

The Poultry Informed Professional

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RUNTING-STUNTING SYNDROME

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Few things are well defined regarding runting-stunting syndrome. Starting by its very name, "runting-stunting" is poorly defined and will probably be changed in the future depending on the etiological agent or agents identified. In poultry, a "runt" is defined as an animal that is unusually small, especially the smallest of a flock. "Stunting" relates to the hindering of the normal growth of an individual. Thus, "runting-stunting" can be defined as a syndrome in which a number of individuals in a flock appear considerably small due to delayed growth. The larger the number of chickens that are unusually small, the lower the body weight average for the flock.

Runting-stunting syndrome (RSS) has been recognized for many years and was first described in the 1970s. One can think of a seemingly endless list of possible causes for RSS, including faulty poultry genetics, management, environmental challenge, feeding and nutrition, infectious disease and perhaps other reasons and any possible combination of them. A syndrome is in the eyes of the beholder... Several candidate infectious agents have been described in the past,

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Broiler Performance Data (Region) Live Production Cost					
	SW	Midwest	Southeast	Mid-Atlantic	S-Central
Feed cost/ton w/o color (\$)	157.34	142.15	161.67	157.54	157.71
Feed cost/lb meat (¢)	14.82	12.62	15.16	15.46	15.26
Days to 4.6 lbs	44	41	44	44	44
Chick cost/lb (¢)	3.83	4.22	4.16	3.52	3.85
Vac-Med cost/lb (¢)	0.06	0.06	0.06	0.09	0.06
WB & 1/2 parts condemn. cost/lb	0.16	0.20	0.12	0.18	0.17
% mortality	5.29	5.53	5.03	5.85	5.70
Sq. Ft. @ placement	0.80	0.83	0.82	0.85	0.84
Lbs./Sq. Ft.	6.88	6.29	6.28	7.12	6.82
Down time (days)	12	10	10	13	10

Data for week ending July 30, 2005

including reoviruses and small round viruses. Although some features of RSS have been reproduced upon experimental infection with reovirus, the general consensus is that these viruses are unlikely to be the sole culprit in RSS. Small round viruses (small within the context of general virology) have been visualized many times in the intestines and intestinal contents of affected broiler chickens using electron microscopy, but such viruses can also be found in non-affected flocks or individual chickens. Bacteria have not been considered a major player in RSS, albeit intuitively one would think that bacteria must play a role at least as secondary pathogens after viruses have damaged the intestinal wall. The digestive tract is one of the most important organs from the economic point of view, and yet it is one of the least understood regarding poultry pathology. Due to the complex nature of the microbial populations in the intestine, isolating potential pathogens and sorting them out is often a daunting task. Culture methods have not been developed or are too cumbersome for some of the viruses visualized in cases of RSS. As a result, essential diagnostic assays are lacking or they are simply impractical. Additional confounding issues include the sheer fact that RSS is a *syndrome* and it may manifest itself in a variety of forms, it may result in different outcomes or it can simply be interpreted in diverse ways in the field. The poultry industry has used multiple intervention strategies attempting to control RSS, often without any palpable success.

During 2003-2005, RSS has caused economically significant problems at least in the Southeastern United States and particularly during winter and spring. As observed in this geographical region, RSS is a condition associated with delayed growth, increased need for discarding runts during the first 2-3 weeks of age, reduced livability, increased feed conversion and days to market, and reduced efficiency at the processing plant should the runts reach it. Some integrators have reported up to 20 points increased feed conversion and up to 30 points lower body weights. Clinically, affected flocks show large numbers of immobile chicks huddling around the feeders and drinkers within hours after placement. Some may peck incessantly at the walls. The litter quickly becomes damp and chicks may exhibit matted down in the abdominal area as a result of resting on wet litter. Consumption of chick starter feed typically lasts a day or two longer than usual. As early as 6-7 days of age many chicks will already appear stunted, pale and sometimes disoriented, but the usual peak of the problem occurs at around 10-12 days of age. The bodies of affected chicks will look small relative to the length of the primary feathers of the wings and beak. A small number of affected chicks may display “helicopter” feathers in their wings and other feather abnormalities.



Figure 1. “Helicopter” wing feathers in a 26 day old runt (left panel). The right panel illustrates the vast range of body weights observed in a 26-day-old flock.

Surprisingly, fat soluble vitamin deficiencies have not been observed consistently. If allowed to remain in the flock, stunted chickens do not recover, although mortality may remain relatively within normal limits. However, the need for culling runts will translate usually into increased mortality as the flock is settled.

Some of the internal gross lesions or changes that have characterized recent cases of RSS include (not exclusively): small livers with a grossly enlarged gall bladder; pale, thin, almost translucent intestinal wall with wet pellets of undigested food that is visible through the intestinal wall; large amount of fluids inside the small and large intestines; infrequent feed impaction in the cloaca; occasional increased amount of pericardial fluid; sporadic white or cream-colored plaques in individual proventricular glands.

Various microscopic lesions have been described but the most frequent one is the presence of multiple cysts involving the intestinal crypts. The early lesion can be described as “cystic enteropathy” and as it evolves into an inflammatory

lesion it turns into “cystic enteritis”. The nature of the inflammatory responses suggests a viral etiology rather than bacterial. As the lesion progresses it may result in shortening and clubbing of the intestinal villi. Other microscopic lesions are important observations but they are not always present in cases of RSS. Viruses, nutritional deficiencies and parasites have been proposed as possible etiologies of cystic enteropathy. Until now, only deficiencies of some complex B vitamins (thiamin, riboflavin, pantothenic acid, and niacin) have consistently reproduced cystic enteropathy.



Figure 2. Two examples of thin-walled intestines with watery contents. Note the apparent small liver size and the grossly enlarged gall bladder (two left panels). The two panels on the right are examples of severe cystic enteritis. Note the large cysts in the intestinal wall and the abundant degenerating or necrotic cells and mucin inside the lumen of the cysts. The intestinal villi are no longer distinguishable.

At the Poultry Diagnostic and Research Center, University of Georgia (PDRC) we have performed a series of experiments designed to reproduce the syndrome, isolate potential pathogens and identify mitigating factors:

Several experiments involving gavage inoculations with intestinal contents from affected chickens have resulted in severe weight depression. Inoculations with filtered gut contents have also resulted in RSS, suggesting that viruses may be involved since the filters used discriminate bacteria. Multiple viruses were isolated initially but most have been eliminated after further characterization revealed that they were unlikely to participate in RSS. After a substantial amount of work in the laboratory, two groups of viruses isolated from cases of RSS are currently being studied at PDRC. These involve *reoviruses* and *astroviruses* that appear to have unusual characteristics. All experiments conducted with bacteria at PDRC have failed to reproduce RSS.

RSS has also been reproduced at PDRC by placing broiler chicks on contaminated litter obtained from an affected local farm. Simple exposure to contaminated litter has resulted consistently in a dramatic body weight depression. Several groups of broilers have already been grown sequentially on such contaminated litter with control chickens grown in a separate facility on fresh litter. A very short downtime has been allowed between each growout, which has resulted in a progressive loss of early uniformity and severe depression of body weight gain. Most affected chicks display lesions consistent with RSS.

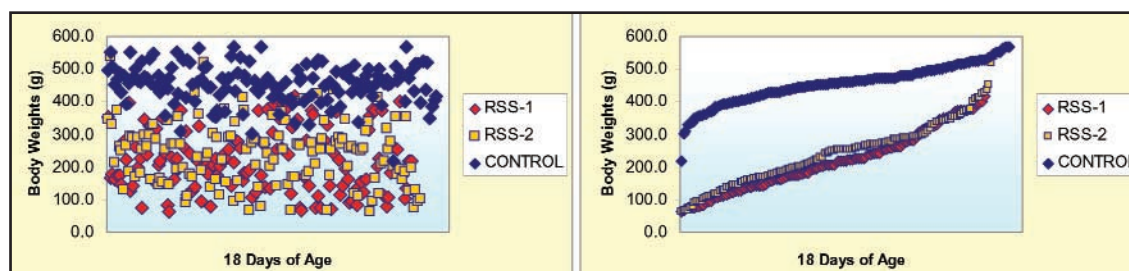


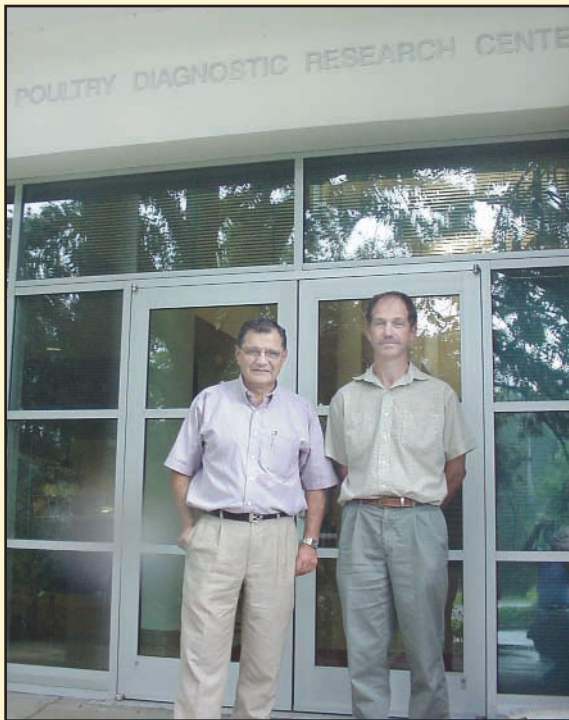
Figure 3. Blue data points in the left and right panels correspond to individual body weights of broiler chicks raised on fresh litter (150 chicks per group). The red and orange data points correspond to body weights of broilers raised on built up litter obtained from an RSS-affected farm (two replicate groups of 150 chicks each). The left panel illustrates the body weights as they were collected at 18 days of age and the right panel illustrates the body weights sorted ascending by group to demonstrate the body weight spread in each group. All chickens were produced by the same breeder

flock and hatched in the same machine. Average body weight for the controls = 455.2 grams (standard deviation = 59.2); average body weight for RSS group 1 = 218.1 g (standard deviation = 93.9); average body weight for RSS group 2 = 242.1 (standard deviation = 97.8). Clearly, body weights and uniformity were severely affected in the RSS groups.

Based on the results of these experiments, it can be concluded that built up litter and short downtime may contribute to RSS in a detrimental way. Additional experiments conducted at PDRC have confirmed that proper brooding temperature is critical to mitigate early poor uniformity and delayed growth. Cold brooding induced a loss in uniformity and depressed body weight gain during the first 7-14 days of age. Furthermore, it is now known that RSS-associated agents may be controlled if exposed to heat. Experiments conducted at PDRC have demonstrated that heat effectively reduces the detrimental effects of infectious agents in the intestines of affected chicks. A practical application of these findings would be to apply heat to affected chicken houses in order to mitigate any agents associated with RSS. Thus along the lines of intervention, research performed at PDRC has suggested the following:

1. Built up litter is clearly infectious and can cause severe body weight depression and loss of uniformity.
2. Short downtime may exacerbate RSS.
3. RSS agents are clearly sensitive to heat. Thus heat treatment of affected houses during downtime is likely to mitigate RSS.
4. Proper brooding temperatures minimize the effects of RSS (delayed body weight gain and chick uniformity).

Research on RSS continues to be an important subject at PDRC and also in other research institutions. Some enteric viruses (reoviruses and astroviruses) are actively being characterized and explored as candidates for vaccines and to develop diagnostic tests. In addition, the possibility of vertical transmission of RSS and maternal immunity are now being explored at PDRC. Studying RSS in broiler breeder pullets is also another priority among the list of items being researched at the University of Georgia.



Dr. Villegas & Dr. Collett

***Dr. Charles Hofacre announces
two new editors for the Poultry
Informed Professional Newsletter***

Dr. Steve Collett has been appointed Editor, and Dr. Pedro Villegas, Co-Editor of the Poultry Informed Professional Newsletter effective with the July / August 2005 issue.

Dr. Collett, an assistant professor in the University of Georgia's College of Veterinary Medicine, Department of Avian Medicine, works with Drs. Hofacre and Zavala in the clinical avian medicine program and teaches students in the MAM program.

Dr. Villegas, a professor in the University of Georgia's College of Veterinary Medicine, conducts student classes in the Poultry Diagnostic and Research Center labs.

Broiler Whole Bird Condemnation (Region)

	SW	Mid-West	S. East	Mid-Atlantic	S. Central
% Septox	0.162	0.271	0.123	0.217	0.156
% Airsac	0.053	0.048	0.032	0.059	0.069
% I.P.	0.008	0.017	0.011	0.020	0.061
% Leukosis	0.001	0.000	0.001	0.020	0.001
% Bruise	0.001	0.001	0.004	0.004	0.004
% Other	0.008	0.004	0.019	0.008	0.005
% Total	0.232	0.342	0.189	0.333	0.295
% 1/2 parts condemnations	0.364	0.732	0.266	0.391	0.389

Data for week ending July 30, 2005

Broiler Performance Data (Company) Live Production Cost

	Average Co.	Top 25%	Top 5 Co.'s
Feed cost/ton w/o color (\$)	157.45	151.12	138.95
Feed cost/lb meat (¢)	14.98	13.70	12.96
Days to 4.6 lbs	43	42	41
Chick cost/lb (¢)	3.93	3.92	3.93
Vac-Med cost/lb (¢)	0.08	0.05	0.09
WB & 1/2 parts condemn. cost/lb	0.17	0.14	0.30
% mortality	5.54	3.83	4.57
Sq. Ft. @ placement	0.83	0.80	0.83
Lbs./Sq. Ft.	6.64	6.48	5.78
Down time (days)	11	12	12

Data for week ending July 30, 2005

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.

Broiler Whole Bird Condemnation (Company)

	Average Co.	Top 25%	Top 5 Co.'s
% Septox	0.172	0.152	0.380
% Airsac	0.051	0.035	0.038
% I.P.	0.028	0.023	0.036
% Leukosis	0.004	0.001	0.000
% Bruise	0.003	0.002	0.001
% Other	0.009	0.005	0.004
% Total	0.266	0.219	0.460
% 1/2 parts condemnations	0.390	0.430	1.004

Data for week ending July 30, 2005



COBB-VANTRESS



Primary
Breeder
Veterinary
Association



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The Poultry Informed Professional Newsletter is published with support from The Primary Breeder Veterinarians Association.

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

Broiler Eggs Set In 19 Selected States Down Slightly

According to the latest National Agricultural Statistics Service (NASS) reports, commercial hatcheries in the 19-State weekly program set 213 million eggs in incubators during the week ending August 6, 2005. This was down slightly 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 Chicks Up Slightly

Broiler growers in the 19-State weekly program placed 176 million chicks for meat production during the week ending August 6, 2005. Placements were up slightly from the comparable week a year earlier. Cumulative placements from January 2, 2005 through August 6, 2005 were 5.46 billion, up 2 percent from the same period a year earlier.

June Egg Production Up 1 Percent

U.S. egg production totaled 7.34 billion during June 2005, up 1 percent from last year. Production included 6.25 billion table eggs, and 1.10 billion hatching eggs, of which 1.03 billion were broiler-type and 61 million were egg-type. The total number of layers during June 2005 averaged 341 million, down slightly from a year earlier. June egg production per 100 layers was 2,151 eggs, up 1 percent from June 2004.

All layers in the U.S. on July 1, 2005, totaled 340 million, down 1 percent from a year ago. The 340 million layers consisted of 281 million layers producing table or market type eggs, 56.0 million layers producing broiler-type hatching eggs, and 2.59 million layers producing egg-type hatching eggs. Rate of lay per day on July 1, 2005, averaged 72.3 eggs per 100 layers, up 1 percent from a year ago.

Egg-Type Chicks Hatched Down 8 Percent

Egg-type chicks hatched during June 2005 totaled 34.5 million, down 8 percent from June 2004. Eggs in incubators totaled 33.0 million on July 1, 2005, down 7 percent from a year ago.

Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 184,000 during June 2005, down 13 percent from June 2004.

Broiler-Type Chicks Hatched Up 1 Percent

Broiler-type chicks hatched during June 2005 totaled 796 million, up 1 percent from June 2004. Eggs in incubators totaled 658 million on July 1, 2005, down slightly from a year earlier.

Leading breeders placed 7.11 million broiler-type pullet chicks for future domestic hatchery supply flocks during June 2005, up 3 percent from June 2004.

Turkey Eggs in Incubators on July 1 Down 2 Percent

Turkey eggs in incubators on July 1, 2005, in the United States totaled 30.5 million, 2 percent below July 1 a year ago. Eggs in incubators were slightly above the June 1, 2005 total of 30.4 million eggs. Regional changes from the previous year were: East North Central up 5 percent, West North Central down 2 percent, North and South Atlantic down 2 percent, South Central down 9 percent, and West down 3 percent.

Poults Placed During June Up 4 Percent From Last Year

The 24.3 million poults placed during June 2005 in the United States were up 4 percent from the number placed during the same month a year ago. Placements were up 2 percent from May 2005. Regional changes from the previous year were: East North Central up 17 percent, West North Central up 5 percent, North and South Atlantic up 6 percent, South Central down 5 percent, and West down 14 percent.

Broiler Meat Production Estimate for Second-Quarter Increased

According to the latest Economic Research Service (ERS) reports, U.S. broiler meat production was up 4.6 percent in the first quarter of 2005 and the revised estimate for the second quarter is now 8.88 billion pounds. This is 50 million pounds higher than earlier estimates and 4.5 percent higher than the same period a year earlier. This adjustment pushes the estimate for 2005 to 35.5 billion pounds, an increase of 4.1 percent from the previous year.

Broiler meat production in May totaled 3.0 billion pounds, up 9 percent from a year earlier. A large portion of this increase was due to May 2005 having one more

slaughter day than in May 2004. The 9 percent increase in meat production was due to a combination of an increase in the number of birds slaughtered (up 6.1 percent) and an increase in the average weight of those birds at slaughter (up 2.3 percent). Preliminary data point towards an increase of 4 to 5 percent in the amount of broiler meat produced in June due again to a combination of a higher number of birds being slaughtered and a 1- to 2-percent increase in average weights.

With strong increases in broiler production over the first half of 2005, prices for most broiler products remain below the levels of a year earlier. The exception is leg quarters where a strong export market has pushed prices since mid-June over 40 cents per pound, over 10 cents higher than at the beginning of 2005. Prices for whole birds have averaged 72.3 cents per pound over the first half of 2005. This is about 5 percent lower than in the same period in 2004. Prices for breast meat products continue to be substantially lower than the very strong prices seen in the first half of 2004. In the first half of 2005, prices for boneless/skinless breast meat in the Northeast market averaged only \$1.45 per pound after averaging \$2.07 per pound in 2004.

With broiler production forecast to rise 3.7 percent over the second half of 2005, prices are only expected to slowly increase. However, prices in the second half of 2005 will strengthen in comparison to a year earlier as prices for almost all broiler products fell heavily in the second half of 2004. Prices for export-sensitive parts like leg quarters are expected to remain strong in the second half of 2005 as exports to most major markets are forecast to remain strong.

Broiler exports in May were 488 million pounds, 41 percent higher than in May 2004. Over the first 5 months of 2005, broiler shipments have totaled 2.16 million pounds, up 28 percent from the same period in 2004. Some of the increase in the quantity of broiler meat exports has been offset by somewhat lower prices especially at the beginning of the year. However, with leg quarter prices strengthening over the last few months, the value of broiler exports is expected to grow faster in the coming months. On a quantity basis, shipments of leg quarters made up 66 percent of total broiler shipments over the first 5 months of 2005. The total value of broiler exports over the first 5 months of 2005 is \$777 million, up 21 percent from the previous year. Most of the increase in broiler exports through May has come from higher shipments to Russia, Mexico, Hong Kong/China, and other major markets. One market that has shown strong growth so far in 2005 has been Cuba, with shipments totaling 110 million pounds, up 60 million (142 percent) from 2004.

With the strength in the export market so far this year, the export forecast for 2005 has been increased by 70 million pounds to 5.04 billion pounds, up almost 6 percent from 2004. The estimate for 2006 exports was also increased by 65 million pounds to 5.18 billion pounds, which would be a 3-percent increase. Most of the expansion in 2006 is expected to come from larger shipments to the current major markets (Russia, Mexico, and a number of Asian and Eastern European countries).

Turkey Production Rises in May

Domestic turkey production totaled 460 million pounds in May, up 2.5 percent from the previous year. Turkey production has now risen in 3 of the last 5 months, but so far in 2005 the overall production is just slightly above where it was in the same period in 2004. Most of the growth in turkey production over the first 5 months of 2005 has come from higher weights at slaughter as the number of birds has been down 5 percent. Turkey hatchery numbers (eggs set in incubators and pullets placed for growout) continue to point to lower production in the future. The estimate for second-quarter 2005 turkey meat production is 1.38 billion pounds, up only marginally from a year earlier.

The small increases in turkey production, along with strong export demand, have continued to provide strength for turkey prices. Prices for whole turkeys averaged 67.7 cents in the second quarter, up slightly from the previous year. With only a small increase in production expected in the second half of 2005, whole bird prices are expected to remain close to those of a year earlier for the remainder of 2005. Prices for other turkey products have not increased much, but are expected to gradually strengthen in the second half of the year.

Turkey exports totaled 48 million pounds in May, up 42 percent from the previous year. Over the first half of 2005, turkey exports are expected to total 266 million pounds, up over 50 percent from the same period in 2004, when turkey shipments were limited by restriction due to avian influenza (AI) outbreaks. Most of the growth in turkey exports has come from larger shipments to Mexico. As with broilers shipments, turkey exports to Hong Kong/China and Japan have also increased substantially without any AI related restriction on exports. With only small increases in domestic production and strong increases in exports, per capita turkey consumption is expected to decline in 2005 to 16.5 pounds, down about 0.5 pound from 2004.

Meetings, Seminars and Conventions

2005 August

August 25-27: VIV Turkey 2005, (Postponed from June 2005), World Trade Center Yesilkoy, Istanbul, Turkey. Contact: HKF Fuarcilik AS, Barbaros Bulvari 135/2, Besiktas, 80700 Istanbul, Turkey. Phone: +90 212 216 4010; Fax: +90 212 216 3360; Email: hkf@hkf-fairs.com; Website: www.hkf-fairs.com

August 25-27: 14th World Veterinary Poultry Congress Fair, Istanbul, Turkey. Contact: Mr. Levent Akdogan. Phone: +90 212 244 7171; Email: levent@ikontour.com

2005 September

September 13-14: Developing & Implementing HACCP for the Meat & Poultry Industry Seminar, Athens, Georgia USA. Contact: Extension Food Science Outreach Program, Department of Food Science & Technology, University of Georgia, 240 Food Science Building, Athens, Georgia 30602-7610 USA. Phone: +1-706-542-2574; Fax: +1-706-542-9066; E-mail: marianw@uga.edu; Website: www.efsonline.uga.edu

September 15-17: Avian Gut Function, Health and Disease, 28th Poultry Science Symposium, Bristol, UK. Contact: Langford Continuing Education Unit. Phone: +44 117 928 9502; Fax: +44 1934 852170; Email: Langford-CE@bristol.ac

September 19-23: IX International Coccidiosis Conference, Hotel Mabú, Iguazu Falls, Brazil. Contact: FACTA, Av. Andrade Neves, 2501, Castelo, Campinas, SP 13070-001, Brazil. Phone: +55 19 3243 6555; Fax: +55 19 3243 8542; Email: facta@facta.org.br

September 21-22: Poultry Production & Health Seminar, Memphis, Tennessee USA. Contact: U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084 USA. Phone: +1-770-493-9401; Fax: +1-770-493-9257; Website: www.poultryegg.org

September 23-25: Fundamental Physiology and Perinatal Development in Poultry, Humboldt University, Berlin, Germany. Contact: Dr. Barbara Tzschentke, Institute of Biology, Humboldt University of Berlin, Philippstrasse 13, 10115 Berlin, Germany. Email: Barbara.Tzschentke@rz.hu-berlin.de; Website: www.biologie.hu-berlin.de/~perinatal/index.htm

September 24-29: 15th European Symposium on Poultry Nutrition, Balatonfüred, Hungary. Contact: Dr K Dubecz, University of Veszprem, Georgikon Faculty of Agriculture, Hungary. Tel: +36 83 312 330; Fax: +36 83 315; Email: dubecz@georgikon.hu; Website: growcare.katki.hu/wpsa2005

September 28-October 1: 44th Fieravicola, Fiera di Forlì, Via Punta di Ferro, 47100 Forlì, Italy. Phone: +39 0543 793511; Fax: +39 0543 724488; Email: info@fieravicola.com; Website: www.fieravicola.com

2005 October

October 4-7: XIX Latin American Poultry Congress, Atlapa Convention Center, Panama City, Panama. Contact: ANA VIP, PO Box 6-3994, El Dorado, Panama. Phone: +1 507 226 3941; Fax: +1 507 226 9905; Email: anavip@anavip.com; Website: www.anavip.com/congreso

October 7-8: 4th European Poultry Genetics Symposium, (WPSA Working Group 3, Breeding and Genetics), Dubrovnik, Croatia. Contact: Helga Medic, Phone: +385 1 4605126; Email: hmedic@pdf.hr

October 9-12: 13th Australian Poultry Convention, Conrad Jupiters, Gold coast, Australia. Contact: Tour Hosts Pty Ltd, G.P.O. Box 128, Sydney, NSW 2001, Australia. Phone: +61 2 9265 0777. Fax: +61 2 9267 5443; E-mail: poultry2005@tourhosts.com.au; Website: www.poultry2005.com

October 11-13: Poultry Farming 2005, 27th International Conference, Business Meeting and Exhibition, IHS 'F. Joliot-Curie, St. Constantin and Elena Varna, Bulgaria. Contact: Bulgarian Poultry Union, 1303 Sofia, 80 Christo Botev Boulevard, Bulgaria. Phone/Fax: +352 2 931 09 58; Email: galus@mb.bia-bg.com

October 13-14: Poultry Protein & Fat Seminar, Nashville, Tennessee USA. Contact: U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, Georgia 30084 USA. Phone: +1 770-493-9401; Fax: +1 770-493-9257; Website: www.poultryegg.org

2005 November

November 1-4: VIV Europe 2005, Jaarbeurs, Utrecht, The Netherlands. Contact: VNU Exhibitions Europe BV, PO Box 880. 3503 RV Utrecht, The Netherlands, Phone: +31 30 295 2772; Fax: +31 3 295 2809; Email: viv.europe@vnuexhibitions.com; Website: www.viv.net

November 3: 3rd International Waterfowl Conference, (WPSA China Branch), Guangzhou, Guangdong Province, China. Contact: WPSA China Secretary-General, Dr. Xiquan Zhang, College of Animal Science, South China Agricultural University, Guangzhou 510642, China. Phone: +86 20 8528 5703; Fax: +86 20 8528 0740; Email: waterfowl2005@scau.edu.cn; Website: www.scau.edu.cn/waterfowl2005
November 3-10: United States Animal Health Association, Hershey, Pennsylvania. Website: www.usaha.org.

2006 January

January 23-24: International Poultry Scientific Forum, Georgia World Congress Center, Atlanta, Georgia USA, Contact: US Poultry & Egg Assn., 1530 Cooledge Road, Tucker, Georgia 30084 USA, Phone: +1 770 403 0401; Fax: +1 770 403 9257, Website: www.poultryegg.com

January 25-27: 2006 International Poultry Exposition, Georgia World Congress Center, Atlanta, Georgia USA, Contact: US Poultry & Egg Assn., 1530 Cooledge Road, Tucker, Georgia 30084 USA, Phone: +1 770 403 0401; Fax: +1 770 403 9257, Website: www.poultryegg.com

2006 February

February 9-11: National Turkey Federation (NTF) Annual Convention 2006, Orlando, Florida USA. Contact: National Turkey Federation, 1225 New York Avenue, NW Suite 400, Washington, DC 20005 USA. Phone: +1 202-898-0100; Fax: +1 202 898 0203; Email: info@turkeyfed.org; Website: www.eatturkey.com

February 20-22: Poultry Focus Asia 2006, Queen Sirikit National Convention Center, Bangkok, Thailand. Phone: +44 1377 256316; Fax: +44 1377 253640; Email: conf@positiveaction.co.uk; website: www.positiveaction.co.uk

2006 March

March 21-23: Midwest Poultry Federation Convention 2006, St. Paul, Minnesota USA. Contact: Midwest Poultry Federation, 108 Marty Drive, Buffalo, Minnesota 55313 USA. Phone: +1 763-682-2171; Fax: +1 763-682-5546; Email: Nicole@midwestpoultry.com; Website: www.midwestpoultry.com

Meetings, Seminars and Conventions

2006 April

April 3-6: 6th International Symposium on Avian Influenza, St. John's College, Cambridge, UK.
Contact: Dr. I. Capua. Fax: +39 49 8084360;
Email: icapua@izsvenezie.it or Dr. D. Swayne.
Fax: +1 706 5463161;
Email: dswayne@sepri.usda.gov

April 24-27: Middle East Poultry Show 2006, Dubai World Trade Centre, Dubai, United Arab Emirates.
Contact: Mediac Communication & Exhibitions LLC, PO Box 5196, Dubai, United Arab Emirates.
Phone: +971 4 2692004; Fax: +971 4 2691296; Email: mediac@emirates.net.ae;
Website: www.mediaccom.com

2006 May

May 9-10: British Pig & Poultry Fair 2006, Warwickshire, United Kingdom. Contact: Haymarket Land Events, Royal Agricultural Society of England, Stoneleigh Park, Warwickshire CV8 2LZ England. Phone: +44 24 76 696969;
Fax: +44 24 76 696900; Email: alice.bell@haynet.com;
Website: www.pigandpoultryfair.org.uk

May 15: Respiratory Diseases 2006, NH Utrecht Hotel, Utrecht, Holland. Phone: +44 1377 256316;
Fax: +44 1377 253640;
Email: conf@positiveaction.co.uk;
Website: www.positiveaction.co.uk

May 16-18: VIV Europe, (Postponed from November 2-4, 2005), Jaarbeurs, Utrecht, The Netherlands.
Contact: VNU Exhibitions Europe BV, PO Box 8800, 3503 RV Utrecht, The Netherlands.
Phone: +31 30 295 2788; Fax: +31 30 295 2809;
Email: viv.europe@vnuexhibitions.com;
Website: sites.vnuexhibitions.com/sites/viv

May 22-26: International Seminar in Poultry Pathology and Production, held by The University of Georgia and the Columbian Veterinary Association (AMEVEA), at the University of Georgia, Athens, Georgia. Contact: Sem2006@uga.edu

May 24-26: VIV Russia 2006, Moscow, Russia.
Contact: Website: sites.vnuexhibitions.com/sites/viv

2006 July

July 16-19: Poultry Science Association (PSA) Annual Meeting 2006, Edmonton, Alberta, Canada.
Contact: Mary Swenson, Poultry Science Association, Inc., 1111 N. Dunlap Avenue, Savoy, Illinois 61874 USA. Phone: +217 356 5285; Fax: +1 217 398 4119; Email: marys@assoqh.org; Website: www.fass.org or www.poultryscience.org

2006 September

Sept. 10-14: 12th European Poultry Conference, Veronafiere Congress Centre, Verona, Italy. Contact: Secretariat XII WPSA European Conference, Department of Food Science, Via San Giacomo 9, 40126 Bologna, Italy. Phone: +39 051 209 4221; Fax: +39 051 251 936; Email: wpsa@alma.unibo.it; Website: www.epc2006.veronafiere.it

Sept. 27-29: VIV China 2006, (Postponed from June 2006-dates not yet specified), Beijing, P.R. China.
Contact: VNU Exhibitions Europe B.V., PO Box 8800, 3503 RV Utrecht, The Netherlands.
Phone: +31 30 295 2772; Fax: +31 30 295 2809;
Email: viv.china@vnuexhibitions.com;
Website: sites.vnuexhibitions.com/sites/viv or Mr. Ruifeng Xu, CNAVS Trade Fair Office.
Phone +86 10 649 50 373; Fax: +86 10 649 50 374;
Email: rfxu@china-av.net

2006 October

October 10-14: World Poultry Science Association (WPSA) European Poultry Conference 2006, Verona, Italy. Contact: Secretariat - XII WPSA European Conference, Department of Food Science, University of Bologna, Via San Giacomo 9, 40126 Bologna, Italy. Phone: +39 041 209 4221; Fax: +39 051 251 936; Email: epc2006@wpsa.it; Website: www.epc2006.veronafiere.it

2006 November

November 14-17: EuroTier 2006, Hanover, Germany.
Contact: DLG (Deutsche Landwirtschafts-Gesellschaft e.V.), Eschborner-Landstrasse 122, 60489 Frankfurt-am-Main, Germany.
Phone: +49 69 24788 265; Fax: +49 69 24788 113;
Email: eurotier@DLG-Frankfurt.de;
Website: www.eurotier.de

2007 January

Jan. 31-Feb. 2: 2007 International Poultry Exposition, Georgia World Congress Center, Atlanta, Georgia, USA. Contact: US Poultry & Egg Association, 1530 Cooleedge Road, Tucker, Georgia 30084 USA. Phone: +1 770 493 9401;
Fax: +1 770 493 9257; Website: www.poultryegg.org

2007 March

March 20-22: Midwest Poultry Federation Convention 2007, St. Paul, Minnesota USA. Contact: Midwest Poultry Federation, 108 Marty Drive, Buffalo, Minnesota 55313 USA. Phone: +1 763-682-2171; Fax: +1 763-682-5546;
Email: Nicole@midwestpoultry.com;
Website: www.midwestpoultry.com

2008 August

August 10-15: XXIII World's Poultry Congress, Convention and Exhibition Centre, Brisbane, Australia. Contact: WPC 2008 Congress, Intermedia Convention & Event Management, PO Box 1280, Milton, Queensland 4064, Australia.
Phone: +61 7 3858 5594; Fax: +61 7 3858 5510;
Email: wpc2008@im.com.au; Website: www.wpsa.info

Broiler Performance Data (Region) Live Production Cost					
	SW	Midwest	Southeast	Mid-Atlantic	S-Central
Feed cost/ton w/o color (\$)	151.29	139.34	152.56	150.51	150.69
Feed cost/lb meat (¢)	14.06	12.71	14.21	14.69	14.57
Days to 4.6 lbs	43	42	43	42	42
Chick cost/lb (¢)	3.89	4.04	4.16	3.37	3.58
Vac-Med cost/lb (¢)	0.09	0.04	0.07	0.10	0.07
WB & 1/2 parts condemn. cost/lb	0.16	0.21	0.11	0.18	0.17
% mortality	4.99	5.02	4.97	5.07	5.31
Sq. Ft. @ placement	0.80	0.84	0.82	0.85	0.85
Lbs./Sq. Ft.	6.76	6.62	6.38	7.44	7.18
Down time (days)	13	11	10	13	12

Data for week ending June 25, 2005

Broiler Performance Data (Company) Live Production Cost

	Average Co.	Top 25%	Top 5 Co.'s
Feed cost/ton w/o color (\$)	150.41	144.41	136.51
Feed cost/lb meat (¢)	14.18	13.10	12.47
Days to 4.6 lbs	42	41	40
Chick cost/lb (¢)	3.88	3.70	3.47
Vac-Med cost/lb (¢)	0.09	0.05	0.02
WB & 1/2 parts condemn. cost/lb	0.16	0.14	0.15
% mortality	4.93	3.61	2.71
Sq. Ft. @ placement	0.82	0.81	0.89
Lbs./Sq. Ft.	6.84	6.85	7.01
Down time (days)	11	12	12

Data for week ending June 25, 2005

Broiler Whole Bird Condemnation (Region)

	SW	Mid-West	S. East	Mid-Atlantic	S. Central
% Septox	0.158	0.254	0.116	0.196	0.150
% Airsac	0.096	0.101	0.042	0.088	0.071
% I.P.	0.011	0.017	0.013	0.026	0.063
% Leukosis	0.000	0.000	0.001	0.028	0.000
% Bruise	0.002	0.001	0.003	0.003	0.004
% Other	0.011	0.003	0.022	0.008	0.007
% Total	0.278	0.376	0.197	0.349	0.294
% 1/2 parts condemnations	0.344	0.734	0.262	0.409	0.395

Data for week ending June 25, 2005

Broiler Whole Bird Condemnation (Company)

	Average Co.	Top 25%	Top 5 Co.'s
% Septox	0.160	0.165	0.379
% Airsac	0.069	0.052	0.017
% I.P.	0.030	0.018	0.004
% Leukosis	0.004	0.001	0.001
% Bruise	0.003	0.002	0.002
% Other	0.011	0.007	0.001
% Total	0.277	0.244	0.404
% 1/2 parts condemnations	0.390	0.427	0.507

Data for week ending June 25, 2005