RUSSIAN BAN ON U.S. POULTRY PRODUCTS HAS LESS IMPACT NOW

by Mark Leggett, President, Mississippi Poultry Association

As you probably heard, the Russians closed their ports in August to U.S. agricultural products including poultry meat. While it is disappointing news, it is not the first time U.S. poultry has been the center of a trade war. Products from the European Union, Canada, Japan, Australia, and Norway were also hit by the current Russian ban.

Poultry is the largest U.S. agricultural export to Russia, and Russia is the second largest market for U.S. chicken, but Russia represented only 7 percent of total U.S. poultry exports in 2013. The first time Russia banned U.S. poultry was in 1996 when that country represented 40 percent of U.S. exports.

Mississippi ships a greater percentage (16.7 percent according to data from the Mississippi Development Authority) of its exported poultry meat to Russia than the U.S. as a whole, but the amount of Mississippi chicken going to Russia has been declining. In 2009, Mississippi shipped $165 million dollars in poultry meat to Russia. By comparison, in 2013, it was $49 million.

What happened? U.S. poultry companies expanded their customer base and more countries around the globe are buying U.S. chicken and eggs. Russia is growing more of its own chickens, and they had imposed a 250,000-ton quota on imported chicken – most of which comes for the U.S. These factors and onerous Russian inspection requirements forced some U.S. companies to decide to no longer ship to Russia and find other customers.

Other factors will also limit the impact of the Russian ban on Mississippi poultry producers and processors. There is increased demand for poultry in this country and a limited supply of breeding stock. The major impact will be on the Russian consumer who will pay more for chicken and the Russian importers who may go bankrupt.

In 2013, the largest consumers of Mississippi poultry were Cuba, Russia, China, Mexico, Canada, and Hong Kong. If you combine China and Hong Kong, that is our state’s largest market for poultry. But Mississippi chicken products are consumed everywhere from Guatemala in Central America to Ghana in Africa, and from Jamaica to Japan. Mississippi ranks fourth in poultry exports. Nationally, about 15 percent of all poultry is exported to global markets from the U.S., according to the United States Department of Agriculture’s Foreign Agriculture Service.

We believe in free and fair trade. We want markets open so we can export more Mississippi agricultural products. There are separate negotiations underway on trade agreements with Europe and Pacific nations that have the potential to open even more doors to Mississippi poultry products.

So what could be the impact of the Russian ban on poultry? It could, at least temporarily, drive down the price of dark meat since that is what Russian consumers purchased. Mississippi companies will find new markets for the nearly 800 million chickens raised here annually and that generate $2.7 billion paid to farmers and 55,000 direct and indirect jobs.
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With a growing population (9 billion by 2050), and rising incomes around the world, global consumers will want more protein and Mississippi is in a good position to meet this increased demand. For example, South Asia, which includes India, is forecast to see a 725 percent increase over 2000 levels in poultry demand by 2030, according to the United Nations’ Food and Agricultural Organization. Demand for eggs in South Asia is forecast to grow 300 percent.

Other countries may take the place of the U.S. in supplying Russia, but no one is as efficient and therefore can provide Russia or the world as affordable a product as the U.S. poultry industry. At home, the American consumer pays 7 percent of his or her income on food, compared to 30 percent in Russia and more than 45 percent in Pakistan. With free and fair trade, Mississippi’s poultry industry has the potential to benefit everyone.

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Earlier this year, the spring tornadoes dramatically altered the lives of Mississippians throughout the state. Families lost loved ones, friends, houses, and businesses in seconds. A number of those businesses were poultry farms. Due to the storm, there were over 65 poultry houses either damaged or destroyed and more than one million chickens were lost.

After the storm, growers began calling MPA with a range of questions and concerns about their insurance. Listening to our members we discovered two common themes: insurance rates were rising and growers had difficulty in finding and purchasing adequate and sufficient coverage. Thanks to our growers’ active participation in MPA, we realized there was a real need to bring together the Commissioner of Insurance Mike Chaney, insurers and agents, growers, bankers, and integrators all in one room to search for ways to ensure a vibrant insurance market for all concerned about a strong poultry industry.

All the requested parties agreed to attend and MPA presented the questions from our growers to the participants in the roundtable discussion. All parties recognized before discussions began that it was important to realize each policy can be a unique document, so all conversations and information discussed should be viewed in generalities.

The most common question MPA received from our growers that we asked our participants about is why insurance rates are rising. Generally, the rates increased after the storms because of three main factors: amount of claims from fire, lightning, and straight-line wind, amount of claims resulting from the spring tornadoes, and relatively low policy rates for the last several years. Overall, policy pricing depends on what the insurer is paying on losses and their operating costs. If an insurer is paying out more than they are collecting, financial adjustments have to be made by the insurer.

To help minimize the future impact of rising rates, insurance professionals recommended growers contact their insurance agents to do a risk assessment of their farms or that growers check the following items themselves. It must be noted enacting the following recommendations will not guarantee your existing rate nor reduce your existing rate.

Participants recommended the following actions to growers:

• The premises need to be well maintained at all times. We see a lot of really high grass around some of the poultry houses, and more so around the other farm structures associated with the farm (compost sheds, dry stack sheds, generator sheds, and incinerator sheds). We suggest that they keep the grass cut around the buildings.

• Suggest that the grower does not have a lot of debris laying around the premises. We like to see a nice, well maintained farm premises. It shows pride of ownership.

• Roof leaks can cause a lot of damage to the interior of the houses from rotten boards to water damaged Tri-Ply. We look for tin that has curled and nails that have backed out. Nails that have backed out should be tapped back down or better yet, replace the nails with screws.

• Insurers look for rotten or broken boards on the trusses. Rotten boards are a sign of a roof leak and broken boards are a sign of shifting. These boards should be replaced.

• For Wood Truss houses, broken posts are a major issue and these need to be repaired or replaced.

• For Steel Truss houses, we look for bent or warped trusses. The environment inside the poultry houses is very corrosive and we look to see that the truss plates and the bolts are still in good shape and that the truss plates are still attached to the footing. We would like to see measures taken to keep the poultry litter off of the truss plates and bolts. We have seen where some farmers have put tar over the truss plate bolts to prevent contact with the poultry litter. We are not sure that this helps, but it seems like it would.

• All electrical panels, junction boxes, outlets, etc. should have their covers in place. There are a lot of dust particles and spider webs that build up in poultry houses over time and these items do not need to be allowed to build up inside of an open electric panel or box as this could generate a fire loss.

• Proper installation of adequate lightning surge arrestors to reduce the chances of a lighting/fire loss

Participants, respective individuals, and MPA staff discussed the issues and what steps can be taken to minimize insurance rates. The question as to why it has become difficult in identifying and purchasing adequate and sufficient coverage was presented to the group. They believe there are two reasons: replacement costs for destroyed poultry houses are extremely expensive and the limited number of admitted and surplus lines carriers interested in writing polices.

What we all realized was each group viewed insurance as an intricate part in protecting the interests of growers, integrators, and bankers. Though all parties wish the cost of policies would stay consistent, as in years past, the reality is the costs of insuring a poultry house to an insurer has risen drastically. MPA will continue to communicate with Commissioner Mike Chaney, insurers and agents, bankers, and integrators to develop some form of relief.
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Mississippi’s 3rd Congressional District ranks third in the nation in poultry and egg production and Mississippi has seven counties in the top 50 in poultry and egg production in the nation, according to data from the USDA’s 2012 Census of Agriculture being released in phases this year.

The poultry industry has and will continue to be an economic driving force for the state of Mississippi. With over $2.7 billion dollars paid to farmers last year, poultry provides livelihoods to farming families across our state. Poultry companies, with employees throughout our state, are currently employing over 28,000 Mississippians with a payroll in excess of $1.19 billion dollars. Below is a table that shows the top 20 poultry and egg counties in figures from the Census of Agriculture.

Mississippi certainly has a lot to be proud of with the poultry industry. The 3rd Congressional District, represented by Greg Harper, is the third biggest poultry producing congressional district in the nation. The 4th Congressional District, represented by Steven Palazzo, is the 19th. The 2nd Congressional District, represented by Bennie Thompson, is 31st. The 1st Congressional District, represented by Alan Nunnelee, is 89th. Thanks to farmers and company employees, poultry and eggs continue to thrive in Mississippi. Below is a table that shows Mississippi’s top 20 producing poultry counties and where they stand nationally.

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The Mississippi Poultry Association’s Education and Research Committee hosted this year’s Fall Breeder and Hatchery Seminar at two locations on August 5 and 6. The Mississippi State Diagnostics Lab in Pearl provided the location on August 5, while the Collins Civic Center in Collins served as the location on August 6.

There were more than 100 participants who attended the Pearl and/or Collins location. Attendance consisted of hatchery managers and personnel, breeder and pullet managers, service technicians, allied members, and sponsors.

The goal of the seminar was to provide attendees information concerning recent developments and practices that could increase the overall efficiency and productivity of hatcheries and farms. Topics covered at the seminars were: Managing Today’s Broiler Breeder Pullets (Tommy Walker, Cobb-Vantress), Managing Hen Performance (Randall Vickery, Aviagen), Rooster Fertility (Chris McDaniel, Miss. State University), Eggshell/Hatchability Relationship (David Peebles, MSU), Practical Hatchery Issues (Jiggs Kilgore, Hubbard), Jamesway Particulars (Jerry Garrison, Jamesway), Developing An Efficient Hatchery Maintenance Program (Chad Daniels, Chickmaster), and Inovo Injection (Chris Williams, Zoetis).

MPA would like to thank our sponsors: Aviagen, Chickemaster, Cobb-Vantress, Hubbard, Jamesway, Mississippi State Poultry Science Department, and Zoetis for graciously providing sponsorship and speakers to this year’s seminar.

For those unable to attend the seminar, please visit our website, www.mspoultry.org. Once at our website, go to the media tab and click videos. The seven presentations will be located there.
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If you have a SuperSaver XL heater, PowerTrak curtain machine, or a RollSeal door, it came from an H-shaped factory using automotive quality assurance techniques in the heart of the poultry belt. Cumberland–Hired Hand products are made in Bremen, Alabama, south of Cullman. There are still chicken houses onsite.

MPA is beginning a member spotlight series with this edition of Emerging Trends, which features information and pictures from a tour of the Cumberland–Hired Hand plant where the 120 employees make poultry house controllers, doors, heating, feeding, watering, and ventilation systems. Production of nesting systems for breeder houses will move from Illinois to Alabama soon. The plant in Bremen, originally opened in 1978 now has 160,000 square feet.

Cumberland–Hired Hand is part of GSI which is a worldwide brand of AGCO based out of Duluth, Georgia. As a global agricultural products corporation, one of AGCO’s best known products are Massey-Ferguson tractors, which are made using the same manufacturing methods as nipple drinkers or the Evolution 4000 Control System. GSI, headquartered in Assumption, Illinois, employs 1,500 associates worldwide.

The Bremen plant has seen numerous changes over the last five years with GSI, Grain Systems, Inc., buying Hired Hand in 2009 and then AGCO acquiring GSI in 2011. As production has grown, so have the buildings on the site. The H-shaped building was originally an L-shaped one, but the need for more space turned it into an H.

Mississippi State University Poultry Science Professor Dr. Tom Tabler, JD Sumrall and Doug Dickinson with Agri-Business, and I were guided through the plant in Bremen by Plant Manager Eddie Harris. Quality Manager Jeff Alvey explained the systems in place taken from Japanese car plants that ensure quality and reduce costs. These include “kanban,” a system of scheduling parts and assembly using cards attached to products and “kaizan” continuous improvement methods, and an “andon” system measuring product flow with green (running well), yellow (issues coming up), and red (stop).

The plant has a testing lab for its fans and doors with what you and I would call a wind tunnel but which Product Engineer Jimmy Campbell called a flow meter to measure volume of air movement. He had dozens of examples of fan blades with varying shapes that move air in different capacities. The lab was one more example of the attention to detail Cumberland–Hired Hand uses to meet customer needs in poultry industry where technology is constantly improving the environment in the poultry house.
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John Milner serves as counsel to the Mississippi Poultry Association and has special expertise in poultry-related environmental issues. Partner Gene Wasson also has impressive abilities in the environmental sector.

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MDEQ ADOPTS EPA’S NEW “SEQUENCING APPROACH”

by John E. Milner, Brunini, Grantham, Grower & Hewes, PLLC

MDEQ is shifting its priority for development of numeric criteria for nitrogen and phosphorus and other nutrients (NNCs) to lakes/reservoirs and estuaries within the state. This change in focus is consistent with U.S. EPA’s recent announcement of a “sequencing” alternative to the development of NNCs (Sequencing Alternative). Nancy Stoner, former EPA Acting Assistant Administrator for Water, unveiled the Sequencing Alternative at the May 21, 2014, meeting of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force as a recognition by EPA that “states may not have the resources to simultaneously adopt numeric nitrogen and phosphorus criteria for all major classes of water bodies.”

The Mississippi Poultry Association has worked with other associations to stay engaged with DEQ on the development of Numeric Nutrient Criteria because the numbers set for phosphorous and nitrogen levels in streams could mean costly equipment upgrades to poultry plants and possibly restrictions on spreading of poultry litter. MPA believes Mississippi should explore all feasible alternatives to setting numeric limits, but any numeric limits should be based on sound science, should be achievable over a longer rather than a shorter period, and they should result improved water quality.

EPA’s summary document explains the Sequencing Alternative as follows:

For those states still lacking sufficient resources to establish numeric criteria for all their water bodies in the near term, EPA suggests the state consider a sequenced approach. In such an approach, numeric nitrogen and phosphorus criteria are adopted in phases, starting with those waters with long retention times (e.g., lakes/reservoirs and estuaries), because they are typically the most sensitive to nutrient pollution. For example:

**Phase 1:** adopt numeric nitrogen and phosphorus criteria for the entire class of waters (e.g., lakes/reservoirs or estuaries). States that are unable to target the entire class of water body type, might prioritize waters within that class using one or more of the following considerations:

- Waters most impacted by nutrients
- High quality waters in most need of protection
- Waters with highest nutrient loads
- Waters most sensitive to nutrient pollution
- Waters used as drinking water supply

**Phase 2:** for flowing waters upstream of the Phase 1 waters, adopt numeric nitrogen and phosphorus criteria, or develop numeric interpretations of narrative criteria, to protect the downstream Phase 1 waters.

**Phase 3:** evaluate whether the stream criteria (or numeric interpretations) intended to protect downstream waters also protect the in-stream water quality of Phase 2 flowing waters. If not, adjust the values. If so, adopt them as criteria if they were previously considered to be narrative interpretations.

**Phase 4:** evaluate results from the first 3 phases and adopt numeric nitrogen and phosphorus criteria, or develop numeric interpretations of narrative criteria, for any remaining NNCs. Consequently, the agency has decided that, in the near term, the Phase I tasks outlined above for lakes/reservoirs and estuaries will be its primary NNC objectives. MDEQ will discuss this new NNC sequencing approach at a stakeholder meeting to be scheduled in October or November of this year.
If your farm is incorporated or an LLC, any paperwork you have to file with the Mississippi Secretary of State’s Office will now have to be done electronically.

On August 25, the Secretary of State’s Office launched a new online filing system for existing and potential businesses in Mississippi.

“Mississippi is the first state in the nation to provide online filing for all of its business services. Requiring the use of the online filing system will save the State of Mississippi thousands in taxpayer dollars, by reducing paper, postage, and manpower to process the documents,” said Secretary of State Delbert Hosemann.

Paper business filings will continue to be accepted through December 31, 2014. Beginning in 2015, all users must utilize the online filing system at www.sos.ms.gov.

1. HOW DO I GET STARTED? Go to the Business Services home page and click on the button entitled “File Business Documents.” You will be asked to login with the username and password. If you do not have one, set up your account by clicking the “register” button. You’ll be asked for your name, business address, and business e-mail. Your email will become your username. You will be sent a temporary password which you will use to select your own password. You may begin setting up your user accounts on August 25, 2014.

2. HOW DO I FILE DOCUMENTS? Once you have logged in with your username and password, the system will give you the option to form a new entity, register a foreign entity, file annual reports, file amendments, dissolved entities, change your registered agent, or order certificates of good standing and certified copies. This PowerPoint presentation will demonstrate some of the screens you will encounter and explain the payment process.

3. HOW CAN I PAY FOR FilINGS? All business filings may be submitted and paid for online. Payments can be made with credit card (American Express, Visa, MasterCard, Discover), E-check, or through an ACH account. To set up an ACH account, complete the form and mail or e-mail it to the Mississippi Secretary of State at the address provided on the form. If you do not wish to pay online, forms may be completed online then printed off and mailed with a check. Be aware that paper registrations will take significantly longer to process than online filings.

4. WHY DO I NEED AN EMAIL ADDRESS? All filed or rejected documents will be returned via e-mail. Some documents which are paid online will be approved and filed immediately. You will receive a copy of the filed stamped document and payment invoice via e-mail. Some online filings will still require review by the Secretary of State’s staff. Once reviewed, your document will be returned filed, or with an explanation of issues preventing filing. This should occur within 24 hours of submission. In addition, notice of any filings for a company will be sent to all emails associated with the company meaning that you will be notified if an unauthorized person attempts to file documents against your company.

5. CAN I USE OLD PAPER FORMS? No. Paper forms will be accepted only for a short time after the new system becomes operational. If you need assistance, please call the Business Services Customer Service Line at 601-359-1633.

6. HOW DO I FILE AN AMENDMENT ON AN EXISTING BUSINESS? After logging in, scroll down to the button entitled “File an Amendment on an Existing Business.” You will be asked to provide the Mississippi business ID number for the business. You will then have a menu of choices for the entity. Please see the PowerPoint presentation for a demonstration of this process.

7. HOW DO I CHANGE MY REGISTERED AGENT? There is no longer a separate form to change the registered agent for a company. Registered agent changes are handled as an amendment using the process outlined above.
8. HOW DO I FILE AN ANNUAL REPORT? Filing an annual report for a Corporation or an LLC, or filing a nonprofit status report, has been simplified. After logging in, choose the appropriate button under “Business Filings.” You will be asked to enter the Mississippi business ID number of your company. The annual report will be pre-populated with the information already in the system. You will simply have to update the information and submit. All entity types will now file these reports online.

Only business corporations and LLC’s must file annual reports in Mississippi. Nonprofit corporations are only required to file a nonprofit status report upon request from the Secretary of State.

9. HOW WILL I KNOW IF MY FILING IS ACCEPTED? The information you enter online will go into the system exactly as it is typed. The system will validate many of the fields and will inform you if there are any errors before the document is filed. Corrections may be made prior to filing. Once the filing is submitted, you will receive an email notification that it has been accepted and filed or that it is being returned to you for further corrections. Once the system is up and fully functioning, you should receive those emails the same day the document is submitted, sometimes within minutes of your submission.

10. HOW DO I REINSTATE MY ADMINISTRATIVELY DISSOLVED COMPANY? When choosing the Reinstatement button from the Business Filings menu, you will be notified that all corporations and certain LLC’s seeking reinstatement will need to obtain a tax clearance letter from the Mississippi Department of Revenue. A link is provided to the Department of Revenue website where you may request the tax clearance letter. You will need your taxpayer information in order to access their website. The tax clearance letter will be e-mailed to you by the Department of Revenue. Save the document to your computer as you will need to attach it electronically with your reinstatement request.

After receiving the tax clearance letter, return to the Reinstatement button and enter the business ID for the administratively dissolved company. The system will ask for information which must be entered to reinstate the company. Instructions are provided on the form. The system will check the information and outline any errors prior to submission.

11. HOW DO I REGISTER MY OUT-OF-STATE BUSINESS? After setting up your account and logging in, find the button entitled “Register an Out-of-State Corporation, Nonprofit, LLC, Partnership or Business Trust.” Follow the instructions provided. You will need to download, as an attachment, a copy of your company’s Certificate of Good Standing/Certificate of Existence from your home state.

12. I'M A REGISTERED AGENT. HOW DO I CHANGE MY ADDRESS? Registered agents may change their address using the button entitled “File Registered Agent Address Change”, found under the Amendment section of the Business Filings. Entering the name of the registered agent will pull up a list of all companies listing that agent. Changing the address of the agent will change the information automatically in all company profiles.

13. WHAT ARE THE FILING FEES FOR MY DOCUMENTS? Filing fees for business documents are set in statute by the Mississippi legislature. The Secretary of State does not control the amount of business fees.

14. WHAT IS AN NAICS CODE AND WHY DO I NEED ONE? An NAICS code is a six-digit number which describes business types. The forms which request this code have a search feature which allows you to determine the code for your business. Choose the code which most closely matches your business activity. The NAICS code allows individuals and businesses researching your company to determine what products and services you offer.

15. CAN UNAUTHORIZED PERSONS FILE DOCUMENTS ON MY COMPANY? It is a misdemeanor in Mississippi for unauthorized persons to file documents on a company with the Mississippi Secretary of State. (see, Mississippi Code Annotated §79-4-1.29, 79-11-123 et al). Enforcement of these provisions is handled by the Mississippi Attorney General.

In addition, the new filing system has several safeguards. Whenever a document is filed for a company, an email notification of the filing is automatically sent to the company’s email and to any other emails associated with the company profile. Also, should fraudulent documents ever be filed, the Secretary of State will have a record of the filer who submitted the document.

16. DO I NEED SPECIAL COMPUTER EQUIPMENT TO FILE DOCUMENTS? No. The filing system is contained entirely within the servers of the Mississippi Secretary of State. You may file documents using any computer with access to the Internet. You may use most browser programs; however, Internet Explorer 8 is no longer supported by Microsoft so we recommend you use Internet Explorer 9 or higher. If you experience difficulty while using Internet Explorer, you may wish to utilize another browser, such as Firefox or Google Chrome.

17. WILL MY PERSONAL INFORMATION APPEAR ONLINE? No. Your company’s FEIN and telephone number will be redacted from forms appearing on the Secretary of State’s website. Social Security numbers are never requested.
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Poultry litter is a source of revenue for growers and a valuable source of fertilizer for landowners in Mississippi. Concerns about nutrients (primarily nitrogen and phosphorus) in litter have caused governmental agencies such as the Mississippi Department of Environmental Quality (MDEQ) and Natural Resources Conservation Service (NRCS) to restrict the amount of litter that can be applied to some fields based on soil testing. The data that form the basis of these restrictions are now 15-20 years old and management practices have changed to reduce the amount of phosphorus excreted by birds onto litter.

In order to determine whether today’s management practices have actually reduced the nutrient levels in today’s poultry litter compared to those of 20 years ago, Dr. Tom Tabler, an Extension Professor in the Department of Poultry Science at Mississippi State proposed to the MPA Board of Directors that he conduct a study to sample litter around the state. The Mississippi Farm Bureau Federation agreed to fund the study that includes ~200 samples from growers associated with all six broiler integrators located in Mississippi.

Dr. Tabler, assisted by Dr. Morgan Farnell, also an Extension faculty member in Poultry Science, is close to meeting the sampling goal. Litter is collected from one house per poultry farm. As each sample of litter is collected, it is coded so that the analysis can be done without revealing which grower and which integrator provided the sample. The Mississippi State University Chem Lab is analyzing the samples. To date over 150 samples have been collected and Dr. Tabler anticipates that the rest will be done by October. Results should be available later in the year.

MPA thanks the Mississippi Farm Bureau Federation for their support of this project. We would also like to thank the Mississippi broiler integrators for cooperating through their broiler managers and service techs who have taken time out of their busy schedules to assist with the logistics of finding grower farms. This research by Drs. Tabler and Farnell should provide valuable information that could lead to beneficial changes in regulatory programs that reflect improved management practices.
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INTRODUCTION

Windrow composting of broiler litter between flocks has become an accepted and increasingly popular method for reducing the microbial loads in broiler houses. Integrators and growers have discovered that windrowing litter can improve bird performance and reduce likelihood of disease spread when a total cleanout is not undertaken. In many broiler complexes today, a total cleanout on a farm may only occur after several years have passed since the previous total cleanout. Windrowing allows the natural metabolism of bacteria present in the litter to cause a partial composting process to take place and, under the right conditions, generates enough heat within the windrow to destroy many pathogenic bacteria and other microorganisms. This results in well-conditioned litter for the next flock with a decreased microbial load.

LITTER MANAGEMENT

Bacteria and other microorganisms have always been a part of poultry production. Regardless of the best efforts by growers and integrators, it is impossible to totally sterilize the poultry house environment. However, by properly managing litter moisture, ammonia, and pH, growers can maintain acceptable bacterial levels that help reduce disease challenges and maintain bird performance.

A variety of microorganisms, including Salmonella, Escherichia coli, Clostridium, Campylobacter, Staphylococcus aureus, and others are pathogenic to humans and also to poultry, causing serious infections that can possibly lead to death (Lavergne et al., 2006). However, poultry litter, with its high pH and high ammonia concentrations, is a harsh environment that somewhat helps control many microorganisms. Unfortunately, Salmonella and Clostridium can survive in the harsh environment of poultry litter, making litter management more challenging.

Even though the bacterial makeup and population in a broiler house is quite dynamic, given time the litter begins to stabilize and develops predictable patterns unique to a grower’s management style, housing design, internal environment, and the birds themselves (Hess et al., 2007). Bacteria present in litter can be classified as either spore formers or non-spore formers. Non-spore forming bacteria (Escherichia coli, Staphylococcus, etc.) increase with the presence of birds in the houses and increasing amounts of fecal matter. Spore forming bacteria such as Clostridium perfringens, the causative agent for necrotic enteritis and gangrenous dermatitis, tend to increase with time as litter ages and number of flocks increase.

Spore formers are difficult to destroy because they have the capability, when environmental conditions worsen, to form a metabolically inactive body (called a spore). Spores are able to withstand harsh environmental conditions that kill many bacteria. Macklin et al. (2007) reported that the rapid temperature change of the litter associated with windrow composting is
rather sudden and may catch Clostridium unprepared to form a spore, resulting in decreased populations of spore-forming Clostridium in windrowed litter.

If litter is windrowed, keep in mind that windrow composting will not reduce the amount of litter that accumulates in the house. The small amount of time litter is actually spent “composting” in a windrow is not long enough to degrade or reduce any appreciable amount of litter. Therefore, whenever litter levels get too deep, growers will still have to remove some of the litter from the house. However, by leaving litter in the house for extended periods, growers are better able to choose the ideal time to remove excess litter based on agronomic or economic considerations.

LITTER MOISTURE CONCERNS
Some uncertainty exists concerning litter moisture levels on the heating process and higher litter temperatures on the potential for ammonia volatilization. Two frequently asked questions concerning management options immediately prior to windrowding are: 1) whether to decake or not; and 2) whether to add additional water to the litter or not (Liang et al., 2013). It is a common belief that incorporating caked litter helps retain moisture, allowing the windrow to heat properly and avoiding the extra fuel and labor associated with decaking. However, some operations require cake removal prior to windrowing. Liang et al. (2013) added 900 gals of water to one windrowed house and no additional water to another in trials 3, 4, and 5 of a 5 trial study. With 900 gals of added water, it was expected to increase moisture content by 3.5% after two flocks on the same litter, but only about 2% after five flocks. A significant decrease in litter moisture content occurred after 7 to 13 days of windrowing, although moisture content of the windrowed litter with water addition was slightly higher than those without water addition. However, windrows with water addition had higher temperatures and stayed hotter longer.

Water soluble phosphorus increased in both the windrowed and non-windrowed litter (Liang et al., 2013). This indicated that an appreciable degree of biotic (living factors – bacteria, fungi, and viruses) and abiotic (non-living factors – temperature, ammonia, season, etc.) activity occurred in the litter with both treatments after flocks were removed. Overall, there were no negative impacts of windrow treatments on litter quality observed with regard to agronomic applications (Liang et al., 2013). However, high ammonia emissions persisted for several days after windrows were spread back out. Without use of a litter amendment, at least 4 days were necessary to purge ammonia with proper ventilation prior to chick placement. In this situation, use of a litter amendment compares favorably to increased fan run-time during cold weather without use of a litter amendment.

PAW QUALITY
It may seem hard to believe but broiler feet, or “paws,” are now the third most profitable part of the chicken. Only the breast and wings are more valuable. Paws are the portion of the leg below the spur. Litter conditions have a large impact on quality of paws. Controlling paw quality has become an important issue to the poultry industry because of the potential profit associated with the overseas paw market and because paw quality is now one of the variables used in animal welfare programs. Many cases of footpad dermatitis are the result of poor litter conditions. Footpad dermatitis is inflammation and ulcers on the footpad and toes of broilers which cause paws to be downgraded or condemned during processing. It appears increasingly evident that footpad dermatitis can begin the first week, based on litter quality. Therefore, it is critical that the litter stay dry!

Litter that has been properly windrowed will be drier than non-windrowed litter and have a decreased bacterial load. This is important, especially for young chicks, when the feet are tender and wet litter and ammonia can cause cracked skin and ammonia burns that result in serious paw damage that may linger and worsen throughout the flock. Early paw damage can lead to product downgrades, food safety issues (lesions can serve as entry points for bacteria and other microorganisms), and animal welfare concerns. Bird performance may also be affected if foot pain prevents birds from feeding and drinking properly. The percentage of birds with paw quality issues may also be seen as a reflection of a grower’s concern for animal welfare and the well-being of the birds in that grower’s care. Paw quality scores can affect pass/fail on animal welfare audits which are now common practice in the poultry industry.

Several possible causes of footpad dermatitis have been identified including:

- Litter – type, quality, and quantity
- Drinker design and management
- House humidity
- Ventilation program
- Diet composition
- Gut health

Of these, litter is likely the most important factor. From chick placement to harvest, footpads are in constant contact with the litter surface. Footpad dermatitis may not develop in the absence of wet litter even though other factors may be present. However, wet litter (>30% moisture) is often times associated with the occurrence and severity of footpad dermatitis. Still, there are exceptions that defy explanation. There are occasions at the processing plant when birds on good quality litter have poor paw quality and birds on poor litter have good quality paws. In addition, the location of birds in the house can make a difference in paw quality, especially during the summer. More damp, caked litter and slow air speeds in the cool cell end leads to more paw quality problems in that end vs. the
fan end where the litter is usually drier. Proper windrowing may result in litter that starts out in excellent condition, but it takes good management throughout the flock to maintain litter quality.

Season can also play a role in litter quality. Ventilation to remove excess moisture is important to keeping dry floors. Plenty of ventilation during the summer is usually not a problem. However, adequate ventilation during the winter becomes a challenge due to high fuel prices. Growers may choose to conserve heat by sacrificing ventilation which increases the likelihood of wet litter. Winter is always a critical period for footpad dermatitis. Often times we see an increased incidence of footpad dermatitis in winter because a house environment resulting from decreased ventilation and increased humidity leads to wet litter which is detrimental to paw quality.

OTHER ISSUES

There are a host of other important factors to keep in mind when considering windrow composting including:

- Down time between flocks
- Number and dimensions of windrows to build
- Tractor time required
- Turning and leveling litter prior to chick placement
- Litter depth
- Insecticide application (must be timely)
- Ventilation schedule (should have continuous ammonia removal)

A minimum of 12 to 14 days are required if windrow turning is included. Turning is important to ensure that all the litter is adequately heated. If decaking prior to windrowing, do it as soon as possible after flock removal. Build the first windrow(s) as soon as possible after the flock is removed and leave in place at least 3 days (Figure 1). Turn the first windrow(s) after 3 days and leave in place for an additional 3 days. Spread litter back out and level at least 4 days prior to chick placement. Make sure the litter is level (Figure 2). Baby chicks do a poor job of navigating the hills and valleys of uneven litter. The number of windrows will depend on litter depth and the equipment used. Windrow height should be at least 18 inches but no more than 4 feet and windrow(s) should run the length of the house. Windrow width can vary and isn't that critical as long as height and length are correct.

Windrowing does take some tractor time and is dependent on grower expertise and the equipment used. If using a contractor or sharing equipment with a neighbor, make sure all equipment is clean before coming on the farm. If doing it yourself, allow 1 to 4 hours to build the first windrow(s), depending on your expertise. Turning may require the same or less time as initial construction. Leveling generally requires more time than windrowning because the surface has to be smooth and flat for baby chicks. Be sure to incorporate the hardpan into the windrow but do not dig into the dirt floor. Pull ALL the litter into the windrow (Figure 3). Do not leave a 6 or 8 inch strip along the side walls untouched. If the litter is too deep, remove excess litter either before or after windrowning but before the litter is leveled for the final time. Check with your service tech or broiler manager on the proper depth. In most cases, 3 to 6 inches of litter works best for optimal bird performance. Less than 3 inches is not enough (birds will dig down to the pad) and more than 6 inches makes it more difficult to manage. The windrow will begin to heat shortly after construction. The heating process will quickly drive litter beetles to the top of the windrow (Figure 4). Therefore, make plans to apply insecticides within 24 hours of windrow construction. Spray the windrow(s) and the exposed footers for maximum killing effect.

Ventilation should be continuous from flock harvest until preheating for the next flock. End doors should remain closed (unless you are working with heavy equipment in the houses) for biosecurity purposes. Curtains can be dropped on curtain-sided houses while solid sidewall houses should run either one 48-inch or two 36-inch fans to remove ammonia on a continuous basis. After litter is leveled, consider using a litter amendment to help control ammonia in the days just prior to and immediately after chick placement.

SUMMARY

Due to the increasing difficulty and cost associated with obtaining quality poultry bedding materials, it is now common practice for broiler growers to grow multiple flocks and perhaps multiple years on built-up litter. This presents challenges in terms of an increase in litter moisture, ammonia production, and bacteria numbers. Windrow composting of built-up litter in-house, when done correctly, can offset some of these challenges. The technique takes advantage of heat produced by microorganisms during organic matter degradation to help dry the litter and kill many bacteria that are present.

Windrowing litter is a process that requires a minimum of 12 to 14 days downtime. It includes building, turning, and leveling windrow(s) based on a specific time frame. Number of windrows and windrow height are important and are determined by litter depth. A litter depth of 3 to 6 inches usually works best. Strategic timing of insecticide application is necessary for maximum beetle kill. Ventilation should be continuous from harvest to preheating. Windrows should be leveled at least 4 days prior to placement in order to allow litter to cool down and further dry out. In most cases, paw quality can be improved if the litter can be kept relatively dry throughout the flock. Windrow composting is a cost-effective method of litter management and disease control which can improve litter quality and extend the life of built-up litter.

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Known traditionally as a human-preying pest, the bedbug loves the taste of chicken blood. Once established in a house, it takes an act of God to rid these blood sucking insects from an infested breeder house. To the author’s knowledge, bedbug infestations are primarily a problem in breeder housing. The ample hiding spots provided by nest boxes and slats give refuge to these bugs during the day. Recently, we have found that these bugs can live in the attic space and along the eaves of the roof inside the house. Because of this, we are beginning to attribute the failure of treatment and the longevity of infestation to this great hiding place.

In contrast with other known poultry ecto-parasites like northern fowl mites, bedbugs do not live on their host. In fact, the longest a bedbug will feed on a chicken is for 10 minutes before crawling off to seek refuge and mate. Bedbugs only need to feed from chickens weekly but can live without a blood meal for months. The most active part of the day for bedbugs is at night. They rely on carbon dioxide generated from the chicken and body heat to find their prey.

Blood loss in chickens from long term exposure to bedbug feedings is common. Egg production loss up to 10 percent has been seen in heavily infested farms. Growers may not know they have a bedbug infestation for several reasons. Bedbugs generally are active during the night and love hiding in cracks and crevices. Preventing a bedbug infestation is well worth the time and effort. Any person or piece of equipment that originates off of the farm can harbor these pests and can spread them to other farms. So, basic biosecurity practice is imperative and limiting the number of visitors to your farm is necessary. Spread of bedbugs from an infected farm to worker’s houses and vice versa is a major concern.

If you suspect you have bedbugs on your farm, early identification and treatment is warranted. Most pesticides work well against bedbugs, however, bedbugs commonly build resistance to pyrethroids quickly. The key to successful treatment lies in precise pesticide application to cracks and crevices and to areas that bedbugs will seek refuge. Bedbugs that hatch out after treatment of a house may not be affected by rapid knock down products that lack a residual. Pesticides with a 4-6 week residual are recommended to alleviate this problem, as is frequent pesticide application.

The author has been monitoring bedbug populations on case farms in Mississippi for over a year. The best and cheapest method to find bedbugs in a house is to use small pieces of corrugated cardboard placed inside nest boxes, perch covers and along the eaves of the house inside. Bedbugs will crawl inside of the corrugations to live and will deposit eggs within and on the outside of these mini cardboard condos. Examination of the cardboard inside and out will reveal these reddish brown insects which then can be identified and counted. This system has worked well on a bi-weekly basis to monitor the effectiveness of a pesticide treatment program.

The poultry veterinarians at the Mississippi State University College of Veterinary Medicine Poultry Research & Diagnostic Laboratory in Pearl, MS, and the MSU Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology are continuously looking for interventions to eliminate bed bugs on poultry farms. If you suspect you may have bed bugs, please have your service technician contact us, and we will be glad to try and help.
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INTRODUCTION
A chicken leg is composed of feathers, skin, muscles, tendons, ligaments, cartilage, and bone. Feathers and skin protect the bird from environmental insults such as scratches and germs that may enter via those openings. Muscles and bones make movement possible. Ligaments connect bone to bone and tendons connect muscles to bone. Damage to any of these tissues can have a negative effect on animal welfare, food safety, growth, and profitability. Common causes of leg problems include recessive genetic traits, improper incubation, poor nutrition, exposure to pathogens, unsuitable environmental conditions, and mechanical injury. Typical leg problems may include tendon rupture, femoral head necrosis, rickets, and tibial chondroplasia.

BREEDERS AND HATCHERY
What happens at the breeder farm and hatchery will impact the health of a young broiler. A breeder hen will incorporate the nutrients that she is fed into her egg, which will become a baby chick. If hens and roosters are not cared for properly, then the egg may not be fertile and the chick may not have the nutrients or a functioning immune system to develop properly and fight off microorganisms. The hatchery should be treated similarly to a hospital as far as cleaning and disinfection is concerned, as it has the potential to positively or negatively affect the entire complex. Dirty eggs and hatchery surfaces will contaminate many more eggs with bacteria that can negatively affect the chick. Improper incubation temperatures also are known to increase incidence of twisted or weaker legs. One third to one fourth of a chicken’s life is spent in the hatchery; therefore, it’s very important that the chick gets a proper start early on.

NUTRITION
A broiler chicken grows at a rapid rate due to improved breeding, nutrition, water quality, veterinary care, and housing. Wideman and Prisby (2013) applied a broiler’s growth rate to a human being and determined that a 6.6 pound newborn baby would weigh 660 pounds in 2 months’ time if it grew as quickly as a broiler chicken! A broiler may see as many as 3 diets during a grow-out. Due to this rapid growth rate, rearing and nutrition of the broiler must be as close to perfect as possible. Seemingly minor lapses in feeding or poor environmental conditions may stress the bird and severely affect leg health. Twenty-four hours in the life of a chicken is a significantly long time period when you consider that the grow-out may only take 42-63 days. These lost opportunities for growth are not recoverable due to the short production cycle.

ENVIRONMENT
Chronic stress can have a negative effect on leg health and overall productivity. The bird should be kept as comfortable as possible to reduce stress so that it will do well, as stress can affect immune function and expose the birds to infections from opportunistic pathogens such as Staphylococcus aureus or Escherichia coli. Stressors could be environmental such as heat or cold stress, ammonia, dust, wet litter, insects, rodents, or establishment of a pecking order. Stressors could also be due to exposure to protozoa (coccidia), bacteria, and virus. Contact with these germs could be reduced by vaccination, antibiotics, antibiotic alternatives (such as probiotics), coccidiostats, litter management, and good biosecurity.

DISEASES
Rubbery legs are typically a sign of rickets which may be caused by deficiencies in calcium, phosphorus, and vitamin D. An improper calcium-to-phosphorus ratio could also cause this issue. Pathogens may enter the skeletal system from the gut, respiratory tract, eyes, and skin abrasions negatively affecting bone development and potentially causing tibial dyschondroplasia (TD) and femoral head necrosis (FHN). These diseases are characterized by cartilage plugs in the femur, where marrow should be, and erosion of the diaphysis, respectively. Slipped or ruptured tendons are identifiable when the tendon detaches or tears away from its attachment point no longer connecting muscle to bone. Birds suffering from ruptured tendons will have difficulty walking and will typically have a bruise on the shank ranging from red to green. Birds with mobility issues won’t be able to access feed and water easily and will not grow well.

SOLUTIONS
Practical solutions to improve leg health are limited and it is something that must be managed on a continual basis as conditions change. There are some anecdotal reports that exercising birds by using a sprinkler, pulsed feeding, or light spiking may help. Reduction of pinch points at the hatchery and injuries in the field are critical in reducing incidence of mechanically induced leg complications. Evaluation of nutrition programs at all stages of live production should be done on a continual basis to ensure that breeders and their progeny are getting the nutrients that they require for optimal growth and performance. Ultimately, good management and animal husbandry are needed to maintain leg health. Reducing exposure to pathogens by persistent hatchery sanitation, vaccination, probiotics, proper litter management, and good biosecurity are probably the most effective management practices to reduce leg issues.
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