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Successful and unsuccessful puberty induction in gilts: A case study

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Introduction

Successful puberty induction in gilts is a necessary component to high reproductive performance in sow farms.

This paper will review the investigation of successful and unsuccessful puberty induction in gilts in a 3400 sow farm in the Midwest USA.

The farm used in this case study experienced a documented reduction in gilt performance in late 2003 and in 2004 after making changes to the gilt rearing conditions and genetics.

Farm History

The sow farm is a 3400 sow farm in Midwest USA constructed in early 1994 as a breed to wean site. In late 2000, a Gilt Developer Unit (GDU) was added to the site to facilitate growth and health of the gilts to be entered into the sow site. The GDU was designed to allow:

1 the replacement gilts to enter the site at 25 to 30 kg

2 20 weeks of isolation and acclimatization.

3 ample space for growth.

4 proper puberty induction and gilt flow into the sow farm

5 the following targets at the time of mating to be met:

   a two or more estrus cycles

   b 300 pounds or greater

   c 16 mm or more backfat

The protocol called for boars to be placed in the gilt pens on a daily basis for a minimum of 30 minutes per pen. Any gilt with a visible heat was recorded and moved to a stall. After 21 days (at the time of the next heat), gilts were then either moved into gestation or mated and then moved, as long as the above targets were met.

This protocol and facility design had been successfully implemented (as measured by gilt rearing performance and gilt reproductive performance) on other farms at the same time as the study farm.

In the 2nd quarter of 2003, a decision was made to close the farm to all outside entries in order to control circulation of PRRSv on the farm. A genetic program was put into place that would allow for maternal line gilts to be internally raised and grown on the farm. On-site facilities were remodeled to allow for more space and growth time from weaning to 25 to 30 kg.

The first internally reared gilts were weaned in the 4th quarter of 2003 and placed into the GDU. These first internally produced gilts entered the puberty induction stage in 2nd quarter of 2004. There was an immediate change in the observed behavior of the internally reared gilts. The number of heat no service (HNS) animals were reduced and there was a subsequent drop in the number of gilts bred per week. The problem continued for a number of weeks as gilt inventory continued to rise and the number of gilts bred per week continued to fall below target.

Investigation

During farm visits, it is a common practice to review production targets including the number of gilts that are cycling and to determine if the farm breeding target is being met. The number of gilts bred is a critical component of the total number of females bred, and failure to meet the breeding target is often a result of improper gilt management and puberty induction. It is not unusual to have weeks on a farm that gilts "are not cycling" resulting in failure to hit overall breeding targets. On this farm, the problem appeared suddenly and was sustained for a long period of time.

The first complaint of poor gilt heat induction and missing the breeding target coincided with the change in gilt sources (from purchased gilts to home raised gilts). As the gilts continued to "not cycle", an investigation was initiated with the following observations:

- Home raised gilts had an aberrant behavior – very aggressive when anyone would enter the pen. As the barn personnel observed – "these gilts are crazy".
- There was a poor response to the boar – gilts would not "stand" or respond to repeated, daily exposure.
- The number of gilts that were culled with "no heat" after 36 weeks of age increased dramatically.

- The number of gilts bred per week decreased.
- The number of older parity sows increased in order to maintain working sow inventory.
- The GDU inventory increased as gilts aged and did not cycle.
- Space for younger gilts was decreased as older gilt inventory increased.
- 10% to 20% of the vulvas in the prepuberal gilts were swollen and reddened.
- Performance of the Party 1 animals declined.

The puberty induction protocol, health and vaccination protocol, ventilation, lighting, and nutrition were all reviewed as the problem continued into 1st quarter 2005 and 2nd quarter 2005.

Intervention

In 3rd quarter 2004, attempts to intervene and solve the "gilts do not stand" problem were initiated. The following interventions were implemented in the GDU:

1 Boar stalls were installed in two of the gilt pens in order to allow a change in the boar exposure procedure. Boars were housed in stalls using the "Foxcroft design and exposure protocol – BEAR (Boar Exposure Area)." This protocol calls for gilts to be moved to the boar area on a pen by pen basis every day. Recorded HNS gilts are then moved to the stall.

2 An exhaustive and intensive record keeping system was installed in order to track and monitor on a weekly basis the number of HNS in the gilts after each group of gilts were introduced into the puberty induction area.

3 All personnel involved in puberty induction were trained and review sessions held in order to be sure that everyone clearly understood the importance of the proper steps to puberty induction in gilts.

4 Observe a cohort set of gilts that have left the site to see if abnormal behavior occurs in pigs reared offsite.

5 Consult with experts in pig behavior to determine if our observations revealed any links between behavior and "not cycling".

6 The age of puberty induction was changed from 150 days of age to 180 days of age.

7 Testing for molds and mycotoxins along with measuring of the serum estrogen levels.

8 Slaughter checks were performed on three different groups of gilts that were removed from the farm for "these gilts do not stand".

9 P.G. 600 (Intervet) was used to induce a standing response in gilts

10 Gilts were brought in from an outside source to determine if there was a difference in the performance of internal gilts vs. externally reared gilts.

11 Discontinue the internal, closed gilt rearing system

Discussion

As previously discussed, it is normal to hear a farm manager comment that the gilts are either cycling well or that gilts are not cycling. This may follow a seasonal pattern or may vary on a farm by farm basis. The farm described in this case was unusual in that the performance of the gilts in the GDU changed when internally produced gilts were used. While it was initially presumed that there was a bias against this new gilt source, as the problem continued, it became apparent that the on farm observations were real.

The behavior of these gilts was abnormal. They were aggressive and appeared "irritated" especially at a younger age (between 40 to 60 kg).

All the interventions that were attempted failed. There was no measurable change in the observed puberty induction in the home raised gilts and the program was eventually abandoned. In addition, the reproductive performance, as measured by farrowing rate, total born and liveborn all decreased in the home raised gilts that had difficulty "standing."

Gilts introduced from an outside source did not exhibit any of the abnormal behavior that was observed in the internally produced gilts and reproductive performance was within normal targets for gilts from this "external" source.

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