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GENETIC CORRELATIONS BETWEEN JUVENILE INSULIN-LIKE GROWTH FACTOR-I (IGF-I) AND MEASURES OF SOW REPRODUCTIVE PERFORMANCE ARE LOW

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SUMMARY
Sow reproductive data (N=9 652 sows) and records on juvenile insulin-like growth factor I (IGF-I: N=23 730 records) were used to estimate genetic correlations between IGF-I and age at first farrowing (AFF), the total number of litters produced prior to culling (TNL), weaning to conception interval between the first and second parity (WCI_{12}), and number born alive (NBA_{1-3}) or average piglet birth weights ($ABWT_{1-3}$) recorded in parities one to three. Heritability estimates (h^2±S.E.) were moderate (0.26±0.02) for IGF-I, but considerably lower (range:0.03±0.01 to 0.15±0.04) for sow reproductive traits. Estimates of genetic correlations between IGF-I and most sow reproductive traits were generally low (range: -0.08 to +0.08), did not differ significantly from zero, and were accompanied by negligible phenotypic correlations. The exceptions were either unfavourable genetic (r_g) and/or phenotypic (r_p) correlations between IGF-I and AFF (r_g: -0.15±0.10, r_p: -0.06±0.02) or WCI_{12} (r_g: -0.45±0.15, r_p: 0.01±0.03). Genetic correlations between IGF-I and NBA or ABWT were low and favourable in parities one and two, unfavourable in parity three, but not significantly different from zero in all cases. In a multiple trait context, selection for improved efficiency of lean meat production using information provided by juvenile IGF-I is unlikely to result in significant unfavourable correlated responses in sow reproductive performance.
Keywords: heritability, litter size, birth weight, longevity, age at first farrowing, remating

INTRODUCTION

Pig and cattle breeding programs that place selection emphasis on efficient lean meat production can use the physiological indicator juvenile insulin-like growth factor-I (IGF-I) to improve accuracy of and response to selection (Bunter *et al.* 2002). However, since breeding goals are typically complex and involve many traits, it is necessary to establish whether IGF-I is also correlated with female reproductive traits expressed later in life. IGF-I, measured before puberty, has been implicated as a possible modulator of the attainment of puberty through its association with body weight and fat (Barb *et al.* 2000). In addition, Karsten *et al.* (2000) reported unfavourable genetic correlations (r_g) between litter size and feed conversion ratio (r_g: 0.13 to 0.44) or backfat thickness (r_g: 0.07 to 0.25), while Hermesch *et al.* (2000) reported unfavourable correlations between litter size and growth rate or feed intake. Since genetic correlations between IGF-I and feed intake, feed conversion ratio or back fat levels are positive (Bunter *et al.* 2005), these results suggest that genetic correlations between juvenile IGF-I and measures of sow reproductive performance may be unfavourable.

Swanchara *et al.* (1999) reported no significant changes in age at puberty in gilts immunized at 35 days of age against growth hormone releasing factor (resulting in lower body weight, lower growth

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