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## Studies on pre- and post-weaning growth performance of Hampshire x Desi half-bred pigs

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**Abstract**

Records pertaining to 51 sows and 464 progeny of Hampshire x Desi half-bred pigs maintained at ICAR-Mega Seed Project (MSP) on Pig located at College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam were utilized to study the Pre – and Post –weaning growth. The overall least-squares means in Hampshire x Desi half-bred pigs for body weight at birth, weaning, 3 months and average daily gain during 0-42 days, 42-90 days and 0-90 days were found to be  $1.149 \pm 0.010$  kg,  $7.060 \pm 0.024$  kg,  $13.539 \pm 0.166$  kg,  $140.721 \pm 0.443$  g,  $131.753 \pm 3.450$  g and  $137.154 \pm 1.823$  g, respectively. Effect of sex, season of birth and parity on growth performances were also studied.

**Keywords:** Crossbred pigs, bodyweight, average daily gain

**Introduction**

Livestock sector in India plays an important role in the socio-economic life of its people. Pig production, among other livestock species has a high potential to contribute to high economic gain. Unlike other parts of the country, where pig raising and consumption of pork is not so common, it is very popular in north-eastern states of India. Increasing demand of pork necessitates the introduction of exotic pig breeds as the productivity of indigenous pigs are poor as compared to the exotic pigs. Crossbreds and graded pigs are, therefore, slowly gaining popularity. In view of the demand for pork in Assam as well as the entire north-eastern states, Government of India has initiated several programmes for improving the local pig germplasm by introducing genes from high yielding pig breeds through crossbreeding. The present study was carried out to evaluate the aforesaid crossbred pigs reared under Mega Seed Project, Assam Agricultural University, Khanapara.

**Materials and methods**

The present study on pre – and post –weaning growth was carried out in the Department of Animal Genetics and Breeding, College of Veterinary Science, AAU, utilizing body weight records of 51 sows and 464 progeny of Hampshire x Desi half-bred pigs maintained at ICAR-Mega Seed Project (MSP) on Pig located at College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati. The average daily gains (ADG) at different periods of growth were calculated as per Brody (1945). The data obtained were classified according to the sex, season: March to May ( $S_1$ ), June to September ( $S_2$ ), October and November ( $S_3$ ) and December to February ( $S_4$ ) and parity (1-5) of the animals. The least squares analysis of variance technique (Harvey 1990) <sup>[12]</sup> was carried out to study the effect of sex, season of birth and parity on the traits under study. Duncan's Multiple Range Test (DMRT) as modified by Kramer (1957) <sup>[17]</sup> was done for pair-wise comparisons of means wherever the significant difference among different levels of effects were obtained.

**Results and Discussion****Body weight at birth, weaning and 3 months**

The least-squares mean (LSM) for body weights at birth, weaning and 3 months of age are presented in Table 1. The overall mean body weights at birth, weaning and at 3 months of age were found to be  $1.149 \pm 0.010$  kg,  $7.060 \pm 0.024$  kg and  $13.539 \pm 0.166$  kg respectively. The mean body weights reported in the present study were in accordance to the observed values made by earlier workers (Kalita 1995; Naskar *et al.* 2006; Phookan 2008) <sup>[14, 18, 21]</sup>

in ½ Hampshire x ½ Indigenous pigs. However, in contrast to the present findings higher body weights of Hampshire

crossbred pigs at different ages were also recorded by Bhowal (1997)<sup>[2]</sup>, Ferdoci (2003)<sup>[9]</sup> and Pandit *et al.* (2011)<sup>[20]</sup>.

**Table 1:** Least-squares means and Standard errors along with the results of Duncan's multiple range tests for factors affecting body weight (kg) at birth, at weaning (42 days) and at 3 months of age in Hampshire x Desi half-bred pigs of Assam:

Sub-class Description	Body weight		
	At birth	At weaning	At 3 months
	LSM ± SE(N)	LSM ± SE(N)	LSM ± SE(N)
μ	1.149 ± 0.010(464)	7.060 ± 0.024(460)	13.539 ± 0.166(45)
<b>Sex</b>			
X <sub>1</sub>	1.171 <sup>a</sup> ± 0.013(243)	7.093 ± 0.031(242)	13.539 ± 0.285(10)
X <sub>2</sub>	1.126 <sup>b</sup> ± 0.014(221)	7.028 ± 0.032(218)	13.549 ± 0.147(35)
<b>Season</b>			
S <sub>1</sub>	1.121 <sup>a</sup> ± 0.020(95)	6.933 <sup>a</sup> ± 0.046(95)	13.514 ± 0.317(11)
S <sub>2</sub>	1.219 <sup>b</sup> ± 0.016(152)	7.198 <sup>b</sup> ± 0.037(149)	13.695 ± 0.295(12)
S <sub>3</sub>	1.123 <sup>a</sup> ± 0.032(37)	7.044 <sup>ab</sup> ± 0.073(37)	12.983 ± 0.326(10)
S <sub>4</sub>	1.133 <sup>a</sup> ± 0.0150(180)	7.065 <sup>b</sup> ± 0.034(179)	13.963 ± 0.280(12)
<b>Parity</b>			
1	1.110 ± 0.023(72)	6.944 ± 0.055(70)	12.370 <sup>a</sup> ± 0.397(7)
2	1.187 ± 0.024(62)	7.087 ± 0.056(62)	14.058 <sup>b</sup> ± 0.454(5)
3	1.122 ± 0.022(86)	7.049 ± 0.051(86)	13.778 <sup>b</sup> ± 0.353(7)
4	1.143 ± 0.015(182)	7.048 ± 0.035(181)	13.851 <sup>b</sup> ± 0.222(17)
5	1.182 ± 0.023(62)	7.172 ± 0.055(61)	13.637 <sup>b</sup> ± 0.294(9)

LSM = Least-squares means; SE = Standard errors; N = number of observations; Sub-class means with different superscripts differed significantly ( $P < 0.05$ ).

#### Average daily gain during 0-42 days, 42-90 days and 0-90 days

The LSM for average daily gain (ADG) during 0-42 days, 42-90 days and 0-90 days are presented in Table 2. The mean ADG during 0-42 days, 42-90 days and 0-90 days were obtained as 140.721 ± 0.443 g, 131.752 ± 3.450 g and 137.154 ± 1.823 g respectively. Comparable values were reported by Bhowal (1997)<sup>[2]</sup> in ½ Hampshire x ½ Indigenous

(143.38 ± 1.58 g) from birth to weaning. On the other hand, higher ADG values were reported by Kalita (1995)<sup>[14]</sup> and Bhowal (1997)<sup>[2]</sup> during 42 -90 days in Hampshire x Indigenous crossbred pigs. The present value of ADG during 0-90 days was higher to that of Tamworth x Desi pigs recorded by Devi and Singh (1998)<sup>[8]</sup> in a feeding trial during birth to 12<sup>th</sup> week.

**Table 2:** Least-squares means and Standard errors along with the results of Duncan's multiple range tests for factors affecting average daily gain (g) during 0-42 days, 42-90 days and 0-90 days in Hampshire x Desi half-bred pigs of Assam:

Sub-class description	ADG 0-42 days	ADG 42-90 days	ADG 0-90 days
	LSM ± SE(N)	LSM ± SE(N)	LSM ± SE(N)
μ	140.721 ± 0.443(460)	131.753 ± 3.450(45)	137.154 ± 1.823(45)
<b>Sex</b>			
X <sub>1</sub>	140.493 ± 0.565(242)	129.888 ± 5.912(10)	136.407 ± 3.125(10)
X <sub>2</sub>	140.950 ± 0.575(218)	133.617 ± 3.063(35)	137.902 ± 1.619(35)
<b>Season</b>			
S <sub>1</sub>	139.118 ± 0.831(95)	132.503 ± 6.573(11)	137.885 ± 3.474(11)
S <sub>2</sub>	140.549 ± 0.661(149)	133.929 ± 6.126(12)	136.342 ± 3.238(12)
S <sub>3</sub>	141.664 ± 1.315(37)	124.767 ± 6.766(10)	132.716 ± 3.576(10)
S <sub>4</sub>	141.555 ± 0.616(179)	135.811 ± 5.810(12)	141.674 ± 3.070(12)
<b>Parity</b>			
1	138.870 ± 0.989(70)	106.372 <sup>a</sup> ± 8.235(7)	124.829 <sup>a</sup> ± 4.352(7)
2	140.516 ± 1.016(62)	147.242 <sup>b</sup> ± 9.429(5)	143.189 <sup>b</sup> ± 4.984(5)
3	141.203 ± 0.913(86)	132.140 <sup>b</sup> ± 7.337(7)	140.047 <sup>b</sup> ± 3.877(7)
4	140.627 ± 0.640(181)	139.935 <sup>b</sup> ± 4.622(17)	141.393 <sup>b</sup> ± 2.443(17)
5	142.391 ± 0.985(61)	133.074 <sup>b</sup> ± 6.110(9)	136.313 <sup>ab</sup> ± 3.229(9)

LSM = Least-squares means; SE = Standard errors; N = number of observations; Sub-class means with different superscripts differed significantly ( $P < 0.05$ )

#### Effect of sex

The least-squares analysis of variance showed significant ( $P < 0.05$ ) influence of sex on body weight at birth which is in conformity with the findings of Bhowal (1997)<sup>[2]</sup> and Deka and Bordoloi (2004)<sup>[7]</sup> in Indigenous, Hampshire and their crossbred pigs. However, variations associated with sex of the animals were non-significant for body weight at weaning and at 3 months of age. Similar observations were reported earlier by Bey (2018)<sup>[11]</sup> in HD-K75 pigs and Deka (1999)<sup>[6]</sup> in

Hampshire crossbred pigs.

The influence of sex on ADG was not significant during 0-42 days, 42-90 days and 0-90 days of age. These findings were in agreement with the reports of Nath (1993)<sup>[19]</sup> and Deka (1999)<sup>[6]</sup> in Hampshire and their crossbred pigs. Contrary to this, Bhowal (1997)<sup>[2]</sup> and Ilatsia *et al.* (2008)<sup>[13]</sup> reported significant ( $P < 0.01$ ) influence of sex on pre-weaning body weight gain.

### Effect of season

Least- squares analysis of variance revealed highly significant ( $P < 0.01$ ) effect of season on body weight at birth and at weaning. The results agreed well with the observations of Kalita *et al.* (2006)<sup>[15]</sup> and Phookan (2008)<sup>[21]</sup>. Bhowal (1997)<sup>[2]</sup>, Kaushik *et al.* (2017)<sup>[16]</sup> and Bey (2018)<sup>[1]</sup> on the other hand reported non-significant effect of season on body weight at birth and at weaning. In the present study, piglets born during season S<sub>2</sub> (June to September) had significantly higher body weight ( $7.198 \pm 0.037$  kg) and differed significantly with S<sub>1</sub> (March to May). This was in agreement with the findings of Prakash *et al.* (2008)<sup>[22]</sup> who also observed a favourable effect of rainy season in Large White Yorkshire x Indigenous pigs. However, variation in the body weight at 3 months of age due to the effect of season was not significant indicating that seasonal changes that prevailed throughout the year had no adverse effects on the animals. It also showed that Hampshire x Indigenous half-bred pigs are very much adaptable to the existing environmental conditions and agreeable with the findings of Bhowal (1997)<sup>[2]</sup> in Hampshire x Indigenous pigs.

In respect of ADG during 0-42 days, 42-90 days and 0-90 days the least- square analysis of variance showed no significant differences between the different seasons of birth. The findings were in agreement with the reports of Goswami and Raina (1983)<sup>[10]</sup> and Bhowal (1997)<sup>[2]</sup> who observed that season had non-significant influence on daily body weight gains at all periods of growth in Landrace and different Hampshire crosses of pigs. Contrary to the present findings Bordoloi (1998)<sup>[3]</sup> and Deka (1999)<sup>[6]</sup> revealed that at all the growth periods in their study, season of birth had significant effect on daily body weight gains.

### Effect of parity

Parity did not influence the body weight at birth and at weaning in the present study confirming earlier findings of Bhowal (1997)<sup>[2]</sup>, Deka (1999)<sup>[6]</sup> in Hampshire x Indigenous crossbred pigs. Contrary to the present findings, Gowrimanokari *et al.* (2018)<sup>[11]</sup> reported that parity had significant effect on body weight at weaning. The least-squares analysis of variance showed that the differences associated with parity on body weight at 3 months of age was significant ( $P < 0.05$ ) in the present study. The mean body weight at 3 months during second parity was the highest ( $14.058 \pm 0.454$  kg) followed by third and fourth (Table 1). The present findings corroborates with the results of Deka (1999)<sup>[6]</sup> in Hampshire x Indigenous crossbreds who observed significant ( $P < 0.05$ ) effect of parity on body weight at 3 months of age. However, Bhowal (1997)<sup>[2]</sup> revealed that it was non-significant at 3 months of age but showed that the pigs born in second parity had consistently higher body weight at all ages followed by third parity and fourth.

Least - square analysis of variance showed that parity of the sow had non-significant effect on ADG during 0-42 days. The results agreed well with the observations of Bhowal (1997)<sup>[2]</sup> who revealed non-significant influence of parity on daily weight gains during birth to 32<sup>nd</sup> weeks of growth. Contrary to this, Kalita (1995)<sup>[14]</sup> revealed pigs born in first parity showed significantly ( $P < 0.01$ ) higher daily weight gains than those born in second parity. The differences in the ADG during 42-90 days and 0-90 days were found to be significantly ( $P < 0.05$ ) influenced by parity of the sow. Goswami and Raina (1983)<sup>[10]</sup> also observed that the influence of parity of dam on daily weight gain was

significant during 8<sup>th</sup> to 24<sup>th</sup> weeks of age. The ADG during 42-90 days was the highest in the pigs born to sows in second parity ( $147.242 \pm 9.429$  kg). Animals born in second parity of the sows in the present study also had significantly higher ADG during 0-90 days ( $143.189 \pm 4.984$  g) compared to other parities of the sows. This was in agreement with the findings of Chung and Park (1989)<sup>[5]</sup> in Duroc, Hampshire, Yorkshire and Landrace pig breeds.

### Conclusion

From the results of the present study on Hampshire x Desi half-bred pigs maintained at AICRP- MSP, Khanapara, it was observed that the performance of Hampshire x Desi half-bred pigs was found to be satisfactory under prevailing managerial conditions. Thus, it may be concluded that Hampshire x Desi half-bred pigs are well adapted to the agro-climatic conditions of Assam. However, further study of these animals under the field conditions of Assam is warranted.

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