



Growing Sweet Corn

Sweet corn farmers ... If your field of dreams includes everything but the baseball diamond, catch up on the nation's all-time favorite crop.

By Rick Gush

About the Author

Rick Gush is a small farmer and freelance writer based in Italy. We're nuts about corn. It would be difficult to imagine our lives without corn, and even more difficult to overstate the important role that corn plays in today's world. The United States grows 40 percent of the world's corn, but China and Brazil are also big producers. Farmers in Nebraska might get the most attention for their crops, but the farmers in East Timor and Africa take their corn crops pretty seriously, too.

Farmers in the United States will plant almost 80 million acres and harvest somewhere around 10 billion bushels of corn in 2002. They will feed half of this crop to livestock and export another quarter of the crop. Much of the remaining crop will be used to produce barrels full of corn sweeteners and ethanol fuels. Some will be used to create plastics from cornstarch in an industry that is relatively new, but already enormous and growing rapidly. Even the corn stalks and foliage left after the ears are harvested will be used to make vast quantities of silage food products for livestock and millions of gallons of syrup for human consumption.

Corn kernels are also being used today as a direct-heating source because falling grain prices and rising fuel costs have caused many farmers to start using grain-burning furnaces in their homes and shops. One bushel of corn kernels will generate as much heat as five gallons of propane, but that bushel will cost only about \$2, while the propane will often cost more than \$1.25 per gallon. The savings can be substantial and farmers can easily burn corn that is damaged, or too small for the market.

Corn growing presents a marvelous opportunity for small farmers in every state. There are so many different ways to approach corn, and so many different corn products that can be sold, farmers are wise to consider some corn crops in their farm plan.

Although growing huge acreages of field corn—like the agribusiness outfits in the Midwest—is impractical for small farmers, growing sweet corn, popcorn, specialty corn, corn decorations, seed corn and building corn mazes can be very profitable activities for the smaller producers. We're a world that's crazy about corn, and the small farmer needs only to decide how to help scratch that itch.

The History of Corn

Corn plants do not exist anywhere today in a wild state. Corn requires the cultivation of human farmers to survive and move forth from one generation to the next. As such, corn is one of the earliest examples of deliberate, human-directed plant breeding. While there is some confusion about which plants are the ancestors of corn, it is known that by 3000 B.C. corn was a popular crop in Mexico. Early corn was similar to today's popcorn varieties, except that it usually had only six kernels per ear. One way historians know about such old corn is that the kernels can be stored amazingly well, and archeologists have discovered corn kernels over 4,000 years old. Even more amazing is that some of the old kernels can still germinate, and scientists have grown plants from seeds more than 2,000 years old!

Corn was unknown in Europe or Asia prior to Columbus' voyages to the New World in the 15th century. But once it started, corn cultivation spread rapidly across the globe along with corn's traditional field partners—tomatoes, potatoes, squashes and beans—all of which have had a major impact on the gardens and diets of the Old World. The Spanish might have been excited about the native Aztec and Inca gold, but over the past five centuries the value of corn and the other New World food crops has dwarfed the value of the more showy precious metal harvests.

Corn Biology

Botanically speaking, corn is a type of grass. Most grasses produce flowers that contain both sexes, but corn is different. There are male flowers at the top of the plant called the tassels, and inflorescences of female flowers on short, lateral branches. The female flower inflorescences become the ears of corn. The male tassels release pollen into the air and wind then carries it to other plants. The long, silky strands that poke out of the top of an ear of corn are the structures that catch the pollen and transmit it down to the waiting female flower ovaries.



Corn Smut

Corn smut is a fungal disease that sometimes affects corn ears. Usually, farmers in the United States treat smut like an undesirable disease and make every effort to eradicate it.

In Mexico, however, the smut is prized and farmers who find their crops infected with it are happy because they know they can sell their crop for a higher price.

Ustilago maydis is the Latin name for the smut that causes the corn kernels to grow large and distorted. In the maturation process the kernels become filled with the characteristic dark, powdery spores of the fungus.

Smut corn has been prized since the Inca and Aztec times, but only recently has the taste grown significantly in the United States; programs that allow farmers to cultivate smut corn are just starting across the country. "It tastes a little like mushrooms, and it's great in scrambled eggs," swear recent American devotees. A kernel of corn has two main parts: the germ and the endosperm. The germ is a young proto-plant, and the endosperm is nutritive material that exists to feed the young plant as it emerges. These two sections are separated in many food-processing systems; corn oil is made from pressing the germs; and corn flour is made from grinding the endosperms.

In addition to their normal roots, corn plants have above-ground roots that appear on the lower stem. These structures, called adventitious roots, act primarily as additional braces. They also act as conduits in the absorption and removal of beneficial and toxic gases from the plant body; and they also search for additional water and nutrients in the layer of the soil above the normal root system.

Types of Corn

All corn is classified by its scientific Latin name, *Zea mays*, but there are five main types of corn: Pop, Flint, Dent, Flour and Sweet. The differences in the main types of corn have to do with the various arrangements of the germ and endoplasm in their kernels. In addition to the five commercially used corn types, there are also pod types that have husks around each kernel, waxy types and a few other more obscure corn types, some of which may prove to be economically important in the future.

Pop corn, also known as Indian corn, is unique in that its endosperm core contains moisture, which expands and explodes when heated, forcing the outer, dry part of the endosperm to rip apart and puff up. Pop-corn types account for about one percent of the yearly corn crop in the United States.

Flint corn, which is essentially a larger-kernelled, pop-type corn was the second type to be developed. Flint corn is still widely grown, mostly due to its great cold tolerance, and it now makes up about 14 percent of the national crop.

Flour corn has a much softer endosperm, making it a better flour and ground-meal source, and is grown specifically for the production of many human- and animal-meal products. Flour corn makes up about 12 percent of the yearly crop in the United States.

Tourist Corn

Aside from mazes, there are a few other ways to lure paying tourists to a cornfield. The Field of Dreams. Fans of the inspirational baseball movie still flock every year to see the field of corn where the movie was filmed. The film's cornfields were grown during a drought and were only half their normal height, so the film producers had to spend \$25,000 on water irrigation.

The Corn Palace. There is a "Corn Palace" in Mitchell, S.D., that is covered each year in a truly mind-boggling array of new corn decorations. The many beautiful, rustic murals depict life in South Dakota, and attract many thousands of tourists every year. The first Corn Palace was built in 1892 and the current building is the third in this series of unique Americana attractions. Dent corn is the most widely grown type of corn, and constitutes about 73 percent of the U.S. annual crop. When one sees a large field of corn, it is most likely a field of dent corn, as the other types are usually grown on much smaller parcels. The term "field corn" usually refers to dent corn, but may also be applied to flint and flour types as well. The endosperm of dent corn has both the flinty-type starch and the softer flour starch. The term "Dent" refers to the characteristic depression in the top of the kernels.

The leaves and stems of dent corn form the basis of the silage industry's ruminant animal food products made from the



composted, green corn-plant parts. The tall towers so common in the Corn Belt farm areas are the sophisticated compost bins where silage is produced. Many Dent-corn green parts are also pressed to extract corn syrup.

Sweet corn is the fresh-eating and canning-corn type. In sweet corns, the endosperm is composed of a special starch that is both soft and very high in sugars. The harvest timing and rush delivery to market of sweet corns is always critical because the sugars deteriorate quickly after the ears are harvested. Sweet-corn farmers often prefer to eat the ears raw in the field because they swear the sweetness is compromised even by walking into the house and cooking them.

Small Farm Corn

Small farmers have a dizzying array of choices when it comes to growing corn. Sweet corn is, of course, one of the obvious choices. This tasty delicacy of summer has been grown since the days when the Iroquois and other Native Americans ruled the eastern seaboard. Some of the old Indian sweet corn varieties are still available and grown today. Growing sweet corn has often been a profitable activity for small farmers, and if you've got access to a farmer's market or a roadside stand to sell your crop, there's no reason you can't partake too.

There are a whole host of different varieties, from early bearers to late, from golden kernels to white, so you'll have to experiment to find the varieties that best fit your situation. The most famous sweet corn variety, Golden Bantam, was released in 1902 and has been a favorite ever since.

Another rising star of profitability for small farmers is gourmet popcorn. Whether it's blue, black or strawberry colored, customers have shown a great attraction and willingness to pay premium prices for unusual popcorn products. The corn can be sold either shelled or still on the husk, and in many markets Pop corn ears bring prices above \$1 an ear!

Popcorn also stretches into the sizable floral and decorations market. Colorful ears of corn are perennial florist and homemaker favorites, and these same customers snap up an amazing amount of stalks, cobs, tassels and husks every year. Savvy farmers waste none of the plant parts and find they can sell everything they grow. Those farmers that go even further and produce craft products such as cob pipes, husk dolls and kernel mosaics usually find a growing market eager for their wares.

One of the good things about unsold corn is that it can be shifted down the product line as the situation changes. Sweet corn that goes unsold can be next marketed as dried decorations; old or damaged decorative corn can be shelled, mixed with other types and sold as corn meal for human markets. Unsold corn meal can always be sold as bird and animal feed.

Special Corn Crops

Corn hybrids do not pass their increased performance on to their offspring. New seed must be specially grown each year by crossing the parent stocks. This means that somebody must grow the new crops of hybrid corn seed each year. That industry is growing and provides conscientious small farmers with the opportunity to become subcontractors for the larger, well-funded field-corn industry.

One of the most fun, recent trends is the development of corn mazes. These huge puzzles feature twisting and confusing pathways cut into tall cornfields. The public is flocking to these rural attractions across the country and there is still a need for more. When combined with other farm activities, such as pumpkins and u-pick strawberries, they can be quite a draw. The number of corn mazes has increased each year since the craze began in 1993. But still there are some states that have not yet seen any mazes, like Oklahoma, Alaska, Kentucky, Maine and Mississippi. So, if puzzles and crowds of happy visitors using flashlights to wander through your cornfields in July and August appeals to you, get busy designing your maze. You'll probably need at least three acres to make a quality maze, and it's traditional and prudent to erect some sort of bridge-viewing platform by which the visitors can get an overhead view. Mazes are almost always made from field corn, but sometimes sweet cornfields are used after the harvest.

Record Corn

The normal, average yield for non-irrigated field corn is around 150 bushels an acre, but there are a few superstars who coax two, and almost three times that much out of an acre. These competitors use a variety of techniques, such as deep plowing, massive fertilizer and pesticide applications, special insect-resistant seed varieties and precise angling of the rows to maximize sun exposure. Most growers think all that extra effort destroys the profit potential, but these super growers usually break even (at least) on their crops and more than make up for any profit loss through lucrative equipment, fertilizer and seed endorsements.

Growing Corn

Growing corn on a big agribusiness outfit is a very scientific corporate matter, with everything from planting to harvest being scheduled according to the cooperative extension's latest micro-management advice. For example, most big



growers adjust the amount of nitrogen-fertilizer applications according to the fluctuations in the corn futures market.

Luckily, small farmers have a much easier job. Sure it's good to get the crop to market early or late to secure the best prices, but the basic fact of corn growing remains the same: the crop likes warm weather, so there's no point to planting seedlings in the winter greenhouses to get an early start. Corn farmers have to wait for the soil and the air to warm up—and that's that.

Corn Pests

The worst corn pests are worms. Cutworms live in the soil and Armyworms over-winter in weeds and grasses as partially matured grubs. Both attack young corn plants and can be serious pests in fields with heavy crop residue, excessive winter weeds or spring cover crops. This is a problem for organic farmers who are accustomed to composting on the fields. Low wet soils and fields bordering wild vegetation are also a potential problem. Hot, clean and dry dirt is what a corn crop likes best, so farmers should modify their practices to achieve this status for their corn plantings.

There are also a variety of worms that attack the developing ears of corn. Corn Earworm and the European Corn Borer are common causes of kernel and ear spoilage. They too can be discouraged by maintaining extremely clean fields.

What might be the single most effective treatment for worm infestations is the bacteria *Bacillus thuringiensis*, which is the "Bt" in the middle of the controversy surrounding some genetically altered corn varieties. Still, Bt as a spray is quite inoffensive to the environment and farm family, and should be considered as part of the pest control program by even the strictest of organic farmers.

Corn Nutrition

Corn, for all its size, does not have unreasonable nutritional requirements. Nitrogen fertilizers are frequently applied in the adolescent stages, but never after the tassels have formed. Of course, soils rich in natural nutrition encourage corn plants to produce more and bigger ears, and very seldom is anything other than field corn grown without irrigation.

Aboriginal agriculture usually employed an intensive poly-species culture system. Corn, beans and squash were frequently grown together in the same hole. This technique also helped provide a balanced source of amino acids because a diet of corn protein alone lacks balance. Amaranth, tomatoes, peppers and greens were also often grown in the same fields and holes.

This article first appeared in the Fall 2002 issue of Hobby Farms magazine. Pick up a copy at your local newsstand or tack and feed store. [Click Here](#) to subscribe to HF.