Genetic selection for commercial conditions
By Chad Bierman, PhD.

Gone are the days of raising breeding stock in pristine environments. Today's market hog requires the genes necessary to perform well in challenged environments. This hog competes for feed and water within a large group or pen setting, experiences performance-reducing conditions when the outdoor temperature rises, and has the potential to be exposed to various health challenges along the way. Continued performance of these animals can be a direct result of the improvement in the breeding stock from which these market hogs are derived. Therefore, they too, should be raised in the same environments or under similar conditions. Failure to perform this type of 'natural selection' can result in unexpected performance of market hogs at the commercial level.

Unexpected performance at the commercial level, when compared to the performance of the breeding stock from which they were derived, can be contributed to a phenomenon called genotype by environment (G x E) interaction. In other words, the genotype, or genetic line of pig is the same, but the performance can be different from expectation dependent on the environment. Many factors contribute to the differing environments pigs can be exposed to in pork production. These differing factors are usually considered across systems rather than within systems, albeit differences within systems can exist. This G x E interaction is a condition that is intended to be largely minimized through selection strategies for nucleus level breeding stock intended to produce market hogs in the targeted systems.

You may rest assured that raising breeding stock under advantageous conditions to any particular individual or sex class, other than from a health standpoint, has not been performed at Babcock Genetics Inc. nucleus production sites. Performance of nucleus level breeding stock has been measured under both all-in-all-out and continuous-flow strategies with a targeted pen density under 8 square feet and a minimum of 20 pigs per pen. Performance measurements are taken at heavier weights as the industry pushes for more pounds of pork produced per animal. Growth rates are heavily considered in selection objectives, for when a disease challenges a market hog's performance, the animal that doesn't lose its appetite will result in less performance loss compared to one that continues to eat. As the industry pushes toward heavier market weights, the efficiency at which these animals convert feed and utilize space (ie. grow fast) will continually be pressed. Babcock continually pushes toward more efficient performance at these heavier market weights.

Selection strategies at the nucleus level attempt to achieve a genetic correlation of 1.0 between parental line and commercial line performance. Minimizing the G x E interaction, as well as understanding the role of gene dominance (or heterosis) can all play critical roles in predicting commercial hog performance. Genetic selection within Babcock parental lines is performed with our closed-herd system in mind. A Landrace/Yorkshire-crossbred maternal female crossed to our Duroc terminal sire has proven to be a profitable option for many pork producers wishing to minimize disease risk from replacement female introductions.