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The Prevalence and Pathological change of Caecal Coccidiosis in Japanese Quails (Coturnix coturnix japonica) in Thi-Qar Province, Iraq.

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Abstract:

Coccidiosis is a common disease in poultry and causes high pathological and economic losses especially in young birds. This study was in five regions in Thi Qar province, Iraq. Where he collected (330) samples for three seasons (winter, spring and summer). The total infection rate was 64.54% highest rate of infection during the spring of 75.75% with a significant difference at ($P \leq 0.01$). Area of Nasiriyah recorded a higher infection rate of 72.72%, with a significant difference from other study areas. In study diagnosis two types of *Eimeria* (*E. bateri* and *E. tsunodai*) rates of infection were (59.62%, 40.37%) respectively, The time of sporulation was recorded within (48-72 hours). Pathological tissue sections revealed clear changes to the cecum and the presence of different stages of the parasite.

Key words: Quail, Coccidiosis, Prevalence, Caecal

Introduction:

Quail producted is consider as a branching of the modern poultry industry, Japan was the original home of quail birds that were domesticated as long as the twelfth century, at the beginning of this century these birds were bred in large numbers for the dual purpose of producing meat, eggs and as laboratory animal (Abd El-Gawad *et al*., 2008). Coccidiosis is the commonest and most important disease of poultry resulting in great economic losses worldwide, Clinical signs are associated with tissue destruction from the release of the merozoites and mature oocysts from the mucosal surface during the last generations of merogony and throughout gametogony (Abdisa et al., 2019). The parasite belony the phylum: Apicomplexa, which goes through a direct life cycle. The parasite grows and multiplies intracellular in epithelial and subepithelial cells, the parasite occurs in some cases only if the bird is exposed to a severe infection and its immunity lowered for infection (Shirley *et al*., 2007). The pathological changes in intestines and caecal according to the various

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species for *Eimeria*. In most cases,loss of surfaceepithelial cells and villous atrophy are associated with first generation schizonts, while crypt destruction or hyperplasia is associated with gametogons stages. Histopathological lesions in case of caecal form revealed loss of epithelial tissue and congestion of blood vessels which indicated disruption followed by leakage of blood. Severe muscular oedema and necrosis of submucosa, loss of villi, disruption of caecal mucosa, cluster of oocysts and marked haemorrhage, necrosis of caecal mucosa and lymphoid cells showing hyperplasia. (Khan *et al*., 2011).

Materials and methods:

Sample collection

Fecal samples were collected from 330 Quails birds, from quail farms of five regions in Thi Qar povince. This study started from December 2019 to September 2020. The sample were transferred in a cool boxto the parasites laboratory at the College of Veterinary Medicine, University of Baghdad for a morphological study.

Laboratory methods:

Samples were prepared for microscopic examination by direct smear and flotation method, positive samples were treated with (K2Cr2O7) at 2.5% for oocysts sporulation and placed into Petri dishes at room temperature to microscopically study of morphological characteristics of *Eimeria spp* (Duszynski and Wilber,1997).

Histological sections:

Necropsy. The birds were euthanized and this was accomplished in accordance with guide for the care and use of laboratory animals. Section of the caeca were taken for gross and histopathological study. Using Haematoxylin, Eosin and PAS stain (Mitchell *et al*., 2003).

Statistical Analysis:

The Statistical Analysis System SAS (2012) program was used to detect the effect of difference factors.Use Chi-square test compare between percentage (0.01 and 0.05 probability) in this study.

Results:

Morphological features:

The study revealed that 213 cases out of 330 were infected with *Eimeria spp*. With a total infection rate of 64.54%. This results diagnosis were of *Eimeria bateri* : the

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morphological characteristics sporulated oocyst were subspherical to ellipsoidal, length and width range size (18-31) x (14-26) μm. S.I (1.3), has a double thick wall and polar granule present with the micropyle absent, sporocyst ovoid to pyriform, It has stieda body prominent a nipple-like figure (1).

Eimeria tsunodai : sporulated oocyst were subspherical to ovoid, length and width range size (18-24) x (14-19) μm. S.I (1.30), has a double wall and polar granule present with the micropyle absent, sporocyst ovoidal to ellipsoidal, It has stieda body triangular- nipple like (fainted) Figure (2).

Fig 1: Sporulated oocyst of *E. bateri* direct wet smear (X40).

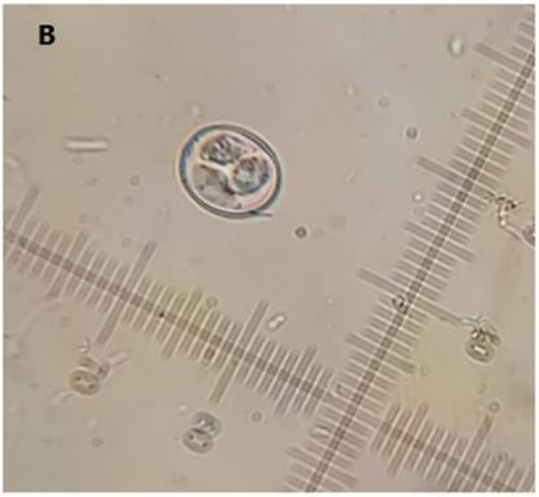

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Fig 2: Sporulated oocyst of *E. tsunodai* direct wet smear (X40).

Sporulation time of oocysts:

The sporulation time of *Eimeria* Oocysts was recorded after treated in 2.5% (K2Cr2O7) at room temperature, sporulation time disparity of the same species between (48-72 hour).

Infection rate of *Eimeria spp* in Quail:

Study recorded the rate of infection were 59.62%, 40.37% for *Eimeria bateri* and *Eimeria tsunodai* respectively with significant difference at (P≤0.01) Table (1).

T 1. Infection rate of *Eimeria spp*

Eimeria spp	**Infection No.**	***Eimeria spp* No. (%)**
E. bateri	213	127 **(59.62%)**
E. tsunodai		86 (40.37%)
		Chi-Square (χ^2)= 7.022

The infection rates during the study seasons of *Eimeria spp*:

Our results during of year seasons showed the highest prevalence for the spring season, it was reached 75.75% and with a significant difference at (P≤0.01), Table (2).

T 2. Infection rates of *Eimeria spp* in quail according to the Seasons

Seasons	**Examined samples**	**Infected samples (%)**
Winter	99	70 (70.70%)
Spring	99	75 (75.75%)
Summer	132	68 (51.51%)
Total	330	213 (64.54%)
		Chi-Square (χ^2)= 8.934

Rates of infection with *Eimeria spp* By study areas:

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The current study recorded 213 cases of *Eimeria spp* in five areas of Thi-Qar province and the higher rate of infection in Nasiriyah area was 72.72%, While the infection rates for other areas were convergent , but with significant variation at ($P \leq 0.05$), Table (3).

T 3. Infection rates of *Eimeria spp* in quail in areas Thi-qar

Areas	Examined faecal samples	Infection samples (%)
AL-Rifai	66	41 (62.12%)
AL-Shatrah	66	39 (59.09%)
AL-Nasiriyah	66	**48 (72.72%)**
Suk AL-Shuyoukh	66	47 (71.21%)
AL-Bathaa	66	38 (57.57%)
Total	330	213 (64.54%)
		Chi-Square (χ^2) = 5.002

Pathological examination:

The caecum tissue sections revealed significant pathological changes resulted from heavy parasitic infestation reflected presence of different developmental stages of *Eimeria spp*. These histopathologic lesions characterized by enteritis to severe necrotic enteritis described as atrophic intestinal villi and their fusion resulted from massive erosive mucosal epithelium. Severe degenerative and necrotic changes range from hydropic, Swollen cells sometimes filled with parasitophorous vacuoles of protozoal developmental stages (parasitophorus) either nuinucleated meronts, multinucleated meronts as collection in the epithelial cells, besides released free merozoites from enterocytes mostly in crypts and mucus glands. revealed marked hyperplastic changes and increased production of mucinous material as red color filled the goblet cells between villous epithelial cells and in crypt-mucosal epithelium figure (3, 4, 5, 6).

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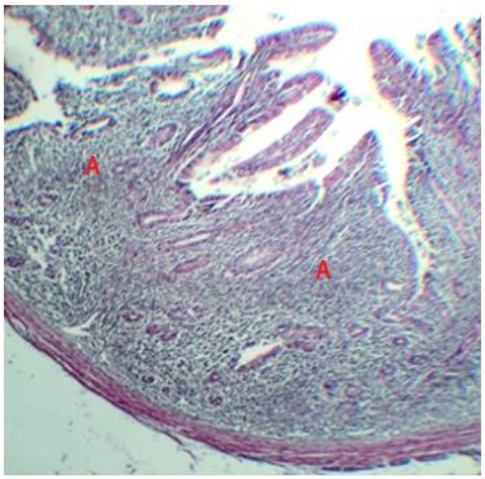

Fig 3: Histopathologic section of Caecum showing, Massive necrotic enteritis (**A**), (H&E stain, 10X).

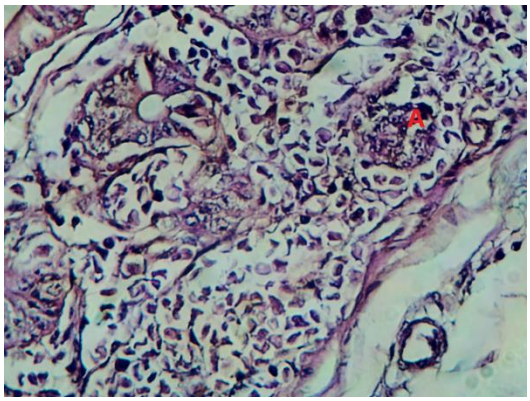

Fig 4: Histopathologic section of Caecum showing, Schizont (A), (H&E stain, 40X).

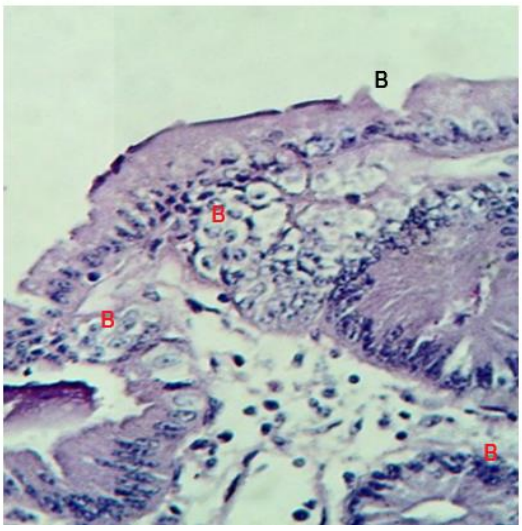

Fig 5: Histopathologic section of Caecum showing, Desquamation of mucosal epithelium (**B**), parasitic vacuoles in mucosal epithelium, lamina properia and

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submucosa aggregation of micro& macrogamets and meronts (**B**), (H&E stain, 40X).

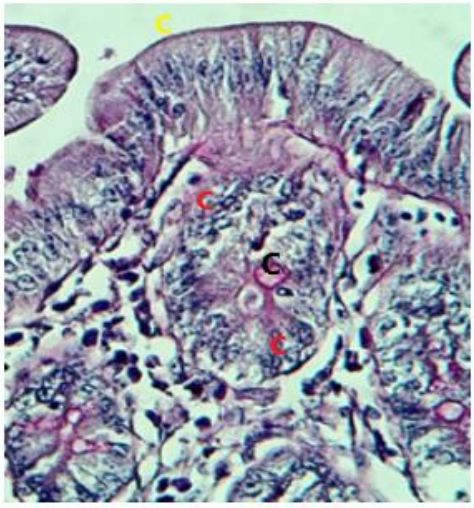

Fig 6: Histopathologic section of Caecum showing, enlarged villous (C), enlarged in goblet cells due to presence different stages of *Eimeria spp* (**C**), Red color for mucin from goblet cells (**C**), (PAS stain, 40X).

Discussion:

The results of the current study reached a total infection rate was 64.54%, from grand total of quail (213 out of 330) for five areas in Thi-qar. Our the total infected rate is agree with Abedel-Aal and El-Sayed (2003) who recorded that it was 62.5% in Sharkia, Egypt in Quails, So was the approach to the result Gebeyeh and Yizengaw (2017) they recorded 65.10% in Ethiopia. Ingreement with Arafat and Abbas (2018) documented infection rate lower than the results of our study as was 31.78% in Mansoura, Egypt and ingreement with Mahdii and Al-Rubaie (2013) in Baghdad, Iraq they recorded 35% in pigeon birds. Difference in the *Eimeria* infection rates could be attributed to number of samples, the density of the birds, type of rearing of the birds such as (Over crowding) may increase the *Eimeria* infection rate to environmental condition (temperature and humidity) and program used for coccidiosis controland resistance against certain anticoccidial drugs and Mismanagement as well as adult birds are resistant to the parasite (Nematollahi *et al*., 2008). *Eimeria* species diagnosis by morphological characteristics was in agreement with many researchers (Teixeira *et al*., 2004; Bashtar *et al*., 2010; Mohammad, 2012; Arafat and Abbas, 2018). Sporulation times vary according to the laboratory conditions, Number of oocysts in the sample and the oxygen percentage (Abd-Al-Aal, 2000). The difference in infection rates between the *Eimeria* species may be due to samples number and the immunity of the bird,

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perhaps areas the different that were collected samples (Khudhair, 2014). In this study prevalence highest for the spring season was 75.75% and summer season display lower prevalence rates. These results were compatible with Al Se´adawy (2013). the spring season considered the reproduction season for most animals which increases its activity and raises the chances of exposure to infection (Williams, 1995). The difference in infection rates for the study areas may be rearing system for quail, health care and use of anticoccidial programs. This is indicated by Sulaiman *et al*. (2005). That a management system that was used for birds propagation. Also, It was know that the *Eimeria* infection had a high infection rate in the crowded and moist environmental systems. The result of the study showed clear histopathological lesions and different stages of *Eimeria* in infected caecum in quails. The mechanisms and degree of tissue damage depend on the species of *Eimeria* involved, the size of the infective dose of oocysts, stress, and various host-related factors including age, physical condition, genetic susceptibility, and degree of immunity in young animals (More *et al*. (I 2011). A common feature of the infection is a severe depression of the digestive and absorptive capabilities of the mucosa. Furthermore, the magnitude of all disturbances and functional changes are usually related to the intensity of the parasitic infection (Bujmehrani, 2011).

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