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Epidemiological study of coccidiosis in quail in Baghdad city

دراسة وبائيه داء الاكريات(الكوكسيديا) في طائر السمان في مدينه بغداد

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بحـــــث مستـــــل

Summery :

This study was conduct to estimate the epidemiology of coccidiosis in quails in Baghdad city by using 180 birds during the period from November 2013 until April 2014 . The total infection rate was 78.33% (141/180) and males had a high infection rate 83.01%(88/106) compared to females 71.61% (53/74)

A high infection rate was recorded in spring season(81.11)% than winter (75.55)% and December month was show high infection rate (90%) while January month was show a low infection rate (66.66%) .

This study was confirmed the species and their sites of infection of Eimeria E. bateri(66.11%) , E. tsunodai (45%), E. uzura *23.88%, fluminensis* (*38.33*%)

A high infection rate was record in ileum (59.44%) and a low infection rate was found in duodenum (40.55%) while jejunum and caecum were show an equal rate (56.66%)

المستخلص :

تضمنت هذه الدراسة معرفة مدى انتشار أنواع الكوكسيديا والتي تصيب طائر السمان (السلوى) من خلال فحص 180 طائر للفترة من تشرين الثاني 2013 ولغاية نسيان 2014 في مدينة بغداد بلغت نسبة الإصابة الكلية 78,33% (141/180).

وكانت نسبة أصابه الذكور (83,01) (88/106) أعلى من الأثاث 71,61 (53/74) وقد بلغت أعلى نسبة أصابه في فصل الربيع (81,11%)بينما اقل نسبه فصل الشتاء (75,55%)كما بلغت أعلى نسبة إصابة في شهر كانون الثاني (90%) واقل نسبة إصابة في شهر كانون الأول 66,66% وقد تم تثبيت الأنواع الايميريا ونسب اصابتها. E. bateri(66.11%) و E. uzura(23.88) E. tsunodai (45%) E. . ***fluminensis*** (***38.33%)***

ووجدت اعلى نسبة اصابة في اللفائفي (59,44%)واقل نسبة إصابة في الأنثى عشري (40,55%) وكانت نسبه اصابة الصائم والاعور متساوية (56,66%)

Introduction:

Coccidian infections especially with *Eimeria* species are one of most dangerous diseases facing poultry production industry. Many *Eimeria* species are highly pathogenic to their hosts causing great economic losses **(1)**. It is one of the most important and common protozoan disease in various avian species (2) specially in the intensive poultry farming worldwide **(3).**It was caused by the intracellular protozoa parasites of the genus *Eimeria* **(3) .**

The Japanese quail *Coturnix japonica* originated from North Africa, Europe and Asia, is used worldwide as an experimental animal and model for aviculture **(4) .**In addition to its importance for aviculture, the Japanese quail has become, in recent decades, an important experimental animal for scientific research. It is used extensively in studies examining genetics, nutrition, toxicology, embryology, physiology and pathology **(5,6,7,8,9,10,11)).**They are most susceptible to various diseases such as coccidiosis which recognized as a serious parasitic disease problem limiting quail industry **(12)** .

Due to direct effects of coccidiosis such as poor feed conversion or to indirect costs associated with control measurements that include the preventive use of anticoccidial or vaccines this study was conducted to

estimate the species of *Eimeria sp*. and there effects on the body weight that infects quails in Baghdad city.

Materials and Methods:-

A total of one hundred and eighty of different sexes Quails were brings from the local markets of Baghdad Al-Jededa and Alrashidia cities in Baghdad province which divided into 6 groups (30 birds/month) during the period from November 2013 to April 2014.They were purchased in the parasitic laboratory of Veterinary Medicine College /Baghdad University .After slaughtered the quails. Intestine (small and large) are exit and after transecting the rectum and make a longitudinal incision through the intestine **(13)**

The fecal analysis was done according to(14) by using two methods (Direct smear and Flotation method)

The oocysts were sporulated by placing them in a potassium dichromate (K2CR2O7) 2.5% in the Petri dishes at room temperature about 25°C for 3 to 7 days and examined under the light microscope**(15)**

Calibration of the microscope which done according to**(16)**

Statistical analysis was carried out by using the standard system for analyze the data **(17)**

Result s :-

1 -Infection Rate:-

The total infection rate of *Eimeria sp*. in quails was 78.33% (141/180). (Table,1).

Table (1): The total *Eimeria* sp. infection rate of quails.

Number of birds examined	Infected	Percentage (%)
180	141	78.33

Eimeria ***bateri*** had a high infection rate (56.25%), while *Eimeria uzura* had a low infection rate (14.75%).(Table ,2)

Table (2) The infection rate of *Eimeria* sp. in quails.

Type of Eimeria sp.	Percentage (%)
E. bateri	66.11
E. tsunodai	45
E. uzura	23.88
E. fluminensis	38.33

2-The characteristics of *Eimeria* sp. oocysts:-

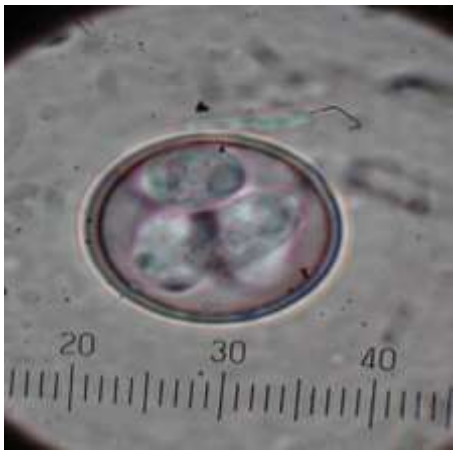
Table (3)and figure (1) were show the characteristic features of *Eimeria* sp. oocysts and table (4)was show the characteristic features of Eimeria sp. sporocysts.

Table(3): The *Eimeria sp*. oocysts dimensions of quails.

Species	shape	Length Range (Mean±SE)	Width Range (Mean±SE)	Index	Polar granule	Residuum body	micropyle
E. bateri	Sub spherical - ellipsoidal	20 - 29 (24.3 ±1.11)	13-25 (19.9±1.46)	1.16-1.53 (1.29±0.29)	present	_	_
E.tsunodai	Sub spherical- Ovoidal	18 – 23 (20.3 ±0.51)	15 - 19 (17±0.47)	1.05-1.3 (1.19±0.18)	present	_	_
E. uzura	Ellipsoidal - Ovoid	19 – 27 (22±0.8)	15 – 21 (17.7±0.57)	1.11-1.37 (1.23±0.16)	present	_	+
E.fluminensis	spherical – Sub spherical	18-15 (16.6±0.33)	15-17 (15.7±0.26)	1-1.2 (1.05±0.22)	absent	_	_

E. tsunodai

E. bateri



E. fluminensis

E. uzura

Fig.(1) . Eimeria species of quails.

Table(4). The *Eimeria* sp. sporocysts dimensions of quails.

Species	Sporocysts				
	Shape	Length Range (Mean ±SE)	Width Range (Mean ±SE)	Index	Stieda body
E. bateri	Ovoidal to ellipsoidal	10-13 (11.6±0.3)	6-8 (6.8±0.2)	1.37-1.85 (1.68±0.6)	+
E.tsunodai	Ellipsoidal	10 – 12 (10.7±0.21)	5-6 (5.5±0.16)	1.6 – 2.2 (1.94±0.23)	+
E. uzura	Ovoidal to ellipsoidal	8 – 13 (10.6±0.54)	6 – 7 (6.4±0.16)	1.3-1.8 (1.61±0.5)	+
E.fluminensis	Ovoidal	8-9 (8.3±0.15)	5-6 (5.7±0.15)	1.3-1.6 (1.47±0.35)	+

3-The infection rate of *Eimeria* sp. according to sex:-

Table (5) was show that males had a high *Eimeria sp*. infection rate (83.01%)than females (71.61%).

Table (5): Eimeria spp. infection rate according to sex in quails.

Sex	N. of birds examined	Infected	Percentage(%)	
Males	106	88	83.01	a
Females	74	53	71.61	b
Total	180	141	78.33	

*P<0.05

4- The infection rate of *Eimeria* sp. according to seasons:-

There was no significant difference ($p \geq 0.05$) between winter and spring seasons in the infection rates of *Eimeria* sp. in quail .(Table, 6).

Table(6) The effect of the season in the Eimeria spp. infected related in the quails.

Season	Number of birds examined	Infected(%)	Uninfected(%)
Winter	90	68 (75.55)	22(24.44)
Spring	90	73(81.11)	17(18.88)
Total	180	141(78.33)	39(21.66)

*P>0.05

5- The infection rate of *Eimeria* sp. according to months:-
January month had a high infection rate (90%) followed by February month(86.66%),while the less *Eimeria* spp. infection rate(66.66%) in December month with a significant deference ($p \leq 0.01$) but no significant deference ($p \geq 0.05$) was record between March and April. (Table, 7)

Table (7): *Eimeria* spp. infection rate according to months of the study in quails.

Months	Number of birds examined	Infected	Percentage (%)
November2013	30	21	70 c
December	30	20	66.66 * d
January2014	30	27	90 a
February	30	26	86.66 a
March	30	24	80 ** b
April	30	23	76.66 b
Total	180	141	78.33

*P<0.01 ** P<0.01

6- The infection rate of *Eimeria sp*. according to site of infection:-
A high *Eimeria sp*. infection rate(59.44%)was record in the ileum ,and the low *Eimeria sp*. infection rate(40.55%)was found in the duodenum, while jejunum and caecum were show an equal rates (56.66%). (Table ,8).

Table (8):*Eimeria sp*. infection rates according to sites of infection in quail .

Number of infected bird	Sites of infection			
	Duodenum(%)	Jejunum(%)	Ileum(%)	Caecum(%)
141	73(40.55)	102(56.66)	107(59.44)	102(56.66)

7- The infection rate of *Eimeria* sp. according to type of infection:-
A high *Eimeria sp*. mixed infection rate was recorded in the two types (48.93%) ,followed by three and more (31.91%), while the one type was show 19.1% infection rate. (Table ,9)

Table (9): Eimeria sp. rate according to type of infection in quail.

Number of birds examined	type of infection		
	Single sp. (%)	Two sp. (%)	three sp. or More (%)
180	21.98	44.67	33.33

Discussion:-

Coccidiosis It is one of the most important and common protozoan disease in various avian species (**2**).The total infection rate was a higher than **(1)** who found an *Eimeria* spp. infection rate 29% ,and **(18)** who recorded that the total infection rate with *Eimeria sp*. 49.4% in Mosul .Also ,It was disagree with **(19)** in a survey on the prevalence of coccidiosis in indigenous chicken in Kenya**(** 27.04%).

Eimeria bateri had a high infection rate (66.11%) ,while *E. uzura* had a low infection rate (23.88%).These results were differ from **(18)** who found that the infection rate of *E. bateri* was less (24.1%) than *E. uzura* (34.5%). These may be due to the difference in the numbers of the samples and areas were collected or to the types of the management system that used for birds propagation . Also, It was Know that *Eimeria* infection had a high infection rate in the crowded and moist environment systems**(20)** .

The characteristics of *E. bateri* oocysts were sub spherical to ellipsoidal, length 20-29 (24.3 ±1.11) µm ;width 13-25 (19.9±1.46) µm; Shape index 1.16-1.53(1.29±0.29 µm) ; Bi-layered wall; Micropyle and residuum are absent and polar granules present. These results were agree with **(18)** who recorded that the shape of oocysts was sub spherical ,length 16-30 µm , width 14.5 – 21 µm , shape index 1.05±0.89 ;**(9)** who recorded that the shape of oocysts was sub spherical to ellipsoidal , length 21-30 µm , width 15-22 µm , shape index 1.1-1.7 and polar granule present and (**4**) who found that the shape of oocysts was sub spherical to ellipsoidal , length 18-31 µm, width 14– 26 µm ,shape index1.0- 1.7 and polar granule present, and also agreement with **(21)** who recorded that the shape of oocysts was sub spherical to ellipsoidal , length 21-30(25.1 ± 2.3) µm, width 15-22 (18.9 ± 1.4) µm ,shape index 1.1-1.7(1.3 ± 0.1) µm, polar granule present and micropyle and residuum are absent .

E.tsunodai oocysts were sub spherical to ovoidal ,length 20.3 ±0.51 (18 – 23), width 17±0.47µm (15 - 19), shape index 1.19±0.18 (1.05-1.3). Bi-layered wall smooth , micropyle and residuum are absent, but polar granules are present. These results were agree with **(18)** who recorded that the shape of oocysts was ovoid with measurement length 16-20µm , width 14.5 – 18µm with shape index 0.88±0.76 also agreement with **(22)** who found that the shape of oocysts was ovoid with a length 15.5-22.5 µm , width 16.6-18.5 µm , shape index 1.36, polar granule present ,and agreement with **(23)** who recorded that the shape of oocysts was ovoid with length 19-22 µm , width 14-16.5 µm , shape index 1.36 ,polar granule present**,** also agree with**(4)** who recorded that the shape of oocysts was ***s***ub spherical to ellipsoidal with length 18-25 µm , width 14-19µm ,shape index 1.0 - 1.5and polar granule present .

Eimeria uzura oocysts were ellipsoidal to ovoid, length 19 – 27(22±0.8) µm , width 15-17 (15.7±0.26)µm, shape index 1.23±0.16 (1.11-1.37), micropyle is present and residuum are absent, but polar granules are present that were agreement with **(18)** who record that the shape of oocysts was broad ellipsoid with measurement length 19-28.5 µm , width 16-21.5 µm with shape index 2.02±0.61 micropyle present .and agreement with **(23)** who found that the shape of oocysts was ovoid with measurement length 19-23 µm , width 15-17 µm with shape index 1.32 Polar granule present also agreement with **(5)** who recorded that the shape
of oocysts was ovoid ,length 18-28 µm , width 16-21µm , shape index 1.1-1.7 and polar granule present.

E .fluminensis oocysts were spherical –Sub spherical, length 16.6±0.33 (18-15) µm , width 15 – 21 (17.7±0.57)µm, shape index (1-1.2) 1.05±0.22, micropyle , residuum and polar granules are absent. These results were agree with **(24)** who found that the shape of oocysts was sub spherical , length 15-19 µm , width 15-18 µm , shape index 1.05, micropyle and polar granule absent.

E. bateri sporocysts were ovoid to ellipsoid, length 10-13(11.6±0.3) µm , width 6-8(6.8±0.2)µm, shape-index 1.68±0.6 , stieda body is present. Our results were agree with **(18)** who recorded that the shape of sporocysts , length 8.5-11.2 µm , width 6-7 µm , shape index 0.5±0.9 and stieda body present and agreement with **(9)** who found that the shape of sporocysts

were ovoid , length 11-14µm , width 7.4-6.9µm , shape index 1.5-1.9, stieda body present; also agree with **(21)** who recorded that the shape of sporocysts were ovoid, and stieda body present**.**

E .tsunodai sporocysts were ovoid to ellipsoidal, length 10-12 (10.7± 0.21) µm ,width 5-6 (5.5±0.16) µm, shape-index 1.6 – 2.2(1.94±0.23) µm and stieda body is present. Our results were agree with **(18)** who recorded that the shape of sporocysts , length 9.1-10.7 µm , width 4.7-.3 µm ,shape index O.4±0.83 ,stieda body present and agreement 5with **(32)** who record that the shape of sporocysts were ovoid length 10-12µm , width 5-6µm , shape index 1.7-2.2and stieda body present ,also agree with**(22)** who recorded that the shape of sporocysts were ovoid to ellipsoid and stieda body present.

E .uzura sporocysts were ovoid to ellipsoid, length 8 – 13(10.6±0.54) µm ,width 6 – 7 (6.4±0.16)µm , shape-index 1.61±0.5 ,and stieda body is present that were agree with **(18)** who found that the length 10.8-12 µm ,
width 5-6 µm , shape index 1.2±0.8 ,stieda body present and agree with Teixeira and lopes 2002 they recorded that the shape of Sporocysts was ovoid with measurement length 11-12.5µm , width 5.5-6.4µm and stieda body present, also agree with**(9)** who found that the shape of sporocysts were ovoid ,length 13-14µm , width 5.5-6.4 µm , shape index 2-2.4 and stieda body present**.**

E.fluminensis sporocysts were ovoid 8-9(8.3±0.15) µm ,width 5-6 (5.7±0.15)µm, shape index 1.47±0.35 and stieda body is present. That were agree with**(24)** who recorded that the shape of sporocysts were ovoid , length 9.3-11.5 µm , width 5.3-6.5 and stieda body present.

Our results were show that males had a high *Eimeria spp*. infection rate than females .These results were agree with **(18)**who found that males had a high infection rate (50%) than females (48.9%) but without significant difference($P<0.05\%$), with a significant deference ($P \leq 0.01$) ,this may be due to the numbers of the samples or areas where samples were collected ,also the types of rearing of the bird (Over crowding) which increase the *Eimeria* infection rate as one of the risk factors of this parasite**(25,26).**

There was no significant difference ($P \geq 0.05$) found between winter and spring seasons in the *Eimeria sp*. infection rates in quail **.**These results were reflex the differences in the prevalence of coccidiosis that referred by **(19)** who found in a survey on prevalence of coccidiosis in indigenous chicken in Kenya**,** the monthly prevalence of *Eimeria* infection was higher in July month (94.4%) compared with other months such as June month was shown a lower infection rate(57.9%) ,also the levels of oocysts shedding per gram were shown higher in Summer season (July, August8; over 40%) than that of Winter season (January, February; 23.1%, 16%) .

January month had a high *Eimeria* spp. infection rate followed by February month ,while the less *Eimeria* spp. infection rate was recorded in December month with a significant deference ($p \leq 0.01$), but no significant deference ($p \geq 0.05$) was record between March and April, these results were differed than**(19)** who showed a higher *Eimeria* sp. infection rate in July month (94.4%) followed by June month (57.9%) and a less *Eimeria* sp. infection rate(16%) in February month followed by January month (23.1%).

A high *Eimeria sp*. infection rate was record in the ileum ,and the low *Eimeria spp*. infection rate was found in duodenum while jejunum and caecum were show an equal infection rates .These results were disagree with **(18)** found that caecum had a higher infection rate compared to duodenum .These may be due to the deference in the species of Eimeria that the study . Also the types of the management infects the animal which some species preferable sites of infection and the species spread in the area of the study**(27)** .

The high *Eimeria* species mixed infection rate was recorded in two species ,but followed by three *Eimeria* species or more. infection rate, while infection by one *Eimeria* species was show the lowest infection rate that was agree with **(18)** who found infection with a single *Eimeria* species had a low infection rate, but disagree with him in the infection by two species or more .This may be due to species of *Eimeria* that spread in the area and the seasons or month of the study.

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