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# Genotypic and phenotypic evaluation of growth performance of Narimster cattle at Sibi balochistan

**Faisal Asharaf, Hubdar Ali Kaleri*, Rameez Raja Kaleri, Asma Kaleri, Ali Ghulam Bugti, Raza Ali Mangi, Zahid Qadir, Abdul Latif**

*Department of Animal Breeding and Genetics, Sindh Agriculture University, Tandojam, Pakistan*

**Key words:** Narimaster, Growth traits, Sire effect, Season effect, Heritability

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**Abstract**

The present study was carried out on the genotypic and phenotypic evaluation of growth performance of Narimaster cattle maintained at Government Beef Production Research Centre Sabi, Balochistan. The data was recorded from 2005-2014 on growth traits including birth weight, weaning weight, yearling weight and weight at 18 months. The collected data was interpreted and analyzed using the statistical package 'Statistix 8.1 and ANOVA. The effect of sire (A, B, C, D and E) with 25 calves per sire, seasons (Spring, Summer, Autumn and Winter) on each trait was observed and the heritability estimate was worked. The result revealed that sire-wise average birth weight, weaning weight, yearling weight and weight at 18 months for calves maintained at Beef Production Research Centre Sibi, Balochistan were 71±4.04, 141.41±8.87, 401.36±20.86 and 579.60±29.15 (kg), respectively. The season-wise results (spring, Summer, Autumn and Winter) for birth weight were 21.74±4.48, 21.50±4.37, 23.74±4.00, 19.78±4.25 (kg), weaning weight 144.56±8.65, 141.76±8.72, 141.68±8.62, 136.76±7.72 (kg), yearling weight 401.74±21.45, 403.28±21.38, 404.36±21.86, 395.54±20.86 (kg) and weight at 18 months 609.00±29.15, 598.78±30.83, 602.30.46, 597.54±27.83 (kg), respectively. Heritability estimates for birth weight, weaning weight, yearling weight and weight at 18 months were 0.475, 0.559, 0.222 and 0.389, respectively. It was concluded that genotypic traits like birth weight, weaning weight, yearling weight and weight at 18 months was found to be higher in the spring and autumn seasons. Heritability estimates of Narimaster cattle were moderate to low.

* **Corresponding Author:** Hubdar Ali Kaleri ✉ hkaleri@hotmail.com

## Introduction

The plan to develop a beef breed for Pakistan was started in 1969 after receiving a gift of five Narimaster cows and one bull from Australia. These animals were kept at Beef Production Research Center Sibi, in Balochistan province, for crossing with the native Bhagnari cattle. The cross breeding between Narimaster and Bhagnari animals was initiated in 1970. The plan of breed development was to cross Drought master males with Bhagnari females and then crossC1 females (having 50% Bhagnari and 50% Narimaster inheritance) to the Bhagnari males to get C2 (having 25% Narimaster and 755 Bhagnari inheritance). The females from C2 were crossed with Narimaster males to get C3 (having 62.5% Narimaster and 37.5% Bhagnari inheritance), (Wahhed *et al.*, 2003). The knowledge on the various economic traits of the crossbred cattle of the state is highly essential to achieve this goal through planned breeding and systematic genetic selection. The birth weight of the calf is one of the important economic traits of the cattle which has a direct bearing on subsequent growth rate and milk production. Farrel *et al.,* (1993) suggested that birth weights lower than the optimum are associated with reduced energy reserves, lowered thermos regulatory capability and increased calf death or near birth. Low birth weight is also related to low rates of growth after birth and decreased mature size. Conversely birth weights greater than optimum are associated with greater calving difficulty, calf losses at birth and increased difficulties with rebreeding the cow. Besides these extremes, heifers having optimum high birth weight grow fast and reach mature weight to produce offspring at an earlier age and subsequently, milk production. Even though information on the birth weight of various indigenous breeds are available in plenty study on the birth weight of crossbred cattle is found to be scanty.

Hence the present study was undertaken to assess the influence of certain genetic and non-genetic factors on the birth weight and to estimate the genetic and phenotypic parameters of birth weight in crossbred calves raised under organized farm conditions.

Therefore, the present study was conducted to study the genotypic and phenotypic evaluation on growth performance of Narimaster cattle maintained at Sibi Balochistan. The heritability is one of the population parameter commonly used in planning genetic improvement program. This parameters is specific to breed or population and expressed the reliability of transferring genetic properties from parents to offspring. The genetic parameters are the measure of the individuals of a population and express the properties of that particular population (Aaron *et al.*, 1987).

## Material and methods

The data for the genotypic and phenotypic evaluation of growth performance of Narimaster cattle were collected from the official record of Beef Production Research Center, Sibi using Proforma, designed for this study. The data was collected for period of ten years from 2005 to 2014. The total of 125 animal's growth performance record was recorded and analyzed in this study. To observed the effect of sire on the growth performance of Narimaster cattle, the data was divided into five groups as, Sire-A (Tag no=217), Sire-B (Tag no=82); Sire-C (Tagno=457), Sire-D (Tag no=493) and Sire-E (Tag no=533), respectively. To observe the effect of season on the growth performance, animals were divided into four 54.seasons as spring (February to April), summer (May to July), autumn (August to October) and winter (November to January).

### *Data Analysis*

The collected data was fed in computer and analyzed for analysis of variance (ANOVA) oncomputer by using statistical program Statistix 8.1.

### *Heritability estimates*

Heritability estimates for birth weight, weaning weight, yearling weight and weight at18 months of Narimaster cattle were worked out using the formula as suggested by Becker (1985).

## Results

*The results for sire-wise comparison of growth traits of Narimaster*

The results for sire wise average birth weight, weaning weight, yearling weight and weight at 18 months for progeny of sires A, B, C, D and E, birth weight and yearling weight was observed higher in sire D and E, respectively, while there was no significant difference observed in all sires, for weaning weight and weight at 18 month details are given in Table-1.

**Table 1.** Sire-wise average values of growth traits of Narimaster calves.

| Sire | Number of calves | Birth weight (kg) | Weaning weight (kg) | Yearling weight (kg) | Weight at 18 months (kg) |
|---|---|---|---|---|---|
| A | 25 | 21.90±4.25 | 141.74±11.09 | 400.02±21.41 | 579.10±30.46 |
| B | 25 | 21.50±4.08 | 141.52±8.46 | 402.80±21.38 | 580.73±31.00 |
| C | 25 | 21.10±4.48 | 141.40±8.65 | 401.00±21.22 | 579.13±30.00 |
| D | 25 | 22.26±4.00 | 141.06±8.62 | 400.34±20.84 | 579.15±27.83 |
| E | 25 | 21.80±3.45 | 141.32±7.72 | 402.64±21.04 | 579.88±28.49 |
| Overall | 125 | 21.71±4.04 | 141.41±8.87 | 401.36±20.86 | 579.60±29.15 |

*The results of season-wise comparison of growth traits Narimaster*

The results shows that highest birth weight, weaning weight, yearling weight and weight at 18month was found in autumn, spring, autumn and spring season respectively, while the lowest birth weight, weaning weight, yearling weight and weight at 18 month was observed in winter season, respectively details are given in Table-2.

**Table 2.** Season-wise result for growth traits of Narimaster calves.

| Season | No. of calves | Birth weight (kg) | Weaning weight (kg) | Yearling weight (kg) | Weight at 18 months (kg) |
|---|---|---|---|---|---|
| Spring (February to April) | 125 | 21.74±4.48 | 144.56±8.65 | 401.74±21.45 | 609.00±29.15 |
| Summer (May to July) | 125 | 21.50±4.37 | 141.76±8.72 | 403.28±21.38 | 598.78±30.83 |
| Autumn (August to October) | 125 | 23.74±4.00 | 141.68±8.62 | 404.36±21.86 | 602.38±30.46 |
| Winter (November to January) | 125 | 19.78±4.25 | 136.76±7.72 | 395.54±20.86 | 597.54±27.83 |

*The results for Heritability estimates*

The results of heritability estimates was observed low for yearling weight and weight at 18 month, while medium heritability estimates was observed for birth weight and weaning weight details are given in Table-3.

**Table 3.** Result for heritability estimates for growth traits of calves.

| Parameters | Heritability estimates |
|---|---|
| Birth weight | 0.475 |
| Weaning weight | 0.559 |
| Yearling weight | 0.222 |
| Weight at 18 months | 0.389 |

## Discussion

The results of present study sire-wise average birth weight, weaning weight, yearling weight and weight at 18 months for calf are supported by the findings supported by Khan *et al.* (1998) recorded that the overall mean for the yearling weight was 151.5 ± 38.9 kg. Khan and Khan (2001) reported the birth weight averaged 24.52 ± 4.40 kg. Bakir *et al.* (2004) reported that the least squares mean of birth weights was 38.09±0.07 kg in Holstein Frisian calves. They estimated that the effects of birth season ($P<0.05$) on birth weight was significant; however, the effect of sex on birth weight was not significant. Serdar *et al.*, (2007) reported the least squares means of birth weight for all calves averaged 38.79 ± 0.171 kg. Hossein *et al.*, (2011) reported highest weaning weight (141.1kg) was observed is that of an increase in weaning weight with time. For birth season, spring, summer, autumn and winter the 205 days weaning weight was 112.2, 115.3, 123.2 and 131 kg respectively. Male calves reached 121.6 kg and female calves 119.2 kg mean value of the adjusted weaning weight.

Akhtar *et al.* (2012) average birth weight, weaning weight and yearling weight, were 35.86±4.30 kg 66.12±9.16 and 145.82±19.50 for Nili-Ravi female calves. Aksakal *et al.,* (2012) least squares mean for birth weight was 37.4±0.70 kg. Bahashwan *et al.*, (2015) average of growth traits for birth weight (BW), weaning weight (WW) and yearling weight (YW) were 17.83 ±0.10, 85.11 ±0.60 and 160.27 ±1.30 kg, respectively.

Results of heritability are supported by the results of Khan *et al.* (1998), who reported heritability estimates for yearling weight was 0.19±0.24. Lee *et al.*, (2000) reported estimates of heritability for yearling weight and 18 month weights of Korean Native cattle were 0.14 and 0.11 respectively. Khan and Khan (2001) reported that the average heritability estimate for birth weight in purebred Bhagnari was 0.13. Wahhed *et al.* (2003) they estimated that the heritability estimates of birth weight and weaning weight were found to be 0.09 ± 0.02 and 0.09±0.01 respectively of Bhagnari and Drought master x Bhagnari crossbred cows maintained at the Beef Production Research Centre, Sibi (Balochistan). In conclusion the heritability estimates for all growth traits were observed moderate to high suggesting that selection might be a good criterion for improvement.

## Conclusions

The effect of sire on growth traits was observed non-significant. The birth weight and weaning weight of calves were elevated in autumn and spring season, respectively and both dropped in winter. The value of heritability of growth traits are low to medium which shows that traits can be improved with better management and selection.

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