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In This Issue

Avian Influenza and Biosecurity

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It has been a little bit over 2 years since the beginning of the largest Highly Pathogenic Avian Influenza (HPAI) outbreak in North America (NA). The virus that caused this outbreak was genetically identified to be a mix between North American and Eurasian Avian Influenza (AI) viruses. Wild migratory birds are thought to play a prominent role in bringing that virus to NA. While the last case of commercial poultry from that outbreak was reported in late spring of 2015, AI continues to be a threat to the poultry population (commercial and noncommercial) in NA. The clearest evidence of that threat materialized in another HPAI outbreak in January of 2016 which affected the commercial poultry industry. Different from the 2015 outbreak, the 2016 outbreak AI evolved from a purely NA virus. It also seems that the Eurasian virus did not disappear from NA; as it has been isolated from wild mallard ducks on two different occasions from two different locations (Alaska, August and Montana, December) during 2016.

As mentioned before, the 2015 Influenza virus that resulted in the death of close to 50 million birds in the United States was genetically related to an influenza virus that circulated in Asia and Europe throughout 2014. Interestingly, during 2016 a very similar virus is currently very active throughout Asia, Europe and Africa. According to a National Wildlife Health Center report, that was issued in December 2016 ***"… [this] virus was reported in wild birds in Russia (during summer) and India (during autumn). Additional outbreaks have subsequently been reported in a growing list of European countries (Austria, Croatia, Denmark, Finland, France, Germany, Hungary, the Netherlands, Poland, Romania, Serbia, Sweden, and Switzerland) and three countries in the Middle East (Egypt, Israel and Iran). Infected domestic animals have included chickens, ducks, and turkeys; affected wild birds have included at least 16 species of waterfowl, five species of gulls and terns, four species of raptors, two species of grebes, as well as a coot, cormorant, crow, heron, and moorhen"***.

It is important to note that to date, the domestic poultry population (commercial and noncommercial) in the United States is still clear of this virus. However, this situation in Europe and Asia is frighteningly similar to what happened in 2014. It is also important to note that in spite of being deadly to poultry, this group of influenza viruses has NOT been reported to infect humans, neither in the United States nor in other parts of the world.

Calendar
- ODHMCP

*Click **here** to view archives*

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While surveillance and quick diagnosis are essential tools to detect the virus and limit the spread of the disease and eventually control the outbreak, it's the BIOSECURITY efforts that will prevent the infection from reaching your flock, whether it is commercial or noncommercial. Biosecurity can be defined as "the sound sanitary practices that are used to stop the infectious agent from reaching the host". Infectious agents are mostly microscopic in nature (cannot be seen by the naked eye). This means that it is very difficult to detect their movement and transmission from one place to another or from one individual to another. So the only option we have to stop their transmission is to put barriers in the face of these microbes to protect our poultry flocks, even though we can't see them. In case of Avian Influenza and other microscopic infectious disease agents, these "biosecurity" barriers can be physical or chemical. Examples of physical barriers include fences, gates, enclosed poultry houses, or even washing and cleaning. On the other hand, chemical barriers include disinfectants and detergents that are used to kill these microbes.

Before understanding biosecurity practices and the logic behind them, one must understand the dynamics of disease transmission. Infectious diseases in bird populations can be transmitted by two main ways:

1. Direct transmission, which means the infectious agents are transmitted through direct physical contact between infected and uninfected susceptible individuals.
2. Indirect transmission, which means the infectious agents are transmitted through indirect transportation vehicles to reach the susceptible individuals. In case of diseases that affect birds including avian influenza, the indirect transportation vehicles could include:
    - Human
    - Domestic animals including pets
    - Wild animals including varmints, rodents and insects
    - Physical objects including equipment
    - Feed
    - Water
    - Environments including shared pastures, water ponds or even air.

Accordingly, we have to tailor our biosecurity practices "barriers" to stop both direct and indirect transmission.

1. Practices that aim to prevent direct transmission.
    - Avoid contact between your flock and other birds, wild, domestic or otherwise.
    - Prevent your birds from mixing with other poultry or wild birds. Mixing of birds often happens around open water bodies and in open pasture.
    - Whenever possible prevent mixing between species within the same flock, and between multiple ages within the same species.
    - Try to acquire birds from National Poultry Improvement Plan (NPIP) disease free sources.
    - If you bring new birds to your flock, quarantine the new birds for 1 – 3 weeks before mixing with the rest of the flock.
    - If you show birds, attend fairs or perform any activity where birds from different places come together in one place, quarantine the birds for 1 – 3 weeks before mixing back with the rest of the flock.
2. Practices that aim to prevent indirect transmission.

- It is highly recommended NOT to bring any visitors to your bird flock. They could be carriers of diseases on their cloths, their shoes, on their hands or any objects they bring with them.
- It's recommended to have specific cloths and shoes dedicated to working with your birds.
- Additionally, using disposable coveralls, gloves and shoe covers are highly recommended. They are relatively inexpensive, easy to dispose of and efficient in controlling the infection.
- Hands are the number one suspect when it comes to disease transmission. So, wash your hands before and after handling your birds, their feed or their water.
- Wash your hands before and after handling any equipment, bedding material housing material on any object that comes in contact with the birds.
- Hand sanitizing stations (hand sanitizing gels or foams) should be in place and used every time the poultry house is entered or exited.
- Similarly, boots and foot wear play a very prominent role in transmitting diseases. Footbaths with freshly changed disinfectants (changed daily) should be in place and used every time the poultry house is entered or exited.
- In this link (http://www.cfsph.iastate.edu/Disinfection/Assets/Disinfection101.pdf) a very useful document by the Center for Food Security & Public Health from the Iowa State University summarizing available disinfectants. Phenols (on page 13 of the document) are one of the few chemicals that can maintain its activity in hard water and organic matter. It's probably one of the most suitable choices to be used in footbaths.
- Don't bring your pets or allow them access to your birds.
- It is essential to house the birds in animal proof/bird proof houses.
- It is very important to have effective rodent and insect control program. Rodents and insects are notorious for transmitting not only poultry diseases but also human disease.
- Equipment, bedding, housing materials or any other objects that comes in contact with the birds should be thoroughly cleaned and properly disinfected before using with your birds.
- Acquire your feed from trusted sources and properly store the feed in a dry, cool and clean place, shielded form access by other birds and animals, particularly rodents.
- Drinking water for birds should be the same quality as drinking water for humans. Surface water from rivers, ponds or puddles is particularly dangerous as it often contains infectious disease agents from migratory wild birds.
- If possible, try to house your birds at a distance (1/2 mile) away from other poultry and wild bird gathering areas.

These practices should be adopted by anyone who owns, grows or handles poultry. They also should be implemented at all times and in all situations. Obviously, different farms and different poultry houses, whether they are commercial or noncommercial, can use countless ways to implement these practices. While you are using the concepts discussed in this article to design your own biosecurity program to fit your own situation, keep the following goal in mind:

"On one hand, there is a worst case scenario when it comes to biosecurity, and that is a mixed species, mixed aged poultry flock that comingles with wild birds and other poultry flocks. On the other hand, there is the best case scenario which is single species, single age poultry flock, all-in-all-out, shower-in-shower-out facility. So, even if you can't be in the best case scenario, you should do everything in your powers to be as close as possible to the best case scenario and you should do everything in your powers to be as far as possible from the worst case scenario. When it comes to biosecurity, never say there is nothing that I can do to protect my birds, there is always something to do to improve your situation".

Every small improvement you make in biosecurity level will pay great dividends in terms of protecting your poultry flock from infectious diseases. Absorb these biosecurity concepts and structure you routine, and your sequence of movements working with poultry around biosecurity. The way you perform your clothing change, the way you step in and out of a poultry house, the sequence at which you schedule your visits to different flocks are all valid points to consider in your biosecurity program. Nothing is too small to consider.

The Link below is an updated for the latest detection of the Eurasian virus in the USA.

- https://content.govdelivery.com/accounts/USDAAPHIS/bulletins/17f3c54

In the link below is additional information about the history of this influenza outbreak worldwide.

- https://www.nwhc.usgs.gov/publications/wildlife_health_bulletins/WHB_2016-08_HPAI_Update.pdf

It also offers recommendations and additional resources regarding safe handling of wild birds.

Finally, if you experience sudden disease signs or sudden mortality in your flock, please contact:

Animal Disease Diagnostic Laboratory
8995 East Main Street
Reynoldsburg, OH 43068-3399
Phone: (614) 728-6220
Email: animal@agri.ohio.gov

OR

Ohio Poultry Association
Phone: (614) 882-6111
Email: info@ohiopoultry.org

Research

Habing, G., Djordjevic, C., Schuenemann, G. M., & Lakritz, J. (2016). **Understanding antimicrobial stewardship: Disease severity treatment thresholds and antimicrobial alternatives among organic and conventional calf producers**. *Preventive Veterinary Medicine, 130*, 77-85. doi: 10.1016/j.prevetmed.2016.06.004

BACKGROUND: Stewardship programs within livestock seek to decrease the total quantity of therapeutic antimicrobial use through reductions in disease incidence, utilization of antimicrobial alternatives, or more stringent diagnostic criteria (higher selectivity) for initiating antimicrobial therapy. In addition, the substantial economic

penalty for antimicrobial treatment (culling the animal) within organic production systems results in frequent use of non-traditional antimicrobial alternatives with undocumented efficacy; however, the types, usage frequency, and perception of efficacy of specific alternative therapies are unknown.

PURPOSE: The objective was to objectively measure selectivity for antimicrobial use using a disease severity treatment threshold for calf diarrhea among conventional dairy producers. In addition, this study aimed to characterize the usage frequency and perception of efficacy of antimicrobial alternatives among organic and conventional producers.

RESULTS: The survey response rate was 49% (727/1488). Overall, 42% of conventional producers reported any veterinary-written treatment protocol, and 27% (113/412) of conventional producers had a veterinary-written protocol for the treatment of diarrhea that included a case identification. The majority (58%,253/437) of conventional producers, but a minority (7%) of organic producers disagreed that antibiotic use in agriculture led to resistant bacterial infections in people. Among conventional producers, the pro-portion of producers applying antimicrobials for therapy increased from 13% to 67% with increasing case severity. The treatment threshold was low, medium, and high for 11% (47/419), 57% (251/419), and 28%(121/419) of conventional producers, respectively. Treatment threshold was not significantly associated with the use of protocols or frequency of veterinary visits; however, individuals with more concern for the public health impact of livestock antimicrobial use had a significantly higher treatment threshold. Alternative therapies were used by both organic and conventional producers, but, garlic, aloe, and "other herbal therapies" with little documented efficacy were used by a majority (>60%) of organic producers.

CONCLUSIONS: The authors concluded that these findings highlight a need for additional research focused on antimicrobial alternatives and opportunities and potential barriers for improved antimicrobial stewardship. Specific needs include more widespread application of herd-specific veterinary written protocols and appropriate education and training of farm personnel on accurate diagnostic criteria for the initiation of antimicrobial treatment.

ACCESS THE ARTICLE…

Gott, P. N., Rajala-Schultz, P. J., Schuenemann, G. M., Proudfoot, K. L., & Hogan, J. S. (2016). **Effect of gradual or abrupt cessation of milking at dry off on milk yield and somatic cell score in the subsequent lactation**. *Journal of Dairy Science*. Advance online publication. doi: 10.3168/jds.2016-11444

BACKGROUND: Multiple studies have been conducted to investigate the best method to dry off cows, often in regards to mammary health, but many of these studies were conducted several decades ago when milk production per cow was substantially lower than what is seen in most dairies today. Despite past studies indicating the beneficial effects of gradual cessation of milking on udder health, abrupt cessation of milking is predominantly used and commonly recommended in the United States.

PURPOSE: The objective was to assess the effect of milk cessation method (abrupt or gradual) at dry off on milk yield and SCC up to 120 DIM during the subsequent lactation using DHIA test-day records.

RESULTS: Overall, milk cessation method was not significantly associated with either milk yield or somatic cell score in early lactation; however, interaction between the milk cessation method and herd was highly significant. Cows producing greater amounts of milk around dry off had significantly higher somatic cell score in the following lactation. Shorter dry periods were significantly associated with decreased milk yield in the following lactation, especially among abruptly dried off cows. Additionally, as expected, several other factors, such as parity of cows and stage of lactation, were significantly associated with both outcomes. No interactions between the milk cessation method and the other explanatory variables in the final models were significant.

CONCLUSIONS: The authors concluded that their results suggest that higher milk yield at dry off was associated with higher somatic cell score in the following lactation, even though milk cessation method at the end of lactation had a varying effect on test-day milk yield and somatic cell score in different herds during the first 120 days in milk in the following lactation. The specific herd characteristics influencing this could not be identified within this study, warranting further research.

ACCESS THE ARTICLE…

Marti, S., Wilde, R., Moya, D., Heuston, C., Brown, F., & Schwartzkopf-Genswein, K. (2017). **Effect of rest stop duration during long-distance transport on welfare indicators in recent weaned beef calves**. *Journal of Animal Science*. Advance online publication. doi: 10.2527/jas2016.0739

BACKGROUND: The transportation of livestock in Canada is regulated by the Health of Animals Act (1990) indicating that weaned calves cannot be confined on a truck for more than 48 hours without being unloaded for a minimum of 5 hours to provide animals with food, water, and rest somewhere along the journey. There is a lack of science-based information regarding the relationship between rest stop duration and welfare outcomes in cattle.

PURPOSE: The objective was to determine the effect of varying rest stop lengths on the welfare of newly weaned calves transported for a total of 20 hours.

RESULTS: No differences in body weight loss were observed among treatments after transportation. Standing time was greater in the no rest group or control (CON) calves compared to 5-hour rest (RS5), 10-hour rest (RS10), and 15-hour rest (RS15) calves. Salivary cortisol was greater in CON and RS15 than in RS5 and RS10 at the end of the 20-hour journey. Serum NEFA concentration was greater in RS5 and RS10 at arrival compared to CON and RS15, but those differences were no longer observed 48 hours after transportation ended. Concentration of substance P did not differ between treatments and haptoglobin concentration tended to be greater in CON calves compared to the other treatments 48 hour after arrival. Hair cortisol tended to be lower in RS5 compared to the other treatments.

CONCLUSIONS: The authors concluded that rest stop periods equal to or more than 10 hours did not prevent short and long-term stress assessed with cortisol, and did not improve average daily gain 25 days after transport. This study provides some evidence that rest stop duration has direct impact on beef cattle health and welfare at arrival, but not within 48 hours after arrival.

ACCESS THE ARTICLE…

Chen, J. M., Stull, C. L., Ledgerwood, D. N., Tucker, C. B. (2017). **Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete**. *Journal of Dairy Science*. Advance online publication. doi: 10.3168/jds.2016-11972

BACKGROUND: Compared with housing systems that have primarily concrete flooring, systems that have dirt surfaces such as drylots may provide advantages for animal welfare; however, a potential disadvantage is that cattle in drylots are less sheltered from the elements than with indoor housing. Although previous studies have examined cattle responses to wet weather, little is known about the effects of exposure to muddy surfaces alone, and no studies have systematically varied the level of soil moisture.

PURPOSE: The objective was to evaluate the effects of muddy conditions, separate from rain and wind, on the behavioral and physiological responses of dairy cattle.

RESULTS: Cattle spent less time lying down in muddier conditions, especially in the first 24 hours of exposure, when cows and heifers spent only 3.2 and 5.8 hours, respectively, lying down in the muddiest treatment compared with 12.5 and 12.7 hours on dry soil. When the soil was dry, cattle never chose to lie down on concrete, but in muddier

conditions they spent a greater proportion of their lying time on concrete. The shift in lying location was more marked for heifers, and all 6 spent ≥87% of their lying time on concrete in the muddiest treatment. When cattle chose to lie down on wetter soil, they limited the surface area exposed to their surroundings by tucking their legs beneath their bodies. Despite cattle spending less time on wetter soil, all 3 measured body parts became dirtier in muddier. In addition, higher soil moisture levels resulted in greater reductions in white blood cell counts relative to baseline levels.

CONCLUSIONS: The authors concluded that their study demonstrates that wet soil, even in the absence of wind or rain, has negative implications for cattle welfare. This underscores the importance of preventing mud accumulation, for example through drainage, rainwater diversion, and manure management.

ACCESS THE ARTICLE…

Calendar

A full calendar of all upcoming events and continuing education opportunities offered by the College of Veterinary Medicine is available on the website at **http://vet.osu.edu/**

Ohio Dairy Health and Management Certificate Program

Module 9 – Dairy Record Analyses

- February 2-3, 2017
- Hilton Garden Inn; Columbus, Ohio

Spots are always available for specific module plan

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