Leucosis in fowls

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The prevalence of leucosis in commercial flocks has become a serious problem to the poultry industry. The disease is a chronic one and usually runs a prolonged course. The losses occur irregularly, but the total of deaths during the course of the season may be heavy and since they mainly occur in the laying flock they represent a serious loss to the poultry farmers. To this must be added the losses resulting from depressed egg production and the cost of feeding unproductive birds.

There is much that is yet to be learnt concerning leucosis, despite extensive research programmes extending over a number of years. Much conflicting evidence has been produced so that it is not possible to make definite statements on many points.

MODE OF INFECTION

Leucosis is a transmissible disease affecting all breeds of poultry and appears to be caused by a virus. Artificial transmission experiments indicate that the birds are most susceptible to infection up to the age of eight weeks and it is probable that chicks running in infected yards and picking up the infection at this early age are the major source of infected birds. The disease is also spread by blood-sucking insects and mites and there is also evidence to indicate that transmission of the disease through the egg may occur. As some strains of birds within the breed are susceptible, while others are resistant, the picture is somewhat complicated.

THE LEUCOSIS COMPLEX

Leucosis is a disease with many manifestations, all of which probably have a common cause and may occur simultaneously. The virus acts upon the blood cells or blood-forming tissues, causing them to behave abnormally. The term "leucosis" refers to a cancer-like condition of the blood cells or blood-forming tissues whereby abnormal numbers or types of cells are present in the circulating blood; or alternatively these cells are deposited in the tissues in the form of cancerous tumours.

Those forms of the disease in which cells are deposited in the tissues in the form of tumours are known as lymphatic leucosis or lymphomatosis and the four main types of this disease are:

Fig. 1.—A bird suffering from neural leucosis or "fowl paralysis"
1. Visceral leucosis where the abdominal organs are the site of the tumours.

2. Neural leucosis (Fowl Paralysis) where the nerves are affected.

3. Ocular leucosis, where the eyes are affected (Pearly Eye).

4. Osteopetrotic leucosis where the leg bones are affected (Thick Leg Disease).

The types of leucosis where the circulating blood is affected are Erythroblastosis and Granuloblastosis (wasting anaemia).

Fig. 2.—Enlarged liver from a bird which died from visceral leucosis. Note greyish areas and projecting tumors.

In both these forms the normal blood corpuscles are replaced by enormous numbers of abnormal cells.

Other manifestations of leucosis also occur but they are so uncommon that, they need not be included in this discussion.

SYMPTOMS AND POST-MORTEM FINDINGS

1. Visceral leucosis.—In Western Australia this form of the disease is the one that is most frequently encountered. The majority of deaths from this disease occur in birds between 5½ and 18 months of age.

Birds affected usually show wasting, loss of appetite, yellowish diarrhoea, and pale shrunken combs. Dropsy may develop, but many deaths occur in birds which are apparently in good condition and showing no definite symptoms.

At post-mortem examination, any organ to the body may be affected, but the liver, kidney and spleen are most often involved. The liver may be enlarged to several times its normal size and may show a number of small pearly areas or large masses of greyish or whitish material. Tumours may be seen projecting from the surface. The spleen is frequently enlarged, usually with greyish areas visible throughout the tissues. The kidneys may be enlarged and infiltrated with grey material.

In pullets and hens, the ovaries are frequently affected and may show cysts, tumours, or cauliflower-like growths.

A form is frequently seen in which the peritoneum and mesentery (those membranes which line the abdominal cavity and support the bowels) show multiple small grey tumours somewhat resembling tuberculosis. (Tuberculosis has not been diagnosed in poultry in Western Australia).

2. Neural leucosis.—This form of the disease is commonly referred to as fowl paralysis, and partial or total paralysis of the legs is the most frequent manifestation, although the wings or neck may also be affected. One or both of the legs may be stretched forward or backward and may be completely useless. A typical early sign is the loss of the reflex action in which the bird's toes are clenched when it is raised suddenly and opened when it is dropped. If the paralysis affects the wings these will be carried in a drooped position and where the neck is affected there is a twisting and abnormal carriage of the head.

This form is due to the infiltration of the nerves with lymphatic cells and this may be evidenced by swellings on the course of the nerve, or may only be detectable by microscopic examination.

3. Ocular leucosis.—The iris of the eye in a normal fowl is brightly coloured, for example, it is orange in White Leghorns and brown in Australorps. When the bird is affected by ocular leucosis, the iris loses its normal colour and becomes a pearly grey. For this reason a common name for the complaint is Pearly Eye. The pupil is distorted and loses its ability to contract when exposed to a bright light.

Birds affected with ocular leucosis are blind in the diseased eye but may otherwise appear quite normal and healthy. They should be immediately discarded however as they will be carriers of the disease.
4. Osteopetrotic leucosis.—This form is the rarest of the lymphatic types of leucosis and appears to be more common in cockerels than in hens and pullets. The shank bones become enlarged and the legs appear boot-like. This disease should not be confused with "scaly leg" which is due to a mite. In "scaly leg," the scales are raised, rough and powdery whereas in osteopetrotic leucosis the scales remain smooth and shiny.

5. Erythroblastosis.—This a true wasting disease and may be referred to as wasting anaemia. The bird progressively wastes away to a skeleton and the head and comb become pale. It may take several months before this stage is reached.

On post-mortem examination small blood-spots are seen in the bowels while the liver, kidneys and spleen are enlarged, pale, soft and fragile.

6. Granuloblastosis.—The symptoms in this condition are practically indistinguishable from Erythroblastsotis but on post-mortem the liver may be mottled with grey.

**TREATMENT**

No treatment is effective against any of the forms of leucosis. Spontaneous recovery from the neural (fowl paralysis) type may occur, but as these birds will be carriers they should be disposed of.

**CONTROL**

The control of leucosis falls into two categories.

1. **The Use of Resistant Strains.**—Resistant strains occur within all breeds of poultry and when purchasing birds an attempt should be made to ascertain whether the disease has been present in the parent flock and whether control measures are being adopted.

Mature birds which have been exposed to infection as young stock and have survived may be expected to possess a considerable degree of resistance and while a proportion of them may still be susceptible it is a sound practice to breed from second and third year hens rather than from pullets. The policy of pullet breeding assists in the spread of the disease as fowls are often producing for some months before symptoms become apparent. This means that susceptible strains may be perpetuated and the disease transmitted via the egg. By using second and third...
year hens for breeding stock and by the reduction of all "pearly eye" and "fowl paralysis" cases, resistant flocks may be built up. However, it is frequently difficult to apply this principle in practice since the old birds are often out of production when eggs most required for incubation and it becomes necessary to rely upon the pullet flock.

2. **Hygienic Measures.** — Since young birds are most susceptible during the first weeks of life it is of the utmost importance that they should be protected from infection during this period and that they should not be allowed access to yards which have been occupied by adult birds.

**SUMMARY**

1. Fowl leucosis is a disease which causes considerable financial loss every year to poultry farmers as the disease principally affects laying birds.

2. The disease is a complex one because a single cause (the virus) gives rise to five separate clinical forms of the disease. 

These are:—

(a) Visceral leucosis (big liver disease) where cancerous tumours occur in various organs.
(b) Neural leucosis (fowl paralysis).
(c) Ocular leucosis (pearly eye disease).
(d) Osteopetrotic leucosis (thick leg disease).
(e) Erythroleukemia and Granuloblastosis (wasting anaemia).

All these forms occur quite frequently (with the exception of "thick leg disease") and several types may occur simultaneously in the same flock. In Western Australia the visceral type is the commonest manifestation of the disease.

3. The disease may be controlled by:—

(a) Using resistant strains.
(b) Avoiding pullet-bred stock.
(c) Hygienic measures.

4. Treatment is of no avail and should never be attempted. All affected birds should be destroyed as soon as they are recognised.