

# Poultry Disease Diagnosis

The proper diagnosis of poultry diseases depends on three important factors:

1. identification of vital organs and body structure
2. knowledge of disease symptoms and lesions
3. a systematic plan for examining the bird's body

This publication outlines a plan for examining sick birds. Become familiar with the normal appearance of birds and their organs by following the procedure outlined here on one or more healthy birds. Examining a healthy bird can help you learn what to look for in sick birds.

It is especially important that you identify affected organs and tissues before seeking a diagnosis from poultry specialists. A treatment cannot be suggested unless an accurate history and list of symptoms and lesions are known.

## Flock History

Poultry diseases must be considered as diseases of the flock rather than individual diseases. Symptoms in a few individual birds are usually an indication of a more serious flock-wide problem. It is important that an accurate flock history be recorded. The source of many diseases can be determined from an accurate flock history.

A complete flock history includes the following:

- name and address of the owner
- number of birds in the flock
- breed, strain, and age of the birds

Management information consists of the following:

- hatchery source
- type of operation
- feeding program
- complete vaccination history

Information on the illness includes the following:

- date the illness was first observed
- severity and number of birds affected
- number of birds dying
- medication history

Final remarks of disease in previous flocks and any unusual problems or conditions should be included.

## External Examination

Before examining the bird internally, observe and inspect the bird for external symptoms. Note the general condition and fleshing (presence of meat on the bone) of the bird. Check the condition of the skin and all natural body openings (nasal openings, mouth, ears, and vent). Examine the head, eyes, comb, and wattles for evidence of swelling, canker lesions, or unusual discharge or coloration.

Look for signs of lameness, paralysis, or general weakness. Inspect the affected areas for abnormalities or swelling that can give a clue to the cause. If you observe a partial or complete paralysis, note the position the bird assumes. It is often an indicator of the cause of illness. Inspect the bird for external parasites such as mites, lice, ticks, and fleas.

## Euthanasia

Starting a flock treatment early often saves more birds than delaying treatment until the first birds die. For disease diagnosis, it is often best to kill a sick bird showing typical symptoms of the flock. Healthy birds from a sick flock contribute nothing when examined.

The most humane method of killing the bird is dislocation of the head from the cervical vertebrae.

Cervical dislocation is the most practiced method of killing birds for examination.

To dislocate the head from the vertebra, direct the bird's head toward you. Grasp the bird's head with a handshake grip. Place your thumb behind the head at the base of the skull, and allow the remaining fingers to extend under the throat. Hold the bird's feet with the other hand and stretch the bird until you feel the head separating from the neck vertebrae. You may need to bend the head back slightly while stretching the bird.

Be careful to stop pulling when the spine separates or the head may be pulled off. The bird dies immediately when the spine separates.

The killing of small birds such as chicks, poults, or parakeets is often difficult because their heads are small and hard to grasp. The vertebrae may be separated by applying pressure with scissor handles at a joint between two vertebrae. It is best to apply pressure on each side of the neck rather than at the throat and back of the neck. This avoids unnecessary damage to the gullet and windpipe.

Large chickens and turkeys may be killed this same way, using a burdizzo instead of scissor handles. A burdizzo is a plier-like tool used when castrating cattle and other farm animals.

It is important that you are familiar with the organs you will see. Become familiar with the following anatomy before examining sick birds.

## Poultry Anatomy

### Respiratory System

Each nasal opening leads into a nasal cavity that is connected to sinus cavities around each eye. A split in the roof of the mouth provides an air passage between the nasal cavities and the lower respiratory system. The nasal cavities filter the air before it enters the lungs.

The larynx is located at the rear of the mouth. It is the structure connecting the trachea (windpipe) and gullet. The trachea is a tube that separates into two bronchial tubes, with each tube attached to a lung. The trachea and bronchial tubes are supported by rings of cartilage that prevent the tubes from collapsing.

The lungs are located near the vertebra against the ribs. They resemble bright red sponges because of the abundant blood supply. Bird lungs are smaller in proportion to body size than other animals. Though

small, the lungs are aided by an extensive system of air sacs found only in birds.

The air sacs are thin membrane sacs that surround the internal organs. They are used as reserve air space to increase lung capacity. When the bird's body is opened, the air sacs appear as clear, thin membranes among the body organs. They are among the first sites affected by respiratory diseases.

### Digestive System

The mouth is connected to the rest of the digestive system by a thin-walled tube called the esophagus or gullet. The lower portion of the esophagus forms a pouch called the crop. It functions as a temporary storage site for food. The lower end of the esophagus is attached to the bird's stomach.

The bird stomach has two parts: proventriculus and gizzard. The proventriculus is the slightly enlarged area between the esophagus and gizzard. When opened, it has a deeply textured appearance. The gizzard has a tough membrane inner lining firmly attached to the muscular outer part.

The gizzard is attached to the upper end of the small intestine. The first portion of the small intestine is the duodenum. It is held in a loop-like position by the pancreas. The pink pancreas is located between and attached to the portions of the intestine forming the loop.

The lower portion of the small intestine is attached to a membrane called the mesentery. This mesentery is laced with many blood vessels that enter and exit the small intestine. When opened, the lining of the small intestine has a soft, velvety texture.

Two large, closed pouches called ceca are attached at the lower end of the small intestine. Bacterial action in the ceca helps break down some of the undigested food passing through the intestine. The ceca in adult chickens are usually about 4–6 inches long. When opened, they contain a darker brown waste material than the intestines.

Following the ceca, the small intestine changes into the large intestine. This large intestine empties into the cloaca, or the chamber where the digestive, urinary, and reproductive systems meet. The external opening of the cloaca is called the vent.

The liver is a large, brown organ located in the front portion of the body cavity (thorax). It is the largest organ

in the body. It has two large lobes separated by a thin membrane. Its function is to produce digestive fluids and filter toxic wastes from the blood. A digestive fluid produced in the liver (bile) is stored in the gall bladder. This gall bladder is a small, greenish pouch attached to the liver. A bile duct between the liver and small intestine directs the bile to the intestine.

### **Urinary, Reproductive, and Vascular Systems**

The urinary system in birds consists of kidneys and ureters. The kidney is a dark brown organ located in a pocket of the pelvic bones. There are two kidneys in each bird, and each kidney has a ureter. The ureter is a tube that passes the urinary wastes from the kidney to the cloaca.

The reproductive organs include the ovary and oviduct in the female and the testes in the male. The hen usually has only one ovary and oviduct. The ovary is a group of egg yolks in various stages of development and is located in the area of the kidneys. Some yolks may not be seen, while some in the laying hen may be the size of normal egg yolks. The oviduct in mature hens appears as a coiled tube extending from the area of the ovary to the cloaca. In immature females the ovary and oviduct may not be easily seen.

The reproductive system of the male consists primarily of the testes. The testes are oval organs located between the lungs and kidneys. Ducts through which sperm pass (ductus deferens) extend from each testis to the cloaca.

Vascular organs consist primarily of the heart and spleen. The four-chambered heart is located above the liver. The spleen is a spherical, reddish-brown organ located between the liver and gizzard. Its primary purpose is removing unhealthy blood cells, micro-organisms, and debris from the blood system.

## **Necropsy Procedure**

A necropsy is an examination of a dead animal. The only tool necessary to perform a necropsy is a sharp cutting utensil, but several good quality tools such as surgical type scissors, scalpels, or knives are recommended.

A sharp pair of surgical-type scissors and a scalpel, or knife, make it easier to cut the necessary tissues. Heavy shears help when cutting through bones. Although few poultry diseases can infect people, it is recommended that you wear disposable plastic gloves during the necropsy procedure.

1. Place the bird on a flat surface with breast side up and head directed away from you. The following steps are numbered to make it easier to follow the procedures.
2. Remove upper portion of the beak by cutting through the nasal cavities and turbinated bones. Turbinated bones are membrane-covered plates on the walls of the nasal chambers. This lets you observe the upper respiratory areas for the presence of infection. Squeeze the turbinate area and note if excessive matter oozes from the area. Check the eyes for inflammation (unusual reddening), mucus, or discoloration.
3. Insert one scissor blade into the mouth and cut through one corner of the mouth. Extend the cut down the neck so the interior of the gullet is exposed. Examine the mouth and larynx for abnormalities that indicate pox, mycosis, or other disease. Scan the gullet for tiny nodules (bumps) or signs of injury by foreign materials.
4. Cut the larynx and trachea from the mouth and open the trachea lengthwise. Examine its interior for excessive mucus, blood, or cheesy material.
5. Make an incision in the abdominal skin just below the tip of the breast cartilage. Extend the cut around the body on each side. Grasp the upper edge of the cut skin and bluntly peel the skin over the breast. This exposes the breast muscles. Examine them for conditioning and the presence of hemorrhages (sites of prior bleeding in the muscle).
6. Cut the skin on the abdomen where the legs join the body. Place a hand on each leg and press down and out until the femoral joints dislocate and the legs lie flat on the table. Remove the skin from the legs and check for small pin-point hemorrhages.
7. Make an incision through the abdominal muscles just below the tip of the breast bone. Do not cut too deep, or you may cut internal organs. Extend the cut toward the back and then angle toward the point of wing attachment on each side. Push the breast toward the head and dislocate the shoulder joints. Cut through the shoulder joints and remove the breast from the carcass.
8. Observe the condition of the air sacs. The membranes are often cloudy and covered with mucus in diseased birds.
9. Examine the liver for unusual swelling, lesions, hemorrhages, or abnormal coloration. Make incisions into the liver and check for scar tissue and necrotic (dead) tissue. Check the spleen for hemorrhages, lesions, and swelling. Check for a cloudy, fluid-filled sac surrounding the heart.
10. Remove the liver, heart, and spleen so the digestive system is exposed. Check the digestive system for abnormal nodules, tumors, or hemorrhages. Sever the gullet near the mouth and remove the entire digestive

system. You can cut the lower intestine behind the ceca for complete removal.

11. Cut into the crop. Note if the contents are sour smelling. Wash contents from the crop and examine the lining for thickened, patch-like areas or necrotic ulcers. Check for capillary worms by making a small cut and slowly tearing the crop wall as if it were a piece of paper. Capillary worms appear as small, hair-like fibers extending across the base of the tear.
12. Open the proventriculus, the slightly enlarged area between the esophagus and gizzard, and note any hemorrhages or a white coating on the lining.
13. Open the gizzard and examine the lining for unusual roughness or lesions. Determine if the lining is separating from the underlying muscles.
14. Slit the intestine lengthwise and examine contents for the presence of worms, free blood, and excess mucus. Check the lining for inflammation, ulcers, or hemorrhagic areas. If unusual conditions exist, note in which one-third portion of the intestine the conditions are located.
15. Open the ceca and examine the contents. Look for cheesy cores and small, thread-like cecal worms. If you find blood, wash and examine the lining for scarring and cecal worms.
16. Check the reproductive organs (ovary and oviduct in females, testes and ductus deferens in males) for abnormalities before removing them from the body.
17. Examine the kidneys and ureters for unusual swelling or the presence of whitish salt deposits.
18. Check the sciatic nerve extending to each leg for swelling. Once you remove the kidneys, you can see this nerve as a small, white fiber stretching from the spinal cord along the femur into the lower leg. Also check the brachial nerve extending from the spine, along each humerus, to the wing tip.
19. Observe the lungs and bronchial tubes for lesions and unusual accumulation of mucus.
20. You can make notes on history, symptoms, and lesions until you are familiar enough to diagnose diseases without consulting references. It is recommended that you follow all the procedures in this publication. Often two or more diseases can infect a bird and the symptoms may be confusing. Check all affected areas before making a diagnosis and administering a treatment.

## Diagnosis and Treatment

After you have listed the symptoms and lesions, you may refer to the internet or a good poultry disease manual to help you determine the proper diagnosis in your backyard flock. You can also get helpful advice from your county agent or Extension poultry specialists.

When you or a specialist diagnoses a disease, a specialist will recommend a treatment. Take care to administer the medication using the proper dosage, method of application, and recommended period of time. Becoming familiar with disease symptoms and lesions and following the proper diagnostic procedures will eliminate the difficulty of diagnosing many poultry diseases.

If you are a commercial poultry producer, notify your service technician at the first sign that you may have a disease problem with your flock. Your service technician may recommend a treatment plan based on his or her necropsy of sick birds on your farm. Follow the recommendations of your service technician for a treatment program and for management of temperature and house environment. Maintain a strong biosecurity program. Do not allow unnecessary visitors on your farm, and do not visit other farms where chickens are present. Limit your contact with other growers at such places as feed stores, co-ops, cafes, and so forth. Do not wear your chicken house clothes to town, and do not check your birds in the same clothes that you wore to town.

# Flock History

Owner \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

Number in flock \_\_\_\_\_ Breed \_\_\_\_\_ Age \_\_\_\_\_

Hatchery source \_\_\_\_\_

Type of operation (floor, cage, range, etc.) \_\_\_\_\_

Feeding program \_\_\_\_\_

Vaccination history

\_\_\_\_\_

Date illness first seen \_\_\_\_\_ No. affected by illness \_\_\_\_\_ No. dead \_\_\_\_\_

Symptoms and remarks

\_\_\_\_\_

## External Examination

Condition of bird \_\_\_\_\_

Comb and wattles \_\_\_\_\_

Eyes, ears, mouth \_\_\_\_\_

Vent opening \_\_\_\_\_

External parasites \_\_\_\_\_

## **Necropsy Results**

Gender \_\_\_\_\_

Head \_\_\_\_\_

Eyes \_\_\_\_\_

Nasal cavities \_\_\_\_\_

Mouth \_\_\_\_\_

## **Respiratory and Circulatory Systems**

Larynx and trachea (windpipe) \_\_\_\_\_

Lungs and bronchial tubes \_\_\_\_\_

Air sacs \_\_\_\_\_

Heart \_\_\_\_\_

## **Digestive System and Accessory Organs**

Gullet (esophagus) \_\_\_\_\_

Crop \_\_\_\_\_

Proventriculus and gizzard \_\_\_\_\_

Small intestine \_\_\_\_\_

Ceca \_\_\_\_\_

Cloaca \_\_\_\_\_

Liver \_\_\_\_\_

Spleen \_\_\_\_\_



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