



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(5): 477-480

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Received: 23-07-2018

Accepted: 25-08-2018

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## Studies on overall prevalence of anaemia in goats with special reference to parasitic infections associated with it

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**Abstract**

Overall prevalence of anaemia was noticed as 27.73% in goats. There was high prevalence of anaemia recorded in anaemic goats of the age group 7-12 month and it was high in winter season of the year. The prevalence of parasitism in anaemia was found (77.46%). Prominent parasitic infections detected in faecal examination were Strongyle spp. (68.81% cases) followed by *Trichuris spp.* (0.72%) and *Eimeria spp.* (0.54%) individually and mixed infections (25.45%). On the basis EPG, it can be concluded that low grade parasitic infections (80%) were high than that of high grade parasitic infection (20%). Correlation of EPG with certain haematological and biochemical parameters revealed that there was significant correlation of EPG with the parameters such as serum calcium and phosphorus levels, whereas non-significant positive correlation was observed with the parameters such as TEC and MCHC. Also there was non-significant negative correlation with the parameters Hb, PCV, MCV, serum glucose and serum Total protein in the present study.

**Keywords:** Prevalence, parasitism, anaemia, EPG

**Introduction**

Goat rearing is a common practice in India. Goats are largely reared by poor people and landless-labors and they greatly contribute to their livelihood and economy.

Goat is considered as poor man's cow, a multipurpose animal providing meat, milk, hide, hair (fur). In India over 20.5 million people, of which about two third of rural peoples, partially or completely dependent on livestock for their livelihood. India ranks second in goat population having 135.2 million goats and in Maharashtra the Goat Population is 84.35 lakh [9]. In India, many scientists reported the incidence of anaemia in goats from 35% [18] to 65.13% [10]. Due to improper management (no proper deworming) unhygienic farm conditions, Indian goats usually suffer from GI tract infections-mostly parasitic one. Parasitism in goat is a major problem causing emaciation, anaemia, weakness, oedema (due to hypoproteinaemia) diarrhoea (leading to dehydration) and death. Parasitic infection ranges from acute disease frequently with high rates of mortality and premature culling to subclinical infections, where goat may appear relatively managemental healthy but perform below their potential. In broader sense, the factors dictating the level and extent of parasitism are climate, managemental conditions of pasture and animals and the population dynamics of the parasites within the host and external environment. Parasitic infections of goats are major factors responsible for economic losses through reduction in productivity and increased mortality. Parasites cause the animals to be unthrifty which may include the loss of weight, low birth weights and difficulty in kidding. Considering the status of anaemia clinical cases of goats in present study has been conducted with following objectives to study overall prevalence of anaemia in goats with special reference to parasitism.

**Materials and Methods**

Total 256 goats presented to TVCC college of Veterinary and Animal Sciences, Parbhani were screened for anaemia out of which 71 were found positive for anaemia symptoms were selected for further study. Overall prevalence is number of goats screened out of which number of positive cases was calculated. Prevalence of Clinical cases was further classified into Age-wise (0-6 months, 07-12 months, and above 12 months), breed-wise (Osmanabadi, Non-Descript) gender-wise (male and female) and Season-wise (winter, summer, Monsoon)

seasons was defined as per WMO norms for Marathwada region [17] and as Summer 5<sup>th</sup> March- 3<sup>rd</sup> June, Monsoon 4<sup>th</sup> June to 4 November and Winter-5<sup>th</sup> November to 4<sup>th</sup> March. Cases studied in a period between November, 2017 to June, 2018 (71 cases) were later divided into three seasons.

The faecal samples collected from directly rectum of were subjected for microscopic examination faecal materials processed by Flotation and sedimentation methods for morphological identification of eggs [11]. For judging the intensity of parasitic infection, the collected samples were processed further to determine the eggs per gm of faecal sediment (EPG). The EPG was determined by using Modified Stoll's dilution method.

**Statistical Method**

Data generated was analyzed statistically to find the level of significance by Chi-square test [13] was employed for analysis of prevalence of anaemia (age, sex, season and breed). Correlation analysis for EPG, haematological parameters and biochemical parameters of anaemic goats was applied

**Results and Discussion**

Clinical cases of goats admitted to TVCC Polyclinic, College of Veterinary and Animal Sciences, Parbhani during period of

study (November, 2017 to July, 2018) were considered for this study. Total 256 goats were screened, out of which 71 (27.73%) were found anaemic (Table-1).

In India, many scientists reported the incidence of anaemia in goats from 35% [18] to 65.13% [10]. Similarly, in Marathwada area of Maharashtra, few workers reported goat anaemia ranging from 15.38% to 48% [4]. Overall prevalence of 27.73% recorded in the present study was found in agreement with the earlier studies conducted in Marathwada region of Maharashtra.

**Age-Wise Prevalence of Anaemia**

On applying chi-square analysis to age-wise prevalence of anaemia, it was found non-significant. Further, the percentage of prevalence of anaemia when calculated (Table-2), it was highest in the age group 7-12 months and lowest in the age group above 12 months in goats. Most of the authors recorded highest incidence of anaemia in the age group 6 months to 1 year [5, 7, 10, 12, 14, 15]. Whereas one author recorded highest incidence of anaemia in the age group above 36 months 28.6% [8]. Findings of present study of highest incidence of anaemia in the age group of 7-12 months of goat are in accordance to earlier reports.

**Table 1:** Overall prevalence and details of goats screened during study at TVCC, COVAS, Parbhani.

Season	Month	No. of goats screened during study at TVCC, College of Veterinary & Animal Sciences, Parbhani	No. of goat positive for anaemia
Winter	Nov.	28	06
	Dec.	40	11
	Jan.	35	12
	Feb.	27	11
Total		130 (100%)	40 (30.76%)
Summer	March	32	10
	April	20	08
	May	24	04
	June	21	05
Total		97(100%)	27(27.78%)
Monsoon	July	29	04
Total		29	04
Grand Total		256 (100%)	71 (27.73%)

**Table 2:** Age-wise prevalence of anaemia in goats

Total No. of anaemic cases 71 (100%)			
Age	% of prevalence	X <sup>2</sup>	Statistics
0-6 month	19 (26.76%)	0.25	NS
7-12 month	30 (42.25%)	2.10	
Above 12 month	22 (30.98%)	0.49	
Total	71	2.84	

**Table 5:** Season- wise Prevalence of anaemia.

Total No. of anaemic cases 71 (100%)			
		X <sup>2</sup>	Statistics
Winter	40 (56.33)	2.03	NS
Summer	27 (30.98)	0.00	
Monsoon	04(12.67)	0.43	
Total	71	2.46	

**Table 3:** Breed-wise prevalence of anaemia in goats.

Total no. of anaemic cases 71 (100%)			
Breed	% of prevalence	X <sup>2</sup>	Statistics
Osmanabadi	58 (81.69%)	0.091	NS
Non-Descript	13 (18.31%)	0.004	
Total	71	0.095	

**Table 4:** Gender-wise prevalence of anaemia in goats.

Total No. of anaemic cases 71 (100%)			
Gender	% of prevalence	X <sup>2</sup>	Statistics
Female	55 (77.46)	1.18	NS
Male	16 (22.53)	0.24	
Total	71	1.42	

**Breed-wise prevalence of anaemia**

On applying chi-square analysis to breed-wise prevalence of anaemia (Table-3), it was found non-significant. Further, the percentage of prevalence of anaemia when calculated, highest prevalence of anaemia was recorded in Osmanabadi goats (58 cases, 81.69%) than in Non-descript goats (13 cases, 18.31%). Highest incidence in Non-descript goat was recorded by many authors [5, 12]. in Osmanabadi goats in the Marathwada region of Maharashtra. In the present study, the highest incidence was recorded in Osmanabadi goats than in Non-descript goats. This is probably due to inclusion of more Osmanabadi type of animals in the period of study. Further, Osmanabadi goat is a pride breed of Marathwada (Maharashtra) region and there is increasing trend among the farmers for rearing this dual purpose breed for fetching more profit. Moreover, high

incidence in Black Bengal goats than in indigenous and Jamunapari goats [10], this is probably because Black Bengal breed of goat is preferred by farmers in that region.

**Gender-wise prevalence of anaemia**

On applying chi square analysis to Gender-wise prevalence of anaemia (Table-4), it was found non-significant. Further, the percentage of prevalence of anaemia when calculated, it can be concluded that percentage of anaemia was higher in females 55 cases, 77.46%) than in males 16 cases, 22.53%). Highest incidence recorded in female goats in the present study was found in accordance to earlier reports [6, 10, 15].

**Season-wise prevalence of anaemia**

Season wise prevalence of anaemia is depicted in table 5. On applying chi-square analysis to season-wise prevalence of anaemia, it was non-significant (Table 5). Further, the

percentage of prevalence of anaemia when calculated, there was highest prevalence recorded in winter (56.33%) followed by summer (30.98%) and monsoon (12.67%) season. Earlier reports found [6, 10, 15] contradictory as they recorded highest incidence of anaemia in goats during monsoon season. Whereas, Higher incidence of anaemia in summer months [4]. The findings of present study are not in accordance with these earlier reports. The higher prevalence observed in winter season in the present study could be due to winter stress and high parasitic infections usually observed in winter season in goat.

**Parasitic infections detected by Microscopic examination of faecal sediment**

Out of 71 cases of anaemic goats 55 goats were found positive for parasitic infections (77.46%). It was indicated that parasitism was the major cause of anaemia in goats (Table-6).

**Table 6:** showing EPG (Mean ± SE) & percentages of different parasitic Infections associated with anaemic goats

EPG	No. of cases	Parasite identified	Positive cases	Total cases examined	Percentage (%)
Mean ± SE (642.25 ± 70.81)		a) Individual infection			
		Strongyles spp.	34	55	61.81
EPG > 1000 (High level of infection)	11	<i>Trichuris spp.</i>	04	55	0.72
		<i>Eimeria spp.</i>	03	55	0.54
			41	55	74.55
		b) Mixed infections	14	55	25.45
EPG < 1000 (Low level of infection)	44	Strongyles spp. + <i>Trichuris spp.</i> + <i>Eimeria spp.</i>	03	15	0.50
		Strongyles spp. + <i>Trichuris spp.</i>	10	15	18.18
		Strongyles spp. + <i>Eimeria spp.</i>	01	15	0.18
Total	55		55	55	100

In the present study, infection of Strongyles spp. was found higher in 34 cases (61.81%) followed by *Trichuris spp.* 04 (0.72%) followed by *Eimeria spp* 3 cases (0.54%) and Mixed infections in 14 cases (25.45%).

In mixed infections (3 cases, 0.50%) were of Strongyles spp. along with *Trichuris spp.* and *Eimeria spp.* whereas, in 10 cases (18.18%) mixed infections of Strongyles spp along with *Trichuris spp.* infection was found. In 1 case (0.18%) Strongyles spp and *Eimeria spp.* mixed infection was

detected. The findings of present study are in accordance with earlier reports [2, 3, 16].

**EPG**

It can be concluded from the findings of the present study that there was high grade infection [1] in 11 (20%) cases having EPG >1000 and low grade infection [1] in 44 cases (80%) having EPG<1000.

**Table 7:** Depicts the correlation of EPG with Haematological parameters and biochemical parameters of goats.

	Haematological parameters correlated						Biochemical parameters correlated			
	EPG	Hb	TEC	PCV	MCV	MCHC	Glucose	ST P	Ca*	P*
EPG*	1.000									
Hb	0.182	1.000								
TEC	-0.008	0.122	1.000							
PCV	0.332	0.842	0.158	1.000						
MCV	0.086	0.636	-0.490	0.673	1.000					
MCHC	-0.140	0.650	0.087	0.241	0.259	1.000				
Glucose	0.127	-0.320	-0.181	-0.274	-0.140	-0.031	1.000			
STP	0.007	0.019	-0.238	0.128	0.159	-0.023	0.240	1.000		
Ca	-0.397	-0.257	-0.298	-0.378	-0.030	-0.049	0.184	0.014	1.000	
P	-0.377	-0.235	-0.265	-0.372	-0.115	-0.073	0.024	-0.064	0.446	1.000

\*indicates significant variation with EPG

Correlation of EPG with certain haematological parameters (Hb, PCV, TEC, MCV and MCHC); certain Biochemical parameters (Glucose, Total Protein, Calcium and Phosphorus), when calculated (Table-7) it was found that there was significant correlation of EPG with parameters such as Calcium and phosphorus. This indicates that when serum Ca and P levels reduces, EPG count increases in anaemic

goats. There was non-significant correlation of EPG with the parameters such as TEC and MCHC in the present study. It was also observed that there was non-significant correlation with the parameters such as Hb, PCV, MCV, serum glucose and serum total protein in the present study.

### Summary and Conclusions

It was observed that the overall prevalence of anaemia was found 27.73%. When Chi-square analysis was applied to study age-wise, breed-wise, gender-wise and season-wise study of prevalence of anaemia, there was non-significant correlation between anaemia and all these factors. However, on percentage basis there was high prevalence of anaemia recorded in the age group 7-12 months, high prevalence in Osmanabadi breed and in winter season of the year.

The prevalence of Parasitism in anaemia was found (77.46%). Parasitic infections noticed were *Strongyle* spp. followed by *Trichuris* spp and *Eimeria* spp individually and mixed infections (25.45% cases). On EPG count severity of infections as low grade infections in 44 cases (80%) were high than that high grade infection in 11 cases (20%). There was significant correlation of EPG with serum calcium and phosphorus levels, whereas non-significant positive correlation was observed with the parameters such as TEC and MCHC. Also there was non-significant negative correlation with the parameters Hb, PCV, MCV, serum glucose and serum Total protein in the present study.

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