



## **NTF Survey: Economic Impact of Turkey Arthritis Reovirus**

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### **Impact of Turkey Arthritis Reovirus to US Turkey Industry:**

According to the results of a survey published in the Proceedings of the 2019 USAHA Annual Meeting<sup>1</sup> the number of **Turkey Arthritis Reovirus (TARV) cases increased by 108%** in 2019 and is ranked in the top ten diseases of concern for the turkey industry. National Turkey Federation (NTF) survey results showed an average of **5.6 cent increased cost per pound** for flocks affected by TARV compared to the companies' surveyed production costs for unaffected flocks. However, it is important to note that due to the varied nature of the virus increased costs as high as 15 cents per pound of TARV affected flocks were reported. Therefore, with the range of costs reported in our survey, the severity of impact could be as high as 33.7 million dollars with highly pathogenic strains of TARV.

A total of **5.627 million** birds were affected in the last year, approximately **226 million pounds**. This is approximately **2% of turkeys produced annually** in the United States. Further, because TARV primarily affects toms, based on our results approximately **5% of toms produced annually** are affected by TARV. The economic impact of TARV to the United States turkey industry is substantial, however the effect of TARV on an individual turkey producer that may only have two flocks per year it can be especially burdensome.

### **Needs to Improve Industry Response to TARV:**

Research for treatments and prevention and control options of TARV is of significant interest to the turkey industry. Currently there is no treatment for Turkey Arthritis Reovirus. In addition, there is a substantial need for the development of prevention and control strategies, including vaccines. There also are not a reliable and cost-effective diagnostic tools established to identify TARV presence in flocks, further emphasizing the need for research in nearly all areas of the disease.

### **Summary of Turkey Arthritis Reovirus:**

**Turkey Arthritis Reovirus** is a progressive condition that appears as early as 10-12 weeks of age in male, and sometimes female, commercial turkeys. Younger birds are occasionally affected. TARV Isolates can be identified as early as 3 weeks. Younger turkeys can be affected but not show clinical signs till later in production. TARV can be transmitted from affected breeders to poults. The disease does not appear to be transmitted from chickens. Signs are most severe when the birds reach 15-16 weeks of age. Clinical signs are characterized by reluctance to move, recumbency and limping on one or both legs. There is often unilateral or bilateral swelling of the hock (intertarsal) joint. Morbidity can be as high as 40% and mortality is usually a result of culling or aortic rupture. Lesions observed in acutely affected birds at necropsy are unilateral or bilateral enlargement (subcutaneous edema) of the hock joints, which contain increased volume of clear yellow to serosanguinous synovial fluid. Similar fluid can expand the sheath of the gastrocnemius and digital flexor tendons. In chronic cases there is bruising of the skin of the hock, with prominent periarticular fibrosis, edema and occasional large flecks of fibrin within the subcutis and tendon

For more information contact Lindy Froebel, Ph.D., Scientific & Regulatory Affairs Manager, National Turkey Federation [lfroebel@turkeyfed.org](mailto:lfroebel@turkeyfed.org) or Steven Clark, DVM, Poultry Veterinarian, Devenish Nutrition (NTF Reovirus Subcommittee Chair) [steven.clark@devenish.com](mailto:steven.clark@devenish.com).



sheaths. In a small percentage of cases one can observe partial or complete rupture of the proximal gastrocnemius tendon or a digital flexor tendon with hemorrhage at the level of the rupture. Histological sections of gastrocnemius tendon and sheath reveal lymphocytic infiltrates in the sub-synovium in acute cases, progressing to prominent sub-synovial and peritendon fibrosis in chronic cases. Secondary bacterial infections (e.g., *Staphylococcus*) occasionally occur and are accompanied by heterophilic inflammation.

### **National Turkey Federation Turkey Arthritis Reovirus Case Definitions:**

**Definitive diagnosis** requires the veterinarian to fulfill these three criteria: 1) observation of typical gross lesions, 2) rule out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, *Mycoplasma synovitis*, dietary deficiencies) and 3) isolation of reovirus, referred to as turkey arthritis reovirus (TARV), from the gastrocnemius and/or digital flexor tendon in embryonated eggs or cell culture.

**Suspect diagnosis** requires the veterinarian to fulfill these two criteria: 1) observation of typical gross lesions, 2) ruling out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, *Mycoplasma synovitis*, dietary deficiencies).

### **Summary of Data Collection:**

The survey described was conducted by staff of the National Turkey Federation in April 2019. NTF Member companies were asked to participate with a condition that results would be reported in a manner to preserve anonymity. Eleven companies provided data and comments. Although the results shed light on the impact of TARV, a more thorough and complete economic analysis would be beneficial to better understand the impact of Turkey Arthritis Reovirus on the United States turkey industry.

### **About the National Turkey Federation:**

The National Turkey Federation (NTF) represents nearly 100 percent of all turkey processors, growers, breeders, hatchery owners and allied companies. It is the only national trade association representing the turkey industry exclusively and aims to strengthen turkey industry's ability to profitably and safely deliver wholesome, high-quality and nutritious food to consumers worldwide.

<sup>1</sup> Clark, SR et al. Current Health and Industry Issues Facing the US Turkey Industry. Proceedings 123<sup>rd</sup> Annual Meeting of the USAHA, Providence, RI; Committee on Poultry and Other Avian Species. Pending Publication. Oct 29, 2019.