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► To cite this version:

Séverine Parois, Anaëlle Faouen, Armelle Prunier. The influence of the housing environment on the sanitary status and sexual development of entire male pigs – Preliminary results. 8. International Congress on Farm Animal Endocrinology (ICFAE), Aug 2015, Billund, Denmark. Danish Centre for Food and Agriculture, DCA Report, 064, 2015, DCA Report. hal-01211064

HAL Id: hal-01211064

<https://hal.science/hal-01211064v1>

Submitted on 2 Jun 2020

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The influence of the housing environment on the sanitary status and sexual development of entire male pigs – Preliminary results

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Boar taint is the major issue for raising entire male pigs. Genetics and feeding are known to influence boar taint levels. Other factors such as health could also play a role by affecting the sexual development. Indeed, the immune system is able to modulate sexual hormones. The objective of the present study was to reveal the effect of a subclinical health challenge on the sexual development of boars, and therefore on boar taint. We tried to induce a weak chronic inflammation to mimic health problems in farms, thanks to a degraded sanitary environment.

Boars (n = 56) from a commercial breed were allocated at 139 (\pm 0.7) days of age (Day 0) and 80 (\pm 5.4) kg of liveweight to either “clean” (n = 32) or “dirty” (n = 24) rooms for 4 weeks. The “dirty” room was previously soiled by other pigs, was weakly ventilated and was not cleaned during the treatment period. The “clean” room was cleaned and disinfected before entry of the experimental pigs, cleaned every day, correctly ventilated and special clothes were used by staff entering the room. Blood was collected on Day 0 and 27 to measure numbers of granulocytes and lymphocytes, levels of the acute phase protein CRP and sex hormones (testosterone, estradiol) in plasma. On Day 27, a biopsy of fat was collected from the neck to measure boar taint compounds (androstenone, skatole, indole). Saliva was collected to establish variations of CRP and estrone. Cleanliness of boars was evaluated on a scale of 0 to 4 based on the percentage of the body soiled by feces (0: <10%; 4: 75-100%) and rectal temperature was measured weekly from Day 0 to 27.

Treatment had an effect on the cleanliness. Pigs on the “dirty” room were always dirtier during treatment ($P < 0.0001$). There was no treatment effect on any health parameters or on the levels of sex hormones ($P > 0.05$). Between Days 0 and 27, concentrations of sex hormones increased ($P < 0.0001$) in saliva and plasma indicating that the pubertal process of maturation was progressing ($P < 0.0001$). We found an effect of treatment on fat skatole (0.043 vs 0.13 $\mu\text{g/g}$ of pure fat, $P < 0.0001$) and indole (0.030 vs 0.44 $\mu\text{g/g}$ of pure fat, $P = 0.0005$) with higher values for the soiled boars. The correlation between fat androstenone and plasma estradiol levels was high on Day 0 ($r = 0.53$, $P < 0.0001$) and Day 27 ($r = 0.69$, $P < 0.0001$).

Our study did not reveal health differences with respect to the sanitary status of boars, so the stated hypothesis could not be tested. We did, however, confirmed a strong effect of a soiled environment on fat skatole levels. In addition, our data show that fat androstenone is dependent on the level of plasma estradiol measured just before or 4 weeks before.

Keywords: boar; sex hormones; health; puberty; housing