Pig Genetics Discussion – PIC

Thursday 18 March

1855 – 2055

Date:	Thursday 18 March 2021
Time:	6:55pm – 8:55pm
Location:	Timaru and Zoom Meeting
Attendees	
Subcommittee members:	NAWAC Subcommittee (Chair Included)
MPI Secretariat:	MPI Representatives
Hosts:	NZ Pork Representatives
Invited Guests:	PIC Representatives Waratah Representatives

Meeting Summary:

A presentation was given by PIC representatives with contributions from Waratah, discussing trait selection in the pig industry and their heritability.

- PIC Genetics are used globally and across all herd sizes. Farms of all sizes require a pig with the same efficiency. The worldwide breeding programme has pedigree linkages between pigs in many farming environments, and their performance data allows PIC to make selection decisions for its nucleus herds. They select for pig genetics appropriate to a wide range of environments so that both large and small customers can access robust, productive genetics.
- PIC animals have traits that will improve their success across any system in any environment. As long as the sow is structurally sound and has been bred for maximising specific traits including mothering ability, she should perform across a range of systems.
- PIC customers in New Zealand have two parent female hybrid products available for outdoor or indoor systems. The outdoor hybrid has traits of lower litter size and fewer teat numbers compared to the indoor line, and more robust bone structure.
- Selection for birth weight increases survivability as does maternal ability as a separate trait. The number of piglets born per litter and piglet birth weights have been able to be increased simultaneously since 2013, despite negative genetic correlations between these traits, by using a Relationship Based Genomic Selection method which uses full genotyping of the pigs to strengthen relationship data between pigs. Similarly, the long-term genetic trends show that Finisher mortality has decreased at the same time as growth rate and Feed Conversion Efficiency have both improved.
- Biological limits to traits such as teat numbers are not clear at this time, but PIC disagree with assertions that with more teats the soundness of the pig will be compromised. Current teat

numbers in PIC females comfortably exceed litter size but reductions in functional teat numbers can occur on farms where teat damage by mastitis or piglet damage occur more commonly

- As genetics change, other aspects such as nutrition and environment need to be adjusted to support the changing needs of the animals. If this doesn't occur, behavioural problems can sometimes ensue.
- PIC's customers in UK outdoor systems use a similar hybrid female and report fewer piglets born compared to indoor hybrid females.
- PIC representatives consider that UK reports of outdoor farrowing systems with similar piglet mortality rates as indoor farrowing systems may not have accounted fully for all births. Thorough checking for all dead piglets in outdoor systems can endanger stock people if sow's attack. Further, some farms do not count pigs immediately after farrowing, with the delay allowing some losses to occur before counting is done. PIC quoted UK industry data from the last 3 years showing Total Born (Alive plus Dead) in outdoor herds around 2.0 pigs / litter lower than indoor herds. The PIC outdoor hybrid female is expected to record Total Born of around 0.9 pigs / litter fewer than the indoor hybrid female, suggesting that litter size outdoors may be under-recorded by just over a pig per litter. When this is compared to the Weaned/litter figure (which is the most dependable figure), then by subtraction the true figure for piglet mortality outdoors may be closer to 19% - similar to New Zealand outdoor figures.
- PIC believe New Zealand farmers must use global genetics to remain competitive. The NZ herd is too small for sustainable genetic variation with meaningful trait selection if it were closed. It always has and always will be dependent on regular importation of unrelated frozen semen to avoid increasing inbreeding coefficients in NZ purebred pig populations. Local farmers must increase maintain increasing efficiency in order to compete with imported pork products which are raised using these world class genetics.
- It was asserted that 90% of pork imports are from countries that do not meet current NZ welfare standards, with many still using gestation stalls (for either all of gestation or the first 4 weeks of gestation) which are illegal in NZ.
- Lameness and locomotor dysfunction are New Zealand's main reasons for sow mortality. PIC say this has declined significantly in NZ herds over the last 15-20 years as selection has focused on robustness and leg structure.
- Future selection using a genomics approach will include behaviour traits with European government funding providing 1.3 million euros to focus specifically on positive behaviours. The genetic component of negative behaviours (e.g. tail biting) are extremely difficult to measure since they are so intermittent and so influenced by a long list of environmental factors, hence the focus on positive behaviours may hold far greater promise in these areas.
- PIC representatives challenged NAWAC's opinion that the NZ pork industry should decrease litter size as a means to improve animal welfare:
    - increasing litter size does not necessarily compromise welfare as long as traits such as birthweight and teat numbers also increase at the same time.
    - Creation of a "custom line" of pigs to decrease litter size would need a customer base of 400 000 sows to justify return on investment - NZ has only 26 000 sows, and nowhere in the world is there genetic selection for smaller litters.
    - It is unlikely that any NZ pig farmer would willingly purchase breeding stock with selection pressure being applied to decrease litter size, unless financially compensated for the decrease in profitability.

    - Data from >80 000 sows in Australia was shown, where litter size is substantially lower than in NZ since Australia has been closed to pig genetic imports for several decades. Despite this, pre-weaning mortality still averages 12% in indoor herds – the same as in NZ and UK indoor herds where litter sizes are larger.
    - PIC explained how input costs (e.g. feed, labour, animal health etc.) increase steadily over time while the value paid for pig meat does not change, meaning the industry cannot stay competitive without increasing genetic efficiency. Increasing litter size also reduces carbon footprint, an expectation made of the global and NZ pork industry.
- PIC's European market observations were that the pork production base is shifting, and will continue to shift, from countries with higher welfare and environmental requirements to countries with lower requirements - having the overall effect of a net decrease in animal welfare. While PIC supports increase in animal welfare standards, they are disappointed to observe such trends working against the intentions of regulators in certain countries. It is feared that the same may occur in the New Zealand pork industry if welfare requirements damage the profitability and the confidence to invest in the local industry.