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Prediction of individual breeding values from group recordings

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Selection for low feed consumption per body weight gain is one of the most important traits in pig breeding programs. Feed intake in pigs is often recorded during a well-defined period of performance test. Pigs are kept in pens and electronic feeders allow for feed intake recorded on individually. However, the use of electronic feeders makes recorded feed intake recording very costly. To reduce the phenotyping costs of feed intake, feed intake recorded at pen level can be an alternative approach, however group size in practice are typically large. To investigate if group feed records of large groups (20 pigs per group) are feasible in a practical selection program, an experiment was conducted with 6,478 purebred DanBred Landrace male pigs growing from approximately 30 kg to 100 kg in 644 pens. Each of two pens was connected to one feeding unit (the two pens was referred to a ‘double pen’ in the context) recording the amount of feed intake of all the pigs in the two pens. In total, feed intake of 322 feed groups were recorded. All pigs were given dry pelleted feed ad libitum. During the test period the aggregated feed intake of all pigs in each double pen was recorded. At the start and end of the experiment, the body weight of all pigs was recorded and the aggregated weight gain of all pigs in each double pen was calculated including weight gain of the pigs that dropped out before end of test. Thereby, group records of feed intake in the 322 feed units and individual record of body weight gain were obtained. An animal model for group records was used to obtain individual breeding values for each of the 6,478 pigs. The model includes genotype information of 6,172 male pigs which cover 95% of the experimental pigs. The results showed that group records can be implemented into practical breeding programs.

Genetic parameters for reproductive and longevity traits in Bisaro pigs

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The Bisaro pig has gained popularity in recent years reflecting the success of the conservation program. Nevertheless, no data is available for animal genetic evaluation in this breed. Therefore, this study aimed to estimate genetic parameters and trends for reproduction related traits in Bisaro pigs. Through a REML procedure applied to mixed linear models, 27,844 farrowing records, from 1995 to 2017, were used to analyse total number of pigs born per litter (NBT), number of pigs born alive (NBA), number of stillborn (NSB), number of pigs weaned per litter (NBW), age at first farrowing (AFF), farrowing interval (FIT), length of productive life (LPL), lifetime number of litters (LNL), lifetime pig production (LTP) and lifetime efficiency (LTP365). The heritability estimates for litter size traits were low and ranged from 0.007±0.004 to 0.015±0.006. Differently, the heritabilities for traits related to longevity and lifetime production traits were moderate (0.078±0.026 to 0.121±0.030). AFF registered the highest heritability value (0.345±0.028). NSB and FIT presented high values of additive genetic coefficient of variation (0.177 and 0.271) in contrast with low heritability estimates (0.007±0.004 and 0.002±0.005). Very tight genetic correlations were found between NBT and NBA (0.968), NBW and NBT (0.974), and NBW and NBA (0.945). Weak genetic correlations were found between both NBT and NSB (0.352) and between NBA and NSB (0.107). Longevity and lifetime production traits presented high positive genetic correlations (0.811-0.969) and moderate to high phenotypic correlations (0.266-0.946). No major genetic changes were registered over time for most of the analysed traits, except for AFF and LPL, having registered an overall decreased of mean estimated breeding values (21.3 and 17.5) and negative genetic trends of -0.6 and -0.4 (P<0.001), respectively.