Robustness Impacts Overall Profitability

Three areas help determine an animal's robustness.

The term "robustness" means different things to different people, but producers know it's an important component in raising pigs. William Herring, Ph.D., PIC Director of Genetic Development, sees robustness as the ability of the pig, through genetic improvement, to grow and convert feed, to become a full-value market hog with a low potential for mortality, and to wean many high-quality piglets in the face of normal disease challenges. Robustness is the ability of the pig to be resilient in the face of those conditions, and then extends through finishing in the form of efficient gain in challenged conditions, he says.

From a genetic improvement perspective, Herring puts robustness into three categories: gilt and sow soundness, pre-weaned piglets, and wean-to-finish pigs.

1. Sow soundness

"If you look at one of the primary causes of fallout, and ultimately sow mortality, lameness is one of those causes near the top of the list, regardless of the system," Herring says. "When we weigh, scan and evaluate underlines, we also score both future parent boars and gilts for front and back leg soundness. We watch them walk and give them a score from 1 to 9. Those scores get blended into an estimated breeding value (EBV) that ultimately goes into the index."

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Regardless of how outstanding an animal is on its PIC Genetic Index, it must pass a visual, independent culling level for sound feet and legs to make it into the elite breeding herd, Herring says.

"We have supportive historical data, and we also have on-going field trials in large production settings, in which we score animals and track them all the way through to later parities to be sure that our leg scoring system remains effective," he adds.

Such factors contribute to pigs weaned per sow per year (PSY), he notes, and other traits like milk production and high quality underlines are critical.

2. Pre-weaned piglets

"We look at the ability of the pig to make it to weaning and have a heavy weaning weight," Herring explains. "We've tackled that very specifically within our breeding program. We weigh every individual piglet of our maternal lines at birth, because we know that a higher birth weight sets the table for that piglet's life." These pigs

grow faster and are more robust post-weaning, giving them a greater probability of becoming a full-value market pig. Weaning weight and milk production also are important measurables.

"We included pre-weaning livability into our PIC breeding objective for all of our maternal lines in 2013," Herring says. "We still want large litters but we also want larger piglets on average at birth. Without that, you have the unintended consequence of driving litter size up but farrowing lighter piglets at birth…and we've seen positive responses in actual production."

3. Wean-to-finish pigs

Herring says PIC directly tackles the trait of wean-to-finish livability with unique data captured from its genetic nucleus (GN) crossbred program, which began 15 to 20 years ago. PIC has commercial sow herds across the world that are typical in size, management and health to that of their customers. These herds range from being positive for porcine reproductive and respiratory syndrome (PRRS) to PRRS-stable, and all within the U.S. have experienced porcine epidemic diarrhea breaks.

"We take our elite great grandparent (GGP) terminal line semen from our PIC327, 408, 337, and 800 lines, and we single-sire breed them to those commercial sows," Herring says. "We identify their piglets with unique individual tags at birth. We track each pig all the way through as it enters the finisher until it exits the finisher for market, and if that pig ends up being a mortality or cull pig during the process, we capture that unique event. We're able to trace each pig back to its respective sire and dam, and this creates a data flow that is meaningful for use in genetic improvement at the elite nucleus sites where the same genes exist."

The welfare component

In addition to the direct traits related to livability described above, robustness carries an important animal welfare element. Producers have a responsibility to ensure animals thrive in their environment, that they're well-cared for, and that they're in good health, says Dan Hamilton, Ph.D., PIC Director of Product Performance.

"We definitely want to put animal welfare first and foremost," he says. "Additionally, it's a huge economic cost to the producer [if an animal fails to thrive]."

The cost associated with producing, maintaining and housing an animal is significant, so every animal must be productive to meet cost demands.

"Anytime you have a mortality or [morbidity], additional treatments may be needed, so robustness is a big economic driver as well.

"And don't forget worker morale," Hamilton adds. "A robust animal is an animal that is doing well. Workers definitely care about their animals so that's positive all the way around."

Collective progress and value

When these multiple traits are bundled together into the PIC Genetic Index, Herring says PIC is able to drive genetic progress faster by incorporating relationship-based genomic selection (RBGS) into its indexing program, a process that has been used for the last seven years.

"Since the introduction of RBGS we've seen the rate of genetic progress increase approximately 35%," Herring says.

Some systems have excellent health and performance, but for the bulk of global commercial producers, robustness is “an incredibly important trait,” Herring says.

“The cost of losing a pig in late finishing is very expensive, relative to the cost invested in that pig,” he notes. The same is true for elite replacement gilts, or early parity gilts.

“It’s not the salvage value of a replacement female or the cost that went into the replacement female,” he continues. “It’s actually the number of piglets that you’ll not realize in the grow-finish system and that the sow will never produce if she perishes in parity 1. That becomes an extremely large number.”

For example, if a producer has a system that’s operating at 32 PSY, and a female leaves the system a year early, that’s a potential loss of 32 market pigs.

“You see how large the financial impact is when you look at it in those terms. It’s as critical as any trait complex we have in genetic improvement,” Herring adds. “There’s not a single producer who wants to see an animal die or leave the system too soon. We all want to be good stewards of the animals we raise. That’s an aspect that’s difficult to measure but it’s incredibly important, so genetic improvement goes hand-in-hand with good management.”

For more information on robustness, contact your PIC team.

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