LEAFY CORN SILAGE

floury LEAFY CORN SILAGE

full floury LEAFY CORN SILAGE

We are proud to offer livestock producers a robust line-up of silage-specific corn hybrids that have been bred and tested for the complex agronomic and nutritional requirements of your operation. These hybrids offer a superior balance of effective and digestible fiber, more rumen-available starch and boast silage-specific agronomics such as high total plant yields and long harvest windows. They need less time in the silo before they can be fed and produce high quality milk and meat dependably and economically. Leafy Corn Silage Hybrids aim to deliver high yields of quality feed for your cows.

Prairie Creek Seed

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THIS IS SILAGE.

LEAFY CORN SILAGE

INFORMATION GUIDE

MESSAGE FROM THE BREEDER

Thank you for choosing to grow a Leafy, Floury Leafy or Full Floury Leafy Corn Silage Hybrid. As a corn breeder who grew up on a dairy farm, I know that feed is your largest expense and that the yield and quality of the forage you harvest each autumn plays a vital role in the health of your cows, the quantity and quality of the milk or beef they produce, and your bottom line.

I began breeding corn plants with the Leafy gene in the 1980s soon after I founded Glenn Seed Ltd. This gene produced large plants with enormous ears and generated a lot of excitement in the breeding community. It took me most of a decade to integrate this gene into the germplasm that I had in my program, to purify lines and to create hybrids with excellent agronomics. While initially enthusiastic, other breeders moved away from this material because its kernels were too moist and fragile for the grain market. Its stalks were too soft for late season harvest. It was in these same plant characteristics that I saw the opportunity for a unique silage-specific product type. In the decades since, we have dedicated our entire breeding program to the development of silage-specific corn hybrids for the complex agronomic and nutritional requirements of livestock operations. Leafy Corn Silage Hybrids have been serving livestock producers across North America, Europe, Australasia and South America since 1992, and Floury Leafy Corn Silage Hybrids have been making milk and beef since 2002. Full Floury Leafies were introduced in 2022.

High quality silage is the foundation of success on a livestock operation. I hope that our silage products bring value and peace of mind as you focus on making high quality milk and beef.

Thank you for your valued business,

Dr. Francis Glenn
President, Glenn Seed Ltd.

Glenn Seed Ltd. is a family-owned corn genetics company located in Ontario, Canada. It was founded in 1980 by Dr. Francis Glenn who has dedicated his career to the development of silage-specific corn hybrids.

LEAFY
CORN SILAGE

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The researchers indicated that the Floury Leafy ration had the same feed conversion as the BMR ration and it produced milk with a higher concentration of fat. "[M]ilk fat content was greater for cows fed LFY (4.05%) than BMR (3.83%)". In addition,"total-tract starch digestibility was greater for cows fed the LFY corn silage." (Ferraretto et al., 2015)

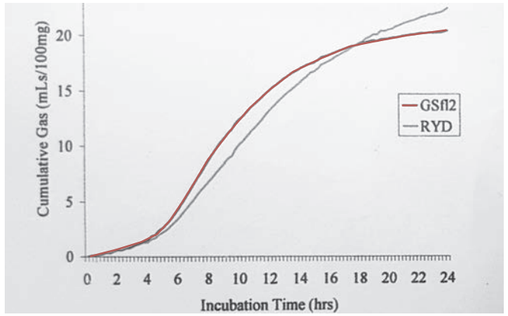
How does the starch of our Floury Leafies compare with other corn starch types?

A key part of our research program has always included third party testing of our products. Over the years, we have worked with many of the major North American labs and dairy research institutions to apply their latest testing procedures to our products, as well as to inform them of the innovations in our breeding program. We have asked researchers to assess the starch digestibility of our floury genetics in many ways.

In 2018, we sent grain samples of our floury kernels to Dairyland Labs so that they could assess the differences between it and a vitreous kernel type. They performed IVSD (*in vitro* starch digestibility) testing on both samples. Samples were ground to 4mm and a 7hr test was performed. The floury kernels were found to have 55.8% starch digestibility and the vitreous corn had 45.2% starch digestibility. This is a 10.6 percentage point boost for our floury corn. They also did *in vitro* gas testing on both samples for a period of 48 hours. At the seven-hour mark, the floury grain had produced 22% more gas than the vitreous grain.

In 2012, we submitted a sample of our floury grain to the University of Wisconsin, where they compared it to Reid's Yellow Dent (RYD), a relatively vitreous kernel type, in order to explore differences in quality between the two endosperm types. Research was conducted by S. Nellis at UW Madison, Department of Dairy Science. Nellis indicated that the floury sample was 75% opaque while the vitreous sample was 25% opaque. Nellis ground the two samples with a Wiley mill set to 4mm and found that the floury sample ground to finer particles than the vitreous sample. The samples were subjected to an IVSD test. Over the 24-hour testing period, the two samples were found to have a similar total degradation, but at the 7 hour mark, the floury kernels had produced much more gas. Nellis concluded that the Floury "nutrients were more readily available to the rumen microorganisms as seen in a faster initial rate of fermentation."

Above: Cows eating a Floury Leafy Corn Silage ration



Above: Cumulative gas production (mLs gas/100 mg sample) over time for the floury kernels (GSfl2) and RYD. (Nellis, 2012)

What we've learned

The results of this research are encouraging. We know that studies that have assessed our germplasm have found evidence of greater *in vitro* and *in situ* ruminal and total tract starch digestibility associated with their more floury endosperm types. Several researchers in the dairy science community have come to the same conclusion by examining other sources of floury endosperm corn. They have concluded that a more floury corn endosperm type reduces starch particle size and increases ruminal and total tract starch digestion.

When we add to this the additional benefits of an extended harvest window in which greater starch accumulation may be achieved in the silage product, the maintenance of effective fiber, the reduction of ration additives and the shortening of required storage time, we begin to see the tremendous contribution that these products can make to the livestock industry.

While this article has focused on starch type and the power of improved starch digestibility, it is essential to remember that corn silage is a forage product. Starch is but one important piece of the equation. A floury endosperm type is only of value to the silage producer if it comes as part of a hybrid package that combines silage agronomics, quality fiber and high yield. The good news is that our products have been bred and tested for these characteristics as well.

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On the cover: Dr. Glenn with a Full Floury Leafy Corn Silage Hybrid
On this spread: An overhead view of a Glenn Seed experimental silage trial at flowering time

GRAIN VS SILAGE

Breeding has a profound effect on the architecture and behavior of a corn hybrid. As a result of very different breeding goals, ideal grain and ideal silage hybrids have mostly OPPOSING characteristics.

BREEDING FOR GRAIN

Approximately 92% of North American corn acres are grown for grain. In order for a grain hybrid to perform, it must have durable kernels that will stay intact during combining, shipping and elevating. These kernels must also dry quickly to save on the cost of mechanical drying. To ensure the successful harvest of a grain crop, breeders select grain hybrids to have stiff stalks that will stand late into the season. These hybrids are also designed to have a relatively high ear placement on the plant for ease of combining. Grain farmers are paid on the basis of kernel integrity, test weight and kernel moisture. To meet this bill, a successful grain hybrid must have three key kernel characteristics: they must have a vitreous, or glass-like kernel type (which makes them hard, tough and heavy), the kernels must be relatively small (to further reduce the likelihood that they will fracture during mechanical processing), and they must dry rapidly on the plant as it reaches maturity (to save on drying costs). Grain-type hybrids, with their small, fast drying, vitreous kernels, are ideal for delivering high quantities of starch in compact transportable packages to distant markets.

Dual purpose hybrids bred for grain do not make ideal silage. Here's why:

THE STARCH

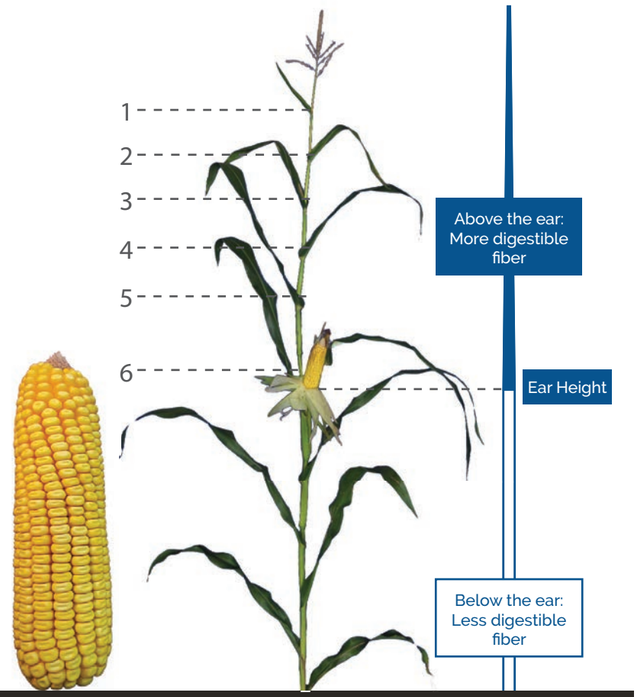
As a grain hybrid reaches silage maturity, its kernels dry rapidly and get very hard. This rapid drying creates a very narrow silage harvest window, which is further complicated by the extended stay green of the grain hybrid's stalk. Often, when the kernels reach a silage appropriate moisture, the plants are too green and wet to put in the bunker. If the plant is harvested once the plant reaches silage-appropriate moisture levels, the kernels have likely become hard and dry. While the kernels may have a high starch test weight, they remain whole or fracture into large pieces during silage harvest and cow chewing. In this form, much of the starch is unavailable to rumen bacteria. In order to soften these large hard chunks of starch, a minimum storage period of six months is recommended. This long storage period increases storage space requirements and dry matter losses, and does not guarantee ideal starch quality by the time it is fed. Starch can be made more digestible by processing, but this damages effective fiber and does not consistently reduce starch to a particle size that is comparable with a hybrid that has a more digestible kernel type.

THE FIBER

A successful grain hybrid is bred to withstand the elements until late season harvest, which requires the stalk to be stiff and solid. In addition, its ear must be positioned high on the plant to ensure successful harvest by the combine. Both of these requirements reduce fiber digestibility. The ear is the heaviest part of the plant, so the below ear portion of the stalk must be heavily lignified in order to support it. By raising the ear position and selecting for stiff stalks, grain hybrids produce a high proportion of indigestible fiber.

It can be difficult to harvest a grain hybrid for silage when its stalks are at the appropriate moisture level. It can pass from too wet to too dry rapidly and this reduces silage quality and feed efficiency. Excessively wet or dry silages often result in inadequate fermentation and unstable silage products.

IDEAL GRAIN



Above: A Floury Leafy Corn Silage Hybrid being chopped

samples at 50% milk line and at black layer. Samples were dried at 40 degrees Celsius and ground with a Wiley mill with a 6mm screen. They then did various *in situ* and *in vitro* tests on the samples and concluded that "[v]itreousness had strong negative correlations with degradability, particularly for more mature samples…" Of the 33 inbred lines that he compared in this study, there were two floury types, one containing the fl2 gene and the other containing opaque-2 gene. These two flouries had the highest ruminal dry matter degradability.

In 2005, Allen did a feed study that compared a floury to vitreous concentrate corn. The two grain types were added to multiple ration types and fed. He found that "[r]ate of ruminal starch digestion was faster and rate of ruminal starch passage tended to be slower in diets containing corn grain with floury vs. vitreous endosperm, resulting in a mean increase of 22 units for ruminal starch digestibility." He saw that "starch entering the duodenum was more digestible for grain with floury endosperm compared with vitreous grain, resulting in greater total tract starch digestibility," and that "vitreous corn grain fermented more slowly and passed from the rumen faster, resulting in decreased ruminal starch digestibility." He concluded that "[e]ndosperm type of corn grain greatly influences site of starch digestion and should be considered when formulating diets."

In a study where Allen fed cows floury and vitreous dry ground corn kernels, he found that regardless of the grind size, the floury was more digestible than the vitreous. He concluded that "endosperm type greatly affects ruminal and total tract starch digestibility independent of corn grain grind size" (2008). In a 2012 study, Allen found that "processing corn silage is not as effective at increasing surface area as fine grinding; processing can reduce, but not eliminate, differences in digestibility of sources varying in vitreousness". In short, even when finely ground, vitreous grain is not as digestible as a floury grain, and when it comes to silage, an aggressively processed vitreous grain hybrid will not have as much starch digestibility as a hybrid with a floury kernel type.

Does the more floury endosperm type of our silage-specific products affect starch digestibility in cows?

The increased starch digestibility of our Leafy and Floury Leafy Corn Silage Hybrids has been documented by researchers since 2001 in both lab testing and in academic milk studies.

In 2012, Agriculture and Agri-food Canada published a study comparing two dual purpose hybrids to two Leafy hybrids over four seasons. They found that the Leafies had significantly higher kernel moisture than the dual purpose hybrids in each of the four years as well as a higher maximum kernel dry weight in two of the four years. They concluded that "[t]he softer kernels in Leafy silage-specific hybrids indicate that under the same ensiling conditions, there would be more digestible energy produced from kernel starch than from non-Leafy dual-purpose hybrids." (Dwyer &Ma, 2012).

In feed studies that compare Leafies to dual purpose hybrids, it is common to see the following pattern: The dual purpose silage product contains a few points more starch than the Leafy, but the Leafy's starch is softer and more digestible. When fed the Leafy ration, cows produce more milk with increased milk solids over the dual purpose ration. (Thomas et al., 2001; Bal et al., 2000; Clark et al., 2002). We see about 6% more starch digestibility *in situ* from a Leafy compared to a dual purpose (Bal et al., 2000) and about 12% more starch digestibility *in situ* from a Floury Leafy compared to a BMR, which has a vitreous grain-style kernel (Ferraretto et al., 2015).

In 2015, the University of Wisconsin published a milk study that compared a Floury Leafy Corn Silage Hybrid to a BMR. Researchers found that "the starch portion of the LFY was more digestible than BMR as observed by ruminal *in vitro* and *in situ* starch digestibility coefficients". They found that the Floury Leafy had a "10 percentage unit greater ruminal *in situ* starch digestibility coefficient (12h)… compared with BMR." They also found that "kernel vitreousness was more than 2-fold greater for BMR than LFY (90.0 vs 37.5%)" and that "starch digestibility of the BMR was inhibited by vitreousness."

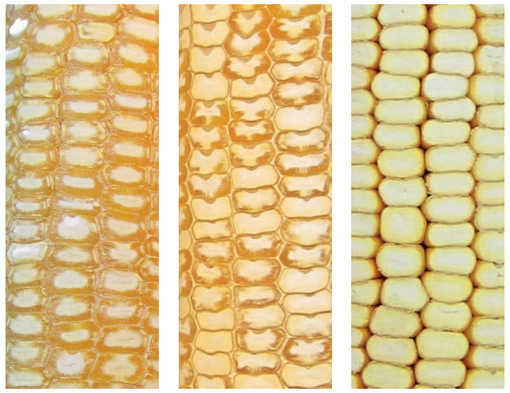
The rest of the starch in the endosperm is white and powdery. Even as kernels reach full maturity, they pack in more floury starch and never deposit more vitreous starch.

Our **Full Floury Leafy** products contain the opaque-1 gene in both parents of the hybrid, resulting in 100% of their kernels being floury (as described above) when self-pollinated.

The opaque-1 gene is recessive. For this reason, our Floury and Full Floury Leafy hybrids must self-pollinate. If they are pollinated by other corn, their kernels will become like those of a Leafy because the opaque-1 gene will be suppressed. These products should therefore not be mixed in the same field with other corn hybrids.

How can a more floury corn silage product be beneficial to a livestock operation even before it reaches the cow?

Choosing a corn silage product with a softer endosperm type has far-reaching benefits that go beyond the boost in starch digestibility that is realized when it is fed. Many of these benefits fall outside the scope of feed studies and cannot be measured by a lab test. For example, corn silage that has a softer, more floury endosperm type gives the opportunity for an extended harvest window because kernels do not significantly lose starch digestibility as they mature. This increases the likelihood of harvesting a highly digestible silage product and translates to feed security. For the same reason, a higher level of starch accumulation beyond 50% milk line can also be achieved without the loss of starch digestibility. Of course, it is essential to monitor plant maturity and ensure that the total plant remains within the harvest window so that good packing and fermentation can be achieved.



Dual Purpose **Floury Leafy** **Full Floury Leafy**

Above: Ears have been shaved to reveal endosperm composition.

Chopping a silage product with a softer kernel type also allows for the retention of effective fiber in the silage product without sacrificing starch digestibility. This is achieved by reducing the aggressiveness of the kernel processor to the point that it cracks kernels into a few big pieces and maintains a recommended ¾" chop length. The longer chop length results in a corn silage product that has a higher content of effective fiber than one that has been chopped fine. The retention of effective fiber helps the rumen function normally and boosts milk fat production. Consequently, this should allow for the elimination of straw from the ration, which is a savings in cost, storage space and effort for the operation.

Once in the bunker, the floury silage product can be fed after 30 days since the starch is readily available. This will save on bunker space and dry matter losses. In addition, concentrate corn and other additives can be reduced in the ration to reflect the increased starch digestibility of the silage product.

These often overlooked benefits of a genetically floury corn silage product can add up to savings in time, money and space for the operation. It can also increase feed security and result in a higher quality feed product. These advantages can have a significant impact on the operation's bottom line when the floury silage product is managed accordingly.

> *"Greater starch digestibility results in increased energy availability for dairy cows and thereby greater milk production, feed efficiency, or both"* (Ferraretto et al., 2015)

How does endosperm type affect starch digestibility in cows?

The topic of variation in starch type and its relationship to starch digestibility has been moderately explored by researchers. Several studies have used other sources of germplasm to support the conclusion that increased vitreousness of corn starch has a negative effect on starch digestibility in cows (Phillipeau, 1998; Correa, 2002; Lebaca, 2007; Ngonyamo-Magee, 2008; Allen, 2005, 2008, 2012). Despite this conclusion, some of the researchers indicate that the impact of these findings on industry have been limited because of the lack of commercially available products that combine the floury endosperm type with yield and agronomics [Lebaca (2007), Ngonyamo-Magee (2008)].

In 2008, Ngonyamo-Magee published a study where he and his team assessed a wide range of inbreds with various endosperm types ranging from floury to very densely packed flint types. They harvested starch

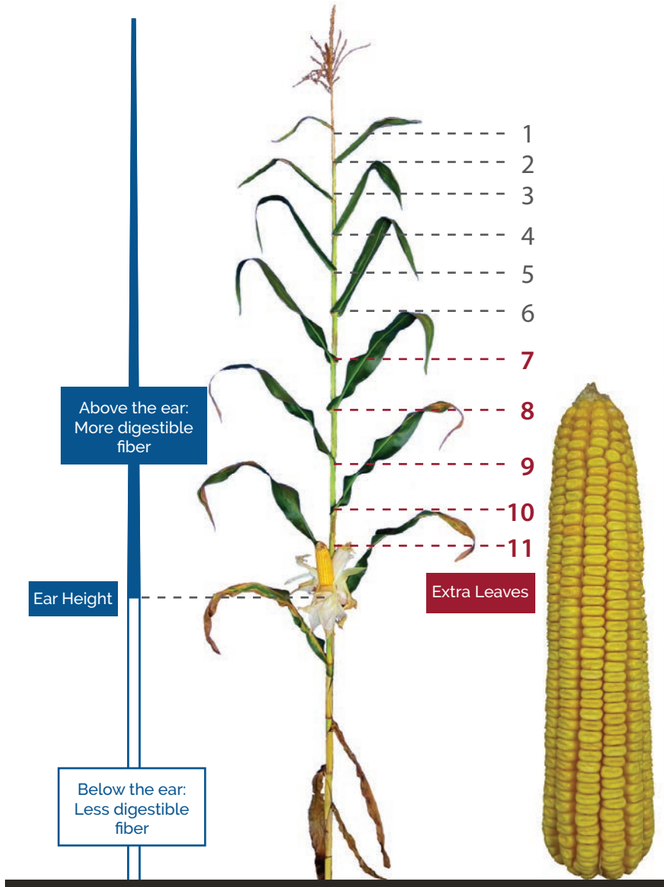
BREEDING FOR SILAGE

Roughly 8% of North American corn acres are grown for silage. Ideal corn silage harvest occurs when the crop has reached 65% moisture and 50% kernel milk line. During this harvest window, the whole plant is cut low to the ground and is chopped into small pieces before being packed into a silo or bunker. Then the corn is ensiled and mixed into a TMR and fed to a herd for a season or more. Given this process, an ideal silage hybrid must satisfy an entirely different set of parameters than a grain hybrid. It must have a high total plant yield of digestible starch and fiber, a long harvest window in which the plant dries to the appropriate moisture and remains there for an extended period, adequate sugars to promote fermentation, and a relatively short storage period to save on space and reduce dry matter losses. Ultimately, a corn silage hybrid must produce a reliable high-yielding, fermentable crop that when fed to cows promotes healthy and efficient rumination that is conducive to the production of a high quantity of high quality milk and beef.

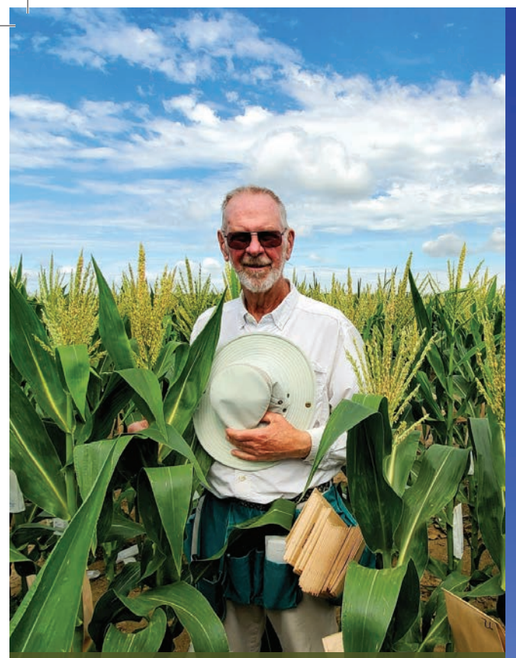
Above: Grain hybrids produce tough kernels that remain unbroken during transport, while silage hybrids produce kernels that are easily broken and digested.

Commercial grain hybrids cannot be the best silage hybrids since breeders select mostly opposing physical characteristics during breeding and testing.

IDEAL SILAGE



	Ideal Grain	Ideal Silage
Yield	High grain yield with high test weight.	High total plant yield of digestible forage.
Kernel Moisture	As dry as possible at grain harvest time.	50% milk line for as long as possible at silage harvest time.
Kernel Hardness	As hard as possible to decrease possibility of breakage.	Soft and easily broken for maximum digestion in the rumen.
Kernel Size	Small to decrease possibility of breakage.	Large to increase possibility of breakage.
Stalk Moisture	Wet to keep plant alive as long as possible to reach ideal grain harvest.	Dries to achieve 65% total plant moisture and stays in that range to extend harvest window.
Stalk Integrity	As stiff and solid as possible for late season grain harvest.	As soft and flexible as possible, yet strong enough to remain standing through late silage harvest.
Ear Height	High position on the plant to ensure harvest by combine.	Low position on the plant to increase proportion of digestible fiber above the ear.
Ideal At Harvest	Wet strong stalk that supports ears of vitreous, hard, dry kernels.	Large plant with a soft stalk and moist ear of large breakable kernels. Stalk and ear dry at a complimentary rate.



Above: Dr. Glenn in the breeding nursery

Above: The research chopping team

Below: A shaved Full Floury Leafy ear

RESEARCH & DEVELOPMENT

BREEDING THE PARENT LINES

In our breeding nursery, we hand-craft robust inbred parent lines that have been selected for silage-specific characteristics. This process of careful observation and pollination takes six to twelve generations. During these seasons, our advancing inbred parents are exposed to a wide range of environmental pressures from extreme weather events, to drought and diseases. Each event is an opportunity to advance only our best genetics and eliminate the rest.

HYBRID TESTING AND ADVANCEMENT

Each of our products is rigorously evaluated in a range of environments. The silage hybrids that make their way to the marketplace must withstand the rigors of at least three seasons in replicated plots at multiple locations and produce a high yield of high quality forage. They must demonstrate a wide silage harvest window in which the ear and total plant dry slowly after reaching silage maturity. Their kernels should be large and slow drying, allowing them to be easily broken in the silage processing system.

Yield trials are evaluated by a research chopper with an onboard NIR. The NIR generates data on dry matter yield, starch content, NDF content and digestibility, protein and moisture content. We also conduct a visual analysis of each plot and give a score for ear size, stay green and root lodging, among other plant and agronomic characteristics.

Of all the new hybrids that we test each year, less than 1% are commercialized. The products that are available to you are the best of the best.

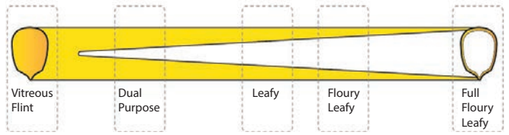
THE VALUE OF FLOURY

The History and the Science. *By Margo Lee, Associate Plant Breeder, Glenn Seed Ltd.*

Our Leafy and Floury Leafy Corn Silage Hybrids have been grown and fed on dairy and beef operations for decades. In this time, we've learned a lot and are taking stock of what we know about the value of their more floury endosperm type in animal nutrition. We have reviewed and compiled studies using our Leafy and Floury Leafy Corn Silage products as well as lab tests that we have commissioned using our genetics. We have also turned to the literature from the dairy science community that has assessed how corn endosperm type affects starch digestibility in cows, though most of these studies have been conducted on genetic sources other than the opaque-1 gene that is responsible for our floury.

What is our floury starch and how is it genetically different from the starch of our Leafies and dual purpose hybrids?

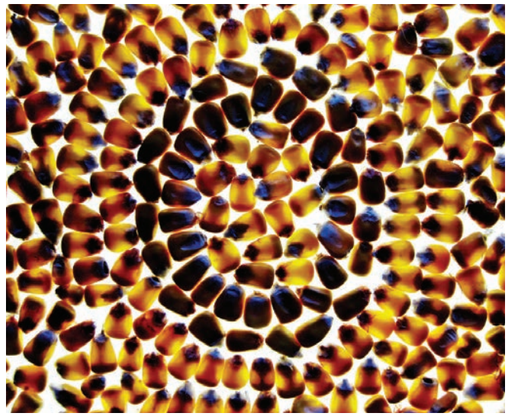
Let's get back to basics. The corn kernel is made up of three main parts: the pericarp, germ and endosperm. The endosperm contains the starch, and starch can be floury; appearing white and powdery, or vitreous; appearing yellow and glass-like. When viewed on a light table, vitreous starch transmits light and glows, while floury starch absorbs the light and appears dark. Both genetics and stage of kernel maturity affect starch type, and most kernels combine vitreous and floury starch in different ratios.



Above: Endosperm type diagram: illustrates a range of kernel starch types from vitreous to floury.

In the pursuit of increasing starch digestibility, our **Leafy Corn Silage Hybrids** have been bred to produce ears that have soft, slow drying, dent type kernels. Their kernels have been selected to be large and to contain a higher proportion of floury starch than grain-bred hybrids. These characteristics combine to increase the breakability of the kernels and to reduce the particle size of the broken starch in the chopped corn silage product to make it more available to the cow.

Our **Floury Leafy** products produce an ear with two distinct kernel types. Seventy-five percent of the kernels on their ears are silage-specific, like those of our Leafy products. The other 25% of their kernels are floury as a result of having the opaque-1 gene in one parent of the hybrid. The floury kernels are composed of a very thin layer of vitreous starch that surrounds the outer parts of the endosperm. This layer is approximately 0.2mm thick.



Above: Floury and vitreous kernels on a light table. Floury kernels appear opaque and vitreous kernels glow.

10 WAYS TO BOOST YOUR BOTTOM LINE

Leafy, Floury Leafy and Full Floury Leafy Corn Silage Hybrids deliver increased income over feed costs in sophisticated ways. The key is in the synergy between their silage-specific characteristics.

1 **MAXIMIZE TONNAGE**
At 28,000-30,000 ppa, Leafies tend to produce the same or higher yields of DM per acre compared to non-Leafies planted at 35,000 ppa, which means using fewer acres to meet your silage needs.

2 **BUY 15% LESS SEED**
Plant your Leafy at maximum population of 28,000-30,000 ppa to produce its optimal silage crop. You typically need to plant a non-Leafy at 35,000 ppa to get its best yield.

3 **MAXIMIZE YOUR HARVEST WINDOW**
The ears and stalks of our products dry slowly and at a similar rate as they approach silage maturity, and our Floury products produce digestible starch, even at an advanced stage of maturity. These physical characteristics extend the harvest window for improved feed security.

4 **CHOP FASTER**
Our silage-specific products are have flexible stalks and soft cobs of breakable kernels. These characteristics allow you to dial back the kernel processor and speed-up harvest. You'll chop faster and use less fuel.

5 **REDUCE STORAGE SPACE BY 25%**
Soft starch type and high sugar content at harvest allow Leafies to be fed as soon as 30 days after harvest, once fermentation is complete. That's five months sooner than hybrids that do not have this softer starch type. You'll need less silage on hand and that frees up a lot of space.

6 **ENJOY HIGH PRODUCTIVITY**
Leafy and Floury Leafy Corn Silage Hybrids have been shown to produce high quantities of milk in feed studies. They are competitive in feed efficiency and milk production relative to competing products.

7 **REDUCE KERNEL PASSAGE & SORTING**
Our silage-specific products have been shown to have more digestible kernels than non-Leafies. When fed, more starch is available to be used as fuel. And because this starch fractures into tiny particles, it is less likely to be sorted during feeding.

8 **REDUCE ADDITIVES**
The increased starch digestibility of our silage-specific products allows for a reduction in concentrate corn and other ration additives, and you'll never need to add straw to gain effective fiber.

9 **MINIMIZE DRY MATTER LOSSES**
Leafy's shorter required storage time can reduce dry matter losses and retain silage quality. Lose less, feed more.

10 **INCREASE 3.5% FAT CORRECTED MILK**
In feed studies, Leafy and Floury Leafies have been shown to produce milk with a higher percentage of milk fat than dual purpose hybrids and BMRs. Depending on how you sell your milk, this could be a big bonus.

PRODUCT CATEGORIES

OUR SILAGE-SPECIFIC PRODUCTS FALL INTO THE THREE CATEGORIES BELOW:

LEAFY CORN SILAGE

Named after the Leafy gene that produces a distinctive plant with 8 and more leaves above the ear, these silage-specific hybrids have been developed for ideal silage characteristics. They produce big yields of digestible fiber and starch. Ears are composed of large, slow-drying, silage-specific kernels for a boost in starch digestibility.

floury LEAFY CORN SILAGE

This silage-specific product type has all of the benefits of a Leafy with the addition of more digestible starch. Floury Leafies contain the recessive opaque-1 gene in one parent of the hybrid. When self-pollinated, 75% of their kernels are silage-specific, like those of Leafies and 25% are completely floury.

full floury LEAFY CORN SILAGE

This silage-specific product type has all of the benefits of a Floury Leafy with the addition of even more digestible starch. The opaque-1 gene is present in both parents of the hybrid. When self-pollinated, Full Floury Leafies will produce ears of 100% floury kernels for maximum starch digestibility.

IDEAL CORN SILAGE CHARACTERISTICS

Our silage-specific corn hybrids are bred for the unique characteristics below:

STRONG AGRONOMICS

Silage hybrids need good stalks, drought and disease resistance, and strong roots in order to produce reliable feed.

HIGH TOTAL PLANT YIELD

A corn silage hybrid should balance high yields of both digestible fiber AND starch.

LONG HARVEST WINDOW

To ensure the best quality silage makes it into the bunker, a hybrid should be slow-drying once it reaches optimal harvest moisture.

SHORT STORAGE PERIOD

Livestock producers need a fermentable silage that can be fed soon after harvest to save on storage space and to reduce dry matter losses.

HIGH STARCH CONTENT

Corn silage needs plenty of energy-rich starch to make milk and beef.

HIGH STARCH DIGESTIBILITY

For maximum availability of starch, kernels should break up easily into small particles at harvest and during cow chewing.

HIGH FIBER DIGESTIBILITY

Livestock producers need a corn plant that has high NDF digestibility and sufficient effective fiber to promote healthy rumination.

RATION TYPE ADAPTABILITY

A silage hybrid needs to be versatile so that it can be balanced in various rations to satisfy the nutritional needs of all cow groups on the farm.

EXCELLENT FEED QUALITY

Silage in the ration must be palatable and promote healthy rumination, while providing the nutrition necessary to keep a herd healthy and productive.

FREQUENTLY ASKED QUESTIONS:

Q Why does my Leafy field have an uneven canopy? Is it mixed with another hybrid?

A An uneven canopy is an identifier of a Leafy crop. The Leafy gene produces plants that have eight or more leaves above the ear. If, for example, you have planted a hybrid that averages 10 leaves above the ear, there will also be plants in your field that have 9, 11 or 12 leaves. The Leafy gene is a bit wild. These extra leaves will add dry matter, and the plants with higher leaf numbers will flower slightly later than the rest of the population for an extended period of pollen shed. This is added assurance of good kernel set.

Q I'm considering planting a Leafy, Floury Leafy, or Full Floury Leafy, but it doesn't look great in competitive yield trials or with MILK2006. Why not?

A Most yield trials are planted at populations that are much too high for Leafies. While the Leafy may produce high tonnage, under these conditions the Leafy will produce less starch and more lignin and will probably have some agronomic issues such as root lodging. A Leafy must be planted at a maximum population of 28,000-30,000 to yield its highest quantity of high quality silage. The milk per ton or milk per acre numbers that are generated from these trials are the result of measuring an inferior Leafy crop planted at the higher populations recommended for grain hybrids. The Milk2006 calculation does not take into account the added starch digestibility of these products, nor their other silage specific benefits.

Q My Leafy yielded really well, and I have some left over. What can I do with it?

A If you've read the section on grain versus silage, it should come as no surprise that these silage specific hybrids are not great grain hybrids. Their kernels are very slow drying and are designed to break. While we don't recommend that they be harvested for commercial grain, some farmers have done it successfully. Others have harvested it to feed as concentrate corn on farm. Just give them extra time to dry out and make sure to watch stalk integrity. These hybrids make excellent high moisture corn, earlage and snaplage.

Q Are there any special considerations that my nutritionist and I should be aware of when designing a ration with a Leafy, Floury Leafy or Full Floury Leafy?

A Yes. Ease back on the concentrate corn initially. All three hybrid types have a starch that is more digestible, which is unlikely to be recognized in a lab test. Watch your herd and add concentrate corn back in slowly if needed.

Q Do you recommend that I apply a silage inoculant to my Leafy?

A Leafy Corn Silage Hybrids generally contain more sugars in their stalks and leaves at silage harvest time due to their increased leaf area above the ear and their extended harvest window. These sugars are converted to lactic acid by the naturally present lactobacilli under anaerobic conditions in the silo. The presence of these extra sugars is thought to lead to a more even fermentation. While a well-packed Leafy crop may undergo better fermentation without an inoculant than a non-Leafy, the application of an inoculant adds silage security. Some inoculants also help to preserve dry matter in the open face of a bunker. For added insurance value, we recommend that a silage inoculant be applied at harvest.

Q Will my Floury product contaminate my commercial corn with pollen drift?

A No. The opaque-1 gene which is responsible for the floury endosperm type in our products is a recessive gene. If your commercial corn is fertilized by pollen from our floury products, it will not affect the starch composition of the grain hybrid.

Q How can I boost the feed quality of a Leafy, Floury Leafy or Full Floury Leafy?

A These products are high-yielding crops that have a large proportion of their total plant above the ear for a natural boost in fiber digestibility. You can further increase the fiber digestibility and the proportion of starch in the ration by raising the cutting bar during chopping.

THE BEST TEST: ANIMAL PERFORMANCE

We believe that the best way to see the difference in feed quality is to let your animals show you!

Our silage-specific products are dramatically different from grain-bred dual purpose corn. When we submit chopped samples to the lab for analysis, test results undervalue their quality relative to what is experienced by livestock producers who feed them to their herds. This occurs because labs grind samples prior to analysis. When samples are ground, the natural boost in starch digestibility of our products is obscured, as is the balance between digestible starch and effective fiber that can be achieved with a courser chop length at harvest. And if the MILK2006 equation is being applied to test results, starch digestibility is not given any value at all. In addition, if the Leafy crop was grown at a higher than recommended population, its starch content and fiber digestibility will also be poorer to begin with.

With this in mind, we encourage you to perform an on-farm feed study to assess the performance of these silage-specific products. To do so, we recommend the following steps:

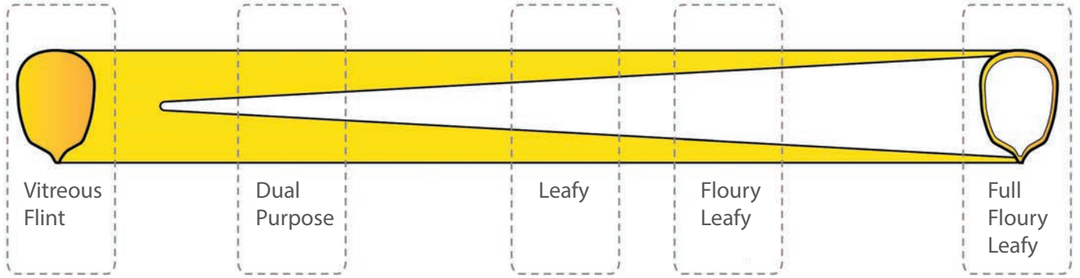
- Grow a minimum of 10-20 acres of the two crops (not just small strips), including your current corn hybrid and one of our silage-specific hybrids.
- Plant your hybrids at their recommended seeding rates, which may be different.
- Grow your floury product separately from other corn to get the maximum quantity of floury kernels.
- Chop and store your corn crops separately.
- When it is time to feed, segregate your animals into randomized groups, or switch your herd from one ration to another. Leave the other ration components the same.
- Assess the results, whether it is in milk production quantity and quality in your dairy herd, or in pounds of gain and cow days of feed per acre for your beef herd.
- **Your cows are the ultimate test and will tell you which hybrid is best!**

EXPECT MORE FROM YOUR SILAGE CROP

Why choose a few great silage characteristics when you can have them all?

Many corn silage hybrids boast only one quality of the plant, such as fiber digestibility, grain yield or kernel type. Chances are that the other characteristics of these hybrids were bred for grain requirements. The best silage products have been bred to achieve total plant silage qualities.

	Dual Purpose	LEAFY CORN SILAGE	floury LEAFY CORN SILAGE	full floury LEAFY CORN SILAGE
Strong Agronomics	●	●	●	●
High Total Plant Yield	●	●●	●●	●●
Long Harvest Window		●	●	●●
Short Storage Period		●	●	●
Ration Type Adaptability	●	●	●	●
Excellent Feed Quality		●	●	●
High Fiber Digestibility		●	●	●
High Starch Content	●	●	●	●
High Starch Digestibility		●	●●	●●●



Above: Dual purpose hybrids have a modern grain type kernel with more vitreous starch, while our silage-specific corn hybrids have more floury endosperm types.

LEAFY CORN SILAGE

Leafies have a different plant architecture and the key to realizing all of their silage-specific benefits is a lower plant population of 28,000 to 30,000 plants per acre, final stand.

Leafy Corn Silage Hybrids are named after the naturally-occurring Leafy gene that produces a distinctive plant with more than 8 leaves above the ear. Because Leafies are larger plants than grain hybrids, they need more room to produce their intended crop. To achieve this, they must be grown at a lower maximum population of 28,000-30,000 plants per acre (ppa). If your soil and productivity history tell you to plant a dual purpose at a lower population than 35,000 ppa, then reduce the population of your Leafy by 15% relative to the seeding rate of the dual purpose on the same acres.

How does leaf area translate into yield?

A corn plant's leaves are the factories that convert sunlight to yield. The chloroplasts within leaf cells produce glucose sugars during photosynthesis. This sugar energy is used for plant growth and development while the plant is young. After the plant flowers, these sugars are transported to the developing kernels to become starch. Starch accumulation is fueled primarily by the above ear leaves, which are relatively young and active, and receive the most sunlight once the plant is fully grown. The early growth of the plant is achieved by the below ear leaves, which become shaded as the plant grows.

The yield potential of a corn crop is related to its leaf area index, which is the one-sided green leaf area per unit of ground surface area. The leaf area index of a corn crop can be maximized by increasing plant population or by increasing leaf area on a per plant basis. Grain corn hybrids produce a maximum of 5-7 leaves above the ear, so these hybrids are planted at a population of 33,000-36,000 ppa to maximize their leaf area index. Leafy Corn Silage Hybrids have 8-13 leaves above the ear, so they have an increased leaf area on a per plant basis. They therefore require a lower maximum population of 28,000-30,000 ppa to achieve a similar leaf area index per acre as the grain hybrid population.

Leafy Corn Silage Hybrids have an increased potential over non-Leafy hybrids to produce high starch yields on a per plant basis because of their high leaf area combined with their flex ear type.

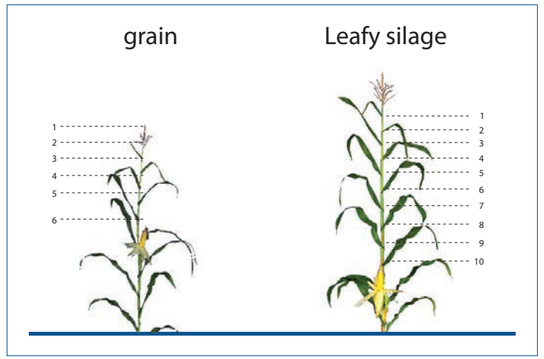


Figure 1

Figure 1 shows the typical stature of a grain hybrid and a Leafy Corn Silage Hybrid. Note the number of leaves above the ear (LAE), the size of these leaves and the position of the ear. The Leafy Corn Silage Hybrid has 10 LAE compared to 6 LAE on the grain hybrid.

Figure 2 shows the difference in leaf area between the two plants. The four leaves highlighted in red just above the ear are the extra leaves on the Leafy Corn Silage Hybrid. This Leafy plant has 70% more leaf area above the ear than the grain hybrid and about 40% more total leaf area than the grain hybrid.

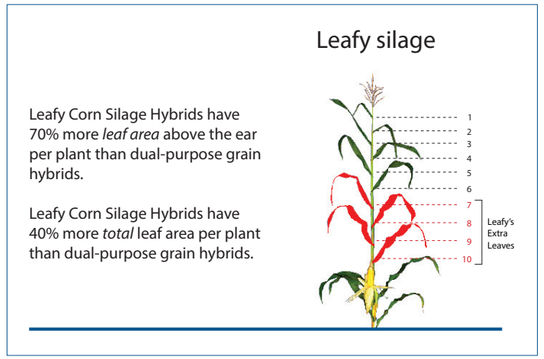


Figure 2

Research: Plant Population

A Penn State University population study compared a Leafy hybrid to a dual-purpose hybrid and concluded that Leafies "may have lower optimum populations than normal hybrids. Leafy hybrids may also have lower starch levels and whole plant digestibility at higher plant populations, which would also support the recommendation for reduced plant populations for leafy hybrids."
(Roth et al., 2000)

GROW, CHOP, FEED.

Make the most of these unique silage genetics:

Plant your crop at no more than 30,000 ppa or at a seeding rate of 15% less than a grain crop in your area. At this population, you should expect maximum yield, best agronomics and optimal feed quality from your Leafy crop.

Isolate your Floury for maximum expression of floury kernels. Each of these products relies on the recessive opaque-1 gene to produce their floury kernels, and therefore needs to self-pollinate. A distance of 300 feet from other corn is ideal. If that's not possible, plant in wide blocks with short shared boundaries to reduce pollen contact between hybrid types, or work with prevailing winds by planting your floury hybrid to the west.

Never mix a Leafy with a different hybrid type within the field because of differences in plant population, crop maturity, harvest window, required storage period and ration balancing.

We recommend a 3/4" chop length when harvesting. This will help to retain effective fiber in the ration and eliminate the need for wheat straw. The kernels will be relatively soft and available for digestion without aggressive kernel processing.

Do not harvest excess corn as grain as kernels are designed to be breakable. Use extra for high moisture corn, earlage or snaplage.

Store in a silo or bunker for a minimum of 30 days, or until fermentation is complete. Since starch is readily available, there is no need to wait for 5-6 months before feeding.

FLOURY LEAFY OR BMR?

What makes the best corn silage?

By Margo Lee, Associate Plant Breeder, Glenn Seed Ltd.

As corn silage product developers, we are frequently asked how our Floury Leafies compare to BMRs. BMR or Brown Mid Rib, is a silage-specific corn hybrid type that is recognized for producing corn plants with a higher level of digestible fiber. This improved fiber quality makes it a top pick for some dairies and nutritionists. While we do not dispute the higher levels of NDFd (digestible fiber) and lower levels of lignin (indigestible fiber) in the chopped BMR silage compared to Floury Leafies, we're asking the question: At what cost? And are dairies really getting what they're paying for?

To help answer these questions, we commissioned the University of Wisconsin to do a milk study comparing a Floury Leafy to a BMR. This study was published in 2015. At our request, the researchers planted the Floury Leafy at its lower, recommended population of 28,000 ppa and the BMR at its recommended population of 32,000 ppa. They also grew the two hybrids in nearby, but different fields so that the Floury Leafy could have its required pollen isolation in order to produce its maximum 25% floury kernels. Researchers found an 11% yield advantage for the Floury Leafy when it was planted at a population of 14% less seed per acre (Ferraretto et al., 2015). This yield advantage was also found in our population-sensitive replicated trials in Ontario the same season.

When balancing the two rations, researchers added straw to the Floury Leafy ration because it was required in the BMR ration. With our insistence that the Floury Leafy ration already had adequate effective fiber, researchers removed the wheat straw from the Floury Leafy ration at week eight of the feed study and replaced it with more fermented Floury Leafy Corn Silage. They then measured the lignin content of the two rations and found that "dietary lignin concentration was similar for the 2 treatments". Researchers found that feed efficiency of the two rations was the same and that the Floury Leafy had "a 10 percentage unit greater ruminal in situ starch digestibility coefficient". The study found that the BMR-fed cows produced more 3.5% fat corrected milk (50.8 kg/day) compared to the Floury Leafy, which produced 49.7 kg/day. (Ferraretto et al., 2015)

When we take into account the lower seeding rate, improved yield, increased starch digestibility, and the ability to eliminate straw from the diet and achieve the same dietary lignin levels as the BMR ration, the Floury Leafy more than makes up for the 2.2% advantage that the BMR had in 3.5% FCM production. It is also possible that the Floury Leafy-fed cows would have produced more FCM than the BMR if they had not been fed a ration with wheat straw for the first half of the study.

But all of this begs the question: What good is it to plant a BMR corn silage product that produces a lower level of NDFd if the dairy operator has to add lignin in the form of straw back in to the ration to feed it to their lactating cows? We've come to the conclusion in our own breeding program that you can only remove so much lignin from the corn plant before the product compromises on agronomics and yield. We select those hybrids that have good NDFd, good standability and a useful dietary mix of digestible and effective fiber in the harvested silage.

> *What good is it to plant a BMR corn silage product that produces a lower level of NDFd if the dairy operator has to add lignin in the form of straw back in to the ration to feed it to their lactating cows?*

This study confirms what we've seen on many farms over the years: Leafy yields more than the BMR with less seed, and without the premium price. We also see in this study that by the time the corn silage is balanced in a ration for the cow to eat, there's no fiber advantage. With BMR, the farmer has paid more money for more bags of seed and harvests a lower yielding crop. They've also paid for straw and its associated storage and handling. And they miss out on all of the benefits of the increased starch digestibility, wider harvest window, improved agronomics and ration-type adaptability that come with the Floury Leafy.

Above: Cows eating a Floury Leafy Corn Silage ration

Comparing apples to apples

The dominant industry message is to plant all corn hybrids at high populations in order to maximize silage yield. While this advice is well-taken for grain-bred hybrids, it is detrimental to a Leafy Corn Silage crop to plant it at the high populations recommended for grain. Table 1 below takes into account the higher leaf area of a Leafy Corn Silage Hybrid and compares that to the population density of a grain hybrid.

Leafy planted at	*is comparable to*	*Grain planted at*
25,000 ppa	x 40% more leaf area	35,000 ppa
28,000 ppa	x 40% more leaf area	39,000 ppa
35,000 ppa	x 40% more leaf area	49,000 ppa

Table 1

When leaf area is accounted for, you can see that planting a Leafy Corn Silage Hybrid at 35,000 ppa gives a comparable canopy to a grain hybrid at 49,000 ppa. Planting the Leafy at 28,000 ppa gives the same leaf canopy as a grain hybrid at 39,000. To achieve the equal leaf area canopy as a grain hybrid that is planted at its recommended population of 35,000 ppa, the Leafy would be planted at 25,000 ppa.

Population affects yield

Leafy Corn Silage Hybrids have been in the marketplace since 1992. In that time, numerous population studies have been conducted on the best hybrids. They have suffered hot dry seasons and have experienced major weather events with high winds and heavy rains. What has been discovered is that plants with 8-9 LAE achieve maximum yields at 30,000 ppa. For plants with 10-11 LAE, maximum yields result when they are planted at 28,000 ppa. At 28,000 to 30,000 ppa, Leafy Corn Silage Hybrids have strong roots and good drought response. They also produce a crop with excellent feed qualities – high starch and a good proportion of digestible fiber. At these populations Leafies are typically higher-yielding than grain hybrids that are planted at 35,000 ppa by about 10%.

Aim for a maximum final population of 30,000 ppa for Leafies with 8 to 9 leaves above the ear and for 28,000 ppa for Leafies with 10 to 11 leaves above the ear.

Balancing yield with quality

When we plant a Leafy Corn Silage Hybrid, we are growing feed that must be digested to produce milk or beef, so we aim to grow this crop at the population that will produce the highest quantity of dry matter with the highest starch yield and best fiber digestibility, while achieving the best crop security. In our population studies, we have seen that in average conditions, the yield of a 10-11 LAE Leafy will not be different between 28,000 and 32,000 ppa, and will often be less at 36,000. But when we look at the difference in the quality of the feed that is produced at different populations, we see that maximum starch yield and NDFd is achieved at the lower 28,000 ppa. For 8-9 LAE Leafy hybrids, this number is 30,000 ppa.

Figure 3 (next page) illustrates the differences between the same Leafy Corn Silage Hybrid planted at 28,000 ppa and 35,000 ppa at the same location.

At 28,000 ppa, the hybrid produced large ears and thick stalks. At 35,000 ppa the ear and stalk size declined. As the stalk size declines, so too does its digestibility.

Research: Plant Population

During a feed study, researchers at the University of Wisconsin harvested a Leafy Corn Silage Hybrid at a low population of 24,000 plants per acre and 32,000 ppa. They found that "NDF was highest and starch lowest for LFY at the high plant population."
(Bal et al., 2000)

According to the Agricultural Research Institute of the Hungarian Academy of Sciences, Leafy Corn Silage Hybrids, on average, have 30-40% more leaf area than non-Leafy plants. "The higher number of leaves above the ear means that they can shade each other more than those of non-Leafy hybrids. As a consequence, choosing the optimal plant density is a very important factor in the production of Leafy hybrids."
(Pinter et al., 2011)

It is essential to grow Leafies at their intended populations. Increasing density can alter flowering dates and maturity, drought response, standability and overall plant composition, all of which affect the feeding value of the silage product.

Select the best corn silage for your operation

Selecting a corn silage hybrid based on its performance in State Trials should be a no-brainer. Unfortunately, these trials are planted at a population that is much too high for Leafy Corn Silage Hybrids. States publish their comparative yield data based on trials that were planted at 33,000-35,000 ppa. As we know, when the Leafy is planted at this population, it is comparable to planting a grain hybrid at 49,000 ppa. How would a grain hybrid do at 49,000 ppa? You have seen higher populations when the rows on headlands come closer together. Plants are thinner, ears are smaller and they mature more rapidly. If you look at the amount of grain in the whole plant community, it is much lower than where the rows are regularly spaced. The high population community has a low grain to stover ratio and the plants are very susceptible to drought stress, fertility stress, and root lodging. You would NEVER grow that grain hybrid at 49,000 ppa. In State Trials, the data that is produced on Leafy Corn Silage Hybrids grown at 33,000-35,000 ppa does not reflect performance at their intended population.

In high population State Trials where the Milk 2006 formula is used to calculate milk per ton, the Leafy Corn Silage Hybrids show less starch and milk per ton, though they generally still have competitive yield per acre. In our trials we grow dual purpose hybrids at their recommended population of 35,000 ppa and Leafy Corn Silage Hybrids at their population of 28,000 ppa, in three row plots. We harvest only the center row to get the best comparable data. In these population-sensitive trials, the Leafies show an advantage in yield and quality. Unfortunately, starch digestibility is not accounted for in the Milk2006 equation.

Take our well-researched advice: grow your Leafy Corn Silage Hybrid at the population that will produce the largest quantity of high quality feed for milk and meat production – **a maximum final population of 30,000 ppa for 8 to 9 LAE hybrids and 28,000 ppa for 10 to 11 LAE hybrids, or at a rate of 15% less than a grain corn hybrid on the same acres.** All you need to do is change that planter population setting, and get the added benefit of buying less seed. When you plant a Leafy Corn Silage Hybrid, less is certainly more!

Comparison of the same hybrid at the same location planted at different populations:

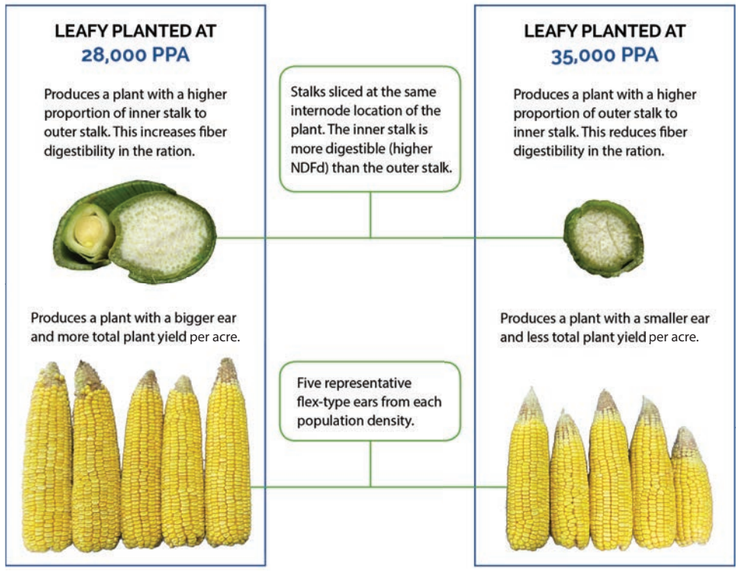


Figure 3

BETTER IN THE FIELD AND FOR YOUR COWS

WIDE HARVEST WINDOW
Corn silage that has a floury endosperm type gives the opportunity for an extended harvest window because kernels do not significantly lose starch digestibility as they mature. This increases the likelihood of harvesting a highly digestible silage product and translates to feed security. For the same reason, a higher level of starch accumulation beyond 50% milk line can be achieved without the loss of starch digestibility. Of course, it is essential to monitor plant maturity and ensure that the total plant remains within the harvest window so that good packing and fermentation is achieved.

SPEEDY HARVEST
The combination of Leafy's softer stalks with the floury kernel type makes harvest a breeze. Dial back the kernel processor and speed-up a touch. You'll cover more acres with less time and fuel.

REDUCED INPUTS
Chopping corn with a softer kernel type allows for the retention of effective fiber in the silage product without sacrificing starch digestibility. This is achieved by reducing the aggressiveness of the kernel processor to the point that it cracks kernels into a few big pieces and maintains a recommended ¾" chop length. The longer chop length results in a silage product that has a higher content of effective fiber. Consequently, straw can be eliminated from the ration. The increased starch digestibility of these products also allows for the reduction of other ration additives such as concentrate corn. Reducing inputs results in a savings in cost, storage space and effort for the operation.

SMALL PARTICLE SIZE
Floury kernels fracture easily into small particles during silage chopping, allowing for a longer chop length (3/4" recommended) and a short minimum storage period of 30 days. After chewing, the starch is readily digested.

HIGH ENERGY STARCH
The small starch particles offer more surface area to rumen bugs for a boost in digestibility.

LONG RUMEN RETENTION
Floury starch particles may be more buoyant in the rumen and float to stay in the rumen mat for an extended digestion period.

RATION-TYPE ADAPTABILITY
Floury and Full Floury Leafy Corn Silage Hybrids are versatile. They can be balanced into various rations types to meet the nutritional needs of your herd.

HIGH QUALITY MILK
Floury and Full Floury Leafy Corn Silage Hybrids have increased potential to produce milk with high fat content. They do not require heavy kernel processing during harvest to reduce starch particle size, so fiber particles can remain large enough to act as effective fiber. This promotes normal rumination and saliva production, which plays an important role in protection from acidosis and increases milk fat content.

FLOURY & FULL FLOURY LEAFY CORN SILAGE

Featuring the same silage-specific characteristics as Leafy Corn Silage Hybrids, but with more digestible starch for milk and beef production.

Floury Leafy and Full Floury Leafy Corn Silage Hybrids have a silage-specific kernel type that behaves differently in the field, the chopper, the silo and the rumen. They contain a naturally occurring recessive gene called opaque-1, which produces a floury kernel type. All kernels are selected to be large, soft, and slow drying so that they will fracture easily during silage chopping and cow chewing for maximum starch digestibility.

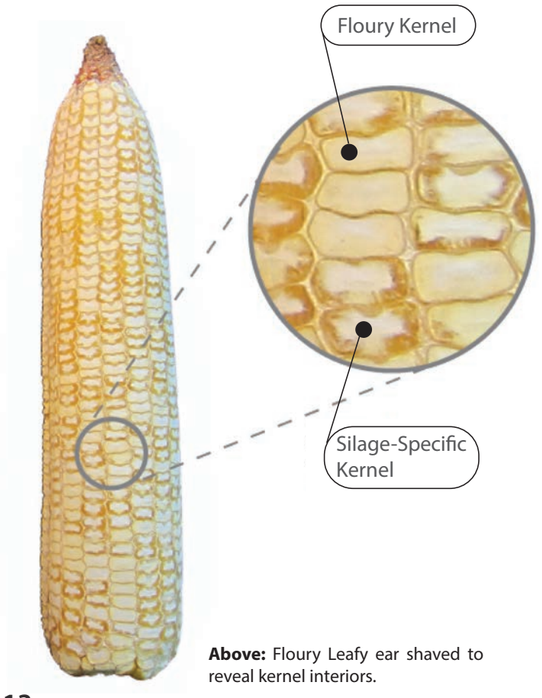
The floury kernels are composed of a very thin layer of vitreous starch that surrounds the outer parts of the kernel. This layer is approximately 0.2mm thick. The rest of the starch in the endosperm is white and powdery. Even as kernels reach full maturity, they pack in more floury starch and never deposit more vitreous starch. This simple change in endosperm type has far reaching benefits in the livestock system.

floury LEAFY CORN SILAGE

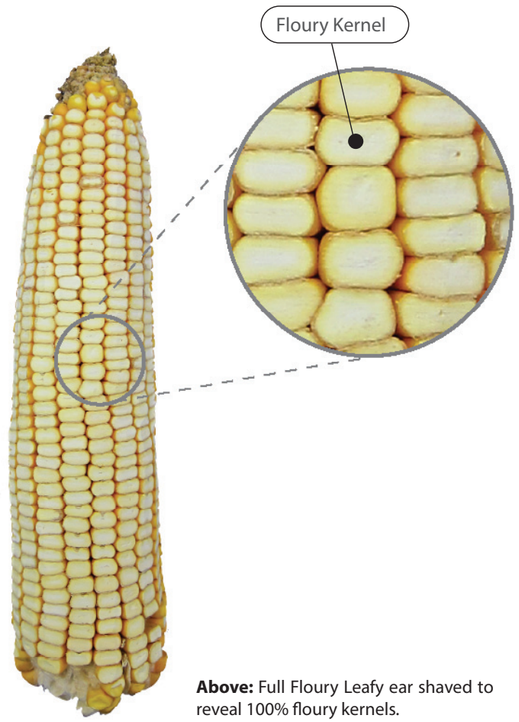
Floury Leafy Corn Silage Hybrids produce an ear with two distinct kernel types. Seventy-five percent of the kernels on their ears have silage-specific kernels like our Leafy products. The other 25% of their kernels are floury as a result of having the recessive opaque-1 gene in one parent of the hybrid.

full-floury LEAFY CORN SILAGE

Full Floury Leafies contain the recessive opaque-1 gene in both parents of the cross, resulting in the production of 100% floury kernels on the ear when self-pollinated.



Above: Floury Leafy ear shaved to reveal kernel interiors.



Above: Full Floury Leafy ear shaved to reveal 100% floury kernels.

FEEDBACK

Bart and Laura Klessens own a dairy with 115 Holstein/ Jersey cows in Southern Ontario where they have been growing and feeding a Floury Leafy Corn Silage Hybrid for nine years - and milk production is right where they want it to be. Their cows produce an average of 37 liters of milk per day with 4.15% fat. They have enjoyed high silage yields, and are always able to chop within the harvest window. The forage portion of their ration contains about 56% corn silage. Excess is harvested for concentrate corn that is added to calf starter and to the TMR.

Their cows are healthy, fertile and produce milk reliably. Feed is palatable and is not sorted. Besides the milk stats, Laura looks to the manure to assess the digestibility of the TMR. Their cows produce a consistent manure that is not too runny, not too firm, and with no visible kernel passage. And that "smells like money."

"We plant Floury Leafy and feel that this is the best choice because it's designed to be digested by a cow, not sit in a container going across the ocean."

-Laura Klessens

Above: Laura and Bart Klessens feeding their herd a TMR based on a Floury Leafy Corn Silage Hybrid.

When you choose a Leafy, you plant 15% less seed to grow more digestible feed. At the lower population, you get as much or more yield than you would with a non - Leafy. That's a 15% savings on seed cost. You just can't do that with anything else.

LEAFY
CORN SILAGE

Right: A single Leafy plant that had tremendous resources due to birds reducing plant population at planting and excellent growing conditions. One seed produced a plant with three large ears on the main stalk and one ear on each of its two tillers, for a total of about 2,900 kernels!

WHEN THE GROWIN' GETS TOUGH, GET LEAFY

Leafy Corn Silage Hybrids are not invincible, but they make the best of even a tough season. These genetics deliver unique agronomics that will help you get the best feed in the bunker.

BOOST IN SPRING VIGOR: The seed of a Leafy has a semi-floury endosperm. This allows it to be more permeable to ground moisture for a boost in spring vigor.

WIND EVENT RESISTANCE: Leafies have a lower ear position on the total plant with a more flexible stalk. This is ideal for producing digestible fiber, but it also gives the crop resilience in a major wind event. A Leafy is more likely to bend than break.

STARCH SECURITY: A Leafy crop has a varied canopy height with some plants putting on a few more above ear leaves than others. Take a walk into a Leafy field at flowering time and you'll see the fertilization security that this characteristic offers, especially in a drought. While the tassels of a non-Leafy crop will flower all at once for about six days in good conditions, a Leafy crop will have a pollen-shed window that is nearly double that, with the shorter plants flowering first, followed by the medium and then the tallest. The key is that while the crop will vary in pollen shed timing, the ears throughout the field will produce silks at about the same time. In drought conditions, the synchrony of the pollen and silking can be thrown off. This wide pollen window brings much needed starch security at this sensitive time.

MOISTURE EFFICIENT: These big plants have a deeper root system than non-Leafies, giving them greater reach for moisture during a drought.

OPPORTUNISTIC: All of our Leafies are flex ear types and make use of additional resources. For example, in areas where the plant population has been reduced due to flooding or bird damage after planting, the Leafies that do come up are more likely to have a larger ear or multiple ears on thicker stalks than a non-Leafy. Depending on resource availability, they may also tiller and the tillers may produce ears themselves! (See image above, right).

EXTENDED HARVEST WINDOW: Leafies have been designed to produce large ears with large, slow-drying kernels for increased starch digestibility. The plants have also been designed to dry slowly and at a complimentary rate to the ear. These characteristics work together to extend the harvest window by about double the time of a non-Leafy. This means that a Leafy is more likely to make it into the bunker at its optimal growth stage when it is packable, fermentable and while the starch is naturally digestible. This translates to a reduction in dry matter losses and better feed quality.

OBSERVE THE DIFFERENCE

Leafies have been bred and tested exclusively for silage. The physical differences resulting from this decades-long breeding program are so evident that they can be easily observed.

To contrast a Leafy with another corn type that is being considered for use as silage, select two hybrids of similar maturity and grow them next to one another at their respective recommended populations. In the week before silage harvest, take some time to compare them in the field. Note differences in height, ear size and stalk girth. Check out their stalk flexibility with a push. Pull out a knife and slice the stalks of each type at the same internode. Note the resistance to cutting and the composition of stalk interiors. This is your fiber. Husk and snap some ears. Compare the rigidity of their cobs and consider which would be more digestible. Cobs make-up between 8% and 10% of harvested dry matter. Contrast kernel sizes and pop some of each in your mouth to see which is softer and more palatable. Shave the kernels below their caps with a knife. Observe the proportion of vitreous and floury starch is inside each type. This is your starch quality. If you're able, chop, store and feed the two products separately and let your animals tell you which they prefer. This will be the test that counts!

Leafies are big plants that produce a high yield of digestible fiber

Above the ear: More digestible fiber

Below the ear: Less digestible fiber

Leafies produce thick, juicy stalks for a boost in fiber digestibility

Leafies are bred to produce big flex ears that set large, soft, slow-drying kernels on soft cobs for a boost in digestibility