COLLEGE OF AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES

Home and Market Garden Sweet Corn Production

Revised by Stephanie Walker[1]

aces.nmsu.edu/pubs • Cooperative Extension Service • Guide H-223

The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and extension programs.

Fresh, high-quality sweet corn is one of the most popular vegetables grown in home gardens and purchased by consumers at roadside stands and farmers' markets. At optimal market maturity, sweet corn will contain 5–6% sugar, 10–11% starch, 3% water-soluble polysaccharides, and 70% water. Sweet corn will also contain moderate levels of protein, vitamin A (yellow varieties), and potassium.

TYPES OF SWEET CORN

Sweet corn probably originated from a mutation of an ancient Peruvian corn called 'Chuspillo' or 'Chullpi'. Sugary forms of corn were, however, probably not very popular in early cultures because they were difficult to store. The first historical reference to sweet corn was in 1779 with the introduction of 'Papoon' or 'Susquehanna', an eight-rowed, red-cob strain grown by the Iroquois. By the early 1900s, there were over 63 known cultivars of sweet corn, including 'Golden Bantam' (released in 1902), which became one of the most popular open-pollinated varieties.

Most open-pollinated sweet corn varieties have been replaced by improved hybrid varieties that are easy to grow, produce good yields, taste sweeter, and store longer. Varieties are generally classified by seed color, maturity date, or nature of sweetness.

All About Discovery!™
New Mexico State University
aces.nmsu.edu

[1]Extension Vegetable Specialist, Department of Extension Plant Sciences, New Mexico State University.

Sweet corn varieties are available in yellow, white, or bicolored types, with varying maturity dates from early to mid- to late-season (Table 1). Maturity dates will vary from year to year and by location depending on weather (primarily temperature). Although mid- and late-season varieties generally produce ears of higher quality, early varieties often produce marketable ears early in the season when sweet corn prices are at a premium.

Based on the nature of kernel sweetness, sweet corns can also be classified into four basic groups: standard, super sweet, sugar enhanced, and synergistic. Sweetness is determined not only by genetics but also by how these varieties are managed and harvested.

Field corn contains approximately 4% sucrose (sugar) in the immature milky stage, while **"standard"** sweet corns at the same stage may contain as much as 6% sucrose. (Standard sweet corns contain the recessive *su-1* gene; field corn is dominant for the same gene, making it starchy.) Following harvest, or if left on the stalk too long, sucrose in standard sweet corn is rapidly converted to starch. Standard sweet corn pollinated by either field corn or popcorn will become tough and starchy; therefore, stands should be planted at least 250 feet away or with 14 days earlier or later maturity to prevent cross-pollination.

"Super sweet" corns contain the shrunken *sh-2* gene, which causes sucrose levels two to three times higher at harvest than standard sweet corns. Sucrose in super sweet varieties will remain relatively high after harvest, making them excellent shipping varieties. Super sweet corns have some notable disadvantages. The smaller, shrunken seed of super sweet varieties is more brittle than standard sweet corn seed, making super sweet seeds more difficult to handle during planting and more apt to crack. This seed must also be planted in warmer soils (above 55°F) and at shallower depths than standard sweet corns for good stand establishment. Although they contain more sucrose than standard sweet corn, fresh super sweet corn kernels have tougher pericarps (crispy texture) and less water-soluble polysaccharides, the complex sugars that give standard sweet corns their creamy textures. Super sweet corn must also be isolated from other varieties of sweet corn because cross-pollination with standard sweet corn will make kernels tough and starchy in both types.

"Sugar enhanced" sweet corn has a sugar enhancer gene, *se*, which, when combined with the *su-1* gene, produces varieties with greater sweetness than standard sweet corn (between standard and super sweet) with the same creamy texture as standard sweet corn. The *se* gene also tends to slow the conversion of sugar to starch. Isolating sugar enhanced from standard sweet corn varieties is not necessary for pollination. Sugar enhanced sweet corns are very popular at roadside stands and farmers' markets.

Table 1. Sweet Corn Varieties

Standard (*su-1*)	**Color**	**Days to Maturity**
Silver Queen	White	92
Golden Queen	Yellow	92
Iochief	Yellow	85
Jubilee	Yellow	85
Golden Cross Bantam	Yellow	85
Bonanza	Yellow	82
NK-199	Yellow	82
Silver King	White	82
Merit	Yellow	75
Seneca Horizon	Yellow	65
Early Sunglow	Yellow	63
Super Sweet (*sh-2*)	**Color**	**Days to Maturity**
How Sweet It Is	White	85
Illini Xtra Sweet	Yellow	85
Jubilee Supersweet	Yellow	82
Honey Select	Yellow	80
Honey 'N Pearl	Bicolor	78
Butter Fruit	Yellow	72
Early Extra Sweet	Yellow	71
Sugar Enhanced (*se*)	**Color**	**Days to Maturity**
Kandy Korn EH	Yellow	89
Argent	White	86
Miracle	Yellow	82
Peaches & Cream	Bicolor	82
Augusta	White	76
Ambrosia	Bicolor	75
Bodacious	Yellow	75
Kandy King	Yellow	73
Synergistic	**Color**	**Days to Maturity**
Applause	Yellow	75
Polka	Bicolor	70
Frisky	Bicolor	69
Open Pollinated (OP)	**Color**	**Days to Maturity**
Stowell's Evergreen	White	100
Golden Bantam	Yellow	82
Trucker's Favorite	Yellow	75

"Synergistic" sweet corns, also known as **"triple sweet"** varieties, were developed to enhance corn taste while maintaining sweetness and crunchy texture longer than other types. The cobs will generally have 1/4 super

sweet kernels and 3/4 standard kernels. Emergence characteristics are similar to those of standard sweet corns. Synergistic varieties do not need to be isolated from other types of sweet corn to prevent cross-pollination.

CLIMATE

Sweet corn is a warm-weather crop that requires at least eight hours of direct sunlight each day. Seed can be planted on or after the average date for the last killing frost. Soil temperature (in the upper 3 in.) should be at least 50–55°F or higher. Super sweet varieties require a minimum soil temperature of 60–65°F. The optimal soil temperature for all sweet corns is 75–95°F. Low soil temperatures at planting can cause poor germination and delayed growth.

Successful early plantings can best be achieved by planting on sandy soils that warm early in the spring. Seed should also be planted on the south side of raised beds that run east to west. Covering beds with black plastic mulch two weeks before planting will help warm the soil. Black plastic will also help control annual weeds. Seed can be planted directly through the plastic.

Optimal plant growth occurs at temperatures between 75 and 86°F. When making successive plantings of a single variety during the spring, later plantings will develop faster than early plantings due to warmer late-season weather. Thus, the number of days between harvests will be much shorter than the number of days between plantings. When planting early, it is best to use early varieties because they tend to germinate better in cooler soils.

In southern New Mexico, extremely high late summer temperatures can cause poor pollination, especially if accompanied by drying winds. Some varieties tolerate the heat better than others and should be considered in these areas.

SOIL PREPARATION AND FERTILIZATION

Sweet corn will grow well on almost any well-drained soil, although deep, sandy loams with adequate organic matter are best. Loams and clay loams are ideal for late-maturing varieties, which require more water and nutrients. Sweet corn will perform well at a soil pH of 6.5–8.0.

Livestock manures used in sweet corn fertilization programs should be applied in the fall at a rate of 10–20 tons/acre (apply a lighter rate for chicken manure). Green manure crops (winter wheat, rye, and oats) planted in the fall should be disked under at least one month before planting sweet corn in the spring. Soil preparation should result in level seedbeds free of clods and trash. Home gardeners may wish to incorporate 1–3 in. of compost with a rototiller or garden fork to help improve soil structure.

All phosphorous fertilizer should be applied before planting and soil-incorporated (broadcast) with a disk or rototiller to a depth of 3–4 in. at a rate of 50–80 lb/acre of P_2O_5 (1–2 lb/1,000 ft^2). Phosphorous can also be banded below (1 in.) and to the side (2–3 in.) of the seed.

Apply nitrogen fertilizer in split applications, incorporating half (40–50 lb/acre or 1 lb/1,000 ft^2) with the phosphorous before planting. The rest can be applied in increments of 25–30 lb/acre of nitrogen (0.5–1.0 lb/1,000 ft^2) in bands 1 in. deep and 4–5 in. to the side of plants when they are 8–10 in. tall, and again when plants are 18–24 in. tall. Nitrogen fertilizers should be covered with soil to reduce the loss of nitrogen into the air as ammonia.

These fertilizer rates are dependent on the results of a soil analysis. Because most New Mexico soils have sufficient potassium, additional potassium fertilizer may not be needed. For more information on soil testing, see NMSU Extension Guide A-114, *Test Your Garden Soil* (http://aces.nmsu.edu/pubs/_a/A114.pdf).

PLANTING AND POLLINATION

Sweet corn should be planted in blocks at least three to four rows wide for good pollination. In the home garden, a block of corn should have at least nine plants. Some gardeners prefer to plant sweet corn in hills of 2–3 plants per hill, with hills spaced 3 ft apart.

Early sweet corn plantings tend to be less uniform in plant growth, and ear quality may be lower due to incomplete pollination. To prevent cross-pollination by unwanted varieties (field corn with sweet corn, standard sweet corn with super sweet corn, and yellow with white sweet corn), varieties should be separated by at least 250 ft or more. Cross-pollination can also be prevented by planting varieties with different maturity ratings (early, mid-, and late-season) at the same time, or by planting varieties with the same maturity rating in successive plantings 14 days apart.

Planting depth varies for the soil and type of sweet corn. Standard, sugar enhanced, and synergistic types should be planted 1 in. deep in clay, 1.5 in. deep in sandy loam, and 2 in. deep in sandy soils. Super sweet types should be planted half as deep for each soil type.

Seeding rates will vary between 10 and 12 lb/acre (0.25 lb/1,000 ft^2) depending on the seed's size and the variety's maturity rating. Less will be needed for super sweet corns due to their smaller, shriveled seeds. More seed may be needed for early varieties planted closer together.

Plant spacing within the row will vary depending on row width. Plant spacings on rows 36–38 in. apart may

range as follows: early season, 8–10 in.; mid- to late-season, 9–12 in. In-row spacing between plants may increase if rows are narrower or decrease with wider rows. Growers may find that planting "sized" seed permits more specific and precise planting.

Some varieties may respond to wider spacing by producing more tillers or suckers (extra stalks from the base of a plant). Removing tillers generally does not increase yields and may actually hurt production.

When planting sweet corn, purchase only fresh seed. Sweet corn seed is relatively short-lived (two years) even under ideal conditions. Do not save seed from hybrid varieties grown the year before.

Although sweet corn will tolerate some water stress when young, an adequate water supply is critical during silking, pollination, and ear development. Water-stress at these times can cause poor-quality ears. Irrigation every five to seven days may be necessary until harvest.

PEST CONTROL

Weeds can be controlled using shallow cultivation until the plants are 18–25 in. tall (for equipment clearance). For home gardeners, cultivation with a hoe can continue throughout the season, but the need for cultivation will diminish as corn plants mature and shade the soil beneath them. Cultivation should be shallow to prevent damage to corn roots. Growers opting to use herbicides to control weeds should contact their county Extension agent (http://aces.nmsu.edu/county/) or agricultural chemical dealer for appropriate recommendations.

Major insect pests on sweet corn include:

- soil insects (cutworms, wireworms),
- foliar insects (armyworms, flea beetles, corn earworms, aphids), and
- stem borers (corn borers).

Follow label instructions of registered insecticides for appropriate control.

Corn earworms are generally the most destructive of the insect pests. Damage is generally more severe in warmer areas of the state. Early planted sweet corn usually has less corn earworm damage than later plantings.

Seed rots and seedling diseases are best controlled with high-quality treated seed planted in warm soil. Field sanitation will help control overwintering organisms that cause various stalk rots and leaf spots.

Smut can be brought on by drought, high nitrogen levels, and plant damage from insects, cultivation, or hail. Tolerant varieties will provide some control.

HARVESTING, STORING, AND MARKETING SWEET CORN

Sweet corn ears are generally ready for harvest approximately three weeks after silk emergence (depending on temperature). Silk will start to turn brown about two weeks after emergence. Ears should be harvested when the kernels appear to be milky when punctured with a thumbnail (milk stage). The unhusked ear should feel firm (the ear will be blunt at the end), have full kernels to the top of the ear, and have brown, dry silk. Fully ripe kernels of *sh-2* varieties will still possess a clear, watery juice.

Ears of standard varieties will remain in prime condition for only a short time in warm weather when compared to cool weather. High temperatures will quickly lower the eating quality of sweet corn. Harvest in the early morning when both the ears and weather are cool.

When harvesting, break the shank (or stem) of the ear as close to the ear as possible without breaking the main stalk. Long shanks and flag leaves should be clipped to reduce moisture loss. Ideally, ears should be cooled to 32°F within an hour of harvest.

If corn cannot be refrigerated immediately, it should be stored in the shade to reduce heating from the sun. Do not store ears in large piles because heat from respiration will raise the temperature of the corn. When harvesting for direct market sales, harvest only a one-day supply and keep as cool as possible.

Field heat can be removed from ears by passing them through a 40°F water bath (hydrocooler). Ears can then be packed in wirebound crates, topped with ice, and held at 32°F (90% relative humidity). Ears will remain marketable for five to eight days. Super sweet varieties can maintain good quality for 10 to 12 days.

Original author: *George W. Dickerson, Extension Horticulture Specialist.*

Stephanie Walker *is the Extension Vegetable Specialist, and has extensive experience in the food processing industry. Her primary research interests include genetics and breeding of chile peppers, vegetable mechanization, enhancing pigment content, post-harvest quality, and irrigation efficiency. She works to help commercial vegetable growers enhance the sustainability and profitability of their operations through collaboration, experimentation, and information sharing.*

Revised March 2018 **Las Cruces, NM**