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Feed Cost/ton w/o color ($)	262.91
Feed cost /lb meat (c)	22.57
Corn Price per Bushel	4.43
SBM price / ton	379.32
Age at harvest (days)	48.00
Days to 4.6 lbs	39.00
Chick cost / lb (c)	6.06
Vac-Med cost/lb (c)	0.11
WB & ½ parts condemn. Cost/lb	0.19
% mortality	**.**
Sq.Ft. @ placement	0.86
Lbs/sq. ft.	7.44
Downtime (days)	20.00

Data for week ending May 19, 2018

Poultry Diagnostic and Research Center
College of Veterinary Medicine
UNIVERSITY OF GEORGIA

New Strategies for Diagnosis of Infectious Bronchitis Virus

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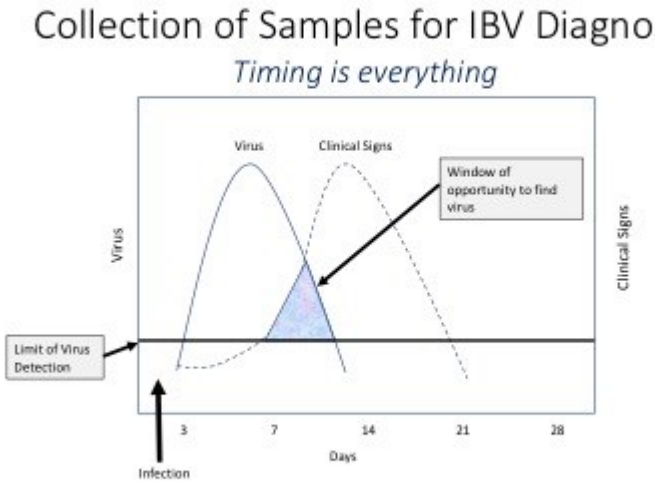
Introduction

Infectious bronchitis is caused by an avian coronavirus, infectious bronchitis virus (IBV). The virus causes a highly contagious upper-respiratory tract disease in chickens. It can also affect the reproductive tract of adult birds and some strains of the virus can cause lesions in the kidneys. It is a severe economic burden on the poultry industry worldwide causing reduced feed efficiency and condemnations at the processing plant due to airsaculitis as well as losses in egg production in layers and breeders. The virus contains an RNA genome that changes rapidly as the virus replicates, frequently producing new antigenic types, which adds to the multiple serotypes of the virus that do not cross protect. Emergence of nearly all new variants of IBV is due to replication and transmission of existing strains from one bird to another. Replication of the virus in a poorly immunized chicken provides it with an opportunity to further adapt and evade the immune response which can lead to the emergence of new variant viruses capable of causing disease.

Surveillance

Surveillance to identify IBV types emerging and circulating in the field is a key component of any disease control program because it provides information on actively circulating viruses in the field. This information can then be used to ensure that effective vaccines (if available) are being used against these viruses. When a bird is infected with IBV, it will shed virus for about 10 days starting approximately 3 days after infection. Clinical signs often begin by 5 days post-infection leaving a window of time to detect the virus of about 8 or 9 days (see collection of samples graph below). Therefore, the timing of sample collection to detect the virus can be challenging.

Surveillance efforts can be either passive or active. Passive efforts involve testing only those birds that show clinical signs. Active surveillance is conducted to determine the incidence and distribution of a particular virus type and involves collecting a large number of samples from birds (sick or healthy) in a given geographic area. Large sample sizes across many flocks are necessary to access how widespread the virus has become. They also provide a high level of confidence that sampling will occur during the limited window of virus shedding. These large sample sizes associated with active surveillance require high throughput and automation of virus detection methods.



Diagnostic testing

Diagnosis of IBV can be accomplished by isolating the virus, by detecting serum antibodies against the virus, or by detecting viral RNA. Virus isolation is typically done by inoculating 9 to 11-day old embryonated eggs, which is labor and time intensive because a number of passages are typically required for the virus to grow. Another limitation is that vaccine viruses will preferentially outgrow field viruses since they are adapted to grow in eggs. Because of those limitations, virus isolation is usually done only when a virus isolate is needed for further characterization or vaccine production.

Regular and recurring serologic testing can also be useful for surveillance. Serum antibodies against IBV can be detected by commercially available enzyme linked immunosorbent assay (ELISA). The ELISA test is not serotype specific but does indicate that the birds were infected with the virus. Serum antibodies can also be detected by the hemagglutination inhibition (HI) test. The HI test is somewhat serotype specific but can suffer from a high level of cross reaction, especially in birds that have received several different IBV vaccine types. Detecting a rise in antibodies against IBV not only indicates that the birds were infected but can also provide information on when (at what age) the birds were exposed to the virus. Antibody titers rise about 7 to 14 days after infection in previously vaccinated birds. Naïve birds usually take 14 days or more to develop a serum antibody response that can be detected by ELISA. Thus, a rise in antibody titer can be used to inform the timing of sample collection from other at-risk flocks.

Viral RNA detected by molecular tests has become routine in most diagnostic laboratories and it is designed to detect all IBV types. Sequencing is then used to determine the genetic type of the virus. Recently, type specific molecular tests designed to identify common IBV types directly from clinical samples have been developed and are changing the way we diagnose IBV.

The molecular tests

Three molecular techniques; 1) reverse transcriptase-polymerase chain reaction (RT-PCR), 2)

real-time RT-PCR, and 3) nucleotide sequencing are now routinely being used in diagnostic laboratories. These procedures have recently benefited from optimization to increase sensitivity and automation to significantly increase the number of samples that can easily be tested in a short period of time. Consequently, the way we use these molecular diagnostic procedures for detection and identification of IBV has changed.

RT-PCR. Nucleic acid amplification is used detect viral RNA. In the past, clinical samples were passed up to 3 or 4 times in embryonated eggs to obtain enough virus for detection. Increases in the efficiency and sensitivity of the commercial RT-PCR test kits now allows clinical samples to be tested directly, saving time and resources. Typically, the RT-PCR test targets the S1 portion of the spike gene. That amplified product can then be used as template for nucleic acid sequencing (see below).

Nucleic acid sequencing. Nucleotide sequence analysis is conducted on the RT-PCR amplified S1 portion of the spike gene to characterize the genetic type of the virus. The hypervariable regions of the S1 subunit, which are unique for different types of IBV can also be used to identify the virus. The nucleic acid sequence is typically converted to an amino acid sequence, which is then compared to sequences of known viruses in the GenBank database (https://www.ncbi.nlm.nih.gov/). Automation and advances in nucleic acid sequencing technology has led to much shorter turn-around times, allowing identification of a virus in as quickly as 24 to 48 hours after submission.

Real time RT-PCR. Real time RT-PCR not only amplifies viral RNA, it detects the amplified product as it is being produced in real time. The test is extremely fast and highly sensitive so clinical samples can be tested directly. In addition, it can be conducted in 96 well plates, which allows for testing of many samples simultaneously. The test is also quantitative, so information on the amount of viral RNA in the sample can also be obtained. The real time RT-PCR test has been developed to not only detect any IBV type but also to identify specific types of IBV in a clinical sample. Unique sets of primers and probes have been developed to specifically detect almost all of the IBV types used as vaccines in the US (see specifics below).

Extracting RNA for testing and setting up amplification reactions can be time consuming if done one at a time. Automation of those procedures has not only significantly increased the number of samples that can be tested in a given period of time but has also reduced cross-contamination and improved quality control issues. It is not unusual to test 200 to 400 samples in approximately 4 hours by real time RT-PCR.

A new strategy for diagnosing IBV

Advances in RT-PCR, nucleic acid sequencing and real time RT-PCR has changed the strategy used to detect and identify IBV in poultry. Procedures to follow in a suspected outbreak of IBV are as follows. Collect 25 to 50 choanal cleft swabs (choanal cleft swabs work just as well as tracheal swabs and are easier to collect) per house, and all houses on the farm (regardless of clinical signs) should be tested. The swabs should be placed into individual tubes containing 1ml of ice cold PBS or viral transport media and kept cold at all times.

The clinical swabs submitted to the laboratory undergo automated RNA extraction followed by real time RT-PCR to detect the presence of IBV viral RNA. Hundreds of samples can be processed and tested in just a few hours. Because the real time RT-PCR test also gives an indication of how much virus is in the sample, samples with the highest amount of viral RNA can be selected for further testing to identify the genetic type of the virus.

If a specific IBV genetic type is suspected, then the type specific real time RT-PCR test can be used to identify which positive samples have that particular IBV type. To date, specific real time RT-PCR tests for Mass, Ark, Conn, DE/GA98, GA08, GA07,and GA13 are available. Tests for DMV/1639 have been developed but are still being verified. Alternatively, the S1 gene can be amplified from positive samples and sent for nucleic acid sequencing. The advantage of using the type specific real time RT-PCR test is cost and the results can be obtained in just a few hours. Amplifying S1 and sending the amplified product for sequencing generally takes 2 business days but it detects any IBV in the sample and provides sequence information that can be examined for similarity to other previously identified IBV types.

In the end, a good indication of the incidence (number of positive samples/total) and viral load can be obtained for IBV types circulating in the field.

Summary

New strategies for the detection and identification of avian coronavirus IBV that take advantage of rapid high-throughput testing are beginning to emerge. Optimization and automation of sample processing and real time RT-PCR has significantly improved testing logistics. Rapid test results ensure timely decisions can be made on vaccine program changes and large sample sizes provide a high probability that the virus causing disease will be detected and identified. Testing strategies for IBV can vary somewhat with the situation in the field, but the faculty at PDRC are here to help design a program that works for your individual situation. Please visit our website https://vet.uga.edu/pdrc for more information.

Excerpts from the latest USDA National Agricultural Statistics Service (NASS) "Broiler Hatchery," "Chicken and Eggs" and "Turkey Hatchery" Report and Economic Research Service (ERS) "Livestock, Dairy and Poultry Situation Outlook"

Chickens and Eggs

Released June 22, 2018, by NASS, Agricultural Statistics Board, USDA

May Egg Production Up 2 Percent

United States egg production totaled 9.12 billion during May 2018, up 2 percent from last year. Production included 7.93 billion table eggs, and 1.19 billion hatching eggs, of which 1.11 billion were broiler-type and 81.2 million were eggtype. The average number of layers during May 2018 totaled 386 million, up 3 percent from last year. May egg production per 100 layers was 2,361 eggs, down 1 percent from May 2017.

All layers in the United States on June 1, 2018 totaled 386 million, up 4 percent from last year. The 386 million layers consisted of 323 million layers producing table or market type eggs, 59.4 million layers producing broiler-type hatching eggs, and 3.38 million layers producing egg -type hatching eggs. Rate of lay per day on June 1, 2018, averaged 76.4 eggs per 100 layers, down 1 percent from June 1, 2017.

Egg-Type Chicks Hatched Up 12 Percent

Egg-type chicks hatched during May 2018 totaled 60.1 million, up 12 percent from May 2017. Eggs in incubators totaled 50.5 million on June 1, 2018, up 8 percent from a year ago.

Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 199 thousand during May 2018, down 33 percent from May 2017.

Broiler-Type Chicks Hatched Up 2 Percent

Broiler-type chicks hatched during May 2018 totaled 839 million, up 2 percent from May 2017. Eggs in incubators totaled 700 million on June 1, 2018, up 4 percent from a year ago.

Leading breeders placed 8.30 million broiler-type pullet chicks for future domestic hatchery supply flocks during May 2018, up 2 percent from May 2017.

Broiler Hatchery

Released June 27, 2018, by NASS, Agricultural Statistics Board, USDA

Broiler-Type Eggs Set In The United States Up 3 Percent

Hatcheries in the United States weekly program set 231 million eggs in incubators during the week ending June 23, 2018, up 3 percent from a year ago. Average hatchability for chicks hatched during the week in the United States was 83 percent. Average hatchability is calculated by dividing chicks hatched during the week by eggs set three weeks earlier.

Broiler-Type Chicks Placed Up 3 Percent

Broiler growers in the United States weekly program placed 189 million chicks for meat production during the week ending June 23, 2018, up 3 percent from a year ago. Cumulative placements from the week ending January 6, 2018 through June 23, 2018 for the United States were 4.58 billion. Cumulative placements were up 1 percent from the same period a year earlier.

Turkey Hatchery

Released June 15, 2018, by the NASS, Agricultural Statistics Board, USDA

Eggs in Incubators on June 1 Down 5 Percent from Last Year

Turkey eggs in incubators on June 1, 2018, in the United States totaled 28.1 million, down 5 percent from June 1, 2017. Eggs in incubators were down 3 percent from the May 1, 2018 total of 28.8 million eggs

Poults Hatched During May Down 3 Percent from Last Year

Turkey poults hatched during May 2018, in the United States totaled 23.5 million, down 3 percent from May 2017. Poults hatched were down slightly from the April 2018 total of 23.5 million poults.

Net Poults Placed During May Down 1 Percent from Last Year

The 22.5 million net poults placed during May 2018 in the United States were down 1 percent from the number placed during the same month a year earlier. Net poult placements were up 1 percent from the April 2018 total of 22.2 million.

Current Month Charts

Broiler Performance Data Live Production Cost	Region					Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
Feed Cost/ton w/o color ($)	255.56	246.31	268.60	264.74	263.60	262.91
Feed cost /lb meat (c)	22.05	20.95	23.30	23.90	22.48	22.57
Corn Price per Bushel	4.37	3.87	4.57	4.60	4.42	4.43
SBM price / ton	369.11	374.21	384.17	378.22	383.02	379.32
Age at harvest (days)	50.00	49.00	49.00	54.00	48.00	48.00
Days to 4.6 lbs	39.00	39.00	39.00	39.00	38.00	39.00
Chick cost / lb (c)	5.55	6.11	5.91	4.90	5.84	6.06
Vac-Med cost/lb (c)	0.08	0.02	0.09	0.11	0.10	0.11
WB & ½ parts condemn. Cost/lb	0.15	0.15	0.16	0.18	0.15	0.19
% mortality	5.19	6.38	5.21	6.64	**.**	**.**
Sq.Ft. @ placement	0.85	0.81	0.88	0.91	0.88	0.86
Lbs/sq. ft.	7.92	7.95	7.29	8.35	7.40	7.44
Downtime (days)	20.00	19.00	19.00	20.00	20.00	20.00

Broiler Whole Bird Condemnation			Region			Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
% Septox	0.105	0.136	0.092	0.130	0.072	0.125
% Airsac	0.052	0.083	0.082	0.148	0.047	0.123
% I.P.	0.005	0.019	0.007	0.030	0.010	0.016
% Leukosis	0.000	0.000	0.000	0.000	0.000	0.000
% Bruises	0.001	0.001	0.004	0.002	0.004	0.004
% Other	0.012	0.003	0.019	0.010	0.043	0.018
% Total	0.174	0.242	0.204	0.204	0.321	0.287
% ½ parts condemns	0.234	0.150	0.202	0.143	0.242	0.191

Data for week ending May 19, 2018

Previous Month Charts

Broiler Performance Data Live Production Cost	Region					Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
Feed Cost/ton w/o color ($)	251.93	243.52	266.84	260.08	260.38	259.12
Feed cost /lb meat (c)	21.71	20.69	23.06	23.44	22.16	22.25
Corn Price per Bushel	4.31	3.83	4.53	4.54	4.37	4.37
SBM price / ton	363.09	368.21	379.27	368.72	377.81	372.69
Age at harvest (days)	50.00	49.00	49.00	54.00	48.00	48.00
Days to 4.6 lbs	39.00	38.00	39.00	39.00	38.00	39.00
Chick cost / lb (c)	5.46	5.90	5.85	4.92	5.76	5.90
Vac-Med cost/lb (c)	0.09	0.03	0.10	0.11	0.10	0.11
WB & ½ parts condemn. Cost/lb	0.17	0.15	0.15	0.16	0.15	0.17
% mortality	5.47	5.66	4.82	6.46	**.**	**.**
Sq.Ft. @ placement	0.85	0.81	0.87	0.91	0.88	0.85
Lbs/sq. ft.	8.00	8.02	7.37	8.36	7.46	7.55
Downtime (days)	20.00	19.00	20.00	20.00	20.00	20.00

Broiler Whole Bird Condemnation	Region					Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
% Septox	0.123	0.142	0.108	0.128	0.076	0.125
% Airsac	0.063	0.092	0.082	0.110	0.048	0.081
% I.P.	0.006	0.018	0.007	0.028	0.011	0.015
% Leukosis	0.000	0.000	0.000	0.000	0.000	0.000
% Bruises	0.001	0.001	0.003	0.001	0.004	0.002
% Other	0.011	0.003	0.032	0.009	0.039	0.018
% Total	0.204	0.256	0.232	0.276	0.179	0.242
% ½ parts condemns	0.247	0.146	0.174	0.134	0.243	0.195

Data for week ending April 28, 2018

PDRC Updates

Clinical Poultry Veterinarian Wanted

The Department of Population Health, Poultry Diagnostic and Research Center (PDRC), College of Veterinary Medicine at the University of Georgia is seeking a veterinarian to fill a position in clinical poultry medicine. Requirements include a DVM degree or equivalents, such as a VMD or BVS, and board certification (or eligibility for examination) by the American College of Poultry Veterinarians. Responsibilities include clinical services to the poultry industry and major participation in instruction in the Master of Avian Medicine and the online Master of Avian Health and Medicine degree programs. This position will be either a non-tenure track clinical professorship or a tenure track professorship depending upon qualifications. The University of Georgia is an Equal Opportunity/ Affirmative Action employer. This position will be open for applications in July 2018. Interested persons should contact Dr. Mark Jackwood (mjackwoo@uga.edu) or Dr. Karen Grogan (kbgrogan@uga.edu). For information on the application process please contact Tracey Collett (tracey86@uga.edu). Information about PDRC can be found here https://vet.uga.edu/pdrc

Changes to Labtrak are in the works!

Faculty and staff at PDRC have been busy working with collaborators on a new and improved version of Labtrak, the database and report generating software that is used to provide results to our clients. The new system will be web based and have client access portals. Beta testing is currently underway. Please stay tuned to the PIP for important updates on the progress of Labtrak development!

Meetings, Seminars and Conventions

July 2018

July 14-17
American Association of Avian Pathologists Annual Meeting
Denver, CO, USA
https://www.aaap.info/2018-annual-meeting-denver

July 22-24
Chicken Marketing Summit
Orlando, FL, USA
https://www.wattglobalmedia.com/chickenmarketingsummit/

July 23-26
Poultry Science Association Meeting
San Antonio, TX, USA
https://www.poultryscience.org/psa18/

August 2018

August 31-September 2
7th International Poultry & Livestock Expo
Bangalore, India
http://www.iplexpo.com/

September 2018

September 11-13
Arkansas Nutrition Conference
Rogers, AR, USA
https://www.thepoultryfederation.com/events/3-nutrition-conference

September 17-19
VIV China 2018
Nanjing, China
http://www.vivchina.nl/

September 17-21
XVth European Poultry Conference (WPSA)
Dubrovnik, Croatia
http://www.wpsa.com/index.php/calendar-home/calendar/51-xvth-european-poultry-conference

September 21-26
Society for Histotechnology Symposium/Convention 44th Annual National
St. Louis, MO, USA
http://www.histoconvention.org/

Reminder

All previous issues of the Poultry informed Professional are archived on our website www.avian.uga.edu under the Online Documents and The Poultry Informed Professional links.