

TECHNICAL BULLETIN



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PREVENTION OF FOWL POX IN LAYERS

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Introduction:

Fowl pox virus (FPV) is a slow spreading viral disease of various avian species that causes skin lesions (dry pox) seen around the comb, wattle, ear lobes and eyes. The diphtheritic (wet pox) lesions are associated with the oral cavity and the upper respiratory tract, especially the larynx and trachea. The latter form is the more serious and the source of current industry problems. The course of the disease in individual birds is from 10 days to two weeks and “on a flock basis” generally lasts 6 to 10 weeks.

There are many types of avian pox viruses and they tend to be specific to particular species of birds. All age groups are at risk and distribution of this disease is worldwide. The incidence of disease is variable depending on climate, management, hygiene, biosecurity and use of a regular vaccination program.



Wet Pox in Trachea, Patchy Lesions

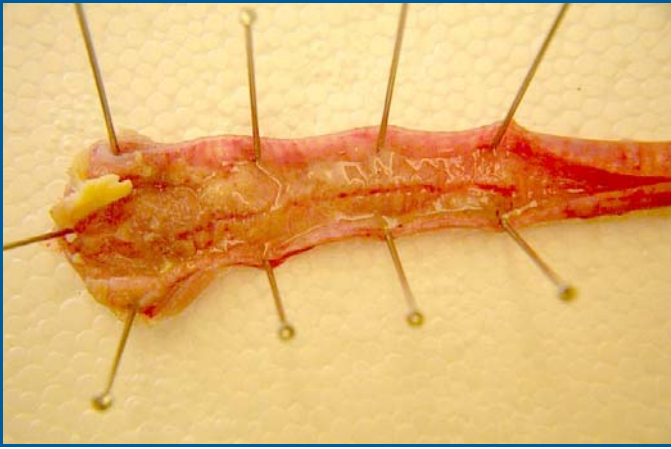


Wet Pox Lesions in Trachea, Similar to ILT

History:

In the past 15 years, outbreaks of wet pox have caused severe mortality losses in both vaccinated and non-vaccinated flocks. Field isolates from severe wet pox cases have been studied and some have been found to contain intact reticuloendotheliosis (REV) provirus or long terminal repeats (LTRs) of REV. Most of these field strains show a greater pathogenicity and induce an antibody response to both REV and FPV. REV is associated with immunosuppression and, with integrated sequences in the genome of FPV, seems to play an important role in the pathogenesis and prolonged persistence of wet pox.

Wet pox alone can cause high mortality of up to 50-60% in unvaccinated chickens. This disease can start out as wet pox and spread to birds in the dry pox form and vice versa. It can be found causing both wet and dry pox at the same time. Infectious laryngotracheitis (ILT) can occur as a dual infection with wet pox.



Wet Pox in Trachea, Thickened Wall with Necrotic Membrane

Lesions – Wet Pox:

Tracheas can appear reddened or hemorrhagic during certain stages of the disease, clinically similar to an ILT infection. The trachea wall is thickened with proliferative, inflamed, often patchy lesions on the interior surface. Mortality occurs when the lesion totally occludes the larynx or the upper part of the trachea.



Occlusion of the Larynx; Typical of Wet Pox or ILT

Wet pox lesions can also be found in the mouth or conjunctiva of the eye. Other upper respiratory diseases such as ILT, viscerotropic velogenic Newcastle disease (VVND), avian influenza (AI), *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), coryza, and cholera may complicate an initial diagnosis of wet pox because of similar respiratory lesions.

Lesions – Dry Pox:

- Proliferative scabs on unfeathered skin areas of the bird
- High level of morbidity
- Poor weight gain in pullets
- Drops in egg production up to 15%



Dry Pox Lesions on Comb, Nostrils, Beak and Wattles

Diagnosis:

Dry pox can be identified visually by the characteristic scabs on the featherless areas of the bird. Diagnosis of the wet pox form can be complicated by similar appearing lesions of other respiratory diseases. The only conclusive way to confirm wet pox is by using histopathology on suspect lesion tissue fixed in formalin. The presence of eosinophilic intracytoplasmic inclusion bodies (Bollinger bodies) is diagnostic for pox virus infection.

Transmission:

The virus contained in the scabs contaminates the environment and remains infective for many months. Mechanical transmission is considered the primary method for dissemination of the virus, although airborne transmission is also suspected in many cases. Infection can occur through injured or lacerated skin. Insects carrying pox virus may deposit it in the eyes of birds or by mosquito bites that can result in rapid spread of pox throughout the farm.

The mucous membranes of both the trachea and mouth appear to be highly susceptible to the virus. The infection may occur in the absence of apparent trauma or injury. In a contaminated house, the infection can spread easily bird to bird, cage to cage, and by the standing water in drinking cups.

Prevention/Control:

- Virus particles are in the environment and debris found in the poultry houses, thus dust control and disinfection of the environment are important
- An effective insect control program should be in place
- Biosecurity program to prevent the movement of equipment that could be contaminated with pox
- In the face of an outbreak, iodine disinfectant added to the water (4-6 oz. per gallon of stock solution, metered at 1 oz. per gallon of drinking water) appears to aid in reducing mortality
- Spray or fog the house with disinfectant to reduce exposure (twice a day with Virkon-S)
- Vaccination is practiced based on history of exposure, and revaccination, if necessary, can be done in the face of an outbreak because pox infections usually are slow spreading

Vaccination:

Vaccination should be done prior to expected exposure to the disease virus. Areas that have mosquitoes throughout the year often use two vaccinations, one early and one later for “permanent” protection.

Guidelines for pox vaccination:

1. Chicks can be vaccinated as early as one day of age. Tissue culture origin (TCO) vaccines (at ¼ to ½ dose/chick) can be used at hatch, either alone by single needle wingweb, or in combination with Marek’s disease vaccine. This type of vaccination does not protect for the life of the bird, but should protect adequately until the second vaccination is given.

2. For permanent protection, birds need to be vaccinated after 8-10 weeks of age with a chick embryo origin (CEO) vaccine.
3. Use the two-prong needle applicators supplied with the vaccine. This allows the skin to be broken and exposed to vaccine virus two times and delivers a full dose of vaccine.
4. Check “takes” (a small swelling or scab at the inoculation site) 6 days post vaccination. Vaccination “takes” should be seen in 99-100% of vaccinated pullets.
5. Check to make sure the correct quantity of vaccine is used and recorded for each flock.



Vaccine Reaction, or “Take”—about 6 Days Post-Vaccination

In addition to the above rules for pox, we have additional steps that may need to be taken during a wet pox outbreak.

1. In high challenge areas, birds may need 2 vaccinations in the pullet stage; an early vaccination at 3-6 weeks of age and a second at 8-14 weeks of age. Additional vaccinations can be added, depending on the degree and time of challenge.

2. Pigeon pox vaccine appears to provide better cross protection to some wet pox field strains. The combination of fowl pox and pigeon pox stimulates a broader spectrum immune response needed for best protection. Use the combination of pigeon pox and fowl pox vaccine at 1.25 doses of each per bird. These vaccines can be mixed together and given in one application by wing web.
3. A better vaccination response occurs by breaking the skin at four places. The skin can be punctured four times with one application by gluing two of the vaccine applicators together. Additional vaccine diluent is required to provide 1.25 doses/bird. The quantity of vaccine used per flock should be checked and recorded.
4. In flocks that receive multiple pox vaccinations or a day of age vaccination, the percentage of takes or degree of vaccine reaction from subsequent vaccinations will be lower than 99-100% because some birds will still be previously protected and not respond to the vaccine. "Takes" should still be checked and recorded after each vaccination so a farm history can be developed.

5. There is no routine serological test for determining pox immunity, but one way to check immunity is to take 200-300 birds at 18-20 weeks of age that have been previously vaccinated and revaccinate them with a full dose of fowl pox. At 6 days post-vaccination, check for "takes". We should expect 99-100% of these birds to show no "takes". A "take" at this time means they were not previously protected and were susceptible to challenge. Flocks at this age (under severe challenge) that don't show at least 95% protection may need to be revaccinated.

Conclusion:

Dry and wet pox challenges are always present and generally well controlled with a standard vaccination program, but you should monitor your pox control by reviewing:

1. Any change in the challenge for the farm or surrounding area
2. Do the vaccines cover the current pox challenge?
3. Check on administration, technique, handling and storage of vaccine
4. Recording of "takes" and quantity of vaccine used on each flock
5. Timing of vaccine administration for early pullet protection and for permanent protection
6. Biosecurity practices to prevent the spread or introduction of a pox challenge



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