



SHORT COMMUNICATION

Factors Affecting Weight Gain in Magra Sheep under Arid Condition of Rajasthan

K. Parihar*, S.B.S. Yadav, H.K. Narula, U. Pannu and B. Bais

Department of Animal Breeding and Genetics, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner, INDIA

**Corresponding author: K Parihar; Email: kuldeeparihar29@gmail.com*

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ABSTRACT

The data for the Present investigation were analyzed from records (1999-2008) of Magra Sheep research flock maintained with CSWRI, ARC, Bikaner. Records of 1638 Magra lambs for growth performance was analyzed to assess the impact genetic group, period of birth, sex and parity. The overall least-squares means were observed for average daily gain in body weight during 0-3, 3-6, 6-12 and 0-12 months of age were estimated as 124.20 ± 1.135 , 78.88 ± 1.792 , 32.99 ± 0.895 and 68.52 ± 0.745 gm/day, respectively. Effect of sire, period and sex were found highly significant on weight gain. The parity had significant effect on average daily gain in body weight during 0-3 and 3-6 but non-significant during 6-12 and 0-12. Regression of dam's weight at lambing had highly significant effect except average daily gain 3-6 months of age.

Keywords: Magra sheep, arid condition, growth, average daily gain (ADG)

Sheep Rearing is major source of livelihood for small and marginal farmers in arid and semi arid areas of Rajasthan. Magra is an important sheep breed of hot arid zone of Rajasthan as it produces most lustrous wool suitable for carpet manufacturing. The evaluation of increase in the productivity of an animal is important with respect to sale of lambs, absolute gain in body weight and income from sheep by culling of the inferior animals in the flock. The gains in weight help in deciding whether a particular lamb is to be retained in flock. Hence the present study, therefore, was taken up to assess average daily gain and effect of genetic and non-genetic factors in Magra lambs to facilitate selection of the quality lambs.

The data for present investigation were obtained from the records of Magra lambs maintained at the Arid Region Campus of the Central Sheep and Wool Research Institute, Bikaner, The data spread over a period of years 1999 to 2008.

The data on growth traits was classified in to 3 periods like P_1 (1999-2001), P_2 (2002-2004) and P_3 (2005-2008) and classified up to 5 or more than 5 parity. Absolute growth rate or average daily gain in the body weight of individual

animal was calculated by using the following formula (Brody, 1964).

$$\text{Absolute growth rate} = \frac{W_2 - W_1}{t_2 - t_1}$$

Where:

W_2 = Final body weight (kg)

W_1 = Initial body weight (kg)

t_2 = Age of the animal at the end of period (days)

t_1 = Age of the animal at the beginning of period (days)

Estimation of various factors affecting on Magra lambs were analyzed through Mixed Model Least-squares Maximum Likelihood programme of Harvey (1990).

The growth of lambs from birth to 12 months of age were evaluated in terms of body weight at average daily gain in body weight during 0-3 (ADG1), 3-6 (ADG2), 6-12 (ADG3) and 0-12 (ADG4) months of age and effect of sire, period, sex, parity and dam's weight as covariate represented in table 1. The overall least-squares means

Table 1: Least-squares means (\pm S.E.) for main effects on average daily gains (gm/day) during 0-3, 3-6, 6-12 and 0-12 months of age in Magra lambs

EFFECTS	ADG1 (0-3 months)	ADG2 (3-6 months)	ADG3 (6-12 months)	ADG4 (0-12 months)
Over All Mean (μ)	124.20 \pm 1.135 (1638)	78.88 \pm 1.792 (1533)	32.99 \pm 0.895 (1144)	68.52 \pm 0.745 (1144)
SIRE	**	**	**	**
PERIOD	**	**	**	**
P1 (1999-2001)	109.32 \pm 3.314 ^a (359)	62.32 \pm 3.944 ^a (335)	25.05 \pm 2.299 ^a (239)	59.47 \pm 1.470 ^a (239)
P2 (2002-2004)	127.59 \pm 2.612 ^b (568)	66.12 \pm 3.243 ^b (535)	34.14 \pm 1.790 ^b (410)	68.47 \pm 1.178 ^b (410)
P3 (2005-2008)	135.70 \pm 4.500 ^c (711)	108.21 \pm 4.824 ^c (663)	39.77 \pm 2.844 ^c (495)	77.63 \pm 1.824 ^c (495)
SEX	**	**	**	**
Male	128.74 \pm 1.285 ^b (831)	88.05 \pm 2.308 ^b (776)	37.56 \pm 1.100 ^b (521)	74.41 \pm 0.790 ^b (521)
Female	119.67 \pm 1.296 ^a (807)	69.71 \pm 2.314 ^a (757)	28.42 \pm 1.072 ^a (623)	62.63 \pm 0.786 ^a (623)
PARITY	**	**	NS	NS
First	128.51 \pm 1.423 ^b (592)	76.03 \pm 2.392 ^a (556)	31.92 \pm 1.150 (405)	68.39 \pm 0.831 (405)
Second	123.40 \pm 1.555 ^a (386)	79.75 \pm 2.468 ^{ab} (373)	32.77 \pm 1.192 (289)	68.91 \pm 0.861 (290)
Third	123.19 \pm 1.744 ^a (294)	81.52 \pm 2.619 ^b (270)	32.53 \pm 1.330 (195)	68.84 \pm 0.909 (195)
Fourth	120.91 \pm 1.999 ^a (208)	81.08 \pm 2.825 ^b (186)	33.12 \pm 1.462 (140)	66.98 \pm 1.001 (141)
Fifth	125.00 \pm 2.226 ^b (158)	76.04 \pm 2.825 ^a (148)	34.59 \pm 1.570 (114)	69.47 \pm 1.079 (113)
DAM'S WEIGHT (kg)	**	NS	**	**
Regression coefficient (kg/kg)	2.359 \pm 0.1731	0.160 \pm 0.1796	-0.540 \pm 0.1106	0.354 \pm 0.0723

No. of observations are given in parenthesis. Figure with different superscripts differ significantly.

** - Highly significant (P 0.01);

* - Significant (P 0.05); NS - Non-significant

for average daily gain showed that the maximum growth took place from birth to 3 months of age and then rate decreased in subsequent periods.

However, Prince *et al.* (2008) and Mishra *et al.* (2009a) found lower estimates for pre-weaning and post-weaning average daily gains in Chokla and Garole \times Malpura half bred sheep, respectively. Higher estimates for average daily gains during 0-3, 3-6 and 6-12 months of age were observed by Narula *et al.* (2010) in Marwari sheep. Whereas, the results were in close agreement with the findings of Gohil (2010) and Singh (2012) in Marwari sheep.

The highly significant (P 0.01) effect of sires on the traits studied indicated that heavier sires could be used effectively for improvement of these traits. Similar results were reported by Gohil (2010) and Singh (2012) in Marwari sheep. The difference in body weight over the parity might be due to effect of sex hormone (Estrogen). The effect of parity was found to be significant (P 0.05) while non-significant for average daily gains during 6-12

and 0-12 month of ages. Gohil (2010) and Singh (2012) in Marwari lambs reported similar results of effect of parity on average daily gains.

Effect of sex had highly significant (P 0.01) on average daily gain, the difference in male and female was found to be highly significant for all pre-weaning and post-weaning average daily gains. The average daily gains in males were higher than that of females. Thus, the males were heavier than females at all the stages due to sex dimorphism and culling practices. Similar significant effect of sex of lamb was reported by Dass *et al.* (1998), Joshi *et al.* (2003), Dass *et al.* (2008), Gohil (2010), Narula *et al.* (2010) and Singh (2012) in Marwari lambs.

The effects of period were highly significant (P 0.01) to all the traits, the Period differences could be due to varying availability of feed and fodder, physical environment and managerial factors prevailing in different years which directly affected the growth rate and production. The regression of average daily gain on dam's weight at lambing, during birth to 3 and 0-12 months of age were

found to be highly significant ($P < 0.01$) indicates that higher body weight of dams had nurtured the lambs with higher daily gain during pre-weaning age. It also indicates that the milk yield is also more in heavier ewes and the gain in weight in pre-weaning stage mainly depends on milk yield. Significant effect of dam's weight at lambing on average daily gain reported by Joshi *et al.* (2003) during birth to 3 months, 3 to 6 month, 6 to 12 month and birth to 12 month of age, Gohil (2010) reported during birth to 3 months and 3 to 6 month of age and Singh (2012) reported during birth to 3 months of age in Marwari sheep, respectively. Negative dam's weight at lambing indicates that higher body weight of dams had nurtured the lambs with lower daily gain.

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