

INFLUENCE OF SEASON AND CONCENTRATION OF SPERMS ON PRODUCTIVE 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 season and different spermatozoa concentrations on productive performance of sows. The mean birth weight was significantly higher ($P < 0.01$) in diluted semen group with spermatozoa dose of 1.8 billion (1.34 ± 0.02 kg) compared to natural service group (1.27 ± 0.02 kg), neat semen group (1.21 ± 0.02 kg) and diluted semen group with spermatozoa dose of 3.6 billion (1.30 ± 0.02 kg). Similarly, treatment groups had significant influence ($P < 0.01$) on weaning weight. However, the litter weight at birth and weaning did not show any significant influence between the treatment groups. Piglets of diluted semen group with spermatozoa dose of 1.8 billion had highest weaning weight compared to the other three groups. The difference in pre-weaning weight gain was found to be highly significant between the four treatment groups with highest gain in diluted semen group with spermatozoa dose of 1.8 billion (188.49 ± 4.10 g/day) due to smaller litter size. Season had a highly significant influence ($P < 0.01$) on birth weight, litter weight at birth and litter weight at weaning. The highest litter weight at weaning was recorded during farrowing at summer (74.57 ± 2.39 kg), followed by rainy season (62.88 ± 1.93 kg). It was observed that season had no influence on weaning weight, pre-weaning weight gain and pre-weaning mortality rate in piglets.

Keywords: Large White Yorkshire pig, productive performance, season, artificial insemination.

Introduction

Artificial insemination is an useful tool to introduce superior genes through greater use of genetically superior sires. It is important to reduce the number of sperms required for insemination in pigs without affecting the litter performance. The present study is undertaken to study the influence of season and artificial insemination with different spermatozoa concentrations on productive performance of pigs.

Materials and Methods

Twenty four Large White Yorkshire gilts of seven months age group were selected and randomly divided into four groups each group containing six animals viz. natural service (group I), neat semen (group II), diluted semen with concentration of 40 million spermatozoa/ml (sperm dose 3.6 billion) (group III) and diluted spermatozoa with concentration of 20 million spermatozoa/ml (spermatozoa dose 1.8 billion) (group IV). The pigs were bred during summer and rainy seasons according to the group allotted. The pigs that were bred during summer season had farrowed during rainy season and the pigs that were bred during rainy had farrowed during the summer season. Creep feed with crude protein of 22 per cent was provided to the piglets from second week of age up to 42 days age of weaning.

The data viz. birth weight, weaning weight, litter weight at birth, litter weight at weaning and pre-weaning weight gain of piglets were analysed using the least-squares means and Duncan Multiple Range Test (DMRT). Pre-weaning mortality rate using Chi-square test. The statistical analyses were carried out using the statistical software IBM SPSS[®] Version 20.0 for Windows[®].

Result and Discussion

Birth weight and litter weight at birth

The sex had a highly significant influence on birth weight. The birth weight was significantly higher ($P < 0.01$) in male (1.34 ± 0.02 kg) compared to female piglets (1.22 ± 0.02 kg). This coincides with the findings of Chhabra *et al.* (1989) who stated that sex of the piglets had a significant effect on birth weight. Treatment group had a highly significant influence on birth weight and had no influence on litter weight at birth (Table 1). The mean birth weight was significantly higher in group IV compared to group other groups. This might be due to higher litter size in group I, II and III sows resulting in lower birth weight compared to the group IV sows. Sai Prasanna *et al.* (2010) also reported that the mean body weight declined as the litter size at birth increased. Season had a highly significant influence on birth weight and litter weight at birth with the highest birth weight (kg) observed during the farrowing month of summer compared to rainy season. The reason might be due to difference in parity, since the farrowing during rainy season corresponded to first parity and the summer corresponded to second parity. In contrary, Sai Prasanna *et al.* (2010) reported that the season had no influence on birth weight of the piglets.

Weaning weight and litter weight at weaning

Treatment group had a significant influence ($P < 0.01$) on weaning weight but not on litter weight at weaning. The group IV piglets had the highest weaning weight than the other three groups. This might be due to smaller litter size at birth in group IV compared to other groups and it was supported by the findings of Chhabra *et al.* (1989) and Lakhani (1992) who reported that the litter size at birth had significant effect on weaning weight. Season had no significant influence on weaning weight. This may be due to better management practices followed in the farm during the pre-weaning period. In contrary, Sai Prasanna *et al.* (2010) reported significant influence of season of farrowing on body weight at different pre-weaning ages. Season had a highly significant influence ($P < 0.01$) on litter weight at weaning. The highest weight was recorded during summer (74.57 ± 2.39) than rainy season (62.88 ± 1.93). This might be due to parity effect since the first parity corresponded to farrowing at rainy season and second corresponded to farrowing at summer season.

Pre-weaning weight gain

Table-1. Least-squares means (\pm S.E.) for effect of mating season and treatment on productive performance

Effects	Birth weight (kg)	Litter weight at birth (kg)	Weaning weight (kg)	Litter weight at weaning (kg)	Pre-weaning growth rate (g/day)
Treatment	**	NS	**	NS	**
Group I	1.27 ^{ab} \pm 0.02 (112)	11.81 \pm 0.76 (12)	8.49 ^b \pm 0.16 (97)	68.43 \pm 4.17 (12)	170.04 ^{ab} \pm 3.90 (97)
Group II	1.21 ^a \pm 0.02 (109)	11.15 \pm 0.65 (12)	8.53 ^b \pm 0.18 (96)	70.00 \pm 4.11 (12)	176.26 ^b \pm 3.89 (97)
Group III	1.30 ^{bc} \pm 0.02 (113)	12.28 \pm 0.63 (12)	8.14 ^b \pm 0.13 (102)	69.15 \pm 2.24 (12)	162.08 ^a \pm 3.78 (102)
Group IV	1.34 ^c \pm 0.02 (97)	10.92 \pm 0.56 (12)	9.28 ^a \pm 0.20 (87)	67.30 \pm 3.50 (12)	188.49 ^c \pm 4.10 (87)
Farrowing season	**	**	NS	**	NS
Rainy (Sept – Oct)	1.24 ^a \pm 0.02 (198)	10.28 ^a \pm 0.39 (12)	8.45 \pm 0.12 (178)	62.88 ^a \pm 1.93 (12)	173.57 \pm 2.88 (177)
Summer (Mar – Apr)	1.31 ^b \pm 0.01 (233)	12.80 ^b \pm 0.39 (12)	8.70 \pm 0.12 (204)	74.57 ^b \pm 2.39 (12)	174.86 \pm 2.66 (206)

^{NS} - Not significant,

* - Means bearing different superscript within a column differ significantly ($P < 0.05$)

** - Means bearing different superscript within a column differ significantly ($P < 0.01$)

Figures in parentheses indicate the number of observations

The difference in pre-weaning weight gain was found to be highly significant between the four treatment groups with highest gain in group IV (188.49 ± 4.10 g/day), followed by

Group II (176.26 ± 3.89 g/day), Group I (170.04 ± 3.90 g/day) and Group III (162.08 ± 3.78 g/day). This might be due to smaller litter size at birth in group IV compared to other groups which led to less competition between the piglets to suckle and better opportunity to suckle more milk compared to the groups that had greater litter size at birth. Similarly, Sai Prasanna *et al.* (2010) reported that litter size at birth significantly influenced the pre-weaning body weight at all ages and the association of litter size and body weights might be due to the increased competition for the resources within the litter. Season did not influence the pre-weaning weight gain. In contrary, Sai Prasanna *et al.* (2010) reported significant effect of season of farrowing on body weights at different pre-weaning ages in piglets.

Pre-weaning mortality

The mean pre-weaning mortality rate in group I, II, III and IV were 13.39, 11.01, 9.73 and 10.31 per cent respectively. The mean pre-weaning mortality rate in group I coincided with the findings of English and Morrison (1984) who reported overall pre-weaning mortality rate of 12.8 per cent in piglets. It was observed that season had no significant influence on pre-weaning mortality of piglets. This may be due to better adaptability of Large White Yorkshire pigs to the climatic conditions of Tamil Nadu and may be due to better management practices followed in the farm. In contrary, Li *et al.* (2010) reported that during summer months, piglet mortality was greater than during other seasons (30 per cent versus 22 ± 2.2 per cent; $P < 0.01$) and the high piglet mortality observed during the summer probably may be due to heat stress during summer.

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