

PIC® Genetics Update

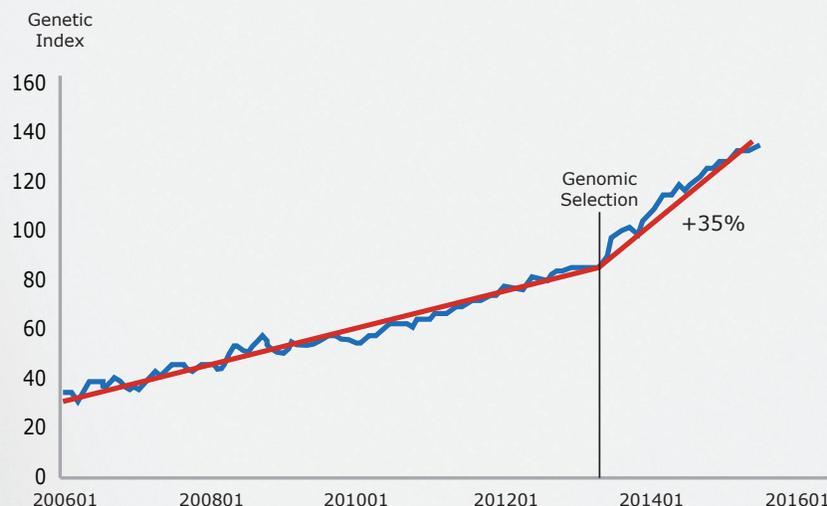
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➤➤➤ The next step-change in genetic improvement – Sequencing the PIC Genome

Relationship Based Genomic Selection

In 2013, PIC was the first swine genetics company to utilize tens of thousands of genotypes per animal to increase annual genetic improvement across all lines and traits. This new way of selection, Relationship Based Genomic Selection, used our repository of millions of pedigrees and traits along with the new genotypes to improve all lines and all traits faster than ever before. Three years into this process we are realizing historically unprecedented genetic trends at the commercial pig level.

PIC Genetic Trend



Our genomics program only works with the vast database of unique traits valued by the pork supply chain. In addition to unique traits such as individual piglet birth weight, we will collect growth, robustness, primal yield, and meat quality traits on over 170,000 commercially pedigreed pigs composed of full-program PIC maternal and terminal genetics during the next 12 months. Through this program we test every elite sire that impacts the global PIC genetic improvement program.

While we believe these programs are creating a sustainable pipeline of the most elite genetics for our customers, we continue to re-invest in the next wave of technologies that will allow our customers to expand their competitive advantage.



The next step-change in genetic improvement – Sequencing the PIC Genome (cont.)

Sequencing the PIC Genomes

The genome of the domestic pig has around 3 billion nucleotides, similar in size to humans. Today, PIC captures a small portion of the sequence (around 80,000 locations) in our genetic improvement program. Every young boar and its dam produced in PIC genetic nucleus farms are genotyped with this platform. However, if full sequence information were available we could increase genetic improvement at even a faster rate.

Ongoing sequencing work in humans has led to many breakthroughs in how to better understand disease, make new and improved vaccines, identify more genes, and treat cancer to name a few. While these things have indirect and parallel benefits for animals, the vast amount of work in this area has improved the quality of sequencing technology and markedly driven down the cost of sequencing. Today, while still not practically affordable to sequence all PIC animals born into the genetic supply chain, we are investing heavily to better understand and exploit this technology.

In November 2015, we embarked upon a collaboration with the Roslin Institute to fully sequence the genome of over 14,000 PIC animals. These animals represent all terminal and maternal lines in the PIC gene bank with corresponding economically important performance data, which drive today's genetic improvement program.

We believe there are numerous possibilities with this project. Minimally, we will be able to further enhance benefits in accuracy of Relationship Based Genomic Selection by having all genome sequence information possible from any one animal. Other possibilities include identifying resistance genes for diseases that challenge our industry. We will also utilize the findings to further understand new areas of epigenetics as well as maximizing combining ability of specific genotypes for PIC commercial products. By re-investing in the future of genetic improvement in this multi-million dollar project, we believe we will deliver the fastest genetic improvement to our customers in the history of PIC.



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