

ANIMAL SCIENCE

Title: Effect of Neonatal Litter Size and Early Puberty Stimulation on Sow Longevity and Reproductive Performance - **NPB # 05-082**

Investigator: W.L. Flowers

Institution: North Carolina State University

Date Submitted: February 23, 2009

Abstract

The objective of this study was to examine the effects of the neonatal environment and puberty induction strategies for replacement gilts on sow longevity and reproductive performance. The study was conducted within an 80,000-sow commercial production pyramid that uses "in-house" gilt multiplication. In this system, replacement gilts remained "on-site" until they were about 190 days of age; and then were sent to commercial farms. A total of 3180 gilts were randomly allocated to a factorial arrangement of treatments involving season of birth (spring or fall); neonatal litter size (≤ 7 litter mates or ≥ 10 litter mates); and puberty stimulation (boar exposure @ 140 days of age; boar exposure @ 140 days of age + PG600®; or boar exposure @ 170 days of age). Between 190 and 210 days of age, gilts were sent to commercial farms. The commercial farms were P.R.R.S. positive, but considered to be P.R.R.S. stable. Season of birth did not significantly influence ($p < 0.43$) sow longevity or reproductive performance. Similarly, the productivity of gilts exposed to boars at 140 days of age and treated with PG600® was the same ($p < 0.52$) as their counterparts receiving only boar exposure during the same time period. Consequently, the only two factors that significantly affected sow longevity and reproductive performance were age at which puberty induction was initiated (140 or 170 days of age) and the size of the lactation litter in which gilts were raised (≤ 7 pigs or ≥ 10 pigs). At the end of 6 parities, regardless of age at puberty induction, significantly more sows ($p < 0.05$) raised in small litters (35%) were still in production compared with those raised in large litters (17%). Similarly, regardless of the size of the litter in which they were weaned, significantly more sows ($p < 0.05$) exposed to boars at 140 days of age (32%) remained in the herd compared with their counterparts exposed to boars at 170 days of age (16%). The positive effects of being raised in a small litter and receiving boar exposure at a young age on longevity were additive. As a result, at the end of 6 parities, 45% of sows raised in litters of 7 or fewer pigs and given boar exposure at 140 days of age were scheduled to be rebred compared with only 10% of females raised in litters of 10 or more pigs and given boar exposure at 170 days of age ($p < 0.01$). Differences in numbers of sows remaining in production after six parities were a combination of two events. First, being raised in a small litter size or receiving boar exposure at a young age had significant positive effects on whether first parity sows returned to estrus after weaning. Second, farrowing rates in each of the six parities were 5% higher in sows reared with 7 or less

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org

litter mates or exposed to boars at 140 days of age. Consequently, approximately one third (15%) of the 45% difference in longevity mentioned previously was due to improved rebreeding performance in first and second parity sows, while the other 30% was the result of a 5% improvement in farrowing rate in each of six parities. In contrast, only the neonatal environment significantly influenced number of pigs born alive. Sows raised in litters of 7 or less pigs gave birth to an average of 11.0 pigs over six parities compared with 10.5 pigs for sows raised in litters of 10 or more pigs ($p < 0.05$). Collectively, based on the differences in longevity, farrowing rates and numbers of pigs born alive observed in this study, the total number of pigs produced through six parities per gilt bred in each management system was determined and these estimates are as follows:

Large neonatal litter + Boar exposure @ 170 days – 21.9 pigs;
Large neonatal litter + Boar exposure @ 140 days – 29.7 pigs;
Small neonatal litter + Boar exposure @ 170 days – 29.8 pigs; and
Small neonatal litter + Boar exposure @ 140 days – 43.2 pigs.

Given the management structure of many operations in the swine industry, providing good, consistent boar exposure to gilts at 140 days of age might be technically challenging and present problems with maintaining biosecurity. Thus, it may not be practical for many operations. In contrast, because males born as litter mates to replacement gilts have limited economic value as market animals, strategic cross-fostering programs for sows nursing potential replacement gilts is a technique that should be easy to implement and improve sow longevity.