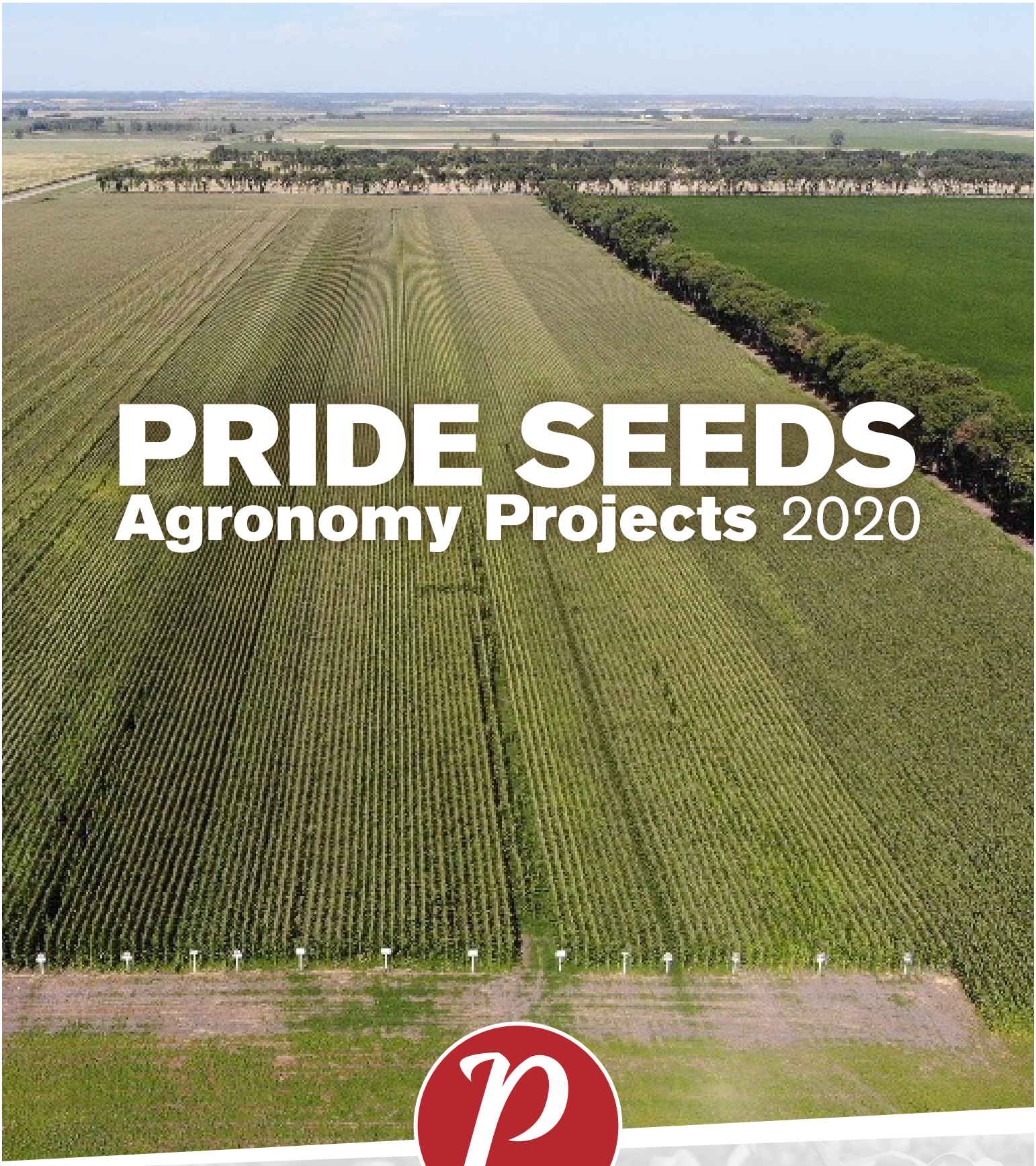


PRIDE SEEDS
Agronomy Projects 2020

PRIDE SEEDS

The year 2020 was one we won't soon forget. There were the usual agronomic and weather variables that farmers experienced but we were also dealt with the added challenges of working in the grips of a global pandemic.

Regardless of the challenges, the PRIDE Seeds agronomy team continued to work hard to help producers and our business partners manage production challenges with our commitment to bringing products and agronomic solutions that maximize performance no matter what the environment or growing season.

As we move forward to the 2021 growing season, we are excited to share with you some of the research we have completed during the 2020 season. While it is important to always be looking forward, the lessons we learned from the 2020 season, as shown through theses research projects, can help with those important decisions that affect your farming operation.

This edition focuses on strategies in corn and soybeans that we felt were foundational for producers to always consider. These studies include practical agronomic and crop production management options, as well as insights and results from their 2020 research studies that we hope growers consider to reliably boost their return on investment.

PRIDE Seeds is focused on bringing strong corn hybrids, soybean varieties and forage products to the farm gate through continual research with our sound agronomic and product knowledge. We recognize the value in conducting research projects that can help find new ways to manage your operation for even better profitability.

On behalf of the PRIDE Seeds agronomy team, have a safe and successful 2021 season.

PRIDE SEEDS
AGRONOMISTS

Carrie MacLean
Central Ontario

London, Ontario
519-282-3253
cmaclean@prideseed.com
@CarrieMacLean1

Matt Chapple
Southwestern Ontario

Chatham-Kent, ON
519-359-3856
mchapple@prideseed.com
@chapple_mc

Neil McGregor
Eastern Ontario

Ottawa, Ontario
343-550-9464
nmcgregor@prideseed.com
@neil_mcg38

Amanda Craven
Southeastern Ontario

Chatham, ON
acraven@prideseed.com
PHONE#
@AmandaCraven_ag

Jean-Francois Foley, AGR
North and East Shore Quebec

Mont-Saint-Hilaire, Quebec
418-573-3291
jffoley@semencespride.com
@PRIDE_RIVE_NORD

François Montambault, AGR
South Shore Quebec

Dunham, QC
514-292-7068
fmontambault@semencespride.com
@PRIDE_RIV_SUD

Alana Serhan
Western Canada

Winnipeg, MB
306-278-7797
aserhan@prideseed.com
@alana_serhan

Sara Meidlinger
Western Canada

Kerrobert, Sask
519-917-2225
smeidlinger@prideseed.com
@meidlinger09

CONTENTS

PRIDE SEEDS®

CORN ROOTWORM MONITORING

Corn Rootworm (CRW) is becoming a growing concern in continuous corn rotations due to the breakdown of many Bt corn traits. Bt resistant CRW has resulted in measurable yield loss and has triggered an urgent call for farmers to implement management strategies regarding the utilization of Bt proteins. Greater crop rotations are necessary to break the cycle of resistance development. Switching to a different Bt corn trait in the 2021 growing season is not considered an effective mitigation strategy as the pressure for resistance development is so strong.

Figure 1 Corn rootworm larvae damage - root pruning
Source: Matt Chapple

Pyramid Bt-RW Hybrids Registered in Canada

Trade Name	Bt-RW Proteins
Agrisure® 3122	mCry3A + Cry34/35Ab1
Agrisure Duracade® 5122	mCry3A + eCry3.1Ab
Agrisure Duracade® 5222	mCry3A + eCry3.1Ab
Optimum® AcreMax® XTreme	Cry34/35Ab1 + mCry3A
Qrome	Cry34/35Ab1 + mCry3A
SmartStax®	Cry3Bb1 + Cry34/35Ab1
SmartStax® Enlist	Cry3Bb1 + Cry34/35Ab1
SmartStax® Refuge Advanced	Cry3Bb1 + Cry34/35Ab1
3 of the 4 Bt-RW proteins are closely related. Resistance to one results in resistance to the other 2. Field failures in Ontario have been observed with 3 of the 4 proteins which indicates cross resistance.	

Figure 2 Source: Canadian Corn Pest Coalition

Integrated Pest Management Strategy

- Rotation will reduce CRW populations
  - 2 years of rotation is important because not everyone will rotate in 2021, soybeans can provide site for egg laying.
  - Switching to a pyramid Bt-CRW traited product is discouraged, as these hybrids are now single trait hybrids at best
- If you cannot rotate – use a non CRW Bt corn hybrid (+ root protection)
- Livestock Producers – consider land swap arrangements with non corn growing neighbours, or consider alternative feed sources (alfalfa, wheat, sorghum)

Continuous Corn and Rootworm

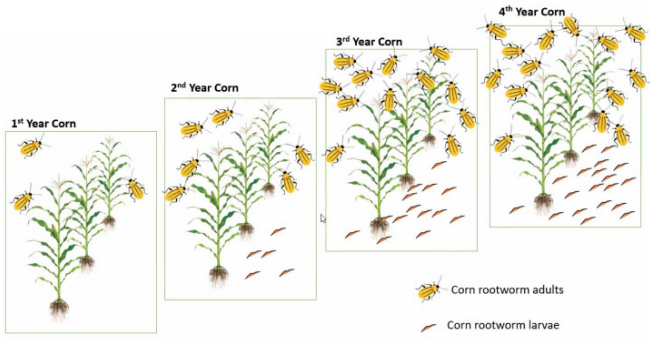


Figure 3 Source: www.country-guide.ca/crops/getting-to-the-root-of-corn-rootworm/

CRW Scouting Efforts

Throughout Ontario and Quebec in 2020 growing season: sites were scouted for CRW adults starting from silking through to early dent. Sites focused on continuous corn acres and various soil textures. These sites were monitored on a weekly basis from 1 week pre silk to 4 weeks post pollination to early dent stage. Observations were noted on signs of root lodging and silk clipping in sites.

How does CRW scouting work?

- 4 CRW sticky traps are placed approx. 30 acres apart from each other on 1 transect and transect is needs to be set up 4 CRW sticky traps and on placed a minimum of 330 ft from the first apart. The first trap at least 165 feet in from the field edge.
- Pheromone traps were attached to the stalk directly above the developing ear.
- Traps were monitored weekly from silking through to early dent and average daily catch of Western and Northern Corn Rootworm numbers are recorded.

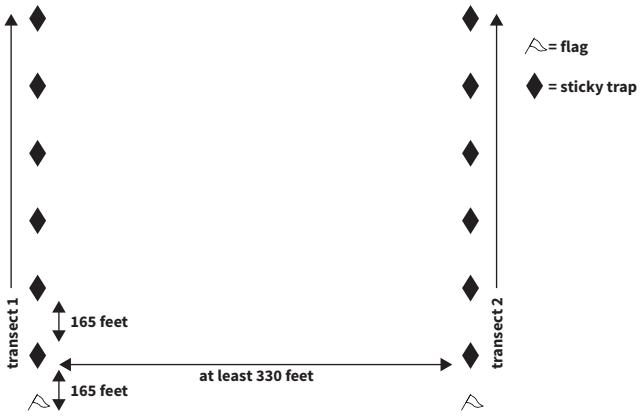


Figure 4 Schematic drawing of CRW sticky traps in corn or soybean fields

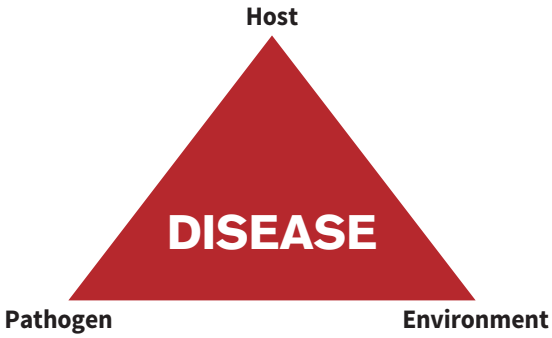
In 2020 Growing season there were very low numbers observed on a weekly basis across all trap sites. The most commonly trapped Rootworm was Northern Corn Rootworm, with a low percentage of traps seeing a spike post pollination. Pest pressure was held relatively low with no sites meeting an action threshold and overall peak pressure was on average 3 weeks post pollination where no significant root clipping or ear feeding was correlated to yield loss. Trapping and screening will continue throughout 2021 in an effort to mitigate resistance development and develop farm specific management strategies around continuous corn production.

Resources
1. Canadian Corn Pest Coalition/OMAFRA/
2. www.trece.com/corn-rootworm/
3. www.fieldcropnews.com/2021/01/taking-root-management-options-for-bt-resistant-corn-rootworm-on-ontario-farms/

MULTI-YEAR HYBRID SCREENING TRIALS OF NEW AND EXISTING COMMERCIAL PRODUCTS

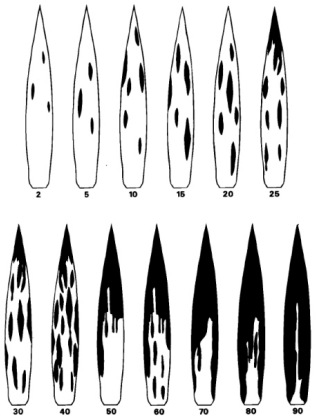
The disease triangle demonstrates the relationship between the environment, host, and pathogen for the establishment of a disease. Simply put, if any of the three factors are missing the disease is unable to establish in the host. Disease negatively impacts yield potential and understanding a hybrids tolerance to common diseases in your region can help us strategically make recommendations and hybrid decisions.

The purpose of the project was to provide customers with a scope of the R&D work done behind the scenes to better understand genetic tolerance and resistance to varying level of disease incidence and severity. This has helped generate base line product ratings for product placement and management recommendations for products in the PRIDE Seeds line-up.



Project Design

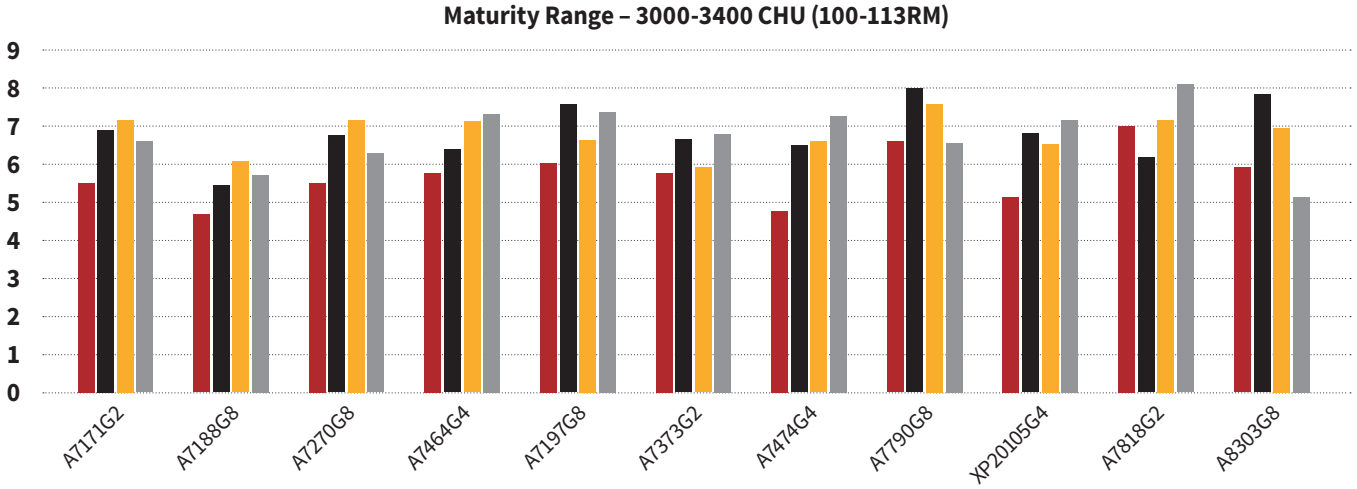
Disease ratings were taken over multiple seasons (2014-2020) and various Research locations throughout the US Midwest and Ontario. Planting date varied over each growing season, but all were within reason of regional planting date averages. Populations aligned with standard hybrid screening and ranged from 32-34,000 seeds/ac. Goss's Wilt research sites were inoculated following individual state guidelines.

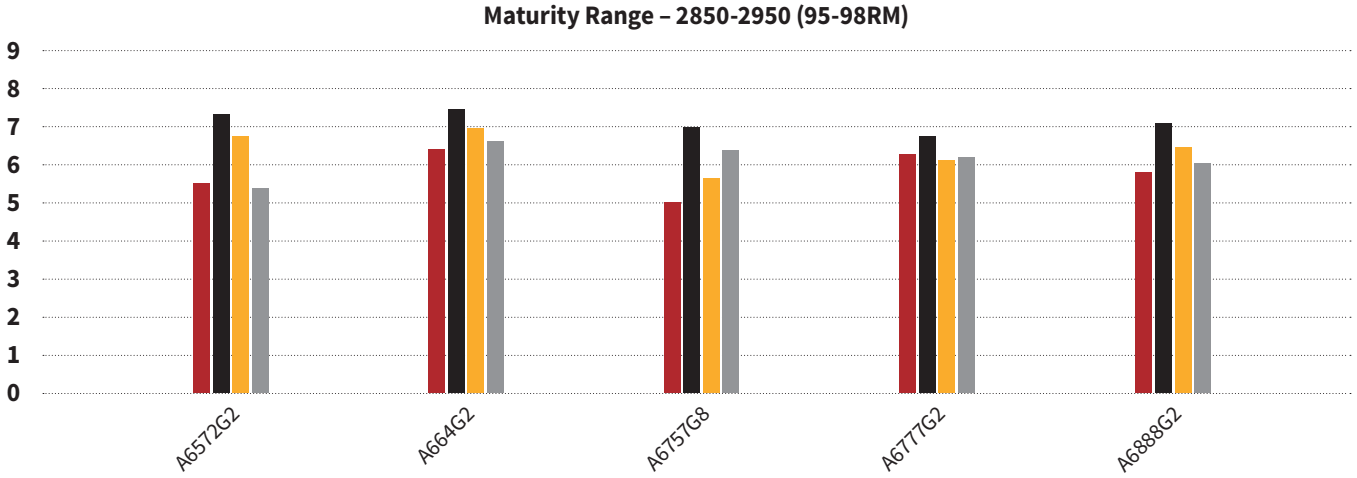


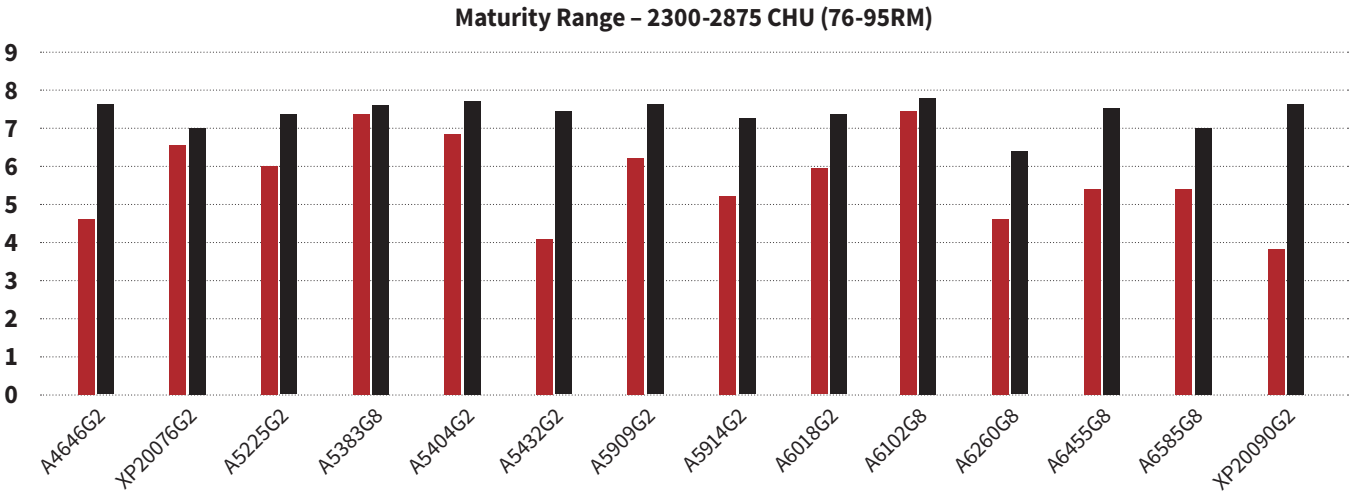
Rating Scale:
1 - Dead
2 - Almost dead
3 - Highly susceptible
4 - Very susceptible
5 - Susceptible
6 - Moderate
7 - Moderately resistant
8 - Highly resistant
9 - 5% of leaf area diseased

Goss - Goss's Wilt
GLS - Grey Leaf Spot
NLB - Northern Corn Leaf Blight
STK - Stalk rot

Results - 2014-2020 Disease Ratings







Conclusion

Understanding the incidence and severity of disease pressure is important to differentiate tolerance of hybrids. Diverse genetics can be placed and managed to reduce risk of yield loss associated with disease pressure. A look at inbred line tolerance to various diseases can provide value in hybrid breeding of future products. Many of the current PRIDE Seeds hybrids have outstanding tolerance to common diseases of Canadian Corn growing regions, diseases of which have proven to be economically damaging and when unmanaged in continuous corn rotations can cause significant yield losses. Important to remember that tolerance of one foliar disease does not necessarily correlate to resistance of others.

SOYBEAN POPULATION X FUNGICIDE

The purpose of this project was to demonstrate varietal response to population and genetic response to fungicide application and to determine if ROI increases when populations are increased and a fungicide is applied.

Project Design

Trial was planted on May 24th, 2020 and harvested October 9, 2020. Soybeans were no-till planted into corn stubble with a 35' John Deere Air Seeder. Soil type in the field was a Perth clay loam. All varieties were treated with a Group 28 (Diamide) Insecticide + VibranceMaxx Fungicide.

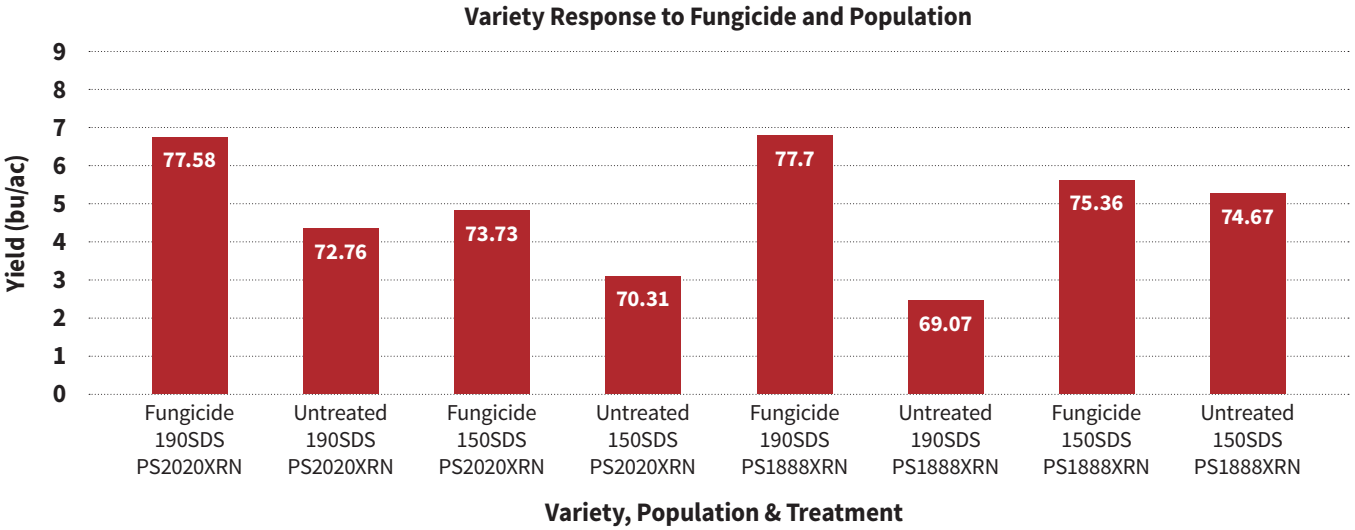
Field Layout

	190,000ppa					150,000ppa					
	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	35 ft	
200 ft	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	No App
200 ft	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	Priaxor
200 ft	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	No App
200 ft	Competitor	Competitor	XP2220X	PS1888XRN	PS2020XRN	Competitor	Competitor	XP2220XRN	PS1888XRN	PS2020XRN	Priaxor

Fungicide Application Direction

Results

Variety	Population (,000)	Fungicide App.	Yield (bu/ac)	Yield Advantage from Fungicide App.
PS2020XRN	190	yes	77.58	4.82
		no	72.76	
	150	yes	73.73	3.42
		no	70.31	
PS1888XRN	190	yes	77.7	8.63
		no	69.07	
	150	yes	75.36	0.69
		no	74.67	
PS2229XRN	190	yes	69.32	8.10
		no	61.22	
	150	yes	73.74	-1.89
		no	75.63	

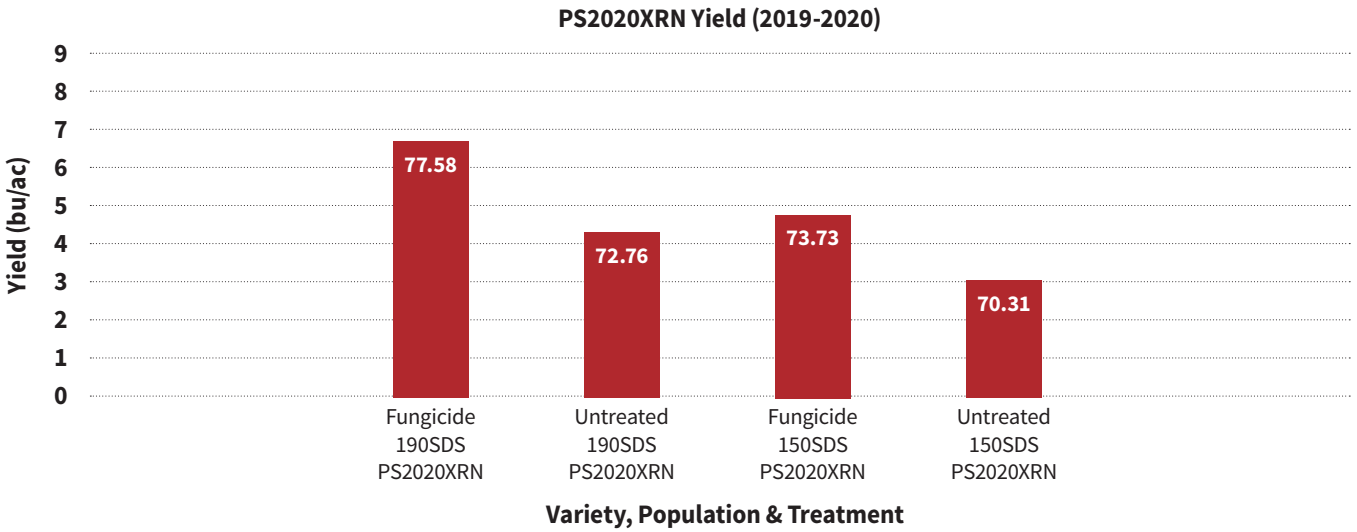


In the 2020 growing season we saw consistent response to fungicide application over different plant profiles and maturity groups. Some of the greatest response was at higher populations as the stand was more consistent and we had more nodes per acre to protect.

PS1888XRN have achieved maximum ROI at lower populations with their ability to branch out and 'flex' to the environment.

PS 2020XRN are a slender plant style and very 'fixed' in nature. Pushing populations on this variety is warranted to achieve max yields.

PS2020XRN – Multi-year data



Consistent response to fungicide application. With slender profiled, more 'fixed' plant style varieties we are able to gain more on fungicide applications as we push to extend the grain fill period, increasing seed size and weight. Multi Year data has shown nice economic returns to applying a fungicide to PS2020XRN at high, and more moderate populations.

ROI to Fungicide Application – 2020				
	Cost	**Value**		**Unit**
Average cost of Application	$10.00			per acre
Product (9.6L/80ac)	$12.90			per acre
Cost	$23.00			per acre
Value of Soybeans		$12.50		per bushel
Break Even Bushels			$1.83	bushels
Average Bushel response			**$5.56**	bushels
Additional Revenue			$69.46	per acre
Probability of Break even			70%	
ROI			**$46.56**	per acre

Average response to fungicide application was 5.5bu across 5 varieties in 2020. Current market process warrant value in protecting investment and maximizing profitability per acre. 2-year data, utilizing PS2020XRN as our offensive and PS1888XRN as our defensive benchmark varieties have demonstrated a positive response to applying a fungicide more than 70% of time.

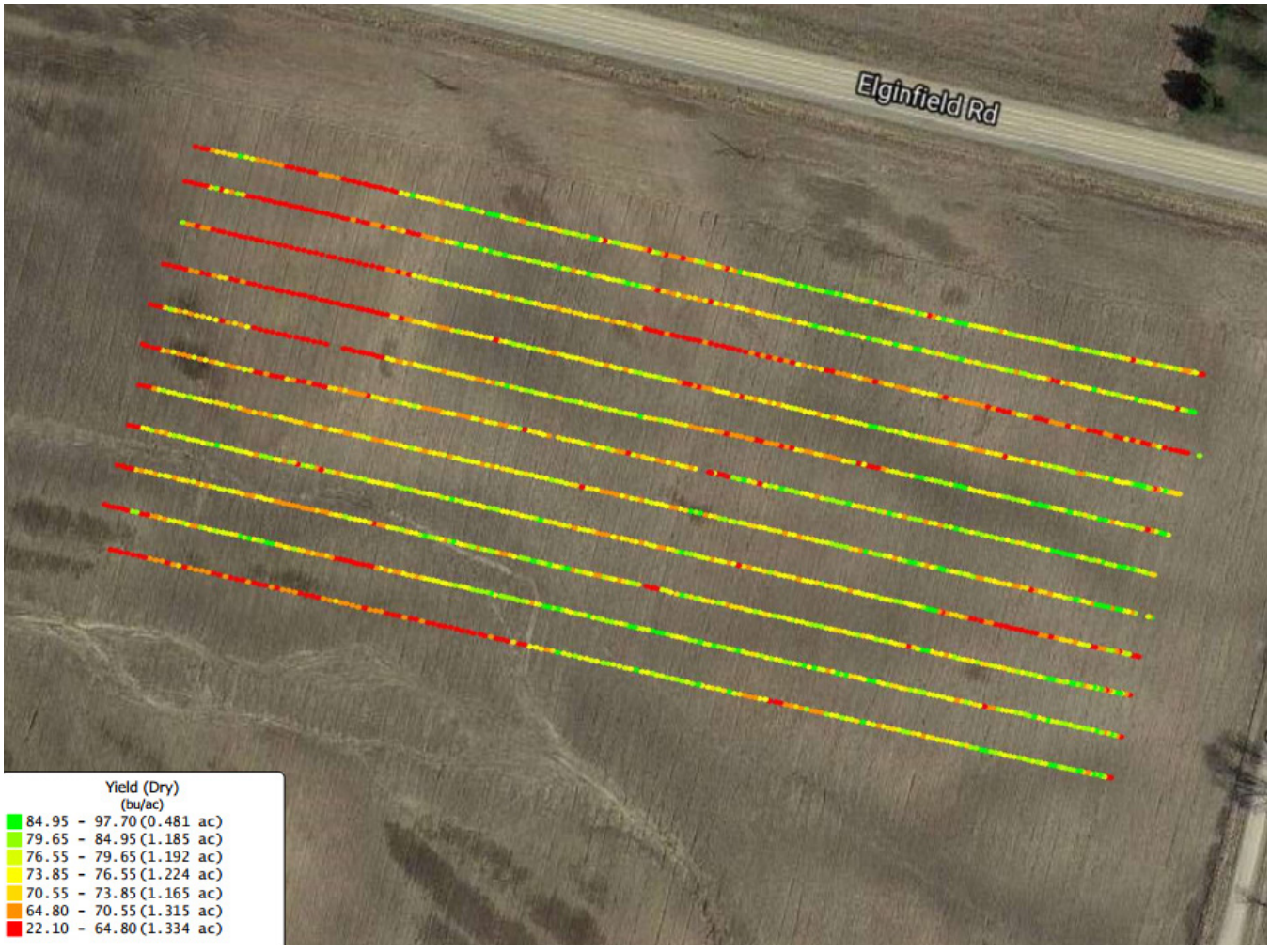
Conclusion

This project study showed positive responses across all varieties.

PS2020XRN has showed multiple years of consistent ROI response at 150,000 plant population. Data from 2019 showed that a fungicide application resulted in average 4.6bu/ac yield increase and 2020 data showed an average 3.4bu/ac yield increase.

Fungicide applications can provide good ROI even at lower crop prices. Average yield increase in 2019 was 2.6 bu/ac and 5.56 bu/ac in 2020 (2019 application date was ~8 days earlier than the 2020 planting date). An open fall allowed soybean varieties to add seed size and maximize late season rains. Fungicide application correlated to more even and consistent leaf drop and avoided premature senescence from late season stresses. Both growing seasons experienced timely rain and favourable growing conditions under medium soil fertility levels. Differences in population response correlate to consistency of stand, and leaf surface area available for absorption.

Soy Yield by Bare soil



TAR SPOT

By now many have heard the crop losses associated with the corn disease Tar Spot. The complex disease is made up of two fungal pathogens: *Phyllachora maydis* and *Monographella maydis*.

Symptoms first develop from Phyllachora, spread by wind at temperatures 16-20°C paired with extended periods of high humidity. The initiated black spots do not significantly impact the plant, however as conditions persist the infection can evolve into a blight, destroying leaf tissue and impacting yield by upwards of 20-30bu. Fish-eye lesions are one of the most notable characteristics of the disease.

The state of Michigan first experienced tar spot in Allegan County in 2016. 2019 growing season proved 35 counties in southern Michigan and into the Thumb had some level of pressure.

So what do we know about PRIDE Seeds hybrids:

The past two growing seasons have provided the AgReliant Genetics Product Development team ample opportunity to assess trials grown in moderate to heavy pressure areas of the US corn belt. Many Core PRIDE Seeds hybrids are often used as checks, for comparison to Experimental and Competitor hybrids. Preliminary ratings have been established from field observations.

What work is being done:

- Trial work in areas of high incidence will continue on Experimental hybrids using Commercial products as benchmarks.
- Sites with high amounts of corn-on-corn acreage will influence site selection and opportunities to develop hybrids.
- Multiple years of in field observations and yield data will aid in development of hybrid ratings.
- Tar spot is difficult to artificially inoculate and it has not been effectively cultured as of yet.
- The AgReliant Native traits team, continues to work to identify tolerant hybrids and which traits could be utilized in breeding for increased tolerance to the persistent disease.

AgReliant Pathology:

When environmental conditions favor infection this disease can intensify very quickly. Cool and wet seems to be optimal with the emphasis on the moisture. Regular overhead irrigation, consistent rain patterns, or even a lot of long dew periods are contributors to the development. Years when these conditions happen earlier than normal have potential for higher presence and severity of tar spot.

As far as screening goes, we are looking into options for AgReliant. Since this pathogen cannot be grown on artificial media, we cannot inoculate plots as we do for other diseases. Closely monitoring plots in areas where conditions have been favorable for disease will be important. Being able to reliably assess a hybrid's performance for tar spot is the most important target for our research with this disease.

There is variability of tolerance to the disease among hybrids. We do not know of any other desirable traits that can be associated with tar spot tolerance at this time. If a hybrid is blighted early enough to cause premature death, stalk cannibalization and lodging can be problems as well.

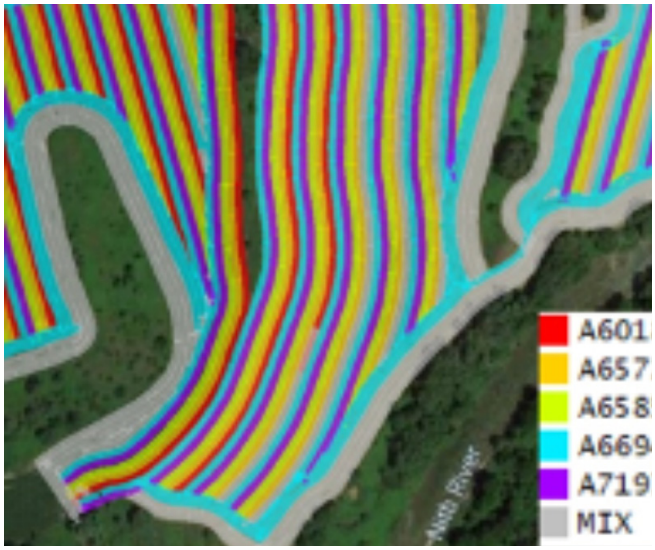
One of the biggest issues to combat with currently available tools is the rapid development of disease in susceptible hybrids. A weak hybrid can go from a little tar spot present to early death in a matter of two weeks. Better understanding when environmental conditions have been favorable and scouting those fields is key to protection. There are a number of fungicides that seem to perform well on tar spot. However, they do not prevent the disease, but rather seem to delay its development. That delay can be critical though depending on the growth stage it coincides with. This particularly was evident in the 2020 Growing season, as infection occurred during cool, high humidity, prolonged leaf wetness in Late August and took 3 weeks to be evident in fields. In many cases the corn was ½ milkline or more where yield impact is negligible.

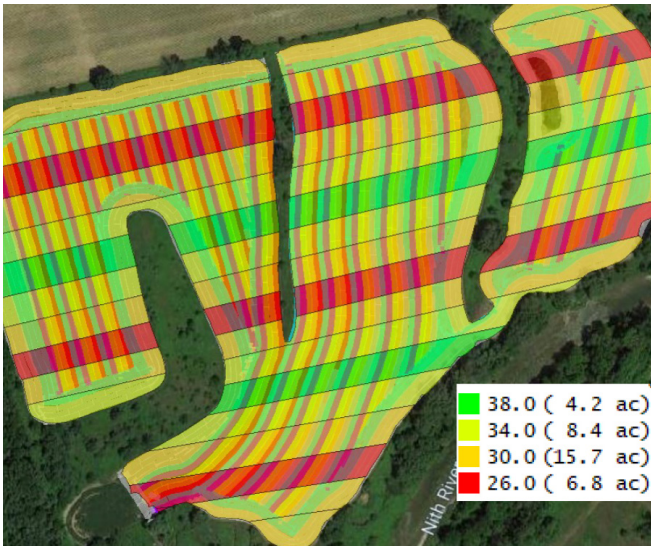
Unfortunately, there is still a good deal to learn about this disease and the pathogen itself.

HYBRID PERFORMANCE
BY PLANTING POPULATION BY SOIL TYPE

This plot was designed to learn more about how specific PRIDE Seeds hybrids react to different planting populations and environmental conditions.

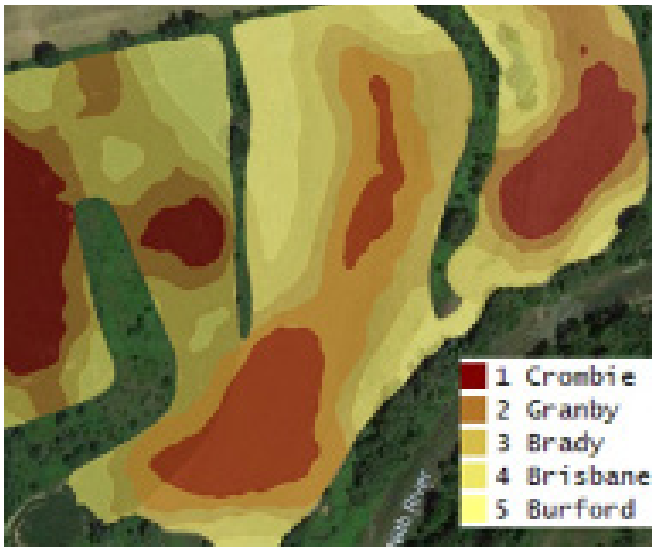
The hybrids were planted in strips using a VR prescription to vary populations. The objective was to compare the performance of five hybrids related to population, soil type and yield zones.

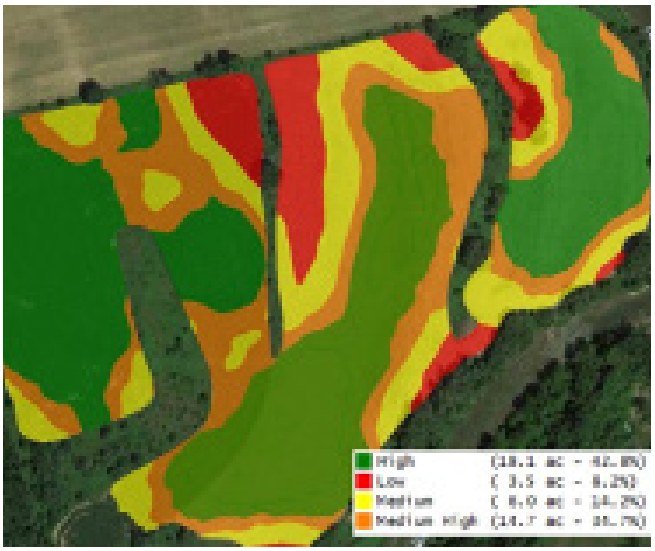




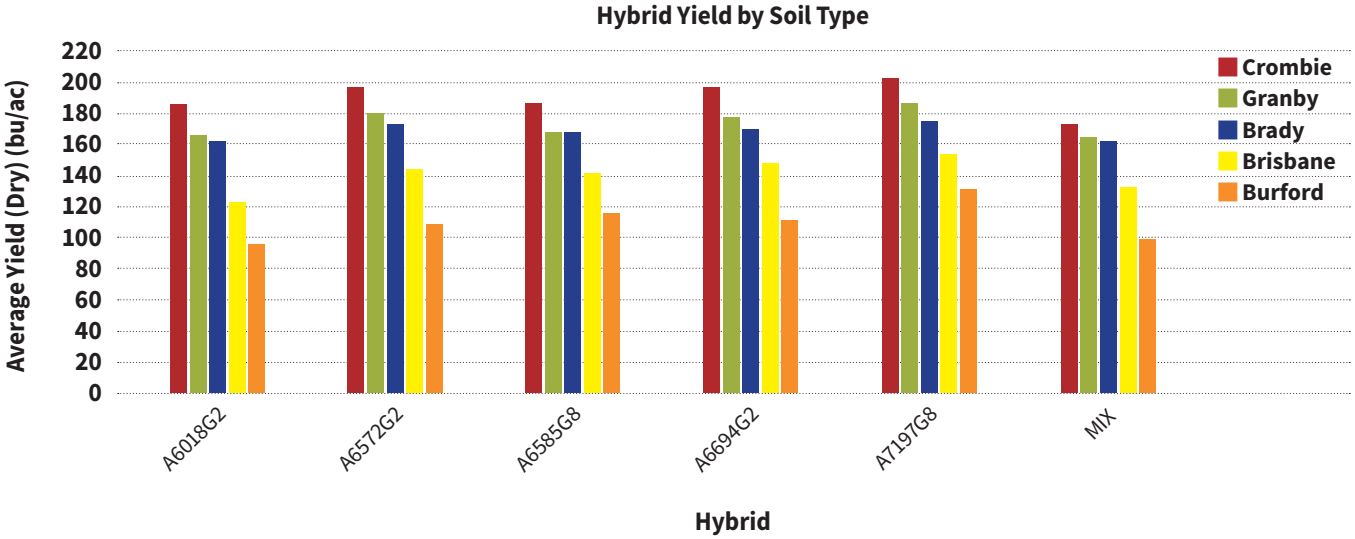
Mother nature had a slightly different plan in store for this particular plot. 2020 delivered the worst drought in 12 years; couple that with light textured soils and what we saw here was more of a comparison in drought stress tolerance.

When comparing the yield zones and soil texture, the maps align very closely. We can see that Crombie soils held top yield potential while Burford was at the bottom end of the spectrum across the 5 different textures in the field





Brady - sandy loam over gravel
Brisbane - sandy loam formed in hollows
Burford - fine sandy loam over gravel
Crombie - silt loam in low positions
Granby - depressional sandy loam

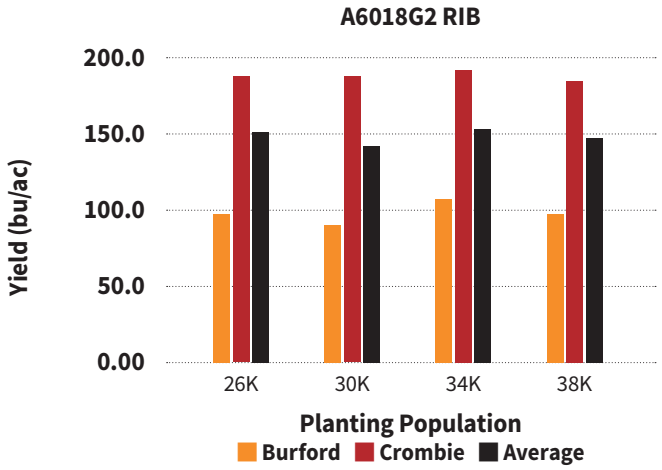


Hybrid yield results by planting population

To more easily compare hybrid response to planting population in drought conditions, we will focus on the yield differences from the best and poorest soil types.

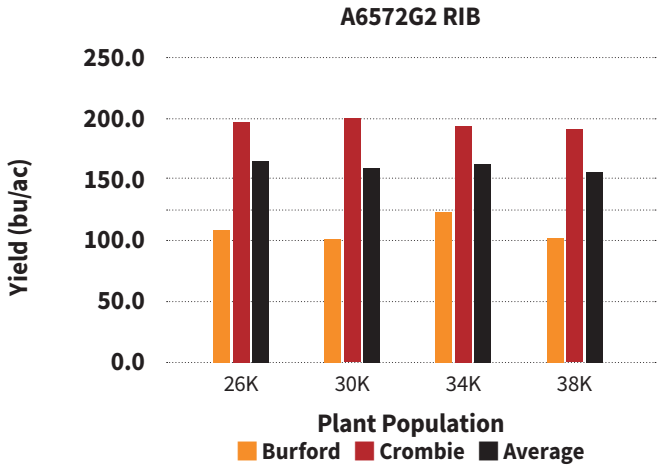
A6018G2 RIB

Strong performance considering it is south of ideal growing region. Do not see a large difference in yield between planting populations for each soil type, that the lack of moisture was the yield limiting factor regardless of population.



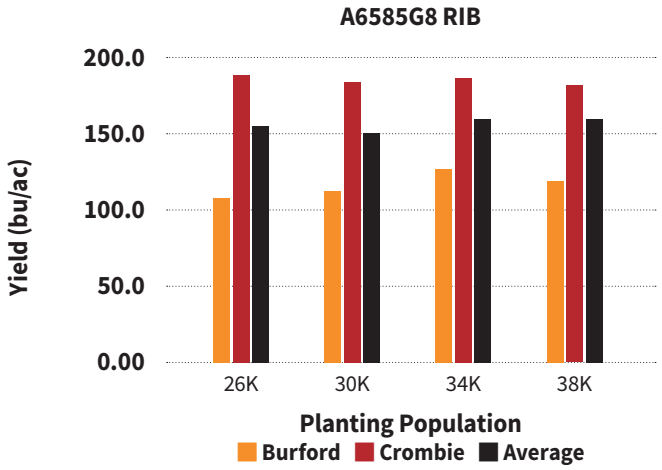
A6572G2 RIB

We saw slightly stronger performance at lower populations. The drought conditions paired with the increased competition of high populations caused a slight decrease in yield at higher plant stands. 34K plant population seems to be the most consistent across soil types. Past data shows A6572G2 has top yield potential in a wide range of environments.



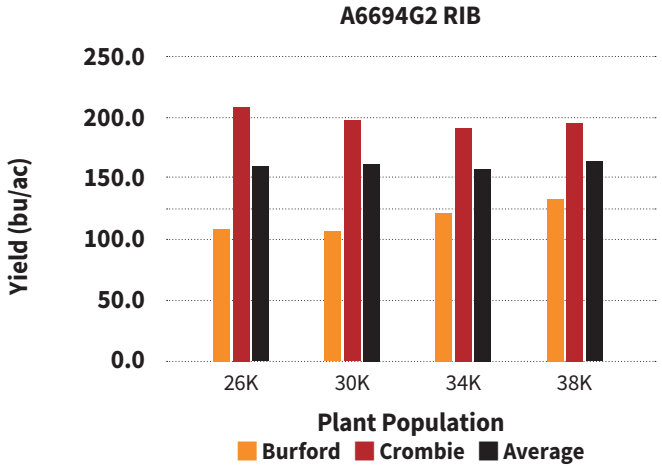
A6585G8 RIB

We see the most consistency between soil types at the 34K seeding rate. A6585 is known to have a semi-flex ear however under these drought conditions it is evident that the ability to flex was limited.



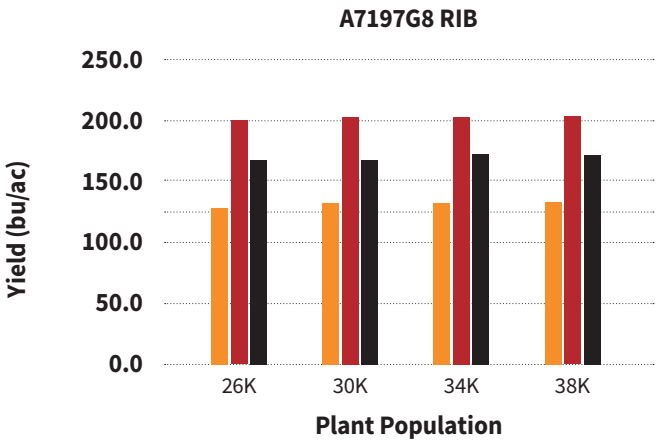
A6694G2 RIB

This hybrid had a great 2020 season in many environments. At this site, A6694G2 did not show very much response to population changes however there was some ear flex at the lower planting populations resulting in a higher yield at 26K plants than at 34K which seems to be the strongest in other hybrids. A6694G2 could be a good candidate for variable rate planting.



A7197G8 RIB

This is the hybrid that the plot cooperator was most excited about throughout the season. A7197G8 fared better in the drought stress conditions compared to other hybrids in the plot. This hybrid has stable performance at the different populations tested in this trial.



It is commonly accepted that in a variable rate seeding situation, populations should be lower on more drought prone soils in order to minimize competition to maximize yield. Using a hybrid that has good ear flex is also recommended. What we saw in this trial was the opposite. In the low yield zones (made up of Burford and Brisbane soils) we saw higher yields at 38 000 and 34 000 seeds per acre and alternatively in the higher yield zones (made of Crombie and Granby soils) the yields were pretty much equal from 26 000 to 38 000 seeds per acre with a slight edge going to the lower populations. It was evident that with the severe conditions of 2020, even the traditional higher performance zones yielded significantly less than normal.

Conclusion

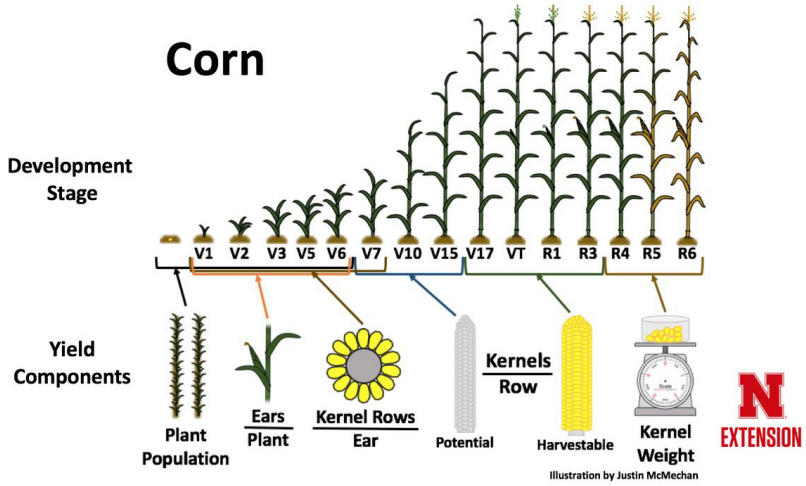
The incredibly dry 2020 growing season was the main yield limiting factor in this trial. Lack of moisture paired with light soils contributed to low yield averages across hybrids and across planting populations on a farm that usually averages 50bu/ac higher. Looking at the hybrid by population yield data does not give a clear idea of if and how each hybrid will flex given the differing populations but what we can see is how the hybrids reacted to the drought stress based on soil type. A7197G8 seems to be the most resilient in drought condition. A6694G2 seemed to flex the best at low populations given the stress of the year. Generally, it appears that 34 000 seeds per acre offers the most consistent yield in drought conditions however the economics of that rate are questionable.

HYBRID X POPULATION X MANAGEMENT RESPONSE TRIAL

Corn yield is affected at different stages throughout the growing season.
Plant population is determined at planting, then ears per plant, kernels per row per ear, kernel length and kernel weight are determined throughout the growing season based on growing conditions and management.

The purpose of this trial was 3-fold:

1. To determine whether intensive management can influence yield at high and low populations
2. To determine if intensive management can further express the genetic potential of a hybrid in a low or high stress environment
3. To determine if intensive management can compensate for a thin stand.



Plot Design & Soil Background – 3 hybrids tested at 2 planting populations with 2 treatments per population

Hybrids Tested	Populations Tested	Treatments Tested
A5914G2 RIB	22, 000 PPA	Check (Starter + Broadcast)
A6018G2 RIB	36, 000 PPA	Intensive Management (IM) (Check + V6 Sidedress + VT Fungicide)
A6572G2 RIB		

Check Treatment	
Starter	7.7-25.6-12.7-8.1S-2.2Mg-1.31Zn @ 152 lbs/ac
Pre-Plant Broadcast	17-15.8-22.8-0.7S @ 657 lbs/ac**
Intensive Management (IM) Treatment	
Starter	7.7-25.6-12.7-8.1S-2.2Mg-1.31Zn @ 152 lbs/ac
Pre-Plant Broadcast	17-15.8-22.8-0.7S @ 657 lbs/ac**
V6 Sidedress	38.6-0-0-7S @ 143 lbs/ac
VT Fungicide	Miravis Neo (*0.4 L/ac*)
**Fertility applied to cover the subsequent soybean crop	

Site Fertility (Zone Sampled)	
pH: 6.7 – 7.0 OM: 4.2 – 4.8 CEC: 11.6 – 17.0 P: 5 – 16 ppm	K: 88 – 133 ppm (2%) Mg: 120 – 207 (7.7 – 10.6 %) Ca: 1820 – 2540 (75 – 78 %)

Site Fertility (Zone Sampled)
Sandy Loam

Nitrogen + Fungicide						Nitrogen + Fungicide					
A5914G2 @ 36K	A5914G2 @ 22K	A5914G2 @ 22K	A5914G2 @ 36K	A6018G2 @ 36K	A6018G2 @ 22K	A6018G2 @ 22K	A6018G2 @ 36K	A6572G2 @ 36K	A6572G2 @ 22K	A6572G2 @ 22K	A6572G2 @ 36K
12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows	12 Rows

Results

Yield potential was estimated twice prior to harvest. On **July 27, 2020**, ears from each hybrid/treatment were examined to estimate the potential kernels per ear pre pollination.

The average ovules per ear were used to estimate potential yield of each hybrid/treatment. On **October 6, 2020**, yield was estimated by counting the number of grains per ear.

			July 27, 2020		October 6, 2020		
Hybrid	**Population**	**Treatment**	**Average Ovules/Ear**	**Potential Yield****	**Grains/ear**	**Estimated Yield****	**% of Yield Potential**
A5914G2	36,000	Check	592	**236.8**	520.8	**208.3**	88%
A5914G2	36,000	N+F	628	**251.2**	534.5	**213.8**	85%
A5914G2	22,000	Check	716	**175.0**	574.8	**140.5**	80%
A5914G2	22,000	N+F	672	**164.3**	613.4	**150.0**	91%
A6018G2	36,000	Check	682	**272.8**	582.4	**233.0**	85%
A6018G2	36,000	N+F	690	**276.0**	529.9	**212.0**	77%
A6018G2	22,000	Check	653	**159.6**	667.5	**163.2**	102%
A6018G2	22,000	N+F	637	**155.7**	640.6	**156.6**	101%
A6572G2	36,000	Check	692	**276.8**	549.0	**219.6**	79%
A6572G2	36,000	N+F	584	**233.6**	538.7	**215.5**	92%
A6572G2	22,000	Check	642	**156.9**	570.6	**139.5**	89%
A6572G2	22,000	N+F	680	**166.2**	543.2	**132.8**	80%

**Yield estimated using 90,000 kernels per bushel

1 Cob board from October 6, 2020. Notice the difference in ear girth and length based on the different population and management treatment.

Harvest Results

Hybrid	Population (PPA)	Treatment	Yield (bu/ac)	Moisture (%)	Test Weight (lbs/bu)	Yield Advantage
A5914G2	36,000	Check	201.8	19.4	55.3	**-2.2**
		IM (N+F)	199.6	19.6	55.4	
	22,000	Check	170.5	21.5	54.3	**8.8**
		IM (N+F)	179.3	21.2	55	
A6018G2	36,000	Check	205.4	20.4	55.1	**0.9**
		IM (N+F)	206.3	21.6	54	
	22,000	Check	187.6	20.5	54.5	**3.6**
		IM (N+F)	191.2	21.7	54.7	
A6572G2	36,000	Check	213.1	22.6	53.4	**0.6**
		IM (N+F)	213.7	21.5	54.5	
	22,000	Check	192.4	21.2	52.6	**-0.4**
		IM (N+F)	192	21.2	54.3	

A5914G2 RIB

- Saw no advantage to increased management (IM) at high population
- Saw 8.8 bu/ac yield increase to IM at low population
- 20 – 30+ bu/ac spread between high and low populations
- Typically classify this hybrid as a racehorse and the data verifies pushing the population

A6018G2 RIB

- Saw minor response to IM at both low and high populations
- Minimizing stress from V8 to R3 directly correlates to ear length which matches A6018G2's ability
- A6018G2 showed the smallest spread (15-18 bu/ac) between high and low populations making it very capable of handling thin stands

A6572G2 RIB

- Showed very minimal response to IM at both high and low populations
- Showed marginal differences in ear size between populations allowing A6572G2 to capture its highest yield potential at high populations

Conclusion

With the exception of A6572G2, IM had a greater influence on yield in the lower population than the high population. I expected to see more impact from IM on the high populations. Hybrid and population definitely have an impact on kernels/bu. Final yields definitely showed variation from the standard 90,000 kernels/bu used to predict yield. Room to expand and improve this trial.

Future trial plans could be to include a separate side-dress nitrogen and fungicide treatment to see which of the two has more influence on yield. Also including a middle population check (30-32,000) to verify if a plateau is existing.

PLANT POPULATION FIELD TRIAL

Optimal planting population is influenced by a number of different factors. Typical planting populations in the area range from 30, 000 to 35, 000 seeds per acre. In this trial, five PRIDE Seeds hybrids are considered and evaluated at 4 different populations.

The purpose of this trial was to determine profit potential of 5 different PRIDE Seeds hybrids at 4 different populations.

Plot Background

Trial was planted on May 13th, west of Elmira, ON at Maple Bend Farm. Plot was harvested on October 29th and no fungicide was applied in season.

For profit calculations, selling price was $4.75 and drying costs are $0.05 per point of moisture above 15% and seed cost was considered.

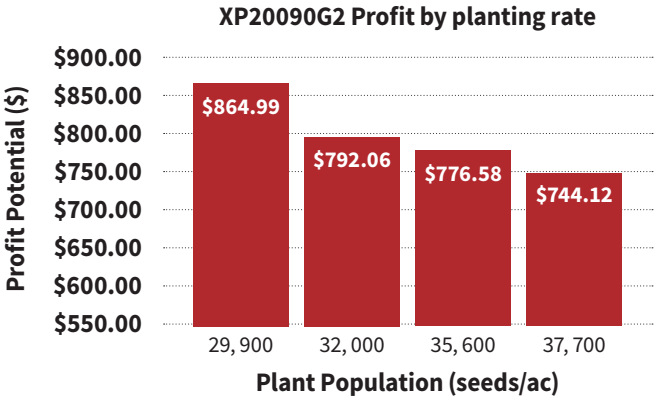
Fertility: 100lbs/ac starter applied at planting and side dressed with 35 gal of 28-0-0.

Hybrids Tested	Populations Tested
XP20090G2	29, 000 PPA
A6102G8	32, 000 PPA
A5914G2	35, 600 PPA
A5404G2	37, 700 PPA
A5383G8	

Results

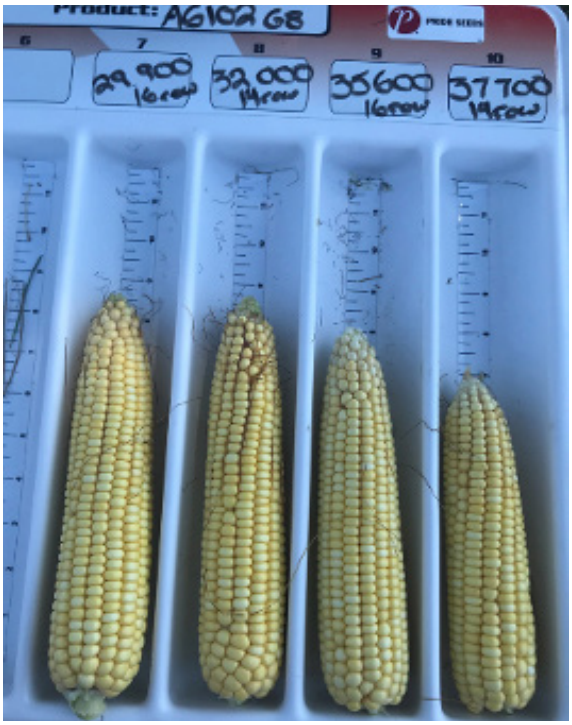
XP20090G2

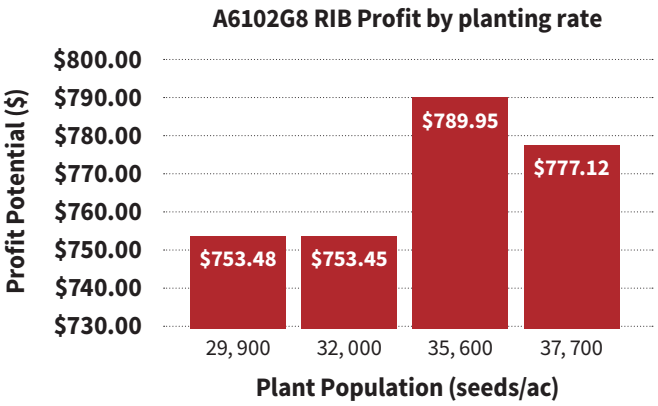
This was the first year of testing for XP20090G2 and we look forward to seeing it in plots in 2021. Emergence was exceptional with early plant counts nearly equal to planting population. This hybrid has obvious flex in both length of ear and girth. In trials across zone 7, it was not hard to find XP20090G2 cobs with 20-22 kernel rows around. A strong starter fertility program will be important for this hybrid for large ears.



A6102G8 RIB

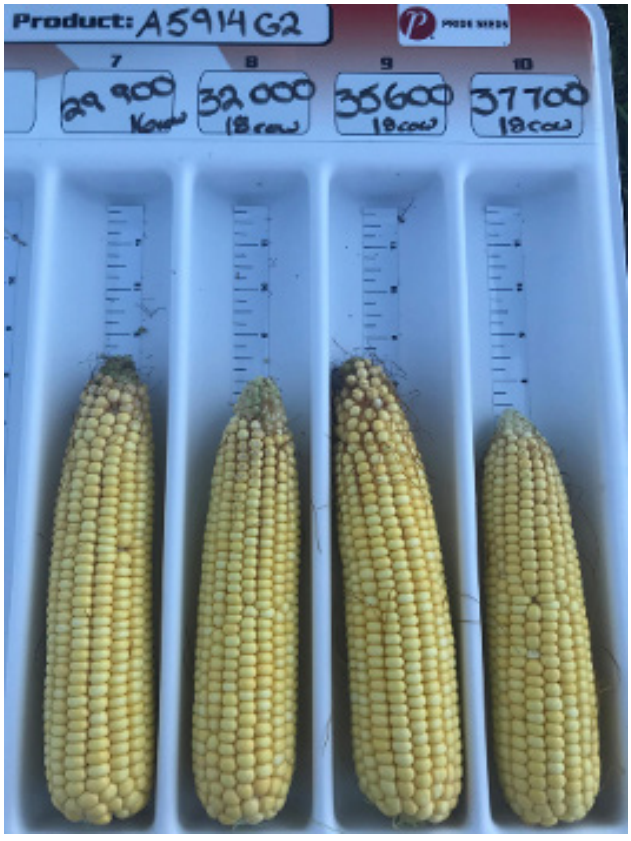
A6102G8 tends to be a real racehorse hybrid. It will generally set a consistent ear size at all populations. In good growing conditions, plant population can be increased to chase top yields. In this trial, the field struggled with drought stress mid-summer which effected the highest population strips the most.

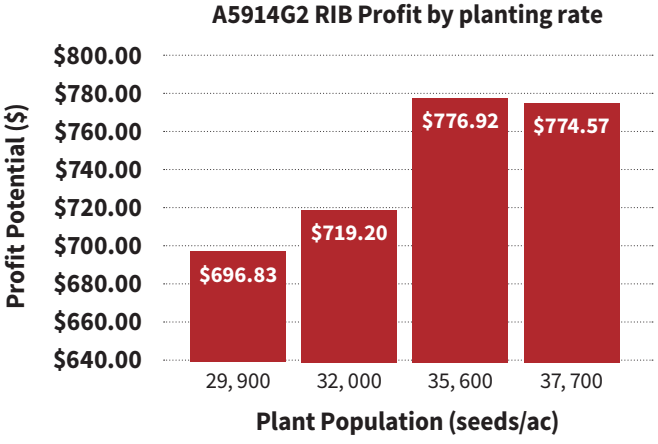




A5914G2 RIB

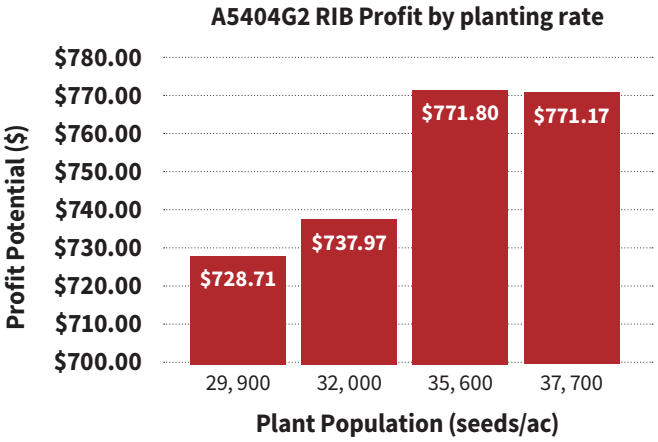
A5914G2 has good top end yield potential and tends to be great at handling late season stress.
In this trial, A5914G2 was a little slower to emerge, but the overall stand was in line with the target plant populations. It is common to see flex in the ears of A5914G2 with the population pressure, so these results were not as expected. The heat and dry conditions in July could have limited the amount of flex in length that is possible with A5914G2.

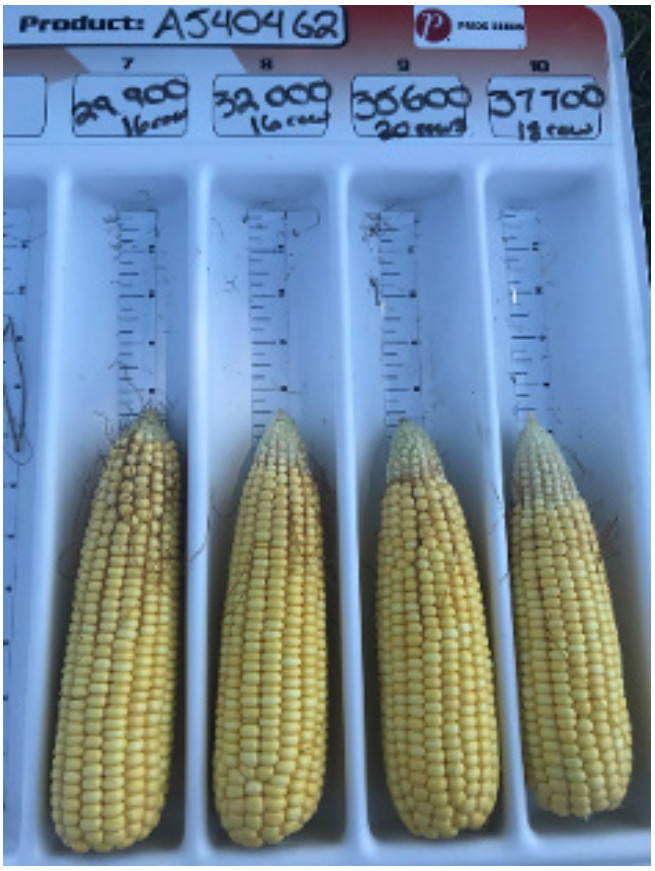




A5404G2 RIB

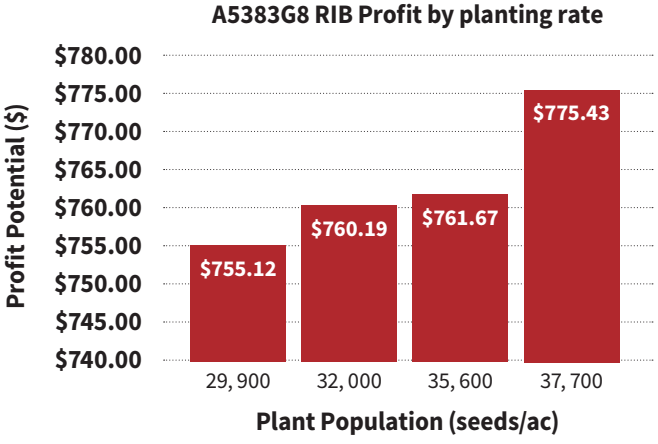
This new 2675CHU hybrid can really take advantage of good growing conditions and heavy management. The semi-flex ears on the hybrid produced a nice yield bump between 32 000 and 35 000 plants per acre however the tip back seen in the image indicates that there was additional yield left on the table. After 2020, we would not recommend moving A5404G2 too far south out of its ideal growing area and it is likely not advantageous to push populations on light, drought prone soils.



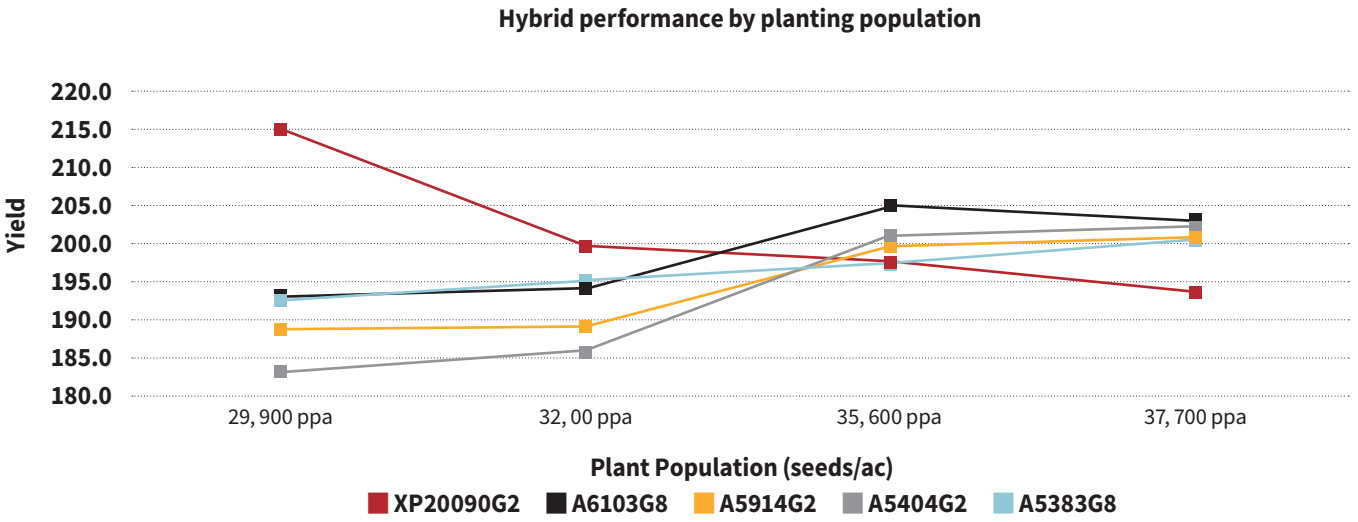


A5383G8 RIB

Another new 2675 CHU from PRIDE Seeds with SmartStax technology. The ear tends to be more fixed and the plant has great defensive characteristics. Adaptable to a wide range of growing situations and management strategies. Able to push populations on high fertility ground.



Yield performance



Conclusion

Typically, we would expect to see a population response curve rise as plant populations increase, level off and then begin to decline, so XP20090G2 is far from typical. We will be learning more about the quirks of this hybrid in 2021 test plots so stay tuned.

FLEX POTENTIAL OF PRIDE CORN HYBRIDS USING THE "GAPS METHOD"

Some corn hybrids have ears that are able take advantage of a reduced plant density. We classify these hybrids as flex ear type hybrids. Understanding the ability of a corn hybrid to flex can result in a better understanding of a hybrids yield potential in different soil types and environments, optimize variable rate seeding (VRS) recommendations and optimize ROI.

A gap in a corn row represents two-thirds of an initial seedling population. To compensate for the lost plant and lost potential yield, the two ears adjacent to the gap must each produce 50% more kernels.

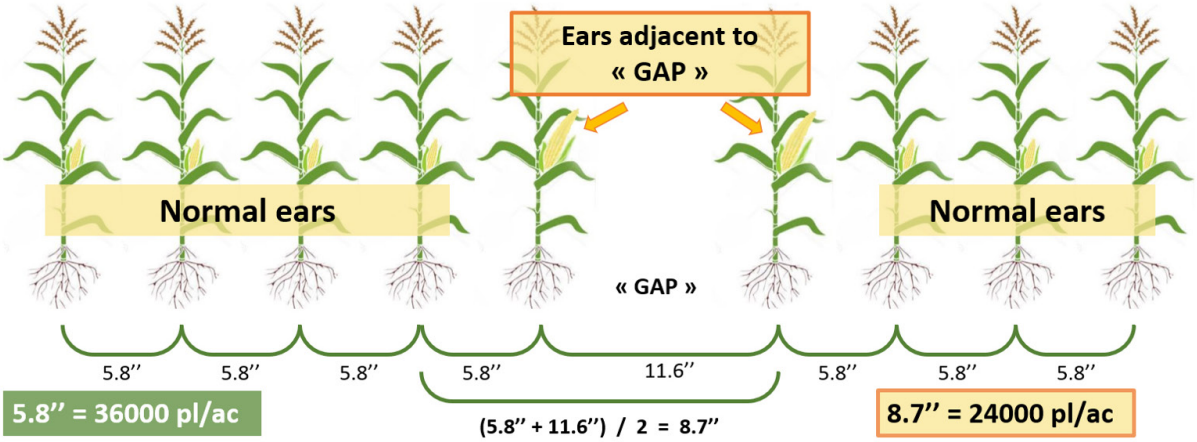
The purpose of this project was to develop a fast and reliable method of determining the ear flex level of corn hybrids. To do this, in-row gaps were utilized – "GAPs Method". Gaps are a result of ungerminated or absent seed. The gap space between plants can be used to estimate the hybrid response level to reduced plant density and the associated increased space for root development. It is predicted that the higher a hybrid's inner flex potential is, the bigger the ear size adjacent to a GAP will be.

Project design

Multi-hybrids plots were used, and observations were taken from those hybrids. Soil type, planting date, seedling population were noted at each site.

Number of kernels per ear (average) were noted from 10 normal ears and from 10 "GAP" ears. The "GAP" ears are the ones adjacent to a gap in a corn row. It is assumed that the more a hybrid flexes, the more kernels there will be on the "GAP" ears, resulting as a response to greater room for root development.

Evaluating flex behaviour on-farm



In this project, the Flex Score was calculated in relation to the 100 Flex of the same hybrid (#kernels normal ear X 50%).The formula used in this project for the Flex Score was:

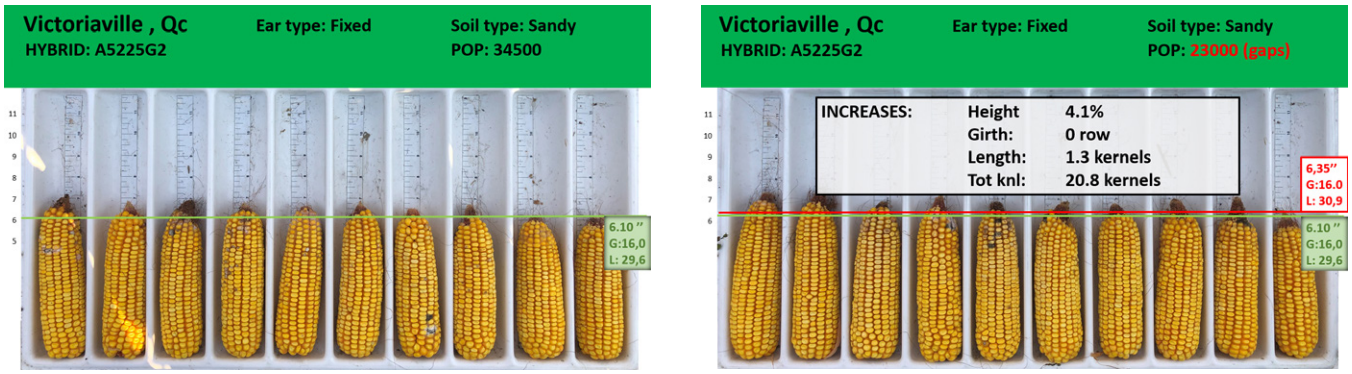
$$\frac{\#kernels_{(gap\ ear)} - \#kernels_{(normal\ ear)}}{\#kernels_{(normal\ ear)} \times 50\%} = \text{Flex Score}$$

Ear type		Ear Flex Score
Fixed	no to little variation	0-10
Semi-flex	little to medium variation	11-55
Flex	significant variation	>55

Results

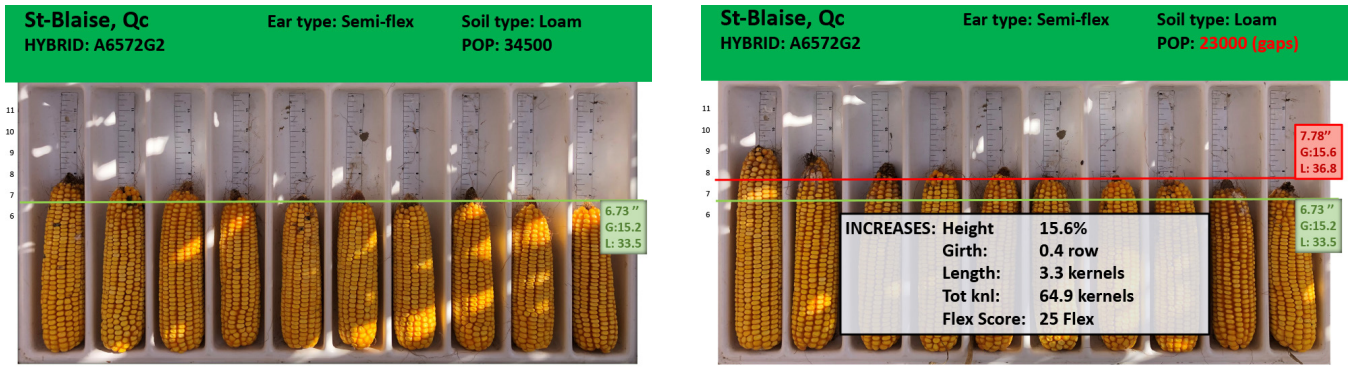
A5225G2 RIB
Flex Score Calculation :

$$\frac{494.4 - 473.6}{473.6 \times 50\%} = 9 \text{ Flex}$$



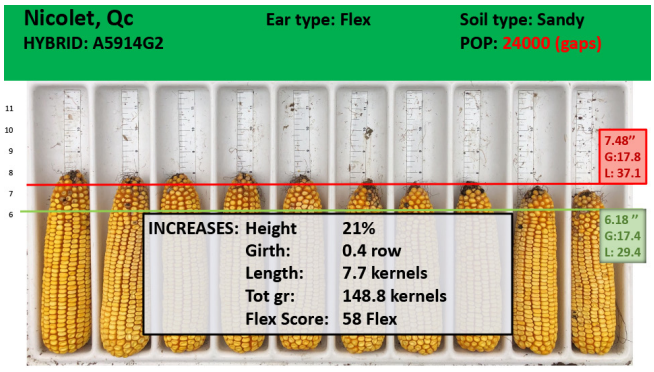
A6572G2 RIB
Flex Score Calculation :

$$\frac{574.1 - 509.2}{509.2 \times 50\%} = 25 \text{ Flex}$$



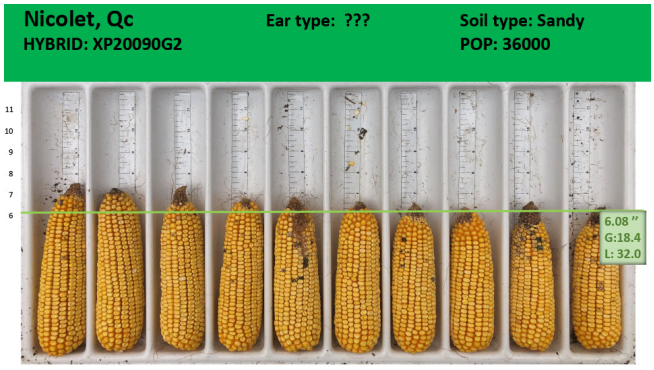
A5914G2 RIB
Flex Score Calculation :

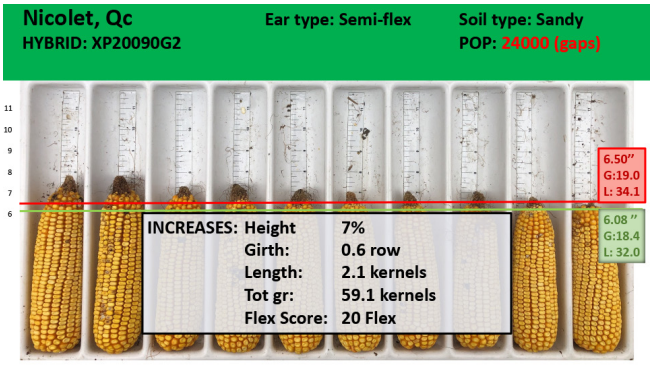
$$\frac{660.4 - 511.6}{511.6 \times 50\%} = 58 \text{ Flex}$$



XP20090G2 RIB
Flex Score Calculation :

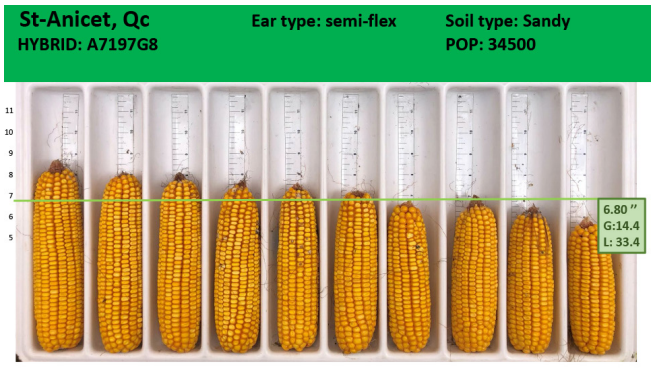
$$\frac{647.9 - 588.8}{588.8 \times 50\%} = 20 \text{ Flex}$$

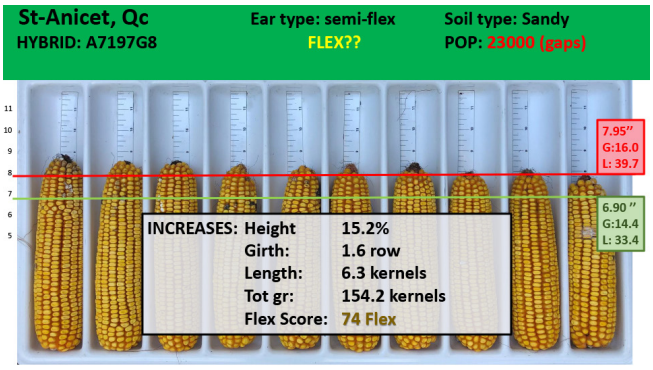




A7197G8 RIB
Flex Score Calculation :

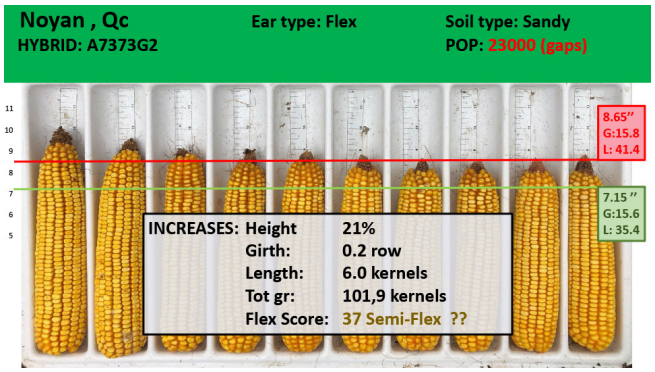
$$\frac{635.2 - 481.0}{481.0 \times 50\%} = 74 \text{ Flex}$$





A7373G2 RIB
Flex Score Calculation :

$$\frac{654.1 - 552.2}{552.2 \times 50\%} = 37 \text{ Flex}$$

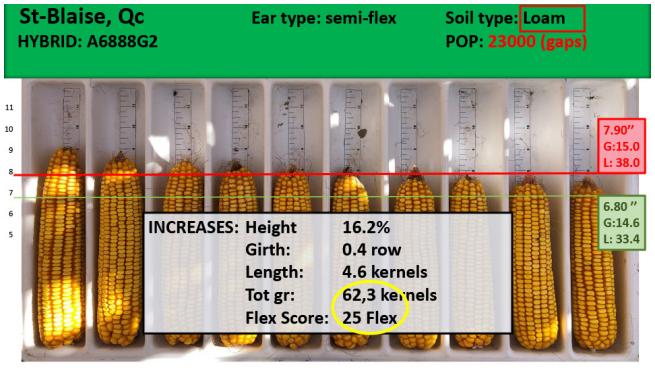


A6888G2 RIB (loam soil)
Flex Score Calculation :

$$\frac{570.0 - 507.7}{507.7 \times 50\%} = 25 \text{ Flex}$$

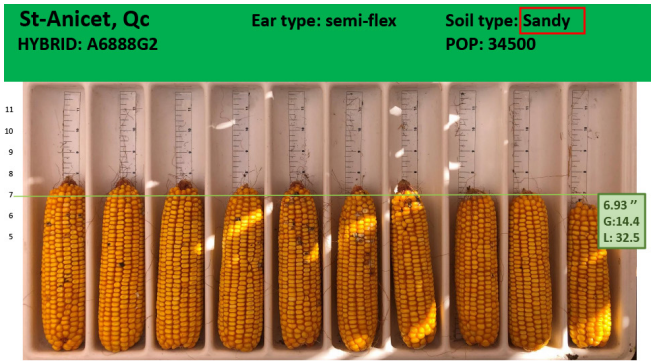
A6888G2 In 2020, an A6888 was tested in 2 different environments to determine the precision of this method for the same hybrid in two different environments.

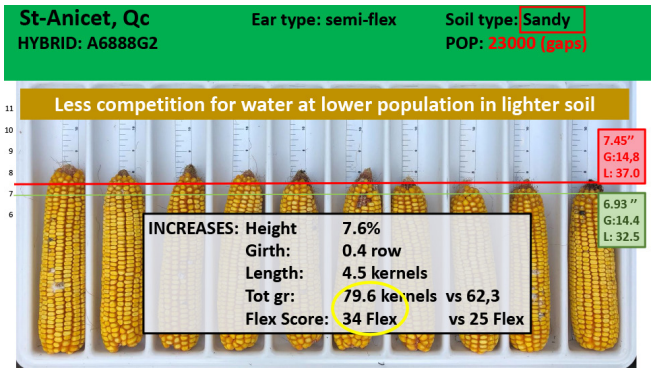
- A6888G2: Sandy soil vs Loamy soil



A6888G2 RIB (sandy soil)
Flex Score Calculation :

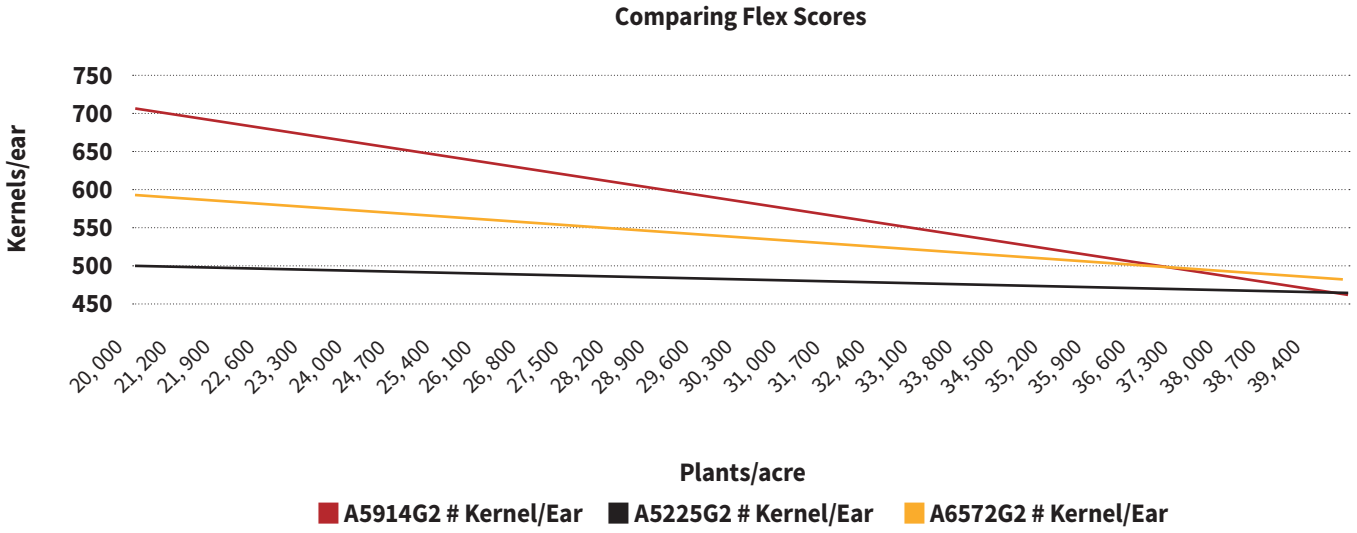
$$\frac{547.6 - 468.0}{468.0 \times 50\%} = 34 \text{ Flex}$$

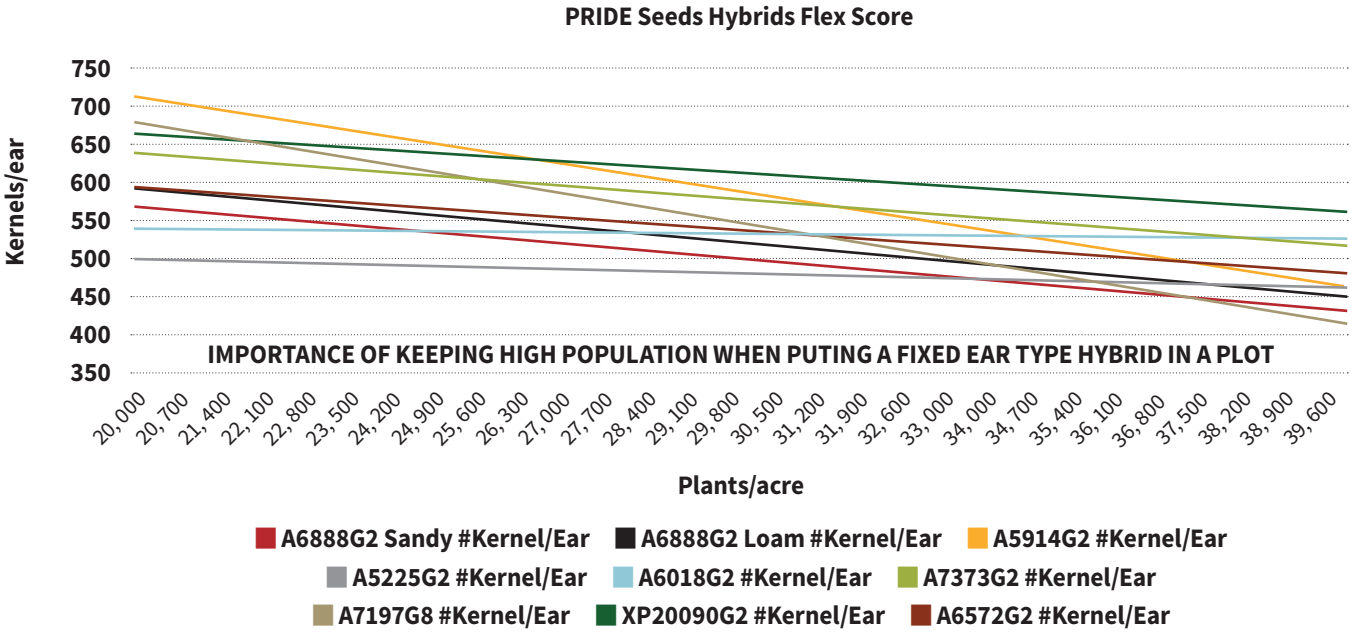




Conclusion

Based on the cob board pictures above and the graphs and summary table below, you will be able to get a feel for the ear type for a lot of the PRIDE Seeds hybrids in the current line-up.





Fixed Ear Type		Semi-Flex		Flex	
Hybrid	Flex Score	Hybrid	Flex Score	Hybrid	Flex Score
A6018G2	3	XP20102G8	17	A5914G2	58
A4939G2	5	XP20090G2	20	A7197G8	64
A5225G2	9	A4646G2	20		
		A5383G8	20		
		A5432G2	22		
		A6572G2	25		
		A6888G2 (loam)	25		
		A6888G2 (sandy)	34		
		A7373G2	37		
		XP20101G5	42		

It is important to remember that the level of flexibility of a hybrid may vary from field to field, year over year. This is the first year of the project and the degree of precision will be enhanced as time goes on. The Agronomy team plans to continue to compare same hybrids (& more hybrids) on different soil types next season.

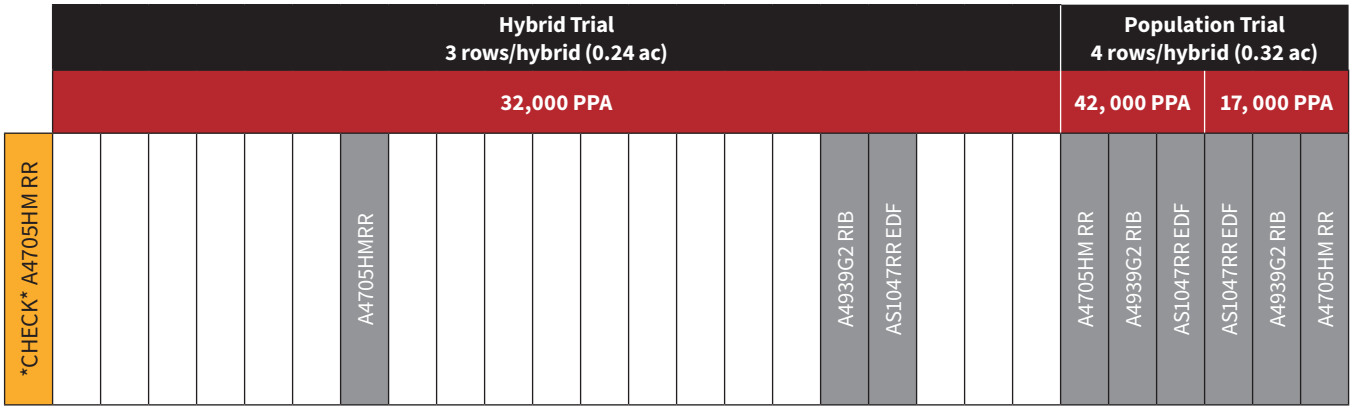
CORN SILAGE POPULATION

PRIDE Seeds has some great corn silage options for your operation. We offer silage specific hybrids that are highly digestible and palatable, have a large plant structure and a wider harvest window due to slower dry down. These silage specifics have flint genetics and showcase a white cob. Dual-purpose hybrid are another option for silage growers. Dual-purpose hybrids are bred for grain but when harvested for silage they have high energy and allow for more flexibility at harvest.

The purpose of this special project was to evaluate corn silage yield and quality when different hybrid types (silage specific (SS) and dual purpose (DP)) are planted at different populations.

Project Design

This trial was planted west of Coaldale, Alberta on May 9, 2020 in a field with pivot irrigation and silt loam soil type. The trial was harvested on September 25, 2020. Harvest data from the hybrid trial was used in conjunction with harvest data from the population trial for all three hybrids. Silage samples were collected while silage was unloaded at the pit and sent to Activation Labs in Ancaster, ON for moisture and feed test values.

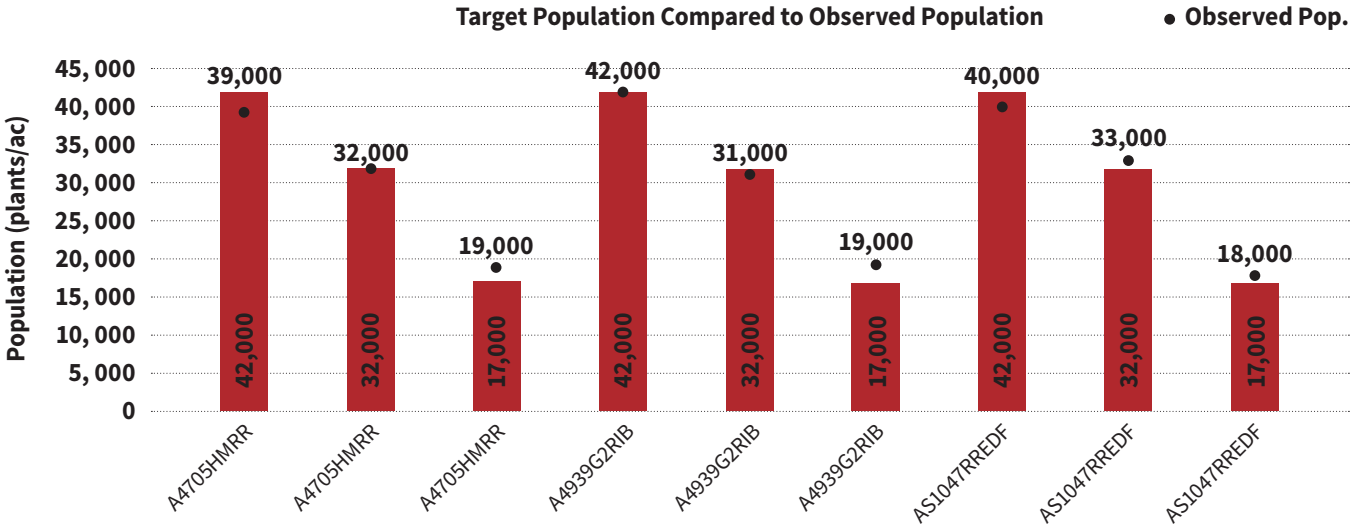


Hybrids	A4705HM RR	A4939G2 RIB	AS1047RR EDF	Population
	RM: 74-77 **Use: Silage Specific (SS)** Ear Type: Fixed	RM: 77-80 **Use: Dual Purpose (DP)** Ear Type: Semi-flex	RM: 79-82 **Use: Silage Specific (SS)** Ear Type: Flex	32K PPA 42K PPA 17K PPA

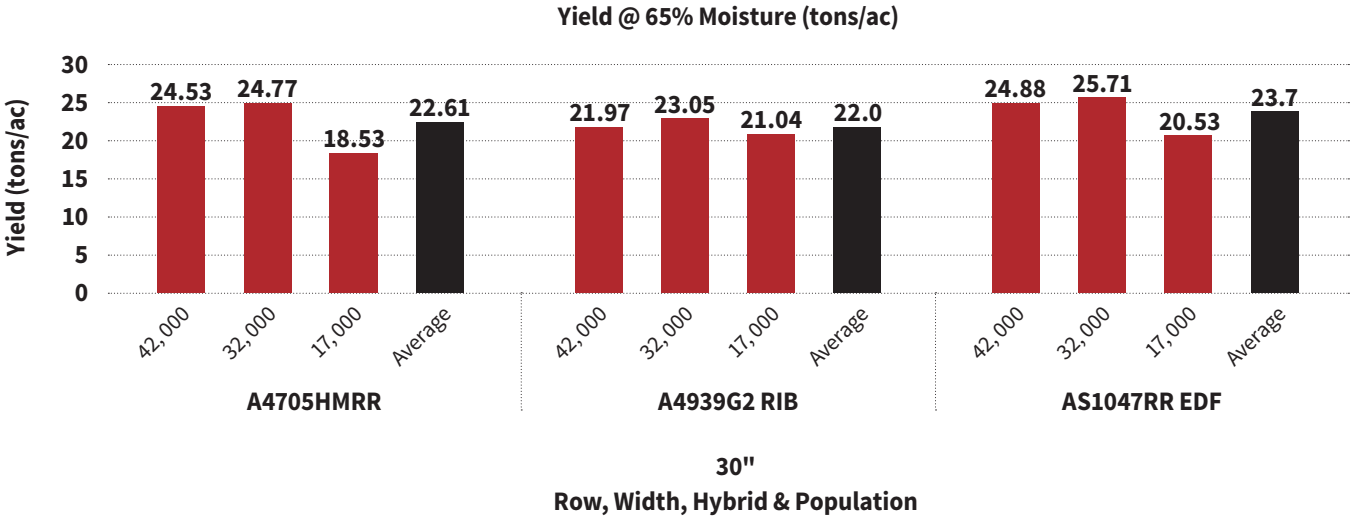
*PPA = Plants Per Acre

Since corn silage yield is a balancing act of yield and quality, 7 different assessment factors were considered for this project.

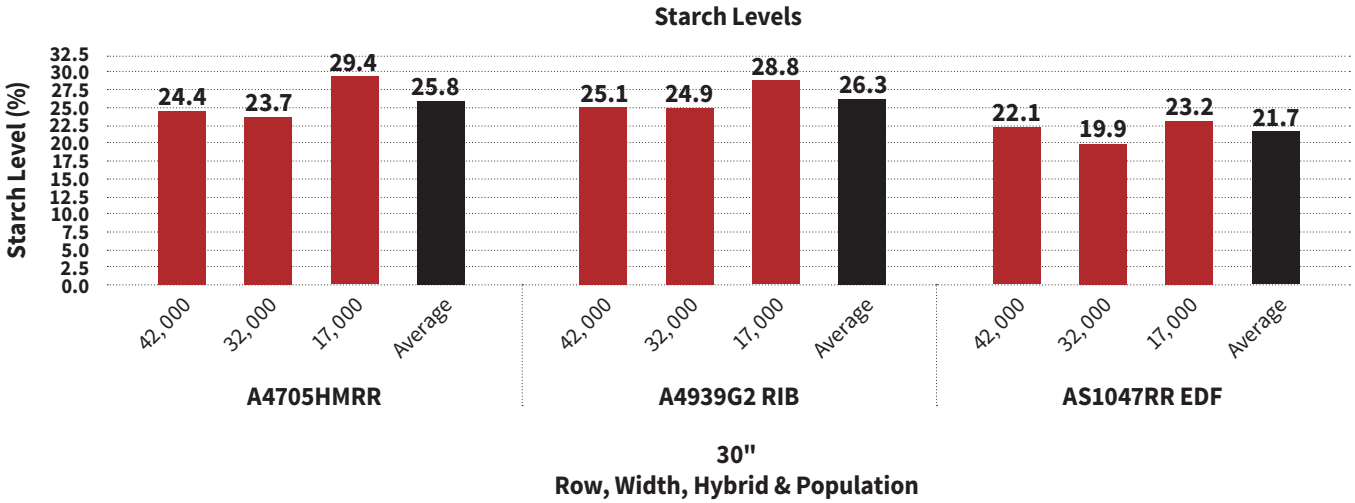
Results



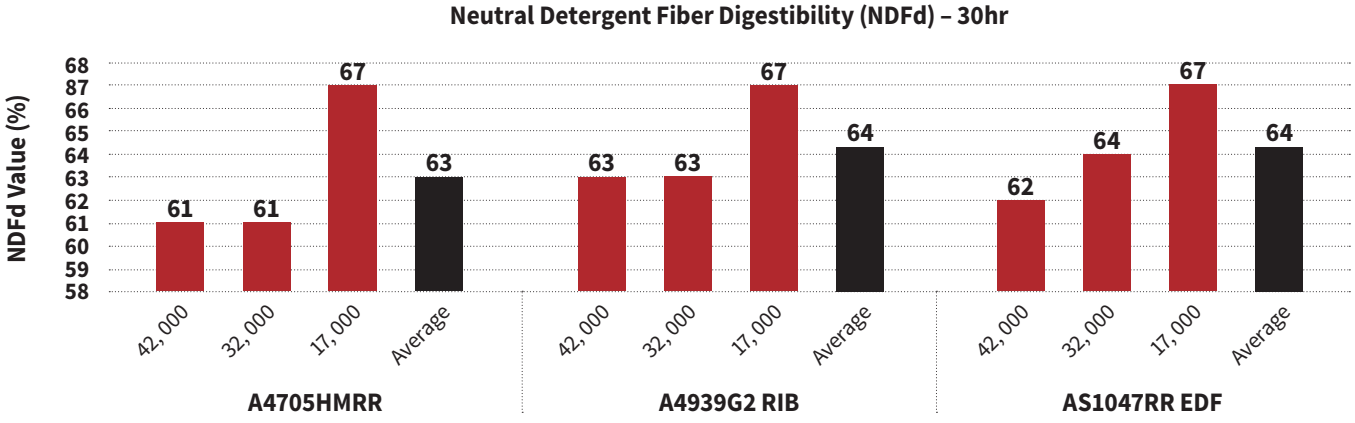
Observed populations were determined by counting 1/1000th of an acre 3 times per strip then calculated average population per strip. Observed populations were close enough to target populations to confirm that what was targeted by the farmer at planting is what was in the field and harvested.



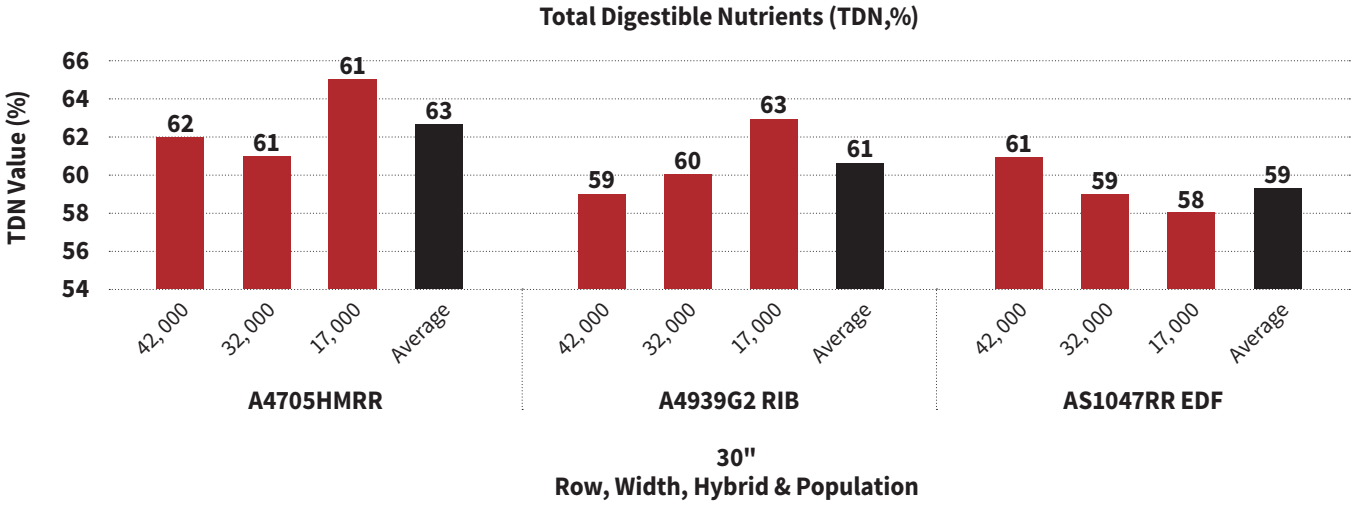
Yield averaged from 22.77 ton/ac. The SS hybrids out yielded the DP hybrid at 32,000 and 42,000 PPA. Yield of the SS suffered at 17,000 PPA. Yield for the A4939G2 RIB was comparatively consistent at all populations compared to the SS hybrids. Highest yield for all hybrids was at 32,000 PPA.



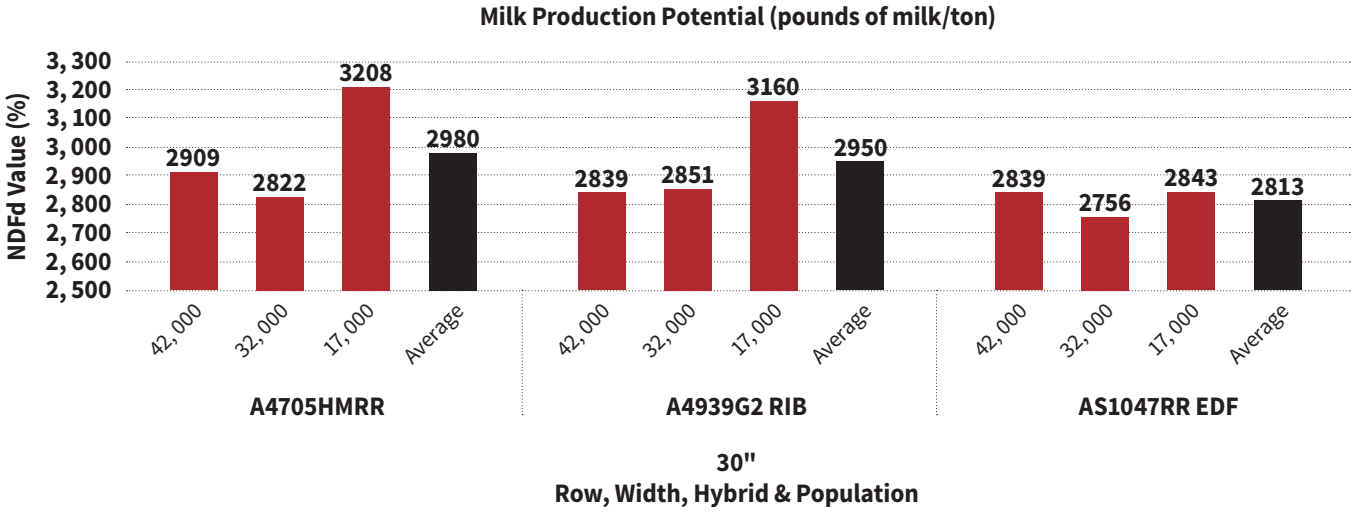
Higher starch levels were observed for all hybrids at 17,000 PPA. AS1047RR EDF has the lowest starch results out of the data set. This is likely due to the high corn stover to grain ratio. AS1047RR EDF produces a good size ear, but the large plant biomass likely dilutes out the starch content of this hybrid. Starch levels at 42,000 and 32,000 PPA are consistent between A4705HMRR and A44939G2 RIB.



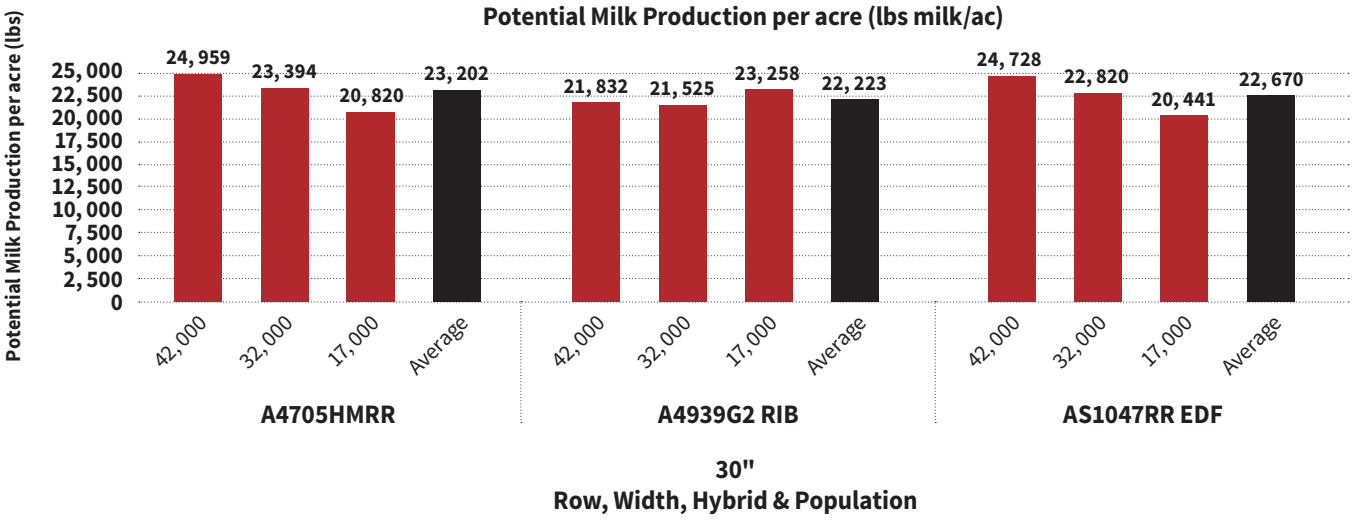
Neutral detergent fibre digestibility (NDFd) values were equally and most digestible at 17,000 PPA for all hybrids – SS and DP. Digestibility decreases as population increased. A4705HMRR NDFd value was the lowest of the data set when planted at 32,000 and 42,000 PPA. NDFd values for AS1047RR EDF gradually decreases as population increased. NDFd values for A4939G2 RIB (DP) were lower but consistent at 42,000 and 32,000 PPA compared to 17,000 PPA.



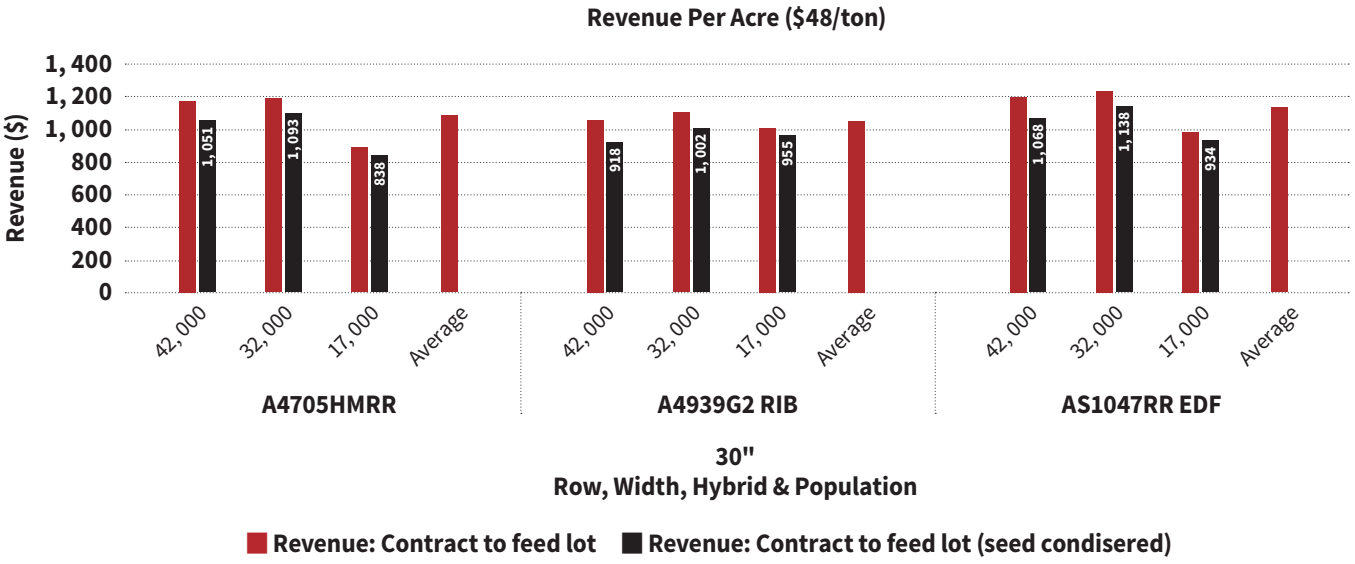
The average TDN value across the data set was 61%. A4705HMRR and A4939G2 RIB had the highest TDN values at 17,000 PPA, while AS1047RR EDF had the highest TDN value at 42,000 PPA. AS1047RR EDF highest TDN value was equal to the data set TDN average. A4939G2 RIB and AS1047RR EDF resulted in average and below average in all populations expect for A4939G2 RIB at 17,000 PPA.



Milk production potential (pounds of milk generated per ton) values ranged from 3208 to 2756 lbs/ ton and averaged 2914 lbs/ton. A4705HMRR and A4939G2 RIB has the highest pounds of milk/ton value at 17,000 PPA. AS1047RR EDF pounds of milk/ac values are relatively consistent between the three planting populations and A4705HMRR and A4939G2 RIB at 32,000 and 42,000 PPA.



Potential milk production per acre values averaged 22,698 lbs of milk/ac. The same pattern is noticed in the SS hybrids – higher values/ac at 42,000 and 32,000 PPA compared to 17,000 PPA. This is due to the higher yield observed by the SS hybrids at 42,000 and 32,000 PPA. A4939G2 RIB (DP) has the highest values/ac at 17,000 PPA and the higher populations are not far off.



Revenue was determined by considering the value/ton ($/ton) of silage corn when contracted to a feedlot in Southern Alberta. Price per ton ranges from $45-50/ton delivered. For these revenue calculations, a value of $48/ton was used.

It was also important to consider the price of seed. For these revenue calculations the price of a SS hybrid bag of seed was $240/bag and $260/bag was used as the price for the DP hybrid seed bag. The DP seed is more expensive because it is a G2 hybrid (contains trait for above ground insect control) compared to SS hybrids that are Round-up Ready hybrids.

Highest revenue return for all hybrids occurred at 32,000 PPA with and without the inclusion of seed costs. A4705HMRR planted at the lower population resulted in $255 revenue loss when seed cost was consider compared to A4705HMRR at 32,000 PPA. A1047RR EDF planted at the lower population resulted in $204 revenue loss when seed cost was considered compared to AS1047RR EDF at 32,000 PPA. A4939G2 RIB planted at the lower population and high population resulted in $47 revenue loss and $84 revenue loss respectively compared to A4939G2 RIB at the 32,000 PPA.

Conclusion

From a silage yield perspective – SS are probably the best option if yield is the number one thing you're looking for. SS tend to perform well at average to high populations, but not as well when population is pushed very low. When considering silage quality – an important parameter for feed – I think lower to average populations are going to result in better quality silage.

Revenue – Arguably one of the most important values to consider depending on the end user and customers needs. For the sake of this project and write up it was easy to put a value on yield, however it would be interesting to know how much value farmers put on starch, fibre digestibility and TDN value. 32,000 PPA was the most profitable and highest yielding population tested.

Going forward and testing populations closer to 32,000 PPA could be valuable for producers.

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LIBERTY LINK® CORN

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Respect the Refuge

Roundup Ready 2 TECHNOLOGY

LIBERTY LINK® CORN

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