COCCIDIOSIS IN VILLAGE CHICKEN: A PRELIMINARY SURVEY IN PASIR PUTIH DISTRICT, KELANTAN, WEST MALAYSIA

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ABSTRACT. A study was carried out to detect and identify the presence of coccidia oocysts in the faeces of village chicken from the district of Pasir Putih, Kelantan, West Malaysia. A total of 135 fecal samples were collected from 15 areas in the Pasir Putih District. The faecal samples were examined by direct smear method (qualitative study). A pinch of the faeces was put onto the glass slide with 1-2 drops of normal saline and cover slip, which was then observed under the compound microscope to detect the coccidia oocysts. The presence of coccidia oocyst was then identified by its size and shape. Results showed that ten out of 135 samples were positive for coccidia oocysts, and classified as *Eimeria maxima* and *Eimeria mitis*, both of which are from two locations at Kampung Chap Banir, Pasir Putih, Kelantan. The remaining 125 samples were observed to be negative. This may suggest that the chickens reared in the backyard (extensive) are less susceptible to the coccidia infection due to their environment with lower stocking density (mostly free ranging chicken), and no damp/wet litter as bedding which can facilitate sporulation of the coccicia oocyst thereby spreading the infection. Further studies need to be done to elucididate other factors which may affect coccidial infections in free range chicken such as the availability of medications in feed or genetic hardiness and tolerance to field infections. The local village chicken industry is an up and coming facet of the poultry industry and needs concerted efforts to boost it.

Keywords: village chicken, coccidia oocyst, faeces, Kota Bharu

INTRODUCTION

Local village chicken is much more preferred than the commercial broiler chicken nowadays as consumer preferences tends towards high-quality meat and eggs that are free of infection, disease and undesirable residues. It is believed by locals that village chicken is more healthy, and more tasty as it is free ranging and its diet consists of natural feed from the environment such as seeds and worms. Today, the marketing and export of village chickens to supply the growing market already exists in South-east Asia. Farmers interested in producing organic village chickens should therefore avoid the use of antibiotics, insecticides and other products that could leave chemical residues in their birds, besides maintaining the disease-free status.

One of the most prevalent diseases in poultry is coccidiosis, and it remains as one of the most important parasitic

diseases in the poultry industry worldwide (Nematollahi *et al.*, 2009, Jadhav *et al.*, 2011). Poultry coccidiosis has been reported as a major constraint to successful commercial and backyard poultry farming due to its significant high mortality rates and huge economic losses globally. It is caused by a species of intracellular protozoan parasites belonging to the genus *Eimeria*. About nine species of *Eimeria* have been recognized in domesticated chickens, of which *Eimeria brunette*, *Eimeria maxima*, *Eimeria necatrix*, *Eimeria tenella* are the most pathogenic; *Eimeria acervulina*, *Eimeria mitis*, *Eimeria mivati* are the less pathogenic and *Eimeria praecox* and *Eimeria hagani* are the least pathogenic (Jadhav *et al.*, 2011, Nematollahi *et al.*, 2008). Coccidiosis resulting from the pathogenic *Eimeria* species is usually characterised by dysentery, enteritis, diarrhea, which may be bloody with certain *Eimeria* species, emaciation, lower feed conversion rate, delayed sexual maturity, drooping wings, poor growth and low production (Rehman et al, 2011; Awais *et al.*, 2012) with attendant high mortality and morbidity rates (Shirzat *et al.*,2011).

The occurrence of different *Eimeria* species combinations and the intensity of infection vary considerably, both locally and globally (Haug et al, 2011, Amer *et al.*, 2010). High incidence of coccidiosis is usually observed in poultry managed under intensive management systems like deep litter system due to increased likelihood of high oocysts accumulation in the litters (Dakpogan *et al.*, 2013, Nnadi *et al.*, 2010). Furthermore, higher stocking densities have been linked with increased incidence of coccidiosis due to a higher rate of infection and transmission of the coccidian oocysts in dense flocks from one poultry house to another (Lunden et al, 2000)

In Kelantan, backyard poultry account for more than 70% of the total poultry flocks accorded. Despite diseases, village chicken production is constrained by many extrinsic factors among which malnutrition, poor management and the absence of biosecurity are outstanding.

Currently there is the need to constantly assess the status of village chicken production constraints and the dynamic of their interactions. In addition, as cofactors with other poultry diseases, the study of coccidial infections is essential in understanding the epidemiology of such diseases and to design appropriate control measures. The current study was conducted to detect and identify the presence of coccidia oocyst in the faeces of village chicken from district of Pasir Putih, Kelantan, West Malaysia.

MATERIALS AND METHODS

The preliminary survey was conducted by identifying the households with backyard free range local village chicken in various locations around Pasir Putih District. About 15 areas were identified with 27 households rearing the local chicken in the backyard. A total of 135 faecal samples; which is five samples from each household were collected. The samples were taken from the cloaca of each chicken using a swab and where possible, freshly voided faeces. The faecal samples were placed into plastic bags, sealed, identified appropriately and

transported to Kota Bharu Regional Lab to be processed.

Sample processing

The observation of coccidia oocysts in the faeces was examined by using the direct smear method. A pinch of faeces was put onto the glass slide with 1-2 drops of normal saline and covered with cover slip, which was then observed under a compound microscope (20× magnification) to detect the coccidia oocyst. The species of *Eimeria* was differentiated by the dimensions and morphology of the oocysts. (Ministry of Agriculture, Fisheries and Food, 1986).

Identification of the *Eimeria* sp.

The oocyst is the most easily accessible stage of any coccidium and many species are known only by the characters of their oocysts. These include colour, size and shape, the surface texture, the presence or absence of a polar cap, the presence or absence of a micropyle and its structure, the shape of the sporocysts and the presence and nature of various ill-defined structures such as residual bodies, polar granules and Stieda bodies. The oocyst description of *Eimeria* sp can be referred in the Table 1.

The oocysts vary in size, with *E. maxima* being the largest (about 20×30 microns) and *E. mitis* the smallest (about 15×16 microns). Table 2 shows the oocyst

Table 1. *Eimeria* species description (chicken) (Levine, 1985)

Species	Oocyst description
Eimeria acervulina	Ovoid, smooth without a micropyle or residuum but with a polar granule
Eimeria brunetti	Ovoid, smooth without a micropyle or residuum but with a polar granule
Eimeria maxima	Ovoid, yellowish and smooth without a micropyle or residuum but with a polar granule
Eimeria mitis	Subspherical, smooth without a micropyle or residuum but with a polar granule
Eimeria necatrix	Ovoid, smooth, colourless without a micropyle or residuum but with a polar granule
Eimeria praecox	Ovoid, smooth, colourless without a micropyle or residuum but with a polar granule
Eimeria tenella	Ovoid, smooth, colourless without a micropyle or residuum but with a polar granule

Table 2. Oocyst size of Eimeria species, site of infection and its pathogenicity (Levine, 1985).

Eimeria species	Oocyst size	Host species	Site of infection	Pathogenicity
E. acervulina	18 × 14 µm	chickens	anterior small intestine	high
E. brunetti	26 × 22 µm	chickens	small and large intestines	high
E. maxima	30 × 20 µm	chickens	mid small intestine	moderate
E. mitis	16 × 15 µm	chickens	small and large intestines	low
E. necatrix	20 × 17 µm	chickens	small intestine, caecum	high
E. praecox	21 × 17 µm	chickens	small intestine	low
E. tenella	23 × 19 µm	chickens	caecum	high

Table 3. Results and location of sampling

SAMPLING LOCATION	NUMBER OF SAMPLES	RESULTS
Kampung Chap Banir	10	Positive coccidia oocyst **Eimeria maxima* (30 × 20 µm) **Eimeria mitis* (16 × 15 µm)
Kg. Bukit Kecik, Kg. Bunut Rendang, Kg. Gong Dato, Kg. Besar, Telaga papan, Kg. Kulim, Kg. Merkang, Kg. Nara, Kg. Gajah Mati, Kg. Ketik Buloh, Kg. Bukit Tanah, Kg. Bukit Abal, Kg. Permatang Sungkai, Kg. Semerak	125	Negative for coccidia oocyst

size of *Eimeria* species, site of infection and its pathogenicity.

RESULTS

Out of a total of 135 fecal samples, ten were positive for coccidia oocyst. The positive samples were from 2 locations at Kampung Chap Banir. The results were reported qualitatively as positive or negative. Table 3 shows the results of microscopic examination of faecal samples and location of sampling .

The coccidia oocysts were identified as *Eimeria maxima* and *Eimeria mitis*. They were recognised by the morphology of size and shape of the oocyst. *Eimeria maxima* was observed as ovoid in shape, yellowish color with smooth surface texture. Other oocysts found were *Eimeria mitis* and they were subspherical in shape, with the surface texture smooth. The size of *Eimeria maxima* was larger than *Eimeria mitis,* that is *Eimeria maxima (*30 × 20 µm) and *Eimeria mitis (*16 × 15 µm) .

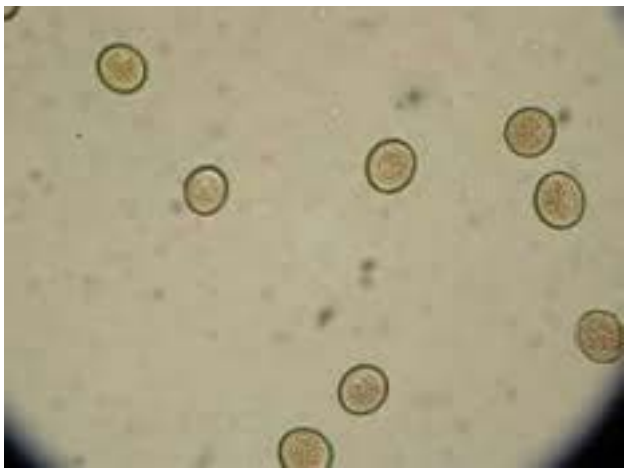

Figure 1. Some coccidia oocysts from samples collected

CONCLUSION

The identification of *Eimeria* species is commonly accomplished through the analysis of some characteristics such as pre-patent period, morphology and morphometry of oocysts and other stages of the life cycle, site of development in the host, macroscopic lesions and isoenzyme analysis by electrophoresis (Joyner and Long, 1974). In this study, only identification of the the species was done by its morphology. The main objective was to detect and identify the common coccidia in the feces from the samples taken. The PCR diagnosis also can be a useful tool in epidemiological studies, since it provides fast and reliable detection of *Eimeria* sp. in field samples, however it can be costly.

The species of a given genus can rarely be differentiated by a single criterion. More often they are distinguished by a balance of characters which may vary in significance for particular species. The systematics of any group is constantly under review because at any time new techniques may reveal differences, the significance of which has to be assessed. The shape of the oocysts varies widely too. Kheissin (1974) considered that the range of variability is genetically controlled and the individual characteristics of oocysts cannot be used as criteria for the classification of species. The oocysts of species in the chicken have no polar caps, no obvious micropyle, the structure and texture of the oocyst walls are all similar and the sporocysts have no peculiarities of shape or size which would enable them to be identified. The oocysts of *E. maxima* are probably the only ones in this host which can be distinguished with certainty by their large size and yellowish colour.

In conclusion, this study reveals that 7.4% of the village chickens sampled were positive for coccidiosis oocysts, identified as *Eimeria maxima and E. mitis*. The chickens belonged to households which rear chicken for their own consumption and thus fed them with household food scraps and were allowed to graze on any available vacant land nearby. Usually, chicken from several households share a common free ranging area thus spreading of diseases is possible especially coccidiosis which requires a damp, warm climate as in Malaysia. It is observed that 10 chickens showed positive infection and this data requires further investigation to elucidate the other factors which may affect infection rates in free ranging village chicken. As the local village chicken industry is becoming more prominent with locals preference for village chicken, there is a need for studies on diseases affecting village chicken.

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