

## Study of brucellosis in serum of camels in southeast of Iran

Ahmad Rafieipour, Nemat Ziaei

Department of Animal Science, Faculty of Agriculture, University of Jiroft, Iran

### Abstract

This study was carried out in the town of Qalehgange, located in southeast of Iran, home of about 3816 camels. To study brucellosis in these animals, serological examinations including rose Bengal plat test (RBPT), MRT and 2ME were performed on 3502 camel's serum samples. Positive results were obtained in 245 (7%), 163 (4.66%) and 89 (7.92%) camels thus tested, respectively. Twenty three percent of the positive camels were adult 2 years old, 36% three years old, 22% four years old, 17% five years old and the remaining 3 percent were six years old. In the infected herds, abortion rates associated with the disease ranged from 10 to 39 percent. Other ailments observed associated with brucellosis were retention of the placenta, fetal death and mummification, delayed maturity and infertility. Recommendations for brucellosis control were given, in order to increase the awareness of shepherds, by suggesting regular testing, slaughtering of infected animals and vaccinations.

### Introduction

Qalehgange is located in the province of Kerman in southeast Iran. The weather in this town is hot-arid (more than 40°C in summer) and its desert is suitable for rearing camels. About 3816 camels live in this area where cattle, sheep and goats also are intensively bred. Camel husbandry has a vital role in the life of a number of shepherd ethnic groups in Iran. The camel's ability to survive under harsh conditions made it possible to use marginal and desert ecosystems.<sup>1</sup> Mayada *et al.* reported that Camels are highly susceptible to brucellosis caused by *Brucella melitensis* and *Brucella abortus*.<sup>2</sup> Mohammed *et al.* stated that camel brucellosis was found to be well spread in the Ethiopia and the management practices and the tradition of using animal products warrant serious endanger of the society to *Brucella* infection.<sup>3</sup> There is an increased awareness of role of camels as the main sources of milk and meat<sup>4,5</sup> and today in Iran, not only shepherds but also the urban population consumes camel's milk and meat. Brucellosis is transmitted from animals to humans by ingestion of

raw milk, milk products, raw liver, and close contact with animals through breeding, birth, slaughtering and contaminated dust.<sup>6</sup> In some countries including Iran, Iraq, Egypt, Kenya, Kuwait, Pakistan a high sero-prevalence of brucellosis in camels is reported. Brucellosis is the most important zoonosis in terms of human incidence: almost all human cases are acquired from animals, particularly camels, goats and sheep.<sup>7</sup> Brucellosis in animals is caused by five recognized species of the genus *Brucella*. Four species commonly infect man: *B. abortus*, *B. melitensis*, *B. suis* and *B. canis*.<sup>8</sup> Omar *et al.* reported that seroprevalence in camels (milk and serum samples).<sup>9</sup> As we observed some cases of brucellosis in human beings in the area of Qalehgange, the aim of this study was to investigate the presence of brucellosis in camels and its impact on the livestock rearing system.

### Materials and Methods

During a 4-month period in early 2009, 3502 serum samples were collected from indigenous camels throughout Qalehgange of Kerman of Iran. The distribution of camels in this area is shown in Table 1. Age, sex, clinical history, and date and place of sampling were recorded in a structured data collection form. Blood samples were drawn from 3502 camels and three serological tests for brucellosis were applied.

These were Rose Bengal Plate Test (RBPT), MRT and 2ME Test. The RBPT was used for all serum samples and both MRT and 2ME were performed on sera positive to RBPT.

### Results

Positive test results were recorded in 245 (7%) camels by RBPT, in 163 (4.66%) camels by MRT and in 89 (7.92%) camels by 2ME. Twenty three percent of the positive camels were 2-year-old, 36% three years old, 22% four-year-old, 17% five-year-old and the remaining 3% were six-year-old. In infected herds, abortion rates associated with the disease ranged from 10-39% depending on the location. Other conditions caused by the disease were retention of placenta, fetal death and mummification, delayed maturity and infertility.

### Discussion

Zoonoses continue to represent an important health hazard in most parts of the world, particularly in developing countries.<sup>10</sup> Brucellosis is a classical zoonosis and the major

Correspondence: Dr. Nemat Ziaei, Department of Animal Science, Faculty of Agriculture, University of Jiroft, Iran.

Tel: +98.348.3260061- Fax: +98.348.3260065.

E-mail Address: Nemat.Ziaei@ujiroft.ac.ir

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sources of infection remain contact with infected animals or the handling of carcasses. Less frequently it is acquired through food. Camels are not known to be primary hosts of *Brucella* organisms, but they are susceptible to both *B. abortus* and *B. melitensis*.<sup>11</sup> Consequently, infection rate in camels depends upon the infection rate in primary hosts animals in contact with them. In the area studied in Iran, camels with brucellosis were kept in close contact with other animals.<sup>12</sup> These finding concur with those of our previous study done in Baft,<sup>12</sup> and those of Zowghi and Ebadi,<sup>13</sup> who isolated *B. melitensis* in several camels in Iran.

In Butana area, Eastern Sudan, where camels are reared together with cattle, sheep and goats, Agab *et al.* isolated many strains of *B. abortus* from lymph nodes of camels serologically positive for brucellosis.<sup>14</sup> In Darfur region, which owns over 25% of cattle, sheep and goats in Sudan, brucellosis is widely spread in large and small ruminants and camels introduced in the area showed high levels of incidence.<sup>15</sup>

The presence of *B. abortus* antibodies in all age groups in this study indicates that the infection starts in the early life probably through sucking. Similar patterns were found in cattle, and Oloffs *et al.* reported that 30% of positive animals in Uganda were younger than 3 years.<sup>16</sup> The high levels of abortions caused by brucellosis and other etiological agents threaten the camel breeding in some parts of Darfur region.<sup>17</sup> Although other causes of abortion were not investigated, trypanosomosis was speculated to be one of them. Brucellosis in camels seems to display less clinical signs and antibody levels than in cattle,<sup>18</sup> probably due to a relative resistance of camels to brucel-

losis. The disease should be controlled by vaccination of camels and primary hosts.

In the Republic of Yemen, the highest prevalence rate was observed in goats (1.3%) and this was statistically significant when compared with the prevalence rate among other species of animals (0.34%).<sup>7</sup>

Camel breeding is common in the hot regions of Iran and camels provide part of the fresh milk used locally for human consumption. Infection may develop in people who are frequently in contact with camel herds, or who drink camel milk and its products. Therefore, the number of human brucellosis cases is expected to increase in some part of Iran as long as the disease persists in the animal reservoir. Kiel and Khan reported that the prevalence rates among goats (1.3%) and sheep (0.6%) in Iran were higher than those among goats (0.8%) and sheep (0.3%) in Saudi Arabia.<sup>19</sup> However, these were lower than those reported in Omani goats (6.4%) by another study,<sup>20</sup> indicating a possible risk factor for Omani camels as well. Radwan *et al.* reported that brucellosis in camels in central Saudi Arabia appeared to be connected with *B. melitensis* infection of sheep and goats, and

also represents a serious public health risk.<sup>21</sup> Omar *et al.* reported that seroprevalence in camels (milk and serum samples) was 37.5%.<sup>9</sup> The seroprevalence in males was 28.2% and in females 40.1%. Twelve (60%) of the 20 nomads and three (9%) of the 33 abattoir workers had positive antibody titres.

## Conclusions

This study confirmed the presence of *Brucella* sp. infection in the Qalehgange region in Iran, showing a significant prevalence rate in camels (7%). Intervention strategies should include safe breeding procedures, regular serology testing, slaughtering of infected animals and vaccination of uninfected herds of camels.

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**Table 1. Distribution of camels in Qalehgange region, Iran.**

Region	Total camel in region	Blood sampled
Jamshahi	541	516
Rigmiti	125	112
Khargoushi	214	199
Dehgowd	123	117
Jahbagh	363	340
Keshmiran	323	303
Jahnoori	128	103
Jahhasan	226	201
Nowdeg	283	280
Bargah	157	140
Gelashkard	356	330
Rameshk	135	115
Hourpasefid	28	25
Mahroueyeh	53	47
Bejegan	412	390
Moarez	237	207
Nourabad	228	203