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Growth Performance of Purgi Goats under Field Conditions in Kargil District (Ladakh)

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ABSTRACT

Background: Purgi goats are native to Ladakh. They are used for fibre production and are known for the quality chevon. A study was, therefore, undertaken to study the effect of non-genetic factors on growth traits of Purgi Goats in its breeding tract.

Methods: Flocks of 80 farmers from 8 villages of district Kargil were monitored to collect the data pertaining to growth traits during 2017 and 2018. The data so collected were suitably classified to study the major fixed effects like birth year, kid, parity of dam, season of birth and type of birth.

Result: The averages were1.21±0.02, 3.62±0.02, 5.82±0.02, 8.73±0.03, 10.71±0.04 and 13.49±0.09 for BW, WW, 6MW, 9MW, 12MW and 18MW, respectively. The coefficients of variations of all the traits were low. Highest variability of 13.49 was observed for 18MW. The values of least squares means (LSM's) of 0.96±0.05, 3.74±0.03, 5.80±0.05, 8.74±0.06, 10.87±0.08 and 13.91±0.19 for birthweight (BW), weaning weight (WW), six months body weight (6MW), nine months weight (9MW), yearling body weight (12MW) and eighteen months (18MW) weight were observed in the present study. The effects of sex of kids, season of birth and year of birth were significant ($p<0.05$) on all traits under study, whereas effect of birth-type was significant ($p<0.05$) on BW and WW and effect of parity was non-significant on all traits under study. All the traits BW, WW and 6MW were positively correlated among themselves. The correlations ranged from low (between BW and WW) to high (WW with 9MW and 12MW).

Key words: Effects, Least squares means, Non-genetic factors, Purgi goat.

INTRODUCTION

J and K and Ladakh possess goat population of 23,47,000 and the number of persons involved in goat farming business is 2,35,985, whereas the number of goats per thousand households is 1062. Kargil is the second largest town in Ladakh, scattered over an area of 14,086 Sq.km. More than 90% of the population is engaged in animal husbandry activities. The goat population is 3.56 lacs in Ladakh region where as Kargil alone contributes 94,440 thousand goats, out of which, about 80% shared by Purgi goats. The Purgi goats are small in size and are useful for meat as well as fibre production. This goat is also reported to have a very good influence on the socio-economic status of tribal population in the area. The breed is being used by the breeders/farmers for meat and fibre production and is known for the quality chevon. Due to the harsh conditions prevalent in the area, very few breeds can survive and thrive in the area. This goes on to say that the good adaptability of Purgi goats in this region is a boon for the region which makes this animal a very important indigenous animal genetic resource.

However this goat is also no exception to the declining population trend which may mainly be attributed to the change social status of the people associated with goat farming and the management practices prevailing in the area. Despite the fact that Purgi goat is an important livestock of Ladakh, has a good role in livelihood support, however, adequate attention has not been given to this goat for its conservation, development and registration as a breed (Alam *et al*., 2019). Despite all this, Purgi has received little attention from researchers and a better understanding of this breed would go a long way in conservation and development of this goat. Keeping in view, the present investigation was carried out as an attempt for developing a sound protocol for evaluation of the breed in respect of growth performance of the breed under field conditions.

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MATERIALS AND METHODS

Location of study area and source of data

Flocks of 80 farmers from 8 villages (Baroo, Treapone, Minji, Salaskout, Titi-Chumit, Purick, Gm-Pore and Btambis) of District Kargil of Ladakh were monitored from 2017 and 2018

to collect data pertaining to birth weight and body weights at 3, 6, 9, 12 and 18 months of Purgi kids born during 2017 and 2018. The birth weight, sex, birth-type and parity of dam were recorded with in 48 hours of kidding. Subsequent body weights were taken at appropriate ages, using hanging spring balance.

Management practices

The animals were managed on semi-intensive feeding systems and fed on an average of 1.5 kg of greens/bhusa/ dried alfa-lfa/goat/day. During the winter, animals were fed on the dried wild grasses and hay @1.0-1.5 kg/sheep/day. Stream and pond water was taken by the goats for quenching their thirst twice a day.

Data analysis

Data were suitably classified to study the major fixed effects like birth year (2 levels; 2017 and 2018), sex of kid (2 levels; male and female), parity of dam (levels; primiparous and pleuriparous), season of birth (2 levels; spring and autumn) and type of birth (2 levels; single and multiple). Descriptive statistics including mean, standard errors and coefficient of variations (CV%) of body weight traits from birth to 18 months were computed statistically (Snedecor and Cochran, 1994). As the subclass frequencies of data were unequal and disproportionate, least square analysis of variance technique was used to study the effect of various factors influencing the traits under study. Data were analyzed using model 1 of Harvey (1990) statistical package and statistical significance of various fixed effects in the least squares model was determined by 'F' test.

The phenotypic correlation was estimated in SPSS statistical software

The standard error of phenotypic correlations was obtained according to formula given by Panse and Sukhatme (1961):

$$S.E.\ (r_p) = \frac{\sqrt{1 - r^2_{p(xy)}}}{\sqrt{N - 2}}$$

Where:

- $r_{p(xy)}$ = Phenotypic correlation between traits X and Y.
- N - 2 = Degree of freedom.

The statistical significance of correlations was tested by comparing t-value with the table given by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

The means and standard errors were 1.21±0.02 (0.51), 3.62±0.02(0.35), 5.82±0.02 (0.50), 8.73±0.03 (0.59), 10.71±0.04(0.88) and 13.49±0.09(2.05) with coefficients of variation 1.21, 3.62, 5.82, 8.73, 10.71for BW(kg),WW(kg), 6MW(kg), 9MW(kg), 12MW(kg) and 18MW(kg) respectively.

The least square means along with SE for the traits under study are reflected in Table 1. The least squares means (LSM's) and test of significance of the fixed factors affecting growth traits of Purgi goats in their breeding tract

Table 1: Least square means± SE for growth traits of Purgi goat.

Particulars	N	BW	N	WW	N	6 MW	N	9 MW	N	12 MW	N	18 MW
Overall	1008	0.96±0.05	999	3.74±0.03	992	5.80±0.05	988	8.74±0.06	981	10.87±0.08	744	13.91±0.19
Sex		0.000*		0.003*		0.041*		0.013*		0.011*		0.040*
Male	448	1.09±0.05	443	3.94±0.03	439	6.01±0.06	427	8.97±0.07	423	11.10±0.09	224	14.16±0.21
Female	560	0.82±0.05	556	3.54±0.03	553	5.59±0.06	451	8.53±0.07	558	10.67±0.09	520	13.50±0.21
Season of birth		0.000*		0.001*		0.001*		0.003*		0.011*		0.030*
Spring	770	0.91±0.04	767	3.55±0.02	764	6.00±0.05	764	8.87±0.05	762	11.11±0.06	625	14.14±0.41
Autumn	238	1.01±0.06	232	3.93±0.04	228	5.60±0.07	226	8.63±0.08	219	10.66±0.09	119	13.52±0.11
Birth-type		0.000**		0.044*		0.95^N		0.697^N		0.695^N		0.234^N
Single	978	1.17±0.03	971	3.90±0.02	965	5.90±0.04	963	8.77±0.04	959	10.90±0.05	729	14.11±0.13
Multiple	30	0.74±0.09	28	3.57±0.05	27	5.70±0.09	25	8.72±0.11	22	10.84±0.14	15	13.71±0.34
Parity		0		0.024^N		0.048^N		0.017^N		0.043^N		0.029^N
Primiparous	140	0.83±0.07	137	3.81±0.04	134	5.99±0.07	131	8.60±0.08	130	10.65±0.11	70	13.65±0.27
Pleuriparous	868	1.09±0.05	862	3.70±0.03	858	5.70±0.05	857	8.89±0.06	851	10.99±0.07		14.17±0.18
Year		0.008**		0.000**		0.007**		0.000**		0.000**		0.000**
2017	732	0.99±0.05	728	3.52±0.03	725	5.93±0.05	723	8.60±0.06	721	10.38±0.08	606	13.04±0.19
2018	276	0.93±0.06	271	3.96±0.04	267	5.67±0.06	265	8.89±0.07	260	11.36±0.10	138	14.78±0.24

** - Significant (P<0.01), * - Significant (P<0.05), NS- Non-significant.

Table 2: Phenotypic correlations among growth traits of Purgi goat.

Trait	WW	6 MW	9 MW	12 MW	18 MW
BW	-0.04±0.04	-0.02±0.04	0.06±0.04	0.08±0.04*	0.08±0.04*
WW		0.06±0.04	0.65±0.03**	0.65±0.03**	0.81±0.03**
6 MW			0.24±0.04**	0.08±0.04*	0.02±0.04
9 MW				0.44±0.04**	0.57±0.04**
12 MW					0.48±0.04**

from birth to 18 months are reflected in Table 1. The values of LSM's of 0.96±0.05, 3.74±0.03, 5.80±0.05, 8.74±0.06, 10.87±0.08 and 13.91±0.19 for birth weight (BW), weaning weight (WW), six months body weight (6 MW), nine months weight (9MW), yearling body weight (12 MW) and eighteen months weight were observed in the present study. From the results it is observed that Purgi is a small and unique goat of region and India.

Effect of year and season of birth

The effect of year and season of birth was significant ($p<0.05$) on all the traits under study. This may be due to differences in availability of feed and forage and effects of climate changes across years and seasons. As Ladakh is an arid region, livestock rearing is characterized by fodder shortages and climatic stress. Significantly higher birth weights and weaning weights were observed in autumn born kids whereas higher bodyweights from 6-18 months were observed in spring born kids. This may be attributed to availability of good quality and quantity of forage during summer for kids, pregnant and lactating ewes thereby translating to higher birth weight and weaning weight in autumn born kids. Our results agree with the reports of Ofori and Hagan, (2020) in West African Dwarf (WAD), Bhusan *et al*. (2012) in Jakhrana and Dudhe *et al*. (2015) in Sirohi and Waiz *et al*. (2018).

Effect of sex

The effect of sex was significant on all the traits with sexual dimorphism in favor of male. These results agreed with the results of Dudhe *et al*. (2015) in Sirohi goats, Bhusan *et al*. (2012) in Jakhrana, Ofori and Hagan (2020) in West African Dwarf (WAD) and Waiz *et al*. (2018) in Sirohi. The variations may be attributed to anabolic effect of androgenic hormones which enhances the growth of long bones and lower cortisol secretion in male lambs (Assan, 2020).

Effect of birth-type and parity

The effect of birth, dam parity was significant ($p<0.05$) on all growth the traits whereas effect of birth-type was significant on BW and WW. Single-borns and kids born to pleuriparous dams were heavier at all ages. Ofori and Hagan (2020) in West-African-Dwarf goat also reported significant effect of parity on growth traits at all ages and effect of birth-type on BW and WW. Waiz *et al*. (2018) in Sirohi kids and effect of birth-type on BW and WW. The advantage of single born kids may be attributed to less competition for nutrients and uterine space. However, twin-born lambs compensate after weaning. The Primiparous dams have small uterine space and less milk which contributes to the small size of kids.

Correlations

The phenotypic correlation between different body weight traits is presented in Table 2. BW, WW and 6 MW were positively correlated. The correlations were ranging from low (BW and WW) to high (WW with 9 MW, 12 MW). The correlation was weak between BW and WW. The high phenotypic correlations of WW with 9MW and 12MW indicated that WW in Purgi kids could be an effective predictor of 9-month and yearling weights.

CONCLUSION

We conclude that Purgi is a small and unique goat genetic resource of the country, adapted to the fragile ecology and climate of Ladakh. It qualifies for registration and should be conserved on priority. The non-genetic factors contribute to the variation in the performance traits.

Conflict of interest

All authors declare that they have no conflict of interest.

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