



Organic Sweet Corn

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Introduction

Organic sweet corn is produced using pest management and fertilization methods that do not include synthetic pesticides or petroleum-based fertilizers. 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

Potential markets for fresh organic sweet corn include roadside stands, farmers markets, community supported agriculture (CSA) subscriptions, 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

High consumer demand for organic products has made organic crop production one of the fastest growing segments of agriculture. Organic sweet corn area harvested in the U.S. increased almost 90 percent between 2008 and 2014, from 6,239 to 11,811 acres, according to the Census of Agriculture. The acreage increase was likely driven by an increase in



the quantity demanded of organic sweet corn for processing, especially freezing, and for use in prepared foods.

Fresh sweet corn is generally not considered a high-profit crop but is in high demand and may be used to draw consumers to a roadside stand, farmers market, or other retail outlet. CSA subscribers also usually expect sweet corn to be among the offerings. Growing sweet corn organically may add value, typically bringing higher returns for the producer when a price premium can be obtained.

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. Genetically modified (GMO) corn



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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. Select marketable cultivars with the disease- and insect-resistant qualities best suited for your situation. By selecting varieties based on age to maturity, growers can extend the harvest period.

Site selection and planting

Only land that has been free of prohibited substances (e.g. synthetic pesticides and petroleum-based fertilizers) for three 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. 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.

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, 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. However, this time difference in maturity can be impacted by weather extremes, resulting in less or more separation in maturity date.

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 through the use of green manure cover crops, 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, and several pre-mixed products are available in granular forms.

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 been 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 because of 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, are 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 to have a harvestable crop before pest populations reach maximal numbers toward the end of summer, 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. Strip-till, no-till, and living mulch systems provide alternatives to herbicide use during production. Cultivation 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) are required to either use separate equipment and facilities for each production system, or decontamination



Corn earworm

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 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 as soon as possible. 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. Key labor components in organic sweet corn systems can be weed control and corn earworm control. Mechanical cultivation and larger-scale application of Bt products may result in labor savings. 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 record keeping.

Economic considerations

Initial investments include land preparation (including cover crop seeding), purchase of seed and organic fertilizers, and installation of an irrigation system. Total pest control costs for organically produced, irrigated sweet corn can vary considerably and may add significantly greater production expenses, depending on production conditions and pest pressure. Total variable production costs (2016) for hand-harvested organic sweet corn were estimated at \$2,800 to \$3,700 per acre. Since returns vary depending on actual yields and market prices, the following estimated per acre returns to land and management are based on three different scenarios.

Pessimistic \$(285)*	Conservative \$915	Optimistic \$1,515
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**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 hand-harvest their crop will usually need to sell their corn at the equivalent of \$2 to \$2.50 per dozen to generate positive returns to land and management.

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 Production Guide for Commercial Growers, ID-36; includes Organic Manures and Fertilizers: Appendix G (pp. 128-130) (University of Kentucky) <http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Vegetable and Melon Enterprise Budgets (University of Kentucky, 2013) <http://www.uky.edu/ccd/tools/budgets>
- GMO Contamination Prevention — What Does it Take? (University of Minnesota) <http://www.demeter-usa.org/downloads/GMO-Contamination-Prevention.pdf>
- No-till Management for Sustainable and Organic Systems (Rodale Institute, 2012) <http://rodaleinstitute.org/technical-bulletin-no-till-management-for-sustainable-and-organic-systems/>
- Organic Sweet Corn Production (ATTRA, 2008) <http://www.attra.ncat.org/attra-pub/sweetcorn.html>
- Organic Sweet Corn Production (North Carolina State University, 2005) <http://www.ces.ncsu.edu/depts/hort/hil/hil-50.html>
- National Organic Program(NOP) <http://www.ams.usda.gov/nop>
- Resource Guide to Organic and Sustainable Vegetable Production (ATTRA, 2012) <http://www.attra.ncat.org/attra-pub/vegetable-guide.html>

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