specifically for fresh consumption can be grown in Kentucky. The right combination of cultivar and environment is important in production of these mild onions. Lower amounts of sulfur in the soil tend to produce milder onions than those grown in soils with high sulfur content. Pungent cultivars generally store better than sweet types.

Pest Management

Disease problems include bulb and neck rots, leaf blast, and purple leaf blotch. Onion maggot and thrips are the main insect pests of onions. Growing resistant varieties, rotating crops, and following good cultural practices can help reduce the severity of these disease and insect problems; however, pesticide sprays may be needed in most years. Regular scouting of fields can help determine when and how often pesticides should be applied.

Season-long weed management is essential because onions do not compete well with other vegetation and will not shade out the competition. Avoid planting onion into fields where noxious perennial weeds have a history of being difficult to control. Be sure the selected field is well prepared and weed-free prior to planting. Some annual and perennial weeds can be managed with herbicides. Because onions have shallow root systems, cultivation is best used for weed management prior to bulb formation; once bulbing begins, hand weeding may be necessary. Some growers are transplanting onto raised beds covered

with black plastic mulch to help manage weeds and are having success with this production method.

Harvest and Storage

Green onions are pulled and put into bunches when they are $\frac{1}{2}$ to 1 inch in diameter.

Bulb onions are harvested when 70% of the plant tops have fallen. These onions are undercut, hand-pulled, and placed in windrows for field drying if weather permits. If rainy weather is a problem, onions are pulled after the tops have dried down, tops and roots are clipped off, and then bulbs are placed in shallow trays inside for drying. Onions are cured at high temperatures prior to storing in a well-ventilated area. Larger farming operations may place harvested bulbs in large bins to undergo forced-air curing for one to three days.

Labor requirements

Onion planting and harvest are labor-intensive, and hired labor is usually necessary, even with machine planting and harvest. Rutgers Cooperative Extension estimates labor needs of approximately 180 hours per acre for planting, harvest and packing of organically grown yellow onions. Penn State University estimates hired harvest labor of one hour per 7.5 bags of conventionally grown dry onions.

Economic considerations

The cost of sets or transplants, plus the cost of specialized planting equipment or hired labor for planting, results in potentially higher pre-harvest variable costs per acre for onions compared to many other vegetable crops. Other significant production costs for larger-scale onion production include plastic mulch, drip tape, plant protection products and harvest labor. Additional costs include land preparation and the installation of an irrigation system.

Variable production costs (2016) for 1,300 50-pound bags of dry onions (drip irrigated) were estimated at \$4,200 per acre, with harvest and marketing costs of \$4,550 per acre. Total costs per acre, including fixed costs, were estimated at \$9,380. Gross returns were estimated at \$8 per 50 pounds, based on 2016 wholesale prices, resulting in a \$1,020 return to land, capital and management. Total per acre costs are similar for large-scale green onion production, according to Clemson University production budget

estimates. Regions where large-scale dry onion production is established will have substantially lower production and harvest costs, based on university estimates from the Southeast and Pacific Northwest. Costs and returns will vary significantly depending on market price, production and management practices.

Selected Resources

- Vegetable Production Guide for Commercial Growers ID-36 (University of Kentucky) <http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Onion Production (Penn State University) <http://extension.psu.edu/business/ag-alternatives/horticulture/vegetables/onion-production>
- National Onion Association <http://www.onions-usa.org>
- Onions (Agricultural Marketing Resource Center, 2015) <http://www.agmrc.org/commodities-products/vegetables/onions/>

- Onion Production Guide, B-1198-2 (University of Georgia, 2008, Reviewed 2014) <http://extension.uga.edu/publications/detail.cfm?number=B1198-2>
- Green Onion Estimated Costs and Returns (Clemson, 2016) <http://www.clemson.edu/extension/agribusiness/files/enterprise-budgets/greenonions-irr.pdf>
- Organic Allium Production (ATTRA, 2006) <http://attra.ncat.org/attra-pub/summaries/summary.php?pub=25>
- Weed Control in Bulb Crops (Onion, Leek, Garlic, Shallot) (University of Florida, 2016) <http://edis.ifas.ufl.edu/wg033>

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