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Gastrointestinal parasitic infections in cattle and buffaloes in southwestern region of Gujarat, India

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Gastrointestinal (GI) parasitic infections are responsible for causing considerable economic losses as a consequence of lowered fertility, reduced work capacity, reduction in food efficiency and lower weight gain, lower milk production, increased treatment cost and mortality in heavily parasitized animals (Krishnamurthy and D'souza 2014). Subclinical GI parasitic infections are most common and economically important in India (Jyoti *et al*. 2011). The hot and humid climatic conditions are very congenial for propagation and perpetuation of parasites (Enderjat 1964). Country like India has this kind of climatic conditions throughout the year except 3 to 4 months of winter, especially in Junagadh where winter is very short. Therefore, data on parasitic prevalence are very essential to make an appropriate plan for its prevention and control. Hence, in this study, an attempt was made to record the prevalence of GI parasites in cattle and buffaloes associated with the influence of age, sex, breed and season in south-western region of Gujarat, India.

Randomly, faecal samples (517) of cattle (215) and buffaloes (302) were collected at the Veterinary College, during January to December 2017. The samples were examined individually for GI parasites, first direct faecal examination method and subsequently through sedimentation method (Soulsby 1982). The samples were examined for parasitic eggs and protozoan ova/oocyst according to Soulsby (1982) and Hendrix *et al.* (2006). At least, 2 to 3 slides were examined for each sample before confirming its result. All protozoa and helminth eggs were identified on the basis of morphological characteristics (Bowman *et al*. 2003) using light microscopy. The results were subjected to standard statistical analysis and χ^2 test was used to compare parasite prevalence and were considered significant when P≤0.05. The prevalence of GIPs was studied taking into consideration the overall prevalence, seasonal variation, age, sex and breed of animals.

In our study, 61.32% of animals were positive for GI parasite infection. Overall, higher percentage of cattle was positive for parasitic infections than buffaloes but the difference was not significant. There were different types of GI parasites recorded in fecal samples like trematode, nematode, cestode and protozoa (Table 1). In previous studies, lower but similar trends of GI parasites infection in cattle and buffaloes [45.5% and 43.4% (Kumar *et al.* 2016) and 42% and 36% (Maharana *et al*. 2016), respectively] were recorded. Lower rate of infection might be due to different time of observation and number of samples examined. Kumar *et al.* (2017) observed that 58.3% of buffaloes in Junagadh were infected with GI parasites. Hirani *et al.* (2006) reported 44.2% prevalence of GI parasites in adult cattle in central Gujarat, which is in the range of present study. Similar trends of GI parasites infections were also recorded from other states of India (Choubisa and Jaroli 2013, Krishnamurthy and D'souza 2014). Maqbool *et al.* (2018) recorded 68.96% helminths infection in cattle in South Kashmir.

Among the infected animals, significantly (P<0.05) highest number of animals were found infected with protozoan parasites (52.68%) followed by nematode (24.92%), trematode (18.30%) and lowest with cestode (4.10%). In the different GI parasites recorded, *Buxtonella sulcata* was the most prevalent one (22.32%) followed by *Toxocara vitulorum* (12.1%), *Eimeria* spp. and amphistomes (8.37% each), *Fasciola* spp. and Strongyle (4.18% each), *Moniezia* spp. (3.25%) and *Strongyloides* spp. (1.86%) in cattle. Similar trends of parasitic infections were recorded in buffaloes but lower than cattle except for *B. sulcata* (27.48%) [other parasitic infections recorded in buffaloes were *T. vitulorum* (7.28%), *Eimeria* spp. and amphistomes (5.96% each), *Fasciola* spp. and strongyle (4.30% each),

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Moniezia spp. (1.98%) and lowest was *Strongyloides* spp. (1.65%)] according to others (Kumar *et al.* 2016, Maharana *et al.* 2016). The different types of parasitic infections recorded in the both sexes of cattle and buffaloes are given in Table 1.

Results indicated that the protozoan parasites dominate over the helminths infections. Among all, *B. sulcata* (25.34%) was the most prevalent one as recorded earlier (Kumar *et al.* 2016) as well as in the present study. Though, *B. sulcata* is considered as non-pathogenic but in recent time its pathogenicity was recorded in the form of diarrhoea (AI-Saffar *et al.* 2010).

Sex wise, higher percentage of female cattle and buffaloes were infected compared to male. But, the differences in GI parasites infections within cattle and between cattle and buffaloes were not significant (P>0.05). However, the difference was significant (χ^2 value: 4.856; P<0.05) between male and female buffaloes. Though, higher percentage of GI parasitic infections such as *B. sulcata*, *T. vitulorum, Eimeria* and amphistomes were recorded in female than that in male, but the difference was not significant (P>0.05). Cestode and nematode infections were not recorded in male buffaloes. This might be because the indigenous male cattle is used for draught purpose, hence, equal importance is given to both male and female. In male buffaloes, significantly low prevalence might be due to less number of animals (9) examined for parasitic observation compared to female (293).

Significantly (P<0.05) higher percentage of young animals, age up to 2 years (69.41%) and age between 2 to 5 years (60.87%), were found infected with GI parasites compared to above 5 years (41.58%) age group. Similar trends were recorded in cattle, where significantly (P<0.05) higher percentage of infections was recorded up to 2 years (72.32%) and 2 to 5 years (68.25%) age groups compared to above 5 years of age (37.50%). Whereas in buffaloes, significantly (P<0.05) higher percentage of GI parasite infections were recorded up to 2 years (67.13%) age compared to above 5 year-age group (44.26%). The age wise difference in GI parasite infection between the cattle and buffaloes was not significant (P>0.05). Age is an important risk factor for the prevalence of GIPs. Young animals are more susceptible to parasitic infections than adults (Maharana *et al.* 2016, Kumar *et al*. 2016, Khan *et al.* 2017).

Significantly (P<0.05), highest prevalence of GI parasites in cattle and buffaloes was observed in monsoon (76.76%) followed by winter (50.56%) and lowest in summer (43%). The trends were similar for both species of animals (Table 2). Statistically significant (P<0.05) higher prevalence of parasitic infections was recorded in monsoon season compared to summer (χ^2 value: 28.6133 for cattle and 11.7249 for buffaloes) and winter (χ^2 value: 20.6538 for cattle and 11.8401 for buffaloes). However, between 2 species, the difference in GIPs infections between summer and winter was not significant (P>0.05). High moisture content along with temperature favour the development of

Table 1. Types of parasites and percentage of samples recorded for GI parasitic infections in cattle and buffaloes (number of positive sample is given in parenthesis)

Parasite class	Parasite species	Cattle			Buffaloes			Overall
		Male	Female	Total	Male	Female	Total	
Trematode		14.29 (04)	12.30 (23)	12.56 (27)	11.11 (01)	10.24 (30)	10.26 (31)	11.22 (58)
	Amphistomes	17.64 (03)	12.29 (15)	8.37 (18)	11.11 (01)	9.71 (17)	5.96 (18)	6.96 (36)
	Fasciola gigantica	5.88 (01)	6.55 (08)	4.18 (09)	00.00 (00)	7.42 (13)	4.30 (13)	4.25 (22)
Cestode	*Moniezia* spp.	3.57 (01)	3.21 (06)	3.26 (07)	0.00 (00)	2.05 (06)	1.99 (06)	2.51 (13)
Nematode		17.86 (05)	18.18 (34)	18.14 (39)	00.00 (00)	13.65 (40)	13.25 (40)	15.28 (79)
	Strongyles	11.76 (02)	5.73 (07)	4.18 (09)	00.00 (00)	7.42 (13)	4.30 (13)	4.25 (22)
	Strongyloides spp.	00.0 (00)	3.27 (04)	1.86 (04)	00.00 (00)	2.85 (05)	1.65 (05)	1.74 (09)
	Toxocara vitulorum	17.64 (03)	18.85 (23)	12.09 (26)	00.00 (00)	12.57 (22)	7.28 (22)	9.28 (48)
Protozoa		25.00 (07)	31.55 (59)	30.70 (66)	22.22 (02)	33.79 (99)	33.44 (101)	32.30 (167)
	Buxtonella sulcata	29.41 (05)	35.24 (43)	22.32 (48)	22.22 (02)	46.28% (81)	27.48 (83)	25.34 (131)
	Eimeria spp.	11.76 (02)	13.11 (16)	8.37 (18)	00.00 (00)	10.28 (18)	5.96 (18)	6.96 (36)
Total		60.71 (17)	65.24 (122)	64.65 (139)	33.33 (03)	59.73 (175)	58.94 (178)	61.32 (317)

Table 2. Seasonal prevalence of GI parasites in cattle and buffaloes (number of samples in parenthesis)

Season	Cattle		Buffalo		Overall	
	Total sample	Positive sample (%)	Total sample	Positive sample (%)	Total sample	Positive sample (%)
Summer	43	39.53 (17)	57	45.61 (26)	100	43.00 (43)
Monsoon	104	83.65* (87)	137	71.53* (98)	241	76.76* (185)
Winter	68	51.47 (35)	108	50.00 (54)	176	50.56 (89)
Total	215	64.65 (139)	302	58.94 (178)	517	61.31 (317)

*P<0.05.

larvae, the reason behind the highest prevalence of GI parasitic infections during monsoon as also observed earlier (Laha *et al.* 2013). The optimum moisture and temperature for development of larvae in the pasture during cold and hot season, could be the reason for lower and lowest prevalence during winter and summer, respectively.

Breed wise, significantly higher percentage of GI parasites infections were recorded in Gir cattle (71.95%) and Jaffrabadi buffaloes (61.26%) compared to HF (42.42%), and Kankrej (38.88%) cattle as compared to Surati (54.83%) and Mahesani (33.33%) buffaloes. The difference in the prevalence of GI parasites between Kankrej and HF cattle, and Surati and Mahesani buffaloes was not significant (P>0.05). Among all the recorded GI parasites, *B. sulcata* was the highest one in all the breeds studied. Significantly higher prevalence of GI parasitic infection was recorded in Gir cattle and Jaffrabadi buffaloes compared to other breeds. Animal husbandry and pasture management practices adopted by the farmers, indiscriminate feeding habits, little or absence of deworming practices pave the way for more worm load in animals.

In conclusion, present study revealed that GI parasites like *B. sulcata, T. vitulorum, Eimeria,* amphistomes, *Fasciola,* strongyle nematodes, and *Strogyloides* are affecting the cattle and buffaloes where the prevalence of first two parasites is maximum especially in monsoon season. Therefore strategic control and deworming programme should be adopted to combat these GI parasites.

SUMMARY

A study was conducted on cattle and buffaloes in western region of Gujarat to determine the incidence of gastrointestinal parasites (GIPs) infection in it. Coprological examination revealed, higher incidence of GIPs infections in cattle compared to buffaloes. Overall, incidence of parasitic infections in both cattle and buffaloes was recorded highest for protozoan parasites followed by nematode, trematode and least for cestode. Age wise, the highest incidence of GI parasitic infections was recorded in up to 2 years age group followed by 2–5 years aged and lowest in above 5 years aged animals. Significantly, higher prevalence of GI parasites was recorded in female cattle and buffaloes compared to male. Seasonally, significantly higher percentage of GI parasitic infections was recorded in monsoon followed by winter compared to summer. Similarly, breed wise, significantly higher infection of GI parasites was recorded in Gir cattle compared to Jaffrabadi buffaloes.

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