

INFLUENCE OF SEASON AND GENOTYPE ON THE REPRODUCTIVE TRAITS OF THE FEMALE PIGS

D. Eyovwunu* S. I. Omeje, & J. O. Akpodiete

College of Education, Warri, Delta State

Department of Animal Science, Delta State University, Asaba Campus

*dafeminna@yahoo.com Phone No. 08030849155

Abstract

The study was carried out at the Piggery Research Unit of the Delta State University Farm, Asaba Campus, Nigeria. It was conducted to evaluate the influence of season and genotype on reproductive traits of pigs. A total of 24 weaner pigs made up of 18 females and 6 males of Landrace (LR), Duroc (DU), and Large White (LW) constituted the experimental stock. The gilts were bred and the offspring from the first parity were also used for the experiment. Data were taken continually every two weeks in the four sub-seasons of the year: Late dry season (October-December); Early dry season (January-March); Early rainy season (April-June); and Late rainy season (July-September) in two replicate years. The data generated were subjected to variance, and significantly different means separated by Scheffe using the General Linear Model (GLM) procedure SPSS (2010) program. Reproductive traits were investigated using standard methods. The findings revealed that season had no significant ($P > 0.05$) effect on all the reproductive traits evaluated. While genotype groups had significant ($P < 0.05$) effects on litter size of sows at farrowing (LSF), litter birth weight (LBWT), litter weaning weight (LWWT) and pre-weaning gain parameters, respectively. The Large White genetic group was superior in litter size at farrowing (LSF) to the Duroc or the Landrace. The Duroc and Landrace groups were superior in weaning weight (WWT) to the Large White. The Duroc group is superior in pre-weaning gain to Large White and Landrace.

Key Words: Season, genotype, pigs, reproductive traits

Introduction

Reproductive performance in sows depends on several factors, such as parity number, breed, season, temperature, photoperiod and nutrition (Gourdine, Bidanel, Noblet and Renaudeau, 2006; Peltoniemi and Virolainen, 2006; Suriyasomboon *et al.*, 2006; and Silva, *et al.*, 2009a). The adverse environmental conditions prevailing in tropical Africa among other factors, such as genotype, could have a varying influence on the reproductive performance of pigs in tropical areas. This present study was carried out to investigate the influence of season and genotype on reproductive traits of female pigs.

Materials and Methods

The study was carried out at the Piggery Unit of the Teaching and Research farm of Delta State University, Asaba Campus, Asaba, Nigeria. Asaba is located between longitude 6°E and 8°N, and between latitude 4°N and 10°N. The mean temperature ranged between 27.90°C -36.90°C. The area has a mean relative humidity range of 76.83% - 85.17%. (Asaba Meteorological Office). A total of 24 weaner pigs made up of 6 females and 2 males each of Landrace (LR), Duroc (DU), and Large White (LW) constituted the experimental stock. They were sourced from the piggery unit of Delta State University investment limited (DIL)

farm. The experimental animals were subjected to 14 days adaptation period within which proper routine health management practices were carried out. The animals were reared together in group of three and one according to gender and genotype. The pigs were placed on prophylactic drugs against baby pig anaemia and intestinal worms. The gilts were bred and the offspring from the first parity were also used for the experiment. Data were taken continually every two weeks in the four sub-seasons of the year: Late dry season (October-December); Early dry season (January-March); Early rainy season (April-June); and Late rainy season (July-September) in two replicate years. The following reproductive traits were carried out on the pigs as applicable: litter size at farrow (LSF); litter birth weight (LBWT); litter weaning weight (LWWT) at 42 days of age (6 weeks); litter size at weaning (LSW); still birth; pre-weaning gain (g day^{-1}); pre-weaning mortality; and gestation period(days). Data collected were subjected to analysis of variance and significantly different means separated by Scheffe using the General Linear Model (GLM) procedure SPSS (2010) program.

Results and Discussion

Anova did not indicate that season was significant ($P>0.05$) on all the litter traits as shown in Table 1. As indicated in Table 2, the effect of genotype was significant ($P<0.05$) for most of the reproductive

parameters measured, except gestation period. Large White (LW) group were found superior for litter size at farrowing (LSF), Duroc (DU) and Landrace (LD) groups for weaning weight (WWT), and Duroc group are superior in pre-weaning gain to Large White and Landrace.

Table 1. Effect of season on reproductive traits

Traits	N	Rainy season	N	Dry Season
Litter size at farrow	13	5.23 $\pm$ 1.24	5	5.00 $\pm$ 0.00
Litter birth weight	68	1.09 $\pm$ 0.33	25	1.24 $\pm$ 0.40
Litter size at weaning	13	4.77 $\pm$ 1.42	5	5.20 $\pm$ 0.45
Weaning weight	67	5.19 $\pm$ 1.42	20	5.72 $\pm$ 1.06
Gestation period	13	115.15 $\pm$ 0.90	5	115.60 $\pm$ 0.55

Table 2. Comparison of the mean reproductive performances of the three genotypes of pigs

Parameters	Duroc	Large White	Landrace
Litter size(No. farrowed per litter)	4.67 $\pm$ 0.82 ^a	6.17 $\pm$ 1.47 ^b	5.00 $\pm$ 0.00 ^{ab}
Litter weights (kg)	0.94 $\pm$ 0.31 ^a	1.30 $\pm$ 0.35 ^b	1.44 $\pm$ 0.49 ^b
Weaning weight(kg)	5.99 $\pm$ 1.27 ^b	5.12 $\pm$ 1.63 ^a	5.95 $\pm$ 1.79 ^b
Still birth	2.00 ^{nt}	0.00 ^{nt}	1.00 ^{nt}
Gestation period	115.17 $\pm$ 0.98	115.33 $\pm$ 0.82	115.33 $\pm$ 0.82
Pre-weaning gain(g day ⁻¹)	109.26 $\pm$ 23.45 ^b	92.06 $\pm$ 28.80 ^a	104.58 $\pm$ 27.90 ^{ab}
Litter size at weaning	4.33 $\pm$ 0.82 ^a	6.00 $\pm$ 1.55 ^b	4.50 $\pm$ 0.84 ^a
Pre-weaning mortality	2.00 ^{nt}	2.00 ^{nt}	3.00 ^{nt}

^{a,b} Means with different superscripts in a row are significantly different ($P<0.05$)

nt: not tested

As shown in Table 1 the season of farrowing was not significant ($P>0.05$) in its effect on all the reproductive traits measured. In this present study season had non-significant ($P>0.05$) influence on litter size at farrowing (LSF) and litter size at weaning (LSW). Similar findings were reported in several study reports on the Landrace, Desi, Tanworth and crossbred genotypes of pigs (Mukhopadhyay, Singh and Singh, 1992; Pandey, Singh, Singh and Dubey, 1996; Singh and Devi 1997; Singh, Mishra, Singh and Chaudhary, 2002; Pandey, Singh and Pandey, 2010). Sharma and Singh (1995), Neopane (2005), and Pokharel, Bhattarai, Sapkota and Kafle (2013) also reported non-significant effect of season on litter size at farrowing (LSF) and litter size at weaning (LSW). The results also revealed that season had no significant ($P>0.05$) influence on litter birth weight (LBWT) and litter weaning weight (LWWT). This is in agreement with the reports of several authors (Mukhopadhyay *et al.*, 1992; Sharma and Singh, 1993; Pandey *et al.*, 1996; Singh and Devi, 1997; Pandey *et al.*, 2010; and Pokharel *et al.*, 2013). However, Siagian, Argan, Alacantura, Aquino and Millena (1986); McLaren, Buchanan and Johnson, (1987); and Kuhlers, Jungst and Little (1989); reported significant ($P<0.05$) effect of season on litter weaning weight (LWWT). Non-significant ($P>0.05$) effect of season on gestation period in the

present study is in conformity with the findings of Das, Deka, Nath and Goswami (2005); Kumari and Rao (2010). The effect of the interaction between season $\times$ genotype on the traits (litter size at farrowing (LSF), litter birth weight (LBWT), litter weaning weight (LWWT), litter size at weaning (LSW), and gestation period were not significant ($P>0.05$) in this present study.

The results showed significant ($P<0.05$) variations due to genotype for most of the traits tested except for gestation period. The litter size at farrowing (LSF) range from 4-8 piglets across the genetic groups. Large White had the largest litter size at farrowing (LSF) with mean value of 6.00 piglets. The significant difference between genotype groups in litter size at farrowing (LSF) in the study supports the findings of several authors (Adebambo, 1983; 1986; Gaugler, Buchanan, Hintz and Johnson, 1984; Kuhlers *et al.*, 1989; Pathiraja and Oyedipe, 1990; Mukhopadhyay *et al.*, 1992; Sharma and Singh 1995; Pandey *et al.*, 1996; Singh and Devil, 1997; Lakhani and Jogi, 2001; Oseni, 2005; and Pandey *et al.*, 2010). The findings also revealed that genotype had a significant ($P<0.05$) effect on litter birth weight (LBWT). Significant differences between pig genotypes in litter birth weight have been reported

by several authors (Johnson, 1980; Adebambo, 1983; Kuhlert, Jungst and Morre, 1988; Mukhopadhyay *et al.*, 1992; Sharma and Singh, 1995; Singh and Devi, 1997; Oseni, 2005; and Pandey *et al.*, 2010). The significant ($P < 0.05$) effect of genetic groups on litter weaning weight (LWWT) in the present study corroborates the earlier findings of Sharma and Singh (1993); Singh and Devi (1997); Lakhani and Jogi (2000); and Pandey *et al.* (2010). In the present study the Large White had the least mean value for litter weaning weight (LWWT) as compared to the Duroc and Landrace groups. The observed differences between genetic groups could be due to large litter size at weaning (LSW) and litter weight at weaning (LWWT) which are high and positively correlated (Khalil, Owen and Afifi, 1986). The highest pre-weaning gain of 109.26g/day was recorded by the Duroc in this study. This might also be attributed to the small litter size at weaning (LSW).

Conclusion

In this present study the findings has revealed that season had no marked effect on all the reproductive traits monitored. Genotype exerts a substantial influence ($P < 0.05$) on litter size at farrowing (LSF), litter birth weight (LBWT), litter weaning weight (LWWT) and pre-weaning gain performance traits respectively. The Large White genetic group was superior in litter size at farrowing (LSF) to the Duroc or the Landrace. The Duroc and Landrace groups were superior in weaning weight (WWT) to the Large White. The Duroc group is superior in pre-weaning gain to Large White and Landrace.

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