Impact of Environmental Factors on Birth Weight in Teddy Goat

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ABSTRACT : The data 1241 birth, weights of Teddy goats maintanied at Livestock Production Research Institute, Bahadurnagar, Okara, Pakistan, during 1975-1990 were used for this study. The mean birth weight during study period ranged from 1.55 ± 0.06 to 1.78 ± 0.09 kg with and over all mean of 1.66 ± 0.031 kg. It was found that year of birth, type of birth, sex of kid and age of dam had significant $(p < 0.01)$ effects on birth weight while the effect of season was found to be non-significant. It was inferred that single born kids were significantly heavier than twins and twins were heavier than triplets. The mean values of birth weight for male and female kids were 1.70 ± 0.032 and 1.61 ± 0.03 kg respectively. The birth weight was found to be the highest in 8 year age group that was 1.82 ± 0.016 kg and the lowest in one year group (1.55 ± 0.02 kg).

(**Key Words**: Goat, Birth Weight, Environment)

INTRODUCTION

Pakistan supports 36.67 million heads of goats includig 62.5 percent breeding animals belonging to thirteen different breeds (Anon., 1970). Among these breeds Teddy goat has got maximum popularity due to its easy handling, small sized animal, early maturity and prolificacy. The small size and relatively low price enable the low income house holds and farmers to be benfited from their potentials. Moreover goats are the important component of mixed and sustainable livestock and agriculture farming systems in this country.

Goat produces food items of high biological value and can play a vital role in suppling animal protein for ever increasing human population due to its better fertility, prolificacy and short generation interval. The knowledge of its production potential under local conditions is a vital spring board to embark upon its improvement by applying the modern scientific knowledge gathered through research. Inspite of its significant role in fulfilling the meat shortage, no systematic work has been undertaken to study the productive potential of Teddy goats in Pakistan. To secure this purpose, a project was therefore planned to investigate various environmental factors that affect the birth weight of Teddy goats.

MATERIALS AND METHODS

Data comprising 777 breeding and performance records of Teddy goat breed kept at the Livestock Experiment Station, Bahadurnagar, Okara, Pakistan, during 1975-1990 were used for this project. The feeding and other managemental practices during the study period remained more or less similar. Breeding of does was practised throughout the year during the study period. After parturition the birth weight of kids was recorded before they were allowed to suckle their mothers.

Data on the following parameters were recorded.

1. Date of birth
2. Birth weight
3. Type of birth
4. Sex of kid

Before statistical analysis, for proper comparison the data on birth weight were standardised for year, season, type of birth, sex of kid and age of dam including the factors under study. To find out the effect of year, season, type of sex, age of dam on birth weiht, the collected data were statistically analysed using the techniques described by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Effect of year of birth

Over all 1241 births were recorded during 1976-1990 showing the mean birth weight of 1.660 ± 0.031 kg. The

yearly grouped data shows that maximum birth weight 1.78 kg ± 0.091 kg was recorded during 1976 and minimum 1.550 ± 0.064 kg during 1983 (table 1).

Table 1. Mean birth weight of kids born during different years

Year	Number of birth	Mean birth weight (kg)
1976	21	1.783 ± 0.091
1977	46	1.667 ± 0.065
1978	56	1.779 ± 0.610
1979	110	1.675 ± 0.048
1980	79	1.607 ± 0.052
1981	103	1.601 ± 0.048
1983	44	1.550 ± 0.064
1984	37	1.629 ± 0.067
1985	105	1.718 ± 0.045
1986	110	1.655 ± 0.044
1987	157	1.619 ± 0.041
1988	120	1.710 ± 0.044
1989	102	1.675 ± 0.048
1990	86	1.648 ± 0.049
Over all mean		1.660 ± 0.031

Statistical analysis revealed that year of birth had a significant effect on birth weight. The year effect is mainly due to environmental factors including feeding, nutrition, management, climatic temperature, disease control and the administrative ability of the person responsible. The result is substantiated by the findings of Khan and Sohani (1983), Mukundan et al. (1983) and Nagpal and Chawla (1984). They all reported that year had a significant effect on birth weight.

Effect of season of birth weight

Total 1241 cases (695 in winter and 546 in summer) were recorded during the experimental period. The average birth weights of the kids were 1.67 ± 0.033 kg and 1.65 ± 0.033 kg during winter and summer seasons respectively. The data on birth weight was subjected to statistical analysis of variance the results indicated a non significant effect of season on birth weight (table 2) and results were confirmed by the work of Garcia et al. (1986) who reported that season had no significant effect on birth weight.

Effect of birth type on birth weight

As single 538, twins 587 and triplets 116 births were recorded showing a mean birth weight of 1.86 ± 0.034, 1.63 ± 0.032 and 1.49 ± 0.044 kg respectively. The results of statistical analysis revealed that birth type had a significant ($p < 0.05$) effect on birth weight table 2. For means' comparison, Duncan's Multiple Range test was applied and found that single born kids were significantly heavier than twins or triplets, similarly the twins were significantly heavier than triplets. These results are confirmed by findings of Siddiqui et al. (1985), Singh et al. (1983), Baik et al. (1985) and Garcia et al. (1986). They all reported that birth weight is significantly affected by the type of birth.

Table 2. Analysis of variance effect of years, type season of birth, sex of kid and age of dam on birth weight

Source	Degree of Freedom	Sum of squares	Mean square	F. Value	Prob.
Year	14	3.3384	0.2384	1.711	0.0479*
Season	1	0.0500	0.500	0.358	0.5495[NS]
Type	2	17.3737	8.6868	62.332	0.0000**
Sex	1	2.1633	2.1633	15.523	0.0001*
Age	9	3.2393	0.3600	2.583	0.0061*
Remainder	1,213	169.0500	0.1393		

Effect of sex of kid on birth weight

The data were tabulated according to the sex of kids to determine the effect of sex on birth weight. It was observed that out of total births of 1241, males were 629 and females 612 in a ratio of 50.68 and 49.32 percent respectively. The mean birth weight was 1.701 ± 0.032 in males and 1.617 ± 0.033 kg in females. To find out the significance of this difference, the data were subjected to analysis of variance. The results revealed that sex had a significant ($p < 0.01$) effect on birth weight. The males were found on an average 0.084 kg heavier than females.

Effect of age of dam on birth weight of kid

To quantify the effect of age of dam on birth weight

of kid, the data were divided into 10 groups on yearly interval basis including 10 years and above in one group due to small number of records beyond this limit. The maximum birth weight (1.82 ± 0.105 kg) was found in 8 year group and minimum (1.55 ± 0.027 kg) in one year group (table 3). The results on statistical analysis revealed that age had a significant effect on birth weight (table 2). The results are in agreement to the findings of 3 and 8. They all reported that dam had a significant effect on birth weight.

Table 3. Number of births and mean birth weight of kids in different age group of dams

Dam's age group (years)	No. of observations	Mean birth weight
1	283	1.552 ± 0.027
2	402	1.642 ± 0.023
3	221	1.651 ± 0.028
4	158	1.660 ± 0.034
5	70	1.633 ± 0.049
6	60	1.655 ± 0.051
7	24	1.648 ± 0.079
8	13	1.820 ± 0.106
9	6	1.789 ± 0.155
10	4	1.573 ± 0.190

REFERENCES

Anonymous. 1970. Economic Survey. Govt. of Pakistan Finance Div., Economic Advisor's Wing, Islamabad, Pakistan.

Baik, D. H., W. Y. Oh and S. H. Na. 1985. Factors affecting preweaning growth in Korean native goat. In Procd. 3rd A. A. A. P. Anim. Sci. Cong., May 6-10, 7:308-309.

Garcia, F. X., S. J. C. Magofke, C. P. Azocar, O. M. Aylwin and P. Dela. 1986. Non-genetic effects as source of varation for growth of criollo kids in the mediterranean arid zone of Chile. Avances en production Anim., 11(1-2):87-93.

Khan, B. U. and K. L. Sahani. 1983. Pre-weaning body weights and linear body measurements in Jamunapari goats under semi-arid farm conditions. Indian J. of Anim. Sci., 53 (8):835-840.

Mukundan, G., P. N. Bhat, B. Nandakumaran and B. U. Khan. 1983. Factors affecting pre-weaning weights in Malabari goats and its Saanan half breds. Ind. J. Anim. Sci. 53 (8):895-897.

Nagpal, S. and D. S. Chawla. 1984. Non-genetic factors affecting body weight in Beetal and Alpine goats. Ind. J. Anim. Res., 18(2):99-104.

Siddiqui, M. F., H. S. Bonde, S. G. Rotte and K. S. Deshpande. 1981. Studies on some growth attributes of Osmanabadi goat kids. J. Agri. Sci., U. K. 97(3):747-749.

Singh, A., M. C. Yadev and O. P. S. Sengar. 1983. Factors affecting body weight at birth and weaning in Jamunapari and Barbari kids. Asian J. Dairy Res., 2(1):55-58.

Singh, A. M., C. Yadev and O. P. S. Sengar. 1984. Factors affecting the body weight of Jamunapari and Barbari kids. Ind. J. Anim. Sci., 54(10):1001-1003.

Snedecor, G. W., and W. G. Cochran. 1967. Statistical Methods. 6th edi. The Iowa State Univ. Press, Ames, Iowa, USA.