

Commodity Spotlight



USDA photo: Bill Tarpenning

How Sweet It Is: Fresh Sweet Corn

Corn-on-the-cob is back. After more than a decade of nibbling, Americans enthusiastically embraced fresh-market sweet corn during the 1990s. Consumption reached record highs in the 1990s enticed by new sweeter varieties and value-added packaging. This strong demand, combined with rising production and higher shipping-point prices, pushed average crop value up 81 percent between 1988-90 and 1998-2000 to \$456 million.

Sweet corn is a member of the Gramineae (grass) family (as are wheat, barley, and rice) and a native of the tropical Americas. It is a subspecies of the genus *Zea* (species *mays*) that has been a staple crop in Central and South America for thousands of years. Sweet corn is actually a genetic mutation of field corn and was reportedly first grown in Pennsylvania in the mid-1700s, with the first commercial variety introduced there in 1779. The natural mutation in sweet corn causes the kernel to store more sugars than field corn. Ironically, this mutation may have been considered a nuisance for centuries as it interfered with the storability of field corn.

Sweet corn is harvested before it matures, while the sugar content is still high. Most varieties of sweet corn feature kernels that are yellow (most popular), white, or bicol-

or (a combination resulting from cross-pollination). Florida growers favor yellow varieties (due to buyer demand) while California growers are increasingly favoring white varieties. Although there may be regional consumer preferences for corn color, sweetness is not related to color.

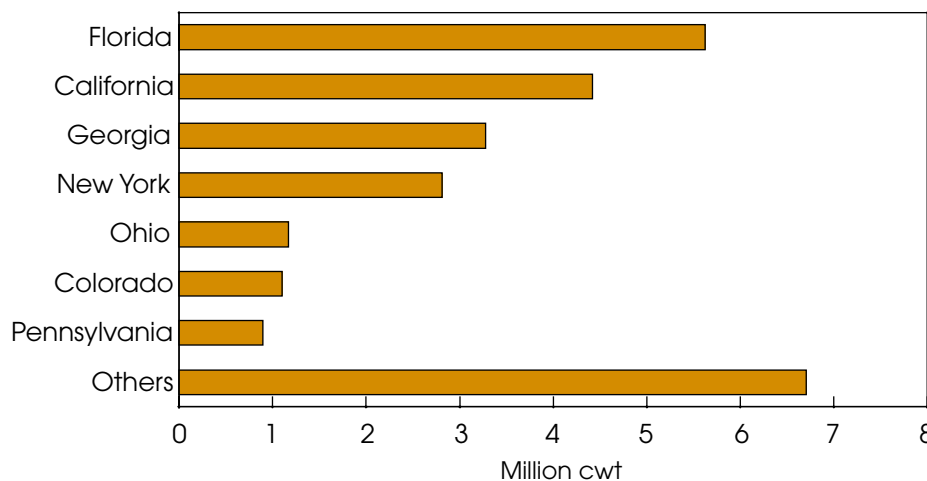
Today, most sweet corn varieties fall into one of three genetic types—normal sug-

ary, sugary-enhanced, and supersweet. The sugary enhanced hybrids are sweeter than the older cultivars, but the supersweets, which now predominate, are even sweeter and offer extended shelf life.

Because sugar content is maintained longer, sweet corn can be more easily shipped long distances while maintaining peak marketability. The supersweet varieties introduced (and refined) over the past 15 years allow corn to hold optimal quality for at least 10 days, twice that of other types. Supersweets have been around for several decades, but until the late 1980s failed to catch on with most growers because of poor germination and very low yields in varieties available at that time.

In the U.S., sweet corn is produced for three distinct markets—fresh, canning, and freezing. These markets largely operate independently, with separate supply, demand, and price characteristics. The canning market is the largest in terms of total acreage and production, accounting for 37 percent of each. However, like broccoli, carrots, and other dual-use (fresh and processing) vegetables, the fresh market accounts for the majority (two-thirds) of total sweet corn crop value.

Florida: Leader of the Pack in Fresh Sweet Corn Production



Average fresh-market sweet corn production during 1998-2000. Source: National Agricultural Statistics Service, USDA. Economic Research Service, USDA

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Corn by Any Other Name, Not as Sweet

The words “sweet corn” or “corn-on-the-cob” summon images ranging from a festive summer barbecue to Yankee pot roast or clam bakes. Sweet corn is one of several types of corn, which also includes flint corn, dent corn (yellow and white), popcorn, flour corn, and pod corn.

White (dent) corn is largely used to make foods such as grits and various breakfast cereals. Blue corn, popular in Mexican foods and health food stores, is a type of flour corn used for colorful tortillas, corn chips, and cereals. Baby corn—a processed product largely imported due to extensive hand harvest requirements—consists of immature field or sweet corn varieties (some developed specifically for baby corn production) harvested a day or two after the silks appear on the ear, while the cob is small and tender.

Flint corn, also called Indian corn, can be very colorful and is largely ornamental in the U.S. Some colorful ornamental corn cultivars are produced from miniature popcorn varieties, which may even sport colorful leaves and stalks. Although used mostly for livestock feed, yellow (dent) corn in the milk stage has a sweet flavor and can be consumed like sweet corn. Through the mid-1900s, this sweet “green corn” was marketed as “roasting ears” in parts of the country, while traditional sweet corn was marketed as sugar corn.

Fresh Market Is Seasonal

In 2000, area harvested for fresh-market sweet corn reached a record high 246,900 acres and production was second only to the 1998 high. During 1998-2000, Florida was the leading producer of fresh-market sweet corn with 22 percent of the U.S. crop. California (17 percent), Georgia (13 percent), and New York (11 percent) are also leading producers. Sweet corn for processing is grown primarily in Wisconsin, Minnesota, Washington, and Oregon.

Production of fresh-market sweet corn is highly seasonal, reflecting both past production trends and consumption habits. Peak volume occurs during July, with 60 percent of total marketings in May-August. Although shipments peak around July 4, they are also strong around the Memorial Day holiday—typically the start of the picnic and vacation season.

Movement during the winter quarter (January-March) accounts for only about 10 percent of annual volume, with the majority supplied by Florida and supplemented by imports from Mexico. Increased winter movement during the 1990s largely reflects both better marketing (largely pre-packaged ears of corn) and the adoption of newer varieties with longer shelf life. These varieties have proven popular with consumers and retailers and could help

further expand the domestic market by fostering off-season demand.

In addition to using varieties that maintain tenderness and sweetness over an extended period, fresh-market growers and shippers have taken other steps to enhance product quality and marketability. Because sugar in the kernel is converted to starch as corn matures, harvest timing is critical. The conversion of sugar to starch is more rapid at higher temperatures, so corn is moved quickly from fields to special coolers where field heat is removed by vacuum (cold air) cooling, hydrocooling (cold water), and/or package icing.

Once harvested (mostly by hand), fresh sweet corn has a relatively narrow market window, which varies greatly with variety and the temperature at which it is held. Sweet corn must be shipped to market in refrigerated transports soon after harvest. If harvested too late or left uncooled for a couple of days, it can be bland, tough, and tasteless.

Fresh-Market Prices Trending Higher

Shipping-point prices for fresh-market sweet corn (unadjusted for inflation) tied the 1995 record high of \$18.30 per cwt during the 2000 season, up 22 percent from 1990. After adjusting for inflation,

the season-average price received by growers in 2000 was about the same as in 1990 and in the early 1960s. Unlike the canning and freezing corn markets, which almost exclusively feature contract pricing between growers and processors, most fresh sweet corn is priced on the daily spot market.

During the 1990s, monthly fresh sweet corn shipping-point prices trended upward until mid-1996 when prices slumped slightly. This pause in the price trend, which continued until 2000, was likely the result of uneven increases in supplies as shippers sought to meet an expansion of market demand. As supply and demand evened out in late 1999 and into 2000, market prices resumed their upward trend. Retail prices are not reported for sweet corn.

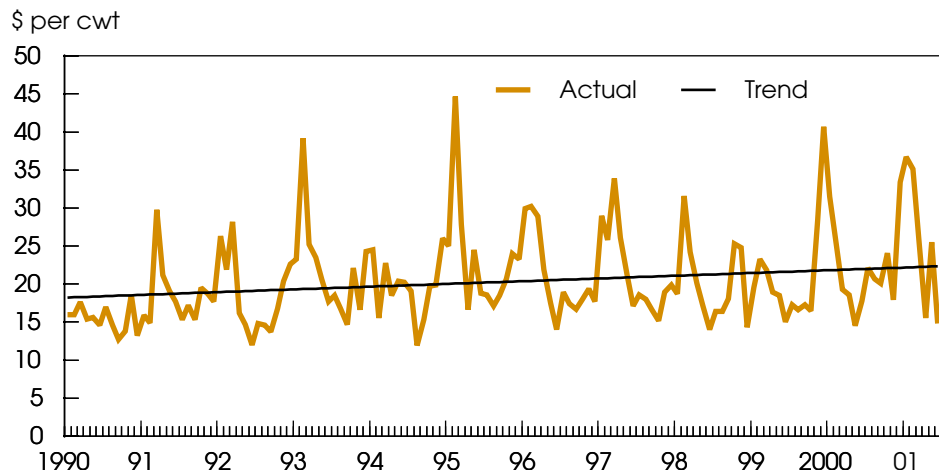
Despite recent increases in production and imports during the cooler months of the year, interseasonal price patterns have been constant for the past two decades. Prices begin to decline in March before falling off sharply in April when production in central Florida begins to flow to market. Prices continue to decline through the seasonal low in June before July 4 holiday demand slightly increases average prices. As supplies become available from more states during the summer, prices settle at low levels through September. Then as cool weather and frost ends production in all but southern states, prices climb and fluctuate through the end of the year.

Trade Increasing, But Still Small

World trade has traditionally been a minor part of the U.S. fresh sweet corn market. The U.S. leads the world in sweet corn exports and is a net exporter of fresh sweet corn, shipping twice the volume imported. During 1998-2000, the U.S. exported 4 percent of production while importing just 2 percent of the sweet corn consumed domestically.

With the strong dollar, higher consumption of fresh vegetables, and lower (or phased out) import tariffs, import volume averaged 180 percent higher in the 1990s than during the 1980s. Sweet corn imports have continued to grow, with 2000 volume more than double the average of the

U.S. Sweet Corn Prices Peak in Winter



Nominal monthly shipping-point prices.
Source: National Agricultural Statistics Service, USDA.
Economic Research Service, USDA

1990s. Mexico provided 92 percent of fresh sweet corn imports during 1998-2000, with the majority arriving during the winter (December to April).

On the export side, growth has slowed over the past two decades. Volume during the 1990s averaged 77 percent higher than in the 1980s, but 2000 exports were just 14 percent above the 1990s average. Canada received 84 percent of U.S. fresh sweet corn exports during 1998-2000, with the United Kingdom a distant second at 5 percent. The majority of exports occur before the Canadian crop is harvested (between April and July), with peak volume in May and June.

Consumption Trend Sweetens

U.S. sweet corn demand has trended higher over the past decade due largely to improved quality, consistency, and marketability. According to *Fresh Trends, 2001* (Vance Publishing), 87 percent of surveyed consumers rate taste as the top attribute in purchasing fresh produce. Product appearance is also important. Therefore, the late 1980s introduction of husked and trimmed ears in attractive tray packs (many microwaveable) may have boosted the appeal of sweet corn. Retailers may also be more interested in sweet corn, given the extended shelf life of supersweet varieties and more sophisticated handling

and packaging at the shipping point, each of which help to reduce retail shrinkage and improve customer satisfaction.

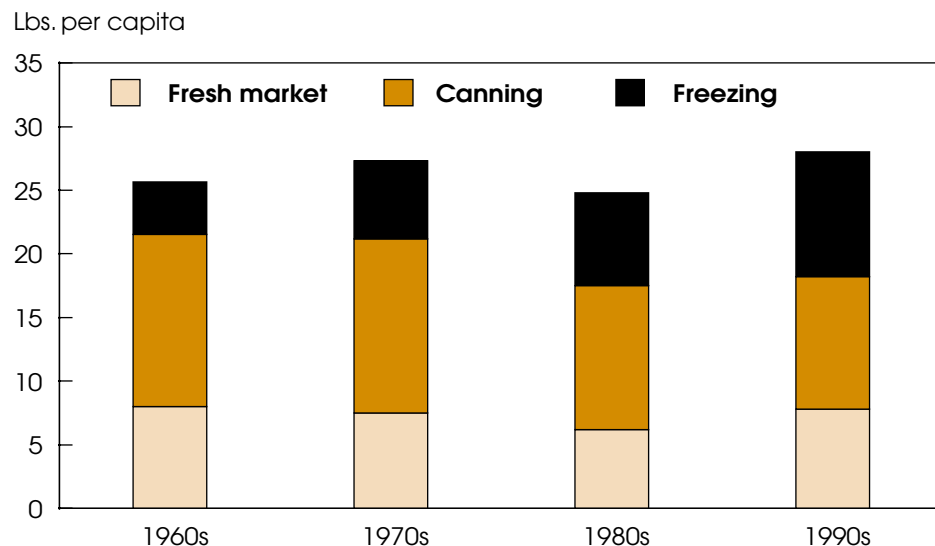
Rising consumption over the past decade is due in large part to the success of the fresh sweet corn industry in providing an improved product. Domestic consumption of fresh sweet corn averaged 2.6 billion pounds during 1998-2000—up 62 percent from 1988-90. In fact, consumption of

sweet corn has been rising since the early 1920s. Per capita use of fresh sweet corn trended up from the early 1920s to the late 1940s before flattening out at around 8 pounds into the mid-1970s. Demand then began to wane and bottomed out at about 6 pounds in the mid-1980s as inconsistent quality, increased away-from-home eating, and the desire for more convenient foods chipped away at demand.

Meanwhile, demand for frozen sweet corn accelerated in the 1980s and into the 1990s as consumers found frozen corn faster and more convenient to prepare (especially in the microwave). Frozen corn also held important advantages in consistent quality and taste. The fresh sweet corn industry responded to this challenge in the late 1980s and 1990s. Shippers began offering convenience and “curb appeal” in the form of tray-pack corn. At the same time, seed companies released new supersweet hybrids that dramatically boosted quality. During 1998-2000, per capita use of fresh sweet corn averaged 9.3 pounds—up 48 percent since 1988-90 and the highest since records began in 1919.

On a fresh-equivalent basis, sweet corn consumption is divided equally among fresh, frozen, and canned. According to USDA's 1994-96 *Continuing Survey of*

Sweet Corn Consumption Was Record High in the 1990s

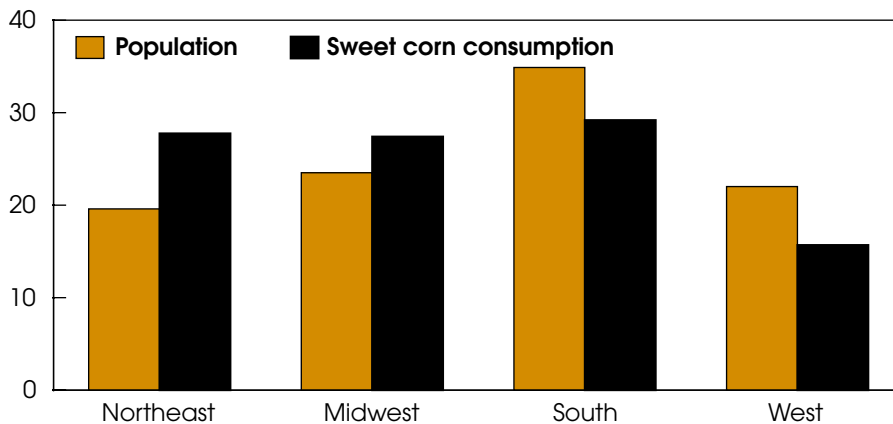


Fresh-weight basis.
Economic Research Service, USDA

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Fresh Sweet Corn Is Most Popular in Northeast and Midwest

Percent of U.S. total



Derived from the Continuing Survey of Food Intake by Individuals, 1994-96; Agricultural Research Service, USDA. Regions defined by Census Bureau.

Economic Research Service, USDA

Food Intakes by Individuals, fresh sweet corn, like most other foods, is largely purchased at retail for home consumption (87 percent). The small percentage used in foodservice may largely reflect the difficulty and labor intensity of handling and preparing fresh sweet corn in a restaurant environment. Labor is the single largest expense in most foodservice operations, and that alone heavily favors the use of prepared frozen and canned corn products.

Relative to onions, peppers, and celery, sweet corn in fresh form offers somewhat limited culinary options. Most fresh-market corn-on-the-cob is boiled, steamed, baked, or grilled. Canned and frozen sweet corn is less labor intensive and offers a wider range of culinary options, including soups, chowders, fritters, casseroles, relishes, salads, and succotash.

In the away-from-home market, U.S. consumers most often eat sweet corn in standard “white tablecloth” restaurants. Shippers of both fresh and processed sweet corn have been unable to find a substantial niche in the expanding fast-food market, which is responsible for less than 4 percent of fresh sweet corn consumption

and less than 2 percent of canned and frozen corn.

Regionally, people in the Northeast and Midwest eat more fresh-market sweet corn than do consumers in other areas of the country. Northeasterners consumed twice as much per capita as did people in the West in 1994-96. Lower sweet corn consumption in the West may reflect both the influence of the Hispanic population (who eat fresh sweet corn sparingly) and the West’s status as the national leader in fast food and other restaurant spending—places where sweet corn is not well represented.

Consumers in suburban areas, where 47 percent of the U.S. population resided at the time of the 1990 Census, consumed nearly 60 percent of all fresh sweet corn. About a third of all Americans resided in metro areas, but they consumed only about one-fifth of fresh sweet corn. Preferences along racial lines indicate that 86 percent of all fresh-market sweet corn was eaten by non-Hispanic White consumers (who accounted for 73 percent of the population in the 1990 Census).

Corn Smut: A Profitable Delicacy

Corn smut is a common fungus found largely on sweet corn throughout the world. In most areas of the U.S., smut is not a major threat to the viability of the corn crop. Some U.S. sweet corn growers actually hope to find smut in their fields. In Mexico, immature smut galls are consumed as an edible delicacy known as *cuitlacoche*. Especially prized in fresh form (it is largely sold canned), sweet corn smut galls have reportedly become a money-making product for a few sweet corn growers who sell them to Mexican restaurants.

The survey results also suggest a positive correlation between income and fresh sweet corn use. Consumers in the survey’s top income bracket reported the highest per capita consumption and those in the lowest bracket reported the lowest consumption.

Men age 40-59 (12 percent of the population) consumed the largest share of fresh sweet corn (21 percent), while women of the same age also consumed slightly more fresh sweet corn than their share of the population. Surprisingly, people under age 20 account for 29 percent of the population but consumed only 20 percent of fresh sweet corn.

Many consumers equate corn-on-the-cob with outdoor barbecues and casual warm-weather dining. However, these perceptions could be changing as consumers vary their diets during cooler months to include summer favorites like sweet corn. A combination of increasing off-season demand, the general upward trend in fresh vegetable use, and industry interest in assembling a research and promotion program should help support further growth in fresh sweet corn consumption. **AO**

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