



Comparison of infestation of gastrointestinal helminth parasites in locally available equines in Peshawar, Pakistan

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Abstract

During September-2010 to January-2011, the present research was conducted to compare infestation of gastrointestinal helminth parasites in local equines in different areas of Peshawar, Pakistan. For this purpose, 96 faecal samples of *E. ferus*, 81 of *E. asinus* and 31 of *E. mulus* were collected. In *E. ferus*, maximum *Parascarum equirum* (66.66%), minimum *Delafondia vulgaris* larvae and *Trichurus ovis* (each 2.08%) and no infestation of *Alfortia edentata* larvae were found. In *E. asinus*, maximum *Parascarum equirum* (66.66%), minimum *Oxyuris equi* (2.46%) and no infestation of *Alfortia edentata* larvae, *Anoplocephala* sp. and *Trichurus ovis* were found. In *E. mulus*, maximum *Parascarum equirum* (61.29%), minimum *Apophalus donicus*, *Delafondia vulgaris* larvae and *Oxyuris equi* (each 3.22%), and no infestation of *Alfortia edentata* larvae and *Trichurus ovis* were found. When compared three equines, *E. ferus* was found the most significantly affected on the bases of number and types of gastrointestinal helminth parasites. The young stages equines, those were highly effective to gastrointestinal helminth parasites have more stunted growth. This study shows that working equines in Pakistan are infected with middle to low range of gastrointestinal helminth parasites.

Keywords: Equines, *Equus asinus*, *Equus ferus caballus*, *Equus mulus*, gastrointestinal helminth parasites, hinny, infestation, mule, Peshawar

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Introduction

The equines [horse, *Equus ferus caballus* Linnaeus 1758; donkey or ass, *Equus asinus* Linnaeus 1758; hinny (female)/ mule (male), *Equus mulus* (synonym) Linnaeus 1758] are mainly use for the heavy work in the most of the mountain area as well as in the cities. Further, their most readily recognizable function against traction and draught in industry and agriculture that they have made the greatest contribution to human welfare and advancement (Matthee et al., 2000; Perveen et al., 2011).

Equus ferus caballus is one of two extant sub-species of the wild horse, *E. ferus*. It is a single-hooved (ungulate) mammal belonging to the taxonomic family Equidae. Its anatomy enables it to make use of speed to escape from predators in the wild is an unusual trait. It

has a well-developed sense of balance and a strong fight and flight instinct. It is also able to sleep in both standing up and lying down positions. Female *E. ferus*, called mare, carries its young for approximately 11 months, and a young horse, called a foal, can stand and run shortly following birth (Swinker, 1998). Most domesticated *E. ferus* begin training under saddle or in harness during age of 2-4 years. They reach to their adolescent by age of 05 years and have an average life-span of 25-30 years. In the past, *E. ferus* were used in wars as well as by king as riding. They are also used for rural or urban transport, pulling two-wheel carts for passengers and freight, four-wheel wagons, carriages and buses for public transport (Valdés, 2002).

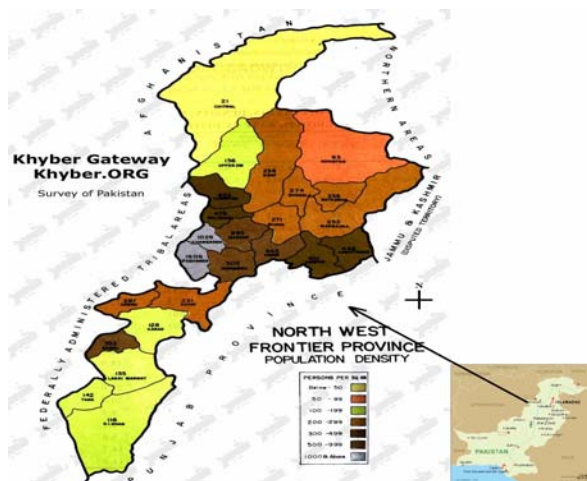
Despite increase in mechanization throughout the world *E. asinus* still deserve the title of beasts of burden. They have a prominent position in the

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agriculture system of many developing countries (Pandey et al., 1994). The low level of development of roads in some regions and rough terrain in other parts make *E. asinus* the most valuable, appropriate and affordable pack animals, especially under the smallholder farming system. Millions of people in the world depend on *E. asinus* daily for transportation and agriculture. More than 90% of estimated 50 million *E. asinus* in the world live in developing countries (Matthee et al., 2000; Perveen et al., 2011).

The hinny is hybrid offspring of a male *E. ferus* and their congeneric, a female *E. asinus*, however, the mule is hybrid of vice versa sexes of the same animals but both are usually sterile with 63 chromosomes (Chivers, 1976). There are million *E. mulus* worldwide still use by civil-society, industry and agriculture as well as by military for different purposes. They get a preference over hill ponies because of their greater strength, sure-footedness and sturdiness (Sapkota, 2009).

Peshawar is the capital of Khyber Pakhtunkhwa and the administrative center and central economic hub for the Federally Administered Tribal Areas (FATA) of Pakistan. It is situated in a large valley near the eastern end of the Khyber Pass, between the eastern edge of the Iranian plateau and the Indus Valley and its strategic location on the crossroads of Central Asia and South Asia. Peshawar under Koppen's climate classification features has a semi-arid climate with very hot summers and mild winters. It is located at 34°01'N and 71°35'E, area is 1,257 km² and population is 3,625,000 (Talbot, 1998; Perveen et al., 2012) (Figure 1).



of Peshawar. The collected information will help in taking appropriate measures to reduce helminthes infestation. Hence, it will help to utilized maximum efficiencies of equines and to improve management practices.

Materials and Methods

Study area

This study was conducted from September 2010 to January 2011 in different areas of Peshawar, which is the capital of Khyber Pakhtunkhwa (KP). There is a great population of equines like horse, donkey and mule.

Collection of faeces

A total 208 fresh equines' faecal samples were collected from September 2010 to January 2011 from different areas of Peshawar from the fields and floor. As embryogenesis occurs rapidly in eggs, therefore, the faecal samples were stored in the refrigerator at 5°C till preparation of slides for presence of helminthes.

Examination of faeces

A 2.0 gm of fresh fecal sample was mixed with 10 ml of flotation solution ($ZnSO_4$) and more was added to fill the tube. A glass cover slip was then placed on top of surface of the tube and left for 10-15 min. Then it was removed vertically and placed on a glass slide and examined under the microscope at 10-40× magnification (Nikon, Tokyo, Japan). All eggs and larvae of helminthes species were identified with help of already prepared slides, literature available, keys (Cheesbrough, 1998; Southwell and Sallur, 2008) and experts on the bases of their structural characteristics till no other egg or larva left on the slide. This procedure was repeated for each sample. The literature about helminthes was also collected.

Results

The total numbers of faecal samples were 208, collected from the available equines which were 96 [female: 71 (weak: 46; healthy: 25); male: 25 (weak: 11; healthy: 14)] from horse, 81 [female: 6 (weak: 5; healthy: 1); male: 75 (weak: 52; healthy: 23)] from

donkey and 31 [female: 24 (weak: 15; healthy: 9); male: 7 (weak: 5; healthy: 2)] from mule when compared to each equines. No emaciated (physically too much weak) animal was found. Those samples infected by specific intestinal helminthes parasites were reported as positive and those did not infected were reported as negative (Table 1).

During the present research, 96 faecal samples of *E. ferus*, 3 were free and 93 were infected by intestinal helminth parasites which were compared present here in descending order: *Parascarium equirum* (66.66%)> *Strongylus equi* (33.33%)> *Oxyuris equi* (25.00%)> *Dicrocoelium lanceatum* (20.83%)> *Dictylocalus arnified* and *Trichostrongylus axei* (each 18.75%)> *Habronema sp.* (15.62%)> *Anoplocephala sp.* (9.37%)> *Cyathostoma* and *Triodontophorus spp.* (each 8.33%)> *Apophalus donicus* (3.12%)> *Delafondia vulgaris* larvae and *Trichurus ovis* (each 2.08%), however, *Alfortia edentata* was absent (Figure 2).

During the present research, examined 81 faecal samples of *E. asinus*, 5 were free and 76 were infected by intestinal helminth parasites which were compared present here in descending order: *Parascarium equirum* (66.66%)> *Strongylus equi* (58.02%)> *Dictylocalus arnified* (30.86%)> *Triodontophorus sp.* (20.98%)> *Cyathostoma sp.* (11.11%)> *Dicrocoelium lanceatum* (8.64%)> *Apophalus donicus* and *Habronema sp.* (each 6.17%)> *Delafondia vulgaris* larvae (4.93%)> *Trichostrongylus axei* (3.70%) and *Oxyuris equi* (2.46%), however, *Alfortia edentata* larvae, *Anoplocephala sp.* and *Trichurus ovis* were absent (Figure 3).

During the present research, examined 31 faecal samples of the hinny/mule, *E. mulus*, 2 were free and 29 were infected by intestinal helminth parasites which were compared present here in descending order: *Parascarium equirum* (61.25%)> *Dictylocalus arnified* (35.48%)> *Cyathostoma sp.* (16.12%)> *Triodontophorus sp.* and *Habronema sp.* (each 12.9%)> *Strongylus equi* and *Dicrocoelium lanceatum* (each 9.67%)> *Trichostrongylus axei* and *Anoplocephala sp.* (each 6.45%)> *Apophalus donicus*, *Delafondia vulgaris* larvae and *Oxyuris equi* (each 3.22%), however, *Alfortia edentata* larvae and *Trichurus ovis* were absent (Figure 4).

Table 1: Faecal samples collected from locally available equines compared on basis of health condition during

SNo	Equines Spp.	n*	Physical condition of females (%)*		Physical condition of males (%)*	
			weak	healthy	weak	Healthy
1.	<i>Equus ferus</i>	96	47.92	26.04	11.46	14.58
2.	<i>Equus asinus</i>	81	6.17	1.23	64.20	28.40
3.	<i>Equus mulus</i>	31	48.40	29.03	16.13	6.45

*n: total number of fecal samples collected; weak: physically weak; healthy: physically healthy; %: percentage of related faecal samples.

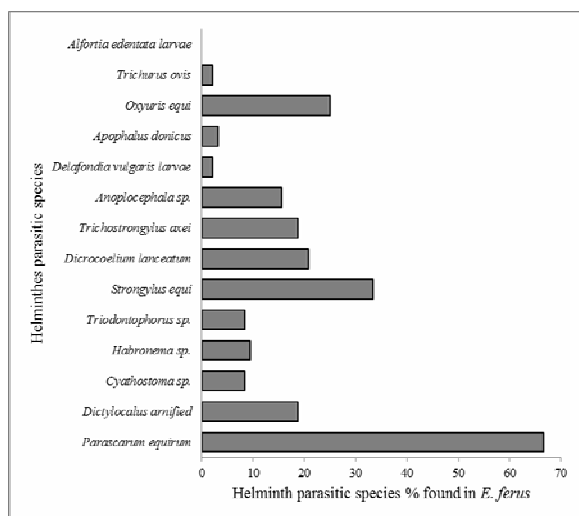


Fig. 2: The helminthes parasites found in fecal samples of the horse, *Equus ferus* Linnaeus during September 2010 to January 2011 in Peshawar, Pakistan

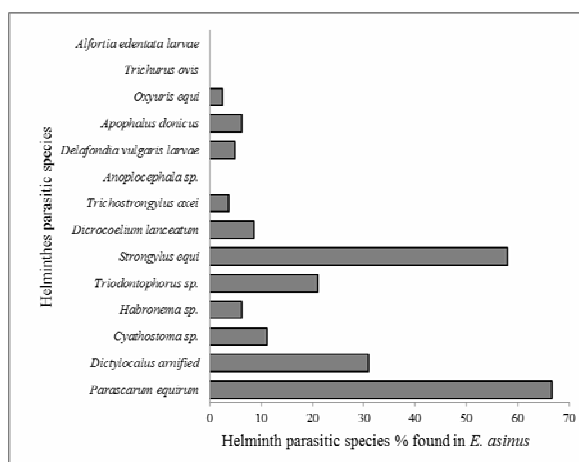


Fig. 3: The helminthes parasites found in fecal samples of the donkey, *Equus asinus* Linnaeus during September 2010 to January 2011 in Peshawar, Pakistan

Discussion

During September-2010 to January-2011, the present study was conducted to compare infestation of gastrointestinal helminth parasites in the equines (*E. ferus*, *E. asinus* and *E. mulus*) in different areas of Peshawar. Such type of research is rare and little literature is available.

Fakae (1990) reported that 63.8% *T. axei*, 18.8% *Strongyloides* sp. and 3.5% *Tr. ovis* in *O. aries*. This result of *Tr. ovis* was also completely similar to the current study which was 2.1% in *E. ferus*. The same report of *Strongyloides* sp. was showing resemblance to the present study which was 8.75% in *E. ferus*. These

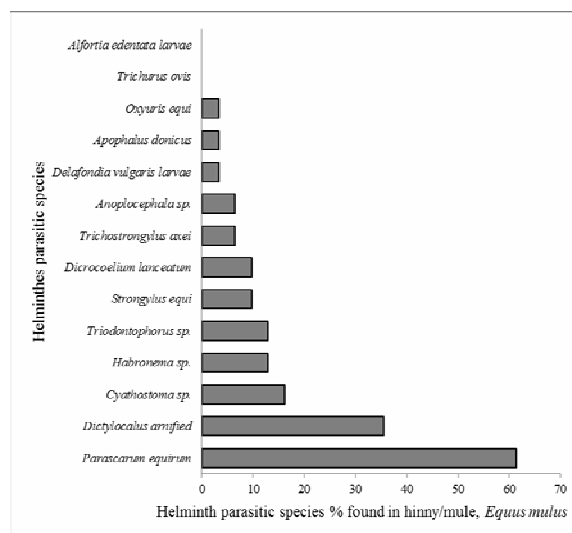


Fig. 4: The helminthes parasites found in fecal samples of the hinny/mule, *Equus mulus* (synonym) Linnaeus during September 2010 to January 2011 in Peshawar, Pakistan

similarities may be due to less infection of these helminthes parasites. In the same report, *Trichostrongylus* sp. was showing difference from the current results which may be due to different environmental condition or different hosts' species used.

The present study revealed that majority of *E. asinus* had high faecal worm egg counts.

The same identification was carried out by Getachew et al. (2009) in *E. asinus* from Ethiopia who revealed 80% *Fasciola*, 51% *Parascaris*, 30% *Gastrodiscus*, 11% *Strongyloides westeri*, 8% cestodes and 2% *Oxyuris equi* infection. Other parasites were also identified, including *Habronema muscae*, *Draschia megastoma*, *Trichostrongylus axei*, *Strongyloides westeri*, *Anoplocephala perfoliata*, *Anoplocephala magna*, *Anoplocephaloides* (*Paranoplocephala*) *mamillana*, *Parascaris equorum*, *Fasciola hepatica*, *Fasciola gigantica*, *Gastrodiscus aegyptiacus*, *Dictyocaulus arnfieldi*, *Oxyuris equi*, *Probstmayria vivipara*, *Gasterophilus intestinalis*, *Gasterophilus nasalis*, *Rhinoestrus uzbekistanicus* and *Setaria equine*. Some of the species, i.e., *Fasciola*, *Gastrodiscus*, *Draschia megastoma*, *Probstmayria vivipara*, *Rhinoestrus uzbekistanicus* and *Setaria equine*, which were not found in the current study, may be the cause or difference in environmental condition, food or application of different methods which were used for identification of intestinal helminthes parasites.

Bastiaensen (1995) reported that 44.88% *Trichostrongylus* sp. and 100% *Strongylus* sp. in cattle during their research work while in the current study *Trichostrongylus* sp. was found 6.45% in mules, 3.7%

donkeys and 18.75% horses and *Strongylus* sp. were 33.33% in *E. ferus*, 58.02% *E. asinus* and 9.67% *E. mulus*. This difference may also be the cause of different host species as there were cattle and in the current study there were equines or different environmental condition or food factors.

Another worker, Hosseini (2008) reported 1.9% *Strongylus* sp., 11.39% *Cyathostomum* sp., 0.53% *Triodontoforus* sp., 6.6% *Trichostrongylus axei*, 20% *Parascaris equorum* and 80% *Habronema* sp. in donkeys this result is also similar to current result of *E. asinus* which is 58.2% *Strongylus* sp., 11.11% *Cyathostomum* sp., 20.98% *Triodontoforus* sp., 3.7% *Trichostrongylus axei*, 66.66% *Parascaris equorum* and 6.14% *Habronema* sp. the current result is somewhat different from this result because the present result consists of many other species, this difference of parasitic species may be the environmental condition or different method of application for identification used.

The present study revealed the presence of a range of gastrointestinal helminthes parasites species, which are representative of the important pathogenic parasites of equines worldwide. The presence of poly-parasitism with medium to low prevalence and infection intensity is an indication that favorable environmental conditions for infection, survival and perpetuation of the parasites exist in Peshawar. The lack of anti-helminthetic treatment may also be a contributing factor. A detailed study of the pathogenicity, treatment and control strategies, and the immune response of working equines to the infection of each parasitic species is highly recommended.

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