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Prevalence of gastro-intestinal parasites in cattle of Nimar region of Madhya Pradesh

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Abstract
Prevalence of gastrointestinal (GI) parasites, based on faecal sample examination of cattle was carried out in the district of Khargone, Barwani and Dhar in Nimar region of Madhya Pradesh. Out of 688 faecal samples were examined coprologically, 319 (46.37%) were found positive for gastrointestinal parasitic eggs and protozoan oocyst. Prevalence of different parasites viz. strongyles (21.37%) followed by amphistomes (13.08%), *Eimeria* spp. (10.03%), *Fasciola* spp. (5.81%), *Moniezia* spp. (3.34%), *Trichuris* spp. (2.33), *Strongyloide*s spp. (1.89%) and *Toxocar* spp. (1.58%) were recorded. There was no significant effect of district on the prevalence of gastrointestinal parasites in cattle. In cattle except amphistomes and *Moniezia* spp. the prevalence of other parasites *viz.* strongyle, *Strongyloides* spp., *Toxocara* spp., *Fasciola* spp., *Eimeria* spp and *Trichuris* spp. did not have significant relation (P>0.05) with sex. The prevalence of strongyle, amphistosmes and *Fasciola* spp. was significantly higher in (P<0.01) in adult cattle whereas the prevalence of *Toxocara* spp. was significantly high in cow calves. The results provide a baseline data for planning future research and control strategies against gastrointestinal parasites in this region.

Keywords: Gastro-intestinal parasites, cattle, Nimar prevalence

1. Introduction
The economic impact of GI parasites in livestock industry encompasses mortality and morbidity losses (measured in terms of less than optimum production of meat and milk), enhanced susceptibility to diseases, and losses resulting from condemnation of carcasses and, viscera as well as cost of drugs and Veterinary aids [1]. A major distinctive feature of this gastrointestinal parasitism is the loss of protein into the gut and increased rates of gastrointestinal tissue protein metabolism and a net movement of amino acid nitrogen from muscles and skin to liver and gastrointestinal tract which decreases their availability for growth, milk and wool production [2]. In spite of significant production losses, which may run into millions of rupees, the problem is neglected due to its chronic and insidious nature [3]. Domestic ruminants due to improper management, unhygienic conditions and improper use of anthelminthic chemicals are suffering from helminth parasitic diseases [4]. Therefore, information on the epidemiological patterns of the parasitic diseases in different agro-climatic zones of the country would provide a basis for evolving effective strategy for their management [5].

Materials and methods
The state of Madhya Pradesh is situated between 17º to 25º latitude and 72º to 85º longitude. The Nimar region occupies a plateau in western Madhya Pradesh and south-eastern Maharashtra between 21°10′N 73°45′E and 25°10′N 79°14′E with Gujarat in the west. The region includes the districts of Khargone, Barwani and Dhar.
30 cattle (20 adult and 10 calves) were selected randomly from each district and freshly laid or rectal faecal samples were collected in an individually labelled polythene bags in every month from different districts of Nimar region over a period of seven months (Nov-2012 to May-2013). A Total of 688 faecal samples were collected and these samples were taken to the laboratory at the earliest for further examination [6].
Modified Sheather's Sugar floatation technique as described [7] was used for the detection of helminth eggs and oocyst of protozoa. The eggs of flukes were examined by Formal ether acetic acid as described [6].

The association of prevalence of different GI parasite with the season, age and sex in these species was tested employing Chi-square test of independence of attributes [8].

Results

A total of 688 faecal samples of cattle were examined, out of that 319 were positive for Gastro-intestinal parasites and overall prevalence recorded was 46.37%. The prevalence of strongyles was recorded to be highest (21.37%) followed by amphistomes (13.08%), *Eimeria* spp. (10.03%), *Fasciola* spp. (5.81%), *Moniezia* spp. (3.34%), *Trichuris* spp. (2.33%), *Strongyloides* spp. (1.89%) and *Toxocara* spp. (1.58%) as shown in Table 1.

Table 1: Prevalence of Gastrointestinal parasites in cattle of Nimar region of Madhya Pradesh

Factors	Sample examined	Positive %	Strongyles (%)	*Strongyloides* spp. (%)	*Toxocara* spp. (%)	*Trichuris* spp. (%)	Amphistomes (%)	*Fasciola* spp. (%)	*Moniezia* spp. (%)	*Eimeria* spp. (%)
	Seasons									
Winter (Nov -Feb)	397	180(45.34)	85(21.41)	10(2.52)	9(2.27)	7(1.76)	41(10.33)	28(7.05)	15(3.78)	35(8.82)
Summer (March - May)	291	139(47.77)	62(21.31)	3(1.03)	2(0.69)	9(3.09)	49(16.84)	12(4.12)	9(3.09)	34(11.68)
Total	688	319(46.37)	147(21.37)	13(1.89)	11(1.58)	16(2.33)	90(13.08)	40(5.81)	24(3.34)	69(10.03)
Chi-square value	---	0.39(NS)	.001(NS)	2(NS)	2.66(NS)	1.31(NS)	6.26*	2.63(NS)	0.23(NS)	1.53(NS)
	Sex									
Female	387	189(48.84)	83(21.45)	8(2.07)	7(1.81)	9(2.33)	65(16.80)	22(5.68)	20(5.17)	37(9.56)
Male	301	130(43.19)	64(21.26)	5(1.66)	4(1.33)	7(2.33)	25(8.31)	18(5.98)	4(1.33)	32(10.63)
Chi-square value	---	2.17(NS)	.003(NS)	0.15(NS)	0.25(NS)	0(NS)	10.73**	0.03(NS)	7.41**	0.22(NS)
	Age									
0-1 year	190	48(25.26)	7(3.68)	3(1.58)	11(5.79)	2(1.05)	0(0)	0(0)	3(1.58)	30(15.79)
>1 year	498	271(54.42)	140(28.11)	10(2.01)	0(0)	14(2.81)	90(18.07)	40(8.03)	21(4.22)	39(7.83)
Chi-square value	--	47**	147**	0.14(NS)	29.3**	1.87(NS)	39.51**	16.20**	2.84(NS)	9.65**
	District									
Dhar	245	117(47.76)	51(20.82)	5(2.04)	3(1.22)	6(2.45)	30(12.24)	14(5.71)	8(3.27)	28(11.43)
Barwani	222	112(50.45)	55(24.77)	5(2.25)	2(0.90)	3(1.35)	36(16.22)	14(6.31)	11(4.95)	23(10.36)
Khargone	221	90(40.72)	41(18.55)	3(1.36)	6(2.71)	7(3.17)	24(10.86)	12(5.43)	5(2.26)	18(8.14)
Chi-square Value		4.51(NS)	2.23(NS)	0.53(NS)	2.66(NS)	1.63(NS)	2.64(NS)	0.16(NS)	2.44(NS)	1.43(NS)

In winter season, a total of 397 faecal samples were examined from which 180 (45.34%) faecal samples were found positive. The prevalence of strongyles was recorded to be highest (21.41%) followed by amphistomes (10.33%), *Eimeria* spp. (8.82%), *Fasciola* spp. (7.05%), *Moniezia* spp. (3.78%), *Strongyloides* spp. (2.52%) *Toxocara* spp. (2.27%) and *Trichuris* spp. (1.76%). Further, a total of 291 faecal samples were examined during summer season, from which 139 (47.77%) faecal samples were found positive. The highly prevalent gastro-intestinal parasite in summer season was strongyle (21.31%) followed in order by amphistomes (16.84%), *Eimeria* spp. (11.68%), *Fasciola* spp. (4.12%), *Moniezia* spp. (3.09%), *Trichuris* spp. (3.09%), *Strongyloides* spp. (1.03%) and *Toxocara* spp. (0.69%).

Out of 688 faecal samples of cattle examined, 387 were from female and 301 were from male. Out of 387 faecal samples of females, 189 were found positive for gastro-intestinal parasites with overall prevalence of 48.84 per cent. The highly prevalent gastro-intestinal parasite in females was strongyle (21.45%) followed in order by amphistomes (16.80%), *Eimeria* spp. (9.56%), *Fasciola* spp. (5.68%), *Moniezia* spp. (5.17%), *Trichuris* spp. (2.33%), *Strongyloides* spp. (2.07%) and *Toxocara* spp. (1.81%). Out of 301 faecal samples of males, 130 were found positive for gastro-intestinal parasites with overall prevalence of 43.19 per cent. The highly prevalent gastro-intestinal parasite in males was strongyle (21.26%) followed in order by *Eimeria* spp. (10.63%), amphistomes (8.31%), *Fasciola* spp. (5.98%), *Trichuris* spp. (2.33%), *Strongyloides* spp. (1.66%) and *Moniezia* spp. (1.33%) and *Toxocara* spp. (1.33%) had same prevalence rate. The details have been shown in Table 1.

Out of 190 faecal samples from cattle calves aged 0-1 year examined 48 (25.26%) were positive for different GI parasites. The highest prevalence was recorded for *Eimeria* spp. (15.79%) followed by *Toxocara* spp. (5.79%), strongyles (3.68%), *Strongyloides* spp. (1.58%), *Moniezia* spp. (1.58%) and *Trichuris* spp. (1.05%). Similarly, the overall prevalence of different GI parasites in cattle aged above one year were recorded as 54.42 per cent (271/498). The highest prevalence was recorded for strongyles (28.11%), followed by amphistomes (18.07%), *Fasciola* spp. (8.03%), *Eimeria* spp. (7.83%), *Moniezia* spp. (4.22%), *Trichuris* spp. (2.81%) and *Strongyloides* spp. (2.01%).

A total of 245 faecal samples from cattle of Dhar district were examined for the prevalence of gastro-intestinal parasites. An overall prevalence of 47.76 per cent was recorded. Strongyles showed highest prevalence rate as 20.82 per cent followed by amphistomes (12.24%), *Eimeria* spp. (11.43%), *Fasciola* spp. (5.71%), *Moniezia* spp. (3.27%), *Trichuris* spp. (2.45%) and *Strongyloides* spp. (2.04%). The lowest prevalence was recorded in *Toxocara* spp. as 1.22%.

Similarly, overall prevalence of GI parasites was recorded as 50.45% out of 222 faecal samples from the cattle of Barwani district. The prevalent parasites were strongyles (24.77%) followed by amphistomes (16.22%), *Eimeria* spp. (10.36%), *Fasciola* spp. (6.31%), *Moniezia* spp. (4.95%), *Strongyloides* spp. (2.25%), *Trichuris* spp. (1.35%) and *Toxocara* spp. (0.90). In Khargone district overall prevalence of GI parasites was recorded as 40.72% (90/221). The prevalence of strongyles was the highest (18.55%) followed by amphistomes (10.86%), *Eimeria* spp. (8.14%), *Fasciola* spp. (5.43%), *Trichuris* spp. (3.17%), *Toxocara* spp. (2.71%) and *Moniezia* spp. (2.26%). The lowest prevalence was recorded in *Strongyloides* spp as 1.36 per cent. The details have been shown in Table 1.

Discussion

The prevalence of amphistomes was significantly high ($P<0.05$) in summer season as 16.84 per cent as compare with 10.33 per cent in winter season. The life cycle of amphistome is indirect and snail acts as intermediate host. The higher prevalence in summer season may be due to husbandry practice by the famers and they allow their animal in pasture. In winter season animals are mostly stall fed so as to avoid

cold wave outside and in summer season farmers allow their animals to graze outside and thus increase the possibility of picking infection as the animal have access to snail intermediate hosts [9]. Again, the highest prevalence of amphistomes during summer months may be attributed to the fact that during summer temperature slowly increases above 20 ^{0}C which is a favourable temperature for larval development in intermediate host [10]. The seasons under study did not have significant effect on the prevalence of strongyle, *Strongyloides* spp, and *Toxocara* spp. This may be due to their direct life cycle and being endo-parasite they are heaving direct life and less prone to climatic effect. In Nimar region the rainy season prolongs upto September and the environment remain humid with suitable temperature for the hatching and development of nematode eggs and larvae.

In cattle except amphistomes and *Moniezia* spp. the prevalence of other parasites *viz.* strongyle, *Strongyloides* spp., *Toxocara* spp., *Fasciola* spp., *Eimeria* spp and *Trichuris* spp. did not have significant relation (P>0.05) with sex. The non-significant influence of sex on the prevalence of most of the gastrointestinal parasites may be due to fact that villagers kept both male and female animals together in at a particular place and thus they share common infections [11]. A significantly high prevalence (P<0.01; P<0.05) of amphistomes and *Moniezia* sp. in female cattle may be attributed to the fact that the life cycle of the parasites is indirect and they depend on intermediate host for completion of life cycle. Male animals are generally stall fed whereas females are generally allowed for grazing in pasture thus increases the chance of getting infection by picking infected intermediated host [12]. Again, in the study area, farmers were engaged in agriculture activities and use of cow bullocks was the common practice and low prevalence of worm infestation in males might be due to caring attitude [13]. This justification was also supported [14]. The higher prevalence in female may also be due to general susceptibility of female to gastrointestinal parasites. It is assumed that sex is a determinant factor influencing prevalence of parasitism [15] and females are more prone to parasitism during pregnancy, lactation and peri-parturient period due to physiological stress and decreased immune status [16].

Age group had significant effect on the prevalence of different gastrointestinal parasites except *Strongyloides* spp., *Moniezia* spp. and *Trichuris* spp. in cattle The prevalence of strongyle, amphistosmes and *Fasciola* spp. was significantly higher in (P<0.01) in adult cattle whereas the prevalence of *Toxocara* spp. was significantly high in cow calves. The prevalence of *Toxocara* spp. showed an inverse relationship with age. It may be due to the vertical transmission of these parasites. Several workers from India have earlier reported an inverse relationship between prevalence of *T. vitulorum* and age of the calf [17]. The results are in agreement with the findings of [18] who reported the prevalence of *Toxocara vitulorum* only in calves which they attributed to transmammary transmission and automatic expulsion of the parasite at the age of four to five months. Young animals are more susceptible due to incomplete development of immune system. Lower prevalence in adults may be due to immunological maturity as the animals get older and it develop acquired resistance due to repeated exposure to parasites. The hypothesis that older animals can acquire immunity against gastrointestinal parasites has been supported experimentally by different studies [19]. Trematode (amphistomes and *Fasciola* spp.) infections were not detected in cattle less than one year of age group. This may be due to that the farmers allow adult animals for grazing in marshy lands from where the adult animals pickup intermediate host i.e. metacercaria of these trematodes [20].

There was no significant effect of district on the prevalence. But overall per cent prevalence was little higher in Barwani district. This may be due hot and humid climatic condition of the district. Barwani is the hottest district of all and the hot and humid atmosphere is conducive for the hatching of parasitic eggs and development of larvae to infective stage [9]. Non-significant association (P>0.05) of prevalence of gastrointestinal parasites in different districts may be due to similar kind of husbandry and managmental practice. The three districts come under Nimar region and they receive almost similar amount of rain, the temperature remain similar in all the season and thus the similar climatic condition resulted in similar prevalence pattern of gastrointestinal parasites) [5].

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Conclusion

The present study revealed that cattle of Nimar region harboured eight different types of gastrointestinal parasites. Among them strongyle was the predominant followed by Amphistome, *Eimeria* spp., *Fasciola* spp., *Moniezia* spp., *Trichuris* spp., *Strongyloides* spp. and *Toxocara* spp.

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