University of Idaho
College of Agriculture

Cooperative Extension System
Agricultural Experiment Station

Current Information Series No. 910

Sweet corn production for the small-market grower and home gardener

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Sweet corn is easy to grow, rewarding home gardeners with a product far superior to corn from the grocery store. Small-market growers find in fresh sweet corn a reliable market niche and a crop they can produce with minimal investment in equipment.

Because of Idaho's dry climate, sweet corn can be grown in most parts of the state without any serious disease problems. Low disease and insect pressures offer a good opportunity for pesticide-free production, which opens new marketing opportunities. Recent advances in sweet corn breeding have led to the development of sweet corn varieties of exceptional diversity and quality.

Varieties

Sweet corn

Sweet corn tastes so sweet because it has a gene that largely prevents sugar in the kernel from turning into starch. Traditionally, this gene has been the *sugary* (*su*) gene. In *su* varieties, sugar is partially assembled into starch, producing a creamy texture savored by many sweet corn lovers.

Within the last 10 years or so, new *su* varieties have been introduced that contain an additional gene called the *sugary enhanced* (*se*) or *everlasting heritage* (*eh*) gene. Sweet corn that bears both the *su* and *se* genes accumulates higher levels of sugar. It also tends to retain the sugar longer after harvest (up to 3 or 4 days under refrigeration). Although sweeter, these varieties retain the creamy texture of traditional sweet corn. They are often exceptionally tender. Sugary enhanced sweet corn varieties are the best choices for most gardeners and small-market growers. Occasionally sugary enhanced sweet corn is referred to as "supersweet" corn. However, sugary enhanced sweet corn is not as sweet as the true supersweets described below.

Supersweet sweet corn

Supersweet sweet corn hybrids use a fundamentally different route to high sugar levels. These varieties employ a gene called *shrunken-2* (*sh-2*) instead of *su*. The *sh-2* gene almost completely prevents the conversion of sugar into starch. This type of corn is extremely sweet and tends to be crunchy rather than creamy. Many people prefer the taste of *sh-2* corn to all other types. Supersweet corn has opened markets for sweet corn in parts of the world where sweet corn is not traditionally eaten.

The most notable feature of *sh-2* corn is its ability to retain superior eating quality long after harvest (2 weeks or more under refrigeration). Many of the large, fresh-market producers in the United States have completely switched to *sh-2* varieties, providing consumers with high-quality fresh corn in the supermarket. Supersweet corn also retains high eating quality on the plant for about 10 days, extending the optimum harvest period beyond the 3 to 4 days typical of sweet corn (*su*) varieties.

Cross-pollination

Because the *su* and *sh-2* genetic systems are unrelated, allowing the two types of corn to cross-pollinate will produce starchy kernels that are less sweet than either type. Cross-pollination with field corn will produce starchy kernels in any kind of

sweet corn. Commercial producers try to separate the different types by at least 1,000 feet. Home gardeners can get away with less isolation, depending on their tolerance for starchy kernels. Of course, if one of the crops tassels 1 or 2 weeks before the other, either because it is an early maturing hybrid or because it was planted earlier, cross-pollination is avoided.

Hybrids and open-pollinated corn

Virtually all sweet corn varieties in the United States are hybrids. Hybrids are inherently higher yielding and more uniform than open-pollinated (nonhybrid) corn. Seeds saved and planted from a hybrid crop will produce an inferior crop with variable characteristics.

One advantage of open-pollinated corn for the home gardener is a longer harvest period because the individual plants vary in maturity. However, the harvest period for hybrids can be extended by planting at different dates or by planting several hybrids that differ in maturity. Any type of sweet corn that matures in the fall will give an extended harvest because cool weather slows maturation.

Varieties for Idaho

Aside from the kernel characteristics discussed above, plant breeders continue to improve disease resistance, flavor, ear size, kernel depth, row count, and earliness. Early varieties sacrifice some of these qualities, but the first corn of the season always tastes the best!

The table on page 5 lists sweet corn hybrids recommended by southwestern Idaho seed companies as best suited for home gardeners or small-market commercial growers in Idaho. These hybrids can be purchased from local seed dealers or mail-order retailers. Although they do not meet the quality standards of modern hybrids, a few open-pollinated varieties have been included for comparison.[1]

The estimated days to maturity in the table have been adjusted for spring planting in southwestern Idaho (the Treasure Valley). These estimates do not agree with those in most seed catalogs, which are based on corn grown in the Midwest. Only the very earliest varieties will mature in the northern, eastern, and higher-altitude regions of Idaho, where corn takes up to 2 weeks longer to mature than in southwestern Idaho.

[1]For help in tracking down rare corn varieties contact the Seed Savers Exchange, 203 Rural Ave., Decorah, Iowa 52101 or the Abundant Life Seed Foundation, P.O. Box 772, Port Townsend, Washington 98368.

Cultural practices

Planting date

Generally speaking, the earlier corn is planted, the more it will yield. If you are selling corn, early planting to some extent means earlier harvest, and this usually means higher prices. Do not plant corn until the soil temperature averages 50° to 55°F. In many corn-growing areas, cold soils prevent early planting. But in sunny spring climates, soils warm early and the biggest threat to early planting is frost. In southwestern Idaho, you can usually escape frost damage by waiting until late April to begin planting. The farther east and north you are, the longer you will have to wait.

Soil preparation and planting depth

Corn does not need an extremely fine seedbed. Overworking the soil can cause it to crust after a rain. The best way to plant corn is to thoroughly water the prepared planting area and allow it to dry slightly. The soil should crumble when you dig the furrow.

Plant seeds deep enough to be firmly in contact with moist soil — 1 to 2 inches deep. Planting deeper than 1½ inches is risky, but not as risky as planting in dry soil. Supersweet corn may not tolerate planting as deep as 2 inches and requires more soil moisture than standard sweet corn.

Watering after planting can be harmful if the water temperature is lower than about 50°F. Try to plant before soil drying makes deep planting or watering necessary. Seeds require shallow planting in heavy soils and deeper planting in sandy soils.

Spacing

Plant corn seeds 8 to 10 inches apart in the row and leave 30 inches between rows. Growers often drop seeds 6 to 8 inches apart, expecting some mortality. Home gardeners usually plant thickly and hand thin to the proper spacing. With fresh, high-quality, fungicide-treated seed, however, this practice is hardly necessary.

Early varieties produce smaller plants, and can be spaced as close together as 6 inches or grown in narrower rows. Pollination and production of well-filled ears are favored by several short rows in a block rather than one or two long rows.

Irrigation

Corn plants beyond the five- to six-leaf stage require at least an inch of water per week in warm weather. If you irrigate before planting and plant into moist soil, you should not need to water again

corn crops in most years will be damaged unless treated with an insecticide. The insecticide Sevin, applied at 5- to 7-day intervals starting when the silks first appear and continuing until they are completely dry, provides effective control. Spray or dust only the silk to avoid killing beneficial insects. A 5 percent Sevin dust can be applied to the silk using a paintbrush.

Planting corn year after year in the same ground causes a buildup of **corn rootworms**, resulting in poor production. Rotating corn plantings to different locations every other year will prevent this insect problem.

Earwigs eat silks and may be numerous enough to impair pollination, especially in gardens with mulch.

Organic production

Production of corn without pesticides and even without synthetic fertilizers is more feasible in Idaho than in most other parts of the country. Idaho's dry climate keeps many serious diseases in check. Weeds can be controlled by cultivating, mulching, or both.

Insects

Earworms can be controlled to some extent by choosing varieties with a tight, elongated husk at the ear tip such as Buttersweet or Incredible. Some gardeners place a rubber band or clothespin on the tip of the husk to hold it shut. Others squirt a few drops of mineral oil onto the silks in the tip of each ear when the silks start to dry. The oil suffocates the tiny worms.

Fertilization

A previous alfalfa crop can supply the N needed for a reasonable crop of sweet corn. The problem is that alfalfa is not easily killed, and using a herbicide to kill it would defeat the goal of organic production. In fall, disk the alfalfa three times in opposite directions and moldboard plow. In spring before corn planting, you may need to till again to kill surviving alfalfa. If rototilling equipment is available, you can incorporate alfalfa in fall or spring, although some delay between incorporation and corn planting improves early N availability. Other green manures such as peas or soybeans are killed more easily than alfalfa but may not fit well into a rotation.

Large amounts of animal manure or compost can supply the N needed to produce a crop of corn. Incorporate it as early in spring as possible to allow some decay before planting. The composition and value of compost are extremely diverse.

Manure varies in moisture, salt, and N contents. You might need to apply up to 50 tons per acre (230 pounds per 100 square feet) of typical cattle manure, but such a large amount could harm corn plants because of its high salt content. Do not use manure that contains a large proportion of sawdust or wood chips unless you plan to add N fertilizer. Decaying wood immobilizes N, making it unavailable to plants until it has fully decayed.

Organic matter from repeated manure and compost applications provides a long-term benefit by storing N and other nutrients and gradually releasing them as it decays. Specific manure recommendations are complex.

Home gardeners can use other natural N sources such as fish meal (10-6-0), cottonseed meal (6-3-1), and blood meal (13-2-1).

Harvest and handling

Sweet corn is normally ready to eat 20 to 24 days after silking, depending on the temperature. If you forgot to note when silking occurred, judge readiness for harvest by feeling the upper part of the ear. If it is firm, with a rounded rather than pointed tip, it is probably ready. Sugary (*su*) sweet corn remains at peak quality for only a few days. Supersweets will remain very good for a week to 10 days, depending on the weather.

For best eating and processing quality with traditional sweet corn, cook it as soon after harvest as possible. This is far less important with *se* types or especially supersweet (*sh-2*) types. Corn for sale, processing, or for refrigerated storage should be picked in the morning, before it has accumulated field heat. Keep it as cool as possible. Heat speeds the conversion of sugar to starch.

Most varieties listed in the accompanying table are good for canning and freezing. Some *se* corns get too mushy during processing or freezing. In general, the standard *su* varieties are the best choices for canning and freezing if they are picked at peak quality and processed immediately. If you desire more sweetness, add sugar to the pack.

Sweet corn varieties recommended for home and small-market gardeners.

Name	Days to Maturity	Color	Comments
Standard sweet corn (*su*)			Cook these very soon after harvest.
Polar Vee	60	Y	Poor in quality, early, and cold tolerant.
Earlivee	64	Y	As early as you can get with acceptable quality.
Earliking	73	Y	High quality for early corn.
Silver Bullet	74	W	Vigorous. Good flavor for an early corn.
Rival	85	Y	High quality for fresh use or processing.
Sugar Ace	86	Y	Attractive husk, good flavor.
Jubilee	88	Y	The quality standard for processed corn.
Platinum Lady	88	W	Narrow purple ears. Exceptional quality for *su*.
Sugar Dots	90	B	Good quality, early bicolor.
Buttersweet	91	Y	Good husk cover.
Stylepak	93	Y	Narrow kernels. Processing variety.
Silver Queen	99	W	Unusually sweet for a standard *su*.
Sugary enhanced corn (*se*)			Sweeter and more tender than standard sweet corn.
Precocious	73	Y	Vigorous. The earliest *se* corn.
Sugar Buns	78	Y	Reliable. Good flavor for such an early corn.
Legend	79	Y	Attractive husk.
Champ	79	Y	High yield, nice appearance.
Spectrum	79	Y	Sweet.
Coronation	84	W	Early for a white *se* corn.
Silverado	85	W	Good seedling vigor. Good flavor.
Bodacious	85	Y	Good flavor. Exceptionally tender.
Pristine	86	W	Early for a white *se* corn.
Zest	88	W	Excellent eating quality.
Incredible	89	Y	Exceptionally tender. Good husk protection.
Calico Belle	89	B	Excellent eating quality.
Tastee Treat	95	Y	Tender and creamy.
Kandy Korn	95	Y	Distinctive purple color in leaves and husk.

Name	Days to Maturity	Color	Comments
Supersweet sweet corn (*sh-2*)			Extremely sweet, crunchy, storable.
BSS 4011	76	B	Early for an *sh-2*.
GSS 3590	76	Y	Early. Good vigor for an *sh-2*.
Sweet Ears	82	Y	Early. Good vigor for an *sh-2*.
Diabolo	83	B	Early. Good vigor for an *sh-2*.
Sweet Treat	83	Y	Early. Good vigor for an *sh-2*.
Challenger	86	Y	Good seed vigor. Consistent producer.
Snow White	87	W	Good seed vigor.
Candy Store	88	B	Excellent quality.
Zenith	88	Y	Often bears second ears.
Sweetie 82	89	Y	Particularly crisp and tender.
How-sweet-it-is	90	W	Excellent quality. Poor seed vigor.
Camelot	90	W	Improved version of award-winning How-sweet-it-is.
Supersweet Jubilee	90	Y	Tender and flavorful.
WSS 3680	90	W	Often bears second ears.
Even Sweeter	90	W	Excellent quality.
Sugar Loaf	91	Y	Combination of *su* and *sh-2*. Often bears two ears.
Open-pollinated sweet corn (*su*)			Heterogeneous.
Dorinny	65	Y	Very early for an open-pollinated corn. Small ears, good quality.
Black Mexican	69	W	Primitive sweet corn. Kernels black when mature.
Golden Bantam	87	Y	Early for an open-pollinated corn. Small ears, good quality.
Country Gentleman	102	W	Late, white, tough kernels do not form rows.
Stowells Evergreen	102	W	Late, white, tough kernels.

Note: Y, yellow; W, white; B, bicolor.

Pesticide residues — Recommendations for use are based on currently available labels for each pesticide listed. If followed carefully, residues should not exceed the established tolerances. To avoid excessive residues, follow label directions carefully with respect to rate, number of applications, and minimum interval between application and reentry or harvest.

Groundwater — To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

Trade names — To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

until the plants are several inches tall. This delay in irrigation promotes deep rooting.

Young corn plants cannot tolerate waterlogged soil for more than 1 day. Even if you see no apparent ill effects, yield will be reduced. To help you decide when to irrigate, dig down about 5 inches and grab a handful of soil. If the ball crumbles easily, it is time to water.

Two periods in the life of corn are particularly sensitive to water stress caused by insufficient moisture: when the tassels are just becoming visible down in the whorl and when the plants are silking. Even 1 or 2 days of stress during these periods can severely reduce yield.

Fertilization

Nitrogen (N) is the nutrient that most limits corn growth. In most soils, corn responds dramatically to addition of N. Phosphorus (P) or potassium (K) availability sometimes limits corn growth in Idaho although many garden soils have sufficient reserves of these nutrients.

Before planting — Most corn needs about 0.25 pounds of N for every 100 square feet of garden space. To apply that amount, mix in about 2.5 pounds of a fertilizer containing 10 percent N such as 10-10-0[2] or 10-5-5 per 100 square feet of garden space. Other fertilizers may be used. For example, to obtain 0.25 pounds of N per 100 square feet using 8-8-8, you would need to add $0.25 \div 0.08 = 3.1$ pounds per 100 square feet. With 17-23-10 you would add $0.25 \div 0.17 = 1.5$ pounds per 100 square feet. Use a fertilizer containing P as well as N for the preplant application. The corn may not need so much P, but the excess P won't go anywhere, and subsequent crops can use it. Very sandy soils could be deficient in K or sulfur, but most garden fertilizers contain enough of these elements.

Micronutrient deficiencies, especially of zinc, can occasionally reduce corn yields in Idaho. Adding and maintaining organic matter in your soil helps to avoid zinc deficiency. If you have a big garden, grow corn commercially, or have very sandy soil, have your soil tested before you plant to make sure the corn won't suffer from a nutrient deficiency.

After planting — When the corn has three to six fully expanded leaves, side-dress with more N fertilizer. Ammonium sulfate (21-0-0) and urea (46-0-0) are the most economical sources. Add about 1.4 pounds (2.5 cups) ammonium sulfate per 100 linear feet of row. This represents about 0.12 pounds of N per 100 square feet. If you are sprinkler irrigating, you can place the sidedressing on the soil surface. With furrow irrigation, place the additional N 6 to 12 inches to the side of the plant and several inches deep in the soil. If this is not feasible, mix in the additional N fertilizer before planting.

Pest control

Weeds — Weeds are the most troublesome gardening problem. Three approaches exist for controlling weeds in corn: mulching, cultivating, and applying herbicide. Growers usually use a combination of two of these methods. One approach for the home gardener is to hoe once or twice when the corn is very small and again after side-dressing with fertilizer. Then apply a mulch.

You can mulch with moldy hay, straw, grass clippings, or even newspapers. Except for newspaper, the mulch should be at least 4 inches deep. Inadequate mulch is worse than none at all because it won't keep down weeds and interferes with hoeing. Black plastic mulch is normally positioned before planting, and the seeds are planted through holes cut in the plastic. Besides controlling weeds, mulch conserves moisture. Black plastic warms the soil, speeding maturity.

A tractor equipped with sweeps for cultivation is a useful adjunct to herbicides for the small-market grower. Do not hoe or cultivate deeply, or you will injure the corn's root system. Rotary hoes are useful for weeding young corn and can also be used before corn emergence to break up soil crusts. Herbicides work well for weed control in corn. See the PNW *Weed Control Handbook* for specific recommendations concerning herbicide use in corn.

Diseases — Sweet corn seedlings up to the five-leaf stage are susceptible to a disease called seedling blight. This disease stunts seedlings and eventually kills them, especially in supersweet corn. Symptoms include dead tips or streaks on the lower leaves. In some plants leaves roll or wilt, even when the soil is moist. Control measures include use of high-quality seed treated with fungicide and frequent, light irrigation.

Insects — The only common and serious insect pest of sweet corn in Idaho is the **corn earworm.** This insect lays eggs on corn silks. Its larvae burrow into the upper part of the ear and feed. The corn earworm is most serious in the western part of the Snake River Valley. In infested areas, most

[2]The first number on a fertilizer analysis tag denotes the percentage of N; the second, the percentage of P (as P_2O_5); and the third, the percentage of K (as K_2O). Thus 10-10-0 stands for 10 percent N, 10 percent P, and 0 percent K.

More University of Idaho publications

The following publications are available from Ag Publications, University of Idaho, Moscow, ID 83843-4196 (208-885-7982). You may also order them from the University of Idaho Cooperative Extension System office in your county.

CIS 226 *Garden Vegetable Insect Control* (45¢)
CIS 645 *Short Season Sweet Corn Trials* (35¢)
CIS 879 *Seedling Blight of Sweet Corn* (50¢)
CIS 897 *Herbicides for the Home Garden* (35¢)
EXT 726 *Weed Control in the Home Garden* (50¢)
PNW 172 *Canning Vegetables* (25¢)
PNW 214 *Freezing Fruits and Vegetables* (25¢)
PNW 239 *How to Calculate Manure Application Rates in the Pacific Northwest* (25¢)

Further reading

Sprague, G. F., ed. 1977. Corn and corn improvement. Agronomy Monograph no. 18. American Society of Agronomy, Madison, Wisconsin.

Whealy, K. 1985. The garden seed inventory. Seed Saver Publications, Decorah, Iowa.

Yepsen, R. B., ed. 1976. Organic plant protection. Rodale Press, Emmanus, Pennsylvania.

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Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, LeRoy D. Luft, Director of Cooperative Extension System, University of Idaho, Moscow, Idaho 83843. We offer educational programs, activities and materials without regard to race, color, religion, national origin, sex, age or disability, in accordance with state and federal laws.

1,500 12-91 (replaces CIS 662)

50 cents per copy