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2016 & 2017 Legend Seeds Silage Research Report

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FEED YOUR COWS WILL LOVE:
Legend Seeds silage hybrids lead to improved feed quality and digestibility

Legend Seeds is proud to be an innovator in the silage market, providing high-quality, locally-tested silage hybrids that fit the unique needs of dairies, cow calf operations, and feed lots in the Northern US. The silage industry has made tremendous progress since the 1980s when the prevailing silage philosophy was: cut the worst looking corn for silage. Today, we offer specialized hybrids that have been extensively researched and bred specifically for silage. In 2013, we were the first seed company to introduce the Floury gene to the marketplace in our Legend Next Generation (LNG) hybrids. The Floury gene is the product of over a decade of research completed by Dr. Francis Glenn. He is responsible for the introduction of both the "Leafy & Floury" and "Leafy" silage specific hybrids available today.

In this article, we will introduce you to features of both of these naturally occurring genes and some of the agronomic management practices we have utilized to help our customers find success with these new silage specific hybrids. We'll also trace a bit of the history of the silage specific hybrids over the past twenty years. It is an industry that has seen a tremendous amount of change.

Incorporating a silage specific hybrid into your operation requires three initial management changes to realize the cost savings of the improved silage quality.

1. Defining the silage acres in advance
2. Lowering the planting population
3. Adjusting the Total Mixed Ration (TMR)

Legend Seeds wants to help you raise the best quality feed, at an economic price, that your cows or calves will love.

What's the difference in silage specific and dual-purpose?

Simply put, silage specific hybrids cannot be taken for grain. As the name suggests, it is specifically raised for silage. Dual-purpose hybrids have a "dual" purpose: they can be used for gain or silage. Silage specific hybrids have lower yields for grain, but higher overall tonnage. Compared to a dual-purpose hybrid, our silage specific hybrids have eight (or more) leaves above the ear because of the Leafy gene, which was introduced in 1985. The leaves above the ear contain less lignin than those below the ear, and are therefore more digestible. While a dual-purpose hybrid is often significantly taller than a grain hybrid, the ear placement sets the silage specific and dual-purpose hybrids apart in terms of feed quality and digestibility.

Silage specific hybrids dry down slower, offering the convenience of a wider window of time for harvesting silage than dual-purpose or grain hybrids. Finally, silage hybrids have lower test weight and softer kernels that shatter more easily during harvest, leading to smaller and more easily digestible corn with more available starch than dual-purpose or traditional grain corn. All the plant qualities that lead to great silage actually make silage specific hybrids poor for grain.

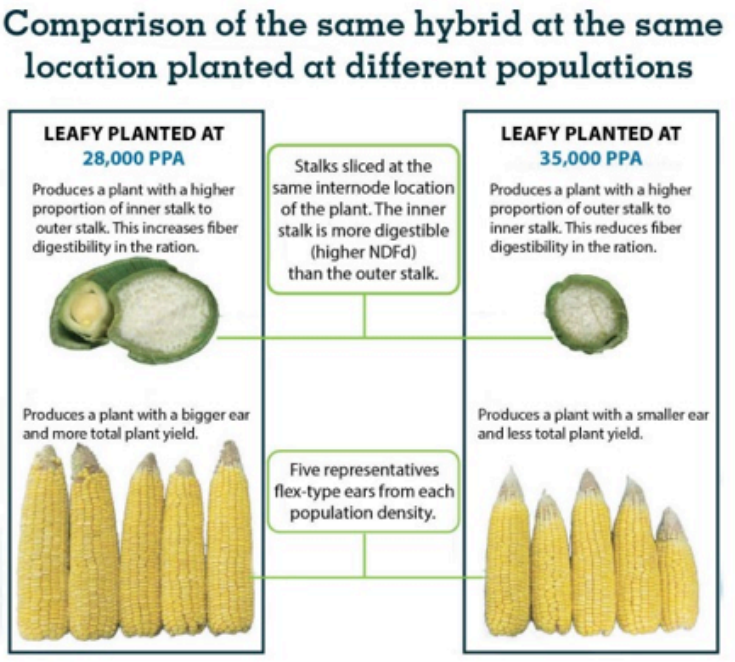
Dr. Glenn recognized this early on in his research. He said, "I saw that what was a failure for grain could be a success for silage, and decided to breed for silage characteristics. We were able to complete two breeding generations per year by planting a summer nursery in Canada and a winter nursery in Chile."

1. Defining the silage acres in advance

The first and hardest part of working with a silage specific product is dedicating a field or a portion of a field to your silage acres in advance. We would suggest that the improved feed quality is worth the dedication and early season planning of the acres. Consider planting 70% of your silage acres to a silage specific hybrid and the remaining 30% to a dual-purpose hybrid. As you open up the silage field, start with the silage specific area and finish with the dual-purpose. If your pile gets to the appropriate size, simply take the remaining dual-purpose hybrid for grain. If you plant 100% of your silage acres to a silage specific hybrid and your pile gets to the appropriate size, the leftover portion of the field makes excellent high moisture corn.

2. Lowering the Population, Improving the Tonnage and Digestibility

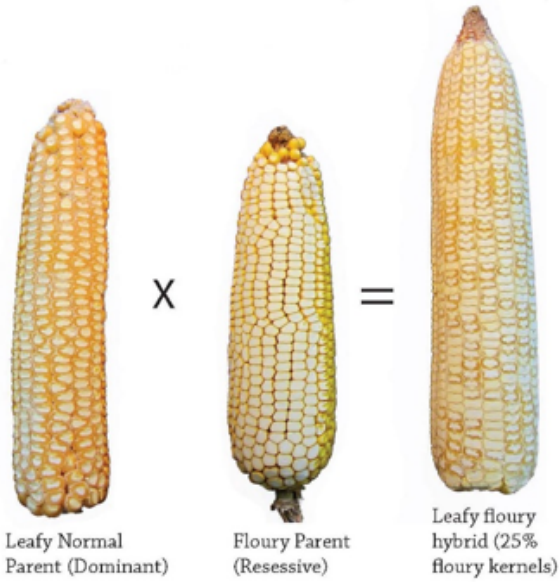
In addition to dedicating acres in advance to silage production, the second management consideration for silage specific hybrids starts at planting time. It is vitally important to lower the planting population down to 28-30,000 plants per acre. Dr. Glenn also discovered that this is the key to unlocking the agronomic and economic benefits of silage specific hybrids. Occasionally, a farmer remarks that their silage corn performed poorly and this is usually because it was planted at a higher (35,000+) population. Dr. Glenn's studies have shown that a lower population results in a plant with a wider girth, more leaves and greater height. It's easy to imagine how a plant with more room and less competition will grow taller and wider – exactly what we want from a silage hybrid. Plus, it is a cost savings on the initial seed purchase.



In addition, the wider stalk girth creates a higher proportion of the easily-digestible inner soft white portion of the stalk to the harder, less-digestible green portion of the outer stalk where the lignin is located. The result is a taller, higher yielding plant with a larger ear and increased fiber digestibility.

Improved digestibility through innovation

Dr. Glenn's singular dedication to silage specific hybrids since 1986 has paid off! In 1992, hybrids with the Leafy gene that were silage specific were introduced to the marketplace as a direct result of his research. From 1992 until 2013, he continued breeding two generations per year. In that time, he also discovered and perfected the use of what he eventually called the Floury gene. In 2014, Legend Seeds was the first seed company to make this newest technology available to dairymen and cattlemen.



Dr. Glenn discovered the Floury expression of the recessive gene, opaque 1. He noticed this phenomenon when he was biting the kernels. This was a simple research technique he used to test for the hardness and texture of the kernels. He discovered that the interior of the kernel (endosperm) in a Floury kernel is made entirely of white flour type starch that is soft and easily digestible. The recessive Floury genetics will express in up to 25% of the kernels on each ear. The addition of the Floury genetics to the already available Leafy silage hybrids created a dream hybrid for silage situations: Leafy and Floury! Leafy hybrids have 5-7% more starch digestibility and Floury & Leafy hybrids have 10-12% more starch digestibility than dual-purpose hybrids.

3. Adjusting the Total Mixed Ration (TMR)

More starch digestibility leads to drastically improved feed quality and economic savings in the ration. In addition to the improved tonnage and wider harvest window, this digestibility is the primary economic advantage of silage specific hybrids over dual-purpose hybrids. The change is so significant that adjustments can be made to the TMR ration, leading to additional cost savings in feedstuffs and labor.

The extra starch availability from our silage specific hybrids allows for a reduction in concentrated corn in the TMR ration. Dr. Glenn suggests when moving a herd from a conventional or a BMR to a Leafy or a Leafy & Floury, reduce concentrate corn and slowly increase as required. Eliminate the straw and watch your herd to adjust the rations as needed.

Bringing It All Together For Your Farm And Cows

Each year our research team plants, monitors, and collects samples of silage products. They take notes on overall plant health, potential leaf diseases, lodging, and green snap. Then, to mimic a silage pile environment at a small sample level, the team collects and vacuum seals samples of each hybrid and

stores them in a cool dark place out of direct sunlight. After 4-6 weeks, depending on temperature, research shows that the fermentation process is completed and the silage is now at a pH of about 4.5.

After approximately 40 days of storage, the silage samples are sent off for analysis. Legend Seeds process all of our samples through Cumberland Valley Analytical Services in Zumbrota, Minnesota. We receive results back on percent moisture, percent dry matter, protein, fiber, lignin, NDF digestibility, uNDF, starch, starch digestibility, NEL (Net Energy Lactation), milk per ton, and tons harvested. All of this information can be used to make an informed corn hybrid choice that will help maximize the feeding value of your silage. Selecting a hybrid with high NDFD can improve dry matter intake, allowing for more forage consumed and less supplemental grain in the ration, which can help lower your feed costs.

The history, genetics, and plant breeding is all interesting and helpful. But, none of it helps you if you can't confidently select the right silage specific or dual-purpose hybrids for your acres next year. That's why we plant, monitor, and harvest dozens of silage test plots each year to gather local agronomic and feed quality data on our hybrids. Our Legend Account Mangers (LAM) and Legend Sales Agronomists (LSA) can show you the local plot data and walk through the selection process with you. Incorporating the proper placement with decades of genetic research and plant breeding from Dr. Glenn with our localized plot data will help take your dairy, cow-calf, or feedlot operation to the next level!

References

Glenn Seed Feed Corn Breeders. (2018). Leafy Corn Silage: Designed for Making Milk. Blenheim, Ont. Dr. Francis Glenn. 1-20.

Dr. Glenn, F. B., (2013). Leafy Floury Hybrids: For Improved Silage Yield and Quality. 1-6.

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WHAT ARE WE TESTING?

At Legend Seeds we offer three types of silage products, during the last three years all three groups have been tested across seven states. There were 15 locations in 2016 and 19 locations in 2017. An agronomic summary of each product type is provided below:

Leafy & Floury Silage Specific Products (RR or Conv.) – Introduced by Legend in 2014

- Called the Legend Next Generation (LNG) hybrids, feature both the Leafy and Floury genes.
- Approximately 25% of the kernels on each ear have completely floury kernels, these are softer and more digestible
- The best feed: 10-12% more starch digestibility than a dual-purpose hybrid.
- Plant at 28-30,000 maximum population to improve digestibility and tonnage.
- Leafy silage products have 70% more leaf area above the ear per plant than a dual-purpose grain hybrid, leading to improved digestibility.
- Quick ensiling period that fits well into the cow-calf operation and dairy operation, 30 days.

Leafy Silage Products (GENSSRIB or Conv.) – Introduced by Legend in 2015

- A 5-7% improved starch digestibility over a dual-purpose hybrid.
- Leafy silage products have 70% more leaf area above the ear per plant than a dual-purpose grain hybrid.
- Quick ensiling period that fits well into the cow-calf operation, 30 days.
- Slower dry down period, more flexibility at harvest time.

Dual-Purpose Products (All trait packages available)

- A flexible option that has "dual" purpose – grain or silage.
- Features the most options for trait packages, good for a corn on corn situation.
- Utilize a higher population range, 34–36,000.
- A tall and broad plant with good tonnage, but less leaves above the ear compared to the silage specific varieties.

HOW DO I READ THE RESEARCH RESULTS?

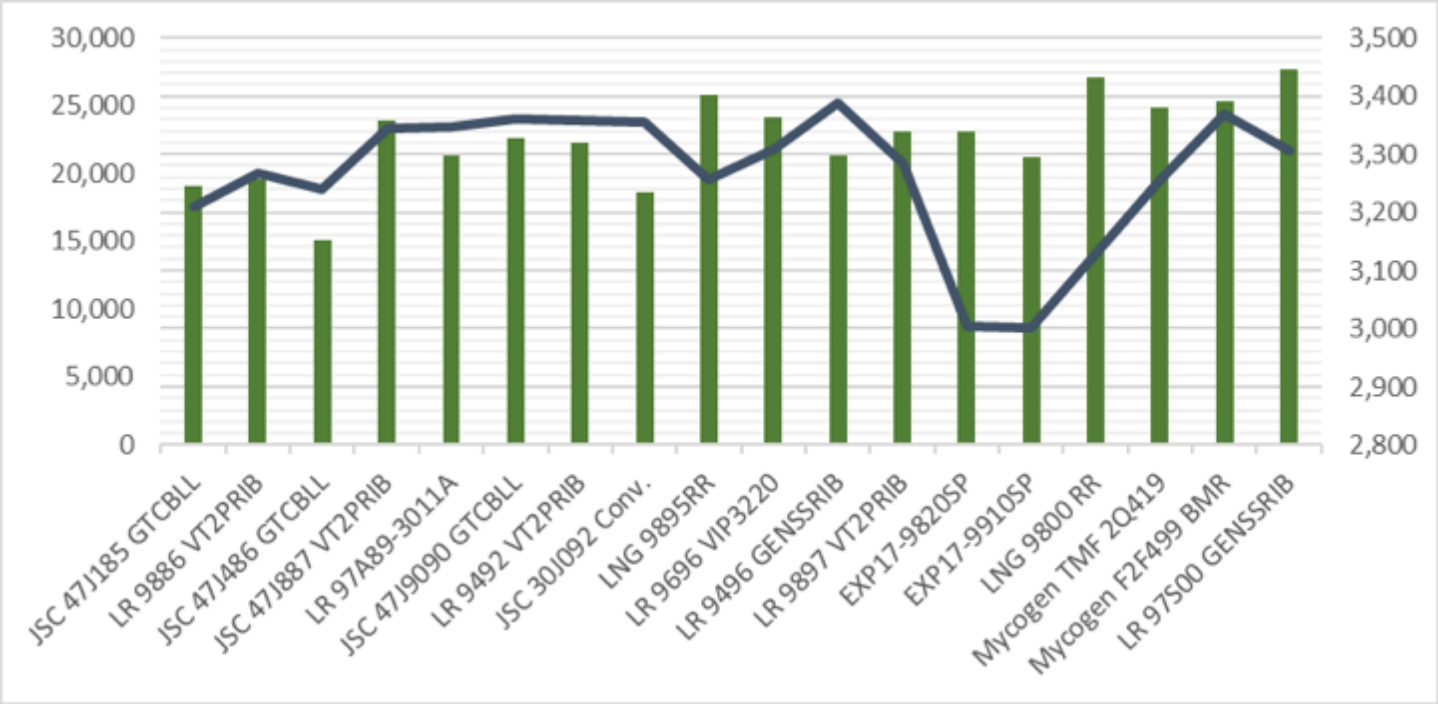
Each nutritionist, dairyman, and cattleman has their own preferred method of comparing silage. Attached are two years of data in two maturity groups: 85-100 day and 95-108 day. We've done our best to provide you with as much information as possible in the research results. Each chart shows an average of how the hybrid performed at all of the locations where it was tested during that planting year. You'll find milk per acre, milk per ton, and dry matter yields included and compared in the charts. Milk per acre is calculated by multiplying dry matter yield by milk per ton. This data shows the importance of testing experimental before launching as commercial products to ensure that yield and quality are competitive with our existing products. They also show the differences between growing seasons from year to year, since growers should consider multi-year data to get a complete view of a product's performance. For location-specific data, please reach out to your Legend Seeds representative. These charts are a summary of all plots in the region.

MILK PER ACRE COMPARED TO MILK PER TON

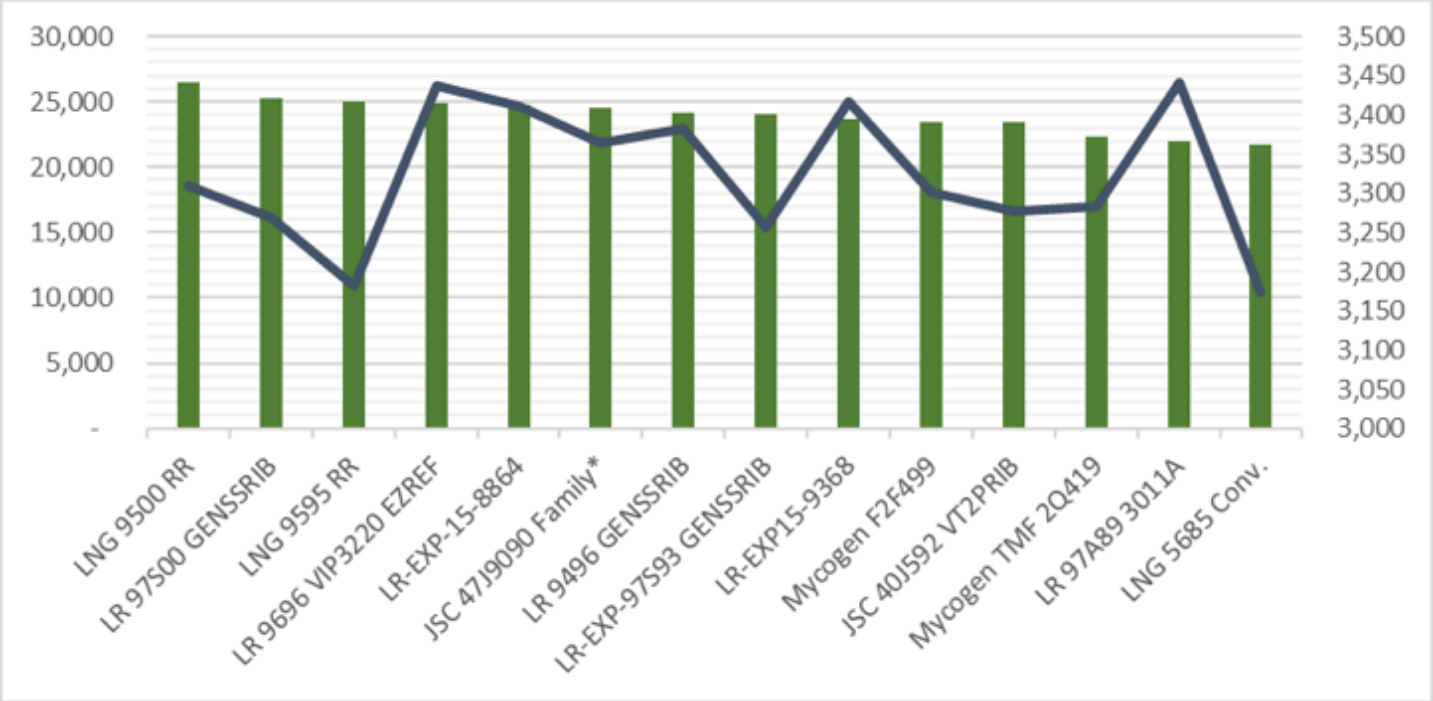
85-100 Day

Milk per ton in blue line & milk per acre in green bars

2017



2016



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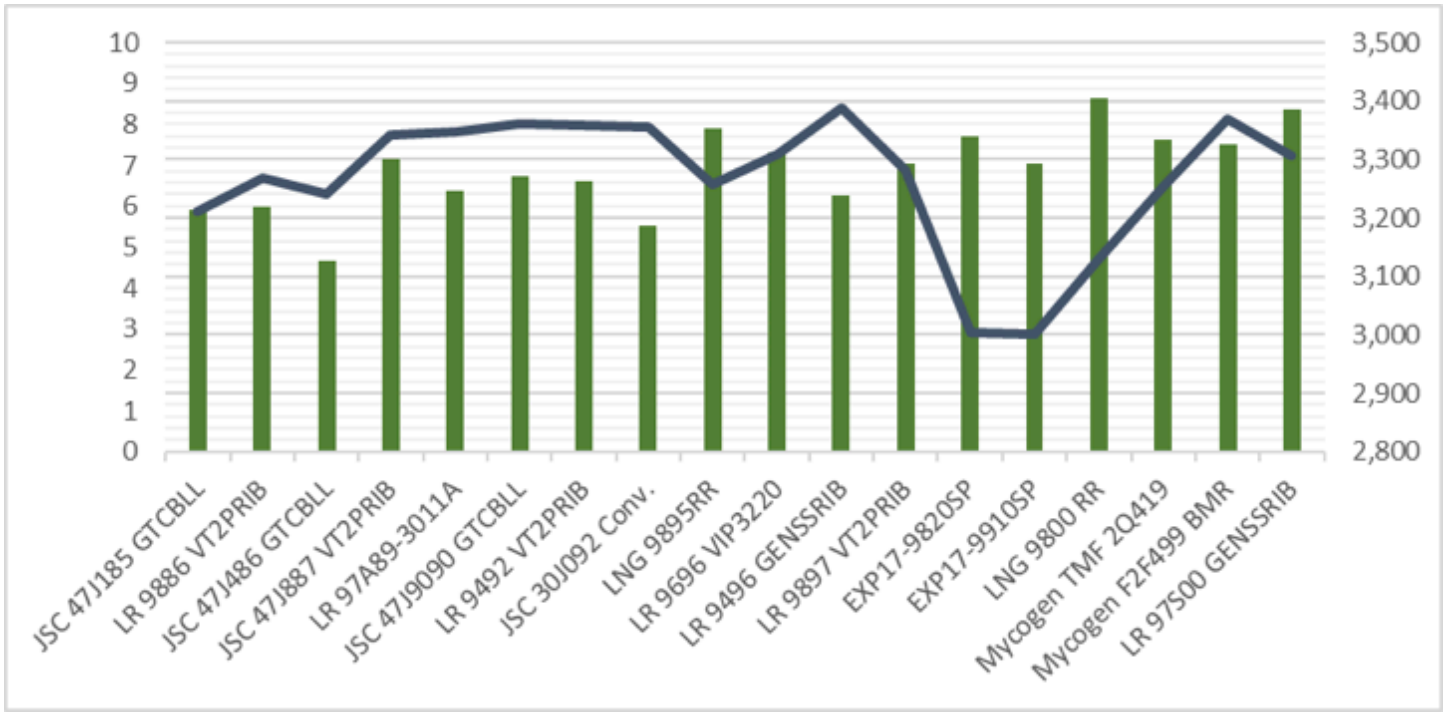
MILK PER TON COMPARED TO DRY MATTER YIELD

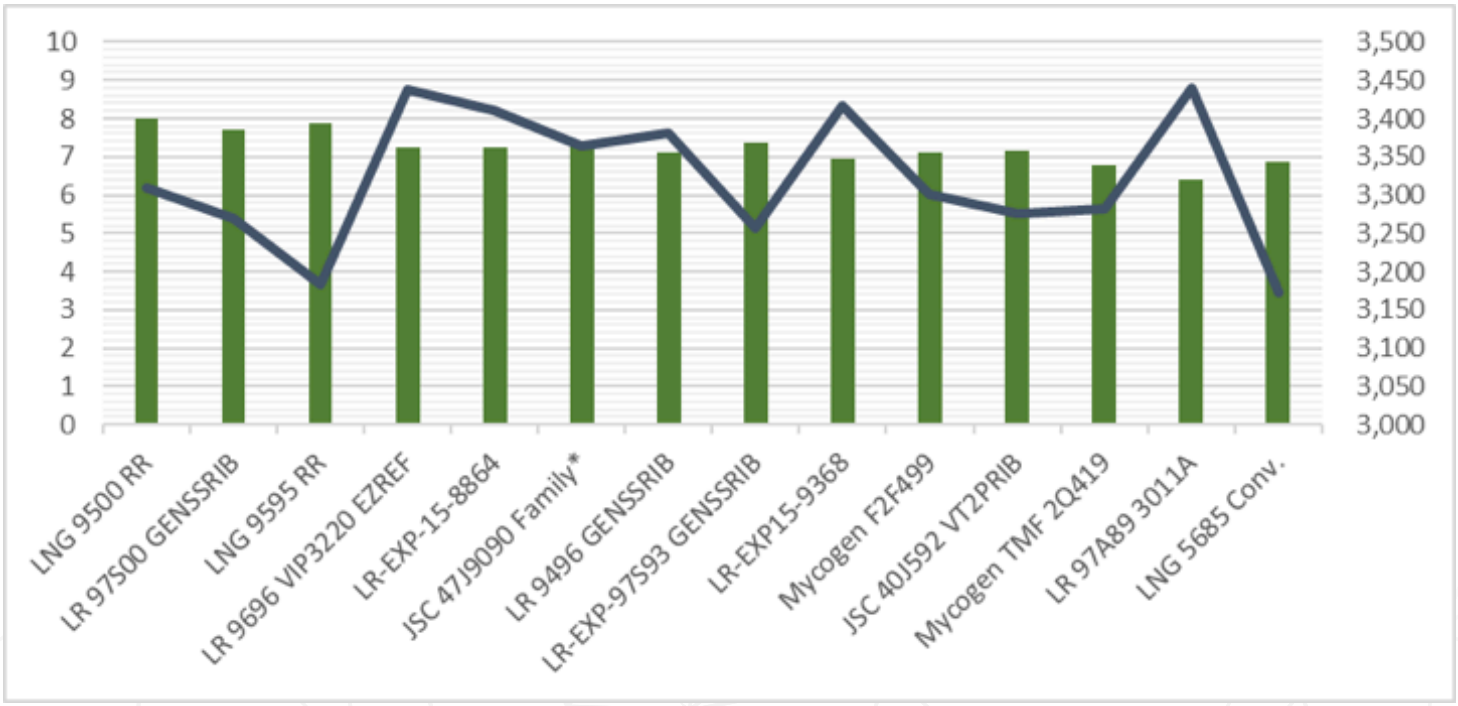
85-100 Day

Dry matter yield in blue line & milk per ton in green bars

2017



2016



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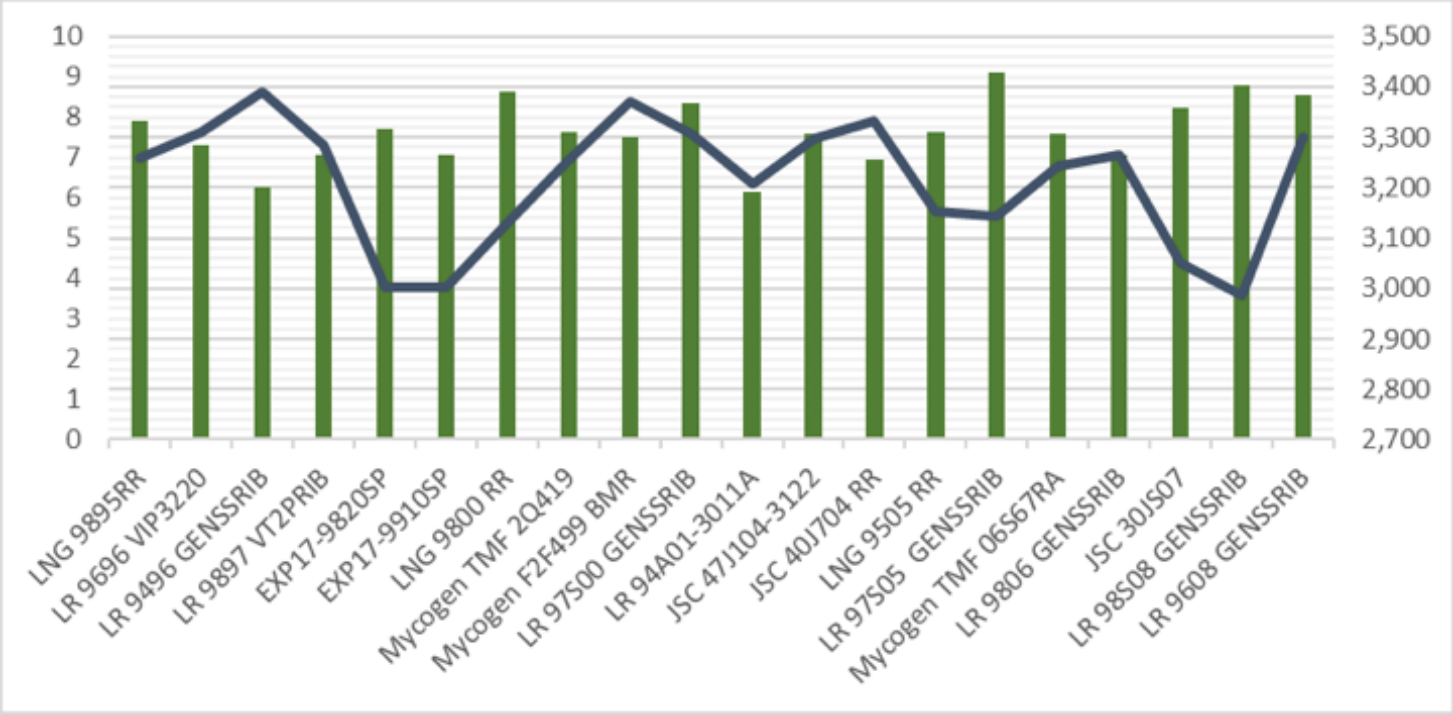
MILK PER TON COMPARED TO DRY MATTER YIELD

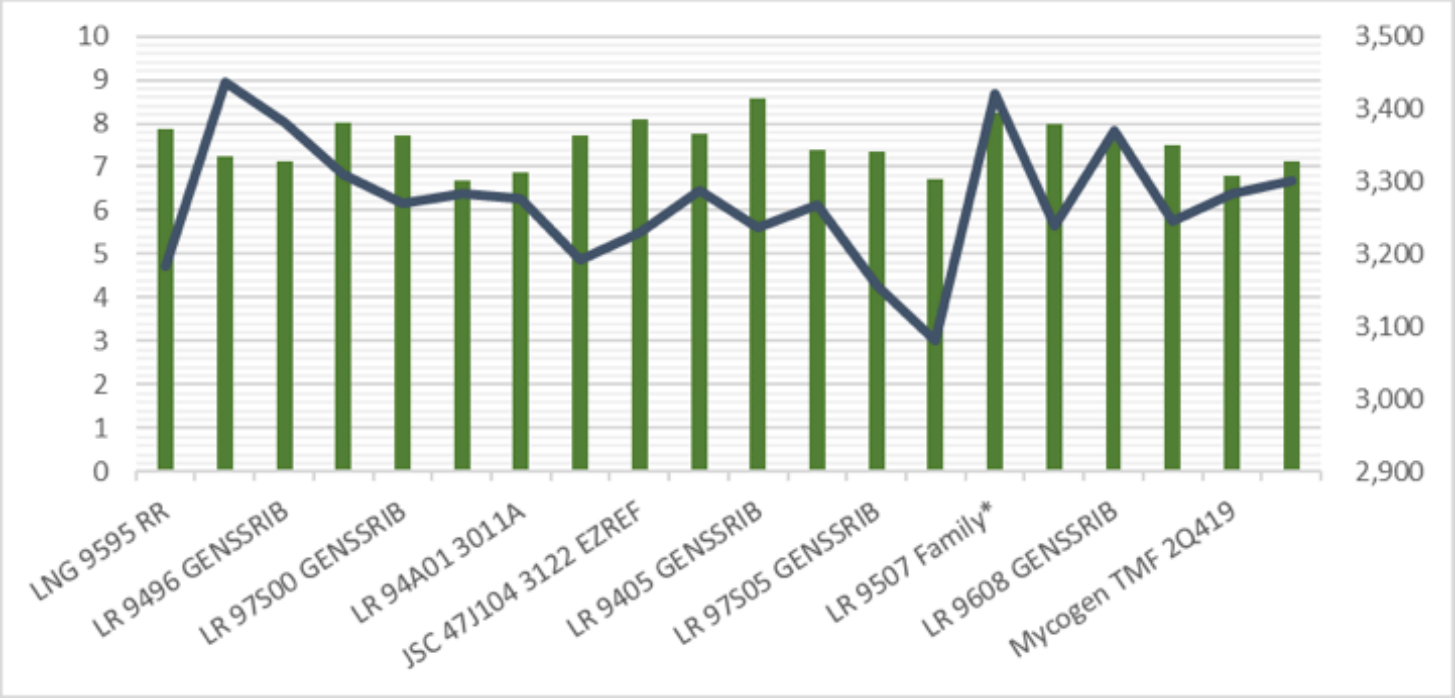
95-108 Day

Dry matter yield in blue line & milk per ton in green bars

2017



2016



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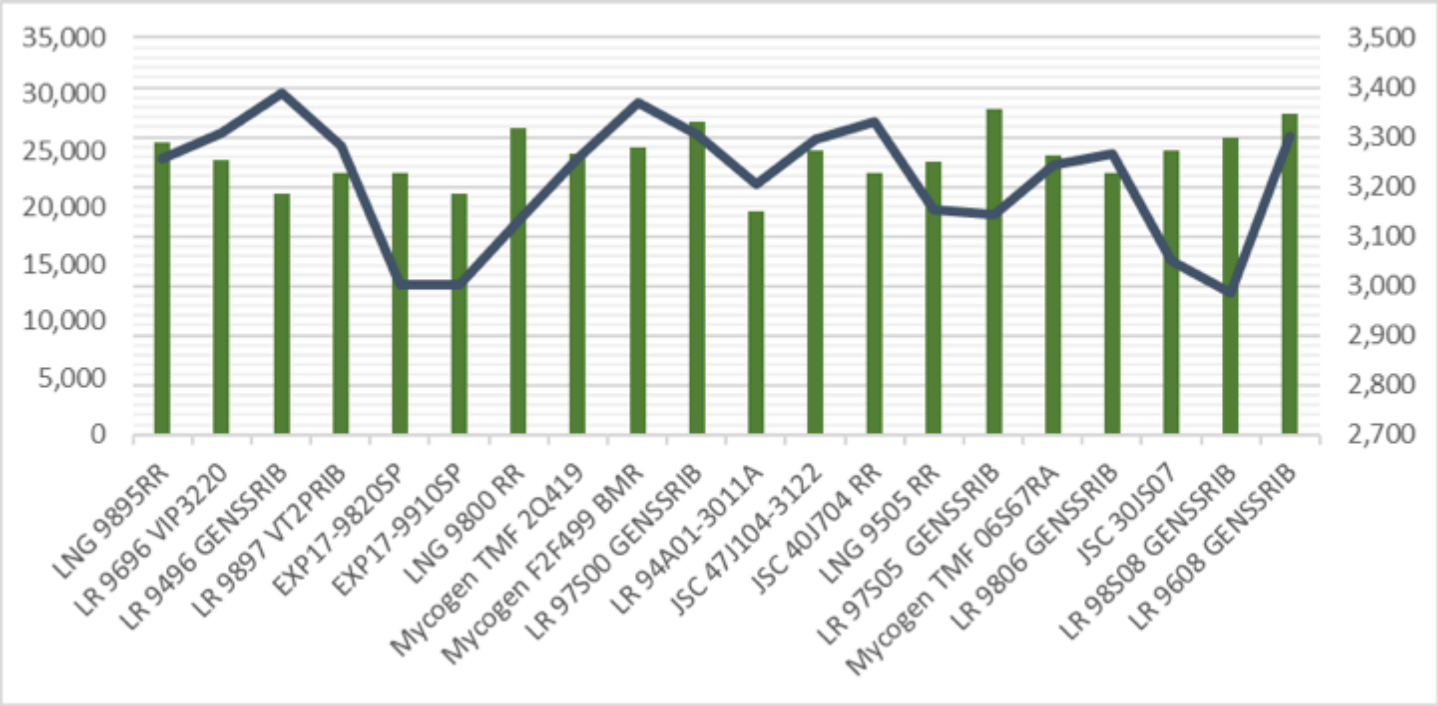
MILK PER ACRE COMPARED TO MILK PER TON

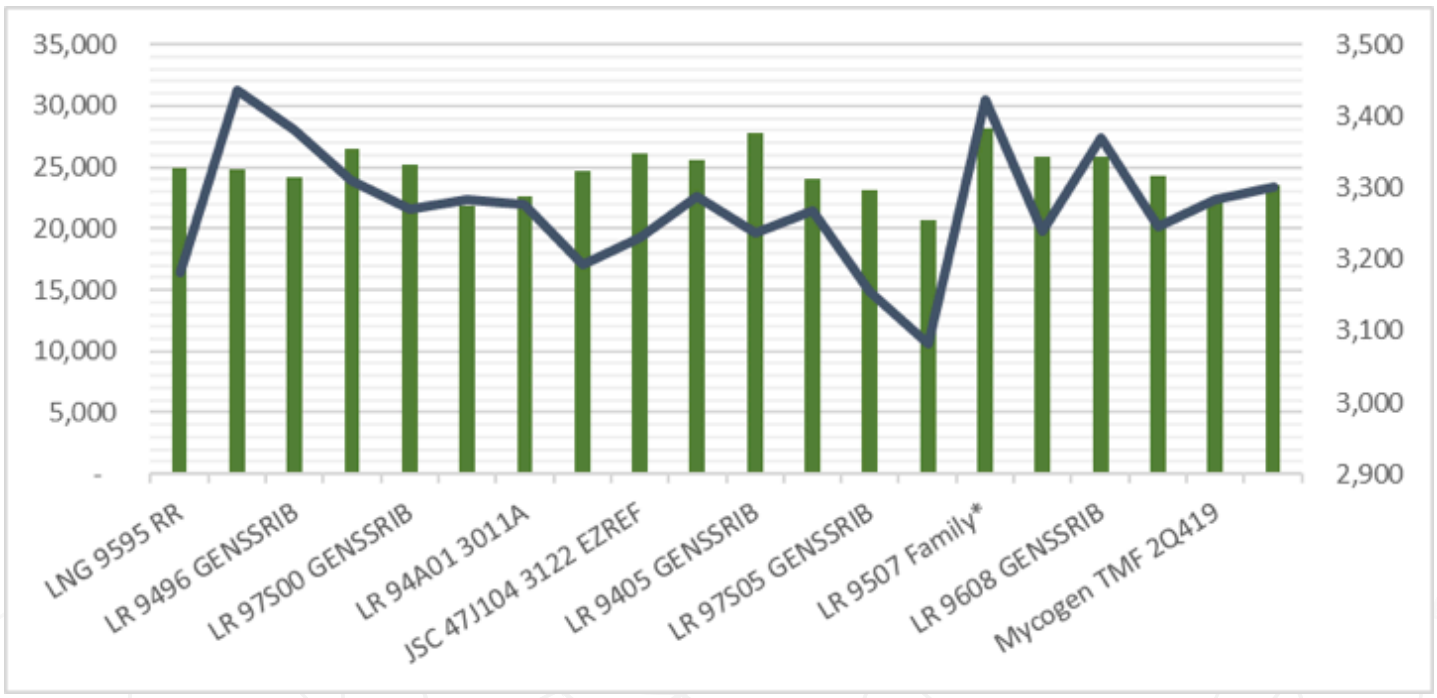
95-108 Day RM

Milk per ton in blue line & milk per acre in green bars

2017



2016



NOTES

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OUR MISSION:

LEGEND SEEDS IS DEDICATED TO PROVIDING HIGH YIELDING, CONSISTENT PRODUCING, TOP QUALITY PRODUCTS THAT WILL PROVIDE YOU WITH MORE PROFIT POTENTIAL THAN YOU CAN GET ANYWHERE ELSE.