Seroprevalence of brucellosis in sheep in the Aksu Region of Xinjiang Uygur Autonomous Region, People’s Republic of China, between 1990 and 2010

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Seroprevalence of brucellosis infection in sheep between 1990 and 2010 in the Aksu Region, Xinjiang Uygur Autonomous Region, People’s Republic of China was determined by Rose Bengal Precipitation Test of Brucellosis (RBPT). The sera samples were analyzed according to region, husbandry practice, sex, and age. A total of 208,438 sheep were tested, with overall brucellosis seroprevalence of 0.26% (550/208438). No statistically significant difference was found in terms of age and region. Seroprevalence in male sheep (0.53%, 52/9877) was higher than that in the females (p = 0.02; OR = 2.105, 95%; CI = 1.581–2.803). Significant difference (p = 0.03; OR = 2.358, 95%; CI = 1.843–3.017) was evident for rates for brucellosis in the scale breeding (0.13%, 73/55195) and backyard groups (0.31%, 477/153243). The current brucellosis serosurvey is expected to broaden the understanding of zoonotic infection in the region. We concluded that the control measures for brucellosis in the Aksu region sheep herds are effective.

Key words: Brucellosis, Aksu Region, seroprevalence, sheep, China.

INTRODUCTION

Bacterial zoonoses still represent a serious medical problem (Karabay et al., 2004; Holt et al., 2011; Bardon et al., 2011). Brucellosis, a widely spread disease in the developing countries (Ahmed et al., 2010), is also known as undulant or Malta fever (Karabay et al., 2004; Tzaneva et al., 2009). It is an important zoonotic disease caused by six species of the Brucella (Kreeger et al., 2004; Al-Majali et al., 2009; Holt et al., 2011). These bacteria exist in the reproductive and internal organs, as well as in the blood (Holt et al., 2011), and can be divided into nine biovar (Al-Majali et al., 2009). Brucellosis is a significant public health and food safety concern (Mikolon et al., 1998) and considered as a second-class animal epidemic disease in China. This disease has an important economic impact on food production because majority of food-producing animals are susceptible to this disease (Al-Majali et al., 2009; Ahmed et al., 2010; Gomo et al., 2011; Holt et al., 2011). Most cases of brucellosis infection are inapparent and lack clinical symptoms. In ewes the first evident manifestation is abortion, which frequently occurs 3 to 4 months after gestation. The amniotic fluid, placenta, excretions and secretion of aborted ewes have special infectivity, aside from the fur (Al-Majali et al., 2009). In rams, orchitis, hogbacks, anorexia, emaciation, and gradual loss of capacity for mating are the major signs of
disease. Other signs include mastitis, bronchitis, and arthritis (Tzaneva et al., 2009).

Several surveys on brucellosis in sheep were conducted in some provinces in China in recent years (AZR, 2011; Yan et al., 2008; Lei et al., 2011; Tian et al., 2011; Gao et al., 2010; Qiu et al., 2006; Sun et al., 2006; Xu et al., 2008). However, no studies have been conducted on the prevalence of sheep brucellosis in the Aksu region since 1979. The current study determined the seroprevalence of brucellosis infection in sheep in this region to estimate the risk factors associated with exposure to the pathogen.

MATERIALS AND METHODS

The Aksu Region, which comprises 8 counties (Kuche, Xayar, Xinhe, Baicheng, Wensu, Awati, Wushi, and Keping) and 1 city (Aksu), is an important area in the Xinjiang Uygur Autonomous Region. The field of study (Figure 1) is located at 78°03’ to 84°07’ N and 39°30’ to 42°41’ E. The Aksu Region has a total land area of 132,500 km² and a human population of approximately 2.5 million. The annual rainfall in this region varies between 42.4 and 94.4 mm. A number of grazing sheep herds share common grazing and watering sources with wild animals (ibex, argali, gazelle, wild boar, and so on), particularly during the dry season when there is limited pasture and water resources for communal farmers. Sheep production is regarded as an important source of income in the Aksu Region.

The current survey was implemented from 1990 to 2010, and 208,438 samples were collected from sheep herds in the entire Aksu Region (total approximate 2 million sheeps, including all farms and backyard households). All blood samples were collected by Animal Loimia Controlling and Diagnostic Center of Aksu Region. The blood samples were carefully drawn from the jugular vein to prevent contamination. After blood clotting at room temperature for 3 h, the samples were centrifuged for 10 min at 1,000 × g. Sera were stored at -20°C for tests using the Rose Bengal Precipitation Test of Brucellosis (RBPT). The experiment was performed according to the animal brucellosis diagnosis (GB/T18646 -2002) methods. The sensitivity and specificity of the RBPT were 95.92 and 95.92%, according to the GB/T18646 -2002. Biometric data from the sheep, including age, sex, region, and husbandry practice, were acquired from the animal owners or medical records.

The data were analyzed (χ²-test) using the statistical software package SPSS version 17.0 (SPSS Inc., Chicago, IL, USA). The risk factors, including age, sex, region, and husbandry practice were noted in present survey. Identification of a risk factor required a 95% confidence level (p < 0.05) as well as a biologically plausible association between the factor and seroreactivity to brucellosis.

RESULTS

The results of the RBPT examinations on sheep brucellosis positive samples are shown in Table 1. Among the 208,438 sheep samples, 550 (0.26%) were positive by RBPT. The seroprevalence in males (0.53%, 52/9877) and in the backyard breeding group (0.31%, 477/153243) were higher than that in females (p = 0.02; OR = 2.105, 95%; CI = 1.581 to 2.803) and in the scale groups (p = 0.03; OR = 2.358, 95%; CI = 1.843-3.017). Of the
The overall seroprevalence in sheep in the Aksu Region was 0.26% (550/208438), comparatively higher than those observed in Gangcha (0.1%) (A., 2011) and Wulan Counties (0.06%) (Yan et al., 2008) in Qinghai Province as well as that in the Ningxia Hui Autonomous Region (0%) (Qiu et al., 2006). However, the obtained seroprevalence in the Aksu Region is lower than those in Jilin Province, China at 2.99% (Gao et al., 2010) and Jordan at 9% (Abo-Shehada et al., 1992).

The Aksu region have 21 million peoples, the minority is about 59.9%. The minority in this region believe in Islam. They have meat the lamb. Animal Loimia Controlling and Diagnostic Center of Aksu Region have been due diligence, hard work, for a positive serology sheep of brucellosis resolutely eliminated, purification. And also, the artificial insemination is used in all sheep to prevent the infection of brucellosis.

Serologic surveys have been generally used to determine the prevalence of brucellosis in China. The present study provides first information on brucellosis infection in sheep in the Aksu Region. In the current research, the seroprevalence in males was 0.53% (52/9877), higher than that in females ($p = 0.02$, $OR = $).
Breeding rams infected with brucellosis were strictly prohibited for use in this region. The numbers of pregnancy and lamb-births also increased along with age. This phenomenon may be one of the reasons why the seroprevalence of brucellosis in this region presents a significant difference.

Husbandry practice was another important risk factor for sheep in the present survey. The prevalence of *Brucella* infection was 0.31 and 0.13% in the backyard and scale breeding groups, respectively. Statistically significant differences between these values were obtained ($p = 0.03$; OR = 2.358, 95%; CI = 1.843-3.017). Larger sheep herds have a higher probability for contact between the animals, and similar epidemiological survey results had been previously reported in other animals (Al-Majali et al., 2009).

Risk of brucellosis was irrelevant of age as difference in seroprevalence in < 2–year-old age group (0.16%, 123/79041), and ≥ 2-year-old age group (0.33%, 427/129397) was statistically insignificant ($p = 0.237$; OR = 0.427, 95%; CI = 0.386 to 0.576). Similarly difference was insignificant in distribution of brucellosis positive sheep in different geographical areas.

In conclusion, current control measures for brucellosis of Aksu region sheep herds might be evaluated as effective.

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**REFERENCES**


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