

## Growing Sweet Corn

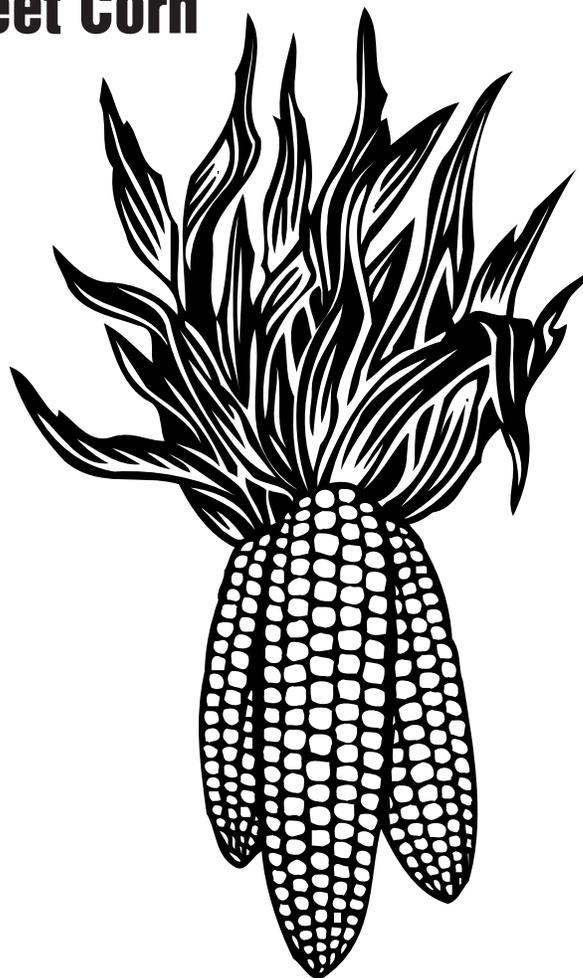
Sweet corn is a popular crop among Maryland vegetable producers who are growing vegetables for fresh market sales. Because it is so popular with consumers also, sweet corn acreage greatly surpasses acreage of other fresh market vegetables. Sweet corn is easier to grow than some other vegetable crops, because some of the cultural and equipment needs of sweet corn are similar to those of field corn.

### Types and Varieties

Seed companies now offer sweet corn varieties in many combinations of color, sweetness genes, and maturity. Although most consumers in Maryland prefer white sweet corn, some high-quality yellow and bicolor types are available for growers who can develop a market for them. With the improved quality and sweetness available in the newer types, many growers are marketing by variety name. Some varieties currently recommended are shown in Table 1. In general, the sugary enhanced (se) and supersweet (sh2) types have a sweeter taste than the standard sugary (su), even after short storage periods.

### Preparing and Fertilizing the Soil

Fertile, easily worked soils are best for sweet corn production. Although corn requires adequate soil moisture, standing water resulting from poor drainage will injure the crop. For early plantings, select well-drained soils that warm rapidly.



Fertilize according to soil tests. If soil test results are not available, use the following as a fertilization guide:

- Soils should be limed to a pH of 6.0 to 6.5. If magnesium is low, use dolomitic limestone.
- Plow down 500 pounds of 10-20-20 per acre three weeks before planting.
- Apply 200 pounds per acre of 10-10-10 with the planter.
- At last cultivation when plants are 12 to

**Table 1. Characteristics of selected sweet corn varieties.**

Color	Maturity	Variety	Sweetness genes <sup>1</sup>	Disease response <sup>2</sup>
White	Medium Early	Pearl White	su	BWMS
		Quick Silver	su	BWMS
		Spring Crystal	su	
		Sweet Ice	SB	
	Main Season	Alpine	se	
		Silverado	se	BWMS
		Snowbelle	se	
		Ssuper Sweet 8701	sh <sub>2</sub>	
	Medium Late	Argent	se	
		Even Sweeter	sh <sub>2</sub>	
		Frontier	sh <sub>2</sub>	
		Silverette	se	
		Silver King	se	
Yellow	Early	Champ	se	
		Seneca Horizon	su	BWMS
		Sundance	su	BWMS
	Medium Early	Earlibelle	su	BWR, MDMR, RR
	Main Season	Gold Winner	su	BWS
		Merit	su	BWR, MDMR, SmR
		Showcase	sh <sub>2</sub>	
		Ssuper Sweet 7210	sh <sub>2</sub>	
		Ssuper Sweet 7630	sh <sub>2</sub>	
	Tracer	se		
	Bicolor		Sensor	se
		Dazzle	sh <sub>2</sub>	
		Cornfetti	su	
		Calico Belle	se	
		Calypso	sh <sub>2</sub>	
		Cabaret	sh <sub>2</sub>	
		Sweet Sue	su	BWMS
		Summer Flavor 79BC	se	

**KEY**

<sup>1</sup> SB = Sweet Breed; se = sugary enhanced; sh<sub>2</sub> = super sweet; su = normal sweet

<sup>2</sup> BWMS = bacterial wilt moderately susceptible; BWR = bacterial wilt resistant; BWS = bacterial wilt susceptible; MDMR = maize dwarf mosaic resistant; RR = rust resistant; SmR = smut resistant

18 inches tall, use 50 to 70 pounds per acre of nitrogen (equal to 100 to 150 pounds of urea).

- If your planter does not have fertilizer attachments, plow down 800 pounds per acre of 10-10-10 into the soil before planting and sidedress with 400 pounds of 10-10-10 at the last cultivation.
- Check with your county Extension office on use of the pre-sidedress nitrogen test (PSNT) to help determine the need for sidedressed nitrogen.
- If manures are to be applied or legume cover crops are to be used, they will contribute to fertility and soil tilth. Reduce the amounts of applied fertilizers according to Table 11 in University of Maryland Cooperative Extension Bulletin (EB) 236, "Commercial Vegetable Production Recommendations." Manures and cover crops to be incorporated should be plowed down prior to planting.
- For organic production, apply materials to provide comparable nutrient rates of 125-150 lb/A nitrogen and available phosphate and potash as recommended by soil tests.

## Planting

Most seed is treated with fungicides and insecticides to reduce injury from soilborne diseases and insects prior to emergence. Growers can treat their own seed, but it is much simpler to purchase treated seed. Organic growers or those intending to grow pesticide-free sweet corn should request untreated seed at the time seed is ordered.

Early varieties of sweet corn are planted about April 10 in most of Maryland, after soils have begun to warm. The early varieties are more difficult to manage than later varieties and often are not as flavorful. Main-season sweet corn is usually planted between May 1 and June 1, although the planting season can be extended to early July. Corn planted after mid-May will usually have more problems with insects, especially with fall armyworm and corn earworm.

Plant 12 to 15 pounds of corn per acre, 1 to 2 inches deep. Supersweet varieties should not be planted more than 1 inch deep or in cold

soils in the spring since they tend to have less vigor. The smaller-eared early varieties should be planted in rows 30 to 36 inches apart with 8 to 10 inches between each plant in the row. Two-eared varieties and later-season large-eared varieties also should be planted in rows 30 to 36 inches apart, but spacings between plants in the row should be 10 to 12 inches. Populations would range from 14,500 to 26,000 plants per acre depending on in-row and between-row spacings selected.

Separate white sweet corn and supersweets by 300 feet or twelve days in maturity from yellow sweet corn, field corn, and ornamental corn, if possible. White corn that is pollinated by yellow varieties will appear bicolor, and the supersweets can taste like field corn if they are pollinated by another genetic type.

For a continuous harvest from a single variety, plant the corn about every ten days or when the previous planting has about one or two true leaves. You should be able to harvest five to seven days apart.

You may want to try the heat unit system for determining when sweet corn should be planted. It uses recorded temperatures to estimate development of the plantings. For more information on the heat unit method of scheduling sweet corn planting, ask your county Extension office for HE 129-82, "The Use of Heat Units to Schedule Plantings of Sweet Corn."

## Irrigating

Make sure corn gets enough water, especially during the time from tasseling until harvest. The crop requires supplemental irrigation or rainfall totaling at least 1 inch per week. Lack of adequate moisture will reduce both quality and yield of sweet corn.

## Managing Weeds

Select fields whose weed and herbicide application histories are known. Try to avoid those fields infested with weeds that can be difficult to control or fields previously treated with herbicides that might restrict selection of crops that follow. Timely cultivation (unless the crop is being grown no-till) and use of appropriate herbicides will help reduce weed pressures on the crop. Before selecting an herbicide or herbicide combination, try to deter-

mine the weed species that are present. Then select from materials that are effective on those weeds. Information in EB 236 lists effectiveness of presently available herbicides as well as suggested materials and rates for sweet corn.

Growers often use preemergence herbicides, which will kill weeds as they germinate. The field must be weed-free at the time of application, because preemergence herbicides are not effective on existing weeds. Combinations of alachlor plus atrazine or metolachlor plus atrazine will generally be effective for the entire growing season. Be sure to note any restrictions on double-cropping following atrazine use. Following harvest, the timely mowing or disking of weeds or the use of contact herbicides can help reduce future weed populations by preventing weeds from going to seed.

## Managing Insects

Since most consumers prefer ears free from insect damage, growers often incorporate insecticides into production programs. Early plantings often escape insect injury, since insect populations tend to go through several peaks and are usually lowest early in the season. Late-maturing sweet corn is usually more severely damaged.

Table 2 gives descriptions and damage of insect pests, and suggests insecticides for each for those who might wish to use them. "Insect Pests of Sweet Corn," available from Extension offices for a small charge, contains a number of color photos of corn insects that can help with proper identification. Be sure to consult a current revision of EB 236 to obtain recent information on all pesticides. Decision-making aids are also available to help growers determine whether an insecticide is needed. These are based on insect types and numbers as well as stage of growth of the crop. Some insecticides are very toxic to beneficial honeybees, so choose and apply materials carefully to protect valuable bees that might be foraging in sweet corn fields.

Some newer varieties are being developed that carry the *Bt* gene, which allows the plant to produce its own insecticide. These plants are thus protected genetically against corn earworm, corn borer, and fall armyworm. They are not protected against flea beetle or sap

beetle, however, so monitoring of these insects will still be needed.

## Insecticide Application

High-clearance sprayers are designed to give good application of insecticides to corn. If you do not have a high-clearance sprayer, air-blast or boom sprayers can be used providing drive space is left in the field. Plant eight rows of corn and then skip two to three rows in order to leave enough space for the spray equipment. The skip rows will also help facilitate moving harvested corn from the field.

## Managing Diseases

Diseases are not usually a problem with sweet corn, especially if the precautions noted in Table 3 are followed. For additional information on pesticides for both insect and disease pests see a current revision of EB 236.

## Harvesting

It is important to harvest sweet corn at the peak of maturity. Corn is ready for harvest when the juice inside the kernel appears milky and spurts out as you press it with your thumbnail. Kernels of immature ears are watery while those on old ears are tough and doughy. Dry brown silks and full ears, firm to the touch, also are a sign of maturity.

To handpick corn, grasp the ear near the base and sharply twist it downward while rotating your wrist. Mechanical harvesters are available, but their use is usually limited to larger acreage. Sorting will be needed after mechanical harvest to remove trash and immature ears.

## Marketing Corn

The sweet corn business is competitive, but with good marketing and management skills, it can be profitable. Listed below are several factors to consider:

- Sweet corn should be picked daily or several times daily for local marketing. Harvest corn in the morning and cool it immediately, either by placing it in a cooler or by wetting it down and keeping it in the shade. Larger growers might invest in walk-in or freestanding coolers or other special facilities such

**Table 2. Descriptions, damage, and insecticides for sweet corn insect pests.**

Pest	Description and damage	Pesticide	Remarks
Corn earworm (most common pest)	Caterpillars are green, yellow, pink, or brown with light stripes and yellow heads, up to 1¾ inches long. They appear first on fresh silks and later feed on kernels near the tip of the ear.	Asana XL, Lannate, Ambush, Pounce, or Warrior. (See EB 236.)	When the silks first form, apply a directed spray to the silks every 2 to 4 days until harvest is complete. Ambush and Pounce may lose effectiveness when air temperature is over 85°F. Under high temperature conditions, spray in the early evening.
Corn sap beetle	These small, dark beetles begin activity when the silks start to form. Adults are black or dark brown, ⅜ inch long. Larvae or young are cream-colored, maggot-like, and up to ¼ inch long. Both adults and larvae are found in the corn ears.	Asana XL, diazinon, or Warrior. (See EB 236.)	The treatment for corn earworm can minimize sap beetle damage. Also, tight husks can reduce sap beetle damage.
Corn flea beetle	Small, black jumping beetles attack young plants and transmit bacterial wilt to sweet corn. They are most abundant after mild winters.	Asana XL, Lannate, Lorsban, Ambush, Pounce, Sevin, or Warrior. (See EB 236.)	Treat susceptible varieties of corn at the spike stage when 6 or more beetles per 100 plants can be found. Planting bacterial wilt resistant (BWR) varieties of sweet corn will lessen the insect's harmful effects.
Fall armyworm	This caterpillar occurs in late season chewing on whorls of late-planted corn. If numerous, this dark-colored worm with an inverted "Y" on the front of its head will feed on ears by either entering the tips or side of the ear.	Baythroid, diazinon, DiPel, Lannate, or Warrior. (See EB 236.)	Apply granules over the plants so that the granules fall into leaf whorls. Repeat as necessary. For foliar sprays, use 50 to 75 gallons per acre for effective control.
European corn borer	European corn borer is a pale, pink or brownish caterpillar with a dark brown head, up to 1¾ inches long. Borers tunnel and feed in stalk and can enter ears at the base or top.	Asana XL, Baythroid, diazinon, DiPel, Lannate, Lorsban, Ambush, Pounce, or Warrior. (See EB 236.)	Thorough spray coverage in whorls and on plants is essential. Select an insecticide that has low toxicity to bees. Granular formulations, if applied over the whorl, are generally more effective than liquid formulations for European corn borer.



as a hydrocooler. Remember that buyers of fresh sweet corn are particular about the word “sweet.”

- Do not display corn in the sun and discourage buyers from leaving corn in the trunks of cars in hot weather.
- Encourage customers to use the corn as soon as possible, since flavor and sweetness begin to diminish after harvest. Tell them to put corn in the refrigerator when they get home if it will not be used immediately.

**Table 3. Sweet corn diseases.**

Disease	Description and damage	Control
Bacterial wilt	Bacteria overwinter in the corn flea beetle and wilt is spread to corn when beetles feed on corn plants. It is more severe on younger plants than old. Pale-green to yellow streaks appear on leaves, which later turn brown. Early infected plants can die, while late-infected plants can be stunted or merely have streaked leaves.	Use an insecticide at seedling emergence, repeating every 3 to 5 days until 4 to 5 applications have been made. In areas where this disease is a problem, use resistant varieties of sweet corn, if possible. See Table 1 for specific recommendations.
Smut	Large, fleshy, irregular galls can form on leaves, stems, ears, and tassels. The immature galls are white and spongy. Mature galls are brown and contain powdery, black spores of the fungus.	Fungus overwinters in the soil. Some varieties of corn are more susceptible to this disease than others. Choose a smut-resistant variety, if possible.
Leaf blights	Leaf spots include northern corn leaf blight and southern corn leaf blight. Size and color of the spots help identify the different diseases.	Fungus overwinters in the soil in diseased plant refuse. In most years, leaf blight is not a serious problem.
Rust	Rust begins as cinnamon brown blisters over both surfaces of leaves. The blisters break and release spores, which can infect additional corn.	In most years, chemical control is not needed. Late-season corn might need spraying if the corn is infected at whorl stage or earlier. (See EB 236).

- Sweet corn can be stored for several days with a minimal loss of flavor at a temperature of 32°F and a relative humidity of 90 percent. High-sugar types maintain their quality longer and for this reason might be preferred by buyers.
- The more marketable ears you produce per acre, the greater your profit will be. Therefore, strive to produce a crop with as many undamaged ears as possible.

## References

- “Commercial Vegetable Production Recommendations,” University of Maryland Cooperative Extension Bulletin 236.
- “The Use of Heat Units to Schedule Plantings of Sweet Corn,” University of Maryland Department of Natural Resource Sciences and Landscape Architecture HE 129-82.
- “Insect Pests of Sweet Corn,” University of Maryland Cooperative Extension Leaflets PMA-1 and PMA-2.

## Costs and Returns

### Yield and price assumptions

Yield	Price per dozen		
	<u>\$1.25</u>	<u>\$1.75</u>	<u>\$2.25</u>
Good—600 doz.	\$ 750	1,050	1,350
Better—800 doz.	\$1,000	1,400	1,800
Best—1,200 doz.	\$1,500	2,100	2,700

### Estimated cash cost per acre

<u>Item</u>	<u>Cost/Acre</u>
Cover Crop Seed (1½ bu. rye seed) . . . . .	\$ 4.50
Lime (½ ton limestone) . . . . .	13.00
Fertilizer	
(500 lb. 10-20-20) . . . . .	67.85
(200 lb. 10-10-10) . . . . .	50.00
(100 lb. urea) . . . . .	9.70
Seed (15 lb.) . . . . .	52.50
Herbicides (2 qt. Lasso + 1½ lb. atrazine) . . . . .	12.15
Insecticide (2 pt. x 6 sprays) . . . . .	26.87
Fuel and Oil . . . . .	12.65
<b>Total . . . . .</b>	<b>\$249.22</b>

The above budget is a cash-cost budget dealing with growing costs alone. Costs for harvesting, grading, hauling, and containers have not been included. To determine total production costs, include the fixed costs for land, equipment, and labor.

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