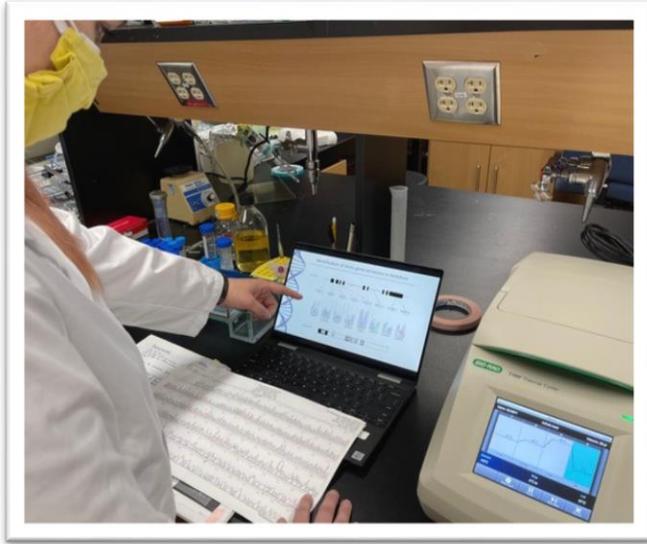


## INSIDE

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One of AGC's pillars is being a leader in genetic improvement and research. Sticking with the tried and true methods of genetic improvement works, but this carries its own risks. Selecting too intensely for some traits can leave others behind or even worse off. This can happen when the negatively affected trait is difficult to measure or incorporate into a genetic program. Some examples are behavior and disease resilience. Researching new technologies and methods can help to overcome these challenges. Secondly, markets and conditions can change, so knowing how to react effectively and in a timely matter is important. A genetic program focused only on large scale production cannot easily adapt to changes in consumer preferences and expectations. Researching flexible programs with a balanced approach can help ensure everyone wins. Continue reading to find out more about some of the exciting research projects AGC is involved in.

Not all research yields the results one hopes for and can often only lead to more questions. Some research, however, can lead to better than expected results. The speedy development and effectiveness

of the COVID-19 vaccines is one powerful example, and for that, we can be thankful. We look forward to things gradually getting back to "normal" and seeing each other face to face at larger gatherings. Through it all, we are grateful for our health care workers, but also for you pork producers who did your part keeping us all well fed.

Sincerely,



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## High Feed and High Hogs

2021 is shaping up to be another memorable year but now because of high commodity prices all around. Good feed efficiency is critical during these times. Selecting for better feed conversion is part of the breeding objective for all three AGC breeds. The graph on the next page shows a clear downward trend in the adjusted feed conversion ratios for an all-in/all-out farm using AGC genetics.

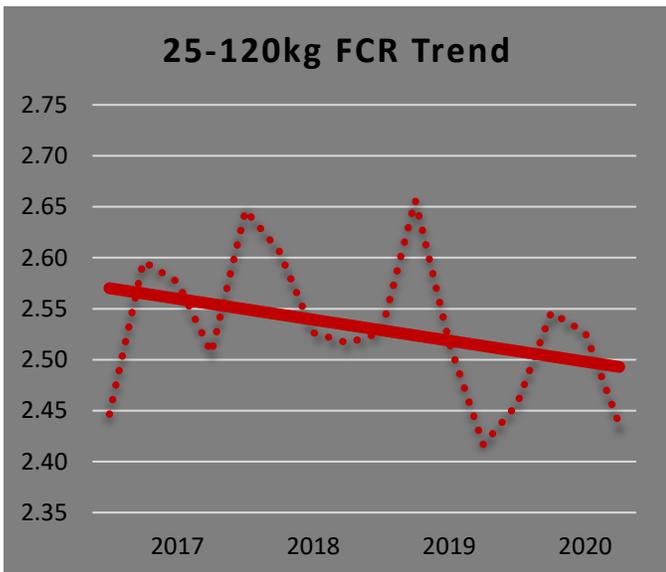
## Reducing sow stress and improving piglet survivability

Farrowing is a stressful time for sows and there can be piglet casualties through crushing or even savaging. Sow behavior, however, is difficult to include in a genetic program because it is mostly subjective (hard to measure) and is largely influenced by the way the sows are handled and treated. AGC has teamed up with Dr. Ray Lu from the department of molecular and cellular biology at the University of Guelph to help tackle this issue with collaboration from the Canadian Centre for Swine Improvement (CCSI). Dr. Lu has identified several genes that are involved in stress response. Might there be a connection between these genes, sow behavior, and piglet survivability?



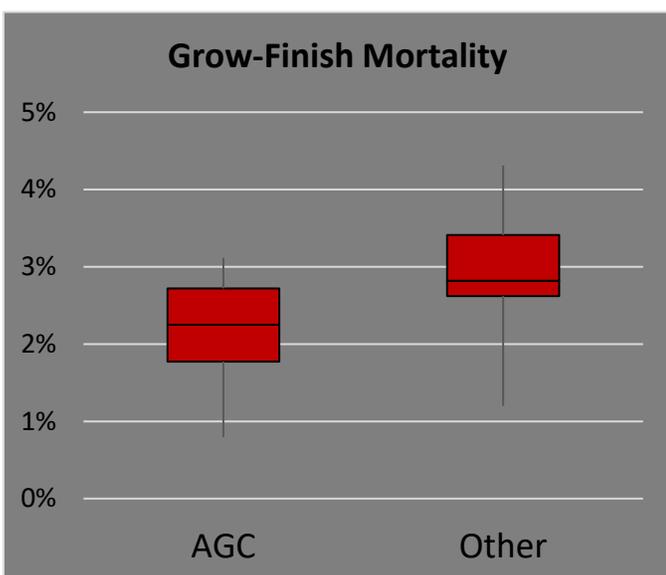
Collecting and processing sow saliva samples

Staff in AGC nucleus barns have been diligently collecting saliva samples from nursing sows and making notes of their behavior in addition to their regular performance records. The saliva is being analyzed for cortisol levels (the stress hormone) and will be cross-referenced with the sows' DNA and mothering ability. AGC sows are known to have a good temperament, so the goal of this project will be to help maintain that reputation by developing new genetic tools to identify outliers. This research is being funded in part by Ontario Genomics through the Ontario Regional Priorities Partnership Program.



Adjusted Feed Conversion Ratio (FCR) of AGC hogs in an all-in/all-out barn.

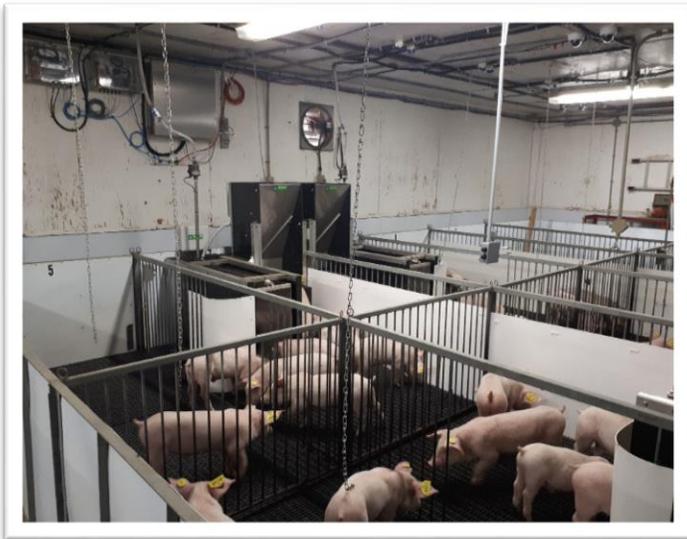
Selecting only on feed conversion, however, can be risky. Vices such as tail biting and frailer animals can arise. A balanced approach is needed. This is why appetite and growth rate are also included in AGC selection indexes. Body shape and structure as well are taken into consideration as these are linked to robustness. A farm with AGC F1s trialed various terminal lines across all seasons over several years. The mortality rate of AGC Duroc sired hogs was almost 1% lower than the others ( $p=0.003$ ). When hogs are as valuable as they are this year, getting each one to market can sure help your bottom line.



Box plot representing distribution of mortality rates from 39 consecutive batches. The difference is statistically significant.

## Breeding for Resilience

Resilience has become a new buzzword thanks to all the stress that COVID-19 has put on us and our livelihoods. This term, however, has been well used for the past several years within PigGen Canada, of which AGC is a member of. With a large team of researchers, we've been searching for traits and genetic markers that would help to predict disease resilience – the ability to maintain performance as pathogen exposure increases. Nucleus herds are high health so the pigs have minimal exposure to pathogens. Thus, disease resilience is a challenge to measure and include in genetic programs. This large scale project that involved intensive study of many naïve F1 barrows brought to a health challenged research barn is coming to a close. A great amount of data have accumulated and the researchers are now sorting through it and connecting the dots.



Pigs in the CDPQ test station nursery.  
Photo courtesy of Frédéric Fortin.

Several approaches to predict disease resilience didn't turn out to be as effective as was hoped, but there are some that show promise. One region in the genome that varied from pig to pig was found to have an impact on late stage nursery growth. Pigs that carry the right combination of genes, when exposed to heavy disease pressure in a nursery, will power through and grow faster than the others –

they are more resilient. Another encouraging finding was a genetic link between consistent feed intake and mortality in the grow-finish stage. Hogs selected for a strong and consistent appetite will have a lower chance of succumbing to disease in a health challenged herd. Breeding for these resilient



traits has the potential to reduce antibiotic use, improve animal welfare, and increase the number of full value market hogs. Major funders of this project included Genome Canada and Genome Alberta.

**GenomeCanada**

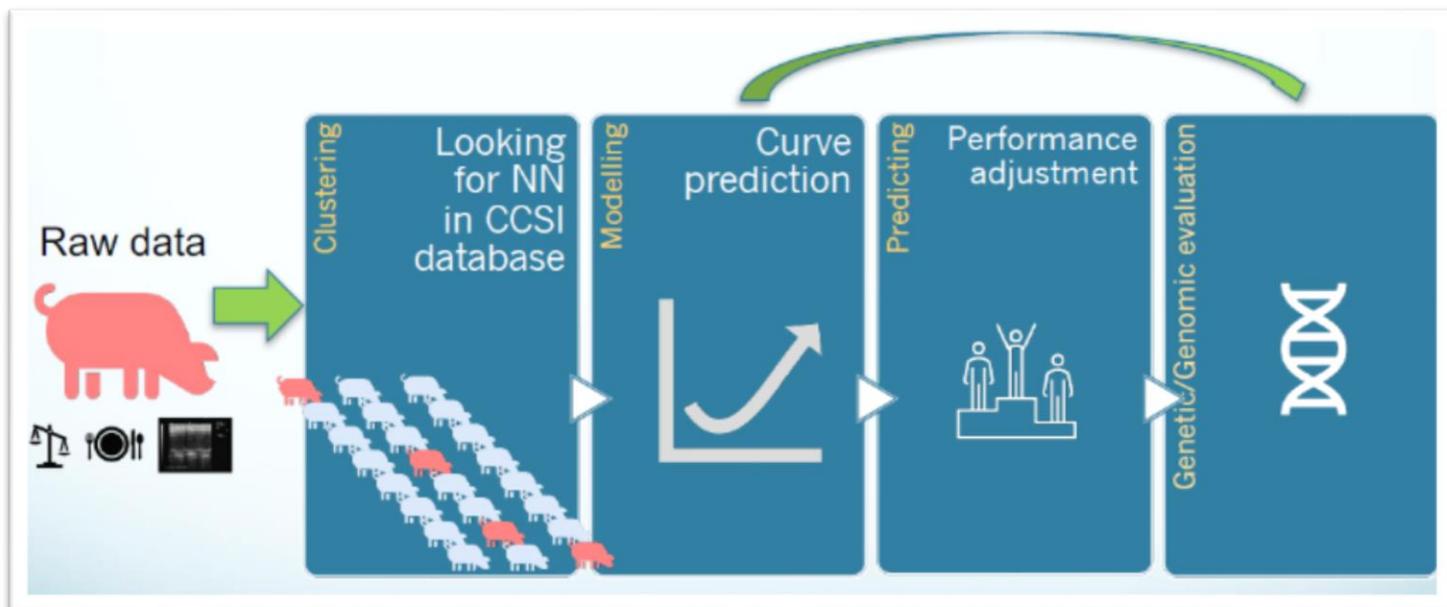
The findings of this project add robustness to AGC's genetic program. We'll continue to use genomic tools to identify important genetic markers and select the best variants. Our genetics are known to have more resilience than others in the nursery stage, particularly when challenged with PRRS or mixed with pigs from multiple farms. One side-by-side trial demonstrated a 3kg advantage for AGC sired pigs vs. a competitor when exiting a nursery barn. As for grow-finish resilience, AGC will continue to select for solid appetites to help ensure survivability remains high.

## New Growth Curve Models

Shipping weights have been increasing substantially over the past number of years. The average weight for performance testing of purebreds is also increasing by 1kg/year. A proper genetic program requires



standardization of weights in order to rank and select animals correctly. Growth rates and ultrasound measurements used to be adjusted to a weight of 100kg. Then it was 120kg. As weights increase beyond, the rate of growth and fat/muscle deposition may change and potentially lead to inaccuracies. Now, thanks to a project led by CCSI



Flowchart for new process of using raw data in genetic/genomic evaluations

and CDPQ (Centre de développement du porc du Québec) with funding by Agriculture and Agri-Food Canada, a novel approach has been developed to provide more accuracy and flexibility to Canadian swine breeders.

Close to 2000 purebred pigs were weighed and scanned multiple times to develop precise growth curves. A useful tool for this project that AGC continues to use, is a scale with an incorporated lift and modern ultrasound scanner. The software for this unit quickly measures not only back fat and loin depth, but also marbling. A thorough analysis of the

data has now led to the development of new statistical models to better represent the growth and performance of modern Canadian swine genetics. As markets evolve, AGC is well positioned to adapt accordingly to ensure our customers maximize profit.

## Sow Mortality Survey

In general, sow culling and mortality rates have increased over the past decade. The reasons behind this change are not well understood, and there is limited information available from Canadian herds on this topic. A Canada-wide survey funded by Swine Innovation Porc has been developed to help determine the underlying factors related to sow mortality and culling. The lead researcher is Dr. Jennifer Brown from the Prairie Swine Centre and University of Saskatchewan. Most producers using AGC F1 sows aren't seeing these high rates, nevertheless, your participation in this survey will benefit both yourselves and the industry as a whole. Please contact us to find out how to contribute.



Weighing and scanning a Duroc for meat quality traits on a BioQStation

Group sow housing questions

10. What year was your group sow housing implemented?

11. When are sows mixed into groups?  
 <7 days after service  
 7-20 days after service  
 21-35 days after service  
 >35 days after service

12. What is the group size?  
 <100  
 101-400  
 401-700  
 701-1000  
 >1000