



The Poultry Informed Professional®



Published by the Department
of Population Health, University of Georgia
Editor: Dr. Stephen Collett, Assistant Professor
Co-Editor: Dr. Pedro Villegas, Professor
Department of Population Health

Phone (706) 542-1904

Fax (706) 542-5630

e-mail: dsbaird@uga.edu

Dynamics of IBV Vaccine Field Boost in Commercial Broilers

Mark W. Jackwood, Ph.D.

University of Georgia, Athens, GA.

This article contains data from a recently published article from our laboratory: *Jackwood, M. W., D. A. Hilt, A. W. McCall, C. N. Polizzi, E. T. McKinley, and S. M. Williams. Infectious bronchitis virus field vaccination coverage and persistence of Arkansas type viruses in commercial broilers. Avian Dis. Accepted, Nov. 2008.*

This work was supported by the US Poultry & Egg Association.

Contents

Dynamics of IBV Vaccine Field Boost in Commercial Broilers	1-4
Excerpts. "Broiler Hatchery" "Chicken and Eggs" and Turkey Hatchery...	5
Broiler performance data (Company) Previous month	6
Meetings, Seminars and Conventions	7

Broiler Live Production Cost	Average Company
Feed Cost/ton w/o color (\$)	269.16
Feed cost /lb meat (c)	24.68
Days to 4.6 lbs	41
Chick cost / lb (c)	5.22
Vac-Med cost/lb (c)	0.07
WB & ½ parts condemn. Cost/lb	0..2
% mortality	3.9
Sq.Ft. @ placement	0.83
Lbs/sq. ft.	7.04
Downtime (days)	18

Data for week ending 15 November 2008

Introduction.

Control of infectious bronchitis in commercial poultry is through the use of attenuated live infectious bronchitis virus (IBV) vaccines. To obtain sound protection, two vaccinations, a prime and a boost, are given to most broilers; the prime in the hatchery at one day of age, and the boost in the field typically between 14 and 18 days of age. This article will address coverage of IBV vaccine given in the field boost. Field boost vaccines are typically given in either the drinking water or via a backpack sprayer. Vaccination in the drinking water is accomplished using a proportioner or by the pump and barrel method. Vaccination by the spray method uses either a STIHL 420 backpack sprayer (STIHL, Virginia Beach, VA), which is a blower type sprayer that delivers vaccine to high velocity air from a gasoline powered blower, or a SoloVac backpack sprayer (Merial Select, Athens, GA), which uses a battery powered pump to force vaccine through a small orifice in a wand assembly to create a fine mist.

In this study, we determined the coverage of IBV vaccine field boost in broilers, the relative amount of vaccine virus in the trachea, and we followed the clearance of the vaccine in the flocks.

Experimental design.

The experimental design was straightforward and relatively consistent for each field study. A total of 10 broiler houses on 6 different farms were examined over a 2-year period. Both drinking water and spray vaccination were used. To determine the number of birds with IBV vaccine virus in their trachea and to follow the clearance of the vaccines, the trachea of 100 birds per house were swabbed, with a few exceptions, at various times post-vaccination. In general, samples were collected from the time the birds were vaccinated until the flock went to the processing plant. The tracheal swabs were put in transport media, brought to the laboratory, and examined directly for presence of virus by real time reverse transcriptase-polymerase chain reaction (RT-PCR).

Using automated nucleic acid extraction equipment and extremely fast real time RT-PCR methodology, we were able to test hundreds of samples daily making this type of study possible for the first time. That test not only indicates which samples are positive and which are negative, it also gives the relative amount of virus present in the sample, detecting as few as 100 copies of the virus nucleic acid. The test does not distinguish between different serotypes of the virus. A separate test was used that examines the sequence of the virus directly from the tracheal swab to identify the type of IBV present. Using recently published data from our laboratory (McKinley *et al.* Vaccine 26:1274-1284. 2008) we were able to distinguish between vaccine viruses from each of the manufacturers as well as field viruses.

Results and Discussion.

Vaccination Dynamics. Two different patterns were observed following vaccination in the field. One pattern was a parabolic shaped curve (Fig. 1) where initially a low percentage of birds were positive for IBV vaccine in the trachea followed by a peak at approximately 14 days post-vaccination and then a decrease in the number of positive birds was observed. But, the vaccines did not completely clear from the flock and were still present when

the flock went to the processing plant. The second pattern was similar to a sinusoidal type wave (Fig. 1) that started with a high number of birds positive for IBV vaccine in the trachea, and cycled from peak to peak on a 2-week interval. Again, the vaccines did not clear from the flock prior to the birds going to processing. The patterns did not correlate with either drinking water or spray methods of vaccination or the type of IBV vaccine given.

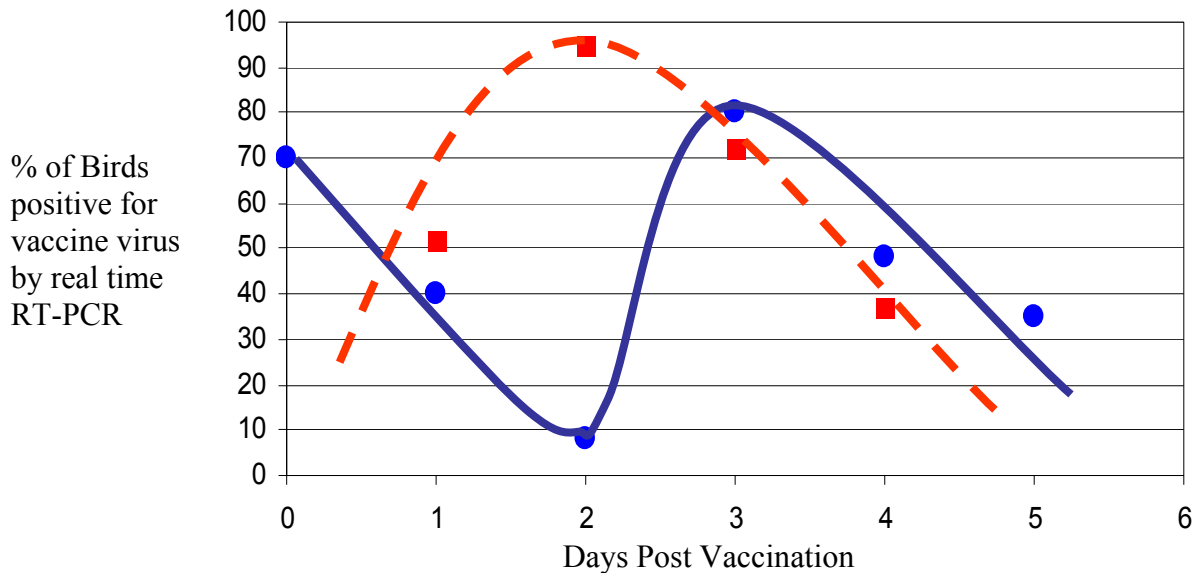


Figure 1. The two different patterns of IBV vaccine coverage following field boost are presented. The red dashed line represents the parabolic curve pattern and the blue line represents the sinusoidal wave pattern.

We monitored the amount of vaccine in the drinking water and found that we could not detect it using the real time RT-PCR test. Based on calculations for one dose of vaccine diluted to a final 8 to 10 ml volume of drinking water, we determined that the vaccine titer was below our level of detection. Examining the amount of virus in the backpack sprayers revealed that up to half a log of vaccine titer is lost between the storage tank and what is delivered from the spray nozzle, regardless of sprayer type.

Arkansas Vaccine Persistence. Different farms used different IBV vaccines according to the viruses endemic in the area. Vaccine combinations used included: Arkansas and Georgia98; Arkansas and Massachusetts; Arkansas and Delaware072; and Arkansas, Massachusetts, and Delaware072. Generally, we examined the type of vaccine present a few days following vaccination and at the end of the grow-out. In all cases, the only virus detected was Arkansas and those viruses were confirmed to be vaccine based on nucleic acid sequence data. Previous studies have shown that Arkansas is the predominant virus isolated from the field (Jackwood *et al.* Avian Dis. 49:612-618. 2005). Persisting Arkansas vaccines in commercial broilers may be due to insufficient priming in the hatchery. In each of the studies, the same vaccines were used in the hatchery as were used in the field boost.

When birds are initially given an priming vaccination in the hatchery, conventional wisdom assumed that when the same type vaccines are given in the field boost, a high number of birds were initially infected with the

vaccine then the vaccine virus waned and finally cleared from the trachea of birds. Evidence in the literature indicates that this is likely not the case when a single vaccination is given. Two different studies showed that when only a single exposure is given, IBV could be isolated from the trachea of birds up to 28 days post-infection (Alvarado *et al.* Avian Dis. 50:292-297. 2006) and vaccine virus could be isolated intermittently for up to 77 days post-vaccination (Naqi *et al.* Avian Dis. 47:594-601. 2003). Thus, it seems likely that persistence of Arkansas type viruses in the field could be the result of insufficient priming by Arkansas type vaccines in the hatchery.

Protection. Further studies on protection from challenge were conducted and we found that the birds vaccinated for Arkansas and Delaware in the field then brought to the laboratory and challenged at 21 days post-vaccination were protected against Delaware but not adequately protected from Arkansas challenge virus. That observation suggests that the birds were not adequately primed against Arkansas in the hatchery.

Summary

This study on IBV vaccination dynamics showed that infection with IBV vaccines administered to commercial broiler flocks in the field follow either a parabolic type curve or a sinusoidal type wave and in none of the studies did vaccine virus completely clear from the flock. In addition, the data showed that Arkansas type vaccines were persisting in the birds and that adequate protection against Arkansas challenge was lacking, which suggests that locally protective antibodies against Arkansas were not present in the trachea.

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”

Chicken and Eggs

Released November 21, 2008, by the National Agricultural Statistics Service (NASS)

October Egg Production Down 1 Percent

U.S. egg production totaled 7.61 billion during October 2008, down 1 percent from last year. Production included 6.54 billion table eggs, and 1.08 billion hatching eggs, of which 1.01 billion were broiler-type and 69 million were egg-type. The total number of layers during October 2008 averaged 335 million, down 2 percent from last year. October egg production per 100 layers was 2,276 eggs, up 1 percent from October 2007.

All layers in the U.S. on November 1, 2008 totaled 336 million, down 2 percent from last year. The 336 million layers consisted of 280 million layers producing table or market type eggs, 53.3 million layers producing broiler-type hatching eggs, and 2.84 million layers producing egg-type hatching eggs. Rate of lay per day on November 1, 2008, averaged 73.4 eggs per 100 layers, up 1 percent from November 1, 2007.

Egg-Type Chicks Hatched Up 10 Percent

Egg-type chicks hatched during October 2008 totaled 40.0 million, up 10 percent from October 2007. Eggs in incubators totaled 34.4 million on November 1, 2008, down slightly from a year ago.

Broiler-Type Chicks Hatched Down 7 Percent

Broiler-type chicks hatched during October 2008 totaled 742 million, down 7 percent from October 2007. Eggs in incubators totaled 585 million on November 1, 2008, down 7 percent from a year earlier. Leading breeders placed 6.84 million broiler-type pullet chicks for future domestic hatchery supply flocks during October 2008, down 2 percent from October 2007

Broiler Hatchery

Released November 19, 2008, by NASS, Agricultural Statistics Board, USDA.

Broiler-Type Eggs Set In 19 Selected States Down 7 Percent

Commercial hatcheries in the 19-State weekly program set 201 million eggs in incubators during the week ending November 15, 2008. This was down 7 percent from the eggs set the corresponding week a year earlier. Average hatchability for chicks hatched during the week was 83 percent. Average hatchability is calculated by dividing chicks hatched during the week by eggs set three weeks earlier.

Broiler Chicks Placed Down 4 Percent

Broiler growers in the 19-State weekly program placed 156 million chicks for meat production during the week ending November 15, 2008. Placements were down 4 percent from the comparable week a year earlier. Cumulative placements from December 30, 2007 through November 15, 2008 were 7.98 billion, down 1 percent from the same period a year earlier.

Turkey Hatchery

Released November 14, 2008, NASS, Agricultural Statistics Board, USDA

Eggs in Incubators on November 1 Down 12 Percent from Last Year

Turkey eggs in incubators on November 1, 2008, in the United States totaled 27.5 million, down 12 percent from November 1, 2007. Eggs in incubators were down 4 percent from the October 1, 2008 total of 28.7 million eggs. Regional changes from the previous year were: East North Central down 8 percent, West North Central down 13 percent, North and South Atlantic down 4 percent, and South Central and West down 35 percent.

Poults Hatched During October Down 10 Percent from Last Year

Turkey poults hatched during October 2008, in the United States totaled 23.3 million, down 10 percent from October 2007. Poults hatched were down 2 percent from September 2008 total of 23.7 million poults. Regional changes from the previous year were: East North Central down 9 percent, West North Central down 8 percent, North and South Atlantic down 4 percent, and South Central and West down 33 percent

Net Poults Placed During October Down 12 Percent from Last Year

The 22.2 million net poults placed during October 2008 in the United States were down 12 percent from the number placed during the same month a year earlier. Net placements were down 1 percent from the September 2008 total of 22.5 million.

Current Month Charts

Broiler Performance Data Live Production Cost	Region					Average
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	Company
Feed Cost/ton w/o color (\$)	276.34	251.82	286.80	277.87	281.44	277.03
Feed cost /lb meat (c)	25.32	22.96	25.79	26.08	26.22	25.32
Days to 4.6 lbs	41	40	40	39	40	41
Chick cost / lb (c)	5.23	4.64	5.32	4.55	5.03	5.20
Vac-Med cost/lb (c)	0.04	0.05	0.08	0.10	0.04	0.07
WB & ½ parts condemn. Cost/lb	0.19	0.21	0.16	0.21	0.21	0.20
% mortality	3.93	4.01	3.86	3.98	3.71	3.87
Sq.Ft. @ placement	0.80	0.81	0.83	0.91	0.83	0.83
Lbs/sq. ft.	7.20	7.23	6.96	7.43	7.44	7.08
Downtime (days)	16	13	21	20	17	18

Broiler Whole Bird Condemnation	Region					Average
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	Company
% Septox	0.166	0.268	0.111	0.160	0.111	0.156
% Airsac	0.021	0.041	0.044	0.045	0.042	0.041
% I.P.	0.009	0.015	0.005	0.042	0.024	0.020
% Leukosis	0.001	0.002	0.000	0.001	0.000	0.001
% Bruises	0.006	0.002	0.005	0.004	0.003	0.004
% Other	0.005	0.003	0.011	0.006	0.008	0.007
% Total	0.207	0.331	0.176	0.258	0.189	0.228
% ½ parts condemns	0.291	0.288	0.213	0.369	0.442	0.334

Data for week ending 08 November, 2008

Previous Month Charts

Broiler Performance Data Live Production Cost	Region					Average
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	Company
Feed Cost/ton w/o color (\$)	303.37	283.84	304.78	311.04	305.31	303.63
Feed cost /lb meat (c)	27.42	25.45	27.14	29.05	27.96	27.39
Days to 4.6 lbs	42	40	40	40	40	41
Chick cost / lb (c)	5.15	4.75	5.34	4.56	4.91	5.17
Vac-Med cost/lb (c)	0.04	0.04	0.09	0.10	0.05	0.08
WB & ½ parts condemn. Cost/lb	0.19	0.20	0.15	0.24	0.21	0.20
% mortality	3.36	3.99	3.53	3.88	3.33	3.57
Sq.Ft. @ placement	0.81	0.81	0.82	0.92	0.83	0.83
Lbs/sq. ft.	7.17	7.24	6.99	7.22	7.45	7.05
Downtime (days)	15	12	19	19	15	16

Broiler Whole Bird Condemnation	Region					Average
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	Company
% Septox	0.147	0.248	0.103	0.248	0.092	0.141
% Airsac	0.081	0.033	0.037	0.033	0.035	0.035
% I.P.	0.008	0.020	0.003	0.020	0.026	0.021
% Leukosis	0.001	0.000	0.000	0.000	0.000	0.001
% Bruises	0.006	0.001	0.003	0.001	0.003	0.004
% Other	0.008	0.002	0.007	0.002	0.009	0.007
% Total	0.188	0.306	0.154	0.306	0.165	0.208
% ½ parts condemns	0.273	0.254	0.202	0.254	0.437	0.321

Data for week ending 11 October 2008

Meetings, Seminars and Conventions

2009

January

January 26-27: International Poultry Scientific Forum Georgia World Congress Center, Atlanta, Georgia. Contact: US Poultry & Egg Association 1530 Cooledge Road, Tucker, Georgia 30084-7804. Phone: +1-770-493-9401; Fax: +1-770-493-9257; [Email: expogener-alinfo@poultryegg.org](mailto:expogener-alinfo@poultryegg.org). Website: www.poultryegg.org

January 28-30: International Poultry Expo 2009, Georgia World Congress Center, Atlanta, Georgia. Contact: US Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084-7804. Phone: +1-770-493-9401; Fax: +1-770-493-9257; [Email: expogener-alinfo@poultryegg.org](mailto:expogener-alinfo@poultryegg.org). Website: www.poultryegg.org

2009

March

March 23-25: 58th Western Poultry Diseases Conference. Holiday Inn Capitol Plaza, Sacramento, CA, USA. Contact Conference and Event Services, University of California, Davis. Phone 530-752-0198 Fax 530-752-5791 e-mail confandeventsvcs@ucdavis.edu Website conferences.ucdavis.edu/wpdc

2009

April

April 5-8: The 7th International Symposium on Avian Influenza, The University of Georgia Center for Continuing Education, Athens, Georgia, USA.: Online registration begins on August 1, 2008at: <http://www.georgiacenter.uga.edu/conferences/2009/Apr/05/avian.phtml> For additional information www.georgiacenter.uga.edu/conferences/ai.symposium@ars.usda.gov USDA-ARS, Southeast Poultry Research Laboratory, 934 College Station Road, Athens, Georgia 30605 USA. Phone: 706-546-3434; FAX 706-546-3161

2009

May

May 28-30: 5th International Symposium on Turkey Production, Berlin, Germany. [Registration Form](#): [Deadline Jan 5, 2009](#) Contact: Prof Dr H.M. Hafez, Institute of Poultry Diseases, Königsweg 63, 14163, BERLIN, GERMANY. Phone: +49 30-83862677, Fax: +49 30-83862690, E-mail: hafez@vetmed.fu-berlin.de

2009

June

June 8-12: XVI Congress of the World Veterinary Poultry Association, Marrakesh/Morocco. Contact: [Prof. Mohamed El Houadfi](#), Moroccan Association of Avian Pathologists (AMPA), A.M.P.A. - I.A.V. Hassan II, Department de Pathologie Aviaire, BP 6202, Rabat-Instituts. Phone: +212 (0)7 77 70 53, Fax: +212 (0)7 67 57 15, E-Mail: mhouadfi@iav.refer.org.ma, For more information, visit the website: [XVI WVPA Congress, Marrakesh 2009](#)

2009

July

July 11-15: AVMA Annual Convention Seattle Washington Call for papers. Deadline December 1st. <http://www.aaap>

2010

April

April 20-23: VIV Europe 2010, Utrecht, The Netherlands. Contact: XNU Exhibitions Europe B.V, P.O. Box 8800, 3503 RV Utrecht, The Netherlands, Fax: +31 302-952-809; Website: www.viv.net



The University of Georgia is committed to the principle of affirmative action and shall not discriminate against otherwise qualified persons on the basis of race, color, religion, national origin, sex, age, physical or mental handicap, disability, or veteran's status in its recruitment, admissions, employment, facility and program accessibility, or services.

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.