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EVALUATION OF OVARIAN FOLLICULAR GROWTH PATTERNS BETWEEN THE LEFT AND THE RIGHT OVARY IN RANDOMLY SELECTED CONTROL LINE GILTS AND GILTS SELECTED FOR HIGH OVULATION RATE

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Abstract

Gilts previously selected for high ovulation rate (RS, n=76) and randomly selected control line (C, n=56) gilts from the University of Nebraska Gene Pool population were used. Gilts from each genetic line were randomly assigned for ovary recovery on day 1, 2, 3, 4, 5 or 6 following administration of prostaglandin $F_{2\alpha}$ (Lutalyse) on day 13 of the estrous cycle. Ovaries were recovered and individual follicles were measured, counted and classified by size into small (S: 2-2.9 mm) medium (M-1, 3-4.9 mm; M-2, 5-6.9 mm) and large (L: L-1, 7–8.9 mm; L-2, 9-10.9 mm) follicle classes. The total number of follicles across days for both lines was 7145. The follicular population in the left and the right ovaries was 3667 and 3478 respectively. The analysis showed that there was no evidence of an interaction between line and ovary ($P>0.1$). Similarly, there were no differences in follicular development ($P>0.05$) between the two ovaries within each line, except on day 5, where the L-2 follicular population of the left ovary in the RS line gilts was larger ($P<0.05$) compared to the right ovary.

Introduction

Ovulation rate or the number of follicles ovulated at a given estrus establishes the potential for liter size and as a consequence exerts an important influence on the economic efficiency of the swine enterprise. Follicle recruitment in the gilt occurs from the proliferating pool of antral follicles between days 14 and 17 of the estrous cycle. Previous studies have shown a different pattern of follicle selection in gilts selected for higher ovulation rate (RS) than in unselected control (C) line gilts. The RS gilts expressed higher ovulation rate because of an extended period of follicular recruitment that maintains a larger pool of healthy follicles due to a lower atresia rate. Similarly, differences in ovulation rate between the right (R) and the left (L) ovary have been reported. However, follicular growth and recruitment between the two ovaries during the follicular phase has not yet been addressed. The objective of this study was to evaluate differences in ovarian follicular development between the left and the right ovary, during the follicular phase, in order to determine which of the ovaries (left or right) contributes more significant to the preovulatory follicular pool.

Materials and Methods

Gilts from the University of Nebraska Gene Pool population representing two genetic lines, (RS, n=76) selected for high ovulation rate for nine generations followed by random selection for 11 generations [3] and a randomly selected Control line (C, n=56) were randomly assigned in a replicated experiment for ovary recovery on d 1,2,3,4,5 or 6 following PGF 2α induced luteolysis on d 13 a.m. Gilts had expressed two or more estrous periods prior to assignment. Ovaries were recovered at slaughter and classified to Right (r) and Left (l), evaluated for number and size (mm) of small (S:2.0-2.9), medium (M-1:3.0-4.9; M-2:5.0-6.9) and large (L-1:7.0-8.9; L-2:9.0-10.9)

follicles. Data were analyzed by the Chi-Square test and *t*-test (one sided) proportional analysis. A probability of $p<0.05$ was considered statistically significant.

Results

The mean number of small, medium (M-1;M-2) and large (L-1;L-2) follicles per ovary and line are presented in Figures 1 through 5.

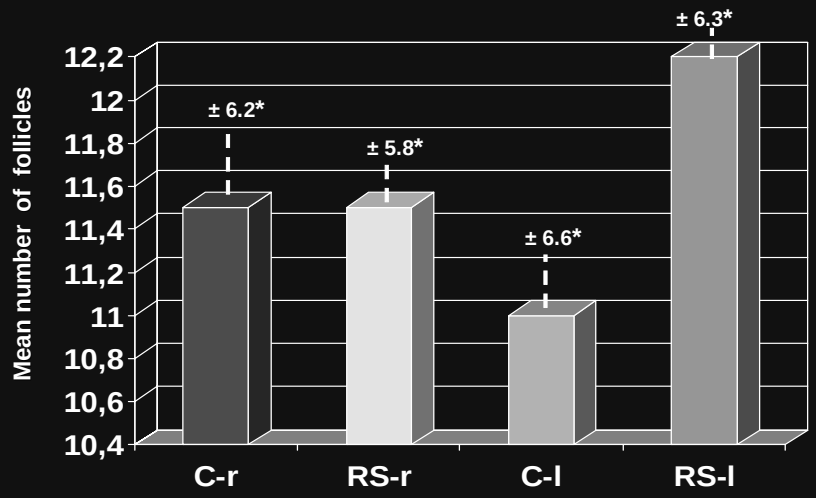
The analysis of the results indicated that there was no evidence of an interaction between line and ovary ($p>0.1$).

Similarly, there were no differences in the follicular population in any size category across days between the two lines and the left, right ovaries ($p>0.05$).

There were no differences in follicular development ($p>0.05$) between the two ovaries within each line, except of the L-2 follicular population on day 5 of the left ovary in the RS line gilts which was larger ($p<0.05$) compared to the follicular population of the right ovary.

Figure 1

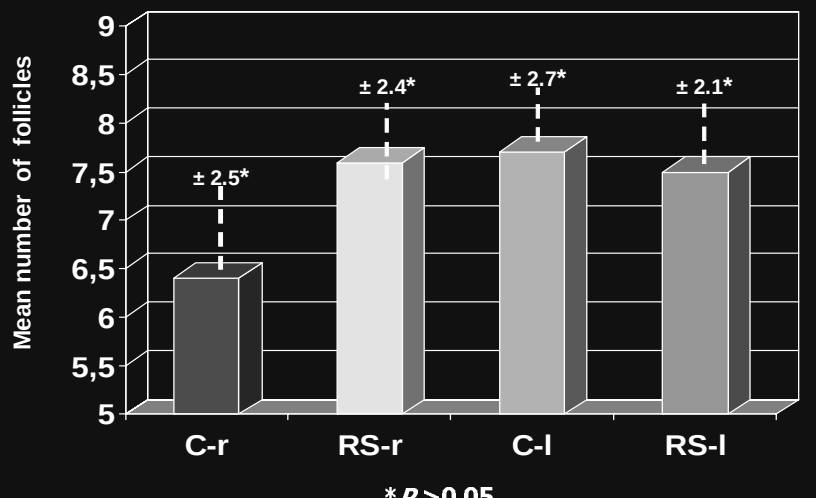
Mean number of small size follicles pooled across days between Right and Left Ovaries in C and RS gilts



*P >0.05

Figure 2

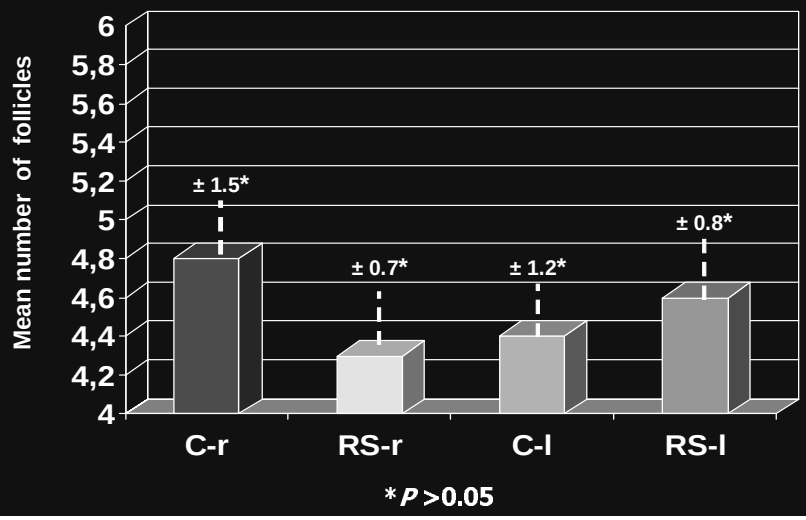
Mean number of M-1 size follicles pooled across days between Right and Left Ovaries in C and RS gilts



*P >0.05

Figure 3

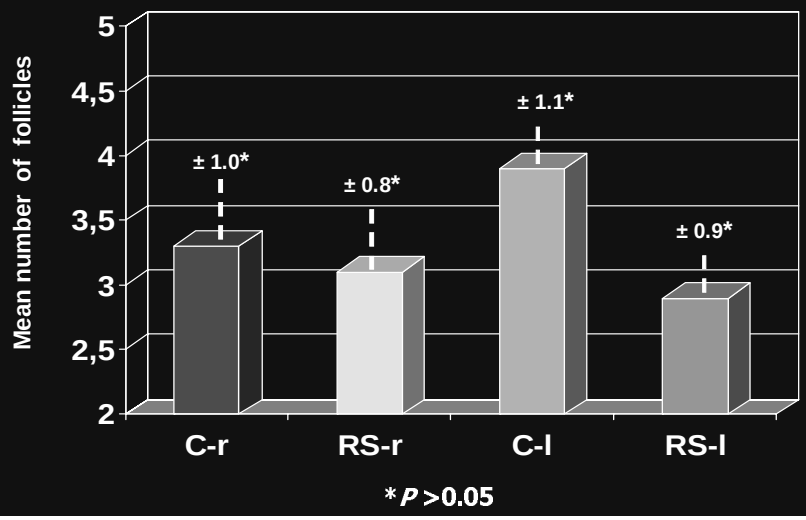
Mean number of M-2 size follicles pooled across days between Right and Left Ovaries in C and RS gilts



*P >0.05

Figure 4

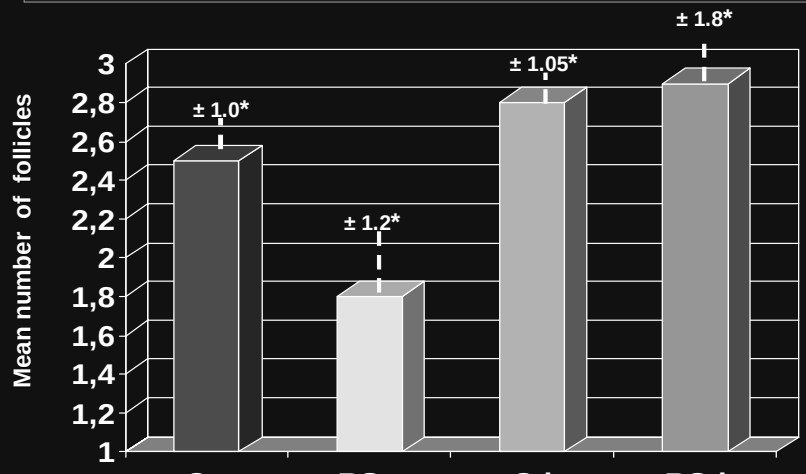
Mean number of L-1 size follicles pooled across days between Right and Left Ovaries in C and RS gilts



*P >0.05

Figure 5

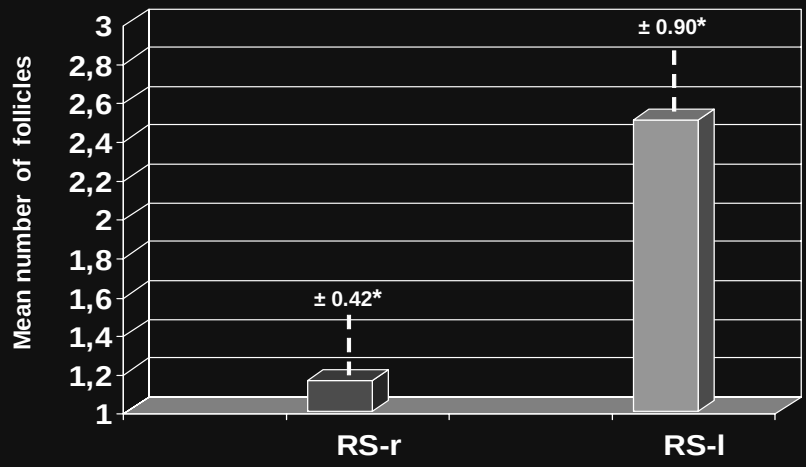
Mean number of L-2 size follicles pooled across days between Right and Left Ovaries in C and RS gilts



*P >0.05

Figure 6

Mean number of L-2 size follicles of RS line on Day 5



*P <0.05

Discussion

The results indicated that there were no differences in the follicular development between the left and the right ovaries in gilts selected for high ovulation rate and randomly selected control gilts. The left ovary has been considered to be more active compared to the right ovary [1,2]. In wild boar populations appears to be no differences in follicular development between the left and the right ovaries [4, unpublished data]. Based on the findings of this study it is concluded that ovarian follicular development between the left and the right ovary, in gilts selected for high ovulation rate (RS line) and randomly selected control line gilts (C line) does not differ. However, at the advanced stages of the follicular phase the left ovary exhibits an accelerated follicular growth compared to the right ovary in gilts.

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