

# Corn

## HISTORY

Corn is a staple food and cereal grain grown in many parts of the world because of its ability to adapt to different climates and environments. Researchers believe it was first domesticated in Mexico 7,000 years ago. Varieties quickly spread across Central and North America. By the year AD 1000, it was a common commodity over most of North America.

Corn arrived in Manitoba by way of trade with Indigenous peoples living in what are now North and South Dakota and Minnesota. There is evidence that Indigenous peoples were farming near what is now Lockport, Manitoba, about 400 years before the Selkirk settlers arrived and removed the Indigenous communities from the settlers' newly claimed land. These Indigenous peoples grew crops, using the shoulder blades from bison as hoes and other tools, and dug deep pits in the ground to store their harvests. Other groups, such as the Netley Creek Odawa people, knew about corn but didn't start growing it themselves until they were given seeds in 1805.

The strongest type of corn to make its way to Manitoba was *Northern Flint*, known for its high yields and resistance to insects and frosts.

## PRODUCTION

While you are probably familiar with the type of sweet corn sold at farmers' markets and roadside stands, most of the corn we grow in Manitoba is for livestock feed, ethanol and distilling. Our corn farmers have produced 1.2 million metric tonnes of grain corn every year for the past five years and corn is our sixth largest crop (by acres) as of 2020. In fact, demand for corn is so high in Manitoba that we import almost as much as we grow! This wasn't always the case, though – the popularity and success of Manitoba corn owes a lot to genetic improvements in new hybrids, which mature prior to fall frosts.

Corn is a *row crop*, which means it is planted at lower populations than smaller grain crops and needs to be planted precisely. *Precision planting* requires careful calibration and maintenance of planting machines to give each kernel a chance to reach optimal yield.

Farmers use a range of practices to manage insects, weeds and disease. *Integrated pest management* involves carefully selecting the variety of corn they grow, *scouting* (monitoring) their crop as it grows, and crop rotation. Farmers implement cultural, mechanical, biological and pesticide control measures that consider potential damage, costs and value, as well as impacts on other pests, beneficial organisms and the environment. Manitoba's corn farmers are always looking for ways to produce corn more sustainably and turn to chemical pesticides only as needed.

Corn loves well-draining soils and newly planted corn grows best in sandy soils that dry out and retain warmth. Later in the growing season, corn benefits from more moisture.

Most plants on earth – including other crops that Manitoba farmers grow, such as wheat, barley and oats – use *C3 photosynthesis* to turn light, carbon dioxide and water into sugars that fuel growth. Corn, on the other hand, uses *C4 photosynthesis*, a process in which the first carbon compound produced has four instead of three carbon atoms. *C4 photosynthesis* helps reduce energy and water loss in hot, dry environments.

As a *C4* plant, corn loves our hot summers, but this also makes corn a long-season crop. If it doesn't reach maturity before the first fall frost, the yield and quality of the crop can be impacted.

Growing corn in Manitoba can be challenging, thanks to our province's short growing season. Because corn requires warm soil to start growing, planting dates vary depending on weather conditions. Manitoba farmers usually plant corn in early May



Photos: Manitoba Crop Alliance



because our soils are not warm enough for *germination* (growth from seed) until mid-May at the earliest. Once germination occurs, it takes seven to 14 days for the seedling to emerge from the soil.

Within a month, the first leaves come out of the ground and all the plant's energy goes toward *vegetative growth*, the growth of leaves, stems and roots, until the plant starts to *tassel* (flower).

Next, the plant begins to produce *silks*, long fine hairs on the ears of corn. Once the silks poke out of the ears, pollen from the tassel falls on the silks, then travels down the silks to fertilize the grains of corn. This is what allows the corn *kernels* (grain) to fill. From here, the plant shifts its energy to filling the grain, which improves the quality and yield of the final product.

Corn is harvested when grain moisture content reaches 20 to 30 per cent. Farmers usually use a *combine* to harvest their corn. A combine cuts the crop and separates the grain from the plant. At the same time, it processes and spreads the remaining material over the field. (It's called a combine because it *combines* several jobs into one machine.)

Combines are used to harvest all kinds of grain, but because corn is larger than other grains and is grown in rows, farmers attach a special *corn header* to the front of the machine. A pair of spinning rolls pull the corn stalks down through the header, while metal plates pop the ears off the stalks. The ears are pushed to the back of the header by gathering chains, funnelled to the centre of the header by an

## DID YOU KNOW?

Corn is one of the *Three Sisters crops* – a triad made up of corn, squash and beans. Indigenous peoples used these crops to support an efficient production system: all three were planted in the same area, so corn could support the bean plants and the squash could cover the ground to prevent weed growth. Beans also help return nitrogen to the soil, keeping the fields healthy and productive. Sometimes, sunflowers were planted around the edge of the fields and called a fourth sister. Today, we call this practice *intercropping*.



augur, then moved into the front of the combine, where the grain separating process begins.

Before corn can be stored safely, its moisture content needs to be brought down to 14 or 15 per cent in a grain dryer. Dryers are a must in Manitoba. Without them, farmers wouldn't be able to store their grain properly because our shorter growing season and weather often make it impossible to let the crop dry down completely and naturally in the field. Grain dryers push heated air around the corn kernels, causing moisture to leave through the surface of the corn.

Corn requires more storage than other seed crops because it is a bigger, bulkier grain. After harvest, farmers transport their harvested grain to storage bins on their farms for later delivery to grain elevators. Grain corn is also delivered directly to buyers, such as feed mills.

## NUTRITION

There are many kinds of corn, each with its own uses and nutritional profiles. We consume sweet corn in many forms, from whole grain to tortillas, corn syrup and everything in between. Sweet corn contains higher levels of sugar (in the form of *sucrose*). Despite its higher sugar content, sweet corn is not considered a *high-glycemic food*, which is any food your body can break down quickly, triggering a rapid increase in blood glucose.

However, corn in Manitoba is grown mainly for livestock feed, ethanol and distilling. We call this *grain corn*, and it has a different nutritional profile from the sweet corn we eat. Like other cereal grains, grain corn is mostly carbohydrate. It's also a source of fibre, protein, and various vitamins and minerals.



## PROCESSING

Corn is *wet milled* to make products for human consumption, including corn starch, thickeners, corn syrups and sweeteners. Corn is *dry milled* to make corn oil, meal and grits (for brewing). Distilleries often use the highest quality corn.

In Manitoba, very little corn is produced for human food. In fact, 66 per cent of corn produced here is used for livestock feed. Manitoba hog producers are our biggest customer, followed by cattle and poultry producers. Corn often replaces feedstocks such as barley and wheat when their supply decreases.

Corn is used to produce *ethanol*, an alcohol that can be used as a biofuel, fuel additive or extender. Ethanol is a cleaner, higher-octane fuel than regular gasoline. Manitoba has a corn ethanol facility in Minnedosa that uses 300,000 metric tonnes of corn every year.

Five per cent of Manitoba corn is distilled for spirits or beverage alcohol. Manitoba has a distillery in Gimli that uses corn to produce bourbon-style flavoured whisky.

Nine per cent of Manitoba corn is exported to other provinces, especially Saskatchewan and Alberta.



## SILAGE

Corn is a popular crop for *silage* (fermented foliage), which is used to feed animals, mostly beef and dairy cattle. Silage is useful to farmers because it can be harvested in any weather, as long as its moisture is at the right level. It provides more nutrients per acre than grain and can be made from crops that are otherwise damaged (by hail or frost, for example). Silage is also nutritious and has a taste that appeals to animals. To make silage, the farmer cuts down the entire corn plant and chops it into small ( $\frac{1}{4}$  to  $\frac{1}{2}$  inch) pieces, then gathers it in a large pile. Next, tractors drive up and down the pile, squeezing all the air out so the silage can ferment with no oxygen.



Photo credit: Manitoba Crop Alliance

## FARMER PROFILE



### CARL BANGERT Beausejour, Manitoba

“The best part of being a Manitoba corn farmer is that we have a partnership with nature to produce a crop that benefits people around the world.”

## INDUSTRY IN MANITOBA

**Production:** 1,140,300 metric tonnes (2020)

**Number of Producers:** 2,147 (2016)

**Value to Economy:** \$172,581,000 (grain corn, 2019)

## INDUSTRY IN CANADA

**Production:** 13,984,000 metric tonnes (2021)

**Producers:** 38,387 farms (2016)

**Value to Economy:** \$2 billion (2021)

## ENVIRONMENT

Manitoba farmers put tremendous effort into making sure the crops they produce are safe and grown in a sustainable way. They use modern agriculture practices and tools to reduce greenhouse gas emissions, address climate change and help build biodiversity. Some of the innovations they use to grow corn include:

- **Reduced tillage** and **conservation tillage**.
- Sustainable, chemical-free **pest controls**
- **Plant breeding research and techniques** to develop high-quality varieties of corn that are more resilient and better yielding.
- **GPS and precision agriculture** that help farmers reduce unnecessary seed, fertilizer and pesticide use, and reduce fuel consumption from farming vehicles and equipment.

## BY-PRODUCTS

A significant by-product of the ethanol and alcohol industry is *distiller grain*, which is made from any grain, including corn, that goes through the distilling process. Distiller grain is a great source of protein and can be added to animal feed rations that are otherwise short on protein. Distiller grains also provide lots of energy, which makes them ideal for winter rations because they help animals stay warm.



Photo credit: Manitoba Crop Alliance

# CAREERS

- » Grain buyer
- » Fertilizer sales
- » Farmer
- » Plant geneticist
- » Meteorologist
- » Production plant worker
- » Retail worker

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