

## *Mycoplasma iowae*

By David Kenyon, Vice President of Sales and Technical Services

Over the past several months there have been meetings and much discussion concerning *Mycoplasma iowae* (MI). Mycoplasmas are bacteria which most of us have heard about, but in general know very little about. MI has brought about challenges several times throughout my 20+ years in the turkey industry, and once again it is a source of concern to many.

Historically MI has caused issues affecting breeder and hatchery operations. Now it seems MI may be working its way down the chain and affecting commercial growing operations. Some feel it is responsible for higher late mortality, increased feed conversion rates and higher condemnation rates at processing. While some may question the association between MI and these conditions, I think there is no question they are more prevalent of late.

Recently there were discussions at the National Poultry Improvement Plan (NPIP) meeting regarding the MI situation and what the turkey industry should do about it. Aviagen Turkeys has taken the position that our industry should eradicate MI before it causes more severe losses.

Many others also believe something should be done about MI and the dollars it is costing our industry. However, there is opposition. Some industry members believe we should "be patient" and not start an eradication program for another five to ten years in hopes that the MI problem will just run its course.

I do not claim to be an expert, but one thing I know for sure: if we do what we have always done, we will just get more of the same...or worse. If we don't eradicate MI, is it not possible that it could mutate and in time become more virulent? This has been a pattern with other infections that we did not deal with in a timely fashion.

Given all the discussions and opinions I decided to consult with four avian / turkey Mycoplasma experts - Dr. Yan Ghazikhanian, Dr. Kenton Hazel, Dr. Mark Grant and Dr. Robert Edson. These scientists have about 100 years of combined practical experience of mycoplasmas. I asked them for professional clarification on the following questions:

### What is mycoplasma?

Mycoplasmas are bacteria lacking rigid cell walls. These fragile organisms cannot survive very long outside of the host. All of the pathogenic avian mycoplasmas (MG, MS, MM and MI) can be transmitted vertically (egg transmission) from one generation to the next, and laterally to neighboring birds or populations of birds by contact (direct or indirect) or by air-borne mechanisms.

Of all the pathogenic strains MI is the most difficult to identify, and it is one of the most variable. There are many "strains" of MI. These may vary significantly in terms of their ability to "damage" the host. Some strains cause severe hatchability depression while others appear to cause some skeletal abnormalities. MI is difficult to diagnose because there is no effective blood test and the organism must be identified by culture or by PCR. MI also tends to be resistant to most of the antimicrobials that effectively treat the other avian mycoplasmas.

### How have mycoplasmas been eradicated?

MG was eradicated in 1960's via "test and slaughter" and egg treatment (dipping). The industry moved quickly to eradicate this infection at the primary and multiplier levels because the vertically transmitted infections caused severe disease in the infected poults. There are still large "pools" of MG in the layer chicken populations.

MS was eradicated from turkey primary breeders in the late 1970's by combined dipping and injection of hatching eggs (tylosin and gentamicin). Various strains of MS caused respiratory disease, joint swellings, severe weight depression and increased condemnation rates.

MM was eradicated by most turkey primary breeders in the early 1980's by a combination of egg dipping and egg injection with tylosin and gentamicin. MM was eradicated because it was an underlying cause for mixed respiratory disease resulting in mortality, skeletal deformities and plant condemnation.

MI was eliminated from BUT and Nicholas turkey breeding stocks by injecting hatching eggs with enrofloxacin (Baytril)

while it was temporarily available in the USA in the mid 1990's. The BUT and BUTA eradication programs were aimed at putting a stop to the serious hatchability reductions caused by the MI infection.

Nicholas did not experience the same loss of hatchability but elected to eradicate MI so that their customers' breeding stocks would not become re-infected by contact through bird handling, insemination, and co-housing of males in stud facilities. The eradication program went smoothly with the use of enrofloxacin; MI was eliminated from their breeding stocks in less than two years.

In 2006 some Nicholas grandparent (GP) hens were infected with MI because the breeding males were housed in the same stud facility with Canadian breeding stock that was MI-positive. The infection was eliminated in 2007 by replacing all infected flocks with MI-negative flocks.

All Nicholas and BUT primary breeding flocks are rigorously and repeatedly tested (by culture and/or PCR) for the presence of MI. All flocks have remained negative.

### **Why is it important to clean it up?**

As a primary breeding company we are obligated to the industry to eliminate vertically transmitted diseases such as mycoplasmas. Without breeders doing so, multiplier operations cannot control or eliminate vertically transmitted infections which would then cause disease in commercial flocks. Multiplier breeding operations are responsible for maintaining clean product and for preventing cross-contamination of clean stocks from other infection sources.

### **How is MI transmitted?**

Vertical transmission occurs when the ova (eggs) become infected. They become infected because the MI infection can reside in the oviduct and the cloaca for long periods.

Lateral transmission occurs by the following means: 1) hen to hen by the oral-fecal route, 2) hen to hen at during insemination when "breaking" the hens and making contact with the oviduct, 3) hen to tom at AI if breaker also collects semen, 4) tom to tom during semen collection, 5) tom to hen via semen at AI, and 6) infected poults or pipped embryos at hatching to uninfected poults

### **What is the best method of detection?**

MI is typically detected in the esophagus of young poults, in the cloaca of older birds, and in infected semen. "Dead-in-shell" (DIS) embryos may also yield large numbers of organisms. It is best to culture embryos that died at 13-24 days of incubation. MI cultures are inexpensive but take 7-14 days to complete. A faster method, but somewhat more expensive is PCR testing of tissues and fluids. This can be completed in 2 – 3 days.

All culture methods may be adversely affected if animals or eggs are being treated with antibiotics. When culturing breeder birds it is a good practice to test enough to ensure a 95% confidence of detecting a 5% level of infection. Reliable sources of culture media are available from a number of labs as are recently isolated or low passage cultures of MI for media control.

### **What is the impact of MI on performance?**

There are multiple strains of MI with different characteristics. Specific strains of MI are recognized to cause reduced hatchability, runting and stunting, poor feathering and skeletal deformities (twisted long bones). Not all strains of MI will necessarily cause pathology under one set of conditions, but may under others. High rates of embryo infection, or exposure to high rates of infection in the hatchery may allow MI to play a significant role in causing pathology and poor final performance.

In the 1970's we thought MI only caused hatchability problems (MI killed embryos). We did not recognize its other pathogenic potentials, possibly because MM was still so prevalent. Now MI has been shown to cause stunting and embryo feather and long bone deformities. As we have learned more about embryo development and the effects of incubation on poults and final performance, we are learning this agent has much larger, lasting and costly affects to the industry. As with MM it appears that MI should be eradicated now that its pathogenic potentials are recognized at more than the breeder level.

### **Conclusion**

Can we afford to prolong the MI infection saga and allow it to shrink our already small profit margins? The turkey industry operates on low margins with input costs rising every year. In spite of this we must continue to produce a competitive protein product.

It is time for all primary breeders to be held accountable for MI infection and its effects. It is time for our industry to insist on the elimination of MI from all turkey breeding stocks and it must begin at the primary breeder level. Once this is done MI will no longer be a source of problems for integrators, multiplier breeders and or commercial growers.

It will only happen through your support of an industry-wide move, via programs like NPIP, to eliminate MI. We can no longer accept excuses and procrastination, and instead we must insist on elimination. The science and the tools exist to accomplish this within a very short period of time. I hope we will decide to insist on it, as I do not think we can afford to ignore it long-term.

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