



GNXbred Breeding for productivity is more accurate than ever before

Rather than focusing on selecting for single traits (which may rapidly improve performance of specific, individual phenotypes), PIC measures and selects a comprehensive range of traits using accurate information and with only one goal in mind - improving productivity. This article expands on the theme by describing PIC's GNXbred program and how this contributes to increased accuracy of selection and increased customer productivity.

What is GNXbred?

Genetic Improvement of Pure Line GN (Genetic Nucleus) animals is pointless unless that improvement is observed at commercial level. The objective of PIC's breeding programme is to maximise the rate of genetic improvement (delta G) so that the performance and productivity of the breeding animals **and their commercial offspring** increases generation after generation. PIC's GNXbred program measures performance of the cross-bred progeny of pure GN herd sires in commercial environments with the sole objective of selecting pure line animals for the performance of their **commercial offspring**.

How does it work?

Single-sire matings using semen from pure line GN boars are performed in commercial disease challenged producer farms (point 1, Figure 1). Reproduction and longevity data from commercial sows (point 2a, Figure 1) and mortality, production and carcass trait data from commercial cross-piglets (point 2b, Figure 1) are recorded and fed into PICtraq, PIC's proprietary database. This information is used in combination with the animal's own performance and that of its pure line relatives (point 3, Figure 1) to calculate Cross-bred Breeding Values (CBVs) of the pure line animals at the GN (point 4, Figure 1).

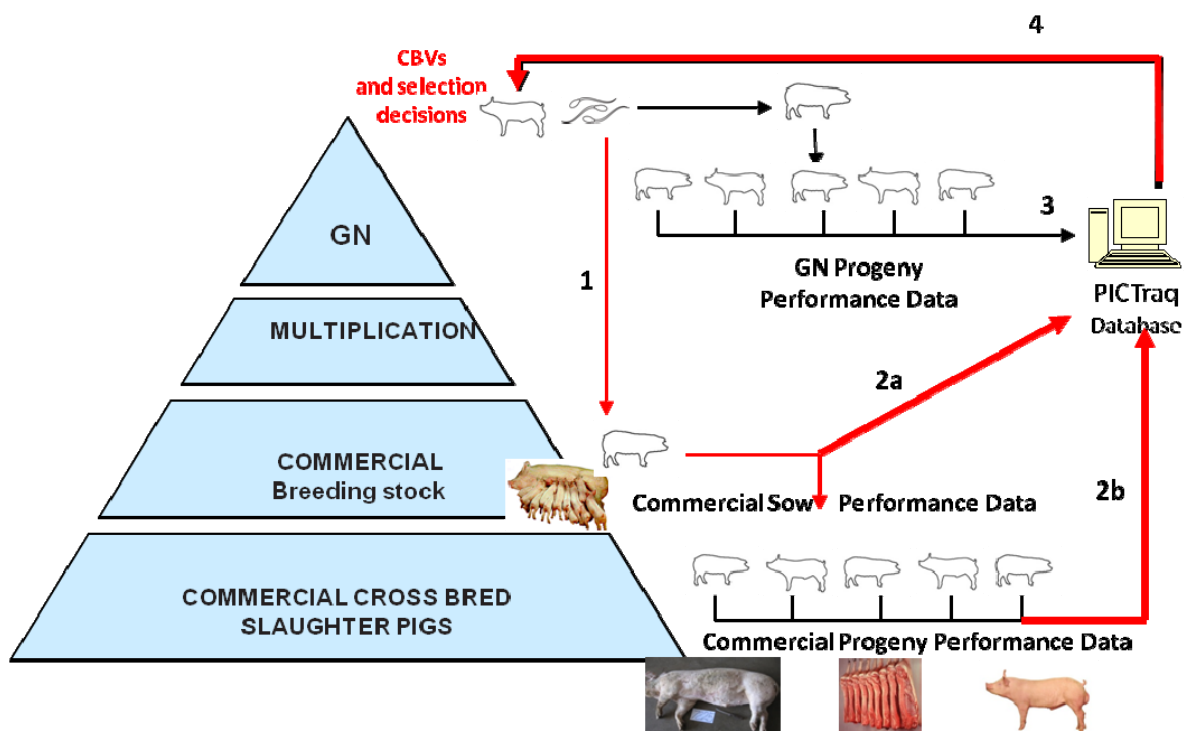


Figure 1: Schematic summarising the set-up and data flow for PIC's GNXbred program

Current Status:

The **Sire Line** GNXbred programme (recording mortality, production and carcass trait data from commercial cross-piglets (point 2b, Figure 1)) started in 2003 and now has >100,000 commercial pigs tested.

The **Dam Line** GNXbred programme (recording reproduction and longevity data from commercial sows (point 2a, Figure 1)) started more recently in 2007 and so far, 18,781 cross-bred females are in place with 36,022 farrowing records in PICtraq.

Sire Line GNXbred	
Total no. commercial carcasses tested to date	100,000+
No. commercial pigs born alive July 2008 – June 2009	49,437
No. carcass data loaded in PICtraq in FY2009	33,453

Dam Line GNXbred	
Total no. GNXbred sows placed to date	18,000+
Total no. commercial farrowing records to date	36,000+

Increased Accuracy:

The inclusion of GNXbred data allows calculation of CBVs for performance of commercial sows and finishing pigs rather than traditional pure bred Estimated Breeding Values (EBVs). These CBVs are significantly more accurate than EBVs (that only focus on pure line performance).

Trait	% Increase in EBV accuracy after inclusion of GNXbred data
Total Number Born	64%
% stillborn	35%
Scrotal hernia	40%
Mortality in finishing	>100%
Loin pH	71%

The end result of these efforts is that real world commercial performance data contributes to the selection of pure line animals. This means that:

- Breeding values are more relevant to our customers - they represent commercial performance of cross-bred sows and cross-bred slaughter pigs.
- It is now possible to measure and improve pure lines for traits such as robustness and piglet survival. That has not previously been possible using standard genetic improvement techniques.
- Breeding values are more accurate than has ever previously been possible. That means that genetic progress is faster than ever.

Summary:

PIC now routinely measures 49 traits that affect the productivity of pig production. Many of these are also measured at commercial level through GNXbred:

- Robustness and mortality of both the sow and her offspring at different phases of life
- Female reproductive performance
- Grower-finisher pig performance
- Meat quality
- Carcass composition

Although the basic principles of Genetic Improvement have been applied by many pig breeders for a number of years, the difference here is that commercial cross-bred performance data are incorporated with the sole objective of **selection for improved customer productivity**.