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THE RELATIONSHIP BETWEEN POULTRY HEALTH AND FOOD SAFETY

Presented at the 53rd Western Poultry Disease Conference, Sacramento, CA., March 7-9, 2004

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SUMMARY

As more is learned about the science linking flock health and finished product microbial prevalence and load, the Veterinary Avian Specialist's role in Food Safety will enlarge. Recent research shows a surprising relationship between a number of common poultry diseases and carcass microbial loads in the processing plant. It follows that maintaining optimal flock health is essential to minimizing food borne pathogens. If pre-harvest HACCP is to be meaningful, the live-production critical control points that impact food safety must be recognized. Management methods, disease prevention biologics, antimicrobials and therapeutics are valuable veterinary tools, and must remain available. Following is a review of what is currently known about the inter-relatedness of flock health and carcass microbial contamination.

Broiler Performance Data (Region)
Live Production Cost

	SW	Midwest	Southeast	Mid-Atlantic	S-Central
Feed cost/ton w/o color ($)	179.63	161.11	181.66	181.05	180.34
Feed cost/lb meat (¢)	16.95	15.04	16.99	17.82	16.69
Days to 4.6 lbs	42	41	44	42	42
Chick cost/lb (¢)	3.78	4.24	4.18	3.61	4.09
Vac-Med cost/lb (¢)	0.05	0.07	0.09	0.07	0.10
WB & 1/2 parts condemn. cost/lb	0.22	0.21	0.29	0.25	0.16
% mortality	4.97	5.22	6.78	6.03	4.86
Sq. Ft. @ placement	0.84	0.77	0.75	0.83	0.80
Lbs./Sq. Ft.	7.07	7.12	7.42	7.47	6.83
Down time (days)	15	9	15	13	13

Data for week ending March 27, 2004

Contents

— Research during the past decade points to a connection between Pre-Harvest flock health status and carcass microbial loads/prevalence.
— We have learned that Food Safety goals are linked to live production Health and Management goals, not just to in-plant processes. (1)

What do the following have in common?
1) Feed withdrawal (FW)
2) Molting
3) Coccidiosis
4) Flock Uniformity
5) Cut intestinal tracts (processing errors)
6) Fecal Contamination
7) Airsacculitis
8) Cellulitis (Infectious Process, I.P.)
9) Total Condemnation (2)

Answer:
All have been shown to impact Food Pathogen prevalence and/or load, pre- or post-harvest. (Salmonella spp., Campylobacter, E. coli)
— Following is a review of the relevant literature to date. . . (3)

REVIEW

A variety of bacterial, viral and "management" diseases of poultry cause morbidity and mortality, increase feed conversion, and reduce body weights and the uniformity of the flock at the time of harvest and processing. Northcutt states that, "Variation in bird size (uniformity) within a flock or over time can affect the efficiency of processing plant equipment, specifically at the vent opener during evisceration", and that "Frequency of carcass contamination depends upon the amount of material present in the digestive tract, the condition of the digesta (partially digested food and feces) remaining in the intestines (watery or firm), the integrity of the intestines, and the efficiency of the eviscerating equipment and plant personnel" (1).

How does disease impact these conditions? As in other species, bacterial and viral infections in poultry produce a fever, leading to cachexia ("off feed") in a portion of the flock. Northcutt and Bilgili find that "When the length of feed withdrawal is too long (greater than 13 or 14 hours), a number of problems may occur that increase the likelihood of carcass contamination….Weaker intestines have a higher incidence of intestinal tearing during visceration….Intestinal strength of broilers has been found to be approximately 10% lower when broilers were without feed for 14 or more hours before processing as compared to full-fed broilers" (1,2,8,9). So any disease that takes birds "off feed" can potentially impact carcass contamination prevalence in the plant.

Carcass pathogen load can be affected, as well. Byrd et al. reported that Campylobacter positive crops increase from 25% before feed withdrawal to 62.4% after feed withdrawal (3). Corrier et al. found that Salmonella positive crops increased from 1.9% to 10% following feed withdrawal (4). Stern et al. produced a five-fold increase in Campylobacter pos-

Feed Withdrawal (FW)
— FW is necessary to preocess broilers with minimal ingesta and fecal contamination of carcasses.
— Priot to FW, 25% of any flock is "off-feed" - individual broilers eat every 4 hours, and gut passage time is 4 hours. (Savage, 1997)
— Therefore, 5 hours of managed FW pre-catch results in 25% of the flock on 5 hours FW, 25% on 9 hours FW, and 50% somewhere between. (Savage, 1997) (4)

Feed Withdrawal (ctd.)
—Changes in ventlation, lighting, house temperature, water availability, and other factors within 5 days of catching affect uniform and proper feed withdrawal. (Savage, 1997)
— Diseases that produce fever, morbidity or reduce bird mobility to feed and water put broilers "ogg-feed" for extended periods. Therefore, good flock health is essential to proper FW preslaughter. (5)

Broiler Whole Bird Condemnation (Region)

	SW	Mid-West	S. East	Mid-Atlantic	S. Central
% Septox	0.155	0.213	0.248	0.228	0.116
% Airsac	0.068	0.092	0.206	0.179	0.122
% I.P.	0.098	0.010	0.032	0.019	0.050
% Leukosis	0.001	0.000	0.002	0.020	0.000
% Bruise	0.006	0.001	0.002	0.004	0.003
% Other	0.011	0.003	0.017	0.014	0.014
% Total	0.339	0.319	0.508	0.463	0.305
% 1/2 parts condemnations	0.485	0.631	0.522	0.449	0.282

Data for week ending March 27, 2004

Broiler Performance Data (Company) Live Production Cost

	Average Co.
Feed cost/ton w/o color ($)	179.97
Feed cost/lb meat (¢)	16.84
Days to 4.6 lbs	42
Chick cost/lb (¢)	4.10
Vac-Med cost/lb (¢)	0.07
WB & 1/2 parts condemn. cost/lb	0.22
% mortality	5.35
Sq. Ft. @ placement	0.79
Lbs./Sq. Ft.	7.06
Down time (days)	13

Data for week ending March 27, 2004

Feed Withdrawal (ctd.)
Northcutt states,
"When the length of feed withdrawal is too long (greater than 13 or 14 hours), a number of problems may occur that increase the likelihood of carcass contamination. . . Weaker intestines have a higher incidence of intestinal tearing during evisceration. . . Intestinal strength of broilers has been found to be approximately 10% lower when broilers were without feed for 14 or more hours before processing as compared to full-fed broilers" (Northcutt, 2001; Biligili, 1997; Buhr, 1998; Northcutt, Savage, 1887)
Diseases causing fever, morbidity and ambulatory problems result in prolonged periods of pathology-induced inappetance (FW). (6)

Feed Withdrawal (ctd.)
— Campylobacter positive crops increased from 25% before FW to 64.4% after FW. (Byrd, 1998)
— Campylobacter positive carcasses increased five-fold in broilers on 16-18 hours FW in coops vs. on litter with full-feed. (Stern, 1995)
— Humphry (1993) and Hinton (1998) found elevated Salmonella levels in broiler crops during FW. (microflora shift, higher PH?)
— Salmonella positive crops increased from 1.9% to 10% following FW. (Corrier, 1999) (7)

Feed Withdrawal (Molting process)
— Feed restriction during molt in commercial laters amplifies Salmonella enteriditis (S.E.) infection and horizontal transmission. (Holt, 1995)
— Molting speeds the onset and increases the defree of intestinal inflammation from S.E. infection. (Macri, 1997) (8)

itive carcasses of cooped broilers off-feed for 16-18 hours, versus broilers on litter with full feed (5). Humphrey et al.(6) and Hinton et al. (7) found elevated Salmonella levels in broiler crops during feed withdrawal, perhaps due to the higher crop pH in feed-withdrawn birds causing a microflora shift. In commercial layers, the molting process involves dramatic reductions in feed consumption, and results in amplification of Salmonella enteriditis (SE) infections and horizontal transmission (10, 11) and increases the onset and degree of intestinal inflammation from SE infection (12). Coccidiosis (Eimeria tenella challenge) in chickens also infected with SE resulted in higher cecal SE populations (13), recrudescence of previous SE infections (14) and increased invasiveness of Salmonella typhimurium (ST) into the cecal wall (15). Coccidiosis control should be considered a pre-harvest critical control point.

Bilgili states that, "Preventing fecal contamination of the carcasses from spillage of digestive tract contents or smearing of fecal material on edible meat surfaces is the single most important aspect of sanitary slaughter and dressing regulations" (16). In Generic HACCP Application in Broiler Slaughter and Processing (National Advisory Committee on Microbiological Criteria for Foods), McNamara states, "Evisceration can be a major source of additional fecal contamination, particularly if the intestines are cut. This would be expected to increase contamination by mesophilic bacteria, including intestinal pathogens (i.e., Salmonella, Campylobacter, and C. perfringens). Cut intestines can lead to contamination of equipment, workers, and inspectors and can be a major source of cross-contamination" (17). A variety of disease conditions produce non-uniform broiler flocks (size and weight). These birds present poorly to mechanized plant equipment that is set for the "average" bird, and as the distribution curve for uniformity flattens, the equipment cuts and tears more intestinal tracts. To test this observation, Russell conducted a replicated processing plant study, The Effect of Airsacculitis on Bird
Weights, Uniformity, Fecal Contamination, Processing Errors, and Populations of Campylobacter and Escherichia coli (18).

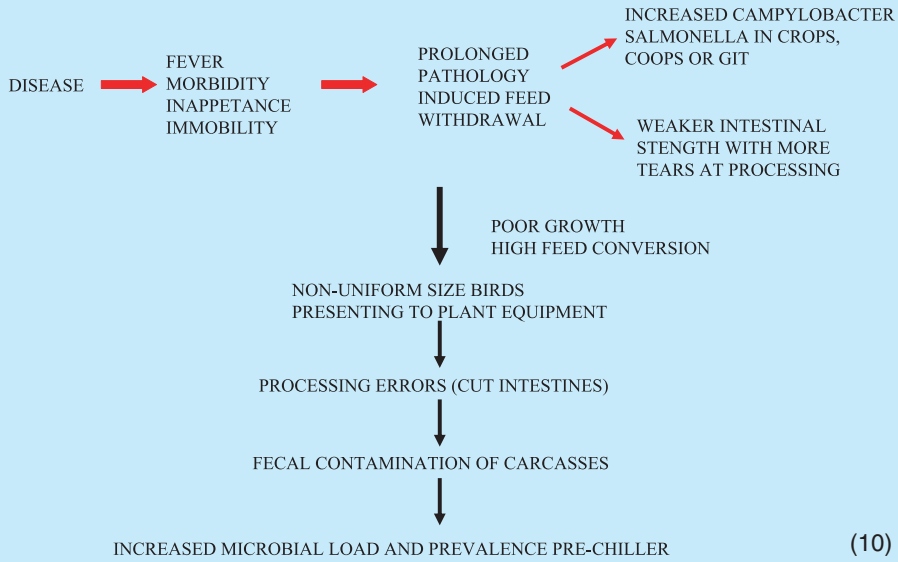
Russell summarizes his findings: "The net loss (airsac positive carcass weights) averaged over five repetitions was 84 g/carcass, equating to a loss of 14,686.9 k (32,379 lb) of chicken meat for one growout house per year as the result of AS (airsac)

Coccidiosis
— Coccidiosis (Eimeria tenella challenge) in chickens also infected with S.E. resulted in higher cecal S.E. populations and recrudescence of previous S.E. infections (Qin, 1995), and increased invasiveness of Salmonella typhimurium (S.T.) into the cecal wall. (Fukata, 1987) (9)

Uniformity and Fecal Contamination
Processing plant equipment (venters, eviscerating spoons) are calibrated to address the "average bird." When bird size varies dramitically as presentation to these mechanical devices occurs, "processing errors" result, i.e., intestinal tracts are cut or torn, exposing the carcass to intestinal contents. (Northcutt, 2001; Russell, 2003)
"Preventing fecal contamination of the carcasses from spillage of digestive tract contents or smearing of fecal material on edible meat surfaces is the single most important aspect of sanitary slaughter and dressing regulations." (Bilgili, 2001) (12)

Fecal Contamination
In Generic HACCP Application in Broiler Slaughter and Processing, FSIS, 1997, McNamara states,
"Evisceration can be a major source of additional fecal contamination, particularly if the intestines are cut. This would be expected to increase contamination by mesophilic bacteria, including intestinal pathogens. . ."
(see also, Berrang, M.E., et al., Effect of intestinal concect contamination on broier carcass Campylobacter counts, J. Food Protection, vol. 67, no. 2, pp. 235-238, Feb., 2004 - "These data indicate that even small (5 mg) amounts of fecal contents can cause a significant increase in the numbers of Campylobacter on eviscerated broiler carcasses.") (13)

Disease and Flock Uniformity at Processing



(10)

Airsacculitis - Making the Connections:
Russell, S.M., The effect of airsaacculitis on bird weights, uniformity, fecal contamination, processing errors and populations of Campylobacter spp. and Escherichia coli. Poult. Sci., 82:8 pp/ 1326-1331. 2003.

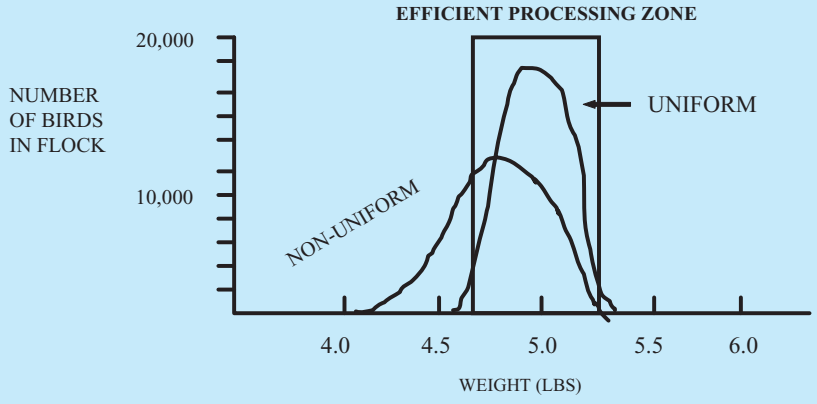
— 5 airsac negative (ASN) flocks (REPs) compared to 5 airsac positive (ASP) flocks (REPs) in the plant.
— 100 bird per REP, randomized samples, post-inspection, pre-chiller (1000 carcasses total), statistics applied.
— Individual bird weights, visual fecal contamination scoring, processing errors (cut or torn viscera), whole-bird rinses, blind-coded bacteriology. (14)

*Airsacculitis - Replicated Plant Study - Results:**
*— 84 g. average weight loss, for ASP, post-inspection**
— Sig. more fecal contamination ASP in 4/5 REPs
— Sig. more cut/torn intestines ASP in 5/5 REPs (49% vs. 17%)
— Sig. higher Campylobacter counts ASP in 3/5 REPs
— Sig. higher Campylobacter counts ASN in 1/5 REPs
— In three repetitions, when AS was absent, Campylobacter counts were absent or extremely low. (<0.05 log_{10} cfu/mL).
— In all repetitions, for ASP flocks, Campylobacter was present at levers greater than 1.4 log_{10} cfu/mL).

**All sampling occured post inspection and salvage, i.e., on carcasses that had passed inspection.* (15)

Uniformity (cont d).

Variation in bird size (uniformity) within a flock or over time can affect the efficiency of processing plant equipment, specifically at the vent opener during visceration. (Northcutt, 2001).



(11)

Russell's conclusion:
"Because flocks of chickens showing signs of AS have lower weights, more fecal contamination, more processing errors, and higher levels of Campylobacter, it is essential to ensure that AS in the broilerindustry be controlled to prevent subsequent food-borne bacterial infection." (16)

Airsacculitis - Additional Plant Studies - Russell
— 96% ASP carcasses removed by FSIS had questionable or unacceptable E. coli counts pre-salvage versus 42% for inspector passed, pre-chill carcasses. (1997)
— Another study in a different plant: pre-chill E. coli counts on ASP carcasses were 3.93 log_{10} cfu/mL vs. ASN carcasses at 2.63 log_{10} cfu/mL. Salmonella prevalence on ASP carcasses was 70% vs. ASN at 40%. (2002, unpublished.) (17)

Airsacculitis - Additional Plant Studies - Russell (ctd)
— Retrospective plant study (2003), 2 years of FSIS plant data on 32 million broilers processed over 2 years, ASN vs. ASP, statistical analysis correlated the following:
1) AS to lower carcass weights
2) AS to fecal contamination
3) AS to Salmonella prevalence
4) Total condemnation to fecal contamination
5) Infectious Process (I.P., cellulitis) to fecal contamination
6) AS to I.P. (18)

infection. ASP (airsac positive) carcasses had higher (p< or = 0.05) fecal contamination in four of five repetitions. The number of total digestive tract cuts or tears were much higher on ASP carcasses at 42, 49, 37, 60, and 59% as compared to 14, 12, 17, 24, and 16% for ASN (airsac negative) carcasses in repetitions 1 to 5, respectively. In three of the five replications, the presence of AS in the flocks increased (P< or = 0.05) the number of Campylobacter recovered from broiler carcasses. Hence, there appears to be a relationship between the presence of AS and Campylobacter-positive carcasses…. Because flocks of chickens showing signs of AS have lower weights, more fecal contamination, more processing errors, and higher levels of Campylobacter spp., broiler companies should emphasize control of AS in the flocks as a means of preventing subsequent
food-borne bacterial infection" (18). Pilot studies conducted by Russell in two integrated broiler companies in 1997 demonstrated that on carcasses removed by FSIS inspectors for airsacculitis, a total of 96% had questionable or unacceptable E. coli counts pre-salvage, versus 42% for inspector-passed, pre-chill carcasses, and that, "In a second study conducted by another integrator, pre-chill E. coli counts for carcasses with airsacculitis were significantly higher (P< or = 0.05) at 3.93 log 10 CFU/mL than airsacculitis negative carcasses at 2.63 log10 CFU/mL. Moreover, this company found that Salmonella prevalence for carcasses with airsacculitis was significantly higher (P< 0.05) at 70% than for carcasses without airsacculitis at 40% (unpublished data). These studies demonstrate a link between the presence of airsacculitis in the flock and increases in indicator and pathogenic bacterial populations"(19). In another processing plant study, Russell used FSIS condemnation records and whole-bird rinse Salmonella counts collected over 2 years on 32 million birds processed (19). He applied statistical analysis to
determine the statistical relatedness of six parameters: airsacculitis, infectious process (I.P.), total condemnation, Salmonella prevalence, carcass weight and fecal contamination. Russell concluded, "The analyses showed that as the percentage carcasses removed from the line by the U.S.D.A. inspectors increased, the percentage of carcasses with fecal contamination increased as well. Increasing levels of infectious process also resulted in a significant increase in fecal contamination. The data revealed that when a high number of carcasses are condemned, an increased fecal contamination occurred. A significant finding was that, as the number of carcasses removed from the line for active airsacculitis increased, the prevalence of Salmonella on processed carcasses increased as well. The statistician concluded that 'with samples of the size used in this investigation, these differences are quite significant; there is very convincing evidence that airsacculitis increase is associated with increasing probability of Salmonella (contamination)'…. From the above studies, it becomes apparent that the reduction of airsacculitis in broiler flocks entering the processing plant is a food safety concern" (19).

Conclusion

As Hargis summarizes, "Research has clearly demonstrated that the reduction of microbial contamination of processed poultry requires the identification of both pre- and postharvest critical control points where contamination may occur, and the implementation of integrated control programs" (20). Known factors affecting carcass microbial contamination or food pathogen prevalence are airsacculitis, infectious process (IP), coccidiosis, total condemnation, flock uniformity, cut intestinal tracts, fecal contamination, extended feed withdrawal and the molting process. Disease prevention and treatment are therefore essential to meeting Food Safety goals, as are the use of current and future vaccines and drugs.

Review:
1) Feed withdrawal (FW)
2) Molting
3) Coccidiosis
4) Flock Uniformity
5) Cut intestinal tracts (processing errors)
6) Fecal Contamination
7) airsacculitis
8) Cellulitis (Infectious Process, I.P.)
9) Total Condemnation

(19)

Conclusions

1) Research to date demonstrates the impact flock health status can have on processing parameters and Food Safety.

2) While HACCP-based actions are taken on a daily basis in processing plants to ensure the microbiological safety of poultry products, this alone cannot always optimize product quality.

3) Use of the best possible management practices, disease preventions, and disease therapies are Critical Control Points in pre-harvest food safety HACCP. This requires the continued availability of the most effective biologics and pharmaceuticals.

(20)

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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.
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% Airsac	0.127
% I.P.	0.051
% Leukosis	0.003
% Bruise	0.004
% Other	0.013
% Total	0.383
% 1/2 parts condemnations	0.449

Data for week ending March 27, 2004

The Ontario Association of Poultry Practitioners is hosting a technical symposium for poultry veterinarians on May 13th - 15th, 2004 to be held at the Ontario Veterinary College, University of Guelph, Guelph, Ontario. Previous OAPP technical meetings have been very successful and afforded attendees excellent opportunities for learning more about important disease and industry issues. The symposium will feature several internationally recognized speakers. The first day and a half of this workshop will offer an excellent opportunity for general pathology review for poultry veterinarians as well as for candidates preparing for the American College of Poultry Veterinarians board exam. The last day will focus on major causes of immunosuppression and respiratory disease encountered in the field using a case study approach.

This meeting qualifies for a maximum of 6 Continuing Education credits by the American College of Poultry Veterinarians.

Please contact Hill Taglietti, Elanco Animal Health at 800-265-5475 or 519-821-0277 or by email at jill_taglietti@elanco.com for registration information.

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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"

Broiler Eggs Set In 19 Selected States Up Slightly

According to the latest National Agricultural Statistics Service (NASS) reports, commercial hatcheries in the 19-State weekly program set 211 million eggs in incubators during the week ending April 3, 2004. This was up slightly 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 Up 3 Percent

Broiler growers in the 19-State weekly program placed 172 million chicks for meat production during the week ending March 27, 2004. Placements were up 3 percent from the comparable week a year earlier. Cumulative placements from December 28, 2003 through April 3, 2004 were 2.36 billion, up 2 percent from the same period a year earlier.

February Egg Production Up 3 Percent

U.S. egg production totaled 6.89 billion during February 2004, up 3 percent from last year. Production included 5.89 billion table eggs, and 1.00 billion hatching eggs, of which 948 million were broiler-type and 54.0 million were egg-type. The total number of layers during February 2004 averaged 339 million, down slightly from a year earlier. February egg production per 100 layers was 2,033 eggs, up 4 percent from February 2003.

All layers in the U.S. on March 1, 2004, totaled 340 million, down slightly from a year ago. The 340 million layers consisted of 281 million layers producing table or commercial type eggs, 56.8 million layers producing broiler-type hatching eggs, and 2.44 million layers producing egg-type hatching eggs. Rate of lay per day on March 1, 2004, averaged 70.5 eggs per 100 layers, up 1 percent from a year ago.

Laying flocks in the 30 major egg producing States produced 6.44 billion eggs during February 2004, up 3 percent from a year ago. The average number of layers during February, at 316 million, was down 1 percent from a year ago.

Individual State estimates are available for the 30 major egg producing States. These States are listed on page 8 of this release and account for approximately 94 percent of the total U.S. egg production. Production for the other States are grouped into an "Other States" category and combined with the 30 States published individually to obtain a U.S. estimate.

Special Note

Preliminary 2002 Census data were used in the review process for the revised 2002 and 2003 layer and egg estimates in this publication. The revised estimates may appear disjointed from historical data until the release of the 5 - year Final Estimates publications which are scheduled for April 29, 2004.

Egg-Type Chicks Hatched Up 7 Percent

Egg-type chicks hatched during February totaled 32.1 million, up 7 percent from February 2003. Eggs in incubators totaled 34.3 million on March 1, 2004, up 12 percent from a year ago.

Domestic placements of egg-type pullet chicks for future hatchery supply flocks by leading breeders totaled 285,000 during February 2004, up 29 percent from February 2003.

Broiler Hatch Up 5 Percent

The February 2004 hatch of broiler-type chicks, at 728 million, was up 5 percent from February of the previous year. There were 648 million eggs in incubators on March 1, 2004, up 3 percent from a year earlier.

Leading breeders placed 7.3 million broiler-type pullet chicks for future domestic hatchery supply flocks during February 2004, up 10 percent from February 2003.

Turkey Eggs in Incubators on March 1 Down 7 Percent

Turkey eggs in incubators on March 1, 2004, in the United States totaled 28.9 million, down 7 percent from March 1 a year ago. Eggs in incubators were 1 percent above the February 2004 total of 28.8 million. Regional changes from the previous year were: East North Central, down 5 percent; West North Central, down 7 percent; North and South Atlantic, down 5 percent; South Central, down 18 percent; and West, down 11 percent.

Poults Placed During February Down 4 Percent From Last Year

The 22.9 million poults placed during February 2004 in the United States were down 4 percent from the number placed during the same month a year ago. Placements were down 2 percent from the January 2004 total of 23.3 million. Regional changes from the previous year were: East North Central, down 12 percent; West North Central, down 1 percent; North and South Atlantic, down 3 percent; South Central, down 13 percent; and West, up 6 percent.

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USDA Reports continued from page 8

Avian Influenza Outbreaks Cloud Trade Outlook

The U.S. poultry industry continues to be rocked by outbreaks of Avian Influenza (AI) in various States. There have been outbreaks in Delaware, New Jersey, Pennsylvania, Texas, and most recently in Maryland. The outbreak in Maryland was at a commercial broiler operation and located where there are a large number of other operations within a relatively short distance. The current assumption is that the countries currently banning all U.S. poultry shipments will, over time, eventually target specific States, provided there are no further outbreaks of AI. The timetable for this regionalization process will vary from country to country. Mexico recently announced that some exports from the United States can resume. There are restrictions on what products specified States can export to Mexico and on the storage of poultry products in Texas before entering Mexico. Due to the number of bans or restrictions placed on the export of broiler products, the forecast for broiler exports was lowered to 4.96 billion pounds from the previous forecast of 5.28 billion pounds.

Broiler Production Rises in January, Production Expected Higher in 2003

Broiler production for January 2004 was reported at 2.84 billion pounds, up 2.3 percent from the previous year. Weekly chick placements are continuing to average about 1.5 percent higher than the previous year, and the forecast for broiler production in the first quarter of 2004 is now almost 8.1 billion pounds, 3.6 percent higher than a year ago. Along with the increase in the number of chicks being placed for growout, the average weight of birds at slaughter has been running over 2 percent higher than the previous year. The overall broiler production estimate for 2004 is now 33.93 billion pounds, up 3.6 percent from 2003.

Revisions in broiler production contained in the Poultry Slaughter-Annual Summary for 2003 increased total broiler production for 2003, to 32.75 billion pounds, up 1.6 percent from 2002. The increase is due to an increase in the average weight at slaughter, as total broiler slaughter declined slightly.

A strong domestic economy and relatively small growth in broiler production has pushed prices for broiler products well above year-earlier levels. Over the first 2 months of 2004, the 12-city whole broiler price has averaged 71.8 cents a pound, 19 percent higher than during the same time in 2003. Prices have also risen for other broiler products. Prices for boneless-skinless breast meat in the Northeast market averaged $1.69 per pound during January and February, 24 percent higher than the previous year. Prices for rib-on breasts averaged 96.4 cents per pound, up 15 percent from the same time in 2003. Prices of these products, which are mostly sold on the domestic market, have risen due to the combination of a strengthening economy, strong prices for other protein products, the effects of consumer reaction to the BSE situation, and high-protein diets increasing broiler demand. Prices for other broiler products, more dependent on the exports market, have also moved significantly higher. Leg quarter prices in January and February averaged 34.6 cents per pound, up 73 percent from the same period in 2003. The same pattern can be seen for wings, up 72 percent and thighs, up 32 percent. Even with a forecast of higher production in 2004, domestic broiler prices are expected to remain strong. How strong will depend on both the domestic economy and how quickly other countries relax bans and restrictions on imports of U.S. poultry products.

Turkey Production Seen Down in 2004

Turkey production in 2004 is forecast at 5.63 billion pounds, down about 25 million pounds from the previous year. Over the last 13 months, the number of poults being placed for growout has only been above its year-earlier level once. While prices for turkey products have begun to strengthen, they have not shown the price strength that broiler products have.

The lower poult placements are expected to result in lower turkey production over the first half of 2004. Turkey stocks at the end of January were down 9 percent from the previous year, a wide departure from the beginning of 2003 when they were up over 30 percent. Smaller stocks of both whole birds and parts, along with lower production is expected to gradually strengthen prices over 2004. The outlook for turkey production and prices has been helped by Mexico's announcement that poultry exports from the United States can resume, under certain restrictions. While no turkey production operations have tested positive for AI they have been under the same trade bans as broilers. Also, Mexico accounts for about 50 percent of all U.S. turkey exports.

Revisions in turkey production slightly raised 2003 production to 5.65 billion pounds, still down 1 percent from 2002. The decrease in turkey production was the result of a lower number of birds being slaughtered, as the average weight was unrevised.

Meetings, Seminars and Conventions

2004 May

May 11-13: ***Victam Europe 2004,*** Jaarbeurs Trade Halls, The Netherlands. Contact: Victam International, P.O. Box 197, 3860 AD Nijkerk, The Netherlands. Phone: +31 33 246 4404; Fax: +31 33 246 4706; Email: expo@victam.com

May 12-13: ***British Pig and Poultry Fair,*** Stoneligh Park, Warwickshire, England. Contact them at: Phone: 00 (0) 2476 69 00 or email: info@rase.org.uk

May 13-15: ***Technical Symposium for Poultry Veterinarians,*** Ontario Veterinary College, Quelph, Ontario, Canada. Contact: Jill Taglietti, Elanco Animal Health, Phone: 800-265-5475 or 519-821-0277; Email: jill_taglietti@elanco.com

May 14-15: ***Ontario Association of Poultry Practitioners (OAPP) Technical Symposium,*** Guelph, Ontario, Canada. Contact: Jill Taglietti, Elanco Animal Health, Phone (800) 265-5475: (519) 821-0277: email: jill_talgetti@elanco.com

May 7-22: ***3rd Annual Multi-State Poultry Health Management Schools,*** Madison, WI. Broiler management school on May 17-18th: Turkey on May 19-20th: and Laying Hen on May 21-22nd. Ohio State University, Purdue University, Michigan State University and University of Wisconson. Contact Dr. Teresa Morishita, ph: 614-292-9453 or email: morishita.1@osu.edu

May 22: ***Georgia Poultry of Knights,*** Cobb Galleria Centre, Atlanta, GA. Contact: Georgia Poultry Federation, P.O. Box 763, Gainesville, GA 30503; Phone: 770-532-0473; Fax: 770-532-7543; Email: beverly@gapf.org

May 25-27: ***Multi-State Poultry Feeding and Nutrition and Health Management Conference and Degussa Technical Symposium,*** Indianapolis Marriott East, Indianapolis, IN. Sponsored by Michigan State University, The Ohio State University, Purdue University, University of Illinois at Urbana-Champaign, University of Kentucky and Roche Vitamins Inc. Contact Tom Robertson, Division of Conferences, Purdue University, 1586 Stewart Center, Room 116, West Lafayette, IN 47907-1586. Ph: 765-494-7220 or 800-359-2968 ext. 92R or fax: 765-494-0567

May 25-27: ***VIV Russia 2004,*** Moscow, Russia. Jaarbeurs Exhibitions & Media, P.O. Box 8800, NL-3503 RV Utrecht, The Netherlands. Fax: +31 (0) 30 295 28 09 or email: viv.russia@jem.nl

May 26-28: ***AveSui 2004,*** Centrosulli Convention Center, Florianopolis, SC, Brazil. Contact: Gessulli Agribusiness. Phone: +55 15 262 3133; Fax: +55 15 262 3919 or email: glaucioamaral@gessulli,com.br

2004 June

June 1-4: ***Poultry Industry 2004 International Forum,*** Crocus Expo Exhibition Center, Moscow, Russia. Contact: Karapetyan Nune, Asti Group Exhibition Company. Phone: +7 095 797 6914; Fax: +7 095 797 6915; Email: nune@meatindustry.ru; Website: www.chickenking.ru

June 8-12: ***XXII World's Poultry Congress,*** WPSA Turkish Branch, Istanbul, Turkey. Contact: congress Organiser: ITU Joint Venture, Cumhuriyet Cad. 18/5, 80230 Elmadag, Istanbul, Turkey. Phone: +90 212 231 3021; Fax: +90 212 232 1522; Email: wpsa2004@wpsa2004.org

June 9-11: ***76th Annual Northeastern Conference on Avian Diseases (NECAD),*** **Ramada Inn,** State College, PA. Contact: P.A. Dunn, Penn State University, Orchard Road, University Park, PA 16802-1110. Phone: 814-863-1983; Fax: 814-865-3907.

June 10-13: ***VIV Poultry Istanbul,*** Istanbul,Turkey. World Trade Center Yesilkoy. Contact: HKF / Jaarbeurs Exhibitions & Media. Barbaros Bulvari 135/2, Dikilitas ? Besiktas 80700 Istanbul, Turkey. Phone: +90 212 216 4010; Fax: +90 212 216 3360; Email: hkf@hkf-fairs.com

June 16-18: ***5th International Poultry & Pig Show (IPPS),*** Port Messe (Nagoya International Exhibition Hall), Nagoya, Japan. Contact: Kokusai Yokei, International Poultry/Pig Show Japan 2004, 2-6-16 Shinkawa, Chuo-ku, Tokyo 104-0033, Japan. Phone: +81 3 3297 5515; Fax: +81 3 3297 5519

June 16-19: ***5th International Symposium on Turkey Diseases,*** Berlin, Germany. Contact: Prof. Dr. H.M. Hafez, Institute of Poultry Diseases, Free University Berlin, Koserstrasse 21, 14195 Berlin, Germany. Phone: 49-30-8385-3862; Fax: 49-30-8385-5824; Email: hafez@zedat.fu-berlin.de

June 23-25: ***Georgia Egg Association's 43rd Annual Meeting,*** St. Simons Island, GA. Contact: Robert Howell, Executive Director, Georgia Egg Association, 16 Forest Parkway, Forest Park, GA 30297. Phone: 404-363-7661; Fax: 404-363-7664; Email: goodeggs@bellsouth.net

2004 July

July 11-14: ***7th International Mareks Disease Symposium,*** Oxford, UK. Contact: Dr. M. Carr, Institute of Animal Health, Compton Laboratory, Newbury RG20 7NN, UK. Phone: +44 1635 577227; Email: margaret.carr@bbsrc.ac.uk

July 24-28: ***AVMA/AAAP Meeting,*** Philadelphia, PA. Contact: http://www.avma.org or http://www.aaap.info; Email: aaap@uga.edu

2004 August

August 25-27: ***XVII Central American Poultry Congress,*** San Pedro Sula, Honduras. See www.anavih.org for details. Contact: Email: anavih@honduras.quik.com

August 31-September 2: ***agriChina,*** Shanghai New International Expo Centre, (SNIEC), Shanghai, P.R. China. Contact: K-M Luth, DLG-Agriservice GmbH, Eschborner-Landstrasse 122, 60489 Frankfurt-am-Main, Germany. Ph: +49 69 24788 257: fax: +49 69 24788 113; www.agritechnica.de

2004 September

September 8: ***Delmarva Breeder, hatchery and Grow-out Conference,*** Delmarva convention Center, Delmar, Maryland. This is a University of Delaware meeting and not a DPI meeting. Contact: Bud Malone, University of Delaware. Ph: 302-856-7303 or email: malone@udel.edu

September 28-29: ***Georgia Poultry Conference,*** Classic Center, Athens, GA. Contact: Georgia Poultry Federation, P.O. Box 763, Gainesville, GA 30503; Phone: 770-532-0473; or Extension Poultry Science, university of Georgia, Athens, GA 30602; Phone: 706- 542-1325.

September 27-October 1: ***International Short Course in Modern Poultry Production,*** University of Arkansas. Contact: Frank Jones; Phone: 479-575-5443 or email: ftjones@uark.edu

September 30-October 3: ***43rd Fieravicola,*** Forle, Italy. Contact: Fiera di Forle. Tel: +39 0543 793511; Fax: +39 0543 724488; email: info@fieravicola.com; Web site: www.fieravicola.com

2004 October

October 6-8: ***National Meeting on Poultry Health & Processing,*** Clarion Resort Fontainebleau Hotel, Ocean City, Maryland. Contact: Karen Adams, Ph: 302-856-9037 or email: adams@dpi

2004 November

November 9-12: ***EuroTier 2004,*** 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

Meetings, Seminars and Conventions

November 23-26: ***EXPOAVIGA International poultry & livestock technology exhibition,*** Montjude Exhibition Center, Barcelona, Spain. Contact: Expoaviga. Fax: +34 93 2332355; email: expoaviga@firabcn.es
Web site: www.expoaviga.com

2005 January

January 26-28: ***2005 International Poultry Exposition,*** Georgia World Congress Center, Atlanta, GA. Contact: US Poultry & Egg Assn., 1530 Cooledge Rd., Tucker, GA 30084; Phone: 770-493-9401; Fax: 770-493-9257, www.poultryegg.org

2005 March

March 9-10: ***Nebraska Poultry Industries Annual Convention,*** New World Inn & Conference Center, Columbus, Nebraska. Contact: Nebraska Poultry Industries, Inc., University of Nebraska, A103 Animal Sciences, P.O. Box 830908, Lincoln, NE 68583-0908. Phone: 402-472-2051

2005 June

June 22-24: ***Georgia Egg Association's 44th Annual Meeting,*** St. Simons Island, GA. Contact: Robert Howell, Executive Director, Georgia Egg Association, 16 Forrest Parkway, Forest Park, GA 30297. Phone: 404-363-7661; Fax: 404-363-7664; Email: goodeggs@bellsouth.net

2005 August

August 22-26: ***14th World Veterinary Poultry Congress & Exhibition,*** Istanbul, Turkey. Contact: Congress organiser: IT Consortium, Mete Cad. 16/11, 34437 Taksim, Istanbul, Turley. Phone: +90 212 244 71 71; Fax: +90 212 244 71 81; Email: info@wvpc2005.org. Website: www.wvpc2005.org

2008 August

August 10-15: ***XXIII World's Poultry Congress,*** Convention and Exhibition Centre, Brisbane, Australia.

Broiler Performance Data (Region) Live Production Cost					
	SW	Midwest	Southeast	Mid-Atlantic	S-Central
Feed cost/ton w/o color ($)	171.00	156.19	174.29	173.15	173.36
Feed cost/lb meat (¢)	15.85	14.28	16.26	17.09	16.27
Days to 4.6 lbs	44	42	42	44	43
Chick cost/lb (¢)	4.24	3.96	4.15	3.68	3.94
Vac-Med cost/lb (¢)	0.07	0.03	0.07	0.05	0.04
WB & 1/2 parts condemn. cost/lb	0.30	0.25	0.21	0.24	0.22
% mortality	6.03	4.89	4.85	5.86	4.63
Sq. Ft. @ placement	0.75	0.75	0.79	0.79	0.81
Lbs./Sq. Ft.	7.08	7.16	6.93	7.44	6.93
Down time (days)	15	14	14	13	15

Data for week ending February 21, 2004

Broiler Performance Data (Company)
Live Production Cost

	Average Co.	Top 25%
Feed cost/ton w/o color ($)	170.68	140.71
Feed cost/lb meat (¢)	15.94	13.07
Days to 4.6 lbs	43	40
Chick cost/lb (¢)	4.26	4.52
Vac-Med cost/lb (¢)	0.05	0.03
WB & 1/2 parts condemn. cost/lb	0.24	0.16
% mortality	5.22	3.46
Sq. Ft. @ placement	0.78	0.77
Lbs./Sq. Ft.	6.94	7.86
Down time (days)	14	13

Data for week ending February 21, 2004

Broiler Whole Bird Condemnation (Region)

	SW	Mid-West	S. East	Mid-Atlantic	S. Central
% Septox	0.369	0.370	0.195	0.288	0.195
% Airsac	0.175	0.139	0.083	0.158	0.067
% I.P.	0.048	0.039	0.175	0.089	0.091
% Leukosis	0.002	0.002	0.001	0.006	0.003
% Bruise	0.009	0.003	0.007	0.007	0.007
% Other	0.024	0.005	0.039	0.012	0.008
% Total	0.627	0.567	0.499	0.559	0.371
% 1/2 parts condemnations	0.505	0.472	0.295	0.303	0.484

Data for week ending February 21, 2004

Broiler Whole Bird Condemnation (Company)

	Average Co.	Top 25%
% Septox	0.272	0.296
% Airsac	0.121	0.061
% I.P.	0.083	0.029
% Leukosis	0.003	0.003
% Bruise	0.008	0.004
% Other	0.018	0.007
% Total	0.505	0.400
% 1/2 parts condemnations	0.396	0.388

Data for week ending February 21, 2004