

# Broccoli

Broccoli (*Brassica oleracea*) is a cool-season crop that performs poorly in hot weather. As a member of the crucifer family, broccoli is closely related to other cole crops, such as cabbage, cauliflower, and Brussels sprouts.

## Marketing

Fresh market wholesale options for Kentucky broccoli producers include produce auctions, local restaurants, groceries, and wholesalers. Retail markets include farmers markets, roadside stands, and community supported agriculture (CSA) shares. Kentucky's location and climate also present opportunities for wholesale organic broccoli production.

## Market Outlook

U.S. per capita consumption of broccoli increased nearly 50% during the 1990s. Processing use (freezing) of broccoli remained flat during this same time period. Fresh use, however, soared to a record high of 6.2 pounds per capita in 1999 before leveling off in 2001. Fresh broccoli use was about 5.5 pounds per capita during the mid-2000s and increased back toward the 6.0 pound per capita level in 2010. Freezing broccoli volume increased in the late 2000s to about 2.5 pounds per capita.

Higher fuel/transportation costs, especially for bulky crops like broccoli and potatoes, impacted most large western produce growers in the mid-2000s. Production alliances with northern,



southern and western growers have been explored by Kentucky producers with some focus on fall broccoli production. Producers interested in growing broccoli on a larger scale should carefully weigh marketing and production costs.

## Production Considerations

### *Cultivar selection*

Growers should consider head size, shape, and color, as well as yield, earliness, and disease resistance when selecting broccoli cultivars. Resistance is available for downy mildew, black rot, *Pseudomonas* bacterial head rot, club root, *Fusarium* yellows, and yellowing in storage. Some varieties are better suited for fall production than spring production. In many cases these fall varieties will have some level of resistance or tolerance to downy mildew and grow well as seedlings in the heat of the summer. Many seed catalogs will denote the cultivar's suitability for spring or fall production. Growers should only select adapted varieties that have the qualities in demand for the intended market.

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### *Site selection and planting*

Select a site that is well-drained; poorly drained soils should be avoided. Slightly rolling land is suitable. This crop will do well on ground that has been in tobacco. Fescue sod ground also works well if the sod is plowed under early in the fall and allowed to decompose.

The ground for spring broccoli should be plowed in the fall in order to have a crop ready for early sales. Avoid planting spring broccoli too late as it can bolt (flower prematurely) before forming a complete head. Broccoli can be direct-seeded; however, use transplants for an early market. A minimum of 11,000 plants will be needed for each acre. Set transplants in the field by the middle of April for a spring crop. Broccoli also does well as a fall crop and should be transplanted by mid-August.

Tobacco setters can be used for transplanting. Care should be taken to choose the appropriate spacing for broccoli production. Extra wide plant spacing can lead to much larger heads, while tighter spacing of plants will lead to smaller heads. Typically, wholesale markets will require a smaller head than direct retail sales. Be sure to determine what size head your market requires to help determine plant density.

Broccoli responds well to plastic mulch and drip irrigation. If using plastic mulch for a fall crop, growers may want to choose a white plastic instead of black. This can result in less transplant shock; black plastic can generate excessive heat during late summer. Irrigation is critical for establishing the fall crop.

### *Pest management*

Insect pests can be a major problem in broccoli production, especially in summer plantings for fall harvest. Damage to transplants and older plants can result from cutworms, imported cabbage worm, cabbage looper, diamondback moth larvae, and cross-striped cabbage worm. Marketability is reduced when insects feed on

heads or wrapper leaves. Early detection is critical for controlling these pests. Scouting to monitor populations can help growers determine when and how often pesticides should be applied. Bt is a microbial insecticide that can be used effectively against most types of broccoli pests. A number of Bt products can be used in organic production.

Several plant diseases (black rot, blackleg, and downy mildew) can also result in yield losses. A good crop rotation program and the use of certified disease-free resistant varieties will help in the prevention of many of these diseases. Fungicide/bactericide sprays may also be necessary.

### *Harvest and storage*

Central heads and later-maturing lateral heads are cut by hand before the yellow petals appear. Cut the heads with 6 to 8 inches of stem attached. Heads need to be cooled immediately after harvest. Broccoli is sold to the wholesale fresh market in waxed cartons holding 14 bunches with two to three heads to the bunch. Top ice may also be required for wholesale markets.

### *Labor requirements*

Labor needs are approximately 14 hours per acre for production, 90 hours per acre for harvest, and 45 hours per acre for packing. Plasticulture will add 8 to 10 hours more per acre, mostly for the removal of the plastic.

## **Economic Considerations**

Initial investments include land preparation and the purchase of seed or production of transplants. An additional start-up cost can include the installation of an irrigation system and plastic mulch.

Production costs are estimated at \$1,385 per acre, with harvest and marketing costs at \$1,383 per acre. Since returns vary depending on actual yields and market prices, the following per acre returns to land and management are based on three different economic scenarios. Conservative

estimates represent the University of Kentucky's average statewide cost and return estimates for 2010. Figures are for trickle irrigated broccoli.

PESSIMISTIC	CONSERVATIVE	OPTIMISTIC
\$(235)*	\$275	\$865

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

### Selected Resources

- Bt Basics for Vegetable Integrated Pest Management, ID-156 (University of Kentucky, 2005)  
<http://www.ca.uky.edu/agc/pubs/id/id156/id156.pdf>

- Growers' Guide to Bt, ID-156A (University of Kentucky, 2005)  
<http://www.ca.uky.edu/agc/pubs/id/id156a/id156a.pdf>
- Vegetable and Melon Budgets (University of Kentucky, 2008)  
<http://www.uky.edu/Ag/cdbrec/vegbudgets08.html>
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky)  
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Broccoli: Commercial Vegetable Production, Circular 764 (University of Georgia, 2010)  
[http://www.caes.uga.edu/Publications/displayHTML.cfm?pk\\_id=6370](http://www.caes.uga.edu/Publications/displayHTML.cfm?pk_id=6370)
- Cole Crops and Other Brassicas: Organic Production (ATTRA, 2006)  
<http://attra.ncat.org/attra-pub/cole.html>

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For additional information, contact your local [County Extension](#) agent