

### Corn for Western Canada:

**Expanding Crop Opportunities for Western Canadian Farmers** 

# **DuPont Pioneer:**

DuPont Pioneer was founded by Henry A. Wallace in 1926. It was the first company in the world to develop, produce and market hybrid seed corn. From the beginning, Pioneer Hi-Bred has maintained a commitment to improving farmer productivity and profitability.

Today Pioneer Hi-Bred is the world's leading source of customized solutions for farmers, livestock producers and grain and oilseed producers. With headquarters in Des Moines, Iowa, Pioneer Hi-Bred provides access to advanced plant genetics in nearly 70 countries.

#### **DuPont Pioneer in Canada**

Established in 1946, Pioneer Hi-Bred is Canada's premier seed company.

#### **Our product line includes:**

Corn

Sunflowers

Soybeans

Winter wheat

Canola

• Sila-Bac® brand forage inoculants

Alfalfa

#### **Crop genetics research and** product development

At Pioneer Hi-Bred, our goal is to rapidly create seed products with ever-greater total economic value. Our product development focuses on increasing yield potential and overall product value while minimizing any potential losses and costs. Key to reaching this goal is the integration of traits deemed valuable by the marketplace into our collection of superior, proprietary germplasm.

#### Breaking new ground in **Western Canada**

Pioneer Hi-Bred is breaking new ground in every field of the seed business. Our customers have challenged us to dig deep for results that will meet the next decade's toughest market and cropping challenges. And our researchers are delivering.

Pioneer Hi-Bred has been breeding corn hybrids for over 80 years. As we apply our global experience to Western Canada, we remain committed to continued investment to expand the corn growing opportunity for local growers. It is our goal to lead the industry in launching new early season corn hybrids that will provide our customers with a new, viable cropping option.

As part of this effort, we have recently placed a new corn breeder in Carman, Manitoba specifically to breed early corn hybrids for Western Canada. The effort is supported by a dedicated research effort in Edmonton, Alberta to conduct maturity trials and silage trials for yield and quality. We are also expanding our corn breeding efforts in Southern Alberta by adding a new corn breeding and research facility to help with the increasing corn acres in Western Canada.

To further grow corn acres in Western Canada, we are continuing to expand our network of Pioneer Hi-Bred sales representatives. Backed by industry-leading agronomy support and expertise, this dedicated team of over 150 Pioneer Hi-Bred sales representatives is committed to helping our customers grow a successful corn crop under their local conditions.

DuPont Pioneer. We're breaking new ground where it matters most to you: in Western Canada.

"Western Canada provides a great opportunity for us to grow corn acreage in Canada. With this in mind we are investing heavily in hybrid corn development which will be supported with a new corn research facility in Southern Alberta. DuPont Pioneer has extensive knowledge of corn agronomy and production which we will use to educate growers on how to produce the new crop and be with them every step of the way from seed to harvest."

Greg Stokke, Business Director - Western Canada, DuPont Pioneer

### Corn Agronomy

#### What hybrid is right for my farm?

Corn hybrid maturity ratings help growers compare and select hybrids, manage risk, and spread out their harvest period. However, since there is no industry standard for these ratings, comparing hybrid maturities between companies can be difficult and confusing.

By rating corn hybrids for silking, physiological maturity and harvest moisture, Pioneer provides the maturity information needed to accurately compare hybrid differences and help make sound hybrid decisions. These maturity ratings are called comparative relative maturity (CRM) ratings.

**Corn Heat Units** Less than 1000 1000 to 1150 1150 to 1300 1300 to 1450 1450 to 1600 1600 to 1750 1750 to 1900 1900 to 2050 2050 to 2200 More than 2200 Physiological Maturity map courtesy of the Government of Alberta - Agriculture and Rural Development. Average corn heat unit accumulations from 1981 to 2010.

Pioneer CRM ratings are values to allow maturity comparisons between hybrids. However, they do not represent actual days from planting or emergence.

Pioneer also assigns corn heat unit (CHU) values to help position hybrids in the field. Corn heat units are a system of relatively ranking hybrids for their maturity as determined by the level of moisture a hybrid has at harvest.

Look at the corn heat unit rating of the hybrid and the physiological maturity for your area (see provided maps) to best determine whether a hybrid can be safely planted on your farm. Compare the ratings of a new or unfamiliar hybrid to one you are currently planting or one that is grown successfully in your area. Keep in mind that varied area climates or extreme conditions may alter some hybrid maturity comparisons.

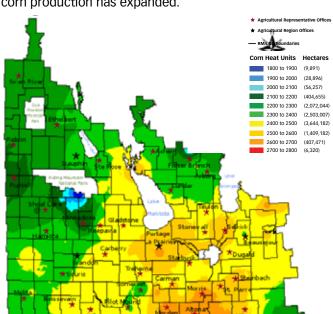
It is important to select a hybrid with the appropriate maturity because a hard killing frost before physiological maturity will cause premature black layer, halt grain fill, and may result in chaffy kernels with poor grain quality and test weight. Frost damaged corn is usually slower drying and additional losses may result due to delayed harvest. Therefore, it is critical to select hybrids that can normally mature before the first average killing frost date in your area.

Depending on the end purpose of your corn crop, you must select an appropriate heat unit corn to achieve the desired maturity. A hybrid that you would choose for silage would not be one you select for grazing. The same can be true for silage to grain production.

When selecting corn hybrids for your local conditions, it is best to work with someone that understands the area. This is where your local Pioneer Hi-Bred sales representative can make a recommendation to help you select the appropriate hybrid for your needs.

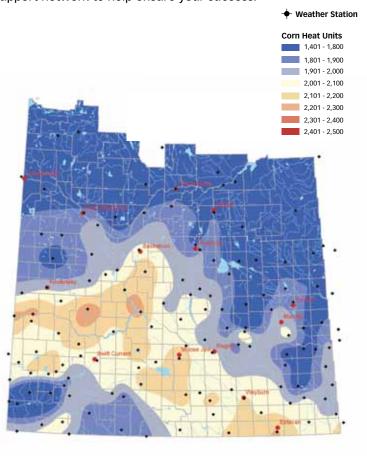
#### **Grain production**

The corn production area of Western Canada is continuing to grow outside the traditional area of the Red River Valley in Manitoba. With the development of lower heat unit corn, and a developing ethanol market, the potential for grain corn production has expanded.



Physiological maturity map courtesy of Manitoba Agriculture and Food. Average Annual Accumulation of Corn Heat Units. www.gov.mb.ca/agriculture/climate/waa50s00.html

With our expanding network of local Pioneer Hi-Bred sales representatives, we are helping to push the boundaries of corn growing areas. Our sales rep network are continually setting up grain corn demonstration sites across what would be considered non-traditional corn growing areas. Ask your local Pioneer Hi-Bred sales representative about setting a trial up on your farm. For those that are interested, Pioneer Hi-Bred has an extensive agronomic support network to help ensure your success.



Physiological maturity map courtesy of the Saskatchewan Ministry of Agriculture. Accumulated Corn Heat Units for Grain Production. Data from 1980-2005.

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# Corn Planting Considerations

Planting corn seed to a depth of  $1\frac{1}{2}$ " – 2" is optimum. Planting too shallow inhibits nodal root development and can lead to lodging. It also risks greater exposure of the emerging plant to herbicide residue. Planting too shallow can effect both brace and crown root development, which are responsible for stabilizing young plants and help with 85% of water & nutrient uptake.

Corn requires 10°C to germinate and emerge, however you should plant once your land is prepared and in planting condition. It is important to plant in early to mid May, if field conditions are suitable for proper germination and emergence. Achieving the maximum potential number of heat units is critical for the success of corn in Western Canada. Planting into cold soil does not increase the potential for more corn heat units, waiting as long as you can until soils warm up will ensure more even and faster germination & emergence.

The growing point of the corn plant remains below the surface until the sixth leaf appears. A slight frost prior to the emergence of the sixth leaf will lead to leaf loss but should not kill the plant.

Day length and night temperature are other factors to consider when choosing a corn hybrid. For example, a grower in Manning, Alberta can plant a 2450 CHU corn for grazing because of the extended daylight hours. While a grower in Saskatoon, Saskatchewan might achieve the same results.

#### **Other considerations:**

- Good seed to soil contact is essential, as the corn seeds require 1/3 of their kernel weight of moisture to germinate.
- Slower planting speeds produce more uniform seed placement.
- Pioneer® brand corn seed is available with one of two seed treatment options: treated with a fungicide only or treated with a fungicide + insecticide seed treatment for protection from pests to ensure the crop gets off to the best possible start.

#### **Plant population**

An initial target of 32,000 plants/acre is a good starting point. However, this may need to be adjusted depending on field conditions. For example, under dry conditions use lower target seeding rates to allow plants more access to available moisture.

Use the following table to check seeding rates:

	Inches Between Kernels			
Kernels/Acre	15" row	20" row	30" row	
22,000	19.0	14.3	9.5	
24,000	17.4	13.1	8.7	
26,000	16.1	12.1	8.0	
28,000	14.9	11.2	7.5	
30,000	13.9	10.5	7.0	
32,000	13.1	9.8	6.6	
34,000	12.3	9.2	6.1	
36,000	11.6	8.7	5.8	



Timing of herbicide application is an important factor in the success of your corn crop

#### **Weed control**

Corn is planted in wide rows and its growth is slower at the early stages versus other crops. Thus, early weed control is very important. Row spacing between 15-30 inches has shown to increase yields due to the high potential to intercept more light and also to reduce weed competition within rows due to faster development of the crop canopy.

Timing of herbicide application is very important, both to minimize competition from weeds and to prevent injury to the corn plant.

Consult your local Crop Protection Guide for herbicide choices and recommendations. Be aware, corn hybrids have different levels of herbicide tolerance to different broadleaf herbicides. Your local Pioneer Hi-Bred sales representative can help you select the best herbicide options for the corn hybrids you are growing.



"In order to maximize yield potential, it is extremely important to keep the early stage of corn development free of weeds."

**Philip Mansiere**, Pioneer Hi-Bred sales representative, Meskanaw, Saskatchewan

# Making High Quality Silage

#### **Critical processes in making silage**

- · Agronomics of the hybrid
- Moisture and maturity at harvest
- Chop length and degree
- ,

of processing

- Rate of fill
- Growing season management Sizing of structure
  - Inoculation
  - Covering with plastic
  - Rate of removal
- Integrity of pack
- Technique of removal

### Silage management considerations

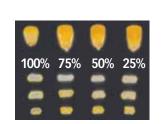
The ideal moisture content for chopping hybrids for corn silage will vary depending on the storage device that you are using. Please refer to the chart below:

### Recommend Moisture Content of Corn Silage for Specific Storage Devices

Silo Structure	Recommended moisture content $\%$
Horizontal bunker silos	70 to 65
Bag silos	70 to 60
Upright concrete stave	65 to 60
Upright oxygen limiting	60 to 50

Silage moisture decreases at an average rate of 0.5% per day. Days between early dent and 50% kernel milk ~12 d; between 50% kernel milk and 0% milk (black layer) ~13 d.

Aim to chop silage at approximately the 1/3 to 2/3 milk line. Milk line describes the hard starch in a kernel. It may be the most widely used indicator for determining when to harvest corn for silage. One advantage of the kernel milk line is that it indicates the rate at which the crop is drying down.



Harvesting at a favourable milk line ensures proper ensiling, and delivers excellent feed quality with maximum stable energy content. If the moisture level is too high when the hybrid is

chopped, it results in higher sugar content which is not stable in the bunk and can lead to increased seepage. While chopping silage when the hybrids are too dry will result in corn kernels passing through the animal undigested.

#### The fermentation process

Phase I	Phase II	Phase III	Phase IV	Phase V	Phase VI
Cell Respiration Production of CO <sup>2</sup> Heat and Water	Production of Acetic Acid and Lactic Acid Ethanol	Lactic Acid Formation	Lactic Acid Formation	Material Storage	Aerobic Decompostion on Re-exposure to Oxygen
69°F* Temp Change	90°F		84°F		84°F
6.0-6.5 pH Change	5.0		4.0		7.0
Aerobic microbes and plant respiration	Acetic Acid and Lactic Acid Bacteria	Lactic Acid Bacteria	Lactic Acid Bacteria		Mold and Yeast Activity

Age of Non-Treated Silage (Days)

Adapted from McCullough \*Temperature dependent on ambient. Ensiling temperature generally is 150 higher than ambient.

## High Moisture Corn

### High Moisture Shelled Corn (HMSC) vs. High Moisture Ear Corn (HMEC)

Technically, HMSC contains corn grain only while HMEC contains grain, cob, husk and various amounts of trash composed of stalks, leaves and tassels. A variation of HMEC known as "snaplage" contains additional stalk, leaves and tassel plant parts. The percent grain in HMEC varies greatly with harvest method, hybrid, and moisture content.

Modern self-propelled harvesters equipped with snapper heads and "kernel processing" units typically harvest HMEC which is 80% grain. Results of other harvest methods can range from 70% grain to almost 90% grain. HMEC will yield 12-20% more dry matter per acre at harvest than HMSC.

HMEC has a tendency to trap more air, has a higher chance of mould and mycotoxin contamination, and separates more when fed. The snaplage form of HMEC will be even more prone to mould and mycotoxins and separation because of additional trash components.

Corn can be harvested wet and stored as high moisture corn. The recommended moisture level for harvesting, storing, and feeding HMSC and HMEC is between 26-32%. Harvesting can typically begin once the corn has reached physiological maturity which is indicated by the black layer

#### **Nutritional Comparisons**

	%DM	CP%	ADF%	NDF%	NEL	PAF
Dry Corn	88	9.4	3.4	9.5	0.92	0.95
HMSC-ground	72	9.2	3.6	10.3	0.92	1.04
HMSC-rolled	72	9.2	3.6	10.2	0.92	1.00
HMEC	67	8.4	9.4	21	0.89	1.04
Snaplage	67	8.4	11	36	0.72	not listed

Source: 2001 Dairy NRC, Michigan State Spartan, Pioneer tech service samples

at the tip of the kernel (refer to kernel diagram earlier). Black layer is typically achieved when a kernel moisture is between 30-32% moisture.

Harvesting too early will reduce dry matter yields and can result in extensive fermentation causing energy losses during storage. Harvesting too late will also reduce dry matter yields and make packing difficult.

"Milk line is a good indicator to determine when you are getting close to the time to start chopping silage. But more accurately, you should actually chop up some representative plants from the field and use a Koster tester to dry down the sample to precisely determine the moisture percentage before you start making silage."

**Brent Jordan**, Pioneer Hi-Bred sales representative, Ponoka, Alberta



# Why use a Silage Inoculant?

#### **Sila-Bac® brand forage inoculants**

Sila-Bac® brand inoculants from Pioneer contain patented strains of lactic acid-producing bacteria designed to help improve silage quality in several ways:

- Speed up and improve fermentation, retaining valuable nutrients and reducing dry matter loss
- Improve nutritive value of starch and fibre
- Improve protein quality by reducing ammonia production
- Extend bunklife by reducing spoilage by yeast and moulds

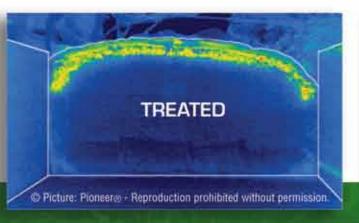
#### **Inoculants pay**

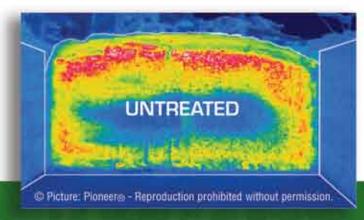
Our newest generation Sila-Bac® brand inoculants contain a combination of unique proprietary strains of bacteria, including Lactobacillus buchneri. L. buchneri is a heterofermentative bacterium that produces acetic and propionic acids, which substantially decrease the growth of the yeasts and moulds responsible for silage heating and spoilage.

#### **Benefits and Strengths:**

- Helps during feed-out, reduces heating thus increasing
- Excellent nutrient retention, reduces spoilage.
- Combination products containing *L. buchneri* require significant testing to insure that the homo- and hetero-fermentative organisms work in a concerted fashion.

Bunker at left features silage treated with an inoculant containing *L. buchneri*. The infrared photo (below) shows cool silage (blue areas) with slight warming on the top caused by the penetration of sunlight (yellow areas). The infrared image of the untreated bunker, right, shows evidence of substantial heating (yellow to red areas), not only on the top but also around the perimeters. This indicates conditions are ripe for the breakdown of nutrients and deterioration of silage quality.





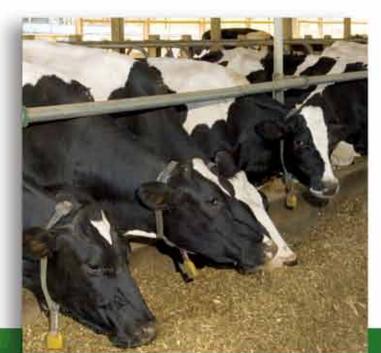
**VARIATION IN TEMPERATURE** :

#### red to blue = range of 20°

Source: Pioneer Seeds, INRA (PIN) and INFRAROUGE RECHERCHES INTERNATIONAL, unpublished.

#### **Pioneer Appli-Pro® SLV** (Super Low Volume) Inoculant **Applicator System**

Designed and developed by Pioneer Inoculant Research, the Appli-Pro SLV uses air from a compressor and a small amount of water to deliver the inoculant solution. The total amount of liquid applied is 10 ml/ton, so each 2.5-litre inoculant bottle treats 250 tons of chopped forage. It's simple to use. All you need to do is add water to the bottles of inoculant, shake the bottle to put the product in solution and screw the bottles to the applicator. Each applicator holds two bottles.





#### **Advantages of the Appli-Pro® SLV System**

- Treats up to 500 tons before needing to refill.
- Saves time! Less stopping and reloading of both water and inoculant.
- Eliminates mixing of inoculant material in large water tank.
- More accurate, more precise application with the unique injection system.
- Less waste, improved quality control because you can remove and refrigerate the mixed inoculant bottle at end of the day. Completion-Pac bottles are available for finishing fields.
- · Unique back-flush system reduces waste, makes system cleaning easy.
- 12-month full manufacturer's warranty on parts and labour.



"By starting to use inoculants, large feedlots and dairies have seen significant improvements in silage quality."

Nicole Rasmussen, Area Agronomist, DuPont Pioneer, Taber, AB

# Grazing Corn Cost Comparison Grazing Corn Versus Barley

#### **Cost Estimates - 2008**

Operating Costs	Barley Swathed \$/acre	Corn \$/acre
Seed	12.00	65.00
Fertilizer (applied)	37.00 (50N + 20P)	63.00 (80N + 40P)
Chemical	10.85	15.00
Labour (cropping & feeding)	16.00	16.00
Seeding	20.00	20.00
Cultivate/Disc	12.00	12.00
Harrow	5.00	5.00
Sprayer	7.00	7.00
Land	45.00	45.00
Taxes	2.00	2.00
Total	166.85	250.00

#### **Cost Predictions - 2008**

Measures	Barley (seeded June 20th)	Corn (seeded May 10th)
Projected Yield	2.75 ton DM	4.0 ton DM
Estimated Cow/Days @ 15% utilization	175 cow days per acre	270 cow days per acre
\$ per cow/day	\$ 0.95/day	\$ 0.93/day

Traditional feeding methods with prepared feeds and rations cost between \$1.10 to \$1.25 per cow per day. These costs may vary depending on the size of the operation.

#### **Nutritional considerations**

- Whole plant corn grazing has high enough quality to meet and exceed the requirements of a beef cow in mid-pregnancy.
- The best way to manage grazing corn and increase utilization is to move animals through paddocks every 1-2 days.
- Beware of mature grazing corn. There are risks of acidosis, bloat, lameness, etc. if not rationed out properly.
- Silaging a potentially mature crop may provide a better return on your investments.
- Select the right maturity for your local area.
   Your Pioneer Hi-Bred sales representative can help.

Feed a little high quality alfalfa/grass hay every 2-3 days. This will improve crude protein level in the diet and allow for better animal utilization of less digestible stalks at the back end of the grazing period.

Feed a highly palatable, complete, 2:1 winter mineral (with salt). Remove other salt sources. If palatability is an issue, add a little dry molasses.

Be prepared to supplement if there is a cold snap. Cows forced to clean up stalks during extremely cold periods can impact. Feed high quality hay or range pellets in the evening. Move into a new paddock if you can.

### **Electric fencing is key to grazing success**

Electric fencing is very important as you are preparing your operation for grazing corn. Consider running a dual wire fence (wire return) – where the top wire is hot while the lower wire acts as the ground. Make sure your fence is well-grounded. Connect the lower wire to grounding rods, driven into the soil at intervals along your fence. Ensure that debris or stalks cannot contact it as this can short out the system. Sometimes you may have to put several rods along the fence in order to obtain a good ground.

Electric fencing will take some time to plan and set up. It's a good idea to run a second paddock next to your current one. This holds animals to a smaller area in case they break out. It also makes moving them easier. Consider getting your paddocks ready just before the ground freezes up.

### When do you want to graze your corn?

- Don't put all eggs in one basket.
- Plan in conjunction with other feed sources.
- Graze corn in mid November to late January to better fit with cow nutrition requirements.





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#### **Dedicated support for your corn-growing needs**

Backed by industry-leading agronomy support and expertise, this dedicated team is committed to helping you grow a successful crop under your local conditions.

#### Give them a call today!

#### **ALBERTA**

**Craig Schmidt** Barrhead (780) 674-4828

**Dennis Nordhagen** Beaverlodge (780) 814-0789

**Danny Nobbs** 

Bonanza (780) 864-1289

Jill Feniak-Splane Boyle/Smoky Lake (780) 689-3386

**Gordon Frank** Brooks (403) 362-7299

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**C Pellerin Ventures Ltd** Debolt (780) 957-2000

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**Brianne Brault** High Prairie (780) 536-7199

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Ag-Vise Ltd.

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**Koester Ag Ventures** Rockyford (403) 901-3560

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St Albert (780) 915-6920

**Gerald Fodchuk** St Brides (780) 645-3720

St Paul Seed Cleaning Assoc St Paul (780) 645-3939

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**Taber Home and Farm Centre** Taber (403) 223-8948

**Chris and Holly Drader** Tangent (780) 359-2727

Bauer Six Ltd Torrington (403) 443-0357

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**Double Bumps Seed & Agron Ltd** Vegreville/Two Hills (780) 336-4808

Kittle Farms Ltd Viking (780) 336-2583

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Pittman Agronomy Ltd Warner (403) 642-7693

Jacob Boychuk Waskatenau/Thorhild (780) 656-6333

Hal Creek Seed Company Inc Clvde/Westloc (780) 348-2629

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**Interior Seed and Fertilizer Ltd** Cranbrook (250) 426-5347

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**David Blais** Maidstone (306) 893-7186

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**Meridian Ventures Inc** Tisdale (306) 873-8892

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