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Epidemiological studies on gastrointestinal helminths of horses of Udaipur Rajasthan

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Abstract

The objective of the study was to estimate the prevalence of gastrointestinal helminths in the horse population of the Udaipur (Rajasthan) India. A total 175 clinical manifested horses were examined and 54 horses were found positive for gastrointestinal helminthes infection by examined coproscopically in Udaipur. Animal details such as age, breed and sex were collected for all study horses and analysed for risk of infection. The overall prevalence of GI parasites in horses in the present study was recorded to be 30.85%. Among various GI helminthes infections reported in the present study, *Strongyles* spp. (48.14%) were the most prevalent gastrointestinal helminthes followed by *Parascaris equorum* (16.66%), Mixed (14.81%), *Trichuris* (9.25%), *Amphistome* (7.4%) and *Oxyuris equi* (3.7%). In horses month wise analysis revealed significant difference ($p < 0.05$) and was found that highest prevalence rate was observed in the month of July (57.89%) and lowest in the month of October (11.53%). The highest seasonal prevalence was (42.46%) in Monsoon followed by (32.39%) in Summer and lowest (12%) in winter season. The age wise prevalence of gastrointestinal helminthes was 33.33% in 5-8 years, 31.25% in >8 years and 25.53% in 1-4 years. The sex wise prevalence highest prevalence (37.77%) in female and lowest (23.52%) in male was observed. In the Farming system wise highest prevalence (34.44%) was in loose farming and lowest (23.52%) in conventional farming i.e. well managed farms (27.05%) and the breed wise prevalence highest in (41.42%) in Marwari followed by Kathiawari (27.5%) and lowest (21.53%) in nondescript (Sindhi, Thorough breed, etc.).

Keywords: GI helminthes, prevalence, *Strongyles* spp.

Introduction

The horse (*Equus ferus caballus*) is a domesticated perissodactyl mammal and is a symbol of bravery and power since ancient days and Horse domestication is the livelihood of landless, small and marginal farmers in India. The total number of horses and ponies in India is 0.32 million numbers and in Rajasthan state horse is 33679 (20th livestock census, 2019) [5].

Horse played an important role in the development of human civilization, both in peace and war and is equally suitable for semi hilly tract and the sandy desert of Rajasthan. It play an important role as working animals in many parts of the world, including India and have been employed for packing, riding, carting and ploughing, while some are used in armed forces sport events and marriage, special functions. It acts as a main means of transport of goods and economy for poor farmers and is considered to be vital for both rural and urban transport system.

The economic losses caused by GI parasites include, losses through reducing working capacity (performance), a reduction in food intake and lower weight gains, colic, diarrhoea, treatment cost and mortality in heavy parasitized animals. (Buzatu *et al.*, 2016) [1]. Equines suffer from a wide spectrum of disease causing pathogens of which gastrointestinal helminths (GIH) are very common and present a serious challenge to health and welfare issues of the equids worldwide (Lester, 2015) [3]. Gastrointestinal helminths not only cause direct damages but also lower the immunity of the infected animals and predispose them to a wide array of diseases. In weakened, debilitated or immune-compromised horses, small numbers of parasites can lead to mortality (Samuel *et al.*, 2015) [11]. The horse is host to a great number of gastrointestinal parasite species, of which nematodes of the family Strongylidae, commonly called *Strongyle* nematodes or *Strongyles*, are the most important. These parasites are ubiquitous and live as adults in the large intestine of equids (Lichtenfels *et al.*, 2002) [4].

In the Rajasthan state precise and systematic studies on GI parasites of horses are sparse, so there appears to be limited published sporadic prevalence study conducted in Bikaner district

(Kachhawa *et al.*, 2015, Sengupta and Yadav, 2001.)^[2, 10] and one from the animal fair of Rajasthan (Pilania *et al.*, 2012)^[8] for determining the prevalence of gastrointestinal helminths in horses. Presently, millions of rupees are being spent every year for GI helminths control in horses, but still internal parasites remain one of the most important problems affecting the health and wellbeing of equines. The probable reason for this might be that still lot of knowledge gaps especially regarding the epidemiology of GI parasites of equines still exist and the control measures recommended and practiced so far, provide limited protection as these are primarily aimed to remove the infections only and very less focus is on effort to reduce the environmental contamination.

Material and Method

A total of 175 faecal samples were collected from horses freshly during morning hours directly from the rectum or

ground. In the laboratory the samples were subjected to Floatation, Sedimentation technique.

Statistical analysis

The results were subjected to chi-square test was analyzed manually and online at Web Agri Stat Package, (SPSS 13.0 software). The difference between various groups were tested to be significant at $p \leq 0.05$ and $p \leq 0.01$.

Result and Discussion

Overall Copro-prevalence of GI helminths in horses in Udaipur (Rajasthan): The present study was carried out on 175 faecal samples collected from horses of Udaipur, Rajasthan. The results of qualitative faecal sample examination were used for elucidating the prevalence of GI helminthic infection and total 175 faecal sample analyzed, 54 (30.85%) were found positive for GI helminths infection in horse.

Table 1: Copro-prevalence of GI helminths in horses in Udaipur (Rajasthan)

Species	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphistome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
Horse	175	54	8	26	4	9	5	2
Percentage positive (%)		30.85	14.81	48.14	7.4	16.66	9.25	3.7

The overall prevalence of GI parasites in horses recorded in the present study was 30.85%. The results of current study are in close proximity with the observations of Pilania *et al.*, (2012)^[8] who reported 33.24% prevalence of GI parasites comprising only of *Strongyles* from animal fair of Rajasthan. Furthermore, the results are also comparable with 35.2%

(Kachhawa *et al.*, 2015)^[2], 61.62% from Rajasthan (Sengupta and Yadav 2001)^[10]. Similarly, close proximity with the 23.85% from Mexico (Romero *et al.*, 2020)^[9].

Month wise prevalence of GI helminths in horse in Udaipur (Rajasthan)

Table 2: Month wise prevalence of GI helminths in horse in Udaipur (Rajasthan)

Month	Total F/S examined	No. of positive	Percent prevalence (%)	Mixed	Strongyle	Amphistome	Parascaris equorum	Trichuris	Oxyuris equi
May	29	8	27.58	1 (12.5)	3 (37.5)	1 (12.5)	2 (25)	0 (0)	1 (12.5)
Jun	23	9	39.13	1 (11.11)	5 (55.55)	0 (0)	2 (22.22)	1 (11.11)	0 (0)
Jul	19	11	57.89	2 (18.18)	7 (63.63)	1 (9.09)	0 (0)	1 (9.09)	0 (0)
Aug	33	12	36.36	2 (16.66)	6 (50)	1 (8.33)	1 (8.33)	2 (16.66)	0 (0)
Sep	21	8	38.09	2 (25)	2 (25)	1 (12.5)	2 (25)	1 (12.5)	0 (0)
Oct	26	3	11.53	0 (0)	2 (66.66)	0 (0)	1 (33.33)	0 (0)	0 (0)
Nov	24	3	12.5	0 (0)	1 (33.33)	0 (0)	1 (33.33)	0 (0)	1 (33.33)
Over all	175	54	30.85	8	26	4	9	5	2

The chi-square statistic is 8.94. The p-value is 0.17. The result is not significant at $p < .05$.

Similar findings were reported by Singh *et al.*, (2019)^[14] highest prevalence rate was observed in the month of August (43.48%) and lowest in the month of March (21.05%) by examining faecal samples. Parsani *et al.*, (2013)^[7] reported seasonally maximum prevalence (85.3%) in March and minimum (65.2%) in July while in our study maximum

prevalence was in July (57.89%) and minimum in a October (11.53%). Yadav *et al.*, (2014)^[15] reported higher prevalence rate of nematodes infection in horses in April (85%) and May (70%) months while in our study higher prevalence was in July (57.89%) and lowest in the month of October (11.53%).

Season wise prevalence of GI helminths in horses in Udaipur (Rajasthan)

Table 3: Season wise prevalence of GI helminths in horses in Udaipur (Rajasthan)

Season	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphistome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
Summer (May-June)	52	17 (32.69)	2 (11.76)	8 (47.05)	1 (5.88)	4 (23.52)	1 (5.88)	1 (5.88)
Monsoon (July-Sep)	73	31 (42.46)	6 (19.35)	15 (48.38)	3 (9.67)	3 (9.67)	4 (12.90)	0 (0)
Winter (Oct-Nov)	50	6 (12)	0 (0)	3 (50)	0 (0)	2 (33.33)	0 (0)	1 (16.66)

The chi-square statistic is 7.4251. The p-value is .024415. The result is significant at $p < .05$.

The chi-square statistic is 7.4251. The p-value is .024415. The result is not significant at $p < .01$.

These findings completely tallied with the results obtained by Singh *et al.*, (2012)^[13] in which they reported higher infection in monsoon (79.35%) followed by summer (69.23%) and lowest in winter (59.70%). Matto *et al.*, (2015)^[6] reported similar seasonal pattern of the prevalence rate with highest

occurrence in monsoon (31.29%) followed by winter (20.40%) and summer (14.23%).

Age wise Prevalence of GI helminths in horse in Udaipur (Rajasthan)

Table 4: Age wise prevalence of GI helminths in horses in Udaipur (Rajasthan)

Age	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphistome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
(1-4 years)	47	12 (25.53)	2 (16.66)	8 (66.66)	0 (0)	2 (16.66)	0 (0)	0 (0)
(5-8 Years)	96	32 (33.33)	5 (15.62)	12 (37.5)	4 (12.5)	4 (12.5)	5 (15.62)	2 (6.25)
(>8 Years)	32	10 (31.25)	1 (10)	6 (60)	0 (0)	3 (30)	0 (0)	0 (0)

The chi-square statistic is 0.4884. The p-value is .783342. The result is not significant at $p < .01$.

The chi-square statistic is 0.4884. The p-value is .783342. The result is not significant at $p < .05$.

Similar findings were reported by Singh *et al.*, (2019) age wise prevalence of 33.96% in 6-12 years, 30.85% in 12-18 years and 29.79% in 1-6 years and Singh *et al.* (2012)^[13] reported that prevalence of gastrointestinal Helminthosis was 77.87%, 71.05%, 63.63% in 2-10 years, less than 2 years and greater than 10 years of age groups. Kachhawa *et al.*, (2015)

^[2] reported that gastrointestinal parasites showed higher prevalence in horses below 2 years of age followed by horses of 2-5 years of age and above 5 years of age.

Sex wise prevalence of GI helminths in horses in Udaipur (Rajasthan)

Table 5: Sex wise prevalence of GI helminths in horses in Udaipur (Rajasthan)

Sex	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphistome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
Male	85	20 (23.52)	3 (15)	10 (50)	2 (10)	3 (15)	1 (5)	1 (5)
Female	90	34 (37.77)	5 (14.70)	16 (47.05)	2 (5.88)	6 (17.64)	4 (11.76)	1 (2.94)
Total	175	54 (30.85)	8 (14.81)	26 (48.14)	4 (7.4)	9 (16.66)	5 (9.25)	2 (3.7)

The chi-square statistic is 2.2113. The p-value is .137004. The result is not significant at $p < .05$.

The chi-square statistic is 2.2113. The p-value is .137004. The result is not significant at $p < .01$.

The present study correlates with Singh *et al.*, (2019)^[14] sex wise prevalence of (33.04%) in female and (31.11%) in male and Singh *et al.*, (2012)^[13] reported that sex wise higher prevalence was recorded in female equines (75.73%) as

compared to males (72.30%).

Prevalence of GI helminths in horses according to rearing system in Udaipur (Rajasthan)

Table 6: Prevalence of GI helminths in horses according to rearing system in Udaipur (Rajasthan)

Rearing system	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphistome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
loose farming	90	31 (34.44)	4 (12.90)	15 (48.38)	3 (9.67)	5 (16.12)	3 (9.67)	1 (3.22)
Conventional	85	23 (27.05)	4 (17.39)	11 (47.82)	1 (4.34)	4 (17.39)	2 (8.69)	1 (4.34)

The chi-square statistic is 3.4241. The p-value is .064253. The result is not significant at $p < .05$.

The chi-square statistic is 3.4241. The p-value is .064253. The result is not significant at $p < .01$.

The findings of present study revealed highest percent prevalence was found in loose farming i.e., 34.44% in comparison of conventional farming i.e. well managed farms (27.05%). On similar lines, higher prevalence has been found in loose farming in comparison of conventional farming i.e. well managed farms reported by Yadav *et al.*, (2014)^[15]. Sharma *et al.*, (2011)^[12] revealed that the highest prevalence

in private unorganized farm (55.12%) followed by that of government organized (16.66%) and private organized unit (36.11%).

Breed wise prevalence of gastrointestinal helminths in horses in Udaipur (Rajasthan)

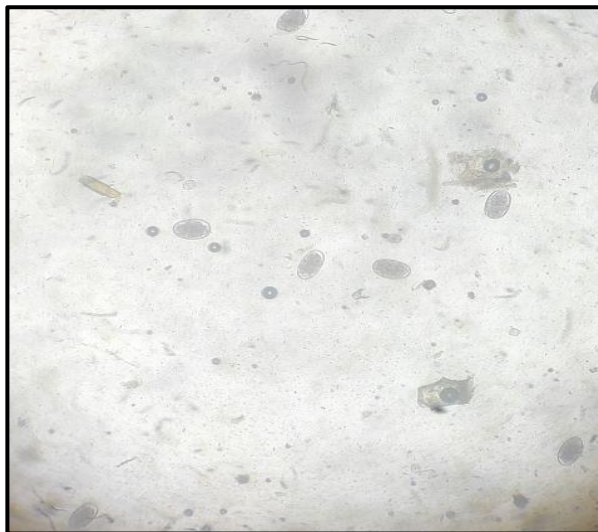
Table 7: Breed wise prevalence of gastrointestinal helminths in horse in Udaipur (Rajasthan)

Breed	Number examined	Number positive	Mixed (M)	Strongyle (S)	Amphi stome (A)	Parascaris equorum (PE)	Trichuris (T)	Oxyuris equi (O)
Mar wari	70	29 (41.42)	4 (13.79)	14 (48.27)	2 (6.89)	5 (17.24)	3 (10.34)	1 (3.44)
Kathia wari	40	11 (27.5)	2 (18.18)	6 (54.54)	1 (9.09)	1 (9.09)	1 (9.09)	0 (0)
Non Descript	65	14 (21.53)	2 (14.28)	6 (42.85)	1 (7.14)	3 (21.42)	1 (7.14)	1 (7.14)
Total	175	54 (30.85)	8 (14.81)	26 (48.14)	4 (7.4)	9 (16.66)	5 (9.25)	2 (3.7)

The chi-square statistic is 3.4122. The p-value is .181573. The result is not significant at $p < .01$.
 The chi-square statistic is 3.4122. The p-value is .181573. The result is not significant at $p < .05$.

The results of current study are in close proximity with the observations of Singh *et al.*, (2019) [14] who reported breed wise prevalence of 33.66% in Kathiawari followed by

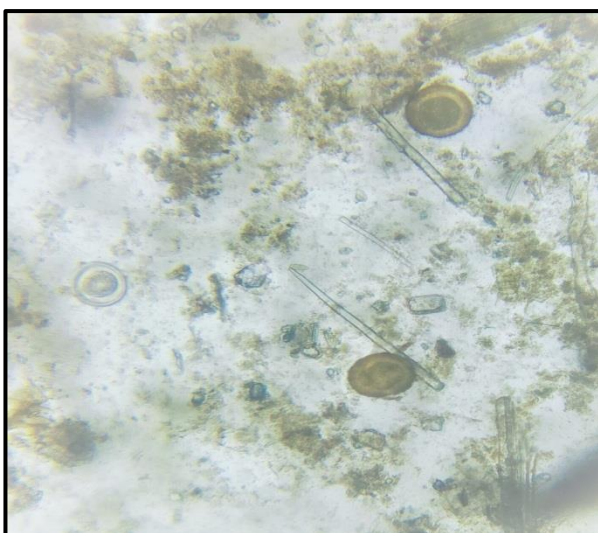
Marwari (32.14%) and lowest (29.03%) in Non Descript, in Gujrat.



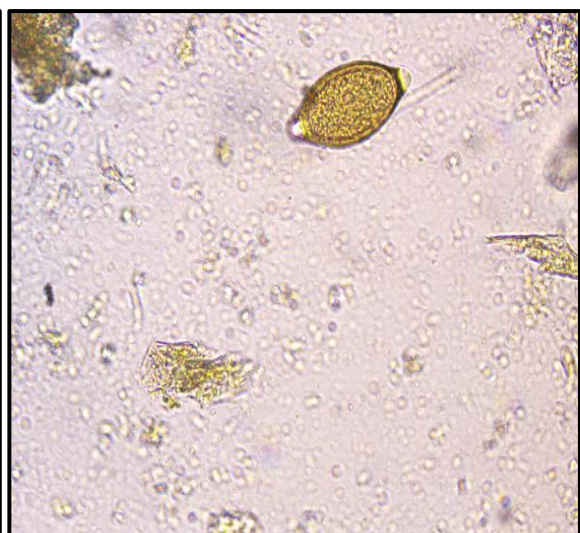
Strongyle spp.



Strongyle spp. (8 celled stage)



Parascaris equorum spp.



Trichuris spp.

Fig 1: Photomicrograph of Eggs

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