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Is Physical Boar Exposure Required for Accurate Detection of Estrus in Gilts?

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Summary and Implications

Accuracy of estrus detection in response to physical (PBE) vs fence-line (FBE) boar exposure was evaluated in 40 gilts during two successive estrous periods. Gilts heat checked with FBE expressed shorter estrous periods (.6 day) than PBE gilts. Estrus was detected within five minutes of boar exposure in 100 percent of gilts on both treatments except for PBE gilts on the first day of estrus. The first day of estrus was expressed after five minutes of boar exposure in 16.2 percent of PBE vs 0 percent of FBE gilts. The PBE gilts may be near the beginning of estrus. They are unresponsive to limited (15 min) FBE and slow to respond to PBE. Fertility was not compared in this study, but inseminations timed 12 to 24 hours after detection of estrus in these gilts (gilts not detected with FBE and slow to respond to PBE on their first day of estrus) will be too late to result in high fertility. Ovulation will occur or be in progress in these gilts at the time of insemination. Therefore, heat-detection with physical boar exposure rather than fence-line boar exposure is recommended to achieve proper timing of insemination and high fertility in gilts.

Introduction

Accurate heat detection is needed with hand mating and artificial insemination (AI) programs to insure optimum timing of the inseminations relative to ovulation. Proper timing of the insemination, especially with AI, minimizes loss of potential piglets (ova) caused by fertilization failure and/or early embryonic death. Heat detection is labor intensive and should be organized so gilts in heat express the immobility reflex rapidly when exposed to the boar. Gilts should be maintained in pens segregated from boars or boar stimuli and taken to a neutral area or the boar room to receive boar exposure during the heat check period. Most estrous gilts handled in this manner respond rapidly (>90% within 5 min) to physical contact with boars. Little advantage is gained from extending the period of heat detection beyond 10 minutes of boar exposure.

Classical research conducted by Signoret and co-workers in France during the late fifties and early sixties demonstrated that only 50 percent of gilts in estrus express the immobility reflex in response to tactile stimulus (hand pressure) applied by the observer in the absence of boars. The estrous response exceeded 90 percent when the gilts were provided olfactory (smell) and auditory (sound) stimuli from a mature boar across the fence-line but the gilts were unable to touch or see the boar. Recently, studies from Australia

and Nebraska evaluated the effects of type and/or duration of boar exposure (physical, PBE vs fence-line, FBE) on pubertal development in gilts. Limited PBE was more effective than limited FBE (each applied for 10 to 30 minutes once daily) for triggering pubertal estrus in gilts. The difference may be due to better transfer of pheromones or to the tactile stimulus of the boar. Alternatively, boars under these conditions (direct contact between the boar and gilts) may provide greater auditory and/or olfactory stimuli than boars not allowed to interact directly with females.

The objectives of the present experiment were to determine, under conditions of limited boar exposure (15 min once daily), whether (1) physical contact with boars results in a higher rate of estrus detection and more rapid expression of the immobility response than fence-line boar exposure and (2) whether type of boar exposure affects the number of days gilts are observed in estrus. Estrous gilts that are slower to respond to boar stimuli may not be detected in heat until their second day of estrus under conditions of limited boar exposure each day.

Materials and Methods

Forty gilts with established estrous cycles (2 or more) from the Gene Pool herd were grouped according to their last estrus in pens of four gilts

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each. Pens of gilts were assigned randomly to receive either physical contact with a boar (PBE) or fence-line contact with boars (FBE) during a standardized period (15 min) of boar exposure between 7 and 9 a.m. each day. Following completion of estrous observations on all forty gilts, the treatment assignment was reversed and the gilts were evaluated again at the next estrus using the same procedures.

Heat checks were initiated when the first gilt(s) in the pen reached d 17 of the estrous cycle and ended when the last estrous gilt in the pen was out of estrus. Gilts were housed in rooms segregated from boars and were taken to the boar room for heat checking. During the first five minutes of the heat check, symptoms of estrus, including the immobility response to back pressure, were observed and recorded for each gilt. Gilts were removed from the heat check pen as they expressed standing heat and the time of expression of estrus was recorded. The boars and FBE gilts were kept in close contact on the fence-line and continued to be checked by hand during the remainder of the 15 minute test. Two boars (11 to 12 mo of age) were used to stimulate estrus. Gilts receiving PBE were placed directly in the pen with each boar on an alternate day basis.

Table 1. Mean number of days gilts were observed in estrus.

Estrous period	PBE ^a	FBE ^b	Difference
Number of gilts	19	18	
First	3.0	2.4	.6
Second	3.1	2.5	.6
Combined	3.05	2.45	.6 ^c

^aPhysical contact with boars.

^bFence-line contact with boars.

^cP<.01

Gilts provided FBE were placed in a pen between the two boar pens and had the opportunity for boar contact, including naso-naso contact through open vertical bars (4-inch spacing) along each 10-ft fence-line. Each gilt was evaluated for rapidity of estrous response and for number of days detected in estrus.

Results and Discussion

One gilt failed to express estrus during either the first or second series of estrous checks and a second gilt (FBE) failed to express estrus during the second series of estrous observations. These gilts were deleted from the study. The rate of heat detection

was comparable in PBE and FBE gilts. However, gilts heat-detected with PBE expressed estrus approximately .6 d longer than gilts heat-detected with FBE (3.05 vs 2.45 days, P<.01, Table 1). This resulted from a shift in the distribution of the percentages of gilts observed in estrus for 1, 2, 3 or 4 days (Figure 1). Few gilts on either treatment were observed in estrus for only one day (2.7% PBE vs 5.4% FBE, P>.1). The percentage of gilts expressing estrus for two days was much higher in FBE than in PBE gilts (48.6 vs 13.5%, P<.01) but the reverse tended to be true for gilts expressing estrus for three days (PBE, 62.2 vs FBE, 43.2%, P>.05). The percentage of gilts observed in estrus for four days was substantially higher (7-fold) in PBE gilts (21.6 vs 2.7%, P<.05).

The distribution of times within the 15-minute heat check period (<5 min, 6 to 10 min or 11 to 15 min) when the first day of estrus was detected also differed between the PBE and FBE treatments. Estrus was detected during the first five minutes in all (100%) FBE gilts compared to 83.8 percent of PBE gilts. The gilts that responded to PBE after 5 min (16.2%) may represent gilts near the beginning of estrus. They may be unresponsive to limited (15 min) FBE and are slow to respond to PBE. All PBE gilts (100%) were detected in estrus within five minutes on the other days of their estrous period. Inseminations timed 12 to 24 hours after first detection of estrus in these gilts (gilts not detected in estrus with FBE on their first day of estrus) would be too late for optimal fertility. These gilts probably already ovulated or are ovulating at the time of insemination. Further research is needed to evaluate ovulation time and fertility in gilts that are unresponsive to FBE and slow to respond to PBE on the first day of estrus.

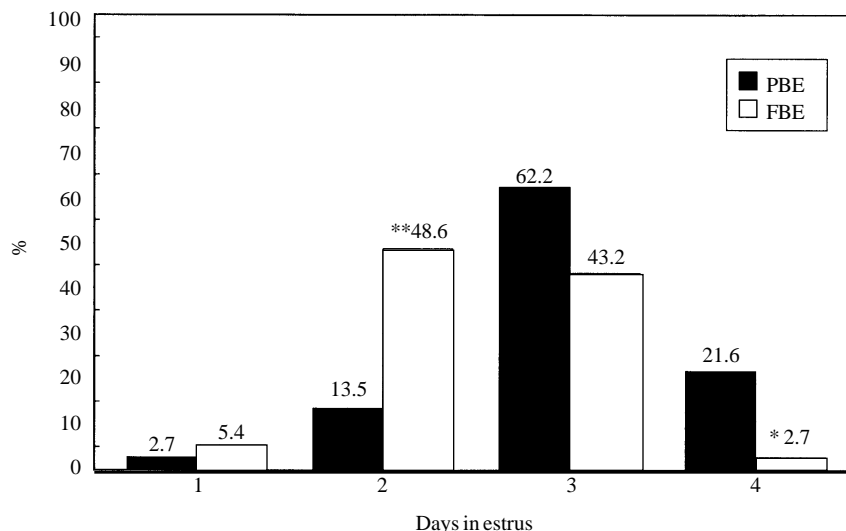


Figure 1. Distribution of days of estrus in gilts receiving physical (PBE) or fence-line (FBE) boar exposure (*P<.05; **P<.01).

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