

Birth weight and biometry of purebred Landrace pigs under Indian farm condition

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Abstract

In the present investigation, the birth weight and biometry were studied in pure Landrace pigs under Indian farm condition. The study was conducted using 377 piglets comprising 201 males and 176 females, born over a period of three years. The piglets were allowed free and *ad libitum* suckling to their respective dams, maintained under stall feeding condition with allowance of free choice of loitering in the attached open run. Each piglet was given individual identification number and sexed. The weights and body measurement of newly born piglets were recorded within 24 h of their birth. The mean birth weight of piglets was 1.33 ± 0.01 kg, the mean values for important type traits being 8.73 ± 0.05 cm (head length), 20.42 ± 0.18 cm (body length) and 18.62 ± 0.13 cm (withers height). The body measurement traits were highly significantly ($P < 0.01$) correlated with the birth weight in pigs, the correlation coefficients ranging from 0.701 to 0.884. The regression analysis showed the body length to be the best predictor of birth weight in piglets ($R^2 = 78.1\%$). The sire effect on the birth weight and biometrical traits was significant ($P < 0.01$). It can be concluded that there exists a significant effect of sex of piglets and sire on the weight and type traits at birth in purebred Landrace pigs and these traits are significantly associated.

Key words: Birth weight, biometry, type traits, Landrace, pigs

Introduction

Pigs are traditionally reared by the socio-economically backward and down-trodden sections of the society. Pig farming is now gaining popularity among the other societal classes due to its higher prolificacy, faster growth rate, less generation interval, less time lapse between investment and income. This prolific meat animal has now been a subject of scientific interest for development of various production technologies and package of practices. As the species is mainly reared for meat purpose, the growth rate is of prime importance. Heavier pigs at birth and weaning have a competitive advantage and remain heavier throughout their farm life (Shinckel et al., 2003). On the other hand, pigs that have lower birth weights frequently have lower weaning weights and remain a problem through the grow/finish phases of production (Smith et al., 2005). Birth weight and biometry are important economic traits in pig production. Landrace, a unique bacon breed, is known for its heaviness, prolificacy and higher growth rate. This breed has been reared under organized farm conditions in India for exploiting its meat production potential. The present investigation, therefore, was conducted to study the birth weight and biometry of pure Landrace pigs under Indian farm condition.

Materials and Methods

The present study was undertaken on 377 piglets, comprising 201 males and 176 females, born over a period of three years at Swine Production Farm, IVRI, Izatnagar. The dams were maintained under stall feeding condition with allowance of free choice of loitering in the attached open run. The piglets were allowed free and *ad libitum* suckling to their respective dams. The mothers were provided with 4 kg of concentrate mixture (with approx. 14% CP and 3100 kcal ME) during the last half of the gestation period. Thereafter the same concentrate was given *ad libitum* throughout the whole lactation period. During the study, each piglet was marked with 4% silver nitrate solution on the left side of the body with individual identification number and sexed. The weights and body measurements of newly born piglets were recorded within 24 h of their birth. The weights were taken with a weighing balance having an accuracy of 0.010 kg. The type traits (in cm) were recorded with the help of an ordinary flexible plastic measuring tape having an accuracy of 0.10 cm. The data were subjected to suitable statistical analysis following the procedures described by Snedecor and Cochran (1994).

Results and Discussion

The average birth weights of male and female piglets were 1.36 ± 0.02 kg and 1.29 ± 0.02 kg, respectively. Mean birth weight of piglets irrespective of sexes was 1.33 ± 0.01 kg (Table 1). The present observations are similar to the values reported for other exotic breeds like Large White Yorkshire (Gopinathan and Usha, 2010) and Landrace x Yorkshire crosses (Smith et al., 2005). The mean values of some important body conformation traits like head length, body and body depth were 8.73 ± 0.05 cm, 20.42 ± 0.18 cm and 8.98 ± 0.07 cm, respectively. Data on these type traits at birth for other breeds of pigs were unavailable for comparison.

Table 1. Biometrical measurements (cm) and body weight (kg) at birth in purebred Landrace pigs

Parameters	Male (n = 201)		Female (n = 176)		Overall (n = 377)	
	Mean±SEM	Range	Mean±SEM	Range	Mean±SEM	Range
<i>Birth weight*</i>	1.36±0.02	0.70 – 2.10	1.29±0.02	0.50 – 1.85	1.33±0.01	0.50 – 2.10
<i>Birth biometry</i>						
i) Head length*	8.81±0.07	7.00 – 11.00	8.62±0.07	6.00 – 11.00	8.73±0.05	6.00 – 11.00
ii) Head breadth (between eyes)*	6.39±0.07	5.00 – 9.00	6.13±0.07	4.00 – 9.00	6.27±0.05	4.00 – 9.00
iii) Withers height	18.78±0.19	10.30 – 24.50	18.45±0.18	14.00 – 23.30	18.62±0.13	10.30 – 24.50
iv) Body length*	20.74±0.25	14.50 – 27.00	20.06±0.26	13.00 – 26.40	20.42±0.18	13.00 – 27.00
v) Body depth	9.08±0.10	6.00 – 13.00	8.87±0.09	6.00 – 13.00	8.98±0.07	6.00 – 13.00
vi) Body width at shoulder**	5.91±0.07	4.00 – 10.00	5.61±0.07	3.00 – 9.00	5.77±0.05	3.00 – 10.00
vii) Body width at rump**	4.54±0.06	2.00 – 8.00	4.22±0.06	2.00 – 7.00	4.39±0.05	2.00 – 8.00
ix) Foreleg length**	11.00±0.11	8.00 – 15.00	10.56±0.11	7.00 – 15.00	10.80±0.08	7.00 – 15.00
x) Hindleg length**	12.31±0.12	9.00 – 16.50	11.81±0.12	7.50 – 16.40	12.08±0.09	7.50 – 16.50

* Significant (P<0.05); ** Significant (P<0.01).

The correlation and regression analysis showed that birth weight is significantly ($P<0.01$) associated with the important type traits like head length, body length, body depth, wither height and hindleg length (Table 2). The body measurement traits were highly significantly ($P<0.01$) correlated with the birth weight in pigs, the correlation coefficients ranging from 0.701 to 0.884. The type traits were proved to be good predictors of birth weight of piglets, with the coefficient of determination values ranging from 49.1% (for body depth) to 78.1% (for body length). Body length was the best predictor of birth weight in piglets ($R^2 = 78.1\%$).

The sirewise analysis of birth weight and biometrical traits (Table 3) showed that the sire effect on the birth weight and biometrical traits was significant ($P<0.01$). The study confirmed the earlier findings (Goswami and Raina, 1983a, 1983b). It can be concluded that there exists a significant effect of sex of piglets and sire on the weight and type traits at birth in purebred Landrace pigs and these traits are significantly associated giving a scope for developing prediction equations after a further detailed study.

Table 2. Relationship of weight and certain body measurement traits in new born Landrace piglets

Traits associated	r	a	b±SE	R ² (%)
Head length	0.843**	-0.69	0.232±0.008**	71.1
Body length	0.855**	-0.05	0.065±0.002**	78.1
Birth weight x Body depth	0.701**	0.07	0.140±0.007**	49.1
Wither height	0.884**	-0.39	0.009±0.003**	73.1
Hindleg length	0.857**	0.14	0.138±0.004**	73.4

** Significant ($P<0.01$).

Table 3. Sirewise means (Mean±SEM) of birth weight and type traits in purebred Landrace pigs

Traits	Sirelines		
	1 (n = 73)	2 (n = 154)	3 (n = 131)
Birth weight**	1.50±0.03	1.25±0.02	1.33±0.02
Head length**	9.36±0.09	8.44±0.07	8.80±0.08
Body length**	22.47±0.40	19.71±0.27	20.43±0.29
Body depth**	9.59±0.19	8.62±0.08	9.12±0.12
Wither height**	20.32±0.30	18.13±0.18	18.42±0.22
Hindleg length**	12.94±0.21	11.65±0.12	12.13±0.14

** Significant ($P<0.01$).

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