

Correlation Estimates of Some Performance Traits of Thari Cattle

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Abstract

The studies were carried out during the year of May 2014 to May 2015 to estimate the correlation among some performance traits of Thari cattle. The recorded data which include three sires with 15 daughters from each sire and four lactations of each daughters were observed. The averaged birth weight and weaning of three sires daughters was found 17.7 ± 1.75 , 17.38 ± 1.01 , 17.4 ± 1.92 and 43.18 ± 2.07 , 42.6 ± 2.49 , 42.7 ± 4.19 , respectively. The result showed that higher birth weight was observed in daughters of sire- B whereas the lowest birth weight was found in daughters of sire- C and the higher weaning weight was found in daughters of sire- A and lowest weaning weight was found in daughters of sire-B. The milk yield of 1st, 2nd, 3rd and 4th lactation yield of all daughter were found averaged 861.60 ± 70.40 , 1046.78 ± 62.36 , 1200.91 ± 111.21 and 1070.87 ± 54.56 liters, respectively. The result showed that 3rd lactation yield was significantly ($P < 0.05$) higher than 1st, 2nd and 4th. The sire wise birth weight, weaning, milk yield and lactation length showed a non-significant different. The results of simple correlation for birth weight x weaning weight and milk yield x lactation length were 0.478 and 0.548. The result of environmental correlation for birth weight x weaning weight and milk yield x lactation length were 0.05 and 0.91. The results of genetic correlation for birth weight x weaning weight and milk yield x lactation length were -0.008 and -0.67. The results of phenotypic correlation for birth weight x weaning weight and milk yield x lactation length were 0.06 and 0.24, respectively.

Keywords: Genetic, Phenotypic, Environmental, correlation, Milk yield, Lactation Length, Birth weight, weaning weight.

INTRODUCTION

Pakistan is rich in agriculture resources and Livestock plays important role in the Economy of Pakistan. Cattle is considered one of the first domesticated animal, tamed to provide milk, meat, hides and for drought purpose. Generally there are three types of cattle breeds Dairy, Meat and Drought purpose (Irfan, 2014). Basically Thari cattle is a drought breed of Sindh and commonly found in Tharparkar and other parts of Sindh. Thari cows are fairly good milk producers cattle that produces an average 1153 liters of milk in average lactation length of 240 days. Generally their colour is light to grey with the color deepening on the fore and hind quarters in males (Mason, 1996). The correlation is one of the important genetic parameter, which play major in the formation of breeding plans for genetic improvement program. The correlation estimation among performance traits is highly valuable to decide single and multiple trait selection strategy. (Rehman and Khan, 2011, Abera, 2011). The genetic improvement in a trait depends upon its genetic and phenotypic correlation with other traits. If correlation among two traits is highly positive, the selection for one trait would result in the improvement of other traits (Shahid, 2009). Keeping in the view importance of Thari cattle and its performance traits, this study was designed, to estimate correlation between some performance traits of Thari cattle.

Materials and Methods

In order to evaluate the some productive performance and estimation of simple, environmental, phenotypic and genotypic correlation among some performance traits of Thari cattle. The recorded data were collected from the official records of Government Thari cattle farm, Nabisar road, Umar kot Sindh, for the period of 10 years i.e. 2003 to 2014. Data for 3 sires (Shan), (Ranjho), (Roshan) and their 45 daughters which include 15 daughters from each sire. Correlation estimates between the birth weight vs weaning weight and milk yield vs lactation length were worked out using the formula suggested by Becker (1984).

Phenotypic correlation (r_p) = $\text{cov } p_i, p_j / \sigma p_i, \sigma p_j$

Genetic correlation (r_g) = $\text{cov } a_i, a_j / \sigma a_i, \sigma a_j$

Environment correlation (r_p) = $\alpha^2_w(x) \alpha^2_s(y)$

Simple correlation (r_{xy}) = $1 \frac{\sum xy - (\sum x)(\sum y)}{\sqrt{\sum x^2} \sqrt{\sum y^2}}$

RESULTS

Birth weight and weaning weight (Sire-wise)

The result of birth weight in kilograms showed that the daughters of sire- B had highest birth weight of 17.38 ± 1.01 kilograms and the daughters of sire-C had observed lowest birth weight of 17.4 ± 1.92 kilograms in (table-1). The overall average showed that daughters of sire-B had highest birth weight 17.4 ± 1.92 kilograms, whereas the daughters of sire- C had observed lowest birth weight of 17.4 ± 1.92 kilograms (table-1). The result of weaning

weight (kgs) indicated that the daughters of sire- A had observed highest weaning weight of 43.18 ± 2.07 kilograms, whereas the daughters of sire- B had observed lowest weaning weight of 42.6 ± 2.49 in (table-1). The overall average weaning weight showed that daughters of sire- A had highest weaning weight of 43.18 ± 2.07 , whereas the lowest weaning weight was observed in daughters of sire- B which was 42.6 ± 2.49 in (table-1).

Table# 1 Sire wise average birth weight and weaning weight (kg)

Sire	Birth Weight (kg)	Weaning Weight (kg)
A	17.7 ± 1.57	43.18 ± 2.07
B	17.38 ± 1.01	42.6 ± 2.49
C	17.4 ± 1.92	42.7 ± 4.19
Overall Average	17.49 ± 1.52	42.83 ± 2.98

Milk yield (Sire-wise)

Milk yield is important economical traits in dairy field. Sire-wise average milk yield of Thari cattle showed that in Sire- 1 the mean milk yield was found as 863.20 ± 73.29 , 1046.33 ± 61.23 , 1205.53 ± 100.41 , 1068.67 ± 56.01 liters in 1st, 2nd, 3rd, and 4th lactations, respectively (table-2). On average daughters of sire- B produced mean lactation yield of 853.27 ± 71.99 , 1043.13 ± 63.66 , 1128.87 ± 102.50 , 1063.73 ± 54.64 liters in the 1st, 2nd, 3rd and 4th, respectively. The daughter of sire- C produced the milk yield of 868.33 ± 69.99 , 1050.87 ± 66.24 , 1214.33 ± 133.11 , 1080.20 ± 55.49 liters, respectively in the 1st, and 2nd, 3rd and 4th lactations. Finally the overall milk yield among three sires in the four lactations was found as 861.60 ± 70.40 , 1046.78 ± 62.36 , 1200.91 ± 111.21 and 1070.87 ± 54.56 respectively in the 1st, 2nd, 3rd and 4th lactations. It was further observed that the daughter of sire-C produced high milk yield of 1214.33 liters in 3rd lactation, and the daughter daughters of sire- B produced lower milk yield of 853.27 liters in 1st lactation. The sire-wise milk yield in four lactations between three sires showed a non-significant different (table-2). The difference among milk yield has been occurred due to genetic makeup of their parents within same breed. Furthermore, the difference in milk yield may be associated to sires, which probably could occurred due to different management and environmental changes. It is real fact that milk yield can be increased by improving the feeding, management practices and other environmental conditions, instead of having whole emphasis on exploring the genetic potential of animals.

Table#2 Sire wise average lactation milk yield (litres) of Thari cattle

Lactation Number	Sire-A	Sire-B	Sire-C	Overall Average
Lactation # 1	863.20 ± 73.29	853.27 ± 71.99	868.33 ± 69.99	861.60 ± 70.40
Lactation # 2	1046.33 ± 61.23	1043.13 ± 63.66	1050.87 ± 66.24	1046.78 ± 62.36
Lactation # 3	1205.53 ± 100.41	1128.87 ± 102.50	1214.33 ± 133.11	1200.91 ± 111.21
Lactation # 4	1068.67 ± 56.01	1063.73 ± 54.64	1080.20 ± 55.49	1070.87 ± 54.56

Sire-wise lactation length

The lactation length (days) of 45 daughters of 3 sires were recorded. The mean lactation length was observed highest in the daughters of sire- A (197.93 ± 9.83 days) and the daughters of sire- B had observed the lowest lactation period of (189.66 ± 9.12 days) in 1st lactation (table-3). The maximum lactation length was observed in sire- A that has maximum lactation length of 214.86 ± 9.42 days and the daughters of sire- B was observed lowest lactation period of 198.93 ± 8.37 days in the 2nd lactation. It was also found that daughters of sire- A had resulted the maximum lactation of 226 ± 15.15 days and the daughters of sire- B observed the minimum lactation length of 216.6 ± 8.89 days in the 3rd lactation. The overall lactation length (days) was observed highest in sire- C of 212.36 ± 18.33 days, whereas the daughters of sire- B had produced the lowest lactation length of 205.8 ± 9.09 (table-3). The average lactation length (days) revealed that the 3rd lactation length was longest in all daughters of three sires which were 212.36 ± 18.33 days. The lowest lactation length was found in 4th lactation which was 205.71 ± 11.97 days.

Table#3 Sire wise average lactation length (days)

Lactation Number	Sire-A	Sire-B	Sire-C	Overall Average
Lactation # 1	197.93 ± 9.83	189.66 ± 9.12	193.8 ± 7.56	206.84 ± 14.94
Lactation # 2	214.86 ± 9.42	198.93 ± 8.37	204.8 ± 7.35	207.19 ± 14.51
Lactation # 3	226 ± 15.15	216.6 ± 8.89	219.4 ± 3.54	212.36 ± 18.33
Lactation # 4	217.26 ± 8.55	205.8 ± 9.09	211.13 ± 4.38	205.71 ± 11.97

Following are the results of Genetic, Simple, Phenotypic and Environmental Correlation

Performance Traits	Simple correlation
Birth Weight (kg) x Weaning Weight (kg)	0.487
Lactation Length (days) x Milk Yield (litres)	0.547

Performance Traits	Genetic Correlation
Birth Weight (kg) x Weaning Weight (kg)	0.008
Lactation Length (days) x Milk Yield (litres)	0.67

Performance Traits	Environmental correlation
Birth Weight (kg) x Weaning Weight (kg)	0.05
Lactation Length (days) x Milk Yield (litres)	0.91

Performance Traits	Phenotypic correlation
Birth Weight (kg) x Weaning Weight (kg)	0.06
Lactation Length (days) x Milk Yield (litres)	0.24

Conclusions

There was no-significant difference among daughters of three sires of under study for some performance traits may be due to inbreeding within herd, while the result indicated the 3rd lactation length was significantly ($P < 0.05$) higher than 1st, 2nd and 4th lactations respectively. The estimates of correlation among some performance traits under the study were moderate, high and positive, while the genetic correlation was found negative among birth weight and weaning weight may due to adverse effect of inbreeding, pleiotropic, feeding and management conditions.

SUGGESTION

The result of present study indicates that there was no significant difference among the daughters of sires used in this study. This study shows that there was might be large inbreeding within the herd under study. Due to negative correlation between birth weight and weaning weight, selection for both components birth weight and weaning weight is advisable. The study suggest that increase in lactation length greatly affect on milk yield positively. It is also suggested from the study that there large variation in transmitting characteristics of sires for production traits. Due to high level of inbreeding adversely affect the birth weight, weaning weight, milk performance and animal survival.

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