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# DISTRIBUTION PATTERN OF *Trypanosoma evansi* IN CAMELS (*Camelus dromedarius*) IN IRAN

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## ABSTRACT

Epidemiological survey of *Trypanosoma evansi* in 285 camels conducted for 3 years in Fars Province and adjoining areas in Iran, indicated an overall 14.0% infection. These animals were brought from neighbouring places for slaughter and few of them were maintained for some time. Aged animals above 4 years showed higher (16.1%) infection rate as compared to young ones below 4 years of age (9.5%). Moderate and heavy infections caused morbidity, emaciation and pale mucous membranes. Few animals had intermittent fever showing temperature upto 41°C. The animals with high parasitaemia were anaemic with haemoglobin as low as 7.5 g/dl and PCV 15%. The infection was mostly chronic indicating the endemicity in the area. Proper control measures are needed to keep the infection under control and protect the other animal population.

**Key words:** Camel, emaciation, Iran, *Trypanosoma evansi*

*Trypanosoma evansi* is an important pathogen causing serious disease problem in camel and many other hosts in many parts of the world (Urquhart *et al*, 1996; Haroun *et al*, 2000). Though the parasite was reported from camels in Iran as early as 1947 (Deply and Rafyi, 1947) but no systematic and concerted efforts were yet made to study its different aspects in different regions of Iran. The present study was therefore, envisaged to investigate its distribution pattern in different parts of Fars Province and adjoining areas in Iran and to quantify the infection in a given population to correlate its effects on animals which has direct influence on health and economy.

## Materials and Methods

**Study area and animals**: Total 285 camels of both sexes above one year age, procured from different parts of Fars Province and adjoining areas in Iran, were examined and the study continued for 3 years (2005-2007). The animals were maintained for some time and stall fed before slaughter.

**Samples**: Blood samples from the animals under examination, were collected. The examination of available animals was randomly carried out for 3 years in different seasons of the year and proper details of the animals and the places of their procurement were recorded. Background data of animals was also collected.

**Examination**: The animals were first examined clinically by observing clinical signs if any, and also for the presence of *Trypanosoma* infection in the blood. Parasitological examination of the blood samples was carried out by examining the wet blood films (WBF) under microscope. Buffy coat examination was also carried out at times. Few Giemsa stained preparations were also used to study the parasites. In doubtful cases, blood samples were inoculated intraperitoneally in albino mice to isolate the parasite. Inoculated mice were monitored for 5-7 days and results was recorded. One to five *T. evansi* in each preparation were taken as light infection, 5 to 10 as moderate and above 10 as heavy infection. Such 10 preparations were examined in each case. Ten animals in each category with light, moderate, and heavy infection with *T. evansi* were selected for estimation of haematocrit parameters including haemoglobin (Hb) and packed cell volume (PCV). The blood samples of such animals were collected separately in EDTA and taken to laboratory for processing. The animals having Hb less than 10 g/dl and PCV below 20% were taken as anaemic. Blood samples from 10 non-infected animals having normal appearance were also collected for simultaneous estimation of Hb and PCV to act as control.

## Results

Three years survey in 285 camels showed 41 animals positive with *T. evansi* infection. The infection was 9.5% in animals of 1-4 years age and 16.1% in animals above 4 years of age with 14.0%

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overall infection rate (Table 1). Regardless of age, sex and season, the animals were susceptible to *T. evansi*. However, the higher intensity of infection was observed in camels above 4 years of age. No variation in the prevalence and intensity of infection was noticed in different season of the year.

**Clinical manifestations**: The animals with heavy and moderate infection with the parasite were emaciated and had pale mucous membranes, dry body coat and weakness. Profuse lacrymation was noticed from both eyes of these animals. Few animals showed intermittent fever with temperature upto 40-41°C. The urine in 2 cases with high parasitaemia was dark brown in colour giving pungent smell.

**Haematological changes**: Haematocrit values, i.e., Hb and PCV recorded in the infected and non-infected control animals, were presented in table 2. There was a marked decrease in Hb and PCV values in the infected animals as compared with the non-infected control ones. The mean Hb values in light, moderate and heavy infections were 12.0, 10.7 and 8.6 g/dl, respectively, where as corresponding PCV values were 26, 22 and 17%. The mean Hb and PCV values were 13.6 g/dl and 30% in non-infected control animals.

## Discussion

The present survey of *T. evansi* in camels provided the data on its distribution in camels procured from different regions of Fars Province and also from adjoining areas in Iran. The infection was common and endemic as observed during the present study in animals of all age groups and also in all the season of the year. The infection was also earlier reported in camels of Iran by Delpy and Rafyi (1947). Singh *et al* (2004) also emphasised about the endemicity of this infection in camels in many countries of the world. Cosmopolitan nature of the infection in wide host range was also reported recently by Delafosse and Doutoum (2004).

The infection in camels in our study ranged between 9.5 and 16.1% in different age groups of animals which corroborated with earlier reports of Hussein *et al* (1991) from Saudi Arabia, Singh *et al*

**Table 1.** Prevalence of *Trypanosoma evansi* in camels in Iran.

| Year of examination | Number of animals examined | | | Animals found positive | | | Intensity of infection* | |
|---|---|---|---|---|---|---|---|---|
| | 1-4 yrs | Above 4 yrs | Total | 1-4 yrs | Above 4 yrs | Total | 1-4 yrs | Above 4yrs |
| 2005 | 24 | 71 | 95 | 3 | 11 | 14 | +(3) | +(4), ++(4), +++(3) |
| 2006 | 35 | 68 | 103 | 3 | 13 | 16 | +(2), ++(1) | +(7), ++(3), +++(3) |
| 2007 | 15 | 72 | 87 | 1 | 10 | 11 | +(1) | +(3), ++(3), +++(4) |
| Grand total | 74 | 211 | 285 | 7 | 34 | 41 | | |

*Intensity of infection + = Light intensity ; ++ = Moderate intensity ; +++ = Heavy intensity
• = Figures in parenthesis indicate number of positive animals.

**Table 2.** Haematocrit values in camels naturally infected with *Trypanosoma evansi*.

| Serial no. | Intensity of infection | | | | | |
|---|---|---|---|---|---|---|
| | Light | | Moderate | | Heavy | |
| | Hb (g/dl) | PCV (%) | Hb (g/dl) | PCV (%) | Hb (g/dl) | PCV (%) |
| 1. | 12.5 | 28 | 10.75 | 26 | 8.0 | 17 |
| 2. | 13.0 | 29 | 10.0 | 22 | 7.5 | 15 |
| 3. | 11.75 | 25 | 12.0 | 24 | 8.25 | 16 |
| 4. | 12.0 | 28 | 11.25 | 23 | 8.5 | 18 |
| 5. | 10.5 | 24 | 12.5 | 24 | 10.0 | 18 |
| 6. | 12.5 | 29 | 10.25 | 21 | 9.25 | 19 |
| 7. | 13.0 | 27 | 10.5 | 22 | 8.0 | 16 |
| 8. | 11.0 | 22 | 9.75 | 19 | 9.75 | 17 |
| 9. | 11.25 | 23 | 9.5 | 20 | 8.25 | 16 |
| 10. | 12.5 | 26 | 10.75 | 19 | 9.0 | 18 |
| Mean values : | 12.0 | 26 | 10.7 | 22 | 8.6 | 17 |

Mean control values : Hb = 13.6 g/dl; PCV = 30 %.

(2004), and Chhabra and Sangwan (2006) from other countries of the world. However, the variation in the percentage of infection in animals could be due to different diagnostic methods used and also because of different agro-climatic conditions in different regions favouring the breeding of vectors. Since the animals in the present study were procured from different regions with quite variable climatic conditions, no seasonal variation was observed in the present study. The decrease in haematocrit values of Hb and PCV observed in our study indicated marked anaemic condition of the animals which caused morbidity particularly in aged animals with heavy infection. The results agreed with the observations of Chhabra and Sangwan (2006). The pungent smell in urine of animals with heavy infection observed during present study was also confirmed by many workers earlier including Hunter (1986). The presence of heavy infection in camels from different regions of this country warranted proper control measures of the infection in animals and also for the control of vectors responsible for transmission of infection in camels and other hosts.

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