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PREVALENCE AND IDENTIFICATION OF COCCIDIAN PARASITE (*EIMERIA* SPP) IN LAYER CHICKEN OF RATNANAGAR MUNICIPALITY, CHITWAN DISTRICT, NEPAL

A. Adhikari, R. Gupta and G. R. Pant

Abstract

Five different species of *Eimeria* viz. *E. acervulina, E. maxima, E. necatrix, E. tenella* and *E. brunetti* were identified. The highest percentage (50%) was found with mixed infection. Specieswise infection with *E. tenella* was recorded in the present study. Monthwise highest prevalence rate (50%) was observed in March and the lowest (10%) in the months of April and September. Seasonwise prevalence showed the highest prevalence rate (33%) in the summer and spring, and the least (14%) in the autumn. The agewise prevalence was the highest (48%) in the 31-45 days age group and the least (6%) in 0-15 days age group of layers. The coccidiosis was found highly prevalence in mud/mud+brick type floor than in concrete type floor farms.

Key words: Coccidiosis, *Eimeria*, infection, layers, percentage, summer, spring

Introduction

Coccidiosis is one of the most important diseases of chicken in Nepal. It is a protozoan disease caused by *Eimeria* species. On the basis of affecting organs, the disease is classified as intestinal coccidiosis affecting the small intestine and caecal coccidiosis affecting the large intestine (caeca). At least nine species of *Eimeria* are known to occur in poultry (Jordan and Pattison, 1996).

Coccidiosis is characterized by dysentery, enteritis, emaciation, drooping wings, poor growth and low production. In all parts of the world where confinement rearing is practiced, coccidiosis represents a major disease problem demanding attention of poultry producers, feed manufactures and poultry disease experts. The economic importance of the disease is due to its high rate of morbidity and mortality in young birds, reduced feed conversion efficiency and egg production in sub-clinical cases.

It is considered to be a disease of poor management. Indiscriminate use of anticoccidial drugs in feed and water has created serious drugs resistance problem. So, the study is essential for proper identification of different species of *Eimeria* and knowledge regarding the epidemiological conditions of prevalence of coccidiosis. This study will greatly help to develop control strategy against coccidiosis.

Materials and Methods

A total of 480 dropping samples of layer chicken were collected randomly from different floor system and farming system of poultry farms of Ratnanagar Municipality and its vicinity to determine the prevalence of coccidiosis from August 2002 to July 2003. For species

identification twenty layer dead chickens were collected.

These dropping samples were examined by smear method and positive samples for coccidian parasites were cultured in 2% potassium dichromate solution at the ratio of 1:5. These sporulated oocysts were examined at low and high power objectives.

Postmortem examinations were carried out by the processes (a) necropsy examination (b) microscopic examination of mucosal scrapping. By postmortem examination, intestinal samples were collected and cultured. The sporulated oocysts of *Eimeria* species were stained by midified Ziehil-Neelsen technique for microscopic examination. At least 27 sporulated oocysts from each area of the intestinal tract (anterior, middle, posterior parts of small intestine and from the caecal pouches) were measured for their morphological characteristics (length, width and shape). The information collected from postmortem finding and findings of microscopic examination were compiled, analyzed with each other. The findings were verified by figures and description made by Gordon and Jordan (1982).

Results

1 General prevalence of coccidiosis

Out of 480 drooping samples examined, 125 samples were positive. This implies that prevalence of coccidiosis in layer was found to be 25%.

2 Monthwise prevalence of coccidiosis

The highest prevalence rate of coccidiosis (50%) was found in the month of March and the least (10%) in the months of April and September. No droppings for coccidiosis were found in the months of November and December (Fig.1).

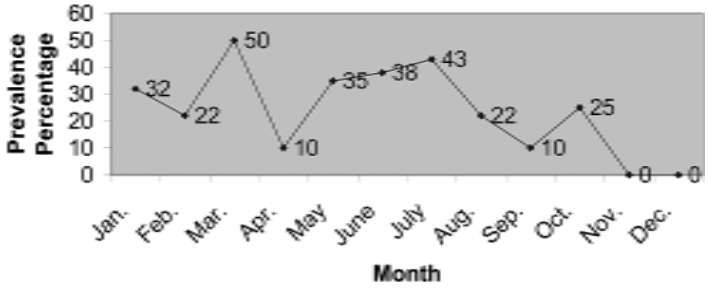

Fig. 1 Monthwise prevalence of cocciciosis

3 Seasonwise prevalence of coccidiosis

The prevalence of coccidiosis was the highest (33%) during summer and spring season followed by winter season (23%) and the least (14%) in autumn (Fig.2).

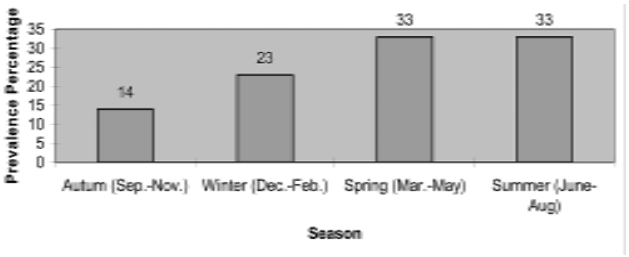

Fig.2 Seasonwise prevalence of coccidiosis

4 Agewise prevalence of coccidiosis

The age groups of studied flocks of layer were categorized into difference of 15 days. The Fig.3 shows that the prevalence of coccidiosis was the highest (48%) in 31-45 days and the least (6%) in 0-15 day's layers. In 90 days above age group, the positive dropping samples for coccidiosis were not found at all.

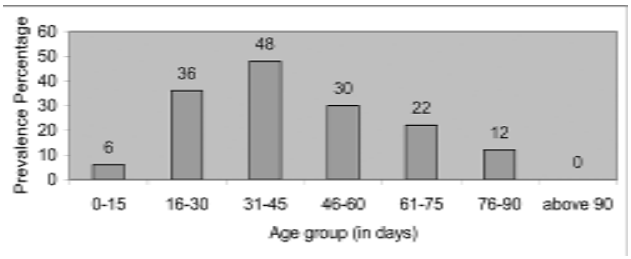

Fig.3 Agewise prevalence of Coccidiosis

5 Prevalence of coccidiosis in different floor types of farm

Out of 180 droppping samples of concrete type floor of layer chicken , (24%) samples were positive and out of 260 dropping samples of mud/mud+brick type floor, (29%) were positive for coccidiosis (Fig. 4).

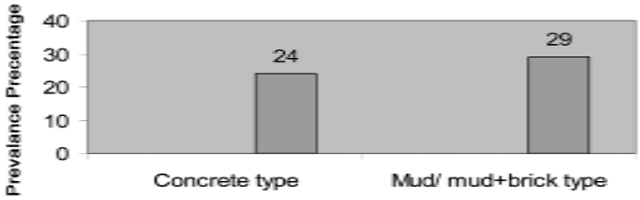

Fig: 4 Prevalence of coccidiosis in different floor systems.

Identification of *Eimeria* spp

Table 1 shows that five different species of *Eimeria* were identified viz. *E. acervulina, E.maxima, E. necatrix, E.brunetti and E. tenella*. The observed postmortem lesions were distinct for all other species except *E.maxima and E. necatrix*. The calculated Z values (1.61 and 1.95) for mean length and width for *E.necatrix* and *E. tenella* were less than tabulated value (1.96). So, there was no significant difference at P< 0.05 level of significance. The shape index often quoted as criteria for species identification but less variation was found in shape index of different species.

Table: 1 Identification of different species of Eimeria

Intestinal part/ location	Postmortem lesions	Characteristics of oocysts				Species of *Eimeria* identified
		Size (µm)		Shape index	Shape	
		Mean Length ±SD (Range)	Mean width ±SD (Range)			
Anterior small intestine	Transverse Whitish band on duodenal loop.	17.93±2.61 (13.76-20.64)	14.12±2.61 (10.32-17.20)	1.27	Ovoid	*E. acervulina*
Middle small intestine	Thickened intestine wall. Patechiae.	29.41±3.25 (24.08-37.84)	22.28±3.25 (17.20-27.52)	1.32	Ovoid	*E. maxima*
Middle small intestine	Balloning of intestine. Mucoid blood filled exudates	20.10±2.6 (17.20-24.08)	16.32±2.43 (13.76-20.64)	1.23	Oblong Ovoid	*E. necatrix*
Caeca	Haemorrhages and clotted blood in caecal pouches	20.81±2.34 (17.20-24.08)	17.12±2.27 (13.76-20.64)	1.21	Ovoid	*E. tenella*
Posterior small intestine	Mucoid, Bloody enteritis	23.75±2.85 (20.64-27.52)	19.52±1.98 (17.52-24.08)	1.22	Ovoid	*E. brunetti*

Mono and mixed infection of Eimeria species

Out of 20 positive cases of coccidiosis the highest prevalence (50%) were found with mixed species infection. In case of mono species infection the incidence of *E. tenella* was found the highest (25%) followed by *E. necatrix* (10%), *E. acervulina* (5%), *E. brunetti* (5%) and *E. maxima* (5%) (Fig.5).

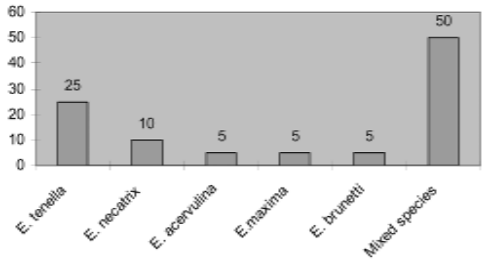

Fig.5 Mono and mixed infection of *Eimeria* species

Discussion and conclusion

Coccidiosis disease is most likely when young stocks are concentrated under conditions which permit the accumulation and sporulation of large number of oocysts. In the present study, the general prevalence rate of coccidiosis was found to be 25%. This was somewhat similar to the 38% farm level prevalence reported by Razmi *et al.* (2000) in Iran. Monthwise higher prevalence was found in the March and the lower (10%) in both April and September. This high prevalence rate of coccidiosis might be due to effect of favourable environment for the sporulation of oocysts. Seasonwise prevalence rate of coccidiosis was the highest (33%) during summer and spring, and the lowest (14%) during autumn season. The prevalence of coccidiosis is higher in summer and spring season may be due to the hot and humid climate .Agewise prevalence of coccidiosis was found the highest in 31-45 days age-group (48%) and the least (6%) in 0-15 days age group. The high prevalence of coccidiosis might be associated with crowding factor and the presence of high number of oocysts in the litter at 31-45 days . Hence, this age group might be very susceptible to coccidial infections. Hofstad (1992) reported that 3-6 weeks age group of chicken were very susceptible to coccidial infection.

Coccidiosis is the disease of poor management. The prevalence of coccidiosis was highest (29%) in mud/mud+brick type floor than that in concrete type floor. This finding was somewhat similar with report mentioned by Farooq *et al.* (1999). They reported significantly higher mobidity (20.89 6.49%) and mortality (8.86 0.41%) in chicken reared on brick+mud made floors at the ground level than concrete type floors above the ground level morbidity (7.37 1.47%), mortality (3.02 1.23%). The lower prevalence of coccidiosis in concrete type floor might be due to effective eradication of *Eimeria* oocysts at the time of cleaning of floors. The higher prevalence of coccidiosis in mud/mud+brick type floors might be associated with more chances of coccdian oocysts to survive in the cracks and cervices of mud/mud+brick type floors, which may difficult for effective cleanliness of farms.

On the basis of biological characteristics, such as lesion seen, location and morphological characteristics, five species of *Eimeria* viz. *E.tenella, E.acervulina, E.necatrix, E.maxima* and *E.brunetti* were identified. It is similar to the report mentioned in Brazil by Franco (1993).These identified *Eimeria* species except *E.necatrix* have been reported earlier by Thakuri and Rai (1996) in the local chickens of eastern hills of Nepal . It is correlated to the report mentioned in Bangladesh by Karim and Begun (1994). The findings agree with the statement made by Macpherson (1978) that the same species of *Eimeria* all over the world will infect domestic poultry. The morphological characteristics, location and nature of intestinal lesions correspond to the description made by Gorden and Jordan (1982).

The highest prevalence of mixed *Eimeria* infection (50%) was found. In case of mono species infection the incidence of *E. tenella* was found the highest (25%). These results coincide with the findings of Aryal (2001). i.e mixed coccidial infection (64%) and *E.tenella* (12%). The highest prevalence of mixed species infection might be due to opportunistic nature of the mild pathogenic species of *Eimeria* i.e. *E.maxima* and *E.acervulina* which starts infection in the bird under sufficient stress due to initial infection with pathogenic species. The highest prevalence of *E.tenella* might be due to its highly pathogenic and predominant nature.

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Author's Address

[1]Arjun Adhikari, [2]Dr. Ranjana Gupta and [3]Dr. Ganesh Raj Pant
[1]Food Quarantine Laboratory, Birganj, E-mail: arjunadh2000@yahoo.com
[2]Central Department of Zoology, T.U. Kirtipur, Kathmandu
[3]Central Veterinary Laboratory, Tripureshwor, Kathmandu

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