

# MYCOPLASMA SYNOVIAE IN BACKYARD POULTRY FLOCKS

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Mycoplasma is an extremely challenging pathogenic bacterial disease for backyard poultry flock owners to face. Like all other animals, poultry may sometimes become sick from numerous bacterial, viral and parasitic pathogen challenges found in the environment. Thus, this is the reason for the strong emphasis we place on biosecurity to keep flocks safe. Fortunately, most poultry recover from infections and return to normal thanks to their own immune system and, in the case of some bacterial infections, the judicious use and assistance of antibiotics, if needed. However, in the case of mycoplasma, recovered birds still carry the bacteria, making them reservoirs of the pathogenic organism and capable of infecting all other birds in the flock. Four major species of mycoplasma cause disease in domestic poultry; *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), *Mycoplasma meleagridis* (MM) and *Mycoplasma iowae* (MI). It should be noted that MM is specific only to turkeys while the other three mycoplasma species can infect turkeys, chickens, pheasants and quail. The commercial poultry industry considers MG the most pathogenic and economically significant mycoplasma due to reduced feed intake, significant condemnations at the processing plant and reduced egg production in commercial layer flocks. More information on MG can be found in UT Extension publication D 192 Backyard Chickens and Mycoplasma Gallisepticum, available online at [tiny.utk.edu/D192](http://tiny.utk.edu/D192). This publication will focus on understanding mycoplasma with an emphasis on MS.

## Understanding mycoplasmas

Mycoplasmas are the smallest free-living organisms on Earth. This allows them to infect the inside of cells as opposed to the outside of cells like most bacteria. This capability better protects them from the chicken's immune system, allows them to go somewhat undetected and "hide" from antibiotics and take advantage of nutrients inside the cell. Unlike other bacteria, mycoplasmas do not have a cell wall, which helps protect other bacteria from the environment.

As a result, mycoplasmas are quite sensitive to the outside environment and cannot survive for long outside their host. Lack of a cell wall makes mycoplasmas naturally resistant to many antibiotics that work by inhibiting cell wall growth. Mycoplasma spreads very easily between birds, and, because the bacteria grow slowly, it may take a while (several weeks) after infection for you to notice that your birds are sick. Again, once birds contract mycoplasma, they will have it for life, even after they recover and appear healthy. They will infect all other birds on the premises, and any new birds added to the flock will also contract the disease.

Mycoplasmas are believed to be ubiquitous (found everywhere) and are quite common in most backyard poultry. A mycoplasma infection can be contracted both vertically and horizontally. Vertical transmission means that mycoplasma can be transmitted from an infected hen to the egg, and the chick or poult will be infected at hatch. Horizontal transmission means that mycoplasma can be transmitted from one bird to another through close contact, such as inhaling infected respiratory droplets. Let's say a new bird is added to the flock that appears to be healthy but is actually a carrier for mycoplasma. Soon the entire flock will have mycoplasma because intra-flock transmission occurs very easily. If one bird in a flock should test positive for MS and/or MG, it is safe to assume that all the other birds also are positive or soon will be. Because mycoplasma can be transmitted both horizontally and vertically, maintaining mycoplasma-free flocks requires stringent biosecurity and commonsense disease prevention practices to avoid introducing the bacteria via horizontal transmission.

In addition, although it doesn't make them sick, rodents and wild birds may carry mycoplasma into the area around your birds where they could contract it. You also could unknowingly bring it to your birds. If you have been around other birds that have mycoplasma at a fair, show, auction, flea market, etc., even if you haven't touched them, you could bring mycoplasma back to your birds on your shoes, clothing, skin or hair. This is one of the most common ways that birds contract mycoplasma. Biosecurity is critical to protecting the health of your birds. If you have been around any other birds at any other location — show, fair, swap meet, or even a friend's or neighbor's house, **DO NOT** visit your birds when you get home until you have taken a shower and changed clothes. You will not get sick from being around other birds with mycoplasma, but you could make your birds sick if you carry it home to them. Eggs from mycoplasma-infected birds are safe to eat **IF** the birds are not being treated with antibiotics and the eggs are handled and cooked properly.

While MG primarily targets the respiratory system, causing symptoms such as nasal discharge, sneezing, coughing and swollen sinuses, MS affects multiple systems, including the joints, respiratory tract and reproductive organs. It can lead to lameness, swollen joints, decreased egg production and possibly infertility in breeding birds. *Mycoplasma synoviae* is more widespread and is common on multi-aged commercial layer farms and in backyard poultry flocks. Often, MS and MG occur as a combined infection with severe upper respiratory disease observed (Figure 1).



**Figure 1.** Turkeys infected with both *Mycoplasma synoviae* and *Mycoplasma gallisepticum*, showing significant facial swelling. Source: Tennessee State Veterinarian's Office.

*Mycoplasma synoviae* frequently occurs as a subclinical upper respiratory infection. Many times, MS becomes systemic and results in infectious synovitis, an acute-to-chronic infection of chickens and turkeys involving the synovial membranes of the joints and tendon sheaths. Although, when combined with other upper respiratory pathogens, such as MG, or when in combination with other secondary bacterial infections like *E. coli*, significant upper respiratory disease can be observed. In many cases, MS may not always be the primary pathogen, and it often occurs as a mixed infection with other respiratory pathogens such as Newcastle disease virus and infectious bronchitis virus. Chronic respiratory disease from these mixed infections can become significant, particularly in stressful adverse environmental conditions like high ammonia levels, cold temperatures and dust.

Unfortunately, you can't assume that birds showing respiratory signs such as sneezing, coughing, swollen sinuses, watery eyes and nasal discharge have a mycoplasma infection. That may or may not be the case. There are multiple other diseases that show similar respiratory signs including infectious coryza, fowl cholera, Newcastle disease, infectious bronchitis and others. The only way to know for sure what disease your birds may have is through testing with the help of a diagnostic lab. In Tennessee, the Kord Animal Health Diagnostic Laboratory (615-837-5125) in Nashville can do diagnostic testing to help determine what disease challenge your flock is facing.

Testing has shown MS to be sensitive to several antibiotics including tylosin, chlortetracycline, oxytetracycline and others. Antibiotic selection should always be made based upon local regulations and under the guidance of a veterinarian. In addition, treatment of existing infectious synovitis, often common with MS infections, is of little to no benefit, as lameness occurs from irreversible scarring and inflammation of the synovial tissues and tendons. It often requires high doses of antibiotics to see significant improvement in the health of the flock. Short, high dose levels of medication are preferred over long-term medication, as long-term medication increases the risk of resistance development.

## Prevention vs. treatment

Good biosecurity measures and preventing MS from reaching your birds should be your primary goal. Common sense dictates that prevention is always preferred and is a less expensive option than treatment. Start with disease-free birds. This is best accomplished by sourcing birds from flocks that participate in the National Poultry Improvement Plan (NPIP) and are known to be clean and disease-free. Minimize contact with other birds. If you have been around other birds, shower and change clothes and shoes before visiting your birds. Have a set of clothes or coveralls to wear when working with your birds. Dedicate a pair of boots to use when working with your birds that are not worn away from the pen/coop area. Use a footbath when entering and exiting the pen/coop area. Dry bleach works well as a disinfectant and can be found online or at poultry supply houses. Keep the footbath free of organic matter and change regularly to maintain its effectiveness. Do not share equipment, tools, or cages with friends, neighbors, other flock owners. If you do share, make sure the items are cleaned first and then disinfected before leaving your operation and before the items are returned. Keep the area where your birds are neat and clean. Clean up any spilled feed and do not allow trash to accumulate that could attract rodents or wild birds. Be aware of the risks associated with purchasing new birds from auctions, swap meets, neighbors or any source where you do not have a history on those birds. You have no way of knowing where those birds have been or what they may have been exposed to. Always separate new birds from the others for 30 days. Remember that new birds could be carrying disease and not showing signs when you bring them home. Use different clothes, shoes and tools when working with the new birds and always visit and feed the new birds last. NEVER visit the new birds first and then work the rest of the flock later.

If prevention fails and your flock does test positive for MS or MG, you have a couple of options, and neither of them are an easy decision for you. First, you can depopulate the entire flock and start over with birds you know are clean and disease-free. Remember, once mycoplasma is present in your flock it will always be there; because of this, the best option to 100 percent get rid of the disease is to depopulate all the positive birds (every bird on the premises should be considered positive whether it tests positive or not) and start over again with known mycoplasma negative birds. This means depopulating the entire infected flock, cleaning and disinfecting the housing area and leaving it vacant for at least two weeks and then repopulating with new birds that have been tested and certified as mycoplasma negative.

Second, the less preferred and more time consuming and labor-intensive option is to treat and carefully manage your infected flock. Several antibiotics may be used to treat mycoplasma infections, but none of them can cure the disease or prevent transmission from infected to non-infected birds. You will need to work with a veterinarian on the best course of action and which antibiotic is best in your situation. Be sure to follow the advice of your veterinarian and read and follow all instructions for poultry on the label and observe the withdrawal times. Treatment may decrease symptoms, speed recovery and help slow transmission to new birds but, again, cannot cure a mycoplasma infection. Infected birds are carriers for life, and monthly treatments may be needed to keep mycoplasma at low levels. Recognize that the disease will have to be managed for the entire life of the flock and that any new birds you add along the way will eventually become infected, even if they don't show signs of disease. You must maintain strict biosecurity practices (separate clothing, boots, footbaths, equipment, restricting access, etc.) to prevent the spread of the disease from your flock to others. If your flock tests positive, no birds should leave the property to be taken to fairs, shows, auctions, swap meets or exchanged with friends, neighbors or others. Even if only a few birds in your flock test positive, all the others could be carrying the disease, and the entire flock should be considered positive. Even if you follow a monthly treatment program, recognize that the disease could reappear at any time and that any new birds added will eventually become infected. You must decide if you are willing to accept that, and keep in mind that it is your responsibility to keep mycoplasma from spreading to other flocks near and far, especially nearby neighboring flocks, that may include commercial poultry farms.

## 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)
- Tennessee Department of Agriculture Poultry Program Coordinator (615-361-4997)
- C. E. Kord Animal Health Diagnostic Laboratory (615-837-5125)

## Summary

Mycoplasmas are the smallest living organisms known and, unlike other bacteria, they lack a bacterial cell wall, making them resistant to many antibiotics that work by inhibiting cell wall synthesis. Mycoplasma infections in poultry can be treated but cannot be cured. Infected birds remain carriers for life and will infect all other birds in the flock and any new birds added to the flock. Both MS and MG are quite common in backyard poultry flocks and are often found together in the same flock. Vigilant biosecurity practices and common sense are a must to protect your flock. Prevention is much preferred over dealing with an infected flock. Treatment options are limited and include 1) depopulation, cleaning, disinfecting and starting over with known mycoplasma negative birds or 2) using antibiotics to treat an infected flock for the remainder of its life, knowing that any new birds brought in will become infected and practicing rigorous biosecurity for the remainder of the flock's life to prevent the disease from spreading off your property.



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