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HAEMATOLOGICAL STUDIES IN TELLICHERRY GOATS

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Cellular and biochemical parameters of blood reflect the health and physiological status of an animal. The type of management and other physiological conditions like age, breed, sex, pregnancy and lactation can alter the above mentioned parameters. Except for the haematological values of adult female goats reported by Krishnan and Viswanathan (1965), no other work is available on any of the South Indian breeds of goats regarding haematological values under different managemental conditions and physiological status. Therefore this work was undertaken to establish the normal haematological values of Tellicherry goats under different managemental conditions and physiological status.

Materials and methods

Erythrocyte and leucocyte values were determined in a total of 135 semi-intensively reared and 15 intensively reared Tellicherry goats under ideal farm conditions and 44 non-descript goats of both sexes brought to slaughter house.

The following treatment wise study was carried out:

1. The influence of age on erythrocytic and leucocytic values was studied in 94 goats, reared under semi-intensive management, which were grouped as 0 to 2 m age (20 nos.), 2 to 6 m age (19 nos.), 6 to 12 m age (14 nos.) and above 12 m age or adults (41 nos.).

2. The effect of different physiological status on erythrocytic and leucocytic counts was studied in 41 goats, reared semi-intensively which were categorised as pregnant (10 nos.), lactating (11 nos.) and dry (20 nos.) goats.

3. All the above mentioned 41 goats, under semi-intensive management were compared with 15 nos. of intensively reared goats to study the effect of management and with 44 nos. of non-descript goats to study the effect of breed on erythrocytic and leucocytic values.

4. The influence of sex within each group was also analysed.

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Three ml. of blood was collected from the jugular vein in vials containing heparin (5000 Iu per ml of blood) and blood smears were prepared. The blood samples were analysed for haemoglobin concentration, RBC count, WBC count and haematocrit values and the smears for differential leucocytic count. RBC and WBC counts were done as per the standard methods described by Schalm *et al.* (1975), PCV was estimated by Wintrobe's microhaematocrit method and differential leucocytic count was carried out using Leishman's stain, as per the standard procedures. Haemoglobin content was estimated by cyanmethaemoglobin method as suggested by Van Kampen and Tijlstra (1965).

Results and discussion

I Age

Values for Hb content, RBC, PCV, WBC, neutrophils and lymhpocyte counts increased with age in younger stock, reached the maximum at 6-12 m age and then declined to attain the adult values (Table 1). This finding in Tellicherry goats completely agrees with the reports of Holman and Dew (1965), Sharma *et al.* (1973), Ghosh *et al.* (1981) and Prasad *et al.* (1988). Eosinophil and monocyte counts increased with age as observed by Wilkins and Hodges (1962).

Increasing values of PCV, RBC and Hb with age in younger animals indicate that the physiological demands during growth phase is greater. The reason for higher leucocytic counts in younger animals may be due to stress against infections and vaccinations, which requires increased synthesis of antibodies during critical age.

II Sex and breed

It was found that in adult Tellicherry goats, male animals possessed significantly higher erythrocytic values than females similar to the reports of Vaidya *et al.* (1979) and Pospisil *et al.* (1987)., probably due to the effect of testosterone which has erythroid stimulating activity leading to higher RBC count and concurrent increase in PCV and Hb content (Table 2).

It was observed that Tellicherry goats had significantly higher Hb content, PCV and leucocytic values than non-descript goats and the probable reason for this superiority of Tellicherry breed over non-descript goats may be due to better plane of nutrition and better managemental conditions in the farms (Table 3).

III Managemental conditions

Tellicherry goats reared under intensive system exhibited significantly higher values for RBC count and PCV when compared to semi-intensively reared goats (Table 4), probably due to better plane of nutrition.

IV Physiological status

Results revealed that pregnant goats possessed significantly higher erythrocytic values than dry and lactating goats (Table 5), as reported by Oduye (1976). The physiological need of the pregnant animal is increased to meet the growing demands of the developing foetus and increased blood volume in animals during pregnancy, resulted in higher RBC, PCV and Hb content.

Table 1 Erythrocytic and leucocytic values in different age groups of Tellicherry goats (Mean ± SE)

Age group	H (g/dl)	RBC 10^6 (x10 / ccm)	PCV (%)	WBC 10^9 (x10 / l)	Neutrophils 10^9 (x10 / 1)	Lymphocytes 10^9 (x10 / l)	Eosinophils 10^9 (x10 / l)	Monocytes 10^9 (x10 / l)
0 - 2m (20)	$8.55^{a} \pm 0.22$	$9.66^{a} \pm 0.18$	$24.45^{a} \pm 0.44$	$90.06^{a} \pm 0.20$	$4.93^{a} \pm 0.17$	$393^{a} \pm 0.11$	$0.10^{a} \pm 0.02$	$0.19^{a} \pm 0.02$
2 - 6m (19)	$9.92^{a} \pm 0.21$	$14.02^{b} \pm 0.22$	$30.53^{b} \pm 0.66$	$11.61^{b} \pm 0.22$	$5.70^{a} \pm 0.16$	$5.50^{b} \pm 0.18$	$0.31^{b} \pm 0.05$	$0.10^{a} \pm 0.02$
6 12 m (14)	$10.59^{b} \pm 0.17$	$16.03^{c} \pm 0.18$	$33.00^{c} \pm 0.54$	$14.53^{c} \pm 0.33$	$6.73^{b} \pm 0.17$	$7.18^{c} \pm 0.28$	$0.44^{b} \pm 0.06$	$0.18^{b} \pm 0.03$
>12 m (adult) (41)	$9.87^{a} \pm 0.13$	$14.12^{b} \pm 0.14$	$27.44^{b} \pm 0.40$	$11.80^{b} \pm 0.21$	$5.28^{a} \pm 0.12$	$5.82^{a} \pm 0.12$	$0.51^{c} \pm 0.04$	$0.19^{b} \pm 0.03$

Mean having different superscripts differ significantly ($P < 0.05$). Values in parenthesis indicate the number of animals

Table 2 Erythrocytic and leucocytic values in male and female Tellicherry goats of different age group (Mean ± SE)

Age group	Sex	H (g/dl)	RBC 6 (x10 / ccm)	PCV (%)	WBC 9 (x10 / l)	Neutrophils 9 (x10 / l)	Lymphocytes 9 (x10 / l)	Eosinophils 9 (x10 / l)	Monocytes 9 (x10 / l)
0 - 2m (20)	Male (10)	8.43^{a} ± 0.41	9.51^{a} ± 0.32	23.90^{a} ± 0.75	9.10^{a} ± 0.25	4.91^{a} ± 0.30	4.01^{a} ± 0.20	0.09^{a} ± 0.03	0.09^{a} ± 0.04
	Female (10)	8.66^{a} ± 0.19	9.80^{a} ± 0.20	25.20^{a} ± 0.42	9.03^{a} ± 0.36	4.94^{a} ± 0.20	3.88^{a} ± 0.10	0.10^{a} ± 0.10	0.11^{a} ± 0.03
2 - 6m (19)	Male (10)	9.75^{a} ± 0.24	13.94^{a} ± 0.31	30.20^{a} ± 0.83	12.09^{a} ± 0.32	5.49^{a} ± 0.20	5.27^{a} ± 0.30	0.37^{a} ± 0.10	0.04^{a} ± 0.02
	Female (9)	10.10^{a} ± 0.36	14.11^{a} ± 0.34	30.00^{a} ± 1.41	11.17^{a} ± 0.26	5.92^{qa} ± 0.20	5.76^{a} ± 0.30	0.29^{a} ± 0.10	0.12^{a} ± 0.04
6 12 m (14)	Male (7)	10.51^{a} ± 0.30	15.89^{a} ± 0.27	32.57^{a} ± 1.04	14.64^{a} ± 0.45	6.28^{a} ± 0.20	7.53^{a} ± 0.50	0.38^{a} ± 0.10	0.20^{a} ± 0.10
	Female (7)	10.67^{a} ± 0.19	16.17^{a} ± 0.27	33.43^{a} ± 0.48	14.41^{a} ± 0.20	6.82^{a} ± 0.30	7.19^{a} ± 0.20	0.48^{a} ± 0.10	0.16^{a} ± 0.04
>12 m (adult) (41)	Male (18)	10.13^{a} ± 0.17	14.12^{a} ± 0.17	28.56^{a} ± 0.41	11.57^{a} ± 0.30	5.12^{a} ± 0.20	5.67^{a} ± 0.20	0.54^{a} ± 0.10	0.24^{a} ± 0.05
	Female (23)	9.77^{a} ± 0.18	14.11^{a} ± 0.22	26.60^{b} ± 0.60	12.14^{a} ± 0.28	5.32^{a} ± 0.20	6.15^{a} ± 0.20	0.50^{a} ± 0.04	0.17^{a} ± 0.04

Mean having different superscripts differ significantly (P< 0.05). Values in paranthesis indicates the number of animals

Table 3 Erythrocytic and leucocytic values in non-descript and Tellicherry goats (Mean ± SE)

Age group	H (g/dl)	RBC 10^6 (x10 / ccm)	PCV (%)	WBC 10^9 (x10 / l)	Neutrophils 10^9 (x10 / l)	Lymphocytes 10^9 (x10 / l)	Eosinophils 10^9 (x10 / l)	Monocytes 10^9 (x10 / l)
Tellicherry (41)	$9.87^a \pm 0.13$	$14.12^a \pm 0.14$	$27.44^a \pm 0.40$	$11.80^a \pm 0.21$	$5.28^a \pm 0.21$	$5.82^a \pm 0.12$	$0.51^a \pm 0.04$	$0.19^a \pm 0.03$
Non-descript	$9.20^b \pm 0.16$	$13.88^a \pm 0.18$	$13.88^a \pm 0.49$	$10.65^b \pm 0.27$	$4.54^b \pm 0.13$	$5.73^a \pm 0.18$	$0.22^b \pm 0.02$	$0.16^a \pm 0.02$

Mean having different superscripts differ significantly ($P < 0.05$). Values in parenthesis indicate the number of animals

Table 4 Erythrocytic and leucocytic values under different management systems in Tellicherry goats (Mean ± SE)

Age group	H (g/dl)	RBC 10^6 (x10 / ccm)	PCV (%)	WBC 10^9 (x10 / l)	Neutrophils 10^9 (x10 / l)	Lymphocytes 10^9 (x10 / l)	Eosinophils 10^9 (x10 / l)	Monocytes 10^9 (x10 / l)
Tellicherry (41)	$9.69^{a} \pm 0.17$	$15.03^{1} \pm 0.15$	$29.07^{a} \pm 0.50$	$12.44^{a} \pm 0.26$	$5.62^{a} \pm 0.19$	$6.08^{a} \pm 0.16$	$0.45^{a} \pm 0.05$	$0.29^{a} \pm 0.04$
Non-descript	$9.87^{a} \pm 0.13$	$14.12^{b} \pm 0.14$	$27.44^{b} \pm 0.40$	$11.80^{a} \pm 0.21$	$5.28^{a} \pm 0.12$	$5.82^{a} \pm 0.12$	$0.51^{a} \pm 0.04$	$0.19^{a} \pm 0.03$

Mean having different superscripts differ significantly ($P < 0.05$). Values in parenthesis indicate the number of animals

Table 5 Erythrocytic and leucocytic values in pregnant, lactating and dry in Tellicherry goats (Mean ± SE)

Group	H (g/dl)	RBC 10^6 (x10 / ccm)	PCV (%)	WBC 10^9 (x10 / l)	Neutrophils 10^9 (x10 / l)	Lymphocytes 10^9 (x10 / l)	Eosinophils 10^9 (x10 / l)	Monocytes 10^9 (x10 / l)
Pregnant	$10.41^a \pm 0.11$	$14.71^a \pm 0.10$	$29.70^a \pm 0.26$	$10.28^a \pm 0.45$	$4.59^a \pm 0.20$	$5.22^a \pm 0.30$	$0.35^a \pm 0.10$	$0.12^a \pm 0.04$
Lactating (11)	$9.04^b \pm 0.18$	$13.90^b \pm 0.21$	$25.09^b \pm 0.37$	$13.20^b \pm 0.19$	$6.96^b \pm 0.20$	$5.59^b \pm 0.10$	$0.45^b \pm 0.10$	$0.20^b \pm 0.04$
Dry	$9.84^c \pm 0.18$	$13.94^c \pm 0.22$	$26.60^b \pm 0.60$	$12.14^c \pm 0.28$	$5.12^c \pm 0.20$	$6.15^c \pm 0.20$	$0.61^c \pm 0.04$	$0.26^c \pm 0.04$

Mean having different superscripts differ significantly ($P < 0.05$). Values in parenthesis indicate the number of animals

It was also observed that lactating goats possessed lower values for Hb content, RBC, PCV and lymphocytic count as reported by Elnouty *et al.* (1984) and increased WBC and neutrophilic count than dry and pregnant goats. This was attributed to the effect of increased glucocorticoid level during lactation, which specifically is known to increase the total WBC count by increasing the number of neutrophils while decreasing the number of lymphocytes in circulation.

Summary

A total of 150 Tellicherry goats and 44 non-descript goats were screened to study the influence of age, sex, breed, type of management and physiological status like pregnancy and lactation on erythrocytic and leucocytic values. Growing goats in the age group of 6 to 12 months showed significantly higher erythrocytic values than adults and still younger stock. Adult male goats as well as intensively reared goats had higher erythrocytic values than adult female goats and semi-intensively reared ones. Tellicherry goats showed significantly higher haematological values than non-descript goats. Pregnant goats possessed higher erythrocytic values where as lactating goats showed increased leucocytic values.

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