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ORIGINAL ARTICLE

Prevalence of gastro-intestinal parasitic infections in goat of Madhya Pradesh, India

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Abstract Gastrointestinal (GI) parasitism in animals is one of the major problems in India causing emaciation, anaemia, oedema, weakness, diarrhoea and death. Present study was designed to generate epidemiological data on GI parasitism of goats of Madhya Pradesh, India. During 8 months study period, a total of 960 samples were collected and examined by sedimentation and floatation methods followed by egg per gram out of 960 samples, 907 (94.48 %) were positive for one or more gastrointestinal parasite, wherein coccidia was predominant (82.4 %) followed by strongyles (69.27 %), amphistomes (22.71 %), *Strongyloides* sp. (9.17 %), *Trichuris* sp. (3.85 %), *Moniezia* sp. (3.02 %), *Schistosomes* sp. (2.29 %) and *Fasciola* sp. (1.77 %). The seasonal incidence was found highest in monsoon (98.06 %) and lowest in winter (91.67 %). The incidence of gastrointestinal parasitism was found higher in kids (96.25 %) in comparison with adult goats (93.89 %).

Keywords Gastrointestinal parasites · Goat · Intensity · Madhya Pradesh · Season

Introduction

India possesses 140.5 million goats (Livestock census 2007) accounting 16.53 % of the total global goat population and 18.97 % of the total meat produced in the country (Livestock census 2007). Goats have enormous potential to boost economy of developing countries like India and can be major source of income especially to marginal farmers and landless laborers. However goats are vulnerable to various parasitic diseases that not only undermine their health but also play a role in lowering the overall production (Sanyal 1996) and are responsible for causing heavy losses due to reduced production, morbidity and mortality in animals (Lutu 1983; Mahusoon et al. 2004; Nwosu et al. 2007; Torres-Acosta and Hoste 2008) especially in developing countries. The present work was designed to generate epidemiological data regarding gastrointestinal parasitism of goat for developing worm management strategies in Madhya Pradesh, India.

Materials and methods

A total of 960 faecal samples from goats (720 adults and 240 kids below 6 months of age) were collected over a period of 8 month from July 2011 to February 2012 from Balaghat, Narsinghpur and Chhindwara in Madhya Pradesh, India. The study period was divided according to seasons i.e. monsoon (July–September), post monsoon (October–November) and winter (December–February). Samples were collected directly from the rectum and examined qualitatively using floatation and sedimentation methods for evaluating the incidence of infections. The eggs per gram of the Strongyle and oocyst per gram of coccidian in each positive sample were determined by modified Mc Master egg counting techniques (Sloss et al. 1994). Data were statistically analyzed using ANOVA (Snedecor and Cochran 1994).

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Results and discussion

Out of 960 faecal samples of goats examined, 907 (94.48 %) were found positive for one or more gastro-intestinal parasitism viz., coccidian (82.4 %), strongyle (69.27 %), amphistomes (22.71 %), *Strongyloides* (9.17 %), *Trichuris* (3.85 %), *Moniezia* (3.02 %), *Schistosoma* (2.29 %) and *Fasciola* sp. 1.77 % (Fig. 1). Various studies had earlier reported the high prevalence rates of gastro-intestinal parasites from different parts of India like 88.23 % prevalence of helminthes in Nagpur (Maske et al. 1990), 90.05 % from Jabalpur (Lalbiaknungi 2002), 96 % in Tarai region of Uttarakhand (Pant et al. 2009). In the present study coccidian was reported to be the highest among common gastrointestinal parasites. Lloyd and Soulsby (1978); Penjhorn et al. (1994); Parihar et al. (1996); Obijiaku and Agbede (2007); Jatau et al. (2011), were also observed high incidence of Coccidia and therefore, are in good agreement with those observed in present study. Highest oocyst count and incidence of coccidia

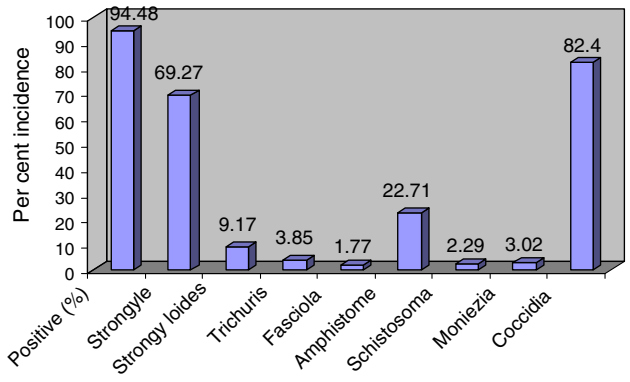

Fig. 1 Overall incidence (%) of GI parasitism in goats of Madhya Pradesh, India

infection during rainy season was reported from Udaipur (Sharma 1984) and dry zone of Sri Lanka (Faaizal and Rajapakse 2001).

The seasonal distribution of percent positivity of various gastrointestinal parasites is given in Table 1. The maximum prevalence was recorded during the monsoon season (98.06 %) while minimum recorded in winter (91.67 %). decreasing trend of gastrointestinal parasitism was followed from monsoon to winter (Fig. 2). Tripathi (1970) and Maske et al. (1990) also reported high incidence of helminth parasites in goat during monsoon or rainy season from Uttar Pradesh and Maharashtra, respectively. Talukdar (1996) from Assam (India), Faizal et al. (1999) from Sri Lanka, Jitendran (1997) from Himachal Pradesh, Meshram et al. (2007) from Maharashtra, Pathak and Pal (2008) from Chhattisgarh, Singh and Swarnkar (2010) from Rajasthan also reported higher incidences of gastro-intestinal parasites during monsoon season. On the contrary, Talukdar (1996) recorded highest strongyle incidence during summer in Assam. This period indicated with heavy rainfall and high humidity in the eastern states of India. Likewise, highest faecal strongyle egg count was also recorded in Sri Lanka (Faizal et al. 1999). The probable reason for high incidence of parasites in monsoon reason might be due to suitability of this season for survival, development and dissemination of nematode larvae in pasture, which leads to higher infection in the pasture grazing animal like goat. Contrary to our findings, Sahay et al. (1996) reported highest incidence of parasites in goats during winter in West Bengal, India. The probable cause of variation in prevalence of infection could be attributed to geographical and environmental variation in eastern region of the country.

Age-wise distribution of gastro-intestinal parasites is given in Table 2. Incidence of parasites was higher in kids

Table 1 Seasonal incidence (%) of GI parasitic infections in goat of Madhya Pradesh

Month	No. examined	Positive (%)	Positive for GI nematodes			Positive for other GI parasites				
			Strongyle	*Strongyloides*	*Trichuris*	*Fasciola*	Amphistome	*Schistosoma*	*Moniezia*	Coccidia
Jul-11	120	96.67	91.67	10.83	9.17	0.83	35.83	7.50	6.67	49.17
Aug-11	120	98.33	93.33	12.50	7.50	3.33	39.17	0.83	2.50	84.17
Sep-11	120	99.17	96.67	22.50	4.17	5.83	25.83	2.50	3.33	82.50
Monsoon	360	98.06	93.89	15.28	6.94	3.33	33.61	3.61	4.17	71.94
Oct-11	120	97.50	80.00	14.17	4.17	0.83	23.33	5.00	3.33	83.33
Nov-11	120	89.17	68.33	2.50	0.83	3.33	28.33	2.50	0.83	85.00
Post monsoon	240	93.33	74.17	8.33	2.50	2.08	25.83	3.75	2.08	84.17
Dec-11	120	97.50	87.50	5.83	0.00	0.00	18.33	0.00	3.33	97.50
Jan-12	120	88.33	25.83	0.83	3.33	0.00	8.33	0.00	0.00	88.33
Feb-12	120	89.17	10.83	4.17	1.67	0.00	2.50	0.00	4.17	89.17
Winter	360	91.67	41.39	3.61	1.67	0.00	9.72	0.00	2.50	91.67
Total	960	94.48	69.27	9.17	3.85	1.77	22.71	2.29	3.02	82.40

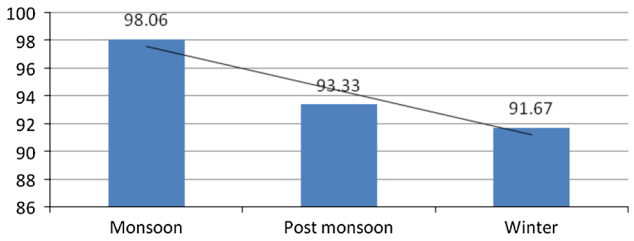

Fig. 2 Seasonal incidence (%) of GI parasitic infections in goat of Madhya Pradesh

(96.25 %) in comparison with adult goats (93.89 %). Higher incidence of parasitic infection in kids corroborates to the finding of Talukdar (1996) and Pundlikrao (2009), in Assam and Nagpur, respectively. Higher prevalence of infection in kids could be attributed to susceptibility to the infection. Lower prevalence of infection in adult goats could be attributed to body resistance as they might have developed immunity due to repeated natural infection. Shirale et al. (2001) observed higher incidence in kids as compared to adults in Nagpur (India). Likewise, Faizal and Rajapakse (2001) also noticed higher incidence and egg load in kids in the dry areas of Sri Lanka. Coincidently, both the above studies were carried out in comparatively dry areas as compared to the chosen area of present study. Overall observations on age related to the present study indicated that there was not much difference among kids and adults. But some worker noticed higher prevalence in adults as compared to kids (Anene et al. 1994). Strongyle larvae recovered on copro-culture, were identified to the level of genera to which they belonged. Prevalence of *Haemonchus* was the most predominant followed by *Trichostrongylus* sp., *Oesophagostomum* sp., *Strongyloides* sp. and *Bunostomum* sp. Yadav (2000) described humid tropical environment to be favorable for the development of various species of Strongyle nematodes viz., *Haemonchus contortus*, *Trichostrongylus* sp., *Oesophagostomum* sp., and *Strongyloides*. Climatic parameters proposed to play an important role in the development and survival of pre-parasitic stages on pasture. The collective predominance of *Haemonchus* sp. on copro-culture in the present study was in agreement with those reported (Anene et al. 1994; Parihar et al. 1996; Faizal et al. 1999).

During the course of study carried out for a period of 8 months, an incidence (of 22.71 % amphistomosis was recorded. Seasonal incidence was high in monsoon season followed by post monsoon and winter. The breeds of goats that in the present study was non-descript, kept on extensive grazing and hence comparatively resistant than the pure and cross breeds. However, workers from Bareilly (Prasad and Verma 1999), Pantnagar (Yadav 2000) and Maharashtra (Tamloorkar et al. 2001) have reported incidence of amphistomes throughout the year with the peak incidence of amphistomes during rainy season. However, contrary findings were indicated by Bedarkar et al. (2000) who recorded higher amphistomes incidence in kids as compared to adult goats in the dry areas of Marathawada region in Maharashtra. It is a general practice in villages that the kids below 6 months of age are not allowed to go out for grazing near to forest area along with adult animal. Having less opportunity of exposure to infection from the field, especially at younger age, the kids, therefore, showed lower incidence that may account for this discrepancy as reflected by the observations of the present study.

The incidence of coccidian throughout the period of study was expected and justified, too, since under natural conditions, repeated exposure lead to acquired immunity in the animals in due course. However, the initial infection may produce a maximal number of oocyst and as the immunity supervenes, oocyst output is reduced to a considerable extent (Soulsby 1982). This immunity is seldom absolute and the animal often continuously pick-up infection and thus, remain a source of infection for young animals (Levine 1985).

In conclusion, prevalence of gastro-intestinal parasitic infections was found different in different stage of goat (kids and adult) and also in different season. In goat kids, incidence of gastro-intestinal parasite was higher due to level of immune response in comparison to adult goats. However, regarding seasonal variation, gastro-intestinal parasitic infection was found higher during monsoon season. Higher gastro-intestinal parasitic infection during monsoon season might be due to favorable environmental conditions for growth and development of gastro-intestinal parasite and their stages. In present findings, it can also conclude that gastro-intestinal parasite infections are prevalent in Madhya Pradesh state of India. The seasonal pattern of the prevalence of these parasitic infections will definitely help in preparation of suitable control strategies, which will be helpful for goat rearing and industry.

Table 2 Age wise incidence of different GI parasitic infections in goat of Madhya Pradesh

	Age	No. examined	Positive (%)	Positive for GI nematodes			Positive for other GI parasites				
				Strongyle	*Strongyloides*	*Trichuris*	*Fasciola*	Amphistome	*Schistosoma*	*Moniezia*	Coccidia
Over all	Adult	720	93.89	69.17	9.86	3.61	1.39	23.75	2.50	1.67	81.39
	Kid	240	96.25	69.58	7.08	4.58	2.92	19.58	1.67	7.08	85.42

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