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PRODUCTION PERFORMANCES OF CROSSBRED PIGS IN GOVERNMENT FARMS

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ABSTRACT: This study was carried out with the objective to evaluate and compare production performances of crossbred pigs between two government multiplier farms at Lingmethang and Serbithang, falling under two different regions. A total of 735 numbers of farrowing data were analyzed from the Elite herd database, maintained by these farms for a period of 5 years from July 2006 to June 2011. The pig breeds under study were Large Black (LB), Saddleback (SB) and Hampshire (H). The study parameters were litter weight at birth, piglet weight at weaning, age at first service, weaning to service interval, farrowing interval, litter sizes at birth and litter size at weaning. Two-sample t-test was conducted. The mean litter weights at birth in LB, SB and H crossbred pigs were greater in Lingmethang farm. The weaning weight, mean weaning age, mean age at first service, mean litter size at birth, and litter size at weaning of all three breeds were also greater in Lingmethang farm. Lingmethang farm had a shorter mean weaning to service interval for all breeds. The study concluded that reproduction and production parameters of crossbred pigs raised at Lingmethang farm are better than those raised at Serbithang farm. Based on performance record, the SB crossbred pigs could be a better breed for warm places. Similarly, LB and H performed better in cold places and could be suitable for temperate environment.

Keywords: Hampshire; Large black; litter; pig; Saddleback; weaning.

1. INTRODUCTION

Livestock is one of the important components of farming system in Bhutan. About 10% of rural households rear pigs (DoL 2016) Bhutanese people raise pigs for meat production and to generate cash income. However, due to religious sentiments, pig farming is still at the subsistence level, generating small supplementary income for the farmers. Most pigs raised in rural areas are indigenous breeds, constituting more than 60% of the total pig population in the country (DoL 2016). Crossbreeding of indigenous pigs with exotic or improved breeds was initiated by the Government of Bhutan since early 1960s with the main aim to enhance and improve income and dietary protein of rural people (Nidup et al. 2011).

Currently, there are three government pig breeding farms in Bhutan; National Pig Breeding Centre at Serbithang in Western Bhutan, Regional Pig and Poultry Breeding Centre at Lingmethang in

Eastern Bhutan, and National Pig Research Centre (NPiRC) at Gelephu in South-Central Bhutan. NPiRC is the nucleus farm and farms at Serbithang and Lingmethang are multiplier farms.

The progenies produced by the nucleus farm are distributed mainly to the multiplier farms for further breeding and multiplication. The multiplier farms raise Saddleback (SB) cross, Large Black (LB) cross, Duroc, and Hampshire (H) breeds of pigs for further multiplication. For the last four decades, the multiplier farms were mandated to carry out crossbreeding to produce hybridized piglets for further distribution to needy farmers in all potential pig rearing areas across the country. Although, for many years, piglets were distributed by nucleus farm to multiplier farms, no assessments have been carried out to date to understand the production performances of pigs in the multiplier farms. A proper understanding of production performance is important as it will provide a basis for setting bench mark for these farms to improve production efficiency. Therefore, a study was conducted with the objective to evaluate and compare production performances of pigs between two government multiplier farms under two different regions.

2. MATERIALS AND METHODS

2.1 Pig breed

The production data of 61 sows at Lingmethang and 90 sows at Serbithang, were compiled from Elite herd database maintained by these two farms. The sows at Lingmethang were progenies of LB boar crossed with SB and H. The sows at Serbithang were progenies of LB and H, sired by SB breed. In this study, the information was collected from those sows, which had all the performance data records available till 8th parity.

2.2. Data collection

The information was collected on sow identification, date of birth, breed, age at first service, number of services per conception, litter size at birth, litter weight at birth, piglet weight at weaning, age at weaning, pre-weaning mortality, weight at weaning and weaning to oestrous interval. A total of 735 production and reproduction related information was collected to evaluate the production efficiency of the farm.

2.3. Data analysis

The dataset was entered in Microsoft Excel and exported to SPSS. Two-sample t-test was performed to compare production parameters between two multiplier farms. Multiplier farms were independent variables and production parameters were dependent variables. Differences between parameters were considered significant when p values were less than 0.05. The entire dataset was analyzed with SPSS version 16.0 (SPSS Inc. Chicago, Illinois, USA).

3. RESULTS AND DISCUSSION

3.1 Litter weight at birth and piglet weight at weaning

The mean litter weight at birth and weaning weight of piglets at Lingmethang and Serbithang are presented in Table 1. The mean litter weights at birth in LB, SB and H crossbred pigs were greater in Lingmethang farm. This is probably due to warm condition at Lingmethang and litter weight at birth has been reported to be heavier in hot places (Jourdine et al. 2006; Belstra et al. 2004). In this study, pigs achieved the highest litter weight at birth from 3rd to 7th parity, which agrees with the findings of Roongsitthichai et al. (2010) and Yuzo et al. (2017).

Similarly, the weaning weight of all three breeds was higher in Lingmethang farm. Among breeds, the weaning weight of SB crossbred piglets was found to be comparatively higher than other breeds, which could be due to good sow mother and excellent milker, besides having heavier litter

Table 1: Birth weight and weaning weight of pig breeds in two government farms.

Breed	Farm	Birth weight (kg)	Weaning weight (kg)	Weaning Age (days)
LB×LB	Lingmethang	9.88	69.95	48.20
	Serbithang	8.68	64.81	39.63
	p value	***	ns	***
SB×SB	Lingmethang	10.67	83.14	46.40
	Serbithang	8.60	64.81	38.37
	p value	***	***	***
H×H	Lingmethang	10.25	77.72	48.04
	Serbithang	8.92	60.59	39.09
	p value	**	***	***

**p≤0.01, ***p≤0.001, ns-nonsignificant

weight at weaning.

The mean weaning age was recorded higher in Lingmethang farm. Among breeds, the weaning age was greater for LB crossbred pigs. The weaning age of piglets in different farms was determined by the bench mark for piglet's wean weight set by Department of Livestock. Generally, Serbithang farm weans piglets when they are about 8 kg, whereas Lingmethang weans piglets when they are about 10 kg. These practices are similar to those reported for SB crossbred pigs (Gatenby and Chemjong 1992). Increasing weaning age improves wean-to-finish growth performance, growth and reduces mortality rate (Main et al. 2004).

3.2 Age at first service, weaning to service interval and farrowing interval

Age at first service, weaning to service interval, and farrowing interval are presented in Table 2. The mean ages at first service at Lingmethang and Serbithang were 550 and 418 days, respectively. In general, the mean age at first service was recorded highest for SB crossbred pigs at Lingmethang farm. There was a significant difference in age at first service for SB crossbred pigs reared in two farms and could be due to its location at different climatic zones. LB crossbred pig reached age at first service earlier at Serbithang, which could be due to LB being a breed suited for temperate environment. However, the age at first service at two farms is higher compared with other countries. Ideally, the age at first service in any of the pig farms should be between 8 and 9 months and if it crosses more than 10 months, then it is advisable to cull these animals (Rymer and Grant 2009).

Weaning to service interval is defined as the number of days from weaning to the day the female is bred again. It is important since the shorter weaning to service interval results in less number of nonproductive days and high number of pigs farrowed or weaned.

The mean weaning to service interval was shorter for all breeds at Lingmethang. Among breeds at Lingmethang, the weaning to service interval was shortest for H and longest for LB. The interval was 40% better at Lingmethang than Serbithang farm. This could be due to warm climatic condition at Lingmethang since other management factors such as feeding and housing were similar. Weaning to service interval was about 30 days in gilts in both farms and was found to be very long, which ideally happens in first and second parity sows. Although, 82% of services were done within 10 days after farrowing, the conception rate was found to be low in both farms, resulting in repeated heat in sow. Seventy percent of breeding occurred within 6 days of post weaning, which is in agreement with the findings of Wilson and Dewey (1993). Weaning to service interval of lactating sow becomes longer when a sow loses its body weight by more than 15% (Kunavongkrit and Heard 2000).

3.3 Litter sizes at birth and weaning

The mean litter size at birth in Lingmethang and Serbithang are presented in Table 3. The mean litter size at birth was highest in Lingmethang. Among breeds, the litter size at birth was greater for SB crossbred pigs. Kumaresan et al. (2007) also reported greater litter size at birth for SB crossbred pigs. This study indicated that litter size at birth increases with increase in parity number, reaching a plateau and then declines from 7th parity onwards. This finding agrees with that of Peadar et al. (2007). The gradual decline in litter size at birth from 7th parity onwards could be due to age at first service, body weight, ovulation rate and implantation rate. Thapa (2012) reported lower

Table 2: Age at first service, weaning to service interval and farrowing interval of big breeds in two government farms. (ns-nonsignificant).

Breed	Farm	Age at First service (days)	Weaning to service interval (days)	Farrowing interval (days)
LB	Lingmethang	468	20.07	182.81
	Serbithang	423	33.34	188.66
	p value	ns	ns	ns
SB	Lingmethang	588	19.92	181.53
	Serbithang	439	26.87	179.37
	p value	***	ns	ns
H	Lingmethang	473	11.77	174
	Serbithang	523	24.4	178.18
	p value	ns	ns	ns

litter size at birth in pure pig breed when compared with crossbred pigs. Young et al. (1976) also reported greater birth weight of crossbred pigs due to hybrid vigor than pure breeds.

The number of pigs weaned depends on the number of piglets born alive and preweaning mortality. In this study, the litter size at weaning was greater for Lingmethang farm. Among breeds, the litter size at weaning in SB crossbred pigs was greater, followed by LB crossbred pigs. This indicates that SB crossbred pigs can perform better in any climatic condition, irrespective of geographic locations. The SB breeds have better mothering abilities, which is indicated by more number of piglets weaned than other breeds. Similar finding was reported by Eugene et al. (1999) that litter size at weaning differs amongst different crossbred pigs under different climatic condition.

Table 3: Litter sizes at birth and weaning of pig breeds in two government farms.

Breed	Farm	Litter size at birth (no.)	Litter Size at weaning (no.)
LB	Lingmethang	8.36	7.97
	Serbithang	7.99	7.27
	p value	ns	***
SB	Lingmethang	8.72	8.36
	Serbithang	8.04	7.43
	p value	***	***
H	Lingmethang	8.31	7.56
	Serbithang	8.28	7.77
	p value	ns	ns

***p≤0.001, ns-nonsignificant

4. CONCLUSIONS

The reproduction and production parameters of crossbred pigs are better at Lingmethang farm than those raised at Serbithang farm. Based on performance record, the SB crossbred pigs could be a better breed for warmer places. Similarly, LB and H performed better in colder places and could be suitable for temperate environment. From this study, it is also evident that litter size at birth increased in both farms from 3rd to 7th parity. Thus, measures should be taken by the farm management to retain high number of sows between these parities in order to maximize litter size and improve farm production efficiency. To minimize long farrowing interval, the farms have to improve weaning to service interval, farrowing index, farrowing rate and reduce weaning age in piglet with efficient management of lactating and dry sows.

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