

Department of Animal Science

MAREK'S DISEASE IN BACKYARD POULTRY FLOCKS

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Backyard poultry flocks have become a popular pastime for folks across Tennessee in recent years, especially since the start of the Covid-19 pandemic. Some people enjoy watching the various personalities of their chickens interact with their flock mates. Others enjoy the experience of gathering eggs and knowing where their food comes from. Still others are attracted by the opportunity that backyard chickens offer as a way to introduce their children to agriculture and teach them the responsibility of caring for the backyard flock. Regardless of the numerous reasons urban and rural small flock keepers have for raising chickens, many are unaware of a common poultry disease that, without early vaccination, is a serious threat to their flock.

Marek's disease

Marek's disease is perhaps the most widespread poultry disease in the world. The disease was first reported in 1907 by József Marek, for whom the disease is named. The disease is now found worldwide and is a major concern to anyone associated with chicken production, from commercial poultry integrators to backyard flock keepers. Marek's disease is a highly contagious viral disease caused by a herpesvirus within the subfamily *Alphaherpesvirinae*. The virus has the ability to invade the body and survive for long periods of time without being destroyed by the chicken's immune system. The virus infects certain white blood cells, causing some of the cells to become cancerous. These cells then infiltrate internal organs (heart, lung, kidneys, liver, gonads and proventriculus), peripheral nerves, skin and muscles. Marek's disease can occur in chickens as young as 3 to 4 weeks of age but is more common in birds between 12 and 30 weeks of age. Female birds are often more affected than males. The disease is not specific to chickens and can also infect quail and, on rare occasions, turkeys.

Transmission

Marek's disease virus replicates in the feather follicles and is shed into the environment in the dander. Birds become infected with Marek's disease by inhaling virus-laden dander.

Transmission can occur by direct and/or indirect contact between chickens. While the virus is easily killed in the purified form, the virus can live for years in the dander. As a result, once the

disease enters a coop, the environment will most likely be infected for months or even years, even if all the birds are gone. Like many herpesviruses, once a chicken becomes infected, it will be infected for life. However, not every infected bird will get sick and show symptoms. Both infected and recovered birds will continue to shed the virus in their feather dander and through nasal and oral secretions for the remainder of their lives. The percentage of clinically sick birds in a flock will depend on the strain of the virus (some strains are more virulent than others) and the breed of bird; for example, leghorns and other lightweight egg-type breeds tend to be more vulnerable to the disease than meat-type breeds. Silkies in particular are highly susceptible to Marek's disease. Seemingly healthy birds may be infected and, if so, will regularly shed the virus into the surrounding environment.

The percentage of illness in a flock can be anywhere from 1 percent to 60 percent. The number of sick birds that die may reach 100 percent. If you have infected birds in your flock and you bring in new birds, the new birds are at risk of becoming infected if they are housed with your flock and did not receive Marek's vaccination at hatch. This is especially true for young chicks which are highly susceptible. Even if new birds are quarantined away from infected birds, caretakers can transport the virus-laden dander on shoes, clothing, hands, hair and skin and spread the disease. However, the disease is not transmitted through the parents to the egg, and unfortunately there is no effective treatment for the disease.

Symptoms and forms of Marek's disease

Birds that develop clinical symptoms of the disease usually do so because of some type of stress trigger. This might be normal hormonal changes associated with the onset of egg laying in hens or crowing in roosters, flock fighting and peck order establishment, extreme weather conditions, predator attack, change in management or flock ownership, high parasite load or rough handling. Early symptoms may include birds suddenly going lame, and this initial lameness may be mistaken for an injury; however, the lameness worsens until the bird is unable to walk. Birds may develop the classic Marek's paralysis pose in which one leg is positioned straight out in front and the other is straight out behind. Symptoms will depend on which tissues are attacked. In its classic form, Marek's will cause inflammation and tumors in the nerves, spinal column and brain. Birds will become paralyzed in the legs or wings and may develop head tremors.

There are four different forms of Marek's disease (Figure 1), and infected birds may exhibit one or more forms:

1. Nerve (neural) (Fig. A)
2. Eye (ocular) (Fig. B)
3. Internal organ (visceral) (Fig. C)
4. Skin (cutaneous) (Fig. D)

Each form of the disease has its own symptoms. Birds infected with the subcutaneous form have enlarged feather follicles (often called skin leucosis) that redden and may turn brownish in color and may scab over. The neural form is by far the most common and is characterized by enlarged nerves, leading to paralysis, incoordination and breathing difficulties. Often the paralysis involves only one leg or wing. These birds often die of starvation or are trampled to death if not euthanized and removed from the flock when symptoms develop. The ocular form causes blindness, and the pupils do not respond to light correctly. The iris may turn gray, so this form of Marek's is often called "gray eye." Birds infected with the visceral form of Marek's disease will

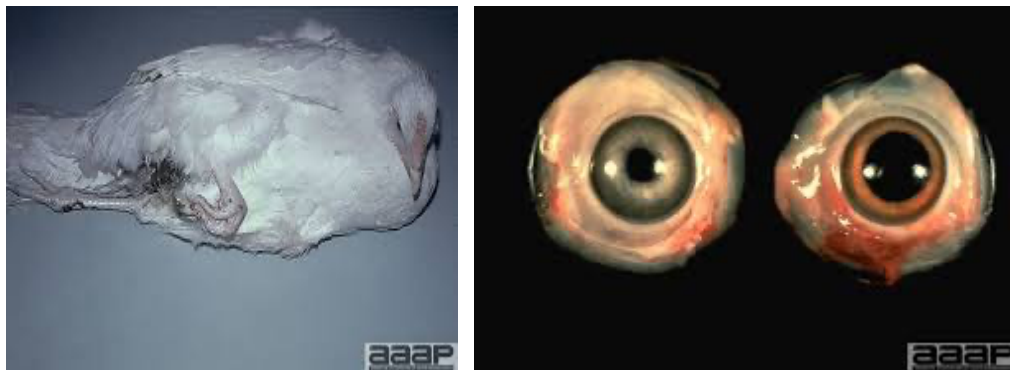
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have lymphoid tumors of various organs. Tumors typically occur in the liver, spleen, heart, lungs, kidneys, proventriculus, gonads and muscles.

There are a number of clinical signs to watch for that may indicate a problem with Marek's disease within the flock. These include:

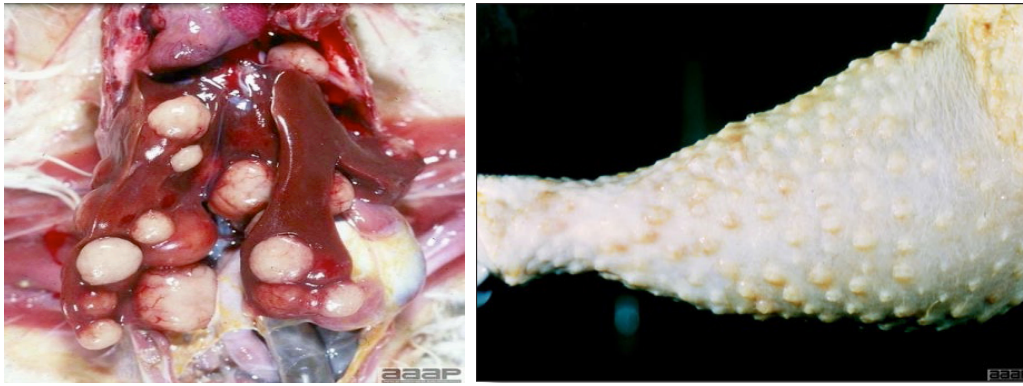
- One leg stretched forward and the other back
- Paralysis
- Gasping
- Drooping wings
- Squatting position
- Inward curving of the toes
- Incoordination
- Torticollis (twisted or crooked neck)
- Nervous tics
- Blindness
- Irregularly shaped or unequally sized pupils
- Change in eye color
- Enlarged crop
- Delayed crop emptying
- Weight loss
- Loss of appetite
- Depression
- Paleness
- Enlarged feather follicles, especially on legs
- Reddened, bloody looking shanks

Figure 1. Forms of Marek's disease. A. Nerve, B. Eye, C. Internal organ, and D. Skin.



A

B



C

D

Source: American Association of Avian Pathologists (AAAP).

Vaccination

There is no cure or treatment for Marek's disease. Vaccination is the only method to control the disease. However, the vaccine should be administered at hatch or *in ovo* (in the egg) before hatching. It may take approximately 2 weeks for birds to build up immunity from the vaccine. During this time, it is critical to prevent young chicks from being exposed to the virus. It is always best to purchase chicks from a hatchery that can vaccinate the chicks before shipment, but if you choose to do it yourself, check with your veterinarian, and be sure to follow instructions on the vaccine label to ensure best results. Vaccines are available for purchase by small flock owners, but they come in large quantities (1,000 bird doses) and must be shipped and stored properly (35-45 F) to be effective. The vaccine should arrive refrigerated with cold packs because it must not be allowed to warm up while in storage. The vaccine must be refrigerated until it is used to be effective. If it arrives warm, it is no longer effective. Carefully follow instructions on how quickly to thaw, what temperature to thaw and using the vaccine within 1 hour after reconstitution. As hardy as the virus is in the feather dander, it is a live virus and dies rather quickly in the vaccine form. Unfortunately, once the vaccine is reconstituted, it must be disposed of after one hour. It cannot be stored for later use as the vaccine is no longer effective after one hour. The vaccine must be injected under the skin usually on the back of the neck to be effective. Vaccinating older birds is not an effective means to prevent Marek's disease as exposure to the virus occurs shortly after placement of the chicks at the farm.

It is possible to vaccinate older birds, but the vaccine will likely not be effective because the birds have probably already been exposed to a natural Marek's challenge by then. Again, Marek's is one of the most common poultry diseases in the world. Always practice good biosecurity, and keep young birds and older birds separated to reduce the threat of disease transmission. Eggs and meat from infected chickens are not affected by the disease and are safe to eat when cooked properly; however, if a chicken was infected with the cutaneous form of Marek's, it may have skin lesions and/or internal tumors that may be unsightly.

Sources of help

- Your local county Extension agent
- Your local veterinarian
- Tennessee State University Extension Poultry Specialist (615-963-5823)
- University of Tennessee Extension Poultry Specialist (931-486-2129)
- C. E. Kord Animal Health Diagnostic Laboratory (615-837-5125)



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