

Impact of Herd Additions on Bovine Leukosis Virus Infection in a Commercial Dairy Herd

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Introduction

The introduction of new cattle into an established herd raises the possibility that infection or disease may be either introduced or augmented. Herd additions should be free of infection or disease, or at least have rates which do not exceed those of the herd into which they are introduced. It was reported that the addition of several small herds with prevalences of bovine leukosis virus (BLV) antibodies of 15% to 80%, raised the prevalence of BLV infection in the entire herd from 8% to 23%.¹ We report the impact of combining two herds, one with a prevalence of BLV antibodies over twice that of the other herd.

Materials and Methods

A purebred Holstein herd was monitored annually for the prevalence of BLV infection. The milking herd consisted initially of 265 cows but increased over a period of nine years to 485 cows. Three years after commencement of monitoring, a herd of 99 cows, all acquired from a single source in another state, were introduced and integrated into the resident herd. Ninety-one of the introduced cows were more than three years old. Blood was collected from the jugular vein into evacuated tubes without anticoagulant. Needles were used once and discarded. Serum was obtained after centrifugation of blood and assayed for BLV antibodies, using the agar-gel immunodiffusion test.² The antigen preparation contained glycoprotein and internal virion antigens. Immunodiffusion plates were evaluated after 48, 72, and 96 hours, and results were recorded as positive or negative.

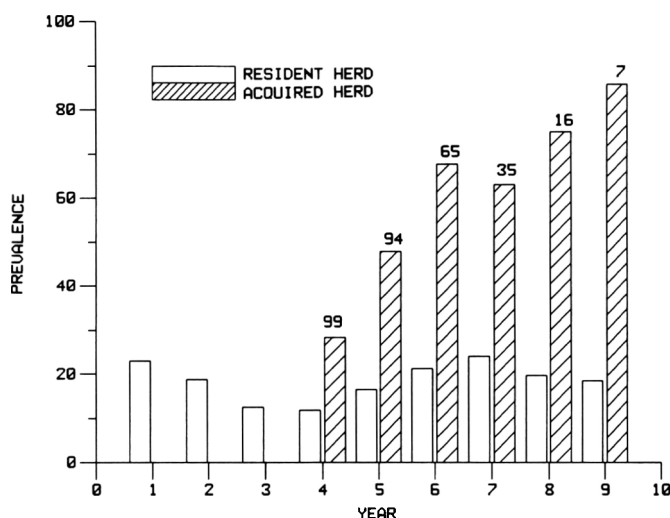
Results

During the first four years of monitoring, the prevalence of BLV antibodies in the resident herd decreased from 23.0% to 11.8% (Figure 1). In the fourth year, the acquired herd was introduced. The prevalence of BLV antibodies in this herd

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was 28.3%. Chi-square analysis revealed that this difference in BLV prevalence between the herds was significant ($p < 0.05$). Over the next five years, the prevalence of BLV antibodies in the acquired herd increased to 85.7%, while the herd declined in number to seven by the last year of testing. After introduction of the acquired herd, the prevalence of BLV antibodies in the resident herd increased from 11.8% to 24.0% over the next three years. It then declined to 18.4% by the last year of testing.

FIGURE 1. Annual prevalence of BLV antibodies in resident and acquired Holstein herds (number above striped bar is number of cattle in acquired herd).



Prior to the introduction of the acquired herd, the annual incidence of BLV infection in the resident herd ranged from 1% to 2% (Table 1). After introduction of the acquired herd, the annual incidence increased to 10%, and ranged from 7% to 10% during the years in which the prevalence in the resident herd increased to 24.0%. For two years after their introduction, the acquired herd had an annual incidence of BLV infection of 30% to 40%. After the sixth year, when two-thirds of 65 acquired cows had BLV antibodies, there were no further seroconversions. After the peak in antibody prevalence in the resident herd during the seventh year at 24.0%, the annual incidence of BLV infection declined.

TABLE 1. Annual Incidence of BLV Infection in a Commercial Holstein Herd.

Year	Resident Herd		Acquired Herd	
	Number*	Percent	Number	Percent
2	3/140	2.1		
3	2/182	1.1		
4	2/219	0.9		
5	23/230	10.0	22/69	31.9
6	14/200	7.0	15/35	42.9
7	21/201	10.4	0/13	0
8	13/209	6.2	0/4	0
9	11/224	4.9	0/1	0

* Numerator = number of cattle seroconverting, denominator = number of seronegative cattle during the previous year.

Discussion

During the first four years of testing, the prevalence of BLV-positive cattle in the resident herd decreased from 23.0% to 11.8%. Analysis by 12-month cohorts revealed that successive cohorts entering the milking herd has lower prevalences of BLV antibodies.³ The overall prevalence decreased as cows in the older cohorts left the herd. The accompanying low incidence of BLV seroconversion was compatible with a cohort effect as the major determinant of the trend in overall prevalence. It was anticipated that this declining trend would continue since the youngest cohorts had prevalences compatible with vertical transmission, a rather inefficient mode of spread.^{4 6}

During the fourth year, another herd was introduced which was about one-fourth the size of the resident herd. More than one-quarter of this herd was infected with BLV when introduced, a prevalence more than twice the prevalence in the resident herd. Over the next two years, about one-third of the seronegative cows in the introduced herd seroconverted annually. In conjunction with this, the rate of BLV seroconversion in the resident herd increased to 10%, a severalfold increase over the previous three years. This resulted in the BLV prevalence in the resident herd increasing by more than twofold over the next three years. All age groups in the resident milking herd evidenced an increase in BLV prevalence after the acquired herd was introduced. Consequently, measures were introduced to prevent the spread of BLV by blood-contaminated devices.^{7,9}

Summary

Introduction of an acquired Holstein herd with a higher prevalence of BLV infection resulted in a doubling of the BLV prevalence in the resident Holstein herd within three years.

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