maizex®

# 2025 AGRONOMY INSIGHTS

# Maizex 2025 Agronomy Insights

## March 2025


### Published by:

Maizex Seeds
4488 Mint Line
Tilbury, ON N0P 2L0

**maizex.com**



### Contributors:

Henry Prinzen
Adam Parker
Horst Bohner
Greg Stewart
Kelsey Boucher

### Contact:

Email: **info@maizex.com**
Phone: 877-682-1720


### About Maizex Seeds:

Maizex Seeds commercializes and markets high-performance corn hybrids, soybean varieties, forages, and seed-based technologies for Canadian farmers. Maizex, together with Sollio Agriculture as a joint venture launched in 2018, is owned and operated by Canadian farmers. Combined, the businesses have over 100 years of experience in building farmer trust through market-leading product performance and best-in-class agronomy and product support.

# TABLE OF Contents

ONTARIO

# Seasonal Review

The year 2024 was a challenging one through Southwestern Ontario. Although it was a timely spring in many regions, Lambton, Middlesex, Elgin, and some areas in Perth County continued to get pummeled with rain throughout the planting window. In some situations, farmers didn't finish planting corn until July, and while some started soybeans in July, there were growers who never planted any. In fact, portions of Chatham-Kent, Essex, and even Norfolk County were able to plant double-crop soybeans earlier than that of some farmers' first crops.

Many growers in these areas switched to significantly earlier maturing products to try to adjust to the shortened season. There were cases where 76-day (2300 CHU) corn was planted in Elgin on July 4th because nitrogen and herbicide had already been applied prior to planting.

The 2024 growing season was marked by above-average heat across all of Ontario. May was especially warm, which made for quick, uniform emergence in fields that could be planted in a timely fashion. Rainfall in Ontario was above normal for most of the season but below normal in May. Keep in mind this was an overall average. There were pockets that received well-above-average rainfall in May.

The biggest positive of the season was above-average rainfall in June and July in many areas that helped forgive some planting sins that occurred. This rain also helped build an incredibly healthy corn crop, which allowed for optimal pollination and set up the potential for record yields. See Graphs 1 and 2 from Southwestern Ontario that display heat and rainfall from April – July.

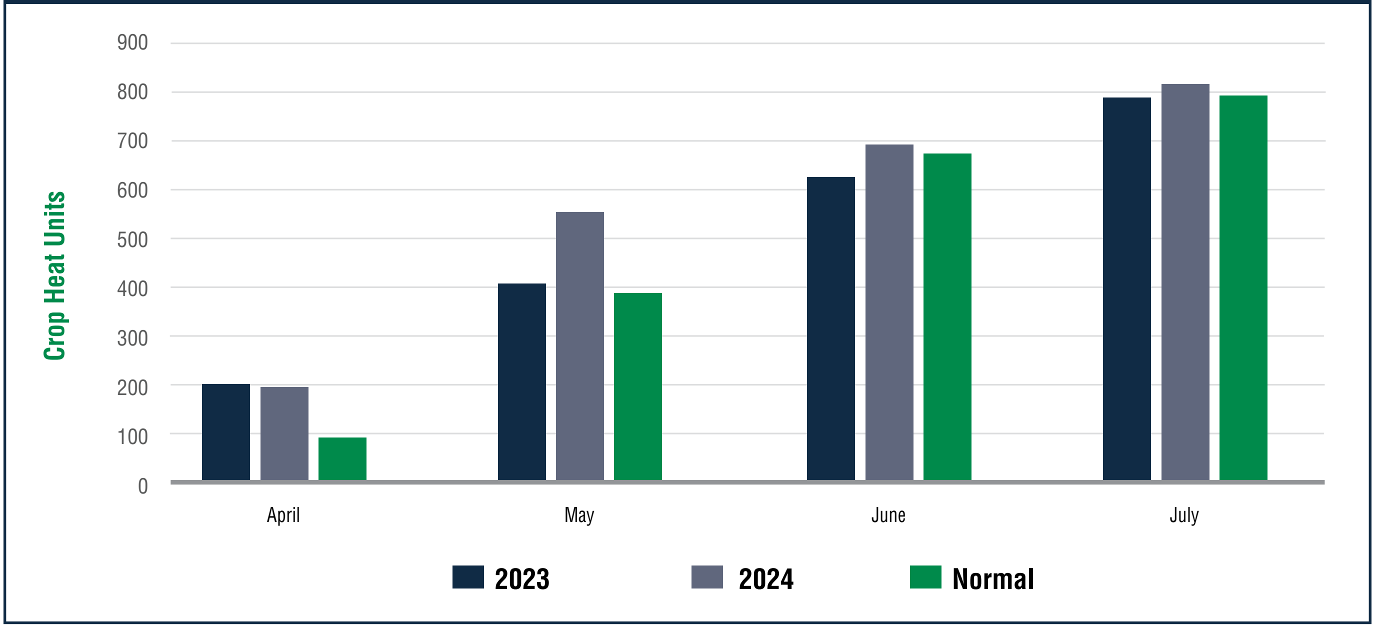
MZ 1688DBR planted July 4th, Elgin County, pictured on October 29th.

## Yield Tour 2024 Review

Regionally delayed planting made for some of the widest arrays of crop staging we have ever had during our Great Ontario Yield Tour in August. Corn ranged from beginning silk (R1) to full dent (R5), while soybeans ranged from first flower (R1) to full seed (R6).

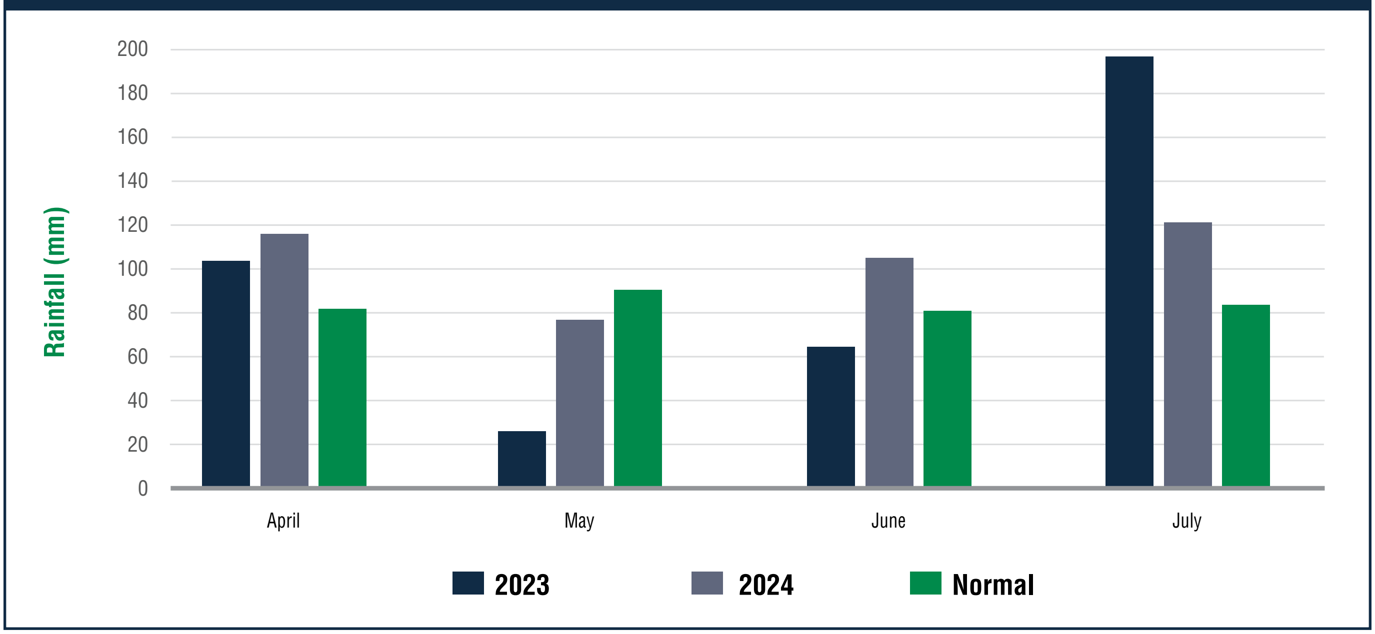
Despite these circumstances, stands were solid in 2024, with an increase from 30,391 PPA in 2023 to 30,768 PPA in 2024, a new record-high for harvestable ears. This surprised us as planting conditions were marginal in many areas. Some of the higher stands can be attributed to sampling bias, as historically no samples were taken from tougher areas of the field, and wet holes were totally avoided. Some areas of Ontario, including the Southeast and some of Eastern Ontario, did have a good spring, and this likely helped increase the overall stand counts collected. Improved planting vigilance and performance also likely played a role, as farmers across Ontario continue to strive for better yields.

The 2024 yield tour included a higher number of fields with greater than 34,000 harvestable ears than any previous season. In corn, the number of rows round and length slipped back to 16.9 kernel rows and 33.9 kernels per row from 17.1 kernel rows and 34.8 kernels per row in 2023. This difference in length and rows round resulted in just over 22 kernels fewer per ear than 2023, or about 7.4 bu fewer than 2023 at equal populations and kernel weight. With this in mind, and significant tar spot pressure across Ontario, Graph 1: **West Region – Crop Heat Units**




Source: WIN Weather Innovations (ONYield24)

Graph 2: **West Region – Rainfall**




Source: WIN Weather Innovations (ONYield24)

we felt that holding our kernel weight steady year over year was the right decision. We predicted a yield of 194.75 bu/ac in Ontario, just over 8 bu fewer than in 2023.

In soybeans, stands again were up year over year from nearly 139,000 PPA in 2023 to almost 142,000 PPA in 2024. With soybeans, a solid population is critical for high yields, but plant-to-plant attrition nearly always results in similar stand counts year over year. The most interesting data observed from the tour was the record-high pod count at 39 pods/plant (up from the 2023 record of 38 pods/plant), which is astounding considering how late many fields were planted. This, coupled with our strong stands, helped in the prediction of a record 54.12 bu/ac.

## Ontario's Record Yields

On January 16th, Agricorp released reported yields to date for Ontario, with soybeans reported at slightly above 53 bu/ac. Once again, the Great Ontario Yield Tour was right on with our soybean prediction of a record crop for 2024. This accurate yield estimate was a result of the strong pod counts coupled with just average conditions for seed weight in soybeans. In 2023, August and September were nearly perfect weather-wise, with moisture and optimal conditions for soybeans. Seed weight was a large contributor in 2023 to maximize Ontario's soybean yield, whereas in 2024 our higher pod count was crucial to maximizing yield. August and September in 2024 came with some droughty conditions in some areas, which minimized heavier soybean seed weights in these areas. This resulted in equal overall yields to 2023. Two different ways to get there: heavy beans in 2023 and lots of beans in 2024.

Agricorp announced corn at 204 bu/ac—a new record. We were off with our estimate by nearly 10bu/ac! What did we miss??? The answer is simple. There are only three components to yield: the number of ears per acre, the number of kernels per ear, and the numbers of kernels in a 56lb bushel. Our sampling was solid, but kernel mass was the factor we could not predict. In estimating the provincial yield, we left the divisor at 89,500 kernels per bushel, which was the same year over year. This is where we were off in our estimate. With ample heat and moisture, as well as many fields properly protected from tar spot with fungicide in Southern Ontario, corn plants were able to fill kernels to record weights. If we had moved the kernel mass divisor from 89,500 to 85,500 kernels per bu, we would have predicted a yield of 203.86 bu/ac for 2024, demonstrating just how close our tour really was on the in-field counts.

Data collected from one location in Southern Ontario demonstrated this strong finish from increasing kernel weight very well. Average kernels/bu were 73,468 in 2022, 73,263 in 2023, and 69,590 in 2024. This data was across the same hybrids each year and demonstrated an increase of just over 5% in kernel mass. This translates to about 10 bu/ac on 200 bu/ac corn. As expected, Lambton, Middlesex, and Elgin took a big hit on corn yields, but counties like Norfolk, Oxford, Chatham-Kent, and Essex out-preformed expectations to help bring yields to this record level (see Figure 1).

## Going Forward in 2025

Looking back at 2024 offers some things to consider in 2025. First, Southern Ontario was hit in 2024 with one of the worst tar spot infections to date. Figures 3 & 4 show the differences in plant health and intactness seen with a fungicide in 2024. Tar spot impacted yield from 10–100 bu/ac depending on location and hybrid across Ontario. One thing did remain consistent, however. No matter what hybrid was planted, spraying a fungicide was always an economical decision where infections were heavy and set in early. Figure 5 shows an untreated check strip in a field of MZ 4158DBR applied with Delaro Complete + Proline. In this case, the sprayed area was 18.0% and 248 bu/ac while the unsprayed was 15.3% and 162 bu/ac—a whopping difference of 86 bu/ac.

We also saw significant differences in tolerance across hybrids when they were sprayed in comparison to when they were not sprayed. We saw that, in some cases, hybrids with

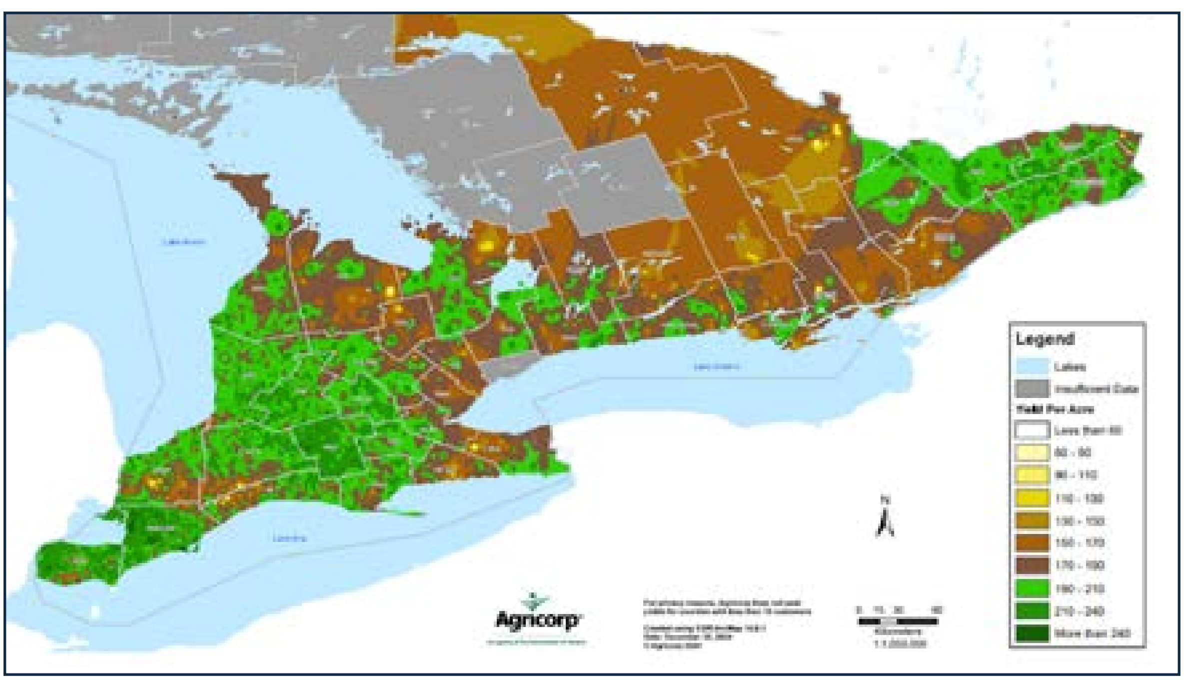



Figure 1.

a strong tolerance to tar spot without a fungicide tolerated tar spot similar to weaker hybrids when both were sprayed. Further, in some circumstances, the more tolerant unsprayed hybrid actually had less green plant material at harvest than the more susceptible sprayed hybrid. And we often saw hybrids that were more susceptible to tar spot outperform more tolerant hybrids when the more susceptible ones were sprayed with a fungicide. Without a fungicide, the reverse occurred.

Monitoring weather conditions will be important in 2025. For significant tar spot infection to occur again, we need the host (corn), the pathogen (which will overwinter in corn stover across the province), and the ideal environment for disease development. Tar spot needs seven hours of leaf wetness per day, 75% or higher humidity, and 18–23°C for maximum reproduction. In 2022, there were fewer days with over seven hours of leaf wetness, which resulted in a lower infection rate. Whereas in 2023 and 2024, many areas received these conditions nearly daily, maximizing the reproduction of tar spot.

A second thing to consider is DON. In 2024, there was a break from DON in most areas. However, if history repeats itself, we can count on it returning. Proper fungicide timing is critical—when silks are all out, white, and a few inches long. Veltyma DLX, Miravis Neo, and Delaro Complete + Proline are the best options when considering DON mitigation. Postponing application as late in the silking window as possible can help to maximize our control of tar spot later in the season as well as control DON. In some cases, targeting spray timing for tar spot over DON with hybrids like MZ 4608SMX, MZ 4799SMX, and MZ 4703DBR, which have consistently shown cleaner across Ontario for DON, may be a smart decision.

Finally, remember that our first pass in the spring is still the most important pass. Ontario's overall yields in the past few seasons have been beyond impressive when compared to some areas in the American Midwest. We need to continue to plant to moisture, maximize uniform emergence, and maximize harvestable ears again in 2025 to keep the yield ball rolling forward.

In 2024, we also saw many farmers willing to plant soybeans first. This allowed them to move across farms to find the most fit fields. With so many farmers willing to plant early beans, we were able to see how well they can adapt to this sort of environment. We observed that early-planted soybeans had incredible yield potential and are much less sensitive to stand issues as they can adapt to the stand that emerges much more readily than corn or late-planted soybeans can.

In regard to corn, year in and year out, the highest yielding fields have ear counts over 31,000 PPA and, in most cases, between 32,500 – 34,500 harvestable ears per acre. A good goal to consider in 2025 is understanding the conversion from seed drop to final ear count. A goal of dropping 34,500 with 33,500 emerging and 32,500 harvestable ears is something to strive for to maximize yields again in 2025.

## Acknowledgments:

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex Seeds.

Figure 3: MZ 4608SMX with fungicide.

Figure 4: MZ 4608SMX without fungicide.

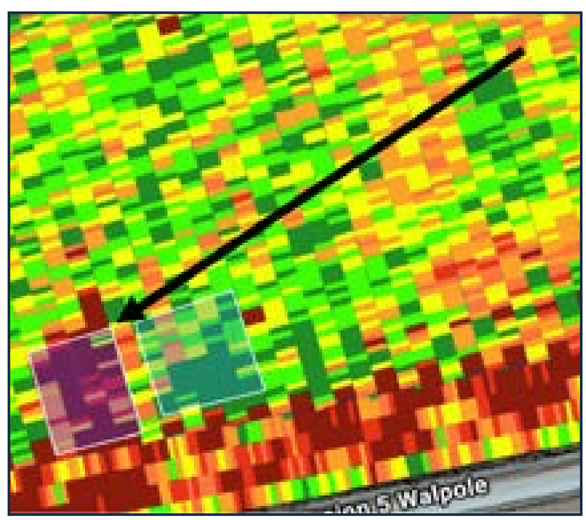


Figure 5: An untreated check strip in a field of MZ 4158DBR applied with Delaro Complete + Proline.

# 2024 Intensive Management

## Background

In 2024, Maizex continued intensive management trials for Maizex Seeds hybrids. Historically, we have used these trials to evaluate our hybrids across an array of environments to pinpoint how each hybrid responds specifically to population and fungicide applications. At one of the locations, Ridgetown, we were also able to evaluate hybrid responses to zero nitrogen. Locations this year included Winchester, Embro, and Ridgetown. At each location, a suite of hybrids relevant to that maturity were planted and evaluated under the varying conditions. Each hybrid was planted at low, standard, and high populations and managed with and without fungicide. In Ridgetown, we added an additional treatment of fungicide that was applied 14 days after the first application.

Figure 1: MZ 3432TRE, Winchester, 32,000 PPA, no fungicide.

Figure 2: MZ 3432TRE, Winchester, 32,000 PPA, Delaro Complete + Proline.

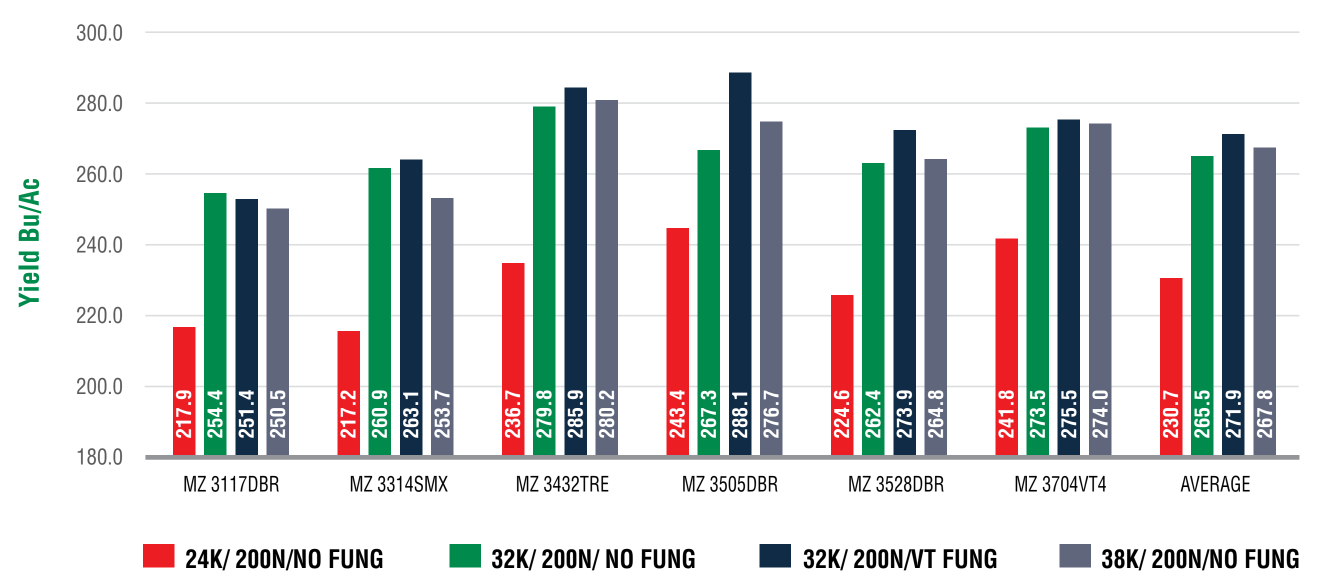
## Winchester

In Winchester, six hybrids were planted from 91CRM–97CRM. Each hybrid was established at 24,000, 32,000, and 38,000 final stands. Delaro Complete + Proline was sprayed on one of the two 32,000 population sets. Very little tar spot was observed at this location, however, there was significant Northern Corn Leaf Blight (NCLB) that developed late in the season (see Figures 1 & 2). With ample heat and rainfall, it was evident that most hybrids still responded to increased population with increased yield, all the way up to 38,000 PPA. However, MZ 3117DBR and MZ 3314SMX responded negatively to the 38,000 PPA vs the standard 32,000 PPA, suggesting these hybrids are more comfortable with moderate populations. MZ 3505DBR had a very strong response to population: nearly 10 bu/ac. This was observed in Southwestern Ontario as well. When MZ 3505DBR is given all the goods, it continues to respond and thrive with increased population.

Overall, MZ 3432TRE was one of the most consistent hybrids topping the plots at the standard and 38,000 PPA, however, it had very little yield response to the increased population and fungicide. Most hybrids here had a small response to a fungicide application with an average yield increase of 6.4 bu/ac. This yield increase is not enough to justify the application, however, it is key to observe individual hybrid responses.

As with increased population, MZ 3505DBR again had a significant response to the fungicide application, adding on an additional 20.8 bu/ac, a very profitable response likely due to an average plant health package and a hybrid that can pack significant yield with increased kernel weight. By increasing stay-green, the fungicide provided the hybrid an opportunity to increase kernel weight by extending the period where the plant moves sugars to the kernel. MZ 3505DBR demonstrated how important these trials are, as it responded significantly different in this environment than most of the other hybrids.

Graph 1: Winchester Intensive Management



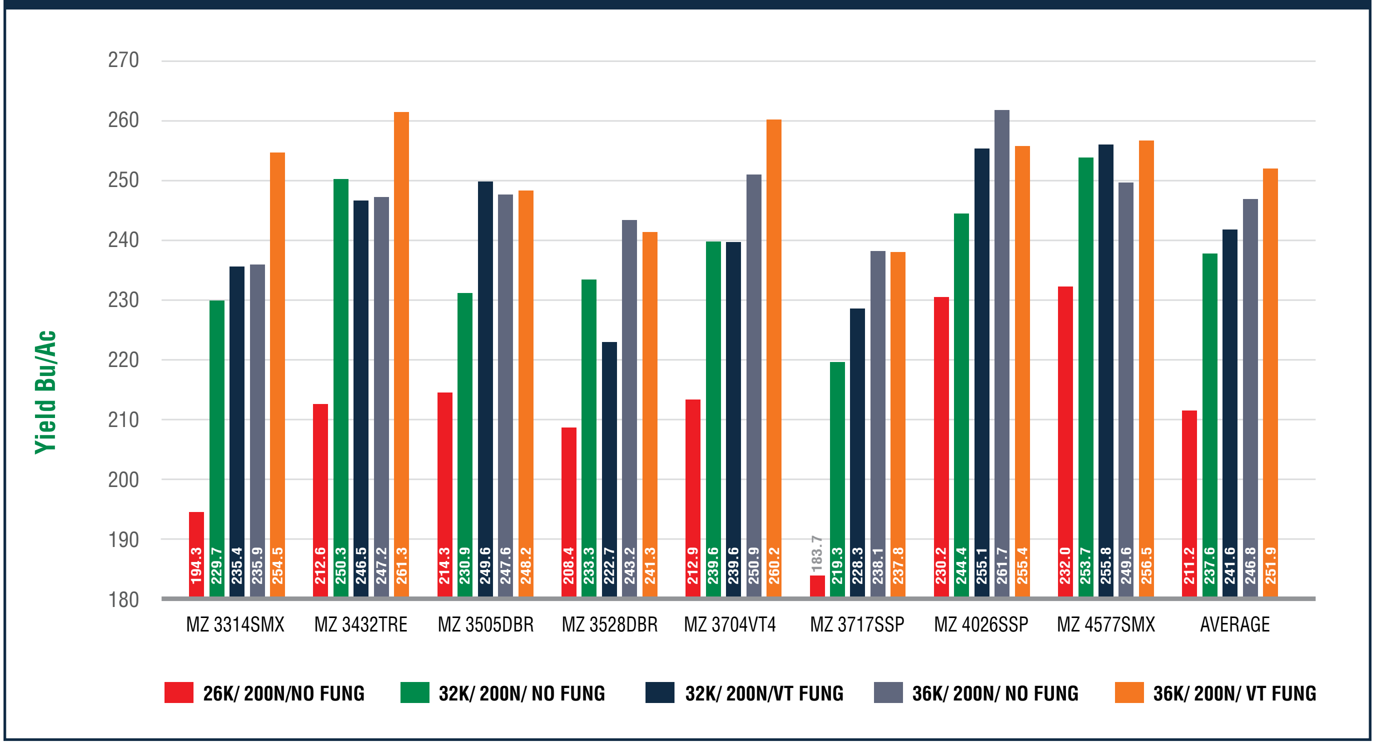
## Embro

In Embro, eight hybrids were selected between 93CRM and 103CRM. Final populations of 26,000, 32,000, and 36,000 were established. Each hybrid had an untreated check and sprayed treatment at VT–R1 with Delaro Complete + Proline at both 32K and 36K. Considerable tar spot was present in this location in September and October. Despite this, the tar spot arrived late enough that it did not significantly impact grain fill, demonstrated by the 4–5 bu/ac average response to fungicide at both 32,000 and 36,000 PPA. This result is similar to areas south of Embro, where fungicide spraying was timely, delaying infection resulting in tar spot showing up later in August and September. However, in most circumstances at this site, additional fungicide applications provided little yield advantage. It can be expected that, with an earlier tar spot infection period in Embro, yields would have been significantly impacted without a fungicide application.

Population was a significant driver of improved yield in Embro, gaining 9–10 bu/ac on average. This was seen in both 32,000 and 36,000 standard treatments as well as the 32,000+ fungicide and the 36,000+ fungicide treatments. Moving to a higher population was a positive economic decision in Embro. This response was likely exacerbated by the fact that the plots emerged slightly thinner than expected. The response to the higher populations further indicates that, under standard field conditions and environments, adding additional population (for example, an increase from 32,000 – 36,000) may be one of the easiest ways to increase yield.

MZ 3505DBR was again one of the only economical hybrids regarding fungicide response in Embro. It averaged just over 10 bu/ac better than the standard, backing the response we saw in Winchester as well. MZ 3505DBR likes management. MZ 3505DBR demonstrates the classic "racehorse hybrid" scenario benefitting from additional inputs. Conversely, we saw several other hybrids with much less response to management, particularly MZ 4577SMX and MZ 3432TRE. Both of these hybrids had limited responses to additional management but were able to achieve some of the highest yields in the plot despite the lack of response to higher management. Their solid plant health and consistent ears from plant to plant made them hard to beat, and both demonstrate some "workhorse hybrid" characteristics.

Graph 2: Embro Intensive Management

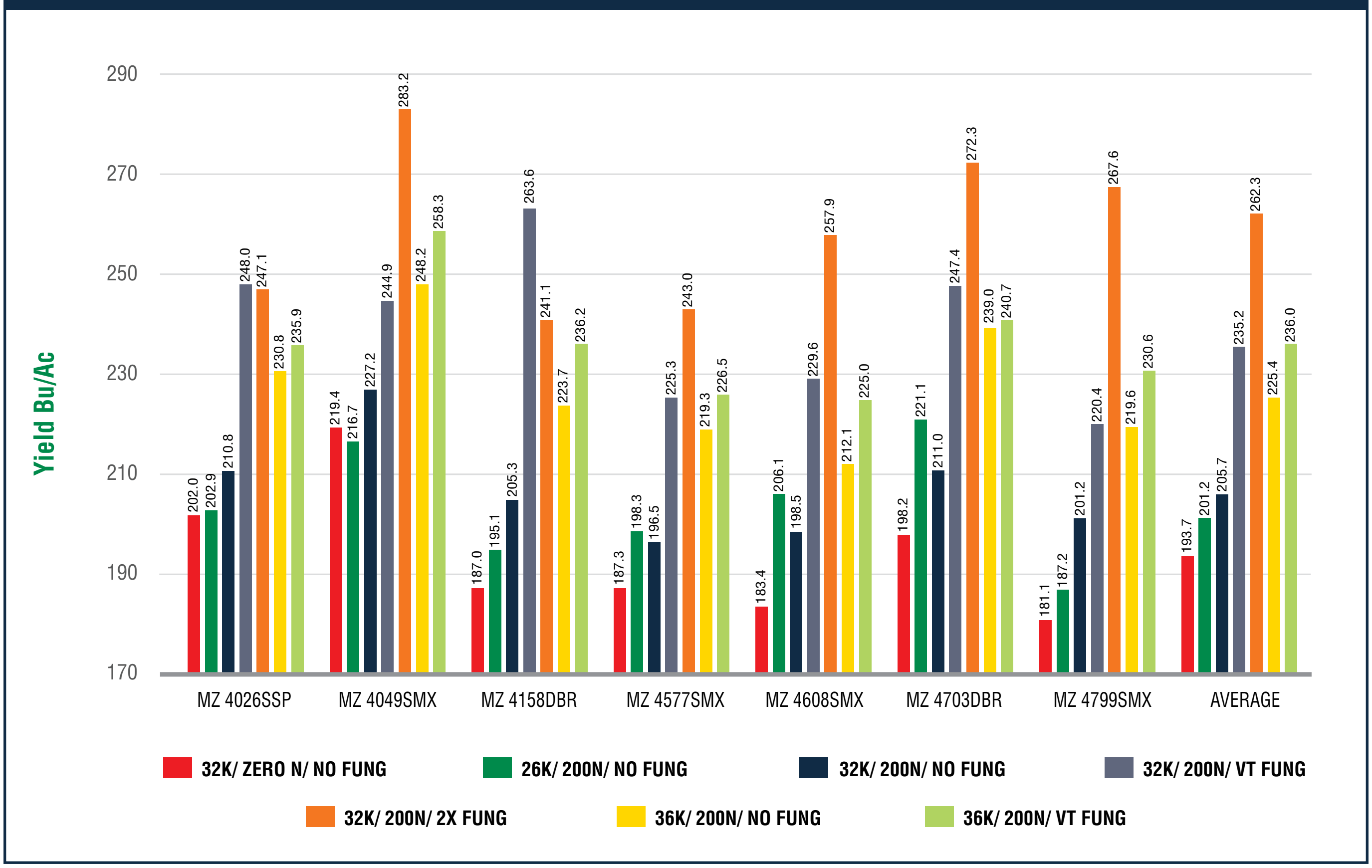


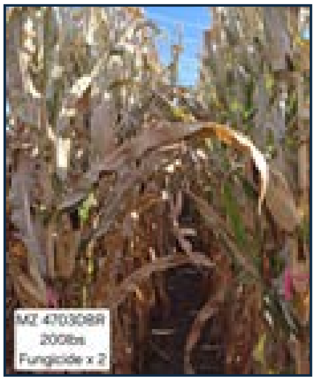
## Ridgetown

Planting at the Ridgetown location ended up occurring at the end of May due to wet conditions. Seven hybrids were established between 100CRM and 107CRM. No maturity changes were made due to the late planting date. There were several treatments that were conducted at Ridgetown, including a zero N rate for each hybrid. Yields of over 200 bu/ac were harvested using zero nitrogen. This far exceeded traditional levels seen at this site, which indicates that nitrogen mineralisation must have been excellent here in 2024. Each hybrid had populations of 26,000, 32,000, and 36,000 final stands. VT fungicide was applied to treatments at 32,000 and 36,000 using Delaro Complete + Proline. An additional treatment at 32,000 was added where Veltyma was applied 14 days after the first fungicide, which would have been R2 timing. There was significant tar spot pressure at the Ridgetown location in the 2024 growing season. Significant responses were seen with a VT fungicide as well as the subsequent application of the second fungicide for some hybrids. It is important to note that our first application was made just prior to a rain event. As recommended, we were able to get one to two hours rain-fast but no more than two hours. However, one may speculate that the second application of fungicide was made more profitable than one application in this scenario given the timing of rain after the first application. In many other cases, we saw 60–80 bu/ac increases with fungicide sprayed only once, whereas here it needed to be two applications to reach that response.

When looking at hybrid specifics, it is interesting that, as we move later in maturity, we see much better responses to lower populations. MZ 4608SMX and MZ 4703DBR, for example, both yielded better at 26,000 than 32,000. The best response was at 36,000, but it was much less substantial than some of the other hybrids. These hybrids are important to take note of for variable-rate recommendations where low populations are attractive due to lack of water-holding capacity, such as on sandy soils. Another takeaway from the trial was that MZ 4703DBR, despite a solid tar spot score, still needed both fungicides to reach its highest yield potential, further reinforcing what Albert Tenuta with OMAFA has said: that no matter the hybrid, under significant tar spot pressure, fungicide is absolutely necessary to achieve maximum yields.

Graph 3: Ridgetown Intensive Management







Intensive Ridgetown ON



## Summary of Population Economics

In Winchester, the highest yielding population was 38,000 PPA, edging out 32,000 PPA by a measly 2 bu/ac, showing additional seed is not economical. However, it did show us the differences between hybrids. MZ 3505DBR was more profitable at 38,000 PPA than at 32,000 PPA. Least profitable was 26,000 PPA, which came with an average yield penalty of about 35 bu/ac vs the 32,000 PPA. Similarly, in Embro, the highest yielding population was 36,000 as an average. We picked up 26 bu/ac moving from 26,000 to 32,000 and another 9 bu/ac moving from 32,000 to 36,000 PPA. The higher seeding rate at this site was profitable across the board. In Ridgetown, 36,000 was again the highest yielding population treatment. We increased yield by 20 bu/ac over 32,000 and 24 bu/ac over 26,000 PPA. Above-average rainfall in 2024 at the Ridgetown location would have allowed 36,000 plants to maximize yield with no drought stress. Chart 1 shows the breakdown of all treatments and their associated income. What was most surprising at Ridgetown was that there were a few hybrids, specifically MZ 4608SMX and MZ 4703DBR, that were more profitable at 26,000 PPA vs 32,000 PPA overall, which could also be season related. However, the majority of the other hybrids had increased profitability at 32,000 PPA over that of 26,000 PPA. The most surprising result though was how impressive the yields with zero nitrogen were in Ridgetown. If one chose to forego fungicide in Ridgetown, it was actually more profitable to forego nitrogen as well in 2024. In Ridgetown, no nitrogen provided more net income on average than that of the standard 26,000 PPA or 32,000 PPA. MZ 4049SMX was most impressive without nitrogen, averaging 219.4 bu/ac.

## Fungicide Economic Summary

In Winchester, the average response to a VT fungicide application was 6 bu/ac. This is not an economical response to a fungicide treatment. With the amount of NCLB at this site, we were surprised that the results were not more significant. However, MZ 3505DBR showed a tremendous response at this location, further signalling the importance of evaluating hybrid-specific responses. In Embro, a VT fungicide application gave a modest response at both populations. At 32,000, we saw an increase of 4 bu/ac, and at 36,000, we saw 5 bu/ac improvement. Both treatments would not have provided an economical return. A VT fungicide with application costs around $50/ac, meaning a 9–10 bushel gain is needed to break even. There was tar spot infection at this location, however, it did not appear to significantly reduce yield, mainly because the infection occurred late enough that most hybrids had enough time and plant-leaf area left to maximize kernel fill. Earlier infection, as can be expected in the future, will likely impact these results.

At Ridgetown in 2024, tar spot was devastating. Fungicide responses were some of the highest we have had since we began our intensive management testing 10 years ago. We saw on average a 30-bushel yield response to one application of VT fungicide at 32,000. We saw less response at 36,000, where the difference was 11 bu/ac. When we applied a second application of fungicide 14 days later, around R2, we were able to add an additional +27 bushels over the 1X application. When compared to 32,000 with no fungicide, the advantage was 57 bushels per acre! The net profit that a producer in Ridgetown would have made with a 2X fungicide program in 2024 would have been $159 per acre. Historically, we have not seen this scale of response, but 2024 by far was the highest tar spot pressure seen to date. This, coupled with the rainfall received hours after our first application of fungicide, was likely the reason for such a significant response. Going forward, producers in Southwestern Ontario need to be prepared to apply fungicides to their corn crop if conditions are favorable for tar spot development. This disease is a game-changer for corn production in Ontario.

## Acknowledgments:

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex Seeds.

Table 1: **2024 Intensive Management Results: Average of all Hybrids**

| WINCHESTER 2024 | YIELD bu/ac | Moisture % | Gross income | Net income |
|---|---|---|---|---|
| 24P/200N/NOFUNG | 230.7 | 18.5 | $1,383.96 | $1,202.53 |
| 32P/200N/FUNG (DELARO COMPLETE) | 271.9 | 18.7 | $1,631.31 | $1,358.90 |
| 32P/200N/NOFUNG | 265.5 | 18.5 | $1,592.79 | $1,374.31 |
| 38P/200N/NOFUNG | 267.8 | 18.6 | $1,606.58 | $1,365.08 |
| **EMBRO 2024** | **YIELD Bu/ac** | **Moisture %** | **Gross income** | **Net Income** |
| 26P/200N/NOFUNG | 211.2 | 28.3 | $1,266.99 | $965.37 |
| 32P/200N/NOFUNG | 237.6 | 28.2 | $1,425.86 | $1,082.10 |
| 32P/200N/FUNG(DELARO COMPLETE) | 241.6 | 30.4 | $1,449.71 | $1,021.81 |
| 36P/200N/NOFUNG | 246.8 | 27.2 | $1,480.69 | $1,129.27 |
| 36P/200N/FUNG(DELARO COMPLETE) | 251.9 | 30.0 | $1,511.34 | $1,064.69 |
| **RIDGETOWN 2024** | **YIELD Bu/ac** | **Moisture %** | **Gross Income** | **Net Income** |
| 32P/ZERO-N/NOFUNG | 193.7 | 17.7 | $1,162.18 | $1,114.45 |
| 26P/200N/NOFUNG | 201.2 | 17.6 | $1,207.36 | $1,041.96 |
| 32P/200N/NOFUNG | 205.7 | 17.7 | $1,234.27 | $1,044.26 |
| 32P/200N/FUNG(DELARO COMPLETE) | 235.2 | 18.5 | $1,410.91 | $1,155.77 |
| 32P/200N/FUNGX2 | 262.3 | 22.3 | $1,573.62 | $1,203.52 |
| 36P/200N/NOFUNG | 225.4 | 17.7 | $1,352.63 | $1,145.09 |
| 36P/200N/FUNG(DELARO COMPLETE) | 236.0 | 18.7 | $1,415.78 | $1,143.04 |

Trials at Ridgetown, ON, 2024.

# UNDERSTANDING HYBRID FLEX:
# The Key to Unlocking Higher Yields

## Background

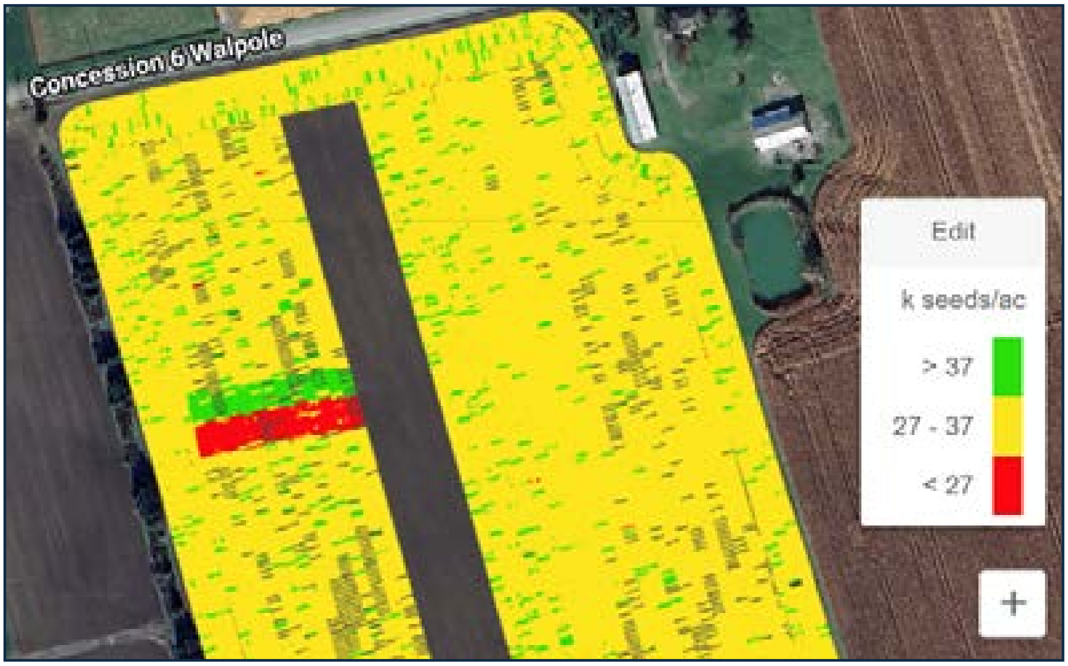
The Maizex team has had a long-term interest in understanding corn hybrid flex. This interest was supported by others across the industry including Ken Ferrie from Crop-Tech Consulting who was the feature speaker at the 2022 Great ON Yield Tour final event in Woodstock, Ontario. Ferrie is an industry veteran who is an expert in identifying hybrid characteristics and how we can use specific hybrid types strategically in fields.

In support of this strategy, Maizex has worked with PT Sullivan Agro in Eastern Ontario for several years. The team at PT Sullivan has been following Ken Ferrie's lead for several years and has been assisting our team on characterizing Maizex hybrids in Eastern Ontario. With several years of data provided to Maizex by PT Sullivan Agro, our team expanded this research to locations in Southern Ontario to further understand how Maizex hybrids are flexing in regard to rows round (girth), length both pre- and post-tassel, and depth or kernel mass.

On top of this, Maizex has continued our intensive hybrid screening to identify hybrids that are 'workhorse' vs 'racehorse' style hybrids. In addition to this work, the Maizex team understands that plant stature and architecture are additional key factors that can help with understanding a hybrid's population response. In our 2025 seed guide, Maizex characterized hybrids by KN or KM, meaning whether they are a kernel number (KN) hybrid that are susceptible to early-season yield loss or kernel mass (KM) hybrid that are more susceptible to late-season yield loss.

## How We Did It

PT Sullivan Agro has been doing flex trials for a number of years. Hybrids in their trials are evaluated at multiple locations at a high 38,000 plants per acre (PPA) and a low 24,000 PPA population to understand hybrid flex. They then collect 10 representative ears from each population to assess how the hybrids flex in girth, length, and kernel depth. Our trials in Southern Ontario were established using variable-rate planters with scripted population changes into the center of market development plots for about one-hundred feet of length (see Picture 1).




Picture 1.

At harvest, we went to each section of high and low population and pulled two reps of 8 feet 7.5 inches, or 1/2,000 of an acre, totaling 17 feet 5 inches, or 1/1000 of an acre, for each population. This provided a bag of 24–27 ears at the low population and 36–39 ears at the higher population depending on the hybrid and their emergence. Each ear at each population was then evaluated for kernel rows round and kernel rows long. Once this was completed, ears were then shelled at our Blenheim, ON, facility to determine 1,000-kernel weight, moisture, and total weight from the ears to assign a yield to each population.

Full field-length strips, of which 90% were planted at 34,500, were also weighed off to help understand a full population response by hybrid and to help assure our calculated yields were accurate. Results varied greatly. Some hybrids responded extremely well to population, like MZ 4026SSP, which yielded 33.7 bu/ac better at the high versus the low population. Conversely, some hybrids like MZ 4608SMX responded negatively to the increased population. MZ 4608SMX yielded 7 bu/ac less at the high population. Understanding a hybrid's flex in kernel number or kernel mass is critical to help understand why the differences exist between these two hybrids.

Bagged ears ready to be shelled and analyzed.

## Analysis

When looking at the individual hybrid responses in Table 1, we can start to tease out differences between each of the hybrids and where they are more likely to flex. It is important to understand that, when talking about flex, we are discussing the change in either girth, length, or kernel mass of the hybrid. This change is always negative; hybrids do not flex up but flex down according to environmental conditions.

For example, in Table 1, MZ 4608SMX lost 1.14 kernel rows round at the higher population, and this loss was much larger than the average loss across all hybrids. This means that early-season stress can negatively affect total rows round and thus year-end yield potential. It also flexed down significantly in length, losing just over seven kernels—again, as a percentage, significantly above the average loss in the plot. MZ 4608SMX had a below-average loss in kernel weight but still flexed down slightly. With this knowledge, we can label MZ 4608SMX a GL1 hybrid or Kernel Number (KN) hybrid as noted in our 2025 seed guide. GL1 means it flexes mostly in total kernels and significantly in girth and length pre-tassel. L2 hybrids, which are relatively uncommon, flex length post-pollination (they abort kernels), and a D hybrid (or depth hybrid) flexes mostly late season in kernel mass.

MZ 4026SSP and MZ 4703DBR had below-average flex responses in both kernels per row and kernel rows or girth. However, both significantly flexed above the plot average in kernel weight. Both flexed down over 10% from their mass at the lower population. In contrast, MZ 4608SMX flexed down about 7%, and MZ 4799SMX only moved 1.3% in kernel mass from the lower population. Both MZ 4703DBR and MZ 4026SSP are classic kernel mass (KM) hybrids, meaning they flex late season. They both have some flex earlier in the season but flexed most significantly in kernel mass, making them both D hybrids. MZ 4026SSP displayed some G characteristics in Eastern Ontario. MZ 4703DBR also displayed some flex in length pre-pollination, suggesting it has some L1 flex.

MZ 4799SMX was the biggest surprise in the plot, flexing very significantly in kernel rows and kernels per row. MZ 4799SMX has a very large kernel mass but did not flex in kernel mass or depth as expected. In fact, it and MZ 3717SSP flexed the least in kernel mass in the entire plot. MZ 4799SMX in this location displayed strong KN or GL1 flex when considering all periods of flex.

Table 1: **Flex response for four hybrids – Jarvis, ON**

| Hybrid | Kernels/bu | Population | Hand-harvest yield | Total kernels | Kernels per row | Kernel rows |
|---|---|---|---|---|---|---|
| MZ 4026SSP | 67110.74 | 38000.00 | 292.37 | 516.35 | 32.81 | 15.74 |
| MZ 4026SSP | 60096.88 | 26000.00 | 258.68 | 597.91 | 37.19 | 16.08 |
| Difference | -7013.86 | 12000.00 | 33.70 | -81.56 | -4.38 | -0.34 |
| MZ 4608SMX | 73687.73 | 38000.00 | 246.17 | 477.36 | 26.14 | 18.26 |
| MZ 4608SMX | 68467.85 | 27000.00 | 253.77 | 643.53 | 33.16 | 19.41 |
| Difference | -5219.88 | 11000.00 | -7.61 | -166.18 | -7.02 | -1.14 |
| MZ 4703DBR | 68257.89 | 37000.00 | 299.04 | 551.67 | 33.46 | 16.49 |
| MZ 4703DBR | 61652.52 | 26000.00 | 283.64 | 672.59 | 39.74 | 16.92 |
| Difference | -6605.37 | 11000.00 | 15.39 | -120.92 | -6.28 | -0.44 |
| MZ 4799SMX | 64931.25 | 38000.00 | 253.60 | 433.32 | 28.06 | 15.44 |
| MZ 4799SMX | 64091.35 | 25000.00 | 239.11 | 613.00 | 36.66 | 16.72 |
| Difference | -839.90 | 13000.00 | 14.48 | -179.68 | -8.61 | -1.28 |

MZ 4026SSP


MZ 4608SMX

MZ 4703DBR


MZ 4799SMX

## Going Forward

In 2025, Maizex is planning to increase the number of locations where we assess total hybrid flex in Ontario. We plan to continue to work with PT Sullivan Agro in Eastern Ontario as well as adding additional locations in Southern Ontario with our later-day hybrids. The goal is to have multiple site-years on all Maizex hybrids to finetune management recommendations. Using this data collected from flex trials can help a farmer determine what management styles a hybrid fits into and which hybrid may best suit their operation.

For hybrids like MZ 4026SSP and MZ 4703DBR that are KM or D hybrids, it is crucial these hybrids have a full season to mature, ample moisture and nitrogen later in the season, and good plant health, meaning a fungicide is an absolute must when considering tar spot in Southern Ontario. However, with little flex early in the season, these are hybrids that may excel in no-till or plant-green environments.

In contrast, hybrids like MZ 4608SMX and MZ 4799SMX displayed KN or GL1 flex, meaning they are very sensitive to early-season stress at V4–V8 when girth is determined as well as at V12–VT when kernels per row is determined. Ample fertility, nitrogen early, and a warm, uniform seed bed is considered critical for these hybrids to reach their maximum genetic potential. Late-season nitrogen is likely less important with these hybrids, but fungicide is likely still a necessity where tar spot can cause significant economic loss. If tar spot is not a consideration and these hybrids had good plant health, these would be candidates to pass on fungicide applications.  Be sure to stay updated on the latest hybrid research to understand flex and how it impacts your management decisions throughout the growing season.

## Acknowledgments

This article was written by Henry Prinzen, CCA-ON, Maizex Seeds.

THE GREAT DEBATE:

# Yield by Numbers or Weight to Increase Yield?

## Background

Maizex continues to work diligently to characterize hybrids and understand where yield comes from. We have seen that kernel mass can help drive higher yields, particularly in 2022. In 2023, when there was just enough heat to finish the crop and the weather provided the corn with a great start and cool pollination window, kernel number more often helped to drive high yields. Following these findings, the Maizex team significantly increased the number of market development and research plots in which our team calculated both kernel numbers per ear and kernel mass for hybrids. Instead of only calculating average thousand-kernel weights, we decided that indexing hybrids against the specific location total results would provide more insight into which hybrids use kernel mass or kernel number relative to other hybrids in driving yield. As seen in Graphs 1 & 2, we also included the overall average thousand-kernel weight and average kernels per ear of each of the hybrids.

## How We Did It

We continue to use the CountThis app, AI technology that is available for mobile devices. This technology uses algorithms to count objects laid out for the camera. We place a weighed sample in a black bin and take a picture, and then the app calculates the number of kernels it sees inside the black bin or tray. Once we have kernel number, weight, and moisture, we can run a simple calculation that provides a thousand-kernel weight or kernels per bushel. Once we had all the kernel weights for a specific location, we calculated the average thousand-kernel weight for the location. This was used to index hybrids against, giving a value that normally ranged from 85% to 115% of the location average (Graph 1). We also calculated an estimated kernel count for each hybrid, as well as a location average, and indexed each hybrid in a similar way (Graph 2). This was done by using the dry yield, population, thousand-kernel weight, and a simple equation.

## What Does This All Mean?

Hybrid thousand-kernel weight indexes are helpful in determining which hybrids in each maturity build yield late through kernel mass. Hybrids that build yield late with kernel mass are at greater risk for late-season stress from heat, frost, or disease. Hybrids that had high kernel-numbers-per-ear indexes could be at risk from early-season stresses at the V4–V8 growth stage when girth is determined, or around the V10–VT stage when length is determined, and also during pollination when the actual number of kernels pollinated successfully results in the final kernel set.

Picture 1: Top – MZ 3432TRE, a KN hybrid.
Bottom – MZ 3505DBR, a KM hybrid.

## Results

What we observed in 2024 is that there are some hybrids that are consistently excelling in thousand-kernel weight and some hybrids that always excel in setting up large ears with higher kernels per ear. Both provide a path to higher yield on the farm.

There is quite a variance between the highest and lowest hybrids in each category, and there is also a suite of hybrids that are consistently average in both metrics. MZ 2575DBR, MZ 2982DBR, MZ 3117DBR, MZ 3314SMX, MZ 3505DBR, MZ 4026SSP, MZ 4158DBR, and MZ 4799SMX consistently index above 100% for thousand-kernel weight. MZ 3117DBR, MZ 3505DBR, MZ 4026SSP, and MZ 4158DBR are what you would consider elite for thousand-kernel weight, continuously topping their respective plots for thousand-kernel weight (Graph 1).

When it comes to kernels per ear, MZ 2344DBR, MZ 3432TRE, MZ 3704VT4, MZ 4049SMX, and MZ 4608SMX consistently indexed over 100%, meaning they consistently had a higher number of kernels per ear than the average hybrid in that location (Graph 2). MZ 3432TRE specifically had an exceptional season, indexing over 110%. It combined both high kernel rounds and length to achieve this feat. Historically, MZ 4608SMX would place in a similar realm but in 2024 indexed second strongest at 106.6%. When looking back to previous years, it does seem to 'kernel' slightly higher than it did in 2024. This is quite possibly due to a drier spell that caught some fields in the back-end of pollination, since it is a later flowering hybrid compared to MZ 3432TRE, which typically flowered in a more optimal window.

## Historical Data and Results

Historical kernel weight and kernels per ear have been calculated on one site in Jarvis for the past three seasons (Chart 1). We have seen that some hybrids are very consistent in where they finish both in kernels per ear and thousand-kernel weight indexes, with MZ 3505DBR being one of the most stable of the group. MZ 4158DBR is also consistently stable, with the exception of 2022, when it was planted late and was not able to maximize kernel weight as the season was cut short, which was the case with other hybrids as well that year. However, the overall average kernels per bushel of the location only wavered by about 5,000 k/bu over the three seasons, but some hybrids moved much more than that.

What was also evident was that hybrids that were stable at this location year over year were also hybrids that the grower preferred given consistent performance. Many of the most consistent and highest yielding hybrids tended to lean towards the thousand-kernel weight side at this location, although this may not be a given elsewhere.

Chart 1: **Jarvis, ON**

| Hybrid | Year | Kernel Mass Index | Kernel Number Index | Hybrid | Year | Kernel Mass Index | Kernel Number Index |
|---|---|---|---|---|---|---|---|
| MZ 3314SMX | 2022 | 102.6% | 94.2% | MZ 4049SMX | 2022 | 99.2% | 100.5% |
| MZ 3314SMX | 2023 | 106.2% | 84.3% | MZ 4049SMX | 2023 | 95.0% | 109.5% |
| MZ 3314SMX | 2024 | 104.3% | 87.4% | MZ 4049SMX | 2024 | 98.5% | 100.5% |
| MZ 3505DBR | 2022 | 108.3% | 96.1% | MZ 4158DBR | 2022 | 97.0% | 104.4% |
| MZ 3505DBR | 2023 | 107.7% | 95.3% | MZ 4158DBR | 2023 | 104.8% | 101.2% |
| MZ 3505DBR | 2024 | 106.1% | 96.2% | MZ 4158DBR | 2024 | 108.3% | 103.8% |
| MZ 3818DBR | 2022 | 98.8% | 101.2% | MZ 4577SMX | 2022 | 91.6% | 108.0% |
| MZ 3818DBR | 2023 | 92.4% | 105.8% | MZ 4577SMX | 2023 | 91.2% | 98.6% |
| MZ 3818DBR | 2024 | 95.9% | 96.3% | MZ 4577SMX | 2024 | 97.2% | 104.0% |
| MZ 3930DBR | 2022 | 99.3% | 104.5% | MZ 4608SMX | 2022 | 88.8% | 111.8% |
| MZ 3930DBR | 2023 | 99.2% | 104.2% | MZ 4608SMX | 2023 | 89.4% | 113.6% |
| MZ 3930DBR | 2024 | 99.7% | 97.8% | MZ 4608SMX | 2024 | 93.3% | 108.8% |

# Moving Forward – What Strategy to Use?

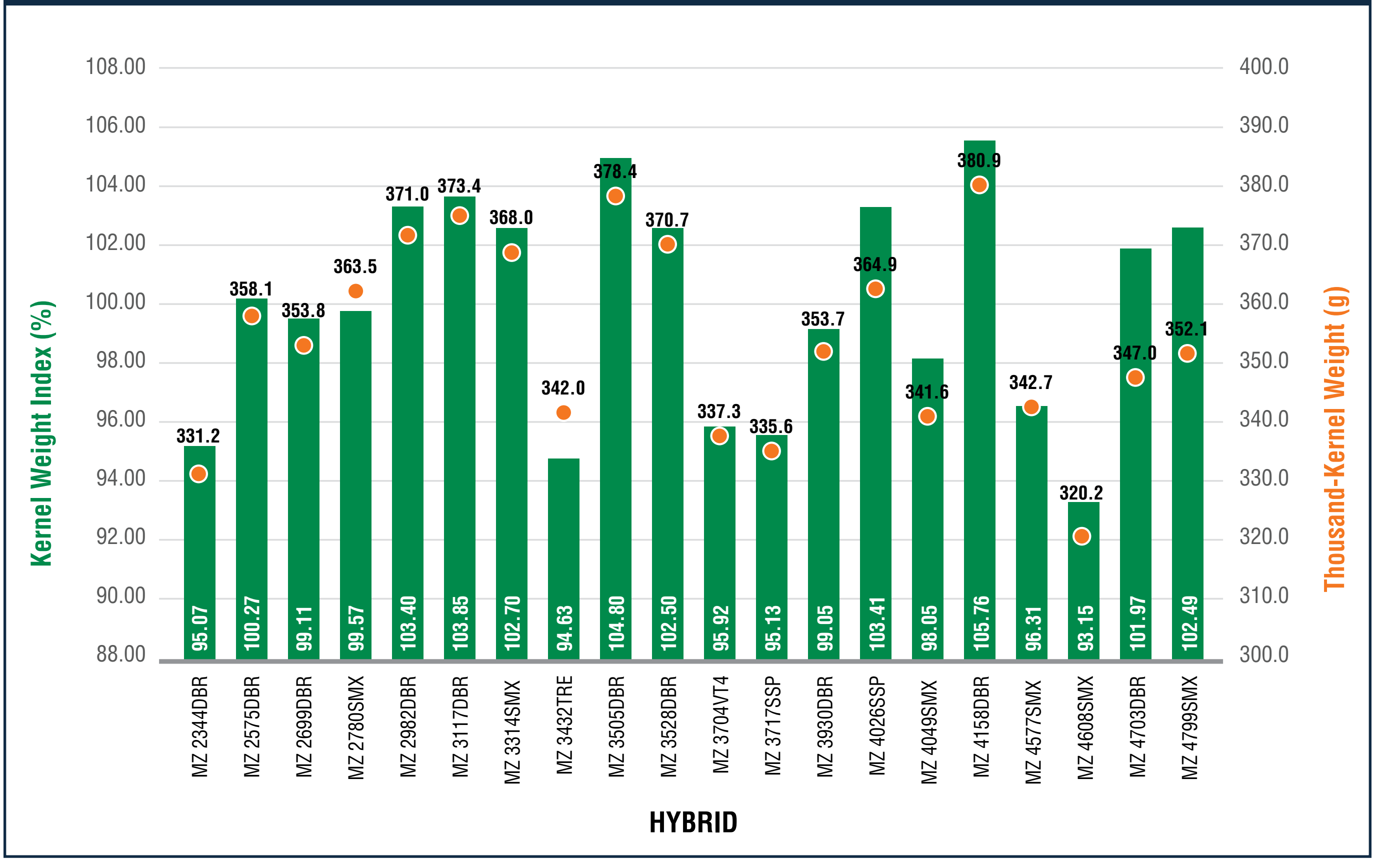
As much as large ears are great for taking to the coffee shop to talk about, we cannot disregard the impact thousand-kernel weight has on yield with some hybrids.

So, what hybrid selection strategy should growers use to optimize yield? On some farms, a combination of both kernel number and kernel weight hybrids is a solid approach to spread risk and increase average yield. Conversely, if you believe fields on your farm excel in one of the two categories more than the other, this research may help you select hybrids that are more likely to excel on your specific farm. It also helps us to identify hybrids that are consistently above average in both metrics and position these accordingly field by field (Graph 3).

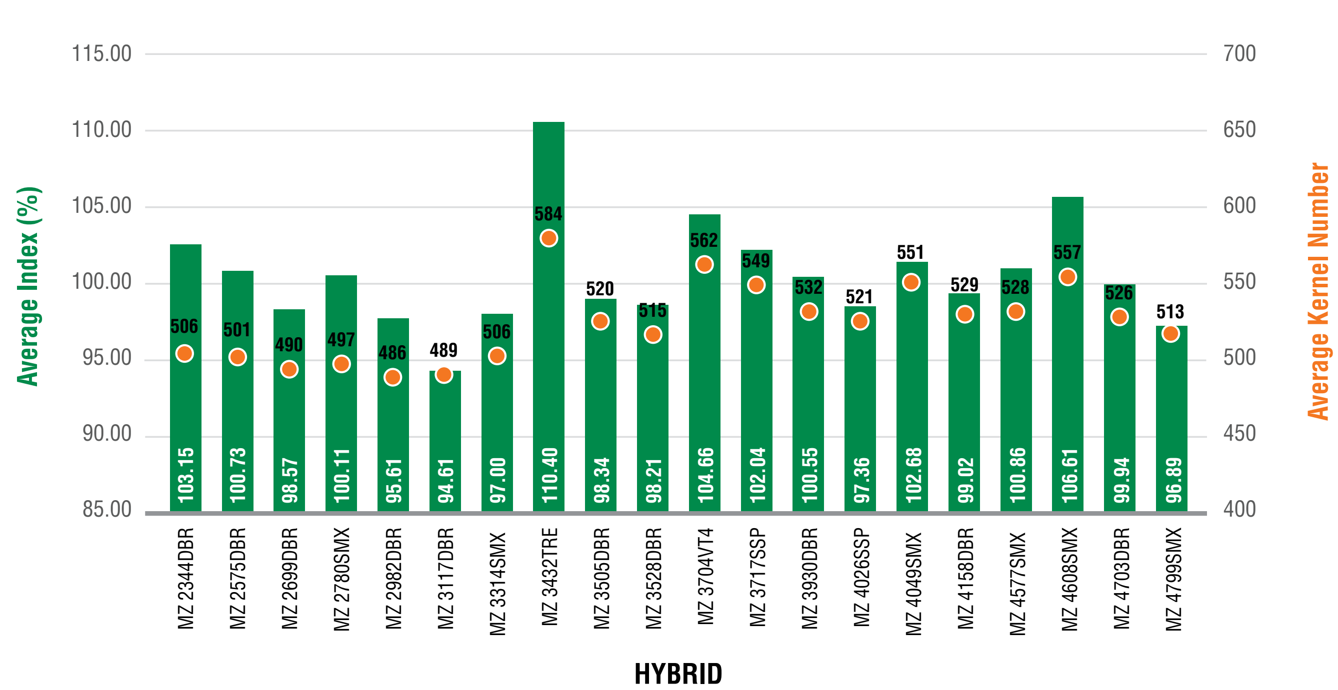
With kernel mass hybrids, it seems they may be more sensitive to a shorter growing season with a higher risk of lower yield in a shorter grain-fill period. Thus, in some cases where you decide to push maturity, it may be smart to choose a hybrid that leans more towards kernel number than kernel mass. The data from 2022 demonstrates this well, where the kernel mass index of MZ 4608SMX wavered much less than that of MZ 4158DBR despite being a hybrid of a later maturity (Chart 1).

Unsurprisingly, as many agronomists would say, our goal is to collect additional data to verify these trends. It is also a good idea to do these measurements on your own farm, as hybrids will respond differently in different environments.

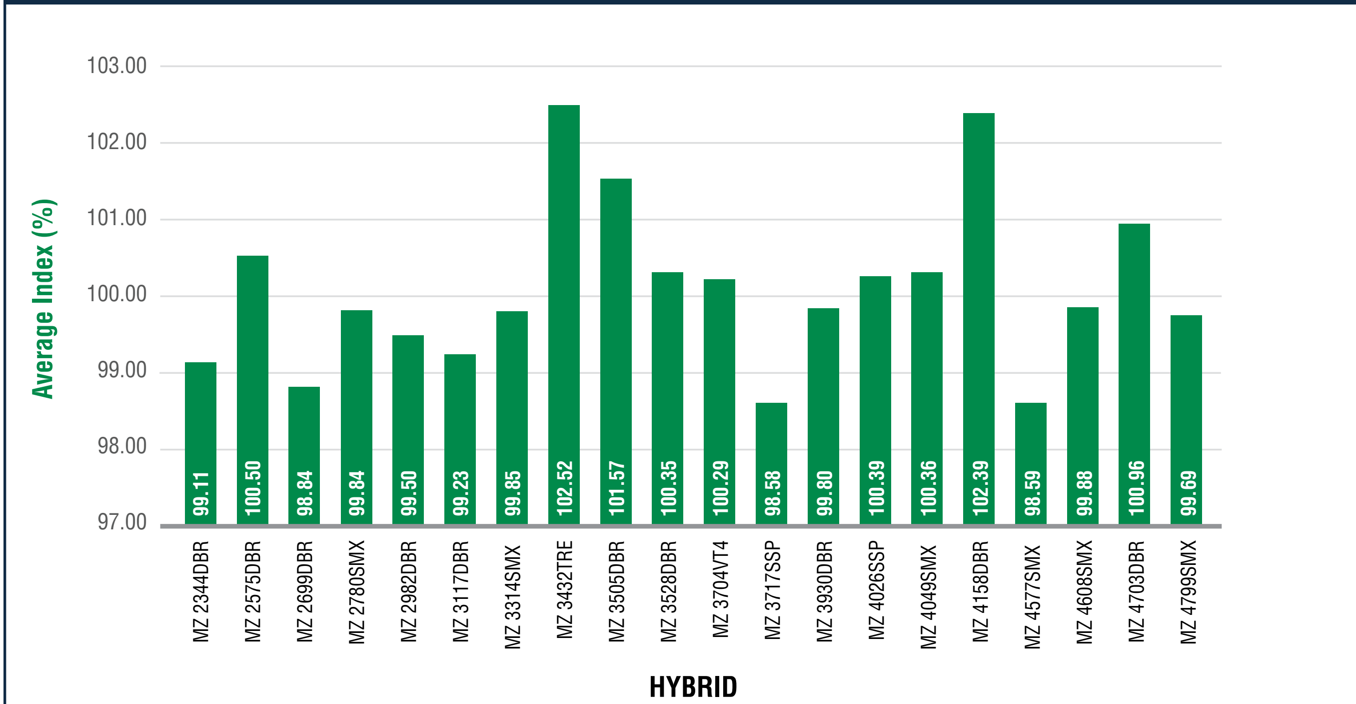
Graph 1: **Average Thousand-Kernel Weight and Average Thousand-Kernel Weight Index**



Graph 2: **Average Kernel Number and Average Kernel Number Index by Hybrid**




Graph 3: **Combined Average Index (KM + KN)**





## Acknowledgments:

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex.

# MANAGEMENT TO INCREASE

# Kernel Mass

## Background

Historically, agronomic research has focused on improving yields by managing the early stages of the corn crop. Journals have been filled and conferences overflowed with information on tillage and seedbed preparation, residue management, planter performance, seed spacing and emergence, starter fertilizer, and weed control.

Over the last 15 years, there has been increased attention on the later growth stages of the corn crop, generally beginning around V12, through pollination, and on into the grain-filling period. In this window, the key agronomic drivers have been the late application of nitrogen through high clearance application equipment, fungicide applications in or around the VT/R1 stage, foliar application of nutrients into the canopy, and more recently an interest in biostimulants to improve nutrient and sugar transport within the plant.

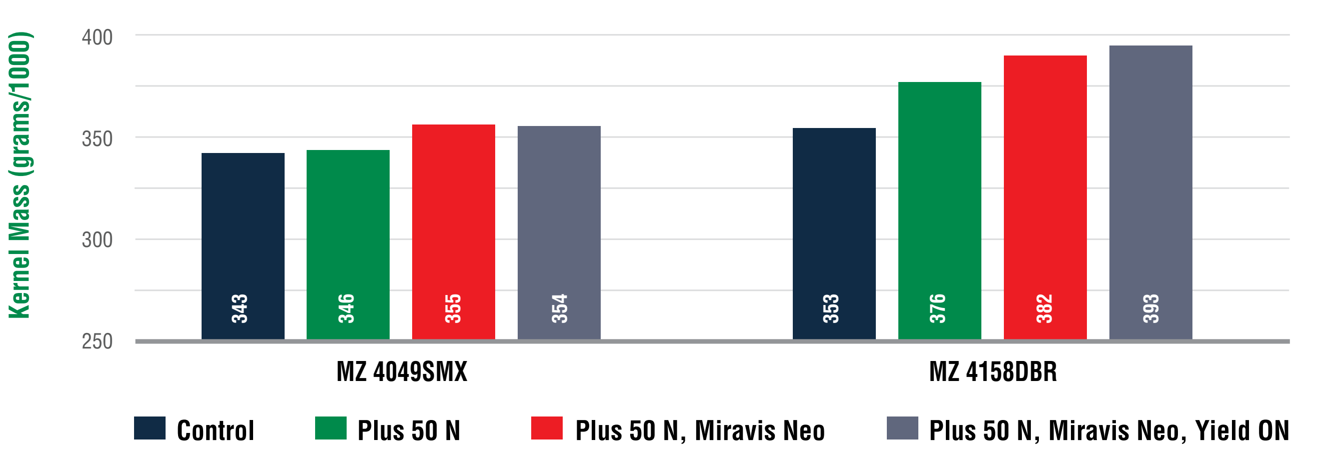
Some of these practices may have an impact on kernel number by reducing tip-back in the ear. However, the impact is more likely directed towards improving kernel mass by augmenting the grain-filling process in the corn crop.

## 2024 Results

In 2024, Maizex teamed up with Syngenta Biologicals to test three main approaches to influencing corn yield components: 1) additional late-season nitrogen, 2) a foliar fungicide applied at R1, and 3) the use of a reproductive biostimulant also applied at R1 as a foliar. In this trial, the additional nitrogen was applied in surface bands to the base of the corn row at V12, at a rate of 50 lbs N/acre as UAN. The fungicide Miravis Neo™ was applied at 400 ml/acre at R1, and the biostimulant YieldON™ was applied at 750 ml/ac. Foliar water volumes were 80 L/acre. Final ear count was 32,000 per acre.

YieldON's composition is dominated by the presence of plant extracts but has additional fertility and biological components. It is promoted by Syngenta as a reproductive biostimulant to be applied in the early reproductive stages of growth. In the Maizex trials, two hybrids were included in the experimental design, MZ 4049SMX and MZ 4158DBR.

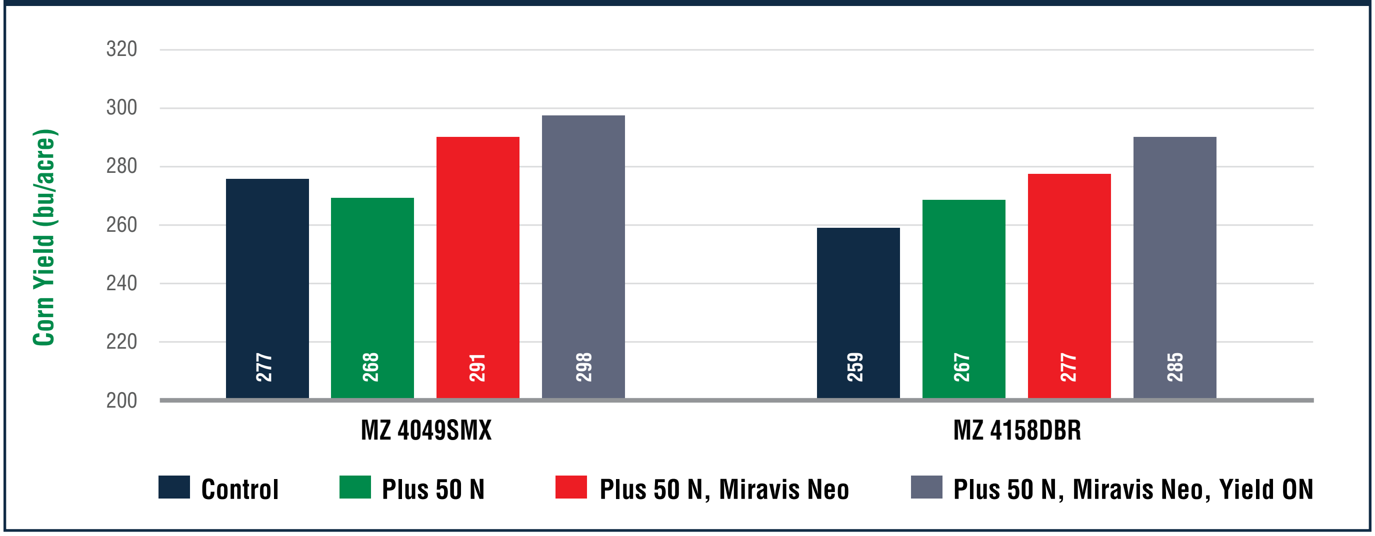
Figure 1: **Late-season management impacts on kernel mass on two hybrids at Embro, Ontario, 2024.**



Improvements in kernel mass stemming from the three management practices are highlighted in Figure 1. Interestingly, MZ 4158DBR, which is a hybrid with traditionally relatively low kernel number and high kernel mass, did respond with greater kernel mass increases than MZ 4049SMX. However, at this site, the high kernel number components of MZ 4049SMX (i.e. often >20 rows and often >32 kernels in length) pushed total yield to a higher level than MZ 4158DBR could achieve even with the boosted kernel mass values (see Figure 2). It should be noted that MZ 4049SMX did also have some modest gains in kernel mass from the late management options.

When results for management options are averaged across both hybrids, the fungicide and biostimulant both tended to increase kernel mass more than the additional late nitrogen. This may not be too surprising considering 200 lbs of N was already applied to all plots prior to the late-season application of 50 additional lbs N/acre.

Figure 2: **The impact of late-season management on corn grain yields in 2024.**




At this site, the YieldON biostimulant tended to improve corn yields by an average of 7.5 bu/acre. For context, the Ontario average number across 32 sites in 2024 was an improvement of 4.2 bu/acre from YieldON applied at VT/R1 (Syngenta Canada data). The Miravis Neo fungicide application increased yields on average 16.5 bu/acre at this site.

## Moving Forward

In future trials, Maizex will continue to investigate any potential advantages to various biological biostimulants and other late-season management options and timings. The question still remains as to whether a reproductive biostimulant like YieldON can consistently improve kernel mass across a range of conditions. Some other questions will also guide future research work:

1. Are hybrids with a propensity to have higher kernel mass also more likely to respond more to late nitrogen, fungicide, or reproductive biostimulants?
2. Often when populations are increased to try to achieve higher yields (i.e. 37,000 PPA versus 32,000 PPA), kernels per ear and kernel mass decline as populations increases, thus relinquishing some of the potential yield boost from the higher population. So, can late-season management reverse this trend and boost higher population corn yields?

   Stay tuned!

## Acknowledgments

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex Seeds. Appreciation is expressed to Greg Stewart, Biological Field Specialist with Syngenta Canada, for co-operation on this project.

# STALK NITRATE

# Testing in 2024

## Background

In 2024, the Maizex team determined that testing stalk nitrates after corn matured was necessary to gain a better understanding of how effectively farmers manage nitrogen across Ontario. This information can help us review nitrogen programs to see if nitrogen levels for that growing season were low, sufficient, or possibly in excess.

In order to conduct this research, we identified several farms and fields across Ontario with different management programs. Stalk nitrates were tested either after corn reached physiological maturity or within 24 hours after chopping corn for silage. In doing this testing, it is important to take random samples and avoid plants with symptoms of stalk rot diseases.

## Sampling method

To assess stalk nitrates, 10–15 eight-inch corn stalks were cut from random areas across each field. Samples should be taken shortly after the corn field reaches black layer, as the ear is no longer translocating nutrients from the stalk after black layer. For silage producers, this can still be done immediately after silage harvest, preferably within 24 hours. Each stalk should be cut 6 inches from ground level and then again at 12–14 inches high off the ground, leaving an 8-inch piece of stalk to sample (see Figure 1). Once they are cut, collect the pieces of stalk and bundle them together. With the samples being fresh, it is best to take them to an identified lab quickly. Keep the samples cool and dry during storage and transport.

## Results

There seems to be some variance between different publications on the interpretation of the low-level threshold. Depending on the source, the low-nitrate threshold varies from below 250ppm to 700ppm. For this project, an average sample below 500ppm of nitrate in the stalk would be considered low. The sufficient level then ranges from 501ppm to 2000ppm, which is consistent among all the articles researched. Fields that test higher than 2000ppm stalk nitrate are considered to have excessive nitrogen levels that exceeded the crop removal needs. As seen in Figure 2, there was a wide range of results from the samples taken in Ontario in the fall of 2024. Results shown in red were below the recommended 500ppm threshold. Of those low results, there were two sites with zero-nitrogen-applied check blocks. These zero N results help to confirm the accuracy of these tests and that the samples align where expected. The green bars indicate that these fields were at a sufficient level of nitrogen for the corn crop to reach its potential. The grey bars, which were the largest segment of the results, are above 2000ppm, which is considered excessive.

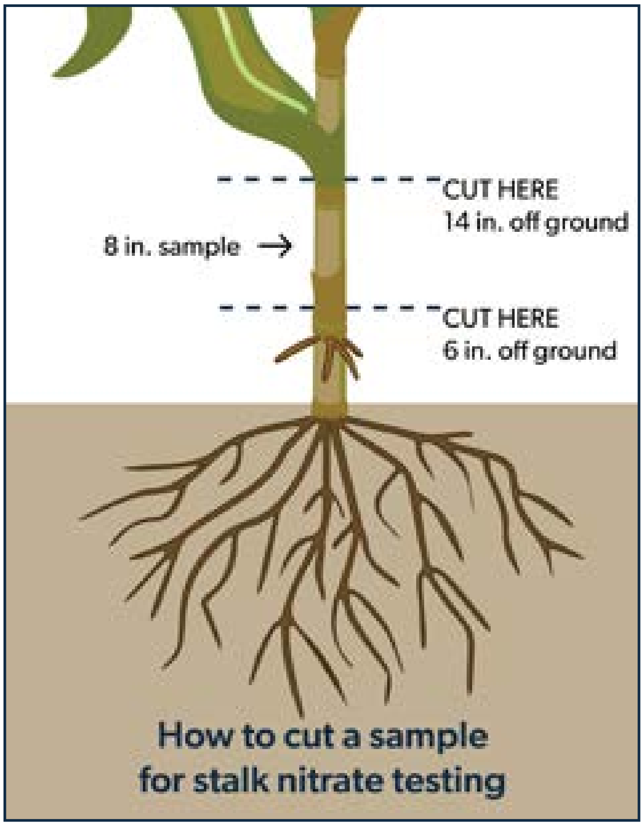



Figure 1.

Example of 8-inch corn stalk samples.

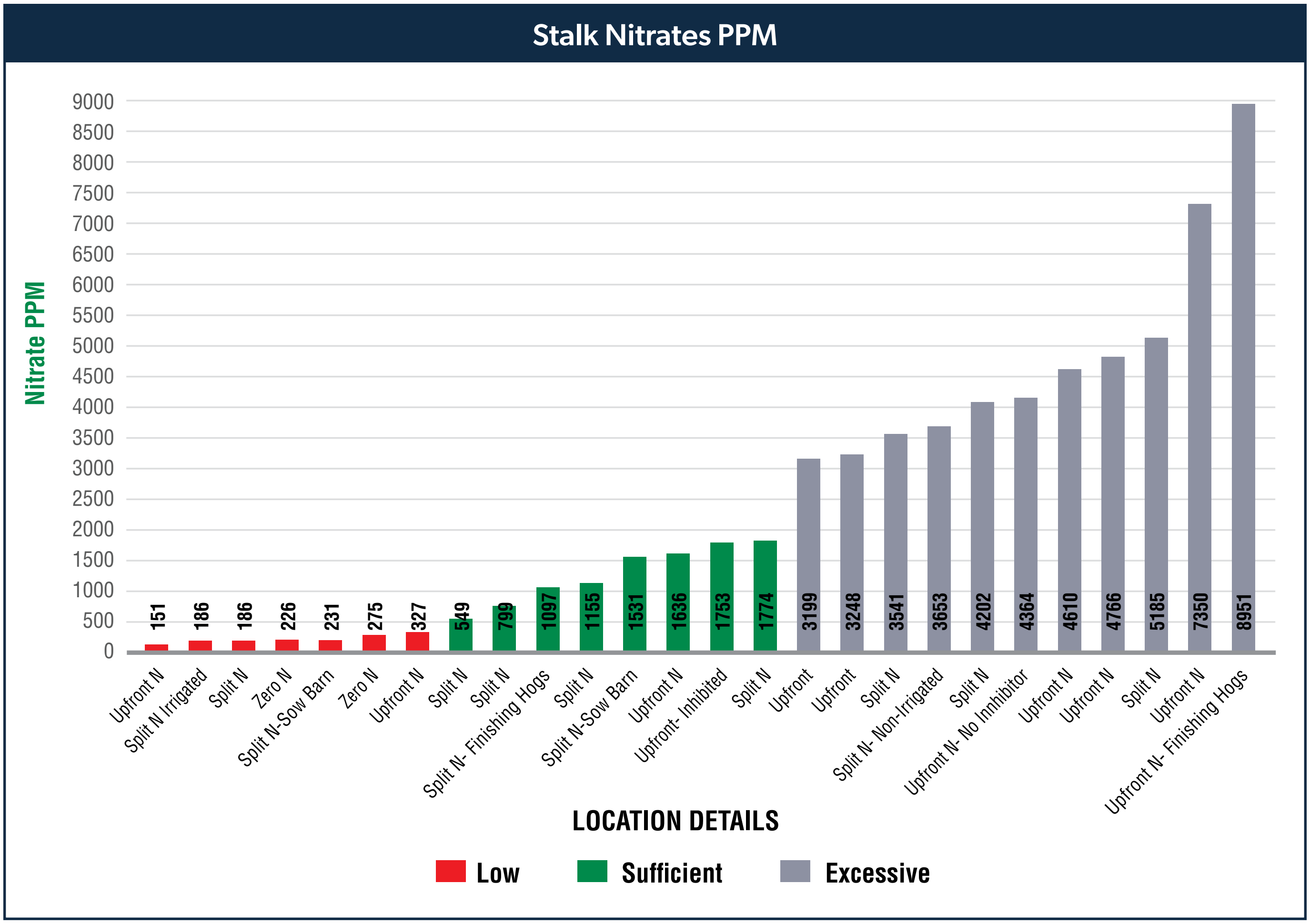



Figure 2: Results from Ontario stalk nitrate sampling in 2024.

| Levels | PPM Nitrate | Recommendation |
|---|---|---|
| Low | 0–500ppm | Predicted yield response to additional nitrogen |
| Sufficient | 501–2000ppm | Nitrogen rates predicted not to be yield limiting |
| Excessive | >2001ppm | Nitrogen rates predicted to be excessive and not yield limiting |

## Discussion and Application

Stalk nitrate testing is a relatively new concept to Ontario corn producers. It allows for timely and relevant results from producers' nitrogen management strategies. It is recommended to test several fields on the same farm to help benchmark fields within the operation, or from different blocks within a field based on different rates or application methods.

The test in our opinion is not calibrated well enough to compare across different environments where soil type, nitrogen rate, manure application, stalk diseases, or other factors could have significant influence on results. For example, the highest testing results of 8,951ppm came from a hog farm in Wellington County on a beautiful loam soil. A total of 85 lbs of nitrogen was applied between starter and a broadcast pre-emerge 28% program. These application rates would not be considered excessive. Manure was applied to this field as well, but with these high results, the farmer could consider reducing the nitrogen rate on this field the next time it is in corn.

Conversely, the split nitrogen field that was irrigated came back very low at 186ppm. This is a Norfolk sand field with very low CEC and nitrogen-holding capacity. This irrigated field had nitrogen applied to it four times throughout the growing season, with a total applied rate of 220 lbs/ac of commercial nitrogen, not including any N credit from biosolids that were applied. Even with this field being spoon-fed all season, the crop could have used more nitrogen according to these results.

These two examples demonstrate the value stalk nitrates can provide. Despite totally different results, both growers have some data that can help them adjust for next season: one possibly cutting back nitrogen rates and the other continuing to spoon-feed nitrogen and perhaps applying even more as the low stalk nitrates indicate that their low CEC sands mineralize almost no nitrogen. Both fields yielded well for the very different management practices at 235 bu/ac and 247 bu/ac, respectively.

Another very applicable result came from stalk nitrate testing from within one farmer's system in Haldimand County. Here the producer applied 205 lbs of nitrogen upfront with a stabilizer. This field yielded 207 bu/ac but looked like it was running out of nitrogen, even though it was planted later and had the same total applied nitrogen as another field nearby that the grower had a split application of nitrogen on. The other field yielded 239 bu/ac, also with a total of 205 lbs of nitrogen applied. The split-applied field received 115 lbs of nitrogen as 28% broadcast with herbicide and a stabilizer upfront and the remaining 90 lbs as 28% Y-dropped at V10–V12 with a volatility stabilizer. If this grower had not stalk-nitrate tested, they may not have understood the difference in yield or may have attributed it to variety, field, or any other variable. However, once we received the stalk nitrate samples back, it showed that the all-upfront field had a stalk nitrate level of 327 ppm, and the split-applied field had a stalk nitrate level of 1,531ppm, right within the optimal range. The low stalk nitrate in the upfront field was likely due to the excessive moisture and heat during the early growing season; leaching and denitrification occurred at the all-upfront field despite the use of the stabilizer.

When reviewing the data from all fields, there did not seem to be a strong correlation between sites that were split-nitrogen versus all-upfront. However, when reviewing results within each operation, like those observed in Haldimand, there was positive evidence that split applications resulted in more predictable and more often optimal stalk nitrate levels.

## Next steps

Stalk nitrate testing allows for comparing results within and across different farming operations and provides information for tweaking nitrogen programs going forward. Unfortunately, finetuning nitrogen management continues to be a challenge for our industry. Different seasonal effects have significant impacts on mineralization, nitrogen loss, and yield potential. The stalk nitrate test is a quick and easy tool for producers to use in their own operation to post-calibrate their nitrogen programs and manure management to refine their rates for the next season. Moving forward, Maizex will continue to test for stalk nitrates in 2025. We plan to build a larger data set and use stalk nitrate results to help growers understand what is working within their own operation and what may need some finetuning. We plan to follow through with more details on each site so we can better track the field history, soil type, nitrogen rates, and final yields. Thanks to all our cooperators in 2024.


## Acknowledgments

This article was written by Adam Parker CCA-ON, Market Development Agronomist, Maizex.


**Sources**


Purdue University: **https://www.agry.purdue.edu/ext/corn/news/articles.03/stalknitratetest-0915.html**

University of Nebraska: **https://cropwatch.unl.edu/2022/using-cornstalk-nitrate-test-evaluate-nitrogen-management-decisions/**

University of Iowa: **https://store.extension.iastate.edu/product/5089**

Penn State University: **https://extension.psu.edu/consider-the-cornstalk-nitrate-test-to-assess-your-nitrogen-management#:~:text=Historically%2C%20in%20Pennsylvania%20the%20CSNT,fields%20where%20N%20was%20excessive**

University of Massachusetts: **https://ag.umass.edu/crops-dairy-livestock-equine/fact-sheets/nitrogen-management-end-of-season-cornstalk-nitrate-test**

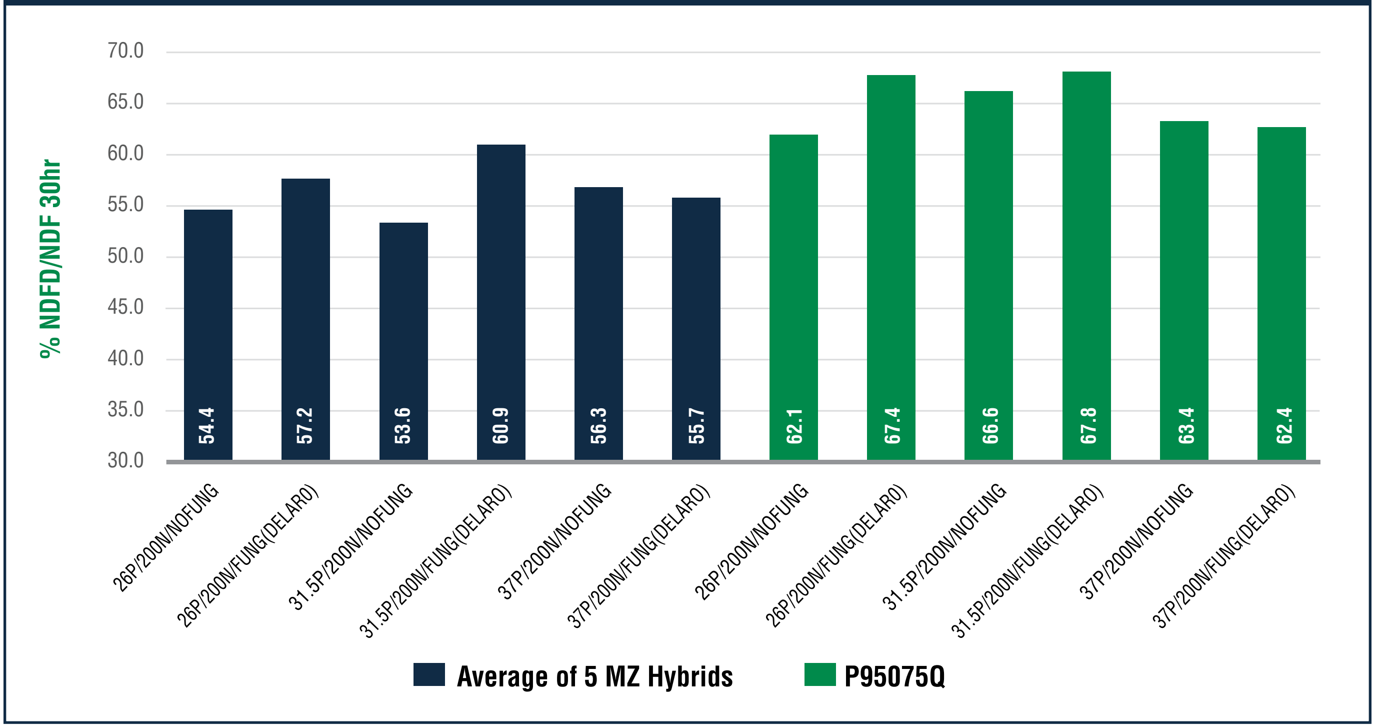
# IMPROVING FEED QUALITY IN CORN SILAGE:

# 2024 Research

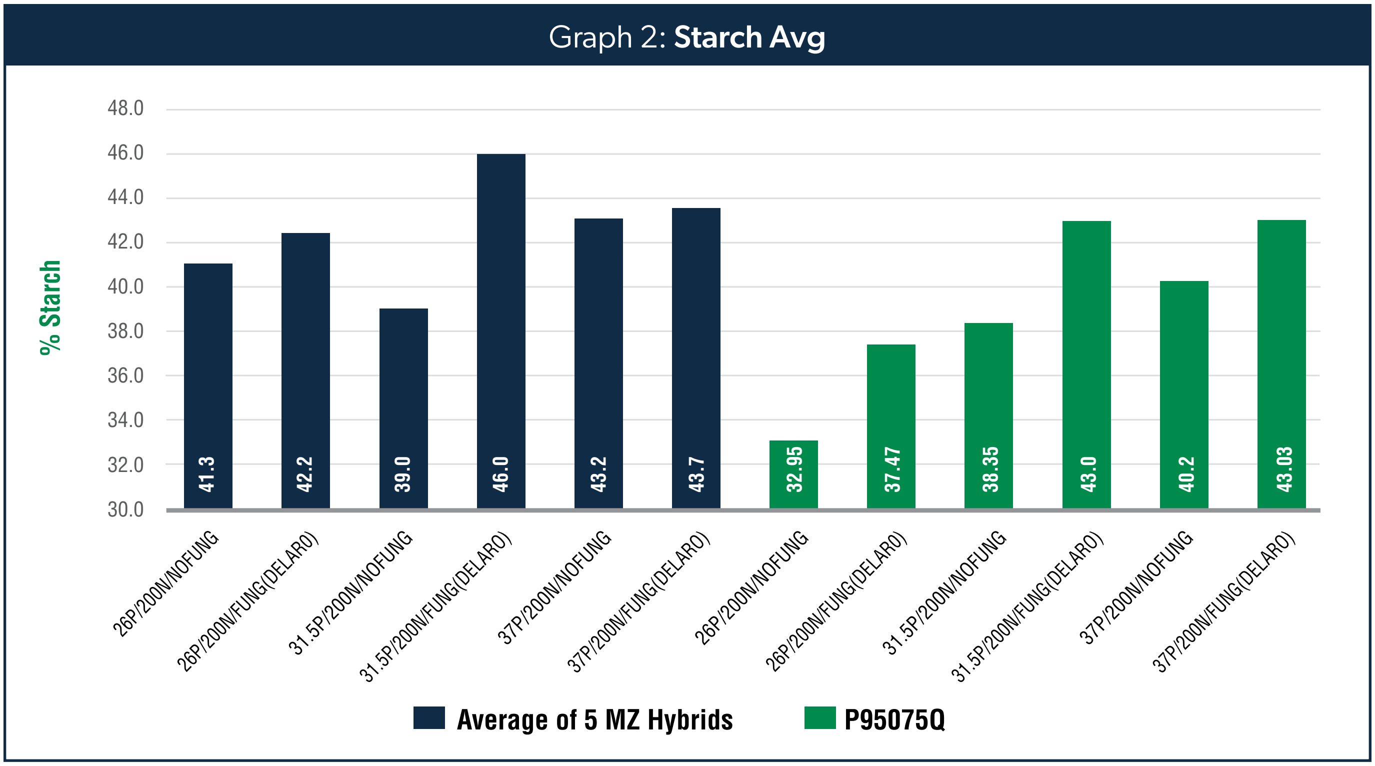
In this article, we will investigate the impact of agronomic practices on feed quality. Feed quality is a broadly used term in livestock production, but for the context of Maizex research in 2024, it was defined as delivering a feed sample that better optimizes milk or beef production through improved fiber digestibility and high energy content. Fiber digestibility (NDFD/NDF 30hr) is one of the main indicators for predicting feed intake with cattle. The faster that the fibre can be broken down in the rumen, the more feed the animal can consume in a day, which translates into higher production or rate of gain. Since the animal can physically eat only so much in a day, it is important that the feed material contain as much energy in each mouthful as possible. Therefore, a high starch content in corn silage will allow for more energy intake and as a result require less concentrates to be added to the ration.

In 2024, we set out to see which agronomic practices in the field could affect feed quality and yield to help producers make better feed, and more of it. Six hybrids, including five dual-purpose and one BMR hybrid, were planted at low, standard, and high populations, and each was also managed with and without a foliar fungicide application. Final stand populations were 26,000PPA, 31,500PPA, and 37,000PPA, respectively. The fungicides Delaro Complete + Proline were sprayed at VT–R1. Samples were collected and sent to the laboratory and analysed using NIR and the Milk 2006 calculation.

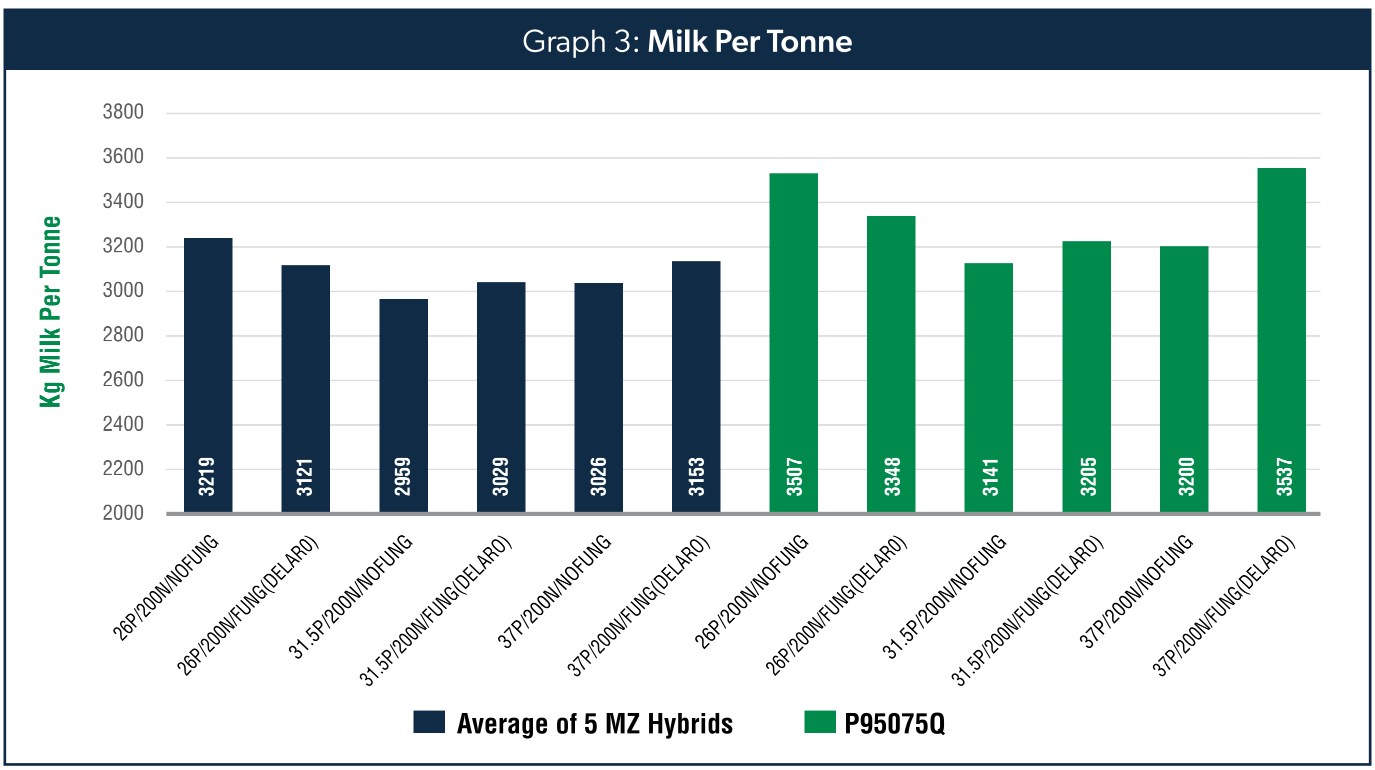
Graph 1: **NDFD/NDF 30hr**



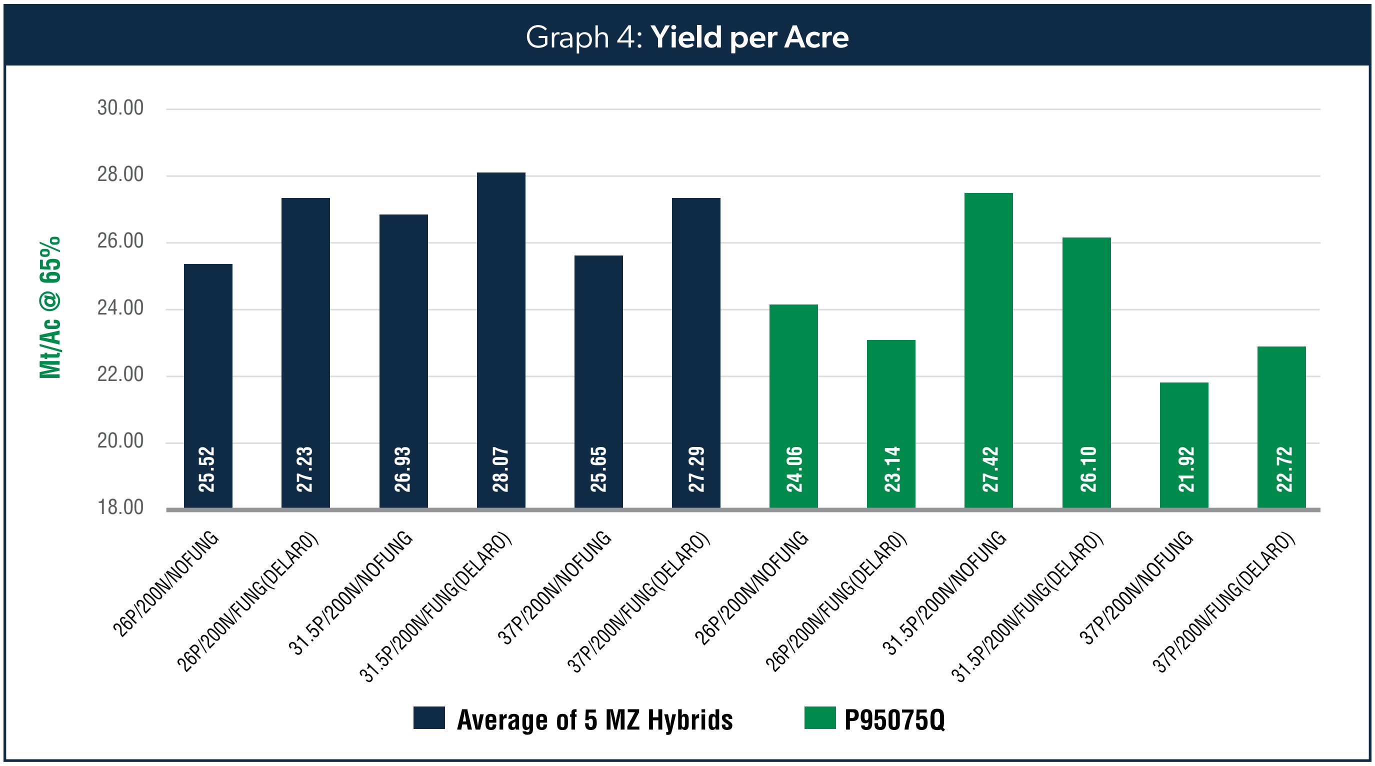

NDFD/NDF 30hr was improved in most treatments with a VT fungicide compared to no fungicide. The population 31,500 maximized the digestibility on all hybrids. The BMR hybrid, as expected, had higher initial digestibility than the dual-purpose hybrids.



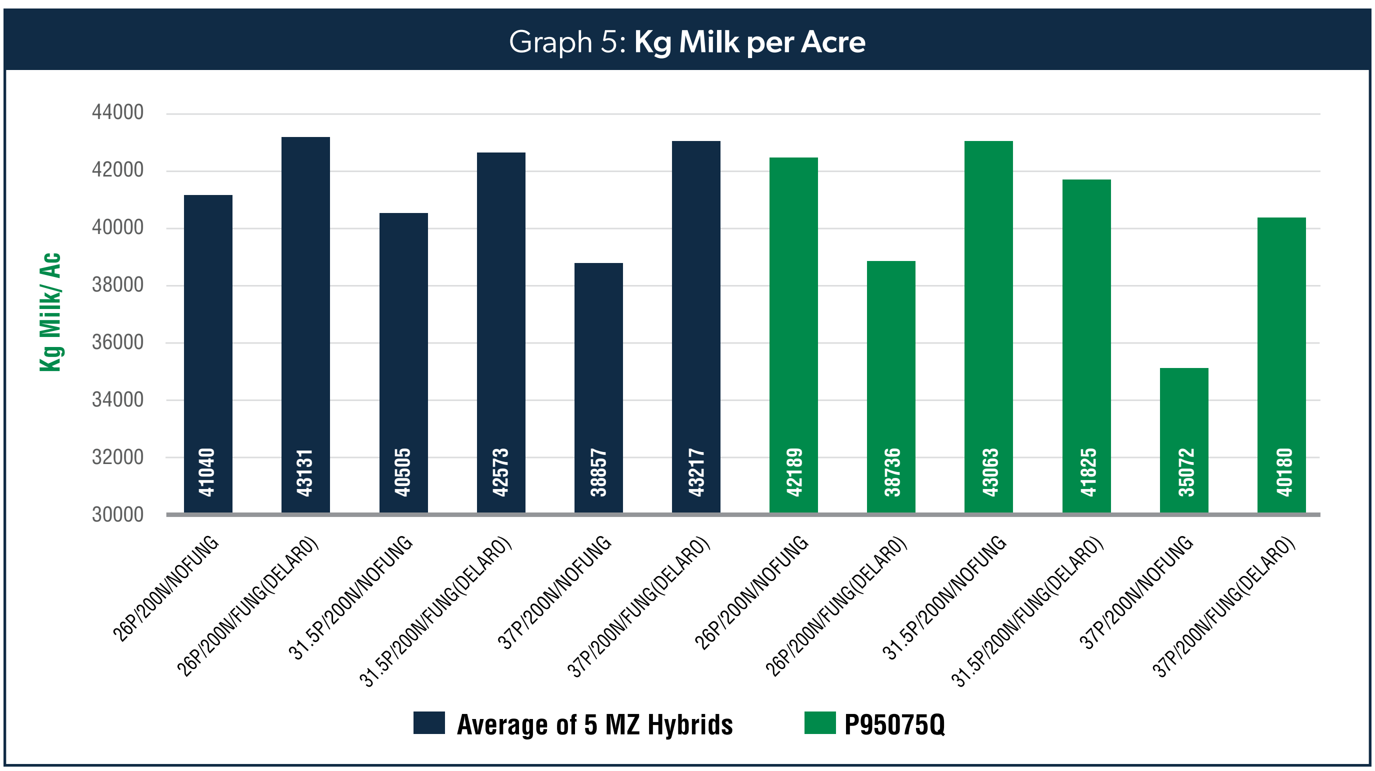

Starch tended to improve with higher populations, which correlates with more grain per acre being harvested. However, 31,500PPA with fungicide managed to maximize the starch content of each hybrid. The dual-purpose hybrids with higher grain yield had higher starch content than the BMR hybrid. VT fungicide was able to allow the corn plants to produce more starch in all treatments.




The milk per tonne is calculated using the Milk 2006 calculation. Milk per tonne was higher at lower populations or with a fungicide. The dual-purpose hybrids and BMR both trended the same to management.

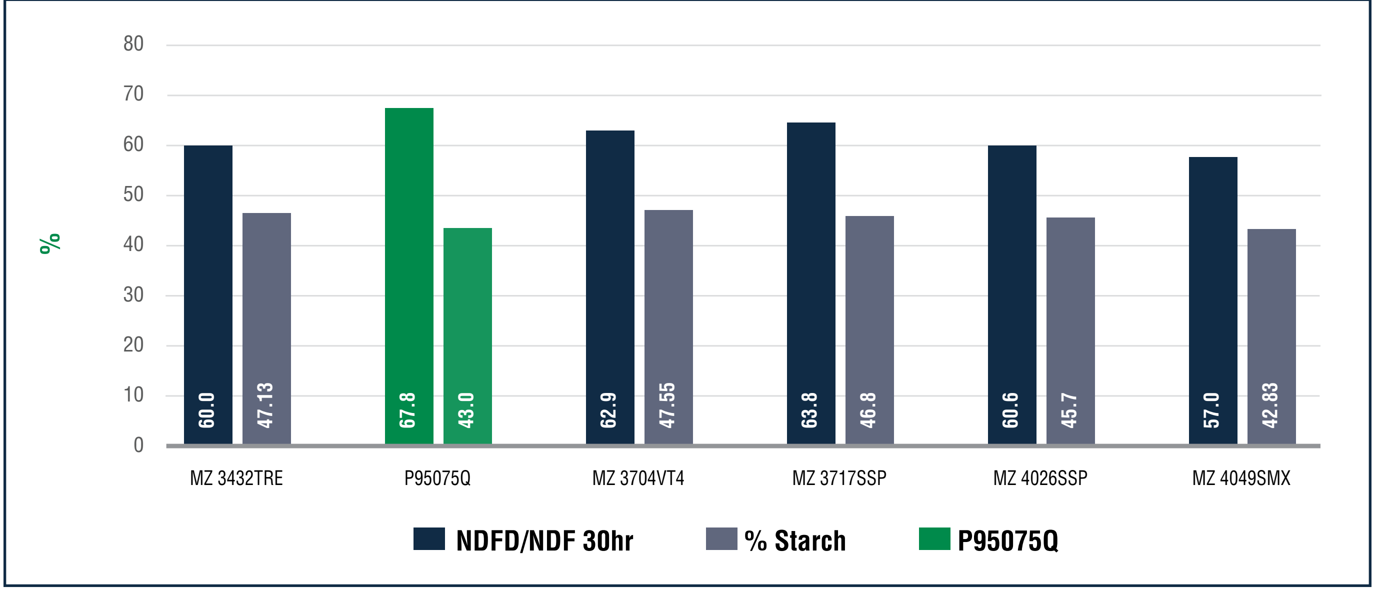



Yield was maximized at 31,500PPA for all hybrids. The Maizex dual-purpose hybrids were consistently higher yielding than the BMR. VT fungicide significantly improved the yield per acre of corn silage, especially with dual-purpose hybrids.




Kg of milk per acre is calculated by multiplying tonnes per acre by milk per tonne. It allows for an evaluation of feed quality and yield for a net benefit to the producer. Dual-purpose hybrids were more consistent with their net yield. Dual-purpose hybrids reliably responded to a fungicide application at VT. Dual-purpose hybrids are able to deliver, at a minimum, comparable milk or beef per acre as BMR hybrids.

Graph 6: **Feed Quality @ 31,500 with Fungicide**




When looking at the dual-purpose hybrids, they tend to have slightly lower digestibility than BMR as expected. It is important to note that achieving above 60% NDFD/NDF 30hr digestibility is a very high score for a dual-purpose corn silage sample. Maizex dual-purpose hybrids are consistently delivering higher starch content than the BMR alternative.

In summary, well-managed dual-purpose hybrids can deliver very good quality feed to producers. With the addition of maximizing the yield per acre of silage, dual-purpose hybrids can deliver the most milk and beef per acre.

Fungicides continue to add significant value to silage production by allowing hybrids to reach their potential. Fungicides help to improve fiber digestibility, starch content, and yield per acre. In this trial, 31,500PPA seemed to be the optimal population to maximize feed quality and yield per acre. It is important to note that, in order to achieve that final population, producers should seed 32–33,000 seeds per acre.

These results help to reinforce the importance of management decisions to improving feed quality and yield in corn silage production.

Embro, Ontario:
Hybrid on the left is P95075Q Bovalta BMR;
hybrid on the right is MZ 4026SSP.

## Acknowledgments:

This article was written by Adam Parker CCA-ON, Market Development Agronomist, Maizex.

# SULFUR ON SOYBEANS:
# A Slam Dunk

## Background

In 2023, Maizex Seeds completed its first full season of research on soybeans and sulfur. This research was inspired by Professor Shaun Casteel of Purdue University. Professor Casteel had extensively studied the impact of sulfur on soybean yields on deeper Prairie soils, and he has spoken on his work at many events across North America, including some for Maizex. Last season, our trials showed positive results. This included some sites on soils with higher cation exchange capacities (CEC) than sandy soils where we anticipated and saw very strong sulfur responses.

In 2024, we also partnered with OMAFA soybean specialist Horst Bohner in our trials to aid Professor John Lauzon with developing an effective sulfur test for our soils. Similar to Casteel's work and our trials in 2023, we applied sulfur treatments prior to or shortly after planting, and we were excited to see positive visual results right out of the gate in 2024. We also added a stand-alone nitrogen, calcium sulphate, and polysulphate treatments to tease out if nitrogen alone was doing any of the lifting with AMS. Polysulphate is a low-salt fertilizer with a slow-release curve of sulfur that contains 18.2% sulfur, 13.3% potassium, 3.3% magnesium, and 11.8% calcium.

The goal in 2024 was to do this research on a diverse array of soil types and locations across Ontario. Trial locations included: Simcoe, Jarvis, Embro, and Tupperville. These locations provided various soil types including low-CEC sands in Simcoe, heavy high-CEC clay in Jarvis, beautiful high-fertility Oxford loam in Embro, and a moderate soil in Tupperville.

## Treatments

**Two varieties were established at each site:**

- Energy E3 (2.8RM) and Ocelot E3 (2.1RM) at Tupperville, Simcoe, and Jarvis
- Maris R2X (1.0RM) and Viper R2X (0.9RM) at Embro

**Eight treatments were compared:**

1. Control, untreated
2. Fungicide at R3.5 (Delaro Complete)
3. 100lbs of AMS at planting
4. 100lbs of calcium sulphate (gypsum)
5. 125 lbs of polysulphate
6. 100lbs of PurYield 1
7. 100lbs of AMS + 100lbs PurYield (ESN)
8. Full package 100lbs of AMS + 100lbs PurYield (ESN) + Delaro Complete at R3.5

- Fungicide: $18.50 + $12 application per acre
- AMS: $655/tonne
- Gypsum: $505/tonne
- Polysulphate: $570/tonne
- PurYield: $1,020/tonne

(Spring 2024 pricing)

Table 1: **Costs of treatments**

| Treatment | Cost of Fungicide and Application | Cost of Sulfur Source | Cost of PurYield | Net Cost of Treatment |
|---|---|---|---|---|
| Control | $0.00 | $0.00 | $0.00 | $0.00 |
| Fungicide | $30.50 | $0.00 | $0.00 | $30.50 |
| AMS | $0.00 | $29.77 | $0.00 | $29.77 |
| Calcium Sulfate | $0.00 | $22.95 | $0.00 | $22.95 |
| Polysulphate | $0.00 | $32.38 | $0.00 | $32.38 |
| PurYield | $0.00 | $0.00 | $46.36 | $46.36 |
| AMS + PurYield | $0.00 | $29.77 | $46.36 | $76.13 |
| Full Package | $30.50 | $29.77 | $46.36 | $106.63 |

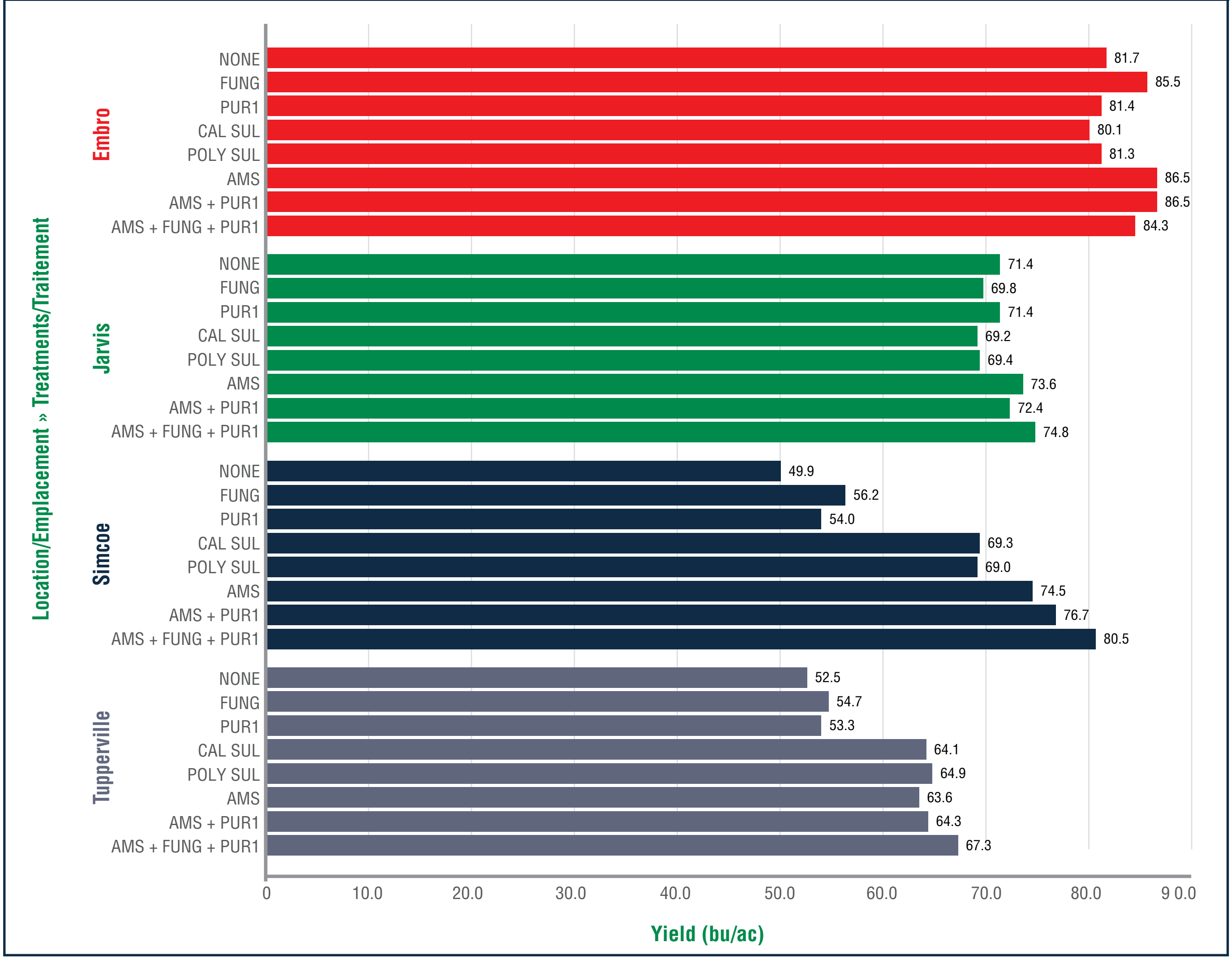
Table 2: **Net return on treatments (all sites)**

| Treatment | Yield (bu/ac) | Gross revenue ($14.00/bu) | Treatment Cost / Acre | Net Revenue / Acre | Advantage / Acre over Standard |
|---|---|---|---|---|---|
| Control | 63.85 | $893.90 | $0.00 | $893.90 | $0.00 |
| Fungicide | 66.55 | $931.70 | $30.50 | $901.20 | $37.80 |
| AMS | 74.50 | $1,043.00 | $29.77 | $1,013.23 | $149.10 |
| Calcium Sulfate | 70.65 | $989.10 | $22.95 | $966.15 | $95.20 |
| Polysulphate | 71.10 | $995.40 | $32.38 | $963.02 | $101.50 |
| PurYield | 65.00 | $910.00 | $46.36 | $863.64 | $16.10 |
| AMS + PurYield | 74.95 | $1,049.30 | $76.13 | $973.17 | $155.40 |
| Full Package | 76.75 | $1,074.50 | $106.63 | $967.87 | $180.60 |

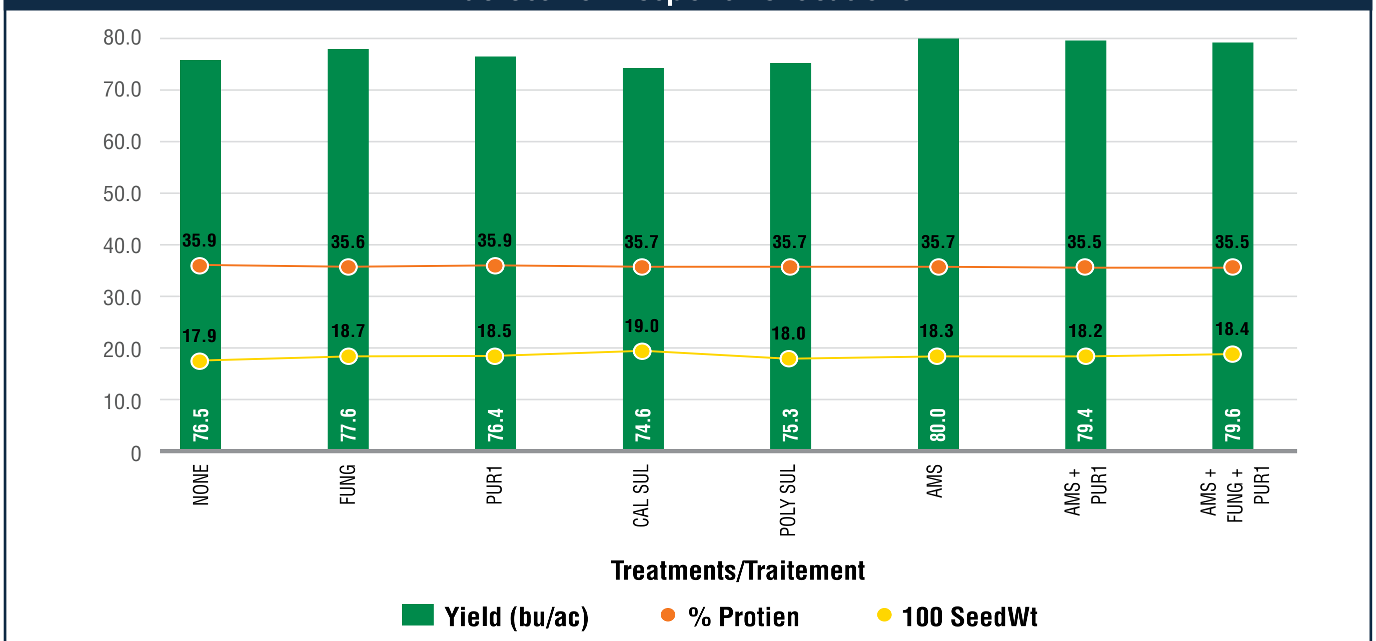
Table 3: **Net return on treatments (responsive sites, Tupperville & Simcoe)**

| Treatment | Yield (bu/ac) | Gross revenue ($14.00/bu) | Treatment Cost / Acre | Net Revenue / Acre | Advantage / Acre over Standard |
|---|---|---|---|---|---|
| Control | 51.20 | $716.80 | $0.00 | $716.80 | $0.00 |
| Fungicide | 55.50 | $777.00 | $30.50 | $746.50 | $29.70 |
| AMS | 69.00 | $966.00 | $29.77 | $936.23 | $219.43 |
| Calcium Sulfate | 66.70 | $933.80 | $22.95 | $910.85 | $194.05 |
| Polysulphate | 66.90 | $936.60 | $32.38 | $904.22 | $187.42 |
| PurYield | 53.60 | $750.40 | $46.36 | $704.04 | **$(12.76)** |
| AMS + PurYield | 70.50 | $987.00 | $76.13 | $910.87 | $194.07 |
| Full Package | 73.90 | $1,034.60 | $106.63 | $927.97 | $211.17 |

## Graph 1: **Yield responses for each site and treatment**




## Graph 2: **Average yield, protein, and 100 seed weight of each treatment across non-responsive locations**



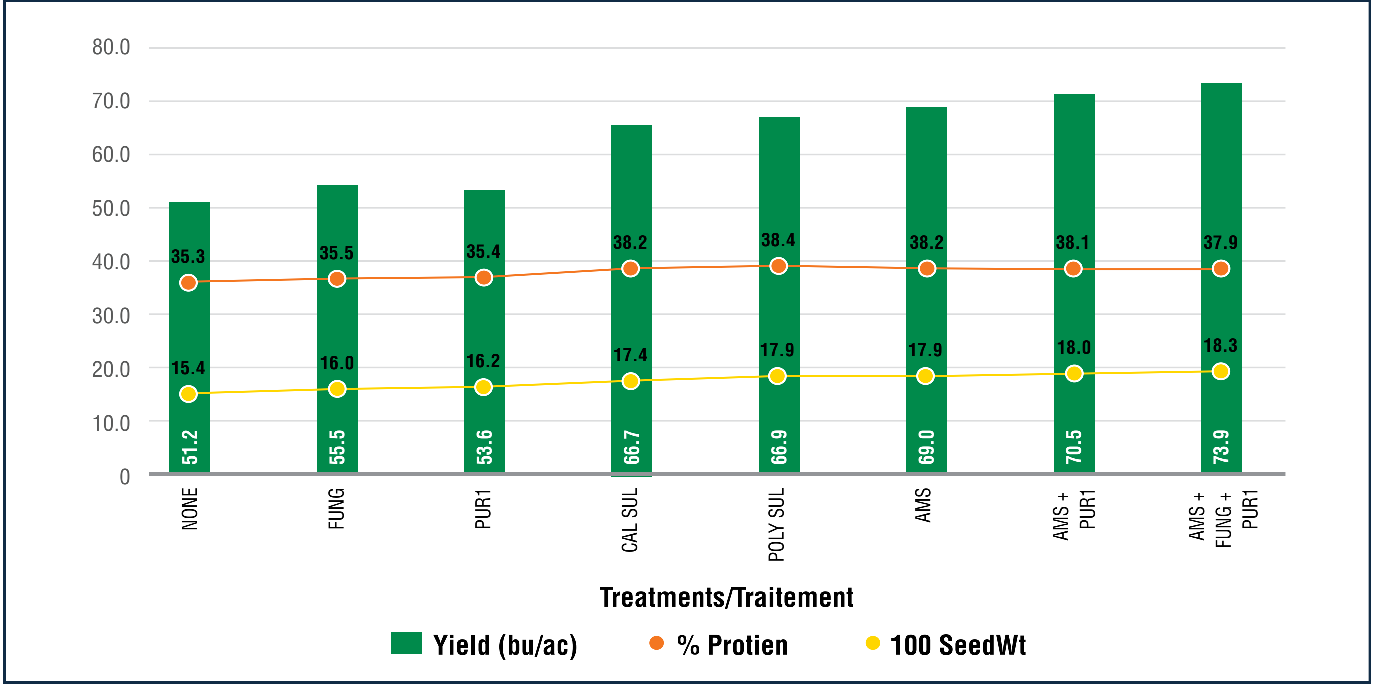
AMS + PurYield centre two rows.
Simcoe, ON, 2024. CEC level: 8.3.

Polysulphate centre two rows.
Simcoe, ON, 2024. CEC level: 8.3.

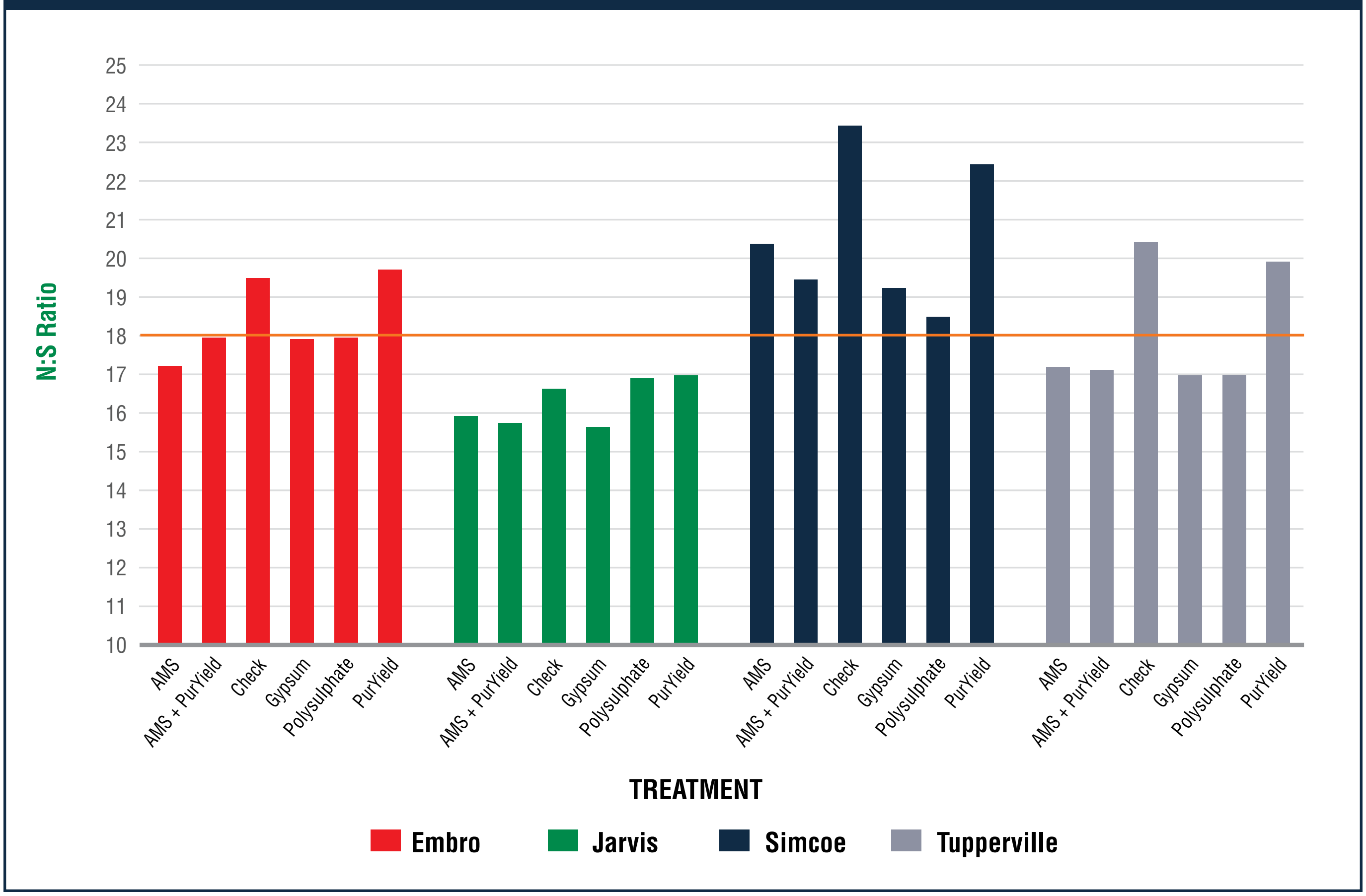
Sulfur + AMS left; untreated right.
Simcoe, ON, 2024. CEC level: 8.3.

AMS + PurYield + Fungicide - border rows to right.
Simcoe, ON, 2024. CEC level: 8.3.

## Graph 3: **Average yield, protein, and 100 seed weight at the two responsive locations**




## Graph 4: **N:S ratio by treatment**



## Tissue Sampling and Response

According to research done by Professor Casteel, the following are the critical levels at which a soybean crop will likely respond to sulfur. These levels were to be used as a guide whether it is worthwhile applying sulfur on soybeans in the future on a given farm or field.

a. 0.25% or lower sulfur concentration in the leaves: goal = above 0.32%

b. 18:1 or higher N:S ratio in the leaves: goal = 15–17:1

c. 5.4% and lower nitrogen concentration in the leaves: goal = 5.5%

## Analysis

The two locations that had a response had CECs of 8.3 and 17.6. We also had a response to application at Embro where all of the sulfur treatments improved the N:S ratio. The yield at Embro was fairly flat but with a slight advantage to the sulfur application. Further testing in 2025 will help to quantify. With positive responses at Tupperville and tissue sample response at Embro, it is starting to look like sulfur is not only needed on sandy soils like in Simcoe and the Norfolk sand plains but also may be a fit on many other soil types and locations across Ontario, including highly fertile soils.

One thing to consider is that we are much less likely to see results on farms with a history of manure and also with later planting dates. Later planting allows for warmer soils and more mineralization and release of sulfur already in the soil. When planting in early May or late April, a sulfur application is much more likely to aid in yield. Our two consecutive years of tissue testing data suggest that tissue testing at R2–R3 could help indicate whether or not a site would be responsive to AMS.

It can also be seen that, at the Jarvis site which had no response at all, N:S ratios were well below Casteel's suggested threshold, whereas the other three sites in Ontario where tissue testing was done show an imbalance in the N:S ratio—two of which in turn led to a significant response. Overall, the full package was the most profitable application as seen in Table 2, netting an additional $180.60 with 12.9 bu/ac advantage over the control at the four locations. However, it is important to note that, at two of the sites, the advantage was not great enough to be an economical decision. When looking at the responsive locations in Table 3, AMS alone was the most profitable pass, gaining $219.43 in income and an additional 17.8 bu/ac. There was a higher yield gain with the full package achieving a 22.7 bu/ac increase, however, that was not as cost-effective as the AMS alone at the responsive locations.

As seen in Graphs 2 and 3, we were able to collect protein and seed weight data at both a responsive and non-responsive location. Interestingly, 100-seed weight increased in all treatments at responsive locations over the control but most significantly in the sulfur treatments. At the responsive locations, the gain was 2.5g/100 seeds or about 16.5% across all treatments containing sulfur. This means that a significant portion of the yield gain came from the seed-fill period resulting in heavier seed. At the non-responsive locations, 100-seed weight was flat and did not change significantly across the treatments, further confirming the overall lack of response at these locations. Similarly, the non-responsive sites had a flat protein across treatments while the responsive sites showed a strong increase in protein with sulfur applications. There was a 2.75% increase in protein across all sulfur treatments at responsive sites. This is quite intriguing. This result may mean we have some ability to increase protein, possibly on I.P. soybeans, with the addition of sulfur, which could in turn increase the demand for some varieties that historically struggle to meet acceptable protein levels.

## Application for 2025

Our Maizex team continues to move forward with our independent agronomy work and will follow up with this trial in 2025, likely adding a few more small plot locations. Our team will be interested in working with farmers to set up a few field-scale trials to further this research. If you are interested, please reach out to your local Maizex dealer or Territory Manager.

Key things to consider before choosing a site or location for a trial would be field history (manure etc.), soil type, and soil uniformity across the location. Soils with higher proportions of sand will have a higher likelihood of response. However, do not rule out heavier soils as our research showed responses at sites with considerably higher CECs where a response to sulfur was not expected. Further, locations on sharp sands, fields lower than 10 CEC, and situations with the addition of nitrogen could be considered. Our sulfur responses were highest on sandy soils, reaching an additional +30.6 bu/ac at the sand location in Simcoe with our full package treatment. Using AMS alone increased yield by 24.6 bu/ac at that location. These are monumental yield gains not seen before in Ontario research. These incredible yield responses from sulfur will continue to drive our research into sulfur on soybeans forward in 2025.

## Acknowledgments:

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex.

# A RECIPE FOR Higher Soybean Yields

## Background

Field trials are often established to determine the yield response of individual inputs or management practices. Testing each input separately is essential to evaluate their specific potential, but this approach does not fully assess the impacts of multiple inputs or strategies employed at once. There may be synergies or unforeseen benefits to a systems or recipe approach to management. Growers are also keen to know a recipe that can be employed across a broad acreage.

Previous Ontario research has shown that planting a slightly longer-season variety for a given area in an early planting window will increase yield. Although the soil test did not require the addition of P or K, approximately ½ of crop removal was applied to help maintain soil tests and maximize yield potential if ideal growing conditions occurred. A relatively small amount of N and S were also applied to ensure fast canopy closure and vigorous growth. Then, one application of a foliar fungicide was applied to improve crop health throughout the growing season. The intent of these treatments was not to apply the "kitchen sink" to achieve the absolute maximum yield but rather to apply a reasonable amount of inputs to improve yields and, more importantly, profits. Two replicated trials were established near Elora and Winchester, Ontario, in 2024. A list of the treatments tested is given in Table 1.

Table 1: **Soybean "Recipe for Higher Yields" Treatments**

| Variety | P K broadcast (lbs/ac) | Urea/PurYield + AMS (lbs/ac) | Fungicide (R2.5) | Planting Date |
|---|---|---|---|---|
| Adapted | – | – | – | Normal |
| Adapted | 91 | 110 | Delaro Complete | Normal |
| Long | – | – | – | Normal |
| Long | 91 | 110 | Delaro Complete | Normal |
| Adapted | – | – | – | Early |
| Adapted | 91 | 110 | Delaro Complete | Early |
| Long | – | – | – | Early |
| Long | 91 | 110 | Delaro Complete | Early |

**Notes**:

- The "adapted" soybean variety used at Elora was Cobra R2X (0.2 MG), and the "long" was Viper R2X (0.9 MG). The adapted variety at Winchester was Viper R2X (0.9 MG), and the long was Avalanche XF (1.4 MG).
- P K broadcast = 38 lbs/ac of 11-52-0 and 53 lbs/ac of 0-0-60 = 20 P and 35 actual K lbs/ac. Spring applied and incorporated.
- Urea/PurYield + AMS = 110 lbs/ac blend (68 lbs/ac urea/PurYield (50/50) + 42 lbs/ac AMS) = 40 actual N + 10 actual S lbs/ac.
- Fungicide = Delaro Complete foliar fungicide sprayed at R2.5 at 237 ml/ac.
- Early planting was May 7 at Elora and May 13 at Winchester. Normal was May 16 and May 25, respectively. The early planting window was intended to be in April, but the first opportunity when the soil was fit for planting was not until May.
- Soil test results for Elora were 7.2 pH, 5.5 organic matter, 65 ppm P, 133 ppm K. Winchester was 6.1 pH, 4.7 organic matter, 12 ppm P, 148 ppm K.

## Results

The yield results from these trials provide strong evidence that a recipe approach to improving soybean yields can significantly increase yields. For example, planting varieties that were 0.5 to 0.7 MG (Maturity Group) longer than would typically be considered adapted increased yields by 1.9 bu/ac (74.5 bu/ac to 76.4 bu/ac) when planted at a normal date. In the early planting date window, yields increase by 4.2 bu/ac (80.4 bu/ac compared to 76.2 bu/ac) when comparing an adapted variety to one that is slightly longer. Picture 1 shows how the early planting date helps to close the canopy quickly to maximize yield. It must be noted that the longer season varieties matured about one week later than the adapted in 2024 but were still harvested by mid-October.

These results suggest that, when planting early, a longer-season variety is very important to maximize yield potential.

Overall, yields increased by 7.8 bu/ac when comparing an adapted variety planted in a normal planting window compared to a longer-season variety planted in an early window with the addition of fertilizers and a foliar fungicide (74.5 bu/ac compared to 82.3 bu/ac). The first year of this study provides strong evidence that yields can be increased significantly by employing a basic recipe strategy for higher yielding soybeans as described in Table 1, even though no obvious soil and plant deficiencies were evident.

Assuming a cost of $675/tonne for potash, $1,100/tonne for MAP, $690/tonne for AMS, $750/tonne for urea, and $20/acre for Delaro Complete, the cost of these inputs is approximately $100/ac, not including application costs. Assuming a selling price of $13.50/bu and a 7.8 bu/ac yield improvement, the total revenue achieved by implementing these strategies was $105/ac.


Picture 1: Soybeans planted early (left side of picture) in an early window closed the canopy approximately 14 days earlier in 15-inch rows. This early canopy closure is part of the reason early planted soybeans yield more than later planted soybeans.

Table 2: **Soybean Yield Response to a "Recipe for Higher Yields"**

| Variety | P K broadcast (lbs/ac) | Urea/PurYield + AMS (lbs/ac) | Fungicide (R2.5) | Planting Date | Yield* (bu/ac) |
|---|---|---|---|---|---|
| Adapted | – | – | – | Normal | 74.5 |
| Adapted | 91 | 110 | Delaro Complete | Normal | 79.3 |
| Long | – | – | – | Normal | 76.4 |
| Long | 91 | 110 | Delaro Complete | Normal | 81.3 |
| Adapted | – | – | – | Early | 76.2 |
| Adapted | 91 | 110 | Delaro Complete | Early | 81.4 |
| Long | – | – | – | Early | 80.4 |
| Long | 91 | 110 | Delaro Complete | Early | 82.3 |

*A yield difference of less than 1.8 bu/ac is not considered statistically significant.

## Moving Forward

An overall yield gain of 7.8 bu/ac is encouraging, so additional trials will be conducted in 2025. Additional treatments will be employed to both reduce costs (cut fertilizer rates) and improve yield gains. From the first year of this study, the largest economic benefit came from the early planting strategy along with choosing a relatively long season variety.

## Acknowledgments:

This article was written by Horst Bohner, Soybean Specialist, OMAFA. These trials were supported by Maizex.

# SUPER SOYBEANS:
# Diving Deeper on Seed Weight

## Background

For years, many farmers focused on their corn crop and soybeans became the forgotten child. Recently, however, more focus has been put on soybeans to determine where larger yields experienced on many farms were coming from.

In 2024, we once again had an outstanding crop of soybeans in Ontario, averaging 53 bu/ac, tying the record yields from both 2022 and 2023. Behind these higher yields has been a push for higher management and earlier planting. But what is still unknown is how yield components in soybeans respond to management strategies from season to season.

Soybean yield is simply calculated by the number of plants, the number of seeds (a combination of pod number and seeds/pod), and seed weight. As we have seen in corn, seed weight could pack a punch and bring soybean yields to levels higher than we would expect.

## How We Did It

Similar to our method for thousand-kernel weight measurement in corn, soybean samples were taken at many farm strip trials across Ontario. Once we had a sample and moisture, we used the CountThis app to count a sample of seeds that were then weighed to calculate thousand-seed weight of each variety from each location. To calculate estimated pod count, we used a 2.2 bean per pod factor, the population, and the yield of the field to calculate how many pods each plant would theoretically have. Once we had all the thousand-seed weights for each variety at each location, we indexed them against the plot average for both thousand-seed weight and the estimated pod count.

## What Does This Mean?

Understanding the way soybeans build yield is critical for developing a season-long strategy to achieve higher yields. The more we understand how soybeans build yield, the more we can understand how management decisions may affect certain varieties.

When analyzing the data, there are two distinct types of varieties, as well as many varieties in the middle that don't necessarily fit either box. The two categories are pod number (or seed number) varieties and seed weight varieties. This is no different than corn with kernel number and kernel weight hybrids. Often varieties that have high pod counts or lots of seeds tend to excel in stressful environments where they may lack moisture late in the season or lack the top-end fertility to help build large, heavy seeds. On the other hand, we have seed weight varieties that use their heavy seeds to maximize their yields and tend to excel when we have late-season moisture, heat, and optimal growing conditions. These varieties are often used to maximize yield in high management, high yield scenarios.

## Results

In 2024, many but not all areas had a strong start to the growing season, resulting in good emergence and solid, uniform soybean stands across much of Ontario. Soybean vegetative growth looked very similar to that of 2023. However, across the province, rainfall volume and timing resulted in much less white mould pressure than experienced in 2023.

The other notable difference in general between 2023 and 2024 was additional CHUs given higher temperatures through most of the summer in 2024. Despite the higher temperatures, there were few stressful periods on the crop given timely moisture until a hot, dry spell from late August into September. This late-season stress impacted varieties that excel in seed weight, as they lost some top-end yield experienced in the past, while other varieties that excelled in pod number floated to the top.

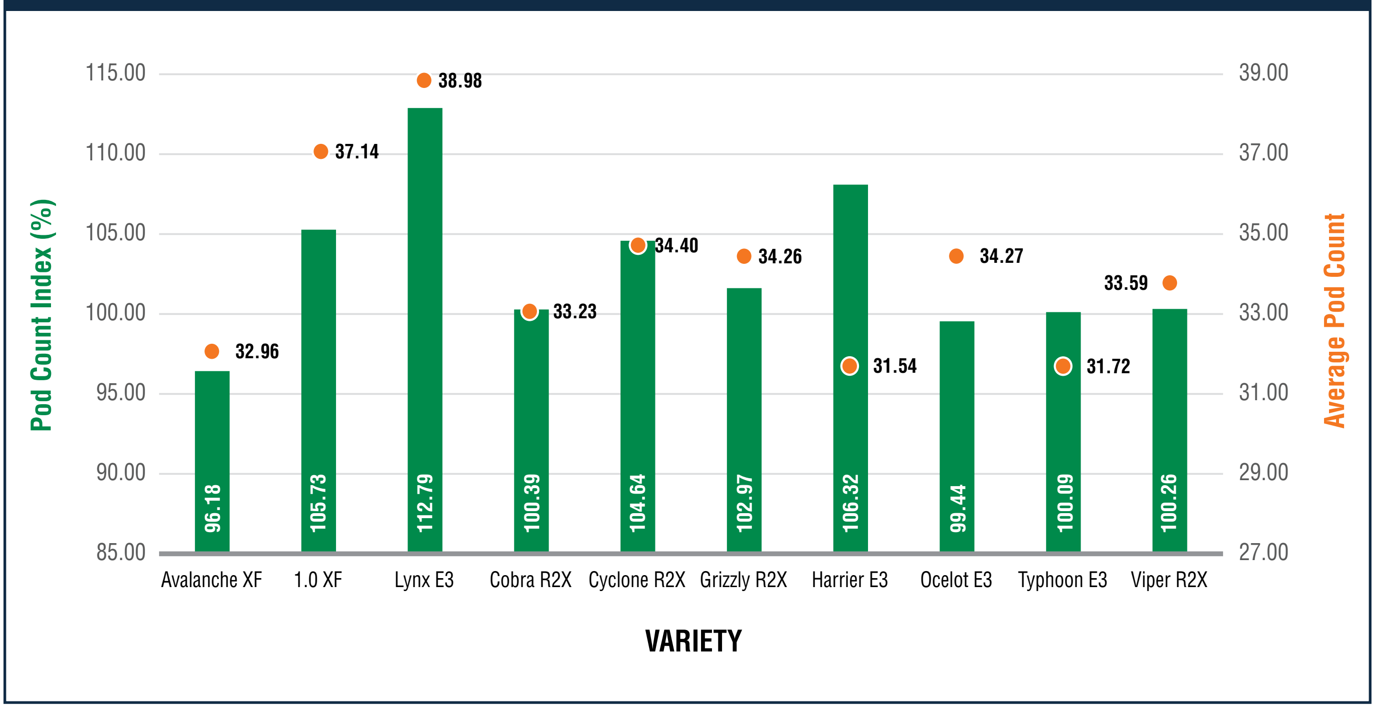
Varieties like our new 1.0 XF variety, new 1.9 E3 variety Lynx E3, Kites E3, and Harrier E3 (Graph 1) excelled in 2024, and that was driven by pod counts established earlier in the season compared with varieties that needed the late summer and early fall to maximize their seed weight.

For example, across Ontario and Quebec, Harrier E3 was beaten by Viper R2X by 2.34 bu/ac, with Harrier winning only 42% of the time in 2023. Contrast that to 2024, when Harrier E3 outperformed Viper R2X by 0.22 bu/ac and won 50% of the time. This was also the case for Avalanche XF and Cyclone R2X. Avalanche XF is an incredible seed weight soybean, topping our weights across all traited varieties in our plots (Graph 2). In 2023, Avalanche XF beat Cyclone R2X by 2.37 bu/ac while in 2024 Cyclone R2X, with a higher pod count, outyielded Avalanche XF by 0.10 bu/ac.

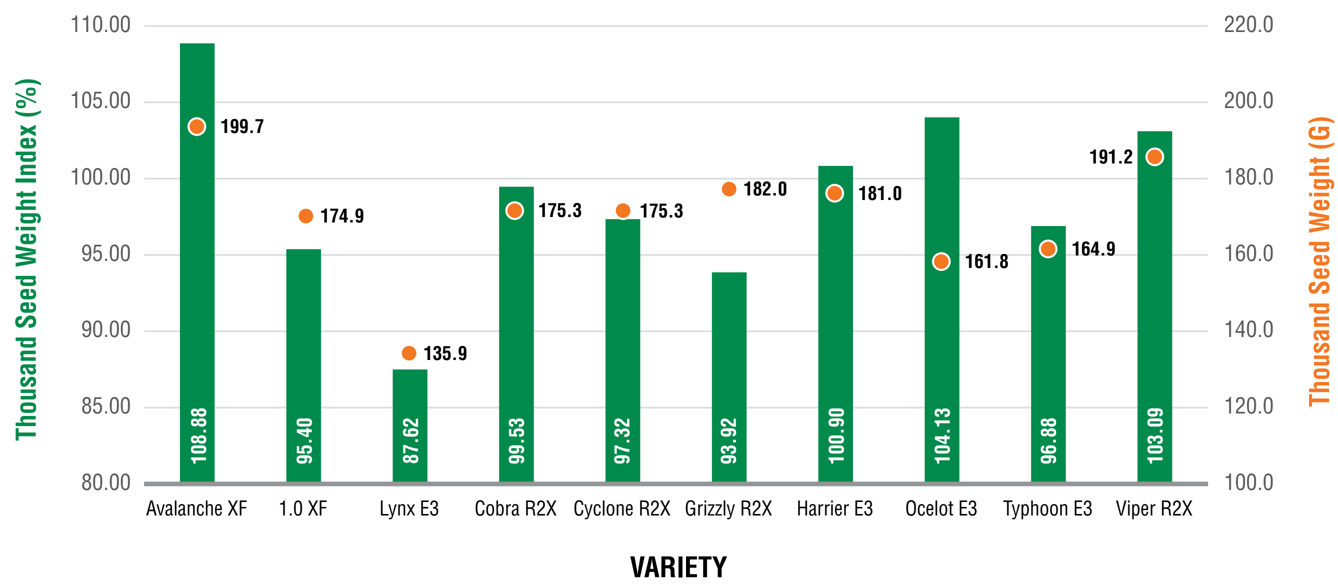
Picture 1: Typhoon E3 (Embro, ON – 184g/1000s)

Picture 2: Avalanche XF (Embro, ON – 213g/1000s)

Graph 1: **Soybean Average Pod Count and Average Pod Count Index**



Graph 2: **Soybean Average Thousand Seed Weight and Average Seed Weight Index**




## Moving Forward

Maizex will continue to take seed weights on soybeans to further understand how different varieties build yield. Strategically, we will also look at varieties that complement each other in the way they build yield. For example, Lynx E3 complements Ocelot E3 both agronomically and in how it builds yield (Graphs 1 & 2). Lynx E3 is elite at creating high pod numbers while Ocelot E3 is only average at pod number but is a top-tier variety at thousand-seed weight (Graph 2). Lynx E3 is also higher yielding on sandy soils and brings better standability and white mould tolerance, while Ocelot E3 seems to excel in clay and clay loam soils from its large plant stature and consistent performance in these environments. Similarly, Maizex is advancing a 1.0 XF variety that will complement Viper R2X. As can be seen in Graphs 1 & 2, the new 1.0 XF variety has a much higher pod count and lower seed weight than Viper R2X, complementing it in a similar way to Lynx E3 and Ocelot E3. Additionally, the 1.0 XF is a slightly larger, branchier plant that may have a stronger fit in tougher conditions while Viper R2X can lead the way in the highly fertile, top-end yielding farms.

Using this data as a farmer can be helpful in spreading risk by picking varieties that excel in different areas or by choosing varieties that float in the middle and may have more yield stability season to season. Another way to utilize this data is to strategically put seed weight varieties where soil type, moisture, and fertility aren't limiting so you can push them to the top-end while placing varieties that excel in pod count on the tougher soils and environments where, historically, the beginning of the season is kinder, in order to help these varieties maximize pod count and thus yield later in the season.

The Maizex strategy moving forward will be to not only bring the strongest yielding varieties to farmers that account for agronomics like standability and disease tolerance but also to select varieties that can spread out risk from a yield component standpoint.

## Acknowledgments:

This article was written by Henry Prinzen CCA-ON, Market Development Agronomist, Maizex.

# SOYBEAN CYST NEMATODE:
# Realities & Strategies

## Introduction

Soybean cyst nematode (SCN) is an issue that is regaining attention with farmers even though it has been an issue in many regions for decades now. According to research, there was an estimated loss of 108,899,000 bushels in 2018 in the northern United States and Ontario (Bradley et al., 2021).

While there are an increasing number of management options available, including genetics in terms of variety tolerances as well as via seed treatments, these must be measured against the pest itself as it evolves and adapts. The most important aspect to controlling the impact of SCN is knowing whether or not it is present in a field. As part of this agronomy research project, a number of farms were sampled throughout Southern Ontario that had not been previously identified as having an active SCN infection. This allowed us to have a more accurate picture of where SCN is, where it may move, and what intensive management is needed.

## Background

Soybean cyst nematode is believed to have originated in Japan and was likely brought to the United States, first appearing in the US in Hanover County, North Carolina, in 1954 (Davis and Tylka, 2021). SCN was first identified in Ontario in 1988, in Essex and Kent counties (Bohner, 2014). Since then, the disease has been slowly spreading throughout Ontario, with sightings into the Ottawa Valley and Quebec, primarily along the St. Lawrence River (Mimee et al., 2014). As SCN continues to move through Ontario and Quebec, the losses caused by the disease will continue to increase, and management strategies will become increasingly vital for maintaining yields.

## Testing Strategies

SCN is a difficult disease to deal with, as there are often little to no above-ground symptoms until the infection is severe. Once SCN has taken hold of a field, it is impossible for it to be completely eradicated. It is therefore important to track infections and avoid spreading infected soil as much as possible.

For this reason, it is highly recommended that farmers sample their fields periodically to understand if there is an infection and, if so, how severe. Agriculture and Agri Food Canada (AAFC) and OMAFA recommend that testing be done in the fall prior to planting soybeans. This is a good time for testing and allows time to adopt a management plan for the upcoming season. If this is not possible, the second-best time is to test soil prior to working the field or planting in the spring.

Sampling involves using a soil probe to take six- to eight-inch samples from the field. For each 20-acre field, at least 20 cores should be collected randomly, following a zig-zag or M-pattern. High-risk areas of the field should be focused on when sampling. These areas include the field entrance, low areas or areas that are often flooded, the tree or fence line, areas where weed control is less effective, any areas where yield was lower the last time soybeans were planted, and areas where the soil pH is higher than 7. These samples can then be sent for testing to a reputable lab, such as Agriculture and Agri Food Canada in Harrow or Agriculture and Food Laboratory (AFL) in Guelph.

If SCN is identified, it is recommended that farmers continue to test their fields every three to five years to monitor the infection. It is also important to note that, just because a test may indicate there is no infection, it does not definitively mean there is no SCN in the field. SCN tends to create 'hotspots' in the field, as the nematode is not able to move far in the soil. Because of this, it is possible that testing will not be able to capture these spots and, therefore, is not completely representative of the infection in the field. Testing high-risk areas and repeating testing frequently is the best way to combat this issue.

Another aspect of SCN that is important to remember is that there are different strains, some of which can overcome resistance that is derived from PI88788 sources. For this reason, it is recommended that growers rotate their resistance sources as much as possible. Unfortunately, there is a limited number of commercially viable varieties with different resistance sources such as Peking or Hartwig.

## Management Strategies

*"My field has SCN. What's next?"*

There are options if you find yourself asking this question. The first step is understanding how severe the infection is based on soil test results.

- Results below 1,000 eggs/100g soil are considered to be a low risk, with yield loss potential from 0–20% (Tenuta, 2020).
- Results showing 1,000–10,000 eggs/100g soil is considered a moderate to high risk) with yield loss potential from 20–50%.
- Infections over 10,000 eggs/100g soil are considered to be high-risk, with severe potential yield losses even with resistant varieties.

For high-risk infections, it is recommended that the field be rotated to a non-host crop (such as wheat, corn, or alfalfa) for a minimum of two years before re-testing to see if the infection has improved (Tenuta, 2020). For moderate to low-risk fields, the use of resistant varieties can be adequate to ensure strong yields. It is recommended to alternate the resistance sources (PI88788 or Peking) of selected soybeans to ensure that SCN does not evolve to overcome resistance.

A well-planned rotation is recommended to keep or reduce SCN levels. For a low infection, it is recommended to begin with a non-host crop (such as corn, wheat, or alfalfa), move to a PI88788 resistant variety, then move back to a non-host, then plant a Peking resistant variety, and so on (Faghihi, 2018). As the infection level increases, the number of years with a non-host crop between soybeans should also increase.

Rotating with a non-host crop helps to reduce the SCN population, as the nematodes do not have material to feed on. Despite this, it is possible for SCN to survive in the field for up to 10 years. For this reason, it is impossible to completely eradicate SCN. But through careful management strategies, it is possible to continue to grow well-yielding soybeans well into the future.

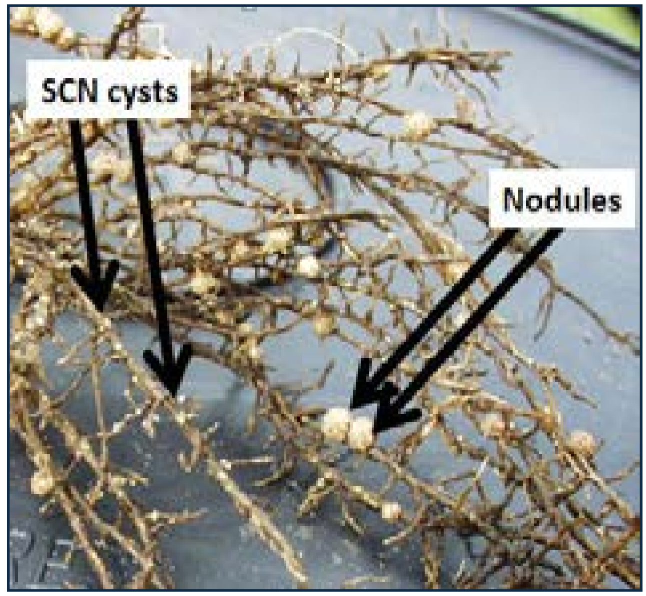
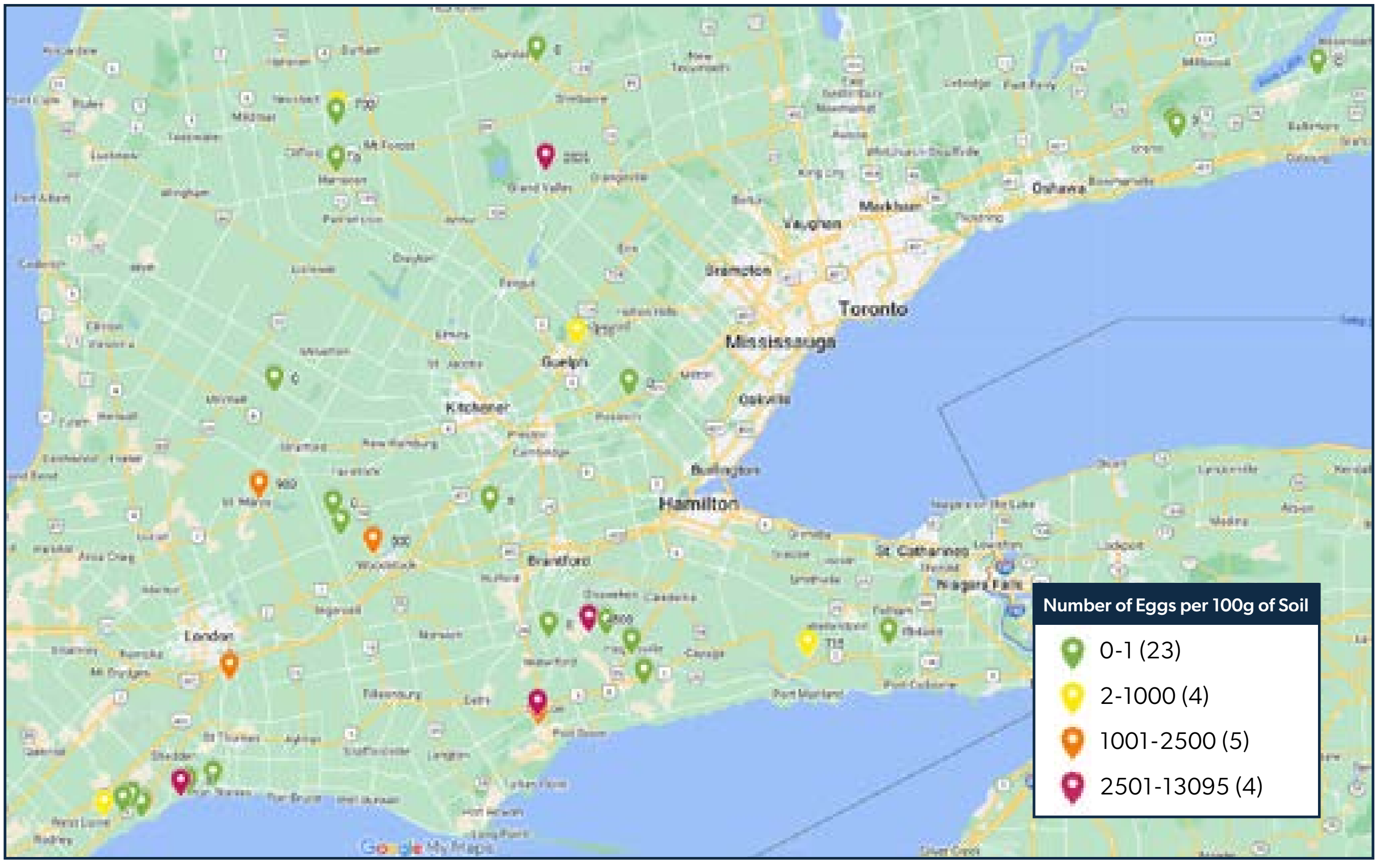



Photo courtesy of OMAFA.

## Maizex 2024 Testing Efforts

Prior to the 2024 planting season, Maizex tested numerous customer fields. The results are shown on the next page. Testing was focused primarily on sites further north versus previous testing, as these areas were underrepresented. We found that while SCN is present in these areas, the infection levels were still generally low, meaning that most farmers do not need to develop an intensive management strategy. Instead, they should focus on sanitation practices to reduce the risk of spread. This includes cleaning off equipment between fields to reduce infected soil movement and continuing to test periodically to ensure that the infection level remains consistent. Continuing to rotate with non-host plants is also a critical practice to flatten infection curves.

# 2024 Ontario Soybean Cyst Nematode Sampling Results




## Acknowledgments

This article was originally drafted by Kelsey Boucher, an intern with Maizex Seeds and graduate student in the Department of Plant Agriculture, University of Guelph.

## References

Bohner, H. (2017, July 27). Cropside: Soybean cyst nematode. Ontario Grain Farmer.
**https://ontariograinfarmer.ca/2014/02/01/cropside-soybean-cyst-nematode/**

Bradley, C. et al. (2021). Soybean yield loss estimates due to diseases in the United States and Ontario, Canada, from 2015 to 2019. Plant Health Progress, 22(4), 483–495.
**https://doi.org/10.1094/php-01-21-0013-rs**

Davis, E. G. L., & Tylka, G. L. (2021). Soybean cyst nematode disease. Plant Health Instructor, 21.
**https://doi.org/10.1094/phi-i-2000-0725-02**

# NOTES

By using the product and any information, guidelines, instructions, and/or best practices ("Advice"), you acknowledge and agree that any and all such Advice is given for informational purposes only. You acknowledge that (i) you may not be able to attain all similar results and many different circumstances and conditions may affect crop performance and yield, including soil, pests, disease, weather, crop, applications, etc.; (ii) that Maizex makes no, and that you acknowledge that you may not in any way rely on any, implicit or implied representation or warranties whatsoever related to the Advice; (iii) that Maizex assumes no liability related to the Advice and that you acknowledge that such no liability may arise on the part of Maizex.

maizex®

**Maizex Seeds Inc.**

4488 Mint Line | Tilbury, Ontario | N0P 2L0 | (877) 682-1720 | maizex.com