The historical background of the control of enzootic bovine leukosis in Estonia

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Summary: The authors describe the history of enzootic bovine leukosis (EBL) in Estonia, including the occurrence and distribution of disease within the cattle population, and the factors which have influenced disease spread since the 1950s. The principles of various control schemes which were applied from 1960 to 1994 are also surveyed.

Considerable progress in eradicating EBL has been achieved during recent years, as a result of systematic serological herd testing, and the slaughter of cattle infected with bovine leukaemia virus (BLV).

The decrease in the numbers of EBL-affected cattle may be expressed by the reduction in the number of leukotic tumour cases recorded annually: from an average of 180 cases per 100,000 cows in the 1980s to four cases in 1994; and by the decrease in the average prevalence of BLV-infected animals in the cattle population, from 31.4% in 1989 to 0% in 1994.

The national EBL control programme will be continued. It is hoped that Estonia can be declared EBL-free within the coming years.

KEYWORDS: Bovine leukaemia virus - Bovine oncovirus - Disease control - Enzootic bovine leukosis - Eradication - Estonia - Veterinary policy.

INTRODUCTION

An account is given of the occurrence of enzootic bovine leukosis (EBL) in Estonia since the 1950s, when the disease started to spread. During the following 35 years, EBL affected a large part of the cattle population. The dissemination of bovine leukaemia virus (BLV) was aided by structural developments in the cattle industry during those years (Table I). At the end of the 1980s, a specific diagnostic method was introduced into the EBL control scheme and thus the programme to eradicate EBL was supported by appropriate technology. Agricultural reforms and changes in the economic situation of the country, which had been occurring since 1990, had finally provided the opportunity to eradicate BLV from cattle herds within the coming years.

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Table I

The dynamics of the cattle industry in Estonia from 1940 to 1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Sector</th>
<th>No. of cattle × 10^3</th>
<th>No. of cows × 10^3</th>
<th>No. of holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>Private</td>
<td>511.5</td>
<td>390.2</td>
<td>132,000</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>16.9</td>
<td>11.6</td>
<td>20 *</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>528.4</td>
<td>401.8</td>
<td>132,020 *</td>
</tr>
<tr>
<td>1950</td>
<td>Private</td>
<td>201.3</td>
<td>154.2</td>
<td>117,000</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>260.7</td>
<td>129.4</td>
<td>3,100</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>462.0</td>
<td>283.6</td>
<td>120,100</td>
</tr>
<tr>
<td>1960</td>
<td>Private</td>
<td>162.0</td>
<td>120.4</td>
<td>94,000</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>331.8</td>
<td>175.5</td>
<td>650</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>493.8</td>
<td>295.9</td>
<td>94,650</td>
</tr>
<tr>
<td>1970</td>
<td>Private</td>
<td>144.0</td>
<td>83.6</td>
<td>76,600</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>548.4</td>
<td>227.0</td>
<td>463</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>692.4</td>
<td>310.6</td>
<td>97,063</td>
</tr>
<tr>
<td>1980</td>
<td>Private</td>
<td>108.2</td>
<td>52.7</td>
<td>48,800</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>710.5</td>
<td>263.6</td>
<td>309</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>818.7</td>
<td>316.3</td>
<td>49,109</td>
</tr>
<tr>
<td>1990</td>
<td>Private</td>
<td>111.8</td>
<td>44.7</td>
<td>38,058</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>646.0</td>
<td>236.0</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>757.8</td>
<td>280.7</td>
<td>38,391</td>
</tr>
<tr>
<td>1992</td>
<td>Private</td>
<td>128.4</td>
<td>64.7</td>
<td>47,000</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>486.2</td>
<td>188.7</td>
<td>350 *</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>614.6</td>
<td>253.4</td>
<td>47,350 *</td>
</tr>
<tr>
<td>1994</td>
<td>Small</td>
<td>154.0</td>
<td>88.2</td>
<td>50,000 *</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>280.7</td>
<td>130.7</td>
<td>800 *</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>434.7</td>
<td>218.9</td>
<td>50,800 *</td>
</tr>
</tbody>
</table>

* approximate data

Historical Developments of Enzootic Bovine Leukosis in Estonia

The first report of leukotic tumours in cattle in Estonia was provided by Viidik and Grünthal-Ridala in 1929 (reviewed in 3).

Until the late 1950s, only a few cases of lymphosarcoma had been recorded annually (an average of six cases per 100,000 cows per year). From the end of the 1950s, EBL spread and the incidence of leukotic tumour cases increased. Thus, during the years 1958 to 1960, an average of 26 cases per 100,000 cows per year were recorded (i.e. 4.3 times more cases than during the previous period). During the 1960s, the incidence rate gradually increased to 174 cases per 100,000 cows a year in 1968 (7).
In the 1970s, the incidence of tumour cases showed a slight decline. However, at the beginning of the 1980s, a new wave of disease was observed (Fig. 1).

![Graph showing incidence of tumorous leukosis in cows in Estonia from 1960 to 1994.](image)

**FIG. 1**

The incidence of cases of tumorous leukosis in cows in Estonia from 1960 to 1994

**DIAGNOSTIC METHODS**

Before the 1950s, when persistent lymphocytosis was first recognised as an indication of leukosis in adult cattle, EBL was diagnosed only by histological examination of biopsy or necropsy material. Subsequently, haematological examination was introduced as a tool for early diagnosis of EBL. The so-called 'leukosis keys' were developed for this purpose. The 'Soviet leukosis key' was slightly modified in Estonia, which enabled more animals to be identified as leukotic. However, it was somewhat less sensitive than the 'Bendixen key' or the 'Rosenberger key' (8).

In the late 1960s, BLV was discovered and serological tests were developed for the detection of antibodies to the virus in the early 1970s (6). In Estonia, the agar gel immunodiffusion (AGID) test was introduced in the 1980s. The veterinary laboratories of Estonia have been supplied principally with the glycoprotein 51 (gp-51) immunodiffusion test from the Russian Federation. This test kit has been compared to that produced in the United States of America and controlled with the E-4 standard
serum (1). These studies have shown that the test kit from Russia is highly specific and sensitive enough to eradicate BLV infection from the herds (the titre of the E-4 serum is 1:16).

In 1990, the indirect BLV antibody enzyme-linked immunosorbent assay (ELISA) was introduced into Estonia. The test was developed in Estonia and, since 1992, has been used in the EBL control scheme to screen herds, by testing pooled milk samples. The sensitivity of the test, expressed by the titre of the E-4 standard serum, is 1:32,000. In an extensive study, the specificity of the test has been controlled and has been found to be 99.99% (5).

**ENZOOTIC BOVINE LEUKOSIS CONTROL SCHEMES**

Since 1960, various initiatives have been taken to control EBL in Estonia. The principles of the control schemes have been modified in accordance with improved knowledge of the aetiology and epidemiology of EBL and improvements in diagnostic methods and in laboratory capacity. The history of this work may be divided into four periods.

**Herd control 1960 to 1969**

In the early 1960s, the first attempts were undertaken to implement control measures in selected cattle herds. The projects were carried out by the Estonian University of Agriculture (EUA) and the Estonian Scientific Institute for Animal Husbandry and Veterinary Medicine. The control scheme was based on a ‘test and slaughter’ strategy, and the main principles were as follows:

- all cattle of 12 months or more were examined haematologically twice a year. Animals with persistent lymphocytosis were slaughtered
- new animals were provided from EBL-free herds. These animals were tested haematologically before transfer
- hygienic measures were required to avoid transmission of the disease between animals within the herd, i.e. single needles, periodic disinfection, etc. (7).

From 1966, the State Veterinary Laboratories were involved in the programme and started to test the herds haematologically in a more systematic way (Table II) (11). However, it took more than five years to control infection in all the farms.

**The Official Enzootic Bovine Leukosis Control Scheme 1969 to 1984**

In 1969, the Veterinary Department of the Ministry of Agriculture of the Soviet Union enacted the first temporary directive for EBL control. An improved version of this act was introduced by directive, dated 14 November 1973. This scheme was also based on the ‘test and slaughter’ strategy. The control measures employed are described below.

*Enzootic bovine leukosis-free herds*

Cattle older than two years are tested haematologically once a year. All additions to the herd must come from EBL-free herds. These animals are tested haematologically before transfer.
### Table II
**Haematological examination of cattle in State Veterinary Laboratories in Estonia from 1964 to 1969**

(11)

<table>
<thead>
<tr>
<th>Year</th>
<th>No. (%) * of animals tested</th>
<th>Incidence of animals with lymphocytosis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>954 (0.3)</td>
<td>3.6</td>
</tr>
<tr>
<td>1965</td>
<td>8,705 (2.8)</td>
<td>5.7</td>
</tr>
<tr>
<td>1966</td>
<td>48,145 (15.5)</td>
<td>5.1</td>
</tr>
<tr>
<td>1967</td>
<td>52,430 (16.9)</td>
<td>3.8</td>
</tr>
<tr>
<td>1968</td>
<td>68,252 (22.0)</td>
<td>2.2</td>
</tr>
<tr>
<td>1969</td>
<td>130,369 (41.8)</td>
<td>2.5</td>
</tr>
</tbody>
</table>

* calculated against total number of cows

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**Enzootic bovine leukemia-affected herds**

Cattle older than two years are tested haematologically twice a year, at an interval of at least three months. EBL-positive animals are culled. Pregnant cows are kept until after calving. Animals suspected of being EBL-positive through haematological testing are isolated in separate sheds and retested three times, at intervals of at least two months. Calves borne by affected cows are separated and culled after fattening. Sale of animals for breeding or production is banned.

**Artificial insemination centres**

Bulls older than two years are examined haematologically twice a year. EBL-positive animals are culled and the semen is destroyed.

**Abattoirs**

All cases of leukotic tumours (confirmed by histological examination) are notified. The herds of origin are examined haematologically.

Before 1973, this law could not be implemented in all parts of Estonia, due to insufficient laboratory capacity. The control programme was implemented in the artificial insemination (AI) centres, in breeding herds and in districts where the laboratories had adequate staff and equipment (12). Only in 1973 were all nine State Veterinary Laboratories equipped with enough electronic cell-counters to test all the cows of Estonia kept on large farms haematologically (13).

The blood samples were collected by the veterinarians of the collective and state farms and by local State Veterinarians. The manager and zoo technician of a large state farm or the owner of a smallholding were responsible for the culling of affected animals. Veterinarians reported the EBL situation on the farm and/or in the county to the State Veterinary Service twice a year. The costs of laboratory diagnosis were covered by the Government.
The control scheme 1982 to 1990

Before 1984, the law covering EBL permitted only the haematological and histological methods for the diagnosis of the disease. However, the first attempts to use the AGID test as a tool for the diagnosis of BLV were made at the Veterinary Faculty of EUA in the late 1970s (4). In 1982, serological testing was implemented in the first eight large farms.

In 1984, the AGID test was introduced as a specific diagnostic method for use in the official control scheme, under a directive from the Veterinary Department of the Soviet Union, dated 29 December 1984. However, until 1987, the new scheme was followed only by volunteer farmers who had joined the programme initiated by the Research Laboratory for Bovine Leukosis of EUA, where the AGID test was implemented (Table III). In all other herds, haematological control of EBL was continued.

**TABLE III**

**Serological testing of cattle to bovine leukaemia virus in Estonia from 1982 to 1987 *"**

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of cattle tested</th>
<th>No. of samples examined</th>
<th>No. (%) of herds under control</th>
<th>No. (%) of infected farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>25,000</td>
<td>30,000</td>
<td>8 (2.7)</td>
<td>8 (100)</td>
</tr>
<tr>
<td>1983</td>
<td>32,000</td>
<td>35,000</td>
<td>18 (6.0)</td>
<td>15 (83)</td>
</tr>
<tr>
<td>1984</td>
<td>25,000</td>
<td>29,000</td>
<td>19 (6.3)</td>
<td>16 (84)</td>
</tr>
<tr>
<td>1985</td>
<td>41,000</td>
<td>62,000</td>
<td>35 (11.7)</td>
<td>32 (91)</td>
</tr>
<tr>
<td>1986</td>
<td>58,000</td>
<td>90,000</td>
<td>53 (17.7)</td>
<td>49 (92)</td>
</tr>
<tr>
<td>1987</td>
<td>61,000</td>
<td>130,000</td>
<td>54 (18.0)</td>
<td>49 (91)</td>
</tr>
</tbody>
</table>

* only state-owned large-scale farms included

During 1987 to 1989, the AGID test was introduced into all fifteen regional veterinary laboratories, and countrywide serological testing of herds could be commenced.

The control scheme implemented in Estonia was somewhat different from the law covering EBL in the former Soviet Union and is described below.

**Bovine leukaemia virus-free herds**

All adult cattle and heifers above six months are serotested once a year. All additions to the herd must be seronegative to BLV. Animals are serotested before transfer.

**Herds with a low infection rate (less than 5% infected)**

Serotesting of the herd must be performed at least twice a year, at an interval of not less than three months. Seropositive animals are culled. All additions must be seronegative to BLV. Animals are serotested before transfer.
**Herds with a moderate infection rate (5% to 50% infected)**

Serotesting of the herd must be performed at least twice a year, at an interval of not less than three months. Seropositive heifers are culled. Seropositive cows are isolated in a separate shed and insemination is stopped. Seropositive cows are examined haematologically and animals with persistent lymphocytosis are culled. All additions must be seronegative to BLV. Animals are serotested before transfer.

**Herds with a high infection rate (more than 50% infected)**

The herd must be repopulated, step by step, with seronegative animals. Cows are examined haematologically and animals with permanent lymphocytosis are culled. Insemination of cows is gradually stopped. The heifers are examined serologically and those that react to the test are culled. Seronegative heifers from the indigenous herd are kept separately, as are animals received from an EBL-free herd. These animals are regularly serotested, and any which react are removed immediately.

**Artificial insemination centres**

All bulls are serotested. Reactors are culled and the semen is destroyed. Additions must be BLV-seronegative.

The herd is declared BLV-free when all seropositive animals are eliminated, when three consecutive herd tests to BLV, performed at intervals of not less than three months, are negative, and when no cases of leukotic tumours in adult cattle have been recorded during the last year.

**The official control scheme since 1990**

Since 1990, the Estonian Veterinary Authority has pursued the EBL control policy, which aims to reduce the risk of transmission of BLV between cattle holdings and to motivate farmers to eliminate the BLV infection from their herds.

The first step in this policy was to allow the sale of breeding animals only from herds in which:

a) infected animals were isolated from the rest of the herd (i.e. kept in a separate shed)

b) the prevalence of infected animals was 10% or less

c) the incidence rate of newly infected animals in the herd during the last year was 5% or less. (These guidelines are contained in the directive from the Veterinary Department of the Republic of Estonia, dated 14 December 1990.)

In 1992, the first law covering EBL of the independent Republic of Estonia entered into force, taking into consideration the changes in the society and economy. New principles were introduced, as follows:

a) breeding animals could only be sold from BLV-free herds

b) milk from infected cows received payment at the rate of the lowest price category. If the infected animals were not isolated from the remainder of the herd, the milk of the whole herd received payment at the rate of the lowest price category

c) haematological examination of seropositive animals was cancelled

d) the ELISA technique was recognised as a diagnostic tool for examining samples from single animals and pooled blood and milk samples for BLV
e) herds which were BLV-free, but in which cases of leukotic tumours were found, were declared BLV-suspicious and were tested twice serologically at an interval of not less than three months. If the result was negative, the previous status was re-established. If BLV-positive animals were discovered, eradication measures were applied. The sale of live animals was prohibited.

In recent times this law has been modified. The reason was the rapid decrease in the number of infected animals in the cattle population. The second law covering EBL in Estonia was enacted on 1 April 1994. The principal modifications in the requirements are as follows:

- seropositive animals must be culled immediately, otherwise the sale of milk and grazing of animals will be prohibited
- a herd will be declared BLV-free after three consecutive negative herd tests, but for the following two years the herd will be serotested at intervals of six months, and thereafter once a year.

The EBL control programme is compulsory for every Estonian cattle owner. The Government pays for the diagnostic laboratory work and also covers a part of the cost of collecting samples, which is performed by veterinary practitioners. No compensation is paid for culled animals.

RESULTS

It appears that the control programme which began in the late 1960s resulted in the stabilisation of the leukotic tumour incidence at the level of 150 to 170 cases per 100,000 cows in the early 1970s (Fig. 1). However, it was evident that EBL had become extremely widespread in the Estonian cattle population. Official statistics from the 1970s and the 1980s show that 30% of the large farms had EBL. The number of affected herds in the official reports was obviously under-reported, as serotesting of herds carried out in 1989 confirms (see below). The area with the highest prevalence of BLV was the southern part of Estonia. In the diseased herds, an average of 5% of animals had permanent lymphocytosis (7). The haematological control of the herds lasted from the late 1960s to 1987, and until 1989 in some districts. In the late 1970s, the incidence rate of animals with lymphocytosis was, on average, less than 1.0% of the total cow population. The data presented in Figure 2 indicate that there was a slight reduction in the number of cases of lymphocytosis, as there was for tumour cases, during the 1970s. However, the incidence increased from the beginning of the 1980s, which indicates that the disease spread continuously. Serological examination for BLV in animals from 60 state farms situated in 11 districts, performed from 1982 to 1988, revealed that the rate of infected cows varied from between 0.4% to 85.0% in these holdings. Of the tested herds, 91% had infected animals (Table III).

In 1989, the first nationwide serological testing of cattle herds occurred. The results were as follows: 98% of 300 large state farms were infected with BLV. In many herds, 90% to 95% of cows were infected. The highest infection rates were found in the southern and north-eastern parts of Estonia. In large herds, the average infection rate was 31.4% of the total number of cows. In smallholdings, the proportion of infected cattle ranged from 0.8% in areas with a low infection rate to 8% in heavily infected areas.
The incidence of tumour cases and cattle giving positive results to enzootic bovine leukosis in haematological testing in Estonia from 1975 to 1985

The rules described previously (see 'The control scheme 1982 to 1990') were respected reasonably well by veterinarians and herd managers. Until the year 1990, infected animals were isolated in separate sheds in most herds. Many of the herds in which serological control was started in the early 1980s on a voluntary basis had managed to eradicate BLV. Depending principally on the initial rate of infection, this eradication took from three to eight years.

The data presented in Table IV show the rapid decrease of the number of infected animals in the cattle population from 31.4% in 1989 to 0% in 1994. The incidence of leukotic tumour cases was reduced as well.

DISCUSSION

A distinct increase in the spread of BLV was observed during three periods. The first wave was noticed during the second half of the 1950s, and was probably connected with the epizootic of foot and mouth disease (FMD) from 1952 to 1953. It is likely that BLV was transmitted through the common use of convalescent serum taken from cattle which had recovered from FMD, and used to treat other cattle which were exposed to an acute attack of this disease (E. Aaver, personal communication). In many cases, animals in the FMD-affected herd were artificially infected by the veterinarian, through transfer of saliva and blood taken from diseased cattle to non-diseased animals. For this purpose, small injuries were made with a special instrument in the mucosa of the mouth (N. Kozlov, personal communication).
**TABLE IV**

Results of the serological testing of cattle and the incidence of enzootic bovine leukemia in Estonia from 1989 to 1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Total no. of cows × 10^3</th>
<th>No. of tests performed × 10^3</th>
<th>Incidence of newly infected cattle (%)</th>
<th>Prevalence of infected cows (%) *</th>
<th>Incidence of tumour cases **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>293.9</td>
<td>559.5</td>
<td>20.7</td>
<td>31.4</td>
<td>160</td>
</tr>
<tr>
<td>1990</td>
<td>280.7</td>
<td>664.2</td>
<td>12.8</td>
<td>27.2</td>
<td>210</td>
</tr>
<tr>
<td>1991</td>
<td>264.3</td>
<td>711.4</td>
<td>4.9</td>
<td>14.0</td>
<td>130</td>
</tr>
<tr>
<td>1992</td>
<td>253.4</td>
<td>575.9</td>
<td>2.8</td>
<td>3.3</td>
<td>49</td>
</tr>
<tr>
<td>1993</td>
<td>226.7</td>
<td>557.7</td>
<td>1.3</td>
<td>0.4</td>
<td>5</td>
</tr>
<tr>
<td>1994</td>
<td>218.9</td>
<td>478.3</td>
<td>0.5</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

* calculated against the total number of cows

** tumours per 100,000 cows

During the first decade of the Soviet regime (1945-1955), private farms were destroyed and replaced by large state-owned farms (Table I). Thus, in 1940, 401,800 cows were held in 132,000 herds. In 1965, 75% of 308,300 cows were concentrated on 624 large farms. These holdings had a total of 3,000 cowsheds, which corresponds to an average of 72 cows in each shed (9). The entire operation involved mixing cattle from many different regions, and the establishment of large groups of animals. Both factors could contribute to the establishment of heavily and permanently BLV-infected cattle holdings. It is not surprising that the second wave of EBL was observed during the 1960s.

The third wave appeared during the late 1970s and continued until the late 1980s. The cattle industry was further concentrated by the foundation of the so-called large-scale farm complexes. Large cowsheds were built, each with an average of 200 places. A farm complex had from 400 to 1,000 cows. In 1979, 41% of cows were held in these complexes (10).

The official control programme for EBL was implemented in Estonia in 1969. As all the large farms, and 79% of the cattle, were state-owned, it was easy to make the programme compulsory. This might have been an advantage, as disease control measures could be coordinated and applied systematically in all parts of the country. However, this potential advantage was lost, as adequate laboratory capacity for diagnostic examinations was not established in time. It was seven years before all herds in Estonia were placed under haematological control. The same events occurred when serological control was introduced.

The 'partial slaughter' strategy on the basis of haematological examination, implemented in the first control schemes, could not be used to eliminate the disease from a herd. This observation had already been reported in Denmark during the first part of the EBL control scheme (2). The use of persistent lymphocytosis as a diagnostic tool was suitable for tracing BLV-affected cattle herds, which could then be eliminated by total slaughter. This strategy was used with success for the eradication of BLV in Denmark, where the incidence of the disease was low.
The herds in Estonia were very large, and it was not possible to follow a ‘strict slaughter’ policy. Thus, the first control schemes had no significant influence on the incidence rates of tumour cases and haematologically positive animals (Figs 1 and 2). On the contrary, by the beginning of the 1980s the frequency of the disease started to increase.

When serological testing of cattle herds was initiated in the 1980s, one can speak about the beginning of a rational BLV eradication programme in Estonia.

When independence was restored to the Republic of Estonia in 1991, the Veterinary Administration established the principles for the future EBL control scheme. It was obvious that the compulsory programme could not be converted into a voluntary one without causing a set-back in the EBL situation. The farming organisations were not equipped to assume responsibility for the necessary functions, and the agricultural reforms had been followed by reorganisation of the Veterinary Service. It was, therefore, decided to let the Veterinary Administration direct the control programme.

The changes in the Estonian economy, and the agricultural reforms in particular, have accelerated the eradication of EBL.

Increased retail prices caused a decrease in the consumption of milk and milk products to half the former quantities. In addition, the loss of the Russian market has meant a reduction in the export of these products. The farmers had to reduce milk production and achieved that aim by slaughtering cattle. The cow population decreased by 13.7% during the period from 1990 to 1992.

The legislative restrictions for herds with BLV-infected animals resulted in an intensified culling of affected cows. In 1990, 59,000 seropositive animals were slaughtered. In 1991, 50,857 cows were killed and 32,000 in 1992. Thus, most of the isolated seropositive cows were culled during these three years and, as a result, the infection rate decreased rapidly from 12.8% per year in 1990 to 1.3% in 1993 (Table IV).

The rapid elimination of a large number of infected cows did not hamper the production and technological cycles in the larger holdings, as the sheds with infected cows were functioning as independent units. Thus it was easy for the farmers to eliminate these units when necessary.

It is difficult to define exactly how many herds in Estonia are infected at present, because the reforms and restructuring in cattle farming are still being conducted. The foundation of small private farms started in 1988 and, to date, approximately 13,000 farms with an average 25 hectares of land have been established. Approximately 60% of such farms have cattle (from 1 to 30 cows). In addition, there exist about 40,000 smallholders or hobby-farmers who own from one to three cows each.

The former collective and state farms have almost all been privatised and converted into co-operatives or limited companies. The former 350 large farms, with an average of 800 cows, which existed in the Soviet period, have been replaced by approximately 800 holdings with an average of 160 cows in each (ranging from 50 to 2,000).

Organisations of cattle breeders, together with the Veterinary Administration of Estonia, have started the re-registration of herds and the identification of all animals by individual ear numbers. This will enable better control over cattle herds which, in turn, means that the EBL situation can be kept under control and eradication completed.
Efforts must be made to avoid the reinfection of herds by the following precautions:
- better control over the movements of animals between herds
- screening of infection-free herds for the reappearance of BLV antibodies in pooled milk or blood samples
- notification of tumour cases suspected of being leukotic and serotesting of the herds of origin.

CONCLUSIONS

It is possible to eradicate EBL from a cattle herd by regular serotesting for BLV antibodies, eliminating infected animals and avoiding the introduction of untested animals. The eradication may take from three to eight years, depending on the initial infection rate and the herd size.

A specific and sensitive diagnostic method is essential for the testing of individual animals and the screening of herds.

The ‘partial slaughter’ strategy can be implemented in highly infected herds, if cows infected with BLV can be kept in a separate shed until culling.

Whether a gradual or radical eradication strategy is decided upon depends on the infection rate in the individual herd and in the country, on the availability of BLV-free replacement animals, and on the economic circumstances within the country (costs of testing animals, compensation for culling seropositive animals, etc.).

Legislation and regulations should be realistic to ensure efficient administrative procedures, application of diagnostic methods and culling of infected animals.

In spite of the difficult EBL situation at the end of the 1980s, remarkable progress has been achieved in recent times. The elimination of BLV from cattle herds has become a realistic objective for the coming years.

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ÉLÉMENTS HISTORIQUES DE LA LUTTE CONTRE LA LEUCOSE BOVINE ENZOOTIQUE EN ESTONIE. – A. Viltrop et T. Laht.


Des progrès considérables ont été accomplis dans l'éradication de cette maladie au cours des dernières années grâce à des enquêtes sérologiques
systématiques dans les élevages et à l’abattage des bovins infectés par le virus leucémogène bovin.

Le recul de la maladie chez les bovins peut se mesurer à la diminution des formes tumorales de leucose enregistrées chaque année (de 180 cas en moyenne pour 100 000 animaux dans les années 1980, ce nombre est passé à quatre en 1994), ainsi qu’à la régression de la prévalence moyenne des animaux atteints dans la population bovine, qui a chuté de 31,4 % en 1989 à 0 % en 1994.

Ce programme national de lutte contre la leucose bovine enzootique sera poursuivi. L’Estonie espère donc pouvoir être déclarée indemne de cette maladie dans les prochaines années.


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ELEMENTOS HISTÓRICOS DEL CONTROL DE LA LEUCOSIS BOVINA ENZOÓTICA EN ESTONIA. – A. Viltrop y T. Laht.

Resumen: Los autores describen la historia de la leucosis bovina en Estonia. Tratan los aspectos relativos a la incidencia y distribución de la enfermedad en el seno de la población bovina, así como los factores que han influido en su diseminación desde los años 1950. También examinan los principios de diversos sistemas de control aplicados entre 1960 y 1994.

En los últimos años se han realizado considerables progresos en la erradicación de la leucosis bovina enzootica, gracias a la práctica sistemática de pruebas serológicas entre los rebaños y del sacrificio de los individuos infectados por el virus de la leucosis bovina (VLB).

El descenso en el número de individuos afectados puede expresarse tanto por la reducción del número de casos anuales de tumor leucóticó (desde una media de 180 casos registrados por cada 100.000 vacas en los años 1980 hasta los cuatro casos de 1994) como por la caída de la prevalencia media de animales infectados por el VLB en el conjunto de la población bovina (de 31,4% en 1989 a 0% en 1994).

Este programa nacional de control de la leucosis bovina enzootica va a continuar. Se espera que Estonia pueda ser declarada libre de la leucosis bovina enzootica en el curso de los próximos años.


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REFERENCES


