Prevalence of Some Enteric Parasitic Infections in Migratory Quails (*Coturnix coturnix*)

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Abstract:

Enteric parasites of migratory quails (*Coturnix coturnix*) were investigated in Matrouh governorate, Egypt. One hundred and ninety birds were trapped and submitted for examination. The overall prevalence of the enteric parasites in the migratory quails was (75.26%). Eight parasites (two protozoans, two nematodes and four cestodes) were recovered. The recovered protozoan parasites were *Eimeria* spp. (42.1%), *Cryptosporidium* spp. (10.52%). The detected nematodes were *Subulura brumpti* (1.05%) and *Dispharynx nasauta* (1.57%). While, the detected cestodes were *Choanotaenia infundibulum* (10.52%), *Raillietina tetragona* (3.68%), *Raillietina echinobothrida* (0.5%) and *Triaenorhina rectangula* (5.26%). The detected *Eimeria* species were identified as *Eimeria bateri* and *Eimeria uzura*.

Introduction:

Wild European or common quails (*Coturnix coturnix*) are important game birds, belonging to Family Phasianidae, Order Galliformes, which breed in Europe and western Asia (from May to August), while migrate (in autumn season) southwards across the Mediterranean into northern Africa and Nile river valley from Egypt to Kenya and Angola ***(Shanaway, 1994)***. Quails are important birds, and they consider as a good dietary source of protein with high quality because of its palatable meat, which are high in protein and water contents and its egg of low cholesterol content ***(Padgett and Ivey, 1959)***, for this reason; Egyptians used to trap these migratory quails for consumption.

Migratory quails are exposed to a more diverse environment than resident birds, and so can harbor much more parasites which may disseminate to the farmed birds, animals and man ***(Adams et al., 1986 and Otify, 1988).*** The enteric parasites of quails were studied in many parts of the world by ***Roa and Sharma (1992); Kumar et al.(***

2001); Teixeira et al.(2004) and Bahar et al. (2014).

In Egypt, literatures of parasites of quails were limited ***(Otify, 1988; Ayoub et al., 2002 and Abdel-Aal and El-Sayed, 2003)***.

The aim of the present study was to investigate the enteric parasites of the migratory quails passing through Matrouh governorate, Egypt; dealing with prevalence of infection.

Materials and Methods:

One hundred and ninety migratory quails (*Coturnix coturnix*) were trapped from Marsa-Matrouh shores during the period of autumn migration (from September to November) 2013-2015, and submitted for examination. All birds were apparently healthy.

The birds were sacrificed. Intestinal contents and mucosal scrapping from small and large intestines were examined for enteric protozoa specially coccidia according to ***Levine (1985).*** The detected coccidian oocysts were allowed to sporulate separately in 2.5% aqueous potassium dichromate solution. Also, scrapping and smears from intestines were examined for detection of *Cryptosporidium* spp. oocysts using modified Ziehl-Neelsen staining technique ***(Dubey et al., 1990).***

Mucosal scraping and intestinal contents were examined carefully for helminth parasites using dissecting microscope. The nematode parasites were fixed in alcohol glycerol (5% glycerol-alcohol 70%), cleared in lactophenol and permanently mounted in glycerol-gelly according to ***Pence and Dowler (1979).*** The collected tapeworms were processed and mounted permanently according to ***Williams (1965).***

Results and Discussion:

I- Prevalence of the detected parasites:-

The overall prevalence of enteric parasites in the examined migratory quails was (75.26%) (Table, 1). The low overall prevalence was recorded by ***Acuna (1997)*** who reported that (21.1%) of California quails were infected with endoparasites and by ***Abdel-Aal and El-Sayed (2003)*** who reported the overall prevalence was 42% among migrant quails.

Regarding to the protozoan parasites the current study revealed that, the overall prevalence of protozoan parasites in migratory quails was 52.63% (Table, 1). A lower overall prevalence of protozoan parasites (29.66%) was recorded by ***Mirzaei and Doosti (2012)***.

Concerning helminth parasites in this study the overall prevalence of helminth parasites was 22.63% (Table, 1). A high overall prevalence of helminth parasites (51.6%) was recorded by ***Rinesh et al. (2003)***.

In our opinion, these variations may be due to the difference of locality of investigation.

Concerning coccidian parasites *Eimeria bateri and E. uzura* were described from the quails (*Coturnix coturnix*) ***(Tsutsumi, 1972; and Svanbaev and Utebaeva, 1973)***. In the present study *E. bateri* and *E. uzura* (Fig. 1&2) were detected from migratory quails (*C. coturnix*) with prevalence (42.1%) (Table, 2). These finding was nearly similar to that obtained by ***Badawy et al., (1998)*** who found that the incidence of natural coccidian infection among Japanese quails (*Coturnix coturnix Japonica*) was 33.6%. While, the lowest one (16.1%) was recorded by ***Roa and Sharma (1992)*** *and* ***Abdel-Aal and El-Sayed (2003)*** (20%). This result was lower than that recorded by ***Otify (1988)*** (90%) and ***Ayoub et al. (2002)*** (100%). The variation among infection rate of *Eimeria* species in quails may be due to the age of examined birds, which were collected randomly.

Cryptosporidium spp. was described from quails (*Coturnix coturnix*) ***(Bomfim et al., 2013)***. In the present study *Cryptosporidium* spp. (Fig. 3) was detected from migratory quails (*C. coturnix*) with prevalence 10.52% (Table, 2). Nearly similar finding (13.1%) was recorded by ***Wang et al. (2012)***. A lower finding was recorded by ***Mirzaei and Doosti (2012)*** (2%). This result was lower than that recorded by ***Bomfim et al. (2013)*** who found the prevalence of *Cryptosporidium* spp. was (55%) and ***Bahar et al. (2014)*** who found the prevalence of *Cryptosporidium* spp. was **(**20%).

Cryptosporidium is a zoonotic coccidian protozoon parasite that has gained significant attention in the last 25 years as a clinically important human and animal pathogen ***(Sevá et al., 2011)***.

The present study revealed two nematode parasites from migratory quails namely *Subulura brumpti* (1.05%) and *Dispharynx nasuta* (1.57%).

The prevalence of *Subulura brumpti* (Fig. 4); in this study was 1.05% (Table, 2). The same result (1%) was recorded by ***Abdel-Aal and El-Sayed (2003)***. A high percentage (27%) was recorded by ***Kocan et al. (1979)***.

In our opinion this variation may be due to the abundance of intermediate hosts of *Subulura brumpti;* which are various beetles and cockroaches ***(Nagarajan et al., 2012).***

Concerning the prevalence of *Dispharynx nasuta* (Fig. 5), during current study it was (1.57%) (Table, 2). This result was fluctuated between ***Forrester et al. (1984)*** (6.6%) and ***Acuna (1997)*** (4.4%). A higher result (11%) was recorded by ***Kumar et al. (2001)***.

The intermediate host of *Dispharynix nasuta* are wood lice or sowbugs (*Armadillidum vulgare*) and (*Porcellio scaber*) ***(Schmidt, 1986)***, so in our opinion the

prevalence of this nematode may depending on the abundance of intermediate hosts; which may depend on the season and kind of area or habitat the birds pass on.

The detected cestodes were *Choanotaenia infundibulum* (10.52%), *Raillietina tetragona* (3.68%), *Raillietina echinobothrida* (0.5%) and *Triaenorhina rectangula* (5.26%).

Dealing with *Choanotaenia infundibulum* (Fig. 6), the prevalence was (10.52%) in the examined migratory quails (Table, 2), the lower percentage; (2.6% and 2.0%) were recorded by ***Otify (1989)*** *and* ***Abdel-Aal and El-Sayed (2003)*** respectively. A higher percentage (71.9%) was recorded by ***Uchida et al., (1984)*** *and* ***Permin et al., (1997).***

Raillietina tetragona was recovered from (3.68%) of examined migratory quails (Table, 2). This result was fluctuating between that of ***Koroglu and Tasan (1996)*** (2%) and ***Kumar et al. (2001)*** (5%). Meanwhile *Raillietina echinobothrida* was recovered from (0.52%) of examined migratory quails (Table, 2). Nearly similar result (1%) was recorded by ***Koroglu and Tasan (1996)***. A higher result was recorded by ***Bahar et al. (2014)*** (2.5%).

In this study the prevalence of *Triaenorhina rectangula* (Fig. 7-9) in the examined migratory quails was (5.26%) (Table, 2). According to the available literature the present study considers the first one that recorded this tapeworm from migratory quails in this locality.

In our opinion, prevalence of tapeworm is associated with insects (as intermediate host) availability, so it should be expected to vary by season and kind of habitat the birds pass on. This opinion is in agreement with ***Peterson (2004)***.

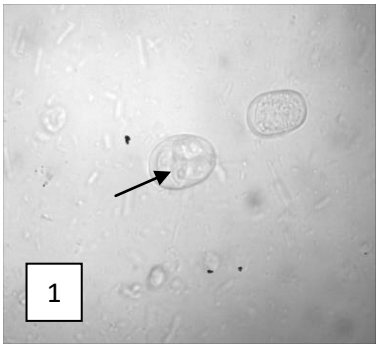
As other migratory birds, migratory quails may act as possible vectors playing a role in the transmission of some parasites and zoonotic pathogens such as *Cryptosporidium* spp. threatening human health and domestic animals.

Table (1): *Overall prevalence of the detected enteric parasites in migratory quails:*

Enteric parasites	No. of infected / No. of examined migratory quails	Overall prevalence %
Protozoan parasites	100/190	52.63
Helminth parasites	43/190	22.63
Total	143/190	75.26%

Table (2): *Prevalence of different enteric parasites in migratory quails:*

Parasites	No. of infected / No. of examined migratory quails	Prevalence %
Eimeria spp.	80/190	42.1
Cryptosporidium spp.	20/190	10.52
Subulura brumpti	2/190	1.05
Dispharynx nasuta	3/190	1.57
Choanotaenia infundibulum	20/190	10.52
Raillietina tetragona	7/190	3.68
Raillietina echinobothrida	1/190	0.52
Triaenorhina rectangula	10/190	5.26



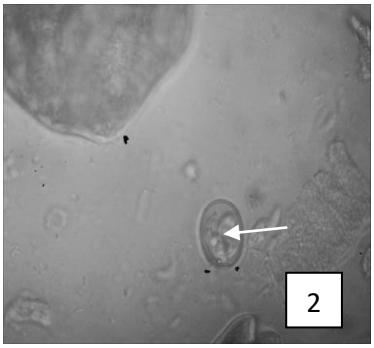
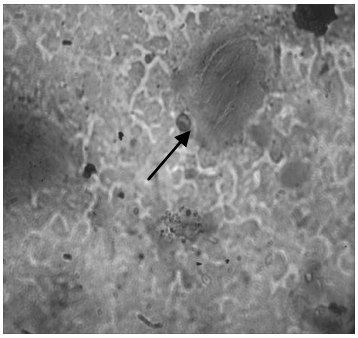


Fig.(1) ***Eimeria bateri***, sporulated oocyst (black arrow) and unsporulated oocyst (white arrow) x1000.
Fig.(2) ***Eimeria uzura***, sporulated oocyst x1000.



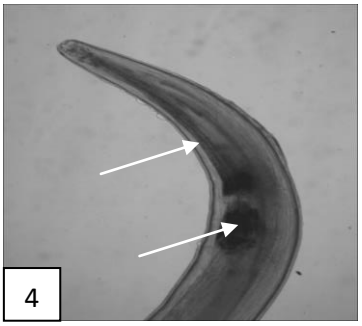
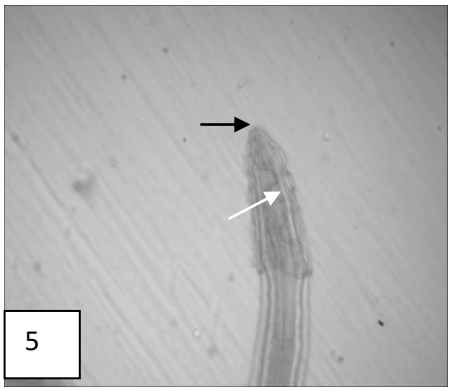


Fig.(3) ***Cryptosporidium* spp**. **oocyst** (arrow), Modified Ziel-Neelsen staining x1000.
Fig.(4) ***Subulura brumpti***, Anterior region, esophagus (white arrow) with a posterior bulb (black arrow) separated from the rest of the esphagus by a well marked constriction x10.



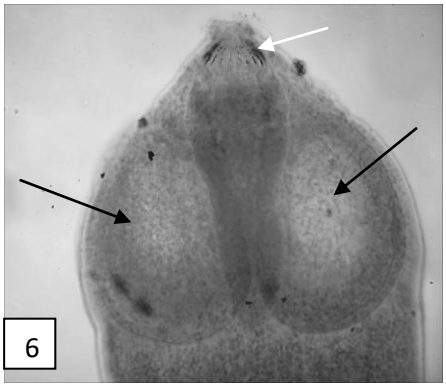
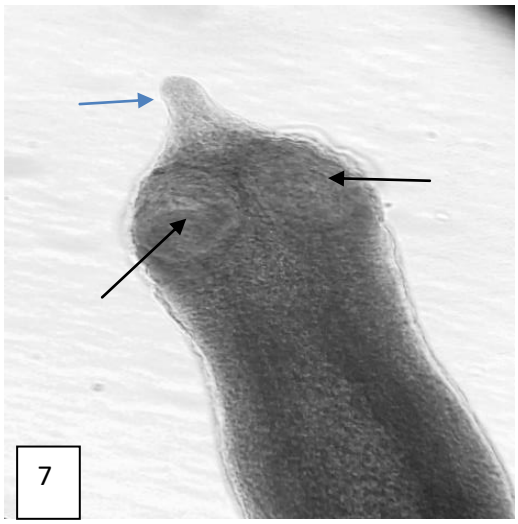


Fig.(5) ***Dispharynx nasuta***, Anterior end showing buccal capsule (black arrow) and cephalic cordons (white arrow) x10.

Fig.(6) ***Choanotaenia infundibulum***, Scolex showing suckers (black arrow) and rostellar hooks (white arrow) x40.



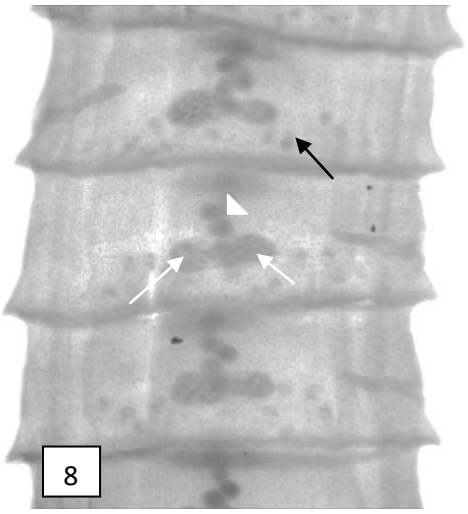


Fig.(7) ***Triaenorhina rectangula***, Scolex showing suckers (black arrow) and rostellum (blue arrow) x40.

Fig.(8) ***Triaenorhina rectangula***, Mature proglottid showing bilobed ovary (white arrow), uterus (white arrow head), testes (black arrow) and common genital pore (blue arrow), x10.

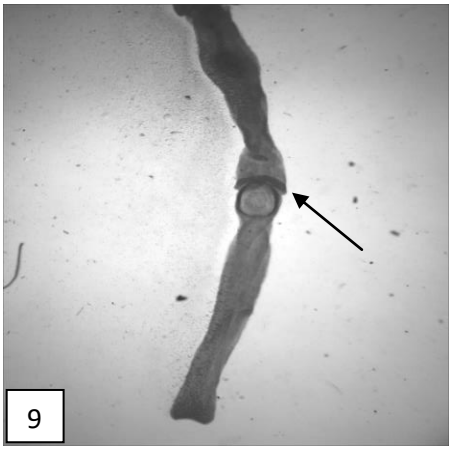


Fig.(9) ***Triaenorhina rectangula***, Gravid proglottid showing egg capsule (arrow), x10.

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معدل انتشار بعض حالات العدوى الطفيلية المعوية فى السمان المهاجر

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فى هذه الدراسة تم بحث العدوى الطفيلية المعوية فى السمان المهاجر فى محافظة مطروح، مصر. لقد تم فحص مائة وتسعون من طيور السمان المهاجر والتى تم الحصول عليها من الصيادين فى محافظة مرسى مطروح وكان المعدل العام للإصابة(75.26%). وقد تم الحصول على ثمانية من الطفيليات المعوية إثنان من الأوليات، إثنان من الديدان الأسطوانية وأربعة من الديدان الشريطية وكانت الطفيليات الأولية هى أنواع من أيميريا (42.1%) وكريبتوسبوريديم (10.52%) وكانت الديدان الأسطوانية هى صبيوليورا برومبتى (1.05%) و ديسفارنكس ناسوتا (1.6%)، اما الديدان الشريطية هى كوانوتينيا انفنديبيولم (10.52%)، راليتينا تيتراجونا (3.7%)، راليتينا ايكينوبوثريدا (0.52%) وتراينورينا ريكتانجيولا (5.26%). وقد تم تصنيف الأيميريا إلى أيميريا باتيرى وأيميريا يزورا.