

Effects of divergent lines on feed efficiency and physical activity on lameness and osteochondrosis in growing pigs

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Locomotion disorders have been identified as a significant production disease for growing and finishing pigs, and a sign of reduced animal welfare (EU PROHEALTH project). Amongst them, lameness is a complex problem including animal-based and resources-based causes. Osteochondrosis (OC) is a very frequent disease in pigs, affecting cartilage. The study assessed the occurrence of lameness and OC in two divergent lines of Large-White selected according to a feed efficiency trait (HRFI, LRFI; high or low residual feed intake), submitted to constraints on the physical activity. Two experimental groups of 80 pigs (40 LRFI and 40 HRFI, ratio 1:1 of females and castrated males) were housed on partly slatted flooring in a room equipped with an electronic weighing device allowing pig access to electronic self-feeders, crossing a sorter. Pigs were equipped with ear tags for their individual electronic identification at the sorter and automatic feeders. The identification determined the side of the room to which the animal was directed after the sorter exit, and thus defined the distance to come back to the sorter (short: spontaneous activity, long: increased activity). Three times, at the beginning (wk3), middle (wk7) and end (wk13) of the growing-fattening period, video recordings were made during the 12 h daylight for screening the posture (standing, sitting, lying). Lameness was assessed weekly using a visual gait scoring (lameness score, 0: no, 1: lame). At slaughter, (weight of 100 kg, between 21 and 22 wks of age), post-mortem quantification of OC lesions was performed on surfaces of both proximal and distal condyles of the humerus and femur (score 0 no lesion; score 5 severe lesion with loose fragment of cartilage). According to the variables, data were analyzed using a χ^2 test or variance analysis with the main factors line, physical activity, sex, replicate and their interactions. The LRFI line showed fewer pigs standing during the daylight period at the three recording times (22.5 ± 0.6 vs $28.3 \pm 0.6\%$ of standing pigs during a 30 min interval, $P < 0.001$). The LRFI pigs also showed a higher occurrence of lameness throughout the experimental period only in the second experimental group (34/313 vs 12/299 occurrences, $\chi^2 = 9.16$ df=1 $P < 0.01$). The scores of OC of the LRFI pigs were also higher on the proximal condyle of the humerus (2.2 vs 1.5 $P < 0.001$) and femur (1.7 vs 1.2 $P < 0.01$). The pigs subjected to the increased activity treatment, crossed the sorter more frequently, whatever the genetic line (5.3 ± 0.6 vs 3.7 ± 1.9 crossings/day for increased vs spontaneous activity, $P < 0.01$), but this treatment did not affect either the number of pigs standing during the daylight period or the OC scores. For these lines, selection on residual feed intake seemed to increase the prevalence of locomotor disorders. This effect of the line has to be investigated through the analysis of behavioural strategies within and between lines.