

A STUDY ON THE PERFORMANCE OF MAHABUBNAGAR GOATS*

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ABSTRACT

Data on body weights at birth, 3, 6, 9 and 12 months of age were recorded on 644 Mahabubnagar local kids born between 1993 and 2008, at Livestock Research Station, Mahabubnagar were utilized. The overall least-squares means for body weight at birth, weaning, 6, 9 and 12 months age were 2.13 ± 0.02 , 8.7 ± 0.08 , 12.23 ± 0.10 , 15.01 ± 0.10 and 17.89 ± 0.13 kg respectively. The effects of period of kidding, sex and type of births were significant on body weights of Mahabubnagar goats ($P < 0.01$), while season of kidding had no significant influence. Male kids weighed heavier than females. Heritability estimates for weight at birth (0.08 ± 0.07) and weaning (0.06 ± 0.09) were low and were moderate for post weaning body weights (0.10 ± 0.10 , 0.21 ± 0.13 and 0.20 ± 0.12 at 6, 9 and 12 months respectively). The genetic and phenotypic correlations among kid weights at different ages ranged from -1.71 to 0.46.

Key words: Mahabubnagar goats, Body weights, Heritabilities

INTRODUCTION

Goats are an important species of livestock for the poor farmers of India as they survive better under harsh climatic conditions, where the vegetation is sparse and no other livestock species is able to thrive and to grow at a faster rate. India is a rich repository of goat genetic resources in the form of 20 well defined breeds, which constitute about 20-25% of the world's goat population of 124.5 millions (FAO, 2003). Andhra Pradesh, with 6.27 million goats in India. Mahabubnagar district in Andhra Pradesh tops in goat population with 5.09 lakhs local goats (Livestock Census, 2003). Mahabubnagar goats are well known for their production potential in Southern telangana region of Andhra Pradesh, though yet to be recognized as a breed.

Although much research was done on descript goat breeds, information on highly adaptable local goats had not been documented adequately and their genetic potential remained unexploited due to lack of systematic and scientific descriptors. Hence, the present investigation was undertaken to study the growth traits of Mahabubnagar local goats.

MATERIAL AND METHODS

The data on body weights at birth, 3, 6, 9 and 12 months age, on 644 Mahabubnagar kids born between 1993 and 2008, at Livestock Research Station, Mahabubnagar were utilized. The experiment was conducted at college of Veterinary Science, Rajendranrgar (S.V.V.U.) Hyderaibad during 2004-2007. The data were classified into 8 periods of 2 years each, 3 seasons viz. rainy (July-October), winter (November-February) and summer (March-June) and two types of birth (single and multiple) and subjected to least-squares analysis (Harvey, 1979) using fixed effects model to study the effect of period, season, sex of kid and type of birth. Significant differences between the means were tested by Duncan's Multiple Range Test (DMRT) as modified by Kramer (1957). The data on 412 kids, progeny of 28 sires were adjusted for significant non-genetic effects and then used for the estimation of heritability and genetic and phenotypic correlations by paternal half-sib correlation method (Becker, 1985).

RESULTS AND DISCUSSION

The overall least-squares means for body weight at birth, weaning, 6, 9 and 12 months age were 2.13 ± 0.02 , 8.70 ± 0.08 , 12.23 ± 0.10 , 15.01

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± 0.10 and 17.89 ± 0.13 kg respectively (Table 1), which are almost similar to those of Beetal (Singh and Khan, 2002), Sirohi (Tomer *et al.* 2004), Tellichery (Kumar *et al.* 1992), Ganjam (Rao *et al.* 2007) goats but were lower than those of Jamunapari (Roy *et al.*, 2003), Kutchi (Yadav *et al.*, 2003), Marwari (Rai *et al.*, 2004), Sirohi (Pathodiya *et al.*, 2005 and Swame *et al.*, 2006) and Jakhrana goats (Verma *et al.*, 2007). The variation of body weight in different breeds could be due to the difference in genetic constitution, plane of nutrition and other managerial practices followed in farm.

The period of kidding had significant influence on body weights. The mean body weight at birth, weaning and 12 months age varied from 1.94 ± 0.06 kg (2007-08) to 2.34 ± 0.08 (1993-94), 8.35 ± 0.23 (1997-08) to 9.37 ± 0.16 (2005-06) and 17.29 ± 0.2 (2003-04) to 18.75 ± 0.24 kg (2005-06) respectively. The kids born during 2005-06 were heaviest at birth (2.19), weaning (9.37 kg), 6 months (12.96 kg) and at 12 months (18.75 kg) age. Significant differences among periods might be attributed to the variation in environmental conditions and availability of feed across the years. A similar significant effect of year on body weight at different ages was reported by Mehta *et al.* (1997) in Sirohi, Roy *et al.* (1997, 2003) in Jamunapari, Yadav *et al.* (2003) in Kutchi, Rai *et al.* (2004) in Marwari and Sharma and Pathodiya (2007) in Sirohi kids.

The season of kidding had no significant influence on body weights of Mahabubnagar goats at all ages. However, the kids born during rainy season exhibited superiority in attaining slightly higher body weights ranging from 2.10 ± 0.03 kg at birth to 18.09 ± 0.1 kg at 12 months age. These effects are in agreement with those reported in Sirohi (Mehta *et al.*, 1997; Pathodiya *et al.*, 2004 and Sharma and Pathodiya, 2007), Jamunapari and Osmanabadi (Kuralkar *et al.*, 2002) and Marwari (Rai *et al.*, 2004) goats. The variation in growth of kids due to season of birth could be because of difference in nutritional status of dams in advanced stage of pregnancy and kids during pre and post weaning periods.

The body weights of Mahabubnagar goats were significantly influenced by sex of kids at all ages studied except at birth. The male kids weighed

heavier than females at all ages (Table 1). The body weights ranged from 2.16 ± 0.03 kg at birth to 18.81 ± 0.17 kg at 12 months age in males, while in females body weights ranged from 2.11 ± 0.03 kg to 16.97 ± 0.15 kg respectively. The higher body weights attained by the males might be because of an anabolic effect of male sex hormones (Hafez, 1962). Significant effect of sex on body weights of various goat breeds were reported by Roy *et al.* (1997 and 2003), Mehta *et al.* (1997), Kuralkar *et al.* (2002), Tomar *et al.* (2004), Rai *et al.* (2004) and Sharma and Pathodiya (2007).

Type of birth had a significant influence on body weights at all ages. Kids born in singles showed higher body weights than those born as a multiple which includes twins and triplets. In the present study, the body weights of single born kids ranges from 2.29 ± 0.02 at birth to 18.61 ± 0.12 kg at 12 months age, while in multiple births 1.98 ± 0.03 kg to 17.17 ± 0.21 kg respectively. The single born kids had the comfort of better uterine space and nutrition during pre-natal period when compared to those born in multiple births, leading to lower birth weights poor suckling in addition kids born in multiple births have to compete with each other in sharing the milk of the does during suckling. The significant differences observed in the present study were in agreement with those reported by Roy *et al.* (1997), Kuralkar *et al.* (2002), Yadav *et al.* (2003), Pathodiya *et al.* (2004), Rai *et al.* (2004) and Sharma and Pathodiya (2007).

Heritabilities

Heritability estimates for body weight at birth (0.08 ± 0.07) and weaning (0.06 ± 0.09) were low but they were moderate for post weaning body weights (0.10 ± 0.10 to 0.20 ± 0.12 at 6, 9 and 12 months), in the present study (Table 2) which was similar to the observations made by Singh *et al.* (1991) and Roy *et al.* (2003).

Genetic and Phenotypic Correlations

The genetic correlations of birth weight with all other body weights except at 9 months age were beyond the normal limits, which might be due to less number of sires. However, the estimates which could be obtained for the 3 months weight with weight at 6 and 12 months and 9 months weight with yearling weight were highly positive. Rai *et al.* (2004) also reported negative genetic correlations between birth weight and body weight at later ages

Table 1: Least-squares means (kg) of body weights at different ages

	Birth			3 months			6 months			9 months			12 months		
	n	Mean	SE	n	Mean	SE	N	Mean	SE	n	Mean	SE	n	Mean	SE
Overall	644	2.13	0.02	480	8.70	0.08	430	12.23	0.10	418	15.01	0.10	412	17.89	0.13
Period of birth:															
1993-94	32	2.34 ^a	0.08	-	-	-	-	-	-	-	-	-	-	-	-
1995-96	45	2.17 ^{abc}	0.06	-	-	-	-	-	-	-	-	-	-	-	-
1997-98	69	2.14 ^{abc}	0.05	34	8.35 ^{cd}	0.23	34	11.95 ^{bc}	0.27	34	14.91 ^{bc}	0.28	34	17.93 ^{ab}	0.33
1999-00	101	2.03 ^{cd}	0.04	76	8.41 ^{cd}	0.16	69	11.76 ^c	0.19	69	14.45 ^c	0.20	69	17.42 ^b	0.24
2001-02	170	2.14 ^{bc}	0.04	154	8.67 ^{bc}	0.12	131	12.19 ^{bc}	0.15	131	14.97 ^b	0.16	131	18.05 ^a	0.19
2003-04	101	2.11 ^{bc}	0.04	93	8.30 ^d	0.14	85	11.84 ^c	0.17	85	14.46 ^c	0.18	85	17.29 ^b	0.21
2005-06	78	2.19 ^{ab}	0.05	75	9.37 ^a	0.16	70	12.96 ^a	0.19	69	15.74 ^a	0.20	69	18.75 ^a	0.24
2007-08	48	1.94 ^d	0.06	48	9.10 ^{ab}	0.20	41	12.69 ^{ab}	0.25	30	15.54 ^{ab}	0.31	24	17.92 ^{ab}	0.41
Season of birth:															
Summer	151	2.12	0.04	116	8.65	0.14	94	12.21	0.17	94	14.95	0.18	94	17.94	0.22
Rainy	206	2.10	0.03	148	8.81	0.12	138	12.35	0.14	136	15.23	0.15	131	18.09	0.19
Winter	287	2.18	0.03	216	8.64	0.11	198	12.12	0.13	188	14.85	0.15	187	17.64	0.18
Sex:															
Male	296	2.16	0.03	209	9.03 ^a	0.11	188	12.77 ^a	0.13	177	15.66 ^a	0.14	175	18.81 ^a	0.17
Female	348	2.11	0.03	271	8.37 ^b	0.10	242	11.69 ^b	0.12	241	14.37 ^b	0.12	237	16.97 ^b	0.15
Type of birth:															
Single	465	2.29 ^a	0.02	377	9.17 ^a	0.08	336	12.67 ^a	0.09	324	15.53 ^a	0.10	318	18.61 ^a	0.12
Multiple	179	1.98 ^b	0.03	103	8.23 ^b	0.14	94	11.79 ^b	0.16	94	14.50 ^b	0.17	94	17.17 ^b	0.21

n= number of animals, Means followed by the same superscript(s) do not differ significantly (P<0.05).

Table 2: Estimates of heritability (on diagonal) and genetic (below diagonal) , phenotypic (above diagonal) and environmental correlations (above diagonal within parentheses) of body weight at different ages

Traits	Birth	3 months	6 months	9 months	12 months
Birth	0.08 ± 0.07	0.12* (0.42)	0.14** (0.45)	0.11* (0.44)	0.11* (0.46)
3 months	-1.71 ± 4.21	0.06 ± 0.09	0.40** (0.78)	0.37** (0.68)	0.32** (0.62)
6 months	-1.16 ± 0.53	0.98 ± 0.05	0.10 ± 0.10	0.46** (0.91)	0.42** (0.81)
9 months	-0.92 ± 0.14	1.18 ± 0.25	1.01 ± 0.01	0.21 ± 0.13	0.46** (0.91)
12 months	-1.17 ± 0.35	0.88 ± 0.16	1.04 ± 0.03	0.98 ± 0.01	0.20 ± 0.12

* Significant at P<0.05; ** Significant at P<0.01

while Yadav *et al.* (2003) and Mehta *et al.* (1997) reported a positive estimate. Genetic correlation of weaning weight with weight at later ages were also reported to be positive and low to moderate by Mehta *et al.* (1997) and Rai *et al.* (2004).

In the present study, the phenotypic correlations among kids weight at different ages were significant and ranged from 0.11 to 0.46. Roy *et al.* (1997), Yadav *et al.* (2003), Rai *et al.* (2004) and Tomar *et al.* (2004) also reported positive phenotypic

association among body weights with the estimates ranging from medium to very high. The positive and higher genetic and phenotypic correlations between 3 and 6 months body weights and with other traits indicated that selection of kids may be done on the basis of 3 or 6 months of body weight in order to obtain higher weights in later ages.

Environmental correlations among body weights ranged from 0.42 to 0.91 while Tomar *et al.* (2004) found lower values than the present estimates.

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