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Title: Evaluation of a Physiological Test for Sow Longevity – NPB #11-103

Investigator: W.L. Flowers

Institution: North Carolina State University

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Industry Summary

A gilt's response to early boar exposure has been shown to be a viable option for estimating her lifetime productivity as a sow. Unfortunately, providing adequate boar exposure at young ages poses several practical and biosecurity issues for many multiplication farms. Boar exposure stimulates the brain to produce gonadotropins which, in turn, stimulate follicles on the ovary to grow and produce estrogen. As estrogen increases the vulva becomes red and swollen and the female will eventually exhibit the standing reflex. The purpose of this study was to determine whether reddening and swelling of the vulva in response to low levels of gonadotropins given to gilts at an early age could be used as a screening tool to estimate her potential longevity. Results from the present study demonstrated that 140 day-old gilts that exhibited any degree of reddening and swelling of the vulva in response to 200 IU of PG600 exhibited retention rates similar to a contemporary group of gilts that exhibited estrus in response to boar exposure. By the end of the third lactation, 62% of the females that entered the farm as replacement gilts were rebred after weaning their third litter in both groups. There was also no difference in farrowing rates or number of pigs born alive between those given low levels of PG600 and their counterparts given boar exposure at 140 days of age. Use of low levels of PG600 and subsequent monitoring of gilts for about 1 week appears to have good potential as a prospective physiological test for sow longevity. In some multiplication systems may be more practical and safer from a biosecurity perspective than providing direct contact with a boar.

Key Findings:

- Sixty-five percent of the gilts that exhibited reddening and swelling of the vulva with 7 days after the low dose of PG600 administered at 140 days of age were still in production after 3 parities.
- This was similar to the 68% of gilts that exhibited estrus within 28 days of boar exposure when it began at the same age (early responders).
- Farrowing rates and number of pigs born alive were similar between gilts responding to low doses of PG600 and early boar exposure.
- Reddening and swelling of the vulva in response to low doses of PG600 administered as early as 140 days of age is an accurate predictor of sow longevity regardless of the neonatal litter size in which they were raised.
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Key Words

Sows, Longevity, Puberty, Gonadotropins

Scientific Abstract

The objective of this study was to examine relationships between changes in the external genitalia of gilts at 140 days of age in response to 200 IU of PG600 or boar exposure and their subsequent reproductive performance as adults. Replacement gilts raised in either litters of $\leq$7 piglets (n=129) or litters of $\geq$10 piglets (n=126) in order to create sows with different longevity potentials. Females within each of these groups were randomly assigned to receive 200 IU of PG600 or daily boar exposure at 140 days of age. Changes in the external genitalia were recorded for 20 days post treatment in all gilts. For the gilts receiving PG600, daily boar exposure began at 160 days of age. All gilts were bred between 190 and 210 days of age with pooled semen from the same boars and managed under the same standard operating procedures through gestation, farrowing, lactation and rebreeding. The proportion of females that were rebred after weaning their third litter was determined for each treatment combination and used as a measure of sow longevity. Gilts that had red and swollen vulvas within 10 days after PG600 treatment (62%) were retained in the herd at a similar rate as their counterparts that exhibited estrus in response to daily boar exposure (60%, $p = 0.76$). Gilts that did not show changes in their external genitalia in response to PG600 or estrus in response boar exposure at 140 days of age had considerably lower retention rates (10% and 12%, respectively; $p = 0.03$) compared with their counterparts that responded. There were no differences in farrowing rates or numbers of pigs born alive or dead between gilts treated with low levels of gonadotropins and those receiving daily boar exposure at 140 days of age ($p \geq 0.23$). These results indicate that administration of low levels of gonadotropins and the subsequent monitoring of the vulva appears to be an alternative strategy for the prospective identification of gilts that have high longevity potential and is similar in effectiveness as identification of gilts that exhibit estrus in response to early boar exposure.

Introduction

High replacement rates for P1 and P2 sows have skewed current parity structures of most North American breeding farms towards younger, less productive females. As a result, herd productivity is being limited because females are culled before they reach their peak periods of reproductive performance which typically occur at parity 3 and higher. It is generally accepted that gilts that possess the ability to elicit estrous activity in response to boar exposure at a young age tend to remain in production longer than those that do not. This observation has led producers to search for ways to identify “early responders”. Unfortunately, providing early boar exposure can be quite challenging. It is labor intensive; can create biosecurity issues; and results in a loss of breeding synchrony of gilts. As a result, early boar exposure probably is feasible for operations that raise their own replacement females “in house”, but not for those that purchase gilts or receive them from separate multiplication farms within the same system. Development of a screening tool that could identify early responders accurately without relying on boar exposure would most likely find increased acceptability and use within the swine industry. It also would provide a valuable tool for evaluating the relative effectiveness of neonatal management conditions on reproductive development of replacement gilts and could also be used to estimate their subsequent longevity potential.

Boar exposure stimulates secretion of the gonadotropic hormones, LH and FSH, from the brain. These stimulate the production of estrogen from ovarian follicles. Increasing levels of estrogens cause the classic behaviors associated with estrus: reddening/enlargement of the vulva; the standing reflex; and eventually ovulation. One hypothesis as to why “early responders” have increased longevity is that they are more sensitive to estrogens. In other words, their reproductive system can function normally with less estrogen. If this is true, then it should be possible to test a portion of the gilt's response to estrogen without inducing ovulation or using boar exposure. PG600 is an approved product for synchronization of estrus in prepubertal gilts. Its mode of action is to stimulate follicles on the ovaries to grow and produce estrogen by mimicking LH and FSH. This, in turns, begins the sequence of events that eventually results in estrus and ovulation that was described earlier. Suboptimal doses of PG600 have been shown to cause reddening and swelling of the vulva without actually causing estrus and ovulation. When induction of puberty in gilts is the goal then this is an undesirable outcome. However, if the main intent is simply to determine if gilts can respond to estrogen at a young age, then this would be desirable and could serve as a physiological test for the identification of early responders and longevity potential in replacement gilts before they are ever bred.

Objectives

1. To compare changes in the external genitalia of replacement gilts given 200 i.u. of PG600 or boar exposure between 140 and 150 days of age; and

2. To determine relationships between changes in external genitalia of gilts given 200 i.u. of PG600 and their subsequent reproductive performance through 3 parities.

Materials and Methods

Our overall approach for this study was to manipulate the neonatal environment of future replacements gilts as we have done previously in order to create populations of females that differ in terms of their reproductive maturity; their ability to respond to early boar exposure; and their longevity. These populations were created using strategic cross-fostering in which future replacement gilts born were allowed to nurse in litters of either $\leq$7 or $\geq$10 piglets. Within each of these neonatal treatments an equal number of gilts were either exposed to mature boars or given low doses of gonadotropins at 140 days of age. Visual, physiological, and behavioral characteristics in response to boar exposure or low levels of gonadotropins were recorded daily for 28 days. At 190 days of age, all gilts were exposed to mature boars and bred via A.I. Reproductive performance and changes in body weight and composition were monitored over 3 parities.

A total of 257 gilts were used in the study and allocated to a factorial arrangement of treatments involving neonatal litter size ($\leq$7 litter mates or $\geq$10 litter mates) and early responder testing (200 i.u. of PG600 or boar exposure at 140 days of age). Neonatal litter sizes of $\leq$7 pigs and $\geq$10 pigs were created by crossfostering pigs 24 to 48 hours after birth. Crossfostering was done so that lactation litters were balanced with respect to genetics and sex. The neonatal litter sizes were expected to create populations of gilts that differ in their ability to respond to early boar exposure and their longevity potential, as we have previously shown.

At 140 days of age, gilts within each neonatal treatment will be allocated to receive 200 I.U. of PG600 or daily boar exposure. Gilts receiving boar exposure were moved to a separate barn. Visual evaluations of the external genitalia of all gilts was performed daily by two experienced technicians beginning 3 days before the onset of boar exposure or PG600 treatment. A modified scoring system based on the work of Langendijk et al. (Anim. Reprod. Sci 78:319) was used with the following criteria: 0 = no swelling and pale vulva; 1 = medium swelling and pink vulva; and 2 = large, swollen and red vulva. At 160 days of age, daily estrous detection for gilts receiving the low dose of gonadotropins began. At 190 days of age, all gilts were bred with pooled semen from the same boars and managed as one group through rebreeding after weaning their third litter (Parity 2). Farrowing rates, litter characteristics, and rebreeding intervals during parities 1 through 3 were collected. Females that do not show estrus within 10 days after weaning or do not conceive following breeding were considered reproductive failures and were removed at that point from the study. The proportion of females that successfully rebred after weaning their third parity was considered to be the best measure of sow longevity.

Visual scores of the external genitalia were analyzed with analysis of variance procedures for repeated measures in a factorial design (Biometrics 33, 133). The statistical model consisted of neonatal litter size, early responder testing (low doses of PG600 or boar exposure), time (day after onset of early responder testing) and appropriate interactions. Analysis of variance procedures for repeated measures in a factorial design also were used to analyze farrowing rates, litter characteristics and rebreeding intervals. The statistical model consisted of neonatal litter size, early responder testing (low doses of PG600 or boar exposure), parity (repeated variable) and appropriate interactions. Survival analyses were used to determine differences in sow longevity from puberty through rebreeding after parity 3 (Cox and Oates, 1984; Analyses of Survival Data; Chapman and Hall; London). Body weights, backfat thickness, and loineye areas were used to estimate changes in weight and body composition throughout the study and used as covariates.

Results

Objective 1 – **Comparison of changes in external genitalia of replacement gilts given 200 i.u. of PG600 or boar exposure**. **(Table 1*)***

The rationale behind this was to see if low doses of gonadotropins could be used to induce swelling and reddening of the vulva of gilts without inducing ovulation. The basic premise is that this would be an easy and effective way to "screen" gilts for their longevity potential without having to provide boar exposure. The physiological responses associated with estrus are shown in Table 1. There were some subtle differences between the Winter and Summer replicates. However, in general, estrous activity appeared to be less intense in the Winter group compared with their summer counterparts. This is most likely due to the fact that gilts born in the Winter/Spring reached puberty during the Summer, whereas gilts born in the Summer reached puberty in the Winter. Consequently, the combination of elevated temperatures and humidities associated with the summer months in N.C. is most likely due to these responses.

The overall responses are shown in last portion of Table 1 (Overall Response). For the gilts raised in small neonatal litters, 85.1% of those receiving PG600 exhibited some reddening and swelling of the vulva, while less than 2% eventually exhibited estrus and ovulated compared with 82.7% and 79.1% of their contemporaries exposed to boars, respectively. A similar trend was observed in the gilts reared in litters of 10 or greater. The proportions of gilts that responded to either low levels of PG600 or boar exposure were 50% compared with 58.7% while those ovulating in response to their respective treatments were 0.9% and 48.2%, respectively. The magnitude of the response was reduced in replacement gilts raised in large litters. This was expected since it has been previously shown that reducing neonatal competition during lactation appears to have a positive association with gilts being able to respond early to boar exposure.

Objective 2 – **Determine relationships between changes in external genitalia of gilts given low doses of gonadotropins or boar exposure and their reproductive longevity. (Figures 1 – 3 and Tables 2 – 5)**

Figure 1 shows the disposition of sows within each treatment combination through rebreeding following their third lactation. The only significant differences observed were those related to their neonatal litter size. Gilts raised in smaller litters after birth and experienced, presumably, less competition during lactation had a higher overall retention rate than those raised in normal sized litters. This was expected and has been previously reported.

Table 1 – Physiological Responses to Low Doses of PG600 or Boar exposure.

Parameters	Neonatal Litter Size $\leq$ 7		Neonatal Litter Size $\geq$ 10	
	Low Dose PG600	Boar Exposure	Low Dose PG600	Boar Exposure
Winter Replicate				
Gilts with Vulva Score of 2 (%)	52.8[a] (28/53)	68.0[b] (34/50)	30.8[c] (16/52)	39.6[c] (23/53)
Gilts with Vulva Score of 1 (%)	24.5[a] (13/53)	16.0[b] (8/50)	15.4[b] (8/52)	15.1[b] (8/53)
Interval from treatment to Vulva Score, days $\pm$ s.e.m	7.2 $\pm$ 1.4[a,b] (41)	5.9 $\pm$ 1.2[a] (42)	10.3 $\pm$ 1.6[b] (24)	9.2 $\pm$ 2.1[a,b] (31)
Gilts exhibiting Estrus in Response to treatment (%)	0[a] (0/53)	78.0[b] (39/50)	0[a] (0/52)	47.2[c] (25/53)
Gilts with Corpora Lutea in response to treatment (%)	1.8[a] (1/53)	72.0[b] (36/50)	0[a] (0/52)	41.5[c] (22/53)
Gilts with vulva score of 0 (%) (no response)	22.6[a] (12/53)	16.0[a] (8/50)	53.8[b] (28/52)	41.5[b] (22/53)
Summer Replicate				
Gilts with Vulva Score of 2 (%)	62.3[a] (38/61)	66.1[a] (43/65)	35.0[c] (21/60)	42.6[c] (26/61)
Gilts with Vulva Score of 1 (%)	29.5[a] (18/61)	15.4[b] (10/65)	18.3[b] (11/60)	16.4[b] (10/61)
Interval from treatment to Vulva Score, days $\pm$ s.e.m.	6.2 $\pm$ 0.8[a] (56)	5.1 $\pm$ 1.0[a] (53)	8.1 $\pm$ 1.6[a] (32)	6.0 $\pm$ 1.1[a] (36)
Gilts exhibiting Estrus in Response to treatment (%)	1.6[a] (1/61)	83.1[b] (54/65)	1.7[a] (1/60)	57.3[c] (35/61)
Gilts with Corpora Lutea in response to treatment (%)	1.6[a] (1/61)	84.6[b] (55/65)	1.7[a] (1/60)	54.1[c] (33/61)
Gilts with vulva score of 0 (%) (no response)	8.2[a] (5/61)	18.5[b] (12/65)	46.7[c] (28/60)	41.0[c] (25/61)
Overall Response				
Gilts with Vulva Score of 2 (%)	57.9[a] (66/114)	67.0[a] (77/115)	33.0[b] (37/112)	42.9[b] (49/114)
Gilts with Vulva Score of 1 (%)	27.2[a] (31/114)	15.7[b] (18/115)	17.0[b] (19/112)	15.8[b] (18/114)
Interval from treatment to Vulva Score, days $\pm$ s.e.m.	6.6 $\pm$ 0.6[a] (97)	5.5 $\pm$ 0.8[a] (95)	9.0 $\pm$ 1.3[b] (56)	7.5 $\pm$ 1.3[b] (67)
Gilts exhibiting Estrus in Response to treatment (%)	0.9[a] (1/114)	80.9[b] (93/115)	0.9[a] (1/112)	52.6[c] (60/114)
Gilts with Corpora Lutea in response to treatment (%)	1.8[a] (2/114)	79.1[b] (91/115)	0.9[a] (1/112)	48.2[c] (55/114)
Gilts with vulva score of 0 (%) (no response)	14.9[a] (17/114)	17.4[a] (20/115)	50.0[b] (56/112)	41.5[b] (47/114)

[a,b,c] means within the *same row* with different superscripts differ ($p \leq 0.05$)

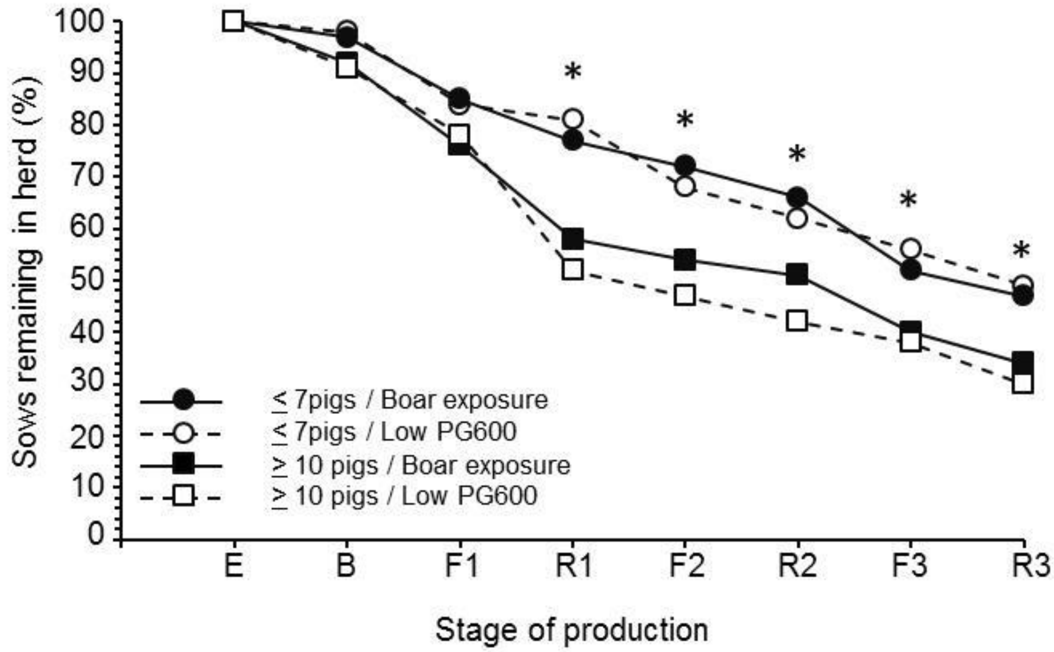

Figure 1. Effect of neonatal litter size and treatment at 140 days of age on disposition of sows through rebreeding after parity 3.

E = gilts delivered to sow farm; B = breeding of gilts; F1 = farrowed parity 1; R1 = rebred after lactation 1; F2 = farrowed parity 2; R2 = rebred after lactation 2; F3 = farrowed parity 3; R3 = rebred after lactation 3.

***indicates effect of neonatal environment, $\leq$ 7 pigs different from $\geq$ 10 pigs, $p \leq 0.05$.**

Data presented in Figure 2 contain longevity data for sows that responded to boar exposure or low levels of PG600 at 140 days of age. As mentioned earlier, a positive response was considered to be any type of change in the external genitalia (Vulva Scores 1 and 2). Data presented in Figure 3 contain longevity data for sows that did not respond to boar exposure or low levels of PG600 at 140 days of age. A negative response was considered to be no visible change in the outward appearance of the external genitalia (Vulva Score 0).

Between 60 and 70% of the gilts that entered the farm were successfully rebred after their 3 lactation if they responded positively to either one of the treatments administered at 140 days of age (Figure 2). This is in contrast to the retention rates of 5 to 25% for the females that did not respond to the same treatments (Figure 3). Gilt raised in small neonatal litters had higher retention rates than gilts raised in large neonatal litters and were given boar exposure at 140 days of age beginning at rebreeding after parity 1 and continuing through farrowing during parity 3. The retention rate of gilts raised in large litters and given low levels of gonadotropins were intermediate of these two and not different from either one statistically.

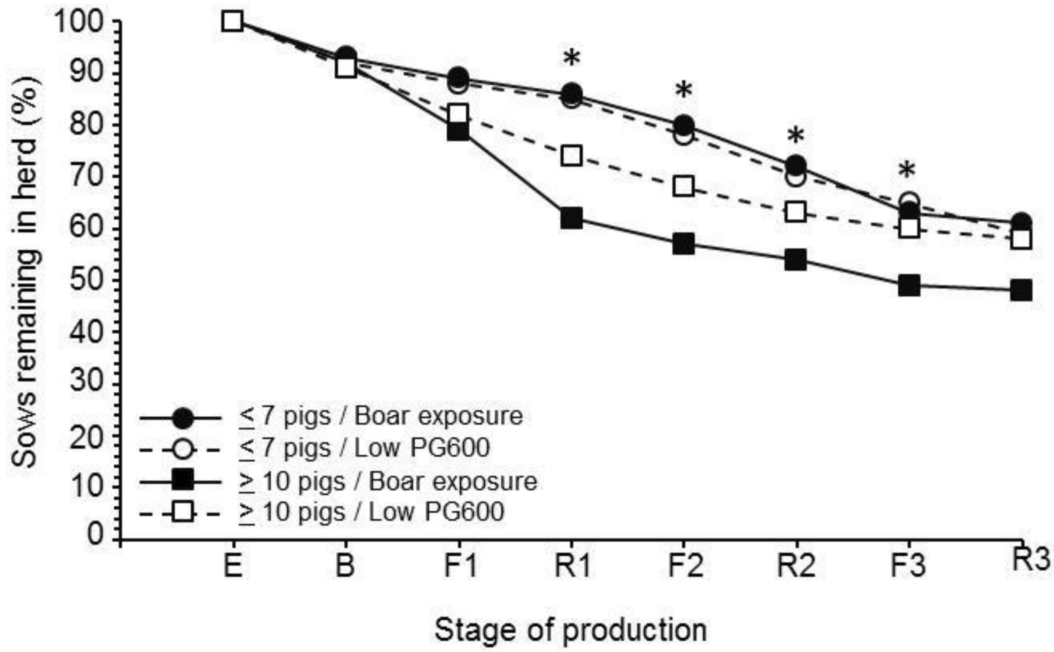

Figure 2. Sow retention rates for gilts raised in small or large neonatal litters that responded to treatments administered at 140 days of age.

E = gilts delivered to sow farm; B = breeding of gilts; F1 = farrowed parity 1; R1 = rebred after lactation 1; F2 = farrowed parity 2; R2 = rebred after lactation 2; F3 = farrowed parity 3; R3 = rebred after lactation 3.

***indicates that gilts raised in neonatal litters of ≤7 pigs were different that gilts raised in neonatal litters of ≥10 pigs and given boar exposure at 140 days of age, $p \leq 0.05$.**

There was an unexpected and interesting finding observed in the retention rate profiles for gilts that did not respond to boar exposure or low levels of PG600 at 140 days of age (Figure 3). The overall longevity of the gilts that did not respond was significantly lower compared with their counterparts that did respond which was expected. However, gilts raised in large litters that did not respond to low levels of PG600 exhibited consistently higher retention after weaning their first litter compared with the other non-responders. At three time points, their retention rates were significantly higher than at least one of the other treatment combinations including being higher than their counterparts raised in large litters and given boar exposure at the end of the study (Figure 3).

Farrowing rates and number of stillborns, mummified fetuses and pigs born alive are shown for the various treatment combinations in Tables 2 through 5. There was a tendency for a main effect on neonatal litter size for farrowing rate ($p = 0.09$) and number of pigs born alive was significantly higher in gilts raised in small litters ($p = 0.03$) as has been previously reported. There was no effect of treatment at 140 days of age (boar exposure versus low levels of PG600) on any of these reproductive variables ($p > 0.23$).

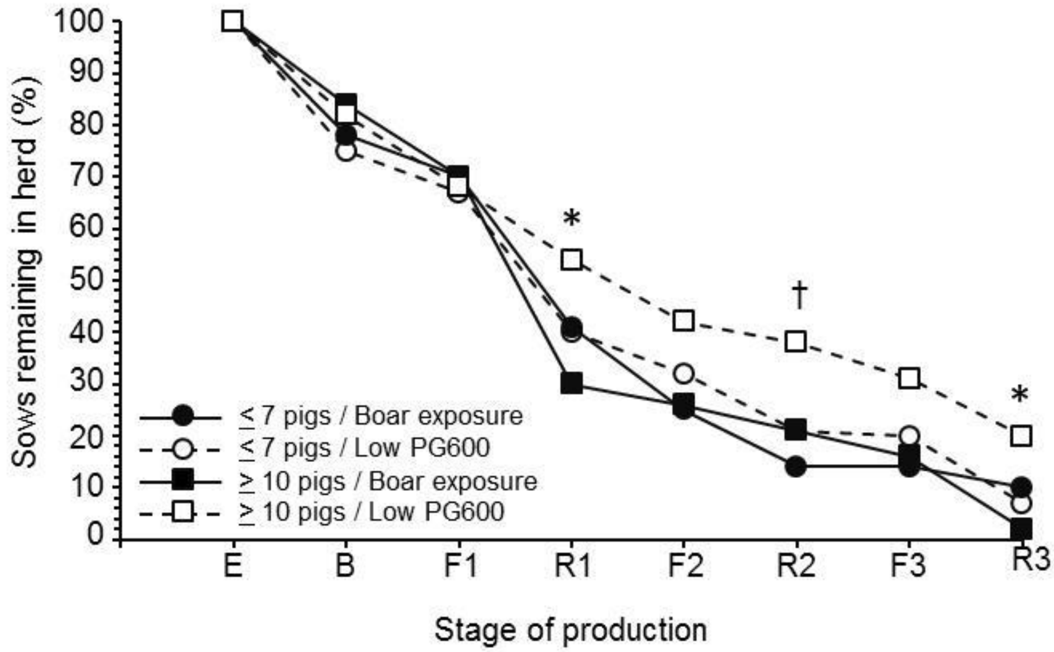

Figure 3. Sow retention rates for gilts raised in small or large neonatal litters that did not respond to treatments administered at 140 days of age.

E = gilts delivered to sow farm; B = breeding of gilts; F1 = farrowed parity 1; R1 = rebred after lactation 1; F2 = farrowed parity 2; R2 = rebred after lactation 2; F3 = farrowed parity 3; R3 = rebred after lactation 3.

***indicates that gilts raised in neonatal litters of ≥10 pigs and given boar exposure were different than gilts raised in neonatal litters of ≥10 pigs and given low levels of PG600 at 140 days of age, $p \leq 0.05$.**

† indicates that gilts raised in neonatal litters of ≥10 pigs were different than gilts raised in neonatal litters of ≤7pigs and given boar exposure at 140 days of age, $p \leq 0.05$.

Table 2. Effect of neonatal litter size and peri-pubertal treatments on farrowing rate (%). Numbers in parenthesis below mean are number farrowed/number bred.

Treatments given at 140 days of age	Neonatal Litter Size ≤ 7 pigs	Neonatal Litter Size ≥ 10 pigs	Peri-pubertal treatment means
Low level of PG600	89.2 (256/287)	83.9 (193/230)	86.8 (449/517)
Boar exposure	90.0 (258/287)	84.9 (198/233)	87.7 (456/520)
Neonatal Litter Size Means[a]	89.5 (514/574)	84.4 (391/463)	

[a] ≤7 pigs tends to be different from ≥10 pigs (p = 0.09)

Table 3. Effect of neonatal litter size and peri-pubertal treatments on number born alive (mean ± s.e.m). Numbers in parenthesis below mean are numbers of litters.

Treatments given at 140 days of age	Neonatal Litter Size ≤ 7 pigs	Neonatal Litter Size ≥ 10 pigs	Peri-pubertal treatment means
Low level of PG600	11.3 ± 0.2 (256)	10.6 ± 0.2 (193)	11.0 ± 0.2 (449)
Boar exposure	11.1 ± 0.2 (258)	10.6 ± 0.3 (198)	10.9 ± 0.2 (456)
Neonatal Litter Size Means[a]	11.2 ± 0.2 (514)	10.6 ± 0.2 (391)	

[a] ≤7 pigs is different from ≥10 pigs (p = 0.03)

Table 4. Effect of neonatal litter size and peri-pubertal treatments on stillborns per litter (% ± s.e.m). Numbers in parenthesis below means are number of litters.

Treatments given at 140 days of age	Neonatal Litter Size ≤ 7 pigs	≥ 10 pigs	Peri-pubertal treatment means
Low level of PG600	5.6 ± 0.4 (256)	6.1 ± 0.4 (193)	5.8 ± 0.4 (449)
Boar exposure	6.0 ± 0.5 (258)	5.8 ± 0.3 (198)	5.9 ± 0.4 (456)
Neonatal Litter Size Means	5.8 ± 0.3 (514)	6.0 ± 0.3 (391)	

Table 5. Effect of neonatal litter size and peri-pubertal treatments on mummified fetuses per litter (% ± s.e.m). Numbers in parenthesis below means are number of litters.

Treatments given at 140 days of age	Neonatal Litter Size ≤ 7 pigs	≥ 10 pigs	Peri-pubertal treatment means
Low level of PG600	0.5 ± 0.1 (256)	0.3 ± 0.1 (193)	0.4 ± 0.1 (449)
Boar exposure	0.2 ± 0.1 (258)	0.4 ± 0.1 (198)	0.3 ± 0.1 (456)
Neonatal Litter Size Means	0.3 ± 0.1 (514)	0.4 ± 0.1 (391)	

Discussion

With regards to the first objective, these results clearly show that low levels of PG600 induce reddening and swelling of the vulva comparable to that what is achieved with boar exposure and accomplishes this without inducing ovulation. The greater response in terms of gilts ovulating to boar exposure compared to administration of low levels of gonadotropins was expected. Boar exposure should stimulate a full activation of reproductive system whereas we hoped that, with a low level of PG600, the typical changes observed in the vulva in response to estrogens could be uncoupled from ovulation. It appears that a 200 IU dose was effective in accomplishing this. It took about a week for the reddening and swelling of the vulva to occur in the PG600-treated animals. Consequently, it appears that treating animals and observing their response over the subsequent week would be sufficient to use low levels of PG600 as a screening tool. Even with the additional cost of injecting the gilts with PG600, this strategy would probably be less expensive compared with providing daily boar exposure beginning at 140 days of age and continuing for several weeks.

This study also demonstrated that if gilts respond with any type of swelling or reddening of the vulva to low levels of PG600 then they are considerably more likely to remain in the herd through three parities compared to their counterparts that show no visible response. Moreover, their retention rate is similar rate to that observed gilts that responded early to boar exposure when it began at 140 days of age. ***In terms of answering the second specific objective of this study, it appears that low levels of PG600 given at 140 days of age in conjunction with subsequent monitoring of changes in the external genitalia is just as good as at predicting the future production potential as exposing gilts to boars and determining when they exhibit estrus.***

In terms of the gilts that responded positively to their peri-pubertal treatments, either PG600 or boar exposure, an interesting observation was the superior longevity observed in gilts raised in small litters compared with their counterparts raised in large litters. It has been speculated that gilts allowed to nurse in small litters during their neonatal development experience less competition and this facilitates the development of their reproductive organs, especially the brain and ovaries in term of estrogen sensitivity. This could be a possible physiological explanation for this occurrence, especially given the fact that significant differences in retention rates among responders were not observed until rebreeding after their first lactation. It has been well-documented that the first lactation is a substantial biological hurdle in the life of sows and a point at which many females are culled from herds. If gilts raised in small litters can function normally under a reduced estrogen environment, then it is physiological reasonable to speculate that a high proportion should be able to exhibit estrus after their first lactation.

In terms of the gilts that did not respond to either boar exposure or PG600 at 140 days of age, the apparent superiority of this those given PG600 and raised in large litters might partially be due to a sampling error. Actual numbers of non-responders were low for gilts raised in small litters, about 18 in each treatment. By the time they were being rebred after their first lactation, there were less than 10, so losing one or two animals at subsequent stages represents a relatively high change on a percentage basis. However, numbers of non-responders were high for gilts raised in large neonatal litters, about 50 in each treatment. These numbers are adequate to have significant statistical power when making comparisons so it is possible that for those gilts raised in large litters, the advantage that the non-responders to PG600 had over the non-responders to boar exposure has some physiological basis which is not apparent at the present time.

It is important to recognize that neither low doses of PG600 or early boar exposure directly change or alter potential longevity. Instead both simply are tools to allow farmers to determine the proportions of their gilts that have the ability to “respond early”. Consequently, depending on genetics and other factors, the optimum time to use either of these tools for the identification of females with high longevity potential could vary among herds. Consequently, a prudent approach would be test a few gilts over several weeks and monitor their subsequent responses prior to treating an entire group. ***Nevertheless, changes in the external genitalia of gilts treated with 200 IU of PG600 at 140 days of age appears to show very good promise as a prospective tool for screening the longevity potential of gilts at least through rebreeding after weaning their third litter.***