

Feature article

The Impact of Management on Infectious Diseases in Broilers

Infectious disease is one of a number of factors that can affect performance in broiler flocks. Modern industry practices such as stringent hatchery sanitation programs, widespread vaccinations, use of feed additives and bio-security precautions have evolved to provide in most cases an effective shield against serious losses caused by disease. However, growers must still be on guard against outbreaks of infectious diseases. This newsletter outlines the basic facts growers need to know about the most common broiler flock diseases and the management practices that are most helpful in preventing disease problems.

Types of Diseases

Four basic categories of infectious diseases are seen on broiler farms. They are classified according to the organisms that cause the diseases, as viral, bacterial, fungal, or parasitic. Some of the categories are represented by only a few significant species or strains, others by several to many. Viruses can only reproduce in the chicken, whereas most fungal and bacterial species may reproduce in the environment as well as in the chicken. Parasites must leave the host in order to complete their life cycle in the litter and then may re-infect other chickens. The viruses in particular, and most bacteria, are contagious and may move directly from bird to bird. This is not true of the fungal and parasitic infections. Fungal infections are seen primarily in young chicks, whereas all other categories may infect broilers at any age.

Vaccinations, feed additives, sanitation and bio-security precautions protect against disease, but growers must still be on guard.

Only laboratory analysis can provide reliable diagnosis of specific diseases. Some infectious diseases result in unique signs or symptoms, but many do not. Further, some symptoms may arise from multiple causes. What growers can do and need to do is maintain careful observation of the flock and of bird behavior. If any abnormalities do arise, the general category of the disease problem usually can be identified. Steps then can be taken to suppress or at least limit the spread of the disease problem.

Viral Infections

A typical broiler flock will be exposed to many viruses. Planned immunization has been very successful in reducing their impact in broilers. Vaccines for the most significant viral diseases are administered to the parent flocks and their protective antibodies are passed in the egg to the hatchling broiler chick. The chicks are then usually hyper-immunized at the hatchery and also again in the field.

Good sanitation, proper ventilation and litter moisture control help stop spread of contagion.

“Airsacculitis” is one of the more common conditions, and may be caused by a combination of viral and bacterial causes. Watery eyes, coughing, and generalized respiratory distress are common symptoms. Severe cases may spread to the gut and result in condemnations and mortalities. Although improper vaccine selection or administration may be involved in triggering airsacculitis, it is usually the result of poor air quality, improper temperatures, poor drinker management, and/or severe environmental stress.

Some viral diseases also can have the effect of suppressing the bird's immune system. As a result, a flock may develop other unrelated infections. A damaged immune system can also make vaccinations ineffective. Preventing this serious situation from developing starts with the vaccination program. However, good flock management to eliminate stress is also extremely important. Adequate ventilation in terms of air quality and quantity dilutes virus particles and reduces litter moisture for controlling the secondary bacterial infections. Removal of dust and feather follicles from house equipment between grow-outs also helps reduce viral causes.

Growers should be aware that viral infections tend to be highly contagious and may move from bird to bird, house to house, or farm to farm. Bio-security and sanitation precautions are very important in combatting viral diseases. Continued poor performance in successive flocks, lack of bird uniformity, and excessive disease

problems from a variety of infections are signs of immune-suppressive viruses. The integrator usually conducts testing to assess the immune status of representative flocks on a complex basis.

Bacterial Infections

Most bacteria are opportunists by nature and may infect the chicken through any point of entry and then invade a variety of tissues or organs. Often the symptoms produced by bacterial infections are not unique and their exact identification requires lab diagnosis. Massive infections, which are rare, may produce generalized infection among different tissues and organs, resulting in mortalities, often with an extremely putrid odor. Good litter management and removing dead birds as soon as possible are effective in avoiding or limiting problems from these bacteria.

Good litter management and prompt removal of dead birds help stop spread of bacterial disease.

Bacterial infections that originate in the hatchery are most commonly found in the navel area or respiratory system (lungs). Navel infections in day-old chicks are usually characterized by a foul odor, excessive culls, and occasionally high mortality in the first three days. Respiratory tract infections may result in high early mortality and severe reactions to respiratory vaccines. Such infections may be caused by a variety of bacteria and usually, but not always, originate at the hatchery. Low litter moisture, water sanitation, proper brooding temperatures, and enclosed drinker systems are effective in reducing these bacterial infections on the farm.

Fungal Infections

Although fungus spores from a variety of species are common in the broiler house environment, serious infections are usually confined to the baby chick and most often originate in the hatchery. The most significant fungal infection in the chick is aspergillosis, which usually involves the respiratory system. Common signs in the hatchling chick are gasping, sleepiness, and increased mortality. Hatcheries make a concerted effort to prevent *Aspergillus* in the incubation and hatching environment. When aspergillosis is suspected in baby chicks, good brooding practices and culling will help.

Good water sanitation and litter management are very important to control parasitic disease.

Parasitic Infections

Only one type of parasite, the coccidia, is of economic significance in broiler production. The coccidia are parasites of the cells lining the intestine. Their greatest impact is on growth, feed efficiency and skin coloring. Additives are usually put in the rations for prevention and control of these parasites. The parasites survive in the litter as very resistant cysts and infection occurs when birds peck into the litter.

Symptoms may include loss of skin color, diarrhea, passage of undigested feed, and occasionally by obvious blood in the fecal material. Mortality as result of coccidial infections is rare. Water and litter management, especially in limiting litter moisture, are very effective in reducing economic losses from this group of parasites.

Exotic Diseases

Certain exotic diseases must be prevented from entry into any commercial flocks in the United States. These include, but are not limited to, exotic Newcastle disease virus and avian influenza. Extensive surveillance and avoidance programs are in place at both the state and national levels. For broiler growers, bio-security at the farm level is the best insurance for reducing the threat of introduction of exotic diseases. Limit entry and traffic on the farm to only what is absolutely necessary for routine operations. Both diseases mentioned can be devastating in large flocks and could compromise an entire industry.

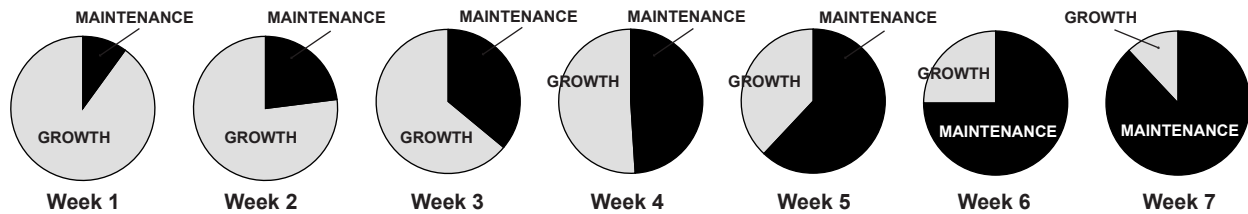
On-farm bio-security precautions are critical to prevent exotic diseases from causing damage to the U.S. poultry industry.

Farm Management for Disease Control

In most instances the presence of infectious organisms does not result in specific or obvious disease on a flock basis, but rather results in an added burden on body maintenance requirements of the broiler. In other words, continuous low level exposure can cause a broiler flock to have to expend some of their nutritional intake on limiting the impact of low-grade infections. These nutritional expenditures can be in the form of mounting an immune response, abnormal body temperature swings, reduced consumption and absorption of feed, and general responses to stress.

Generally speaking, our past experience in large-scale broiler production over the years allows us to predict the presence of the significant disease-causing organisms and the industry has developed integrated

Keeping Birds Stress-Free Prevents Disease and Promotes Growth



These pie charts show that as birds grow the percentage of their feed energy that must go to body maintenance (instead of growth) gets larger and larger. The lesson to be learned is that flocks must be kept as free of stress as possible, so that they are less susceptible to disease and their energy demands for body maintenance are kept as small as possible. This allows the greatest possible feed energy to produce growth, and produces the best feed efficiency numbers. *Maintaining consistently good in-house conditions helps healthy birds stay healthy and gain weight rapidly.*

Bio-Security: Essential Steps to Prevent Disease Outbreaks on Your Farm

Many chicken diseases, including exotic Newcastle's disease, avian influenza, and laryngotracheitis (LT), could be devastating to individual growers and to the industry as a whole. While the integrators take all possible steps to prevent disease outbreaks from their operations, the grower must realize that the ultimate responsibility for keeping diseases off the farm rests with the individual grower. Here are the most important precautions you should observe:

1. Do not allow unauthorized or unnecessary visitors to come onto your farm or into your houses. No one should enter one of your houses except by invitation for a specific purpose.
2. Do not yourself visit other poultry houses except for specific need and on invitation, and if you do be sure to take proper bio-security precautions.
3. Require all visitors and employees to wear disinfected rubber boots or 6-mil disposable plastic boots to enter a house. Keep a supply of plastic boots on hand.
4. Make your houses wild bird-proof, discourage other fowl from coming onto your premises, and avoid contact with other birds by yourself and your employees.
5. Keep your houses clean and free of rodents.
6. Do not use a pond or lake as a water source for your flocks.
7. Pick up and properly dispose of dead birds promptly.
8. Make sure all equipment, such as cleanout equipment, is thoroughly cleaned and disinfected before coming onto the farm or being used in your houses. This rule must be applied both to your own equipment and to equipment used by any contractor.

health programs that target each of the categories. However, it remains a common misconception that the various health programs (i.e., feed additives, vaccines, sanitation chemicals, etc.) provided at the hatchery, in the feed, or administered to the chick bear the sole responsibility for flock health. In fact, meeting the needs of the modern-day broiler through proper flock management is at least as important, or probably more so, than the integrated health programs in limiting losses to infectious diseases.

Flock management to eliminate stress keeps birds healthy, prevents low-level disease from sapping feed energy away from growth.

Often, the difference in broiler performance among houses or farms is the percentage of feed nutrients that go for body maintenance requirements versus growth. In general, feed goes to body maintenance and feather development first and what is left over is available for growth. Therefore meeting the needs of the flock via optimal management limits nutritive requirements for maintenance and maximizes flock performance. Marginal management in terms of improper house temperatures, poor air quality, excessive litter moisture, and generalized stress, will increase disease susceptibility in most flocks and shift feed ingredient utilization from growth to body maintenance. This is why proper management in the grow-out is so important to

complement the integrated health programs and provide an environmental foundation for the flock that will optimize the effectiveness of feed additives, vaccines and sanitation chemicals.

The brooding phase is especially important. Upon arrival at the farm, the chick must eat and drink immediately. Why? Because rapid feed and water consumption provide the critical nutrients necessary for the development of tissues and organ systems that allow maximum performance and health. In most instances the chick will have been vaccinated with various live viruses that will produce some degree of infection. This is necessary in order to encourage development of the immune system. However, it is critical that the brooding environment provide stress-free, optimal conditions in terms of feed, water, air quality, house, and litter temperatures, so that chicks can get through this stage as quickly as possible and start growing rapidly. Flocks that are started well will continue to make good growth and fend off disease problems as long as they are given the proper environment for growth.

The Bottom Line

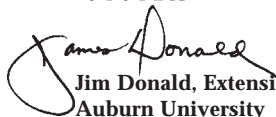
Vaccination, feed additives, sanitation and bio-security programs provide a solid first line of defense against disease in broiler flocks. But grower management in terms of facility and equipment, feed and water availability, temperature regulation, air quality, litter quality, and sanitation is equally important and has an enormous impact on poultry health. Management and health programs are inseparable and must be considered in combination with all facets of live production in the grow-out. The proper blend of health and management programs will provide an environment that will offer the best opportunity for sparing nutrients in the feed for growth, instead of expending them on body maintenance beyond what is necessary for best bottom-line performance.

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Jim Donald, Extension Engineer
Auburn University


Mike Eckman, Extension Poultry Scientist
Auburn University


Gene Simpson, Extension Economist
Auburn University

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