Influence of Season and Sperm Concentration on Reproductive Performance of Large White Yorkshire Pigs*

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Abstract

A study was conducted in Large White Yorkshire pigs maintained at Post Graduate Research Institute in Animal Sciences, Kattupakkam, Tamilnadu to study the influence of different spermatozoa concentrations and season on reproductive performance of sows. The reduction in spermatozoa dose from 3.6 billion to 1.8 billion had no significant influence on conception rate and farrowing rate. Treatment groups had significant influence (P<0.05) on total number of piglets born. Insemination dosage had no significant influence on litter size born alive and litter size at weaning. It was observed that season had a highly significant influence (P<0.01) on total number of piglets born, litter size born alive and litter size at weaning.

Key words: Season, semen concentration, Large White Yorkshire, reproductive performance.

The introduction of artificial insemination using the semen collected from genetically superior exotic boars will solve the problem by improving the reproductive and productive performance of native pigs and thereby improving the socio-economic status of the pig farmers. However, in India the research on artificial insemination in pigs is still scanty. Hence, the present research is undertaken to study the influence of different sperm concentrations and season on reproductive performance of Large White Yorkshire (LWY) pigs.

Materials and Methods

Twenty four gilts of seven months age group were selected and randomly divided into four groups each containing six animals viz. natural service (group I), neat semen (group II), diluted semen with concentration of 40 million spermatozoa/ml (spermatozoa dose 3.6 billion) (group III) and diluted semen with concentration of 20 million spermatozoa/ml (spermatozoa dose 1.8 billion) (group IV). The pigs in standing heat were bred by natural service or artificial insemination and repeaters were bred second time. Artificial Insemination was done using the foam catheter during summer and rainy seasons according to the group allotted. Pregnancy diagnosis was done by using the equipment Rotec Preg-tector after 25 days of natural service or artificial insemination. Reproductive performance viz. conception rate, farrowing rate, total number of piglets born, piglets born alive, litter size at weaning and post-weaning estrous were recorded. Weaning was carried out at 42 days of age. After weaning the sows were bred again during the first oestrus cycle as per the group allotted and their reproductive performance were recorded. The data viz. total number of piglets born, litter size born alive, litter size at weaning and post-weaning estrus were analysed using the least-squares means and Duncan Multiple Range Test (DMRT). Conception rate and farrowing rate were analysed using Fisher’s Exact. The statistical analyses were carried out using the statistical software IBM SPSS® Version 20.0 for Windows®.

Results and Discussion

In the present study treatment groups and season had no influence on conception rate (Table I). The mean conception rate in natural service (Group I), Artificial Insemination with neat semen (Group II), Artificial Insemination using diluted semen with sperm concentration of 40mn/ml (Group III) and 20mn/ml (Group IV) was 100, 91.67, 91.67 and 75 per cent, respectively. However, Ronald et al. (2013) reported 100 per cent conception rate by natural service.

Even though sperm dose had no significant effect on conception rate of sows that were artificially inseminated, the highest conception
rate (91.67 percent) was recorded in AI group with sperm dose of 3.6 billion (spermatozoa 40 million/ml) than AI group with spermatozoa dose of 1.8 billion (spermatozoa 20 million/ml). Similarly, Mercat et al. (1999) reported that a reduction in doses of spermatozoa from 2.4 to 1.8 billion viable spermatozoa had no effect on both fertility and prolificacy. They reported fertility rates of 90.1 and 90.6 per cent, respectively with doses of 1.8 and 2.4 billion viable spermatozoa.

The analyses revealed that treatment groups and season had not influenced the farrowing rate. The mean farrowing rates in artificial insemination group coincides with the findings of Rozeboom et al. (1997) in Minnesota. They reported the farrowing rate of 66 to 90 per cent in Yorkshire X Landrace sows and gilts with insemination dose of greater than 5 billion spermatozoa.

Treatment groups had significant influence (P<0.05) on total number of piglets born, the highest recorded in natural service group (9.67 ± 0.36) followed by diluted semen group with spermatozoa dose 3.6 billion (9.50 ± 0.36), neat semen group (9.17 ± 0.41) and diluted semen group with sperm dose 1.8 billion (8.33 ± 0.35). Similarly, Flowers and Alhusen (1992) reported the highest number of piglets born under natural service than artificial insemination.

The treatment groups had no significant influence on mean litter size born alive. In contrary, Ronald et al. (loc cit.) reported a significantly higher litter size at birth under natural service (10.6 ± 0.64) compared to artificial insemination group using diluted semen with spermatozoa dose of 3.0 billion sperms (8.36 ± 0.28) in Large White Yorkshire pigs.

It was observed that season had a highly significant influence on total number of piglets born and litter size born alive. The lowest total number of piglets born and litter size born alive during rainy season may be due heat stress affecting the dam during the mating season (summer). In contrary, Chhabra et al. (1990) and Singh et al. (2002) reported that season of farrowing had a non-significant effect on litter size at birth.

The litter size at weaning between the groups had no significant difference. Season had a highly significant effect on litter size at weaning, the highest being recorded during summer farrowing (8.54 ± 0.25) compared to farrowing during rainy season (7.42 ± 0.22). This might be due to favourable conditions prevailing during the conception period (rainy season) which resulted in higher litter size born alive and thereby higher litter size at weaning. Further, the summer farrowing related to second parity and farrowing at rainy season related to first parity. As the parity increased from first to second the litter size also increased. In contrary, Singh et al. (loc cit.) reported that season had non-significant influence on litter size at weaning in LWY pigs.

Treatment groups and season had no influence on post-weaning estrus. Weaning-to-estrus interval ranged from 4.75 ± 0.18 to 5.08 ± 0.31 days. In contrary, Jayashree Chiring Phukon (2011) reported longer weaning to estrus interval of 10.67 ± 2.08 days in Large White Yorkshire pigs weaned at 42 days.

**Summary**

Season had a highly significant influence on total number of piglets born, litter size born alive and litter size at weaning. Sperm concentration had no influence on conception rate, farrowing rate and litter size born alive.

**References**


