Indian Journal of Hill Farming 27(1):59-63 Available online at www.kiran.nic.in

Epidemiology of Gastrointestinal Parasitism in Pigs in Subtropical Hill Zone of Meghalaya

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Received 18.4.2014, Revised4.6.2014, Accepted 11.6.2014

ABSTRACT

An epidemiological study on gastrointestinal parasitic infections in pigs in a subtropical hill zone of Meghalaya was conducted from April, 2011 to March, 2012. The faecal samples of 2370 numbers of pigs were examined for the purpose and out of these, 806 (34.00%) were found positive for different gastrointestinal parasites either single or mixed infections. The mean eggs per gram of faeces (EPG) were 1244.10 with higher load of infections during rainy season. The prevalence of different gastrointestinal parasites as recorded after microscopical examination of faeces were *Ascaris suum* (61.29%), Strongyle spp. (45.90%), *Trichuris* spp. (16.25%), *Strongyloides* spp. (9.30%) and *Eimeria* spp. (37.96%). The prevalence of infection was found more in unorganized pig farms as compared to organized pig farms which were recorded as 36.18% and 28.65% with mean EPG 1345.98 and 1056.12, respectively. The infection was higher in rainy (36.96%) and cool (36.44%) seasons as compared to cold (24.75%) and warm/hot (23.12%) seasons. The coproculture of positive samples revealed the presence of larvae of *Oesophagostomum dentatum* (82.54 %) and *Strongyloides ransomi* (17.45 %).

Keywords: Epidemiology, Gastrointestinal parasitism, Meghalaya, Pig, Subtropical hill zone

INTRODUCTION

Pig farming has been recognized as an important source of income for tribal population of Meghalaya due to low input and maintenance cost. But pigs have been found to be infected with high percentage of various Gastrointestinal (GI) parasites (Yadav and Tandon 1989; Kumari et al. 2002; Khajuria et al. 2010; Kagira et al. 2012; Ebibeni et al.2013) and due to the different GI parasitic infections in pig's, farmers face economic losses in terms of condemnation of liver, reduce growth rate and feed conversion (Stephenson et al. 1980; Hale et al. 1985). There are reports on prevalence of GI parasitic infections in North Eastern states of India (Sarma and Gogoi, 1986; Yadav and Tandon, 1989; Chandra and Ghosh 1989; Rajkhowa et al. 2003). But systematic studies on epidemiology of GI parasitism in pigs in subtropical Hill Zone of Meghalaya have not yet been done so far. So, the present paper reports the epidemiology of GI parasitism in pigs in subtropical Hill Zone of Meghalaya along with information on prevalence of GI parasitic infections in pigs maintained in organized and traditionally managed pig farms of this agro climatic zone.

MATERIALS AND METHODS

The study was carried out for a period of one year from April, 11 to March, 2012. For **e**pidemiological studies on GI parasitic infection in pigs, faecal samples were collected directly from rectum from different places of subtropical Hill Zone of Ri-Bhoi District of Meghalaya, India, at regular intervals. Six villages of this zone viz. Umbir, Umden Mission, Umdoh, Mawpanshaid, Umroi Madan and Umsaw where pigs are maintained in unorganized way, and organized pig firmers of ICAR Research Complex for NEH Region, Umiam, were the places from where faecal

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samples were collected. Faecal samples of pigs were subjected to qualitative and quantitative examinations for the presence of GI parasites using standard parasitological techniques. The eggs per gram of faeces (EPG) of nematode eggs was determined by modified McMaster technique (MAFF 1986).The representative numbers of faecal samples were pooled and cultured for identification of larvae (MAFF 1986). The meteorological data of the area was collected from the meteorological section of the ICAR Research Complex for NEH Region, Umiam, Meghalaya.

RESULTS AND DISCUSSION

The meteorological data of the area for the period of study has been presented in Table 1. The over all prevalence along with month wise prevalence, EPG and the eggs of parasites present in the faecal samples of pigs has been shown in the Table 2.

Table 1: Meteorological observation of the study area from April, 2011 to March, 2012

Month	Av. T_min (°C)	Av. T_max (°C)	TRF (mm)	Av. RH (%)
Apr'11	14.5	27.8	182.0	75.0
May'11	17.0	28.9	429.9	84.3
Jun'11	19.5	28.9	635.1	88.8
Jul'11	19.7	28.9	338.6	89.1
Aug'11	19.5	29.2	380.8	89.1
Sep'11	18.8	29.4	294.3	89.9
Oct'11	15.5	28.5	187.9	86.6
Nov'11	9.2	24.3	101.3	82.5
Dec'11	6.9	22.1	12.3	85.5
Jan'12	5.4	18.5	32.9	84.2
Feb'12	7.2	23.0	0.0	79.3
Mar'12	12.0	26.9	1.8	77.6

It could be observed from the table that overall 34.00% pigs were found positive for GI parasitic infections. Yadav and Tandon (1989) reported that 68.38% pigs of Meghalaya were found infected with one or more species of GI nematode where as (Chandra and Ghosh 1989) observed over all 47.85% pigs of Meghalaya were infected with one or more species of GI nematodes. As per species of parasites are concerned, *Ascaris suum* were predominant (61.29%) followed by Strongyle spp. (45.90%), *Trichuris* spp. (16.25%) and *Strongyloides* spp. (9.30%). *Eimeria* spp. was also detected in 37.96% pigs. Similar to the present findings, *Ascaris suum* has been found to be most prevalent parasite in pigs as reported earlier (Yadav and Tandon 1989; Kumari et al. 2002; Deka et al. 2005). In this study mean EPG of infected pigs were recorded as 1244.10 where as mean EPG of GI nematodes in pigs as 2355 have been reported (Kagira et al. 2012). Month wise correlations between metrological parameters with percentage of infection and EPG have been depicted in Fig.1.

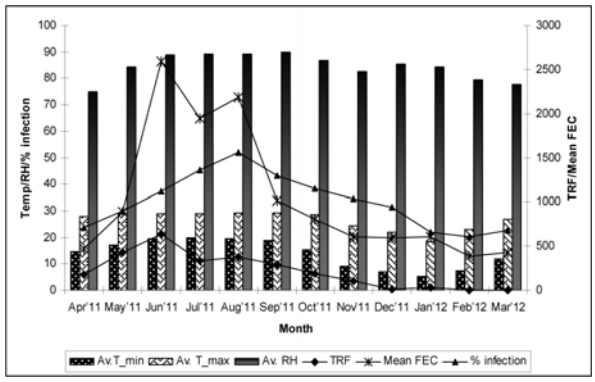

Fig. 1: Correlation of meteorological parameter with monthly prevalence and mean EPG count in pigs (2011-12)

It could be observed from this figure that there is an increase trend of EPG counts from the month of February which reached its peak in the month of June and then it declined in the month of July, then increased in August and then there is a trend to decline. There is an increase trend of percent prevalence of GI parasitism from the month of February which reached its peak in the month of August (51.76%) and then there is a trend to decline. It has been observed from the Table 1 and Table 2 that highest rainfall and highest Mean EPG observed in the month of June. High humidity and optimum temperatures were also prevailed in these months. So, these agroclimatic conditions made it possible for hatching of eggs and availability of larvae and pigs picked up infection which showed in subsequent months i.e. in the months of August, highest percentage of prevalence of GI parasitic infections. The seasonal prevalence of GI parasitic infections in pigs of this agro climatic region has been presented in Table 3 and Fig. 2.

The state Meghalaya has four distinct seasons i.e. the rainy season from May to early October, the cool season from early October to November,

Table 2: Month-wise prevalence of gastrointestinal parasites in pigs (2011-12)

Month/ year	Sample tested	No. positive	Mean EPG	*Ascaris suum*	Strongyle spp.	*Strongyloides* spp.	*Trichuris* spp.	*Eimeria* spp.
Apr'11	160	38 (23.75)	475.00	28	23	7	8	12
May'11	184	55 (29.89)	890.00	39	27	07	12	28
Jun'11	210	78 (37.14)	2592.30	45	39	22	16	42
Jul'11	212	96 (45.28)	1942.70	36	45	11	12	30
Aug'11	226	117 (51.76)	2187.60	53	36	16	19	47
Sep'11	188	81 (43.08)	1011.72	49	24	0	11	28
Oct'11	230	88(38.26)	805.11	57	39	0	15	42
Nov'11	198	68 (34.34)	611.02	43	34	6	14	22
Dec'11	218	68 (31.19)	597.05	51	41	6	0	19
Jan'12	192	42(21.87)	604.76	37	12	0	12	14
Feb'12	192	39 (20.31)	391.02	28	27	0	7	7
Mar'12	160	36 (22.50)	430.55	28	23	0	5	15
Total	2370	806(34.00)	1244.10	494 (61.29)	370 (45.90)	75 (9.30)	131 (16.25)	306 (37.96)

(Figure in the parenthesis indicate percentage)

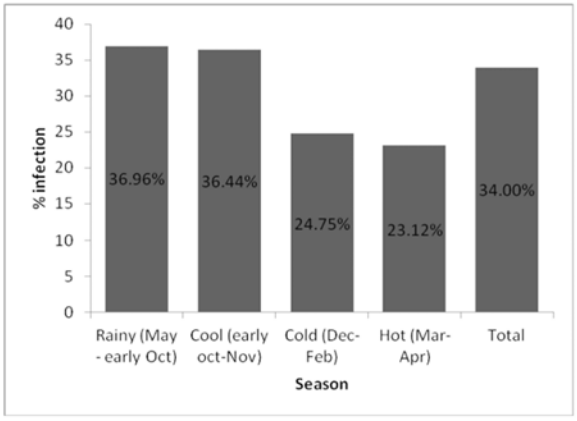

Fig. 2: Season-wise prevalence of gastrointestinal parasites in pigs of Meghalaya (2011-12)

Table 3: Season-wise prevalence of gastrointestinal parasites in Pigs of Meghalaya (2011-12)

Season	Pigs		
	Sample tested	No. positive	% positive
Rainy season (May - early Oct)	1020	377	36.96
Cool season (early Oct - Nov)	428	156	36.44
Cold season (Dec - Feb)	602	149	24.75
Hot season (Mar - Apr)	320	74	23 .12
Total	2370	806	34.00

the cold season from December to February and the warm season or hot season from March to April (www.bharatheritage.in/meghalaya/weather.htm), unlike most of the states of India, where three seasons like summer, rainy and winter have been observed. In that respect, over all the higher prevalence was recorded during rainy season (36.96%) followed by cool season (36.44%), cold season (24.75%) and summer season (23.12%) and more EPG was observed during rainy season. In Meghalaya, Chandra and Ghosh (1989) observed highest percentage of infections (60.97% to 66.66%) during rainy season and Yadav and Tandon (1989) recorded highest level of infection (73.2%) during August to October, similar to the present findings of highest level of infection during rainy season. The difference of the present findings of highest level of infections in rainy season with other workers is that they observed more percentage of infections (>60%) in comparison to present findings (36.96%). Differences in particular places of sample collections, long interval of time period of collections and consciousness of farmers about the use of anthelmintics or antiparasitic agents, might be the reason of such variations (Laha et al. 2014). During rainy season, EPG was recorded maximum and suitable environmental conditions for hatching of eggs were present in rainy seasons thereby made maximum availability of infective stages of infections during rainy seasons, might be the reason for highest percentage of infections during rainy season. From Nagaland, during rainy season, highest prevalence (80.98%) of GI nematodes in pigs recorded (Rajkhowa et al. 2003). Highest percentage of infections during rainy season has

also been reported from other parts of India (Kumari et al. 2002; Dutta et al. 2005) and a positive correlation of prevalence of nematode infections in pigs and amount of rainfall has been reported (Kagira et al. 2012). A season particularly for Meghalaya denoted as cool season from October to November showed almost similar percentage of infection like rainy season. Infections picked up by the animals during rainy season gradually matured and showed such similarity of percentage of infections in cool season also. In the present study there was no significant difference of percent prevalent of GI parasitic infections in pigs in cold season (24.75%) and hot season (23.12%) which may be considered as lowest percent prevalence. Similar to the present findings lowest level of infections in winter and summer also reported earlier (Yadav and Tandon 1989; Rajkhowa et al. 2003; Dutta et al. 2005).

The prevalence of GI parasitic infection was recorded as 28.65% and 36.18% with mean EPG 1056.12 and 1345.98 in organized and unorganized pig farms, respectively. Dutta et al. (2005) reported higher percentage of infection in pigs maintained in free range systems (55.32%) as compared to pigs maintained in intensive systems (38.75%). The pigs maintained in organized farms followed improved managemental practices like housing, sanitation and deworming that makes them less percentage of infections as compared to pigs maintained in unorganized way in different village conditions.

The results of monthly coproculture examinations of pigs maintained in sub tropical hill zone of Meghalaya have been presented in Table 4 and Fig. 3. It could be observed that coproculture of positive samples revealed the presence of larvae

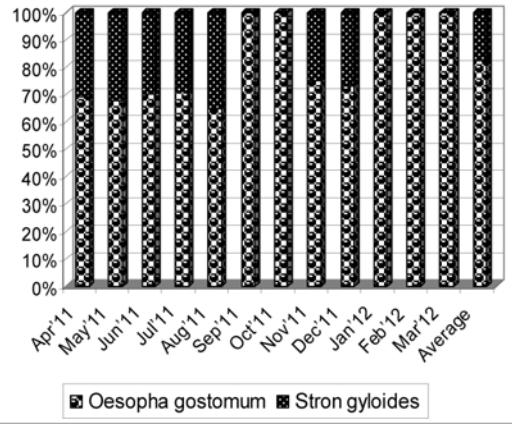

Fig. 3: Month-wise coproculture examination report of pigs (2011-12)

Table 4: Monthly coproculture examination of pigs of Meghalaya (2011-12)

Month	Average Infection observed (%)	
	Oesophagostomum dentatum	*Strongyloides ransomi*
Apr'11	69.0	31.0
May'11	67.5	32.5
Jun'11	70.0	30.0
Jul'11	71.0	29.0
Aug'11	65.0	35.0
Sep'11	100.0	0.0
Oct'11	100.0	0.0
Nov'11	75.0	25.0
Dec'11	73.0	27.0
Jan'12	100.0	0.0
Feb'12	100.0	0.0
Mar'12	100.0	0.0
Average	82.54	17.45

of *Oesophagostomum dentatum* (82.54%) and *Strongyloides ransomi* (17.4 %). The presence of *Oesophagostomum dentatum* in pigs has been reported earlier from Meghalaya (Yadav and Tandon 1989) and other parts of India (Dutta et al. 2005).

CONCLUSION

The present study indicates GI parasitic infections in pigs are prevalent through out the area with highest percentage of infections during rainy season. This may be a contributing factor for low productivity. Therefore deworming of pigs is very much essential particularly before rainy season.

ACKNOWLEDGEMENT

The work was funded by ICAR, New Delhi through "All India Network Programme on Gastrointestinal Parasitism" for which authors are grateful. The authors are also thankful to the Director, ICAR Research Complex for NEH Region, Umroi Road, Umiam, Meghalaya, for facilities provided for this research work.

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