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In This Issue

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ag animal health ***is devoted to the transfer of current, relevant information to food animal owners and veterinarians in the Pacific Northwest.***

From the Editor – June is National Dairy Month and July is National Ice Cream Month. We should be celebrating. But around the country, dairy farms are going out of business. Margins (if any) have been tight on many farms and money woes the topic at many farm dinner tables. Is there any light in the future? For dairy farms, there just may be. On June 12, the *World Ag Supply and Demand* estimates report was released and forecasted higher milk prices for the remainder of this year and on into 2019 with an all milk price at $16.60 to $17.70, not the $18.90 seen in Jan 2017 or even the $18.20 last November but certainly better than the $15.30 seen this February. Why am I concerned about milk price? Well, it pays the bills for all of us, farmers and veterinarians and cows. When farms are financially healthy, the families that depend on them are healthy and the cows benefit. When milk prices fall, farmers often increase cow numbers for cash flow but might overstock pens, or they might reduce prevention programs to save money, putting cows potentially at risk. Price volatility like this is not welcomed by many farmers or veterinarians or cows.

Moore Re-elected to Represent District 11 on AABP Board

Thank you, all you bovine practitioners in Alaska, Idaho, Montana, Oregon and Washington, for allowing me to represent you on the American Association of Bovine Practitioners Board of Directors for another three years. The board meetings can get lively, the topics are always pertinent to bovine practice and the management of the organization (Executive Vice President) has always been in good hands. In fact, the AABP runs so smoothly that we took on management of the American Association of Small Ruminant Practitioners organization. Just a reminder: The time is now to register for both meetings…we meet jointly September 13-15, 2018 in Phoenix, Arizona.

Dale Moore

Dairy: Can We Predict Which Sick Calf Will Make It and Which One Might Not?

by Dale A. Moore, Extension Veterinarian, WSU

For quite some time now Dr. Sischo (WSU FDIU) and others here at WSU have been interested in reducing unneeded antimicrobials in calf-rearing to reduce risks for antimicrobial resistance. One idea was that if we could predict which calves might not make it when they got sick, we could make better decisions on what treatments to use and when to consider stopping treatment. A recent study of 225 Holstein calves with diarrhea gets us closer to answering the question about predicting calves that might die when they get diarrhea.

Boccardo and others *(2017)* set standard treatment protocols for diarrheic calves admitted to their teaching hospital. The age at hospitalization averaged about 8-11 days and the calves had diarrhea for about 2.5 days duration at admission. Almost all calves were dehydrated on admission, most were very weak or wobbly, but most had a normal temperature (101.5 F). All of the calves were treated based on suckle reflex, vigor score, dehydration status and blood acid-base status* and all were given amoxicillin subcutaneously at 10mg/kg for 5 days and IV flunixin meglumine (2.2 mg/kg) on admission.

Despite the aggressive, individualized treatment at the teaching hospital to correct the consequences of diarrhea, 66 of the 225 (almost 30%) of calves subsequently died. Taking information from calves' blood tests and clinical scoring, two factors emerged as predictors of a high likelihood of dying even after treatment. One was the calf's serum total protein (STP) value (which ranged from 2.4 to 8.3 g/dL) and the second was their suckle reflex on admission. The higher the STP, the greater the likelihood of survival. For example, calves with an STP of 5.8 were twice as likely to survive compared to those with an STP of 4.8, controlling for other factors. A poor or absent suckle reflex was also an indicator of poor survival and calves with a poor suckle reflex was almost five times more likely to die compared to calves with a strong suckle reflex at admission.

Lessons learned:
(1) Despite individualized care given to sick calves, there are risks that reduce their survivability.
(2) To improve a calf's chance of survival if it gets diarrhea, aggressive fluid therapy is essential. Because a calf is losing water in its diarrhea, it needs to *replace* body fluids as well as *maintain* body fluids.
(3) The average age of calves in the study was about 10 days at admission. Although this might be considered to be beyond the time where taking blood for serum total proteins is considered valid for estimating passive transfer of immunity *(Villaroel et al., 2013)* a new study indicated that reliable testing could be done up to 9 days of age *(Wilm et al., 2018)*. This reminds us that providing enough clean colostrum to insure passive transfer of immunity is essential to survival and that evaluating calves for IgG or total serum protein concentrations could be a useful indicator to provide to use for prognosis when they become ill, particularly after treating for two days.
(4) The lack of a suckle reflex after about 3 days of diarrhea indicated a poor prognosis for survival. Practically, and speculatively, if a calf is not eating or able to drink by the third day with diarrhea, the prognosis is most likely poor.

We still need to treat the calves that get sick. Some medications and other treatments are better than others. Our mantra here is FLUIDS FIRST; oral electrolytes if they have diarrhea and IV fluids if

they are clinically dehydrated. For some presentations and fact sheets on the evidence for different treatments used for calf diarrhea, please go to our CalfScience website: ***Disease Detection, Treatment, and AMR*** at: http://vetextension.wsu.edu/calfscience/

*Diarrheic calves with strong suckle reflex, vigor score 4, dehydration score 1, base excess up to 8 mmol/L received on admission 1 L of ORS containing 4 g sodium chloride, 20 g dextrose, 3 g potassium bicarbonate and 3 g sodium propionate. One liter of ORS was additionally administered three times between milk feedings during the first 24 h after admission.
Calves that did not completely drink ORS at the time of admission or between milk feedings received a constant drip infusion consisting of 5 L of isotonic saline spiked with 8.4% NaHCO3 at slow infusion rate (10 mL/kg/h).
Calves with vigor score < 4 or dehydration score > 1 or base excess <8 mmol/L received a constant drip infusion consisting of 5 L of isotonic saline spiked with 8.4% NaHCO3 at slow at constant drip infusion (40 mL/kg/h).
Calves with dehydration degree 2 received an additional 5 L bag of isotonic saline at slow infusion rate.

References

1. Boccardo A, et al. 2017. Risk factors associated with case fatality in 225 diarrhoeic calves: A retrospective study. *The Veterinary Journal*. 228:38-40.
2. Villarroel A, et al. 2013. Factors Affecting Serum Total Protein and Immunoglobulin G Concentration in Replacement Dairy Calves. *Advances in Dairy Research*. 1:106. doi:10.4172/2329-888X.1000106
3. Wilm J, et al. 2018. Technical note: Serum total protein and immunoglobulin G concentrations in neonatal dairy calves over the first 10 days of age. *Journal of Dairy Science*. 101:6430-6436.

Beef: Bovine Pinkeye Considerations: Two Agents?

by Craig McConnel, Extension Veterinarian, WSU

Over the past several years there has been a debate within academic circles regarding the underlying bacterial agent or agents that cause pinkeye in cattle (also known as bovine keratoconjunctivitis, or IBK for short). *Moraxella bovis* historically has been the bacteria of concern for IBK, and the target for both treatment with antibiotics and prevention through vaccination. Over a decade ago, another bacteria now named *Moraxella bovoculi* began to be recognized as a common isolate from ocular swabs of IBK cases. The apparent increase in *Mor bovoculi* may be related to herd management, bacterial ecology, or simply targeted diagnostic techniques.

Mor bovis is a relatively fastidious (fussy) organism that is most easily isolated very early in the disease process during the initial signs of increased tearing and ocular irritation. Swabs taken after corneal ulceration is present are more likely to isolate other opportunistic bacteria. Furthermore, the type of swabs used to sample infected animals and the handling of those swabs for transport to a lab can affect whether *Mor bovis* survives the process or is overwhelmed by other bacteria such as *Mor bovoculi*.

Regardless, it is important to note that experimental challenge studies have failed to demonstrate a role for *Mor bovoculi* in causing corneal ulcers associated with IBK. In other words, studies published to date have not proven a direct causal role for *Mor bovoculi* in IBK. Nonetheless, ongoing investigations into the role of *Mor bovoculi* in causing IBK have demonstrated a cellular toxin and possible attachment proteins (pili) similar to those found in *Mor bovis*. It is possible that *Mor bovoculi* may assist in *Mor bovis*-associated ocular colonization or spread, similar to the role of other pathogens such as *Mycoplasma* spp and infectious bovine rhinotracheitis (IBR; bovine herpesvirus).

For those who have dealt with pinkeye in cattle, a primary frustration is the potential for an annual recurrence of disease even in animals that have dealt with pinkeye in the past. In those situations it is always worth evaluating herd management related to ocular irritation (dust, long-stemmed

grass), fly control, and nutrition (macro- and micro-mineral balance in particular). A possible cause of reinfections may be related to antigenic diversity within bacteria. For example, exposure to a particular strain of *Mor bovis* may lead to selective immunity against that strain's pili. However, within a population of animals there may be multiple strains of bacteria present, and immunity against one or more strains may simply present alternate strains a window of infective opportunity. This concept of selective immunity has been proposed as a reason for commercial vaccine failures. Vaccines are limited in the number of strains that can be included while still stimulating immunity, and the strains that are included may not represent circulating strains within a given herd.

Vaccines against *Mor bovis* are registered for prevention and control of IBK but a review paper (Burns & O'Connor. Vaccine. 2008. Vol 26.) revealed that *Mor bovis* vaccines may not be highly effective in protecting cattle from IBK. In fact, a recent paper (Cullen et al. 2017. JAVMA. Vol 251. No 3.) investigated the use of a commercial vaccine against *Mor bovis* and found no reduction in the cumulative incidence of IBK in beef calves. Interestingly, a previous trial that evaluated a farm-of-origin autogenous *Mor bovis* vaccine also revealed no greater protection from IBK in vaccinated versus unvaccinated calves (O'Connor et al. 2011. J Vet Intern Med. Vol 25.).

Irrespective of the roles of *Mor bovis* and *Mor bovoculi* in causing IBK and influencing duration and severity, there is a need to develop more effective vaccines for the prevention of this painful, production-limiting disease. Currently, all commercially available vaccines contain only *Mor bovis* antigens, aside from one newly available commercial vaccine containing 8 different *Mor bovoculi* isolates (Addison Biological Laboratory, Inc.; conditionally licensed as efficacy and potency have not been fully demonstrated). There are also options for the development of farm-specific autogenous vaccines through Newport and Addison labs targeting both *Mor bovis* and *Mor bovoculi*. However, given the lack of rigorous field trials demonstrating vaccine efficacy, these vaccine options should be used in conjunction with veterinary input and an evaluation of herd management practices.

The reality is that there is no magic pill that can eradicate IBK. Best management practices should reduce case numbers and severity but many herds will experience IBK outbreaks periodically. In the face of an outbreak, current commercial vaccines may provide the timeliest intervention. It may be prudent to isolate both *Mor bovis* and *Mor bovoculi* at the start of an outbreak to use in the development of an autogenous vaccine as well. If you are a cattle owner, consult with your veterinarian to determine the best methods for recovering the bacteria and submitting samples. For those animals that require treatment, your veterinarian will be able to determine the most cost effective and efficacious antibiotic therapy given your herd dynamic. It is never too early to develop a plan for dealing with an IBK outbreak—preparedness will help alleviate the stress of the situation and limit poor choices made in haste.

Key Points for Prevention:

- Vaccines may not work for a specific herd because of bacterial strain differences.
- Autogenous vaccines can be made from strains isolated from the herd but there may be a different strain the following year.
- Consider management such as mineral status for good immune system function of the cattle and aggressive fly control to prevent transmission.

For more information on the disease itself, go to:
http://vetextension.wsu.edu/wp-content/uploads/sites/8/2015/03/PinkEye_Feb20113.pdf

Sheep: Highlights of the American Sheep Industry Meeting

by Dale A. Moore, Extension Veterinarian, WSU

The American Sheep Industry annual meeting highlights are posted at their website (https://www.sheepusa.org/Events_2018Convention). Slides from the speakers *(including our own Dr. Maggie Highland)* are available. On the animal health side, Dr. Highland spoke about *Mycoplasma ovis* in bighorn and domestic sheep. There are also presentations on OPPv eradication, genetics and genomics, scrapie, malignant catarrhal fever, Footvax vaccine for footrot, parasites, and reproduction. Browse the site for topics of interest to you.

Swine: Piglet Ear Hematomas – To cut or not to cut?

by Dale A. Moore, Extension Veterinarian, WSU

Ear hematomas are swellings of the ear cause by fluid accumulation, usually rupture of the blood vessels, within the pinna or ear flap. This condition is relatively common in swine farms and causes discomfort to the pigs. Head shaking or scratching are the most likely causes and risks include mange, feed in the ear from overhead feeders, bites from other pigs or other injuries. A study reported in the May/June issue of the *Journal of Swine Health and Production* investigated two options for 'treatment' (1) no treatment, which often takes several weeks for resolution of the hematoma, or (2) surgical excision with removal of the fluid.

Dewey and others (2018) enrolled pigs (N=124) that developed ear hematomas on four farms. One-third of the pigs got no treatment and two-thirds were treated with surgical incision. They also enrolled age-matched control pigs without hematomas. They evaluated the pigs for consequences of treatment and for average daily gain (ADG).

In general, pigs with hematomas gained less weight than those without. Sixty-one percent of the surgically-incised pigs developed infections at the site and some were severely infected. Pigs in the surgical group had lower ADG in the first two weeks of treatment compared to non-treated hematoma pigs but had compensated growth by week three. The proportion of pigs with resolved hematomas was the same for weeks 1, 2 and 3 in the two treatment groups.

The authors recommended that preventing the inciting causes of ear hematomas would benefit the pigs and their weight gain. Management of mange or lice and practices such as lower stocking density, more food and water sources and pen enrichment to reduce aggression and ear biting are needed to reduce the chances for ear hematomas. And, if a pig does develop an ear hematoma, it is preferable to leave the ear alone.

References

1. Torres SMF. Auricular hematomas. Merck Veterinary Manual.
2. https://www.merckvetmanual.com/eye-and-ear/diseases-of-the-pinna/auricular-hematomas
3. Dewey C, Sunstrum J, Richardson K. 2018. Management of ear hematomas in pigs. *Journal of Swine Health and Production*. 26(3):137-141. https://www.aasv.org/shap/issues/v26n3/v26n3p137.pdf

WSDA Corner
Following Series of Listening Sessions on Animal Disease Traceability, USDA Releases Report

by Dr. Amber Itle, WSDA Assistant State Veterinarian

In the spring of 2017, the U.S. Department of Agriculture hosted a series of listening sessions across the country to hear from the agriculture industry about animal disease traceability. The USDA has now compiled this information into a 30-page report, "Animal Disease Traceability: Summary of Program Reviews and Proposed Directions from State-Federal Working Group," which it released in April. The report provides an overview of the Animal Disease Traceability Program and preliminary recommendations of the State-Federal Animal Disease Traceability Working Group. The full report is available at the www.APHIS.USDA.gov and is worth reading for all the details, but below is a summary of some key recommendations of the working group:

1. Traceability regulations do not apply to interstate movements to a custom slaughter facility or for direct sale of meat products to consumers. The exclusion of movements to custom slaughter would pertain only to animals that were born on the premises that ships directly to the custom slaughter facility.

2. Breeding animals will continue to be the priority for ADT initially. The ADT rule will continue to include: all dairy cattle, beef cattle 18 months of age or older, all rodeo and exhibition cattle.

3. Cattle should be identified to their birth premises, thus the official ID records must provide birth premises information for the animal. The appropriate authority – either USDA or state officials – should establish regulations that trigger official ID requirements at: change of ownership, first point of commingling, and interstate movement.

4. The U.S. must move toward an electronic ID system for cattle with a target implementation date of January 1, 2023. A comprehensive plan is necessary to address the multitude of very complex issues related to the implementation of a fully integrated electronic system. A specialized industry-lead task force with government participation should develop the plan.

5. APHIS and states must make the advancement of electronic records an immediate high priority. The enhancements recommended below would increase the ease of collecting data in a standardized format and subsequently provide access to accurate data in near real-time, greatly enhancing the effectiveness of U.S. traceability and disease control programs.

6. Greater uniformity of enforcement should be promoted. Evaluate and implement appropriate enforcement procedures for markets, private sales, internet sales, production sales, herd dispersals, etc.

7. APHIS should continue the efforts of the State/Federal Slaughter Plant Working Group to improve the rates of ID collection and correlation at slaughter.

8. APHIS and states need to establish a partnership with industry that would enable utilization of private information systems for disease surveillance and response events. Ideally, establish a communication protocol between the private systems and an animal disease traceability portal that would allow producer data to be maintained in the private systems and made available to animal health officials only when needed for animal disease control and response. Producers would have

the choice to maintain their data in a private or public system. APHIS and the states would continue to protect producer data held in their systems and use it only for disease response.

9. APHIS should not require official ID for all cattle movements. Tagging sites, APHIS and states should maintain the option to move cattle to a tagging site where they are tagged on behalf of the owner or person responsible. Official identification options as agreed on by shipping and receiving state. APHIS should continue to allow cattle to move from the farm/ranch direct to slaughter on an approved USDA backtag in lieu of the official ID eartag, and retain the stipulation that requires official ID of cattle moved from the slaughter plant.

10. The state of destination should be responsible for determining the documents appropriate for collection and compliance of key traceability components for livestock arriving to that state. The working group provided further proposals regarding ICVI exemptions which are included in detail in the report.

11. States should not be required to expand health requirements to achieve uniformity, as it would actually lead to more import regulations across the country and would be unwarranted from an animal disease control perspective. APHIS should continue revision of the regulations to increase standardization considering that eliminating various exemptions will lessen confusion and state differences.

12. There is value in considering a standard, or uniform, official eartag to increase awareness and understanding that it is unlawful to remove the tag. APHIS should conduct a study to determine the potential advantages and disadvantages of having one national ID eartag for cattle.

13. APHIS should allow the retagging of imported animals with an official EID tag by revising the traceability regulation to define an “Import Tag” (with a specific range of AINs and tag color).

14. The inclusion of beef feeder cattle in the traceability regulations is an essential component of an effective traceability system in the long term. However, addressing other fundamental gaps in the traceability framework must occur first. The working group noted in the report that it values the feedback from stakeholders regarding the official ID of beef feeder cattle under 18 months of age, and agreed with the points provided by stakeholders.

WSDA ADT program updates and priorities for 2018-2019

Dr. Amber Itle, Assistant State Veterinarian and David Hecimovich, ADT Program Coordinator

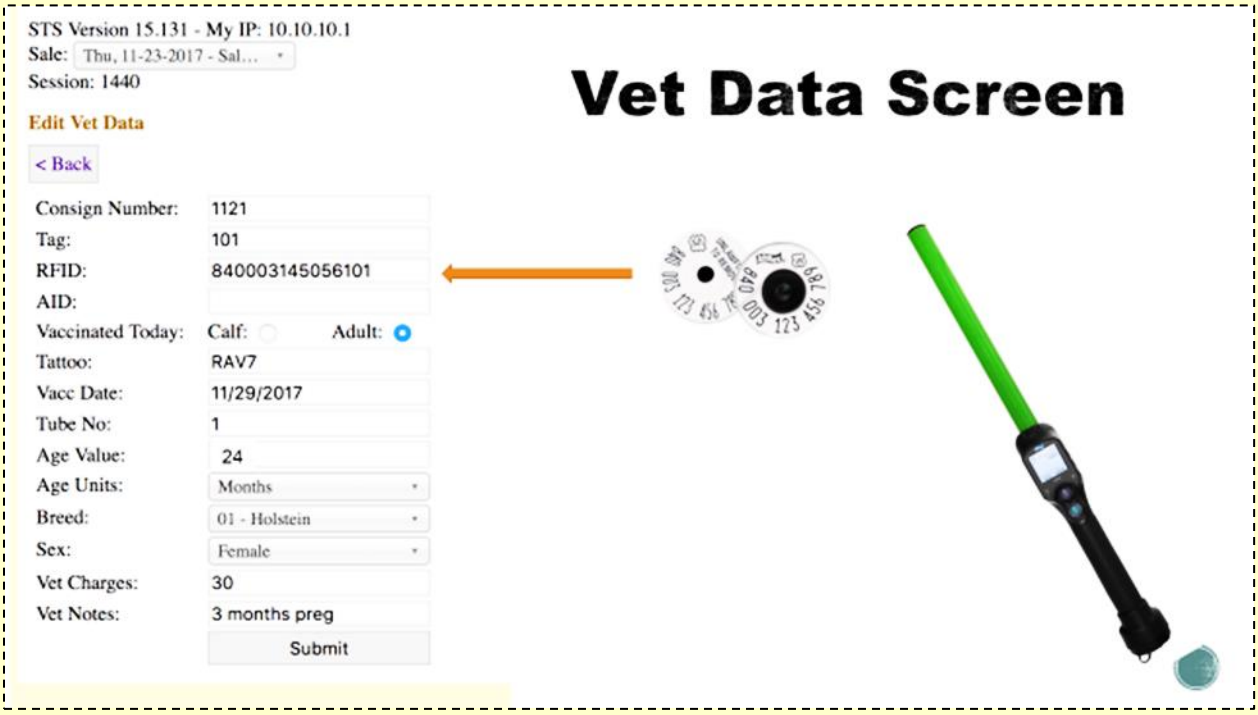
As the Washington State Department of Agriculture moves forward with animal disease traceability, we will continue to work with our federal partners and use the recommendations of the U.S. Department of Agriculture’s State-Federal Animal Disease Traceability Working Group to match traceability efforts across the country.

Although at times, it may seem as though Washington is all alone out there in front, we are actually just keeping pace with other states. We aren’t winning the ADT race.

In the 2018-2019 cooperative agreement cycle, WSDA plans to focus on the implementation of infrastructure that can support Animal Disease Traceability at auction markets and slaughter facilities in Washington. To create a “bookend system” that can track animal movements from birth premises to slaughter, WSDA is working to install both panel and handheld reader systems as well as develop market and tag retirement modules that can electronically capture ADT data.

We are testing out this approach with the Everson Auction Market Demo project. The first phase of the demo project was successfully completed in May 2018.

WSDA is working closely with the market veterinarians to streamline processes and improve the speed of commerce. WSDA is also working with the market's computer software developer to create additional fields that allows the market veterinarian to electronically capture RFID tag and animal health information in real-time in the market system with a hand-held reader.
This information is paired with animal movement information resulting in key traceability data that is automatically sent to our Animal Tracks database after a sale. WSDA developed Animal Tracks, a searchable database, to house animal movement, change of ownership and animal health information.



The next phase of the demo project will focus on making market veterinarians even more efficient as they perform regulatory medicine while helping markets come into compliance with animal health requirements. WSDA is working with the market software developer to create electronic animal health documents from market sale information including Certificate of Veterinary Inspections (CVIs) for cattle imported to or exported from Washington state, brucellosis vaccination records, and brucellosis test records. The system will also identify cattle that require animal health work prior to leaving the market.

WSDA will pilot these enhancements at the Everson Auction Market later this summer.
We plan to offer these enhancements at Stockland Livestock later this year and the Toppenish Livestock Commission next year. In addition to working with markets, the WSDA ADT program is working with slaughter facilities to collect RFID data on cattle slaughtered. Our IT developer is adding a tag retirement module to our traceability database that will allow us to identify and retire tags creating a "book end" ADT system. By retiring RFID tags from Animal Tracks, we feel confident that those animals are no longer a disease risk in our state.

In the coming year, we will continue to build infrastructure to support our cattle industry groups. We continue to encourage industry to help us find solutions to the front end of ADT as we look for cost effective and efficient ways to promote tagging cattle with RFID at the birth premises.

WSDA Animal Services Listserv
The WSDA Animal Services Division has created a new Listserv to help with communication efforts.

This new Listserv is open to the public and we wanted to offer our stakeholders an additional avenue to receive information from the Animal Services Division. We will be using this Listserv to send out informational articles, disease alerts, and division updates that are pertinent to the animal industry in Washington.

To join the listserv, please visit www.agr.wa.gov and click on the "Animal Services" button at the top of the page. Or you can reach the listserv directly at www.agr.wa.gov/AboutWSDA/Divisions/AnimalHealthServices.aspx and click Animal Services ListServe to subscribe. You can "unsubscribe" from this Listserv anytime.

What's New at WADDL: Caprine (goat) and Ovine (sheep) Website

The Washington Animal Disease Diagnostic Laboratory at WSU have a website devoted to sheep and goats and testing needs for owners and veterinarians (http://waddl.vetmed.wsu.edu/labs-sections/immunodx-serology/caprine-and-ovine). At the site, you can find sampling requirements and tests costs for biosecurity screening and tests for sick animals. It's sample submission made easy.

WSU Ag Animal Faculty Research Updates

(1) Alabdullah HA, Fox LK, Gay JM, Barrington GM. 2018. Interactive effects of dexamethasone and opsonized *Mycoplasma bovis* on bovine neutrophil function in vitro. Vet Immunol Immunopathol 196:18-21.

Previously we had reported that exposure to high levels of glucocorticoids, and to unopsonized *Mycoplasma bovis*, has a negative interactive effect on bovine neutrophil function in vitro, and this interactive effect was a function of M. bovis strain differences. Here we hypothesized that in vitro treatment of bovine neutrophils by glucocorticoid would impair phagocytosis of opsonized M. bovis compared to non-treated neutrophils and such impairment would be a function of M. bovis strain differences. Neutrophils isolated from 20 mid-lactation cows were treated with immunosuppressive dose of 5×10^{-4} M dexamethasone or placebo and incubated with one of four opsonized M. bovis strains that had been isolated from bovine origin. After incubation neutrophil function measured included: percentage reduction in $\log_{10}$ of M. bovis CFU/ml, percentage of phagocytizing neutrophils, phagocytized M. bovis per neutrophil, and killed M. bovis per neutrophil. Least square means of all neutrophil groups were contrasted using linear mixed-effects models. Effects due to strain, treatment, and their interaction on neutrophil function measured by the number of phagocytized M. bovis per neutrophil and number of killed M. bovis per neutrophil were different ($P < 0.05$). However, no significant strain by treatment interaction effect on percentage reduction in $\log_{10}$ of M. bovis CFU/ml was found. Neither a strain nor a strain by treatment interaction was found to affect the percentage phagocytizing neutrophils. **These findings might explain in part the association of stressful events with subsequent outbreaks of Mycoplasma bovis associated bovine diseases.**

(2) Calcutt MJ, Lysnyansky I, Sachse K, Fox LK, Nicholas RAJ, Ayling RD. 2018. Gap analysis of *Mycoplasma bovis* disease, diagnosis and control: An aid to identify future development requirements. Transbound Emerg Dis. 65 Suppl 1:91-109.
There is a worldwide problem of disease caused by *Mycoplasma (M.) bovis* in cattle; it has a significant detrimental economic and animal welfare impact on cattle rearing. Infection can manifest as a plethora of clinical signs including mastitis, pneumonia, arthritis, keratoconjunctivitis, otitis media and genital disorders that may result in infertility and abortion. Current diagnosis and control information are reviewed and analysed to identify gaps in knowledge of the causative organism in respect to the disease pathology, diagnosis and control methods. The main considerations are as follows: no vaccines are commercially available; antimicrobial resistance is increasing; diagnostic and antimicrobial sensitivity testing needs to be improved; and a pen-side test would facilitate more rapid diagnosis and implementation of treatment with antimicrobials. More data on host susceptibility, stress factors, immune response and infectious dose levels are required. The impact of asymptomatic carriers, M. bovis survival in the environment and the role of wildlife in transmitting the disease also needs investigation. To facilitate development of vaccines, further analysis of more M. bovis genomes, its pathogenic mechanisms, including variable surface proteins, is required, along with reproducible disease models.

(3) Stenkamp-Strahm C, McConnel C, Magzamen S, Abdo Z, Reynolds S. 2018. Associations between Escherichia coli O157 shedding and the faecal microbiota of dairy cows. J Appl Microbiol. 124(3):881-898.
AIMS: Dairy cattle shed pathogenic *Escherichia coli* O157 (O157) in faeces, playing a role in human exposure. We aimed to measure faecal microbial communities in early lactation dairy cattle, and model outcomes with O157 shedding metrics. **METHODS AND RESULTS:** Daily faecal samples were collected from 40 cattle on two Colorado dairies for five consecutive days, and characterized for O157. 16S rRNA gene sequencing was used to measure sample-level microbial communities. Alpha-diversity metrics were associated with O157 outcomes via regression modelling, adjusting for confounders. Differential abundance of taxa were identified between O157(+) and O157(-) samples and between shedding days of individuals, using matched Wilcoxon rank-sum tests, zero-inflated Gaussian (ZIG) regression and negative binomial regression. After removing an outlier, multi-day and intermittently shedding cows had lower average richness compared to those that never shed. ZIG modelling revealed *Bacillus coagulans* to be more abundant in O157(-) samples, while *Moryella* were more abundant in O157(+) samples. Negative binomial models and Wilcoxon tests revealed no differentially abundant taxa between O157(+) vs O157(-) samples, or between shedding days of individuals. **CONCLUSIONS:** Microbial diversity and some taxa may be influenced by or affect O157 shedding by dairy cattle. **SIGNIFICANCE AND IMPACT OF THE STUDY:** If future work corroborates these findings, dairy cow microbial community changes may be used to guide on-farm strategies that mitigate O157 dissemination, protecting the human food chain.

(4) Amirpour-Haredasht S, Vidal G, Edmondson A, Moore D, Silva-del-Rio N, Lopez BM. 2018. Characterization of the Temporal Trends in the Rate of Cattle Carcass Condemnations in the US and Dynamic Modeling of the Condemnation Reasons in California with a Seasonal Component. Front Vet Sci. 5:87. doi: 10.3389/fvets.2018.00087
Based on the 2016 National Cattlemen's Beef Association statistics, the cattle inventory in the US reached 93.5 million head, from which 30.5 million were commercial slaughter in 2016. California ranked fourth among all the US states that raise cattle and calves, with 5.15 million head and approximately 1.18 million slaughtered animals per year. Approximately 0.5% of cattle carcasses in the US are condemned each year, which has an important economic impact on cattle producers.In this study, we first described and compared the temporal trends of cattle carcass condemnations in all the US states from Jan-2005 to Dec-2014. Then, we focused on the condemnation reasons with a

seasonal component in California and used dynamic harmonic regression (DHR) models both to model (from Jan-2005 to Dec-2011) and predict (from Jan-2012 to Dec-2014) the carcass condemnations rate in different time horizons (3 to 12 months).Data consisted of daily reports of 35 condemnation reasons per cattle type reported in 684 federally inspected slaughterhouses in the US from Jan-2005 to Dec-2014 and the monthly slaughtered animals per cattle type per states. Almost 1.5 million carcasses were condemned in the US during the 10 year study period (Jan 2005-Dec 2014), and around 40% were associated with three condemnation reasons: malignant lymphoma, septicemia and pneumonia. In California, emaciation, eosinophilic myositis and malignant lymphoma were the only condemnation reasons presenting seasonality and, therefore, the only ones selected to be modeled using DHRs. The DHR models for Jan-2005 to Dec-2011 were able to correctly model the dynamics of the emaciation, malignant lymphoma and eosinophilic myositis condemnation rates with coefficient of determination (R2t) of 0.98, 0.87 and 0.78, respectively. The DHR models for Jan-2012 to Dec-2014 were able to predict the rate of condemned carcasses 3 month ahead of time with mean relative prediction error of 33, 11, and 38%, respectively. The systematic analysis of carcass condemnations and slaughter data in a more real-time fashion could be used to identify changes in carcass condemnation trends and more timely support the implementation of prevention and mitigation strategies that reduce the number of carcass condemnations in the US.

Continuing Education

Veterinarians

WSU CVM Homecoming CE Event, September 29, 2018. WSU Pullman. ½ day (3 Hours) of continuing education for large and small animal practitioners and technicians. SAVE THE DATE! For online CE programs, visit: https://apps.vetmed.wsu.edu/CVME/

Academy of Dairy Veterinary Consultants, Fall Meeting October 5-6, 2018.
https://academyofdairyveterinaryconsultants.org/upcoming-meetings/

WSU CVM Spring Conference, March 29-31, 2019. SAVE THE DATE!! Pullman, WA. For updates visit:
https://cvme.vetmed.wsu.edu/

Producers

BEEF – NCBA Recorded webinars on Genetics. http://www.beefusa.org/pastwebinars.aspx

BEEF – Stockmanship & Stewardship. October 12-13, 2018. SAVE THE DATE! TRAC Event Center, Pasco, WA.

DAIRY – Genomics of Fertility Project Update and Use of Genomics. October 10, 2018. Prosser WA. SAVE THE DATE!

SHEEP – 2018 Northwest Junior Sheep Exposition/Washington Ram and Ewe Sale. July 13 &14, 2018. Grant County Fairgrounds. Moses Lake WA. https://extension.wsu.edu/animalag/news/northwest-junior-sheep-exposition/
(Entries closed for both events but if you are shopping….)

Visit our website for information on current research projects and outreach materials for veterinarians and producers! http://vetextension.wsu.edu/

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