BRIEF NOTE

Mink Enteritis in Japan

II. Epidemiology of the Disease

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An infectious diarrhea in mink occurred on mink ranches in the northern part of Hokkaido in 1978 and in 1979. Mink enteritis virus (MEV) was isolated from an affected kit in the 1978 outbreak of the disease [3]. This report deals with the epidemiological survey on the mink ranches where the disease was prevalent.

In mid-April 1978, an infectious diarrhea occurred on K mink ranch in Abashiri district of Hokkaido. This ranch had approximately 2,900 adult minks in ten separate houses. The arrangement of these houses is shown in Fig. 1. More than a hundred of the 400 minks reared in houses No. 3 and No. 5 were suffering from the disease. Few affected minks were observed in houses Nos. 6–8, which were separate from houses Nos. 1–5. The mortality was as high as 7.14 percent (100/1,400 cases). This outbreak continued for 2–3 weeks and then temporarily ceased.

In mid-June 1978, the kits which were born in spring of the same year in this K ranch were suffering from the disease with similar symptoms but manifesting severer diarrhea. The affected kits were first observed in house No. 4 and then in houses No. 2, No. 3 and No. 5. Few kits were suffering from the disease in houses Nos. 6–8. The affected kits had no appetite and did not even drink. They excreted watery black feces and died within 3–5 days. The mortality rate was 10 percent (200/2,000 cases) in house No. 1. On 16–20th July, all minks in this ranch were vaccinated with commercial mink enteritis (ME) vaccine (Entox, American Scientific, Lab., U.S.A.). Two to three weeks after the vaccination, the number of dead kits significantly decreased from 1,150 to 209, indicating that the vaccination had a preventive effect. A virus isolated from a mink kit reared in house No. 1 was
identified as MEV, which was designated MEV Abashiri strain [3]. The results of the serological survey on MEV infection in minks are shown in Table 1. These sera were collected prior to the vaccination. Antibodies were examined by serum neutralization (SN) test as described previously [3]. In the sera of minks in group A, which were reared in houses Nos. 1–5, there was high percentage of antibody positive samples. On the other hand, only a few minks in group B, which consists of minks reared in houses Nos. 6–8, were positive for antibodies. These results indicate that houses Nos. 1–5 were contaminated with the virus in the outbreak of MEV infection in adult minks in April and the kits in these houses were infected with the virus when the maternal antibodies disappeared from their sera in the 2 months after birth.

In July 1979, a disease with similar symptoms occurred on L mink ranch and M mink ranch, which are both located also in the Abashiri district of Hokkaido. L mink ranch had approximately 2,500 adult minks and 8,700 kits in 17 separate houses. The disease was observed in all houses. The mortality rate in kits was 3.7 percent (322/8,650 cases), while that in adults it was 0.36 percent (9/2,500 cases). MEV antigen was detected in the cells inoculated with tissue homogenate of the two dead kits by using indirect immunofluorescence (IF) test. M mink ranch had approximately 1,000 adult minks and 4,700 kits in 4 separate houses. The mortality rate was 3.6 percent (166/4,652 cases) in kits. After the outbreak of the disease, all minks in these ranches were vaccinated with commercial ME vaccine. Two to three weeks after the vaccination, the number of deaths on both ranches decreased from 292 to 30 and from 100 to 60, respectively.

From these observations, it was deduced that MEV was the causative agent of these outbreaks of infectious diarrhea.

Attempts to isolate the virus from six rats and a crow on K mink ranch and a rat and a kitten on L mink ranch were made. Twenty percent tissue homogenate was inoculated on feline lung cell line, FLF-3 cells, immediately after the cells were seeded, and then the cultures were passed three times for the detection of the virus antigen by using indirect IF test [3]. The sera from rats and crows were also examined for antibodies to MEV by SN test. No virus was isolated from the rats and the crow. However, when the cultures inoculated with intestines homogenate of one of these rats were passed two additional times, MEV antigen was observed in a few cells, indicating that a small quantity of the virus was present in the rat. Antibodies to MEV were not detected in any of the sera of these animals. Since unsuccessful attempts for ex-
perimental transmission of MEV infection to rats by oral, nasal, and subcutaneous routes were reported [5] and antibodies to MEV were not detected in the serum of this rat in the present experiment, the role of rats in the transmission of MEV might be only a mechanical carrier, if any. Schofield [6] suggested that the spread of infection from ranch to ranch was due to the migration of crow. Many crows were observed at the three ranches with the outbreak of ME and they were feeding on mink food and droppings beneath the cage of the minks. Although virus isolation from a crow in K mink ranch resulted in failure, the possible role of crows as a mechanical carrier in the transmission of MEV is of interest.

The kitten from L mink ranch showed leukopenia (leukocyte count was 500 per mm³), anorexia and did not drink even water. It died the next day following its capture. The MEV antigen was detected in cultures inoculated with homogenized spleen or intestines of this cat. SN antibodies were detected in sera of four other kittens which had inhabited L mink ranch. Stray cats often inhabit mink ranches. Experimental transmission of feline panleuко-
penia virus (FPLV) to mink [5], and a close serological relationship between FPLV and MEV [1, 4] have been reported. Goto et al. described that 57.5 percent of stray cats had antibodies to FPLV and suggested that FPLV is widespread among cat populations in Japan [2]. Therefore cats infected with FPLV may play an important role in the transmission of MEV.

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References