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Heat tolerance ability in local, osmanabadi, barbari, jamnapari and sirohi goat with related to rectal temperature

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Abstract

The mean value of rectal temperature for Barbari, Jamnapari, Sirohi, Osmanabadi & Local breeds of goat were 100.96 ± 0.139 , 101.40 ± 0.192 , 101.03 ± 0.091 , 101.14 ± 0.105 , & $101.02 \pm 0.235^{\circ}\text{F}$ respectively. Analysis of variance revealed non-significant effect of rectal temperature between breed were observed. The correlation coefficient revealed rectal temperature to positively significant and correlated with respiration rate in all breed except Sirohi (-0.101) where as it was observed non-significant and in negative direction. Rectal temperature was non-significant co-relate with pulse rate in positive direction in Barbari (0.356), Osmanabadi (0.168) & in negative direction in Sirohi (-0.694) breed of goat. The correlation coefficient revealed rectal temperature to significant correlated with IHTC in Barbari (-0.995), Jamnapari (-1.002) and Local (-1.001) whereas non significant correlated in Sirohi (0.153) and Osmanabadi (-0.121) in negative direction, highly negative significant correlation was observed between rectal temperature and IHTC except for Osmanabadi and Sirohi where it was negative but non-significant. Thus the rectal temperature of different breed appeared to be stable characteristic which did not change with breed.

Keywords: Heat tolerance ability, different breeds, rectal temperature

Introduction

In India goats are reared in small flocks by the small and marginal farmer for uplifting their socio- economic condition. Factor like rectal temperature, respiration and pulse rate also contribute significantly to the maintenance of goat rearing. Comparative heat tolerance of various breeds of goat have not been investigated to larger extend. This aspect will help in cross- breeding program of goat in order to develop breed most suitable to arid and semiarid climate of Vidarbha endowed with high production potential. It is well established that heat tolerant is hereditary nature in goats. Adequate genetic variability exists for heat tolerance in various goat breeds (Kumar *et al.* 1990; Mittal 1992, 1993, Kumar P1994, Singh Khub and Saxena 1995) [3, 5, 6, 4, 9].

Materials and Methods

A total of 125 healthy goats, 25 each of Barbari, Jamnapari, Osmanabadi, Sirohi and local breed (of both the sexes) where utilized for the present investigations. These animals (aged $1\frac{1}{2}$ to 3 years) were maintained at Shivaji Estate livestock farm (SELF) (pvt) Ltd. Chargaon, Nagpur.

Daily weather components comprising maximum and minimum temperature ($^{\circ}\text{C}$) and morning and evening relative humidity (%) were recorded from meteorological laboratory office of the Extra ASSTT Director farm College of Agriculture, Nagpur.

Weekly and overall means and standard errors of rectal temperature were worked out.

The data thus obtained was utilized for numerically quantitating the Iberia heat tolerance coefficient (IHTC) and Benezera Coefficient of Adaptability (BCA) for all the breeds following the equations formulated by Rhoad (1944) [8] and Benezera (1954) [1]. The original formulae basically developed for cattle by this worker slightly modifying for goats by putting the value of normal rectal temperature and pulse rate of Indian goats under most favourable conditions as 39.44°C (103.0°F) and 24 Breaths/minutes (JINDAL, 1984) [1].

1) Iberia heat tolerance coefficient (IHTC) (Rhoad, 1944) [8]

$$\text{IHTC} = 100 - 1(\text{BT} - 103)$$

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- 2) Benezera coefficient of adaptability (BCA) (Benezera, 1954) ^[1]

$$BCA = B.T/39.44 + N.R/24$$

Data obtained for all the physiological responses and heat tolerance. Indices subjected to statistical analysis (Snedecor and Cochran, 1967) ^[10].

Result and Discussion

The mean value of rectal temperature for Barbari, Jamnapari, Sirohi, Osmanabadi and Local breeds of goats were 100.96 ± 0.139°F, 101.40 ± 0.192°F, 101.03 ± 0.091°F, 101.1 ± 0.165°F and 101.0235 °F respectively. The respiration rate were recorded as 34.063 ± 1.80, 30.68 ± 1.123, 28.21 ± 0.526, 28.21 ± 1.60, 22.6 ± 20.906 breaths/minute respectively where as pulse rate recorded were 76.43 ± 0.602, 79.26 ± 1.21, 80.80 ± 0.506, 76.81 ± 0.196 and 72.60 ± 0.46 breath/ minute for Barbari, Jamnapari, Sirohi, Osmanabadi and local breeds of goat respectively as per table no. 1 The correlation coefficient revealed rectal temperature is positively significant and correlated with respiration rate in all breed except Sirohi (-0.101) where it was observed non-significant and in negative direction. Rectal temperature was non-significantly correlated with pulse rate in positive direction in Barbari (0.356), Osmanabadi (0.168) and in negative direction Sirohi (-0.096), local (-0.337) where as positively significant correlation was observed in Jamnapari (0.694) breed of goat the correlation coefficient revealed rectal temperature to significantly correlated with IHTC in Barbari (0.995), Jamnapari (-1.002)

and Local (-1.001) where as non-significant correlated in Sirohi (0.153) and Osmanabadi (-0.121) in negative direction. Highly negative significant correlation was observed between rectal temperature and BHTC expect for Osmanabadi and Sirohi it was negative but nonsignificant as per (table no.2) the rectal temperature of different breeds appeared to be stable characteristics which did not change with breed.

The various breed studied in the experiment have been in these in environment for up word of three years and fact that there was little difference in their rectal temperature is and indication they have been acclimatized. High significant positive correlation has been observed between rectal temperature with that of BCA and environmental temperature except for Sirohi breed where these were in significantly low and negative in magnitude. Negatively high significant correlation between rectal temperature and humidity was noticed for Sirohi goat (as per table No.2).

Table 1: The correlation coefficient revealed rectal temperature is positively significant and correlated with respiration rate in all breed except Sirohi (-0.101) where it was observed non-significant and in negative direction.

Parameter Breed	RT	RR	PR	IHTC	BLA
Barbari	100.96	34.063	76.43	120.33	2.40
Jamnapari	101.40	30.68	79.26	116.074	2.26
Surti	101.03	28.21	80.80	119.72	2.15
Osmanabadi	101.14	28.21	76.81	118.61	2.14
Local	101.02	22.62	72.66	118.54	1.92

Table 2: Correlation coefficient between climatologically parameters and heat tolerance indices.

Name of Breed	RR	PR	IHTC	BCA	Environmental Temperature	Humidity
Barbari	0.761**	0.356	-0.995	0.776**	0.617**	0.176
Jamnapari	0.909**	0.694**	-1.002**	0.920**	0.738**	0.003
Surti	-0.101	-0.096	-0.153	-0.034	0.208	-0.671**
Osmanabadi	0.653**	0.168	-0.121	0.672**	0.684**	0.182
Local	0.935**	-0.337	-1.001**	0.943**	0.565*	0.304

(P<0.05)(R<0.01)

Thus the rectal temperature of different breeds appeared to be stable characteristic which did not change with breeds. Hence selection of goat with high tolerance to a thermal stress primary important as basis for future development of goat industry in hot climate.

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