HISTORY

Known for the spectacular size of its flower heads and its edible seeds, the sunflower is native to North America. Evidence suggests the sunflower plant was first cultivated by Indigenous people in what is now Arizona and New Mexico around 3000 BC.

Although those early varieties were very different from today's sunflower, they were used in similar ways. The seeds were pounded into flour for bread, cracked and eaten as a snack, or pressed to make oil for skin and hair. The plant was also used to make dyes, medicines, body paint, and building materials, and was used in ceremonies. Wild sunflowers – the ancestors of today's modern sunflower – can still be found on the Prairies, from Canada to Mexico.

In the 16th century, Spanish explorers brought the sunflower to Europe, where it was grown mainly as an ornamental flower in gardens. By 1716, a patent was granted in England for squeezing oil from the seed. In 1830, sunflower seeds began to be commercially produced. By the 19th century, farmers in the Russian Empire were growing over two million acres of sunflowers for oil production and human food consumption.

Sunflowers have grown in Canada for over 100 years and are a diverse, sustainable, valuable crop for farmers.

Cultivating sunflower seed in Canada began in the 1870s, when Mennonite immigrants from what is now Ukraine brought seeds with them.

The first sunflower breeding program in Canada was launched in 1936, when Agriculture Canada gathered seeds from plants grown in the fields and gardens of Mennonite farmers. As demand for cooking oil increased, so did the acreage devoted to growing the plant. By 1946, Canadian farmers had established a small crushing plant at Altona, Manitoba, and spread acreage into neighbouring Minnesota and North Dakota. In 1964, the Canadian government licensed the Russian cultivar, Peredovik – a high-yielding seed with good oil content. By the mid-1970s, the sunflower was hybridized even further to provide additional yield, oil, and disease resistance.

PRODUCTION

The sunflower is a tall, broad-leafed plant, usually with a single main stem and one head per plant. A single sunflower head is actually composed of thousands of individual flowers, fused together in what is called a composite flower. The stem is hairy and becomes very fibrous as the plant matures.

Sunflowers are **heliotropic**, which means that, from emergence to early flower bud formation, the plants follow the sun from east to west during the day and return to face the east during the night. However, sunflowers cease to be heliotropic when they reach the blooming stage and the plant's priorities shift from growth to pollination. At that point, most of the flowerheads face east.

Over 90 per cent of all Canadian sunflowers are grown in Manitoba. They are classified as either **oilseed** or **confection** sunflowers.

- **Oilseed varieties** make up about 75 per cent of our sunflower plants. Their seeds have black hulls (shells), which are dehulled and crushed for oil production or sold as bird seed.
- **Confection varieties** make up about 25 per cent of our sunflower production. Their larger seeds have striped hulls and are used for human consumption. Only the largest, highest-quality seeds are used in this market.

Sunflowers thrive in loamy, well-drained soils.



Like all other crops, sunflowers grow best as part of a **crop rotation** with other crops. Crop rotation reduces pests and disease, lowering the need for herbicides and insecticides. Crop rotations also help farmers manage moisture more efficiently by varying crops of different moisture requirements and with roots that grow at different depths. Sunflowers have deep tap roots that can reach water and nutrients 1.5 metres or more below the surface.

Farmers add **fertilizer** consisting of nitrogen, phosphate, potassium, and sulphur to the soil to help the sunflowers grow. Fertilizers can come from synthetic sources, or from biological sources such as manure.

Sunflowers are usually planted with row-planting equipment between May 1 and June 1. Farmers plant the rows 55 to 76 cm apart to ensure each plant has equal space and can access enough water, nutrients, and sunlight. Seeds are usually treated with a **fungicide and insecticide seed treatment** to prevent and control downy mildew, pythium root rot, and cutworms.

Honeybees are an important part of sunflower production. Honeybee colonies located near sunflower fields will actively forage and pollinate the crop, resulting in a win-win for both beekeepers and sunflower growers: while the flowers produce a large supply of nectar and pollen for the bees, honeybee pollination results in greater sunflower yields.

Sunflowers reach full flower 70 to 80 days after planting and take about 120 to 150 days to mature. Sunflowers are harvested when seed moisture levels are between 15 and 25 per cent. If the seeds contain too much moisture, they are more likely to scuff during harvesting and shrink during drying. If they contain too little moisture, they can shatter. Sunflowers are one of the last crops to be harvested in the fall, and may require a frost, which helps dry the plant further. Farmers sometimes use chemical desiccation to dry the sunflower heads faster.

Once the plant reaches maturity, farmers harvest the crop as soon as possible to avoid losses caused by foraging blackbirds or sclerotinia head rot.

Farmers use a **combine** to harvest their sunflowers. A combine cuts the crop and separates the grain from the plant. At the same time, it processes and spreads the remaining plant material over the field. (It's called a combine because it *combines* several jobs – reaping, threshing, gathering, and winnowing into one machine.)

Once they are harvested, the seeds are stored in well-ventilated bins that regulate moisture and temperature. Sometimes the seeds are dried to reduce moisture, prevent rot and mould, and prolong their shelf life. Oilseed sunflowers are dried at 71 to 104°C. Confection sunflowers are dried at much lower temperatures to avoid a "fireburnt" taste and reduce premature cracking.


Photo credit: Manitoba Crop Alliance

PROCESSING

Sunflowers are processed for oil or seed. Oilseed sunflowers are used in both the bird food and oil crushing industries, and produce one of the highest quality vegetable oils. Although the bird food market uses mostly the oilseed type of sunflower seed, smaller confection seeds are sometimes also used for birdseed.

Sunflower oil is produced using the black-shelled oilseed variety of sunflowers. Once the **hull** (shell) of the seed is removed in a process called **dehulling**, the seeds are crushed, and the oil is squeezed out and collected. The oil can be used for cooking and frying or made into shortening or margarine.

Confection-type sunflowers grown in Manitoba are marketed primarily as roasted snack food in the shell, or as dehulled seeds for the baking industry. Most of this seed is sold to markets in North America, but Canadian sunflower seed processors do sell their products to a growing number of customers in Europe, the Middle East, and Asia.

DID YOU KNOW?

Sunflowers are the symbol of international nuclear disarmament due to their ability to 'mop up' heavy metals from contaminated soil.

BY-PRODUCTS

The **meal** (crushed material left over after the sunflower oil is removed from the seeds during oil production) is used as a livestock feed ingredient, which contains significant amounts of protein.

NUTRITION

Sunflower seeds and oils pack a lot of nutritional value. Because they're high in protein, they can be eaten as a meat alternative. They contain almost every vitamin except vitamin C, and boast high amounts of key minerals, including magnesium, iron, copper, and zinc.

Sunflower oil is very high in omega-6 polyunsaturated fatty acids. Sunflower seeds that have been damaged during harvest or crushed into meal during oil production can provide high-energy feed for livestock because of their high fat content. Cattle producers sometimes replace some of the barley grain/silage they feed their livestock with sunflower seeds to enhance the conjugated linoleic acids (CLA) content of the milk and meat produced by those animals. CLAs are compounds with enormous health benefits.

Feeding whole sunflower seeds to dairy cattle can boost milk production by three to five per cent.

ENVIRONMENT

Manitoba sunflower 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 used to grow sunflowers include:

- Reduced and conservation tillage
- Sustainable, integrated pest-management controls
- Plant breeding research and techniques to develop high-quality varieties of sunflower that are more resilient to pests and changing climates, as well as better yielding
- GPS and precision agriculture software that helps reduce unnecessary seed, fertilizer, and pesticide use, and reduce fuel consumption from farming vehicles and equipment

Sunflowers also offer pollinators such as honeybees the opportunity to forage and pollinate, benefiting the ecosystem overall. Thanks to their long tap roots, which help the plant access water resources deep in the ground, sunflowers can withstand droughts much better than most other crops. Sunflowers are a lower-input crop, which means they require less nitrogen than wheat, corn, or canola crops.

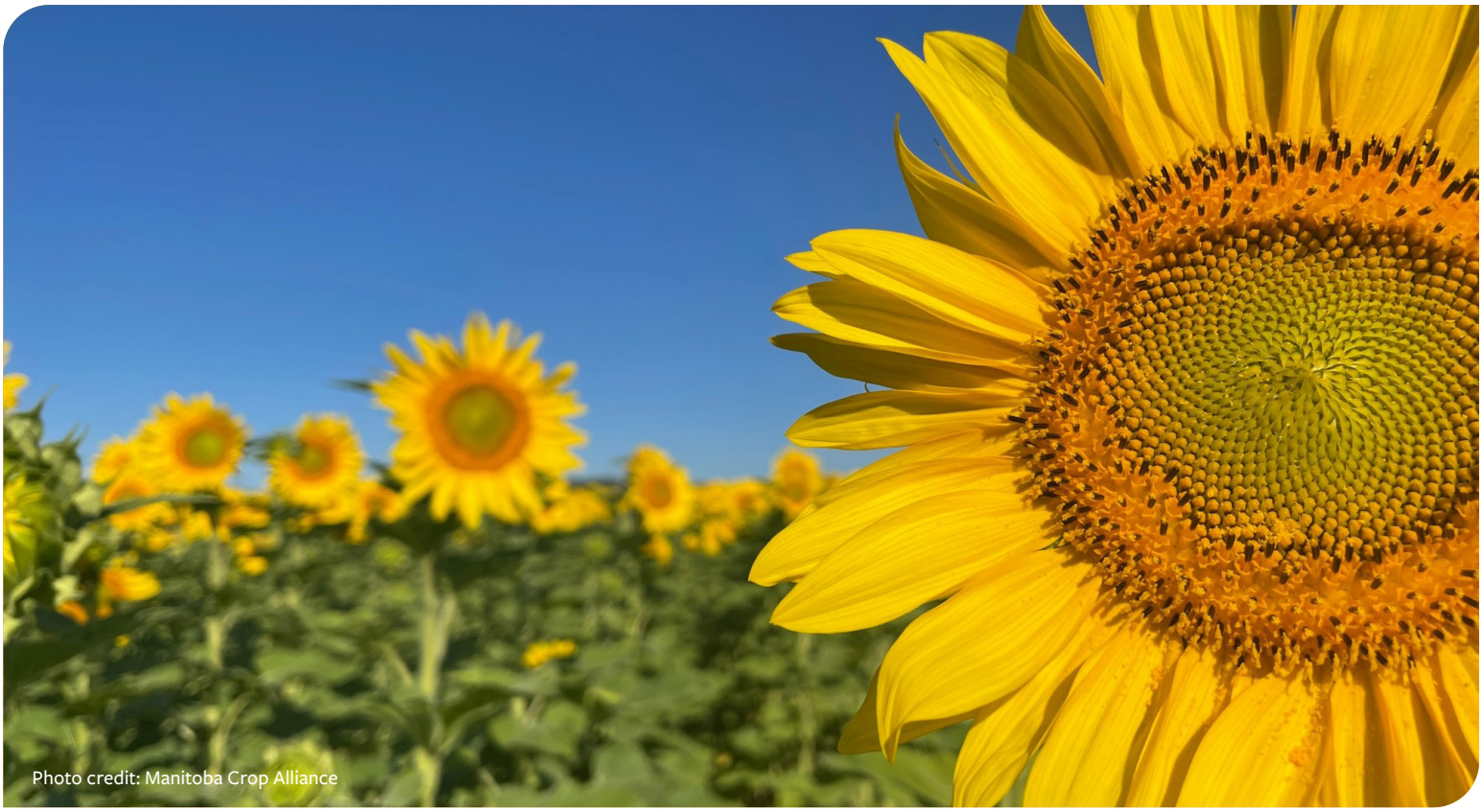

Photo credit: Manitoba Crop Alliance

INDUSTRY IN MANITOBA

Production: 50,000 to 80,000 seeded acres each year

Number of Farms: 222 (2021)

Value to Economy: More than $324 million in farm cash receipts, not including domestic or interprovincial sales (2020/2021)

INDUSTRY IN CANADA

Production: 85 million metric tonnes per year (annual average)

Manitoba dominates the Canadian sunflower market – so much so that information about sunflower production in other provinces can be hard to come by!

FARMER PROFILE

SALLY PARSONAGE Baldur, Manitoba

"What I love most about growing sunflowers in Manitoba is the diversity they bring to my crop rotation. Sunflowers help to spread out seeding and harvest and have deep taproots to utilize water and nutrients from lower down in the soil profile. Overall, sunflowers are enjoyable and profitable to grow!"

CAREERS

- Farmer
- Milling technologist
- Plant breeder
- Research technician
- Agronomist
- Soil scientist
- Grain trader

Explore the diverse careers in agriculture at thinkAg.

thinkAG

Agriculture in the Classroom MANITOBA

