

Leafy Greens

Introduction

“Leafy greens” or “greens” are broad terms used for a number of vegetable crops with edible leaves. Plants in this group belong to several unrelated taxonomic plant families that include Brassicaceae, Chenopodiaceae, and Asteraceae. Greens are cool-season crops that are planted in early spring or late summer/fall in Kentucky. High tunnels and similar structures can be used to extend the season into winter; however, extreme summer temperatures make year-round production in Kentucky a challenge.

Marketing

Fresh market options for Kentucky greens producers include wholesale marketing through produce auctions, as well as sales to restaurants and local retailers. Direct retail markets include farmers markets and roadside stands. Bagged leaf lettuce mixes (sometimes called “mesclun mix”) are popular farmers market sales items. Local and regional marketing opportunities may be available for bagged salad and greens mixes, especially if they are certified organically grown. Leafy greens are also a popular item in Community Supported Agriculture (CSA) shares.

Market Outlook

Leafy greens or salad greens are consumed daily by most Americans. The popularity of salad bars and bagged salad greens has increased the demand for these products.

The per capita use of romaine lettuce alone tripled in the 1990s before increasing from 8.4 pounds per capita in 2000



to an estimated 11.2 pounds in 2010. During this same period, head lettuce use declined. Nearly all types of greens can be grown profitably in Kentucky and most have a potential for further expansion here.

The high cost of shipping lettuce from the west coast may at some point create a greater demand for “east coast” lettuce, such as romaine. Growers willing to adapt their production methods to suit companies that are looking for spring and fall eastern-grown romaine may be able to tap into this growing market. To do so, they must be able to compete on a delivered price and quality level. Volume production plus post-harvest cooling and handling issues would have to be addressed to succeed in this market.

Production Considerations

Crop and variety selection

Leafy greens that have been grown in Kentucky include the following, grouped by plant family:

- CRUCIFER OR MUSTARD FAMILY (BRASSICACEAE)
Arugula, broccoli raab, collards, kale (including flowering kale and Chinese kale), mustard greens, and turnip greens

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- GOOSEFOOT FAMILY (CHENOPODIACEAE) Beet greens, spinach (flat leaf and savoy), and Swiss chard
- SUNFLOWER OR ASTER FAMILY (ASTERACEAE) Bibb (Boston), iceberg, leaf, and romaine (cos) lettuce; chicory; dandelion; endive; escarole; and radicchio

There are numerous cultivars to choose from, depending on the type of greens and market. Varieties can differ in leaf size, texture, and color, as well as earliness (very early, early, mid- and late season). The head types of lettuce cultivars include solid head, loose head, or loose leaf. Resistance/tolerance to such diseases and physiological problems as bolting, downy mildew, heat, lettuce mosaic virus, *Rhizoctonia* bottom rot, *Sclerotinia* drop, and/or tip burn is available in some selections.

Varieties suitable for processing may not be suitable for selling to local fresh retail markets or other wholesale markets. For example, the head size required for processed romaine lettuce is too large for farmers market sales. Other varietal characteristics, such as color and earliness, should be considered for these other markets. Commercial growers should only select locally adapted varieties that have the qualities in demand for the intended market.

Site selection and planting

Soils should be well-drained and rich in organic matter. Lettuce is very sensitive to herbicides, such as triazines, and should not be planted where carryover could be a problem. Irrigation is necessary to provide continuous moisture for maximum yields and quality.

Traditionally, greens have been grown as row crops with wide spacing. Today Kentucky growers are planting at higher densities using raised beds with multiple rows per bed. This system, along with plastic mulch and drip irrigation, has proved to be very productive for many crops in this group. Black plastic mulch

is used for spring plantings while white mulch can be used for late summer plantings. Greens can also be grown on raised beds without plastic; however, weed control with hand/mechanical cultivation or herbicides becomes critical.

Bed shaping machines commonly used in Kentucky will form a 6-inch-high raised bed 30 to 32 inches wide at the top with 5 to 6 feet between centers of the beds. Depending on the crop and between-row spacing, two to three rows can be used per bed. Companies contracting for wholesale quantities of romaine lettuce can require beds that are 3 to 4 feet wide with three to four rows per bed. This tight spacing gives the crop a desirable shape and density per acre.

Growers in the northeast make wider and lower beds on bare ground using a meeker harrow or roller. They plant four to six rows of greens per bed depending on the crop. This system relies heavily on the use of herbicides and overhead irrigation. Similar systems are used in California, but with drip irrigation.

Greens can be direct-seeded into either bare ground or plastic mulch. Pelleted seed is normally used for direct-seeding with a simple "Planter Junior" type seeder or vacuum seeder. Most Kentucky growers, however, use transplants that are set by hand or with a waterwheel setter onto raised beds with plastic mulch. The number of rows can be increased to three or four per bed by making a special wheel for the waterwheel setter. Transplants are seeded into cell plug trays in the greenhouse 4 to 6 weeks prior to going to the field. Transplanting has the advantage of resulting in an earlier crop than direct-seeding, as well as a more accurate plant spacing and final plant population. In addition, transplants are less exposed to insect damage, drought, or other early season stresses. Competition from weeds is also reduced.

Some Kentucky growers have also produced leafy greens in tobacco float beds in the same way

that tobacco transplants are grown. High quality Bibb lettuce and other greens can be produced in traditional greenhouses using a hydroponic production system.

Pest management

Greens are susceptible to a number of foliar diseases that can reduce the quality and marketability of leaves. These include downy mildew, powdery mildew, and various fungal leaf spots. Most greens are susceptible to bolting (premature flower stalk production) during persistently hot weather and long days. Bolting is one of the main reasons it is very difficult to grow commercial quantities of head lettuce in Kentucky. Other types of lettuce, such as romaine, are more heat tolerant. Tip burn, an abiotic disorder generally related to nutritional problems, can also affect greens.

Potential insect problems include cutworms, wireworms, aphids, flea beetles, leafminers, leafhoppers, and white flies. Scouting to monitor populations can help the grower determine when and how often insecticides should be applied.

Harvest and storage

Greens can be harvested as whole plants (once over harvest) or as individual leaves (multiple harvests). Fresh market leafy greens are hand-harvested. Greens have a high respiration rate and should be washed, packed, and sold as quickly as possible. They can be field packed and top-iced in waxed corrugated cardboard boxes or wooden crates.

Turnip, mustard, collards and kale are harvested when the stalks are fairly young and tender. Rubber bands can be used to bunch three to five stalks together, but larger wholesale buyers may require labels or bands with price-look-up (PLU) codes. Spinach is harvestable as soon as the leaves are an edible size. Lettuce and spinach are often packed in cello bags. Endive and escarole must be harvested before a strong bitter taste and toughness develops that makes them unmarketable.

Labor requirements

Labor needed to produce a crop of green leafy vegetables will vary based on two factors: weed control techniques and harvest yield. Most budgets show labor needs of approximately 22 hours for field preparation, planting, and crop care. If herbicides or black plastic are not used for weed control then up to 80 hours of weeding labor may be required in addition to the 22 hours of production labor mentioned previously. Harvest and packing rates go from a low of five boxes per hour for bundled greens to 13 boxes per hour for intensive head lettuce production. Most budgets for greens have harvest labor of approximately 80 hours per acre with some higher yielding crops requiring up to 95 hours of harvest labor.

Economic Considerations:

Initial investments for start-up may include specialized bed shapers, precision planters, bed cultivators, and/or plastic laying and transplanting equipment. In addition, an irrigation system and post-harvest washing/cooling equipment may be required to produce quality products.

Leafy greens cover a wide variety of crops from head lettuce to mustard greens. Production techniques vary in intensity from bare ground cultivation in single rows to multi-row, irrigated, densely planted raised beds. Season-extension in greenhouses and high tunnels is also a possibility for this crop.

Crop values can vary from \$2,800 per acre for greens (mustard, turnip, and collard) planted into single rows on bare ground to more than \$7,000 per acre for intensive head lettuce production. Production expenses rise with more intensive production techniques. Per acre breakeven estimates in 2010 ranged from \$6.50 to \$7.00 per box of collard greens, based on four hundred 18- to 20-pound boxes of collard greens produced per acre. For spring greens, breakeven estimates per acre for 2010 ranged from \$5.50 to \$7.00 per box of 48 bunches (there are usually six plants in a bunch). Breakeven prices for producers

growing greens on a smaller scale are typically higher than these per acre estimates.

Growers considering volume production of greens for wholesale markets need to address the post-harvest cooling and handling requirements for the crop, as well as the production needs.

Selected Resources

- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky)
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Commodity Highlight: Romaine Lettuce (Economic Research Service, USDA, 2005)
<http://www.ers.usda.gov/publications/vgs/feb05/vgs307.pdf#page=24>
- Collards–Irrigated (Hand Harvest) Enterprise Budget (Clemson University, 2009)
<http://cherokee.agecon.clemson.edu/collards6.pdf>
- Commercial Production and Management of Cabbage and Leafy Greens, B-1181 (University of Georgia, 2009)
http://www.caes.uga.edu/Publications/displayHTML.cfm?pk_id=6280
- Commodity Highlight: Leafy Greens: Foundation of the Vegetable Industry (Economic Research Service, USDA, 1998)
<http://www.ers.usda.gov/publications/agoutlook/jan1998/ao248b.pdf>
- Common Diseases of Leafy Greens (Alabama Cooperative Extension, 2000)
<http://www.aces.edu/pubs/docs/A/ANR-1189/>
- Greens–Spring (Hand Harvest)–Irrigated Enterprise Budget (Clemson University, 2009)
<http://cherokee.agecon.clemson.edu/greens6.pdf>