



COOPERATIVE EXTENSION SERVICE  
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

# Corn for Grain & Silage

## Introduction

Field corn (*Zea mays*) grown in Kentucky is used mainly for livestock feed. It can be harvested for grain and used in feed mixes for livestock, or entire plants can be harvested, chopped, and fermented for silage.

## Marketing and Market Outlook

Corn for grain and silage can be produced for on-farm use and/or off-farm sale. There are a variety of local and regional markets for corn in Kentucky, such as local grain elevators. U.S. producers face international competition in the livestock category; corn prices have fluctuated greatly in recent years. Expanded corn markets, as well as the emergence of more uses for corn, could help stabilize future prices. In addition to animal feed, field corn uses include industrial (sweeteners) and energy (ethanol) products.

## Production Considerations

### *Cultivar selection*

High yielding hybrids that are high in digestibility and starch are desirable for both grain and silage production. Other important characteristics include standability (resistance to lodging), insect and disease resistance, and drought stress tolerance. Selecting multiple cultivars with a range in days to maturity will help spread out harvest times. Dual-purpose hybrids can be grown for both grain and silage. Variety trial data from Kentucky and neighboring states can provide useful information on hybrid selection. Choose cultivars that have performed well during multiple years and over a



range of conditions. Refer to the University of Kentucky Corn Variety Testing Web page for more information.

### *Site selection and planting*

Corn does well on a wide variety of soils, but performs best on silt loam soils that are well drained, in good tilth, and free from erosion. No-tillage techniques, pioneered by farmers and researchers in Kentucky, are now so widely used in-state that they dominate seeding methods for corn. No-till is best suited to soils that are moderately well-drained to well-drained. Avoiding droughty soils and following a good crop rotation program is recommended. Standard crop rotations often include corn-soybean or corn-wheat-soybean rotations. Optimum planting dates usually range from the first of April to mid-May in Kentucky. Early-planted corn has fewer disease and insect problems, and it generally out-yields late-planted corn.



Seeding rates depend on the tillage system (conventional or no-till) and use (silage or grain). If there is uncertainty as to whether the crop will be harvested for grain or silage, the field should be seeded at the rate recommended for grain. Recommended seeding rates for grain corn are from 22,000 seeds per acre for low-yielding soils to 30,000 seeds per acre for high-yielding soils. If the crop is grown for silage only, then seeding rates should be closer to 30,000 seeds per acre.

#### *Pest management*

Flea beetles, cutworms, corn borers, and corn earworms are the major insect pests of corn. Potential disease problems include damping-off, gray leaf spot, stalk rots, and viruses. Foliar insecticide and/or fungicide sprays typically do not show justifiable economic returns for commercial corn production. Crop rotation, seed treatment, and the use of resistant varieties can help reduce disease and insect problems. Weed control can be achieved by a good crop rotation program and the use of herbicides.

#### *Harvest and storage*

**Silage:** The best time to harvest corn for high quality silage is when the kernels are at  $\frac{1}{2}$  to  $\frac{3}{4}$  milk line. Crude protein and digestibility are higher at this point. Some farmers wait to chop corn for silage when the kernels have all dented and a black layer has formed near the base of the kernel. Chopping corn at black-layer results in higher yields than chopping corn at  $\frac{3}{4}$  milk-line; however, crude protein and digestibility are lower. The silage should be chopped at a length of approximately  $\frac{3}{8}$  to  $\frac{1}{2}$  inch to ensure adequate packing. Excluding air is of major importance in making and preserving silage.

**Grain:** When the kernels reach black-layer (also known as physiological maturity), corn kernels are at about 30 to 35 percent moisture. Harvesting corn for grain usually occurs after the kernel moisture is below 25 percent. Kernels need to be dried to 16 percent moisture within 24 hours after harvest and should be cooled to outside air temperatures within 48 hours after harvest for safe storage.

#### *Labor requirements*

Labor needs are approximately 2 to 4 hours per acre for production and harvest, depending on equipment size and production system. Silage production will require slightly more labor than grain production.

### **Economic Considerations**

Initial investments include land preparation and purchase of seed.

Total 2013 variable costs for no-till corn silage are estimated at \$640 per acre. Harvest amounts can range from 13 to 22 tons per acre, with prices between \$30 and \$50 per ton. A break-even price of \$36.55 per ton would be needed to cover variable costs of a 15-ton per acre harvest. The total cost of producing 15 tons of silage per acre for on-farm use was estimated at about \$40 per ton for 2013.

A 2013 estimate for costs of no-till corn for grain totaled \$655 per acre. Presuming a harvest of 150 bushels per acre sold off-farm at \$6.25 per bushel, gross returns of \$937 can be expected. This scenario, which assumes a land charge (cash rent) of \$150 per acre, would return approximately \$282 per acre to management. A break-even price of \$3.94 per bushel would be needed to cover variable costs of a 150-bushel per acre yield.

### **Selected Resources**

- Comprehensive Guide to Corn Management in Kentucky, ID-139 (University of Kentucky 2001) <http://www.ca.uky.edu/agc/pubs/id/id139/id139.htm>
- Corn and Soybean Budgets (University of Kentucky, 2013) <http://www.ca.uky.edu/agecon/index.php?p=29>
- Corn Variety Testing (University of Kentucky) <http://www.ca.uky.edu/cornvarietytest/>
- Grain Crops Extension Web site: Corn (University of Kentucky) <http://www.uky.edu/Ag/GrainCrops/corn.htm>
- Grazing Corn: An Option for Extending the

Grazing Season in Kentucky, ID-152 (University of Kentucky, 2004) <http://www.ca.uky.edu/agc/pubs/id/id152/id152.pdf>

- Important Steps during the Silage Fermentation Process (University of Kentucky, 2013)

<http://afsdairy.ca.uky.edu/extension/nutrition/milkingcows/forages/silagefermentationprocess>

- IPM in Kentucky Farm Stored Grain (University of Kentucky) <http://www.ca.uky.edu/entweb/storage/open.html>

- Kentucky Integrated Crop Management Manual for Corn (University of Kentucky 2009) <http://www.uky.edu/Ag/IPM/manuals/ipm2corn.pdf>

- Organic Field Corn Production (ATTRA, 2002) <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=90>

- Producing Corn for Silage, AGR-79 (University of Kentucky, 2006) <http://www.ca.uky.edu/agc/pubs/agr/agr79/agr79.pdf>

- Tips for Harvesting and Storing High Quality Corn Silage (University of Kentucky, 2011) [http://afsdairy.ca.uky.edu/files/extension/nutrition/Tips\\_for\\_Harvesting\\_and\\_Storing\\_High\\_Quality\\_Corn\\_Silage.pdf](http://afsdairy.ca.uky.edu/files/extension/nutrition/Tips_for_Harvesting_and_Storing_High_Quality_Corn_Silage.pdf)

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