

A recent report in the national press (1) stated that, at any given time, farms in Norway have a total pig population of 60,000. It was also reported that the standing worldwide pig population at any given time that is produced via Norsvin insemination is 1 million, many of them in the USA. NBS-Nytt talked with Eli Grindflek who is R & D Manager for Norsvin at Ås about how molecular technologies are being exploited to improve Norsvin's international market position.

Norsvin is a cooperative owned by 1650 pig farmers in Norway. Since 2004, CIGENE on the NMBU campus at Ås has been the locale for the company's genome screening program. Using the Illumina 60K Porcine SNPchip, the research team headed by Eli Grindflek has screened approximately 8,000 male pigs since 2008. The average number of polymorphic SNPs per animal is about 40,000.

Parallel with the genome profiling work at Ås, Norsvin conducts animal phenotyping studies, including CT scanning of approximately 3500 animals per year to determine meat-to-fat ratios and to check for abnormalities, for a total of 30 different characteristics. Some of the most important features include: feed efficiency, growth rate, lean meat %, meat quality, litter size and piglet survival.

Combining the SNP data with results on animal characteristics, Norsvin can calculate a relative breeding value (2) for the entire population in Norway and for the semen that is sold to other countries for insemination. Norsvin is the largest supplier of pig semen in Finland, Norway and Sweden with a market share, for example, of 40% in Sweden in 2013. Through its subsidiary Norsvin USA plus partnerships, it is making inroads in the market in the USA, too.

According to Eli Grindflek, Norsvin is basing its business strategy on genotypes with superior characteristics, including feed efficiency, and on a robust and sustainable breeding program using their genomic selection platform. As far as feed efficiency is concerned, high feed costs for pig production in

Norway have made it a priority to develop genotypes that will produce the most meat per unit of feed consumed. Norsvin's success is shown in Fig. 1 which is based on results from Norsvin's Annual Report 2013 (3). Fig. 1 shows improvements since 2008 for two important characteristics; namely, days to grow pigs from 88-265 pounds and pound decreases in feed requirements during the 88-265

pound interval. For both characteristics, breeding has given consistent and significant gains.

Animal breeding concepts have changed during the last 10-20 years. Eli Grindflek says, "It used to be popular to search for major QTLs (quantitative trait loci) that could give us good markers for quality. As an approach for animal improvement, this was only



Eli Grindflek

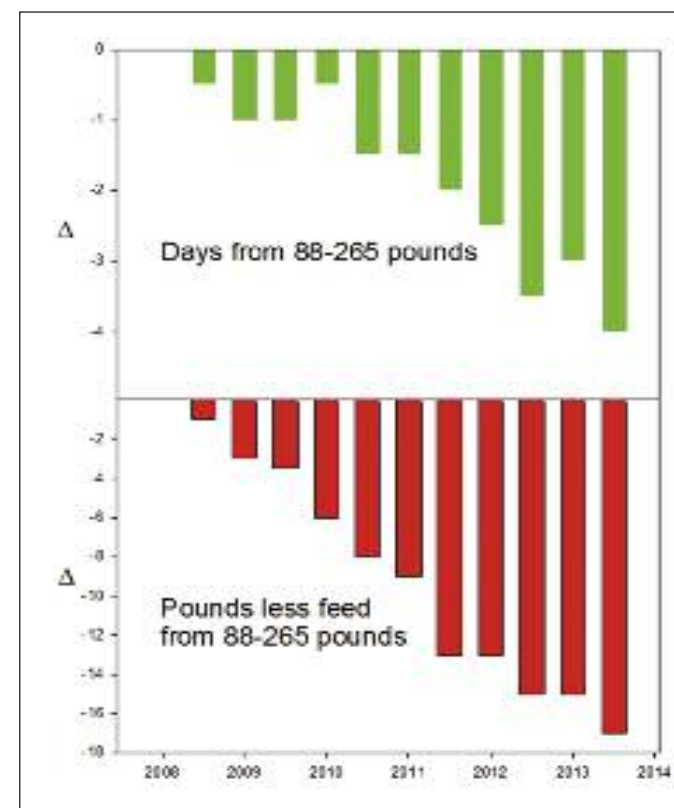


Fig. 1. Pig characteristic improvement from 2008-2013. The results show that the number of days for 88-265 pounds has decreased by 4 days since 2008 (top panel) and that the amount of feed required for this weight gain has decreased by nearly 20 pounds (lower panel).

marginally successful. While we would still like to find major QTLs, our current approach assumes that any trait of interest is dependent on many genes spread across the genome. We focus now on using molecular and statistical methods to determine the sum of effects of a large number of polymorphisms. The other new aspect of this approach has to do with a more precise determination of genotype. In the old days, breeders would look at pedigrees and make assumptions about the probability that any given trait would be inherited by offspring. Today, using genomic screening technology, we can determine for certain whether a SNP has been inherited by a given individual. It also gives us the advantage that we can get a good idea of an individual's genomic potential even when we are not certain about its pedigree."

Norsvin has high ambitions and feels that the genome screening approach has already proved itself. They also believe that their genetic material for optimum

feed efficiency is the best in the World. It will be interesting to see whether Norsvin's strategy can be used successfully for other farm animals and for plant breeding, too, in a recently funded project entitled 'Genomics for improved sustainability and competitiveness of Norwegian breeding programs on livestock, aquaculture species and plants' which aims to implement genetic breeding for dairy cattle, pigs, Atlantic salmon, wheat and forage grasses.

## References

1. Aase BB. Norske grisar erobrer utlandet. Nationen, 22 March 2014
2. Meuwissen THE, Luan T, Wooliams JA 2011. J Anim Breed Genet 128: 429-439
3. Norsvin Genomics 2013 Annual Report, 58 pp.

## Skal du arrangere et vitenskapelig møte?

Mulighet for gratis annonsering i NBS-nytt

Dersom NBS-nytt har ledig plass så tilbyr vi gratis annonsering av vitenskapelige møter som er av interesse for medlemmene.

Kontakt redaktøren (tore.skotland@rr-research.no) dersom du ønsker å benytte deg av denne muligheten.



FORFATTER: JOHN EINSET, UNIVERSITET FOR MILJØ- OG BIOVITENSKAP (NMBU), ÅS  
E-post: john.einset@nmbu.no