2024 AVIAN METAPNEUMOVIRUS OUTBREAK

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At the time of this writing, the 2024 outbreak of avian metapneumovirus (aMPV) in the United States continues to threaten poultry flocks. Since January, aMPV has spread rapidly in turkey and chicken flocks across the country. Avian metapneumovirus is a highly contagious RNA virus that typically affects turkeys, chickens and ducks but can also impact pheasants, pigeons, guinea fowl and various wild birds. The virus is mainly associated with upper respiratory tract infections (turkey rhinotracheitis in turkeys and swollen head syndrome in chickens) leading to clumping and loss of cilia, which predispose the birds to secondary bacterial pathogens resulting in severe respiratory signs, high morbidity and mortality. The reproductive system also may be infected, resulting in a significant decrease in egg production (up to 70 percent in breeder turkeys) and egg quality (poor shell quality, pale color, chalkiness and misshapen eggs) (VanBeusekom, 2024). Four subtypes of the virus (subtypes A, B, C, and D) are recognized, with subtypes A and B widespread in turkey and chicken producing countries around the world. The 2024 outbreak has consisted of two distinct subtypes. States in the eastern U.S. have been affected by aMPV subtype B, while western states have been affected by aMPV subtype A. All detections in previous years from aMPV were from subtype C.

Background

Avian metapneumovirus was first detected in turkeys in South Africa in 1978. A few years later it was reported in the United Kingdom and then quickly spread throughout much of Europe, including Spain, France, Germany, Italy and Hungary. The virus was undetected in the U.S. until 1996, when the subtype C was diagnosed in commercial turkeys in Colorado and later in Minnesota. Until 2024, previous sporadic outbreaks of aMPV subtype C occurred in turkeys across the upper Midwest. However, the situation changed in January 2024, when reports of severe respiratory disease outbreaks started coming in from chicken and turkey flocks in North Carolina and Virginia. The cause was identified as aMPV subtype B, the first detection of this subtype in the U.S. Later surveillance revealed detection in Texas, California and numerous other states of aMPV subtype A, also a first for this subtype in the U.S. These new subtypes then spread rapidly across North America and, in less than six months, subtypes A, B or both A and B were confirmed in 26 states and two Canadian provinces (Manitoba (May 2024) and Ontario (June 2024)) (Figure 1). Subtypes A and B cause disease in both chickens and turkeys, whereas subtype C seems to infect mainly turkeys and, to a lesser extent, ducks. Subtype A can spread through a flock extremely rapidly, with an entire flock potentially becoming sick within just one day, while the other subtypes can spread more slowly, depending on a variety of factors (VanBeusekom, 2024).

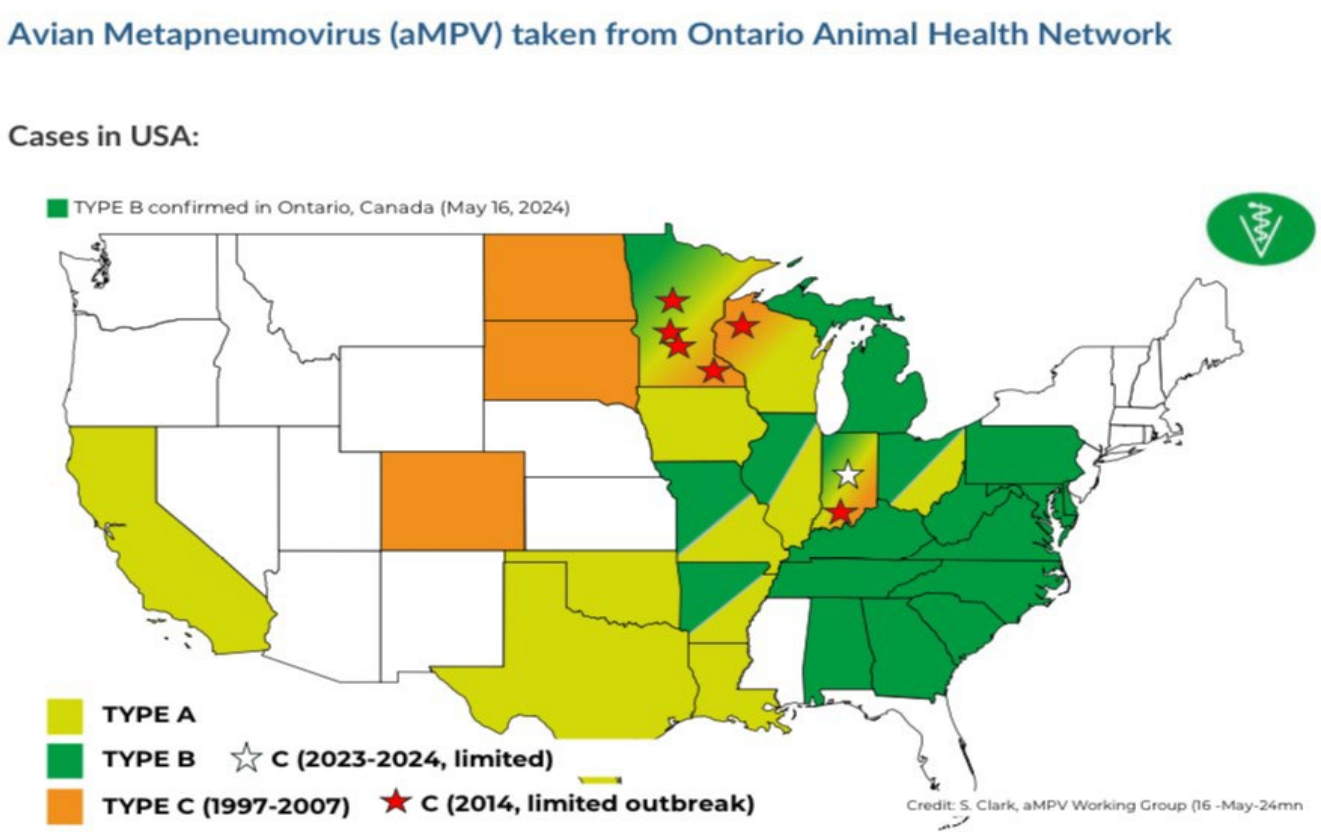

Figure 1. *Map of avian metapneumovirus subtype A, B and C detections in the U.S.* (Source: Steven Clark, aMPV Working Group).

Methods of disease spread

Avian metapneumovirus spreads horizontally. Direct contact between animals is the most important method of aMPV transmission within flocks. Indirect spread on contaminated fomites and the movement of birds, people, feed trucks and equipment from infected to susceptible farms has been implicated in the spread of the virus. Airborne transmission also is possible, and birds are usually infected through inhalation of virus infected aerosols, especially respiratory secretions (Cook et al., 1991; Alkhalaf et al., 2002; Jones and Rautenschlein, 2013). Migratory wild birds and pigeons are considered natural reservoirs of infection and may play an important role in the spread of the disease. Wild migratory birds have been implicated in the spread of aMPV in many countries (U.S., Canada and many European countries), which may explain the coincidence of main outbreaks of the infection occurring with migratory periods (Shin et al., 2002). Currently, there is no conclusive evidence of vertical transmission from the hen to her progeny through the egg.

aMPV attacks the respiratory system

Birds appear to shed aMPV for only a few days after infection, making it quite difficult to find when trying to detect it. Avian metapneumovirus attacks the birds through the respiratory route and damages the cilia that line the respiratory tract and causes immune suppression. This opens the door for other pathogens and makes the bird more susceptible to secondary bacterial infections, resulting in more severe respiratory disease and increased mortality. Good management is critical to limit the damage should a flock become infected with aMPV. Growers must maintain optimal humidity and air quality parameters and keep the poultry houses well-ventilated. Management factors play a key role in severity, and the disease is made worse by poor environmental conditions, with significantly more severe disease and higher mortality seen on farms that are poorly managed and those with poor ventilation. Turkeys are more severely affected than chickens, and younger birds are more susceptible to the disease than older birds. The entire flock (100 percent) may have the disease, but mortality rates can vary greatly, ranging from 0.4 percent to 50 percent or more, especially in young turkey flocks with secondary bacterial infections.

What to look for

In turkeys, the disease is usually seen in birds between 3 to 12 weeks of age, but birds of all ages are at risk of infection. Symptoms include swelling of the face, coughing, conjunctivitis, wet eyes, head shaking and neurological signs (twisted necks and "star gazers"). Neurological signs result from bacterial infections of the middle ear, skull and brain (Manginsay, 2024). As mentioned previously, infected birds often suffer from secondary bacterial infections caused by pathogens such as *E. coli*, Ornithobacterium rhinotracheale (ORT) and cholera. A preliminary diagnosis in the field might be considered by clinical signs and lesions observed at necropsy. However, several diseases can be confused with aMPV infection in turkeys (Kaboudi and Lachheb, 2021). Laboratory investigations are essential to confirm the disease (Figure 2) because of the emergence of co-infection, involvement of multiple environmental factors and the risk of secondary bacterial infections. Samples should be taken as soon as possible after the beginning of symptoms. Again, isolation of aMPV is generally very hard after the first week of disease because of the secondary bacterial infections. In addition, the excretion of virus from damaged tissues occurs for only a short time after infection (Cook et al., 2001).

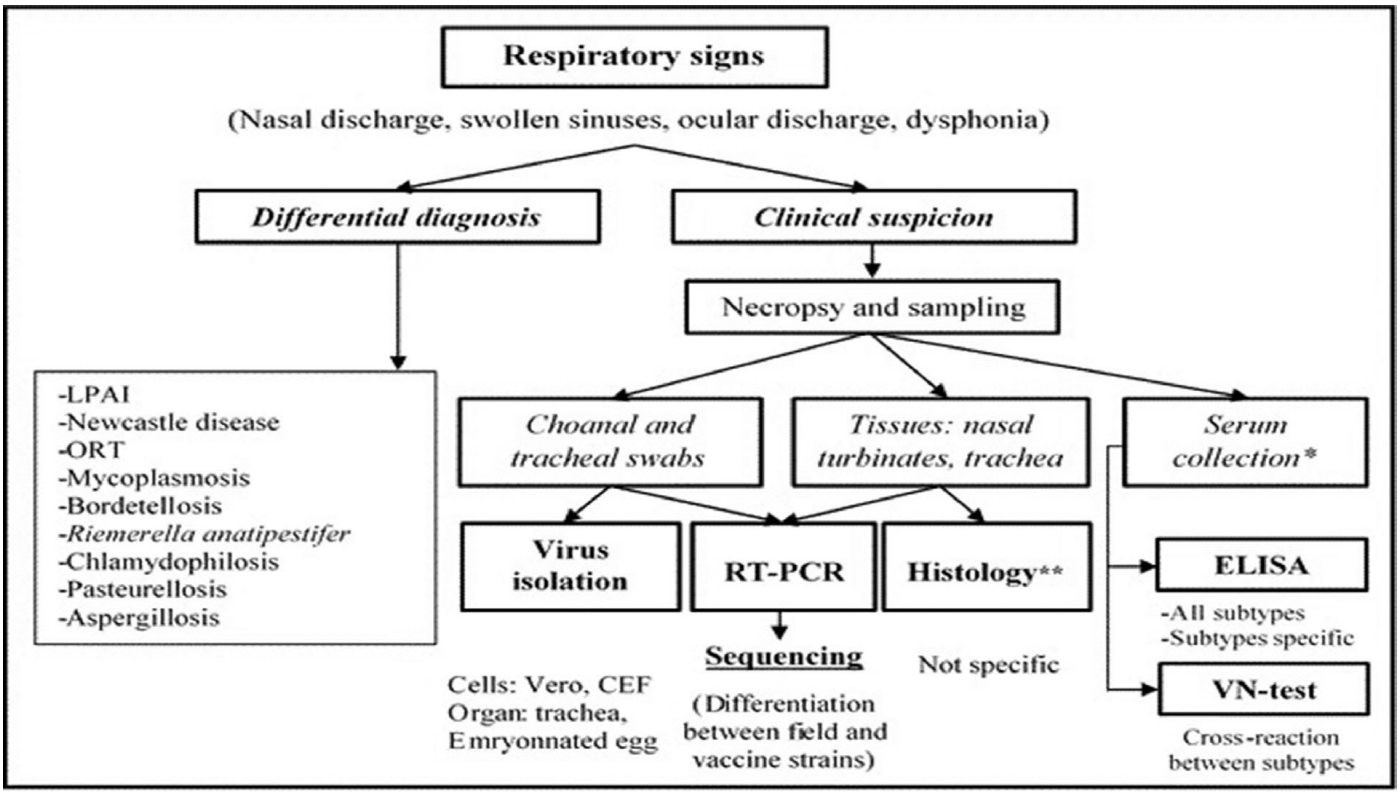

Figure 2. *Diagnosis approach to aMPV infection in turkeys*. (Source: Kabousi and Lachheb, 2021).

In the current outbreak, most cases in chickens have involved 4- to 9-week-old broilers and broiler breeders. Older broiler breeder flocks (older than 40 weeks) have reported more severe disease with higher mortality (Manginsay, 2024). Respiratory signs typically appear three to five days after infection. Egg production drops and elevated mortality are common in broiler breeder and layer flocks. Neurological signs often appear in some birds from affected flocks that include loss of coordination, head shaking, twisted necks and star gazing. Within a few days of the first respiratory symptoms, birds will develop swollen sinuses, swelling around the eyes and/or swelling of the entire face/head. Hens are often more affected than roosters in broiler breeder flocks, and widespread secondary bacterial infections may be evident in mortality. In broilers, decreased feed and water consumption are typically noted. Evidence of secondary bacterial infection is often present at necropsy, mainly resulting from E. coli. Increased processing plant condemnations often occur in broiler chickens. Egg production losses are worse in turkeys (losses of 10 percent to 40 percent are not uncommon in turkeys) than in broiler breeder and table egg flocks (0.5 percent to 10 percent). Egg quality changes that may include a loss of pigmentation and eggshell deformities are possible and have been reported internationally but appear rare in the current U.S. outbreak.

Summary

Like many other diseases, the best defense to ensure that aMPV is not introduced onto the farm is a rigorous biosecurity program and management practices. Avian metapneumovirus has spread rapidly across the U.S. since January with serious impacts on poultry health. Understand that early detection of the disease is critical and remain vigilant for suspicious respiratory signs in your flock. Seek assistance at the first sign of disease. Multiple sources of assistance are available including:

- 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)
- Tennessee Department of Agriculture Poultry Programs Coordinator (615-361-4997)
- C. E. Kord Animal Health Diagnostic Laboratory (615-837-5125)
- Tennessee State Veterinarian's Office (615-837-5120)

There are no commercially available aMPV vaccines in the U.S. and no treatment for aMPV infection. Therefore, biosecurity is the best defense we have in protecting our flocks, and its importance cannot be overstated. Isolate (as quickly as possible) any birds showing disease signs from the rest of the flock. Isolate for 30 days any birds that leave the farm and return, even if they appear healthy. Flock owners should care for heathy birds first, always wearing clean clothing and sanitized footwear. Care for isolated or sick birds last. Do not share equipment, feed and water containers, feed scoops, etc. between isolated and healthy birds. Any cages or equipment that leaves the farm should be cleaned first and then disinfected before leaving and before returning to the farm. There is no substitute for good biosecurity, and it is our first and best line of defense in disease prevention.

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