

SERO-PREVALENCE EVOLUTION OF INFECTIOUS BOVINE RINOTRAQUEITIS (IBR) AND BOVINE VIRAL DIARRHEA (BVD) IN DAIRY CATTLE POPULATION OF THE SOUTHERN REGION OF URUGUAY, BETWEEN 1998-2003.

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Introduction

The Bovine Viral Diarrhea (BVD) and the Infectious Bovine Rinotraqueitis (IBR) are two diseases of viral etiology, highly contagious, of easy transmission and of wide distribution through out the world ^(1,2,8,9). The reproductive losses may well be the principal consequence associated with the infection by these agents as they are two of the main diseases that affect reproduction all over the most important dairy region of Uruguay. At present, the excessive use of conventional vaccines has distorted the serological results, making the evaluation of the real incidence of these diseases difficult. Therefore, except for the areas where the vaccination is administered, the presence of antibodies shows the exposure of the animals to such viruses. Moreover, it is worth noting that in Uruguay there is no National System of Information and Monitoring of Animal Health that deals with this type of reproductive diseases that mainly affect the herds and not human health or trade. As a result, the country is facing a decline in the efficiency of the animal productive systems. In addition, as sanitary aspects have not been considered in the development of national technology packages, the impact of these problems has not been dimensioned or quantified.

The aim of this study was to establish the seroprevalence for BVD and IBR in dairy cattle population of the southern region of Uruguay, by means of comparing two transversal seroepidemiologic studies, between 1998-2003.

Materials and methods

Such study was done during the year 2003, in the frame of a research project developed by the Veterinary School (2001-2004): "*Evaluation of a Longitudinal Monitoring System of Health in Dairy Production*". The main Uruguayan dairy region (southern areas: Florida, San José and Colonia) was established as the geographical area under study. The data collected was compared with that obtained in 1998 through a seroepidemiologic study in Florida, performed by the Veterinary School under a Project of Animal Health Monitoring called "*Pilot Plan Dairy 98*" ⁽⁶⁾.

In the transversal study of 2003 a random stratified sampling by county was carried out. The exclusion criteria used for taking part in the project was the number of cows: farms with less than 30 cows were excluded and only Police Sections were considered where farms were under surveillance. Once the dairy farms were randomly selected, the animals were selected by random systematic sampling. From each establishment 20 cows were sampled, attempting to get 5 from first calving.

Through out the development of the project, 54 dairy farms were visited (32 in Florida, 16 in Colonia and 6 in San Jose) and a total of 1,120 animals were sampled. The design was intended to detect sanitary problems that affected 5% or more of the establishments at a confidence level of 95%. In each farm, the power of the sampling allowed the detection of problems that affected at least 15% of the cows with a confidence level of 95%.

The indirect ELISA technique (SVANOVIR EIA Kit, developed by SVANOVA Biotech, Upsala, Sweden) was used as serologic screening test for the detection of antibodies against the viruses of IBR and BVD. The optical density was measured at 450 nm through a plaque reader Multiskan II, of Labsystem. The corrected optical density <0.25 was considered negative as indicated in the kit's procedures manual. The technique's sensibility used was 100% along with 98,2% of specificity.

The statistical software used for the analysis and modeling was STATA/SE 8.2 ⁽¹⁹⁾.

Results

The situation regarding the estimated seroprevalence in the animal population of dairy cows of Uruguay's southern region for BVD shows a constant increasing tendency since 1998 up to the recent transversal study in 2003, with the figures being 69% and 88% respectively. A similar tendency is detected for IBR where the numbers raise from 49% in 1998 to 75% in 2003.

The estimated seroprevalence divided by age group for DVB shows, in the random sampling (transversal) of 2003, 82% for first calving cows and 89% for adult cows. As for the IBR, the prevalence in first calving cows was 68% as opposed to 76% in grown up animals. There is no available data from 1998, discriminated by age group.

The estimated seroprevalence by county for DVB establishes for the 2003 study 90% in San Jose, 88% in Florida and 77% in Colonia. In the case of IBR, according to the same study, a seroprevalence of 75% was found in San Jose, 78% in Florida and 44% in Colonia. The information by county from the year 1998 only considers Florida, with 69% for DVB and 49% for IBR.

Regarding the distribution of the dairy farms of the country's southern areas according to their estimated seroprevalence, an important increase of establishments with high seroprevalence can be detected compared to the data collected in 1998. With the purpose of acknowledging the distribution of the serologically positive animals, the farms were categorized according to their sampled prevalence into 5 stratum: negatives, from 1 to 25%, from 26 to 50%, from 51 to 74% and over 75%.

The distribution of relative frequencies of BVD at farm level shows that 47% of them presented prevalence over 75% in 1998; in 2003 this figure increased to 82%, the distribution being biased with a greater concentration of farms in the upper category. As in the 1998 study, in 2003 no potentially free dairy farms were found (100% of the establishments had at least one animal with antibodies against this disease); 98% of the farms belonged to stratum of prevalence higher than 50% determining a wide diffusion of the disease during these last years. Studies of the same type in the United States show seroprevalence at farm level of 91%⁽¹⁰⁾.

As for IBR, 58% of the dairy farms had more than 75% of its animals positive; negative establishments were only found in Colonia. Furthermore, a difference can be seen with respect to the numbers obtained in 1998 where 36% of the farms presented prevalence in the stratum of 26 to 59% and only 14% of them showed prevalence higher than 74%. The collected data for IBR showed a wide diffusion of the disease as in 1998 the potentially free dairy farms were less than 8% of the universe, while in the transversal study in 2003 such figures decreased to less than 1% (99% of the establishments had at least one animal with antibodies for the disease).

The vaccination record for DVB was stable through out the study (2003) where 21% of the dairy farms applied the vaccine against 79% that did not. The situation is similar for IBR, the numbers being 25% and 75% respectively.

Regarding the dairy farms with history of diagnosis of the disease for IBR and DVB in 2003, the figures were 18% and 17% respectively.

Discussion

The seroprevalence for the animal population under study was high (DVB: 87%, IBR: 75%), with similar values found in the majority of the studies carried out in bovines worldwide. This high value contrasts with the lack of clinical evidence (diagnosis history) indicating that in most cases the disease appears in a sub-clinical way or is not considered by the producer and/or the professionals in charge of the establishment. Vaccination could be one of the

factors distorting the obtained prevalence values, however, only a low percentage of producers apply such tool and no statistically significant differences were found between the vaccinated and not vaccinated population. Therefore, this does not mean that vaccination should not be applied, as in the case of DVB the disease has several ways of appearing, such as the one associated to abortions and the common mucosal disease, where the protection granted by the field strains is yet unknown.

That is, considering the high seroprevalence found along with the low vaccination percentage, it can be accepted that the antibody levels found are naturally protecting the herds, and that the seroprevalence is not altered by such practice.

The seroprevalence tendency for both diseases since 1998 to the day has experienced a constant increase reaching a stage where almost no negative animal is found. The strategy adopted conscious or unconsciously by producers and technicians of the sector of ignoring the presence of such agents in the population has enabled these diseases to reach levels where it is extremely difficult to identify an animal that has had no contact with the virus thus making the planning of control strategies particularly complex. In the case of IBR the disease's control is difficult to apply due to the latency state the virus adopts in the organism that keeps the animal infected through out its life⁽¹⁵⁾.

These increases in the seroprevalence for both diseases may be explained by the agent's wide diffusion among the herds, resulting endemic. In addition, the lack of action by those involved in terms of animal health has determined that the agents are now present in the production systems all over the country as one more constant.

Conclusion

Due to the potential impact of these agents, we presume that the only option is to develop systematic investigations in order to outline recommendations for producers and technicians.

In other countries this type of sanitary problems are part of the Health Programs of national investigation institutions allowing the development and coordination of control sketches for these diseases that are put forward by the extension organizations⁽¹³⁾. As Uruguay lacks a National System of Information and Monitoring in Animal Health, the situation is chaotic and will probably face deterioration in the Animal Health aspects, thus affecting the efficiency of the different animal production systems at farm level. This absence is worsened by the lack of use of reliable production registry systems as well as by the absence of permanent professional assistance in most of the livestock establishments. In addition, since the sanitary

spects are not considered in the development of the national technological packages, the impact of these problems has not been dimensioned or quantified.

Owing to the wide diffusion at herd level, the control margins for these diseases are getting smaller every time, forcing us to extend on this subject as it is being more and more used as a non-tariff barrier for the livestock trade throughout the world.

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