

Project Number & Title: 2B-105: Genetic parameters for health, survival, immune competence, post-weaning growth and disease resilience of pigs

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Aims and Objectives: Estimate genetic parameters for traits describing disease resilience for genetic improvement of health of growing pigs

Key Findings:

Immune and haematological traits had moderate to high heritabilities. Further, multiple immune and haematological traits had significant genetic correlations with growth traits. Average growth of a group of pigs was lower for groups of pigs that required more medication. This finding confirms the concept of growth as a health indicator.

A simple score about whether a pig was medicated or not was lowly heritable in this high-health herd which offers new opportunities for genetic improvement of health of pigs. The heritability was not significantly affected by the approach to account for non-medicated pigs which provides extra flexibility for the definition of this trait for genetic evaluations. Medication of pigs has economic and welfare costs. The economic value of medication score is based on the cost of medication and loss in productivity due to the disease incidence.

Disease resilience is a two-dimensional trait which requires definition of environmental challenges. In this regard, it is important to separate other environmental, non-infection stressors from infection challenges. Methodology was developed to obtain finer descriptions of possible infection challenges by removing climatic effects from environmental descriptors using performance data recorded on farms.

An on-farm measure of haemoglobin was genetically the same trait as haemoglobin measured in the laboratory. However, the on-farm measure of haemoglobin had a lower heritability than the laboratory measure due to larger residual variation which indicates measurement errors for the on-farm measure.

Application to Industry:

It is recommended to measure white blood cell counts and haemoglobin as well as post-weaning growth in weaner pigs. Haptoglobin and immunoglobulin (Ig) G and IgM may be recorded if cost-effective measurement techniques are available. Recording these traits in weaner pigs at five weeks of age has practical advantages for the application and adoption of these traits. At this age, weaners may also be recorded for juvenile IGF1 which is an early selection criterion for genetic improvement of efficient lean meat growth. Outcomes from this study warrant recording of white blood cell counts, haemoglobin, post-weaning growth and possibly haptoglobin and IgG and IgM in weaner pigs at 35 days in other pig populations that have information about feed intake, juvenile IGF1 or post-weaning survival available.

On farm-measures of immune and haematological traits should be explored if it is not possible to obtain measurements from the laboratory.

Medication records are available on farms and the promising results from this study should be confirmed with further data. Medication score has economic and welfare cost and this trait should be incorporated in breeding objectives of pig breeding programs for genetic improvement of health in growing pigs.