



# MINK DISEASES

JOHN GORHAM, D.V.M.

## MATERNAL ANTIBODY — FRIEND OR FOE\*

J. R. Gorham, R. K. Farrell, and L. Lauerman \*\*

**N**ATURALLY-EXPOSED or distemper-vaccinated female mink pass a substance called antibody to their litters. This maternally-conferred antibody, which destroys the distemper virus, is probably transferred to the kit for the most part with the first milk (colostrum). The antibody concentration in the kit rises and quickly approximates that of the dam. Thereafter, the concentration declines at a regular rate until antibody is no longer detectable as depicted in the accompanying chart. On one hand, it protects the vulnerable kit against virulent distemper virus attack; on the other, it blocks early kit vaccination.

### Review of Literature

Larson observed that young mink vaccinated in late May with regular chicken embryo-propagated distemper virus vaccine were susceptible to distemper the following September. These kittens were from distemper-immune females vaccinated in April.<sup>1</sup> Hartsough noticed that vaccination was ineffective in 4- to 6-week-old mink kittens.<sup>2</sup> He thought that maternal antibody conferred by immune females interfered with early immunization of the kittens.<sup>3</sup> Ott and Gorham found that young ferrets from nonimmune dams responded to vaccination on or after the eighth day of age; whereas, young from immune ferret females were not successfully immunized until between 36 and 47 days of age.<sup>4</sup>

### The Immunization of Young Mink

To provide information concerning the earliest age that mink kits from distemper immune females can be successfully immunized, two separate trials were conducted. Similar vaccination and challenge dosages, using the same inbred group of mink, were employed in both trials. Because of the results obtained in the Trial 1, the age range of kitten vaccination was extended in Trial 2.

**Trial 1**—Thirty-two female breeder mink were vaccinated in October and

\*This is an abstract of a paper currently appearing in the October, 1962, issue of *Veterinary Medicine* by the same authors. Additional comment for the mink rancher has been added.

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**TABLE 1.**—The Response of Young Mink, the Progeny of Immune Dams, to Chicken Embryo-Propagated DV Vaccine (1957 trial)

Age of kittens at time of vaccination (weeks)	Results of Challenge inoculation*
3	1/12
4	0/10
5	1/13
6	0/11
7	2/12
8	7/11
9	4/12
10	8/12
Controls (unvaccinated)	0/6

\* Numerator = number of surviving kittens;  
Denominator = number of kittens receiving virulent challenge inoculations.

again in April to provide known immune dams. The distemper antibody titers of the dams were very high at the time of whelping. Mink kittens received vaccine at the age designated in Table 1. The kittens from at least three females were included in each age group. All kittens were given challenge inoculation of virulent distemper 2 weeks after the vaccine schedule was completed. Ten of the vaccinated dams used in the trial were randomly selected and given challenge inoculation to test their im-

141  
mune status. None of these dams showed signs of distemper.

Because death represents failure of the individual kitten to become resistant to virulent distemper, most likely maternal antibody interfered with vaccination. Most mink kittens less than 10 weeks old failed to become actively immunized.

**Trial 2.**—Twenty-five female mink received a similar schedule of inoculations as described in the previous trial to render them immune. The young kittens of these immune dams were vaccinated at wider intervals to cover a greater age range. Ten randomly-selected vaccinated dams that received challenge inoculation simul-

taneously with the kittens were found refractory to virulent distemper. The results of this trial are recorded in Table 2.

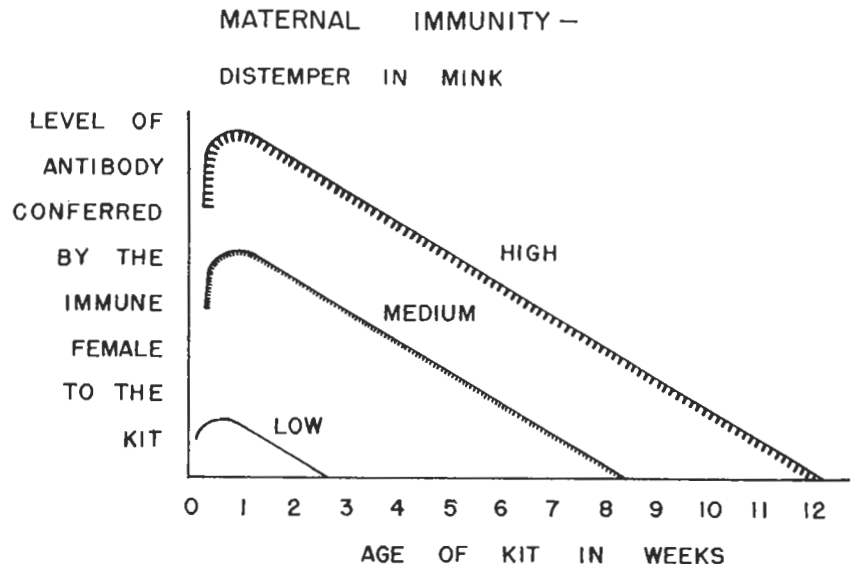
Some of the 8- and 10-week-old kittens failed to become immunized. Under practical ranch conditions, vaccination of the 10-week-old kitten has proved to be a satisfactory recommendation. However, from this trial, it appears that 12-week vaccination would be a more satisfactory procedure. The kittens in both trials, how-

Continued on page 39

**TABLE 2.**—The Response of Young Mink, the Progeny of Immune Dams, to Chicken Embryo-propagated DV Vaccine (1959 trial)

Age of kittens at time of vaccination (weeks)	Results of Challenge inoculation*
6	1/14
8	13/15
10	18/21
12	17/17
14	15/16
Controls (unvaccinated)	2/12

\* Numerator = number of surviving kittens;  
Denominator = number of kittens receiving virulent challenge inoculation.



### Antibiotics and Growth

Continued from page 10

1. Is the inclusion of an antibiotic in the diet of the growing mink as useful or as desirable as it was found to be 7 or 8 years ago? The answer is yes if you want to grow large mink.

2. Is aureomycin still a dependable antibiotic to use? The answer is yes.

3. Have newer products become available that are more efficient than aureomycin? Zinc bacitracin has given us a little greater gain than aureomycin the past two years but these gains are not statistically significant indicating that zinc bacitracin is as useful as aureomycin. Graph 1 shows the growth curves of the males, females and males and females combined at 6, 11, 16, 20 and 29 weeks of age.

### Sioux City Show

Continued from page 19

#### Section IV—Brown

##### A. Brown & Lt. Brown (Cont'd.)

##### —Light Medium

1. Jim Fassett
2. Luverne Tolzman
- 3-5, 7, 10. Spencer Fur Farm

6. Howard Wohlers
- 8, 9. Ralph De Jong, Blue Earth, Minn.

##### —Light

- 1, 3, 7. Jim Fassett
- 2, 5, 6. Spencer Fur Farm

4. Roy Martin
8. Perrin Fur Farm
9. Ralph De Jong

10. Melvin Mc Ollaugh

##### —Pale

- 1, 9. Luverne Tolzman
2. Charles Schank
- 3, 4. John Stone

5. Perrin Fur Farm
6. Ralph De Jong
7. Dean Erickson

8. Roy Martin
10. Drew Williams

##### —Extra Pale

- 1, 3, 5. Perrin Fur Farm
- 2, 4. Robt. Cornelius
6. Wesley Dierschow

##### B. Pale Brown

##### —Medium

1. Spencer Fur Farm
2. Luverne Tolzman
3. Perrin Fur Farm

- 4, 5. Kingswood Mink Ranch

6. John Stone
7. Sidney Craig

##### —Light

1. Kingswood Mink Ranch
- 2, 3, 5. Drew Williams
4. Luverne Tolzman

6. Spencer Fur Farm
7. Verner J. Anderson, Omaha, Neb.

##### —Pale

1. Charles Schank
2. Perrin Fur Farm
3. Drew Williams

- 4, 7. Spencer Fur Farm
5. Luverne Tolzman
6. Roy Gordon

8. Roy Martin
9. John Jansen

##### —Extra Pale

- 1, 3-7. V. J. Anderson
2. Spencer Fur Farm

##### Section V—Taupe

##### A. Grey Taupe

##### —Medium

- 1, 2. Turbak Bros., Kranzburg, S.D.
- 3, 4. Drew Williams
- 5-7. Ralph De Jong

##### —Light

- 1, 3, 4, 7. Drew Williams
- 2, 5, 6, 8. Turbak Bros.

##### B. Lavender-Brown

##### —Medium

1. Robt. Cornelius
2. Sidney Craig
- 3, 4. Jim Fassett
- 5, 6, 8, 9. Perrin Fur Farm
7. Roy Gordon
10. Elmer Ramon, Hull, Ia.

##### —Light

- 1, 3, 5. Robt. Cornelius
- 2, 4. Sidney Craig
6. Melvin McOllaugh
7. Roy Gordon

##### C. Lavender Grey

##### —Medium

1. Luverne Tolzman
- 2, 6. Perrin Fur Farm
3. Ralph De Jong

##### —Light

- 1, 3, 5. Robt. Cornelius
- 2, 4. Sidney Craig
6. Melvin McOllaugh
7. Roy Gordon

- 4, 5. Drew Williams
7. Turbak Bros.

##### —Light

- 1, 3, 4. Robt. Cornelius
- 2, 7. Roy Gordon
- 5, 6. Turbak Bros.
8. Luverne Tolzman
9. Dean Barnes

##### —Pale

- 1, 3, 6. Roy Gordon
2. Luverne Tolzman
4. John Stone
5. Turbak Bros.
7. John Jansen
8. George Cetak, Ord, Neb.
9. Irvin Brahmaer

##### Section VI—Pearl

##### A. Blue Pearl

##### —Light

- 1, 2, 7. Turbak Bros.
3. Kingswood Mink Ranch
4. John Stone
5. Sidney Craig
6. John Jansen

##### —Pale

- 1, 2. Turbak Bros.
3. Roy Gordon
- 4, 5. John Jansen

##### —Extra Pale

1. Geo. Cetak
- 2, 5, 7, 9, 10. Howard Nees, Burlington, Ia.
3. Charles Schank
- 4, 6. Perrin Fur Farm
8. Sidney Craig

##### B. Beige Pearl

##### —Light

- 1, 2. Drew Williams
3. Kingswood Mink Ranch
- 4, 5. John Jansen
6. Elmer Ramon

##### —Pale

1. Roy Gordon
- 2, 5. Drew Williams
3. Geo. Cetak
- 4, 6. John Jansen

##### Section VII

##### —Platinum

- 1, 4. Turbak Bros.
2. John Jansen
- 3, 6. Perrin Fur Farm
5. Kingswood Mink Ranch

### Mink Diseases

Continued from page 25

ever, were from females receiving a second vaccination prior to whelping—a situation rarely encountered in regular ranch operations.

#### The Protection Afforded Young Ferrets by Distemper-Immune Females

While this investigation appears straightforward, it was a most miserable experiment to conduct. We took two groups of ferret females—one susceptible to distemper and another immunized. At intervals following birth, we gave the young litters from both groups virulent distemper. All went well until the kittens from the susceptible females gave the disease to their own mothers. The females became sick and didn't nurse their young, and we never did know what killed the young ferrets in this group.

The results were not as clouded when young ferrets from immune dams were given challenge inoculation—they were resistant to distemper until about 12-13 weeks of age. Interestingly enough, some of these ferrets were immune to virulent virus challenge at 5 months of age. This probably indicates that they became immunized by contact with virulent virus while they were still protected by maternal antibody. This was a delicately balanced situation; the level of antibody was low enough to allow immu-

Continued on page 42

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### Mink Diseases

Continued from page 39

nization but sufficient to prevent disease by virulent virus.

#### May and June Distemper Outbreaks

Distemper outbreaks that occur in May and June usually go unnoticed until several litters are involved. The kittens die so rapidly that the typical signs observed in older mink do not occur.

When the diagnosis is obtained, the veterinarian and rancher are faced with a disease-control situation that offers no effective solution. The breeders must be vaccinated for immediate control. But some kits are too small

to be vaccinated and some of the females may not have whelped.

In almost all outbreaks, virulent distemper virus remains active among the vaccinated adults that are incubating distemper when they are inoculated. In this situation, the virus is maintained in enough breeders to provide ample exposure for the kits.

In an outbreak situation, it is imperative that the kit crop be inoculated as soon as they reach a suitable size. The youngest age at which a kit can be conveniently vaccinated is about 4 weeks. To delay vaccination will result in further spread of the virus among the kits. Many of these inoculated kits fail to develop a lasting immunity, as evidenced by re-

curring losses throughout the summer months.

What is the reason for these losses? The vaccination of the adult female or exposure to virulent virus furnished her litter with immune bodies that interfered with the kits being immunized with living egg-adapted virus. In effect, the distemper antibody dealt with the chick-embryo vaccine just as it would with virulent-killing virus—the antibody destroyed the vaccine.

The individual variation in the level of antibody gained among the vaccinated kits allows immunization of some kits but not of others. Those kits which had a high level of maternal immunity conferred upon them by the dams are less likely to become immunized when inoculated.

The continuing losses in the unprotected kits throughout the summer months necessitate revaccination. Not only do the second and perhaps third vaccinations result in additional cost, but, more important, the inoculation procedure itself usually spreads the virus by direct and indirect contact to other kits.

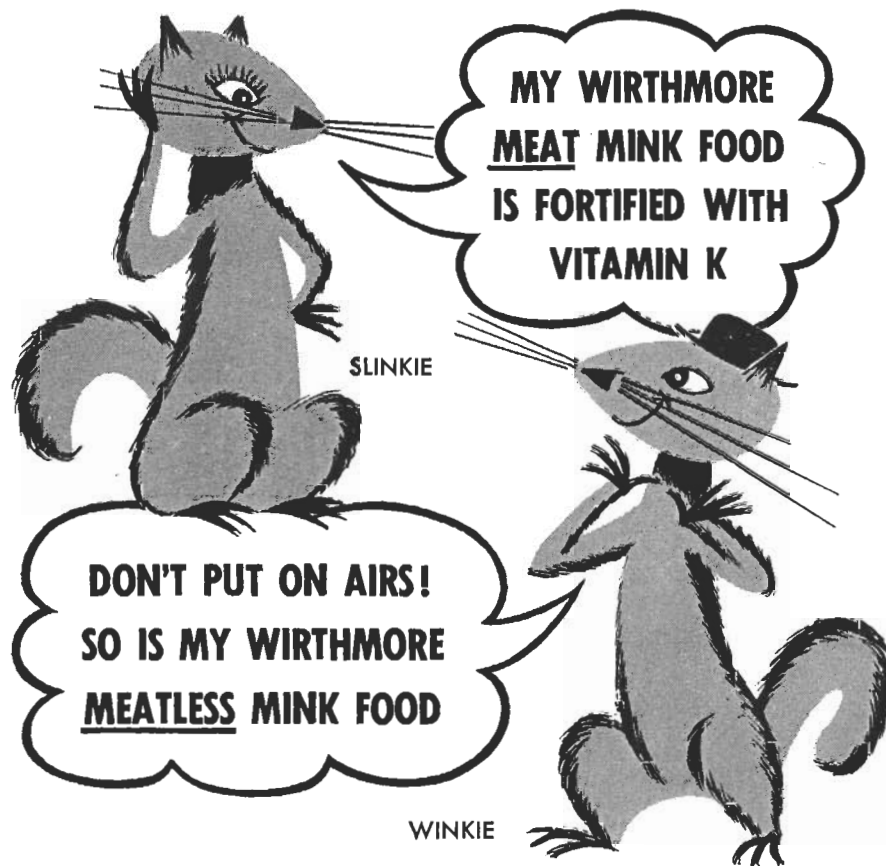
#### Summary

Maternal antibody is necessary to protect kits from distemper attack in the first weeks of their life. If the breeder herd is immunized during the winter months, there is little likelihood of distemper becoming active in the kits during the critical May-June period.

The sword has a double edge! This same maternal antibody will interfere with vaccination. Thus, kittens from distemper-vaccinated females should be at least 10 weeks of age at the time of vaccination.

#### REFERENCES

- <sup>1</sup> Larson, A., personal communication. 1954.
- <sup>2</sup> Hartsough, G. R., News of the Great Lakes Mink Association, December, 1955.
- <sup>3</sup> Hartsough, G. R., personal communication. 1955.
- <sup>4</sup> Ott, R. L. and Gorham, J. R., The Response of Newborn and Young Ferrets to Intranasal Administration with Egg-Adapted Distemper Virus. Jour. Am. Vet. Med. Assn., 16:571, 1955.



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