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Goat Body Weight Determinants with Fundamental Parameters

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ABSTRACT: Basic facts regarding Sirohi goats' body weights (Kg) at different ages are provided. 1055 animals, totalling 340 males and 715 females, have been included in the data for various purposes. At birth and then every 30 days up to 365 days, the average body weights for both sexes. There were 32.33 percent male and 60.7 percent females in the current research of data from birth to 360 days of age. Only animals that remained alive from birth to age 12 were taken into account. For body weights measured from birth to 360 days of age, the coefficient of variation (CV) ranged from 19.99 to 32.50 percent. For body weight, the coefficient of variation (CV) ranged from 19.72 to 36.59 percent for male children and 18.11 to 29.76 percent for female children. This could be as a result of several environmental influences that affect an individual's body weight. Animals' body weights with high range coefficients of variation demonstrated good room for improvement. By choosing sires with strong genetic potential or by creating better environmental conditions, this could be improved.

Keywords: Body weight, coefficient of variation, Sire, Sirohi goat

INTRODUCTION

Farmers, especially landless, marginal, and small farmers, can make a sustainable living by raising goats. Goats are often kept on grazing or browsing, with supplementation from locally accessible crop leftovers and agro-industrial byproducts. Due to their special traits, such as their small size and tendency for eating grass and tree leaves, goat farming is a low-cost endeavor (Sabapara *et al.*, 2014; Sunwasiya *et al.*, 2020).

The majority of goats in Rajasthan are Sirohi, which makes about 60% of the state's entire goat population (DADF, 2013). A sirohi breed goat with two purposes. Ajmer, Jaipur, Tonk, Udaipur, Chittorgarh, Rajsamand, Bhilwara, and Sirohi districts in Rajasthan are home to villages where the Sirohi breed is found in its purest form. With regard to disease resistance, adaptability in dry and hot climates, and performance under challenging climatic conditions, this breed has proven to be an outstanding goat breed. In addition to being raised primarily for chevrons, goats are also raised for their milk, which they produce on average at 933 g per day throughout the first 90 days of lactation (Shinde *et al.*, 2008; Sunwasiya *et al.*, 2019).

Rajasthan's semi-arid region is where the Sirohi breed's breeding tract are located. The minimum and maximum temperatures for each month were 9.3 to 22.3°C and 24.9 to 31.5°C, respectively. At 5.5 in the morning and 48 at night, the monthly average for relative humidity (percent) is. It rains 169 cms per year (Acharya, 1982). Therefore, the following research was conducted to identify the Sirohi goat's growth for body weight prediction, and examine the impact of various genetic and non-genetic factors on genotypic and phenotypic traits.

MATERIALS AND METHOD

Source of data. The farmer's flock of Sirohi, which is kept under the ICAR-sponsored All India Co-ordinate Research Project (AICRP) on goat improvement, Livestock Research Station, Vallabhnagar, Udaipur (Rajasthan), is the source of data for the present investigation. The study used data from 2009 to 2017.

Collection of data. For the period from January 2009 to December 2017, the precise details of every animal were gathered from farmers' flocks in the field. Early in the morning, before to the flock had been sent away for grazing, the body weights of newborn kids, kids aged three, six, nine, and twelve months, and does at kidding were recorded.

Body weight of different months of age. The estimates of overall least-squares means at birth to 12th months of age are presented in Table 1. Basic information about Sirohi goats' body weights (Kg) at

various ages is presented. 340 male and 715 female animals totaling 1055 were used in the data for various goals. The average body weights for both sexes at birth and every 30 days thereafter up to 365 days were 2.54±0.01, 5.60±0.03, 8.52±0.06, 11.81±0.09, 13.13±0.10, 14.44±0.10, 15.80±0.12, 17.50±0.15, 18.00±0.16, 18.50±0.16, 20.50±0.20, 21.30±0.20 and 22.10±0.20 Kg, respectively. In the current study of data from birth to 360 days of age, there were 32.33 percent males and 67.7 percent females. Only animals that survived from birth to age 12 were taken into consideration.

From birth to 360 days of age, the coefficient of variation (CV) for body weights ranged from 19.99 to 32.50 percent. The coefficient of variation (CV) for body weight has been shown to range between 19.72 and 36.59% for male kids and between 18.11 and 29.76% for female kids. This could be because diverse environmental factors affect every individual's body weight differently. Animals had a good potential for improvement based on their body weight, which had a high range coefficient of variation. Selecting sires with strong genetic potential or providing better environmental conditions may both improve this.

Body weight at birth. The overall least-squares means at birth weight was estimated as 2.40±0.06 kg. The present finding is in close agreement with the reports of Meel *et al.* (2010) as 2.35±0.04 kg in Sirohi kids, Dudhe *et al.* (2015) as 2.55±0.05 kg in Sirohi kids, Kharkar *et al.* (2014) as 2.43±0.04 kg in Berari kids, Rao *et al.* (2007) as 2.25±0.01 kg in Ganjam kids, Kumar *et al.* (2005) as 2.27±0.08 kg in Tellichery kids, Bhusan and Rai (2007) as 2.52±0.00 kg in Jakhrana kids, Patel *et al.* (2005) as 2.42±0.06 kg in Marwari kids and Rashidi *et al.* (2008) as 2.48±0.04 kg in Markhoz kids.

The lower estimates of birth weight were found by Pathodiya *et al.* (2003) as 2.14±0.02 kg in Sirohi kids, Pathodiya (2004) as 2.18±0.02 kg in Sirohi kids, Sharma *et al.* (2010) as 2.16±0.05 kg in Sirohi kids, Bhakar *et al.* (2015) as 2.10±0.06 kg in Sirohi kids, Rao *et al.* (2007) as 2.25±0.01 kg in Ganjam kids, Thiruvenkadan *et al.* (2008 and 2009) as 2.20±0.10 and 2.17±0.03 kg in Tellichery kids, Birari *et al.* (2012) as 1.85±0.02 kg in Osmanabadi kids and Tyagi *et al.* (2013 and 2015) as 1.83±0.02 and 2.02±0.01 kg in Surti kids, respectively.

Higher estimates of birth weight were found by Mehta *et al.* (1997) as 2.88±0.03 kg in Sirohi kids, Arora *et al.* (2011) as 2.89±0.01 kg in Sirohi kids, Gowane *et al.* (2011a and 2011b) as 3.11±0.01 and 3.12±0.05 kg in Sirohi kids, Yadav *et al.* (2013) as 3.19±0.02 kg in Kutchi kids, Afzal *et al.* (2004) as 3.38±0.06 kg in Beetal kids, Alam *et al.* (2007) as 2.98±0.52 kg in Beetal kids, Rai *et al.* (2004) as 3.05±0.05 kg in Marwari kids, Patel *et al.* (2013) as 2.81±0.02 kg in Mehsana kids, Gupta *et al.* (2014) as 2.75±0.03 kg in Mehsana kids, Patel *et al.* (2005) as 2.87±0.20 kg in Jamunapari kids and Singh *et al.* (2009 and 2013) as 3.14±0.02 and 3.17±0.01 kg in Jamunapari kids, respectively.

Body weight at 1st month. The overall least-squares means at 1st month body weight was estimated as 5.30±0.23 kg.

Body weight at 2nd month. The overall least-squares means at 2nd month body weight was estimated as 8.27±0.43 kg.

Body weight at 3rd month. The overall least-squares means at 3rd month body weight was estimated as 11.23±0.64 kg. The present finding is in close agreement with the reports of Pathodiya *et al.* (2004) as 11.23±0.12 kg in Sirohi, Arora *et al.* (2011) as 11.37±0.09 kg in Sirohi, Gowane *et al.* (2011b) as 11.45±0.22 kg in Sirohi, Kumar *et al.* (2006) as 11.34±0.46 kg in Kutchi and Rai *et al.* (2004) as 11.35±0.17 kg in Marwari goat, respectively.

Table 1: Basic statistics of data structure for body weights of Sirohi goat.

Period	No. of kids records	% of male kids records	% of female kids records	Mean BW (Kg.)	Standard deviation	Coefficient variation (%)
OBW	1055	32.23	67.77	2.54	0.55	21.68
1MBW	1055	32.23	67.77	5.60	1.11	19.99
2MBW	1055	32.23	67.77	8.70	2.05	23.67
3MBW	1055	32.23	67.77	11.81	3.01	25.63
4MBW	1055	32.23	67.77	13.13	3.24	24.77
5MBW	1055	32.23	67.77	14.44	3.55	24.71
6MBW	1055	32.23	67.77	15.80	3.92	25.01
7MBW	1055	32.23	67.77	17.50	5.05	29.03
8MBW	1055	32.23	67.77	18.00	5.26	29.38
9MBW	1055	32.23	67.77	18.50	5.49	29.76
10MBW	1055	32.23	67.77	20.50	6.65	32.50
11MBW	1055	32.23	67.77	21.30	6.69	31.54
12MBW	1055	32.23	67.77	22.10	6.70	30.39

Note: 0BW= Body weight at birth, 1MBW= 1 month body weight, 2MBW= 2 month body weight, 3MBW= 3 month body weight, 4MBW= 4 month body weight, 5MBW= 5 month body weight, 6MBW= 6 month body weight, 7MBW= 7 month body weight, 8MBW= 8 month body weight, 9MBW= 9 month body weight, 10MBW= 10 month body weight, 11MBW= 11 month body weight, 12MBW= 12 month body weight, SD= Standard deviation, CV= Coefficient variation

The lower estimates of 3rd month body weight were found by Pathodiya *et al.* (2003) as 10.94±0.10 kg in Sirohi, Sharma and Pathodiya (2007) as 10.84±0.23 kg in Sirohi, Sharma *et al.* (2010) as 10.8±0.23 kg in Sirohi, Kharkar *et al.* (2014) as 10.60±0.67 kg in Berari, Rao *et al.* (2007) as 6.80±0.03 kg in Ganjam, Bharathidhasan *et al.* (2009) as 6.93±0.30 in Barbari, Yadav *et al.* (2013) as 9.59±0.13 in Kutchi, Kumar *et al.* (2005) as 9.30±0.19 in Tellicherry, Birari *et al.* (2012) as 6.99±0.03 kg in Osmanabadi, Verma *et*

al.(2009) as 8.83±0.83 in Malabari, Singh *et al.* (2002) as 8.56±0.18 kg in Beetal, Bhusan and Rai (2007) as 8.55±0.00 kg in Jakhrana, Mandal *et al.* (2010) as 8.82±0.20 kg in Jakhrana, Barhat (2005) as 8.95±1.39 in Marwari, Patel *et al.* (2013) as 9.92±0.11 in Mehsana, Gupta *et al.* (2014) as 10.33±0.16 in Mehsana, Singh *et al.* (2009 and 2013) as 10.52±0.07 and 10.60±0.05 in Jamunapari, Tyagi *et al.* (2013 and 2015) as 10.08±0.12 and 10.99±0.06 kg in Surti goat, respectively.

Higher estimates of 3rd month body weight were found by Meel *et al.* (2010) as 12.80±0.19 kg in Sirohi, Gowane *et al.* (2011a) as 12.93±0.06 kg in Sirohi, Bhakar *et al.* (2015) as 13.29±0.42 kg in Sirohi, Dudhe *et al.* (2015) as 13.30±0.47 kg in Sirohi, Kumar *et al.* (2007) as 12.44±0.00 kg in Kutchi, Alam *et al.* (2007) as 13.64±0.11 kg in Beetal, Patel *et al.* (2005) as 12.52±1.06 kg in Jamunapari and Rashidi *et al.* (2008) as 13.78±0.41 kg in Markhoz goat, respectively.

Body weight at 4th month. The overall least-squares means at 4th month body weight was estimated as 12.67±0.76 kg.

Body weight at 5th month. The overall least-squares means at 5th month body weight was estimated as 14.00±0.89 kg.

Body weight at 6th month. The overall least-squares means at 6th month body weight was estimated as 15.37±1.03 kg. The present finding collaborated with the results of in Sirohi and Sharma and Pathodiya (2007) as 15.24±0.28 kg in Sirohi goat, respectively.

The lower estimates than the present findings were reported by Kharkar *et al.* (2014) as 15.08±0.30 kg in Berari, Rao *et al.* (2007) as 9.95±0.04 kg in Ganjam, Bharathidhasan *et al.* (2009) as 6.93±0.30 in Barbari, Kumar *et al.* (2005) as 13.13±0.02 in Tellicherry, Thiruvenkadan *et al.* (2008 and 2009) as 10.50±0.40 and 12.50±0.19 kg in Tellichery, Verma *et al.*(2009) as 13.78±0.83 in Malabari, Singh *et al.* (2002) as 12.87±0.23 kg in Beetal, Mandal *et al.* (2010) as 11.70±0.28 kg in Jakhrana, Patel *et al.* (2005) as 14.68±0.49 in Marwari, Gupta *et al.* (2014) as 13.83±0.23 in Mehsana, Singh *et al.* (2009 and 2013) as 14.95±0.10 and 14.62±0.06 in Jamunapari, Patil *et al.* (2013) as 14.05±0.12 kg in Sangamneri, Mohammadi *et al.* (2012) as 14.38±0.20 kg in Raini and Kuthu *et al.* (2013) as 11.70±0.02 kg in Teddy goat, respectively.

Higher estimates of 6th month body weight were found by Pathodiya*et al.* (2003) as 15.82±0.14 kg in Sirohi, Meel *et al.* (2010) as 16.31±0.21 kg in Sirohi, Arora *et al.* (2011) as 16.35±0.14 kg in Sirohi, Gowane *et al.* (2011a and 2011b) as 18.36±0.09 and 17.49±0.41 kg in Sirohi, Bhakar *et al.* (2015) as 16.94±0.65 kg in Sirohi, Dudhe *et al.* (2015) as 15.96±0.52 kg in Sirohi, Alam *et al.* (2007) as 19.40±0.44 kg in Beetal and Patel *et al.* (2005) as 18.80±1.92 kg in Jamunapari goat, respectively.

Body weight at 7th month. The overall least-squares means at 7th month body weight was estimated as 17.34±1.55 kg.

Body weight at 8th month. The overall least-squares means at 8th month body weight was estimated as 17.94±1.66 kg.

Body weight at 9th month. The overall least-squares means at 9th month body weight was estimated as 18.54±1.77 kg. These results were accordance with the reports of Pathodiya (2004) as 18.65±0.37 kg and Sharma and Pathodiya (2007) as 18.33±0.40 kg in Sirohi goat, respectively.

The lower estimates than the present findings were reported by Rao *et al.* (2007) as 12.27±0.06 kg in Ganjam, Thiruvenkadan *et al.* (2008 and 2009) as 13.80±0.50 and 15.09±0.26 kg in Tellichery, Rathod *et al.* (2011) as 12.93±0.10 kg in Osmanabadi, Birari *et al.* (2012) as 14.15±0.03 kg in Osmanabadi, Mandal *et al.* (2010) as 15.54±0.59 kg in Jakhrana, Patel *et al.* (2005) as 17.84±0.59 in Marwari, Gupta *et al.* (2014) as 16.98±0.35 in Mehsana, Jagdale*et al.* (2012) as 17.77±0.13 kg in Sangamneri, Mohammadi *et al.* (2012) as 17.13±0.60 kg in Raini and Kuthu *et al.* (2013) as 16.69±0.02 kg in Teddy goat, respectively.

Higher estimates of 9th month body weight were found by Pathodiya *et al.* (2003) as 19.42±0.24 kg, Meel *et al.* (2010) as 19.34±0.25 kg, Arora *et al.* (2011) as 20.22±0.18 kg, Gowane *et al.* (2011a) as 22.02±0.10 kg, Bhakar *et al.* (2015) as 20.00±0.86 kg and Dudhe *et al.* (2015) as 20.98±1.05 kg in Sirohi goat, respectively.

Body weight at 10th month. The overall least-squares means at 10th month body weight was estimated as 20.82±2.38 kg.

Body weight at 11th month. The overall least-squares means at 11th month body weight was estimated as 21.67±2.48 kg.

Body weight at 12th month. The overall least-squares means at 12th month body weight was estimated as 22.58±2.57 kg. The present findings were in consonance with the reports of Pathodiya (2004) as 22.09±0.18 kg in Sirohi, Bhusan (2012) as 22.63±0.87 kg in Jakhrana and Patil *et al.* (2013) as 22.38±0.36 kg in Sangamneri goat, respectively.

The lower estimates than the present findings were reported by Sharma and Pathodiya (2007) as 21.94±0.35 kg in Sirohi, Kharkar *et al.* (2014) as 21.14±0.39 kg in Berari, Thiruvenkadan *et al.* (2008 and 2009) as 16.90±0.60 and 18.78±0.44 kg in Tellichery, Rathod *et al.* (2011) as 15.82±0.23 kg in Osmanabadi, Singh *et al.* (2002) as 18.98±0.34 kg in Beetal, Mandal *et al.* (2010) as 21.89±0.71 kg in Jakhrana, Patel *et al.* (2005) as 20.92±0.66 in Marwari, Gupta *et al.* (2014) as 20.44±0.31 in Mehsana, Mohammadi *et al.* (2012) as 17.99±0.30 kg in Raini and Kuthu *et al.* (2013) as 21.03±0.03 kg in Teddy goat, respectively.

Higher estimates of 12th month body weight were found by Pathodiya *et al.* (2003) as 23.73±0.245 kg, Arora *et al.* (2011) as 24.45±0.22 kg, Gowane *et al.* (2011a) as 25.80±0.12 kg, Bhakar *et al.* (2015) as 24.80±0.49 kg and Dudhe *et al.* (2015) as 25.80±0.49 kg in Sirohi goat, respectively.

CONCLUSIONS

The coefficient of variation (CV) for body weight may result from a variety of environmental factors that have an impact on an individual's body weight. Body weights of animals that had significant range coefficients of

variation showed that there was opportunity for improvement. This could be enhanced by selecting sires with high genetic potential or by promoting better environmental conditions. The findings of this study can be used to aid plan farm management strategies and decision-making on the culling of poor animals and the selection of animals that are highly productive simply based on their growth.

FUTURE SCOPE

The findings of this study can be utilized to help plan farm management strategies and decision-making on the culling of underperforming animals and the selection of animals that are highly productive simply based on their growth.

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Conflict of Interest. None.

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