

# Avian Reovirus in Broiler Chickens



Avian Reoviruses (ARVs) are non-enveloped viruses that multiply in the gastrointestinal tract of infected poultry. Most ARVs will not cause disease, therefore, detecting or isolating a reovirus from chickens does not confirm that ARVs are the cause of disease.

The reovirus Sigma C protein is the most important viral protein and used for determining the strain of virus. Reovirus "variants" occur when the sigma C protein differs from the classical vaccine strain of reovirus. These "variants" cause arthritis and other issues in chickens. Each time a new Canadian isolate is sequenced it is genotyped and grouped into 1 of 7 clusters. Cluster 4 and 5 are the most common isolates in Ontario currently.

ARV infection is associated with multiple clinical conditions in chickens, but the important ones for Ontario include:

- Viral arthritis (VA)
- Runting-Stunting (RSS)

## Viral Arthritis (VA)

- Occurs mainly in meat-type birds.
- Infection occurs early in life, usually at 4-5 weeks of age but sometimes as early as 6 days of age.
- Infection causes poor growth and uniformity
- Clinical signs, which develop at a later age, include:
  - Lameness, rupture of tendons
  - Increased secondary infections
  - Cull rates range from 2-50%
- Because this condition can look like other diseases, veterinarians will differentiate it from secondary bacterial joint infection, osteoporosis, footpad dermatitis, osteomyelitis, and *Mycoplasma synovitis*.



Photo courtesy of Dr. C. Taylor

## Runting-Stunting Syndrome (RSS)

- Uniformity issues are obvious by 2 weeks
- Clinical signs include:
  - Diarrhea observed usually at 8-10 days of age due to malabsorption of nutrients.
  - Uniformity issues are obvious by 2 weeks.
  - Pale birds and growth retardation, abnormal feather and/or femoral head fractures
- Several other pathogens are implicated in RSS such as astroviruses and enteroviruses which is why it is classified as a syndrome.

## How are reoviruses transmitted?

Reoviruses are transmitted by both the horizontal and vertical routes.

- Horizontal transmission occurs between birds and/or from a contaminated environment. Birds transmit the virus directly to other birds via respiratory secretions (nasal discharge) or ingesting infected feces. Contaminated litter can also infect birds through broken skin. Once in the tissue, the virus can replicate and move up the leg towards the tendons and joints.
- Vertical transmission occurs from the parents to their progeny which can occur through infection by oral, respiratory or skin transmission or by egg transmission. This rate of egg transmission is low and variable between strains of virus (~<1.7% of infections are due to egg transmission). Reovirus can persist in birds for more than 250 days so these carrier birds may act as potential sources of infection.

## How are VA and RSS diagnosed?

- A confirmed diagnosis of VA and RSS must consider all of the following:
  - Clinical signs
  - Other causes of disease have been ruled out through diagnostic testing (i.e. looking for other agents such as bacteria and viruses and looking at tissue samples).
  - Identification of DNA through polymerase chain reaction (PCR) testing, genotyping and/or isolation of reovirus from the joint/tendon.
- Testing of blood taken at slaughter may also be helpful.
- According to the IBH working group case definition, clinical signs must be present and at least 2 of 3 of the following must be positive to make a diagnoses of VA or RSS: PCR, serology, histopathology.

## How are VA and RSS managed?

- There is no treatment for either VA or RSS therefore the focus is on managing these conditions by focusing on:
  - Biosecurity, particularly focusing on cleaning and disinfection with adequate downtimes (14 days or more) between cycles. Consult with your veterinarian about the best product to use.
  - Parent stock vaccination. This reduces the level of infection in the breeders, prevents egg transmission and produces maternal antibodies which protect the progeny.

### Available vaccines

#### i) Commercial Live Modified.

*All available commercial vaccines are from Cluster 1 and may not provide protection against challenge from common Ontario variants.*

#### ii) Commercial Inactivated

**iii) Autogenous Inactivated** (to control variants)

**All of these types of vaccines are currently used in the Ontario broiler breeder industry**

## How can you help?

In order to know what current reovirus strains are affecting your birds, isolating and genotyping the virus from field strains needs to be done on a regular basis. Autogenous vaccines can be developed that reflect the current strains, however it can take up to two years for this to occur. Therefore, there is a need for ongoing surveillance. **If you have a sick bird, contact your veterinarian and request testing.**