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Investigation of Gastrointestinal Parasites in Dairy Cattle of Tehsil Babozai, District Swat

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Abstract

A study was conducted from January, 2018 to August, 2018 in different wards of Tehsil Babozai, district Swat, Khyber Pakhtunkhwa to investigate and find out the prevalence of gastrointestinal parasites in dairy cattle. For this purpose, a total number of 116 fecal samples from cattle were randomly collected from different wards of district Swat and a well-structured questionnaire having the information about the cattle age, sex, parity, management, body conditions, fecal consistency, and disease were filled. Result showed overall prevalence of gastrointestinal parasites (37%), species observed in this study were Protozoan (6.89 %) as Eimeria bovis, Nematodes (60.34%), as Ostertagia ostertagi (30%), followed by Trichostrongylus spp. (19%), Haemonchus contortus (5%), Strongyloides papillosus (3.44%), Cooperia spp. (1.7%), Toxocara canis (0.8%). Trematodes (5.17%) as Paramphistomum spp. and Fasciola hepatica, however, only one species of Cestodes (0.8%) such as Moniezia expansa was observed. Statistical analysis revealed that there is no significant variation in prevalence of cattle in relation to age, sex, parity, management, fecal consistency, body condition, disease, however high prevalence showed in young cattle < than 3 years having poor body condition due to animia and diseases. These all factors and conditions are greatly associated with parasitic infection in cattle of Swat. Our study concludes that gastrointestinal parasites such as Liver fluke and roundworms cause the biggest problems for Swatian producers and need to be eradicated.

Key words: liver fluke; gastrointestinal parasites; Swat; diseases; cattle; Nematodes.

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1. Introduction

Gastro-intestinal parasites are problems among cattle population in Pakistan. They can cause serious diseases in gastrointestinal tract of human and other animals. Their infections are most common in under-developed countries where there are poor hygienic conditions [8]. The two main types of GI parasites are protozoan and helminths. Helminths are worms with many cells; it includes Cestodes, Trematode and Nematodes [3]. Cestodes have long flat bodies that are divided into three sections: strobila, Neck and proglottids. The scolex contains several suckers and may have hooks. *Taenia*, *Moniezia expansa* are common Cestodes found in gastrointestinal tract of cattle and other animals. Trematodes (flukes) are another group of helminths usually leaf like in shape and have suckers that they use for attaching to and feeding on their host. Some of the common trematodes found in cattle are *Fasciola* spp. *Paramphistomum cervi, Dicrocoelium dendriticum, Schistosoma* spp. [18]. Liver fluke is an important trematode parasite in the areas with temperate climate [5]. Nematodes (roundworm), they get their name from their round cross section. Roundworms are small slender, thread like, un-segmented worms which are tapered at both ends. The most important GI nematode responsible for considerable production losses in cattle is *Ostertagia ostertagi* and to a lesser extent, *Cooperia* spp. [2]. In cattle and other animals these parasites can cause mal-absorption and mal-nutrition, resulting in stunting growth and chronic anemia which can affect the physical and cognitive development of calves [9]. The infections of these parasites are found throughout the world but most commonly in Southeast Asia [21;22] including Pakistan due to suitable environmental conditions such as warm temperature, improper management practices, and inadequate measures for health control [10]. Helminths and nematodes can be identified easily by their morphological structures because they are larger in size and can be seen with naked eyes, their eggs are identified under microscope. These parasites are a big problem for farmers and have a big negative impact on economy.

2. Material and Methods

2.1. Study Area

This study was conducted from January, 2018 to August, 2018 in Tehsil Babozai, district Swat, Khyber Pakhtunkhwa (KP), Pakistan.

2.2. Collection of samples

Dairy cattle were investigated for the presence of gastrointestinal parasites in different age groups. Fecal samples were collected from rectum. Collected samples were kept in tight bottles, labeled and were studied on the same day of collection [4;25].

2.3. Examination of sample

Microscopic examination of all the fecal samples was done with direct method, Flotation method, Sugar solution flotation & Sedimentation technique.

Identification of parasites: The parasites were identified by using Identification keys described by [7]**.**

Statistical analysis: The data were analyzed by chi-chart square test as described by [24]**.**

3. Results

3.1. Over all prevalence of gastrointestinal parasites

A total of 116 fecal samples, 43 were found positive with an overall prevalence of 37% for GIT parasitic infection (Table 1).

Table 1: Overall prevalence of gastrointestinal parasites in cattle

# of Fecal Samples Examined	Total Positive	Overall Prevalence
116	**43/116 x 100**	**37 %**

3.2. Types of parasites observed

The current study showed higher prevalence of Nematodes 60% followed by Protozoan 6.89%, Trematodes 5.17%, however only one species of Cestodes was observed 0.86%. **Nematodes:** our study resulted *Ostertagia ostertagi* (30%), followed by *Trichostrongylus* spp. (19%), *Haemonchus contortus* (5%), *Strongyloides papillosus* (3.44%), *Bonostomum* spp. (2.58%), *Cooperia* spp. (1.7%), *Toxocaracanis*(0.8%). The most common and prevalent nematodes in this study were *Ostertagia ostertagi* and *Trichostrongylus* spp. **Trematodes**: Our study showed a good prevalence of *Fasciola* spp. in subject area. However, there was only one sample positive for *Paramphistomum* spp. The *Fasciola* spp. showed a prevalence rate of (3.44%) while the *Paramphistomum* spp. showed a prevalence rate of (0.8%). **Cestodes:** In the current study only a single cestode spp. identified as *Moniezia* was found in most samples. **Protozoans**: Many samples were found positive for protozoan. Members of the genus *Eimeria* were more prevalent (4.31%) as showed in (Table 2).

Table 2: Prevalence of different types of GIT parasites in Cattle

Name of parasite	No. of cattle infected	Percentage
Ostertagia ostertagi	35	30%
***Trichostrongylus* spp.**	23	19%
Haemonchus contortus	6	5%
Strongyloides papillosus	4	3.44%
Cooperia cooperia	2	1.7%
Toxocara canis	1	0.8%
***Fasciola* spp.**	4	3.44%
***Paramphistomum* spp.**	2	1.72%
***Eimeria* spp.**	8	6.89%
Moniezia expansa	1	0.8%

3.3. Area and management wise prevalence of GIT parasites in cattle

This study was carried out in different wards of Babozai Tehsil of Swat which show high prevalence in Gulkada and low prevalence rate in Tahir Abad (Table 3). Results showed a high prevalence of parasites in domestic cattle as compare to dairy cattle (Table 4).

Table 3: Prevalence of GIT Parasites by area (ward)

		Flotation + Sedimentation		**Total**
		Positive	Negative	
Area	Saidu Sharif	4	6	10
	Qambar	4	6	10
	Ten Do Dog	5	5	10
	Shahdara	4	6	10
	Manglawar	1	9	10
	Panr	5	5	10
	Kokari	4	6	10
	Malook Abad	3	7	10
	Rang Mohalla	5	5	10
	GulKada	6	4	10
	Amankot	2	8	10
	Tahir Abad	0	6	6
Total		43	73	116

Table 4: Prevalence of GIT parasites based on Management

		Flotation		**Total**
		Positive	Negative	
Management	Farms	18	37	55
	House Hold/ Domestic	25	36	61
Total		43	73	116

3.4. Age and sex wise prevalence of GIT parasites

In this study the cattle were categorized in three age groups. e.g. (1-3 years), (3-7 years) and >7years. The following age wise prevalence was observed:

young cattle showed a prevalence rate of 42%, followed by 38%, and 34% respectively. The result showed that young cattle were more susceptible to GIT parasites as compared to adults (Table 5).

Sex wise prevalence of GIT parasites was studied. Out of 116 cattle, 21 individuals were male and 95 were female. The sex-wise prevalence rate observed was 38% and 36% respectively. Sex wise results showed that there was no significant variation in the prevalence rate of both sexes (Table 6).

Table 5: Age wise prevalence of GIT parasites

		Flotation + Sedimentation		Total
		Positive	Negative	
Age	1-3 Years	8	11	19
	3-7 Years	19	31	50
	> 7 Years	16	31	47
Total		43	73	116

Table 6: Sex wise prevalence of GIT Parasites

		Flotation+ Sedimentation		Total
		Positive	Negative	
Sex	Male	8	13	21
	Female	35	60	95
Total		43	73	116

3.5. Prevalence of GIT parasites based on body weight or body condition and Parity

Physical observation of cattle was also carried out, those having low weight and poor body condition showed 45% prevalence while those in good condition showed 29% prevalence. The current study found that the cattle which show poor body condition and low weight have high prevalence of GIT parasites while those having good body condition showed less prevalence rate (Table 4.7).

The study also showed the relationship of parasites with parity. During sampling, the farmers were asked for the parity of the cattle that either the cattle is pregnant or not. The result showed that 46% prevalence was found in pregnant cows while 35% in non-pregnant cows (Table 4.8).

Table 7: Prevalence of GIT parasites based on parity

		Flotation + Sedimentation		Total
		Positive	Negative	
Parity	Yes	6	7	13
	No	37	66	103
Total		43	73	116

Table 8: Prevalence of GIT parasites based on Body Condition

		Flotation+ Sedimentation		Total
		Positive	Negative	
Body Condition	Poor	30	42	72
	Good	13	31	44
Total		43	73	116

3.6. Prevalence of GIT parasites based on disease, anemia and fecal consistency

The cattle with disease symptoms showed highest prevalence of parasites (54%) while those having no disease

symptoms showed low prevalence of 34% (Table 9).

The fecal consistency was also examined (diarrheic) or hard (non-diarrheic) and examination showed a 44% prevalence in diarrheic while hard feces showed 29 % prevalence. The result showed slightly highest prevalence in diarrheic cattle as compared with non-diarrheic cattle (Table 10).

This was also observed at the time of fecal sample collection that either the cattle is anemic or not, those cattle which showed anemic characteristics have a highest prevalence rate of GIT parasites (Table 11).

Table 9: Prevalence of gastrointestinal tract parasites based on disease symptoms

		Flotation+ Sedimentation		**Total**
		Positive	Negative	
Disease	Yes	6	5	11
	No	37	68	105
Total		43	73	116

Table 10: Prevalence of GIT parasites based on fecal Consistency

		Flotation + Sedimentation		**Total**
		Positive	Negative	
Fecal Consistency	Loose	35	63	98
	Hard	8	10	18
Total		43	73	116

Table 11: Prevalence of GIT parasites based anemic condition

		Flotation+ Sedimentation		**Total**
		Positive	Negative	
Anemic	No	1	1	2
	Yes	42	72	114
Total		43	73	116

3.7. Comparison of concentration techniques used for the detection of parasites

This coprological study was carried out by direct microscopy, sedimentation and floatation methods. Flotation technique was found the most satisfactory and easiest one.

Table 12: Comparison of concentration techniques used for the detection of parasites

S. No	**Technique**	**Positive**	**Negative**	**Percentage**
1	Direct Microscopy	16	100	14%
2	Sedimentation Technique	15	101	13%
3	Flotation Technique	39	69	33%

4. Discussion

The results from the current study revealed that helminths in the study area were more prevalent. Over all

prevalence of our study agrees with the work done by [13] whose results showed a prevalence rate of 34% in cattle, however study carried out by [19] showed a prevalence rate of 28%. Another study conducted by [18] showed a significant variation in prevalence rate of parasites and had reported highest prevalence rate of 64% in cattle which was probably due to favorable condition for the development and maturation of larvae. Our results are in line with the previous study conducted by [17] showing *Ostertagia* as the most prevalent species. The prevalence of these parasites usually depends upon the agro-climatic condition including quality and quantity of the pasture, study area, temperature, humidity, and grazing behavior of the host [16].

Only one species of trematode *Fasciola hepatica* was more prevalent in the current study. However, one sample was positive for *Paramphistomum* spp. The *Fasciola* spp. showed a prevalence rate of 3.44% while the *Paramphistomum* spp. showed a prevalence rate of 0.8%. The current study agreed with the study carried out by [23] which showed *Fasciola* spp. as the most prevalent. The cattle, from which the fecal samples were collected having *Fasciola* spp., were raised near the lake and the previous studied shows that humidity and temperature play a key role in development of this species in snail.

The only cestode observed in this study is *Moniezia expansa*; however, there is no other species of cestodes observed. The current study results are in line with the study performed by [18]**.** *Moniezia expansa* was the common species observed in most studies. *Moniezia* infections are usually asymptomatic however, a great variety of clinical signs including un-thriftiness, diarrhea and respiratory signs have attributed to this species [11]**.** Of the most economically important cattle diseases, coccidiosis is the costly one. Our study showed 4.31% prevalence of *Eimeria* spp. in cattle. On the contrary, a similar study conducted by [20] reported highest prevalence of 47.09% in cattle. Certain types of managemental practices involving cattle yards offer optimal conditions of humidity and temperature for the sporulation of oocyst and if the cattle farm is overcrowded then the chances of heavy infection is increased [11]**.**

The cattle raised in houses were more infected than those in the farms. The current results show resemblance with the work conducted by [12]**.** The lowest prevalence in large scale farm's cattle may be attributed to the fact that most of the animals examined were kept in confinement and managed on intensive management [12]**.**

Age wise prevalence revealed that young cattle showed highest prevalence rate of 42%, followed by 38%, and 34% respectively. The result showed that young cattle are more susceptible to GIT parasites as compared to adults; however, there are no significant differences in all age groups. Our results are in line with the study conducted by [13] which prevailed high prevalence in young cattle. Calves are usually more susceptible to parasitic infections due to their under develop immune system, diet, the environment, presence of pathogenic viruses and bacteria and calf management.

Gender wise study did not show significant variation and the prevalence rate of parasites was 38% in male and 36% in female. The previous work carried out by [6] showed high prevalence in male than female. Another study conducted by [16] showed highest prevalence in female. The highest exposure to parasitic infection while grazing in the field may be the reason.

Physical observation of cattle was also carried out, those having low weight and poor body condition showing 45% prevalence while those in good condition showing 29% prevalence respectively. The current study suggested that the cattle which show poor body condition and low weight have high prevalence of GIT parasites while those having good body condition show less prevalence rate. The present study is agreed with the work done by [4] which also showed high prevalence in low weighted cattle. The low weight of cattle is because of parasitism is known to induce the loss of appetite in the host as well as the reduction in the metabolic efficiency of the host which lead to reduction in body weight and condition [14;15]. The present study suggested that pregnant cows are more at risk to get infected than because of stress. In general, this is true that GIT parasites induce a rapid build-up of protective immunity in their host which leads to individual diseases [1].

The fecal consistency was also examined either they are loose (diarrheic) or hard (non-diarrheic), this result showed that the cattle with loose feces have 44% prevalence while those with hard feces showed 29 % prevalence. The result shows high prevalence rate in diarrheic cattle as contrast to non-diarrheic cattle.

5. Recommendations

This study recommends proper steps to be taken by the Livestock Department, including farmers' awareness through mass media campaign for tick control measures, acaricidal spray through arranging field days, timely laboratory diagnosis of protozoan diseases and close contact between farmers and Veterinary Research Institutes.

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6. Competing Interests

The authors declare that they have no competing interests.

References

[1]. J. Armour. The influence of host immunity on the epidemiology of Trichostrongyle infections in cattle. Veterinary Parasitology, vol. 32(1), pp. 5-19, 1989.

[2]. J. Armour, Bairden, K., Duncan, J.L., Jennings, F.W., Parkins, J.J. Observations on ostertagiasis in young cattle, pp. 44-50, 1979.

[3]. D. R. Arora, & Arora, B. Medical Parasitology. CBS Publishers, pp.15-67, 2005.

[4]. T. Awraris, Bogale, B., & Chanie, M. Occurrence of gastro intestinal nematodes of cattle in and around Gondar town, Amhara regional state, Ethiopia. Acta Parasitological Globalis, vol. 3(2), pp. 28-33, 2012.

[5]. S. C. Bennema, Ducheyne, E., Vercruysse, J., Claerebout, E., Hendrickx, G., & Charlier, J Relative importance of management, meteorological and environmental factors in the spatial distribution of Fasciola hepatica in dairy cattle in a temperate climate zone. International Journal for Parasitology, 2011.

[6]. M. Q Bilal., Hameed, A., & Ahmad, T.. Prevalence of gastrointestinal parasites in buffalo and cow calves in rural areas of Toba Tek Singh, Pakistan. J. Anim. Plant Sci, vol. 19(2), pp. 67-70, 2009.

[7]. D. D. Bowman. Georgis' Parasitology for Veterinarians-E-Book. Elsevier Health Sciences, 2014.

[8]. M. Cappello. Global health impact of soil-transmitted nematodes. The Pediatric infectious disease journal, vol. 23(7), pp. 663-664, 2004.

[9]. R. L. Coop & Kyriazakis, I. Influence of host nutrition on the development and consequences of nematode parasitism in ruminants. TRENDS in Parasitology, vol. 17(7), pp. 325- 330, 2001.

[10]. F. R. Gwaze, Chimonyo, M., & Dzama, K. Prevalence and loads of gastrointestinal parasites of goats in the communal areas of the Eastern Cape Province of South Africa. Small Ruminant Research, vol. 84(1-3), pp. 132-134, 2009.

[11]. D. Jacobs, Fox, M., Gibbons, L., & Hermosilla, C. Principles of Veterinary Parasitology. John Wiley & Sons, 2015.

[12]. J. D. Keyyu, Kyvsgaard, N. C., Kassuku, A. A., & Willingham, A. L. Worm control practices and anthelmintic usage in traditional and dairy cattle farms in the southern highlands of Tanzania. Veterinary Parasitology, vol. 114(1), pp. 51-61, 2003.

[13]. M. N. Khan, Sajid, M. S., Khan, M. K., Iqbal, Z., & Hussain, A. Gastrointestinal helminthiasis: prevalence and associated determinants in domestic ruminants of district Toba Tek Singh, Punjab, Pakistan. Parasitology research, vol. 107(4), pp. 787-794, 2010.

[14]. K. Louie, Vlassoff, A., & Mackay, A. D. Gastrointestinal nematode parasites of sheep: a dynamic model for their effect on live weight gain. International journal for Parasitology, vol. 37(2), pp. 233-24, 2007.

[15]. A. F. Loyacano, Williams, J. C., Gurie, J., & DeRosa, A. A. Effect of Gastrointestinal nematode and liver fluke infections on weight gain and reproductive performance of beef heifers. Veterinary Parasitology, vol. 107(3), PP. 227-234, 2002.

[16]. R. A. Pal, & Qayyum, M. A. Z. H. A. R. Distribution of gastrointestinal amphistomes and Cestodes in small ruminants grazed on irrigated and non-irrigated pasture zones. In Proceedings of Pakistan Congress of Zoology (Vol. 13, pp. 307- 313, 1993.

[17]. A. F. Perri, Mejia, M. E., Licoff, N., Lazaro, L., Miglierina, M., Ornstein, A &Lacau-Mengido, I.M. Gastrointestinal parasites presence during the Peripartum decreases total milk production in grazing dairy Holstein cows. Veterinary Parasitology, vol. 178(3-4), pp. 311-318, 2011.

[18]. T. A. Rafiullah, Sajid, A., Shah, S. R., Ahmad, S., &Shahid M. Prevalence of gastrointestinal tract parasites in cattle of Khyber Pakhtunkhwa. J. Agri. Biol. Sci, vol.9, pp. 6, 2011.

[19]. M. Ramzan, Ahmad, N., Ashraf, K., Saeed, K., Durrani, A. Z., Jan, S., & Khan, M. A. Epidemiology and therapeutic studies on nematodes infection in cattle at district Qilla Abdullah, Baluchistan. JAPS: Journal of Animal & Plant Sciences, vol. 27(3), 2017.

[20]. Rehman, Tauseef Ur, et al. "Epidemiology of Eimeria and associated risk factors in cattle of district Toba Tek Singh, Pakistan." Parasitology research vol. 108.5, pp. 1171-1177, 2011.

[21]. S. S. Roy, Sarkar, S., Batabyal, S., Pramanik, A. K., & Das, P. Observations on the epidemiology of bovine cryptosporidiosis in India. Veterinary Parasitology, vol. 141(3-4), pp. 330- 333, 2006.

[22]. N. Sahoo, Mohanty TN, Samal S. Prevalence of gastrointestinal helminthic infection among grazing and stall-fed cattle in a rainfed district of Orissa. J Vet Parasitology, pp. 16-61, 2002.

[23]. S. A. Sardar, Ehsan, M. A., Anower, A. K. M. M., Rahman, M. M., & Islam, M. A. Incidence of liver flukes and gastro-intestinal parasites in cattle, Bangal J Vet Med, vol. 4(1), pp. 39- 42m, 2006.

[24]. G.W. Snedecor and Cochran, W.G. Statistical Methods. 8th ed. Oxford and IBH Publishing Co., New Delhi, 1994.

[25]. A.M. Zajac and Conboy, G.AVeterinary clinical Parasitology. Eighthedition. American Association of Veterinary Parasitologist. Blackwell publishing, Oxford, U.K, 2012.