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Prevalence of *Eimeria* sp. among Broiler Chicks in Tabriz (Northwest of Iran)

[1]A. Nematollahi, [2]Gh. Moghaddam and [3]F. Niyazpour
[1]Department of Parasitology, [2]Department of Clinical Science,
[3]Department of Basic Science, Faculty of Veterinary Medicine,
University of Tabriz, Tabriz, Iran

Abstract: This study was conducted on 1090 chicks (2-6 weeks of age) from 218 broiler farms stayed in Tabriz northwest of Iran. These chicks were submitted for post-mortem and parasitological examinations. Five *Eimeria* sp. were identified: *E. acervulina*, *E. tenella*, *E. necatrix*, *E. maxima* and *E. mitis*. The overall prevalence of *Eimeria* sp. among examined farms was 55.96% (122 of 218 farms). *E. acervulina* was the most prevalent species (23.58%). Prevalences did not vary by flock size. Also, neither the use of coccidiostat nor previous coccidiosis clinical outbreaks were associated with the prevalence of infestation. The prevalence of infestation increased with the age of the chickens. Chickens with 5 weeks of age showed the highest prevalence of infestation.

Key words: Prevalence, *Eimeria* sp., broiler chicks, poultry, economic

INTRODUCTION

Coccidiosis is one of the most important and common diseases that affect poultry, it results in a great economic loss all over the world (Braunius, 1980). It is caused by the genus Eimeria of an Apicomplixa protozoan parasite (Shirely, 1995). This parasitic infection occurs in the epithelial cells of the intestine, despite the advances in nutrition, chemotherapy, management and genetics (Magner, 1991). Most *Eimeria* sp. affect birds between 3 and 18 weeks of age and can cause high mortality in young chicks (McDougald and Mattiello, 1997).

About 1800 *Eimeria* sp. affect the intestinal mucosa of different animals and birds (Shirely, 1995). In the domestic fowl Gallus gallus, 9 *Eimeria* sp. are recognized: *E. brunetti*, *E. maxima*, *E. necatrix* and *E. tenella* are highly pathogenic, *E. acervulina*, *E. mitis* and *E. mivati* are rather less pathogenic and *E. praecox* and *E. hagani* are regarded as the least pathogenic (Thebo *et al*., 1988). Bad management (such as wet litter that encourages oocyst sporulation, contaminated drinkers and feeders, bad ventilation and high stocking density) can exacerbate the clinical signs (Ruff, 1993).

Coccidiosis can be controlled by good management including good ventilation, dry and clean litter (Jordan, 1995), cleaning and decontamination of drinkers and feeders (Gross, 1985) and proper stocking density in the farm (Jordan, 1995).

We studied the prevalence of *Eimeria* sp. among broiler farms in northwest of Iran. Also, we tested the risk factors of flock size, use of coccidiostats and prior clinical coccidiosis.

MATERIALS AND METHODS

Study site: The survey was conforming September 2005 to December 2006 in 218 chicken farms. An average population of 5,000,000 broiler-chicks distributed over 500 chicken farms exists in this area. The houses of farms were built of brick and cement and are of different sizes. The method of housing the broilers is an intensive deep-litter system. Before birds were placed, the houses were cleaned, washed, disinfected and provided with new wood shavings. During the rearing period, the birds received mash feed. The broiler-chickens were slaughtered at an average of 48 days of age with an average live weight of 1.8 Kg. The broiler-chickens are produced in different broiler parent stocks and hatcheries in Iran. The most-common breed broiler was the Ross 308.

Sample size determination: A sample of 5 birds per 10 000 is sufficient to diagnose coccidiosis (Mattiello, 1990). Because the prevalence of coccidiosis in chicken farms in Iran has not been reported, the prevalence of infection in each farm was assumed to be 50%. The desired sample size was 218 houses (houses typically have <10 000 chickens each), using a 95% level of confidence and 5% desired absolute precision (Thrusfield, 1995). Total 218 chicken farms were randomly selected by using a random-numbers table; we also used such a table to select one house per farm. Randomly selected farms were initially contacted by veterinary services.

Corresponding Author: Gh. Moghaddam, Department of Clinical Science, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran

Sampling: Five chicks from each house were selected. The chicks were brought to the laboratory of parasitology in faculty of veterinary medicine in university of Tabriz for necropsy. All viscera were examined for gross pathological changes and the mucos of duodenum, jejunum, ileum and the caeci were examined for the presence of *Eimeria* sp. stage according to the method described by Mattiellio (1990).

Parasitological technique: Wet smears of mucosa were prepared from intestinal and caecal scraping for microscopic examination of *Eimeria* sp. Eimeria spp identified according on the site of infection and oocysts morphology including size, color presence or absence of micropyle, cap and time of sporulation (Soulsby, 1982). Sporulation was performed in wet chamber at 24-26°C in a 2.5% aqueous solution of potassium dichromate ($K_2Cr_2O_7$).

At the same time that chicks were sampled, litter samples were collected for counting of oocysts in litter. A modification of the McMaster's oocyst-counting technique was used (Soulsby,1982). Litter samples were thoroughly homogenized by manual mixing. Then, a 9 g sample was weighed and soaked in 126 mL of water and allowed to stand overnight. Next morning, the samples were vigorously shaken to break up the feces. Then, each sample was sieved through a tea strainer. The strained samples were poured into a 15 mL centrifuge tube. The tubes were centrifuged at 2000 rpm for 5 min. The supernatant fluid was decanted and sediment was mixed with a saturated solution of sugar in the centrifuge tube. The suspension was thoroughly mixed and a sample was taken and placed in a McMaster's chamber. The number of oocysts within each ruled area, multiplied by 100 represents the number per gram of the original sample collected around the drinker and feeders of the same house from which chickens were collected on each farm.

Data collection: Information collected at the time of sampling included farmer's name, address, farm location, flock age, flock size and use of coccidiostats in the feed for that flock and previous coccidiosis infection within the last year in the farm.

Statistical analyses: Data comparing prevalence by risk factors were analyzed using chi-square with a significance level of $p<0.05$. 95% confidence intervals were calculated for the prevalence

RESULTS

Five *Eimeria* sp. was identified in naturally infected birds in northwest Iran. The overall prevalence of *Eimeria* sp.infection among examined farms was 55.96% (122 of 218 farms). *E.acervulina* was the most prevalence species (Table 1). All farms had multiple infections.

Table 1: Prevalence of 5 *Eimeria* sp. among 218 broiler farms in west north Iran

Eimeria sp.	Broiler farms	
	No. of positive	% of positive
E. acervulina	52	23.58
E. tenella	31	14.22
E. necatrix	22	10.09
E. maxima	12	5.5
E. mitis	5	2.29

Table 2: Prevalence of coccidiosis among 218 broiler-chicks farm

Risk factor	Level of risk factor	No. of farm	No. of positive farm	% of positive farm
Flock size	2000-4000	14	8	57.14
	4000-8000	81	53	65.43
	8000-10000	123	72	58.53
Use of coccidiostat	Yes	180	83	46.1
	No	38	23	60.52
Previous coccidiosis infection	Yes	203	117	57.63
	No	15	9	60

Table 3: Prevalence of coccidiosis and median of oocysts of litter in chicken farms by age

Age (week)	No. of farm	No. of positive farm	Positive farm (%)	Oocyst/gr median
2	31	16	51.61	120
3	42	28	66.66	300
4	63	41	65.07	420
5	52	40	76.92	600
6	30	16	53.33	140

No significant difference was observed between the prevalence of infection among farms of different flock size. Also, neither the use of coccidiostat nor previous coccidiosis clinical outbreaks were associated with the prevalence of coccidiosis (Table 2).

The prevalence of infection increased with the age of the chickens. Chickens with 5 weeks of age showed the highest prevalence of infection. The median number of oocyst gr^{-1} of litter in the 5 weeks old chickens was higher than for other age of chickens (Table 3).

DISCUSSION

In this study, the prevalence of *Eimeria* sp. in broiler farms in Tabriz was 55.96%.This rate is high compared to results of other survey in iran that Razmi and Kalideri (2000) reported 38% (Razmi *et al*., 2000). The Poor management practices in Tabriz area broiler farmers might be a direct cause. Also one cause of this difference might be due to different season that survey was achieved.

The biologic characteristics of coccidian of chickens are well known and variable,and can identified on the basis of oocyst size (McDougald *et al*., 1997). This study

is showed that 5 *Eimeria* sp. was identified in naturally infected birds (*E. acervulina*, *E. tenella*, *E. necatrix*, *E. maxima* and *E. mitis*). These results are in agreement with reports from Sweden, France and Argentina and Jordan (Except *E. brunetti*) suggesting that those species of *Eimeria* are widespread in most countries where poultry are produced on a commercial basis (Al-Natour and Suleiman, 2002; McDougald *et al*., 1997; Thebo *et al*., 1988; Williams *et al*., 1996).

This survey showed that the size of flock is not effective in rate of infestation to *Eimeria*. This result is not agreement with other survey in Iran and Netherlands that express the prevalence of coccidiosis increased with flock size (Braunius, 1980; Razmi *et al*., 2000).

There was no significant difference in prevalence of *Eimeria* sp. and previous coccidiosis This result is in agreement with experiences of Razmi and Kalidari (2000) and Al-Natour and Suleiman (2002) and expressed the role of good results of disinfectant material in prevention of disease after outbreak it in other period of breeding (Al-Natour and Suleiman, 2002; Razmi *et al*., 2000). Also, there was no significant different in prevalence of *Eimeria* sp. and use of coccidiostats.This might be due to misuse of coccidiostats (dose or improper mixing in feed)or the development of local strain of *Eimeria* sp. to variable compounds.

The results of this study showed that the prevalence of *Eimeria* sp. and the median of oocyst/gr of litter increased with age and is picked in 5 week. This result is in agreement to experiences of Long and Rowell (1975) and is in no agreement to Chapman and Johnson (1992) , Stayer *et al*. (1995) experiences (Long and Rowell, 1975; McDougald and Mattiello, 1997; Stayer *et al*., 1995). In many studies occurance period of coccidiosis is related to species of *Eimeria* and the type of anticoccidial drugs. Therefor, differences in management of the anticoccidial programs may have contributed to this difference.

REFERENCES

Al-Natour, M.Q. and M. Suleiman, 2002. Flock-level prevalence of *Eimeria* sp. among broiler chicks in northern Jordan. Pre. Vet . Med., 53: 305-310.

Braunius, W.W., 1980. Monitoring the biological performance in broilers with special regard to subclinical coccidiosis. Archiv fur Geflugelkunde, 44: 183-187.

Chapman, H.D. and G.B. Johnson, 1992. Oocyst of Eimeria in the litter of broilers reared to 8 weeks of age. Poult. Sci., 7: 1342-1347.

Gross, W.B., 1985. Effect of social environment and oocyst dose on resistance and immunity to *Eimeria* tenella challenge. Avian Dis., 29: 1018-1029.

Jordan, F.T.W., 1995. Poultry Diseases. 3th Edn. The Cambridge University Press, UK, pp: 226-236.

Long, P.L.and J.R. Rowell, 1975. Sampling broiler house litter for coccidial oocysts. Poult. Sci., 16: 583-592.

Magner, B.R., 1991. Anticoccidials.Veterinary Applied Pharmacology and Therapeutics. 5th Edn. Bailliere Tindall, London,UK, pp: 549-563.

Mattiellio, R., 1990. Detect subclinical coccidiosis. World Poult., 6: 82-83.

McDougald, L. and R.A. Mattiello, 1997. Survey of coccidia on 43 poultry farms in Argentina. Avian Dis., 41: 923-929.

Razmi, G.R. and G.A. Kalideri., 2000. Prevalence of subclinical coccidiosis in broiler-chicken farms in the municipality of mashad, Iran. Prev Vet. Med., 44: 247-253 .

Ruff, M.D., 1993. External and internal factors affecting the severity of avian coccidiosis. In: Proc. 6th Int. Coccidiosis Conf., pp: 73-79.

Shirley, M.W., 1995. *Eimeria* sp. and strains of chickens. Guidelines on Techniques in Coccidiosis Research. European Commission, Directorate General XII, Science Research and Development, Agriculture Biotechnology, Luxemburg.

Soulsby, E.J.L., 1982. Helminths Arthropods and protozoa of domesticated animals, Academic Press. Loundon, UK, pp: 630-639.

Stayer, P.A., L. Pote and K. Mand, 1995. A comparison fo Eimeria cysts isolated from litter and fecal samples from broiler house at two farm. Poult. Sci., 74: 26-32.

Thebo, P., A. Uggla and P. Hooshmand-Rad, 1988. Identification of seven *Eimeria* sp. in Swedish domestic fowl. Avian Pathol., 27: 613-617.

Thrusfield, M., 1995. Veterinary Epidemiology, Blackwell Science, London,UK, pp: 182.

Williams, R.B., A.C. Bushell, J.M. Reperant, T.G. Doy, J.H. Morgan, M.W. Shirley, P. Yvore, M.M. Carr and Y. Fremont, 1996. A survey of *Eimeria* sp. in commercially reared chickens in France during 1994. Avian Pathol., 25: 113-130.