

# 2015 NC-1180 Delaware Station Report

**Eric Benson, Erin Brannick, Jack Gelb, Jr.,  
Calvin Keeler, Jr. Brian Ladman, Mark Parcels**

**Department of Animal and Food Sciences,  
University of Delaware, Newark, Delaware,  
USA 19716-2150**



# Objective 1: Ecology of Poultry Respiratory Diseases

## IBV

- **IBV surveillance**
  - Arkansas (230)
  - Mass/Conn (45)
  - DE 072 (67)
  - **DMV/1639/2011 (170)**
  - Two or more genotypes (130)

# NDV and ILTV

- **NDV (54 by rRT-PCR)**
  - Not associated with respiratory disease
  - No vNDV isolates
- **ILTV (115)**
  - Virulent non-vaccine related isolates were rare (5)
  - 1 case in non-vaccinated flock (May)
  - 4 cases in non-vaccinated flocks after vaccination was stopped this summer



# Concurrent Infections

- **IBV and NDV (43)**
- **IBV and ILTV (88)**
- **IBV, NDV and ILTV (21)**



# AIV

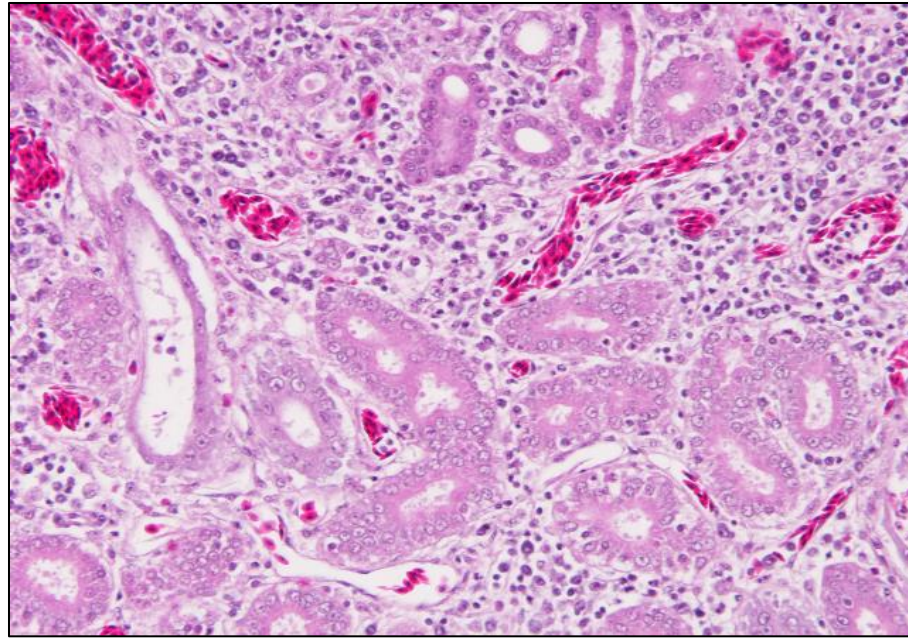
- **No isolates from active (pre-slaughter) or passive (clinical cases) samples from commercial broilers or backyard flocks**
- **No wild bird surveillance during the period**
- **AIV was detected in a non-commercial mallard type duck in April, 2015**
  - **Non-H5, non-H7 subtype**

# Objective 3: Pathogenesis of poultry respiratory diseases

## IBV DMV/1639/11

- Aug-Nov. 2014 – 6 cases of nephropathogenic IBV (originally identified in 2011)
- Over 40 cases to date in 2015
- Interstitial nephritis seen in 100% of cases (see Figure)
- Over 100 flocks positive for “1639” by PCR
  - Respiratory, renal, or combination
- **“1639” strain of IBV is more widespread than previously believed**

# Nephropathogenic IBV Lesions



**Figure 1:** In nephropathogenic Infectious Bronchitis Virus (NIBV) infection, there is wide variability in both the severity of interstitial nephritis and in the presence or absence of urate formation. In the majority of NIBV cases, lymphoplasmacytic interstitial inflammation predominates separating renal tubules, and little to no urate formation is observed. This type and pattern of inflammation is the most consistent microscopic lesion observed in NIBV cases and is most specific for NIBV when observed in the area of the medullary cones.



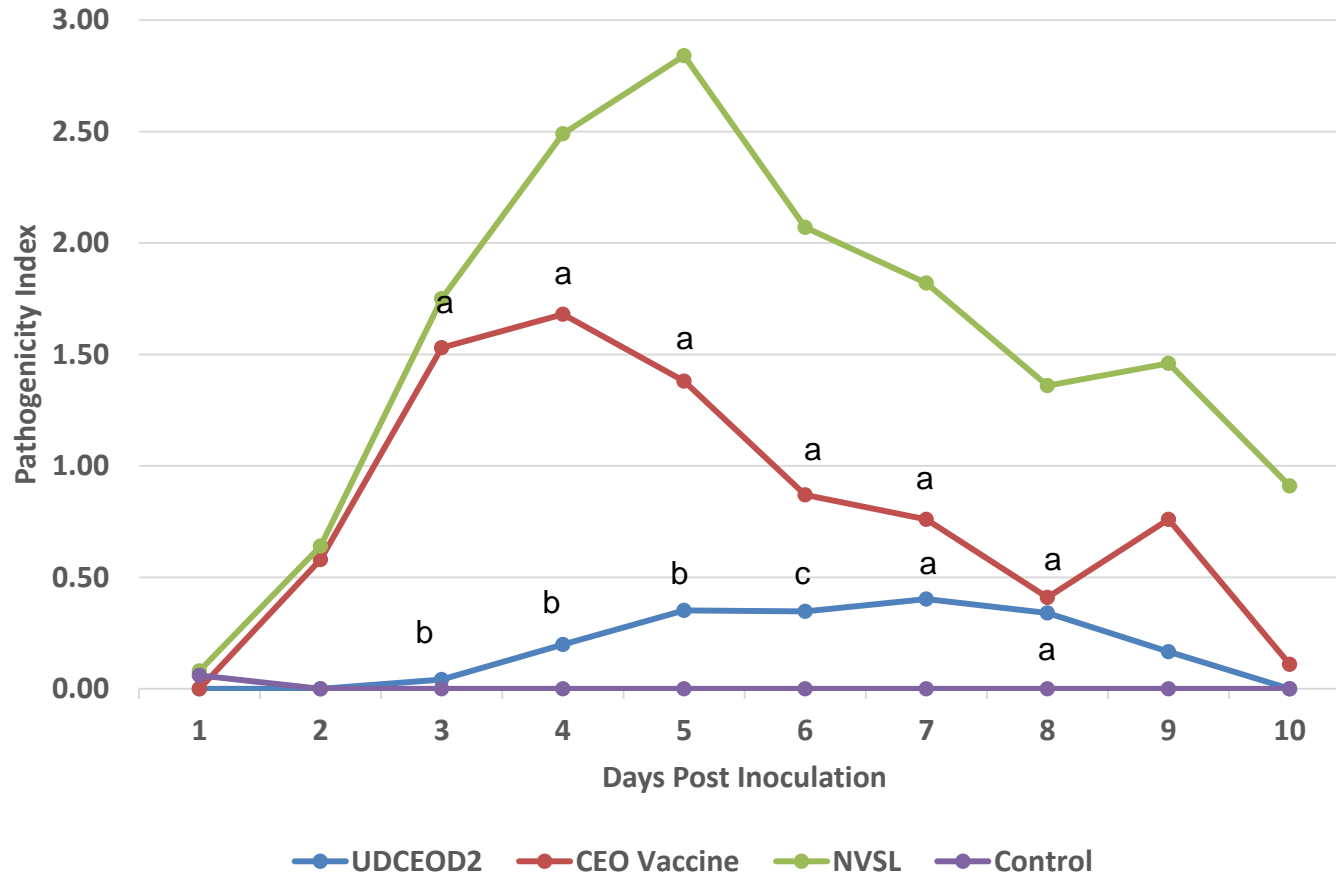


# ILTV

- **CEO ILTV vaccines are composed of virus mixtures**
- **UDCEOD2 and UDCEOD3 are less pathogenic but offer protection from challenge**
- **Stability is being evaluated by passage (20) in eggs, birds and primary hepatocyte cell culture**



# UDCEOD2 is Less Pathogenic than the Parent CEO vaccine



**UDCEOD2 is less pathogenic than the CEO vaccine on days 3-5 post inoculation ( $p < .001$ ), and on day 6 ( $p < .011$ ). There is no statistical difference in pathogenicity on days 7-8.**

# Objective 4: Control and Prevention of Poultry Respiratory Diseases

## IBV

- Cold adaptation and heat exposure methods have been used to attenuate DMV/1639/11
- Preliminary pathogenicity testing indicates that the heat-treated strain is a potential vaccine candidate
- Additional studies are planned

# ILTV

- **Previously reported that ILT vaccine given at 1X dose by drinking water produces only 50% coverage**
- **One company has increased vaccine dosage (2X to 3X) and application frequency**
- **Company reports more consistent vaccination results (fewer flocks with lingering and severe vaccination reactions)**
- **Back passage of the vaccine virus may be reduced by increasing vaccination coverage**

# 2015 PRD-CAP Delaware Report

**Eric Benson, Jack Gelb, Jr., Calvin Keeler, Jr.**

**Department of Animal and Food Sciences,  
University of Delaware, Newark, Delaware,  
USA 19716-2150**



## **Objective 2: Investigate the multifactorial etiology involving poultry respiratory diseases**

- **RDC (Respiratory Disease Complex) is the multi-agent (bacterial and viral), multi-variable avian respiratory disease syndrome that has been the focus of this and previous USDA regional projects**
- **The development of newer molecular techniques (based on NG sequencing technologies) now allow the study of the microbial ecology of the avian respiratory tract (microbiome, virome)**

# Key Questions and Approaches

- **Source of bird**
  - Broiler (DE), layer (OH), turkey (MN)
- **Source of material**
  - Oral-pharyngeal swab, broncho-alveolar lavage, respiratory tissue, others?
- **Common methodology**
  - Bacterial and viral enrichment
  - Library construction/sequencing
  - Bioinformatic analysis



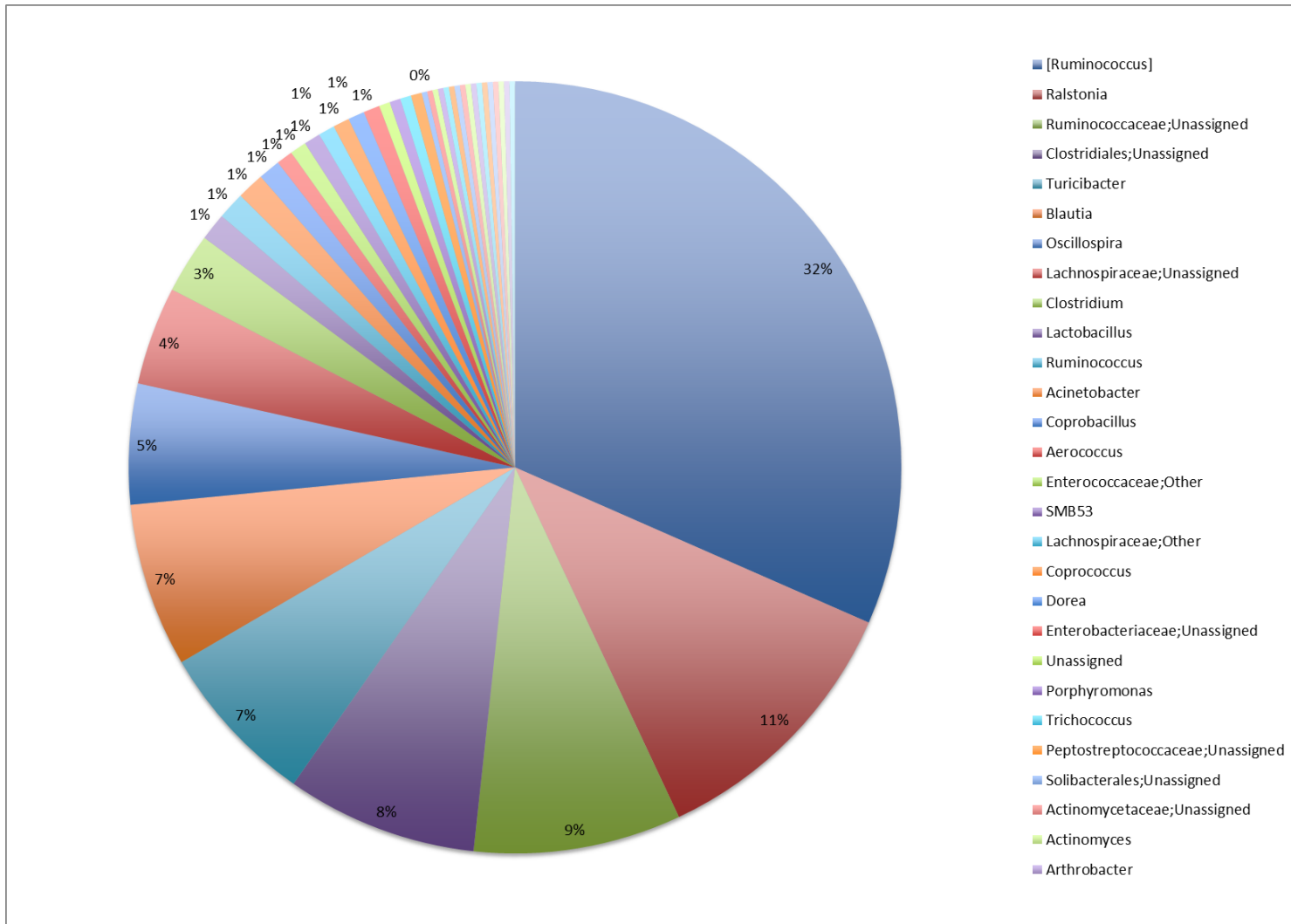
# UD Progress



- **Identifying research partner(s)**
  - **Longitudinal study of broilers grown under traditional and “free range” conditions**
- **Evaluating methods for the enrichment of bacterial and viral populations**
  - **Epifluorescence**
- **Evaluating**
  - **Bacteria – 16S**
  - **Virus – RNA and DNA based metagenomics**



# Sample 16S Analysis from a (1) Lavage Sample



**Ruminococcus? (Clostridia), Ralstonia (Proteobacter – Pseudomonas), Clostridiales - total ~60%**