

Bovine Leukosis Virus

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 (cancer of the lymphatic system) 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 voluntary Canadian Health Accredited Herd (CHAH) program was established to certify herds to be free of several diseases, including BLV but has had limited uptake.

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. Many other countries have reported BLV infection, but valid national estimates of seroprevalence are rare.

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. At least 25 percent of individual dairy cows were positive on 75 percent of the positive operations.

In 1997 BLV seroprevalence in U.S. beef cow-calf operations was estimated. This study included 2,713 operations from 23 of the leading cow-calf states. 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. 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**).

BLV in US Beef Cattle 1997

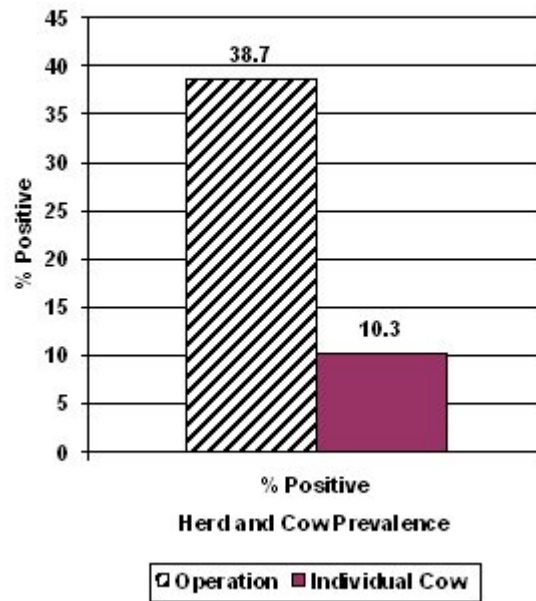


Figure 1 Results of testing 403 beef herds and a total of 10,944 cows. Almost 40% of the herds have at least one positive cow.

Herd Size is often a risk factor for infectious disease. With larger herd having more disease. In the recent US study the opposite was found (**Figure 2**).

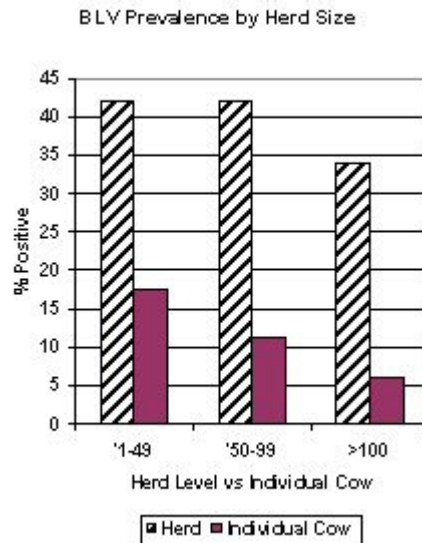


Figure 2. Herds of less than 50 cows were more likely to have an EBL reactor

and more of the smaller herds had a greater proportion of cows positive around 17% of cows positive in a small herd compared to around 7% positive cows in a positive herd consisting of more than 100 cows.

Disease Transmission within a Herd

BLV infects white blood cells of cattle and is rarely found free in the serum. Most infections occur from the transfer of lymphocytes (blood) between cattle with a small proportion occurring in utero. Around 4% of EBL infected cows will give birth to an infected calf. It is possible to transmit the virus in colostrum and milk, however this route explains little of the spread of the disease within a herd.

Gouge dehorning is very efficient at transmitting EBL from infected to uninfected calves if the gouges are not cleaned between animals. Electrical disbudding does not transmit EBL. Other surgical procedures in calves like castration and ear implant use have some risks for transmission of EBL.

Needle re-use is considered a major method of transmission of EBL between cattle with intravenous injections being more hazardous than subcutaneous and intramuscular injections.

Natural breeding does not transmit EBL between bulls and cows or as carry over between cows.

Rectal palpation or pregnancy testing by a veterinarian is a well-documented risk factor. A study in an Idaho dairy herd indicated that washing the latex sleeve between cows decreased the seroconversion rate from 22% to 2% in the heifers subsequently palpated.

Insect transmission has also been studied as a potential cause of within herd spread. Only horse flies and stable flies have large enough mouth parts and the biting behavior, which would allow them in theory to disseminate the virus. Experimental evidence to implicate flies is very limited although there is some reports of an increased risk of cattle being positive after the fly season.

Economic Impact

The economic impact of EBL in dairy cattle has been well examined. Decreased milk production and early culling is associated with EBL infection. As infected cows age they are at increased risk of developing develop leukemia-lymphoma. In general about 5% of EBL infected cattle will develop lymphoma. Cattle with lymphoma are condemned at post mortem and all salvage value is lost.

The economic impact on commercial beef herds is difficult to establish. Most studies are unable to demonstrate any negative effect on reproductive parameters associated with EBL

infection.

Foreign countries have varying restrictions on importing live cattle and freedom from EBL. In general EBL positive cattle, semen and embryos from such cattle are not eligible for export.

For more information on enzootic bovine leukosis and other chronic diseases of cattle contact your local veterinarian.