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Occurrence of some Parasites in farmed ostriches *(Struthio camelus)* in Egypt

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Abstract

Ostrich farming is a new field of livestock production in Egypt and still in its infancy stage in comparison to the poultry industry. Parasitism is considered as a potential health problem hindering the development of ostrich production resulting in economic losses. Feathers and fresh faecal samples were collected from 26 farmed ostriches and examined microscopically for external and internal parasites. Three species of ectoparasites ; *Gabucinia bicaudata* (3.85%) , *Dermoglyphus pachycnemis* (3.85%) , *Struthiolipeurus struthionis* (3.85%) and four species of internal ones; Strongylid egg *" Libyostongylus* sp*.* or *Codiostomum* sp*.*" (3.85%) , *Cryptosporidium* sp. (15.38%) *Eimeria* sp. (3.85%) , *Balantidium struthionis* (7.69%) were recorded and identified. *Dermoglyphus pachycnemis* was reported for the first time in farmed ostrich in Egypt.

Keywords: Farmed ostriches , *Struthio camelus*, ectoparasites , endoparasites

Introduction

Ostriches are one of the toughest and strongest birds on this planet. They can be reared in northern and southern countries outside Africa, but climate is a limitation for a profitable farming. The ostrich industry is considered as a multi-processing business producing a number of commodities as feathers, leather and meat (Pittaway and Van Niekerk, 2015). Ostrich farms have become an extended activity throughout the world and considered to be one of the most preferable agriculture project. Ostrich meat is a wonderful , healthy red meat with all of the flavor and texture of beef ; it is rich in protein and high in iron and lower in fat, calories and cholesterol than other meat sources. On the other hand, ostrich feathers are used to clean fine machinery and equipment as well as for aesthetics and in the fashion industry. furthermore tendons of ostrich leg are used to replace torn tendons in human leg and a substance derived from ostrich brain is being studied for the treatment of Alzheimer's disease and other types of dementia (Shanawany, 1994).

Ostriches live mostly in desolate desert climates, so they have to be flexible in their diet and eat almost anythings like plants, lizards, seeds and locusts; these make them susceptible to many infections including parasitic ones. The later seem to be uncommon in ostrich all over the world (Dingle, 1996 ; Huchzermeyer, 1998) inspite of some of these infections may lead to the death of infected birds (Nel, 1980). Ostriches may be infested with their own specific parasites as well as with external and internal parasites of other birds (Eslami et al., 2007). Ostrich diseases and parasites reported in Africa include tapeworm, nematodes, lice and ticks (Davis, 1998). This study aimed to record and identifies the parasites infecting farmed ostriches in Egypt.

Materials and Methods

This study was carried out on 26 farmed ostriches inhabiting three small scale ostrich farms in Sharkia and Ismaalia provinces. Feathers and fecal samples from each bird were taken by veterinarians working on the farms . Feathers were kept in sealed plastic bags at room temperature. In the laboratory, feathers were examined under a stereomicroscope at 10–60× magnification. The recovered ectoparasites were collected , stored in 70% ethanol, then cleared in lactophenol until slide mounts in

polyvol were made (Belding,1965). Fresh faecal samples were collected from each bird in the early hours of the morning using clean polythene bags and labeled serially .

Parasitological examination was performed on fresh faeces using direct , sedimentation and floatation methods. The direct fecal smears were examined according to Beaver et al. (1989) . Formaline-ethyl acetate sedimentation technique was processed and wet mounts from the sediment were made for detection of diagnostic stages of the parasite **(**Levine and Estevez, 1983). Sheather's sugar flotation technique was done ; two grams of feacal sample were mixed with a small amount of tap water. The mixture was screened through a coarse sieve, poured into a 15ml centrifuge tube and spun at 1200 rpm for 5 min. The supernatant was discarded ; 12 ml Sheather's sugar flotation solution (specific gravity= 1.27) was added, mixed to break up the pellet and then more sugar solution was added to form a convex meniscus. A cover slip was placed on the meniscus and allowed to stand for 30 min. The cover slip to which the eggs adhered was removed from the tube and placed on a microscope slide then examined under microscope (Dryden et al., 2005). Oocysts of *Cryptosporidium* sp. and *Eimeria* sp were stained with modified Zeil Neelsen and sporulated in potassium dichromate 2.5% respectively. The detected parasites were identified according to previous literatures (Ponce Gordo et al., 2002; Yaman and Durgut, 2005; Cooper and EL Doumani, 2006 and Taylor et al ., 2007).

Results and Discussion

An overall ten out of twenty six (38.46%) of the examined farmed ostriches in three different small scale farms were found positive for various parsasites and the infection was single . Feathers of few numbers of examined ostriches (7.69%) were found to be infested with ectoparasites, while a greater numbers (30.77%) of the collected fecal samples were found infected with endoparasites. In the current study two species of mites (3.85%) were identified *; Gabucinia bicaudata* and *Dermoglyphus pachycnemis* (Fig. 1). These were collected mainly from the vein in the ventral groove of large wing feathers and appear as small, reddish, dust-like , elongated particles in the feather vein . A species of lice (3.85%) ; *Struthiolipeurus struthionis* was recovered from the feather barbs all over the body and appears as narrow-bodied lice with large heads (Table 1; Fig. 1). The low prevalence of parasites

of ostrich may attributed to antiparasitic program used for eradication of parasites.

There are several types of arthropods that consider the major ectoparasites of ostrich in the world, primarily mites and lice (Ponce Gordo et al., 2002). Non determined infection rate with mite and hundered percent prevalence of *Struthiolipeurus* lice were given in study on parasites of farmed ostriches and rheas in Europe (Ponce Gordo et al., 2002); while ostriches raised in northern Nigeria showed a higher infection rate with mite"11.6%" (Mshelia et al., 2010). *Gabucinia bicaudata* detected in this study was reported as a species of mite infesting farmed ostriches in Europe (Ponce Gordo et al., 2002; Nemejc and Lukesova, 2012) , State of Rio Grande do Su in Brazil (Ribeiro et al., 2004) , small scale private farms in Egypt (Cooper and EL Doumani, 2006) and had been collected from Southeastern Brazil as *Struthiopterolichus bicaudatus* (Faccini et al., 2006). The current study reported *Dermoglyphus pachycnemis* from wing feathers of farmed ostrich for first time in Egypt , this come in accordance with the finding the same species in Europe by Ponce Gordo et al.(2002) who stated that there is no previous report of this species from ostrich in Europe . *Struthiolipeurus struthionis* isolated in this study correspond findings of the same species in small scale private ostrich farm (Cooper and EL Doumani, 2006) as well as ectoparasites of *Gabucinia and Struthiolipeurus* were recorded in captive ostriches at the zoo (Andrém, 1960 and Dom´ınguez et al., 1976) and imported ones in Sweden (Jansson and Christensson, 2000) . The infested ostriches showed mild broken feathers with lacking barbs primarily in the large wing feathers and mild feather preening and loss ; comparable findings were observed in some infested ostrich farms (Verocai et al., 2008).

Concerning the endoparasites, coprological examination revealed four species of parasites infecting farmed ostriches; Strongylid egg "*Libyostongylus* sp*.* or *Codiostomum* sp .egg" (3.85%) , *Cryptosporidium* sp. (15.38%) *Eimeria* sp. (3.85%) , *Balantidium struthionis* (7.69%) (Table 1). The farmed ostriches in Europe revealed a higher infection rate with *Libyostrongylus* sp. "20%", *Cryptosporidium* sp. "60%" , *Balantidium struthionis* "80%" and a lower one in *Eimeria* sp. "less than 1%" (Ponce gordo et al., 2002). Similary, higher rates of infection with Strongylid egg (14.9%) and *Eimeria* sp. (11.6%) were recoded in ostriches raised in northern Nigeria (Mshelia et al., 2010). Strongylid

eggs"*Libyostongylus* sp. or *Codiostomum* sp " recovered from fresh faeces showed higher prevalences "25% and 55%" and "39.89%" in ostrich raised at two different areas in Iran (Eslami et al., 2007) and Greece (Sotiraki et al., 2001) repectively , other than higher infection rate of *Cryptosporidium* sp. (28%) in farmed ostriches was reported in Iran (BehzadiI et al., 2009) .

Libyostrongylus or Codiostomum spp. eggs are oval , measures 59-74 by 36-44 µm and contains an advanced morula-developing larvae (Fig.2 A), our finding coincides with presence of *Libyostrongylus* sp. eggs in faeces of raised ostriches in Sweden (Jansson and Christensson, 2000) and Spain and Portugal (Ponce gordo et al., 2002) . *Libyostrongylus* sp. is considered the most pathogenic nematode responsible for 50% of the mortality of juvenile birds and occasionally killing adults (Reinecke,1983). Diagnostic stages of protozoal parasites observed in this study include *Cryptosporidium* sp., *Eimeria* sp. and *Balantidium struthionis* . *Cryptospridium* sp. oocysts are ovoid to subspherical , measure 5-6 µm and contains sporozoites which appear as refactile granules in wet mount and red colour in sample stained with modified Zeil Neelsen (Fig.2 B). *Cryptosporidium* oocysts had been isolated from ostriches in Greece (Sotiraki et al., 2001) and widely distributed in Spanish and Portuguese ostriches (Ponce gordo et al., 2002) . Infection with *Cryptosporidium* sp may cause of phallus and cloacal prolapse in ostrich chicks (Penrith et al., 1994) and enteritis (Huchzermeyer, 1998) . *Eimeria* sp. oocysts are spherical with a double layerd wall , measure 15-18 µm and contain four sporocysts each one has two sporozoites(Fig.2 C). Corresponding finding of *Eimeria* sp. oocyst was detected in ostrich faeces (Sotiraki et al.,2001 and Eslami et al., 2007) . Symptoms of coccidial infection are usually minimal in ostriches and the infection can only be properly diagnosed by post-mortem examination (Dingle and Shanawany, 1999). *Balantidium struthionis* cysts are spherical and measure 50-55 µm (Fig 2 D). This species was considered as ostrich specific (Sotiraki et al., 2001) while, other findings have been recorded as *Balantidium* sp. (Jansson and Christensson, 2000). Later, Ponce gordo et al. (2008) consider the *Balantidium* species from ostriches as *Balantidium coli*-like.

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Table (1) . Occurrence of parasitic infection among farmed ostriches

Parasite species	Farm I No.examined (9)	Farm II No.examined (7)	Farm III No.examined (10)	**Total (26)**
	No . positive (%)	**No . positive (%)**	**No . positive (%)**	**No. positive (%)**
A) Ectoparasites	**1 (11.11)**	**0 (00.00)**	**1 (10.00)**	**2 (7.69)**
•Mites(*G. bicaudata,D. pachycnemis)*	0 (00.00)	0 (00.00)	1 (10.00)	1 (3.85)
•Lice *(Struthiolipeurus struthionis*)	1 (11.11)	0 (00.00)	0 (00.00)	1 (3.84)
B) Endoparasites	**3 (33.33)**	**2 (28.57)**	**3 (30.0)**	**8 (30.77)**
•*Strongylid eggs*	0 (00.00)	0 (00.00)	1 (10.00)	1 (3.85)
•*Cryptosporidium* sp.	2 (22.22)	1 (14.29)	1 (10.00)	4 (15.38)
•*Eimeria* sp.	1 (11.11)	0 (00.00)	0 (0.00)	1 (3.85)
•*Balantidium struthionis*	0 (0.00)	1 (14.29)	1 (10.00)	2 (7.69)
Total	**4 (44.44)**	**2 (28.57)**	**4 (40.00)**	**10 (38.46)**

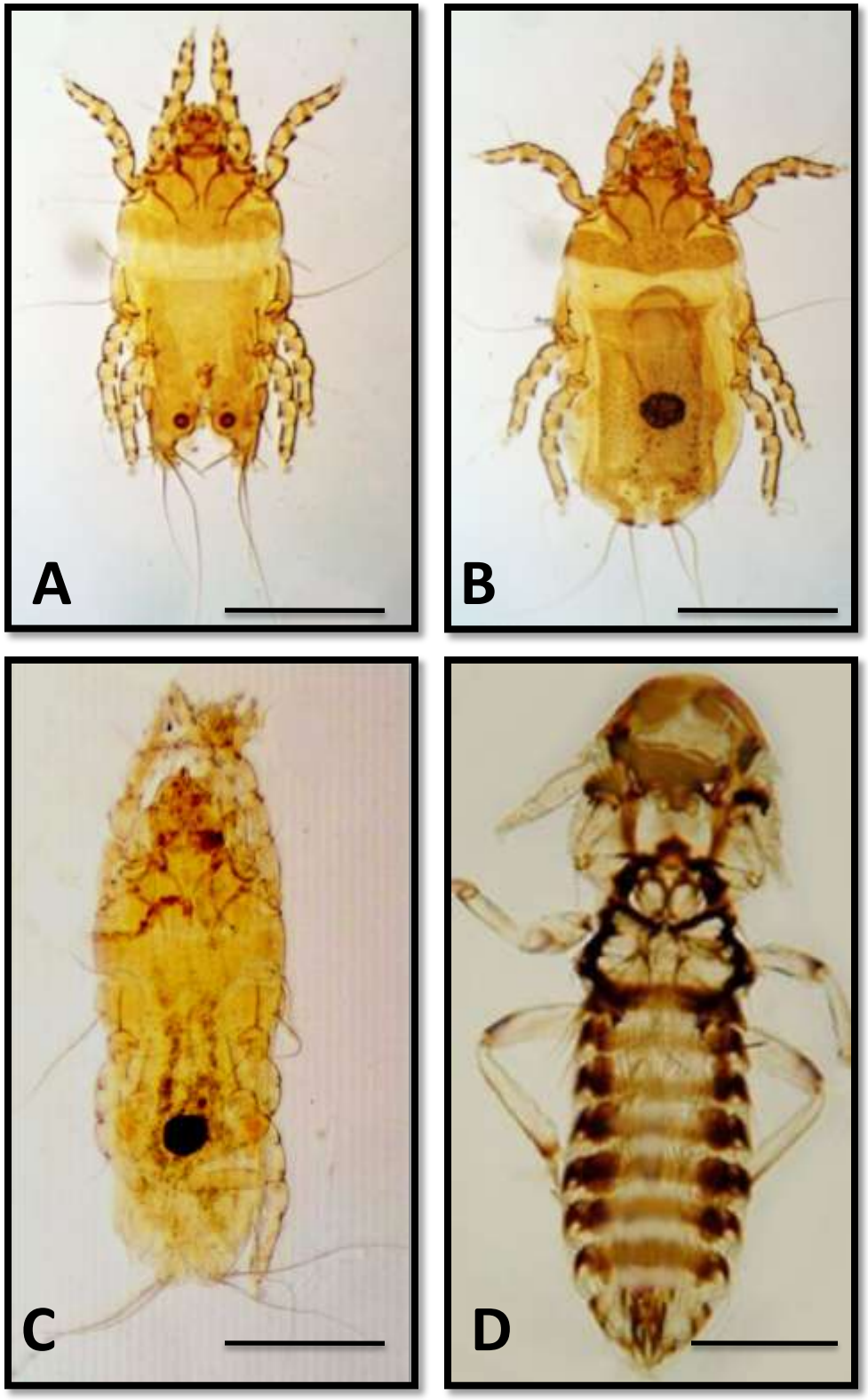
A
B
C
D

Fig.1. Ectoparasites of farmed ostrich . A) *Gabucinia bicaudata* (male) , B *Gabucinia bicaudata* (female) ; scale bar: 0.25 mm C) *Dermoglyphus pachycnemis* (female) ; scale bar: 0. 25 mm, D) *Struthiolipeurus struthionis* (male) scale bar: 0.5 mm

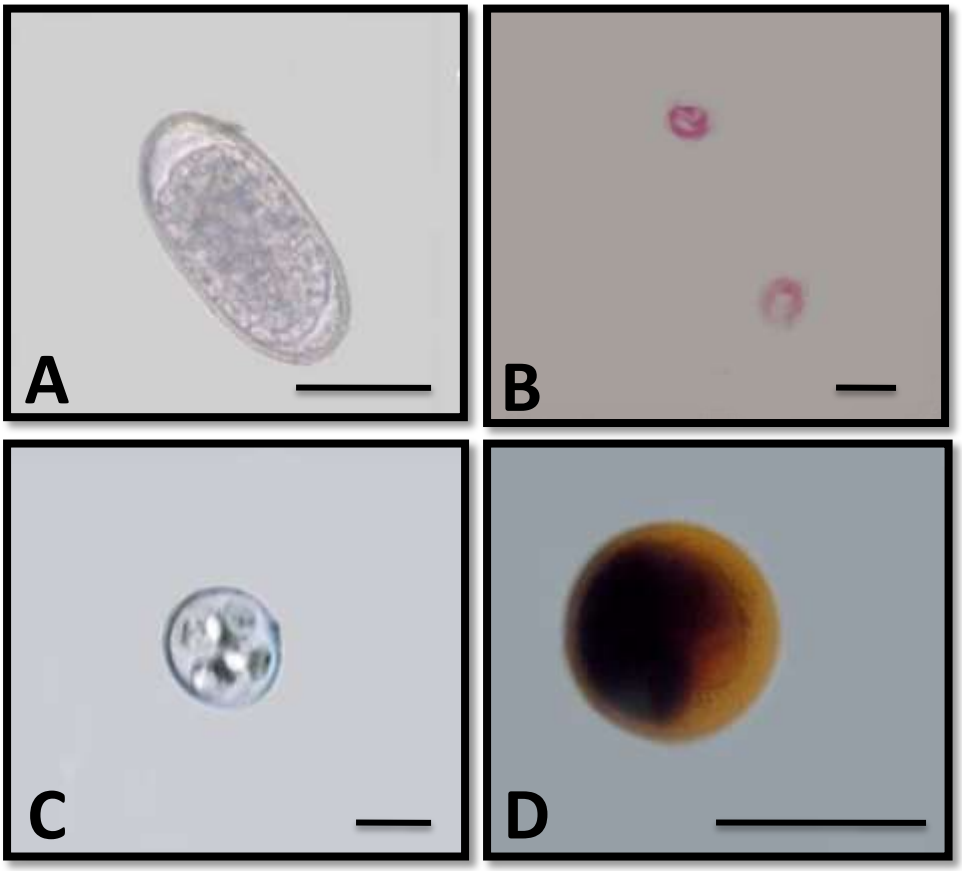

Fig.2. Endoparasites of farmed ostrich . A) Strongylid egg *(Libyostrongylus or Codiostomum* spp.) ; sacle bar : 20 µm , B) *Cryptosporidium* sp. oocyst (Modified Ziel Neelsen staining); scale bar: 5 µm , C*)Eimeria* sp. sporulated oocyst ; scale bar:10 µm D) *Balantidium struthionis* cyst (Lugol's staining) scale bar: 50 µm.

تواجد بعض الطفيليات في نعام المزارع في مصر

نصير محمد السيد

قسم الطفيليات - كلية الطب البيطري - جامعة الزقازيق

زراعة النعام هو حقل جديد للإنتاج الحيواني في جميع أنحاء العالم والتي لا تزال في مرحلة الطفولة مقارنة بصناعة الدواجن . يعتبر التطفل مشكلة صحية محتملة تعوق تطوير إنتاج النعام مما قد يؤدى إلى خسائر اقتصادية. تم فحص عدد 26عينة من نعام المزارع (الريش والبراز) عينيا و مهجريا للتعرف على الطفيليات الخارجية والداخلية . تم التعرف على ثلاثة أنواع من الطفيليات الخارجية جيبسينيا بايكوداتا *Gabucinia bicaudata* (3.85%)، درموجليفس باكيسنمس *Dermoglyphus pachycnemis* (3.8%) ، ستريثيوليبيريس ستروثيونس *Struthiolipeurus struthionis* (3.85%) ، وأربعة أنواع من الطفيليات الداخلية تشمل بويضات الاسترنجوليدس"ليبوسترونجيلس او كوديوستومم" *Strongylid egg"Libyostrongylus/ Codiostomum sp.* (3.85%) ، حويصلات الكريبتوسبوريديوم *Cryptosporidium sp.* (15.38%) ، حويصلات الأيميريا *Eimeria sp.* (3.85%) ، قربية ستروثيونس *Balantidium struthionis* (7.69%) .