

Bovine Leukosis Virus (BLV) in U.S. Beef Cattle

Bovine leukosis virus (BLV) is a retrovirus infection of dairy and beef cattle. In less than 5 percent of infected cattle, BLV causes malignant lymphoma which leads to illness and death loss that may be economically significant.

Signs of malignant lymphoma may include weight loss, decreased milk production, enlarged lymph nodes, loss of appetite, rear-limb weakness or paralysis, fever, protruding eyeballs, gastrointestinal obstruction, heart failure, and abnormal blood lymphocyte count. Bovine malignant lymphoma (BML) is always fatal because there are no economical and effective treatments. Other economic losses associated with BLV infection are due to restrictions on trade of infected animals and germplasm.

There is no evidence that BLV is transmissible to humans, and no human disease has ever been attributed to BLV.

A national study of BLV in Canada in 1980 showed that 40 percent of its dairy herds and 11 percent of its beef herds were infected. The national seroprevalence (a measurement of the magnitude of BLV infection) in dairy cattle was much higher than it was in beef cattle (9.3 percent versus 0.5 percent). The Canadian Health Accredited Herd (CHAH) program was established to certify herds to be free of several diseases, including BLV. BLV control programs have been established in member countries of the European Economic Community (EEC) since the 1980's. Eradication programs for dairy and beef cattle have been initiated in Sweden, and seroprevalence studies of BLV are underway in Norway, Latvia, and Poland. BLV infection has been reported by many other countries, but valid national estimates of seroprevalence are rare.

¹ AGID: Leukassay B, Pitman-Moore, Washington Crossing, NJ.
BLV ELISA Test: IDEXX Laboratories, Westbrook, ME.

² Alabama, Arkansas, California, Colorado, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Mississippi, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Tennessee, Texas, Wyoming, and Virginia.

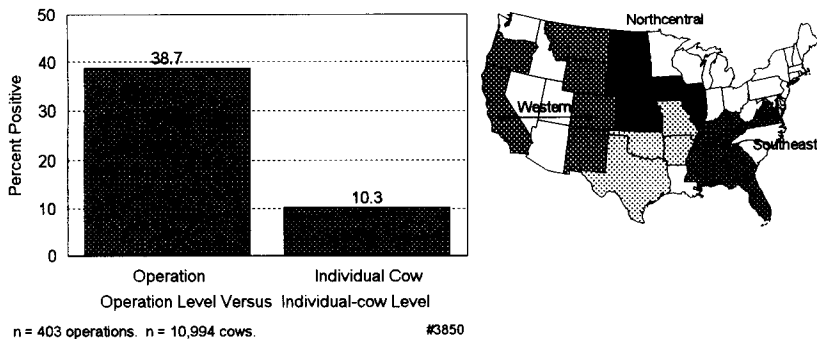
The USDA's National Animal Health Monitoring System (NAHMS) collaborates with others in the livestock industry to provide information on national animal health and related issues. NAHMS assessed BLV seroprevalence in U.S. dairy operations in 1996 as part of the Dairy '96 Study. Study findings showed that 89 percent of all U.S. dairy operations and 43.5 percent of all U.S. dairy cattle were seropositive for BLV using the agar gel immunodiffusion (AGID) test¹. At least 25 percent of individual dairy cows were positive on 75 percent of the positive operations.

During the Beef '97 Study, NAHMS assessed BLV seroprevalence in U.S. beef cow-calf operations. This study included 2,713 operations from 23 of the leading cow-calf states.² Blood samples were collected from beef cows on 403 of those operations and sent to the National Veterinary Services Laboratories in Ames Iowa to test for evidence of BLV infection. The AGID test was used to test samples from 78.2 percent of the cows' sera on 76.5 percent of the operations that participated in the biological sampling phase. During the study, the AGID test was removed from commercial production, and the remaining samples were tested with the enzyme-linked immunosorbent assay (ELISA)¹. Studies have shown that the agreement between the AGID test and the ELISA test is excellent.

Unlike the Dairy '96 Study, the number of herds sampled in the Beef '97 Study were insufficient to provide national estimates of BLV infection, however the Beef '97 Study results are valuable to researchers and others. Thirty-eight percent of all beef operations and 10.3 percent of all beef cows tested during the Beef '97 Study were seropositive for BLV (Figure 1 on the next page). Larger percentages of positive operations and individual cows were found in the Southcentral and Southeast regions (Figure 2). The lowest percentages of positive operations and individual cows were in the Western region.

Figure 1

BLV Infection In Beef Cattle Operation & Individual-cow Prevalence



Viewed by herd size, the operation prevalence was highest in herds of 1 to 49 cows (42.1 percent). Likewise, the individual-cow prevalence was highest in herds of 1 to 49 cows (17.6 percent). The operation prevalence and individual-cow prevalence were lowest in herds of 100 or more cows (Figure 3).

Less than 25 percent of the cows were positive on 56.4 percent of the positive operations (Figure 4). More than 75 percent of the cows were positive on 12.2 percent of the operations.

NAHMS national estimates showed a high seroprevalence and broad geographic distribution of BLV infection in U.S. dairy herds. Though similar national estimates for U.S. beef operations were not determined, prevalence estimates for beef operations that were sampled during the Beef '97 Study indicated lower prevalence in beef operations than dairy operations. Regional prevalences in beef operations varied from 13 to 51 percent, indicating the infection occurs at varying levels in some regions of the U.S.

The high individual-cow prevalence on positive dairy operations indicates that culling alone will not be a cost-effective method for reducing BLV prevalence on those operations. Regarding beef operations, control strategies may vary, depending on the number of infected animals. Culling alone may be effective in some operations. In addition, implementation of a program to reduce transmission may be necessary for other operations.

The Beef '97 Study provided estimates of BLV infection on U.S. beef cattle operations that can be used to: 1) assist herd control programs through education of veterinarians, animal health officials, and producers, and 2) provide baselines from which to monitor progress. It is difficult to compare results of these studies with information from other countries because most countries, with the exception of member-countries

Figure 2

BLV Infection In Beef Cattle Prevalence By Geographic Region

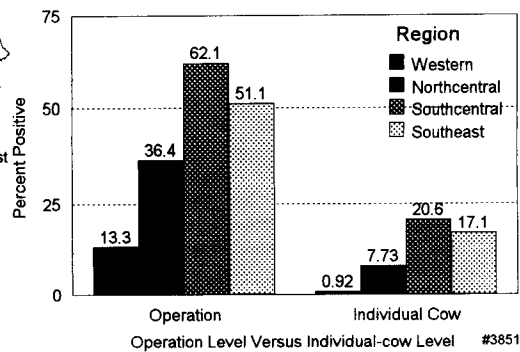


Figure 3

BLV Infection in Beef Cattle Prevalence by Herd Size

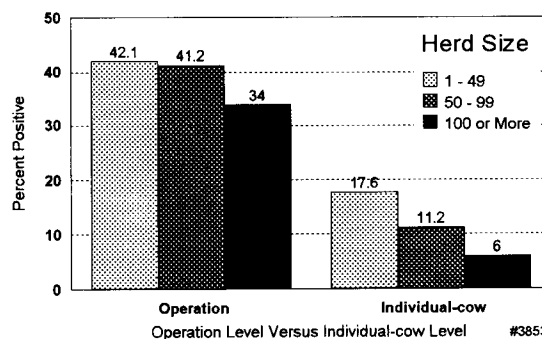
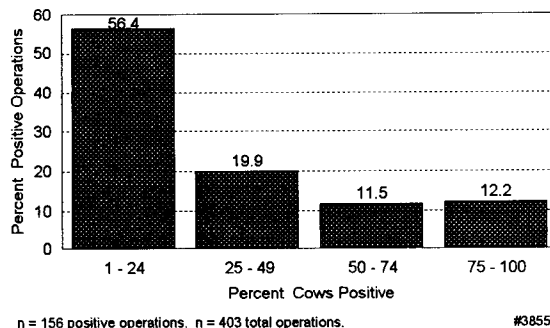


Figure 4

Percent of BLV-positive Beef Cows on BLV-positive Operations



of the EEC (where control efforts have been underway for many years) and Canada, have not published results from prevalence surveys.

For more information, contact:

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NAHMS collaborators included the National Agricultural Statistics Service (USDA), National Veterinary Services Laboratories (NVSL), and State and Federal Veterinary Medical Officers and Animal Health Technicians. NAHMS Info Sheet reviewers included staff from the Agricultural Research Service, private industry, Washington State University, Virginia Tech University, and Kansas State University. N299.299