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D.R. Shelby  
*South Dakota State University*

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## INFLUENCE OF THE BOAR ON LITTER SIZE

D. R. Shelby

Although the role of the boar in achieving a high conception rate among sows in a herd has long been recognized, the sow has generally been considered to be solely responsible for litter size. Litter size is determined by (1) the number of eggs ovulated, (2) the quality of eggs ovulated as evidenced by the ability of the eggs to be fertilized and develop into normal embryos, (3) the ability of the uterus to provide the proper environment for implantation and the development of normal embryos during pregnancy and (4) the number and quality of sperm received by the female at mating as evidenced by the ability of the sperm to fertilize the eggs and insure normal development of the embryo. The factors which determine litter size may be affected by nutrition, age of animals, temperature, light, hormone balance, disease and various other stresses on the animal.

This study was made to determine if differences in fertility level exist among boars and to determine whether these differences, if they exist, can affect litter size.

### Experimental Procedure

During the past year, the reproductive tracts from 91 pregnant crossbred gilts have been recovered at slaughter between the 25th and 32nd day of pregnancy. These tracts were examined and the number of corpora lutea and normal embryos present in each tract were counted and recorded. Since one corpus luteum normally grows in to fill up the empty antrum of a follicle after ovulation, the assumption was made that each corpus luteum observed represented the ovulation of one egg from a mature follicle. It was assumed that the gilts used in this study were of equal fertility, because only pregnant gilts were examined and there were no significant differences among gilts in the number of ova shed.

These 91 crossbred gilts, along with several other gilts, had been bred at random to nine Yorkshire boars by natural service. No attempt was made to mate an equal number of gilts to each boar. Three of the boars were not retained in the herd very long, so there were fewer litters by these boars. The gilts were self-fed a bulky ration containing 30% dehydrated alfalfa meal and 13% crude protein during the prebreeding and postbreeding periods. The boars were hand-fed 5 lb. of the same ration daily.

There were no significant effects of season on litter size; therefore, the data were pooled over seasons and analyzed by Chi-square.

### Results and Discussion

The results of this study are shown in table 1. There were significant differences ( $P < .01$ ) among boar groups in the percent of ovulated eggs which were present as embryos after 25 days of pregnancy and in the number of embryos present. The average number of embryos per gilt was used as an indication of litter size.

Table 1. Influence of the Boar on Litter Size

Boar	Number of gilts	Eggs ovulated	Embryos present	% eggs present as embryos <sup>a</sup>	Mean number of embryos per gilt <sup>a</sup>
267	18	278	235	84.5	13.1
507	15	248	152	61.2	10.1
333	14	204	144	70.5	10.3
714	11	182	120	65.9	10.9
442	10	161	93	57.7	9.3
487	9	151	85	56.3	9.4
268	5	77	55	71.4	11.0
504	5	68	52	76.4	10.4
718	4	66	55	83.3	13.8
Total	91	1435	991	69.1	10.9

<sup>a</sup> The differences among boar groups in percent eggs present as embryos and in mean number of embryos per gilt were significant at  $P < .01$ .

Although the major source of variation in litter size comes from the sow, the boar can affect litter size. Sperm must be capable of fertilizing an ovum and they must contribute genetic material to the egg at fertilization to insure the development of a normal embryo. A loss of either of these functions from the sperm will result in a reduced number of embryos implanting in the uterus and, therefore, will result in a reduction in litter size. Although this study was not designed to separate the effects of these two functions of the sperm, it is apparent that variability in the completion of these functions exists among boars which can affect litter size.

#### Summary

The results of this study indicate that boar differences in fertility level do exist, and therefore the boar can have a significant influence on litter size.