# INCIDENCE AND SURVEY OF GASTROINTESTINAL PARASITES OF CAMEL IN BEHERA AND MATROUH PROVINCES

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***Abstract***

In this study 106 camel fecal sample from Al- Behera province and 120 sample from Matrouh province were collected and examined for gastrointestinal parasites . A total percentage of infestation was 65.09% and 62.5% in Al-Behera and Matrouhrespectively . Total incidence of gastrointestinal helminthes was 61.3% in Al-Behera and 58.3% in Matrouh . Nematode infestation was 57.5% and 56.7%. the recorded nematode species in Al-Behera were Trichostrongylus sp. 66% ,Trichuris sp. 30.7% , Nematodirushelvetianus 30.7%, Strongyloidespapillosus 24.6% and Haemonchus sp. 10.8%.Nematode species in Matrouh were Nematodirushelvetianus 57.1%, Bunstomum sp. 25.7%, Trichostrongylus sp. 20%, strongyloidespapillosus 17.1%,Trichuris sp. 12.9% , Haemonchus sp. 4.3% and Cooperia 2.8% . the only recorded cestode is Monezia sp. with an incidence 3.3% in Al-Behera and 4.2% in Matrouh .Trematode incidence was 2.8% and 1.7% respectively and the recorded parasite was Paramphistomum.Regarding to protozoal incidence, total incidence in Albehera was 19.8% and 19.2% in Matrouh .Eimaria sp. the only protozoa was found in Albehera and the recorded species were E.cameli 76.2% , E.dromedarii 38.1% and E.pellerdyi 23.8%. In Matrouh Province protozoal sp. were Eimaria species 15.8% and Balantidiun coli 3.3%, the revealed Eimaria sp. were E.camili 69.6% , E.dromedarii 30.4% , E.pellerdyi 26% and E.rajasthani 21.7% . The eefect of age on gastrointestinal helminthes is of no value but in case of Eimaria the older age represented the lower incidence. Cryptosporidium infection was not recorded.The morphological characters of gastrointestinal nematodes and oocysts of Eimeria were studied .

## INTRODUCTION

Camels breeding has received special attention in Egypt today because they considered an important source of animals protein and milk . One of the most serious problems affecting camels breeding is the parasitic infection, as it may not be the

direct cause of certain disease, but also because it adversely affects the general condition and predispose to diseases of other origins.

Several camel gastrointestinal parasites were reported in various regions of Egypt ,Selim and Rahman( 1972),Nafia et al(1992) ,Abdel –Aal and Sahlab (1998) ,Elsalahy and Arafa (2000),Mahran (2006). In other countries gastrointestinal Helminths and protozoa affecting camels were studied by many authors Gill (1976) in India ,Yagoub (1989) who investigated sudanese camels, Kinne and Wernery (1997) reported an outbreaks of camel ooccidiosis in united Arab Emirates, El Metenawy (1998)in Saudi Arabia , Moustafaetal(2003) in Al Ain UAE, Borji et al (2010) in Iran.Dromedaries has several species of gastrointestinal parasites, Trichostrongylus sp., Haemonchuslongistips , strongyloidespapillosus, Trichuris sp., Nematodirussp.,Oesophagostomum sp., Marshallagia sp., Cooperia sp., Moniezia sp., Eimeria sp. ,Blandiumcoli,and Cryptosporidium sp. (El-Bihari1985,Hayat et al 1998, El Salahy and Arafa 2000 ,Moustafa et al 2003, Razavi et al 2009 and Tajik et al 2011). The present study was designed to determine the incidence of the gastrointestinal parasites affecting camels in al-Behera and Matrouh provinces as they are both provinces of the west delta section in Egypt and their population depends too much in camels as a major source of animal protein and milk.

## MATERIALS AND METHODES

### ***Samples***

Faecal samples were collected From camels of different ages and sex which reared in Al-Behera and Matrouh provinces .106 samples were collected from Al-Behera province (60 from Komhamada ,26 from El-Dalangat and 20 from Saftelhorria) and 120 samples from Matrouh provinces(75 from Matrouh city,25 from Seedibarrany and20 from Sewa )

Each faecal sample was collected directly from rectum in plastic bags and labeled with full identification of examined animal. Samples were transferred to the laboratory and examined for gastrointestinal parasites. Faecal samples were divided into 3 groups according to age of examined animal as group I< one year of age ,group II 1-3years and group III> 3years old.

### ***Methodes***

1-concentration sedimentation technique according to Soulsby (1982).

2- concentration flotation technique according to Soulsby (1982).

3-Faecal culture technique (Eckert 1960), (Georgi and Georgi 1990).

4-Identification of Helminths eggs was based on the description given by Soulsby (1982).

5- Differential diagnosis of 3rd stage larva was done based on the morphological characters according to Soulsby (1982), Dunn (1978) and Levine (1980).

6-Sporulation of oocysts was done in 2.5% potassium dichromate solution according to Soulsby (1982) and the sporulation time for each species was estimated.

7- Identification of sporulatedEimerasppoocysts were done according to their morphological characteristic and as described by Levine 1985 and Higgins 1986 .The dimensions of eggs and oocysts of each species were measured and recorded using the eye piece micrometer and illustrated by photomicrographs.

8-Faecal smears were done,air dried, fixed with methanol and stained with modified Ziehl-Nneelsen stain using technique performed by Henriksen and Pohlenz (1981) for detection of Cryptosporidiaoocysts.

## RESULTS AND DISCUSSION

In our work out of investigated 106 and 120 camels from El-Behera and Matrouh provinces 69(65.09%) and 75(62.5%) camels were found infected with gastrointestinal parasites respectively. from these examined animals 65(61.3%) and70((58.3%) were harboring gastrointestinal helminthes eggs, 21(19.8%) and 23(19.2%) were having protozoa oocysts, 17(16%) and 18(15%) were suffering mixed helminthes and coccidian parasites in Al-Behera and Matrouh provinces respectively. (Table 1&2).Regarding to total gastrointestinal parasite incidence our results were nearly agreed with those of Swai et al. (2011) who recorded an incidence of 62.7% in Tanzania, 60% by Mahfooz et al(2006) in Pakistan and 61.88% by Mahran(2006).On the other hand higher results were given by El Metenawy(1998)who recorded 80.4%in Saudi Arabia ,Sharrif et al(1998) in Jordan 96%,Abubakr et al(2000)in Bahrain, in Egypt El Salahy and Arafa (2000) found incidence79.7% and Pwaveno and Arunsi(2011)92.4%in Nigeria.In fact those high level of records and the relatively high of us is probably related to the level of host immunity, lack of improvement in the animal health management programs or non adoption of the modern animal health care programs by camel owners.

In the present investigation total incidence of helminthes parasite was 61.3% in Al-Behera province and 58.3% in Matrouh . (Table 1&2),higher incidence was recorded at North of Sinai by Nafie et al(1992) as 82.7% . However moderate infection rate (54%) was found by Sayed et al (1997) from diarrheic camels in Assiut . This study concluded that the frequency of nematodes , cestodes and trematodes helminthes at Al-Bhera

and Matrouh was(57.52,3.8,2.8%) and(56.7,4.22,1.7%) respectively (Table 3&4) .Higher record by Sharrif et al (1998) nematodes 84%, cestodes 21% and trematodes 4%, also by Borji et al (2010) in Iran who recorded an incidence for nematodes 75.1%.Table 5 showed that five nematode species were identified in Al Behera they were Trichostrongylus sp. 66% (plate I fig 1)( plate III fig 4), Trichurissp . 30.7% (plate I fig 3) , Nematodirushelvetianus 30.7% (plate I fig 2), (plate IIIfig 1), Strongyloidespapillosus 24.6% (plateI fig 4), (plate IIIfig 3) and Haemonchus sp. 10.8% (plateI fig 5) ,(plateIII fig 6) . Concerning recovered nematodes from Matrouh there were as in table 6 seven species , they were Nematodirushelvetianus 57.1% (plate I fig 2) ,(plate III fig 1) , Bunstomumsp 25.7% (plate III fig 2), Trichostrongylus sp. 20% (plate I fig 1) ,(plate III fig 4), Strongyloidespapillosus 17.1% (plate I fig 4),(plateIII fig 3),Trichurissp 12.9% (plate I fig 3) , Haemonchussp 4.3% ( plate I fig 5) ,(plate III fig 6) and Cooperia sp. 2.8% (plateIII fig 5).The differences in the results between the two provinces may be due to different localities , weather, management, food ,water supply , pastural condition and animal husbandry . On the other hand ,in Egypt Abdel –Aal and Sahlab (1998) recorded that Trichostrongyluswas prevalent followed by Haemonchus ,Nematodirus ,Trichuris and Strongyloides , while El salahy and Arafa (2000) recorded Trichostrongylus sp., Trichuris sp., Oesophagostomum sp., Haemonchus sp. ,Ostertagiasp.andNematodirus sp., Abdel-Gawad (2008) showed that Trichuris has the highest rate of infestation followed by Strongylus and Nematodirus . In Iran the incidence of Nematodes was Nematodirus 32%, Trichuris 32% ,Marshallagia 28% ,Strongyloides 16% .(Tajik et al 2011) . All these differences in the results due to the previous mentioned causes. Regarding to cestodesMonezia sp. the only cestode recorded in the 2 investigated provinces with an incidence of 3.8% in Al Behera and 4.2% in Matrouh(table 3,4)(plateI fig 6) . These results were nearly similar to that of Abd El Aal and Sahlab (1998) and El Salahy and Arafa (2000), while Mahran (2006) found an incidence of 1.82% . The present study reported an infestation rate for trematode of 2.8 % & 1.7% for Al Behera and Matrouh respectively the paramphistomum sp. is the only recovered trematode (table3,4)(plate I fig 7). Kayum et al (1992) in U.A. Emirates recorded this parasite. Concerning the effect age on the incidence of gastrointestinal parasites there is no observed effect in our study in the 2 provinces(table8&9), but Abdel- Gawad (2008) found that the higher rates of infestation were in young camels in case of Trichuris ,Nematodirus and in old camels in case of Strongyl sp.. Regarding protozoa infection only Eimeria species was recorded in Al Behera study with total incidence of 19.8% (table3). In MatrouhEimeria species were investgated with an incidence of 15.8% and Balantidium coli with 3.3% (table4). Higher prevalence of Eimeria infection 48.9% by Biu et al (2003) in Nigeria and 80% by Nabih and Toos (2002) in Egypt . While nearly similar results was obtained by Abubakr et al (2000) in Bahrain they recorded an incidence of 20% and by Yakhchali

and Athari (2010) in Iran 20.73% lower incidence by Yakhchalim and Cheraghi (2007) and Sazmand (2012) in Iran . In our study 3 species of Eimeria were recovered in Al Behera province and 4 species in Matrouh province(table 7)(plate II fig 1,2,3,4) .Four species of Eimeria were detected in Saudi Arabia they were E. cameli, E. rajasthani, E. pellerdyi and E. dromedarii, ( El Metenawy 1998), Sazmand et al 2012 recorded three species of Eimeria ,E. cameli , E. dromedari and E. bacteriani, while Yakhchalim and Cherachi (2007) recorded five species E. bactriani , E. rajasthani, E. pellerdyi, E. cameli ,and E.dromedari . The most prevalent Eimeria species in this work was E. cameli represented 76.2%

in Al Behera and 69.6% in Matrouh ,followed by E.dromedari,E.pellerdyi then E.rajasthani in the following order (38.1%,23.8%) in Al Behera and (30.4%,26%,and21.7%) in Matrouh (table 7).Similar results were obtained by Sayed et al(1998),El Salahy and Arafa (2000),Nabih and Toos (2002) and Mahran (2006) in Egypt, while Kasim et al (1985) and Mahmoud et al (1998) both in Saudi Arabia reported the E. dromedarii is the most prevalent followed by E.rajasthani and E.cameli.This may be due to variation in weather and localities .

In this work Balantidium coli was recoreded only in Matrouh province with an incidence of 3.3%( table 4) nearly similar results was observed by Kayum et al (1992) andAbubakar et al(2000) and Pwaveno and Arunsi(2011).

Concerning the effect of age on the rate of infection of Eimeria in Al-Behera (table 9) the highest infection rate was in age group (1-3 years) 24% followed by the group (up to 1 year) 21.4% and finally the group (older than 3 year ) 14.2%,in Matrouh the highest infection rate was in group under (1 year) 24% then the group of (1-3 years) 21.8%,finaly the older group 15.8% (table 9). Mahmoud et-al (1998) in SaudiArabia concluded that infection rate was higher in those age more than 2 years and also Biu et-al (2003) in Nigeria, they noticed higher infection rate in adults than younger camels.In this study the lower incidence in older ages may be attributed to the acquired immunity attained by adults through continous exposure to infection. In the present the investigation Cryptosoridium infection is not recorded in 2 provinces. This may be attributed to that Cryptosporidium is a parasite of low immunity host and the camels have good immune system. Camels husbandry have been considered as an important sector for food supply of rural an sometimes urban people in Egypt. Thus their health status is of importance and epidemiological data on parasite infection in camels are of value to minimize the economic losses in camel breeding specially in younger camels.

Table 1. incidence of gastrointestinal parasites in Al-Behera province (total examined 106)

| TotalG.I. parasitic incidence | | Total Helminths incidence | | Total protozoa incidence | | Single Helminths incidence | | Single protozoa incidence | | Mixed infection (Helminth+protozoa) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No | % | No | % | No | % | No | % | No | % | No | % |
| 69 | 65.09 | 65 | 61.3 | 21 | 19.8 | 48 | 45.3 | 4 | 3.7 | 17 | 16 |

Table 2. incidence of gastrointestinal parasites in Matrouh province (total examined 120)

| TotalG.I. parasitic incidence | | Total Helminths incidence | | Total protozoa incidence | | Single Helminths incidence | | Single protozoa incidence | | Mixed infection (Helminth+protozoa) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No | % | No | % | No | % | No | % | No | % | No | % |
| 75 | 62.5 | 70 | 58.3 | 23 | 19.2 | 52 | 43.3 | 5 | 4.1 | 18 | 15 |

Table 3. Frequency of the revealed parasites among examined faecal samples in Al-Behera province

| Type of parasite | Total incidence | | Single incidence | | Mixed infection | |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | % |
| Nematodes | 61 | 57.5 | 45 | 42.5 | 16 | 15 |
| Cestodes | 4 | 3.8 | 1 | 0.9 | 3 | 2.8 |
| Trematodes | 3 | 2.8 | 2 | 1.9 | 1 | 0.9 |
| Eimeriasp | 21 | 19.8 | 4 | 3.7 | 17 | 16 |

Table 4. Frequency of the revealed parasites among examined faecal samples in Matrouh province.

| Type of parasite | Total incidence | | Single incidence | | Mixed infection | |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | % |
| Nematodes | 68 | 56.7 | 47 | 39.2 | 21 | 17.5 |
| Cestodes | 5 | 4.2 | 4 | 3.3 | 1 | 0.83 |
| Trematodes | 2 | 1.7 | 1 | 0.83 | 1 | 0.83 |
| Eimeriasp | 19 | 15.8 | 4 | 3.3 | 15 | 12.5 |
| Balantidium coli | 4 | 3.3 | 1 | 0.83 | 3 | 2.5 |

Table 5. Prevalence of identified nematode species among infected camels (N=65) in Al-Behera province.

| Species | No. of pssitive | % |
|---|---|---|
| Trichostrogylussp | 43 | 66 |
| Trichurissp | 20 | 30.7 |
| Nematodirushelvetianus | 20 | 30.7 |
| Strogyloidespapillosus | 16 | 24,6 |
| Haemonchussp | 7 | 10.8 |

Table 6. Prevalence of identified nematode species among infected camels (N=70) in Matrouh province.

| Species | No. of pssitive | % |
|---|---|---|
| Nematodirushelvetianus | 40 | 57.1 |
| Bunstomumsp | 18 | 25.7 |
| Trichostrogylussp | 14 | 20 |
| Strogyloidespapillosus | 12 | 17.1 |
| Trichurissp | 9 | 12.9 |
| Haemonchussp | 3 | 4.3 |
| Cooperiasp | 2 | 2.8 |

Table 7. Prevalence of identified Eimeria species among infected camels.

| Species of Eimeria | Al-Behera province (infected samples=21) | | Matrouh province (infected samples=23) | |
|---|---|---|---|---|
| | No.of positive | % | No.of positive | % |
| Eimeriacameli | 16 | 76.2 | 16 | 69.6 |
| Eimeriadromedarii | 8 | 38.1 | 7 | 30.4 |
| Eimeriapellerdyi | 5 | 23.8 | 6 | 26 |
| Eimeriarajasthani | - | - | 5 | 21.7 |

Table 8. Effect of age of examined camels on the incidence of gastrointestinal Helminthes

| Age | Al-Behera province | | | Matrouh province | | |
|---|---|---|---|---|---|---|
| | No of examined camels | No of positive cases | % | No of examined camels | No of positive cases | % |
| Up to one year | 14 | 8 | 57.1 | 25 | 16 | 64 |
| 1-3 year | 50 | 32 | 64 | 32 | 21 | 65.6 |
| Older than 3 year | 42 | 25 | 59.5 | 63 | 33 | 52.3 |
| Total | 106 | 65 | 61.3 | 120 | 70 | 58.3 |

Tablev 9. Effect of age of examined camels on the incidence Eimeria species.

| Age | Al-Behera province | | | Matrouh province | | |
|---|---|---|---|---|---|---|
| | No of examined camels | No of positive cases | % | N0 of examined camels | No of positive cases | % |
| Up to one year | 14 | 3 | 21.4 | 25 | 6 | 24 |
| 1-3 year | 50 | 12 | 24 | 32 | 7 | 21.8 |
| Older than 3 year | 42 | 6 | 14.2 | 63 | 10 | 15.8 |
| Total | 106 | 21 | 19.8 | 120 | 23 | 19.2 |

Table 10. Morphological features of the identified third stag larvae of the revealed nematodes.

| Larva | Total length (mean) | Lengh of tail sheath (mean) | Esophagus | Intestinal cell | Posterior end |
|---|---|---|---|---|---|
| Nematodirus | 940 M | 160 M | Filariform 1/3 body lengh | 8 | Suddenly reduced+long forked tail |
| Bunstomumsp | 588 M | 50 M | Filariform more than1/3 body lengh | 16(not clear) | Suddenly reduced |
| Trichostrongylussp | 660 M | 26 M | Filariform 1/3 body lengh | 16 | Cone shaped |
| Strongyloiedpapillosus | 671 M | Without | Filariform 1/3 body lengh | not clear | Cone shaped |
| Haemonchussp | 800 M | 148 M | Filariform 1/3 body lengh | 16 | Gradually reduced |
| Cooperiasp | 868 M | 168 M | Filariform 1/3 body lengh | 16 | Symmetrically narrow |

Table 11. Morphological features of identified Eimeria spp.

| Eimeriaspp | Oocyst size | Oocyst shape | Oocyst wall | Micropyle | Polar cap. |
|---|---|---|---|---|---|
| E. cameli | 93-122x82-105 | Pyriform | 2layers very thick | present | present |
| E. dromadarii | 27-31x20-24 | Ovoid,subspherical | 2layers brown | present | present |
| E. pellerdyi | 27-29x22-25 | Oval | 1layers light yellow to yellowish brown | present | absent |
| E. rajasthani | 33-36x22-26 | Ellipsoidal | 2layers ,outer light yellow green, inner dark | present | present |

Plate I

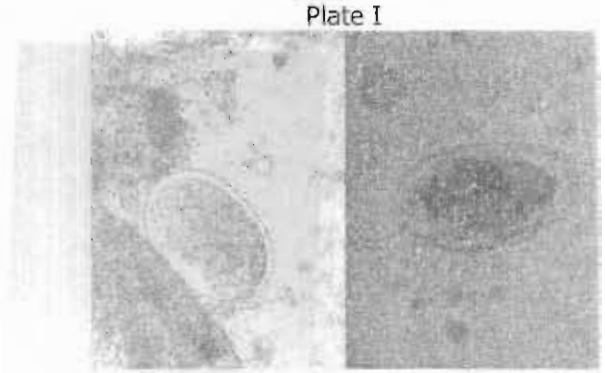

Fig.(1) Fig.(2)

Fig.(3)

Eggs of gastrointestinal helminthes:-

Fig.(1):- Trichostrongylus sp. egg.

Fig.(2):- Nematodirus sp. egg.

Fig.(3):- Trichuris sp. egg.

Plate I

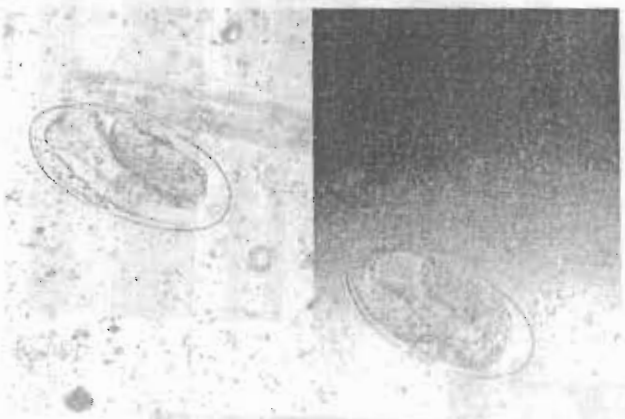

Fig.(4)

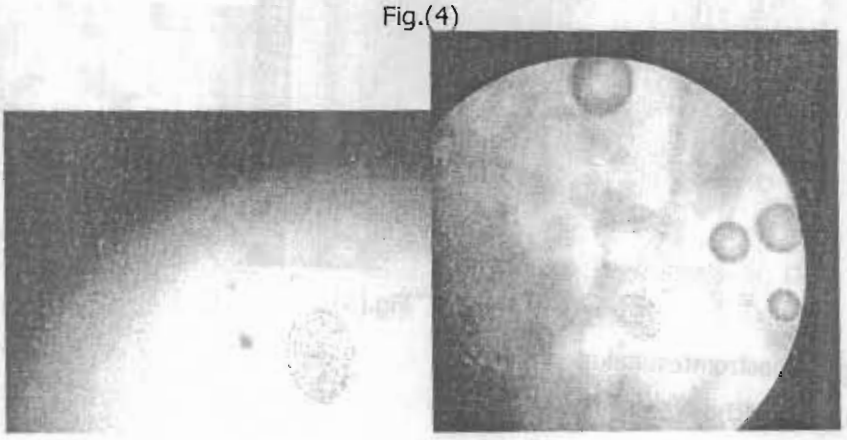

Fig.(5)

Fig.(4):- Strongyloides sp. egg.

Fig.(5):- Haemonchus sp. egg.

Plate I

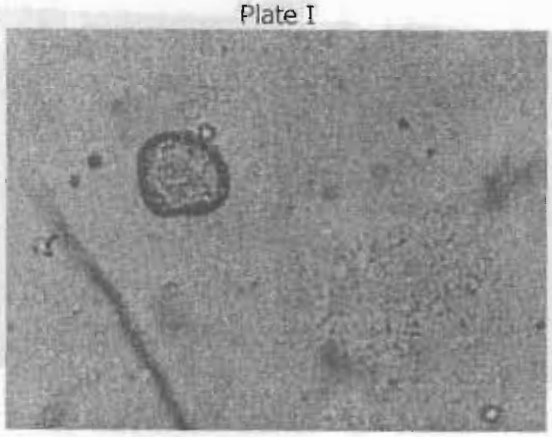

Fig.(6)

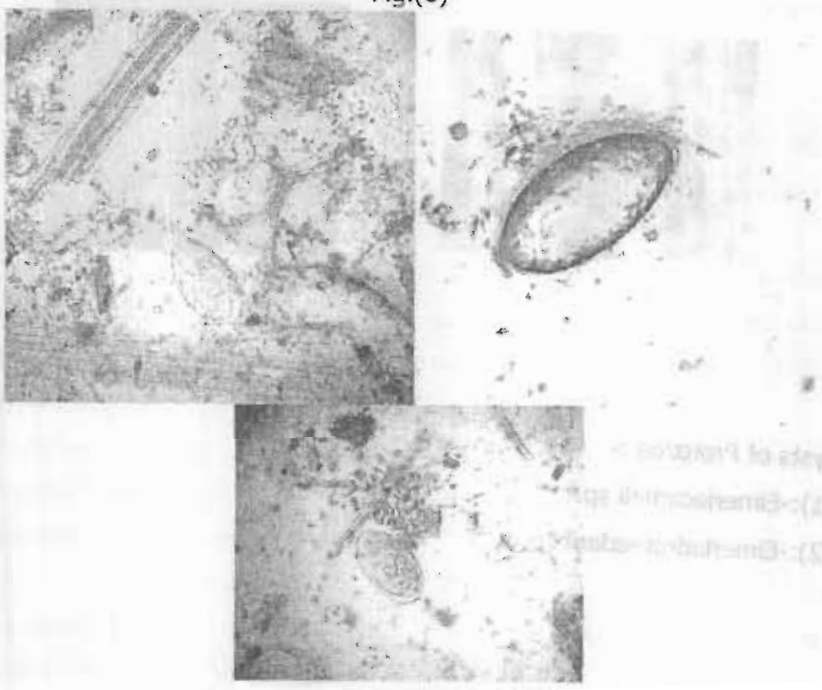

Fig.(7)

Fig.(6):- Moneizia sp. egg .

Fig.(7):- Paramphistomum sp. egg

Plate II

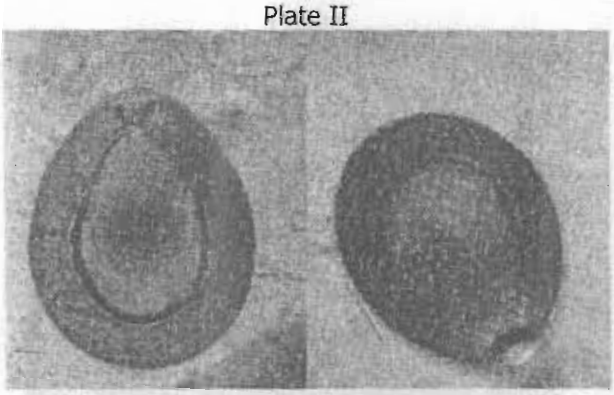

Fig.(1)

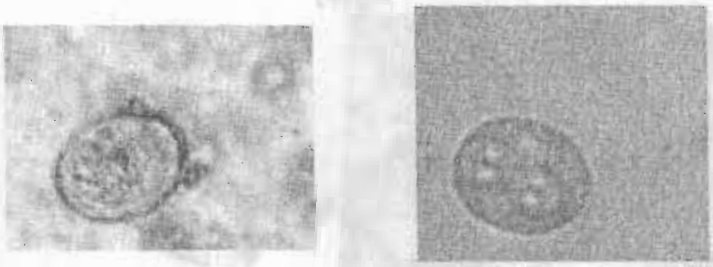

Fig.(2)

-Oocysts of Protozoa :-

Fig.(1):-Eimeriacameli sp.

Fig.(2):-Eimeriadromedarii sp.

Plate II

Fig.(3)

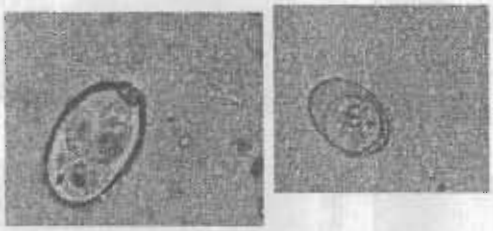

Fig.(4)

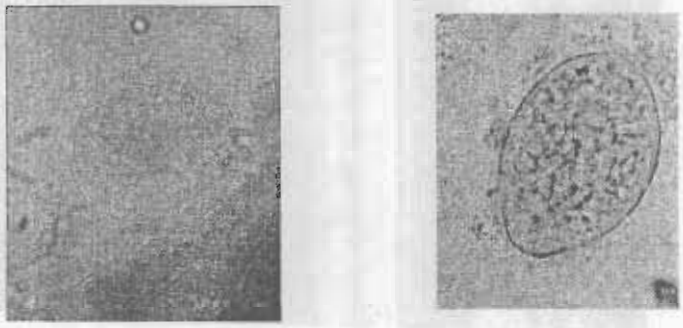

Fig.(5)

Fig.(3):-Eimariapellerdyii sp.

Fig.(4):-Eimariarajasthani sp.

Fig.(5):-Oocyst and Trophozoite of Balantidium coli

Plate III

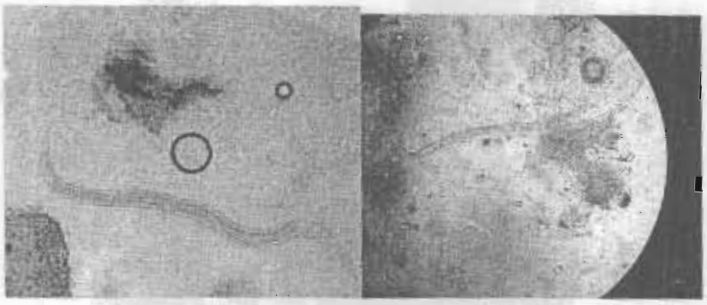

Fig.(1)

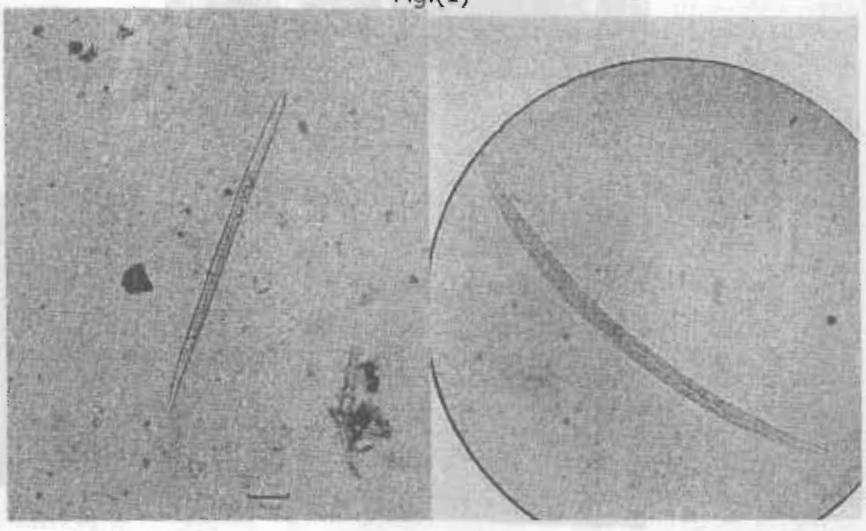

Fig.(2) Fig.(3)

-Larvae of Nematodes :-

Fig.(1):-Larva of Nematodirus sp.

Fig.(2):-Larva of Bunstomum sp.

Fig.(3):-Larva of Strongyloied sp.

Plate III

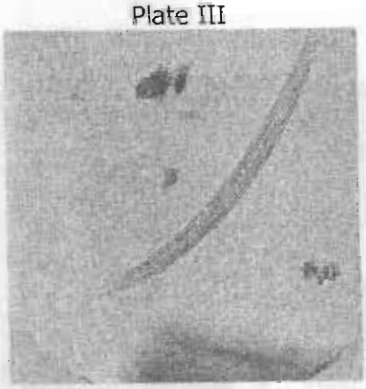

Fig.(4)

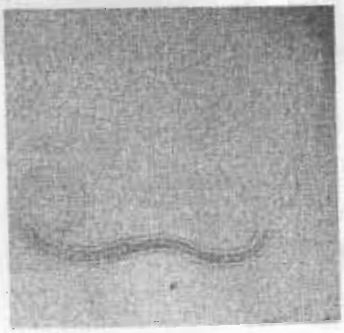

Fig.(5)

Fig.(4):-Larva of Trichostrongylus sp.

Fig.(5):-Larva of Cooperia sp.

Plate III

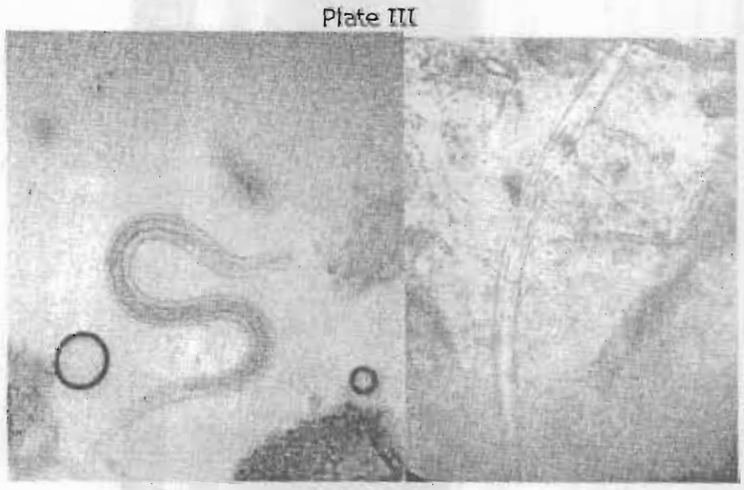

Fig.(6)

Fig.(6):-Larva of Heamonchus sp.

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# مدي انتشار وحصر الطفيليات المعدمعوية فى الإبل فى محافظتى البحيرة و مطروح

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أجريت هذه الدراسة على ١٠٦ عينة براز من الجمال فى محافظة البحيرة و١٢٠ عينة من محافظة مطروح و كانت نسبة الإصابة الكلية بالطفيليات المعمعوية فى البحيرة 65.09%و فى مطروح 62.5%و كانت نسبة الإصابة بالديدان المعد معوية 61.3%و58.3%فى كل من المحافظتين على الترتيب و كانت نسبة حدوث الإصابة بالديدان الإسطوانية و الشريطية و المفلطحة فى محافظة البحيرة هي على الترتيب 57.5%و 3.8%و 2.8% أما فى مطروح فكانت 56.7%و4.2%و 1.7%. وكانت أكثر أنواع الديدان الإسطوانية شيوعا فى البحيرة هى الترايكوسترونجيلس أما فى مطروح فكانت النيماتوديرس هى الأكثر شيوعا و ظهرت العدوى بديدان المونيزيا الشريطية و ديدان البارامفيستومم المفلطحة فى كلتا المحافظتين. وبالنسبة للأوليات كانت نسبة الحدوث الكلية فى محافظة البحيرة 19.8%و فى محافظة مطروح 19.2%و لم يظهر فى محافظة البحيرة إلا طفيل الإيميريا أما بالنسبة لمحافظة مطروح ظهر طفيل البلانتيديوم بنسبة3.3%و سجلت الإيميريا نسبة15.8%و وجد أن طفيل الإيميريا كاملاي هو الطفيل الأكثر شيوعا بنسبة حدوث 76.2%و69.6%فى كل من محافظة البحيرة و مطروح على التوالى تليها أيميريا روميدارى ثم إيميريا بيلاردى أما أيمريا راجاثانى فلم تسجل إلا فى محافظة مطروح فقط . و بدراسة تأثير العمر على الإصابه الطفيلية وجد أن العمر ليس له تأثير على الإصابة بالديدان و لكن فى حالة الأيميريا فإن العمر الأكبر هو الأقل فى نسبة الحدوث