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In this 2018 World Pork Expo edition of the INSIDER we present recent highlights of the Topigs Norsvin Research and Development Program. These stories demonstrate Topigs Norsvin’s commitment to improve the performance of our products, to increase profitability for our customers, and to enhance the sustainability of pork production. Please contact your local Topigs Norsvin representative to learn more.

Topigs Norsvin implements PRRS resistance

PRRS is considered the most costly disease in swine. Several factors contribute to the economic significance of PRRS: PRRS can affect pigs during all stages of production, PRRS is difficult to control, and no effective PRRS control strategy is currently available.

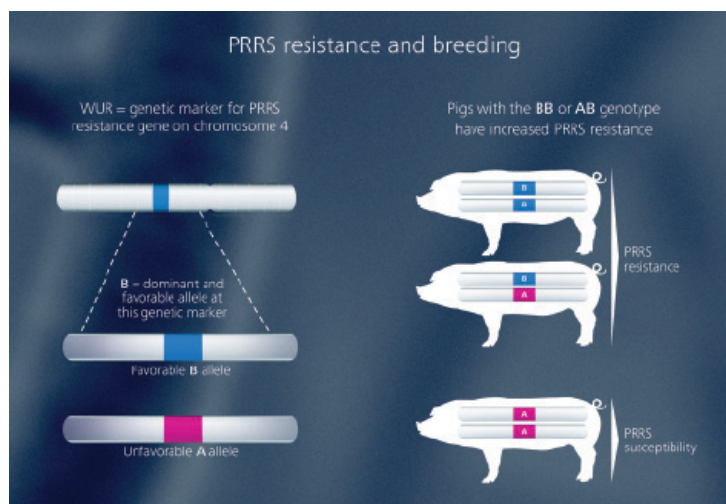
Some pigs and some breeds appear better able to cope with PRRS than others. Genomic regions that are associated with PRRS virus load and post-infection weight gain were identified by performing a genome-wide association study. Such studies combine genetic information with trait information to identify chromosomal regions associated with the trait of interest.

Topigs Norsvin implemented selection for increased natural resistance to PRRS by using the WUR SNP in breeding value estimation. The WUR SNP is a genetic marker for a major gene associated with natural resistance to PRRS.

Several research trials have demonstrated that pigs with the favorable WUR genotype were more resistant to PRRS as a result of lower virus load and greater daily gain upon challenge with the PRRS virus. This means that pigs with the favorable genotype were better able to cope with the infection, thereby reducing the overall economic impact of disease. Implementing selection for increased resistance to PRRS in the Topigs Norsvin breeding program presents a natural, readily available control strategy for the most costly swine disease in the world. By incorporating WUR SNP genotype into the breeding program, Topigs Norsvin has

introduced an effective defense mechanism against this economically important disease.

Topigs Norsvin continues to invest in breeding for natural disease resistance to specific diseases like PRRS, as well as general robustness to disease challenge. This will lead to healthier and more sustainable pig production.

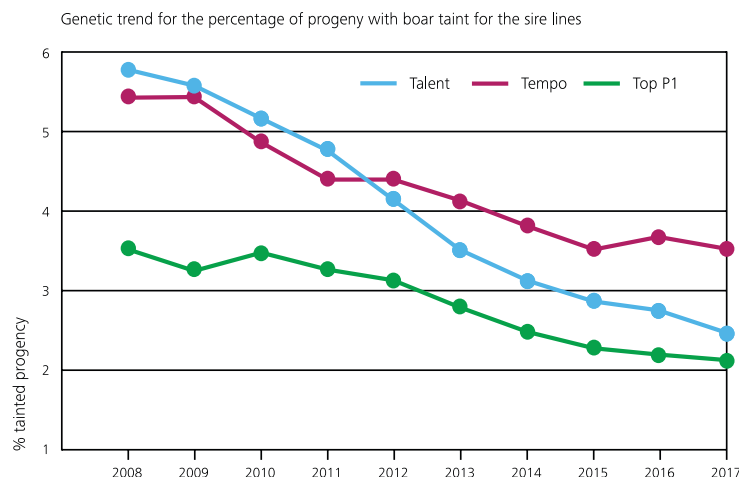


Topigs Norsvin finds new genes to reduce boar taint

Topigs Norsvin researchers found new genes that influence the occurrence of boar taint. The genes influence the level of skatole, one of the hormones that cause boar taint.

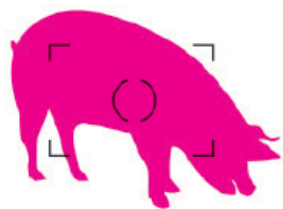
In 2012, Topigs Norsvin was the first company to start breeding against boar taint. Using a combination of human nose scores, biopsies and genomic information, boars that inherit less boar taint can be sorted or selected for. In the last few years, Topigs Norsvin has improved the technology to select and sort genetics with low boar taint. Selection on low boar taint is now part of the breeding of both dam and sire lines.

The Nador concept for boars makes it possible to reduce boar taint by 40% with a selected group of boars at the AI station. Large steps can now be made thanks to the latest breeding value calculation models that include genomic information.



Precision phenotyping

New techniques offer new possibilities for precision phenotyping. These traits may raise the level of animal welfare or contribute to a higher feed efficiency and higher quality of the carcass and meat. In short, traits invaluable for more sustainable pig farming.



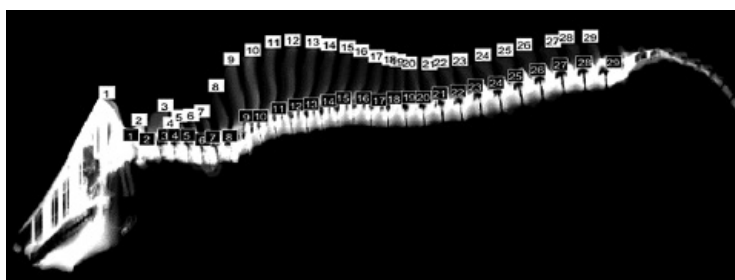
Camera

With video imaging-based precision phenotyping, the camera replaces the human eye in monitoring, registering and interpreting characteristics or behavior. Video cameras are much better at providing daily estimates of the weight of an animal or registering deviations in its movement.

These are important characteristics for total feed efficiency and longevity.

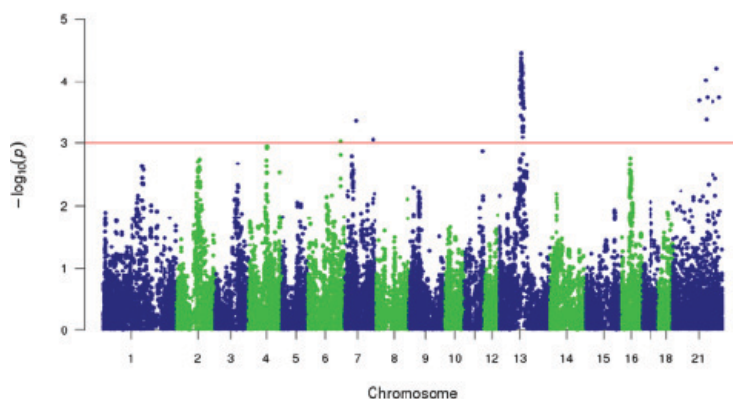
CT Scanner

CT scan technology opens even more doors, because it offers the possibility to look inside a live pig. Thus, CT scanning provides for rapid assessment of potential new breeding values as we do not have to produce offspring in order to determine the hereditary characteristics of new traits. The CT scanner can, for example, easily determine the number of vertebrae, which is connected to the number of teats and, consequently, to the number of piglets a sow can raise by herself.



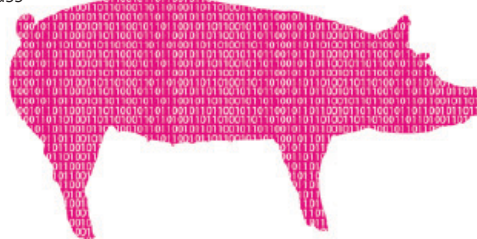
Additionally, the CT scanner is better at diagnosing osteochondrosis than the vet and it can measure the size and form of organs as well. This gives information about longevity and disease resilience traits.

Osteochondrosis Total Score (OCT)



Pig Atlas

Topigs Norsvin collects the actual and historical CT scan data in the Pig Atlas, which currently includes data from over 25,000 pigs of the Norsvin Duroc and Norsvin Landrace. This Atlas will become available for the TN Tempo and Z-line as well in 2018. The Pig Atlas is an important tool for accurately predicting the carcass conformation of pigs, which may help make pig farming more sustainable and could result in carcass composition that is tailored to consumer demands.



Indirect genetic effect for daily gain and animal welfare

Performance traits like growth are influenced by the environment and the genetics of the pig. In addition to genetics, nutrition, health and room temperature can all have a significant influence on the performance of the pig.

Pen mates also influence each other's performance. For example, the behavior of one pig can disturb the feeding behavior of the other pigs, resulting in reduced gain. It is also possible that a pen mate can have a positive effect on the performance of the rest of the pigs in the pen.

This indirect effect of one pig on the weight gain of pen mates can be estimated by models which use data on the growth performance and pen composition, and is somewhat heritable. In research trials, it was

demonstrated that the breeding value for indirect genetic effect for gain partly explains damaging behavior, such as tail biting, which is observed in group-penned pigs.

Pig producers dock the tails of piglets to prevent tail biting when they get older. The economic losses from tail biting are significant for the producer as tail biting can lead to higher morbidity, mortality, suppression of growth rate and condemnations of the carcass at the slaughter plant. Pig producers want to ensure that the animals in their production system continue to perform under the new regulations and provide maximum value. By taking indirectly heritable effects into account, Topigs Norsvin can more effectively select for improved growth performance and animal welfare.



Commercial Concepts AI now distributing Topigs Norsvin semen

Commercial Concepts AI now collects and distributes semen from TN Tempo and Norsvin Duroc boars to customers in the Eastern Corn belt and Mid-Atlantic regions of the USA. Commercial Concepts is a welcome addition to the Topigs Norsvin USA family of boar studs that enhances both our distribution and availability to meet the growing demand for Topigs Norsvin sires.

Commercial Concepts A.I. began in 1992 with 20 boars and one employee. Today, Commercial Concepts houses nearly 1,000 boars across four different studs in Pennsylvania and Maryland and provides multiple genetic options for its customers. Commercial Concepts produces and delivers over 1 million doses of semen to customers annually.

implements to protect his customers' biosecurity. Providing a safe and reliable source of the highest quality semen has created a loyal customer base.



Over the last 25 years, Commercial Concepts has grown in size, but also in reputation. Herd health and semen quality remain top priority for J. Mac Magee (General Manager), as does the strict policies and protocols he

Producer Profile: Silver Corners Inc.



The Terpstra Family

Tara and Dennis Terpstra, along with their sons Cameron (12), Reid (10) and Tyler (7), are pork producers in Huron County, Ontario. They own and operate Silver Corners Inc. which includes 650 acres of farmland. Typical crop production consists of growing 270 acres of soybeans to sell and the remaining 380 acres are planted to corn. The corn acres will fill their silo with high moisture corn for the grower and finishing pigs. The best corn (all fields are tested for toxins before harvest) Dennis dries and stores for use in gestation, lactation and nursery feeds. All feed is milled on farm with the exception of the first phase of nursery feed which is purchased.

In 2015 they began construction of a group sow housing facility for 370 sows. This was part of a plan to raise their hogs on an RWA (Raised Without Antibiotics) program. Dennis and Tara had no experience with sows going into this project so everything was a learning experience. They spent a lot of time visiting with other producers, asking questions and looking at barns for ideas. The construction started late in the year and was finally completed in September of 2016. Along with their barn and equipment fact-finding missions, they also researched various genetics companies and their products. After completing their research, they felt that the best program and animals were available from Topigs Norsvin. The first TN70 gilts arrived in early October 2016.

Not only were the Terpstra's lacking in experience managing sows, but Tara was born and raised in the city, so owning and managing sows was a much larger commitment than running only finishing pigs as they had in the past.

The barn is well built, constructed with concrete walls, and equipped with the AirWorks Ventilation system. The gestation area consists of two dynamic groups using the Schauer electronic sow feeding system on a slatted floor with solid floors in the laying cubicles. Sows are weaned into breeding stalls and are introduced into one of the dynamic groups once they are no longer in standing heat. A gilt training area and a few hospital pens make up for the balance of the gestation barn. Mixing into the dynamic groups has worked really well. Minimal aggression occurs due to



Happy and content TN70 sows

having many sows in each group and the TN70 having a very sociable nature. The sows are also given blocks of wood and hanging toys to play with in the big pens.



Large litters of heavy piglets from TN Tempo

The farrowing rooms are all equipped with Verijken lift decks as well as creep area covers and hot water heat pads for the little pigs. This allows them to lower the room temperatures for the sow's comfort. The sows are also supplied with a meter long piece of burlap a couple of days before they farrow. The burlap allows the sows to exhibit their natural nesting behaviour as they pull and play with it. The burlap helps to relax the sow and creates a calming environment in the farrowing pen.

The Terpstra's chose the TN Tempo as their terminal sire. Dennis had bought Tempo weaner pigs from another producer to keep his finishing barn full while the sow barn was being built. He liked the way the way Tempo pigs finished and thus carried on with Tempo when they started breeding their own gilts.

Shortly after they started farrowing the new herd, they suffered a setback in production and health. An aerosol transmission of PRRS infected their new herd. They had no choice but to work their way through the PRRS break. Pigs weaned per sow per year dropped to about 23 at its lowest point. Since stabilizing the PRRS, production has steadily increased to their current 31.7 pigs weaned/sow. Mortality has been excellent as well with only 6% to 8% pre-weaning mortality in farrowing. Mortality has been maintained at less than 2% in the nursery and less than 1.5% in the finishing barn.

At a weaning age of 22 days the piglets move to hot nursery rooms where they stay until being moved to the 4,000 head finishing unit. The finishers are all fed high moisture corn through a liquid feed system. "The TN Tempo sired pigs are performing extremely well," said Dennis. They are

shipped to the Sofina processing plant in Burlington, Ontario and do very well on their grid where the target carcass weight is 95-100 kg. The growth rate in the finisher is 952 grams per day from 25 kg to 125 kg. Pigs are averaging averaging 105 days in the finishing unit. "We have loads of pigs that index over 110 with 16mm of backfat, 65mm loins and over 62% lean yield which we are happy with," stated Dennis.

"We couldn't be happier with the pigs and performance we get from the Topigs Norsvin products," said Tara, "the service we receive from Topigs Norsvin has been great and we look forward to even more successful results and long-term farming career for our family."



Uniform, fast growing TN Tempo pigs

InGene – The best “homemade” sows

With InGene you can produce Topigs Norsvin sows on your own farm using the knowledge and support of Topigs Norsvin. You effectively become the multiplier for your own farm and benefit directly from the genetic progress of Topigs Norsvin.

With InGene, a part of the sow herd on a farm is pure line. The pure line sows (Z-Line; Large White) with the best TSI are inseminated with semen of the same line to breed the next generation of the pure line sows on the farm. The balance of the pure line sows are inseminated with a different pure line (Norsvin Landrace) to produce F1 parent sows (TN70).

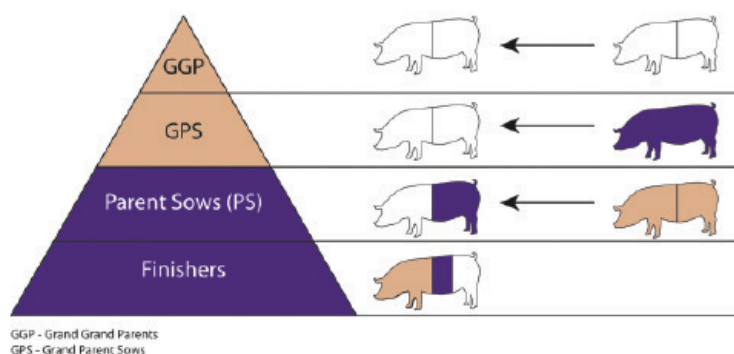
With this breeding program only semen is introduced to the farm, rather than live animals, which minimizes health risks.

But most important: the InGene program gives producers access to semen of the highest genetic value, from the top of the Topigs Norsvin breeding pyramid. And that pays off in an age where genetic progress is faster than ever before.

But InGene is more than the best genetics. It is also about being connected to the worldwide breeding program of Topigs Norsvin. The third element of InGene is the support provided by our breeding specialists. With their knowledge and expertise they help producers to use InGene efficiently and with maximum added value.

InGene is:

- **Best genetics from the top of the breeding pyramid.**
- **Knowledge and support from Topigs Norsvin specialists.**
- **Reduced health risks.**



Schafer Farms, Inc.: Sales agency for Topigs Norsvin USA

Topigs Norsvin USA is pleased to announce an agreement with Schafer Farms, Inc. (Goodhue, MN) to become a swine genetics sales agency for Topigs Norsvin semen and gilts. Schafer Farms (SFI) includes both parent multiplication at the home farm (1,600 sows) and pure line multiplication at Hay Creek (650 sows). SFI is co-owned and operated by Brandon Schafer, a sixth generation pig farmer and past-president of the Minnesota Pork Producers Association.

"Topigs Norsvin is focused on improving production at the slat level," commented Brandon regarding his decision to work more closely with TN USA. "It became quickly apparent to me that this is a producer-owned company operates with a producer's mentality that is reflected in its breeding goals, the results of which I have seen on my farm since 2008."

"The TN70 is very sound on her feet and legs," noted Brandon. "She stays in the herd and has nice depth of body, providing both uterine capacity and capacity for feed intake." And, more muscle. "The TN70 is both leaner and has an improved temperament," commented Schafer, noting the simplicity of moving animals across scales and into stalls. "And she is a very self-sufficient sow that farrows easily and is quick to ramp up on feed."

"Plus, she has the pigs," Schafer added. "The TN70 defies the odds – improved reproduction, greater ease of management, improved carcass merit and production traits all together in one product."



Brandon Schafer



Schafer Barn



Schafer TN70 Weaners

More live-born piglets expected thanks to discovery of harmful genetic mutations

Fewer piglet deaths during gestation and improved sow welfare. That is what researchers from Animal Breeding and Genomics of Wageningen University & Research (WUR) and Topigs Norsvin want to achieve. They identified the genes associated with stillbirth among pigs and published their findings in the BMC genomics journal. These findings will lead to more live-born piglets by avoiding matings between two carriers.

Reducing the number of stillborn piglets is one of the major goals in the pig breeding industry and contributes to the improvement of overall animal welfare.



Finding the mother's genes that help piglets to survive

The success of producing significantly larger numbers of live-born piglets at birth means that more attention needs to be paid to the sow's rearing ability. For some time the selection indices have been devised so that increases in numbers born are matched with increases in the number of teats on the sow. A ground-breaking study by the genetics and genomics research platform is giving researchers an insight into how genetics impacts on the number of teats. The number of teats is an easy trait to measure and so we have incorporated this into our breeding goals, as it is an important trait for piglet survival.



* Number of teats 72,000 TN70 gilts born in 2017

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Eastern Iowa AI

Spragueville, IA
Doug Peterson
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Mar-Ke Semen Service

Sharon, WI
Keith & Marie Rithamel
(262) 736-2345

Ai Partners-Skylab

Morris, MN
Bruce Zierke
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Whole Hog AI

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Andrew Buesekom
(888) 553-4844

Carlo Genetics Inc.

Ste. Anne, MB
Kyla Ripley
(204) 355-4012

Total Swine Genetics Inc.

Tillsonburg, ON
Stuart De Vries
(800) 844-9913

C & M Genetics

Lucan, ON
Dr. Corneliu Oltean
(888) 259-7594

Sunrise Genetics

Amherst, NS
Mike MacDonald
(902) 661-7883

US Sales Agents

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Abe Fisher - Sales Agent
(717) 615-8378

Hamilton, IL

Terry Turner - Sales Agent
(309) 337-5291

AgCentral

Canistota, SD
Keith Letcher - Owner, Sales Manager
(605) 661-5819

Topigs Norsvin Insider Quiz

How to Play

Please answer the questions in our Insider Quiz. All the answers are in this newsletter. Then fax, mail or email your answers, along with your name, address, and phone number to:
Fax: 204-489-3152
Email: info@topignorsvin.ca

Entries are to be received by **July 31, 2018**. The first 10 entries drawn with the correct answers will receive a \$20.00 gift card. The Topigs Norsvin rep in your area will deliver the prize. Employees of Topigs Norsvin and their subsidiaries are not eligible.

Topigs Norsvin INSIDER Quiz Winners

Winners from the Spring 2018 issue will receive a \$20.00 gift card. Here are the winners from the last issue:
Ron Entz, River Road Farms, AB; Mac Wurtz, Jamesville Colony, SD; Ben Waldner, Midland Farms Co. AB; Benjamin Waldner, Eagle Creek Colony, MB; Joey Waldner, Sturgeon Creek Colony, MB; Carlene Kleinsasser, Westview Colony, MB; Hannah Hofer, James Valley Colony, MB; Jolina Entz, New Rockport Colony, AB; Clifford Waldner, Shamrock Farms, SD; Andrew Wollman, Sprucewood Colony, MB. The Topigs Norsvin rep in your area will deliver your prize. Congratulations!

How many tubes of semen are produced annually at Commercial Concepts? _____

Which SNP is a genetic marker for a major gene associated with natural resistance to PRRS? _____

How many total sows in parent and pure line multiplication at Schafer Farms? _____

What is the current number of pigs weaned/sow/year at Silver Corners? _____

Name: _____

Farm Name: _____

Address: _____

Phone #: _____ Fax #: _____ Email: _____

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