Vegetables

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Growing Sweet Corn in Missouri

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Figure 1. Sweet corn has separate male (tassel) and female (ear) flowers on each plant.

Sweet corn (*Zea mays* L. var. *rugosa*) is one of the most popular summer vegetable crops grown in Missouri. Like peppers, pumpkins, squash and beans, sweet corn is native to the New World where it has been cultivated for more than 4,000 years. Sweet corn is a *monecious* plant, which means it has a separate male and female flower on each stalk. The tassel is the male flower, which produces the pollen, and the ear is the female flower (Figure 1). For kernels to form on each ear, pollen from the tassel must be deposited on the silk of the ear. Sweet corn is wind pollinated, although bees are often seen collecting nectar and pollen from the tassels. For small plantings of sweet corn, a series of short rows rather than a single, long row will improve the chances for efficient pollination. Sweet corn typically produces one or two ears per plant.

Sweet corn is sensitive to cool weather and should be seeded when soil temperatures reach at least 60 degrees F (2 inch depth) or about 7 to 10 days before the last killing frost. There is a premium price for early sweet corn in Missouri. In addition, early plantings avoid many insect pests that become established later in the growing season. For early production of sweet corn, an early-maturing variety can be planted. Also, the sweet corn seeds can be sown as double rows (14–24 inches apart) under clear, perforated plastic (1–1.25 mil). An herbicide can be applied after seeding and the rows covered with clear plastic. The plastic is left on the plants for about 30 days and then is slit and removed when plants are 6 to 12 inches in height. Some growers have seeded sweet corn on black plastic mulch for early harvest. The rows can be covered with a row cover for frost protection. Sweet corn can also be transplanted for early harvest, but transplanting sweet corn requires more care than transplanting most vegetables. Ideally transplants should be planted in cone-shaped, inverted pyramid cells or peat pots, which allow for vigorous root growth without damaging the root system. A starter fertilizer solution (for example, 9-45-15) containing phosphorus should be applied immediately after transplanting to promote root growth.

Early-maturing varieties can be seeded 8 inches apart while later maturing varieties can be seeded 9 to 12 inches apart in the row. Approximately 10 to 15 pounds of seed will be needed per acre, and seed should be planted about 1 inch deep. Corn can also be planted in hills about 3 feet apart, each hill containing three or four seeds. At wider spacing, sweet corn sometimes develops suckers or tillers. These should be left on the plant because they do not reduce yield. A final plant population of 15,000 to 24,000 plants per acre is average.

Sweet corn types

Sweet corn can be classified many different ways such as kernel color (white, yellow or bicolor) or also by the level of sugar content. Bicolor sweet corn has 80 percent yellow kernels and 20 percent white kernels on

each ear. Originally sweet corn was a standard or sugary type labeled as Su-1. Today, these types of sweet corn are used primarily for processing. Sugar-enhanced (SE) sweet corn has a tender kernel and higher sugar content. SE sweet corn can be either heterozygous or homozygous. Heterozygous SE sweet corn is the offspring of an SE and Su-1 cross while homozygous SE sweet corn has both SE types as parents, making it the sweetest type of SE sweet corn.

Supersweet or "ultra/extra sweet" corn contains the SH2 gene, which is associated with slightly tougher kernels, an increased level of sweetness over SE types, and a longer shelf life. The conversion of sugar to starch is significantly reduced with SH2 varieties. Supersweet varieties are well suited for wholesale marketing where shelf life is important. Avoid planting supersweet varieties in cool soil (less than 60 degrees) because they lack germination vigor.

A new group of sweet corn varieties includes synergistic (SY), or triple-sweet types. These types of sweet corn have about 75 percent of their kernels as SE sweet corn and 25 percent as super sweet. Synergistic types have higher sugar content than regular SE types and have excellent shelf life and kernel texture.

Sweet corn groups may need to be isolated in some circumstances to maintain consistent quality of certain varieties. Table 1 summarizes the groups of sweet corn that need to be isolated.

Table 1. Isolation requirements for sweet corn types.

Sweet corn type	Isolate from this type
Yellow or bicolor	White kernel varieties
Yellow	Bicolor kernel varieties
Su-1	Supersweets
Sugar enhanced (SE)	Supersweets
Synergistics (SY)	Supersweets
Supersweets (SH2)	Su-1, Sugar-enhanced, Synergystics
All sweet corn	Field corn and popcorn

Isolation can be accomplished by either distance or time. Planting different types about 250 feet apart will reduce cross-pollination. Also a 14-day difference between planting dates will prevent cross-pollination.

Variety selection

There are many varieties of sweet corn, and the choice of which varieties to grow depends on personal preferences as well as market demand in your area of Missouri. Because sweet corn seed loses vigor in storage, fresh seed should be used each year. Table 2 lists suggested varieties that perform well in Missouri.

Fertilization

Sweet corn grows well in a wide range of soils with a pH range of 5.5 to 7.0. Sweet corn requires relatively high levels of nitrogen to produce a large stalk and ear. Rotation with nitrogen-fixing plants such as alfalfa, vetch or clover may be beneficial to sweet corn production. Avoid applying all the required nitrogen at planting. Before seeding, 65 pounds of actual nitrogen (1.5 lb/1,000 sq. ft.) should be applied. Based on a recent soil test, 0–100 pounds (0–2.3 lb/1,000 sq. ft.) of phosphorus (P_2O_5) and 0–150 pounds (0-3.4 lb/1,000 sq. ft.) of potassium (K_2O) can be broadcast over the field. When sweet corn plants reach a height of 6 inches, an additional sidedress application of 35 pounds of nitrogen (0.8 lb of actual nitrogen per 1,000 sq. ft.) is beneficial.

Table 2. Suggested sweet corn varieties for Missouri.

Sweet corn varieties	Days to maturity	Type	Disease resistance/ comments*
Bodacious	72	Yellow-SE	SW; NCLB
Incredible	83	Yellow-SE	SW; CR; SCLB
Kandy Korn	89	Yellow-SE	SCLB
Tuxedo	77	Yellow-SE	SW; NCLB; CR
Bon Apetit	71	Bicolor-SE	NCLB; SCLB
Luscious	75	Bicolor-SE	CR
Jackpot	82	Bicolor-SE	NCLB; CR; SW
Temptation	72	Bicolor-SE	NCLB; CR; SW; Performs well in cool soil.
Delectable	80	Bicolor-SE	CR; NCLB; SCLB; Good for baby corn
Providence	82	Bicolor-SY	CR
Applause	75	Yellow-SY	CR SW
Argent	86	White-SE	NCLB; CR; CS; SW
Silverado	80	White-SE	NCLB; CR; CS; SW
Saturn	75	Yellow-SH2	NCLB; SCLB; SW; CR
Prime Plus	78	Yellow-SH2	NCLB; CR; SW
Mirai™ types†	70–78	Augmented SH2	SCLB; CR; SW

***Disease code:**
SW = Stewart's wilt
CR = Common rust
CS = Common smut
SCLB = Southern corn leaf blight
NCLB = Northern corn leaf blight

†Mirai™ is a trademark grouping of yellow, bicolor and white supersweet sweet corn varieties.

Irrigation

Sweet corn has a relatively shallow root system and requires an inch of water per week. Adequate watering is particularly critical during silking, tasseling and ear development of sweet corn. Poor pollination during hot, dry weather results in sweet corn ears with "skips" in the kernels and poor tip fill. Heavy rains during tasseling can wash off pollen or cause it to stick to the tassel, reducing pollination. Most growers use a traveling gun irrigation system, but solid set irrigation or drip irrigation may be used for sweet corn.

Pest management

Common insect pests of sweet corn in Missouri include corn earworm, European corn borer, seed corn maggots, cutworms and corn rootworms. Consult the *Midwest Vegetable Production Guide for Commercial*

Growers (MX384) for specific information about pest management. Some varieties of sweet corn have the Bt *(Bacillus thuringiensis)* protein incorporated into them for protection against the corn earworm and the European corn borer and are labeled as Attribute® varieties. These varieties often require isolation from other types of sweet corn and destruction of the crop residue at the end of the harvest period. The Bt protein does not harm beneficial insects and is safe for consumption. However, you may wish to determine if these varieties are suitable for your market outlet.

Mineral oil mixed with a Bt insecticide (Dipel®) can be effective for controlling corn earworm. The oil is applied to the tip of the ear by hand on each silk about two days after the silk emerges from the ear. Applying the oil any earlier may reduce pollination. This insect management technique is most applicable for small plantings of sweet corn because it takes 8 to 10 hours of labor to treat one acre.

If insecticides are used, choose a sprayer that is suitable for sweet corn plant architecture, such as a high-boy or mist sprayer. Control of insects such as the earworm requires that sprays be directed on the green silk. Spraying may be necessary every four to seven days depending on pest pressure. Spraying for corn earworm can stop once the silks have dried. Early plantings of sweet corn have fewer problems with corn earworm and fall armyworms.

Sweet corn develops fewer disease problems than most other vegetables. Stewart's wilt is a bacterial disease spread by flea beetles and can be a problem if there is a large population of flea beetles. Corn smut is a fungal disease most commonly seen as galls emerging from the ear. Sweet corn should be rotated with other crops each year to prevent insect and disease problems. Choosing varieties resistant to these and other diseases is the most effective control strategy (Table 2).

Sweet corn does not compete well with weeds during early growth stages, so the use of herbicides or cultivation is essential for weed management. Effective preemergence herbicides for sweet corn include atrazine (Aatrex®), alachlor (Lasso®), metolachlor (Dual®) while pendimethalin (Prowl®), 2,4-D (Weedar®), bentazon (Basagran®), halosulfuron (Permit®) and clopyalid (Stinger®) are effective postemergence herbicides. Consult the *Midwest Vegetable Production Guide for Commercial Growers* (MX384) for specific details about the rates and timing for these herbicides.

Raccoons, groundhogs, birds and deer are other serious pests of sweet corn in Missouri. Bird damage can be reduced by growing varieties with a tight husk. In addition, propane cannons can be used to scare birds from the field. Raccoons, groundhogs and deer are best controlled by fences or aggressive dogs.

Harvesting and handling

Sweet corn is ready to harvest about 20 days after silking. Ripe ears have a dried silk and are full to the touch. Ripe kernels will be plump and squirt a milky liquid when punctured by the thumbnail. Sweet corn (predominantly supersweet varieties) can be mechanically harvested, but most growers prefer to hand-harvest the corn several times to attain the highest marketable yield. Average yields are 1,000 to 1,500 dozen ears per acre in Missouri.

Sweet corn is harvested every three or four days. An access lane (every 12^{th} row) makes harvesting and spraying sweet corn easier. Sweet corn is sold by the count and for wholesale markets in wire-bound crates or bags containing 48 to 60 ears. Sweet corn should be harvested when field heat is low, preferably in the morning. If the sweet corn is to be sold in a wholesale or distant market, the ears can be cooled in water to remove any field heat and top iced. Sweet corn should be held at 34 to 40 degrees F for maximum quality. Most sweet corn has a shelf life of 4 to 6 days while the supersweets can have a shelf life close to 10 days.

Marketing and economics

Sweet corn is marketed through community farmer's markets, roadside stands, on-farm stores and wholesale produce auctions in Missouri. Consumer demand for fresh sweet corn remains strong from June through September. Most growers make sequential plantings of sweet corn to maintain a continuous supply through the summer.

Sweet corn is not as profitable per acre as crops such as tomatoes and peppers. However, sweet corn has lower labor requirements than most vegetable crops. Average net returns per acre are $2,000 to $3,500 for sweet corn in Missouri.