



# The Poultry Informed Professional

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## INFLUENCE OF AMMONIA ON BROILER PERFORMANCE

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How many times have we all been in a broiler house when the chicks were being unloaded from the chick bus or a few days after chick arrival and detected the strong smell of ammonia? High levels of ammonia adversely affect bird health, live weight, feed conversion, carcass quality, carcass yield, and can cause blindness. Reducing ammonia concentration in the house could be the difference between a below average and a high performance flock on the grower's settlement sheet.

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Broiler Performance Data (Region) Live Production Cost					
	SW	Midwest	Southeast	Mid-Atlantic	S-Central
Feed cost/ton w/o color (\$)	141.01	133.79	146.76	148.41	145.33
Feed cost/lb meat (¢)	13.12	12.15	13.38	14.39	13.41
Days to 4.6 lbs	45	44	44	45	44
Chick cost/lb (¢)	3.99	3.82	3.93	3.56	3.74
Vac-Med cost/lb (¢)	0.06	0.03	0.07	0.04	0.03
WB & 1/2 parts condemn. cost/lb	0.20	0.19	0.13	0.16	0.18
% mortality	4.63	3.77	4.06	4.00	3.50
Sq. Ft. @ placement	0.80	0.79	0.82	0.81	0.82
Lbs./Sq. Ft.	6.26	6.68	6.51	6.96	6.57
Down time (days)	12	10	11	14	13

Data for week ending 09/21/02

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Ammonia is a colorless gas produced by microbial decomposition of nitrogenous compounds (protein, amino acids, and non-protein nitrogen) in the litter. Litter contains a diverse population of microorganisms that produce the enzyme urease, which converts the nitrogen into ammonia. Moisture, temperature, and pH of the litter also play an important role in the conversion of nitrogen into ammonia.

The most common problem with ammonia in broiler production is decreased health status of the birds. Reduction in growth rate may be secondary. The trachea contains hairlike projections called cilia, which prevent dust and pathogens from entering the respiratory tract of the bird. High ammonia impairs the cilia of the trachea and damages the tracheal lining. Once the lining of the trachea has been damaged, *E. coli* and other pathogens enter the respiratory tract causing a higher incidence of respiratory infections that could lead to condemnations.

It is recommended that ammonia concentration during brooding be maintained at approximately < 25 ppm and the amount of ammonia should not exceed 50 ppm from four weeks of age until the end of the growout for optimum bird performance (Reece et al. 1980). However, as someone is constantly exposed to ammonia, their ability to detect ammonia by sense of smell decreases. For example, with time most growers are not able to detect ammonia by sense of smell until the ammonia concentration in the broiler house has reached 50-60 ppm or higher. By this time, chick performance can be severely affected.

What is the impact of ammonia production on broiler performance? The USDA Poultry Laboratory at Starkville, Mississippi, recently evaluated the effects of ammonia on broiler performance (Miles et al., 2002). A total of 480 Ross 508 chicks were randomly placed into five environmental chambers with two chambers at 0ppm, whereas 25, 50, and 75 ppm ammonia were represented in one chamber. Anhydrous ammonia was metered into each chamber at either 0, 25, 50 or 70 ppm. At 28 days, all birds were moved from the chambers and placed into floor pens until the end of the growout. Each chamber contained fresh pine shavings, tube feeders, and nipple waterers. Ammonia content decreased live weight at the end of the seven week study (0 ppm = 6.74, 25 ppm = 6.55, and 75 ppm = 6.23 lb). The variation in body weight was more prevalent with increasing ammonia as measured by coefficient of variation (0 ppm = 12.1, 25 ppm = 13.2, 50 ppm = 14.2 and 75 ppm = 16.8%). The reduction in live weight carried over to a decrease in the amount of breast meat yield. As expected with the high ammonia concentrations, chicks exposed to 50 and 75 ppm of ammonia had more severe eye lesions than the chicks subjected to either 0 or 25 ppm of ammonia. Field observations have shown that chicks subjected to a high ammonia levels often become blind due to these eye lesions.

What is the economic impact of ammonia production to growers? In the Mississippi study, the difference in body weight from birds exposed to 25 ppm vs. 50 ppm ammonia was 0.31 lb/bird. Let's assume a six house farm with 25,000 birds/house with an average live weight of 4.0 lb. Increasing ammonia content from 25 to 50 ppm will result in a reduction of \$2,250 to the grower based on the result from this study. As long as we are producing broilers, ammonia production will be a concern. Therefore, we must seek methods to minimize ammonia. The goal of growers should be to maintain ammonia below 25 ppm especially during the first two weeks of the growout.

**Broiler Whole Bird Condemnation (Region)**

	SW	Mid-West	S. East	Mid-Atlantic	S. Central
% Septox	0.273	0.308	0.142	0.226	0.185
% Airsac	0.098	0.098	0.071	0.061	0.060
% I.P.	0.045	0.046	0.041	0.029	0.088
% Leukosis	0.002	0.004	0.001	0.013	0.002
% Bruise	0.009	0.006	0.006	0.008	0.011
% Other	0.029	0.003	0.034	0.004	0.012
% Total	0.451	0.465	0.296	0.340	0.358
% 1/2 parts condemnations	0.384	0.469	0.288	0.384	0.501

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**Broiler Performance Data (Company)  
Live Production Cost**

	Average Co.	Top 25%
Feed cost/ton w/o color (\$)	145.00	133.84
Feed cost/lb meat (¢)	13.41	12.31
Days to 4.6 lbs	44	44
Chick cost/lb (¢)	3.94	3.45
Vac-Med cost/lb (¢)	0.04	0.02
WB & 1/2 parts condemn. cost/lb	0.17	0.13
% mortality	3.54	3.46
Sq. Ft. @ placement	0.80	0.79
Lbs./Sq. Ft.	6.48	6.44
Down time (days)	13	12

Data for week ending 09/21/02

How does a grower determine the level of ammonia in the broiler house? Many of the instruments to measure ammonia directly can be cost prohibitive. A dragger tube to measure ammonia costs about \$300. An indirect method can be done using relative humidity. Relative humidity should be in the range of 50-70%, but as relative humidity increases above 70% ammonia will also increase above 25ppm.

### MANAGEMENT TIPS TO MINIMIZE AMMONIA PRODUCTION

1. When cleaning out between flocks, remove the caked litter. Caked material prevents the wet litter below the cake from drying.
2. Prior to bird placement, ventilate the house to remove high ammonia levels, waiting till the chicks arrive to properly ventilate. To reduce the ammonia may result in lower air temperature and chilled chicks.
3. Fix all water leaks and drips as soon as possible to minimize caked litter.
4. The best method to minimize ammonia during the growout is to properly VENTILATE.
5. Litter treatment amendments can be an effective management tool to reduce ammonia, but they are not a substitution for ventilation. Some growers have experienced variable results with litter amendment among flocks. The variation is partially attributable to not heating the house prior to applying the litter treatment. If the ammonia is not removed before applying the litter treatment, then the product will be tied up with the existing ammonia. Thus, a reduced amount of litter treatment will be available for the ammonia generated by the birds. Also, some litter treatments require a certain amount of moisture for activation.

#### References:

Miles, D.M., S.L. Branton, B.D. Lott, and J.D. Simmons, 2002. Quantified deterrent of ammonia to broilers. *Poultry Sci.* Vol 81 (Suppl. 1).

Reese, F.N., B.D. Lott, and J.W. Deaton, 1980. Ammonia in the atmosphere during brooding affects performance of broiler chickens. *Poultry Sci.* 59:486.



## GOLDEN EGG AWARD

Dr. John Glisson of the University of Georgia Department of Avian Medicine, left, is presented with the Georgia Egg Commission's 2002 Golden egg Award. David Lathem, a commission board member, made the presentaion at a special luncheon honoring Dr. Glisson. The award is presented annually to a person who has assisted the egg industry during the year.

### Broiler Whole Bird Condemnation (Company)

	Average Co.	Top 25%
% Septox	0.221	0.236
% Airsac	0.071	0.061
% I.P.	0.054	0.048
% Leukosis	0.004	0.004
% Bruise	0.009	0.008
% Other	0.014	0.005
% Total	0.373	0.361
% 1/2 parts condemnations	0.395	0.371

Data for week ending 09/21/02



*Dr. Darko Mitevski, Dr. Sara Steinlage & Dr. Scott Gustin*

Dr. Mitevski began as an MAM candidate in June, 2002. Before joining us, he was working at the veterinary Institute at Skopje, Macedonia where he was actively involved in diagnostic and extension service. He also was a part-time teaching assistant at the Chair of Diseases of Poultry.

Dr. Gustin, who also began in June, 2002, is a graduate with his DVM from Virginia-Maryland College of Veterinary Medicine, Blackburg, VA. He also has a BS in Animal and Poultry Science from Virginia Tech.

Dr. Throne-Steinlage, began her MAM program in June 2001, received her bachelor of science degree from Kansas State University in Animal Science and Agriculture. She received her veterinary degree from Kansas State in May 2001.

**REMINDER**

All previous issues of the Poultry Informed Professional are archived on our website [www.avian.uga.edu](http://www.avian.uga.edu) under the Online Documents and The Poultry Informed Professional links.

**FOR YOUR INFORMATION**

**Bayer has launced a website that will keep you informed of the Notice of Opportunity of Hearing proceedings with FDA to withdraw Baytril from the U.S. market. The site gives the science behind Bayer's defence of Baytril as a tool in poultry production. It will be continually up-dated. The address is [www.healthypoultry.com](http://www.healthypoultry.com)**



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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" Reports

lion, up 1 percent from a year earlier. August egg production per 100 layers was 2,189 eggs, up 1 percent from the 2,170 eggs in August 2001.

All layers in the U.S. on September 1, 2002, totaled 336 million, up 1 percent from a year ago. The 336 million layers consisted of 278 million layers producing table or commercial type eggs, 55.9 million layers producing broiler-type hatching eggs, and 2.51 million layers producing egg-type hatching eggs. Rate of lay per day on September 1, 2002, averaged 70.8 eggs per 100 layers, up 1 percent from a year ago.

Laying flocks in the 30 major egg producing States produced 6.89 billion eggs during August 2002, up 2 percent from a year ago. The average number of layers during August, at 315 million, was up 1 percent from a year ago.

#### **Egg-Type Chicks Hatched Up 3 Percent**

Egg-type chicks hatched during August totaled 35.9 million, up 3 percent from August 2001. Eggs in incubators totaled 32.6 million on September 1, 2002, down 1 percent from a year ago.

Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 221,000 during August 2002, down 12 percent from August 2001.

#### **Broiler Hatch Up 1 Percent**

The August 2002 hatch of broiler-type chicks, at 780 million, was up 1 percent from August of the previous year. There were 634 million eggs in incubators on September 1, 2002, down 1 percent from a year earlier.

Leading breeders placed 7.4 million broiler-type pullet chicks for future domestic hatchery supply flocks during August 2002, down 1 percent from August 2001.

#### **Turkey Eggs in Incubators on September 1 Down 2 Percent**

Turkey eggs in incubators on September 1, 2002, in the United States totaled 29.5 million, down 2 percent from September 1 a year ago. Eggs in incubators were 9 percent below the August 1 total of 32.2 million. Regional changes from the previous year were: East North Central, up 1 percent; West North Central, up 16 percent; North and South Atlantic, down 17 percent; South Central, up slightly; and West, down 17 percent.

#### **Poults Placed During August Down 1 Percent From Last Year**

The 24.7 million poults placed during August 2002 in the United States were down 1 percent from the number placed during the same month a year ago. Placements were down 4 percent from the July 2002 total of 25.6 million. Regional changes from the previous year were: East North Central, up 9 percent; West North Central, up 4 percent; North and South Atlantic, down 12 percent; South Central, down 8 percent; and West, up 11 percent.

### **Quarterly Broiler Consumption Tops 20 Pounds**

According to the latest Economic Research Service (ERS) reports, a combination of higher broiler production and lower exports pushed domestic broiler consumption to over 20 pounds per person during the second quarter of 2002. Broiler production for the second quarter was 8.3 billion pounds, 3.3 percent higher than the previous year, and exports totaled 1.12 billion pounds, down 20 percent from the same period in 2001. These two factors pushed second-quarter consumption to a record 20.8 pounds per person on a retail weight basis.

The broiler production estimate for the third quarter was increased to 8.2 billion pounds. This is a 3.4-percent increase in production compared with a year earlier and reflects a continued growth in both birds slaughtered and average weight. The growth in broiler meat production is expected to slow somewhat in the fourth quarter. Late in the third quarter and early in the fourth quarter, the number of chicks being hatched is expected to slow to levels only slightly higher than the previous year. The most recent broiler hatchery report shows that over the last 5 weeks (August 10 through September 7), the average number of chicks placed was only 0.7 percent higher than the same period a year earlier.

### **Broiler Exports Down in Second Quarter**

Second quarter 2002 broiler exports totaled 1.12 billion pounds, down 20 percent from the same period in 2001. The chief reason for the decline in shipments was the trade disagreement with Russia. While exports to Russia have been almost 30 percent lower over the first 6 months of 2002, the 169 million pounds reportedly shipped during June were considerably higher than in the previous 2 months. While lower broiler exports to Russia is the major factor in the decline in total broiler shipments, exports have also been lower to a number of other major markets, such as Hong Kong/China and Japan. The only major markets with increased exports over the first half of 2002 have been Mexico and Korea.

The forecast for broiler exports during the second half of 2002 calls for gradually increasing shipments compared with second-quarter 2002. However, exports will still be considerably lower than the previous year. The forecast for total exports in the third and fourth quarters is 2.5 billion pounds, down 7 percent from the previous year. Along with improvements in the Russian market, this forecast is dependent on gains in exports to such markets as Hong Kong/China and Japan.

### **Higher Turkey Stocks Pressure Prices**

Over the first 7 months of 2002, U.S. turkey production totaled 3.3 billion pounds, 4 percent higher than during the same period in 2001. This increase in production coupled with no gain in exports and flat domestic consumption have resulted in growing stocks of whole turkeys and turkey parts. At the beginning of August, turkey stocks were 703 million pounds, 32 percent higher than the previous year. Although most of the increase has come from an increase in turkey parts (up 70.5 percent) stocks of whole turkeys are 8.5 percent higher. The higher stocks have put downward pressure on prices, but so far prices for whole turkeys and breast meat have not fallen sharply, with July 2002 prices for those products only 1.7 and 4.7 percent lower, compared with a year earlier. The prices for turkey drumsticks and wings have responded much more to the buildup in turkey stocks, falling 30 and 20.8 percent from their year-earlier levels.

# Meetings, Seminars and Conventions

## 2002 October

Oct. 16-20: *National Chicken Council's 48th Annual Conference & Fall Board of Directors Meeting*, JW Marriott Hotel, Washington, D.C. National Chicken Council, 1015 15th St. NW, Ste. 930, Washington, D.C. 20005-2605. Phone: 202-296-2622.

Oct. 29: *Carolina Feed Industry Assoc.*, Feed Production Technology School, Sheraton Imperial Hotel, Research Triangle Park, Raleigh, NC. Contact: Owen Robertson, 2116 N. Shoreline Dr., Sanford, NC 27330. Phone: 919-776-3054.

Oct. 31: *Carolina Feed Industry Assoc.*, Poultry Nutrition Conference, Sheraton Imperial Hotel, Research Triangle Park, Raleigh, NC. Contact: Owen Robertson, 2116 N. Shoreline Dr., Sanford, NC 27330. Phone: 919-776-3054.

## 2002 November

Nov 12-13: *Alabama Breeder/Hatchery Workshop*, Alabama Poultry & Egg Assoc, Auburn University Hotel & Dixon Conference Center, Auburn University, AL. Contact: Wanda Linker, P.O. Box 240, Montgomery, AL 36101-0240. Phone: 334-265-2732; Fax: 334-265-0008.

Nov 12-15: *EUROTIER 2002*, Hanover, Germany. Contact: German Agricultural Society, Eschborner Landstr. 122, D-60489 Frankfurt am Main, Germany. Phone 49-0-69-24788-259. <http://www.eurotier.de>

Nov 26-29: *EXPOAVIGA 2002*, Mantjuic 2 Trade Fair Centre, Barcelona, Spain. Contact: Fira de Barcelona. Phone: 34-932-332-358.

## 2002 December

Dec. 4-5: *Listeria Workshop*, Hilton Cincinnati Netherland Plaza, Cincinnati, Ohio. Contact: Katie Branam, American Meat Institute Foundation, 1700 N. Moore St., Suite 1600, Arlington, VA 22209. Phone: 703-841-2400; [kbrannan@meatami.com](mailto:kbrannan@meatami.com)

## 2003 January

January 22-24: *International Poultry Exposition*, Georgia World Congress Center, Atlanta, GA. Contact: U.S. Poultry and Egg Association, 1530 Cooledge Road, Tucker, GA 30084. Phone: 770-493-9401; Fax: 770-493-9527

## 2003 February

February 6-8: *NTF Annual Convention*, San Antonio, Texas. Contact: National Turkey Federation, 1225 New York Ave., S.W., Suite 400, Washington, D.C. 20004. Phone 202-898-0100; <http://www.eatturkey.com>

February 24-27: *PEPA Annual Convention*, Palm Springs, Calif. Contact: Pacific Egg & Poultry Association, 1521 I St., Sacramento, Calif. 95814. Phone 916-441-0801; <http://www.pacificegg.org>

## 2003 March

March 5-6: *Nebraska Poultry Industries Annual Convention*, New World Inn and Conference Center, Columbus, Nebraska. Contact: Nebraska Poultry Industries, Inc., University of Nebraska, A-103 Animal Sciences, P.O. box 830908, Lincoln, NE 68583-0908. Phone: 402-472-2051

March 5-6: *U.S. Poultry Environmental Management Seminar*, Raleigh Marriott Crabtree Valley Hotel, Raleigh, N.C. Contact: U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, GA 30084-7303. Phone 770-493-9401; <http://www.poultryegg.org>

March 5-7: *VIV Asia*, Queen Sirikit National Convention Center, Bangkok, Thailand. Contact: Jaarbeurs Exhibitions and Media. P.O. Box 8500, 3503 RM Utrecht, The Netherlands. Phone: +31 30 295 5662; Fax: +31 30 295 5709 or email: [viv.asia@jaarbeursutrecht.nl](mailto:viv.asia@jaarbeursutrecht.nl)

March 8: *ACPV Sponsored Workshop, Molecular Biology Made Easy*, Contact: H.L. Shivaprasad, 2789 S. Orange Ave., Fresno, CA 93725.

March 9-11: *52nd Western Poultry Disease Conference*, Capitol Plaza Holiday Inn, Sacramento, CA. Contact: R.P. Chin, 2789 S. Orange, Ave., Fresno, CA 93725

March 19-20: *U.S. Poultry Feed Mill Management*, DoubleTree Hotel, Nashville, TN. Contact: U.S. Poultry & Egg Association, 1530 Cooledge Road, Tucker, GA 30084-7303. Phone 770-493-9401; <http://www.poultryegg.org>

## 2003 April

April 4-5: *Florida Poultry Days*, Orlando, FL. Contact: Florida Poultry Association, 4508 Oak Fair Blvd., No. 290, Tampa, FL 33601

April 20-23: *Middle East Poultry Show*, Dubai World Trade Center Exhibition Complex, United Arab Emirates. Contact: Mediac Communication and Promotion, P.O. Box 5196, Dubai, UAE. Phone: +971 4 2692004; Fax: +971 4 2691298

## 2003 June

June 5-7: *VIV Poultry Yutav*, World Trade Center Yesulsky, Istanbul, Turkey. Contact: Jaabeurs Exhibitions and Media, P.O. Box 8800, 3503 RM Utrecht, The Netherlands. Phone: +31 30 295 2772; Fax: +31 30 295 2809

June 25-27: *Georgia Egg Association's 42nd Annual Meeting*, King & Prince Hotel, St. Simons Island, GA. Contact: Robert Howell, Georgia Egg Commission, 16 Forest Park, GA 30297. Phone: 404-363-7661; Fax: 404-363-7664 or email: [goodeggs@bellsouth.net](mailto:goodeggs@bellsouth.net)

## 2003 July

July 19-23: *XIII Congress of the World Veterinary Poultry Association*, Denver, CO, USA. Contact: Details are posted on the web site of the American Association of Avian Pathologists. Website: <http://www.avian.uga.edu/~wvpa/>