JSR 1

Genetic selection for extra performance

Dr Grant Walling

On a recent overseas trip, future business targets were discussed with a customer who explained they were expecting to achieve a 3.7% per annum increase in the number of slaughter pigs produced, from the same number of sows.

As they were currently selling in excess of 25 pigs per sow per annum, it was clear their performance was good, but the challenge was trying to identify methods of achieving the target, as there were limited areas where management efficiencies would yield the necessary rewards.

Connecting to a well-run genetic programme will deliver an additional 0.2 pigs born alive per litter, but with born alive across the business running around 13.5, this 0.2 pigs per litter only gives a 1.5% lift in the figures, so genetic selection would have to deliver more. This means looking for additional traits under genetic control that would assist in the improvement of number of pigs sold.

One obvious trait is teat number, which is often neglected by geneticists because the economic value of having an additional trait is difficult to calculate. The trait alone has no direct economic value, but if helping to reduce pre-weaning mortality, the value of an additional teat can be considerable, albeit difficult to model financially.

In addition, with the heritability of teat numbers in pigs being moderate and typically around 0.3, it is a trait worthy of consideration. It is particularly useful when the average litter size within a farrowing room becomes close to, or exceeds, 14 piglets, as this is often the selection criteria that have been used for teat number, when the gilts were first analysed for their suitability to enter the herd.

The other area to target for increased production is based around oestrus in the modern sow, specifically in the interval between weaning and oestrus.

You may argue that this period represents only a small part of the reproductive cycle of the sow and typically would be between 4-7 days. However, the difference between those three days represent a 2% difference in productivity of a sow over a year and therefore, plays an important part in contributing to achieving the 3.7% per annum target set by the business.

When we are dealing with high performing herds, it is the attention to these details that determine whether we can ultimately hit the targets in forthcoming years. The great news for geneticists is that this trait is heritable (around 0.2), as demonstrated by Jan ten Napel, consultant geneticist, over a decade ago and selection can reduce the weaning to service interval, resulting in animals with fewer empty days.

Oestrus in some modern lines can be unpredictable, is often difficult to detect and in some animals is only detected much later than would be expected for a first oestrus. This work suggests more genetic selection could focus on oestrus in the gilt to further improve the productivity of the herd.

Ultimately, delivering increased performance year on year is challenging and geneticists are often questioned about when we will reach some biological limit or exhaustion of genetic variation, which simply decreases and slows down the rate of response.

If we look at the broiler industry, where they have much more rapid generation intervals, we haven't seen any evidence that genetic selection has stopped delivering. In fact, the performance for traits such as breast meat yield and feed conversion ratio are exceptional and far exceed what many thought would be possible 20 years ago.

Overall, genetic selection keeps providing solutions and JSR Genetics, along with our management services business, Checkfarm, will keep assisting businesses around the world to design genetic programmes to ensure they are meeting their business targets. ■

JSR 2

Pork quality and your customer

Dr Grant Walling

The Pig Focus Asia event, which was held in Bangkok, Thailand, in early March, was a good opportunity for pig producers and those in the supply chain to hear about new scientific developments relevant to the Asian pig sector. As in previous years, the event was well supported and the quality of presentations and debates was excellent.

However, it was surprising how few talks referred to the final product – pork. In one presentation, the fact that the farm is the start of the human food chain was briefly highlighted, but many talks focused their efforts on the changes that can be applied on farms to deliver benefits to the pig producer.

Interestingly, the meat quality and food safety presentations were held in a different meeting, in a different room at the Focus Asia events – and herein lies the problem. Previous academic work, as well as studies at the JSR Food Quality Centre, has illustrated that all components of the supply chain impact on meat eating quality.

Adjustments to genetics, feed, management, transport and slaughter can all benefit or retract from the quality of the meat. However, with the exception of one presenter, who discussed the issues of boar taint, the speakers (and I include myself in this category) did not consider this to be an appropriate extension of their innovative trial work.

A number of Asian delegates bemoaned the relatively low price for pigs within their current market, yet the failure to engage with the consumer may be the very reason why price and demand is relatively low.

It need not be this way. At JSR, we are aware that changes in our genetics and production systems can significantly change the meat eating quality of a product.

Because of this, JSR sire lines are analysed for intramuscular fat (IMF), known to influence taste, at the end of the test period and beyond. In addition to this, slaughter progeny produced from JSR's genetics are regularly assessed for objective traits such as slice shear force, bite force, drip loss and colour, as well as subjective traits using a trained taste panel.

Overall, JSR can predict not only the impact on the pig producer from a change in genetics, but also the impact on the pork consumer. It is for this reason that we have the genetics, technology and technical know-how to produce pork with exceptional meat eating quality, and why we are committed to good quality pork in dedicated supply chains around the world.

If new technology and innovation in pig production is to be accepted by the consumer, we should all consider our impact on the final product and perhaps some speakers at Pig Focus Asia 2016 will remember they are part of the pork supply chain – not simply the pig production business. ■

Intramuscular fat scanning and colour assessment at the JSR Food Quality Centre.

Only capitalise on good price for long-term gains

Dr Grant Walling

At a time when there is an opportunity for many to operate with good margins, it is key for pig producers to optimise their performance …

The current restriction of imports over the concern of bringing disease into the country is leading to very high prices for pigs in Russia. The presence of African Swine Fever in Lithuania and Poland, and Porcine Epidemic Diarrhoea Virus (PEDv) in North America, means local producers are experiencing some of the best economic conditions they have ever seen.

This leads on to the question we are constantly asked – at what weight should I slaughter my animals? Producers often ask this when prices are good and the business is profitable, but what other adjustments can be made to the production cycle at this time to maximise long-term profit?

The first point is an obvious one to most – don't be tempted to sell pigs lighter to capitalise on the good price. Yes, there is a short-term benefit, but encouraging oversupply into a market has a negative impact on product value and fails to provide a profitable longer-term model.

If you are making $0.50 per kilo liveweight (I know many don't, but we are talking about record high prices) and have a contract to accept pigs up to 130kg liveweight, the profit potential is $65 per pig. Selling a pig four weeks earlier will likely reduce the profit to $50 per pig (a conservative estimate in lost profit), hence a 23% loss from the potential four weeks later. There are very few other investment opportunities that can offer such large returns in four weeks!

Hopefully this point illustrates the need to maximise the value in the slaughter contracts available to the business during more affluent times. So, what should pig producers be doing to ensure that pigs are achieving their maximums? The answer is to divert significantly more focus onto the feeding herd and the slaughter pig.

Most pig businesses can quote their conception rates, farrowing rates and numbers born almost immediately, but don't know their food conversion ratio and can only recount approximate growth rates. Pig businesses need to apply the same attention to feeding herds as they currently do to breeding herds. One of the problems is that most of the farm recording packages have very good, detailed statistics for the breeding herd and very poor data recording and analysis for the feeding herd. This means that, not only do we need to concentrate on the feeding herd, but we must also improve our recording systems if we are to benefit from an opportunity to generate greater profit for our businesses.

It is also appropriate to review sireline strategy. When writing an article several years ago, I highlighted the huge importance of feed efficiency, even at the expense of growth rate. However, at the time, we were experiencing record high feed prices and relatively stagnant selling prices internationally. Reviewing the same advice today changes things significantly. Feed is now a lot more affordable and prices are good. This means extra kilos equal extra profit and the best sire line previously may now be replaced with a faster-growing boar line, even if that animal is less feed efficient.

This has been demonstrated by several trials I have been involved with in Russia. A relatively small difference in performance between boar lines, especially for growth, can create a large difference in profitability per slaughter.

In some cases, very small changes in performance are generating $9 per pig additional profit per animal. For a well managed 500-sow unit, that equates to an additional profit of over $100,000 per annum additional profit.

Changing times for genetic selection

Dr Grant Walling

For the past four decades, breeding companies have been selecting animals based on production traits that are designed to maximise performance on customers' farms. This has involved improving traits like litter size in dam lines and growth rate in sire lines, and they have delivered significant results in breeding stock.

However, a number of sizeable changes are now very evident in pig genetics. Selection is now much more focused on traits that have indirect benefits, not just those that affect the specific economic values.

For example, at JSR we have been examining teat numbers. It's a trait that in itself has no direct economic value. However, on farms with high litter sizes – which are increasingly the norm with modern genetics – the additional teats could potentially ensure more piglets survive through until weaning. This, in turn, will have a positive impact for pig producers.

Another indirect trait that could have a positive impact is birth weight. This does not have an economic benefit in itself, as a newborn pig has no commercial value. However, by increasing the birth weight by 100g, producers can reduce pre-weaning mortality.

This topic was covered at the recent 10th World Congress on Genetics Applied to Livestock production, in Vancouver, Canada, where excellent work was presented by staff from Wageningen, a university based in the Netherlands.

They demonstrated the ability to reduce the variability in birth weight through selection. This is not because producers get paid for lower variability of birth weight, but because the economic outcome for pig producers is better through lower variability and lower pre-weaning mortality.

Along with this emerging trend is a focus on health, with many in the industry asking whether it's possible to select for animals with ability to resist disease. For some diseases, such as E. coli k88 and f18, there are genetic tests.

There are also known genetic markers for regions of the genome known to improve the animal's ability to resist porcine reproductive and respiratory syndrome (PRRS).

These do not give 100% resistance, but significantly improve the ability of animals to perform in a PRRS-challenged environment.

When it comes to other diseases, how can we produce animals better able to resist the impact of the disease?

Arguably, the best approach is to revert back to our selection of traits mentioned in the start of this article as indicators of the animal's health status.

Ultimately, producers are unconcerned whether an animal is wholly resistant to a disease or simply tolerant and high performing within its presence.

This means the best economic indicators are the very traits we have historically used, as they are much more relevant to our producers than any measure of immune response.

Perhaps the strategy of the past four decades can still help us in these changing times.

The Hampshire breed with its improved disease resistance.