BRIEF NOTE

Preliminary Attempts to Eradicate Infection with Bovine Leukemia Virus from a Stock Farm in Japan

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(Received 18 October 1981/Accepted 14 June 1982)

Bovine leukemia is classified into two types, epizootic and sporadic, from epizootiological studies [3, 25]. Epizootic leukemia is the commonest neoplastic disease in cattle caused by bovine leukemia virus (BLV) [15, 18]. Since practically all BLV-infected cattle possess specific antibodies to the glycoprotein antigen of this virus, agar gel immunodiffusion (AGID) with the glycoprotein antigen is used for diagnosis of the disease [4, 6, 8, 11-13, 16, 19, 20, 24]. Attempts are being made in some countries to eradicate it by the slaughter program as a control measure [1, 14, 23]. In this country as well, epizootic bovine leukemia is one of the more notorious cattle diseases and tends to gradually increase. A strict control program has been carried out against bovine leukemia at the Yakumo Stock Farm of Kitasato University, Hokkaido. This has been done by continued removal of BLV-infected animals over a period of four years as a basic research project on the control of this disease. This report describes the studies aimed at attaining a non-BLV-contaminated stock farm.

The Yakumo Stock Farm, established in 1976, of approximately 360 hectares is located about 12 km from Yakumo Town in Southern Hokkaido and is well isolated from neighboring ranches (Fig. 1). Approximately 500 heads of neonatal calves and breeding beef cattle (mainly Japanese Shorthorn, Japanese Black hair and Aber-
Table 1. Frequencies of seropositive animals in nine cohorts

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<tr>
<td>E</td>
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<td>0/11</td>
<td>0/10</td>
<td>0/15</td>
<td>0/16</td>
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<tr>
<td>Total</td>
<td>8/227</td>
<td>6/283</td>
<td>22/193</td>
<td>11/196</td>
<td>6/177</td>
<td>0/157</td>
<td>0/144</td>
<td>0/208</td>
<td>0/220</td>
<td>0/231</td>
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<td>%</td>
<td>3.52</td>
<td>2.12</td>
<td>11.39</td>
<td>5.61</td>
<td>3.39</td>
<td>0</td>
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deen Angus) are maintained on the stock farm. One hundred and sixty-three heads of breeding cattle (Japanese Shorthorn and Japanese Black hair) were introduced into the farm during the year it was moved from Towada City, Aomori, Prefecture, where the main campus is located and is regarded as an endemic area of this disease [7, 21, 26]. Since then, none has been allowed to be introduced from any other area. The animals are maintained on the farm by open yard feeding during the summer and drylot feeding during the winter.

Serologic surveys of the herds for antibodies to BLV were performed by AGID with the glycoprotein antigen preparation described previously [9] on a total of ten occasions during the four-year period from September 1977 until May, 1981. All of the adults over two years of age were subjected to the tests and those found to be positive for antibodies were either immediately slaughtered or transferred to the Towada Experimental Farm of Kitasato University for investigation. The surveys disclosed that 3.52% of the cattle examined were seropositive on the first occasion, 2.12% on the second, 11.39% on the third, 5.16% on the fourth and 3.39% on the fifth. The high incidence in the third survey (11.39% or 22 positive cases) was seen during the yard feeding period from May through November (Table 1). Therefore, the survey was conducted at three-month intervals after the third. After the fourth survey, the seropositivity rate decreased progressively, and none was found positive in any of the sixth through the tenth surveys. As for the incidence per paddock, positive animals tended to be more frequent in paddocks A (20 animals, 3.13%) and C (13 animals, 4.09%). However, it could not be ascertained whether these paddocks were the sites of frequent infection inasmuch as inter-paddock removal of animals occurred annually. The incidence of seropositive animals increased among the herds of Japanese Shorthorn and Japanese Blacks introduced from endemic areas and among the native herds of the Angus breed. This would strongly suggest the possibility of intrapaddock horizontal transmission. The seropositivity rate tended to be higher in the age group of 4 years. However, differences in the susceptibility to BLV infection were rather inconspicuous among various age groups.
The results suggest that complete decontamination of cattle farm from BLV infection can be accomplished by eradication of the animals positive in the AGID test. The AGID test is procedurally less cumbersome to perform than other serodiagnostic methods and is currently in wide use all over the world [22]. Radioimmunoassay (RIA) has been reported to be more sensitive in the detection of serum antibodies to BLV [10]. Since the AGID test is less sensitive than RIA the positive reaction in the AGID test should indicate such more pronounced infection with BLV. Such a control program that performing the test at 3 to 5-month intervals over an extended period should be effective for eradication of bovine leukemia [5]. Mammerickx et al. [14] succeeded in the eradication of BLV infection after four serial AGID tests at five-month intervals by eradication of seropositive animals. Straub [23] also achieved complete decontamination after four to five serial tests conducted at three-months intervals.

We succeeded in attaining and maintaining a non-BLV-contaminated stock farm after five serial surveys of seropositive animals by AGID tests, but the mode of transmission of BLV within the range still remains to be clarified. The role of blood-sucking insects in the spread of BLV was suggested [2, 17]. Concomitant, effective control measures against arthropod vectors such as biting stable flies and mosquitoes would be important for eradication of BLV infections.

On the basis of the present result, the eradication of bovine leukemia seems to be possible by detection of the reactors by the AGID test and their slaughter.

REFERENCES

[20] Onuma, M., Olson, C., Baumgartener, L. E.,
要約

わが国における牛白血病ウイルス（BLV）非汚染養場の作成に関するはじめての試み（短報）：吉川寛・吉川博・小山弘之1・樫野志郎2（北里大学獣医畜産学部獣医病理学教室，1獣医畜生物学教室，2獣医衛生学教室）——北里大学附属八雲牧場においてBLV感染牛の淘汰による浄化実験を4年間にわたり試みた。BLV抗体の検出は糖蛋白抗原を用いたAGID法により、1977年9月から1981年5月までの4年間に計10回、延べ2,036頭について抗体調査を実施、陽性牛は直ちに淘汰して実験に使用、あるいは殺された。その結果、試験開始後約2年、すなわち6回目の調査からBLVは抗体保有牛は検出されず、4年後の10回目の検査でも陰性が維持されていた。