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Boar Libido Affects Pubertal Development of Gilts

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Summary and Implications

Young boars (10 months) expressing either high (HLB) or low (LLB) libido in standardized mating tests were compared for their ability to stimulate earlier puberty in gilts. Boar exposure was initiated when gilts were either 140 or 160 days old to determine whether the effect of boar libido on attainment of puberty in gilts is influenced by sexual maturation (age) of the gilts. Another group of gilts was isolated from boars (NBE, not boar exposed) and served as controls. Gilts exposed to HLB (10 min/day) reached puberty 8.9 days earlier ($P < .06$) than gilts exposed to LLB. Gilts exposed to boars, regardless of libido level, reached puberty 21 days earlier ($P < .01$) than the control gilts. Boar exposure initiated at 140 days induced puberty 11.3 days earlier ($P < .06$) than when initiated at 160 days. Differences in pubertal responses between HLB and LLB were similar when exposure was initiated at 140 or 160 days. Boar libido is an important component of the boar-stimulating effect on puberty in gilts. Therefore, gilts should be exposed to boars with relatively high libido to achieve optimal pubertal development.

Introduction

Variation in the pubertal response of gilts to boar exposure has been attributed to age of the gilts and boars at initiation of boar exposure, the frequency and duration of boar contact, the nature of the contact between the

gilts and boar (e.g., physical vs fence-line contact), and the possible interaction of these factors. In addition, there may be differences between individual boars of similar age in their ability to stimulate gilts. This may result from differences in the quantity or type of pheromone emitted, the level and frequency of their vocalizations during courtship or their ability and willingness to sustain physical interactions with gilts during the period of contact. Data from Australia indicate boar libido significantly affected the pubertal response of gilts to daily boar exposure initiated at 160 days of age. High libido boars (HLB) were more effective than low libido boars (LLB) at inducing earlier puberty in gilts (180 vs 194 days). The objective of this experiment was to compare the effectiveness of HLB versus LLB and determine whether gilt pubertal response to level of boar libido is affected by stage of sexual maturation (age) of gilts at initiation of boar exposure.

Materials and Methods

One-hundred-sixty gilts representing two genetic lines (AP, early puberty; R-LS, average pubertal age) were assigned randomly within genetic line and litter to a replicated ($n=4$) experiment involving a $2 \times 2 + 1$ factorial arrangement of treatments. The treatments consisted of exposure of gilts to HLB vs LLB starting at 140 days or 160 days of age. Non-boar exposed (NBE) gilts were maintained in a separate room. Gilts were bled for progesterone analysis 7 to 13 days and one day before treatment to establish ovulatory status; gilts with elevated progesterone were deleted from the study. NBE gilts were bled at approximately 10-day intervals during the course of the experiment. First elevation of progesterone above baseline was used to

establish approximate time of first ovulation. Gilts were then checked for estrus after termination of the experiment. Pubertal estrus was back calculated, using a 20-day estrous cycle length, to coincide with the first detected elevation of progesterone.

Thirty-six young boars (10 months) from the White-line population were screened for libido using a standardized 10-minute test with a single estrous female. Six high-rated boars and 6 boars rated low were subjected to repeated testing for their ability and willingness to sustain courtship behaviors and their reaction time to mounting and successful copulation. Boars assigned to the HLB group ($n=4$) consistently exhibited vigorous courtship behaviors, including vocalization and salivation, sustained vigorous physical interactions and were quick to mount and achieve intromission. Boars selected for the LLB group ($n=4$) consistently showed only passive interest in the estrous female, made only intermittent, usually non-vigorous, physical contacts with the gilt, exhibited little or no vocalization or salivation, failed or were slow to mount and failed to achieve intromission. Two boars of each category were used on alternate days to stimulate pens of gilts assigned to each type of boar libido. Boar exposure was initiated once daily (10 min duration) as gilts in each replicate reached the target age (140 or 160 days) for boar exposure. Physical contact with boars was provided in a neutral area away from the home-rooms of the gilts and boars. Gilts expressing estrus within the first 5 minutes were recorded and removed from the heat-check pen as soon as observed. Gilts observed in heat after 5 minutes were recorded in estrus between 5 and 10 minutes.

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Results and Discussion

Twenty-five percent of the gilts were deleted from the experiment due to estrous cycles initiated prior to the start of the experiment. Of the 25 percent, most were from the early puberty line and 160-day treatment group. Four gilts (2 HLB and 2 LLB) failed to achieve puberty by termination of the experiment (7 1/2 mo of age). For purposes of statistical analysis, pubertal age in these gilts was considered to be their age at termination of the experiment.

Physical boar exposure, regardless of boar libido level, stimulated earlier puberty in gilts than no boar exposure (HLB, 164.4 and LLB, 173.3 vs NBE, 194.0 days, $P < .01$, Table 1). Gilts exposed to HLB reached puberty 8.9 days earlier than gilts exposed to LLB ($P < .06$). No interactions were observed between level of boar libido, age of gilt and genetic line. Genetic line and age of gilt, however, also influenced pubertal response. As expected, gilts from the AP line reached puberty 14 days earlier

Table 1. Effect of boar libido on mean age at puberty

Treatment ^a	Pubertal age, days ^b
HLB	164.4 ^a
LLB	173.3 ^b
NBE	194.0 ^c

^aHLB, high libido boars; LLB, low libido boars; NBE, non-boar exposed.

^bMeans with different superscript differ (a vs b, $P < .06$; a and b vs c, $P < .01$).

($P < .003$) than R-LS gilts. Gilts exposed to boars starting at 140 days reached puberty 11.3 days earlier ($P < .06$) than gilts exposed to boars starting at 160 days of age (Table 2).

Conclusion

Boar libido appears to be one important component of the boar-stimulating effect on puberty in gilts. The boar libido effect may be caused by more vigorous physical stimula-

Table 2. Effect of genetic line and gilt age at initiation of boar exposure on mean age at puberty

Genetic line ^a	Gilt age, days		
	140	160	Combined ^b
AP	158.4	167.2	162.8
R-LS	172.7	180.9	176.8
Combined ^c	165.5	176.8	

^aAP = early puberty and R-LS = average pubertal age line.

^bSignificant ($P < .003$) genetic line effect.

^cSignificant ($P < .06$) gilt age effect.

tion, greater pheromonal and/or auditory stimuli emitted by high libido boars or a combination of these factors. Future experiments will attempt to identify the important component(s) of the boar libido effect.

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