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Artificial light programmes in entire male pig production – effects on androstenone, skatole and animal welfare

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The aim of the study was to evaluate whether artificial light programmes could be a useful tool to reduce boar taint substances in entire male pig production. Decreasing day length and short days are reported to stimulate the onset of puberty and reproductive activity [1]. The hypothesis in the present study was therefore that pigs raised under conditions with increasing day length and high light intensity (spring), would be less sexually mature at slaughter than pigs raised under conditions with decreasing day length and low light intensity (autumn). Since the levels of androstenone, and to a certain degree skatole, are closely related to the onset of puberty, an effect on sexual maturation would also be expected to give an effect on boar taint substances. However, the literature on the topic is ambiguous [1-3].

The study was performed in one integrated herd with farrow-to-finish-system in the period January to May 2005. A total of 173 entire male pigs were distributed to 30 pens in two sections. The study period started at weaning. In section I, all windows were covered up to block the penetration of daylight, and an artificial light programme imitating the day length from August (18.5 hours) to December (8 hours) was implemented. The average light intensity was 60 Lux. In section II, the windows were kept unblocked, and with an improved lighting system, the average light intensity was 440 Lux. The artificial light programme in this section, was parallel to the actual day length from January (8 hours) to May (19 hours). Registrations of activity, including registrations of aggressive and sexual behaviour, was performed for all the pens in week 10, 14 and 17 of the study period, while individual registrations of skin wounds for all animals were performed in week 10 and 15. The animals were slaughtered in week 17–19. Back fat samples collected at slaughter were analysed for androstenone and skatole, and weight of testes and length of *gl. bulbourethralis* was registered as indirect measurements of sexual maturity of the animals.

The results of the data registered at slaughter are presented in Table 1. The activity registrations demonstrated that the activity level in section I increased when the day lengths were reduced (week 14 and 17). Simultaneously aggressive behaviour increased, while sexual activity remained low in both sections (Figure 1). In addition, the registration in week 15 demonstrated higher frequency of skin wounds in section I than in section II.

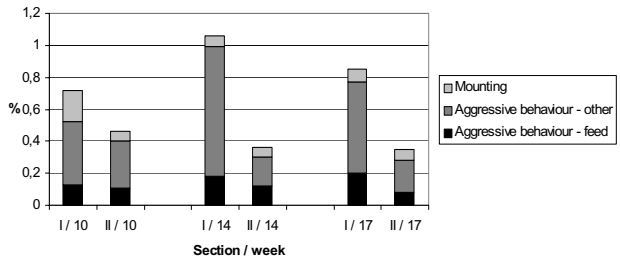

Figure 1
Average percentage of animals showing aggressive behaviour related to access to feed, other aggressive behaviour and mounting, per section and week. In week 10 the day lengths were 13 and 12 1/2 hours, in week 14, 10 3/4 and 14 3/4 hours, and in week 17, 8 1/2 and 18 1/2 hours in section I (autumn) and II (spring) respectively

Table 1: Registrations and analysis at slaughter for entire male pigs raised under artificial light programmes corresponding to either autumn (Section I) or spring (Section II)

	Section I – Autumn		Section II – Spring	
	Mean(median)	SD	Mean(median)	SD
Age at slaughter (kg)	136	6.5	135	4.9
Carcass weight (kg)	72.4	5.3	71.6	5.6
Daily weight gain (g)	791	72.0	785	68
Skatole (μg/g)	0.085(0.080)	0.04	0.081(0.070)	0.05
Androstenone (μg/g)	1.46(1.12)	1.27	1.72(1.30)	1.37
Weight of testes (g)	281.6	100.6	273.1	100.8
Length of gl. bulbourethralis (cm)	10.8	1.1	10.9	0.9

In conclusion, the artificial light programme with increasing day length and improved light conditions, did not restrain sexual maturation. On the contrary, entire male pigs from this section had higher levels of androstenone than entire male pigs raised under poor light conditions and decreasing day length. In the section with decreasing day length, the animal welfare was affected as the day length for the slaughter pigs were reduced. According to these results, artificial light programmes can not be recommended to reduce boar taint in entire male pig production.

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