News

Pig Research Centre

DanBred pigs ahead in development

October 27th, 2011 DanBred announced the use of genomic information in all breeds and for the entire range of traits in the Danish breeding objective. The genetic gain is expected to increase by 20 percent annually. Denmark is the first country to apply DNA information in the breeding programme.

Today, breeding is based on mating the best boars and sows with each other to create a genetic gain in the next generation. The challenge is to pinpoint the animals, which genetically seen are the best. Now this method is changing due to genomic selection that is based on DNA testing.

-Due to genomic selection, DNA testing is a useful tool in determining the best animals. This ensures a greater genetic gain in every generation. Genomic selection boosts all the traits within the breeding objective. In less time, this new approach enables us to obtain much better results in relation to for example better survival, better feed conversion and a decreased impact on the environment, says Mr Nicolaj Nørgaard, Director of the Danish Pig Research Centre, the Danish Agriculture & Food Council.

Approximately EUR 0,25 more per finisher per year

In recent years, breeding has resulted in an expected gain in production of approximately EUR 1,35 per pig per year. It is expected that this gain will increase to EUR 1,6 by the time the effect of genomic selection has reached its full impact on production.

-All traits will be affected positively, but especially feed conversion and the amount of live born piglets. The improvement in our breeding will also lead to increased interest of DanBred genetics globally, says Nicolaj Nørgaard.

International standard

Throughout many years, the Pig Research Centre has been focusing on genomic approaches and their potential for breeding. Genomic selection in DanBred is based on collaboration with the Research Centre Foulum, part of Aarhus University, Denmark. In Foulum, research in the field of genomic selection is internationally respected.

-We use software and methods developed in Foulum, ensuring that we continue to be ahead in research and development. – and that we use the full potential in genomic selection. This also ensures that the latest research findings are applied as fast as possible, says Nicolaj Nørgaard.

Facts about breeding and genomic selection

Traditional methods in breeding work

Breeding is based on the selection of animals with the best genetics and to use these for future generations. Genetic improvement depends, among other things, on our ability to select the best animals. Throughout the last 30 years, DanBred's breeding work has been based on information of the family. Thus, the breeding value of an animal is determined by its test performance, how the offspring copes, how well the animal's siblings cope, etc. Until now, this method has created great progress within the Danish DanBred breeding system.

Breeding with genomic information

Genomic selection extends this principle and makes it possible to apply tests from animals other than the immediate family. Animals, which are not closely related can easily share a lot of DNA information. Measuring the feed conversion of a distant relative by means of DNA testing for instance can be used to reveal information about the breeding value of an animal, which has no information on feed conversion of close relatives. We obtain a greater benefit of the few measurements of feed conversion that we have, and consequently more genetic gain.

In applying genomic selection, the DNA of the best animals will be tested, only, resulting on a yearly basis in approximately 2,000 animals per breed. The actual test is carried out by hair extraction from the animal, which then is sent to a laboratory in the United States of America. The result of the analysis is 60,000 points on the animal's DNA string with a possibility of three different values each. The results are then used by DanBred to calculate the animals' extent of similarity on their DNA level, providing information that leads to increased genetic gain. The use of genomic selection in pig breeding was established in a collaboration between the Pig Research Centre, the University of Beijing, Aarhus University and the University of

Copenhagen by sequencing the DNA of pigs. This cooperation was finalised in 2007/08. Information obtained through this cooperation forms a part of the underlying basis for the DNA chip manufactured by American Illumina, which is applied in breeding today.

DanBred is a global concept and brand, owned and managed by the Danish Pig Research Centre. We develop, market and sell breeding material from one of the worlds most innovative breeding system to maximise the benefits of our customers. Our global customers benefit from a complete three-way crossbreeding system based on more than 100 years of analysis, research and development. And our customers are guaranteed a documented economic effect based on our universal and robust breeding objective.