



# Watermelon

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## Introduction

Watermelon (*Citrullus lanatus*) is a warm-season crop in the Cucurbit family. Watermelons are grown across the state, including larger areas in Casey County, Lincoln County, Hart County, Allen County and Daviess County. Kentucky farms annually harvest more than 1,000 watermelon acres, the Commonwealth's second largest fresh market vegetable by area.

## 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, community supported agriculture, local retailers, food services, and wholesale markets. More wholesale (semi-trailer load) watermelon shipments from Kentucky helped increase harvested area by nearly 500 acres between 2007 and 2012. Potential for more large-scale production remains, particularly in areas of Kentucky near the large melon industry in southern Indiana.

Watermelon use in the U.S. exceeded 16 pounds per person in 2016, the highest recorded consumption. Increasing yields per acre, and higher volumes of imported watermelons account for the increase. The majority of U.S. watermelon is now planted in seedless varieties. Watermelon volumes are influenced by the fresh cut industry and rise in "grab-and-go" items. Current consumer trends call for increased pre-cut melon quarters and halves, uniquely colored melon varieties (such as yellow-fleshed watermelons or those with a unique rind pattern), and "personal-sized" icebox, seedless watermelons. Fresh cut processors are developing new packaging op-



tions, including bags for melon quarters, to increase consumer convenience and reduce waste for retailers.

## 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 (7 to 35 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 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 pro-



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duction over a given acre. The pollinizer 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.

Direct seeding was the most common way of planting seeded 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 results in extremely poor stands. Transplants should be given several days outside of the greenhouse to allow for hardening off before transplanting, which is about four to six weeks post-seeding, depending on conditions. Transplanted melons generally mature 10 days to two weeks earlier than direct-seeded crops.

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 reduced, and weeds are better controlled. Planting in raised beds encourages earlier maturity and improves soil



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



SOME WATERMELON VARIETIES HAVE A UNIQUE RIND PATTERN.

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 can be used to inject fertilizer and will result in increased fruit size and number.

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 bumblebee 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 five 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. The 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.<sup>1</sup>

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 reduce 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 and often indicates over-maturity. The presence of a dead tendril at the point where the fruit attaches to the vine helps in determining when to harvest seeded watermelons, but this does not apply to seedless watermelons. A primary criterion is checking for the change in color on the belly or ground spot of the watermelon; this 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 three to four 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 watermelon are approximately 30 hours for production and 80 to 120 hours for harvest and field grading. An additional 10 hours per acre may be needed for plastic removal following harvest. Harvest labor times are influenced by yield as well as the type of equipment used to assist melon harvest and postharvest operations.

### 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 in 2017 were estimated at \$1,505 (seeded) and \$1,990



THE VARIETY HARVEST MOON FEATURES A DARK RIND.

(seedless) per acre, with harvest and marketing costs at \$2,785 (seeded) and \$3,280 (seedless) per acre. Total costs per acre, including fixed costs, are approximately \$4,825 (seeded) and \$5,840 (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 an average cost and return estimate for 2017.

#### SEEDED WATERMELONS

Pessimistic	Conservative	Optimistic
\$(485) *	\$349	\$1,209

#### SEEDLESS WATERMELONS

Pessimistic	Conservative	Optimistic
\$(161) *	\$1,642	\$2,449

\* Parenthesis indicate a negative number, i.e. a net loss

Well-managed watermelons can be profitable when grown on smaller areas and marketed direct to consumers. A Kentucky budget estimate developed for the 2017 season using small-scale assumptions for 700 row feet indicated positive returns to land and management are likely when melons were sold at \$5 per seedless melon and \$4 per seeded melon. The estimated 2017 return for this system was \$357 for seeded and \$766 for seedless watermelons.

<sup>1</sup>Egel, 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>

### 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, 2017)

<http://www.uky.edu/ccd/tools/budgets>

- Mississippi State University 2018 Vegetable Planning Budgets <http://agecon.msstate.edu/whatwedo/budgets/docs/18/MSUVeg18.pdf>
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky) <http://www2.ca.uky.edu/agc/pubs/id/id36/id36.pdf>
- Commercial Watermelon Production, Bulletin 996 (University of Georgia, 2017) [https://secure.caes.uga.edu/extension/publications/files/pdf/B%20996\\_4.PDF](https://secure.caes.uga.edu/extension/publications/files/pdf/B%20996_4.PDF)

- High Tunnel Melon and Watermelon Production (University of Missouri, 2006) <http://extension.missouri.edu/publications/DisplayPub.aspx?P=M173>

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*Photos courtesy of Pixabay (Pg. 1), and Shubin Saha (Pgs. 2 & 3)*

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