Winter Squash
Cheryl Kaiser¹ and Matt Ernst²

Introduction
Winter squash is a taxonomically diverse group of vegetables in the Cucurbita genus. Cultivars may belong to one of several species: *Cucurbita pepo* (acorn and spaghetti squashes), *C. maxima* (hubbard, buttercup, and kabocha), *C. moschata* (butternut), and *C. mixta* (cushaw). Because these squash are harvested when mature and rinds have hardened, most types can be stored for use during the winter.

Marketing
Fresh market options for Kentucky-grown winter squash include wholesale markets, restaurants, farmers markets, community supported agriculture (CSA) subscriptions, produce auctions, and roadside stands. Local grocery retailers are another option. In retail markets, point-of-purchase materials such as recipes and other preparation tips are effective marketing aids for increasing winter squash sales. Winter squash can be stored throughout the winter to extend the marketing season if humidity is maintained around 50-70% and temperature around 50° F.

Market Outlook
Although winter squash does not move in the same volume as summer varieties, quantities of winter squash demanded have been strong as more people diversify their diets. A greater use of winter squash for decorative purposes has also increased demand. The key to maintaining farm profitability for winter squash in Kentucky may be storing the squash in cold storage and arranging off-season sales when prices are higher.

Production considerations

Cultivar selection
Winter squashes differ greatly in shape, coloration, size, skin texture, and flavor. Flesh can vary in consistency from smooth to fibrous to stringy. Because of the great diversity among squash types, it is important to select those with the qualities in demand by the intended market. Once that is determined, growers should select well-adapted cultivars and look for disease and pest resistance, if available.

Site selection and planting
Winter squash produces best on well-drained soil where 10 to 12

¹Cheryl Kaiser is a former Extension Associate with the Center for Crop Diversification.
²Matt Ernst is an independent contractor with the Department of Agricultural Economics.
Tons of well-rotted manure have been applied per acre. To help avoid some soil-borne disease problems, select fields where tobacco, pepper, or tomatoes, as well as other cucurbit crops, have not been grown for at least three years. Winter squash performs well using black plastic on raised beds with trickle irrigation.

Squash is a warm-season crop that should not be planted in the field until all danger of frost has passed. The planting date should be based on the cultivar’s number of days to harvest and the desired harvest date. Winter squash that matures during cooler weather has a higher sugar content and the crop stores better. Honeybees are necessary for pollination and are essential for obtaining high yields of good quality fruit. If bees are not abundant at flowering time, hives should be placed next to the field, with at least one hive per acre.

**Pest management**
Potential disease problems include black rot, downy mildew, Phytophthora blight, powdery mildew, yellow vine, and viruses. A good fungicide spray program is critical to produce quality fruit. Cucumber beetles, squash vine borer, spider mites, and squash bugs can become serious pests if not controlled. Using insect traps or scouting to monitor populations can help the grower determine when and how often insecticides should be applied. Special precautions should be taken with insecticide treatments during bloom to avoid damaging bee populations.

**Harvest and storage**
Winter squash is harvested when the fruit is fully mature. Rinds should be tough and not easily punctured with a fingernail. A curing period helps to rapidly heal squash harvest injuries and increase sugar content, but will take place without an elevated temperature treatment. Curing is not recommended for acorn squash. Winter squash are often placed in cold storage; however, once removed from storage, they should be marketed immediately.

**Labor requirements**
Labor needs per acre for trickle-irrigated winter squash are approximately 40 hours for production and 80 hours for harvest. An additional 8 to 10 hours may be needed for black plastic disposal.

**Economic considerations**
Initial investments include land preparation and the purchase of seed or transplants. Additional start-up costs can include the installation of an irrigation system and black plastic mulch.

Production costs for trickle-irrigated winter squash are estimated at $1,125 per acre, with harvest and marketing costs at $1,855 per acre. Fixed and variable costs can total more than $3,300. Since net returns vary depending on actual yields and market prices, the following per acre returns to land and management estimates are based on three different scenarios. Conservative estimates represent the University of Kentucky’s 2013 statewide average cost and return estimates.

<table>
<thead>
<tr>
<th>Pessimistic</th>
<th>Conservative</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>$68</td>
<td>$695</td>
<td>$1,490</td>
</tr>
</tbody>
</table>

**Selected Resources**
- Vegetable and Melon Budgets (University of Kentucky, 2013) [http://www.uky.edu/Ag/CCD/vegbudgets13.html](http://www.uky.edu/Ag/CCD/vegbudgets13.html)
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky) [http://www.ca.uky.edu/age/pubs/id/id36/id36.htm](http://www.ca.uky.edu/age/pubs/id/id36/id36.htm)