

Organic Sweet Corn

Introduction

Organic sweet corn (*Zea mays*) is produced using pest management and fertilization methods that do not include synthetic compounds. Because organic crop production standards are regulated by the National Organic Program (NOP), growers producing and selling sweet corn labeled “organic” must be certified by a USDA-approved state or private agency. While there are benefits to using the Kentucky Department of Agriculture (KDA) for the certification process, Kentucky residents can be certified by any approved agency operating in the Commonwealth.

Marketing

Identifying markets for organic produce often requires more time and effort than locating markets for conventionally produced crops. Potential markets for fresh organic sweet corn include roadside stands, farmers markets, cooperatives, community supported agriculture (CSA) subscriptions, local grocery stores, produce wholesalers, and produce auctions. Restaurants, health food stores, and locally owned grocers may also be interested in Kentucky-grown organic products.

Market Outlook

Although sweet corn is generally not considered a high profit crop, it is in high demand and is often used to draw consumers to a roadside stand, farmers market, or other retail outlet. CSA subscribers generally expect sweet corn to be among



the offerings. High consumer demand for organic products has made organic crop production one of the fastest growing segments of agriculture. Growing sweet corn organically adds value, typically bringing higher returns for the producer.

Production Considerations

Seed and variety selection

Organic sweet corn production begins with certified organic seed purchased from a reputable dealer. Only seed that has not been treated with synthetic chemicals can be used. Sweet corn cultivars are grouped according to the gene(s) controlling sugar content level: standard type, super sweet, sugar-enhanced, plus several others. Any of these may have white, yellow, or bicolor kernels. Select marketable cultivars with the disease and insect resistance qualities best suited for your situation.

Genetically modified (GMO) corn cultivars are not permitted in organic production. Growers will need to take steps to prevent pollen drift from GMO varieties that may be present in neighboring fields.

**Crop Diversification
& Biofuel Research
& Education Center**

Site selection and planting

Only land that has been free of prohibited substances (e.g. synthetic pesticides and artificial fertilizers) for 3 years can be certified for organic production. Selecting a growing site that is well-suited to the crop is especially important when utilizing organic methods. Healthy, fast growing plants are better able to tolerate or outgrow pest problems. Choosing appropriate varieties, plant densities, and planting dates are also critical to enhancing plant health.

Sweet corn will do well in all areas of Kentucky, but well-drained soils are essential for good results. While sweet corn is relatively drought-tolerant, yields are improved with irrigation. Sweet corn must have adequate moisture from silking through kernel fill for high quality ears. In most parts of Kentucky the earliest plantings are made between April 20 and May 1.

It will be necessary to isolate different cultivars of sweet corn from each other to avoid cross pollination. Reductions in sugar content can result when cultivars of varying sugar types are produced in close proximity. Similarly, all bicolor corn may result when white and yellow varieties cross-pollinate. Isolation of cultivars can be accomplished by physical separation or by making sure there is a minimum of 14 days difference in their maturities.

Fertility, tillage systems, and crop rotations

Healthy soil is the key to successful organic production. Sweet corn is a heavy feeder and requires good fertility for the production of quality ears. Nitrogen is particularly important for optimum sweet corn production.

Soil fertility can be enhanced by green manure, properly aged animal manure, and approved natural fertilizers. While cover crops of grasses will increase organic matter, nitrogen-fixing legumes have the additional benefit of adding nitrogen. A healthy legume cover crop planted prior to sweet corn can supply a large portion of the corn crop's nitrogen needs. Supplemental

organic nutrient sources include bloodmeal, fishmeal, cottonseed meal, and soybean meal.

Potential tillage/cropping systems for sweet corn include no-till, low-till, mulch till, living mulch, strip till, clean till, strip cropping, and intercropping. Growers who choose to use a conservation tillage method can kill the cover crop by mowing, undercutting, or rolling, instead of using herbicides. A living mulch between corn rows provides an alternative method for weed management and fertility. Strip cropping involves planting one or two additional crops in strips two to six rows wide in the same field as sweet corn. Intercropping corn with a vine crop (such as cucumbers) or greasy beans has proved successful for some commercial growers.

Crop rotation is a required practice in annual organic cropping systems and it is especially beneficial for soil "depleters," such as sweet corn. Well-planned rotations and soil-building cover crops are needed to replenish the soil between corn crops. Rotations have the additional benefits of improving plant health, disrupting plant pest cycles, and enhancing biodiversity. Sweet corn is often grown in a 3- to 7-year rotation with other vegetable crops, pasture, and/or small grains.

Pest management

Organic sweet corn production is generally very challenging in Kentucky due to the number of weed, disease, and insect problems that can reduce harvest quality and yields. Pest management in organic production emphasizes prevention through good production and cultural methods. The goal is not necessarily the complete elimination of a pest, but rather to manage pests and diseases to keep crop damage within acceptable economic levels. Frequent crop inspections are essential to keeping ahead of potential problems; monitoring pests requires accurate identification.

Corn earworm is one of the most destructive insects attacking sweet corn. Properly timed sprays with an organically approved insecticide,

such as Bt, is the most effective way to combat both this insect and the European corn borer. Baits of Bt with corn meal or bran with molasses may be effective for reducing cutworm damage. Other insect pests that can cause crop damage include armyworm, Japanese beetles, and flea beetles. Variety selection, adjusting planting dates, controlling nearby vegetation, beneficial insects, plowing under corn debris, and crop rotation are additional organically approved pest management strategies. Microbial pesticides and other organically acceptable pesticides are also available. Pheromone and/or black light traps are useful for monitoring pest populations.

Common disease problems include Stewart's wilt, leaf blights, rust, and viruses. Key disease management practices in an organic system include crop rotation and the use of resistant varieties.

Weeds present their own special challenge to organic growers. Crop rotations and cover crops help reduce weeds prior to planting. Soil solarization may be effective as a pre-plant weed control strategy, but it must be utilized the summer prior to planting the field to sweet corn. Strip-till, no-till, and living mulch systems provide alternatives to herbicide use during production. Cultivation, propane torches or flame weeders, and mowing are methods of reducing weed problems during the growing season.

Harvest and storage

Harvest equipment, storage areas, and packaging materials must comply with NOP standards. Growers with split operations (conventional and organic production on the same farm) must either use separate equipment and facilities for each production system or decontamination protocol must be followed before use in the organic end of the enterprise. Packaging materials must be protected against potential contamination from prohibited substances.

Sweet corn is either mechanically or hand-harvested at the milk stage. Corn is ready to

harvest when the ears have filled out so husks are tight and silks have turned brown. To maintain top quality, sweet corn should be picked in the cool of the morning and field heat removed promptly. Quickly cooling ears to as close to 32° F as possible prevents the sugars from changing into starch. Field heat is often removed by plunging ears into ice water. Transporting the ears any distance to market will necessitate the use of top ice.

Labor requirements

Organic systems are more labor intensive than conventional systems. This is largely a result of increased labor times required for monitoring and managing pests, as well as more labor for weed control. Due to the variation in production systems that may be employed by organic growers, labor needs for organic sweet corn production can range from 25 to 50 hours per acre. Hand harvesting and packing requires 55 to 65 hours per acre, while machine harvesting and packing requires 20 to 30 hours per acre. Organic production will also require additional management time for the mandatory recordkeeping.

Economic Considerations

Initial investments include land preparation (including cover crop seeding), purchase of seed and organic fertilizers, and installation of an irrigation system. Total costs for organically produced, overhead irrigated sweet corn can vary considerably. Variable production costs (2008) for machine-harvested organic sweet corn were estimated at \$2,000 to \$2,400 per acre. 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.

<i>Pessimistic</i>	<i>Conservative</i>	<i>Optimistic</i>
\$(144)*	\$456	\$918

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

The estimates above were generated as follows: pessimistic — no price premium over

conventional; conservative — 25 percent price premium; optimistic — 38 percent price premium. According to these estimates, Kentucky organic producers who mechanically harvest their crop will need to sell their corn at the equivalent of \$2.00 to \$2.50 per dozen to generate positive returns to land and management. Corn that is hand-harvested would require a somewhat higher selling price to ensure profitability.

Conventional sweet corn profits are extremely sensitive to price. Organic corn prices, however, often command a steady premium regardless of conventional sweet corn price fluctuations. Organic returns vary considerably from producer to producer and may be substantially greater than the estimates provided here. According to the USDA Economic Research Service, organic crops can receive price premiums of anywhere from 10 percent to 200 percent (or more) over conventionally grown products. These higher prices can translate to higher profits for organic growers.

Selected Resources

- Kentucky Department of Agriculture
Division of Value-added Plant Production:
Organic Program (KDA)
<http://www.kyagr.com/marketing/plantmktg/organic/index.htm>

- Kentucky Sweet Corn Insect Integrated Pest Management Scout Manual (University of Kentucky, 1994)
<http://www.uky.edu/Ag/IPM/manuals/ipm10swt.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; includes “Organic Manures and Fertilizers” in Appendix G, pp. 132-133 (University of Kentucky)
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- National Organic Program (NOP)
<http://www.ams.usda.gov/nop>
- Organic Sweet Corn Production (North Carolina State University, 2005)
<http://www.ces.ncsu.edu/depts/hort/hil/hil-50.html>
- Resource Guide to Organic and Sustainable Vegetable Production (ATTRA, 2001)
<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=19>
- Sweet Corn: Organic Production (ATTRA, 2008)
<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=31>

Reviewed by Mark Williams, Associate Professor; Derek Law, Research Analyst; and Ben Abell, Farm Manager II (Issued 2009)

Photo by Doug Wilson, USDA-ARS; Organic logo courtesy of USDA-NOP

February 2009

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