STUDIES ON HELMINTHE PARASITES IN NECROPSIED DONKEYS IN EGYPT

Nagwa Eid Ahmed, Lubna M. El-Akabawy, Ramadan, M.Y., Radwan, A.M.M.
Department of parasitology, Faculty of Veterinary Medicine, Benha University.

ABSTRACT

The current study was aimed to detect different helminthes parasites in necropsied donkeys in Egypt. For this purpose, necropsied 65 donkeys in Faculty of Veterinary Medicine, Moshtohor and Giza Zoo were used during the period extended from February 2007 to January 2008. The total percentage of infection was 98.45% with 22 helminthes species including, *Fasciola hepatica*, *Anoplocephala perfoliata*, Hydatid cyst, *Parascaris equorum*, large *Strongylids*, small *Strongylids*, *Habronema muscae*, *H. megastoma*, *H. microstoma*, *Setaria equina* and *Oxyuris equi*. The detected large *Strongylids* were *Strongylus vulgaris*, *Strongylus edentatus* and *Triodontophorus serratus*. The small *Strongylids* were *Cylicodontophorus mettami*, *Cylicosthapanus longibursatus*, *Cylicosthapanus goldi*, *Cylicocyclus auriculatus*, *Cylicocyclus brevicapulatus*, *Cylicocyclus insignis*, *Cylicocyclus labrum*, *Cyathostomum labiatum*, *Cyathostomum tetracanthum*, *Cyathostomum coronatum* and *Cyathostomum pateratum*. Moderate worm burden (100-500 worms per animal) were found in 61.11%, 75.00% and 73.33% of infected donkeys by large *Strongylids*, small *Strongylids* and *Habronema species* respectively. Adults and old ages of necropsied donkeys harbored most of detected parasites, *Fasciola hepatica*, hydatid cyst, *Parascaris equorum*, *Setaria equina*, *Anoplocephala perfoliata* and *Oxyuris equi* with low parasite burden (1-100 worms per animal). The present work showed that, the females were more susceptible to hydatid cyst, small *Strongylids*, *Habronema species* and *Oxyuris equi* infection than males.

KEY WORDS: Donkey, Helminthes, Necropsy

1. INTRODUCTION

Equines still receive much interest and care in many countries as draft animals, source of meat, leather and other related products. Donkeys are still well deserving of the name 'beasts of burden'. They have a prominent position in the agricultural systems of many developing countries. This is shown by the wide spread use of donkeys in rural and urban areas in Africa [38].

The low level of development of the road transport network and the rough terrain of the country will make the donkey the most valuable, appropriate and affordable pack animals under the small holder farming system of Egypt [19]. Parasitic infection is one of health problems that hinder equine breeding, interfering with their production and cause heavy losses among them. Equines are considered the host of large numbers of
parasites, also the presence of tapeworms as a risk factor in certain equine colic syndromes [39], damage is related specifically to the location of *Anoplocephala perfoliata* (*A*. *perfoliata*) at the ileocaecal junction and its tendency to locate in clusters. At the point of attachment, these parasites are able to cause severe focal enteritis and even areas of necrosis [41].

There are different kinds of damage associated with the migration of larvae especially, *Strongylus vulgaris* (*S*. *vulgaris*) which cause obstruction in the circulating blood which may lead to colic, paralysis, heart diseases or sudden death [14]. As well *Anoplocephala* spp. and *Parascaris equorum* (*P*. *equorum*) cause obstruction of intestine, bile ducts and poor absorption of nutrients. *Strongylus species* cause allergy and anemia due to ingestion of large quantities of blood with the production of anti-coagulants [42].

The attention given by governmental and non-governmental organizations to equines has been far below to what it deserves. Also, Knowledge about the health problems affecting their welfare is limited for most parts in Egypt [16, 20, 36]. Therefore, the objectives of this study were to determine the helminthes parasites infecting donkeys at necropsy as well as to reveal the effect of age and sex of equines on its parasitic infection.

2. MATERIALS AND METHODS

2.1. Post mortem examination:

Necropsy for 65 donkeys was carried out in dissecting room of Faculty of Veterinary Medicine, Moshtohor and Giza Zoo during the period from February 2007 to January 2008 according to Soulsby [42] as follows:

2.1.1. Examination of the alimentary tract for gastric and enteric parasites.

The alimentary tract was removed from the animal after legating each end. Later on, stomach, small intestine and large intestine were isolated separately by double legation at sites of contact. After opening, the contents of the three portions of alimentary tract were examined by naked eye, as well as 2-3 times as handfuls according to Lyons et al. [30, 31] were taken from their contents and placed in a separate container for further examination. Moreover, the mucosa of each part was scraped and the scrapings were examined, by dissecting light microscope.

2.1.2. Examination of other internal organs:

Livers, lungs as well as serous cavities were also examined for the detection of helminthes. The collected worms were washed several times in physiological saline to get rid of mucous and debris before examination. The contents of each part of intestine were sieved through mesh screen of 1 mm apertures then washed with a stream of tap water until no more colored matter had passed. The screen was evacuated into a suitable basin containing some saline. Small quantities from these contents were placed into a Petri dish, diluted with water, examined with hand lens and dissecting microscope. Preparation, Fixation, preservation and identification of detected helminthes were carried out according to Soulsby [42] and Yamaguti [43].

3. RESULTS

3.1. Incidence of recovered helminthes:

Results presented in table (1) and figures (1-5) revealed that, 64 (98.46%) out of 65 donkeys were infested with different helminthes The recovered parasites were *Fasciola hepatica* (*F*. *hepatica*), *A. perfoliata*, *Hydatid cysts*, *P. equorum*, three large *Strongylids*, eleven small *Strongylids*, *Habronema* spp., *Setaria equina* (*S*. *equine*) and *Oxyuris equi* (*O*. *equi*). Mixed infection was common
during this study. *F. hepatica* was detected in bile ducts of two animals (3.08%). *A. perfoliata* was found in small intestines of 25 animals (38.46%) and found in mixed infection with two or three species of parasites (36% and 64%, respectively).

Table 1 Incidence of the parasites recovered at necropsy of donkeys

<table>
<thead>
<tr>
<th>Parasites spp.</th>
<th>No. of Infected</th>
<th>%</th>
<th>Mix. Infect. with one spp.</th>
<th>%</th>
<th>Mix. Infect. with two spp.</th>
<th>%</th>
<th>Mix. Infect. with three spp.</th>
<th>%</th>
<th>Infected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Habronema</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bile ducts</td>
</tr>
<tr>
<td><em>Cyathostomum</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Liver tissue</td>
</tr>
</tbody>
</table>

Table 2 Incidence of the parasites recovered by post mortem examination of internal organs of donkeys in relation to age and sex of animals

<table>
<thead>
<tr>
<th>Parasites spp.</th>
<th>No of Infected Animals</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Adult</th>
<th>Old</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Fasciola hepatica</em></td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><em>Amphiplecta perfoliata</em></td>
<td>25</td>
<td>15</td>
<td>60</td>
<td>10</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td><em>Hydatid cyst</em></td>
<td>3</td>
<td>3</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><em>Parascaris equorum</em></td>
<td>13</td>
<td>13</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td><em>Large Strongylids</em></td>
<td>54</td>
<td>10</td>
<td>18.52</td>
<td>33</td>
<td>61.11</td>
<td>13</td>
<td>24.07</td>
<td>36</td>
</tr>
<tr>
<td><em>Small Strongylids</em></td>
<td>4</td>
<td>1</td>
<td>25</td>
<td>3</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><em>Habronema spp.</em></td>
<td>15</td>
<td>4</td>
<td>26.67</td>
<td>11</td>
<td>73.33</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td><em>Setaria equina</em></td>
<td>28</td>
<td>28</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td><em>Oxyuris equi</em></td>
<td>6</td>
<td>6</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

Adult animals referred to those 2-10 years and old animals referred to those beyond 10 years of age. Low =1-100 worms (or larval stage) per animal. Moderate = more than 100 and less than 500 worms (or larval stage) per animal. High = more than 500 worms (or larval stage) per animal. IA = Number of infected adult animals. IO = Number of infected Old animals. IM = Number of infected male animals. IF = Number of infected female animals.
Hydatid cysts were detected in livers of 4.62% of examined animals and found mainly in mixed infection with two other species of parasites (66.67%). *P. equorum* was detected in 13 donkeys (30%). The caecis and colons of donkeys harbored different *Strongylids* (*S. vulgaris*, *Strongylus edentates* (*S. edentates*), *Triodontophorus serratus* (*T. serratus*), *Cylicodontophorus mettami* (*C. mettami*), *Cylicostphanus longibursatus* (*C. longibursatus*), *Cylicostphanus goldi* (*C. goldi*), *Cylicocyclus auriculatus* (*C. auriculatus*), *Cylicocyclus brevicapsulatus*, *Cylicocyclus insigne* (*C. insigne*), *Cylicocyclus labratus* (*C. labratus*), *Cyathostomum labiatum* (*C. labiatum*), *Cyathostomum tetracanthum* (*C. tetracanthum*), *Cyathostomum coronatum* (*C. coronatum*), *Cyathostomum pateratum* (*C. pateratum*) (Table 1). *S. vulgaris* was the most prevalent species in the present study where 53 donkeys (81.54%) were infected and mainly was found in mixed infection with one species of other worms (71.70%). The small *Strongylids* were detected in 6.15% of autopsied animals and found mostly in mixed infection with one other parasites species (75%). In the dorsal colon, only females of *O. equi* were detected from 9.23% of necropsied animals and found mostly with three other species of parasites (50%). Examination of stomachs revealed presence of three species of *Habronema* in (23.08%) of animals. *H. muscae* was the predominant species (21.54%), followed by *H. microstoma* (15.38%). *S. equina* was detected in the peritoneal and pericardial cavities of 28 animals (43.08%) and mainly in mixed infection with two other species of parasites.

3.2. The relationship between age of the necropsied donkeys and parasitic infection:

Table (2) revealed that *F. hepatica*, *Hydatid cyst* and *P. equorum* were found in Adult necropsied donkeys. The adults
also acquired higher infection with *A. perfoliata* (72%), large and small *Strongylids*, *S. equina* and *O. equi*. *Habronema* spp. was detected in both adults and olds (40% and 60% respectively).

3.3. Relationship between sexes and parasitic infection:

Table (2) showed that *F. hepatica* was found in male necropsied donkeys only. *A. perfoliata* and *Hydatid cyst* were mostly found in females of (56.00%) and (66.67%) of necropsied donkeys, respectively.

Males and females donkeys were infected with large *strongylids* at percentage of 50% for each, while with small *strongylids* at percentages of (75% and 25%), respectively. *P. equorum*, *Habronema* spp., *S. equina* and *O. equi* were detected in heavy infection in females (61.45%, 66.67%, 57.14% and 66.67%, respectively). The table also revealed that, most of helminthes were found in low number (<100 worm/animal) in infected animals except for *strongylids* and *Habronema* spp. which were found in moderate intensity (100-500 worms/animals).

4. DISCUSSION

Necropsy of 65 donkeys showed that 2 donkeys were harbored *F. hepatica* (3.08%) in their bile ducts with low intensity (1-100 worms/animal). Lower incidence of *Fasciola* infection was detected also by Ahmed [2] and Khalifa et al. [23] who detected it in 2.78% and 0.37%, respectively of examined animals. *A. perfoliata* was found in small intestine of 38.46% necropsied donkeys. These results were relatively similar to those of Alcaíno et al. [3], Mfitilodze and Hutchinson [32] in horses which were (34.6% and 32.0%, respectively). Lower percentages of infection were recorded by previous authors [1, 7, 8, 22, 24] which were 1.8%, 20.0%, 28.9% and 7.2%, respectively. The difference may be attributed to hygienic condition and age of animals.

*Hydatid cysts* were detected in livers of (4.62%) of donkeys. This result was lower than those recorded by in earlier studies [5, 35, 40] that recorded rate of donkey infestation ranged from 9.3 to 17.8%. Nevertheless, very low incidence of hydatidosis (0.3%) was reported in horses [26]. This variation may be due difference in the age of infected animals [40].

The recovered gastrointestinal nematodes were *P. equorum* (20%), *Strongylids* spp.
(92.31%), Habronema spp. (23.00%), S. equina (43.00%) and O. equi (9.33%). Nearly similar incidence of P. equorum (24%) was recorded by Mohtes [34]. Higher incidences (46% and 75%) were obtained by Lyons et al. [29, 31]. On the other hand, Ahmed [2] reported very low incidence (4.17%). The deviation in results may be due to difference in age of examined animals where the heavy infection with P. equorum was appeared to be predominated in young animals and yearling as reported by Heil [21].

The present data showed that, the incidence of large Strongylids in necropsied donkeys was (83.08%) and S. vulgaris was the predominant species (81.54%) followed by T. serratus (24.62%) and S. edentatus (1.54%). Similarly Alcaño et al. [4] found high incidence (93.3%) of large Strongylids in horse including, S. vulgaris and S. edentatus at 92.3% and 67.3%, respectively. In this respect, Ahmed [2], Khalifa et al. [23] and Lyons et al. [29] found S. vulgaris in large intestine of 93.80%, 60.45% and 95.00% of examined donkeys, respectively. Also Gawor et al. [18] found S. vulgaris and Triodontophorus in 64.3% and 21.4% respectively.

Small Strongylids were found in low percentage (6.15%), which included eleven species, C. mettami, C. longibursatus, C. goldi, C. auriculatus, C. brevicapsulatus, Cylicocyclus insigne, C. labratum, C. labiatum, C. tetracanthum, C. coronatum Cyathostomum mainly found in large intestine and in mixed infection. Comparatively, higher incidence was recorded by Heil [21] who found that 12.3% of donkeys harbored small Strongylids. Also Eysker and Pandey [17] detected small Strongylids in 14 donkeys. Such differences may be attributed to changes in the environmental condition.

The present study showed that the stomachs of donkeys were infected with adults worms of Habronema spp. (23.08%) and the predominant one was H. muscae (21.54%) followed by H. microstoma (15.3%) and H. megastoma (7.69%). In this respect, higher incidence was recorded by Ahmed [2] found of Habronema spp. (65.8%) and lower incidence of H. megastoma (0.69%), El-Assaly [15] reported Habronema spp. in 94 donkeys and horses, Khalifa et al. [23] found H. muscae in 45.81% of 48 equines. Pandey et al. [37] and Burgu et al. [8] reported higher incidences of H. muscae (89.7% and 100%, respectively) and H. microstoma (85.4% and 90%, respectively). The variation in incidence may be attributed the difference in the age of examined animals, or the recent methods used in combating vectors of these worms [27].

S. equina was detected in peritoneal cavity of (43.08%) of donkeys. This was in accordance with Mohtes [34] who detected it in of autopsied donkeys (48%). Higher incidences (82.6%) were reported by Ahmed [2]. Such differences may be attributed to changes in the methods of detection of the parasites.

Adult females’ O. equi were detected in six donkeys (9.23%). In this respect Mohtes [34] detected O. equi in 30% of donkeys. Such variation may be due to application of control and hygienic measures as well as the age of the animals.

Concerning the relation between parasitic infection and age of examined donkeys, F. hepatica was recovered from adult necropsied donkeys only. Similarly Alcaño et al. [3] detected it in horses up to 5 years old.

The present results showed that both adult and old animals acquired infection with A. perfoliata with higher percentage in adults (72%). Lyons et al. [27] detected it in (54%) of horses aged at 1-26 years old and Lyons et al. [28] found A. perfoliata in adult horses more than young (60% and 30% respectively). Also Beelitz and Gothe [6] found it in 38% of necropsied horses ranged from 2 to 31 years old. Collobert et al. [9] mentioned that the infection rate was not related to age at necropsy or presence of other intestinal parasites.

Hydatid cyst was found in the livers of adults and not detected in old ages.
Similarly, Mukbel et al. [35] denoted that no donkeys of 3 years of age or less were infected, whereas 33.3% (22 of 66) of those aged 4 years or greater were infected. Also Rahif and Atia [40] found it in donkeys of age 3-22 years.

In the present study, *P. equorum* was detected in intestines of adults (2-10 years) only and not found in old ages. Similar results were reported by Mfitilodze and Hutchinson [32] who found that, the infection with *P. equorum* was restricted to animals less than 5 years old. On the other hand Lyons et al. [31] detected *P. equorum* in 46% of weanlings and Kornas et al. [25] mentioned that *P. equorum* mainly occurred in young (21%) compared to (3.5%) in adult animals. The variations of the results may be due to the ages of examined animals.

The present data revealed that old donkeys were more susceptible to infection with large and small Strongylids (66.67% and 75%, respectively). Collobert et al. [11] noted that the prevalence of small Strongylids significantly increased with age, 11.80% of the 1 to 6 months old animals compared to 39.47% of the 2 to 4 years old animals.

*Habronema spp.* were detected at higher incidence (60%) in old donkeys compared to (40%) in adult ages. Similar results were recorded by Collobert-Laugier et al. [10] who found that, the infection rate of *Habronema spp.* increased regularly from 2 months to 10 years of age. *O. equi* was found in Adult examined animals only. Similarly Daoud and Al-Alousi [12] found *O. equi* in adult donkeys.

Concerning the relationship between sex and helminthes infection, the present study revealed that, *F. hepatica* was found in male donkeys. *A. perfoliata* was found in female donkeys more than males. This result came in contrast with Kornas et al. [24] who found it in stallions and mares (12% and 5.2% respectively) and with Agneessens et al. [1] who said that there were no associations of prevalence and intensity of infection with *A. perfoliata* and sex.

*Hydatid cysts* were found in males and females necropsied donkeys by 33.33% and 66.67%, respectively, this was disagreed with Rahif and Atia [40] who found the infection rates of hydatid cyst was higher in males than females.

Males and females donkeys were infected with large Strongylids by equal percentage, while males were more susceptible to infection with small Strongylids. In this respect little literature were found but Mfitilodze and Hutchinson [33] found that male horses had lower overall prevalence of Strongyles.

The present data showed that females had higher infection rates of *P. equorum* , *Habronema spp.*, *S. equina* and *O. equi* than males. Similarly Kornas et al. [25] found *P. equorum* in mares higher than stallions. The heavy infection of gastrointestinal nematodes in females of donkeys may be due to their hormonal activities as mentioned by Dietz et al. [13].

5. REFERENCE


NAGWA E. AHMED et al. (2011)
Helminthes in necropsied donkeys in Egypt


دراسات على الديدان الطفيلية في الحمير المشربة في مصر

نجوى عيد أحمد - لبنى محمد - اسماعيل العقباوي - أحمد محمود مهني - جامعة بنها

المشربة في مصر

تم إجراء الأبحاث التشريحي لعدد 65 حماراً في محافظات قبليتوبية والجيزة وذلك بفحص تجمع الأنواع المختلفة من الديدان التي تصيبها وتعرف عليها. كشفت الدراسة أن نسبة الإصابة بالديدان المختلفة كانت 98.45%. وقد تم جمع الأطوار البالغة من الديدان من نوع الفاشيولا، والأولوبوليسلافا بيروفيلا، ويرقات الأكياس المائية، وديدان أسكارس الخيول وديدان المسترجليد الكبيرة والصغيرة، وديدان الأورانماتيما وليفولاتا وفاشولا بيروفيلا، وديدان سيتيريا وإكسيورا، والكاس روفولا وفاشولا بيروفيلا.

وشهدت الدراسات القريبة بين الديدان مسترجليد الكبيرة والفاشولا بيروفيلا، وديدان استرجليد الصغيرة، وديدان سترونجيمس كوبأر، وديدان الاسترجليد الصغير، وديدان سيتيريا، وديدان إكسيورا، وديدان سترونجيمس. وجدت الدراسة أن نسبة الإصابة بين الحمير كانت 60% من الحمير، والحيوانات البالغة من الأكياس في الفاشولا بيروفيلا،خفضة من نسبة الإصابة في الأكياس المائية، والكاس روفولا وفاشولا بيروفيلا، وديدان سيتيريا وإكسيورا.

الناقص الجيني

وتعتبر نسبة الديدان الطفيلية في الحمير من الأمراض المهمة التي تؤثر على صحة الحمير. وجدت الدراسة أن الذكور كانت أكثراً بنسبة 33% من الإناث، وأكثر من الذكور عرضة للإصابة بأوكاريوماتا والروتافولا. وأظهرت الدراسة أن الديدان الطفيلية تؤثر على أداء الحمير، حيث أن الديدان الطفيلية تسبب في انخفاض إنتاج الحمير وزيادة معدلات الإصابة بالديدان الطفيلية.

المنطقة المعرضة

وتغطي منطقة الساحل الشمالي، وجبل النبطية، وقبرص، ولبنان، إلخ. وتظهر الدراسة أن الديدان الطفيلية تؤثر على صحة الحمير بشكل كبير، حيث أن الديدان الطفيلية تسبب في انخفاض إنتاج الحمير وزيادة معدلات الإصابة بالديدان الطفيلية.