

Disease

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The term disease implies a deviation from health. Disease can be caused by invading organisms (infectious diseases), or may result from nutritional imbalances or toxic substances in the feed, environmental stress (as a result of some error or failure in management) or even genetic problems. Disease may be **acute** (sudden onset), **sub-acute** or **chronic**, and either **clinical** (can identify sick animals) or **sub-clinical** (no visible symptoms).

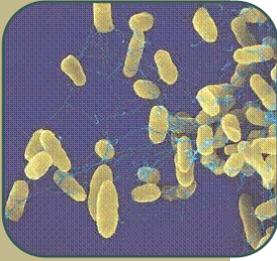
Infectious Diseases are those caused by infectious agents that include a variety of pathogenic bacteria, viruses, parasites, fungi, etc. **Zoonotic** diseases are those that are transmissible from animals to humans and may have significant human health concerns (e.g. Rabies). Infectious Diseases are complex and influenced by many factors. In order for an infection to occur the following combination of circumstances are needed:

- **a susceptible host:** The bird must be susceptible to the disease. It must be the appropriate species, the correct age, and not immune to the potentially infectious agent. If enough birds in a flock are susceptible a disease outbreak could occur.
- **a suitable agent:** The disease causing agent must be able to gain access to or invade the host, then replicate within the host and cause damage that results in the symptoms of the disease. An organism capable of causing disease is called a **pathogen** or **pathogenic agent**.
- **a suitable environment:** Conditions that allow the disease causing agent and the susceptible host to interact.



*Northern Fowl Mite
(Ornithonyssus sylviarum).*

Pathogenic Agents



*Bacteria
(Salmonella
enteritidis).*

Bacteria

Bacteria are small, single-celled organisms that abound in the environment. Some bacteria require oxygen to grow (**aerobic**) and thrive in tissues rich in oxygen like the respiratory tract and blood stream. Other types of bacteria are **anaerobic**, and grow in the absence of oxygen.

Of known bacteria, 99% are considered beneficial or harmless to the body. Bacteria of concern however, replicate in the body and produce toxins, enzymes and acids that harm the host. Most types of bacteria grow well and survive for long periods outside the host in organic substrates like manure. They can survive for months, even years, on surfaces of floors, walls, fans, and boots. Careful cleaning and disinfection of the barn, loft or pens between flocks is crucial in reducing bacterial load and minimizing the likelihood of diseases carrying over to the next flock.

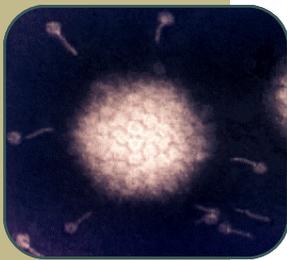
Viruses

Viruses are exceptionally small organisms that can only be observed through the use of an electron microscope. Examples include: Infectious Laryngotracheitis (ILT), Avian Influenza virus, West Nile Virus, and paramyxovirus (Newcastle disease virus). Unlike bacteria, viruses can only replicate within a living host cell. The **virion**, the infective part of the virus that contains the viral genetic material, gets injected into a host's cell. The virus then overtakes the regulation of the cell, forcing it to code for new viral genetic material, enzymes, and structural proteins. This shutdown of the host cell's biochemical pathways and energy producing systems results in damage or destruction of the cell. The cell lyses (bursts open) and the "new" viruses that have replicated are released to infect other nearby cells.

Generally, viruses that cause diarrhea are shed in the feces and infection is through the fecal/oral route. Viruses that infect the respiratory tract are shed through saliva and nasal discharges and infection is through contamination of the oral/nasal cavity or via inhalation. Viruses that impact multiple body systems may enter through many routes. Antibiotics are **NOT** effective against viruses, and with the exception of a few drugs used in human medicine, there is no treatment for viral diseases.

Biosecurity supplemented with vaccination is the best defense.

Some viruses are quite fragile and do not survive for long periods outside the host, while others are amazingly resilient and can survive, but not replicate, for years in the soil or old manure. Some viruses are so resistant that only extremely toxic agents like formaldehyde are powerful enough to kill them. It is because of these characteristics of viruses that producers must be so careful with their management; all in all out, good sanitation, traffic control, wild bird control, etc...all of which make up a good farm **biosecurity** program.



*Virus
(Adenovirus, the cause
of marble spleen
disease in pheasants).*

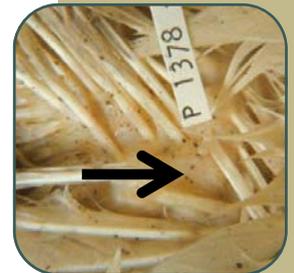
Pathogenic Agents

Parasites

The term parasite includes any organism that lives on or within another living organism and gains nutrients or some other advantage from that organism. With this definition many organisms including bacteria, viruses, and fungi are parasites, but in general the use of the word parasite is restricted to **protozoa** (e.g. coccidia or *Trichomonas*), **helminthes** (worms) and **ectoparasites** (mites, ticks, etc.). Depending on the nature of the invading parasite, they can cause problems by competing for nutrients (i.e. coccidiosis and roundworm infestations), weakening the birds external defense mechanisms (i.e. mites) or by destroying blood cells (i.e. leucocytozoonosis).



Coccidial eggs in feces.



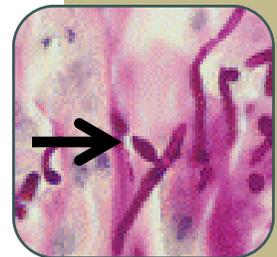
External parasites (Northern Fowl Mites).

Fungi

Fungi are single-celled plant organisms that include yeasts, moulds and mushrooms. The simplest forms are single-celled budding yeasts. In birds, yeasts like *Candida albicans* may be present in the environment or within portions of the digestive tract like the crop. Under certain conditions, like prolonged antibiotic use or an over-distention of the crop with food, these yeasts may overgrow and damage the crop lining.

Fungi can cause disease by:

- **Direct invasion of tissues and release of toxins by fungal cells.** Aspergillosis is a good example of this and the most important fungal disease of birds. *Aspergillus* grows readily in damp, warm environments, like wet litter or around a leaky drinker. Birds become infected by inhaling large numbers of the fungal spores which then grow in the bird's respiratory tract and air sacs. Other important fungal diseases are Thrush caused by *Candida albicans* and Dactylariosis caused by *Dactylaria gallopava*. See [Aspergillosis](#) factsheet (6.5).
- **Allergic disease.** Although allergies to the fungal spores are rarely diagnosed or reported in birds, this can be a significant health concern for people working in dusty bird environments (i.e. Bird Fancier's Lung).
- **Mycotoxigenesis or the ingestion of toxic fungal metabolites in feed.** Grains become infected with fungi during the growing season and the toxins, produced by the fungi, remain in the grain after it has been harvested. The toxins become inadvertently incorporated into the avian diets. Mycotoxigenesis is particularly important if the summer has been hot, humid and rainy.



Budding yeasts (*Candida albicans*).



Pigeon with trichomoniasis cankers in mouth.



Non-infectious Disease

Examples of non-infectious diseases include:

- Nutritional deficiencies or excesses.
- Toxic agents (lead poisoning, pesticides, mycotoxins, etc.).
- Genetic abnormalities (extra toes, deformations, etc.).
- Management related diseases (mismanagement of incubator, ventilation, feed, water, etc.).
- Metabolic/endocrine imbalance (leg problems or ascites in fast growing birds, etc.). See [Ascites](#) factsheet (6.3).
- Autoimmune disease (thyroiditis in budgies, etc.).
- Tumours or cancer.

Key Points to Remember:

- Bacteria can replicate in the environment in the absence of a host bird.
- Viruses can only replicate within a living host, but some are very hardy and can survive for long periods of time in the environment.
- Bacterial diseases can be treated with proper antibiotics, but antibiotics **ARE NOT** effective against viral diseases.
- Viral diseases must be controlled by good biosecurity, supplemented with vaccination (if available).
- The key to controlling fungal disease and parasites is good management.
- Nutritious feed, good quality water and good management practices will prevent most non-infectious diseases.

TAKE HOME MESSAGE

This factsheet has introduced you to the many different things that can cause disease in your birds and could also impact your health and safety. Understanding the differences between agents that cause disease and the importance of good husbandry will help you develop your management and biosecurity programs.



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