The prevalence of the genus *Eimeria* in Draught and Al- Fourosia club horses of Baghdad Province

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Summary

The aim of the study was to investigate the prevalence of infection with the genus *Eimeria* in draught and Al- Fourosia club horses of Baghdad province regarding season sex, and age. The prevalence of *Eimeria* oocysts was investigated from November 2009 to July 2010 in 369 horses from Baghdad province; they included 136 draught horses and 233 Al-Fourosia club horses varying in age from < 2-12 years old. Fecal samples were examined by using direct method and flotation technique. *Eimeria* oocysts were found in 75 (20.32%) of the samples divided into 41(30.14%) from draught horses and 34 (14.59%) from Al-Fourosia club horses with a significant difference (P<0.05) between the two groups. No differences were recorded regarding sex. The highest rate of prevalence was recorded in draught horses during April, May and June, and the lowest rate, in January and July. In Al-Fourosia club horses the rate of prevalence was also highest in April, May and June, while the lowest rate, was in January and December. The results showed the effect of the age on the rate of prevalence with significant differences (P<0.05) between draught horses and Al-Fourosia club horses at less than 2 years old; the rate was 0% in draught horses and 11.11% in Al-Fourosia club horses. In contrast, the rate was much higher in drought horses than Al- Fourosia club horses at the age of 2-4 years old. A similar finding was recorded in the 4-6 year old group.
Keyword: prevalence, *Eimeria*, draught and Al- Fourosia club horses, horse.

Introduction

Epidemiological study concerned with prevalence of the genus *Eimeria* in Iraq and carried out during the period from 1997-2000 (1and 2). *Eimeria leuckarti (*syn = *Globidium leuckarti*) is the most commonly prevalent and studied species of *Eimeria* in equids (3). Two other species, *Eimeria solipedum* and *Eimeria uniungulata* have been described but their validity is uncertain (4). Typically *E. leuckarti* is more common in foals and yearlings than older horses (5). There is great ambivalence about any pathological effects of these parasites. Although detrimental effects have been reported, there is question as to whether, in at least some instances, the oocysts were present but possibly some other factor was the actual cause of inflammation, diarrhea and even death (4 and 6). In one study on experimental infection of *E. leuckarti* in ponies, no clinical signs of gastrointestinal disease resulted (7). There is general consensus that, until proven otherwise, *Eimeria* in equids probably is not pathogenic (4). There is little information about *Eimeria* infection in horses in Baghdad province, an epidemiological study was concerned with prevalence of the genus *Eimeria* in Iraq only during the period from 1997-2000. The aim of the present study was to investigate the provenance of infection with the genus *Eimeria* in draught and Al- Fourosia club horses of Baghdad province regarding season, sex, and age.

Materials and Methods

Three hundred and sixty nine horses were sampled. Fecal samples were collected randomly from 136 (60 males, 76 females) draught horses which were working equids from different areas of Baghdad province and 233 (110 males, 123 females) Al- Fourosia club horses which are raised in stables in the big Abu-Grab area in the suburbs of Baghdad province and used for racing. Those samples were transported daily to the parasitology laboratory at the Baghdad veterinary college/ Baghdad University. The study was conducted during the period from November 2009 - July 2010 regarding the sex, season, and age less than 2 years to 12 years old. Two methods were used for examination of the fecal samples: direct method and flotation technique. Two grams of feces were weighted and examined; Sheather's sugar solution was

used for flotation (8). Slides were set up and examined for oocysts at 20x and 40x (9). Identification of *Eimeria (E. leuckarti)* oocysts was according to published characteristics (10). Data were analyzed using ANOVA. Differences between means were compared between the two groups of horses regarding significance (P<0.05) (11).

Results and Discussion

The results of the study revealed that the total rate of prevalence with *Eimeria* species was 20.32% (75), the positives included 30.15% (41) draught horses and 14.59% (34) Al-Fourosia club horses with significant differences (P<0.05) between the two groups. A significant difference (P<0.05) was observed in the rates of prevalence in draught horses during the months of study. The rates 38.8, 44.4, and 38.8%, were highest in April, May and June, respectively, and the lowest rate 23 and 25% in January and December, respectively. In Al-Fourosia club horses the difference was also statistically significant (P<0.05) in April, May and June which was 20, 17.14 and 28%, respectively. In contrast to January and December, recorded much lower rates 0 and 8.33%, respectively (Table, 1).

Table, 1: The rates of prevalence in Al- Fourosia club and draught horses groups regarding the months

Group	Al- Fourosia club horses			Draught horses			Total		
Months	Fecal samples	Positive No.	infection rate %	Fecal samples	Positive No.	infection rate %	Examined fecal samples	Total positive	infection rate %
November	25	3	12%	12	3	25%	37	6	16.21
December	24	0	0%	13	3	23.07%	37	3	7.8
January	24	2	8.33%	14	2	14.28%	38	4	10.52
February	25	4	16%	13	3	23.07%	38	7	18.42
March	25	4	16%	12	5	41.66%	37	9	24.3
April	25	5	20 %	18	7	38.88%	43	12	27.9
May	35	6	17.14%	18	8	44.44%	53	14	26.4
June	25	7	28%	18	7	38.88%	43	14	32.5
July	25	3	12%	18	3	16.66%	43	6	14
Total	233	34	14.59%	136	41	30.15%*	369	75	20.32
	Chi-12.83		*p=0.001*	*odd=2.52*		* Significant differences (P<0.05)			

Results of the present study revealed that the total rate of infection with the genus *Eimeria* was 20.32%. This rate was much higher than in other studies in Iraq, performed in Baghdad, and recorded 10.96% (2) and in Mosul province was only 4% (12). These results are compared with the studies recorded in other countries: in Germany it was (50%) in ponies (5) the same rate was recorded in Italy (50%) in young horses (13) these considered a high rates while The lower rates recorded in Austria 0.35% (9), Poland 4.18% (14), and Nigeria 3 (1.2%) (15), these rates were much lower than had been reported in the present study. Regarding sex, the difference in prevalence rates was not statistically significant between males and females within the group of draught horses; the rate was 26.67% of males and 32.89% of females. A similar finding in Al- Fourosia club horses; it was 11.8% and 17.07% in males and females, respectively (Table, 2 and 3).The results in the present research demonstrated that the rate of prevalence in drought horses was about twice that of Al-Fourosia horses. These findings were much higher than recorded of 12.5% and 10.8% in drought and Al-Fourosia horses respectively in another study (2). The increase in rate of infection in the present study may be due to the source of nutrition especially in the drought horses and the absence of concern with horses which suffered from simple requirement of hygiene measurements and routine veterinary care was not provided mainly for the last 10 years especially in drought horses that used for working. The differences in the rate of infection between the present study and other studies may be attributed to the number of horses examined, the period of study, the way of management, source of nutrition, species of parasite and the method for parasite detection (2 and 14). The horses raised in a confined area will increase the chance of infection. Despite differences in

the rates of infections between males and females within drought and Al- Fourosia horses, the differences were not significant. These findings are in agreement with other researches (2).

Table, 2: The rates of prevalence in drought horses group regarding the sex

Months	Examined Fecal samples		Positive number		%	
	Male	Female	Male	Female	Male	Female
November	6	6	1	2	16.66	33.33
December	7	6	2	1	28.5	16.66
January	7	7	0	2	0	28.57
February	7	6	1	2	14.28	33.33
March	5	7	2	3	40	42.85
April	8	10	2	5	25	50
May	7	11	4	4	57.14	36.36
June	7	11	3	4	42.85	36.36
July	6	12	1	2	16.66	16.66
Total	60	76	16	25	26.66	32.89

Table, 3: The rates of prevalence in Al- Fourosia club horses group regarding the sex .

Months	Examined Fecal samples		Positive number		%	
	Male	Female	Male	Female	Male	Female
November	14	11	1	2	7.14	18.18
December	12	12	0	0	0	0
January	10	14	0	2	0	14.28
February	13	12	2	2	15.38	16.66
March	12	13	1	3	8.33	23.07
April	10	15	2	3	20	20
May	16	19	3	3	18.75	15.78
June	11	14	2	5	18.18	35.71
July	12	13	2	1	16.66	7.69
Total	110	123	13	21	11.81	17.07

The effect of age on the rates of prevalence with *Eimeria* species recorded a significant difference ($P<0.05$) demonstrated in the rate of prevalence between draught horses and Al-Fourosia club horses at the age less than 2 years; the rate was 0% in draught horses and 11.11% in Al- Fourosia club horses. For drought horses the rate was much higher 28.57% than Al- Fourosia club horses 14.77% at the age of 2-4 years old. A similar finding was recorded at the age 4-6 years old; it was 38.89 and 13.25% in draught horses and Al-Fourosia club horses, respectively. No difference was recorded between both groups at age 6-9 and 9-12 years old (Table, 4). Findings in the nine-month study, displaying a significant difference in the rates of infection in drought and Al- Fourosia horses, with *Eimeria* being higher in summer months than winter months, this is in agreement with observation in one report (2) but in contrast with other research (5). The variety of climatic conditions in these countries is the reason for the differences in the rate of incidence of this parasite. Increasing in the rates of infections in summer months was attributed to moderate climate and humidity, besides green grass during these months. These are suitable factors for sporulation of oocysts which remain viable for long periods (2). Existing of the animals and defecation in the same grass land used for cultivation increases the chance of contamination of grassland and distribution of infection between horses (6).

The present study demonstrates a lower rate of infection in horses less than 2 years old while there was a significant difference in 4-6 year-olds, but no difference between the 6-9 and 9-12 year old groups. This result may be attributed to the fact that the number of horses less than 2 years old examined was lower than older groups. These findings are in contrast with results of others (15). Who mentioned that oocysts were found in feces at the first sampling of 3-month-old foals.

Table , 4: The rates of prevalence in Al-Fourosia club and draught horses regarding the age.

Age group	Al- Fourosia club horses			Draught horses			Statistical analyses		
	No.	Positive	%	No.	Positive	%	*chi*	*p*	*odd*
< 2 y	18	2	11.11*	1	0	0	0.124	0.725	-
> 2-4 y	88	13	14.77	14	4	28.57*	1.656	0.198	2.30
> 4-6 y	83	11	13.25	54	21	38.89*	12.01	0.001	4.16
> 6-9 y	35	6	17.14	56	15	26.78	1.128	0.288	1.76
> 9-12 y	9	2	22.22	11	1	9.09	0.669	0.413	0.35
Total	233	38	16.30	136	41	30.14	-	-	-
* significant differences (P<0.05)									

In the present study, because very few young horses were sampled, the infection may have decreased by the time older horses were first examined (16). It is particular interest in the current study, that several older horses were positive. The present study shows the current presence of infection of "older" horses with the genus Eimeria in Baghdad province and the Abu-Ghriab area. It is evident that more investigations are needed, especially in very young horses.

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انتشار الايميريا في خيول السحب وخيول نادي الفروسية في محافظة بغداد

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الخلاصة

تم التحري عن انتشار الايميريا في الخيول من تشرين الثاني 2009 إلى تموز 2010 في 369 من خيول محافظة بغداد، شملت 136 خيول السحب و 233 من خيول نادي الفروسية تفاوت أعمارها بين <2 - 12 سنة. تم فحص عينات البراز بإستعمال الطريقة المباشرة وتقنية التطويف. تم العثور على اكياس بيض الأيمريا في 75عينة (20.32٪) من العينات المقسمة إلى 41 عينة (30.15٪) من خيول السحب و3عينة (14.59٪) من خيول نادي الفروسية مع وجود فرق معنوي ($P<0.05$) بين المجموعتين. لم تسجل أية فروق ذات دلالة إحصائية فيما يتعلق بالجنس. وقد سجلت أعلى معدل انتشارفي خيول السحب خلال شهر أبريل وايار وحزيران وأدنى معدل، في كانون الثاني وكانون الاول. في خيول نادي الفروسية كان معدل انتشار أيضا أعلى، في نيسان وايار وحزيران ، في حين كان أدنى معدل، في يناير كانون الاول والثاني. أظهرت النتائج تأثير العمر على معدل انتشار مع وجود اختلافات معنوية ($P<0.05$) بين خيول السحب و خيول نادي الفروسية في العمر أقل من 2 سنة، كان معدل 0٪ في خيول السحب و11.11٪ خيول نادي الفروسية. في المقابل كان معدل أعلى بكثير في خيول السحب من خيول نادي الفروسية مع وجود فرق معنوي بين المجموعتين في العمر 2-4 سنوات من العمر. وسجلت نتيجة مماثلة في المجموعة 4-6 سنوات من العمر.

الكلمات المفتاحية: انتشار، الأيمريا، خيول السحب و خيول نادي الفروسية، الخيول.