

# STUDIES IN NEWCASTLE DISEASE

## VII. THE POSSIBLE ROLE OF THE PIGEON AS A CARRIER

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Pigeons are common in many farm and chicken-raising communities. If infected with Newcastle disease, their roving and feeding habits, by which they might travel considerable distance and come in intimate contact with fowl, would seem to make possible a means of transferring infection. For this reason it was thought desirable to determine if infected individuals would excrete virus in an amount sufficient to establish Newcastle disease in contact chickens.

Four separate trials were arranged, each using a group of three pigeons. Members of each group were infected by a different route. The trial pigeons were obtained from local sources and checked by the haemagglutination-inhibition test (HI) to determine freedom from antibodies.

The Newcastle disease virus used was the Canadian (Twiss) strain, known to possess considerable virulence for fowl. Fluids freshly harvested from inoculated embryonated eggs constituted the inoculum. These fluids had a haemagglutination titre of 1:1280 and were 100 per cent embryocidal in a  $10^{-8}$  dilution in embryonating eggs.

As indicated, the groups of pigeons were infected by several routes. A period of three days incubation was allowed to elapse after which they were moved to uncontaminated quarters. Into these quarters were introduced four baby chicks so that intimate exposure would result. The following indicates the groups and the results.

### *Group 1*

The drinking water provided to this group was contaminated by adding the virus-bearing tissue to the water, making a final dilution of 1:1000. After twenty-four hours clean uncontaminated water was substituted. Therefore this group was exposed orally for 24 hours.

One pigeon died on the seventh day. Virus was found present in a pool of tissue inoculum composed of the spleen, lungs, trachea, and brain.

A second pigeon developed a mild form of paralysis on the twelfth day. It was killed but virus was not isolated. The third remained free of symptoms but later was shown to have strong titre of antibody as demonstrated by the HI test.

One baby chick was found dead on the second day of contact. This was apparently a cage death, no virus was isolated. The three remaining chicks remained normal over a thirty-day period. Each revealed antibody formation on the HI test and was immune subsequently to a challenge dose of virus. It therefore seems evident that these birds had received an exposure which was not sufficient to bring about a progressive and fatal infection but did establish a mild degree of Newcastle disease.

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*Group 2*

The three pigeons in this group received intranasally virus-bearing fluids in a dilution of  $10^{-3}$ . All remained free of symptoms but later when checked by the HI test were found to have present in the blood a high antibody content. Four young chickens were introduced three days following the inoculation of the pigeons and afterwards removed to an uncontaminated area. Three of the contact chickens died on the second and third day. A fourth was found dead on the sixth day. From it virus was recovered.

*Group 3*

Three pigeons in this group were inoculated in the breast musculature with 0.25 cc. of fluids or egg-propagated virus in a dilution of  $10^{-3}$ . All died on the fifth and sixth day. Virus was recovered from the tissues of each.

As in the other groups they were removed on the third day from the cage in which they were infected and placed in a non-contaminated unit. Four young chickens were exposed, one died on the seventh day following contact and virus was isolated. The three remaining chickens appeared normal for a thirty-day period but each proved to possess a high antibody content and were immune to challenge.

*Group 4*

Three chickens were inoculated intranasally. On the third day when respiratory symptoms were evident, three pigeons were placed in direct contact. After an exposure of three days the pigeons were removed to uncontaminated quarters. There, four normal chicks were placed in contact with them. All of the original chickens died two or three days after the pigeons had been removed and virus was demonstrated in the tissues of each. The pigeons, however, remained normal. After thirty days they were found to possess a high concentration of antibodies.

Three of the baby chicks died on the sixth and seventh day and virus was recovered from each. The other chick exhibited slight paralysis on the eighth day, which gradually increased in severity. It was killed on the thirteenth day when moribund but virus was not recovered.

REMARKS

The trials indicate that pigeons may be infected through the usual methods of normal field exposure, that is, by way of the oral and respiratory tracts. The disease produced in them is evidently not as fatal as in adult fowl. However, some do die and others go through the infection presenting few symptoms but nevertheless excreting virus. It would therefore seem evident that pigeons are at least a potential means of transferring infection from one premises to another.

That pigeons excrete virus in an amount sufficient to initiate infection in exposed baby chickens is shown by the trials. Under usual farm conditions it is adult birds rather than baby chickens that are exposed to pigeons. Therefore, a trial using adult fowl would appear to be indicated.