Volume 5

2 November 2015

PoultryPractices

Oklahoma Cooperative Extension Service

A newsletter for poultry producers and poultry litter applicators...

poultrywaste.okstate.edu

Editor's Column

In this issue, we focus our attention on the largest animal health emergency in US history, highly pathogenic avian influenza. Prevention strategies such as proper biosecurity standards are examined. Response plans including mass mortality management options are outlined. We also cover financial planning before a potential animal disease outbreak. Finally, we introduce our NEW Oklahoma Litter Market website.

For publications, regulatory information, and upcoming classes, visit your local county Extension office or poultrywaste.okstate.edu where you can also obtain archived issues.

Josh Payne

Mortality Management Options During an Avian Influenza Outbreak

Josh Payne, Ph.D.
State Poultry Specialist, OSU

The highly pathogenic avian influenza (HPAI) outbreak has become the largest animal health emergency in US history. As of October 2015, the USDA reports 232 detections (211 commercial facilities and 21 backyard flocks) affecting approximately 50 million birds in 21 states. Impacted farms have remained out of production for several months and trade restrictions have been imposed resulting in economic hardship to both growers and the poultry industry. To date, over $950 million federal dollars have been spent on disease control efforts and indemnities. The last confirmed case of the outbreak occurred in June, 2015; however, there is concern of fall and winter outbreaks due to the migration of waterfowl which are the reservoir for the virus.

Infected birds have either died from the disease or been euthanized to control disease spread. Proper carcass management is vital for managing nutrients and controlling disease. Improper disposal may cause odor nuisance, spread disease, and the resulting leachate (carcass fluids) could negatively impact water sources. The avian influenza virus may still be present within the carcass and could be spread by insects, rodents, predators, and subsurface or above ground water movement, as well as through direct contact with other birds, leading to increased disease transmission risks. For these reasons, proper mortality management practices must be implemented immediately following a catastrophic event.

Mortality management options that were used during the recent HPAI outbreak include composting, burial, incineration, and landfilling. The most commonly implemented option was mass mortality composting which will be discussed later.

Burial requires a site assessment to determine that local environmental guidelines are followed. In most cases, burial can be conducted on-site and quickly.

Sandy soils, karst topography or areas with a high water table pose a risk of contaminating groundwater supplies. Research has demonstrated the potential transport of carcass leachate components, such as nutrients and bacteria, from burial pits to groundwater[1,2,3,4].

Proper incineration requires a closed air unit, can be conducted on-site and is a pathogen inactivation procedure. Depending on the state, an air quality permit may be required. Several incinerators are required during a large animal disease outbreak. Carcass throughput can be a limiting factor.

If locally available, landfilling can be convenient but requires transportation of infected carcasses in large sealed bags. Transportation off-site may increase biosecurity risks during a disease outbreak.

Mass mortality composting was successfully implemented on several poultry operations. The purpose of mortality composting during the HPAI outbreak was to use biological heat treatment methods to degrade the carcass, inactivate the avian influenza virus, control odors and reduce fly exposure in a safe, biosecure, and environmentally sustainable manner.

By definition, composting is a controlled biological decomposition process that converts organic matter into a stable, humus-like product. Composting animal carcasses is characterized by microbial breakdown of a large centralized nitrogen source, the carcass, which is surrounded by a carbon source, the bulking agent. The bulking agent supplies carbon for microbial energy while the carcass tissues and fluids supply nitrogen for microbial protein synthesis. Optimal conditions for carcass composting include a carbon to nitrogen ratio around 30:1 and a moisture content of approximately 50%. The process begins with an initial breakdown of carcass soft tissue by naturally present microorganisms which produce heat, carbon dioxide, ammonia and volatile organic compounds as by-products. Following soft tissue decomposition, thorough mixing of the bulking agent and carcass promotes an ideal blend of carbon and nitrogen for optimum composting. The bulking agent traps leachate and odors produced during the process, therefore acting as a biofilter between the carcass and the environment. The continuous high temperatures (> 131°F) achieved through proper composting will destroy most pathogens including the avian influenza virus. Microorganisms will eventually degrade the carcass leaving only a few remaining bones. This valuable by-product can then be land applied as a fertilizer source, recycling nutrients and organic matter to the soil.

In-house turkey mortality compost windrow

(Photo by Josh Payne)

Composting of mass poultry mortalities is a procedure that can be implemented on most commercial poultry farms. This method requires guidance from a trained composting expert, proper equipment, experienced operators, and sufficient carbon, water and open space. As a result of the outbreak, a national composting technical team was formed by the USDA, and a mortality composting protocol for avian influenza infected flocks was published[5]. This document provides more information on mass poultry mortality composting.

Final compost after 28 days with an average analysis of 60-46-36 (N-P-K; lbs/ton).

(Photo by Mark Wells)

REFERENCES:

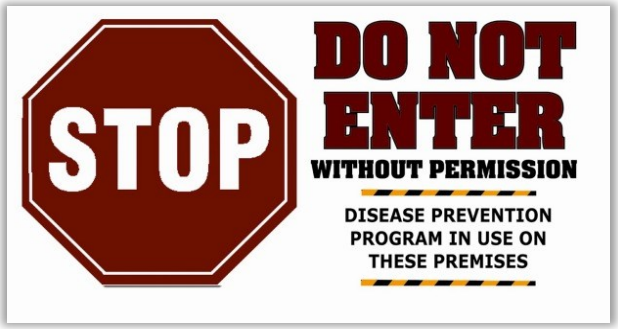
1. Ritter, W.F., and A.E.M. Chirnside. 1995. Impact of dead bird disposal pits on ground-water quality on the Delmarva Peninsula. Bioresour. Technol. 53:105-111.
2. Glanville, T. 2000. Impact of livestock burial on shallow groundwater quality. Proceedings of the American Society of Agricultural Engineers, Mid Central Meeting. St. Joseph, MI.
3. Pratt, D.L., and T.A. Fonstad. 2009. Geochemical implications of livestock mortality burial. 3rd International Symposium on Management of Animal Carcasses, Tissue, and Related Byproducts Proceedings (cd). Davis, CA.
4. Myers, Bush, Segars and Radcliffe, 1999. Impact of Poultry Mortality Pits on Farm Groundwater Quality, Proceedings of the 1999 Goergia Water Resources Conference
5. United States Department of Agriculture (USDA). 2015. Mortality Composting Protocol for Avian Influenza Infected Flocks: September 2015. Accessed October 26, 2015. https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/mortalitycompostingprotocol.pdf

Farm Biosecurity Crucial to Preventing a Disease Outbreak

Josh Payne, Ph.D.
State Poultry Specialist, OSU

In order to help prevent the introduction of highly pathogenic avian influenza (HPAI) or other diseases onto poultry farms, it is imperative that poultry producers adhere to strict poultry farm biosecurity practices. Biosecurity refers to the measures and methods adopted in order to secure a disease-free environment for optimal flock health and profitability of a farm. Diseases can be introduced onto the farm by human movement between houses and flocks and by contamination from vehicles, equipment, feed, water, rodents, wild birds and insects. A major concern with HPAI is the risk of spreading the disease even before symptoms appear in flocks, so diligent biosecurity will be a grower's best defense for prevention. Growers should familiarize themselves with company biosecurity policies and work with company officials to implement these programs. Below are minimum biosecurity standards recently developed by the Arkansas Livestock and Poultry Commission Biosecurity Committee which are recommended for commercial poultry growers.

1. Growers and farm workers should wear farm dedicated clean clothing and footwear.



2. A designated entry and exit point for each house should be identified and footpans with fresh disinfectant and hand sanitizer must be provided at each.

3. Footwear should be cleaned and free of organic material, and then disinfected prior to entering each poultry house.

4. Use hand sanitizer prior to house entry and upon exit.

5. Growers and farm workers should not have contact with other birds.

6. Bird hunting is discouraged. Company personnel should be notified of hunting activities and refer to company specific policy regarding those activities.

7. Visitors to poultry farms should be discouraged (including family and friends). Company personnel and essential contract service providers must follow visitor guidelines when a service call is needed.

8. Do not allow pets, livestock, wild animals or birds to enter poultry houses.

9. Implement effective vegetation, rodent, wild bird, and insect control. The area around the poultry houses should be well maintained and free of debris. Feed spills should be cleaned up immediately.

10. Keep workrooms clean.

11. When poultry are present, sharing of equipment between farms is not recommended. Sharing of equipment between farms must be preapproved by company personnel. Effective cleaning and disinfection of equipment must take place between farms.

12. Observed biosecurity violations should be immediately corrected and reported to company personnel.

13. Growers should have a designated farm vehicle that does not leave the immediate poultry house area and is used only for work on the poultry houses, not for other farm work or recreation. If a designated vehicle is not in use, the external surfaces (tires, wheel wells, etc…) of all vehicles should be cleaned and disinfected prior to entering the farm. Vehicles should be disinfected upon exit of the farm.

14. Biosecurity/Disease Control Area/Keep Out signs will be posted at farm entrance.

15. Keep poultry house doors locked and secure during off hours.

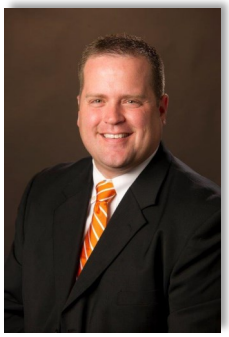
These and other recommended biosecurity practices can help reduce the risk of introducing a poultry disease such as avian influenza onto the farm resulting in continuity of production without major economic loss.

The Oklahoma Cooperative Extension Service proudly continues to provide the state-mandated Poultry Waste Management Education for Oklahoma registered poultry operators and certified poultry waste applicators.

The 2015 Fall Class Schedule is now available online at poultrywaste.okstate.edu or from your local county Extension office.

Preparing for Extended Out Times

Scott Clawson
Area Ag Economist, OSU



Regardless of the driving factor, extended out times for poultry producers can provide some unwanted stress and uncomfortable financial positions. A simple definition of farm liquidity is what cash or assets easily converted to cash are available. While liquidity is talked about and encouraged by those in the financial community, it's often a goal still "in progress" at the farm level. The discussion of avian influenza migrating south has certainly sparked the "what if" conversations. This is certainly one of those. "What if" we were out of production for six months?

Address the Farm Mortgage

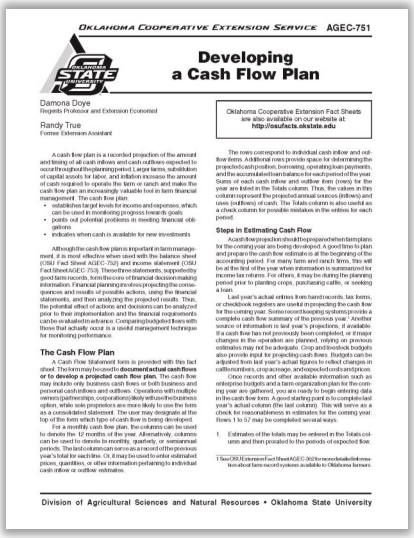
One of the unflattering issues of poultry house financing is that there is most likely only one way to cover the mortgage payment and that of course is through the flock settlements received. The dollar amount and term of the loan creates such a sizeable payment that off-farm income simply can't cover the debt. This creates a dilemma for the farm finance partnership (grower and lender). The first option is to defer these payments and pick them up at the end of the loan . This simply takes the current principal and interest payments and places them at the end of the loan. The important issue is to discuss this in advance with your lender so that both parties can work a solution that is mutually beneficial.

Track All Expenses for At Least One Month

Before we can plan for how to fill a cash shortage, we need to know what the cash shortage will be. One step in this process is to identify what we are spending. In most cases the motivation from tax season keeps farm expense recording front and center. The bigger variables may be on the personal side of things. Start a log or spreadsheet tracking all expenses for at least a month and begin to look for opportunities for some savings.

Complete a Six Month Projected Cash Flow

Using the expense tracking from above, any off-farm or other farm income sources and expected future farm expenses, build a six month projected cash flow. Building a cash flow is the easiest of financial documents to prepare. It is just a list of all monthly income and all monthly expenses. If expenses out- pace income, then we have a deficit. If the opposite happens, we have a surplus. If we add up the results of each of the next six months, we will have an idea of what the cash void will be. Several tools can help producers build a cash flow. One of which is OSU Factsheet AGEC-751 Developing a Cash Flow Plan. Keep on the lookout for farm expenses that will need to be paid regardless of your production or lack thereof. An example of this is your farm hazard insurance. If you are paying a portion of your premium with every flock settlement then this expense will still need to be covered. If we don't cover it now, it could hurt our future cash flow by trying to make up ground on the payment when birds are placed later.



OKLAHOMA COOPERATIVE EXTENSION SERVICE AGEC-751

Developing a Cash Flow Plan

Damona Doye
Regents Professor and Extension Economist

Randy True
Former Extension Assistant

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: http://osufacts.okstate.edu

A cash flow plan is a recorded projection of the amount and timing of all cash inflows and cash outflows expected to occur throughout the planning period. Larger farms, substitution of capital assets for labor, and inflation increase the amount of cash required to operate the farm or ranch and make the cash flow plan an increasingly valuable tool in farm financial management. The cash flow plan:

- establishes target levels for income and expenses, which can be used in monitoring progress towards goals
- points out potential problems in meeting financial obligations
- indicates when cash is available for new investments

Although the cash flow plan is important in farm management, it is most effective when used with the balance sheet (OSU Fact Sheet AGEC-752) and income statement (OSU Fact Sheet AGEC-753). These three statements, supported by good farm records, form the core of financial decision making information. Financial planning involves projecting the consequences and results of possible actions, using the financial statements, and then analyzing the projected results. Thus, the potential effect of actions and decisions can be analyzed prior to their implementation and the financial requirements can be evaluated in advance. Comparing budgeted flows with those that actually occur is a useful management technique for monitoring performance.

The Cash Flow Plan

A Cash Flow Statement form is provided with this fact sheet. The form may be used to **document actual cash flows or to develop a projected cash flow plan.** The cash flow may include only business cash flows or both business and personal cash inflows and outflows. Operations with multiple owners (partnerships, corporations) likely will use the business option, while sole proprietors are more likely to use the form as a consolidated statement. The user may designate at the top of the form which type of cash flow is being developed.

For a monthly cash flow plan, the columns can be used to denote the 12 months of the year. Alternatively, columns can be used to denote bi-monthly, quarterly, or semiannual periods. The last column can serve as a record of the previous year's total for each line. Or, it may be used to enter estimated prices, quantities, or other information pertaining to individual cash inflow or outflow estimates.

The rows correspond to individual cash inflow and outflow items. Additional rows provide space for determining the projected cash position, borrowing, operating loan payments, and the accumulated loan balance for each period of the year. Sums of each cash inflow and outflow item (rows) for the year are listed in the Totals column. Thus, the values in this column represent the projected annual sources (inflows) and uses (outflows) of cash. The Totals column is also useful as a check column for possible mistakes in the entries for each period.

Steps in Estimating Cash Flow

A cash flow projection should be prepared when farm plans for the coming year are being developed. A good time to plan and prepare the cash flow estimates is at the beginning of the accounting period. For many farm and ranch firms, this will be at the first of the year when information is summarized for income tax returns. For others, it may be during the planning period prior to planting crops, purchasing cattle, or seeking a loan.

Last year's actual entries from hand records, tax forms, or checkbook registers are useful in projecting the cash flow for the coming year. Some record keeping systems provide a complete cash flow summary of the previous year.[1] Another source of information is last year's projections, if available. If a cash flow has not previously been completed, or if major changes in the operation are planned, relying on previous estimates may not be adequate. Crop and livestock budgets also provide input for projecting cash flows. Budgets can be adjusted from last year's actual figures to reflect changes in cattle numbers, crop acreage, and expected costs and prices.

Once records and other available information such as enterprise budgets and a farm organization plan for the coming year are gathered, you are ready to begin entering data in the cash flow form. A good starting point is to complete last year's actual column (the last column). This will serve as a check for reasonableness in estimates for the coming year. Rows 1 to 57 may be completed several ways.

1. Estimates of the totals may be entered in the Totals column and then prorated to the periods of expected flow.

[1] See OSU Extension Fact Sheet AGEC-302 for more details on farm record systems available to Oklahoma farmers.

Division of Agricultural Sciences and Natural Resources • Oklahoma State University

Develop a Funding Plan for the Deficit

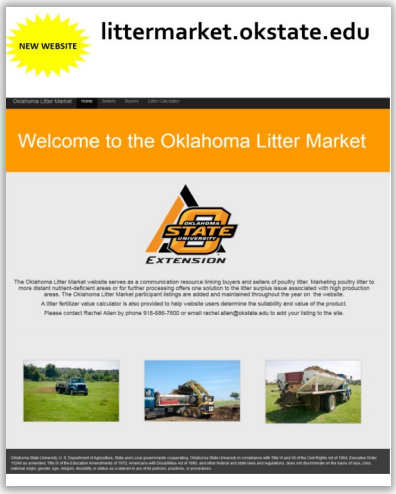
At this point, we should have a number. This number should tell us what the cash deficit will be in this time period. The easy and ideal way would be to have cash/savings available to fund the deficit. If this is not an option, we need to look for funding. External income from short term off-farm income would be another option to pursue. Also, if non-essential equipment has been acquired over the years, it could be liquidated to fund the deficit. Lastly, discussing the development of an operating line of credit to use in this period may be needed. This type of loan will typically have a better interest rate and the terms of repayment can be discussed with your lender. Try to avoid the usage of high interest revolving debt.

The idea of missing six months of production income can be daunting. Keeping open clear lines of communication with your farm team will be important. Your farm team can include your integrator, lender, insurance agent, accountant or others that fit your operation. In addition, it can take years to rebuild a credit score from a short time of financial stress so monitor your score over time. Having a game plan together to overcome prolonged out times, regardless of reason, is one part of your farm management plan that should not be overlooked.

New Site for the Oklahoma Litter Market Unveiled

Rachel Allen
Poultry Waste Management Education
Program Assistant, OSU

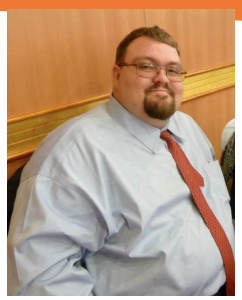
The Oklahoma Litter Market website has a new look and a new web address: littermarket.okstate.edu. The site serves as a communication resource linking buyers and sellers of poultry litter while marketing poultry litter to more distant nutrient-deficient areas.



If you have litter to sell, are looking to buy litter, or provide services such as spreading or trucking, you can add your listing to the site by contacting Rachel Allen by email: **rachel.allen@okstate.edu** or by phone 918-686-7800. The Poultry Litter Value Calculator is also located on this site.

The free fertilizer decision-support computer program is still available to download at **soiltesting.okstate.edu** where you will find tools to assist in comparing the value of litter to commercial fertilizer.

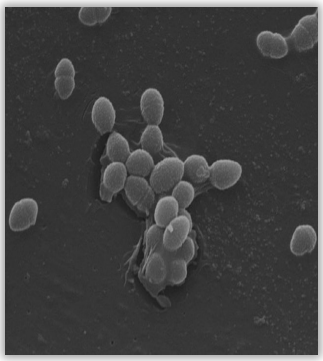
What is *Enterococcus cecorum?*



Justin Talley, Ph.D.
Extension Livestock Entomologist, OSU

Brandon Lyons
Graduate Assistant, Entomolgy and Plant Pathology, OSU

Originally isolated and described from poultry ceca in 1983, it was not until relatively recently that this bacteria has been linked to Spondylitis disease in birds. *Enterococcus cecorum* is considered a normal inhabitant of bird intestines once they are of a certain age. The bacteria are not typically found in day-old chicks but by 3-4 weeks the concentration has risen to 7% of the intestinal bacterial population and 50% in 12-week-old birds. Following this pattern of population increase, *Enterococcus* Spondylitis will affect broilers 6-10 weeks of age.



Where this bacterium resides inside broiler houses is not currently known. A one-year study of several houses in Georgia tested boxliners, litter, and feed for presence of bacteria. No *E. cecorum* was found from any of these sources. Water lines and rodents found inside the houses were tested in a North Carolina study and were also found negative for *E. cecorum*. In the same study researchers tested the parent birds of chicks brought to the houses and while both parents and chicks were found to have the bacteria, they were genetically different. The hatchery in this study underwent rigorous testing of the environment and surfaces including egg residues, chick paper, air in various places, all of which yielded no *E. cecorum*. The next likely source in a broiler house that has not been tested yet is litter beetles. These beetles are in great abundance in most houses and have already been proven to be reservoirs of several pathogens including *Salmonella* spp, and *Campylobacter jejuni* .

So what makes this bacteria leave the intestines and affect the spine of the bird?

The exact cause of this move from the intestine to the other parts of the body is also not understood. It is theorized that a sudden disturbance in gut bacteria balance can cause damage to the intestinal or respiratory layer that would normally provide protection. Even if litter beetles are not carrying *E. cecorum* to poultry, consumption of the beetles by birds may be enough to allow the *E. cecorum* already in the intestine to become systemic. Consumption of litter beetles by chicks has proven to cause Coccidiosis, and spread enteritis-causing pathogens to turkey poults.

While seasonality for the *E. cecorum* and enterococcus spondylitis has not been clearly established, a study in Georgia found that an unusually cold and wet winter saw an increase in disease prevalence. This is possibly caused by a sudden increase in Coccidiosis causing spores in the environment.

So once the bacteria are in the bird's system, why does it affect the sixth vertebra of the spine?

While the 5th and 7th vertebra are also vulnerable, the 6th vertebra, unlike the other vertebra, is not

fused with another vertebra allowing additional mechanical stress that may lead to increased natural inflammation therefore creating a more convenient home for *E. cecorum* that is circulating in the system.

With all the unknowns of this system, what are OSU researchers doing?
OSU researchers in the Entomology department are working to see if the lesser mealworm can pick up *E. cecorum* from the environment and expel it back out into the environment. If this is successful, studies are planned to link the transmission of the bacteria from the environment, through the beetle, and into broilers to verify missing links in the disease cycle.

Continuing Education Requirements for PWME Graduates

If your graduation	These are the fixed three-year blocks for your Continuing Education requirements. Attend one class during each block.*					
12/31/11	01/01/12-	01/01/15-12/31/17	01/01/18-12/31/20	01/01/21-12/31/23	01/01/24-12/31/26	01/01/27-12/31/29
2012	01/01/13-12/31/15	01/01/16-12/31/18	01/01/19-12/31/21	01/01/22-12/31/24	01/01/25-12/31/27	01/01/28-12/31/30
2013	01/01/14-12/31/16	01/01/17-12/31/19	01/01/20-12/31/22	01/01/23-12/31/25	01/01/26-12/31/28	01/01/29-12/31/31
2014	01/01/15-12/31/17	01/01/18-12/31/20	01/01/21-12/31/23	01/01/24-12/31/26	01/01/27-12/31/29	01/01/30-12/31/32
2015	01/01/16-12/31/18	01/01/19-12/31/21	01/01/22-12/31/24	01/01/25-12/31/27	01/01/28-12/31/30	01/01/31-12/31/33
2016	01/01/17-12/31/19	01/01/20-12/31/22	01/01/23-12/31/25	01/01/26-12/31/28	01/01/29-12/31/31	01/01/32-12/31/34

*** Only showing 5 blocks but education could continue past these dates.**

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of $1.50 per copy. 1115