

# Dairy Cows



## History

One hundred years ago, dairy farms looked very different than they do today. Farms usually kept only two or three cows; just enough to feed their families. Cows were milked every day by hand into a milk pail and the milk was carried to the house. Fifty years later, dairies were larger, holding about 20 to 30 cows. Most farms had stanchion barns where the cows were milked into buckets. From the bucket, the milk was poured into milk cans and sold to the processing plant. Today, we use pipelines in dairy barns. As the cows are milked, the milk automatically moves from the cows into the pipeline which leads to a bulk tank. From the bulk tank the milk is loaded into a bulk truck and hauled to the processing plant.

## A Day in the Life of a Dairy Farmer

While a dairy farmer is known for milking cows, they wear many occupational hats to make sure their cows remain happy and healthy. A dairy farmer acts as a cow chef, constantly working with professional dairy nutritionists to monitor what cows are eating. A dairy farmer acts as a veterinary technician, always monitoring cow health and working closely with their veterinarians. A dairy



farmer is also a mechanic, having to understand a vast amount of equipment and how to fix it if something goes wrong. And of course, a dairy farmer milks their cows.

A dairy farmer spends several hours each day milking the cows with many farmers milking cows 2 - 3 times every day. An average dairy cow will produce anywhere from 27 to 45 kilograms of milk per day, and it is important that farmers maintain good udder health. First each teat is dipped with an antibacterial solution, called "pre-dip", then cleaned and dried off. This process both helps clean the udder and stimulate milk production. Then the milking machine is attached to all four teats and the cow is milked. A cow takes about four to five minutes to milk completely. The machine will drop off the teat automatically after it is done milking. After the milking is done the cow is dipped again with a solution called "post-dip" that helps protect her teats from bacteria after milking.

Most farmers cannot do all the work by themselves and have family members or employees that they hire to help. A farm that has 150 milk cows often has two to three additional employees - some full time and some part time just for the milking. During the summer months, the farmer also grows the feed that the cows eat all year round. Most farmers grow feed such as silage and grains and buy enough straw and hay to last them through the year. It takes a large land base to grow all the feed that the cattle need.

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## Production

Dairy cows are mammals meaning that before a cow can produce milk, she must give birth to a calf. A cow is pregnant for nine months. Once a cow calves, her milk production will steadily increase for the first two to three months, and then it decreases gradually until it is time for her rest period. A normal lactation from birth of the calf to rest period is about 10 months. A cow is re-bred two months after giving birth. At the end of her lactation she has a two month rest period. During this rest period she eats, drinks, and stores energy to give birth. Most dairy cows in Saskatchewan are bred by artificial insemination, although some farms keep a bull for breeding the heifers or cows that are problem breeders. Farmers can take an artificial insemination course that teaches them how to breed a cow.

When dairy cows give birth on a farm, the calf will stay with the mother for only a few hours, until the farmer makes sure both the cow and calf are healthy. The calves are fed the first milk from their mother. The very first milk that the mother has is called colostrum. The colostrum is very important for new born calves because it is rich with the antibodies that provide the calf protection from diseases in early life until the calf's own immune system becomes functional. Farmers make sure colostrum is kept separate and does not go into the bulk tank.

A newborn calf is housed in a hutch or in a calf barn; a hutch is a shelter that looks like a small shed. A calf barn is a barn housing calves only. The

calves are healthiest if they are kept separate from each other for the first few months of life. Each calf has its own hutch with lots of straw to keep it warm and dry. Newborn calves are given an ear tag when they are born; this tag is important because it contains a number that is unique to them alone and stays with them their entire life.

Female baby calves are called heifers and male baby calves are called bull calves. Bull calves are generally castrated soon after birth unless they are to be raised for breeding purposes. Most bull calves are sold to other farms to raise for beef. Heifer calves that are born on a dairy farm are raised on the farm to become milk cows and they are bred to have their first calf at two years of age.

## Processing

Once the milk leaves the farm it goes to a dairy processing plant. It comes into the plant from all over the province in tanker trucks. The dairy plant has a very clean, temperature-controlled environment. All milk has to be pasteurized before any human consumption. To kill the bacteria the milk has to go through a pasteurization process. The process involves heating the milk to 100°C so that there are no bacteria left. After the milk is heated it is very quickly cooled. The pasteurization process does not change the flavour, colour, or taste of the milk.

Other processes that occur at the plant are the processes of separation and homogenization. Separation is the removal of the milk fat. This takes place in a large machine called a separator. The

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milk fat that is removed is called the cream. The remaining milk is called skim milk. Standardization is the process of producing milk products that have the same milk fat content. The milk fat content depends on the milk product. For example, raw milk coming from the farm has approximately 3.6% milk fat. Following the process of separation, the remaining skim milk has 0.3% milk fat remaining. To make 1% milk, milk fat or cream is added to skim milk so that it contains 1% milk fat. This is called standardization. All 2% milk has 2% milk fat. Whole milk has 3.25% milk fat.

All milk except skim milk and whipping cream is mixed using a machine called a homogenizer. This process, called homogenization, is used to break the milk fat into small pieces called globules. This is done so that the milk fat does not rise to the top of the milk. Only Vitamin A and D are added to milk. Raw milk naturally contains vitamins A and D, but the process of separation and pasteurization removes a portion of these vitamins as well as the milk fat. The processor adds the vitamin A and D back into the milk. For chocolate milk, vitamin A and D as well as cocoa and sugar are added.

Milk and milk products are packaged in a wide variety of paper and plastic containers. The cartons must protect the milk from dirt and light. They must be easy to handle and fit into refrigerators at

homes. Dairy plants decide what type of containers to use. They make this decision by talking to consumers, grocery stores, and transportation companies. All paper and plastic milk containers can be recycled.

## Diet

A cow is a ruminant. A ruminant has a four chamber stomach which helps them digest the food that they eat. Cows swallow their food after very little chewing, the food goes into the first chamber, which is called a rumen and bacteria in the rumen mixes with the food and softens it. In the second chamber, called the reticulum, the food is formed into lumps of partially digested food called the cud. Cows chew their cud from six to eight hours per day. The muscles in the reticulum send the cud back to their mouths to re-chew. Cud is partially digested food about the size of a tennis ball. When a cow chews her cud it kind of looks like she is chewing gum. A cow that is content and healthy is usually chewing her cud. After the cow thoroughly chews the cud she swallows it again and it goes into the third chamber called the omasum where softening and grinding continues. The last chamber, called the abomasum, is where digestion occurs.

Cows are fed a healthy, nutritious diet that consists of hay, grains, silage, vitamins, and minerals. Many

## Industry in Saskatchewan

Number of Producers: 166 (2019)

## Industry in Canada

Number of Producers: 10,371 (2019)

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farmers hire a “feed representative” to help make sure that the cows have a balanced diet.

A typical daily meal for a cow would be:

- 4.5 kilograms of alfalfa hay
- 12.0 kilograms of barley silage
- 14.0 kilograms of corn silage
- Ten kilograms of dairy ration
- 57 grams of minerals and salt
- 80 to 160 litres of water

Water is available to the cattle at all times. Milking cows need more water every day than a non-milking animal because it takes water to make milk. A cow needs two litres of water to produce one litre of milk.

Calves are fed at least two times a day on a dairy farm; early in the morning when the cows are milked and again in the late afternoon. They get one to two litres of milk at each feeding and the amount increases as they grow. They are fed milk or a milk replacer until approximately two months of age.

At about two weeks of age they are offered a young stock ration. This is made up of crushed corn and grains plus the necessary vitamins and minerals that they need. They are weaned off the milk or milk replacer at two months of age and fed water, silage, and a mixture of grains.

A lot of farms feed a Total Mixed Ration (TMR). Feed is mixed in a large mixer wagon and the farmer follows a ration sheet which details how much of each grain, silage, and hay he puts into the wagon. This ration is changed according to the needs of the

cows. Cows that are at peak production are fed a higher nutrient mixture because they need more energy to produce milk.

Cows have 32 teeth. On the top front, cows have a tough pad of skin instead of teeth. They have eight incisors on the bottom front and six strong molars on the top and bottom of each side to grind their food.

## Careers

- Veterinarian
- Feed Specialist
- Computer Technician
- Electrician
- Construction Worker
- Mechanic
- Dairy Herd Manager

## Nutrition

Whether there's skim, 1%, 2%, homogenized, or chocolate milk in your glass, you always get the same 16 essential nutrients. Milk is also fortified with vitamin D and contains 87% water making it a great thirst quencher. The fat and sugar content changes depending on the type of milk.

A cup of milk contains:

- More calcium than 12 sardines with their bones.
- As much protein as a Grade A large egg.

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- More thiamine, riboflavin, and niacin than one slice of 100% whole wheat bread.
- Close to  $\frac{3}{4}$  of the amount of vitamin A that is in a cup of broccoli.
- 45% of our daily requirement for vitamin D.
- A total of 25 measurable nutrients.

## Technology

Technology is very important on a dairy farm. Many farms have computers that are very important to the management that takes place on a farm. On some farms, a cow wears an ankle bracelet or necklace called a responder. The responder sends information to the computer such as:

- Her name or number.
- If she has been milked or not.
- When and how many calves she has had.
- History of when she has been sick and treated.
- The amount of milk she gives. If she gives less milk than she usually does, this could mean she is sick.
- How many steps she takes. If the cow is in heat and is ready to be bred she moves around more than normal.

You will also notice, if you go to a dairy farm, that each cow has an ear tag. It does not hurt them; they get their ears pierced soon after they are born. Each cow has her very own number. This is one way of telling the farmer who each cow is, but it also keeps track of each cow in Canada. If the farmer sells the cow that tag stays on the cow, it does not get removed; this tag stays on the calf her complete

life until it is slaughtered. This way, if there was ever a need to trace the animal's history it can be done easily.

## DAIRY FARMS AND THE ENVIRONMENT

Dairy farmers live and work on their farms every day, so it is important for them to protect the land, water, and air for their families, surrounding communities, and future generations. Environmental practices on all dairy farms, regardless of their size, are regulated by federal and provincial laws. Dairy farmers exceed regulations, implementing environmental farm plans to improve manure usage, equipment, and storage, to maximize the use of manure as a fertilizer for soil, and to adopt modern technologies allowing them to maintain the temperature and ventilation of their barns while reducing their dependency on energy.

## By-Products

Dairy cows are used to produce a wide range of food products including skim, 1%, 2% and whole milk, chocolate and flavored milk products, butter, cream, cheese, cream cheese, cottage cheese, sour cream, yogurt, ice cream, buttermilk and milk products. In addition, milk products are ingredients in animal feeds and used to produce nutraceuticals.

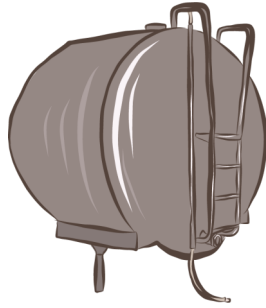
### Glossary

- Bull: a male that breeds the cows*
- Calf: newborn until one year of age (either female or male)*
- Cow: female that has given birth to a calf; at least two years of age*
- Heifer: female that has not calved*
- Steer: a male that is castrated as a baby*

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## Mama Milk

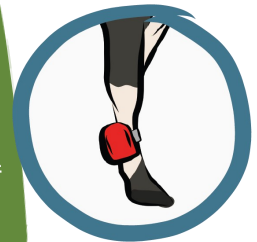
Before a cow can give milk she must give birth to a calf. A cow is pregnant for nine months. Once a cow gives birth, her milk production will steadily increase for the first two to three months, and then it decreases gradually until it is time for her rest period.



## Safety First

Once the milk leaves the farm it goes to a dairy processing plant. The dairy plant has a very clean, temperature-controlled environment. All milk has to be pasteurized before it can be consumed by humans. Pasteurization involves heating the milk to 100°C so that there are no harmful bacteria left. After the milk is heated it is very quickly cooled. The pasteurization process does not change the flavour, colour, or taste of the milk.

Dairy cows wear pedometers to track their steps. Farmers can tell if a cow might be sick if she doesn't take her usual number of steps in a day.



Dairy cows give an average of **30** litres of milk per day. That's **126** glasses of milk!



## Nutritious!

A cup of milk contains:

- More calcium than 12 sardines with their bones.
- As much protein as a Grade A large egg.
- More thiamine, riboflavin, and niacin than one slice of 100% whole wheat bread.
- Close to  $\frac{3}{4}$  of the amount of vitamin A that is in a cup of broccoli.
- 45% of our daily requirement for vitamin D.
- A total of 25 measurable nutrients.

Cows eat 3 suitcases full of hay and drink a bathtub of water every day!

