



Determination of Parasitic Load in Government Cattle Breeding and Dairy Farm, Charsadda, Khyber Pakhtunkhwa-Pakistan

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Abstract | This study was conducted to determine the parasitic diseases in Cattle Breeding and Dairy Farm, Harichand. For this purpose a total of 234 blood samples and 100 fecal samples were collected from different breeds, age and sex of cattle and screened for endo-parasites. Giemsa stained thin blood smears were used for haemo-protozoan while for gastrointestinal parasites direct examination and floatation technique was used. Incidence of haemo-parasitic diseases was recorded as 18 and 28% for *Theileria* and *Anaplasma*, respectively while incidence of intestinal parasites were recorded as 12, 8 and 9% for *Trichostrongylus*, *Bonostomum* and *Monezia bending*, respectively and 53% were recorded as mixed infections. Incidence of haemo-parasitic diseases was found significantly higher ($P < 0.05$) in exotic and cross breeds cattle. Haemo-parasitic diseases were found significantly higher ($P < 0.05$) in female while no significant differences ($P > 0.05$) was recorded with respect to age, though occurrence was higher in adult animals. Gastrointestinal parasitism was significantly higher ($P < 0.05$) in female and young animals while no significant differences ($P > 0.05$) was recorded breed wise. It can be concluded from the results that indigenous breeds of cattle offer significant resistance to onset of haemo-parasitic diseases while exotic and cross bred animals are easy targets for these dreadful diseases. Various therapeutic and managemental measures should be adopted for complete eradication of parasitic diseases in farm.

Keywords | Haemo-parasitic diseases, Gastrointestinal parasitism, *Theileria*, *Anaplasma*, Exotic breeds

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INTRODUCTION

Livestock plays a pivotal role in Pakistan's economy by uplifting the socioeconomic conditions of resource-poor farming communities and alleviating poverty. In the financial year 2013-14, the livestock sector contributed 11.8% to the Gross Domestic Product (GDP) of Pakistan; its share in the value of all agricultural commodities was 55.9% (PES, 2013-14). In the livestock sector, water buffaloes and cattle with an estimated population size of 35-40 million are the main milk-producing animals and yielding approximately 18,000-31,000 million tons of milk (PES, 2013-14).

Keeping in mind its great share in economy, it is important to deal efficiently with all challenges to livestock industry. These challenges are in the form of various infectious diseases which adversely affect the economy of the country (Carroll et al., 2008). Among these, parasitic diseases i.e. haemo-protozoan and gastrointestinal parasites are most important which affect milk and meat production of animals (Artis, 2006; Gohil et al., 2013; Khan et al., 2013). Cattle are highly susceptible to most of the diseases and parasites that affect buffaloes. Despite of great genetic potential of cattle in Pakistan, its production is not good due to these parasitic diseases. In Pakistan, parasitic diseases including haemo-protozoan and gastrointestinal parasit-

ism are considered a major obstacle in the health and production performance of cattle. Ticks are important vector for transmission of diseases (Shah et al., 2017) and also it cause physical damage to livestock, thus affecting the quality of hide. Most important tick borne diseases of livestock are Theileriosis, Babesiosis and Anaplasmosis.

Gastrointestinal parasites (Nematodes, Trematodes and cestodes) are important parasites of cattle having a negative impact on both animal health and financial returns from production animals. Parasitic diseases offer a great obstacle to livestock, thus causing direct and indirect losses (Harper and Penzhorn, 1999; Kagira and Kanyari, 2001). Gastrointestinal parasitism lowers the productive capacity of animals and may cause death in some cases (Lebbie et al., 1994). Some of these are zoonotic and therefore a threat to public health.

The current study focus on the prevalence and diversity of parasitism caused by haemo- protozoan and helminthes in Government cattle breeding and dairy farm, Harichand, Charsadda to provide a basis for evolving strategic and tactical control of these parasites.

MATERIAL AND METHODS

STUDY AREA

This study was conducted in Cattle Breeding and Dairy Farm, Harichand which is located in District Charsadda, having more than 400 heads comprising of different local, exotic and cross bred animals. It is located at 34.8°N Latitude and 71.43°E longitude with an altitude of 276 meters (908 feet) and lies 29 km from the provincial capital, Peshawar.

Table 1: Overall prevalence of Haemo- protozoan and Intestinal parasites in cattle in Cattle and breeding farm, Harichand

Parasitism	Parasites	N	Prevalence %
Haemo- protozoan	Theileria	234	18
	Anaplasma	234	28
	Mixed infection	234	0.01
Fecal Examination	Trichostrongylus	100	12
	Bonostomum	100	8
	Moneizia benedeni	100	9
	Mixed Infection	100	53

SAMPLE COLLECTION

During hot months of the year samples were collected from different breeds, age and sex of cattle from Cattle breeding and Dairy Farm Harichand, Charsadda. For studying the haemo- protozoan, a total of 234 blood samples were collected while 100 samples were collected for coprological examination.

MICROSCOPIC EXAMINATION

Thin blood smears were prepared and fixed in methanol for 5 min and stained for 30 min in Giemsa stain diluted to 5% with buffer. Slides were then examined for haemo- protozoan i.e. *Anaplasma*, *Theileria* and *Babesia* spp. at 100× objective magnification (Shah et al., 2017) The parasite identification was done with the help of keys mentioned in the book titles “Veterinary Clinical Parasitology” (Zajac and Conboy, 2012).

COPROLOGICAL EXAMINATION

Fecal samples were collected directly from the rectum in sterile bottles and transported to Parasitology Lab, Center of Poultry and Parasitology, Veterinary Research Institute, Peshawar. Fecal sample was dissolved in saturated sugar solution (Soulsby, 1982) and examined for the presence of eggs/oocyst. Parasite eggs were identified on the basis of morphology (Zajac and Conboy, 2012).

STATISTICAL ANALYSIS

Data collected was arranged in Ms Office Excel and statistically analyzed by Chi square (χ^2) using Statistical Package for Social Services (SPSS) version 16.0 as described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

PREVALENCE OF TICK-BORNE DISEASES (TBDS)

Prevalence of Haemo- protozoan and gastrointestinal parasites were estimated using formula.

$$P = \frac{d}{n} \times 100$$

Where:

P: Prevalence; d: No. of animals found positive; n: Total no. of animals sampled (Thrusfield, 1995).

Out of total 234 blood samples 112 (48%) samples were positive for Haemo- protozoan’s in which *Theileria* and *Anaplasma* was recorded as 18 and 28%, respectively while mixed infection was recorded as 0.01%. In coprological examination 82 out of 100 samples were positive for intestinal parasites in which *Trichostrongylus*, *Bonostomum* and *Monezia* were recorded as 12, 8 and 9% , respectively while mixed infection was recorded as 53% (Table 1).

HAEMO-PARASITES

Breed wise prevalence of haemo- protozoan was 51, 61, 27, 37 and 46% for Jersey, Fresian, Achai, Jersey Achai cross and Fresian Sahiwal cross, respectively. Table 2 shows that there was significant difference (P<0.05) in the prevalence of haemo- protozoan with

the respect to breed, whereas no significant difference ($P>0.05$) was recorded age wise, though prevalence was higher in adult animals. Sex wise prevalence of haemo- protozoan was 20 and 58% for males and females and was found statistically significant ($P<0.05$).

Table 2: Prevalence of Haemo- protozoan in different cattle with respect to breed, age and sex

Variables	Category	N	Prevalence of Haemo- protozoan %	χ^2 value	P value
Breed	Jersey	41	51	27.82	0.006
	Friesian	83	61		
	Achai	33	27		
	Jersey \times Achai	51	37		
	Friesian \times Sahiwal	26	46		
Age	Adult	193	51	4.66	0.198
	Young	41	34		
Sex	Female	170	58	21.15	0.000
	Male	64	20		

GASTROINTESTINAL PARASITES

Gastrointestinal parasitism was found to be 87, 71, 100, 89 and 80% for Jersey, Friesian, Achai, Jersey Achai cross and Friesian Sahiwal cross, respectively. Breed wise prevalence was found to be non-significant statistically ($P>0.05$) through *Chi* square analysis. Prevalence of intestinal parasitism was statistically significant ($P<0.05$) with respect to age and sex (Table 3).

In Pakistan, parasitic infections *i.e.* haemo- parasites and gastrointestinal parasitism poses significant threat to the booming dairy industry of the country. Haemo- parasitic diseases are present throughout the world, but are most devastating in tropical and sub-tropical areas (Sathaporn et al., 2004). Different developmental stages of ticks serve as means of transmission for these haemo- parasitic diseases (Pipano and Shkap, 2006). Many tick borne haemo- parasitic diseases are present in domestic animals in Pakistan, including *Babesia*, *Theileria* and *Anaplasma* (Zahid et al., 2005; Silke, 2009).

In the current study, overall prevalence of haemo- parasitic infections was 47.8%, in which *Theileria*, *Anaplasma* and mixed infections were recorded as 18, 28 and 0.01%. Prevalence of *Theileria* was slightly lower from that of Zahid et al. (2005) who recorded higher (24%) incidence of theileriosis. The difference might be due to the fact that

Zahid et al. (2005) focused mainly on Holstein Friesian while in the present study different local, exotic and cross bred cattle were observed. Similarly, Afridi et al. (2005) has stated the prevalence of Anaplasmosis as 4.2% which is lower from that recorded in the present study (28%). Afridi et al. (2005) conducted their study in Peshawar which might be the possible reason of disagreement because the current study was carried out in Cattle and breeding Farm, Harichand, Charsadda which offer more favorable environment for tick infestation.

Breed wise prevalence of haemo- parasitic diseases showed higher prevalence in Friesian cattle (61%) followed by Jersey (51%), Friesian Sahiwal cross (46%), Jersey Achai cross (37%) and Achai (27%). These findings are in congruent with the results stated by Tahir (2000), Fukasawa et al. (2003), Durrani et al. (2010) that prevalence was more in Friesian and cross bred cattle as compare to local breeds. Exotic and cross bred cattle are more susceptible to haemo- parasitic diseases as compare to indigenous breed. Achai being the indigenous breed of cattle in Khyber Pakhtunkhwa, Pakistan exhibits a high level of resistance to ticks and ultimately to tick transmitted diseases.

Table 3: Coprological examination of different cattle with respect to breed, age and sex

Variables	Category	N	Prevalence %	χ^2 value	P value
Breed	Jersey	23	87	22.09	0.140
	Friesian	38	71		
	Achai	11	100		
	Jersey \times Achai	18	89		
	Friesian \times Sahiwal	10	80		
Age	Adult	65	72	34.40	0.000
	Young	35	100		
Sex	Female	80	89	14.76	0.005
	Male	20	55		

Though the prevalence of haemo- parasitic diseases was more in adult cattle as compare to young in the present study but statistically it was non-significant. These results were found similar to the findings of Khan et al. (2004) and Atif et al. (2012). Prevalence was found significantly higher in female as compare to male and these findings are in congruent to Rajput et al. (2005) and Durrani (2008) who reported higher prevalence of *Theileria annulata* and *Anaplasma marginale* in female animals. Hormonal disturbances and immunosuppression in female animals might be the possible reason for the higher prevalence of haemo- parasitic diseases (Kocan et al., 2003).

Parasitic diseases have strong seasonal correlation as hot and humid weather provide conducive environment for the

propagation of ticks which act as vector for haemo-parasitic diseases. As this study was conducted in a farm where mostly animals are roop-tied which exert stress and thus immunosuppression and eventually higher parasitic diseases. In study area, animal's movement was limited which predisposed animals to increase tick infestation.

Coprolological examination of cattle revealed that mixed infection was present in most of the animals followed by *Trichostrongylus*, *Moneizia benedeni* and *Bonostomum*. Higher prevalence of helminthes in the current study might be due to the fact that the study area provided a conducive environment for the development of these parasites. These findings are supported by the work carried out by Samanta and Santra (2007), Jyoti et al. (2011) and Singh et al. (2012). Intestinal parasitism was found significantly higher at young age comparatively. Young animals are most susceptible to parasitic diseases as compare to adult due to weak immune status. These results are supported by Singh et al. (2012). Most of the animals in the study area were tethered animal that is why no trematodal infection was recorded in this study.

CONCLUSION

It was concluded from the present study that both parasitic infections *i.e.* Haemo-parasites and gastrointestinal parasites were prevalent in Cattle and Breeding Farm, Harichand. For the complete eradication of parasitic diseases, control strategy including proper treatment and management should be devised along with periodical screening of animals.

AUTHOR'S CONTRIBUTION

MIK conceived idea of the manuscript. SSAS, MI and AU collected samples. SSAS and HK analyzed the data and wrote draft of the manuscript. All authors reviewed the final version of the manuscript.

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