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# Absence of antibodies against *Brucella* sp. in different species of semi free-ranging Bovidae in the Emirate of Dubai, United Arab Emirates

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### Summary

During the period from November 2003 to March 2005 blood samples were collected from 256 ruminants living in 3 semi free-ranging groups in 2 private collections in Dubai (UAE). Although brucellosis exists in wild and domestic ungulates and camels in the area, *Brucella* antibodies were not detected in any samples using the Rose Bengal Test.

Abbreviations: *B. = Brucella*; CVRL = Central Veterinary Research Laboratory; DFH = Dubai Falcon Hospital; RBT = Rose Bengal Test; SAT = Serum Agglutination Test; UAE = United Arab Emirates

**Schlüsselwörter:** Oryx, *Brucella*, Brucellose, Seroprevalenz, Dubai, Vereinigte Arabische Emirate.

### Zusammenfassung

Abwesenheit von Antikörpern gegen *Brucella* sp. in verschiedenen Spezies von halbfrei gehaltenen Wildwiederkäuern im Emirat Dubai, Vereinigte Arabische Emirate

Von November 2003 bis März 2005 wurden von 256 Wildwiederkäuern Blutproben gewonnen. Die Tiere stammten aus 3 halbfrei (in sehr großen, einfach umzäunten Gehegen) gehaltenen Gruppen die zu 2 privater Menagerien gehören.

Obwohl Brucellose in dieser Region sowohl bei Wildwie auch bei Hauspaarhufern und Kamelen vorkommt, konnten mit dem Rose Bengal Test in keiner der Proben Antikörper gegen *Brucella* sp. nachgewisen werden.

# Introduction

Brucellosis is an important and dangerous disease for animals and, being a zoonosis, even for humans. The pathologic agents that cause Brucellosis are bacteria of the Genus *Brucella* (Family: Brucellaceae). In the most recent taxonomy there is only 1 species (*Brucella melitensis*) and 5 different biovars, but the nomenspecies like *B. melitensis* and *B. abortus* can be retained for non-taxonomic purposes to avoid confusion (ICSP, 1988).

The target tissues of the bacteria include the mammary gland, the male or female reproductive tract, the bones and joints, the eyes, the lymphoid tissue and occasionally the brain (ENRIGHT, 1990). Infection of the female reproductive tract during pregnancy leads to abortion in the last third of the pregnancy or stillbirth, retention of the placenta and metritis. If born alive any offspring may be weak and will often fail to thrive. In male animals the bacteria can cause inflammation of the testes or accessory sexual glands (GEDEK et al., 1993).

In recently infected populations the disease can result in high mortality in offspring. Once infection is established it results in a high morbidity, but a low mortality rate in adults (HUNTER and KREEGER, 1998). In humans it causes undulant fever and arthritis (GEDEK et al., 1993).

In countries of the Arabian Gulf Region (Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) the disease is frequently reported in domestic animals (cattle, sheep, goats, camels), except Bahrain

(KARIM et al., 1979; ISMAILY et al., 1988; AL-KHALAF and EL-KHALADI, 1989; WERNERY and WEWRNER, 1990; ZOWGHI et al., 1990; AFZAL et al., 1994; ABBAS and AGAB, 2002; REFAI, 2002; WORLD ORGANISATION FOR ANIMAL HEALTH, 2004) and man (AL-DUBOONI, et al., 1986; AL SOUB et al., 1994; REFAI, 2002; DIMITROV et al., 2004; WORLD ORGANISATION FOR ANIMAL HEALTH, 2004), except Bahrain and the United Arab Emirates.

MOORE and SCHNURRENBERGER (1981) and GRETH et al. (1992) identified *Brucella abortus* in body fluids of Arabian Oryx (Oryx leucoryx). The former tested more than 100 species in all continents and found *Brucella* sp. also in members of the Genus Gazella (G. granti, G. thomsonii) and the Genus Antilope (A. americana). HUNTER and KREEGER (1998) list several species of ruminants that are reported to be receptive for different biovars of *Brucella*.

There is a paucity of data concerning infectious diseases of wildlife species in the Middle East. Nonetheless, brucellosis exists in wild ungulates in the region. MOLLAH and MCKINNEY (2002) found *B. melitensis* in Dubai in a male Nubian Ibex (*Capra ibex nubiana*) suffering from orchitis, necrotic abscesses in both testes and arthritis in the carpal joints. OSTROWSKI et al. (2002) reported a case of orchitis caused by *B. melitensis* in an Arabian Oryx in Saudi Arabia.

The aim of our study was to assess the prevalence of brucellosis in semi free-ranging (very large single fenced enclosures) ruminants of the genera listed below in different locations in Dubai, United Arab Emirates (UAE).



# Material and methods

In the present study serological tests were used to detect antibodies to *Brucella* sp. in 256 blood samples collected during the period from November 2003 to March 2005 from all the Bovidae kept in 2 private zoological collections: Wadi al Safa Wildlife Centre with 2 locations (Wadi al Safa, 400 ha and Al Awir, 300 ha) and Muraquab (250 ha) all of them in the Emirate of Dubai (Tab. 1, Fig. 1). The group comprised 158 Arabian Oryx (*Oryx leucoryx* [Pallas, 1777]), 51 Sand Gazelles (*Gazella subgutturosa marica* [Thomas, 1897]), 14 Impala (*Aepyceros melampus* [Lichtenstein, 1812]), 16 Black Buck (*Antilope cervicapra* [Linnaeus, 1758]), 12 Speke's Gazelles (*Gazella spekei* [Blyth, 1863]) and 5 Laristan Red Sheep (*Ovis orientalis* [Nasonov, 1909] ssp. *laristanica*).

All 3 enclosures include gentle sand dunes rising to not more than 10 m in height, but primarily small crested dunes of about 3 - 4 m. There is very little grazing vegetation, except some perennial grasses such as *Sporobulus* sp. All animals were unvaccinated and uniquely marked with plastic ear tags (Kruuse, Marslev, Denmark) and Trovan® microchips (Microchip Australia, Melbourne, Australia). Every animal was sampled once. None of the sampled animals showed obvious signs of sickness (separation from the group, anorexia, diarrhea, emaciation, etc). A clinical examination was not possible due to the fact that these animals cannot be handled like farm or even zoo animals.

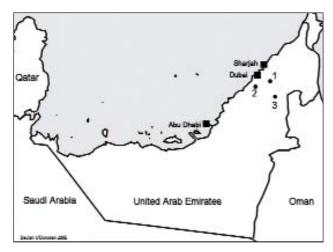
The animals were encouraged into a funnel-shaped raceway with a drop crush (Junior Tamer™, Fauna Products Inc., Red Hook, New York) at the end. The blood samples were collected from the jugular vein using 19G needles, 20 ml syringes and 10 ml BD Vacutainer® "Z" (BD Vacutainer Systems, Belliver Industrial Estate, Plymouth, UK) sample tubes without additive. The blood was then cooled to 8 °C until transported to the lab. Samples were held at room temperature for 6 hours to enhance the clotting process and centrifuged for 20 minutes at 2,000 g. The supernatant was decanted and stored at - 20 °C. Analysis of sera was performed at the Central Veterinary Research Laboratory, Dubai (CVRL) using the Rose Bengal Test (RBT) according to ALTON et al. (1988). The RBT was used following the manufacture's recommendations (Brucelloslide-Test®, bio-Mérieux, Marcy l'Etoile, France). The RBT is sensitive to antibodies against all Brucella sp. In positive cases which do not indicate positive reactions at low dilutions in SAT it was planned to verify the result with a Coombs Test.

# Results

All 256 serum samples were negative in the RBT for Brucella antibodies.

## **Discussion**

This survey is the first published study on the brucellosis status of a large group of semi free-ranging wild ruminants in the Middle East. The negative results indicate that these 3 populations have not been exposed to *Brucella* sp. The absence of antibodies in the sampled groups was unexpected because results of other studies showed clinical cases of Brucellosis and the presence of *Brucella* anti-



**Fig. 1:** Location of the 3 different sites (1. Al Awir, 2. Wadi Al Safa and 3. Muraquab) from where animals were sampled

bodies in the farm animal populations in Dubai (WERN-ERY and WERNERY, 1990) and other countries of the region (REFAI, 2002; WORLD ORGANISATION FOR ANIMAL HEALTH, 2004). All probed reserve areas are surrounded by farms that keep domestic ruminants.

Direct contact through fences is possible but seems unlikely, but the organism is shed by infected individuals through body fluids (especially aborted fetuses, their placentas and fetal fluids), spread over soil and vegetation and might then be transmitted by vectors. *Brucella* has been found in a large number of carnivores including domestic dogs (*Canis lupus familiaris*) (WITTER, 1981) and foxes (*Vulpes vulpes*) (DAVIES et al., 1973). WITTER (1981) showed that carnivores shed the organism through their feces and urine. Presumably other wild canids play the same role in distributing viable *Brucella* bacteria. Also, small mammals, including rodents, or even birds and reptiles frequenting pastures may act as mechanical vectors. WELLMANN (1951, 1952) and CHEVILLE et al. (1989) have demonstrated the transmission by insects.

The climate of the area is arid with absolute temperature maxima above 40 °C from March to November and a yearly average of 9.6 hours sunshine per day (DEUTSCH-ER WETTERDIENST, 2006), which provides unsuitable conditions for these bacteria because they are sensitive to ultraviolet radiation and heat.

Further serological studies on a greater number and wider range of species would be useful to elucidate the *Brucella* prevalence in free-living wildlife. However, the Arabian Oryx is extinct in the wild in the UAE and there are no current programs monitoring wild gazelles that inhabit the desert. Our study shows that in the UAE (semi freeranging) wild ruminants do not appear to be a reservoir for brucellosis as has been reported from other parts of the world (EDMONDS et al., 1998; NOT et al., 2004).

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Tab. 1: Number of animals and coordinates of the zoological collections

Species \ Location	Wadi al Safa	Al Awir	Muraquab	sum
	25°05'N, 55°16'E	25°10'N, 55°33'E	24°49'N, 55°35'E	
Arabian Oryx (Oryx leucoryx)	80	47	31	158
Sand Gazelles (Gazella subgutturosa maric	ea) 51	-	-	51
Impala (Aepyceros melampus)	-	14	-	14
Black Buck ( <i>Antilope cervicapra</i> )	-	16	-	16
Spekes Gazelles ( <i>Gazella spekei</i> )	-	12	-	12
Laristan R. Sheep (Ovis orientalis)	-	5	-	5
sum	90	94	31	256

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