

Watermelon

Dr. Shubin Saha¹ and Matt Ernst²

Introduction

Watermelon (*Citrullus lanatus*) is a warm-season crop in the Cucurbit family. Watermelons are grown in various areas across the state, including: Casey County, Lincoln County, Hart County, Allen County, and Daviess County. Watermelon is the second-largest fresh market vegetable produced in the state, with 1,116 acres, and accounts for 16% of the total fresh market vegetable acreage.¹

Marketing and Market Outlook

Kentucky fresh market seeded and seedless watermelons are sold at produce auctions and farmers markets throughout the state. Other marketing options include roadside and on-farm stands, local retailers, food services, and wholesale markets. Some production has occurred for large wholesale (semi-trailer load) shipments from Kentucky. There is also potential for increased growth, particularly in central and western Kentucky with the proximity to the large industry in southern Indiana.

Seedless watermelons have become more popular with U.S. consumers in recent years. In fact, the majority of the acreage now is seedless watermelon. This has resulted in melon consumption levels nearing 15 pounds per person in 2012, the highest level since 1996. Consumers are attracted



SOME WATERMELON VARIETIES HAVE A UNIQUE RIND PATTERN.

to seedless melons, as well as the high levels of lycopene present in watermelon. Current consumer trends call for pre-cut melon quarters and halves, smaller-sized “icebox” melons, uniquely colored melon varieties (such as yellow-fleshed watermelons or those with a unique rind pattern), and “personal-sized” icebox, seedless watermelons.

Production considerations

Cultivar selection

Watermelon cultivars differ in such horticultural traits as fruit shape (round to oblong), rind pattern (crimson type, jubilee type, allsweet type, black/dark green), fruit size (35 pounds to 7 pounds), and flesh color (red, dark red, pink, orange, yellow, and white). Varieties may be classified as open-pollinated, F1 hybrid, or triploid (seedless) depending on



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how they were developed. When farmers started growing seedless varieties, about one third of the plants in the field had to be seeded watermelons to provide adequate pollination or there would be no fruit production. As the demand for seeded melons has decreased significantly, farmers now often use a non-harvestable pollenizer variety. These varieties are smaller and compete less with the seedless varieties to maximize production over a given acre. The pollenizer variety is interplanted with the seedless varieties generally at a ratio of 1:3. Disease resistance to Fusarium wilt is available in some cultivars. Growers should select only adapted varieties that have the qualities in demand for the intended market.

Site selection and planting

Watermelon should not follow watermelon, other cucurbits (such as cucumber, squash, or pumpkin), tomatoes or peppers for at least four years. This crop grows best in sandy or sandy loam soils. Watermelons grown on extremely heavy, poorly drained soils tend to be irregular in shape and may contain less sugar.

In the past, when seeded melons predominated, direct-seeding was the most common way of planting watermelons. Seed should not be planted until the soil temperature has warmed up sufficiently to promote rapid germination. Another method is to set transplants that have been started from seed in a greenhouse. This method must be used for seedless watermelons due to their high seed costs and exacting germination requirements. Direct-seeding seedless watermelon generally results in extremely poor

stands. Transplants should be planted in the field about 4-6 weeks post-seeding, depending on conditions. Additionally, transplants should be given some time outside of the greenhouse to allow for hardening off. Transplanted melons generally mature 10 days to 2 weeks earlier than direct-seeded crops.



ABOVE: EXAMPLES OF VARIOUS FLESH COLORS.
BELOW: "PERSONAL-SIZED" WATERMELON.



Black plastic mulch in raised beds with drip irrigation has been used successfully with watermelons. Advantages of plastic mulch include: soils warm up faster, soil moisture is retained, nutrient leaching is prevented, and weeds are controlled. Planting in raised beds encourages earlier maturity and improves soil drainage. A hand corn planter can be used for planting seed through the plastic, while a bulb setter or waterwheel setter may be used effectively for transplanting. Trickle irrigation increases fruit quality and quantity. In addition, fertilizer can be injected through the

irrigation system at more appropriate times during the season.

Wild bees will help provide pollination; however, beehives should be used to ensure good pollination in commercial plantings. One strong hive per 2 acres is generally considered adequate. There has also been some increased use of domesticated bumble bee hives that can be purchased from various suppliers.

Pest management

Gummy stem blight had been the most widespread and serious disease of watermelon in Kentucky. Although it is still important, over the last 5 years there has been an increase in anthracnose to levels often higher than gummy

stem blight. Other diseases that can result in crop losses include *Phytophthora* fruit rot, *Fusarium* wilt, *Alternaria* leaf spot, *Cercospora* leaf spot, and yellow vine decline. Some disease resistance is available in certain cultivars. Good spray coverage with appropriate fungicides/bactericides is essential. MELCAST disease forecasting system can help with optimizing timing of fungicide applications for management of gummy stem blight, anthracnose, and *Alternaria* leaf spot. In some seasons, that can result in a reduction of two or three fungicide applications in a given season.² Watermelon insect pests include aphids, cucumber beetles, and two-spotted spider mites. Weekly scouting is recommended for early detection and best management of insect and mite pests. As with all vegetables, weeds can be a serious problem in commercial fields. Black plastic mulch usually works well to remove weed pressure from within rows, and selective herbicides or cultivation can be used in row middles.

Harvest and storage

Watermelons are hand-harvested when fully ripe. “Thumping” the fruit is not a reliable indicator of fruit maturity. The presence of a dead tendril at the point where the fruit attaches to the vine helps in determining when to harvest watermelons. Along with the dead tendril, checking for the change in color on the belly or ground spot of the watermelon is the best way to check for maturity. However, because this color varies among cultivars, growers must become familiar with the varieties grown to determine the best stage of harvest. In atypically cool summers as in 2013 and 2014, the ripening process becomes extremely slow. Melons should be handled gently to avoid bruising. Cooling harvested fruit removes field heat and prolongs shelf life. Watermelons may be stored for 3 to 4 weeks at the proper temperature and relative humidity. As watermelons are sensitive to ethylene, avoid storing with produce that generates ethylene, such as apples or tomatoes.

Labor requirements

Per acre labor needs for trickle irrigated



THE VARIETY HARVEST MOON FEATURES A DARK RIND.

watermelon are approximately 20 hours for production, 60 hours for harvest, and 10 hours for grading. An additional 10 hours per acre is needed for plastic removal following harvest.

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 watermelon are estimated at \$1,225 (seeded) and \$1,665 (seedless) per acre, with harvest and marketing costs at \$1,452 (seeded) and \$1,560 (seedless) per acre. Total costs per acre, including fixed costs, are approximately \$3,105 (seeded) and \$3,660 (seedless).

Since 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 statewide average cost and return estimates for 2013.

SEEDED WATERMELONS

Pessimistic	Conservative	Optimistic
\$(515) *	\$445	\$1,105

SEEDLESS WATERMELONS

Pessimistic	Conservative	Optimistic
\$(227) *	\$961	\$1,589

* Parenthesis indicate a negative number; i.e. a net loss

Selected Resources

- IPM Scouting Guide for Common Problems of Cucurbit Crops in Kentucky, ID-91 (University of Kentucky, 2009) <http://www.ca.uky.edu/agc/pubs/id/id91/id91.pdf>
- Vegetable and Melon Budgets (University of Kentucky, 2013) <http://www.uky.edu/Ag/CCD/vegbudgets13.html>
- Commodity Highlight: Watermelon (USDA, 2012) <http://www.ers.usda.gov/media/826893/fts352.pdf#page=39>
- Clemson University – Seedless Watermelon Production Budget <http://www.clemson.edu/extension/aes/budgets/files/watermelons-plasticirr.pdf>
<http://www.clemson.edu/extension/aes/budgets/index.html>
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky) <http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

- Commercial Watermelon Production, Bulletin 996 (University of Georgia, 2000) http://www.agmrc.org/media/cms/B996_B3D54FD90A36C.pdf
- High Tunnel Melon and Watermelon Production (University of Missouri, 2006) <http://extension.missouri.edu/publications/DisplayPub.aspx?P=M173>
- Watermelon (Agricultural Marketing Resource Center, 2009) http://www.agmrc.org/commodities__products/vegetables/watermelon.cfm

¹United States Department of Agriculture, 2013. National Agricultural Statistics Service. 2012 Census. Retrieved October 16, 2014, from http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/Kentucky/st21_1_065_065.pdf

²Egel, D. and R. Latin, 2012. *Vegetable Diseases: Foliar Disease Control Using MELCAST* (BP-67W). West Lafayette: Purdue University College of Agriculture. Retrieved October 16, 2014, from <https://www.extension.purdue.edu/extmedia/BP/BP-67-W.pdf>

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