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Original Article

Prevelance and Morphological identification of *Eimeria* species in quails

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Abstract:

A total 205 quails (93 migrant; *Coturnix coturnix japonica* and112 farm's quail) were collected. Fresh faecal samples were examined from each bird by direct and concentration method. The results showed that the total percentage of infection with *Eimeria* species oocysts was 43.90%. The prevelance of *Eimeria spp*. in migrant and farm's quails was 68.82% and 23.21%, respectively. Five species of the genus *Eimeria* were recorded in migrant quails and identified as *E. bateri, E. tsunodai, E. uzura, E. colini* and *E. bahli* and two species of *Eimeria*; *E. bateri, E. tsunodai* were found in farm's quail. Morphological characters of the detected *Eimeria* were described.

Key words *Eimeria spp*, prevelance, quails, migrant quails, farm's quail, *coturnix coturnix japonica*

INTRODUCTION

Quails were mid-sized birds generally considered in the order *Galliformes*, like; chicken, turkey and pigeons. There were two important species; The Japanese quails (*Coturnix coturnix japonica* and Bobwhites quails (*Colinus virginianus*). The Japanese quail originated from Eastern Asia and Bobwhites were from United-State **(Bahar et al., 2014)**. Migratory quail, known as common quail (*Coturnix coturnix japonica*) was one of the most migratory birds which migrates from Europe to Egypt during autumn season and act as biological and or mechanical vectors playing a role in ecology and circulation of some zoonotic pathogen threatening human health and domestic animals (**Benskin et al., 2009**).

Coccidiosis is a wide spread disease caused by protozoan parasites of the genus *Eimeria* (Coccidia: Eimerriidae), which is a complex and diverse group of protozoan parasites (**Musaev et al., 1998)**. Over 1700 *Eimeria* species have been identified worldwide (**Duszynski and Wilber, 1997)**. In Birds, pathogenic *Eimeria* causes enteric disease and major economic losses in the global poultry industry (**Mcdougald and Raid, 1991**).

Various species of *Eimeria* have been isolated from the different species of quails such as *E. tsunodai, E. uzura* and *E. bateri* from Japanese quails (**Teixeira et al., 2004**); *E. lophortygis* and *E. okanaganensis* from California quails; *E. crusti* and *E. oreortygis* from mountain quail (**Duszynski and**

Gutievrez, **1981**); *E. conturnicis* and *E. bateri* from grey quail **(Tsutsumi, 1972)**; *E. colini* and *E. lettyae* from Bob white quail **(Ruff, 1985)** and *E. tahamensis* from Arabian quail (**Amoudi, 1987**).

The present study was conducted to study the prevelance and morphological characterization of *Eimeria* species infecting quails

MATERIAL AND METHODS

A total of 205 quails (112 farm's quail and 93 migrant quails; *Coturnix coturnix japonica* were collected. The farm's ones were bought from different farms at Sharkia province. Migrant quails were bought from hunters during migration season (September, October and Novmber) from Rasheed and Damietta cities.

Fresh faecal samples were collected daily from each quail which was kept in a separate wire cage and offered clean water and food. A faecal sample was taken soon after admission and examined microscopically for detection of unsporulated oocysts usind direct smear and concentration flotation method **(Coles, 1974; Hoffmann, 1987 and Duszynski and Wilber, 1997)**.

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The collected oocysts were sporulated in 2.5% potassium dichromate solution (K2Cr2 O7), mixed well and poured into petri dishes to a depth of less than 1 cm and kept at room temperature in the dark to facilitate sporulation **(Duszynski and Wilber, 1997)**.

Sporulated oocysts were identified according to **Norton and Pierce (1971), Tsutsumi (1972), Pellerdy (1974) and Teixeiraet al. (2004)** and photographed.

Results

Out of the 205 examined quails (93 migrant and 112 farm's quail), 90 cases (43.90%) were positive for *Eimeria* spp. The present study revealed that the prevelance of *Eimeria sp* was 68.82% and 23.21% in migrant and farm quails, respectively. **(Table 1)**

Five *Eimeria* species were identified in naturally infected migrant quails, namely *Eimeria bateri*, *Eimeria tsunodai*, *Eimeria uzura*, *Eimeria colini* and *Eimeria bahli*, while, two species (*Eimeria bateri* and *Eimeria tsunodai)* were identified in naturally infected farm's quails **(Tables 2 and figures1-15).**

Table (1): Prevelance of *Eimeria species* in migrant and farm quails.

Birds	Migrant quails	Farm quails	Total
Migrant quails	93	64	68.82
Farm's quails	112	26	23.21
Total	205	90	43.90

Table (2): The morphology of the oocysts of *Eimeria* spp determined in quails.

Species	Oocyst size(µ)	Oocyst shape	Wall	Micropyle	Polar granule	Oocystic residum	Sporocyst shape	Sporocystic residum	Stieda body
E. bateri	20 x 14	Subspherical	Double	-	+	-	Pear	+	+
E. tsunodai	20.35 17	Ovoid	Double	+	+	-	Ovoid	+	+
E. uzura	18 x 13.5	Oval	Double	-	+	-	Fusiform	+	+
E. colini	24.15 x 20.4	Oval	Double	-	+	-	Curved fusiform	+	+
E. bahli	16.8 x 17.6	Spherical to subspherical	Double	+	-	-	Oval	+	+

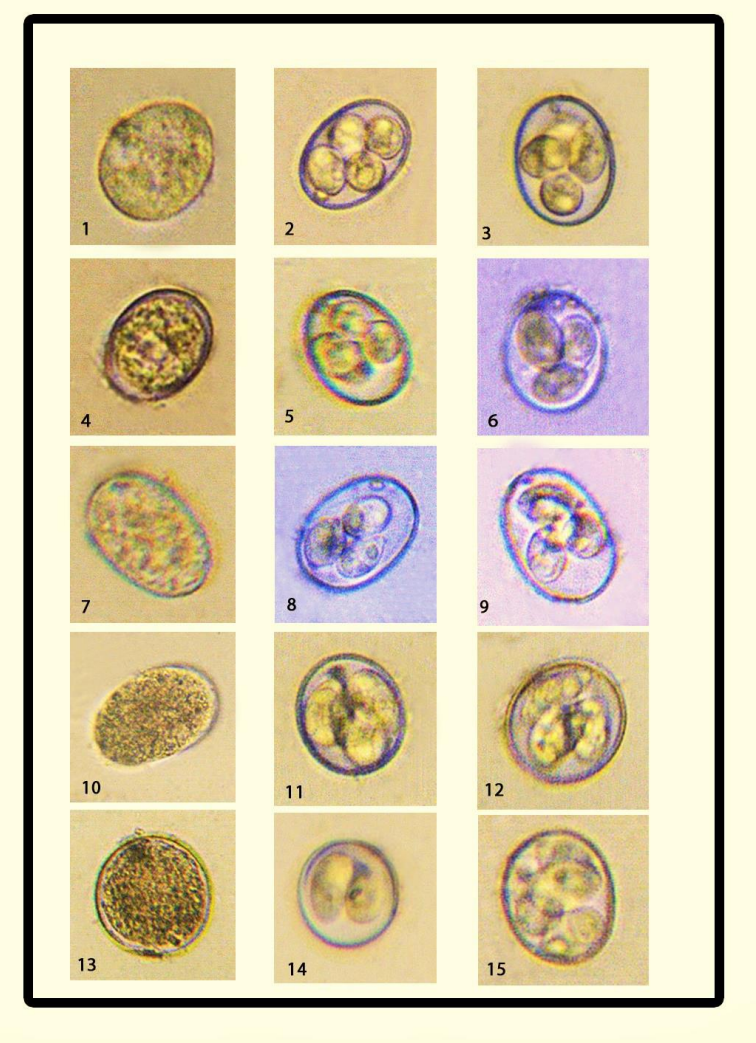

Fig. (1-15): *Eimeria* species oocyst obtained from naturally infected quails (Migrant and farm's quails 400x).

(1-3) *Eimeria bateri* (migrant and farm's quails)
(1, *Eimeria bateri* non sporulated oocysts; 2&3- *Eimeria bateri* sporulated oocyst)

(4- 6) *Eimeria tsunodai* (migrant and farm's quails)
(4- *Eimeria tsunodai* non sporulated oocysts; 5&6- *Eimeria tsunodai* sporulated oocyst)

(7- 9) *Eimeria uzura* (migrant quails)
(7- *Eimeria uzura* non sporulated oocysts; 8& 9- *Eimeria uzura* sporulated oocyst)

(10- 12) *Eimeria colini* (migrant quails)
(10- *Eimeria colini* non sporulated oocysts; 11&12- *Eimeria colini* sporulated oocyst)

(13- 15) *Eimeria bahli* (migrant quails)

(13- *Eimeria bahli* non sporulated oocysts; 14&15- *Eimeria bahli* sporulated oocyst)

Discussion

Quails considered a branch of the modern poultry industry. Poultry producers were looking for some substitutes of chicken meat, which in the future will come in the form of pigeon and quail meat to contribute towards the increase in gross domestic production through livestock sector (**Urquhart, 1996**). Several *Eimeria* species are highly pathogenic to their host causing great economic losses in quail breeding and limiting development of this industry **(Seok et al., 2003)**. In the present study revealed that the prevelance of *Eimeria* species in quails was 43.90%. Higher prevelance rate was reported by **Abedel-Aal and El-Sayed (2003)** in Sharkia, Egypt who recorded that it was 62.5%. Lower prevelance rate was reported by **Shakshouk et al. (1992)** to be 21%. The infection rate of *Eimeria species* was higher in migrant quails to be 68.82% than in farm's ones infection rate (23.21%). Similar findings of higher prevelance in migrant than farm's ones were mentioned by **Otify (1988b)** in Egypt who found that the infection rate in migrant and farm's quails was 37.5% and 20%, respectively and **Abedel-Aal and El-Sayed (2003)** in Sharkia, Egypt recorded that it was 90% and 76.6%, respectively. In current study the infection rate of *Eimeria species* detected in migrant quails was 68.82%. This result was nearly similar with that obtained by **Kucera and Reznicky (1991)** in Czechoslovakia who recorded that the infection rate was 68.6%. Also, **Daugschies et al. (1999)** in Brazil rcorded to be 68.8%. However, **Ruff et al. (1985)** in USA stated that the percentage of infection was 100%. **Bashtar et al. (2010)** in Saudi Arabia recorded that it was 80%. While, **Abedel-Aal and El-Sayed (2003)** in Egypt recorded the infection rate was 20% and **Otify (1988b)** in Egypt recorded that it was 37.5%. Morever, **Musaev et al. (1998)** in Iran reported that the infection rate was52%. Meanwhile, **Mohammad (2012)** in Iraq recorded that it was 49.4%.

In the present study the infection rate of *Eimeria species* in farm's quails was 23.21%. This result was nearly similar with that reported by **Iqbal et al. (1995)** in Pakistan who found that the infection rate was 28%. This result was contrary with that obtained by **Abd-El-Maged (2005)** in Egypt who recorded the infection rate was 31.5%. While, **Abedel-Aal and El-Sayed (2003)** in Egypt recorded that it was 76.6%, **Badawy et al. (1999)** in Egypt recorded the infection rate was 33.6%. However, **Otify (1988b)** in Egypt recorded that it was 90% and **El-Madawy**

(2001) in Egypt recorded that it was 89.8%. While, **Berto et al. (2013)** in Brazil recorded the infection rate was 100%. However, **Roa and Sharma (1992)** in India recorded that the infection rate was 16.1%.

The difference in the percentage of infection of *Eimeria* species in migrant quails may be due to the age of examined birds, which were collected randomly. Morever, the variation in prevelance of *Eimeria* infection in farm's quails may be due to the different system of rearing and management in quail farms.

In this study. five *Eimeria* were diagnosed in naturally infected migrant quails (*Eimeria bateri, Eimeria tsunodai, Eimeria uzura*, *Eimeria colini* and *Eimeria bahli*) and two species of *Eimeria* (*Eimeria bateri* and *Eimeria tsunodai*) were detected in farm's ones. These results were nearly similar with that reported by **Abedel-Aal and El-Sayed (2003)** in Sharkia, Egypt who found more than six species of *Eimeria* namely; *E. bateri, E. bahli*, *E. uzura, E. oreortygis, E. colini, E. tsuondai* and un identified *Eimeria sp*. from common quails (C. coturnix). However, **Abd-El-Maged (2005)** in Sharkia, Egypt recorded two species of *Eimeria*; *E. bateri* and un identified *Eimeria sp* in farm's quails. While, migrant ones were free from infection.

The morphology of oocysts which observed in this study was in agreement with those described by **Abedel-Aal and El-Sayed (2003**), **Bashtar et al. (2010)** and **Anbarasi et al. (2016)**

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الملخص العربي

معدل الأنتشار والوصف الظاهرى لطفيل الأيميريا فى السمـــــــــــــان

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تضمنت الدراسة على دراسة معدل الإصابة بالأيميريا فى كلا من السمان المهاجر وســمان المزارع. لقد تم فحص مائتان وخمس من طيور السمان (١١٢ سمان مزارع , ٩٣ ســمان مهــاجر) حيث جمع سمان المزارع من مزارع مختلفة فى محافظة الشرقية والســمان المهــاجر خــلال فتــرة الخريف الممتدة من سبتمبر الى نوفمبر٢٠١٧ من شواطىء رشيد ودمياط. بينت الدراسة ان المعدل العام للإصابة هى ٤٣,٩٠% وكانت نسبة الإصابة بالأيميريا فى السمان المهاجر(٦٨,٨٢%) اعلــى من نسبة إصابتها فى سمان المزارع (٢٣,٢١%). وايضا تم التعرف على خمسة أنواع من الأيمبريــا فى السمان المهاجر وهم أيميريا باترى, أيميريا تسوندى, أيميريا أزورا, أيميريا كــولينى وأيميريــا باهلى يبنما وجد نوعين من الايميريا فى سمان المزارع وهما أيميريا بــاترى وأيميريــا تســوندى . بالأضافة إلى وصف ظاهرى لأنواع الأيميريا التى تم عزلها من السمان.