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THE DETECTION OF LEPTOSPIRA IN BACTRIAN CAMELS (*Camelus bactrianus*) IN NORTH WEST IRAN

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ABSTRACT

The aim of the present study was to determine the prevalence of *Leptospira* infection in bactrian camels in North West Iran by culture and microscopic agglutination test (MAT). Blood and urine samples were collected from 60 bactrian camels (19 males and 41 females) in Ardabil province, North West Iran during an 11-months study spanning between April 2008 to February 2009. Twelve out of 60 (20%) serum samples had a titre against *Leptospira*, out of which 58% (7/12) were from female and 42% (5/12) from male. The predominant serovars observed were *Leptospira grippotyphosa* (6/50%) followed by *Leptospira icterohaemorrhagiae* (4/3%), *Leptospira pomona* (1/33%) and *Leptospira canicola* (1/33%). No other serovar was detected among camels of this province. The highest antibody titres were 1:1600 for *L. icterohaemorrhagiae* and *L. canicola* (2x), 1:400 for *L. grippotyphosa* and *L. icterohaemorrhagiae* (4x) and 1:100 for *L. grippotyphosa* and *L. canicola* (6x). None of the sera showed reaction with more than one serovar. All 60 urine samples were negative when cultured for 6 weeks.

Key words: Bactrian camels, culture, *Leptospira*, MAT, north west Iran

Leptospirosis is one of the most widespread and significant zoonotic disease around the world. It has a wide host range, such as cattle, camel, swine, dog, rodent, wild animals and humans (Mansour and Gar El Nabi, 2009). The demonstration of leptospira in body fluids or internal organs usually kidney, liver, lung, brain, or adrenal gland of aborted or stillborn foetuses is considered chronic leptospirosis of the mother, and is evidence of active infection of the foetus (OIE, 2008). *Leptospira* causes significant economic losses in the dairy industry worldwide due to abortion, reduced milk production and infertility (Niraimathi *et al,* 2011). Bactrian camel (*Camelus bactrianus*) is vital to the productive system of desert and semi-desert areas, and is well adapted to the harsh climatic conditions (Zhaohui Xie *et al,* 2011). Different types of camels reared in Iran are animals with an unique physiological constitution, resistant to many infectious diseases, but affected with leptospirosis (Doosti *et al,* 2012).

The most important diseases in bactrian camels (*Camelus bactrianus*) are anthrax, brucellosis, colibacillosis, enterotoxemia, leptospirosis, salmonellosis and tuberculosis (Khalafalla and Bornstein, 2012).

In Iran, Rafi and Maghami (1959) detected *Leptospira icterohemorrhagiae* antibodies in a female camel, which suffered from haematuria that later led to abortion.

The aim of this study was to determine the prevalence of *Leptospira* infection in bactrian camels in north west Iran by culture and MAT.

Materials and Methods

Blood and urine samples were collected from 60 (19 males and 41 females) 11 month-old apparently healthy bactrian camels in Ardabil province, North-West Iran between April, 2008 to February 2009. This study was conducted at the *Leptospira* Reference Laboratory of the Razi Vaccine and Serum Research Institute, Karaj-Iran which keeps 20 reference serovars of living *Leptospira*. Blood were taken from the jugular vein and sera were kept at -20°C until used. MAT was done according to the Cole *et al* (1973) using all 19 reference strains. A positive titre was considered at ≥ 1/100. For urine culture, 5ml of each urine was transferred to tubes containing 5 ml *Leptospira* Medium Base EMJH containing *Leptospira* Enrichment EMJH (Becton Dickinson and Company) medium with supplement. The tubes were incubated at 28°C for 6 weeks and examined each week by darkfield microscopy (WHO, 2003).

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Results

Twelve out of 60 (20%) were found to have a titre against *Leptospira* with the MAT test. Seven (58/3%) of the positive sera were from females and 5 (41/6%) were from males (Table 1). The predominant serovars were *L. grippotyphosa* with 50% (6/12) followed by *L. icterohaemorrhagiae* with 33% (4/12), *L. pomona* with 8% (1/12). The *Leptospira* antibody distribution was as follows: 2 times with a titre of 1:1600 with *L. icterohaemorrhagiae* and *L. canicola*, 4 times with a titre of 1:400 with *L. grippotyphosa* and *L. icterohaemorrhagiae* and 6 times with a titre of 1:100 with *L. grippotyphosa* and *L. canicola* (Table 2). Among the 12 *Leptospira*- positive sera, 58% (7/12) were from females and 42% (5/12) were from males (Table 1). None of the sera showed serological reactions to more than one serovar. A total of 60 urine samples were negative in culture.

Table 1. MAT results based on gender.

Samples	No. (%) of Male	No. (%) of Female	Total no. (%)
Positive	5 (41/6%)	7 (58/3%)	12 (20%)
Negative	14 (29/1)	34 (70/8)	48 (80%)
Total	19 (31/6)	41 (68/3)	60

Table 2. Serological distribution of *Leptospira* serovars in bactrian camels.

Serovars	Positive sera	Antibody titration		
		1:100	1:400	1:1600
L. grippotyphosa	6 (50 %)	5	1	–
L. icterohaemorrhagiae	4 (33.3 %)	–	3	1
L. pomona	1 (8%)	1	–	–
L. canicola	1 (8%)	–	–	1
Total	12 (100%)	6	4	2

Discussion

Hajikolaei *et al* (2013) collected 128 serum samples from camels (*Camelus dromedarius*) in Yazd. Six live antigens of *L. interrogans* serovars *pomona, canicola, hardjo, ballum, icterohaemorrhagiae* and grippotyphosa were used. Antibodies against one or more serovars were shown in 30 (32.4%) sera at a dilution of ≥1:100. Among the positive sera *L. pomona* (57.9%), *L. canicola* (23.7%), *L. hardjo* (10.5%), *L. grippotyphosa* (5.3%) and *L. icterohaemorrhagiae* (2.6%) were the most frequent serovars. Our result was in agreement with their results with slight difference in the species identification which was similar to the study of McGrane and Higgins (1985). The *L. grippotyphosa* serovar was dominant in our research but Talebi (2010) found that the *L. pomona* was the most frequent serovar in *Camelus dromedarius*. Differences detected in these studies may be explained either by the camel species investigated or by regional zones and time of sampling. According to the study of Anan'ina IuV *et al* (2011) on 51 sera of cattle and camels (*Camelus bactrianus*) with 13 reference serovars indicated that *L. sejroe* serogroup (probably *L. hardjo* serovar) was significant in goats, sheep and camels. In another study in Iran Talebi (2010) examined 183 camel (*Camelus dromedarius*), of which 51 (27.87%) had titre against at least one of the *Leptospira*l serotypes. The highest titre was 1:400 which was observed in only two serum samples and 4 serum samples showed a titre of 1:200.

In our study none of the sera showed serological reactions to more than one serovar. McGrane and Higgins (1985) tested 61 camel sera against 8 *Leptospira* serotypes. They found that 11 out of 61 sera had titre against *L. grippotyphosa* (9. 8%), *L. canicola* (3 .3%) and *L. ballum* (1 .6%). In another study 73 racing dromedaries in the UAE tested for leptospirosis using the slide macroscopic test. Three out of 73 (4.1%) had *Leptospira*l antibodies (Afzal and Sakkir, 1994). Similar results were obtained in other serosurveys in the UAE, where 2.5% of racing and 5.6% of breeding dromedaries had *Leptospira*l antibody titres (Wernery and Wernery, 1990). Sebek *et al* (1978) examined serologically 18 sera of camels in Afghanistan for leptospirosis. They detected antibodies in 10 out of the 18 (55.5%) camels. In another study at Ethiopia Moch *et al* (1975) found the incidence of anti-*Leptospira*l antibodies in dromedaries reported was 15.4%. Furthermore, antibodies against more than one serovar were found in 8 (26.6%) samples among positive sera. The results of our study showed that *L. grippotyphosa* is widely distributed in Old World camels as shown by Sebek *et al* (1978) in Afghanistan, Moch *et al* (1975) in Ethiopia and Wernery and Wernery (1990) in United Arab Emirates.

The present survey may provide baseline data for future studies on prevalence of *Leptospira* infection in bactrian camels by MAT test.

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