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Blood profile of Assam hill goat in different ages

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Abstract
Goat is one of the most important species in livestock industry. Literature pertaining to the estimation of different hematological parameters are very scanty in general and almost not available in Assam hill goat in particular, hence the present investigation was carried out to establish a baseline on different hematological parameters *viz.* hemoglobin (Hb), Total leucocyte count (TLC), Total erythrocyte count (TEC) and packed cell volume (PCV) of Assam hill goat at various age groups viz. day old, 3 month and 6 month. Eighteen (18) numbers of goats divided into 3 (three) groups, consisting of 6 animals in each group according to their age were utilized for the present study. The hemoglobin level was found to be decreased from day old to 6 months age groups. The average hemoglobin level in day old, 3 months and 6 months age group were 9.45±0.30, 8.37±0.14, and 8.13±0.32 gm respectively. The TLC level was found to be increased from day old to 3 months old age group and thereafter it showed a decrease value at 6 months old age group. The average TLC level in day old, 3 months and 6 months were found to be 13.19±1.41, 22.49±1.34and 16.59±0.93 Th./cmm respectively. The TEC level was found to be increased from day old to 6 months age group. The average TEC level in day old, 3 months and 6 months age groups were 9.71±0.31, 14.48±0.76 and 14.81±0.51 m/cmm. Respectively. The PCV level was found to be decreased from day old to 3 months age groups and thereafter it showed a increased level at 6 months old age group. The average values of PCV in day old, 3 months and 6 months age groups were 33.65 ± 0.93%, 23.28±1.58% and 24.55±1.37% respectively.

Keywords: Age, hemoglobin (Hb), total leucocyte count (TLC), total erythrocyte count (TEC) and packed cell volume (PCV) Assam hill goat

Introduction
Goats are considered as "poor Man's cow" because it can support the livelihood of poor farmer who are not able to bear the cost of a cow having the same benefit as that of cow with minimum initial investment. Goats plays a major role in the socio-economic development of rural people of India particularly for small and marginal farmers and landless labours due to its short generation interval, higher rate of prolificacy and low initial investment. In the present study Assam hill goat has been therefore taken as an animal of choice considering its economic importance and large population in this state. Although scientific study of various aspects of Assam hill goat has been conducted, but no systemic study of different hematological parameters *viz.* hemoglobin (Hb), Total leucocyte count (TLC), Total erythrocyte count (TEC) and packed cell volume (PCV) of Assam hill goat has conducted so far. In the present investigation an attempt is made to elucidate this aspect of life science with an objective of to investigate different blood parameters of Assam hill goat at different ages of development.

Ethical approval
The prior approval from the institutional Animal Ethical committee was obtained for collection of the blood sample from animal used for the present study. Experiments should be carried out in accordance with the guidelines laid down by the international animal Ethics Committee or institutional ethics committee and in accordance with local laws and regulation.

Material and Methods: Experimental Animal
The present study was conducted in eighteen healthy goat of different age groups viz day old, 3 month and 6 month comprising six animals in each group (irrespective of sex). The animals were procured from in and around Guwahati city. The animals were utilized in the following manner for assessing different parameters as illustrated in the table 1.

Table 1: Numbers of Animals and Their Groups as Per Age Used In the Experiment

Group	Age group	Numbers of animals
Group 1	Day old	6
Group 2	3month	6
Group 3	6 month	6
Total		18

Collection of sample

For hematological estimation 5-10 ml of blood were collected from each animals and transferred to sterilized test tube containing EDTA for hematological study viz. Hemoglobin (Hb), Total leucocyte count (TLC), Total erythrocyte count (TEC) and Packed cell volume (PCV) estimation. The analysis were done in Auto Hemo Analyzer, MS4e.

Statistical Analysis

The obtained results were analyzed by standard statistical methods advocated by Snedecor and Cochran (1994).

Result and Discussion

Hemoglobin (Hb): The average hemoglobin (Hb) level in Assam hill goat for all the age groups are shown in the table 2and ANOVA in table 3.The hemoglobin level was found to be decreased from day old to 6 months age groups. The average hemoglobin level in day old, 3 months and 6 months age group were 9.45±0.30, 8.37±0.14and 8.13±0.32 gm% respectively. There was highly significant difference (P<.01) between age groups I and II and also between I and III but there was no significance difference found between age group II and III in Hb level.

Nangia *et al.* (1968) [7] reported that the mean Hb level as 8.0, 7.0, 7.4, 7.0,6.5 and 7.0 g/dl at 0-6,6-12 months, 1 to 2, 2-3, 3-4 and 4-5 years of age in Beetal goat. Bhargava (1980) [1] carried out a study on hematology in Marwari breeds of goat and observed the Hb level as 10.09 gm/dl. Pyne *et al.* (1982) [10] carried out a study on hematology of healthy Black Bengal goat and reported mean value of Hb as 9.98±0.56 g /dl. Rastogi and Singh (1990) [11] reported the Hb content of mountain Gaddi goats to range from 10-12 g/dl with an average of 11.1±0.72 g/dl. The slight variation of Hb level in the present investigation might be due to age and breed variation which affect the process of erythropoiesis.

Table 2: Showing Hemoglobin (Hb) Level in Assam *Hill Goat* at Different Age Groups

Age group	Hemoglobin (gm %)
Day old (I)	9.45±0.30[a]
3 Months (II)	8.37±0.14[b]
6 Months (III)	8.13±0.32[b]

Means with different superscripts differ significantly

Table 3: Analysis Of Variance Tablefor Hemoglobin Level in Assam *Hill Goat* at Different Age Groups

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Group	2	5.92333333	2.96166667	7.07**	0.0069
Error	15	6.28166667	0.41877778		
Total	17	12.20500000			

*Significant at 5% (.05),
**significant at 1% (.01)

Total Leucocyte count (TLC): The average total leucocyte count of Assam hill goat for all the three age groups are shown in the table. 4 and ANOVA in table 5. The TLC level was found to be increased from day old to 3 months old age group and thereafter it showed a decrease value at 6 months old age group. The average TLC level in day old, 3 months and 6 months were found to be 13.19±1.41, 22.49±1.34and 16.59±0.93 Th./cmm respectively. There was highly significant difference (P<0.01) between age group I and II and also between II and III while there was no significance difference between age group I and III in TLC level.

Similar observation were also made by Nwiyi *et al.* (2000) [8] and concluded that goat showed high number of WBC in the first few months of life. According to them tropical environments are known to be favorable for parasites and high WBC counts in the young ruminants may probably due to environmental disposition. However, Pyne *et al.* (1982) [10] carried out a research on hematology of healthy Black Bengal goat and reported mean value of TLC as 10.18±28 thousands per cmm. Kanti Biswas (2001) reported that the mean Total Leucocyte Count (TLC) of Black Bengal goats under field conditions was obtained to be 10.016±0.030 th/cmm. Bhargava (1980) [1] carried out a study on hematology in Marwari breeds of goat and observed the WBC value as 10.14 th/cmm. In the present investigation the higher value of TLC may be due to age and breed variation and stress related to environment.

Table 4: Showing Total Leucocyte Count (Tlc) Level In Assam *Hill Goat* At Different Age Groups

Age group	Total leucocyte count (Th./cmm)
Day old (I)	13.19±1.41[a]
3 Months (II)	22.49±1.34[b]
6 Months (III)	16.59±0.93[a]

Means with different superscripts differ significantly

Table 5: Analysis Of Variance Tablefor Total Leucocytic Count in Assam *Hill Goat* at Different Age Groups

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Group	2	265.6353444	132.8176722	14.32**	0.0003
Error	15	139.1684833	9.2778989		
Total	17	404.8038278			

*Significant at 5% (.05),
**significant at 1% (.01)

Total Erythrocyte Count (TEC): The average total erythrocyte count of Assam hill goat for all the age groups were showed in the table 6 and ANOVA in table 7. The TEC level was found to be increased from day old to 6 months age group. The average TEC level in day old, 3 months and 6 months age groups were 9.71±0.31, 14.48±0.76 and 14.81±0.51 m/cmm. Respectively. There was highly significant difference (P<0.01) between age group I and II and also between I and III, however there was no significance difference between age group II and III in blood TEC level.

Similar observation was also made by Holman and Dew (1965) [6] where they mentioned that after 3 month of age on male goat found to have a higher RBC count. Bhargava (1980) [1] carried out a study on hematology in Marwari breed of goats and observed the RBC count as 10.12 million/cmm. Pyne *et al.* (1982) [10] carried out a research on hematology of healthy Black Bengal goat and reported mean value of TEC level was found to be increased from day old to 6 month age group.

Gill and Mishra (1972) [5] studied some of the blood constituent characters of the Beetal goats and reported the TEC value as 11.40x106/cmm. Dey Sarkar (1974) [4] recorded total erythrocyte count (TEC) of goat to be highest among other domestic animals. Patra (1981) [9] estimated the TEC

value as (10^6 /cmm): 11.32± 0.41. Das *et al.* (1992) [3] estimated the hematological profile during the pre and post weaning age of Assam hill kids. The level of TEC values decreased significantly (P<0.01) during post weaning period in comparison to pre weaning period. The slight variation of TEC in the present investigation might be due to variation in age and breed, which affect the erythropoiesis

Table 6: Showing Total Erythrocyte Count (Tec) In Assam *Hill Goat* at Different Age Groups

Age group	Total Erythrocyte count(million/cmm))
Day old (I)	9.71±0.31[a]
3 Months (II)	14.48±0.76[b]
6 Months (III)	14.81±0.51[b]

Means with different superscripts differ significantly

Table 7: Analysis Of Variance Table for Total Erythrocyte Count in Assam *Hill Goat* at Different Age Groups

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Group	2	97.7140111	48.8570056	26.17**	<.0001
Error	15	28.0035000	1.8669000		
Total	17	125.7175111			

*Significant at 5% (.05),
** Significant at 1% (.01)

Packed Cell Volume (PCV): The average packed cell volume of Assam hill goat for all the three age groups were showed in the table. 8and ANOVA in 9. The PCV level was found to be decreased from day old to 3 months age groups and thereafter it showed a increased level at 6 months old age group. The average values of PCV in day old, 3 months and 6 months age groups were 33.65 ± 0.93%, 23.28±1.58% and 24.55±1.37% respectively. There was highly significant difference (P<0.0001) between group I and II and also between group I and III, however there was no significant difference found between group II and III.

However, Nangia *et al.* (1968) [7] reported that mean PCV value as 27.9, 24.3, 22.6, 25.5, 21.9 and 24.3% at 0-6, 6-12 months, 1 to 2, 2-3, 3-4 and 4-5 years of age in Beetal breed of goat. Bhargava (1980) [1] carried out a study on hematology in Marwari breed of goats and observed the PCV as 37.96%. Holman and Dew (1965) [6] observed a changing pattern of PCV with age, which shows three phages. At first a fall during first month, then a rise to the 3rd month and again a fall to the mature level at 30 month. Their findings was in agreement with the present investigation. Das *et al.* (1992) [3] estimated the hematological profile during the pre and post weaning age of Assam hill kids. The level PCV values decreased significantly (P<0.01) during post weaning period in comparision to pre weaning period. The slight variation of the PCV value in the present investigation might be due to age and breed variation.

Table 8: Showing Pack Cell Volume (Pcv) Level in Assam *Hill Goat* at Different Age Groups

Age group	Pack Cell Volume (%)
Day old (I)	33.65±0.93[a]
3 Months (II)	23.28±1.58[b]
6 Months (III)	24.55±1.37[b]

Means with different superscripts differ significantly

Table 9: Analysis Of Variance Tablefor Pack Cell Volume in Assam *Hill Goat* at Different Age Groups

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Group	2	383.7644444	191.8822222	18.32**	<.0001
Error	15	157.1183333	10.4745556		
Total	17	540.8827778			

*Significant at 5% (.05),
** Significant at 1% (.01)

Conclusion

It can be concluded that the blood profile of Assam Hill Goat changes with increaing age. The data generated can be used as a baseline for further research in Assam Hill goat.

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