Sweet Corn Production

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Production Requirements

High quality sweet corn is a very popular vegetable. Small-scale production can be sold directly from the farm or at roadside stands, farmer's markets or local stores. Large-scale production requires a considerable investment in harvesting equipment and packing and hydrocooling facilities to prepare shipments for terminal markets or supermarket distribution centers. Sweet corn is a warm season crop, easily killed by frost. It is subject to serious injury if exposed to prolonged cool temperatures of several degrees above freezing. Growing conditions in central Oklahoma provide about a six-week harvest period beginning in early June and ending in mid-July. High temperatures, which normally occur in early July, interfere with pollination and prevent season-long production.

Corn earworm is a serious insect pest, and sweet corn production should not be attempted without an adequate insecticide spray program during the silking to harvest stages of crop development. Fall production is possible, however an intense insect control program throughout crop development is necessary. Use of varieties with genetic resistance to corn earworm is especially important if fall production is attempted. A good yield of sweet corn in Oklahoma is 1,000 dozen ears (200 bu) per acre.

Site and Soils

Sweet corn grows on a wide range of well-drained sites and soils. For early production, choose sandy soils that can be plowed early on a site that is not subject to late spring frosts.

Varieties

Sweet corn varieties are often classified by seed color and by maturity date. Sweet corn kernels may be yellow, white, or a mixture of yellow and white (termed bicolor). Yellow is dominant to white. Thus, for example, if a white variety receives pollen from a yellow variety, ears on the white variety will have bicolor kernels.

Another feature which has become increasingly important in selecting a sweet corn variety is the nature of its sweetness. The sweetness in normal sweet corn, modified sugary sweet corn, and supersweet corn comes from different genes.

Normal sweet corn (e.g. Merit) has the recessive version of the "*sugary1*" gene (su_1). Modified sugary sweet corn has the *sugar-enhancer* gene (se) which increases the sugar content of the kernel by modifying the *sugary1* gene. Supersweet corn has higher sugar content than normal sweet corn or modified sugary sweet corn because of its *shrunken2* gene (sh_2). Compared to normal or modified sugary types, supersweet types are higher in sugar, tougher skinned, lower in starch and retain their quality longer after harvest. The seed of supersweet types may not germinate as well as normal or modified sugary types, particularly in cold soils. They also have smaller, more brittle seeds, which crack easily if mishandled. Growers should make small trial plantings initially to determine performance under specific conditions.

Genes affecting sweetness are recessive. If varieties having these "sweet" genes are pollinated by varieties having the dominant forms of these genes, sweetness will be lost. Table 1 summarizes isolation requirements of the various types. Sweet corn is wind pollinated, therefore farmers will need to reduce the risk of undesirable cross-pollination, which could affect kernel sweetness or color by separating stands of different types of sweet corn by at least 250 feet or by planting so the flowering occurs at different times (i.e. the silk on one variety is dry before or after the tassel on another develops).

If isolation space is limited, plant the most affected variety on the upwind side of the field. Separate the plantings with

Table 1. Sweet corn isolation chart*.

Sweetness types	*Standard-su_1*	*Sugary enhanced-se*	*Supersweet-sh_2*
Standard sugary-su_1	OK	OK	Starchy
Sugary enhanced-se	OK	OK	Starchy
Supersweet-sh_2	Starchy	Starchy	OK

*OK indicates that cross fertilization will either have no effect on flavor, or, at worst, the kernels will taste like a normal standard sweet corn. STARCHY indicates that isolation is required because cross fertilization will result in starchy, inedible kernels.

at least four to six border rows. If the corn is offered for sale, check the product regularly to ensure that cross-pollination has not occurred.

Sweet corn varieties that have performed well in Oklahoma trials are described in Extension Fact Sheet HLA-6035. Early varieties often produce smaller ears and have reduced eating quality compared to those that mature later. Days to maturity, as listed in seed catalogs, are only guides. The actual number of days required to reach harvest quality will be greater in cool, dry weather. Make trial plantings of new varieties to determine if they offer some advantage over currently grown varieties.

Soil pH and Fertilizer

Apply lime to maintain a soil pH between 6.0 and 6.5 if pH is low. Based on OSU soil test results, the following quantities of P_2O_5 and K_2O are recommended:

Phosphorus					
When test shows	0	10	20	40	>65
Add lbs. P_2O_5/A	150	125	100	55	0
Potassium					
When test shows	0	75	125	200	>250
Add lbs. K_2O/A	150	125	100	50	0

Nitrogen: Apply 50 lbs/A (pounds per acre) N with the P_2O_5 and K_2O fertilizer, as shown in the preceding table, at preplant or planting. Sidedress or topdress 60 lbs/A N when corn is one foot high. Additional N may be needed to produce dark green husks for good market quality. Soils with available zinc levels below 0.8 ppm may need zinc included in the preplant fertilizer to promote good sweet corn growth under cool, wet conditions. For additional information on fertilizing, consult Extension Fact Sheet HLA-6036, available at your county Extension office or online at osufacts.okstate.edu.

Spacing and Planting

Plant 10 to 12 lbs/A of graded seed in rows 36 to 38 inches apart. Space early varieties 8 to 10 inches apart in the row (20,000 plants/A) and the remaining varieties 10 to 12 inches apart in rows (14,000 plants/A). Planting depth should be about one inch in loamy soils and one to two inches in sandy soils. Planting of individual varieties should be at least four rows wide to ensure good pollination.

When planting early, use only early varieties as they are normally more vigorous under cool temperatures. Germination does not occur at soil temperatures below 50 F and is poor below 60 F. Use normal varieties for the earliest plantings, and delay planting of sugar-enhanced or supersweet varieties until soils have warmed. When there is less danger of frost damage, plant the full range of varieties (early, mid-, and late season). Successive plantings should be made using either the mid-season or late varieties that have adequate ear size. After the ears reach maturity, prime quality is maintained for two or three days in the field, depending on temperature. The last planting in the spring should be made so the crop will mature no later than mid- to late July. Sweet corn planted too late pollinates poorly due to high summer temperatures during silking and pollination.

Weed Control

Both mechanical and chemical weed control methods are recommended. Consult the latest edition of the Extension Agent's Handbook (E-832) for specific recommendations.

Insects

Sweet corn seed should be treated with an insecticide or apply insecticide at planting for protection from seed corn maggots. Cutworms also attack corn early in the season; however, control is usually applied postemergence as the need arises. The most damaging and prevalent insect is the corn earworm. Earworms occur in large numbers in the spring and are most numerous in the fall. Controls should be started when silks appear and continued up to harvest. Corn planted in the fall should be inspected as soon as it emerges for fall armyworms. The fall armyworm feeds in the whorl and is capable of destroying entire plantings. For specific insect control measures, see the latest edition of the Extension Agents' Handbook (E-832).

Diseases

Sweet corn seed should be treated with a fungicide to protect against seed rot and damping off. Corn leaf blights can attack corn, but are usually not major problems. Leaf rust and occasionally some smut is present in corn plantings, but does little economic damage. Bacterial wilt, transmitted by the corn flea beetle, can be a problem on early varieties. Maize dwarf mosaic virus, transmitted by aphids from johnsongrass, can severely stunt corn and cause economic loss. Resistance to some of these diseases is available in several varieties. For specific disease control measures, see the latest edition of the Extension Agents' Handbook (E-832).

Irrigation

Moisture is needed for effective herbicide activation and during the early stages of germination and plant emergence. Soil moisture is also critical during silking and ear development. Supplemental irrigation should be provided to meet moisture requirements at least during these critical periods. Water needs of a corn crop will vary from weather and soil conditions and crop growth stages, but a system should be capable of applying at least 1 to 2 inches of water per week. Irrigation methods range from overhead sprinkler irrigation, to furrow and flood, to drip irrigation. Selection of an irrigation method will depend on availability of water, what the site already has in place, such as an overhead pivot irrigation system and available capital.

Harvesting and Handling

Sweet corn has a very short period of optimum harvest maturity, and quality changes rapidly prior to and following the peak. Unfortunately, appearance of unhusked ears provides little indication of optimum harvest maturity. Condition of the silks can be used as an indicator of immaturity; sweet corn should not be harvested before the silks are dry and brown. Ears harvested immature will have small diameter, poor cob

fill, and kernels that are watery and lack sweetness. At optimum harvest maturity, the kernels are plump, sweet, (milky kernel — sap for se and su_1 types only), and are tender and nearly maximum size. After optimum harvest maturity has been reached, eating quality of sweet corn begins to decrease rapidly, while husk appearance changes very little. Overmature corn is starchy rather than sweet, tough, and the kernels are often "dented." In yellow colored varieties, kernels will be deep yellow rather than pale yellow. Sweet corn is often harvested too late for maximum eating quality. Ears harvested with a few immature kernels at the tip (1/2 inch from tip end) will be sweeter and have more tenderness than corn with tip kernels that are full size.

Sweet corn may be harvested either by hand or mechanical harvester. Selection of a harvest method depends on the desire of the grower, availability of labor, size of the operation, etc. Harvesting in an once-over system, either by hand or mechanically results in much greater variability in maturity of the ears and requires more sorting and grading following harvest. Multiple hand harvests allow for some selection of marketable ears and reduces the amount of grading.

Freshly harvested sweet corn is highly perishable and eating quality deteriorates rapidly. Effective temperature management is critical to the maintenance of sweet corn quality. The loss of sweetness due to conversion of sugars to starch is most rapid at high temperature. At 86 F, 60 percent of the sugar may be converted to starch in 24 hours; whereas, at 32 F, sugar content would decrease only 6 percent. Ideally, sweet corn should be cooled to 32 F within one hour after harvest, and held at 32 F until consumed. Although cooling to 32 F within one hour after harvest is rarely possible, any steps taken to keep ear temperature as low as possible are beneficial to sweet corn quality.

Temperature management should begin at the time of harvest. Sweet corn harvested in the early morning when air and ear temperatures are lowest will deteriorate less rapidly and require less cooling than corn harvested during the later part of the day. Keeping sweet corn in the shade will prevent heating by the sun. Minimizing bulk handling of sweet corn will reduce heating. Icing or spraying with water will help to reduce ear temperature and inhibit moisture loss. Long shanks and flag leaves should be trimmed to reduce moisture loss and subsequent denting of the kernels. If sweet corn is to be marketed locally, it is best to make frequent small harvests, so holding time is minimized.

If sweet corn is to be shipped to distant markets, it must be packed in water-resistant fiberboard cartons, returnable plastic containers, or wirebound crates, precooled to remove field heat, top iced, and held under refrigeration at 32 F throughout the distribution system. Even under optimum conditions, normal sweet corn varieties will not maintain marketable quality for more than five to eight days. The supersweet varieties will maintain good quality for 10 to 12 days postharvest.

The following publications are referenced in this fact sheet:

HLA-6036	Soil Test Interpretations for Vegetable Crops
HLA-6035	Commercial Vegetable Varieties for Oklahoma
E-832	OSU Extension Agent's Handbook of Insect, Plant Disease, and Weed Control

These and other fact sheets are available at your County OSU Extension office or online at osufacts.okstate.edu.

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