The Fowl Leukosis Battle

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A FEW YEARS AGO, chickens were dying right and left on farms with a disease called range paralysis, fowl paralysis and various technical names. At that time we little understood the disease—its cause or what to do about it. Probably in the last 10 years this disease has caused more losses to the poultry raiser than any other single disease of adult poultry.

In order that we might study the disease, find its cause, the method by which it was transmitted from one bird to another and what to do to cure or prevent it, we bought an entire flock that was badly infested with the disease. This flock was taken to the Poultry Research Farm of Iowa State College.

We soon discovered that the disease showed up not only as paralysis of the legs, wings or internal organs, but in various other forms. Some of these other forms affected the eyes (sometimes complete blindness), tumors in various parts of the body, a sort of anemia infection of the marrow of the bones.

It is obvious that to call this disease range paralysis or fowl paralysis isn't satisfactory, for a bird suffering from the disease may be able to transmit it on to other members of the flock and still not be paralyzed. So to work out a nomenclature for the disease as a whole, a group of poultry pathologists met at the Regional Poultry Disease Laboratory at East Lansing, Mich., last summer and adopted the following nomenclature:

**FOWL LEUKOSIS COMPLEX**

1. Lymphomatosis
   - Ocular (eye type)
   - Neural (paralysis)
   - Visceral (tumor infiltrations)
   - Osteopetrotic (enlarged bones)

2. Erythroleukosis

3. Myeloid leukemia

We found that infected material taken from a bird affected with one type of leukemia injected into susceptible birds might produce any of the other types.

Fowl leukemia is an infectious disease caused by a filterable virus.

The disease is highly infectious, spreading readily within a flock. It usually strikes birds between 4 and 8 months of age and most often around 6 months. Birds of all breeds are affected, and no recoveries from the disease have been noted, but temporary let-ups do occur.

Going back to the flock which we purchased about 12 years ago for study of the disease—we trapped the layers to keep track of them. We made some matings the first year, and part of the chicks were inoculated with leukemia virus, while control lots from the same matings were not inoculated.

In this first year of our study, the control chicks which received no virus came down about as badly with leukemia as the birds injected with the virus.

Then we began to notice few-
er of the chicks from certain families died—the chicks from certain hens seemed more resistant than others.

With this lead we continued our breeding to see whether or not careful selection and breeding could conquer the disease. Now after about 10 years of breeding we have certain strains or families that are 95 percent resistant to leukosis, and other strains of which 40 to 100 percent will die when inoculated with the leukosis virus.

It is our observation that practically all flocks have some leukosis. So we have watched the effort of certain breeders and hatchery operators to control leukosis. The work of these men has supplemented our own efforts.

We have come to the conclusion that the breeder or hatchery operator who follows a thorough practice of culling and breeding can control the disease. Here is the schedule he needs to follow:

Cull several times a year, removing at each culling all birds that have gray eyes and those that are light in weight or have pale combs. Obviously, any that are paralyzed in the wings or are lame should be removed.

The control program may be speeded up by using as many 2-year-old hens in breeding flocks as possible. In using 2-year-old birds, care must be taken in control of other diseases, as tuberculosis.

The eyes, weight of the birds and comb color are about the only obvious symptoms of the disease. By continually removing these birds showing infection (these infected birds have had an opportunity to pass the disease on to the other members of the flock), you will be saving as breeders the birds that have stood up and showed resistance to the disease. The more frequently the flocks are culled, the better the results will be.

Such careful culling and selection will bring another indirect benefit—it gets rid of the low producers, and better chicks will be turned out.

About the various forms in which fowl leukosis appears, we have made the following observations.

Neural

Neural is the nerve type. Paralysis in these birds may be general or local. Paralysis of one or both legs, or one or both wings may occur. The paralysis may be slight or so severe that the bird is practically helpless.

When the brain is involved, various symptoms may show as well as abnormal head movements. Some of these may be a waving motion of the head, throwing the head backwards or the beak downward, lateral movements and, in general, a lack of ability to hold the head in a normal position.

Many cases show a paralysis of the internal organs. In some cases the nerve of the neck is affected and the bird has difficulty in breathing. It may breathe through its mouth. The disease may strike suddenly or it may come on gradually.

Ocular

In the eye cases the iris or red portion of the eye frequently shows in the beginning a depigmented circle around the pupil. The circle is gray at first or may be only a slightly faded color, but gradually extends until the red or bay color is almost completely replaced. The process may start in any part of the iris as a small depigmented spot, or it may start as a generalized depigmented process throughout the iris, characterized as a faded gray appearance.

In many birds the depigmentation appears to start in several places in the iris at the same time, giving the appearance of a normal bay color, interspersed with faded or gray areas.

Often the depigmentation is irregular and has a streaked appearance, mingling the bay color with gray. The color changes...
may vary from a faded bay to a dark or light gray, bluish gray or slate gray. In some cases a black colored tissue appears as a multiple tumorous mass. Generally both eyes are involved, with one appearing more severely affected than the other.

Many cases show involvement of only one eye. In a high percentage of cases regular or irregular constriction of the pupil occurs with impaired vision or even blindness. The condition may spread rapidly or slowly, and in many cases it appears that the disease has become arrested. The birds usually remain in good health unless blindness occurs or unless the eye type cases become complicated with other forms of the disease.

Frequently we have observed birds with uncomplicated eye cases in the beginning which developed some other type eventually. We have also seen several uncomplicated eye cases that have lived 2 years without any great impairment of health.

While most of the popular breeds of chickens should have normally a reddish bay colored iris, some do not have. The iris of the Cornish, and some game birds, is normally a yellow or pearl color, and many crosses of this breed may have normally pearl or gray eyes.

**Visceral**

Clinical symptoms in cases affected with lymphocytoma tumors and tumor-like infiltrations in various organs vary greatly, depending upon the tissues or organs involved. Many cases in good flesh have died suddenly and upon autopsy were found to be suffering from an enormously enlarged liver.

Respiratory difficulty was observed in a few cases which upon autopsy showed an involvement of the lungs by lymphocytomatosis (tumors). The symptoms in general are more obscure than in the other types of the disease.

**Erythroleukosis**

Many degrees of affection are noted in the erythroid type. The most characteristic symptom is a severe paleness with a definite yellow discoloration of the skin of the face. The tendency in most of these cases is toward “going light.”

The course of the disease is also variable, in some cases progressing rapidly and in others slowly. The appetite usually remains normal except in the very acute, generalized cases and in cases of prostrated birds.

**Myeloid Leukosis**

The clinical manifestations of myeloid leukosis are widely variable. The onset may be gradual or rapid and general weakness with diarrhea is quite common. The skin, comb and wattles may not show any color changes, while some birds show varying degrees of paleness as well as a peculiar pallor. The tendency in these cases is toward a rather rapid emaciation.

In order to seek an answer for this question, we made matings of paralyzed birds but with very little success because of lack of production or fertility. Birds suffering from erythroleukosis or myeloid leukosis rarely produce eggs. In cases of ocular type or eye type, birds may produce normally with a normal degree of fertility. Matings were made of iritis females and iritis males. The birds were hatched and placed in isolated colony houses. During a 12-month period 65 percent of these birds died of some form of the fowl paralysis complex. Matings were made of iritis females and iritis males. The virus was present in the blood of chicks of such matings generally attributed to this disease.

The disease known as range paralysis or fowl paralysis is more aptly named fowl leukosis and this term includes the various manifestations such as paralysis, tumors, iritis, erythroleukosis and myeloid leukosis.

The disease in all its manifestations may be produced by infecting healthy with diseased chicks and by contact of healthy birds with infected premises or litter.

An injection of a suspension made from one type of this disease produced all the manifestations generally attributed to this disease.

The disease has an extremely long incubation period in most instances, as chicks injected at 1 week of age did not show symptoms or die of the disease until between 4 and 8 months of age. The disease rarely attacks birds over 12 months of age.

The disease was transmitted by way of the egg in mating of iritis birds. The virus was present in the blood of chicks of such mating when the chicks were 1 day old.

**Control Methods**

A rigid culling program eliminating all birds with faded gray eyes, light colored comb and wattles, lame or paralyzed birds, and extremely light birds, will eliminate carriers, thus greatly decreasing this disease in the flock.

When the disease becomes prevalent the above procedures should be followed and the birds surviving kept as a source of resistant breeding stock.

In only extreme cases should a flock be disposed of and new birds brought on the farm as they will, in most instances, be very susceptible to the disease, whose infective agent is already present on the premises.

**Summary and Conclusions**

The disease known as range paralysis or fowl paralysis is more aptly named fowl leukosis and this term includes the various manifestations such as paralysis, tumors, iritis, erythroleukosis and myeloid leukosis.

The disease in all its manifestations may be produced by injecting infective material, by contact of healthy with diseased chicks and by contact of healthy birds with infected premises or litter.

An injection of a suspension made from one type of this disease produced all the manifestations generally attributed to this disease.

The disease has an extremely long incubation period in most instances, as chicks injected at 1 week of age did not show symptoms or die of the disease until between 4 and 8 months of age. The disease rarely attacks birds over 12 months of age.

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