

Detection of BHV-1 antibodies in bovine raised in rural households from Iași County

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Abstract

Infectious bovine rhinotracheitis / infectious pustular vulvovaginitis (IBR/IPV) is a significant disease among domestic and wild cattle. IBR/IPV is caused by Bovine Herpesvirus-1 (BHV-1) that is capable of attacking many different tissues in the body leading to a variety of clinical diseases. The virus can persist in clinically recovered animals for years, remaining inactive until the animal is placed under stress. Investigations were undertaken during 2015-2016 on bovine raised in rural households in Mirosllovești and Ciohorăni commune from Iași County. Individual serum samples from 305 cattle were tested for detection of BHV-1 antibodies using an ELISA commercial kit (IDEXX IBR Ab). The results showed that overall seroprevalence of infectious bovine rhinotracheitis (IBR) was 63.6% in tested cattle. These data underline the fact that in household reared cattle are several animals with BHV-1 lifelong latent infection.

Key words: BHV-1, bovine, antibodies

Introduction

Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis (IBR/IPV) is a highly contagious and infectious viral disease that affects cattle of all ages. The disease is characterized by inflammation of the upper respiratory tract. The virus that causes IBR, bovine herpes virus 1 (BHV-1) also causes infectious pustular vulvovaginitis in the female, and infectious balanoposthitis in the male and can cause abortions and foetal deformities (Jones C, Chowdhury S., 2007).

Infected cattle develop a latent infection once recovered from the initial infection and despite appearing clinically normal may suffer recrudescence of disease when under stress. Exposure to BHV-1 may be highlighted by antibody detection. In most cases, cattle are able to overcome a primary BHV1 infection, so the primary immune response provides valuable information for primary, secondary, and passive immunity. The main immune response to the virus and virus-infected cells is to the viral envelope glycoproteins gB, gC, and gD (Engels and Ackermann, 1996).

Materials and methods

Investigations were undertaken during 2015-2016 on bovines raised in rural households in Mirosllovești and Ciohorăni commune from Iași County. Individual serum samples from 305 cattle were tested for detection of BHV-1. All bovine submitted to test were not prior vaccinated against any viral respiratory disease. Prior to analysis all serum samples were stored at -20°C .



Fig.1 Miroslavești Commune (Mitești, Verșeni, Soci, Miroslavești vilages)



Fig. 2 Ciohorăni Commune

A commercially available screening blocking ELISA kit was procured from HerdChek, Idexx Laboratories. The kits were used strictly in accordance with the manufacturer’s instructions.

Results and discussions

Specific antibodies to BHV-1 can be first detected at 7 to 10 days post-infection. After the acute phase and during latency, BHV-1-infected cattle are mainly detected by the presence of specific antibodies to BHV-1 (Jones C. et al, 2006). Enzyme-linked immunosorbent assay (ELISA) is a sensitive and specific test in terms of detection of the low level of antibody for several viral diseases; this has been extensively used in recent past by many researchers to highlight the seroprevalence of IBR in cattle population (Muylkens B et al., 2007).

Out of 305 serum samples screened, 194 (63.60%) were found to be positive AB-ELISA for BHV-1 antibodies (Table 1). At period level seroprevalence of IBR antibodies was highest in 2015 (77.14%) and lowest in 2016 (56.50%).

Table 1. Serologic results of BHV-1 antibodies detection in bovine raised in rural households from Iași County

| Year | Samples tested | Positive samples | | Negative samples | |
|--------------|----------------|------------------|-------|------------------|-------|
| | | No. | % | No. | % |
| 2015 | 105 | 81 | 77.14 | 24 | 22.86 |
| 2016 | 200 | 113 | 56,5 | 87 | 43,5 |
| Total | 305 | 194 | 63,6 | 111 | 36,4 |

Investigations undertaken during 2015 revealed a higher seroprevalence in rural households of 4-9 cattle (82%) compared to rural households of 4-9 cattle (73%).

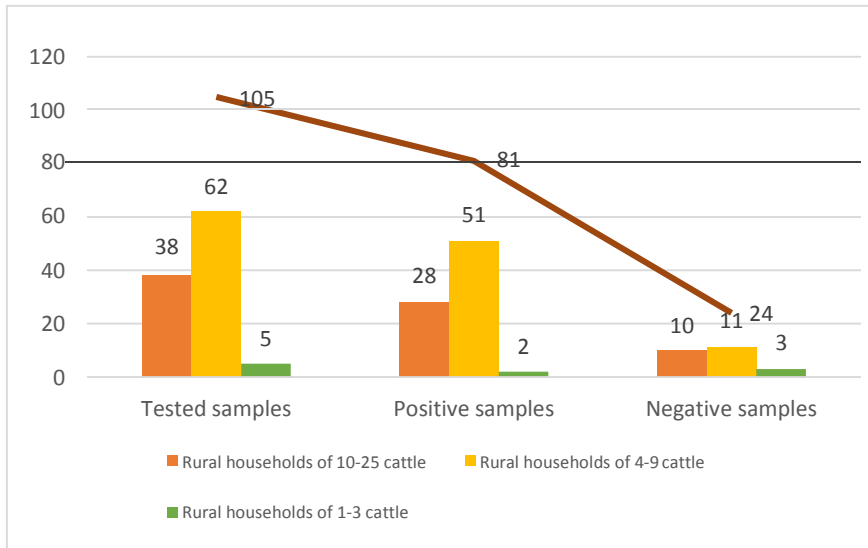


Fig. 3 Serologic results of BHV-1 antibodies detection in bovine in 2015

Our results indicate that BHV-1 is widely disseminated in cattle population raised in households from Iași County. The variation in seroprevalence rate among different size households can be attributed to management in all aspects, especially introducing of purchased animals.

The overall seroprevalence obtained in 2016 (56.50%) was lower than the one in 2015. Prevalence rate among different size households had the same pattern as in 2015, with higher percentage for rural households organized in 4-9 cattle. Consequently farmers need to be aware that they must increase their efforts to avoid the introduction and spread of BHV-1 to their herds, to establish the health status of their herds and determine what mitigation measures are required to address.

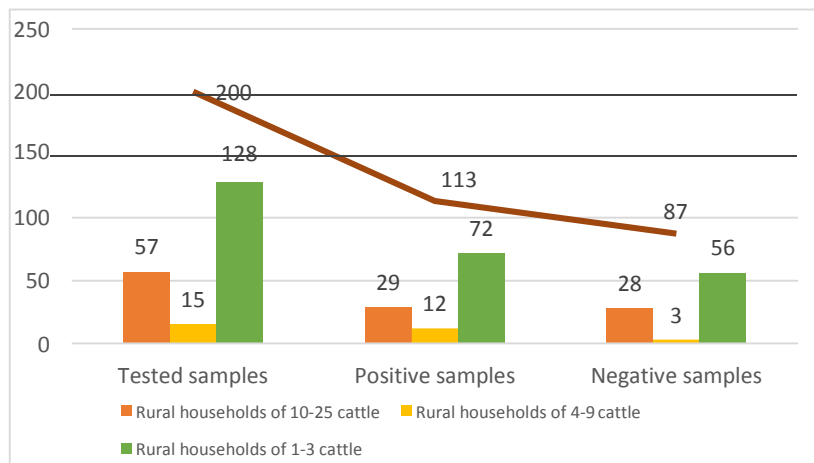


Fig. 4 Serologic results of BHV-1 antibodies detection in bovine in 2016

BHV1 infection is commonly diagnosed serologically. The presence of the BHV-1 infection has been demonstrated through studies conducted in previous years on cattle in eastern

Romanian counties (Aniță D. et al, 2013; 2010). Identifying seropositivity following natural BHV-1 infection in cattle population means that some of the animals in that herds may have a latent infection and that these animals should, from an epidemiological perspective, be viewed as carriers and transmitters of the virus (Tuncer P, Yeşilbağ K., 2015). Serological testing and removal of infected animals has been successfully used to eliminate BHV-1 from Denmark, Switzerland and Austria (Ackermann and Engels, 2006).

Conclusions

Overall seropositivity rate of BHV-1 antibodies in bovine raised in households from Iasi County was 63.60%. Cattle identified as seropositive have an increased risk of virus transmission and recurrent disease. Detection of anti-BHV-1 antibodies in bovine raised in households reveals the need to implement control measures regarding the Infectious Bovine Rhinotracheitis (IBR).

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