

EPIDEMIOLOGICAL STUDY ON HAEMOPARASITES OF DROMEDARY (*Camelus dromedarius*) IN IRAN

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ABSTRACT

This research was conducted to determine the prevalence and seasonal fluctuation of haemoparasites in dromedaries in the eastern part of Iran. Blood samples of 262 dromedaries in abattoir of Mashhad, from May 2008 to June 2009 were analysed for haemoprotozoa by smear examination of blood stained with Giemsa's stain. The same samples were also examined by knott technique for detection of camel filariasis.

Dromedaries were infected with *Dipetalonema evansi* (5.34%) and *Trypanosoma evansi* (0.58%), respectively. No infection with *Theileria* and *Anaplasma* were found. The prevalence rate of infection with *Dipetalonema evansi* was highest in autumn in female dromedaries aged 4-8 year. However, there was no significant relation between infection, age, sex and season. In the second study, inspection of testes, epididymis, spermatic cord and lungs of 172 dromedaries revealed that 10 (5.81%) dromedaries were infected with adult forms of *Dipetalonema evansi*. Male nematode was measured to be 9.5-10.5 cm, female nematode 17.5-19.5 cm and microfilariae 260-360 micrometer. Dromedaries in eastern part of Iran usually suffer from low grade infections with *Dipetalonema evansi*.

Key words: *Camelus dromedarius*, epidemiological study, haemoparasites, haemoprotozoa, Iran

Camel (*Camelus dromedarius*) is an important multipurpose animal of Iran and more than 200,000 dromedary camels are living in the arid and semi-arid deserts of eastern part of Iran including Khorasan and Sistan, Blouchestan Provinces (Mowlavi *et al*, 1997; Rahbari and Bazargani, 1995).

Trypanosoma evansi, is the most widespread pathogenic trypanosome in the world. It is mechanically transmitted by haemotophagus biting flies and therefore distributed widely outside the tsetse belts. Clinical signs of disease include emaciation, fever, anaemia, corneal opacity, diarrhoea (Soulsby, 1982; Wernery and Kaaden, 2002). Literature is scarce on prevalence of theileriosis in dromedaries (Mahran, 2004; Mazyad and Khalaf, 2001).

Camel filariasis caused by *Dipetalonema evansi* may cause emaciation, orchitis, aneurysms and haematoma in the testicle and spermatic cord as well as arteriosclerosis, heart insufficiency and interstitial pneumonia and nervous manifestation (Soulsby, 1982; Butt, 1995; Turkutanit *et al*, 2002; Wernery and Kaaden, 2002). Reports on haemoparasites of dromedaries in Iran is available just of type investigation within a short period of time (Rahbari and Bazargani, 1995; Zarifard and Hashemi-Fesharaki, 2000; Oryan *et al*, 2008). Information on epidemiology of haemoparasites of

dromedaries in another part of world is also scarce (Pathak *et al*, 1998; Mahran, 2004).

Hence, the present study was designed to provide preliminary information on epidemiology, seasonal pattern and type of haemoparasites of dromedaries in eastern part of Iran.

Materials and Methods

This study was conducted on 262 dromedaries of different age and sex group slaughtered in Mashhad abattoir. Generally, these camels were collected from eastern parts of Iran including Khorasan and Sistan and Bluchestan provinces of Iran. Before slaughtering, the age and sex of dromedaries were recorded and peripheral blood of each dromedary was smeared on a microscopic slide. Blood samples were collected from the jugular vein of each camel in sterile tube containing EDTA during slaughtering.

Blood samples were subjected to knott technique to detect *Dipetalonema evansi* (Anon, 1977; Soulsby, 1982). Smear of peripheral blood were stained using Giemsa's stain for haemoprotozoa (Anon, 1977).

Testes, spermatic cords and lungs of 172 dromedaries slaughtered at the Mashhad abattoir during the study period were collected randomly and placed in a plastic container and transported to the

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parasitology laboratory of Veterinary Faculty, Ferdowsi University of Mashhad, for immediate processing. These sections were sliced and carefully examined for detection of *Dipetalonema evansi*. Identification and counting of this worm was conducted (Soulsby, 1982).

SPSS 15 was used for statistical evaluation of results (© SPSS Inc., USA). The Chi-square test was used to adjudge the effects of season, age and sex alongwith their possible interactions with haemoparasites (Mead and Curnow, 1983).

Results

Dromedaries were infected with *Dipetalonema evansi* (5.34%) and *Trypanosom evansi* (0.38%), respectively. No infection with *Theileria* and *Anaplasma* were found. The prevalence rate of *Dipetalonema evansi* was highest in female dromedaries (6.66%) aged 5-8 years (7.3%) during autumn (10%) (Table1, Table2, Table3). However, there was no significant difference between prevalence rate of infection between *Dipetalonema evansi* and host sex ($p=0.49$), age ($p=0.728$) and season ($p=0.171$).

At necropsy, out of the 172 male dromedaries only 10 (5.81%) had adult worms of *Dipetalonema evansi* in their testes, epididymis, spermatic cord and lungs. Male nematode measured 7.5-9.5 cm, female 17.5-19.5 cm and microfilaria 260-360 micron in length. Right and left spicules were 120-200 and 500-610 micron long, respectively.

Discussion

The prevalence rate of *Dipetalonema evansi* in present study was 5.34% which is in agreement with previous reports from other geographical regions of Iran (Zarif-fard and Hashemi-Fesharaki, 2000 and Mirzayans and Halim, 1980) but is relatively lower than previously reported in other geographical regions of Iran (Oryan *et al*, 2008; Rahbari and Bazargani, 1995). The low prevalence rate recorded for *Dipetalonema evansi* in the present study area may be due to the difference in management system of the dromedaries.

Although the rate of infectivity among female was higher than male dromedaries but not significant statistically. In contrast, results of Mahran (2004) and Oryan *et al* (2008) described that the prevalence rate of infection in male (23%) was higher than female (14%) dromedaries although it was not significant.

In addition, the prevalence rate of *Dipetalonema evansi* was highest in animals aged 5-8 year (7.3%) but there was no significant difference between rate of infection with *Dipetalonema evansi* and age. However,

Rahbari and Bazargani (1995) recorded that average rate of *Dipetalonema evansi* infection was comparatively higher in young dromedaries. On the other hand, Mahran (2004) and Pathak *et al* (1998) reported that the rate of infection was higher among older dromedaries than younger individuals. Also, the prevalence of infection had a high rate in autumn but no significant difference was found in statistical analysis whereas Mahran (2004) and Arafat (2002) noticed the highest rate of infection during summer in Egypt.

In present study, 5.81% male dromedaries showed adult worm of *Dipetalonema evansi* at necropsy whereas only 4.65% male dromedaries showed microfilaria in Knott test which is consistent with previous results of Oryan *et al* (2008) and Mowlavi *et al* (1997). The difference was found in prevalence rate of *Dipetalonema evansi* in Knott test and at necropsy may be due to immaturity of the nematodes, the presence of only one sex or nocturnal periodicity of the microfilaria.

Also, the male nematode measured 7.5-9.5 cm, female 17.5-19.5 cm and microfilaria 260-360 micron, right and left spicules were 120-200 and 500-610 micron long, respectively as reported by Soulsby (1982).

Table 1. The prevalence rate of infection with *Dipetalonema evansi* based on sex in dromedaries.

Sex	<i>Dipetalonema evansi</i>		Total
	Positive (+)	negative (-)	
Male	8(4.65%)	164(95.3%)	172
Female	6(6.66%)	84(93.33%)	90

Table 2. The prevalence rate of infection with *Dipetalonema evansi* based on age of dromedaries.

Age	<i>Dipetalonema evansi</i>		Total
	Positive (+)	negative (-)	
5>	2(3.6%)	53(96.36%)	55
5-8	3(7.3%)	38(92.68%)	41
>8	9(5.4%)	157(94.57%)	166

Table 3. The seasonal prevalence rate of infection with *Dipetalonema evansi* in dromedaries.

Season	<i>Dipetalonema evansi</i>		Total
	Positive (+)	negative (-)	
Spring	7(7%)	93(93%)	100
Summer	1(1.88%)	52(98.11%)	53
Autumn	6(10%)	54(90%)	60
Winter	1(2.04%)	48(97.95%)	49

In present study, only 1 dromedary (0.38%) was infected with *Trypanosoma evansi*. In another study, Rahbari and Bazargani (1995) reported 7.7% prevalence of *T. evansi* in dromedaries in Iran. Detection of parasite in the blood is difficult because parasitaemia is intermittent (Mahmound and Gray, 1980). Parasitological techniques show high sensitivity, early infection drum but during the chronic phase of infection, a very low sensitivity is observed.

In spite of tick infestation in dromedaries, tick-borne haemoparasites such as *Theileria* and *Anaplasma* were not encountered in the present study. The prevalence of *Theileria* in Egyptian dromedaries reported by Mahran (2004) and Mazyad and Khalaf (2002) was 6.2% and 12.6%, respectively. It showed that tick infestation in dromedaries and there was no transmission of blood parasites in Iran.

Results of this study showed that dromedaries in eastern part of Iran usually suffer from low grade infections with *Dipetalonema evansi* and that indicates the necessity of biological research for understanding reproduction, tissue migration, vectors and host-parasite interactions of this filarial nematode parasite.

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