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Method of Detection, Not Type of Housing, Affects Accuracy and Rapidity of Estrus Detection in Gilts

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Summary and Implications

The effects of type of housing (stalls versus pens) and method of heat detection (fence-line boar exposure conducted in-place versus after relocation of gilts to the boar room) on the accuracy and rapidity of estrus detection were evaluated in 24 gilts during two successive estrous periods. Gilts relocated to the boar room showed a higher rate of estrus detection and a more rapid estrous response ($P < .05$) to fence-line boar exposure (81% and 1.7 min, respectively) than gilts provided fence-line boar exposure in-place (67.5% and 2.3 min, respectively). Gilts housed in stalls and pens showed similar rates of estrus detection (68% and 67%, respectively) but the estrous response to fence-line boar exposure tended to occur more rapidly in gilts housed in pens than in stalls (2.0 versus 2.5 min, $P < .1$). Gilts not detected in estrus with fence-line boar exposure were slow to respond to a later heat check with physical boar exposure (3.8 min). Physical boar exposure is required for highly accurate heat detection in gilts. For optimal results, boar stimulation should be provided in an environment removed from the residence of the gilts.

Introduction

Accurate estrus detection is needed to assure proper timing of insemination with both handmating and artificial insemination breeding programs. Recent evidence from our laboratory (1996 Nebraska Swine Report) demonstrated heat detection was less accurate with fence-line boar exposure (FBE) than with physical boar exposure (PBE). Some gilts (16.2%) failed to respond to 15 minutes of FBE but responded to PBE, although slowly (between 5 and 10 min after contact) on the first day of estrus. These gilts were probably in the very early stages of estrus.

Females maintained in individual stalls are difficult to check for estrus and it is time consuming to remove them from individual stalls at each heat check. Also, when females are heat checked in stalls, it is difficult to achieve optimal contact or interaction with the boar. Gilts in estrus or near estrus are attracted to the boar but are unable to pursue and maintain contact with him as he moves away from their stall. The following experiment was designed to compare the accuracy and rapidity of heat detection in gilts heat checked in-place on the fence line, when housed either in stalls or in pens, versus relocating gilts to the boar room for heat detection on the fence-line.

Materials and Methods

Twenty-four gilts with established estrous cycles (two or more) from the Nebraska Gene Pool herd were grouped according to their last estrus into sets of four gilts each. Sets of gilts were assigned randomly to three treatments (two sets or replicates per treatment). Gilts on treatment 1 (S/IP-FBE) were housed in 18 inch-wide gestation stalls (S) and heat checked in-place (IP) with a boar placed in the alleyway directly in front of each set of four stalls. The front of the stalls consisted of vertical bars with 4-inch spacings. Gilts on treatment 2 (P/IP-FBE) were maintained in groups of four in 6 foot x 9 foot pens (P). The 6 foot front gates consisted of vertical bars with 4-inch spacings. These gilts were also heat checked in-place by putting a boar in the alleyway directly in front of each pen. Gilts on treatment 3 (P/R-FBE) were maintained in pens comparable to those used in treatment 2 but were relocated (R) to the boar room for heat detection with FBE. Following completion of estrous observations on all 24 gilts, they were assigned randomly to a different treatment and the gilts were evaluated again at the next estrus using the same procedures.

Heat checks were initiated when the first gilts in each set reached day 17 of the estrous cycle and ended when

(Continued on next page)



the last estrous gilt was out of estrus. All gilts were housed in the same room and were segregated from boars except during in-place heat checking. Gilts heat checked in-place in stalls or pens were located at opposite ends of the room and were screened from boars during heat detection of the opposite treatment. Gilts relocated to the boar room for heat detection were removed to a neutral room before the heat check boar was brought into the room for IP heat checking. The same boar was used to check gilts on each treatment each day. Gilts relocated to the boar room for heat detection (P/R-FBE) were placed in a heat check pen adjacent to the boar pen. The fence-line separating the boar and gilts consisted of a 10 foot panel with vertical bars separated by 4 inch spacings. Two boars (11 to 12 months old) were used on alternate days to provide 10 minutes of daily (between 7 and 8 a.m.) FBE for each treatment group. In all cases of FBE, efforts were made to keep the boar in close contact with gilts on the fence-line during the 10 minute heat check period. During the heat check period, symptoms of estrus were observed and recorded for each gilt. After heat checking with FBE, each group of gilts was placed in a pen with a different boar and provided PBE for 10 minutes.

Results and Discussion

During the experiment, two successive estrous periods were detected in all but one gilt. One gilt had an extended estrous cycle (33 days) and controlled estrous observations were terminated before she expressed her second estrus. Detection of the first and last day of estrus with in-place FBE was comparable in gilts housed in pens and stalls (S, 67% versus P, 68%) but the rate of heat detection was higher ($P < .05$) in gilts relocated to the boar room (81%) than in gilts heat detected in-place. All gilts responded to FBE

Table 1. Mean rate (%) of estrus detection and mean interval to estrus (min) in response to 10 min of fence-line boar exposure

Treatment ^a	Estrus detection rate, % ^b	Mid-estrus detection rate, % ^c	Interval to estrus, min
S/IP-FBE	67	100	2.5 ^f
P/IP-FBE	68	100	2.0 ^g
P/R-FBE	81 ^e	100	1.7 ^h

^aGilts housed in stalls (S) or pens (P) and heat detected with fence-line boar exposure (FBE) in place (IP) in gilt room or after relocation (R) to boar room.

^bDetection rate of first and last days of estrus (combined) with FBE.

^cDetection rate of second day of estrus (mid-estrus) with FBE.

Means in each column with different superscripts differ (e vs others, $P < .05$; h vs f and g, $P < .05$; and f vs g, $P < .1$).

on their second day of estrus (middle estrus) regardless of whether they were housed in stalls or pens or whether they were heat checked in-place or relocated to the boar room for heat detection (Table 1).

Estrous responses (first and last day of estrus combined) occurred more rapidly in gilts relocated to the boar room for heat detection than in gilts heat checked in-place (1.7 min versus 2.3 min, $P < .05$). Gilts housed in pens tended to respond more rapidly to boar exposure than gilts housed in stalls when both groups were heat checked in-place (2.0 min versus 2.5 min, $P < .1$). Gilts not detected in estrus with FBE (28% for first and last days of estrus combined for all three treatments) also tended to be slow to respond to PBE (3.8 min). Gilts in mid-estrus (second day of estrus) not only were able to respond to FBE (100% overall) but 98% also showed estrus within 3 minutes of initiation of FBE.

No differences were detected in duration of estrus between treatment groups. Overall, duration of estrus averaged 52.1 hours. This reflects the average interval of time gilts were actually observed in estrus and makes no correction for the 9 to 15 hour intervals between estrous checks.

Conclusions

Data from this experiment confirm previous observations at Nebraska and elsewhere regarding proper procedures for accurate and efficient heat detection. Relocation of gilts from their home environment to the boar room or a neutral environment to receive contact with boars results in a higher rate of heat detection and a more rapid estrous response to boar exposure than providing boar exposure in-place. Fence-line boar exposure, even under ideal conditions (i.e., when gilts are taken to the boar), is not adequate for accurate detection of estrus in gilts. FBE may be used to quickly screen and identify gilts in solid estrus but the gilts that are not responsive to FBE should be provided PBE in order to find the females that are in early or late stages of estrus and unresponsive to FBE. Housing gilts in stalls versus pens appears to have little influence on the rate of heat detection achieved, as long as the females are properly exposed to boars. The key to achieving accurate and rapid heat detection is to provide gilts with novel stimuli, including physical contact, from a high libido boar(s) at a site other than the gilt's residence.

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