WEST LAFAYETTE ADDL

Annual Report Fiscal Year 2016

PURDUE UNIVERSITY

ADDL

ANIMAL DISEASE DIAGNOSTIC LABORATORY

HPAI OUTBREAK

By: Dr. Craig Bowen, Velina Lindley, Angie Chan and Liam Fitzgerald

2016 began with a diagnosis of highly pathogenic Avian Influenza (HPAI), the second year in a row for Indiana. A commercial turkey flock in southwest Indiana suffered a major increase in mortality, and ADDL sister lab, the Heeke Laboratory of Southern Indiana Purdue Agricultural Center, confirmed farmers' fears with a positive diagnosis for Avian Influenza Virus. This was the first of a total of ten locations confirmed positive over the next several days. Diagnoses were confirmed by the ADDL laboratory and the National Veterinary Services Laboratory for nine of those locations.

The first diagnosis was made on January 14th, immediately initiating a multi-agency effort to prevent the disease from spreading that would last until April 21st. Those involved included the Indiana State Board of Animal Health, the United States Department of Agriculture Veterinary Services, the Indiana Department of Homeland Security, and the Indiana State Poultry Association. Throughout the episode, the Indiana Animal Disease Diagnostic Laboratory at Purdue served as the primary location for testing, and the Molecular Diagnostics staff worked long hours to provide reliable results quickly.

Veterinarians, representatives from state agencies, and local farmers collected swabs from birds at commercial poultry companies, backyard/small flocks and wild birds, sending all samples to the ADDL. Extreme caution and biosecurity were used to prevent contamination and exposure.

The Molecular Diagnostics section tested samples using Polymerase Chain Reactions (PCR). To perform a PCR, genetic material (DNA or RNA) is extracted from a sample. Using a controlled combination of primers and enzymes, technicians initiate a reaction that replicates DNA or RNA, but only DNA or RNA that targets the agent interest, in this case influenza A virus. By repeating the process of replication over and over, the targeted sequence is amplified to a level which can be detected and measured. In this case, ADDL targeted a genetic segment found only in the RNA of the Influenza A Virus.

State animal health officials initiated quarantines and movement restrictions. All commercial poultry operations and backyard flocks within ten kilometers of the infected premises were tested. Throughout the three months, ADDL provided diagnoses for over four thousand eight hundred samples. Quick turnaround was critical in keeping the Influenza contained, and maintaining necessary poultry operations.

Positive results were sent to NVSL for confirmation and characterization. The initial positive was identified as highly pathogenic H7N8. Eight of the additional nine positives were identified as low pathogenic H7N8, with the tenth positive deemed a suspect. As the episode progressed, ADDL continued to test samples not only for initial diagnosis but also for surveillance, movement, environment, post cleaning and disinfection. It is in no small part thanks to the exceptional work of the ADDL staff that this Influenza episode was contained.

This Highly Pathogenic Avian Influenza episode occurred on a much larger scale than that of 2015. It was through review of the 2015 incident and evolution of ADDL's process that the laboratory was prepared to handle the large demand of the 2016 episode. The Molecular Diagnostics section entered 2016 with the materials and strategy to handle four hundred cases a day for ten days straight, which is the amount of time necessary to receive supplies for the next ten days. This worst-case scenario strategy was nearly stretched to capacity in the 2016 episode. ADDLs crucial role in containing this outbreak reaffirms the relationships, communication, and inter-agency teamwork that are vital to the future of animal health in the state of Indiana.

HPAI OUTBREAK

USDA Press release

USDA Confirms Highly Pathogenic H7N8 Avian Influenza in a Commercial Turkey Flock in Dubois County, Indiana

WASHINGTON, January 15, 2016 -- The United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) has confirmed the presence of highly pathogenic H7N8 avian influenza (HPAI) in a commercial turkey flock in Dubois County, Indiana. This is a different strain of HPAI than the strains that caused the 2015 outbreak. There are no known cases of H7N8 infections in humans. As a reminder, the proper handling and cooking of poultry and eggs to an internal temperature of 165 ˚F kills bacteria and viruses, including HPAI.

Samples from the turkey flock, which experienced increased mortality, were tested at the Indiana Animal Disease Diagnostic Laboratory at Purdue University, which is a part of USDA's National Animal Health Laboratory Network, and confirmed by USDA this morning. APHIS is working closely with the Indiana State Board of Animal Health on a joint incident response. State officials quarantined the affected premises and depopulation of birds on the

HPAI case discovered in Indiana

WASHINGTON – An Indiana-based commercial turkey flock is the site of the first case of highly pathogenic avian influenza (HPAI) in the US since this past June. According to the US Dept. of Agriculture's Animal and Plant Health Inspection Service (APHIS), the flock is located in in southern Indiana's Dubois County. USDA confirmed

INDIANA STATE BOARD OF ANIMAL HEALTH

Indiana State Veterinarian Optimistic, While Reminding the Avian Flu Event is Not Over

More testing to be done in Dubois County

INDIANAPOLIS (22 Jan. 2016)--Although tests in the Dubois County avian influenza incident continue to prove negative, much more work must still be completed before this event can be considered over, according to Indiana State Veterinarian Bret D. Marsh, DVM.

"We are optimistic with each day that yields more negative flock tests," said Dr. Marsh. "But we are mindful that the

State Veterinarian Bret Marsh Praises Avian Flu Response

Dubois County Poultry Control Area Released After Negative Tests Conducted at Purdue ADDL

The Indiana Board of Animal Health (BOAH) announced this week that the 6.2 - mile (10 km) control area associated with the highly pathogenic avian influenza (HPAI) incident in Dubois County, Ind. has been lifted by Indiana State Veterinarian Bret Marsh (PU DVM '84). The action, which was taken Monday (February 22), means that poultry owners, commercial and residential, in the area may now resume normal operations and movements of birds and poultry products.

The control area was established on Dubois County commercial turkey farm. Poultry and poultry products could not enter or leave the control area without a negative avian influenza test and a permit issued by BOAH. Because the tests must be completed within 24 hours of the movement, many commercial egg farms had to be tested daily to continue to move products.

The Animal Disease Diagnostic Laboratory at the Purdue University College of Veterinary Medicine ran more than 4300 avian influenza tests during the 38-day period. Since all farms consistently tested negative throughout that timeframe, BOAH was able to lift the control area, based on guidelines established by the U.S. Department of Agriculture.

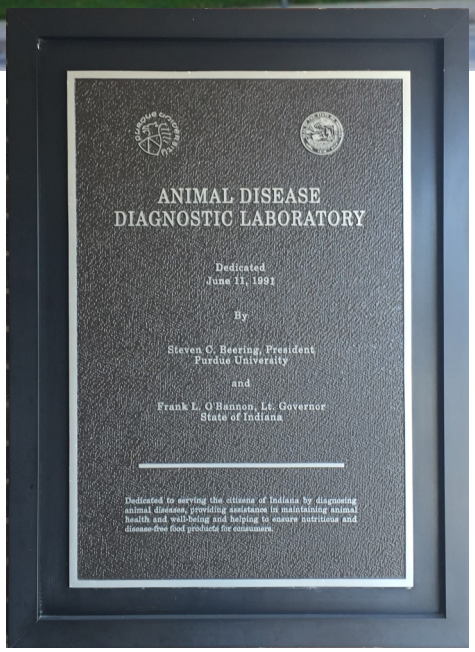
"We are pleased to be where we are…just 38 days after HPAI was identified in Dubois County," said Dr. Marsh, who is a member of the Purdue DVM Class of 1984. "This is an unprecedented event for the state of Indiana, and the level of cooperation and response at all levels has been incredible. The BOAH team and I are grateful for the hard work of our local, state, federal and industry partners who came together to bring this event to a close."

Dubois County Poultry Control Area Released After Negative Tests

INDIANAPOLIS (22 Feb. 2016)—The 6.2-mile (10 km) control area associated with the highly pathogenic avian influenza (HPAI) incident in Dubois County, Ind. was lifted today by the Indiana State Veterinarian. Poultry owners, commercial and residential, in the area may now resume normal operations and movements of birds and poultry products.

DEDICATION OF THE ADDL

2016 Marks the 25th Anniversary of the Dedication of the ADDL



On June 11, 1991 the Animal Disease Diagnostic Laboratory was dedicated by Steve C. Beering, President, Purdue University and Frank L. O'Bannon, Lt. Governor, State of Indiana.

Dedicated to serving the citizens of Indiana by diagnosing animal disease, providing assistance in maintaining animal health and well-being and helping to ensure nutritious and disease-free food products for consumers.

STAY CONNECTED!

Don't let your inbox fill up with unwanted emails! Sign up to get real time customized information that YOU want to know about. The ADDL is excited to offer a new email communication tool to ensure our clients stay up to date on the latest test offerings, outbreaks and much more!

This new email tool will be replacing our current email list serve so be sure to stay connected with the ADDL by signing up now!

Visit our website and click the sign up now button or use the QR Code below!

Client service is our number one focus at the ADDL. Our goal is to keep you informed and up to date on the latest events without bogging down your inbox!

QUALITY SYSTEM

By: Lou Samudio

In early 2016, the lab gained full AAVLD Accreditation after completing several improvement projects stemming from the initial audit (Summer 2014). These projects included the revamping of our Equipment Maintenance and Calibration tracking program (Equiparec). Equiparec can now track routine maintenance needs as well as service completion dates. Prior to this, each lab maintained a written log for each instrument/equipment in the lab. With Equiparec, all records are accessible via computer and can be updated and/or reviewed quickly and easily.

Another big addition has been the creation of a Nonconformance Tracking System. This system was created to help ADDL staff comply with quality system requirements for client negative feedback, nonconforming testing, corrective and preventive actions and the tracking of Corrective Actions stemming from internal and external audits. This system allows any employee to enter the complaint/issue into the system. The system is interactive, allowing the quality manger and section supervisor to determine the nature of the complaint/issue and to place it under the correct compliance heading. Once entered and defined, the system tracks the event through the entire process, including root cause analysis, necessary follow-up actions, and ultimately, incident resolution/close. Due to the ease of use, the new system has increased the use of this quality improvement tool.

Also, in 2016 the ADDL Quality Working Group participated in several lab audits. This group was created in 2014 to assist the quality manager with internal section/lab audits. This group has been a great help to the quality manager and a viable benefit to the lab. Besides assisting with internal audits, the committee members serve as the link between quality system requirements and implementation of these requirements in their own respective sections/laboratories.

MOLECULAR DIAGNOSTICS

By: Dr. Sam Yingst

The ADDL Molecular Diagnostics team is many things to many people – We have the capability to support foreign animal disease diagnostic investigations under the auspices of the National Animal Health Laboratory Network, as evidenced by our successful support of the Avian Influenza outbreak from January to March 2016. We provide routine viral, bacterial and antibiotic resistance gene PCR diagnostics for food and companion animals. We processed nearly four thousand samples for PCR diagnostics last year. Last but not least, we stay abreast of the cutting edge of molecular diagnostics – sequencing. We provide traditional Sanger sequencing, for example, of the ORF 5 gene of PRRS, but we are progressing steadily toward the use of Next Generation Sequencing in a cost effective way, yet with fast turnaround and much more robust sequence data. For example, we are aiming to be able to provide the full genomic sequence of PRRS for a reasonable cost in the near future, potentially revolutionizing practitioners' ability to make the best possible decision regarding vaccination.

TOXICOLOGY

By: Dr. Christina Wilson

The Toxicology section is exploring the use of Noviplex™ plasma prep cards for toxicological analyses and for canine heartworm testing. Because these cards separate plasma from whole blood and can be stored at room temperature, they can expedite sample collection and shipping for veterinarians. The Noviplex™ cards only require two drops of blood; therefore, they also hold potential clinical value for plasma testing in anemic and smaller patients.

In addition to the Noviplex™ cards, the Toxicology section has validated diagnostic methods to screen for trace nutrients and toxic metals in serum/plasma, whole blood, CSF, and water samples by ICP-MS. The Toxicology section is currently working to validate diagnostic methods to test for trace nutrients and toxic metals in feedstuffs, bone, and biological tissues (brain, liver, and kidney) by ICP-MS.

FY16 REPORTS

Accessions by Month

West Lafayette ADDL

July	1764
August	1800
September	2075
October	1879
November	1517
December	1471
January	2202
February	2477
March	2467
April	2362
May	2063
June	2523
TOTAL	24600

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Accessions by Species*

West Lafayette ADDL

Aquatic	69
Avian	2926
Bovine	1457
Camelid	94
Canine	7588
Caprine	641
Cervid	1016
Equine	5137
Feline	1300
Misc.	437
Non Animal**	277
Ovine	1068
Porcine	2554
Unspecified	20

*Individual accessions may represent multiple animals especially in livestock.

**I.e. feed, environmental substances

FY16 REPORTS

Accessions by Section

West Lafayette ADDL

Avian	1255
Bacteriology	4003
Histology	5848
Molecular Diagnostics	3975
Pathology	7763
Parasitology	1770
Serology	6293
Toxicology	306
TSE	2164
Virology	1198
TOTAL*	34575

*Individual accessions may be handled by multiple sections.

FY16 REPORTS

Tests By Month

West Lafayette ADDL

July	7045
August	17073
September	8507
October	8393
November	7644
December	6972
January	6829
February	6773
March	10702
April	8867
May	8605
June	6916
TOTAL	104326

HEEKE LAB

Annual Report Fiscal Year 2016

Heeke Animal Disease Diagnostic Laboratory

HEEKE LAB

Southern Indiana Purdue Agricultural Center

Hello from southern Indiana! The Heeke Animal Disease Diagnostic Laboratory, located on the campus of the Southern Indiana Purdue Agricultural Center (SIPAC), continues to provide diagnostic services to veterinarians, farmers, and animal owners in the southern part of our state. In January, the Heeke lab aided in the diagnosis of highly-pathogenic avian influenza in Dubois County and worked to support local and state agencies during the outbreak. The lab continues to monitor for this important foreign animal disease, as well as other emerging threats to animal populations.

In addition to avian and mammalian autopsy and microbiology, the Heeke ADDL is now offering a slate of avian ELISA tests, including those for *Bordetella avium*, Newcastle disease, Avian influenza, Reovirus, Hemorrhagic enteritis virus, *Mycoplasma gallisepticum*, and *Mycoplasma synoviae*. During the past fiscal year, the Heeke lab also began offering an ELISA for Avian metapneumovirus (abbreviated AMPV or APV), another avian paramyxovirus that can affect poultry. The lab also continues to offer the IFA for turkey coronavirus (TCV). The Heeke ADDL is only one of a few labs in the nation to offer testing for AMPV and likely the only lab in the country that performs the IFA for TCV.

Travis Haag, a graduate of Indiana University with a specialization in microbiology, joined the Heeke lab as a technician in May. Travis became part of a dedicated team at the lab, including Denise Riley (28 years), Margaret Gehlhausen (19 years), Audrey Verkamp (3 years), and Grant Burcham (2 years). The staff is working hard, with a 5% gain in total accessions in fiscal year 2016.

The Heeke ADDL will continue to work with individuals, as well as local and state agencies, to ensure prompt diagnosis of important animal disease in the coming year. If you have any questions or suggestions for the Heeke ADDL, please send me a note or give me a call, we'd love to hear from you.

Grant N. Burcham, DVM, PhD, DACVP

FY16 REPORTS

Accessions by Month

HEEKE Lab

July	145
August	128
September	139
October	119
November	101
December	121
January	120
February	114
March	117
April	177
May	209
June	216
TOTAL	1706

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Accessions by Species*

Heeke Lab

Avian	1172
Bovine	126
Camelid	4
Canine	57
Caprine	32
Cervid	7
Equine	11
Feline	18
Misc.	16
Non Animal**	210
Ovine	16
Porcine	36
Unspecified	1

*Individual accessions may represent multiple animals especially in livestock.

**I.e. feed, environmental substances

FY16 REPORTS

Accessions by Section

Heeke Lab

Avian	558
Bacteriology	1078
Pathology	996
TOTAL*	2632

*Individual accessions may be handled by multiple sections.

FY16 REPORTS

Tests By Month

Heeke Lab

July	801
August	697
September	765
October	782
November	550
December	638
January	560
February	661
March	488
April	709
May	509
June	981
TOTAL	8141