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In This Issue

From the Editor – As I write this note for the Spring newsletter, I'm looking out the window on a very white landscape! Although it feels like winter it's worth remembering that summer is just around the corner. If you haven't done so already consider preparing for upcoming seasonal considerations such as heat stress, pinkeye, parasite management, and potential biosecurity issues associated with fairs and shows. If you haven't thought about your biosecurity strategies lately, you might consider checking out a biosecurity webinar series that was created as a collaboration between UC Davis, Colorado State University and Washington State University. It was developed with small farms in mind but provides food for thought for anyone interested in basic biosecurity principles or more advanced biosecurity preparation. For those of you with an interest in biosecurity, the go-to for resources can be found at The Center for Food Security & Public Health.

If you have a farm of any size and would like some help reviewing your biosecurity plans, please feel free to contact me (cmcconnel@wsu.edu) to discuss options for an onsite visit. We have two DVM candidates participating in an Extension internship this summer with the goal of helping develop basic and advanced biosecurity plans for producers. See below for specific information provided by Dr. Minden Buswell (WSDA Reserve Veterinary Corps Coordinator/Epidemiologist II) regarding the implementation of Secure Food Supply Plans. Beyond local and regional biosecurity concerns, most of you are likely aware of the national issue we are currently experiencing with Highly Pathogenic Avian Influenza. Dr. Dana Dobbs (WSDA Avian Health Program Lead) provides an update on the situation in an article you can find below as well.

I should also mention that for those of you who only saw the hyperlink-based emailed version of our Winter 2022 newsletter, you might have noticed that my opening remarks didn't line up with the first article. Updates from our ongoing research investigations were mistakenly left out of that version of the newsletter and only landed in the pdf version you can access via the above link. Our research endeavors will continue this summer as we progress with the concept of applying summary measures of health to dairy population medicine. We are continuing to investigate the long-term impacts of pre-weaning subclinical and clinical disease on dairy heifer productivity and survivability. Furthermore, Dr. Leal-Yepes and his research team will be moving forward with a project that is investigating the use of timely and effective fluid therapy to restore hydration, electrolytes, acid-base balance, and crucial nutrients to calves experiencing GI disease. We'll keep you posted as these projects progress and results come to light.

Other than that, let's hope that this most recent blast of winter is the last and spring will soon be out in all its glory! Enjoy the increasing warmth and light and I'll look forward to connecting with many of you over the coming months.

Small Ruminants: Caseous Lymphadenitis and Biosecurity

By CS McConnel, Veterinary Medicine Extension

As we near the summer months and increasing opportunities for attending shows, fairs, etc., it is worth reconsidering how you manage your animals' biosecurity. Caseous lymphadenitis (CL) caused by *Corynebacterium pseudotuberculosis* is a particularly concerning disease that was covered here last year by Dr. Claire Burbick, and for which the Washington Animal Disease Diagnostic Laboratory (WADDL) has an excellent resource site: https://waddl.vetmed.wsu.edu/animal-disease-faq/caseous-lymphadenitis. As a reminder of the biosecurity challenges inherent to preventing the introduction of CL to your animals, check out the following results from samples that were processed through our Field Disease Investigation Unit laboratory. These 15 samples were processed as part of an investigation into potential exposures to CL. Sample types were comprised of swabs, soil, and bedding. DNA was extracted and a commercial Real Time-PCR kit was used to detect *C. pseudotuberculosis*. As you can see, *C. pseudotuberculosis* DNA was present on one of the ear tag applicators even after being subjected to a chlorhexidine rinse. This was likely due to residual organic matter that remained after the rinse. In other words, when considering biosecurity for your animals keep in mind that limiting exposures to infectious pathogens often is a function of basic hygiene. After all, cleanliness is next to godliness!

Sample Location	***Corynebacterium pseudotuberculosis***
Washing area	Absent
Barn walkway	Absent
Weight scale station	Absent
Scale (right)	Absent
Scale (left)	Absent
Pen #1	Absent
Pen #2	Absent
Fences #1	Absent
Fences #2	Absent
Fences #3	Absent
Fences #4	Absent
Ear tag applicator #1	Present
Ear tag applicator #1 after disinfection with chlorhexidine	Present
Ear tag applicator #2	Absent
Ear tag applicator #2 after disinfection with chlorhexidine	Absent

Goats-Scrapie and Genotyping

By CS McConnel, Veterinary Medicine Extension

USDA-APHIS recently published an Information Brief regarding findings related to scrapie and genotyping in goats. This information came from the National Animal Health Monitoring System (NAHMS) Goat 2019 study. As you probably already know, scrapie is a fatal, degenerative disease of sheep and goats that mainly affects the animals' brain and spinal cord. Scrapie belongs to a group of diseases called transmissible spongiform encephalopathies (TSEs). TSEs are caused by an infectious agent known as a prion. What you may not know is that in the United States, the economic impact of scrapie is estimated to be $10 to $20 million per year.

Obviously, that means that eliminating scrapie would be beneficial to small ruminant industries, and scrapie genotype testing is one mechanism to help breed goats that are less susceptible to the disease.

The full USDA-APHIS Information Brief is quite informative, with the conclusion being that goats with genotypes less susceptible to scrapie are found on many goat operations across the United States, but only one-third of all U.S. goats carry the genotypes that are less susceptible to scrapie.

Scrapie in U.S. sheep has been greatly reduced, in part because of breeding for genetic resistance. Scrapie-resistant sheep develop clinical signs much later in life, if ever, and shed fewer scrapie prions, reducing the amount of the infectious agent on the farm. Actions that helped reduce scrapie in sheep are now being advocated for in goats.

These actions include official identification, testing, and breeding for resistant genotypes. Biosecurity actions such as limiting outside herd additions and purchasing breeding animals from scrapie free herds, as well as breeding for scrapie genetic resistance, are important ways to prevent scrapie in goat herds. An efficient method to increase the prevalence of scrapie resistant genotypes in a herd is to only breed bucks that carry genotypes less susceptible to scrapie. Producers are urged to work with their veterinarian regarding rules for official identification, test their animals on farm and at slaughter, and consider breeding scrapie resistance into flocks and herds.

Cattle: *Tritrichomonas Foetus* Testing Update

By Tim Baszler, Executive Director, Washington Animal Disease Diagnostic Laboratory

Bovine trichomoniasis is a disease regulated by the Washington State Department of Agriculture that causes reduced reproductive performance in cattle herds. Bovine venereal trichomoniasis is caused by *Tritrichomonas foetus*, a flagellate protozoan parasite. *T. foetus* lives in the reproductive tracts of bulls and cows and has worldwide distribution. The widespread use of artificial insemination in many areas of the world has helped to reduce the prevalence. Trichomoniasis is still of importance in herds where artificial insemination is not used and requires culling of infected carrier bulls. Details related to diagnosis and official regulatory testing for bovine trichomoniasis in the State of Washington can be found at https://waddl.vetmed.wsu.edu/animal-disease-faq/trichomoniasis.

Major highlights of bovine trichomoniasis testing:

- Detection of infected carrier bulls requires laboratory testing and the official laboratory test in the state of Washington for bovine trichomoniasis is the polymerase chain reaction (PCR) test.
- WSU-WADDL is an official testing laboratory for bovine trichomoniasis in the state of Washington.
- Samples for bovine trichomoniasis testing should be submitted on a WADDL "Trichomoniasis PCR Accession Form".
- WADDL is offering a PCR test that is more sensitive than the currently used PCR test. This "Trich Direct Realtime PCR" test utilizes phosphate buffered saline (PBS) or lactated ringers solution (LRS) as the primary transport medium. WSU-WADDL is the only Washington laboratory recognized by the State Veterinarian for official trichomoniasis testing and conducts testing using a quantitative PCR (qPCR) method.
- The required sample for "official" detection of trichomoniasis in bulls is a smegma sample from either a preputial scraping or preputial wash taken by an accredited veterinarian registered by the WSDA. WADDL has validated the direct smegma PCR assay when samples are inoculated into either 2mL PBS in a 15mL

screw cap tube, 2mL LRS in a 15mL screw cap tube, or other acceptable transport media (e.g., commercial Trichomonas test media/TF transport tubes that are in date).

- **Method 1**: Samples collected into either PBS or LRS and refrigerated at 4°C and received at the laboratory within 5 days post-collection.
- **Method 2**: Sample collected into either PBS or LRS and frozen at -20°C and received at the laboratory within 7 days post-collection.

The bottom line is that the *T. foetus* PCR used in WADDL as of April 2022 is more sensitive than the PCR test used previously. For more information regarding the "Trich Direct Realtime PCR" test you can check out this article in the Journal of Veterinary Diagnostic Investigation. This test has been accepted by multiple states for official "Trich" testing and as mentioned above, the test is more convenient for veterinarians because it utilizes PBS or LRS as the transport medium rather than Trichomonas test media. To reiterate, the new test also is accepted as the official test for trichomoniasis by the WSDA if submitted to an official laboratory using the methods and shipping times described above (5 days for refrigerated samples and 7 days for frozen samples). It should be mentioned, however, that samples must not be pre-pooled within tubes by the submitting veterinarian but can be pooled after receipt of in the laboratory. This is so that individual animals within a pool can be accurately identified (e.g., individuals in positive pools are re-tested individually). For more information regarding trichomoniasis please contact WADDL at 509-335-9696 or check out the site mentioned above.

Cattle: Understanding Liver Abscesses

By CS McConnel, Veterinary Medicine Extension

Liver abscesses in cattle significantly affect the beef industry through the loss of a condemned liver and often all viscera, as well as through reduced animal performance, diminished carcass yield, and decreased processor efficiency. A recent article by Herrick et al. (Applied Animal Science, Vol 38, Issue 2) does a nice job of presenting the information summarized below related to live abscess frequency, bacterial presence, and associated costs. Their study was conducted using observational liver audits at 7 fed-beef (n = 130,845 livers) and 4 cull-beef (n = 30,646 livers) processing facilities. Per their results, the average liver abscess incidence was 20.3% for cattle slaughtered at fed-beef processing facilities. Within fed-beef processing facilities, High Plains and Northeast regions had the greatest ($P < 0.01$) edible liver incidence rates (76.9 and 72.9%, respectively), whereas the Pacific Northwest region had the lowest edible liver incidence rate (46.8%). Furthermore, the greatest ($P < 0.01$) total abscess incidence rate for a fed-beef processor occurred in the Pacific Northwest (33.8%), whereas the Northeast region had the fewest liver abscesses (10.0%).

The authors suggested that because cattle finished in the Northeast are more likely to be fed a silage-based ration with the large particle sizes promoting increased feeding duration and decreased rates of intake in comparison to most concentrate feeds. Furthermore, a silage-based ration leads to a dilution in energy density that may have contributed to reduced abscess incidence rates in comparison with those fed a "traditional" midwestern or western feedlot diet that is not likely silage based.

Grain type is purported to affect the incidence of liver abscesses, and in the Pacific Northwest wheat and barley are commonly produced and incorporated into feedlot rations. These grains are rapidly fermented in the rumen, which allows for greater variations in ruminal pH and the subsequent development of acidosis, ruminitis, and liver abscesses. In addition to an increased liver abscess incidence observed at the processor in the Pacific Northwest region, cattle from the Pacific Northwest region also had the greatest ($P < 0.01$) incidence of other abnormalities compared with the remaining fed-beef facilities (10.2 vs. 2.8%, respectively). This was primarily due to increased incidence of liver flukes, which contributed to the decreased rate of edible livers. The lifecycle of a liver fluke is dependent on its snail transitional host; therefore, the distribution of the parasite is limited to geographical areas (Gulf Coast and Pacific Northwest) where annual rainfall is high and pastures are poorly drained.

When data were segregated by cattle type, Holsteins had greater ($P < 0.01$) abscess incidence rates (25.0%) than fed-beef steers (18.2%) or heifers (19.1%). Reasons for greater liver abscess incidence in Holsteins are not known, but the predominant theory is based on increased days on a high-energy diet. Holsteins are on feed for longer periods of time than conventional fed-beef animals (300 to 400 d on feed for Holsteins vs. 120 to 150 d on feed in non-Holstein beef). Additionally, Holstein steers have a greater daily DMI (on average, up to 12% greater) than beef breeds at similar weights, which is attributed to an increased maintenance energy demand due to a greater proportion of GI and organ tissue. Furthermore, increased DMI increases the fermentable substrate in the rumen, allowing for prolonged ruminal fermentation and greater decreases in rumen pH. Interestingly, it also is plausible that management of Holstein calves might affect rumen health and total abscess incidence. Holstein calves are commonly removed from their dams immediately after birth and are bottle fed as they are transitioned to concentrate diets, with some calves being completely weaned by 4 wk of age. As with feedlot cattle, calves may experience acidosis, and damage to the epithelial lining of the rumen may promote the development of rumen wall abscesses. Although feedlot cattle undergo these conditions at an older age, Holstein calves undergo them early in life because they spend less time on milk and are transitioned to an energy intensive diet before most non-Holstein beef. The increased potential for acidotic events throughout the life of a fed Holstein may further contribute to the increased incidence of liver abscesses.

In terms of bacterial presence, *Fusobacterium necrophorum* ssp. *necrophorum* was identified in 79.9% of abscesses from fed-beef processing facilities and 76.9% of abscesses from cull-beef plants. *Fusobacterium necrophorum* ssp. *funduliforme* was isolated from 24.3% of abscess samples taken from fed-beef processors and 17.6% of abscess samples collected at cull-beef facilities. Liver abscesses cultured from the Pacific Northwest region had the greatest ($P < 0.05$) incidence (44.0%) of *F. necrophorum* ssp. *funduliforme.* Of the 2 subspecies isolated, *F. necrophorum* ssp. *necrophorum* is the more virulent strain of *F. necrophorum* due to its increased production of leukotoxin which results in lysis of leukocytes (white blood cells) and releases products that are cytolytic to hepatic parenchymal cells, contributing to the accumulation of purulent and necrotic material in the liver which forms the basis of a liver abscess.

Trueperella pyogenes was present in 14.8% of abscesses from fed-beef processing facilities and in 8.8% of abscesses from cull-beef processors. *T. pyogenes* was not detected in liver abscesses from fed-beef facilities in the Central Plains, Desert Southwest, and High Plains regions or at cull-beef facilities in the West Coast region. In contrast, *T. pyogenes* was present in 60% of Pacific Northwest samples.

Fusobacterium necrophorum, regardless of subspecies, and *T. pyogenes* were present together in 14.3% of abscesses from fed-beef facilities and 8.8% of samples collected from cull-beef processing plants. Of all the geographic regions, the Pacific Northwest had the greatest ($P < 0.01$) incidence (56.0%) of both *F. necrophorum* and *T. pyogenes* within the same liver abscess. As noted above, the Pacific Northwest had the greatest total

abscess incidence, which may have resulted from the increased incidence of *F. necrophorum* and *T. pyogenes* together within
liver abscesses. A pathogenic synergy exists between *F. necrophorum* and *T. pyogenes. T. pyogenes* uses oxygen to create anaerobic conditions, which creates a favorable environment for *F. necrophorum*. Furthermore, the waste product of *T. pyogenes* is lactic acid, which is the primary energy substrate of *F. necrophorum.*

No differences (P = 0.48) in total visceral losses ($/animal) were noted by region or cattle type (P = 0.86). Fed-beef losses were estimated at $2.05/animal due to liver abscess and other abnormalities, whereas cull-beef losses were estimated at $1.05/animal. Total viscera losses are composed of losses due to liver abscess ($1.46/ animal, fed beef; $0.60/animal, cull beef), losses due to liver contamination ($0.43/animal, fed beef; $0.23/animal, cull beef), and losses due to other abnormalities ($0.16/ animal, fed beef; $0.22/animal, cull beef). Therefore, using calculated values for national, annual fed- and cull-beef slaughter cattle, viscera losses for fed beef are estimated at $53.1 million ($37.7 million due to liver abscesses, $11.1 million due to contamination, and $4.3 million due to other abnormalities) annually, and $6.8 million ($3.9 million due to liver abscesses, $1.5 million due to contamination, and $1.4 million due to other abnormalities) for cull beef. Based on conservative estimates, liver abscesses and other abnormalities cost beef processors approximately $60 million annually in viscera losses, with liver abscesses accounting for $41.6 million in losses. Because the incidence and severity of abscesses are increased in Holsteins, their potential to negatively affect the industry is magnified, so additional management practices may need to be implemented to minimize their potential negative effects on the beef industry.

Public Policy: Cattle Contract Library Act

By CS McConnel, Veterinary Medicine Extension

A little over a month ago, the Senate passed the Fiscal Year 2022 Omnibus Appropriations package. In addition to providing funding for several programs of importance to U.S. beef cattle producers, the package also included a Cattle Contract Library pilot program. This new program will be similar to the swine contract library currently administered by the USDA's Agricultural Marketing Service (AMS). The National Cattlemen's Beef Association (NCBA) views this as a critical tool to help increase market transparency for cattle producers. Per the NCBA, the pilot program marks a win for the U.S. cattle industry as it equips producers with the market data they need to make informed business decisions and work to capture more value. As NCBA Vice President of Government Affairs, Ethan Lane stated that, "This pilot program will allow USDA to work on the model for a contract library that works for everyone in the supply chain while Congress and industry continue to work out the details of a permanent library in subsequent legislation like the Cattle Contract Library Act."

If you have not been following this issue, in December 2021, Representative Dusty Johnson's (South Dakota) Cattle Contract Library Act (H.R. 5609) passed by 411-13. However, it did not come up for a vote in the U.S. Senate. H.R. 5609 creates a library for cattle contracts within USDA's AMS Department. Currently, cattlemen are unaware of contract terms being offered by packers, leading to a decline in leverage for smaller producers during price negotiations.

It should be noted, however, that the North American Meat Institute is critical of the pilot program for failing to obtain industry input. The group notes that the Cattle Contract Library pilot program will require beef packers to report private business information to the government that will then be published, but it blocks public comment on the proposed rules for the program. "Congress and the administration say they value transparency in the beef and cattle market, yet they bury this rider without debate in a giant spending bill and direct USDA to create the pilot program without any feedback from beef companies or cattle producers," says Meat Institute

President and CEO Julie Anna Potts. “There will be no opportunity for companies to provide valuable perspective on what information should be included or how it should be reported.”

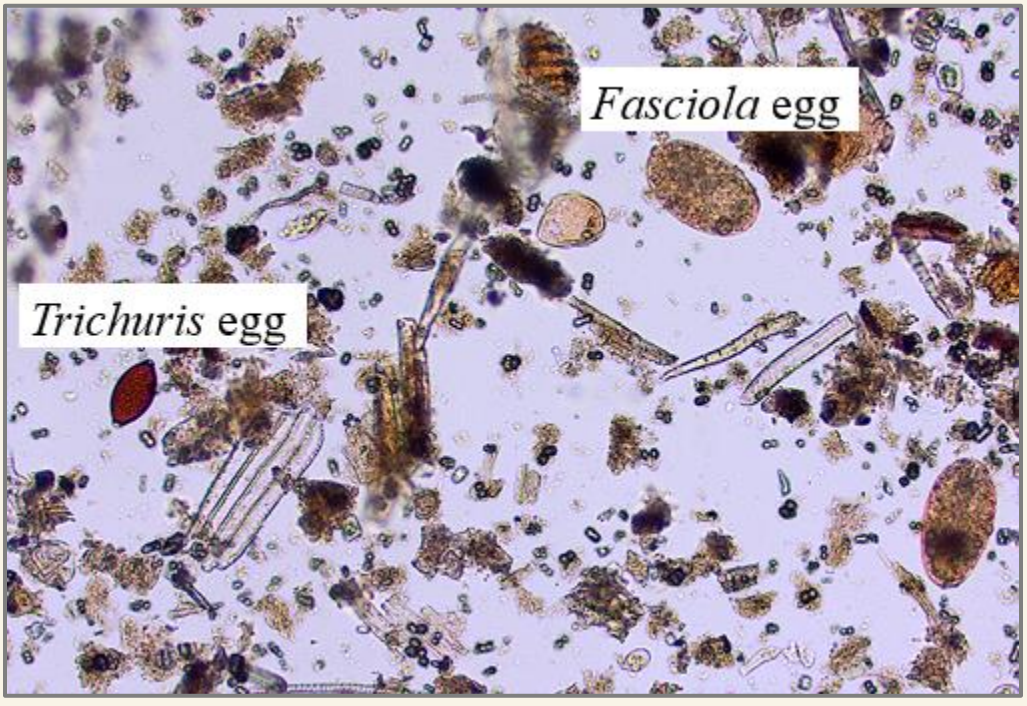
Clearly it will be interesting to see how this all plays out and where the Cattle Contract Library pilot program leads. For those of you who are interested in this topic, check out the USDA AMS Swine Contract Library Information to get a sense what is up for discussion.

WADDL: Improved Parasitology Consultation Services

By Laura Williams, Parasitology Section Head

Have questions about diagnosing, treating, or controlling parasites in your livestock? Unsure if you’re dealing with *Haemonchus contortus*, *Trichuris ovis*, or *Fasciola hepatica* (**Figure 1**)? Good news! The Washington Animal Disease Diagnostic Laboratory is expanding its parasitology section! WADDL has provided comprehensive parasite diagnostics for years- including fecal floats, fecal sedimentations, Baermann testing, and parasite identification. With the recent addition of a full-time parasitology technician, WADDL’s capacity for performing these procedures continues to improve. Notably, WADDL offers the expertise of Dr. Laura Williams, WSU’s first board-certified veterinary parasitologist. Dr. Williams received her DVM from WSU in 2013, completed her anatomic pathology residency and obtained a PhD in infectious disease at WSU in 2018. Dr. Williams is currently an Assistant Professor at WSU, and provides surgical biopsy and necropsy services in the Washington Animal Disease Diagnostic Laboratory. Dr. Williams is currently the only veterinarian in the world board certified in both anatomic pathology and parasitology. Dr. Williams teaches the Veterinary Parasitology course in the DVM curriculum and leads the parasitology section in WADDL. She has a special interest in parasites affecting herd health. So the next time you submit a fecal sample to WADDL, don’t hesitate to reach out to Dr. Williams for advice (lartz@wsu.edu; 509-335-3882) on how to optimize the appropriate parasite diagnostic tests or to discuss treatment and control management strategies!

Figure 1. *Trichuris ovis* and *Fasciola hepatica* eggs identified via a fecal floatation.



WSDA: Tailgate Talks (Dad knows best—know when to test)

By Dr. Amber Itle, WA State Veterinarian

I think it's safe to say that the most important things I've learned in life have occurred on the tailgate of a pickup truck or at the tail end of a cow. This is the first of a multi-part series, where I will sit down on a tailgate or at the tail end of a cow and talk to veterinarians and producers about best practices.

I remember growing up riding along with my Dad on vet calls and getting to "hold the tail" while he worked his magic on a calving or doing pregnancy checks. The tail end of the cow is where the action is, but it's also the best place to listen and learn. Little did I know that holding the tail, meant so much more, it was holding on to information that would guide my professional journey.

I headed back home over spring break, so my kids and I could help "Pappy Joe" with the annual blood test at our family's dairy farm. For as long as I can remember, we have tested the entire herd of adult cattle every year for a series of diseases. You might be thinking, why would you do that? Is it another government program making you test unnecessarily? Do you have a really high death or disease prevalence driving that decision? Are you nuts? Well, the answer is yes, no and maybe!

My Dad, Dr. Joe Itle, celebrates 50 years of bovine practice this year and I thought it would be fun to sit down with him on the tailgate and follow him behind the cows to find out the answers to those hard questions.

What diseases do you test for and why?

The diseases we test for is really herd dependent. Many diseases have significant economic losses associated with them, so we picked the ones with the biggest impacts.

We started annual testing with the onset of the mandatory brucellosis and tuberculosis programs in the 1970s to gain accredited, certified status to allow for easy cattle movement and sale between states. Throughout the years, we have identified other diseases of concern either through clinical diagnosis or necropsy of animals that have died. We use what we learn from our sick cow work to determine what diseases to routinely test for, what diseases we want to try to eliminate from the farm and to help decide what vaccination protocols we should use.

About 20 years ago, the state introduced a certified Johnes program that we enrolled many herds in a voluntary test and cull program to obtain free status. I also work with several herds that had clinical Bovine Leukosis virus that showed up clinically as down cows or cattle that were condemned at slaughter with lymphosarcoma. When these cows goes down, they are worth nothing. It's a total loss to the producer.

The other big one we like to test in the last decade or so is Bovine Viral Diarrhea or BVD, an economically devastating disease of cattle that causes abortion, respiratory and gastrointestinal disease.

How did you decide what diseases a herd should test for?

First, you need to decide what your animal health goals are and also consider the income cycles of those business models. Are you interested in selling breeding stock, running a commercial farm, selling raw milk or selling breeding bulls? Your goals will help drive decisions around what diseases to test for, which ones you want to try to eradicate from your herd and which ones you will need to manage through vaccination. For example: If

you sell show cattle or breeding stock, your goal make be to market disease free status animals, such as Johne's free or BVD free since these diseases can be easily transmitted to calves at birth or in utero. If you sell raw milk, you need to be thinking about brucellosis, tuberculosis, Q fever and mastitis causing organisms that can make people sick. If you want to sell breeding bulls your focus may be more on venereal diseases like trichomoniasis or vibrio.

What diseases have the biggest concern for you?
Pinkeye, Bovine Respiratory Diease Complex, Johne's, Bovine Viral Diarrhea, and Bovine Leukosis Virus

What do you do if a cow tests positive?
Again, this will depend on the goals for your cattle. You will need to work with your veterinarian on the best strategy to meet your goals. The important thing is doing the testing in the first place so you know what diseases are having the biggest impact on your profitability and then deciding what management strategies you can implement to reduce your production losses. Depending on how many animals in your herd test positive, you may opt for a voluntary test and cull program. Alternatively, you may employ certain management strategies to prevent disease spread. For example, if you have a bunch of BLV positive cows, you can focus on fly control and using individual needles.

How do you approach those diseases on farms for control and risk mitigation?
In recent years, we've seen some really aggressive strains of pinkeye on both beef and dairy farms. This has required us to take samples on farm and work with vaccine companies to culture the organism and make autogenous vaccines. That's helped us control the impact of pinkeye, but not eliminate it.

Johne's disease used to be a big problem in dairy herds, but now it seems to be on the rise in beef cattle. The use of rumensin, targeted vaccination and test and cull programs seems to have reduced its incidence on dairy farms. For dairies, it's important to clean and disinfect the maternity pen when infected animals calve in those areas. With beef cows being out on pasture, we are seeing an increase in the disease. The Johne's organism, *Mycobacterium paratuberculosis*, is most commonly spread through fecal contamination and through the milk. You can see how this presents a management problem for beef cattle. I recommend that you test all your dry cows for Johnes and you know one is positive, you may decide not to feed her milk to the calves to decrease the risk of transmission. We also see some hobby farms with other vulnerable species like sheep and goats sharing pastures and becoming infected or contaminating pastures. Once a pasture is contaminated, it is very hard to break the disease cycle.

Bovine Viral Diarrhea has been a problem for many years. It's a problem because calves can become infected in utero and then be subclinical, persistently infected carriers for life spreading the huge viral loads through direct contact, respiratory secretions to herdmates. There are more BVD tests available now for detection including bulk tank tests and tests that can detect the virus in ear notch samples. There are also many vaccines out there for control, but this is one that you really want to consider a test and cull program for because of the costs associated with the disease itself. Testing incoming animals for BVD should be a must.

Bovine Leukosis Virus or BLV causes lymphosarcoma, a form of cancer in cattle that often results in condemnation at slaughter or paralysis. The virus can be spread through needles, insect bites and even palpation sleeves. I have some herds that I change my sleeve for every cow to prevent infection and use individual needles for every cow. Fly control is really important for control as well.

Can you tell us some lessons learned from your 50 years in practice?

1. **I don't want to treat, I want to prevent**.
2. **Control disease risk by understanding risk factors**. The first thing I would do is think about the management challenges on your farm and then figure out what risk factors you can control. No farm is disease free, but think about the disease risk you are willing to incur and how to prevent it in the first place. How is the diseases transmitted and how can I prevent disease spread?
3. **Develop a cost-effective vaccination program to prevent disease**. Only use vaccines for diseases that you are trying to control on your farm. This will help reduce costs associated with unnecessary vaccines. For example, in Washington, you don't need to vaccinate your cows for rabies, but in Pennsylvania, you might need to depending on your risk. Over-vaccinating can tax the immune system and under-vaccinating or not giving a booster at the right time can end up as a waste of time and money. **Make sure vaccines are customized to the farm**, and administered at the right intervals, especially before putting cattle out on pasture
4. **Know what you are buying and test all cattle for diseases of concern before you bring them in**. When you purchase an animal, you are also bringing in their diseases. Test them before introducing them into your herd. Ask the seller about vaccination programs and disease on their farm. BVD is one of the most important diseases to test for in my opinion.
5. **Be sure to test every breeding bull**. In my mind, these are the highest risk animals in your herd. I recommend a full breeding soundness exam including trich and vibrio testing as well as other diseases of concern before you bring them into your herd.
6. **Consider genetics** that improve welfare, disease resistance and productivity. This will reduce treatment costs and improve longevity in the herd.
7. **Remember that a single parameter or certification doesn't ensure disease free status or health.** "Registered" or "brucellosis vaccinated" doesn't mean healthy.
8. **Control wildlife/ domestic animal interface to prevent disease transmission** including birds, rodents, ticks and wildlife for disease transmission.
9. **Consider your geographic area**, what diseases are the biggest problems based on vectors, climate and endemic diseases in local populations. Consider that with climate change, insects and tick populations that carry disease will also change over time and may introduce diseases that haven't historically been a problem.
10. **Pasture management is critical for disease transmission.** Pastures can become a real challenge for disease control. Pastures are hard to clean and disinfect when you are trying to break a transmission cycle. Pastures can become contaminated with fecal borne pathogens (Johne's, parastites), water borne pathogens (giardia) and some pathogens that stick around for years (Q Fever, Clostridium/ blackleg).

You don't have to listen to me, but you should listen to your Dad and you probably should listen to my Dad too. He's taught me a few things over the years ….. and this is just the start of it. You'll never meet anyone with more passion and dedication to veterinary medicine and the food animal industry. His passion is contagious, and I caught that bug. He inspires me every day to work hard for you.

For more information about diseases to test for, talk to your veterinarian and look at the list of available tests at WSU WADDL here: Tests & Fees (wsu.edu)

WSDA: Duck for Cover – Avian Influenza is in the Air

By Dana R Dobbs, DVM, WSDA Avian Health Program Lead

As most have probably heard by now, Highly Pathogenic Avian Influenza (HPAI) H5N1 is taking the United States by a storm. The virus initially started brewing in European countries last year, causing significant concern due to similar climactic conditions present during the 2014/2015 outbreak. As a result, USDA APHIS VS and their State partners began to prepare for the worst and hope for the best; building upon previous lessons learned.

Unfortunately, HPAI H5N1 entered the Atlantic flyway in January 2022, hitching a ride with several different species of wild waterfowl during their annual migration North. Migratory birds can be inapparent carriers of Influenza A viruses*, which may be transmitted to susceptible domestic poultry by direct contact (saliva, nasal secretions, etc.), fecal contamination, and breaches in biosecurity.

Although everyone was hoping the disease would literally fly by, a commercial turkey producer in Indiana became infected on February 8, 2022. Even though the disease was rapidly detected, and the flock depopulated, a surprising chain of point source introductions began to affect nearby states. This is in stark contrast to the 2014/2015 detections, which often involved lateral transmission by farm personnel, feed trucks, etc.

Currently, as of April 6, 2022, twenty-four states have been affected by H5N1 HPAI; including 103 commercial poultry flocks and 43 backyard flocks. A majority of the commercial flocks involved turkey operations, while backyard, non-poultry flocks, were of mixed variety. While Influenza A viruses can be zoonotic, this strain of H5N1 has not been detected in humans in the United States thus far.

So, what can we do to help prevent the spread of this highly contagious disease that has affected nearly half of the United States? The key is advanced preparation, enhancing biosecurity practices, and reporting any signs of illness in both commercial and backyard flocks. This is especially true if birds are showing respiratory signs, a drop in feed or water consumption, decreased egg production, huddling, lethargy, and unusual mortality levels. The WSDA Avian Health Program maintains a Sick Bird Hotline that is monitored daily; please call **1-800-606-3056**.
Commercial poultry producers in Washington State have been very proactive in reviewing their biosecurity plans and have participated in preparedness discussions with USDA and WSDA. Free range birds have been moved indoors as an extra precaution, with the hopes that waterfowl migration will be complete by May. For backyard flock owners, an excellent resource for protecting birds is the USDA "Defend the Flock" website at: USDA APHIS | Defend the Flock Program

In closing, now is the time to prepare, not panic. Stay vigilant and report any unusual signs of illness in your flocks to the WSDA Avian Health Program immediately. Hopefully, by working together, we can help prevent this devastating poultry disease from reaching our flocks.
*Avian influenza is caused by influenza Type A virus (influenza A). Avian-origin influenza viruses are broadly categorized based on a combination of two groups of proteins on the surface of the influenza A virus: hemagglutinin or "H" proteins, of which there are 16 (H1-H16), and neuraminidase or "N" proteins, of which there are 9 (N1-N9). Many different combinations of "H" and "N" proteins are possible. Each combination is considered a different subtype, and related viruses within a subtype may be referred to as a lineage. Avian influenza viruses are classified as either "low pathogenic" or "highly pathogenic" based on their genetic features and the severity of the disease they cause in poultry. Most viruses are of low pathogenicity, meaning that they cause no signs or only minor clinical signs of infection in poultry. *Courtesy USDA APHIS*

WSDA: Veterinarian's Role in Biosecurity and Secure Food Supply Plans

By Minden L. Buswell, DVM, MPH, DACVPM

The Secure Food Supply (SFS) Plans provide guidance for livestock producers to voluntarily prepare before a foreign animal disease (FAD) outbreak to limit exposure of their animals through enhanced biosecurity. Animals with **no evidence of infection** may qualify for a movement permit from the Washington State Department of Agriculture (WSDA). The ultimate goal is to provide business continuity for the livestock industry, transporters, packers and processors in the face of an ongoing FAD outbreak.

There exists a SFS Plan for the following commodities and FADs:

- Secure Beef Supply – Foot and Mouth Disease (FMD)
- Secure Milk Supply – FMD
- Secure Pork Supply – Classical Swine Fever (CSF), African Swine Fever (ASF), and FMD
- Secure Poultry Supply – Highly Pathogenic Avian Influenza (HPAI)
- Secure Sheep and Wool Supply – FMD

As a veterinarian, you have a unique opportunity to provide a value-added service for your clients. In order for your clients to maintain business continuity during an FAD outbreak and receive a product movement permit from WSDA, they must have an **enhanced biosecurity plan** completed and ready to be utilized. Each one of the SFS Plan websites offers a free enhanced biosecurity plan template that you can download, review, and fill out with your client. Once the enhanced biosecurity plan is completed, keep the file on the farm. Then alert Dr. Buswell at WSDA that the plan is complete and a review of the plan will be scheduled.

It should be noted that the enhance biosecurity plan is more robust and different than a normal daily biosecurity plan, such as the Beef Quality Assurance – Daily Biosecurity Plan for Disease Prevention or National Dairy FARM Biosecurity Plans. Both resources are excellent starting points for everyday biosecurity.

This advanced FAD planning effort on the part of veterinarian, the producer, and WSDA can only serve to strengthen the agricultural industry resilience and help preserve the agricultural economy in Washington State.

If you are interested helping your clients maintain their business during an FAD outbreak, WSDA is ready to help you get started!

For more information, please contact:

- Dr. Minden Buswell - Email: mbuswell@agr.wa.gov, or Phone: 360-280-6499

WSU Animal Science: MythBusters!

By Don Llewellyn, Livestock Extension Specialist

Is it true that very low quality forages are only fillers in beef cow diets?

Low-quality forages: First, let's define what a low-quality forage (roughage) is: In the beef cow world, we consider low-quality as being less than 7% crude protein. The reasoning behind this is that with low-quality forages, protein is the first limiting nutrient. That means without protein in sufficient amounts to meet the cows' (and rumen microbes') requirement for nitrogen (supplied by the crude protein), maximum or even optimum productivity can't be expected even if all of the other nutrients are available in adequate amounts. Some

examples of low-quality forages available to beef cattle producers in the Pacific Northwest are wheat straw (and other small grain straw, 3-4% crude protein [CP]), bluegrass straw (6% CP), and dormant cool season grasses (5-6% CP) just to name a few. We typically focus our attention to low-quality forages when the cows' nutrient requirements are relatively low such as in the fall/winter for spring-calving cows.

So why do we want to feed low quality forages in the first place? The main reason is that they can be purchased at a relatively reasonable price and with the high proportion of the annual costs for beef cattle producers in the Pacific Northwest going for feed, it is a great way to manage the feed bill and support profitability.

There is an inexorable link between protein and energy in our forages. This goes back to the idea of the protein being the first-limiting nutrient. The rumen microbes need nitrogen which is ultimately used to make microbial protein. This is particularly important because a cow's metabolizable protein requirement is met by two sources, microbial protein as the rumen microbes die off and enter the small intestine, and bypass (ruminally undegradable) protein that escapes rumen degradation and finds it way to the small intestine for digestion and absorption. The bottom line is, with low-quality forages, it is important that feeding programs are meeting the rumen microbe's requirement for protein by supplementation. When we supplement protein, our goal is to meet the rumen microbe's nitrogen requirement so that the microbes can maximize their degradation of fibrous feed in the rumen. In doing so, increases in intake and/or digestibility will result in delivery of more energy to the cow and productivity by whatever measurement you are evaluating (i.e., weight gain, increased body condition scores, conception rates, etc.).

There is a common misconception that low-quality forages have little feed value. Think about the ability of wild grazing ruminants like bison and elk to survive and thrive. If adequate low-quality grass is available in the winter, they do quite well. Ruminants are well adapted to harsh conditions.

On this issue of "fillers": Table 1 illustrates dealing with the common misconceptions of the feeding value of low-quality forages. Let's take a look at the similarities and differences.

Table 1. Comparison of nutritional chemical composition of alfalfa hay and wheat straw

	Forage/Feed[1]	
Composition	Alfalfa Hay[2]	Wheat Straw
	---------- Percent (%) ----------	
Dry Matter	100	100
Crude Protein (CP)	20.0	3.5
Ruminally degradable protein	13.9	1.1
Available fiber	18.7	31.9
Neutral detergent fiber (NDF)	40.0	73.7
Total digestible nutrients (TDN)	66.0	43.1
Microbial CP potential	10.0	8.0
	----------Mcal/kg----------	
Gross energy (GE)[3]	4.1	3.9
	---------- Mcal/kg ----------	
Metabolizable energy (ME)	2.2	1.5
Net energy for maintenance (NE_m)	1.5	0.68
Net energy for gain (NE_g)	0.91	0.11

[1]Adapted from NRC Nutrient Requirements of Beef Cattle, 2000, and 2016, and Rohwer, 2021 unpublished data.
[2]Mid-bloom
[3] Hossein Janmohammadi et al., 2014

We can all agree that alfalfa and wheat straw are pretty much on opposite ends of the spectrum when it comes to forage quality. Let's discuss how we might evaluate the use of wheat straw in a low-cost cow diet for winter feeding. First consider gross energy (which is in simple terms, the heat of combustion). In other words, if we were to combust equal amounts of alfalfa and wheat straw, they would liberate roughly the same amount of heat (4.1 Mcal/kg vs 3.9 Mcal/kg, respectively). So why is alfalfa considered a better feed if they both contain relatively equal amounts of energy? In one word, utilization. When all of the various losses during digestion are accounted for, more nutrition per unit fed is retained in the cow that is fed alfalfa. Alfalfa hay is quite rich in crude protein (our example in Table 1, 20%) and therefore is one of our classic protein supplements in the Pacific Northwest. On the other hand, wheat straw is very low in quality as measured by crude protein

(3.5%; remember that protein is the first limiting nutrient with low quality forages). A measure of fiber, Neutral Detergent Fiber (NDF), is lower in the alfalfa (which indicates higher quality) and is quite high in wheat straw (higher NDF is related to reduced intake by the animal). The degradability of the protein (RDP/DIP) in alfalfa is much higher than from wheat straw meaning that it would be better in supplying nitrogen to the rumen microbes. Total Digestible Nutrients (TDN), one of our long-standing energy systems, suggests that the digestibility is about 66% and 43% for alfalfa and wheat straw, respectively. Many folks find it hard to reconcile the fact that so much of the feed actually comes right out the back end of the cow as undigested material. There are two reasons why we don't just feed alfalfa: 1) it is usually expensive, and 2) doing so would overfeed protein which would be wasteful, and the nitrogen excreted would not be beneficial to the environment.

After all energy losses are accounted for in digestion and utilization of feed, we arrive at Net Energy for Maintenance (NEm, Table 1). Notice that the NEm for alfalfa and wheat straw is 1.5 Mcal/kg and 0.71 Mcal/kg of feed, respectively. This tells us that it takes 2.1 lbs of wheat straw to equal 1 lb of alfalfa to maintain the cow. While this ratio may seem quite large, it also says that it is possible to make good use of wheat straw. It is also important to note that wheat straw can support up to about 8% equivalent protein supplementation from non-protein nitrogen (NPN) sources such as urea without concern about urea toxicity. Supplementation of crude protein beyond what is required to provide 8% crude protein in the diet will require natural protein sources such as efficient amounts of alfalfa hay, distiller's grains, and/or oilseed meals.

Taken together, low-quality feeds like wheat straw do have their place in beef cow feeding programs if used appropriately. When producers want to feed roughages like wheat straw, they need to apply feeding strategies to enhance forage utilization. As noted earlier, feeding supplemental protein in the form of alfalfa hay or byproduct feeds such as oilseed meals and distiller's grains can be effective in correcting for the protein deficit. It is also important to note that when feeding low-quality forages like wheat straw that provision of a Ca and P based self-fed mineral supplement is essential to provide to the cows to ensure their feeding program is in balance for all essential nutrients. There are a host of commodities and forms of protein supplements that producers can use in beef cattle operations (that is a discussion for another day). In fact, small amounts of supplemental protein can be very efficient in enhancing the ability of the rumen microbes to degrade roughage in the rumen. In doing so it is common to see increases in intake and/or digestion, which in turn delivers more energy to the cow. In other words, the base forage is better utilized and the benefit is much greater than achieved from the supplement alone. Anything that can be done to enhance forage utilization, such as when providing supplemental protein to meet the requirement, but not overfeed is money in the pocket of producers.

There you have it; the myth is busted! Low-quality forages are more than just "fillers", are relatively inexpensive and when supplemented appropriately, can deliver sufficient energy to the cow to meet production goals.

WSU CVM Senior Paper Highlights

The importance of backyard chicken medicine for the small animal veterinarian
By Isla Dubendorf (Advisor: Dr. Chrissy Eckstrand)
Summary: Backyard chicken ownership has become increasingly popular over the past few decades, especially during the SARS-CoV-2 pandemic and more specifically in urban and suburban centers. Although these areas have primarily served small animal patients (cats and dogs), there is a growing need for veterinarians that have a general understanding of chicken husbandry and illnesses. This will help prevent disease transmission, as well as maintain the human-animal bond, and decrease morbidity and mortality. This paper is designed to be a guide for small animal veterinarians and contains an overview on basic backyard chicken husbandry and care, as well as common ailments that can occur. Overall, backyard chicken medicine is of genuine importance, especially as

the number of backyard flocks rise in more urban and suburban areas. With the local food movement of the 21st-century urging people to live a more sustainable way of life and the SARS-CoV-2 pandemic expanding this trend, the exponential increase in chicken ownership has been astounding. This increase further emphasizes the importance of a general chicken knowledge for small animal veterinarians, as they tend to be the closest medical sources for owners. From Marek's disease to mite and lice management, proper identification of Newcastle's disease, egg binding, adequate husbandry, and an understanding of the public health risks for lead poisoning and *Campylobacter*, veterinarians play an important role in helping manage these backyard poultry flocks.

Continuing Education

Veterinarians

1. Academy of Dairy Veterinary Consultants, Spring 2022 Meeting, April 22-23, Boise ID

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