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The Old and New Landscapes of Infectious Laryngotracheitis

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Broiler Live Production Cost	Average Company
Feed Cost/ton w/o color (\$)	335.47
Feed cost /lb meat (c)	30.89
Days to 4.6 lbs	40
Chick cost / lb (c)	5.08
Vac-Med cost/lb (c)	0.05
WB & ½ parts condemn. Cost/lb	0.21
% mortality	3.82
Sq.Ft. @ placement	0.82
Lbs/sq. ft.	7.46
Downtime (days)	15

Data for week ending May 20th 2011

Infectious laryngotracheitis (ILT) has been a significant infectious respiratory disease affecting for decades the poultry industry of many countries. Although ILT is a widespread economically significant problem, research regarding ILT and infectious laryngotracheitis virus (ILTV) has been relatively sparse. Significant research on infectious laryngotracheitis was only initiated in the 1960s after the isolation of infectious laryngotracheitis virus (ILTV) in the 1950s. Reflecting the poor understanding of ILT and ILTV at the time, the identity of one of the original ILTV isolates (known as the 146 virus) was questioned since it was not neutralized by hyperimmune serum raised against ILTV. This observation illustrated a deficient understanding of the immune responses to ILTV at the time. Interestingly, 50 years later our understanding of the complex immune responses against the Gallid Herpes virus I causing ILT is still very limited.

In the early years of a developing large-scale poultry industry, lack of effective live attenuated vaccines forced poultry producers to use relatively virulent virus cultures to immunize their flocks. Some of the cultures were aggressive enough as to cause overt ILT in the exposed flocks. Thus, creative vaccine administration methods had to be developed in order to reduce the consequences of vaccination. Such was the case of vent brush application, which was frequently used as a standard method of vaccination against ILTV.

In many ways the use of various types of vaccines against ILTV has shaped the epidemiology of ILT in the field. Conversely, to some extent the epidemiology of ILT in the field has shaped the development and use of vaccines against ILT. Therefore, it is important to summarize a few important aspects of vaccines and vaccination in order to better understand the past and present situation of ILT in the field.

The isolation and identification of ILTV as the causative agent of ILT in the 1950s allowed for the development of vaccines that would eventually be produced on a large scale in chicken embryos (CEO) and cell cultures (TCO). Such vaccines, which in many cases contributed positively to controlling ILT in the field, have been in use for approximately 50 years and continue to be used for protection of millions of chickens worldwide. It was not until 2006-2007 that a new generation of ILT vaccines reached the market in the form of recombinant ILT vaccines. Such recombinant products have been used extensively ever since by the broiler industry in various countries. Use of recombinant vaccines in layers and breeders has been less intense and TCO and CEO vaccines remain popular, particularly in commercial layers.

CEO vaccines can spread horizontally and are known to have the potential for reversion to virulence after a few back passages in naïve chickens. TCO vaccines have a lesser potential for reversion to virulence and spread horizontally only modestly. Both types of vaccines can establish latency and thus may recrudesce after a few weeks or months post-vaccination, thus enhancing the potential for virus shedding and transmission, presentation of clinical signs, and vaccine-induced disease after back passaging of the vaccine viruses. In addition, TCO vaccines can only be applied by individual methods (eye drop), while CEO vaccines can be applied by individual or mass application methods. However, when applied by mass application methods CEO vac-

cines can be excessively reactive and if vaccine coverage is poor the opportunities for back passaging to naïve (uncovered) chickens are quite significant. In reality, industrialized nations will never use individual vaccination methods to vaccinate billions of chickens against ILT and thus spray or water vaccinations will be the norm where the use of CEO vaccines is allowed. Furthermore, because CEO vaccines are considered by the poultry industry as the most protective vaccines available, long-lived birds such as commercial layers will continue to be vaccinated with CEO vaccines for years to come until a better alternative is presented to this sector of the poultry industry. Broiler breeders are long-lived birds as well, but their economic life span is considerably shorter (65 weeks of age) and typical breeder farms contain single age flocks as opposed to multi-age layer complexes, which may contain a variety of ages in the same premise, often ranging from 16 until 120 weeks of age. Thus, the risk of experiencing an outbreak of ILT in layers is quite patent and the industry prefers in many areas to use vaccines that are as protective as possible such as CEO or secondarily, TCO.

Despite the excellent capability of CEO and TCO vaccines to protect chickens against clinical signs and mortality, the disadvantages aforementioned prompted the development of vaccines that would not: a) back passage with reversion to virulence; b) persist in the chicken long enough to prompt a durable immune response; c) establish latency and thus potential recrudescence; and d) cause significant vaccination reactions associated with losses in body weight gain and feed conversion. The end result of such objectives has been the development of recombinant vaccines vectored in herpes virus of turkey (HVT) and fowlpox virus (FPV). Although both types of recombinant vaccines have accomplished some of these goals partially, they are still far from perfect. Field experience and laboratory research have demonstrated recently that recombinant vaccines do provide some protection against clinical signs and mortality, albeit such protection is inferior compared to the protection provided by CEO and TCO vaccines. Very importantly, flocks vaccinated with either type of recombinant vaccine (HVT- or POX-vectored) do allow for significant replication of the challenge virus in the trachea, thus allowing for virus shedding, virus transmission, and spread of the disease, all of which are important contributing factors in the perpetuation of the disease. Regardless of such disadvantages for the recombinant vaccines, broiler producers have quickly adopted their use because: a) they can be applied by mass administration methods such as *in ovo*; b) they reduce mortality in the event of an outbreak; c) they do not induce the delay in growth or the disadvantage in feed conversion that has been observed in CEO-vaccinated flocks.

Some of the facts that shaped the early epidemiology of ILT in the field included (not exclusively): a) lack of full understanding of the epidemiology and pathogenesis of ILT and poor understanding of the immune responses involved; b) lack of live attenuated vaccines that would not cause vaccine-induced ILT, also known as vaccinal laryngotracheitis (VLT); c) a gradual integration of the poultry industry and intensification of the production systems; d) concomitant diseases; e) a progression in the forms of poultry production systems, marketing and sales; and f) possible differences in the susceptibility of the chickens of yesterday compared to the ones the industry uses today. These items and their role in the evolution of ILT in the field are discussed brief-

ly herein.

- a. **Understanding the epidemiology and pathogenesis of ILT.** Until the infectious nature of the causative virus was understood, and until the essential steps in the pathogenesis of ILT were resolved it must have been difficult to control the disease in the field even with vaccines being available to the poultry industry. For example, infected flocks tend to shed a vast amount of virus during the prepatent period, which is a critical piece of information in disease control. In addition, knowing that ILTV establishes latency and that the infection can recrudesce is also critical because previously field-infected flocks can begin shedding infectious virus at any moment, a fact that is also true for CEO and TCO vaccine viruses. Knowing that CEO vaccines can back passage through naïve chickens while regaining virulence has also been an important item to understand because of the fact that most ILT outbreaks are known to be associated with virus strains that are very closely related to CEO vaccine viruses (Cover or Hudson strains). Decades ago, when these facts were not known or when they were not fully understood, vaccination practices remained indiscriminate and without consideration for potential spread of disease associated with CEO vaccines.

- b. **Lack of live attenuated vaccines that would not cause VLT.** As mentioned above, CEO and TCO vaccines have been in use for decades. Their use has been successful in that they effectively control the disease, contribute to stop outbreaks, and prevent ILT very efficiently. However, as stated earlier, TCO vaccines cannot be administered by mass application methods, which in effect eliminates them for practical and economic use in broiler chickens. TCO vaccines are used successfully in layers and breeders only because TCO vaccines are given simultaneously with other vaccines that also require individual application and handling of chickens. Thus, for decades the only vaccine that remained practical and economically attractive to the broiler industry was CEO. We now know through field and research experience that CEO vaccines establish latency, can revert to virulence, may spread horizontally, and may cause VLT. The poultry industry knows by field experience that CEO vaccines can cause a delay in growth and may also induce a loss of up to 4 points in feed conversion for a live body weight adjusted to 4.5 pounds. Despite all such disadvantages, CEO vaccines continue to be in use because they can effectively stop and control ILT outbreaks better than any other available vaccine. However, almost invariably ILT outbreaks are associated with CEO-related viruses.

- c. **Integration of the poultry industry and intensification of the production systems.** The integration of the poultry industry and intensification of the production systems has shaped the forms of expression of ILT in the field through the years. The United States produces today over 9 billion broiler chickens per year; it has an inventory of approximately 290 million table egg layers in production; and produces enough turkey meat for the country to have a per capita consumption of 18 lbs of turkey meat a year. In addi-

tion, there is a sizeable industry producing duck, pheasant and quail meat and eggs. Often times a densely populated area may harbor broilers, broiler breeders, grandparent and great grandparent meat type chickens, layer breeders, commercial layers, quail and non-commercial poultry. Situations like this are quite challenging in terms of infectious poultry disease control and ILT is not the exception. For example, one densely populated area may have large numbers of farms with naïve (non-vaccinated) broilers in close proximity to commercial layers that have been vaccinated with CEO vaccines against ILT, or in proximity to broiler breeder flocks that have been vaccinated with either CEO or TCO vaccines. Naturally, the same area is home to rendering plants, hatcheries, feed mills, spent fowl processing plants and numerous processing plants. Thus, the opportunity for disease outbreaks is considerable compared to the same areas decades ago. Regarding ILT, one disadvantage poultry producers faced in the past was the fact that more poultry was marketed live, in small numbers, and without much regard for disease control.

- d. **Concomitant diseases.** It is quite different to face an outbreak of infectious laryngotracheitis without concomitant respiratory diseases than with them. Before the successful eradication of *M. gallisepticum* (MG) and *M. synoviae* (MS) in breeding stock, outbreaks of ILT were likely more dramatic and difficult to control, particularly in naïve chickens that had not been vaccinated against ILT. Today, most breeder flocks are MG- and MS-free, which makes ILT a brief unwanted episode within a flock. The consequences might be unpleasant but there are usually no lingering effects after a few days. Likewise, before the advent of vaccines against Marek's disease, immunosuppression caused by Marek's disease virus (MDV) likely exacerbated the impact of ILT in the field. Those field veterinarians that have had the opportunity of addressing ILT outbreaks in commercial layers that are concomitantly infected with MG, MS and infectious coryza can appreciate the benefits of gradually ridding the industry of some of these respiratory agents. This fact has also shaped the many ways of expression of ILT in the field in the past in contrast with today.
- e. **Poultry production systems, marketing and sales.** A few routine activities in broiler production that are considered significantly risky include "thinning" in broilers, routine sampling pre-slaughter (for specific antibodies, antibiotic residues and heavy metals), and litter movement. In some markets, if the sales departments of companies cannot sell enough chickens at once, they will engage in partial selling of the flocks until the entire flock is sold. Likewise, a given company may have a market for various body or carcass weights and thus may engage in broiler thinning practices. Repeated entry of vehicles, crates and personnel into a farm that still has chickens in order to sell the flocks in stages is obviously a serious risk and is one of the practices responsible for the spread of ILTV. Such practices, which were very common in the past, are only followed today in select areas of the world. Also regarding sales of poultry, poultry products or poultry byproducts, the sale of spent table egg layers in some countries is one of the highest risks when it comes to controlling ILT. For example, an international capitalization cost per good layer

pullet may approach approximately \$4.50 to \$5.00 U.S. dollars. Spent layer hens may have a commercial value of up to \$4.00 to \$6.00 U.S. dollars in the same areas. Although this is an excellent source of income for layer companies (because they essentially replace hens for “free”), it represents a serious biosecurity risk. Spent hens that may be carriers of MG, MS, Avibacterium paragallinarum or ILTV are some times transported through very long distances until they can be sold, thus putting at risk other poultry operations. One additional risk is the selling and movement of poultry litter stemming from operations where CEO vaccination may be practiced routinely or where an outbreak of ILT may have been recorded recently. Poultry litter can harbor viable infectious agents such as NDV, AIV, ILTV and others. Although moving of spent hens and contaminated litter are not new, the volumes that are handled today through dense poultry production areas have increased dramatically. Furthermore, the inventory of chickens in a single farm or a single house has increased dramatically as well compared to what was used on the past, thus making it more challenging to control diseases such as ILT. For example, a typical modern egg layer house has a capacity of at least 100,000 chickens and the newer facilities can hold up to 475,000 hens in a single house, whereas a single farm may have an inventory of several million chickens at any one time.

- f. **Susceptibility of early versus current genetic stock.** No formal research has been done to examine possible differences in the types of genetic stock used by the poultry industry regarding susceptibility to ILTV. It would be difficult for such research to address this subject objectively simply because immunity to ILTV appears to be rather complex. However, field experience (and laboratory experience to some extent) has suggested a higher difficulty in reproducing clinical ILT in single comb white Leghorn chickens (SCWL) compared to meat type chickens. Indeed, reproduction of ILT-related clinical signs and lesions appears to be easier in broilers than in commercial layers or specified pathogen free (SPF) chickens in the laboratory. In the past, the poultry industry used breeding stock that carried less Cornish type genes than the broilers of today. Brown and white layers have undergone dramatic changes as well in recent years, and the higher current pressures of production may have influenced the expression of ILT in some of today’s chickens.

Another important item determining how ILT occurs (or is allowed to occur) in the field today compared to yesterday is the organized efforts of industry to minimize losses to not only ILT but also to avian influenza, exotic Newcastle disease, Mycoplasmas of economic importance, and other pathogens. In today’s industry, an index case is followed by immediate distribution of information throughout the local industry regarding the location of the outbreak, the physical destination of the affected flock, the exact date for processing, whether or not the local industry will vaccinate or not and with which types of vaccines, and finally when and how to stop vaccination in an affected area. Biosecurity rules are enforced and specifics on farm sanitation, litter treatment and transportation (or lack thereof) and personnel activities in the area are clearly laid out and enforced in the affected area. Although the expression of ILT in the field would have been similar decades ago, the approach for its control and the prompt dissemination of information would have been dramatically dif-

ferent. The poultry industry of yesterday would have not had the tools available today to control disease epidemiologically and with the aid of technologies such as geographic information systems (GIS).

An additional and critical tool that is required for ILT control is a series of rapid, precise, specific and economic diagnostic tools. Although the gold standard for ILT diagnosis is virus isolation, it is no longer used for routine diagnostics because it is time consuming, expensive and labor intensive. Because it may take up to weeks for a confirmation using virus isolation, virus isolation has no place in today's environment. The poultry industry requires methods that can provide answers within 24 hours such that rapid decisions regarding commercialization of affected flocks, biosecurity, litter movement, etc. can be made. Therefore, expedited histopathology and molecular detection have become the standard methods of diagnosis for ILT, both of which allow for a more rapid and effective control approach in the field compared to the past.

After contrasting the old and new landscapes of ILT, it is clear that the poultry industry still does not have available effective, safe, economic, non-latency-establishing vaccines that can protect chickens for their entire economic life, without inducing delayed growth and increased feed conversion, and without the risk for horizontal spread and recrudescence. Clearly, the most protective vaccine available today is the CEO type of vaccine, but it is also the most invasive, the most reactive and the most capable of spreading and reverting to virulence. The fact that virtually all viruses isolated from field ILT outbreaks are CEO-related is quite revealing. A better understanding of the immune responses against ILTV may be indirectly useful for developing new and better vaccines. Recombinant vector vaccines are clearly being used more frequently to protect chickens against various diseases. Development of HVT- and Fowlpox virus-vectored vaccines has been an improvement in some ways but it has not solved the problem. The industry continues to experience outbreaks, many of which have occurred in flocks or areas where recombinant vaccine use has been intense. Perhaps we need a better understanding of the structural and regulatory proteins of ILTV before we continue developing recombinant vaccines. Perhaps we need to understand better the interaction of the immune system with the structural proteins of ILTV. Alternative vectors may be part of the formula to control ILT. For that, development of vector viruses that replicate in epithelia that are the targets for ILTV replication may be a productive area of research. On another note, as long as the layer industry (and in part the broiler companies) continue to vaccinate their pullets with CEO vaccines in areas where there are unvaccinated broilers; as long as the broiler industry continues to market millions of broilers at the peak of virus shedding; as long as spent fowl continues to be sold and transported in risky manners; and as long as poultry litter continues to be moved around with disregard to biosecurity and disease control there will be no vaccine that will be capable of fully solving the ILT problem in the field.

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 May 23, 2011, by NASS, Agricultural Statistics Board, USDA

April Egg Production Up Slightly

U.S. egg production totaled 7.61 billion during April 2011, up slightly from last year. Production included 6.56 billion table eggs, and 1.06 billion hatching eggs, of which 987 million were broiler-type and 70 million were egg-type. The total number of layers during April 2011 averaged 340 million, down slightly from last year. April egg production per 100 layers was 2,236 eggs, up 1 percent from April 2010.

All layers in the U.S. on May 1, 2011, totaled 339 million, down slightly from last year. The 339 million layers consisted of 281 million layers producing table or market type eggs, 54.7 million layers producing broiler-type hatching eggs, and 2.93 million layers producing egg-type hatching eggs. Rate of lay per day on May 1, 2011, averaged 74.3 eggs per 100 layers, up 2 percent from May 1, 2010.

Egg-Type Chicks Hatched Down 9 Percent

Egg-type chicks hatched during April 2011 totaled 43.4 million, down 9 percent from April 2010. Eggs in incubators totaled 40.8 million on May 1, 2011, down 2 percent from a year ago. Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 287 thousand during April 2011, up 24 percent from April 2010.

Broiler-Type Chicks Hatched Up 2 Percent

Broiler-type chicks hatched during April 2011 totaled 780 million, up 2 percent from April 2010. Eggs in incubators totaled 649 million on May 1, 2011, up 1 percent from a year earlier. Leading breeders placed 6.90 million broiler-type pullet chicks for future domestic hatchery supply flocks during April 2011, up 1 percent from April 2010.

Broiler Hatchery

Released June 1, 2011, by NASS, Agricultural Statistics Board, USDA

Broiler-Type Eggs Set In 19 Selected States Down 2 Percent

Commercial hatcheries in the 19-State weekly program set 207 million eggs in incubators during the week ending May 28, 2011. This was down 2 percent from the eggs set the corresponding week a year earlier. Average hatchability for

chicks hatched during the week was 84 percent. Average hatchability is calculated by dividing chicks hatched during the week by eggs set three weeks earlier.

Broiler-Type Chicks Placed Up 1 Percent

Broiler growers in the 19-State weekly program placed 174 million chicks for meat production during the week ending May 28, 2011. Placements were up 1 percent from the comparable week a year earlier. Cumulative placements from January 2, 2011 through May 28, 2011 were 3.59 billion, up 1 percent from the same period a year earlier.

Turkey Hatchery

Released May 16, 2011, by the NASS, Agricultural Statistics Board, USDA

Eggs in Incubators on May 1 Down 4 Percent from Last Year

Turkey eggs in incubators on May 1, 2011, in the United States totaled 27.7 million, down 4 percent from May 1, 2010. Eggs in incubators were down slightly from the April 1, 2011 total of 27.7 million eggs. **Please note that regional estimates have been discontinued:** NASS will no longer publish regional *Turkey Hatchery* estimates. Only estimates at the United States level will be published due to the limited number of hatcheries involved.

Poults Hatched During April Down 4 Percent from Last Year

Turkey poults hatched during April 2011, in the United States totaled 23.9 million, down 4 percent from April 2010. Poults hatched were down 2 percent from the March 2011 total of 24.3 million poults.

Net Poults Placed During April Down 5 Percent from Last Year

The 23.2 million net poults placed during April 2011 in the United States were down 5 percent from the number placed during the same month a year earlier. Net placements were down 2 percent from the March 2011 total of 23.7 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 (\$)	328.16	308.89	339.16	339.83	339.4	335.47
Feed cost /lb meat (c)	30.31	28.08	30.44	32.12	32.10	30.89
Days to 4.6 lbs	41	40	40	39	40	40
Chick cost / lb (c)	5.04	4.91	5.22	4.56	5.13	5.08
Vac-Med cost/lb (c)	0.06	0.03	0.05	0.06	0.02	0.05
WB & ½ parts condemn. Cost/lb	0.18	0.16	0.15	0.25	0.21	0.21
% mortality	3.51	3.91	3.75	3.98	4.33	3.82
Sq.Ft. @ placement	0.77	0.80	0.83	0.88	0.82	0.82
Lbs/sq. ft.	7.81	7.52	7.05	7.77	7.71	7.46
Downtime (days)	14	11	15	19	13	15

Broiler Whole Bird Condemnation	Region					Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
% Septox	0.118	0.156	0.068	0.121	0.075	0.107
% Airsac	0.058	0.034	0.037	0.117	0.041	0.061
% I.P.	0.010	0.009	0.008	0.057	0.026	0.028
% Leukosis	0.000	0.001	0.001	0.013	0.001	0.004
% Bruises	0.001	0.001	0.001	0.002	0.002	0.001
% Other	0.007	0.002	0.011	0.008	0.008	0.009
% Total	0.195	0.203	0.125	0.317	0.152	0.211
% ½ parts condemns	0.219	0.202	0.210	0.247	0.345	0.262

Data for week ending May 20th 2011

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 (\$)	322.94	301.98	332.36	331.07	333.93	328.34
Feed cost /lb meat (c)	29.66	27.14	29.85	31.53	31.33	30.26
Days to 4.6 lbs	41	39	40	39	40	40
Chick cost / lb (c)	5.04	4.99	5.28	4.47	5.00	5.05
Vac-Med cost/lb (c)	0.06	0.03	0.05	0.06	0.02	0.05
WB & ½ parts condemn. Cost/lb	0.20	0.17	0.15	0.21	0.20	0.20
% mortality	3.98	3.8	3.71	3.98	3.85	3.90
Sq.Ft. @ placement	0.77	0.79	0.82	0.91	0.82	0.82
Lbs/sq. ft.	7.73	7.47	7.04	7.71	7.67	7.45
Downtime (days)	15	13	16	19	14	15

Broiler Whole Bird Condemnation	Region					Average Company
	SW	Midwest	Southeast	Mid-Atlantic	S-Central	
% Septox	0.127	0.162	0.082	0.103	0.093	0.114
% Airsac	0.068	0.032	0.037	0.071	0.047	0.053
% I.P.	0.019	0.007	0.010	0.018	0.032	0.018
% Leukosis	0.000	0.002	0.001	0.029	0.001	0.006
% Bruises	0.001	0.001	0.001	0.001	0.001	0.001
% Other	0.007	0.001	0.013	0.008	0.009	0.009
% Total	0.223	0.205	0.144	0.230	0.183	0.202
% ½ parts condemns	0.222	0.254	0.210	0.250	0.316	0.263

Data for week ending April 6th 2011

Meetings, Seminars and Conventions

2011 June

June 9-11, 2011. VIV Turkey 2011. To be held in Istanbul, Turkey at the Istanbul Expo Center.. More info: <http://www.vivturkey.com/indexen.html>

June 16-18, 2011. 6th International Symposium on Turkey Production. To be held at the Hotel Steglitz International, Berlin, Germany. Please contact Dr. H.M. Hafez at hafez@vetmed.fu-berlin.de.

2011 July

July 16-19, 2011. AVMA Annual Convention. The American Veterinary Medical Association is holding this event with the Poultry Science Association (PSA) and the American Association of Avian Pathologists. St. Louis, MO. For more info: <https://www.avmaconvention.org/avma10/public/Content.aspx?ID=2816&sortMenu=101001>

2011 August

August 14-18, 2011. XVII Congress & Exhibition of the World Veterinary Poultry Association Cancun, Mexico. More info: www.congressmexico.com

2011 September

September 6-9, 2011. XXII Latin American Poultry Congress. To be held at La Rural in Buenos Aires, Argentina. For more information, please visit <http://www.avicultura2011.com/en>

September 7-9, 2011. 30th Poultry Science Symposium on Alternative Systems for Poultry – Health, Welfare

and Productivity. To be held at the University of Strathclyde, John Anderson Campus, Glasgow, UK. For more info, go to <http://www.wpsa-uk.com/newSite/meetings/30thPoultryScienceSymposium.html>

September 18-22, 2011. IEC's Annual Marketing and Production Conference. The International Egg Commission will hold this event in Washington D.C. this year. Further details to be announced.

September 21-22, 2011. 2011 Northeastern Conference on Avian Diseases / Pennsylvania Poultry Sales and Service Meeting. To be held in the Eden Resort/Hotel in Lancaster, PA. Now accepting titles for the Scientific Session (deadline Aug 1, 2011) - send to pierson@vt.edu. Registration and additional materials will be available mid-summer.

September 29-October 5, 2011. USAHA Annual Meeting. The U.S. Animal Health Association will be holding this event in Buffalo Adam's Mark Hotel in Buffalo, NY. More info: <http://www.usaha.org/meetings/>

2011 October

October 10-14, 2011. 30th World Veterinary Congress 2011. To be held at the Congress Safari, Cape Town, South Africa. For more information, please visit <http://www.worldvetcongress2011.com/>

October 11-13, 2011. 46th National Meeting on Poultry Health and Processing. To be held at the Clarion Resort Fountainbleau Hotel in Ocean City, MD. For program details and registration info, please contact Delmarva Poultry Industry, Inc. at 302-856-9037 or dpi@dpichicken.com. Website: www.dpichicken.org

October 31—November 4, 2011. 18th European Symposium on Poultry Nutrition. Located in Çeşme - İzmir - Turkey and organized by the Turkish branch of the WPSA . Please visit <http://www.espn2011.org/> for more info.

2012 January

January 24-26, 2012. International Poultry/Feed Expo. Located at the Georgia World Congress Center in Atlanta, GA. Please visit <http://www.ipe11.org/> for more info.



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Reminder

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