The nature and origin of disease

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Consideration of flock health is an essential component of any good management program. Few management decisions are without some degree of influence on the health of the poultry flock.

Because of wide-ranging differences between poultry operations, no one flock health program will apply in all situations. Before mapping out a flock health program, it is necessary to know the nature of diseases affecting poultry and where they originate.

THE NATURE OF DISEASE

A working knowledge of the nature of disease is probably the most important single factor in managing flock health. The need for this knowledge is not greatest in some distant laboratory, or in a central management office--the need is most acute where the birds live.

If the man directly involved with flock maintenance is ignorant of the nature of disease, then many problems will go unnoticed until a major blowup occurs.

Utilize veterinarian

I think the best advice here is to include a competent poultry veterinarian in the management operation. If the production enterprise isn't large enough to accommodate a full-time veterinarian, then arrangements should be made to retain one on a regular part-time basis.

The poultry veterinarian has the knowledge of disease needed for managing flock health, and it should be his responsibility to transfer needed basic knowledge to flock managers and other personnel with daily exposure to the birds.

Disease is not an easily defined term. In its broadest term it can apply to any biological abnormality which results in impaired fertility, hatchability, livability, productivity or product quality.

Many of us have the mistaken notion that we've got to see mortality or drastic postmortem tissue alterations for a problem to qualify as a disease. Neither is consistently true.

Infectious bronchitis in a laying flock, for example, causes little mortality and few severe tissue changes, but it can devastate egg production. On the other hand, lymphoid leukosis causes mortality and unmistakable postmortem lesions, but it rarely has a substantial effect on productivity.

Some disease noninfectious

The cause of disease should be understood also. We put a great deal of emphasis on infectious diseases, but by no means are all flock losses infectious in origin. Many very important diseases represent behavioral (e.g., hysteria, cannibalism), metabolic (nutritional deficiencies, poisonings), or management (chilling, starvation, dehydration) defects. It is
important, however, to be aware of infectious agents, how they are transmitted, how to get rid of them, how to prevent or control the diseases they produce, etc.

Susceptibility varies

Another important factor in understanding the nature of disease is the susceptibility of the bird. We all know that some part of the susceptibility or resistance of chickens or turkeys is genetically determined. We know also that some infectious agents are so potent or virulent that they can overcome natural resistance in most birds. On the other hand, perhaps most infectious agents are opportunists. They have very little obvious effect on normal, healthy, well-cared-for birds, but may produce severe disease and drastic losses in birds that are stressed by rough handling, chilling, poor ventilation, etc.

We're just beginning to pay close attention to the importance of the immune system in the maintenance of flock health. The story unfolding indicates that birds with a faulty immune system are highly susceptible to infectious agents and respond poorly to vaccines. Assuring proper development of the immune system is a worthy objective of future research efforts.

Outward signs may be a few

The manifestations or outward signs of disease must be understood, too. We're often lulled into the stereotyped view that if we don't see some drastic abnormality in the behavior or appearance of the poultry flock, we don't have to worry about disease.

In many situations, such as silent infections or marginal nutrient deficiencies, there may be few outward signs of disease, yet the disease is there and smoldering. Birds need to be checked regularly if this type of involvement is to be detected and controlled before serious losses occur.

Finally, and extremely important in knowing about the nature of disease, it is absolutely essential that key personnel keep updated on new information. Attendance and participation at meetings, reading trade journals, and scientific periodicals, verbal communication by personal visits or telephone calls are all appropriate in obtaining needed information to keep abreast of the latest and most effective means of managing flock health.

THE ORIGINS OF DISEASE

If we are to emphasize disease prevention, it is absolutely essential to know where diseases come from.

Some of the more common origins are:

1. Genetic defects
2. Management-related
3. Feed and water-related
4. Infectious.

Genetically Determined defects
Some diseases are clearly of genetic origin, and many others are suspected to have a genetic component. Anatomic deformities (for example, kinky back in broilers, wry neck, cystic or malformed kidneys, cystic right oviduct) fall in this category as do some behavioral (hysteria) and growth (poor feathering and tibial dyschondroplasia) problems.

Generally, our major breeders have done an excellent job of excluding these problems, and they seldom cause major constraints on productivity.

**Management-related disease**

Unfortunately, starvation, dehydration, cannibalism, ammonia blindness and a variety of other such diseases are not all that uncommon. These problems can be directly related to careless or inattentive management. These diseases can be avoided by insisting on regular and frequent flock observation and timely performance of the day-to-day adjustments needed to maintain a healthy flock.

Some problems seem to have evolved with newer and otherwise very beneficial management systems. Cage layer fatigue and fatty liver syndrome, for example, are seen particularly in layers kept in cages.

Certainly, the maintenance of layers in cages has virtually eliminated many diseases such as coccidiosis and intestinal parasites, but we need to recognize that new management procedures such as this may create a few new problems also.

**Feed and water-related diseases**

Diseases in this category include nutritional deficiencies, intoxications and problems associated with chemical residues. All of these problems can be costly and disruptive, and they need to be watched very closely. The best approach to their prevention is monitoring of feed and water to assure desired quality and advance knowledge of dangerous contaminants.

**Infectious disease origins**

These diseases have so many possible origins that it's difficult to specifically pinpoint them. Some of the more common origins are:

1. **The breeder flock.** Any infectious agent that is passed from the breeder hen, through the egg, to the hatched chick or poult has its ultimate origin in the breeder flock. Mycoplasmosis, salmonellosis and avian encephalomyelitis are among the diseases that can originate from breeder flocks.

2. **The hatchery.** Several diseases can originate within the hatchery as a result of faulty sanitation. Omphalitis, salmonellosis, and aspergillosis are examples.

3. **The contaminated premises.** Infectious agents that are difficult to kill by routine cleanup and disinfection are likely to be carried over from one brood to the next simply by survival on the contaminated premises. In this category would be diseases caused by clostridial
spores, the erysipelas bacterium, staphylococci, infectious bursal agent, adenoviruses, Marek’s disease herpes-virus, etc.

Special efforts need to be made to get rid of these agents by meticulous cleanup and proper selection of disinfectants.

4. **Biological and mechanical carriers.** These are particularly common sources of infectious diseases. Blood-sucking arthropods (mosquitoes, blackflies, mites, ticks, etc.) are known to be involved in transmitting such diseases as pox, spirochetosis, leukocytozoonosis.

Rodents and fee-flying birds are dangerous sources of the causative agents of cholera and salmonellosis.

Flies and beetles can be carriers of a number of infectious agents and are known intermediate hosts of several internal parasites.

MAN is, without doubt, the most dangerous mechanical carrier of all infectious agents that can survive (in exudates, fecal material, dust, etc.) long enough to be tracked from one premises to another.

5. **Recovered or normal appearing carrier birds.** Recovery from an infectious disease during the brooding or grow-out period does not mean that the birds are totally free of the infectious agent. Started pullets may thus bring infectious agents into the laying house, and if pullets from more than one source are congregated, disease may result.

Adult birds (such as spent hens) are especially dangerous sources of infection for younger birds with dissimilar exposure backgrounds.

Elimination of the carrier bird as a source of infection is one of the major justifications of the all-in all-out management system. On the other hand, it is the carrier bird source which will surely perpetuate certain infectious diseases (e.g., coryza) in any multiple-age operation.

6. **Dead birds.** There is always a small percentage of birds in any flock that are more susceptible to infections than the rest, and these may be killed even by opportunistic agents. These birds act as factories for the involved agent and dead birds represent a source of massive concentrations of the disease organisms.

If dead birds are left in the flock for any extended period of time, it simply magnifies the number of infectious particles to which healthy birds are exposed. This is the basis for recommending that dead birds by removed from the flock frequently and handled carefully.