

INSULIN-LIKE GROWTH FACTOR-I (IGF-I) MEASURED IN JUVENILE PIGS IS GENETICALLY CORRELATED WITH ECONOMICALLY IMPORTANT PERFORMANCE TRAITS*

K. L. Bunter¹, S. Hermes¹, B. G. Luxford², H.-U. Graser¹ and R. E. Crump¹

¹Animal Genetics and Breeding Unit, University of New England, Armidale, NSW 2351, Australia.

²QAF Meat Industries, PO Box 78, Redlands Road, Corowa, NSW 2646, Australia.

SUMMARY

Insulin-like growth factor-I (IGF-I) is a naturally occurring polypeptide produced in the liver, muscle and fat tissues. It is known to be associated with growth and development during the post-natal growth period. Evidence for strong genetic correlations between juvenile IGF-I and performance traits would suggest this physiological measure would be useful as an early selection criterion. This paper reports estimates of genetic parameters from 9 trials where IGF-I was measured in juvenile pigs. All trials involved populations undergoing active selection for improved performance (e.g. efficient lean meat growth). Juvenile IGF-I was moderately heritable (average h^2 : 0.31) and influenced by common litter effects (average c^2 : 0.15). Genetic correlations (r_g) between juvenile IGF-I and backfat (BF), feed intake (FI) or feed conversion ratio (FCR) traits were generally large and positive: r_g averaged 0.57, 0.41 and 0.65, respectively. Phenotypic correlations (r_p) between juvenile IGF-I and BF, FI or FCR were much lower (r_p averaged 0.21, 0.09, and 0.15, respectively) as residual correlations between IGF-I and these performance traits were low, consistent with being measured at very different times. Correlations (genetic or phenotypic) between juvenile IGF-I and growth traits (e.g. lifetime daily gain or test daily gain) were relatively low, with average values within ± 0.09 of zero. Results from the trials reported here, and several physiological studies, indicate that information on juvenile IGF-I concentration can be used as an early physiological indicator of performance traits traditionally measured later in life. There is a clear role for juvenile IGF-I to facilitate pre-selection and more accurate selection of livestock for hard to measure traits, such as FCR, in pig breeding programmes.

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