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Testicular development, sex hormones and boar taint in pig lines divergent for residual feed intakeA. Prunier¹, Y. Billon², J. Ruesche³, S. Ferchaud⁴ and H. Gilbert³¹INRA, UMR PEGASE, 35590 Saint-Gilles, France, ²INRA, GenESI, 17700 Surgères, France, ³INRA, GenPhyse, 31320 Castanet-Tolosan, France, ⁴INRA, GenESI, 86480 Rouillé, France; armelle.prunier@inra.fr

Improving feed efficiency and rearing entire male pigs are relevant strategies to reduce feed cost and environmental waste in pig production. The major constraint for rearing entire male pigs being boar taint, an experiment was performed to determine the consequences of a divergent selection on residual feed intake (RFI: low RFI = LRFI; high RFI = HRFI) on pubertal development and boar taint. Purebred French Large White male pigs from two divergent lines for RFI (9th generation of selection, n=45 or 43 pigs/line from 33 litters) were reared in two batches (n=19 to 24 pigs/line/batch). Blood samples were drawn at 15 and 166±1 days of age (mean ± SD) and pigs were weighed. After slaughter at 167±1 days of age, a backfat sample was collected in the neck and the genital tract was removed for testis and epididymis weighing after tissue trimming. Percentages of testis and epididymis weight relatively to liveweight were calculated for statistical analyses. All data were analysed by ANOVA using R, including line and batch as fixed effects and litter as a random effect. When necessary, a log transformation was applied before analysis and adjusted means were back calculated. Before slaughter, LRFI pigs were lighter than HRFI pigs (100±2 vs 106±2 kg liveweight, P<0.02). Plasma testosterone at both ages and plasma estradiol-17b at 15 days were similar in both lines (P>0.1). However, plasma estradiol-17b before slaughter (9.0 vs 17.5 pg/ml), fat androstenone (0.22 vs 0.34 µg/g pure fat), testis (3.5 vs 4.4‰) and epididymis (1.18 vs 1.62‰) relative weights were lower in HRFI than LRFI pigs (P<0.001). Fat skatole was lower in HRFI than in LRFI (0.10 vs 0.28 µg/g pure fat, P<0.001) in the first batch with slaughter performed on the 17th July 2016 during a summer heat wave. Fat skatole was low in both lines (0.08 µg/g) in the second batch with slaughter performed on the 29th August 2016. Overall, these data indicate a lower testicular activity in the HRFI than in the LRFI line, which suggests the existence of genetic links between feed efficiency and reproduction.

Genetic determinism of boar taint and relationship with meat traitsC. Dugué¹, A. Prunier², M.J. Mercat³, M. Monziols³, B. Blanchet⁴ and C. Larzul¹¹GenPhySE, université de Toulouse, INRA, ENVT, 24 Chemin de Borde Rouge, 31326 Castanet-Tolosan, France, ²PEGASE, INRA, Agrocampus Ouest, Domaine de la Prise, 35590 St-Gilles, France, ³IFIP, La Motte au Vicomte, 35650 Le Rheu, France, ⁴UEPR – INRA, Domaine de la Motte, 35653 Le Rheu, France; claire.dugue@inra.fr

Entire male meat can have a major quality defect called boar taint, partly due to the presence of androstenone in fat. This study evaluates the feasibility of a selection to directly decrease back fat androstenone level or indirectly by a selection on the plasma estradiol level and estimate the consequences on meat traits in purebred or crossbred pigs. Pure Pietrain (P) and Pietrain Large White crossbred pigs (X) were measured for hormone levels: estradiol (Est) and testosterone (Tes), growth traits: average daily gain, feed conversion ratio (FCR), average daily feed intake (ADFI), carcass composition: carcass yield (CY), lean percentage (L%) and quality traits: pH in Ld and ham, drip loss, intramuscular fat and back fat androstenone level (Andr). The number of skin lesions (SL) was measured at three stages. Carcass additional measures were obtained by computerized tomography: loin eye area (LEA) and density, femur density, ham muscle/bone length ratio (HFR). The number of measured animals varied from 553 to 712 for P and from 556 to 736 and for X. Heritabilities were of medium values for estradiol level and high values for androstenone level. A selection to decrease P Andr level would increase HFR and pH in ham and decrease FCR and Tes in P pigs. On X it would increase CY, LEA, L% and HFR and decrease SL at fattening entrance, FCR, drip loss, ADFI and femur density. A selection to decrease P Est level would decrease Andr, FCR, ADFI and Tes in P pigs and Andr, SL at fattening entrance and Tes in X pigs. Heritabilities and genetic correlations indicate that a selection to decrease estradiol level would have overall favourable effects on meat traits. The authors are extremely grateful to the UEPR personnel, PEGASE technicians and IRSTEA. This study has been granted by ANR (ANR-10-GENOM_BTU-015, ANR-15-CE20-0008), Alliance R&D, InaPorc and FranceAgrimer.