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RESEARCH ARTICLE

Prevalence of Gastro-Intestinal Nematodes in Goats in Hyderabad and Adjoining Areas

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ABSTRACT

The study was conducted to determine the prevalence of gastrointestinal nematodes of goats (n=1065) in and around Hyderabad using qualitative and quantitative coprological examinations. Results revealed that 43.10% (459) goats were infected with different species of nematodes including *Haemonchus contortus* (14.65%), *Trichuris ovis* (8.17%), *Trichostrongylus axei* (7.61%), *Trichostrongylus colubriformis* (6.76%), *Oesphagostomum columbianum* (5.35%), *Ostertagia circumcincta* (5.35%), *Chabertia ovina* (4.79%) and *Strongyloides papillosus* (4.51%). Infections with mixed species of nematodes were recorded in 6.54% (n=30/459; *T. ovis + H. contortus*), 5.23% (n=24/459; *C. ovina + H. contortus*), 5.88% (n=27/459; *S. papillosus + C. ovina*), and 12.42% (n=57/459; *O. circumcincta + T. ovis*) goats. Of the total infected (n=459); 51.4, 38.3 and 10.2% goats had light, moderate and heavy infections, respectively. The prevalence, nature and intensity of the helminthiasis in goats warrant an immediate attention to devise strategies for its control to reduce the production losses.

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INTRODUCTION

Goats are one of the earliest domesticated ruminants which have served mankind longer than cattle and sheep. It is reared for the production of milk, meat and hair, particularly in arid, semi-tropical or mountainous areas. In tropical and sub-tropical zones, goats are kept often as supplementary animals by small farmers. The goat population in Pakistan is 58.3 million heads, which produce 0.7 million tons of milk and over 0.26 million tones of mutton. In addition, goats provide hair, leather and manure (FAO, 2010).

Gastro-intestinal nematodes cause major drain on the production of goats due to their adverse effects like reduction in appetite, loss of body weight, hypo-proteinemia, impaired digestive efficiency and other pathogenic complications leading to lowered productivity, retarded growth rate and even death (Holmes, 1986; Sykes, 1994; Al-Shaibani *et al*., 2009; Raza *et al*., 2010; Siddiki *et al*., 2010). Little attention has been paid towards the prevalence of parasites of caprine in Sindh-Pakistan. The present study was, therefore, undertaken to assess the prevalence of gastrointestinal nematodes in goats in Hyderabad and surrounding areas.

MATERIALS AND METHODS

Study area

The samples were collected from Tando Allahyar, Tando Muhammad Khan, Hyderabad, Halla (Matairi) and Tandojam (Hyderabad) in the province of Sindh, Pakistan (Fig. 1). Sindh is situated in a sub-tropical region and is divided into three climatic regions: i) Siro (the upper region, centered on Jacobabad), ii) Wicholo (the middle region, centered on Hyderabad) and iii) Lar (the lower region, centered on Karachi).

Goat and sheep flocks are maintained through traditional production system. Feeding requirement of the animals is met mainly through grazing. According to Khushk and Lashari (2010), 59% animals are fed from fields, 20% are stall fed and 21% on both grazing and stall feeding. It has been estimated that about 51% animal feeding is dependent on tree leaves, cut fodder and kitchen waste, 29% on tree leaves and 20% on cut fodder (Khushk and Lashari, 2010).

Survey and parasitological procedures

A total of 50 small ruminants farms in five localities (Table 1) were selected for this study. The total number of goats on these farms was 10032. Fecal examination of

Table 1: Area wise prevalence of gastro-intestinal nematodes of goats

Area	Farms visited	Number of animals			Percentage*
		On Farm	Examined	Infected	
Tando Muhammad Khan	10	1896	198	93	46.97
Tando Allahyar	10	1965	210	96	45.71
Tandojam (Hyderabad)	10	2400	240	120	50.00
Hyderabad	10	1761	207	75	36.23
Halla (Matyari)	10	2010	210	75	35.71
Total	50	10032	1065	459	43.10

*Percentage has been calculated out of the total number of animals examined.

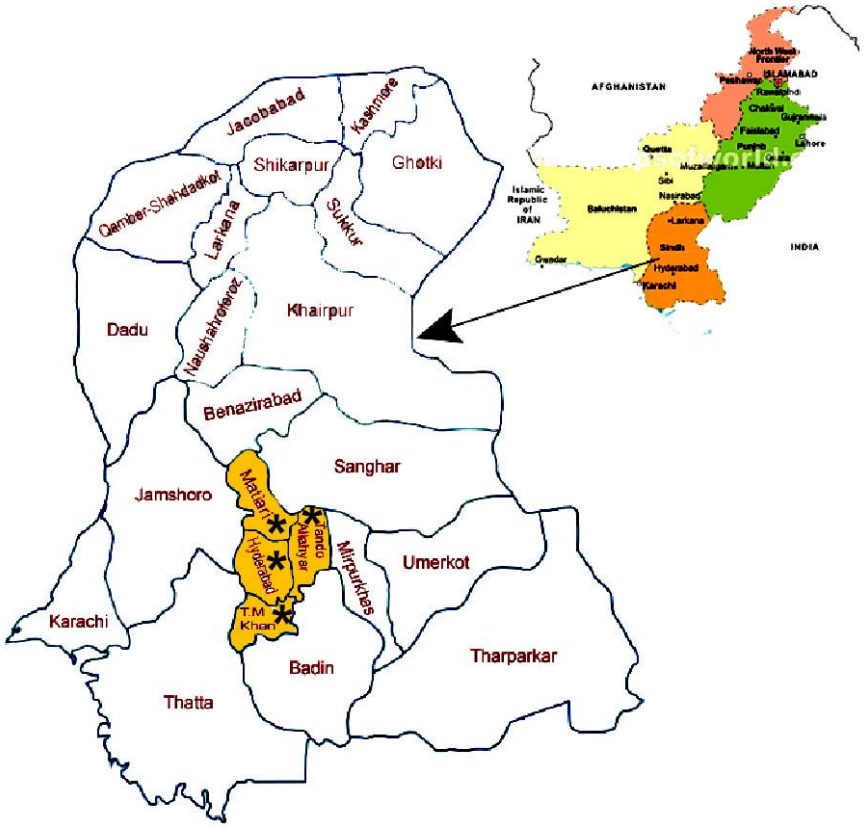

Fig. 1: Map of Pakistan. Magnified portion showing Province of Sindh and asterisks indicate areas where study was conducted.

Table 2: Prevalence of different gastrointestinal nematode species in goats (n=1065).

Nematode species	Infected animals	
	No.	Percentage
Haemonchus contortus	156	14.65
Trichostrongylus axei	81	7.61
Trichostrongylus colubriformis	72	6.76
Trichuris ovis	87	8.17
Oesphagostomum columbianum	57	5.35
Chabertia ovina	51	4.79
Ostertagia circumcincta	57	5.35
Strongyloides papillosus	48	4.51

about 10% (n=1065) of the total number of goats from each of the selected farms was conducted randomly. Fecal samples were collected directly from rectum by Simple Random Sampling Method. In each case, 5-10g of feces was collected and examined qualitatively and quantitatively following standard direct smear and concentration methods. Fecal samples were cultured and larvae identified (MAFF, 1986).

RESULTS AND DISCUSSION

Of the 1065 goats examined, 43.1% were found infected with different species of gastro-intestinal nematodes (GINs). Prevalence of GINs among different localities included in the study ranged from 35.71 to 50%: the highest and lowest being in Tandojam and Halla, respectively (Table 1). Variation in prevalence of GINs has been widely reported within and among different regions of the world. For example, 50% in Kashmir (Makhdoomi *et al*., 1995), 36.97% (Mbaria *et al*., 1995) and 62% (Meingi *et al.*, 2001) in Kenya; 52% in Southern Punjab-Pakistan (Raza *et al.*, 2007) and 55.8% in Nigeria (Nwosu *et al*., 2007).

Eight species of GINs: *Haemonchus contortus, Trichuris ovis, Trichostrongylus axei, Trichostrongylus colubriformis, Oesphagostomum columbianum, Ostertagia circumcincta, Chabertia ovina,* and *Strongyloides papillosus* were recorded in the present study (Table 2). There is a long inventory of the GINs of goats reported by different workers in textbooks of Parasitology and also in the research publications (Urquhart *et al*., 1996). In general, though with varying prevalence, the most common and widely studied GINs are *Haemonchus contortus,, Trichostrongylus spp, Strongyloides papillosus, Oesphagostomum columbainum, Ostertagia spp., Trichuris ovis, Bunostomum spp., Chabertia ovina, Nematodirus spp., Cooperia spp.* in Pakistan and elsewhere (Mbaria *et al*., 1995; Makhdoomi *et al*., 1995; Meingi *et al*., 2001; Shahiduzzaman *et al.*, 2003; Nwosu *et al.*, 2007; Raza *et al.*, 2007; Ijaz *et al.*, 2008). The prevalence of different species of GINs in the present study ranged from 4.51 to 14.65%; the lowest and highest being for *Strongyloides papillosus* and *Haemonchus contortus*, respectively.

Based on EPG and subsequent copro-cultures, majority of the goats were found to have light infections (51.4%) followed by moderate (38.3%) and heavy (10.2%) infections with GINs (Table 3). Mixed infections were recorded with *T. ovis* + *H. contortus* (6.5%) *Chabertia ovina* + *H. contortus* (5.2%) *S. papillosus* + *Ch. ovina* (5.9%) and *T. circumcincta* + *T. ovis* (12.4%) nematodes (Table 3).

EPG for different species of GINs have been presented in Table 4. Hansen and Perry (1994) suggested that the presence of 50-800 (mixed infection), 300-800 (mixed infection with *Haemonchus* absent), 100-2000 (pure *Haemonchus),* 100-500 (pure *Trichostrongylus),* 100-800 (pure *Oesophagostomum*) eggs per gram of feces in goat and sheep be considered as clinical infections. In the light of this criteria, all the goats detected as positive in the present study are considered as clinically infected.

A variety of factors like age, sex and breed of the host, grazing habits, level of education and economic capacity of the farmers, standard of management and anthelmintic used (Pal and Qayyum, 1992; Jorgensen *et al.*, 1998; Valcarcel and Romero, 1999; Ouattara and Dorchies, 2001) can influence the prevalence of nematodes. Some of the other factors that may influence prevalence of GINs in different areas include climatic/environmental conditions (Armour, 1980), physiological status of animals like parturition, lactation stage (Lyons *et al.*, 1992), hypobiosis (Altaif and Issa, 1983), and pasture contamination (Barnes and Dobson, 1990). Last but not the least, there should be many more operational factors playing crucial roles in the prevalence of different species of GINs. Nevertheless, results indicate GINs as one of the major problems in the study area leading to low productivity of goats. Detailed investigations on epidemiology of GINs in goats and other animals would be of great interest in devising a control strategy.

Table 3: Intensity of different gastro-intestinal nematode species in goats

Nematode species	No. of animals infected			Degree of infec
		Light (%)	Moderate (%)	Heavy (%)
Haemonchus contortus	102	30 (29.4)	48 (47)	24 (23.5)
Trichostrongylus axei	81	30 (37)	42 (51.8)	9 (11.1)
Trichostrongylus colubriformis	72	44 (61.1)	22 (30.5)	6 (8.3)
Oesophagostomum columbianum	45	36 (80)	9 (20)	--
Strongyloides papillosus	21	21 (100)	--	--
Trichuris ovis + Haemonchus contortus	30	16 (53.3)	12 (40)	2 (6.6)
Chabertia ovina + Haemonchus contortus	24	6 (25)	15 (62.5)	3 (12.5)
Strongyloides papillosus + Chabertia ovina	27	15 (55.5)	9 (33.3)	3 (11.1)
Ostertagia circumcincta + Trichuris ovis	57	38 (66.6)	19 (33.3)	--
Total	459	236 (51.4)	176 (38.3)	47 (10.2)

Table 4: Eggs per gram of feces of different species of gastro-intestinal nematodes in goats

Nematode species	Light infection			Moderate infection			Heavy infection		
	n-val * *	Range	Mean	n-val	Range	Mean	n-val	Range	Mean
Haemonchos contortus	30	100-1800	853.3	48	2000-7000	4208	24	7100-8500	7850
Trichostrongylus axei	30	100-500	253.3	42	500-2000	1023.8	9	2000+	2400
Trichostrongylus colubriformis	44	100- 500	263.6	22	500-2000	1018.2	6	2000+	2450
Oesphagostomum columbianum	36	100-800	377.8	9	800-1600	1111.1	--	--	--
Strongyloides papillosus	21	100-1000	514.3	--	--	--	--	--	--
Trichuris ovis+Haemonchus contortus	16	50- 800	406.2	12	800 - 1200	1000	2	1200+	1600
Chabertia ovina+Haemonchos contortus	6	50 - 800	433.3	15	800 -1200	1040	3	1200+	1666.6
Strongyloides papillosus+Chabertia ovina	15	300-800	566.7	9	800-1000	877.8	3	1000+	1267.7
Ostertagia circumcincta +Trichuris ovis	38	300 - 800	589.5	19	800 -1000	826.3	--	--	--
	236			176			47		

* EPG= Eggs per gram; ** n val. Number of infected animals

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