

PREVALENCE OF BORDER DISEASE VIRUS ANTIBODIES AMONG NATIVE AND IMPORTED SHEEP HERDS IN ZABOL

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ABSTRACT

The subject of this study was to compare the seroprevalence of Border Disease Virus (BDV) infection using an indirect Enzyme-linked immune sorbent assay (ELISA) test among imported and native sheep herds. The present study was carried out between January and June 2012. Totally, 182 serum samples were tested. Antibodies against BDV were detected using an indirect ELISA test. Data were analyzed using Chi-square test. 124 (68.13%) sheep were ELISA seropositive. However, the true BDV seroprevalence ranged from 71 to 100 was within the herds. The prevalence in animals lower than 2 years old differed significantly with sheep higher than 2 years old ($P < 0.05$). The results revealed no significant differences in seroprevalence of BDV between native Iranian and imported sheep herds in Sistan and Baluchistan provinces of Iran. Sex of animal had no influence on the prevalence of BDV. Results of this study indicated that BDV is highly prevalent in north of Sistan and Baluchistan and BDV infection could be controlled by livestock-trade control and applying strict biosecurity in the sheep farms.

KEY WORDS: BDV, Antibody, Sheep herds, ELISA, Iran.

INTRODUCTION

Viral Diarrhea Virus (BDV) can cause an infectious disease of sheep herds, which is a major problem worldwide affecting different species of ruminants. This virus is classified into two biotypes designated as noncytopathic (NCP) and cytopathic (CP) depending on their effect on tissue culture cells (Deregtand Loewen 1995). The NCP Biotype is most commonly isolated in the field. It replicates in cultured cells without inducing Cell death, and crosses the placenta to establish a persistent and lifelong infection if the fetus is infected in the first 125 days of gestation and survives past birth. The measurement of antibody responses of animals exposed to BDV either through a natural exposure or an immunization protocol is still a standard procedure. For BDV, the test formats have been largely limited to Enzyme-linked immune sorbent assays (ELISAs) (Saliki and Dubovi 2004). ELISAs are versatile diagnostic methods for prevalence studies which can be used to detect almost any immune reactive molecule. For BDV serology they have become popular for several reasons; they are independent of cell culture, they can easily be applied. For mass screening and test results can be read in a few hours (Marsand Van Maanen 2005). The objectives of this study were to determine: 1) To evaluate the seroprevalence of BDV among imported and

native sheep herds in Sistan-Iran, and 2) to estimate the possible influence of breed and the different age on BDV prevalence in these sheep herds.

MATERIALS AND METHODS

2.1. Herd management and size

Sistan is a major producer of livestock production in southeast of Iran and it has dry tropical climate. Most of sheep herds in Sistan are small farms which are familiar agriculturist system. They own about 95% of the sheep in Sistan-Iran. The herd density is about 2-10 animals per farm with a low technology level and milk production. The population of the tested herds was 5-30. The samples were determined by taking true randomly using an accidental mechanism in the sheep herds.

2.2. Sampling of animals:

In this study total, 182 blood samples were obtained from 20 sheep herds in north of Sistan and Baluchistan- Iran. A questionnaire contains kind of animals as native or imported, gender and breed was completed for every sheep herds. 80 blood samples were collected from Iranian Sistani sheep herds (*Bosindicus*) and 29 blood samples from different and crossbred sheep herds of Sistan area-Iran. Also 73 samples were collected from indigenous imported sheep herds from Afghanistan in Zabol slaughterhouse. The samples were determined by taking true randomly using a lottery mechanism in the sheep herds. Both young (<2 years old) and older (≥ 2 years old) sheep herds were sampled on each farm. The sample size required estimating the sero prevalence of BDV in the population of herds, with level of confidence 95%, desired absolute precision 5% and expected prevalence of 90%, was at least 178 sheep using the relevant formula as follows (Thrusfield, 2005):

Where

N required sample size:

P_{exp} expected prevalence:

D desired absolute precision.

The samples were collected between January and June 2012. They were carried beside ice bag to microbiology section of Faculty of Veterinary Medicine, University of Zabol-Iran. The collected serum stored at -20°C till analyzed.

2.3. Serum testing

Serum samples were assayed using commercial indirect ELISA-kit (IDEXXBDV AB, Switzerland, Liebefeld-Bern) in which microtitre plates are coated with BDV antigen. According to the procedure of the manufacture and validated protocol, they were used for detection of antibodies against BDV in serum samples. The sensitivity (Se) and specificity (Sp) of the test as manufacture instruction were mentioned 96.3% and 99.5%, respectively. Before Interpretation of the results, all optical densities (ODs) were corrected by subtracting the ODs for the control antigen from the samples ODs (OD sample- OD control= OD values for the test samples as well as the negative control are related to the corrected OD values of the positive control as follows:

PP (Percentage positivity)= Test sample or negative control (ODcorrect)

Positive control (OD corrected) $\times 100$

As the manufacture the present positivity (PP) < 14 and ≥ 14 values interpreted negative and positive, respectively.

Statistical analysis

The Rogan and Gladen's (1978) correction of apparent prevalence were used for estimation of the true prevalence for seropositive of the samples. It was equated the true prevalence = (apparent prevalence + Sp - 1) / (Se + Sp - 1). Differences in prevalence between the herd sizes were tested using Chi-squared statistical method.

RESULTS

The sero prevalence of BDV in imported Afghani sheep herds wasn't significantly higher than Sistan herds. The prevalence of BDV antibody among the imported and native sheep herds is presented in Table 1. It was demonstrated that 124 (apparent prevalence = 68.13%) out of 182 serum samples had PP ≥ 14 values which were interpreted BDV seropositive (Table 1). However, 58 (31.87%) sheep had pp < 14 values. All of the herds had antibody against BDV. However, the true prevalence ranged from 74 to 100% within the herds. The results of our study showed that the number of seropositive animals increases with the age. The infection rate in animals < 2 and ≥ 2 years old were 52.38% and 72.86%, respectively (Table 2). The differences between seropositive animals lower and more than 2 years old were significantly higher (P < 0.05) (Table 2). When comparing the positivity between sheep and bulls, no significant difference was found (figure 1).

DISCUSSION

Based on

The individual antibody detection, the true prevalence (73.50%) of BDV seropositive samples in sheep herds did not make high difference with observed prevalence (68.13%). Since, vaccination against BDV was not practiced in the herds in Sistan and Baluchistan-Iran; therefore, serological response reflected natural infection. The evaluation of the effects of herd size on BDV distribution revealed that there were no significant differences among the Iranian native Sistani breed, and imported Afghani breed. (Table 1). However, the prevalence rate was differed significantly related to the age of sheep (Table 2). In this study, our results clearly demonstrated that the prevalence of antibodies to BDV in sheep herds in north of Sistan and Baluchistan does not differ greatly from the other reported surveys carried out in other part of Iran. It was shown that the herds with high sheep herds population density had higher prevalence of infection than the herds which were smaller our finding was not in agreement with results obtained by other research studies (Mockelinien et al. 2004). It may be due to the population size and the different management system in traditional sheep herds in Sistan and Baluchistan province: Iran. It may also be due to the higher density of sheep population in sheep herds of Sistan-Iran than the other studies. The values obtained according to specific prevalence of seropositive animals in sheep herds of the different age groups were comparable. The obtained results in this study showed the tendency to higher risk among older (≥ 2 years old) sheep compared to younger (aged < 2 years) animals (Table 2). It is probably due to the fact that BDV antibodies in most cases are life long. So the older animals, the higher is the probability that has been infected during its life. Based on our results it was concluded that BDV sero infection present widely in sheep herds north of Sistan and Baluchistan. However, these herds have had a recent or an ongoing infection most likely due to the presence of PI

animal(s) (House and Meyling 1991). According to the results, it is concluded that it is likely the presence of persistently infection (PI) animal(s) within the imported and native sheep herds in Sistan and Baluchistan Provinces of Iran which is responsible for the presence antibody. Therefore, it must be studied more for the prevalence and different epidemiological aspects of BDV in Sistan district as an important pole of sheep production in southeast Iran. Table the sero prevalence of BDV according to breed of herds and tasted animals in some sheep herds in north of Sistan and Baluchistan: Iran.

BDV Ab. Positive			
Breeds	No. of animals	No. of positive	Prevalence
		Animals	
Mixed	31	19	61.29%
Sistani(Bosindicus)	54	26	67.50%
Imported(Afghani)	71	51	71.83%

Table 2. Distribution of BDV antibody within the different age groups in some sheep herds in north of Sistan and Baluchistan: Iran.

Age (year)	BDV Total	
	-(%)	+(%)
<2		22(52.38)
20(47.62)	42	
≥2		102(72.86)
38(27.14)	140	
Total		124(68.13)
58(31.86)	182	

*Significant differences (P< 0.05).

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