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Copro-prevalence of endoparasites in domestic pigs (*Sus Scrofa*) and associated risk factors in different pig farms of Hassan district, Karnataka

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Abstract
The prevalence of endoparasites in pigs of Hassan district was studied (April 2019 to March 2020). A total 207 faecal samples were collected from 26 farms distributed across eight Talukas (Administrative units below district). The overall parasite load was 40.59% in the entire sample size. The parasites observed in the study were *Ascaris suum (*51.19%*)*, *Strongyle* spp. (21.43%), *Trichuris* spp (5.95%), *Oesophagostomum* spp (3.57 %). *Coccidia* oocysts (16.67%), *Balantidium coli* (17.86%). The *A. suum* appeared as the dominant endoparasites followed by *Strongle*s spp. and *Coccidia* spp. The monsoon season influence was significant ($P \leq 0.05$) on higher prevalence of *Trichuris* spp. ($P \leq 0.05$). The katccha floor contributed significantly towards higher prevalence of *Trichuris* spp. and *Oesophagostomum* spp. The higher prevalence of parasites in all age groups suggest improper hygienic management and lack of scheduled deworming practices which are essential for reducing the worm burden.

Keywords: Pigs, Endoparasites, Prevalence Hassan, Risk factors

Introduction
Of all species, pigs are likely to constitute a greater share of the growth in the livestock subsector. Pig farming also requires small investment on buildings and equipments. It has immense potential to ensure nutritional and economic security for the weaker sections of the society. About 1.7% of the total livestock is contributed by pigs in India [1]. The pig population scenario over the decades in India indicates a decline in growth rate, which is a cause of concern. As per the 20th livestock census the total Pig Population in India is 09.06 million which has shown decline of 12.0% over previous 2012 Livestock Census. There is good scope to create sustainable progress in the pig production for increase the economic status of pig farmers in Karnataka state. However, various constraints such as infectious and non-infectious diseases, parasites and their control, labour management, feed constraint and socio-economic aspects need to be addressed.

Internal parasites are one of the most neglected threats and very common in swine worldwide, sometimes involving in the compromising production and occasionally the cause of clinical disease. Parasite infestations though not caused severe mortality but high morbidity affects the cost of production by influencing FCR, susceptibility to other disease, time taken to gain market weight etc. [2]. In India, pig farming is an attractive business particularly for the persons belonging to lower socio economic groups. Most of the pig farmers prefer backyard farming. Pigs are let loose to feed in garbage dumps during the day time, thus they may expose to a variety of pathogens especially internal parasites [3]. Although several reports have been published on various endoparasites of pigs from various climatic regions of India [4, 5, 6, 7], the information about these parasites in pigs of Hassan district, one of the major pork consuming district of Karnataka state is sparse. The objective of this study is to investigate the common parasite spectrum of domestic pigs at farm level and the associated managemental risk factors in this district. Hence a pilot work has been carried out to know the presence of endoparasites of domestic pigs at farms level in various Talukas of this district.

Materials and Methods
Selection of study area and sample collection
Hassan district belongs to southern part of Karnataka.

The district lying between 12° 13´ and 13° 33´ North latitudes and 75° 33´ and 76°38´ East longitude. Hassan district has a total area of 6826.15 km². The geography is mixed with the mountainous region to the west and south west called 'Bisle Ghat' and the plains regions in the north, south and east. There are some areas of degraded forest ranges in central portion of the district. The district is more famous for pork consumption. There are total of eight Talukas in this district. A detailed survey on the piggery farms in the district revealed a small house hold farms to average commercial bigger farms of the capacity of up to 300-350 animals have been kept in the farms. Majority of the farms were fattening type and very few farms are for breeding type. The official data on number of pig farms in the district is lacking and hence listing was done by contacting pig farmer, pig traders, Hassan district pig society, Dept of Animal Husbandry and Veterinary Services Government of Karnataka and Department Animal Husbandry Extension Veterinary College Hassan. A total of 28 were identified which are having pigs ranging from 50 to 350 numbers. From each farm 5 to 10% of animals were chosen for sample collection. The animals were in the age group ranging from 2 months to up to 2years. Preferably animals of age less than one year were selected for sample collection. In addition the pigs more than 2 years were also sampled

Sample collection

The faecal sample was collected by using self-made faecal swabs or the fresh void faeces was also collected if the animal passed the faeces. The collected faecal sample was brought to the laboratory at 4 °C and analysed within 2 hours.

Faecal examination method

The faecal samples were subjected to qualitative faecal examination techniques (Direct and sedimentation technique) as per standard protocols described by Soulsby [8]. The parasite eggs and the oocysts were identified based on the morphological features and the micrometry.

Statistics

The analyses were conducted using IBM SPSS Statistics for Windows, Version 22.0 statistical software (released 2013. © 2013, Armonk, NY: IBM Corp). The bivariate association between each hypothesized risk factor and endo-parasitic infection in pigs was evaluated using the Pearson chi-square test for categorical and continuous variables.

Ethical approval

As this study does not involve any invasive methods for sample collection hence no ethical committee approvals required.

Results

The study has been conducted during the period from April 219 to March 2020. A total of 26 farms of a total of seven different Talukas (Administrative units below district) of the Hassan district have been screened for the presence of endoparasites. A total of 207 faecal samples were screened in the study. Among screened samples 87 (40.59%) samples were positive for parasites (Table 1). The overall individual parasites and their percent prevalence observed in the study were *Ascaris suum* (Figure 1) (51.19%), *Strongyle* spp (Figure 2) (21.43%). *Trichuris* spp (Figure 3) (5.95%). *Oesophagostomum* spp (3.57%). unsporulated *Coccidia* oocysts (Figure 4) (16.67%) and *Balantidium coli* trophozoites and cysts (Figure 5) (17.76%). Some of the samples contain mixed parasite load (16.67%) like *A. suum* and *B. coli*, *Coccidia* and *B. coli*, *Strongyle* and *B. coli*. *Ascaris suum* is the higher abundant species followed by *Strongyle* spp. *Balantidium coli* and *Coccidia* oocysts.

The prevalence of parasite in relation to some of host factors was analysed and the results were tabulated in the table 1. The results revealed that the higher prevalence was observed in the age group between 3 to 6 months (52.5%) for by the age group more than 9 months (40%). The parasite prevalence was not significant ($P \leq 0.05$) among the age group. The percent prevalence of *A. suum* was higher in the age group up to 6 months compared to next subsequent age groups. The other parasites like *Strongyle* spp., including O*esophagostomum* spp. were at higher percentages at the age group between 6 and 9 months. None of the parasite prevalence was statistically significant ($P \leq 0.05$) in any age of the animals. The faecal samples from various breeds of pigs were analysed results revealed higher percentage of prevalence in most of the breeds as mentioned in the table 1, but in none of the breed the prevalence was significantly ($P \leq 0.05$) higher. The analysis of the parasite prevalence in both male and female sexes revealed higher abundance of parasites in both the sexes and there was no much significant ($P \leq 0.05$) difference between male and female sex was observed. The prevalence and abundance of the endoparasites in a total of eight Talukas of Hassan district was studied (Table 2). In seven out of eight Talukas represented the parasite load. In one taluka, named Arakalagudu only two samples were analysed revealed no parasites. The variations in the percentage of prevalence have been depicted in the fig 6**.** The overall higher percentages of abundance endoparasites prevalence was higher in Beluru (72.2%) taluka followed by Hassan (43.6%) and Holenarasipura (42.8%). The individual prevalence of different endoparasites which were observed in almost 7 talukas except Arakalagudu were analysed which revealed that significant ($P \leq 0.05$) higher prevalence (66.7%) of *Trichuris* spp. was observed in Aluru taluka. Similarly *Oesophagostumum* spp. appeared significantly ($P \leq 0.05$) in higher percentages (50%) in Sakhaleshpura taluka. The remaining other species of parasite like *A.ssum*, *Strongyle* spp. *Coccidia* spp. and *B, coli* were also in higher percentages in most of the Talukas but which were statistically not significant($P \leq 0.05$).

Higher abundance of Endo- parasites was observed in all the four seasons (Classified according to Indian Metrological Department) of the year (Table 3 and Figure 7). The pre-and post-monsoon seasons witnessed the higher percentage of overall prevalence and abundances. The higher abundance of *A. suum* was observed in all three seasons except rainy season but was statistically not significant ($P \leq 0.05$). The *Trichuris* spp., abundance was significantly ($P \leq 0.05$) higher in rainy season. The remaining all other species were also observed in most of the seasons but their abundances was statistically not significant.

The managemental factors like farm strength, floor type, deworming status and separation of young one and mixed raring of young and adults were noted and their association with the prevalence of endoparasites was studied the results were tabulated (Table 4). The farms were grouped in to four groups depending on the number of animals present in the farm. Higher numbers of parasites were observed in all the groups which were not statistically significant ($P \leq 0.05$). Among all the parasites *A. suum* was observed with higher

prevalence in almost all groups. The floor types in individual farm were recorded. The prevalence of endoparasites in animals kept on different floor was studied

The results revealed that the floor type has no influential in the prevalence and abundance of endoparasites except *Trichuris* spp and *Oesophagostomum* spp. In both these two species significant ($P \leq 0.05$) higher prevalence had been observed in the farms with Katccha floor. Similarly the prevalence of other parasites like *Strongyle A. suum*, and the protozoa like *Coccidia* and *B.coli*, was in higher percentages in farms having katchha floor but was not significant ($P \leq 0.05$). The deworming has got no significant influence on the prevalence of endoparasites instead for some of the parasites, higher abundance has been observed in the farms which were dewormed. Similarly, the farms with the mixing of young ones with the adults and the farms with the separate raring of young ones were compared for parasite prevalence. No significant change has been observed in both the farms.

Discussion

The results obtained from the study indicated that there is higher prevalence and abundance of endoparasites was existed the study area. The average parasite load of 40.59% has been observed out of 207 samples in the present study were almost in correlation with the earlier reports elsewhere in India. Various workers from different parts of India were reported the higher prevalence rate (11 to 38 %) of endoparasites in pigs [9, 10, 11, 12]. An overall 37.77% of gastrointestinal parasitism in pigs with a distribution of 36.34%, 47.31%, 34.45% and 60.95% in Meghalaya, Nagaland, Mizoram and Manipur states of India, respectively were reported [13]. The high prevalence of GI parasite infections (40.59%) in the pigs of the area under study is an indication of both a favourable environment for the survival and development of pre-infective stages of nematodes. Various parasites like *Ascaris suum*, *Strongyle* spp *Trichuris* spp, *Oesophagostomum* spp. unsporulated *Coccidia* oocysts and *Balantidium coli* trophozoites and cysts were recorded. The prevalence of various parasites

from Shimoga region of Karnataka were reported the prevalence and abundance of the parasites which were observed in the present study [14].

Among all the endoparasites observed in the present study, *A. suum* was recorded as the predominant GI parasites with the prevalence ranging from 14.3 to 55%. Similarly, *A. suum* had been found to be most prevalent parasite in pigs as reported earlier in India [8, 15,16, 17] as well as abroad [18, 19]. The higher prevalence of *Strongyle* spp. followed by *A. suum* and *B. coli* were reported from Shimoga region of Karnataka [14].

The prevalence of endoparasites in different age group was varied between 27 to 52.5% in the present study which was statistically ($P \leq 0.05$) not significant. The present study supports the finding of Sharma *et al*. [20] who didn't observed significant difference of parasite prevalence indifferent age groups. The high prevalence of GI parasitic infections in piglets (81.6%) and in adult pigs (61.7%) in Dimapur district of Nagaland were reported [21]. An overall higher prevalence of (56.5 %) endoparasites in pigs of more than one year age from Punjab, India was reported [3]. The variation in the prevalence might be due to the differences in the sampling criteria as they targeted pigs were only a few pigs from organised farms. Also, geographical location along with management practices like hygiene and deworming etc., are the major determinants may be considered. Overall, in the present study higher prevalence of parasites can be expected irrespective of the age groups of the pigs. Further detailed analysis with large sample size may yield a better clarity. With respect to individual species of parasites, *A.suum* and *Strongyle* spp. were observed in good percentage of abundance which was statistically not significant ($P \leq 0.05$). The prevalence of endoparasites was not significantly affected by the breeds of the pigs. In almost all the breeds including the local pigs there was a good percentage of abundance was found which indicated that breed has no impact on parasite prevalence. The present study is in accordance with Roesel *et al.* [22].

The sex of the pigs didn't have any significant ($P \leq 0.05$) influence on these GI parasitic infestations. In both males and the females good percentage of abundance of parasites was found. The sex of an animal had no significant influence prevalence of individual parasite. Our results are supported by Sharma *et al.* [20] who found statistically non-significant ($P > 0.05$) difference and almost similar prevalence of GI parasites i.e.is in males (28.4 %) and female (28.3 %) pigs. Similarly other worker (15, 17, 18, and 23) obtained the same findings.

The parasites prevalence was varying with the Talukas. The percentage abundance was higher in Belur Taluk followed by Hassan and Holenarasipura. The differences in percentages are due to the varying in sample collection. A significant ($P \leq 0.05$) higher prevalence of *Trichuris* spp. and *Oesophagostomum* spp. was observed in Aluru and Sakhaleshapura Talukas respectively. The study on parasite prevalence in different zones of Punjab state revealed that significant change in the prevalence of parasite was observed indifferent zones [20]. In the present study change in micro-climate and macroclimate, husbandry practices geographical picture and climate of individual Talukas might have played a significant role in change in parasite prevalence. Further detailed long term study in this aspect need to be studied all these Talukas.

There was no significant change in the overall parasite load as per the seasons (Seasons were classified according to Indian Metrological Department) in year is considered. Good percentage of abundance was found ranging from 25.8 % to 73.3 % in monsoon and pre-monsoon seasons respectively. The percentages variations between the seasons was not statistically significant ($P > 0.05$). The seasonal pattern of overall nematode infections observed in the investigation is attributable to one major factor i.e. the presence of larvae in the soil during the Rainy seasons and post rainy seasons which are usually wet. A climate with warmth and wetness is the most congenial for the majority of nematode parasites as reported by Rogers, [24]. During the wet season there is sufficient moisture for development of the pre-parasitic stages of the nematodes. Thus, in the present study the highest level of infection was noted in pre monsoon season which could be due to the fact that pre-monsoon rains in these areas along with the high level of humidity might have played a role in increasing the higher prevalence of parasites. Relatively low infections recorded during rainy season could be associated with the low level of infection. However, the seasonal pattern of incidence of infection did show a wide fluctuation between the seasons which was statistically not significant in the present study and followed a more or less uniform pattern throughout the year. A possible explanation could be that the region lacks the extreme climatic conditions, as the average monthly maximum and minimum temperatures do not

fluctuate much and, in addition, rains are distributed throughout the year as reported by Yadav and Tandon [15] and also could be due to the fact that the number of samples estimated were varying between the seasons. The prevalence of most of parasite under the present study were almost similar, except the prevalence of *Trichuris* spp. which was observed significantly (*P*>0.05) higher prevalence in the monsoon season followed by post- monsoon and winter seasons. The longer period prevalence could be due to the fact that *Trichuris* (whipworm) eggs are hardy and can therefore withstand adverse environmental conditions for up to 4 years [25]. The *Trichuris suis* can be zoonotic [26] and is therefore a public health concern.

Some of the farm factors like farm size, floor type, deworming status and animal mixing were studied to know the influence of these factors on parasite prevalence. The size of the farm didn't have any significant influence on parasite load. This could be due to the reason that in almost all the visited farms the managemental practices does not vary. The present study is in agreement with Roesel *et al*. [22] who studied the potential risk factors associated with gastrointestinal parasites in small-scale pig enterprises in Central and Eastern Uganda. They found the association of parasite infection with farm size with an odds ratio of 0.982 (P value 0.427). Almost higher percentage of abundances of parasite was observed in all three types of floors. *Ascaris suum* prevalence was higher at concrete floor compared to other types of floors. The *Trichuris* and *Oesophagostomum* spp. prevalence was significantly (*P*>0.05) higher in farms having Katccha floors, which could be because continuous moisture in the soil, improper removal of faeces makes the longer survivability of parasite eggs and behaviour of coprophagia in pigs makes them higher infection with the parasite eggs leads to higher prevalence. The lower prevalence of parasite infestation in the Mizoram as the floor of the house constructed in an elevation with wooden or bamboo made floor preventing dumping of faecal materials in the floor. This floor remained without contact with ground, which prevent the picking up of the infective stages of parasites directly from ground [13]. Deworming has got no impact on the parasite prevalence. Our results are in correlation with Roesel *et al*. [22] who found that administering anthelminthic drugs had no significant impact on the prevalence, even considering specific timing of deworming. Their study recorded self-reported practices by farmers and they were not able to capture if the correct drugs were administered at the correct dosage. The higher prevalence of gastrointestinal parasites amongst the pigs that had not been dewormed (86.8%) than the dewormed group (62.5%) [27]. they also found that *Coccidia* were the most prevalent parasite in both categories at 50% for dewormed and 83% for non-dewormed pigs. The reason could be the improper schedule of deworming, improper dosage, selection of dewormer, improper method of administration of dewormer and continuous usage of the same dewormer for long period of time might have led resistance in the parasites all these factors might have played a role in higher prevalence of endoparasites in the present study. Further detailed study in this aspect is need of an hour. The mixing of piglets with the adult ones did not impact on the parasite prevalence. In both separate raring and the mixing farms there was good prevalence of parasites was observed. The study on parasite prevalence in both mixed farm and separate farm revealed that separate raring of piglets yielded less chances of parasite infestation compared to mixed raring [22]. The present study is contradictory to the above report the reason could be improper data recording and poor managemental practices and we have recorded self-reported practices by farmers and we were not able to record if the correct drugs were administered at the correct dosage. Due to the pigs' behaviour of coprophagia, they are likely to ingest helminth eggs if faeces are not regularly removed. Because of all these reasons the infestation load was higher in both the type of farms in the present study.

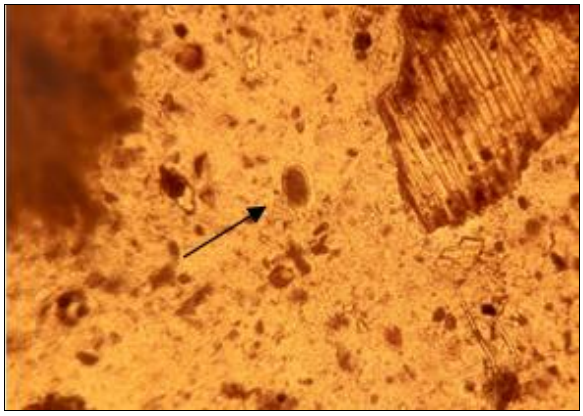

Fig 1: *A. suum* egg (10X)

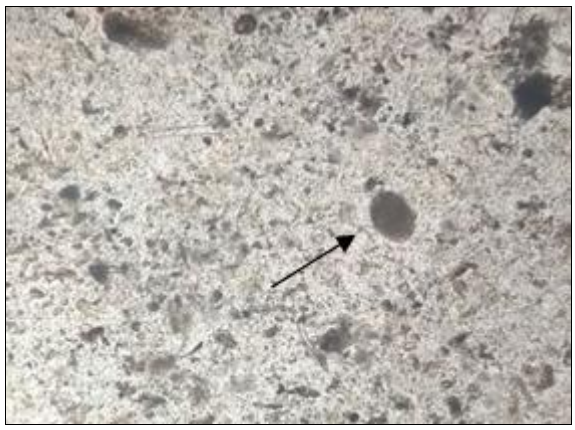

Fig 2: *Strongyle* egg (10X)

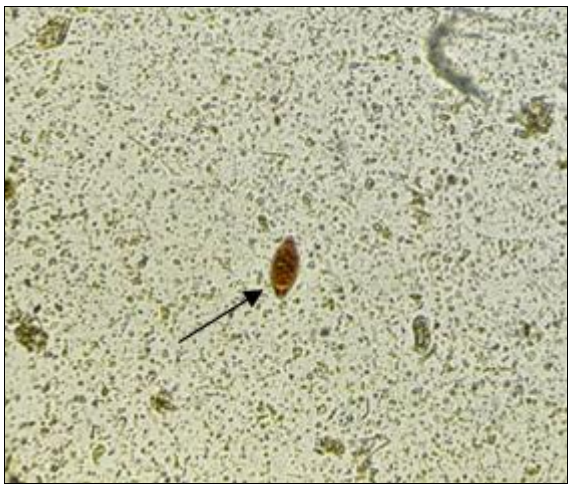

Fig 3: *Trichuris* egg (10X)

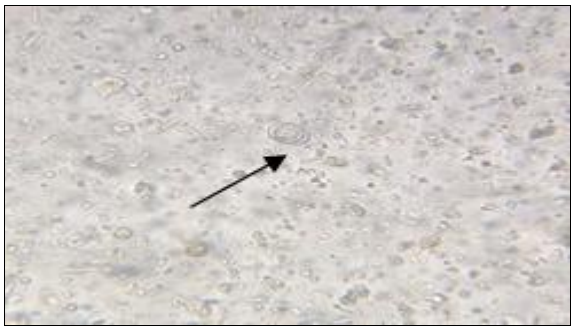

Fig 4: *Coccidia* unsporulated oocyst (10X)

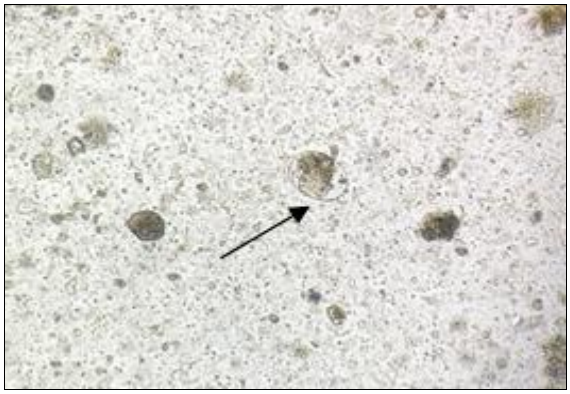

Fig 5: *Belantidium* coli (10X)

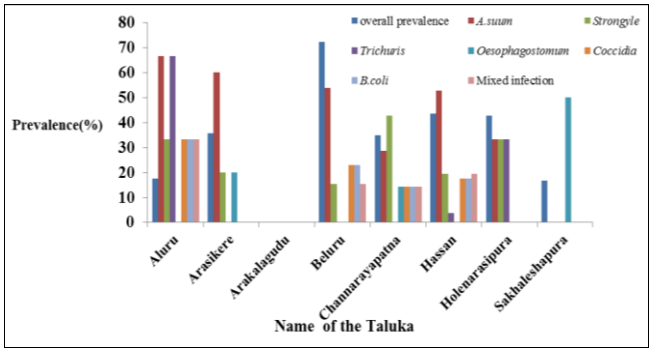

Fig 6: The Taluka wise prevalence of endoparasites in Hassan District

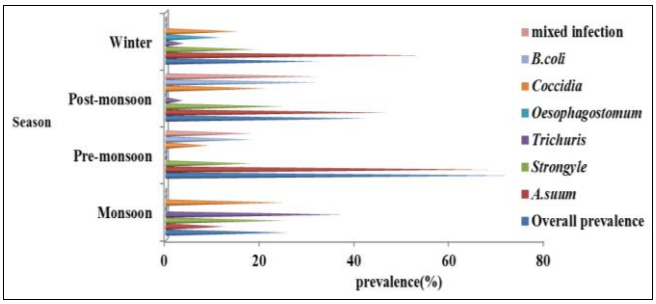

Fig 7: The season- wise variations in the Endo-parasite prevalence in pigs of Hassan District

Table 1: The variations in gastrointestinal parasite prevalence in association with Age, Breed and Sex of the animals

Sl. No.	Host Factors	Total sample collected	Samples with parasite load	*A. suum*	*Strongyle* spp.	*Trichuris* spp	*Oesophagostomum* spp	*Coccidia* Spp.	*B. coli*	Mixed infection
		207	84(40.59)	43(51.19)	18(21.43)	5(5.95)	3(3.57)	14(16.67)	15(17.86)	14(16.67)
	A. Age of the animals (Months)									
1	≤3	70	20(28.6)	11(55)	4(20)	1(5)	0(0)	5(25)	2(10)	3(15)
2	3-6	101	53 (52.5)	29(54.7)	10(18.9)	4(7.5)	1(1.9)	6(11.32)	8(15)	7(13.2)
3	6-9	26	7(27)	1(14.3)	3(42.9)	0(0)	1(14.3)	2(28.6)	4(57.1)	3(42.9)
4	>9	10	4(40)	2(50)	1(25)	0(0)	1(25)	1(25)	1(25)	1(25)
		P≤0.05	0.1001	0.6481	0.7102	0.8423	0.0568	0.4974	0.1696	0.4398
	B. Breed									
1	Large White Yorkshire	155	56(36.1)	29(51.8)	13(23.2)	4(7.14)	2(3.6)	7(12.5)	8(14.3)	9(16.1)
2	Landrace	34	18(52.9)	13(72.2)	1(5.6)	1(5.6)	0(0)	3(16.7)	2(11.1)	2(11.1)
3	Durac	10	6(60)	1(16.7)	2(33.3)	0(0)	0(0)	3(50)	4(66.7)	2(33.3)
4	Cross bred	3	1(33.3)	0(0)	0(0)	0(0)	0(0)	1(100)	0(0)	0(0)
5	Local	5	3(60)	0(0)	1(33.3)	0(0)	1(33.3)	0(0)	1(33.3)	1(33.3)
		P≤0.05	0.6826	0.6033	0.3482	0.6985	0.8875	0.217	0.1954	0.8088
	C. Sex									
1	Male	82	34(42.5)	19(55.9)	8(23.5)	3(8.8)	1(2.9)	5(14.7)	5(14.7)	6(17.6)
2	Female	125	50(40)	24(80)	10(20)	2(4)	2(4)	9(18)	10(20)	8(16)
		P≤0.05	1.0	0.84	1.0	0.222	0.729	1.0	0.8231	0.8825

Table 2: The Taluka wise prevalence of gastrointestinal parasites in Hassan District

Sl. No.	Taluka Name	Total sample collected	Samples with parasite load	*A. suum*	*Strongyle* spp.	*Trichuris* spp	*Oesopha Gostomum* spp	*Coccidia* Spp.	*B. coli*	Mixed infection
1	Aluru	17	3 (17.6)	2(66.7)	1(33.3)	2(66.7)	0(0)	1(33.3)	1(33.3)	1(33.3)
2	Arasikere	14	5 (35.7)	3(60)	1(20)	0(0)	1(20)	0(0)	0(0)	0(0)
3	Arakalagudu	2	0 (0.0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
4	Beluru	18	13 (72.2)	7(53.8)	2(15.4)	0(0)	0(0)	3(23.1)	3(23.1)	2(15.4)
5	Channarayapatna	20	7(35.0)	2(28.6)	3(42.9)	0(0)	1(14.3)	11(14.3)	1(14.3)	1(14.3)
6	Hassan	117	51(43.6)	27(52.9)	10(19.6)	2(3.9)	0(0)	9(17.65)	9(17.6)	10(19.6)
7	Holenarasipura	7	3(42.8)	1(33.3)	1(33.3)	1(33.3)	0(0)	0(0)	0(0)	0(0)
8	Sakhaleshapura	12	2(16.7)	1(50)	0(0)	0(0)	1(50)	0(0)	0(0)	0(0)
		P≤0.05	0.4211	0.9901	0.9161	0.0141*	0.0156*	0.8850	0.8850	0.3057

Table 3: The Season-wise gastrointestinal parasites i in pigs of Hassan District.

Sl. No.	Season	Total sample collected	Samples with parasite load	*A. suum*	*Strongyle* spp.	*Trichuris* Spp.	*Oesophagostomum* spp.	*Coccidia* Spp.	*B. coli*	Mixed infection
1	Monsoon	31	8(25.8)	1(12.5)	2(25)	3(37.5)	0(0)	2(25)	0(0)	0(0)
2	Pre-monsoon	30	22(73.3)	15(68.2)	4(18.2)	0(0)	0(0)	2(9.1)	4(18.2)	4(18.2)
3	Post monsoon	66	28(42.4)	13(46.4)	7(25)	1(3.6)	0(0)	6(21.4)	9(32.1)	9(32.1)
1	Winter	31	8(32.5)	1(53.85)	2(19.2)	3(3.8)	3(11.5)	2(15.4)	0(0)	0(0)
		P≤0.05	0.0748	0.4025	0.9581	0.0094*	0.1018	0.7291	0.1839	0.2725

Table 4: The managemental risk factors associated with gastrointestinal parasite in pigs Hassan District.

Sl. No.	Managemental factor	Total sample collected	Samples with parasite load	*A. suum*	*Strongyle* spp.	*Trichuris* spp	*Oesophagostomum* spp	*Coccidia* Spp.	*B. coli*	Mixed infection
	A. Farm size									
1	51-100animals	77	35(45.4)	19(54.3)	5(14.3)	3(8.6)	2(5.7)	7(20)	6(17.1)	5(14.3)
2	101-150 animals	19	4(21)	2(50)	1(25)	0(0)	0(0)	1(25)	0(0)	0(0)
3	151 -200 animals	76	26(34.2)	12(46.1)	8(30.8)	1(3.8)	1(3.8)	3(11.5)	5(19.2)	5(19.2)
4	> 201 animals	35	19(54.3)	10(52.6)	4(21)	1(5.3)	0(0)	3(15.8)	4(21)	4(21)
		P≤0.05	0.334	0.9866	0.6685	0.8471	0.741	0.8732	0.8399	0.7906
	B. Floor Type									
1	Concrete	48	19(39.6)	16(84.2)	3(15.8)	1(5.3)	0(0)	4(21)	3(15.8)	2(10.5)
2	Stone tiling	143	58(40.6)	25(43.1)	12(20.7)	1(1.7)	1(1.7)	8(13.8)	10(17.2)	12(20.7)
3	Katchha	16	7(43.7)	2(28.6)	3(42.9)	3(42.9)	2(28.6)	2(28.6)	2(28.6)	0(0)
		P≤0.05	0.98	0.20	0.5194	0.0015*	0.0046*	0.6376	0.8187	0.3642
	C. Deworming status									
1	Dewormed	64	21(32.8)	15(71.4)	6(28.6)	2(9.5)	0(0)	3(14.3)	4(19)	5(23.8)
2	Not dewormed	143	63(44)	28(44.4)	12(19)	3(4.8)	3(4.7)	11(17.5)	11(17.5)	9(14.3)
		P≤0.05	0.3865	0.3375	0.6629	0.8231	0.762	1	0.8625	0.6101
	D. Animal Separation									
1	Separate raring	77	23(29.9)	17(74)	2(8.7)	1(4.3)	1(4.3)	5(21.7)	5(21.7)	5(21.7)
2	Combined raring	130	61(47)	26(42.6)	16(26.2)	4(6.6)	2(3.3)	9(14.7)	10(16.4)	9(14.7)
		P≤0.05	0.1435	0.2334	0.2488	0.8875	0.6629	0.1718	0.86	0.7518

Conclusion

The present study showed the prevalence of endoparasites in pigs of Hassan district. *Ascaris suum* is the most dominant parasite followed by *Strongyle* spp. The risk factors for contracting and harbouring some of the identified parasites are age, managemental practices, floor and geographical location. The higher prevalence of parasites within all age groups showed that proper hygienic management and scheduled deworming practices may require in reducing the worm burden in the pig. The higher prevalence of parasites in all the seasons of the year showed a uniform congenial climatic condition is exist in this region. Further in-depth studies that will survey parasitic infections during all four seasons using larger sample populations are required to ascertain the levels of helminth and parasite contamination on farms in Hassan district.

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