

Turkey Industry Annual Report - Current Health and Industry Issues Facing the US Turkey Industry

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In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry & Other Avian Species, the subcommittee chairman, Dr. Clark, surveyed turkey industry professionals and veterinarians representing a majority (n=28) of the US turkey production regarding the health status of turkeys produced in August 2013 through August 2014. The turkey industry reports several disease challenges for this 12 months varying by geographic regions within a state and across the United States. This report will list, Table 1, the challenges by disease and issues. Of particular interest in 2014 are issues with lack of efficacious drugs, clostridial dermatitis, bordetellosis, blackhead, reovirus digital flexor tendon rupture (TR-DFTR) and colibacillosis.

The “**lack of approved efficacious drugs**” continues to be the top health issue (Table 1). The withdrawal of the NADA (New Animal Drug Application) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to **colibacillosis** (ranked #3, unchanged since 2009), or **fowl cholera** (ranked #12 from #17). In July 2011 the sale of roxarsone was suspended; September 30, 2013, the FDA marketing authorization NADA was withdrawn. The controversy over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture.

Clostridial Dermatitis (CD), previously referred to as **Cellulitis**, remains a major disease issue across all geographic regions; as the survey average decreased slightly to a score of 3.5 (from 3.6 in prior year) and ranked #2 (no change), from 3.8 (#2), 3.9 (#2), 4.0 (#2), 3.8 (#2) and 3.3 (#3) in 2012, 2011, 2010, 2009 and 2008, respectively. Analysis indicates range of concern; 50% of respondents score CD a 4 or 5 (severe), 32% score it a 2 or 1 (mild); it was 62%, 76% and 27%, 20%, respectively for the prior two years (2013, 2012). CD is most commonly seen in, but not limited to, commercial male turkeys nearing market age. *Clostridium septicum*, *C. perfringens* type A, or *C. sordelli* is isolated from fluid or affected tissue samples of affected or dead birds. Affected turkeys present with two or more of the following clinical signs: subcutaneous emphysema (crepitus); serous or serosanguineous subcutaneous fluid; vesicles on the skin, especially on the breast/inguinal area; moist, dark, wrinkled skin, especially breast/inguinal area; cellular necrosis (microscopic); organ involvement (spleen/liver); vesicles on the skin, and/or moist, dark, wrinkled skin, on the tail area. The affected flock will have mortality greater than or equal to 0.5 dead per 1,000-birds, fitting the individual bird definition, for two consecutive 24-hour periods. Opinions vary as to risk factors and potential causes of the problem. Some of the key areas to control of CD include: early recognition; removal of mortality 2-3 times per day; medicating affected flocks with appropriate

antimicrobials; promptly managing all water spills and wet litter. There has been limited success with vaccinating at-risk flocks with autogenous bacterins and toxoids. Recently, a novel litter amendment has shown some success.

Poult enteritis of unknown etiologies has decreased in importance, to position #10 from #7, with a score of 2.4 (from 2.8). **Turkey Coronavirus (TCV)**, as a defined cause of enteritis, was ranked #27 (Table 1), unchanged from #27, with reported cases (Table 2); we began reporting in 2008 with 10 cases (2013, 420). Majority of TCV cases were limited to one geographic area. We conducted an Enteric Health supplemental survey in April 2012; the survey was not conducted this year.

Protozoal Enteritis, attributed to flagellated protozoa, *Cochlosoma*, *Tetratrichomonas* and *Hexamita*, ranked #23 (score 1.8). Several types of protozoa are associated with enteric disease of turkeys. Protozoal enteritis can present with general signs, including dehydration, loss of appetite (off-feed), loose droppings (diarrhea) and watery intestinal contents. Flagellated protozoa include *Cochlosoma*, *Tetratrichomonas* and *Hexamita*. *Eimeria* and *Cryptosporidia* are non-flagellated protozoa. *Cochlosoma* and *Hexamita* are associated with enteritis, primarily in young turkeys, especially in the summer months. There are field reports of co-infections with *Cochlosoma* and *Tetratrichomonas*, or *Cochlosoma* and *Hexamita*, or flagellated protozoa and *Eimeria*.

Single age brooding has been implemented during the last several years to assist in managing diseases on turkey farms, especially enteric diseases. Historically, production systems included 2 - 3 different ages on a single farm site reared in separate barns, from day-old to market age. The trend is to isolated, specialized brooding facilities. All production is separate hen and tom rearing. The brooding phase for commercial turkeys is rearing about 0 – 5 weeks of age, then the flock is moved to specialty finisher or grow-out barns. Single age brooding may be termed all-in/all-out or single-age or brooder hub. Single age brooding systems can operate in two ways. One option rears the turkeys to slaughter age at the same farm site, without other ages on the farm. Another system of single age brooding involves farm sites dedicated to brooding, then at 5 weeks of age birds are moved to a separate site for finishing; some systems may move birds 0.25 miles up to 20 miles away. In 2014, 55% of brooding was single age, compared to 44% in 2008. Single age brooding is more common in the Southeastern US than the Midwest states. Conversion to single age brooding started in late 1990 following the emergence of PEMS in North Carolina; advantages became obvious and it has expanded to other areas of the US.

Late mortality ranked fourth (#4) health issue and changed from #5 the prior year. Late Mortality may be defined as mortality, in excess of 1.5% per week, in toms (males) 17-weeks and older; mortality is not diagnosed to a specific disease or cause. Excess cumulative mortality of 5 – 10% in toms prior to slaughter has been reported. Late mortality may be associated with physiologic or biomechanical deficiencies following early rapid growth in heavy toms achieving genetic potential; aggressive behavior noted in mature toms; cannibalism; leg problems and/or hypertension.

Leg problems (#6, prior year was #4) are ranked among the top concerns of the turkey industry. Leg problems are a common complaint, such as, spiral fractures of the tibia or femur. Leg Problems may be defined as lameness, particularly in toms, several weeks prior to slaughter. Leg problems are attributed to various conditions (refer to Table 1), including, pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, “Shaky Leg”, etc.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR) was recognized as a newly emerging disease in 2011. A unique reovirus has been isolated and identified as the cause of tenosynovitis and digital flexor tendon rupture in commercial turkeys. Clinical signs in young flocks are reportedly mild to nonexistent, but can develop into lameness and/or abnormal gait in older flocks, starting at about 12 weeks of age. Affected flocks may also report an increased incidence of aortic ruptures and poor flock performance (weight gain, uniformity). Research is on-going into pathogenesis, virus characterization, diagnostics and epidemiology. Research indicates that the turkey arthritis reovirus is distinct from the recently identified novel reovirus causing arthritis in chickens, and most similar to the turkey enteric reovirus. TR-DFTR was added to the survey in 2011 and ranked #11 (Table 1) with 106 “confirmed” cases or flocks (Table 2). In 2014 TR-DFTR ranked #18 with 150 cases (2013, #26, 39; 2012, #28, 131). A

breeder company has implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Results show a significant reduction in associated clinical signs in those poult placed from vaccinated flocks. A commercial turkey lighting program of 4-8 hours of continuous dark in a 24-hour period has also been recommended. The combined efforts of breeder vaccination, commercial farm biosecurity and flock management appear to be controlling this disease. Increased recognition of TR-DFTR in 2014 is under investigation but it is suspected that the reovirus has mutated.

Blackhead, also known as Histomoniasis, increased to position #11 (#16 prior year). It is one disease with no efficacious drug approved for use in turkeys. There were 61 reported cases of blackhead (Table 2) an increase from 52 the prior year, and a record 108 in 2010. Losses to blackhead have been severe and sporadic cases are occurring in North America. The disease can be devastating in the individual flocks affected. Nitarsone is the only product approved by the FDA for the prevention of histomoniasis, Dimetridazole was extremely efficacious and previously approved for use in turkeys for the prevention and treatment of blackhead; it was banned in 1987. The lack of any legal treatment for histomoniasis is of concern, especially in the case of valuable turkey breeder candidate flocks. Losses to blackhead have been severe in several areas of Europe, and sporadic cases are occurring in North America.

Heat stress ranked #29 following another hot summer, compared to #12 the prior year. Poultry Enteritis Mortality Syndrome (**PEMS**) ranked #34 versus #31 previously, *Ornithobacterium rhinotracheale* (**ORT**) ranked #9 versus #13 previously, and Avian Metapneumovirus (**AmPV**) ranked #35 versus #35. In 2014, *Bordetella avium* became of significant respiratory disease challenge in several geographic regions; bordetellosis ranked #5 (2.9 score) in 2014 compared to #8 (2.5) the prior year.

Mycoplasma synoviae (**MS**, infectious synovitis) infections, ranked #25 (#24, prior year), are one cause of synovitis. It may be present in flocks 10-12 weeks of age with typically low mortality and low morbidity. There were 41 cases of MS reported (Table 2). The primary breeders have remained free of *M. gallisepticum* (**MG**), *M. meleagridis* (**MM**) and MS. Sporadic, but increasingly frequent infections with Mycoplasma, both MG and MS, often in association with backyard poultry and broiler breeder flocks is an ongoing concern, having the greatest impact when a breeder flock is infected and has to be destroyed. There were 17 cases of MG reported (Table 2).

Over the past 15 years the US animal agriculture industry has been continually challenged with numerous attempts to ban the use of antibiotics in livestock and poultry. The current attempt at the federal level is with the [113th Congress] **Preservation of Antibiotics for Medical Treatment Act** of 2013, introduced into both the House and Senate [H.R.1150; S.1256], otherwise known as PAMTA 2013. The Senate version is titled S. 1256 **Preventing Antibiotics Resistance Act** (PARA) and is “to amend the Federal Food, Drug, and Cosmetic Act to preserve the effectiveness of medically important antimicrobials used in the treatment of human and animal diseases.” The legislation would disallow use of medically important antimicrobials for nontherapeutic uses. The turkey industry opposes PAMTA, a bill that would devastate the ability to protect animal health by unnecessarily and inappropriately removing several classes of important antibiotics from the market. The turkey industry welcomes honest discussion of science-based, pragmatic options allowing producers to farm in the best interests of their animals and customers while providing consumers’ assurance our use of these vital, safe and effective production tools is professional, judicious and does not jeopardize these products’ effectiveness in human medicine.

In late 2013, Congress passed the **Animal Drug User Fee Act** (ADUFA) to renew user fees for animal drugs. The bill, S. 622, has now been signed into law by the President. ADUFA reauthorizes fees for brand-name and generic drugs for animals through 2018. Under the bill, brand-name animal drug manufacturers would pay \$23.6 million in fiscal 2014 and \$21.6 million each subsequent year through fiscal 2018. The generic animal drugs industry would pay \$7.3 million in fiscal 2014 and \$30 million over the next four years. Reauthorization was a top priority for the turkey industry.

Among the industry’s primary focuses in 2013 - 2014 continues to be the health of turkeys and ability to utilize approved drugs, especially in light of increased scrutiny from special interests regarding antibiotic resistance. The first related guidance was published in 2003, **Final Guidance #152**, “Evaluating the Safety

of Antimicrobial New Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern.” Since then there has been a great deal of discussion around antibiotic resistance leading to numerous efforts by the Food and Drug Administration's Center for Veterinary Medicine (FDA/CVM) beginning in 2012 with the **Guidance for Industry (GFI) #209** "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals." In 2013, FDA/CVM published the proposed rule for the **Veterinary Feed Directive** and **Guidance #213**, “New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209”. Guidance #213 provides recommendations for drug companies to voluntarily eliminate production drugs or transition from “production” (growth promotion and feed efficiency) claims to “therapeutic” claims, in order to conform to Guidance #209. All 26 animal drug manufacturers have agreed to comply. In conjunction with this guidance, the Veterinary Feed Directive (VFD), which is expected to be published as a final rule in 2015, will increase the veterinary oversight of the administration of drugs. Given FDA/CVM continues to work through the details of VFD, industry continues to play an active role in helping to shape how they ultimately look, both through comments and participation in FDA and APHIS’ public meetings.

Though antibiotic resistance has been a key focus throughout the Obama Administration, recently they have announced some several high level actions. The CDC recently released a report on antibiotic resistance calling for immediate action to address the issue due to its severity. Though there was discussion of human medicine, animal antibiotics received significant attention. Following on the heels of this report the **President’s Council of Advisors on Science and Technology (PCAST)** published a report on antibiotic use in human medicine and agriculture -- **Combating Antibiotic Resistant Bacteria (CARB)**. The report includes an Executive Order which calls for a national response to antibiotic resistance by establishing a Presidential Advisory Council run by HHS in consultation with USDA and Department of Defense. This group, along with a task force, is supposed to establish a **National Action Plan** by February 15, 2015 to achieve five goals: (1) slow the emergence and spread of antibiotic resistance; (2) strengthen surveillance; (3) identify rapid diagnostics for resistant pathogens; (4) facilitate the development of new treatment and control method; and (5) improve collaboration across agencies. To collect better data to inform these goals, USDA’s Food Safety Inspection Service (FSIS), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS) are working with FDA/CVM. The industry will work closely with these Agencies on determining what data should be collected and how it will be done.

A major, growing concern of the turkey industry over the past several years has been the impact of feed prices on feed availability, and on potential animal health impacts of feed alternatives. The **Renewable Fuels Standard (RFS)** has distorted feed costs for turkey producers, as well as the rest of the livestock and poultry industries. Today, livestock and poultry feed accounted for ~4.4 billion bushels (40.8% of domestic production), while ethanol consumed ~4.6 billion bushels of corn (42.7%). The result has been corn stocks at near-record lows and corn prices at near-record highs, leading turkey producers to search for alternative feed sources, and reduce production overall. The distillers’ grains that are byproducts of ethanol production do not have a major impact on feed availability, as only about 10% of a turkeys’ feed ration can be comprised of DDGs. The turkey health impacts of such altered-diets are currently a subject of concern and research for turkey producers. Further, with growing attention on antibiotic usage, the Center for Food Safety (CFS) and the Institute for Agriculture and Trade Policy (IATP) submitted a petition to the FDA in April of 2013 encouraging a ban on the use of antibiotics in ethanol production when DDGs are sold as animal feed for food producing animals. This debate further complicates the feed availability and antimicrobial resistance issues.

The industry continued work on developing the **Federal and State Transport (FAST) Plan for Movement of Commercial Turkeys** in a **High Pathogenicity Avian Influenza (HPAI)** Control Area, and Turkey Risk Assessment. The goal of this work is to facilitate business continuity and economic survival of participating non-infected turkey operations in a Control Area after an outbreak of HPAI, and to help assure the continuous availability of safe turkey meat to consumers. Recent outbreaks of Low Pathogenicity AI (LPAI) in the U.S. (including in turkeys), as well as its continued have underscored the need for such programs in responding to a potential AI outbreak. Regarding disease surveillance, the industry has continued to voice strong support for the maintenance of the **National Poultry Improvement Plan (NPIP)** in the face of increased government spending cuts. NPIP is a vital state-federal-private partnership for the

turkey industry, as well as the broiler and egg industries, and APHIS has continued to show strong support for the program, having hired additional staff for the program in 2014, and maintaining their officers in Conyers, Georgia, instead of moving it to the Washington, D.C. area. The industry is also supportive of federal efforts to update and modernize ARS' **Southeast Poultry Research Laboratory** in Athens, Georgia.

In August of 2014, the Food Safety and Inspection Service (FSIS) published the final **New Poultry Inspection System** (NPIS) rule, which will modernize the inspection of turkeys and other poultry in the United States. In establishments that volunteer to transition to the new inspection system, FSIS inspectors will be allowed more flexibility to patrol the plant and provide scientific oversight to ensure the plant is meeting the required food safety performance standards. Federal inspectors will be stationed at the end of the production line to verify every poultry carcass meets the federal regulations, and plant employees will have an expanded role in inspecting carcasses for quality standards on the inspection line.

In 2013, turkey production **decreased** to 7,276.800 from 7,561.905 million pounds (live weight) in 2012. Overall domestic per capita consumption for turkey products **remained flat at** 16.00 lbs in both 2012 and 2013. The preliminary number for 2014 is **15.70 lbs** turkey consumption per capita, which is the **lowest level since 1988**. Production in 2013 **decreased to 240.00 million** head with an average live weight of **30.32 lbs**. In 2012, 253.500 million head were produced with an average live weight of 30.32 lbs. (Reference: National Turkey Federation Sourcebook, October 2014).

Table 1. Turkey health survey (August 2013 - 2014) of professionals in US turkey production ranking current disease issues (1= no issue to 5 = severe problem).

Issue	Score Average	
	(1-5)	Score Mode (1-5)
Lack of approved, efficacious drugs	4.2	3
Clostridial Dermatitis (Cellulitis)	3.5	2
Colibacillosis	3.4	1
Late Mortality	3.1	3
<i>Bordetella avium</i>	2.9	2
Leg Problems	2.9	1
Salmonella	2.9	1
Cannibalism	2.8	2
<i>Ornithobacterium rhinotracheale</i> (ORT)	2.6	2
Poult Enteritis of unknown etiologies	2.4	1
Blackhead (Histomoniasis)	2.3	3
Cholera	2.3	5
Bleeders (aortic, hepatic ruptures)	2.3	5
Coccidiosis	2.3	4
Breast Blisters and Breast Buttons	2.2	4
Round Worms (<i>Ascaridia dissimilis</i>)	2.2	3
Tibial Dyschondroplasia (TDC, Osteochondrosis)	2.2	1
TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)	2.2	1
Osteomyelitis (OM)	2.1	1
Newcastle Disease Virus (NDV)	1.9	2
Shaky Leg Syndrome	1.9	1
Fractures	1.8	1
Protozoal Enteritis (Flagellated)	1.8	2
<i>Mycoplasma iowae</i> (MI)	1.7	1
<i>Mycoplasma synoviae</i> (MS)	1.6	1
H3N2 (H1N1) Swine Influenza	1.6	1
Turkey Coronavirus	1.6	1
Avian Influenza	1.5	1
Heat stress	1.5	5
<i>Mycoplasma gallisepticum</i> (MG)	1.5	1
Necrotic enteritis	1.5	1
Erysipelas	1.3	1
<i>Mycoplasma meleagridis</i> (MM)	1.3	1
PEMS (Poult Enteritis Mortality Syndrome)	1.3	1
Avian Metapneumovirus	1.2	1
Spondylolisthesis (Kinky-Back)	1.2	2

Table 2. Turkey health survey (August 2013 - 2014) of professionals in US turkey production. * One respondent noted that their operation processed over 300 flocks with varying degrees of severity, but not included in the reporting of 2011 confirmed cases; Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR).

Cases (##) of	2014	2013	2012	2011	2010	2009	2008	2007
Blackhead (Histomoniasis)	61	52	80	89	108	67	63	68
<i>Mycoplasma gallisepticum</i> (MG)	17	45	n/a	n/a	n/a	n/a	n/a	n/a
<i>Mycoplasma synoviae</i> (MS)	41	75	49	39	56	38	47	52
Turkey Coronavirus (TCV)	43	420	221	70	91	3	10	n/a
Turkey Reovirus Digital Flexor Tendon Rupture	150	39	131	106*	n/a	n/a	n/a	n/a

Table 3. Turkey research priorities (August 2013 - 2014) of industry professionals in turkey production (1= low to 5 = high).

Issue	Score Average (1-5)	Score Mode (1-5)
Food Safety	4.1	5
Disease	3.9	4
Welfare	3.9	4
Nutrition	3.1	3
Poultry Management	3.1	3
Environmental	2.6	3
Processing	2.4	2
Waste Disposal	2.3	2

Table 4. Percentage (%) of brooding (commercial; farm) production is all-in/all-out (single-age; brooder hub); average of respondents (n=26).

Year	Percentage (%)
2014	55.1
2008	44.4

Table 5. Nineteen (19) in-feed FDA approved medications for turkeys listed by label indication categories: subtherapeutic (improved weight gain, feed conversion) versus therapeutic (disease prevention, control, treatment). * Not currently marketed. ** Deemed “Medically Important” per FDA Guidance #209 and #152. (Roxarsone approval was withdrawn September 30, 2013).

Subtherapeutic	Therapeutic (Prevention, Control, Treatment)
Bacitracin Zinc	Amprolium
Bacitracin Methylene Disalicylate	Bacitracin Methylene Disalicylate
Bambermycin	Chlortetracycline **
Chlortetracycline **	Clopidol
Neomycin + Oxytetracycline **	Diclazuril
Oxytetracycline **	Fenbendazole
Penicillin **	Halofuginone *
Ractopamine	Lasalocid
Virginiamycin **	Monensin
	Neomycin + Oxytetracycline **
	Nitarson
	Sulfadimethoxine + Ormetoprim **
	Oxytetracycline **
	Zoalene (DOT) *