From the Editor - Livestock shows and county fairs are upon us. Yes, this editor showed cows in Whatcom County many (4) decades ago, two summers in a row. The good thing about Milking Shorthorns is that there are few (if any) other cows in your class... The featured article is about the mis-use of a product to enhance show animals. The most we ever did was shave, wash and fluff tails... Our second article highlights results of a year-long investigation of low colostrum production in Jersey cattle. This investigation came about because of questions from a nutritionist, producer and veterinarian. Most of our good ideas come from questions from you. Our Field Disease Investigation Unit investigates your herd or flock problems that might be a regional issue, like Weak Calf Syndrome (see article on Vitamins A and E).

Melatonin Use in Market Lambs
by Susan Kerr, WSU Regional Livestock Extension

The state veterinarian has been informed that some market lamb youth have been using an unapproved product (melatonin) in project animals. Please share the information below widely so we can stop this ILLEGAL activity.

Although melatonin is available over the counter as a sleep aid/regulator for humans, it is classified as a dietary supplement and therefore not approved by the Food and Drug Administration (FDA). The FDA does not approve or license dietary supplements; it only tests them for safety (no contaminants, etc.).
Melatonin is a hormone. It is approved for use in food animals in other countries, but in the US, it is only approved for use in mink “to accelerate the fur priming cycle.” See the info below from the FDA site; it specifically says “do not use in food-producing animals.”

Because melatonin is not approved for use in food animals in the US, no withholding times have been established for it. This means the residue tolerance level is ZERO. The Food Animal Residue Avoidance Database says no recommendations can be made regarding withholding times to achieve zero residue in animals that have been treated with this hormone.

Do not confuse this issue with extra-label drug use (ELDU). ELDU is permissible under the guidance of a farm’s veterinarian in specific circumstances (details at https://www.fda.gov/AnimalVeterinary/GuidanceComplianceEnforcement/ActsRulesRegulations/ucm085377.htm). A critical aspect of ELDU: “it is limited to circumstances when the health of an animal is threatened, or suffering or death may result from failure to treat. This means extralabel use to enhance production is not permitted.” Uninformed or unscrupulous sheep producers use melatonin to enhance wool/hair growth and to calm excitable animals; these are production issues (and “show animal” production issues at that), not health issues, so this use does not fall under legal ELDU. Additionally, ELDU only pertains to medications approved by the FDA for animals or humans; melatonin is not approved by the FDA. For a comprehensive and up-to-date resource of FDA-approved medications, see https://animaldrugsatfda.fda.gov/adafda/views/#/search.

Summary

- Melatonin is not approved for use in food animals in the U.S.
- Using melatonin in food animals violates federal food safety regulations
- Using melatonin never qualifies for legal extra-label drug use
- Penalties and incarceration are possible when food safety regulations are violated
- It is critical for food animal producers to use credible sources to thoroughly investigate the legality of any products they use in or on their livestock
- Use of unapproved medications threatens the reputation of all youth-grown food animal products, risks exclusion of youth market animals from processing plants, and endangers the future of youth livestock market sales

Please make sure all 4-H youth, leaders, volunteers, and fair sheep superintendents receive and understand the contents of this message. Contact me if you have any questions. THANK YOU for helping to ensure food safety through education and compliance!
Seasonal, Low Colostrum Production in Dairy Cattle
by Dale A. Moore, Extension Veterinarian

Over the last five years, we have gotten questions from producers, nutritionists, and veterinarians about why some cows produce low amounts to no colostrum at certain times of the year. We could find little in the literature 5 years ago with the first question but a little more information has come to light, and because of your questions and help, we have been able to conduct a year-long study, led by Kevin Gavin (CVM Class of 2018) to describe this phenomenon in a large herd and identify some associated risks. The full results of this study will be published soon in the Journal of Dairy Science, available In Press at: http://www.journalofdairyscience.org/article/S0022-0302(18)30296-0/fulltext

What did we find? The problem in the herd we studied, and reported by many other producers and veterinarians, was one of seasonal LOW to NO colostrum production. The low colostrum production started with some cows calving in September and reached its lowest point with cows calving at the end of November into December. The problem was particularly common among older cows. Some older cows (almost 40% of those calving in December) produced no colostrum. The most important factor was time of the year, followed by age of the cow. When we did a pedigree analysis, there were some sire and cow family lines that had more low colostrum producers.

Calves need their colostrum and if their dam cannot produce it, dairy farmers have to purchase colostrum replacer. The problem appears to be quite complicated. As we say in science, “more research is needed”. As a result, Dr. Neibergs’ lab is looking to genomic testing to identify possible genetic factors associated with the seasonal low colostrum production, with a grant from the American Jersey Cattle Association.

Beef: The Importance of Vitamins A and E to Beef Calf Health
by Craig McConnel, Extension Veterinarian, WSU

An outcome of WSU investigations into Weak Calf Syndrome has been a renewed focus on the importance of trace minerals and vitamins to calf health. Two papers from Cheryl Waldner et al (J. Vet. Diag. Invest., 2014, Vol. 26 (3), 376-389; Can. J. Anim. Sci., 2017, Vol. 97, 65-82) highlight the importance vitamins A and E in calf health outcomes. Deficiencies in either can contribute to a number of causes of fetal, neonatal, and postnatal losses in beef calves. Selenium and vitamin E deficiencies lead to well-documented degenerative conditions such as myocardial and skeletal muscle lesions, but many micronutrients play an important role in the development and function of the immune system. In the 2014 paper by Waldner et al and based in western Canada, the two most commonly identified micronutrient deficiencies potentially associated with death in calves born alive were vitamins A and E. In that study, Calves with serum vitamin A concentrations in the lowest quartile of the study group were 2.8 times more likely to die during the follow-up period than calves with higher vitamin A concentrations. Furthermore, calves with less than adequate serum vitamin E concentrations were also 3.1 times more likely to be treated for scours. Interestingly, neither vitamin A nor vitamin E concentrations were associated with the risk of pneumonia.
In herds where infectious disease and poor cow body condition do not seem to be contributing factors to neonatal calf mortality, the role of other nutritional factors such as micronutrient deficiencies should be considered. Vitamin A is not present in plants. Cattle acquire vitamin A primarily through bioconversion of its precursor, β-carotene which is present in forages. The intensity of green color in a plant is a good approximation of its carotene content. In a growing plant all green parts are rich in carotene and have a high vitamin A value. The amount of vitamin A in cows’ colostrum and milk depends on their intake during late gestation. Yellow to orange pigmentation is an important indicator of carotenoid-rich and, therefore, vitamin A rich colostrum. Concentrates are a poor source of vitamin A and β-carotene, and vitamin A concentrations are higher in cattle after summer grazing periods compared with after winter feeding.

Forage type is considered to be the primary factor affecting β-carotene concentration in milk, while parity and production level seem to have only a limited effect. Primary hypovitaminosis A in pastured cattle may occur during periods of drought conditions when heat and sunlight contribute to oxidation and depletion of carotenoids. Drought conditions during the plant growing period can reduce the quality of forage and decrease the availability of carotene for vitamin A production in cattle. This leads to lower levels of vitamin A in colostrum and milk. Newborn calves must get most of their vitamin A from colostrum as they are born with very limited plasma β-carotene and retinol concentrations and little vitamin A reserves. Intake of decreased quality or quantity of colostrum may result in deficient serum concentrations of vitamin A, often associated with substandard levels of serum immunoglobulins as well. Furthermore, plasma β-carotene and retinol concentrations are also reduced in calves with delayed colostrum administration, possibly because of reduced intestinal absorptive capacity or changed post absorptive repartitioning.

Up to 90% of vitamin A is stored in the liver and can serve as a vitamin A source to the animal for a long period of time. As such, it is important to consider that plasma concentrations of vitamin A may not provide an accurate indication of current vitamin A status, and liver biopsy samples have been reported to be more accurate.

In contrast to vitamin A, the liver is not a major storage site for vitamin E. Adipose tissues and muscles store a significant amount of the total body vitamin E, and body stores are generally more limited. Although specific time frames for the duration of vitamin E persistence in the body have not been reported, small amounts of vitamin E can persist for a long time. The rate at which stores are depleted varies depending polyunsaturated fatty acids in feedstuffs and other factors increasing the need for antioxidants. Given these differences, an association between vitamin E and the previous growing season would not be expected if vitamin E consumed during the growing season is not stored by cattle for prolonged periods.

Similar to vitamin A, green grass is one of the most important sources of vitamin E for cattle. Although vitamin E tends to be less susceptible to destruction in stored feed (including premixes) compared with vitamin A, it will deplete over time and is sensitive to heat and moisture. Most unsupplemented rations consisting of stored forages and cereals or processed feed are considered poor sources of vitamin E. Stage of maturity of grass at harvesting for hay and the time from cutting to dehydration affect vitamin E concentration in forage, with losses of up to 50% in forage stored for 1 mo and up to 60% within 4 d during drying in the swath.

As with vitamin A, the newborn calf depends largely on colostrum as a source of vitamin E at birth as placental transfer is minimal. Vitamin E is an essential antioxidant that enhances neutrophil function by protecting them from oxidative damage, and it has immunostimulatory functions. Further it is essential for the integrity and optimum function of the reproductive, muscular, circulatory, and nervous systems. Nutritional myodegeneration is probably the most recognized
condition associated with vitamin E deficiency, and supplementation is a principal preventive measure for white muscle disease in young calves.

The amount of vitamin E contained in currently available commercial injectable products containing both selenium and vitamin E is limited, and these injections alone should not be relied on to address vitamin E deficiency. The product label maximum recommended dose of Mu-Se® (Merck Animal Health) for a 100 lb calf contains 187.5 mg (255 IU) of vitamin E, and the recommended dose of Vita E Selen® (Bioveta) for a 100 lb calf contains 114 mg of vitamin E. There are, however, injectable vitamin E formulations without selenium that have much higher concentrations of vitamin E. One product, Vitamin E-300 Injection® (Vet One, MWI Veterinary Supply, Boise, ID) provides 1200-1800 IU of vitamin E to a newborn calf at the recommended dose. Similarly, MWI’s VetOne provides 1200-1800 IU of vitamin E as well as 400,000-600,000 IU of vitamin A.

In the unfortunate event that you have suffered abortions, stillbirths, or neonatal and postnatal losses in your beef calves, you may want to consider screening for both vitamin A and E. Serum and liver samples can be submitted through the Washington Animal Disease Diagnostic Lab. Serum samples suitable for vitamin A and E evaluation can be obtained in the field using techniques that are practical and economical. Blood should be collected into Vacutainers™ or clean syringes and allowed to clot. Care should be taken to avoid hemolysis. Serum samples should be stored out of direct sunlight and refrigerated or frozen. They should be sent to the laboratory on ice and by overnight courier. Liver samples for vitamin A analysis can be taken from necropsy specimens or as biopsy samples.

If you are interested in additional information and details related to vitamins in ruminants, you may want to check out DSM’s excellent website regarding Ruminant Vitamin Nutrition.

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**WSDA Corner**

**Animal Disease Traceability: Why Now?**

by Amber J. Itle MS, VMD, WSDA Assistant State Veterinarian

**Introduction**

In the last century, agriculture has changed dramatically with the adoption of technology and modern food safety practices. In the early 1900s, milk-borne illness from tuberculosis and typhoid were an enormous problem. Both diseases are zoonotic or diseases that can be passed from animals to humans. Tuberculosis was the leading cause of death in the U.S. with approximately 450 deaths/day (1). As a result, the USDA implemented the Tuberculosis Eradication Program in 1917 that still exists today.

In the 1940s, pasteurization was widely adopted, decreasing the incidence of milk-borne illness. However, brucellosis, also zoonotic, remained endemic in the U.S. Prior to implementation of the brucellosis eradication program, there were 154,000 positive herds in the US and $400 million in related production losses (2). Both the tuberculosis and brucellosis eradication programs
implemented in the last century initially relied on ear notching cattle and by the 1970s, official identification in the form of metal tags was adopted. Although these eradication programs have been successful in controlling these diseases in cattle herds, outbreaks continue to occur in the U.S. and traceability efforts are becoming more challenging.

**Changing Trends since the 1950s**

Since the 1950’s, industrialization and intensification practices have changed the dairy and beef industry to what we know today. In 1950, the average dairy herd size was 14 cows and approached 17 by 1954 (3). Even then, there was a trend towards larger, fewer farms. As of 2013, nearly 60% of dairy herds had 500+ cows (4). From 1950 to 2010, total milk production increased by approximately 600%, production per cow by 200%, number of cows by 100%, despite the number of dairy farms decreasing by 50% (5). According to 2007 Ag Census data, 24% of farms were producing 81% of the milk in the U.S.

**Modern Farms and Animal Identification**

In the last 60 years, producers have gone from hand milking cows to robotic rotary parlors, from bull breeding to artificial insemination and genomics, from labor intensive feeding practices to TMRs and robotic feed pushers. Radio-Frequency Identification (RFID) is an emerging technology on farms offering developments in activity-based welfare assessments (estrus and lameness detection), sensors of temperature and pH (calving alert, illness and rumen function) and welfare biomarkers (stress and metabolic diseases).

Although this type of RFID technology is being adopted for management practices on farm, a national RFID based Animal Disease Traceability (ADT) program in the U.S. has yet to be adopted. The trend towards increasing herd size without ADT is a serious threat to our secure food system. With fewer but larger herds in concentrated areas, the risk for disease transmission is intensified and increases risk to producers as well as consumers if products are not able to move in commerce due to animal disease.

Producers and veterinarians are still using the silver metal clips or orange metal brucellosis tags instituted for official individual animal identification for disease traceability. These visual tags are hard to read, are prone to transcription errors, and often are only recorded on paper hampering traceability efforts. Transitioning from metal tags to Electronic Identification (EID) such as Radio Frequency ID (RFID) would help close the gap for effective ADT by bringing the outdated 1950s system into the modern age.

**Why is ADT important?**

Disease outbreaks are expensive and negatively affect Washington State’s economic viability. The faster a disease can be detected and contained, the faster recovery and return to commerce can occur. ADT allows for continuity of business for those producers without diseased herds and reduces the time herds are under quarantine. Additionally, ADT can protect animal welfare and health by reducing the number of animals infected during an outbreak, reducing animal suffering and death.

Most of our state’s producers remember the significant market impact to the cattle industry in 2003 when a single Canadian cow with bovine spongiform encephalopathy (BSE) was imported into Washington. Export losses for America’s beef industry totaled $3.2 billion to $4.7 billion in 2004 (6). Cattle producers have yet to fully recover from that event. Most concerning, it took seven days of searching through paper records to trace the cow’s origin and some of the animals that had been exposed were never found.
**Why? Wildlife can become disease reservoirs.**

Although Foot and Mouth Disease (FMD) is an ongoing concern for the cattle industry, producers may not perceive this disease as a real threat because it has yet to enter the U.S. in recent decades. However, tuberculosis continues to be a very real problem and highlights national challenges with disease control and eradication. Despite the success of the ongoing Tuberculosis eradication program, cattle continue to become infected from wildlife. Bison and elk act as disease reservoirs.

Once wildlife populations become infected, it is extremely challenging to eradicate the disease. Last year, 29 dairies had to be quarantined after a steer identified as a positive for Tuberculosis, could not be traced to the farm of origin. Seven steers in the exposed lot could never be traced. In 2016, the Canadian Food Inspection Agency reported that 26,000 cattle on 50 premises had to be quarantined after six Tuberculosis positive animals were found. Canada slaughtered 11,500 cattle and committed $17 million to their response (7). An FMD outbreak would be much more devastating, especially if wildlife populations become infected. Without quick containment of Foot and Mouth disease, it could become a reoccurring problem in the U.S. just like TB.

**Why? Cattle are on the move.**

Cattle in the U.S. are on the move, which increases risk of disease exposure and transmission. According to WSDA, in 2016 alone, 160,000 head of WA cattle were exported to 32 states (Fig 1A.) and 822,100 head of cattle imported into WA from 33 states and four provinces (Fig 1B.). In addition, approximately 180,000 Mexican cattle were imported to the U.S. in the last year, up 20% from 2016.

![Map of cattle movement](image)

**Fig 1A. Number of cattle exported from WA in 2016**  
*Source: WSDA*
What Do We Need to Create an Animal Disease Traceability Program?
To implement a robust cattle ADT system in the U.S., a “bookend system” is the gold standard (Fig 2.). ADT should capture individual identification from birth premise, record all animal movement, and retire the ID tag at harvest to be fully effective. The three components of an ADT system are the animal, the location of that animal, and an electronic database that can quickly capture and track that information (Fig 4.).

1. The Animal (cow, heifer, bull, or steer)
An official, unique, and permanent electronic identification tag must be applied to every bovine for a true ADT system to work (Fig 3.). All classes of cattle are equally vulnerable to diseases. Exemptions create vulnerability in ADT systems. For a tag to be considered official, it must have the “840” prefix indicating the animal was born in the U.S. An 840 tag is functionally equivalent to a 900 series tag and is compatible with herd management systems. Because 840 tags are official, they can replace metal clips at brucellosis vaccination and can be applied during any point in the animal’s life, preferably at birth.
2. **Location or PIN number**
To obtain an 840 tag, a producer must get a Premise Identification Number (PIN) by verifying the address of the farm where the animals are located. Go to WSDA’s website ([https://agr.wa.gov/FoodAnimal/AnimalID](https://agr.wa.gov/FoodAnimal/AnimalID)) to complete an application or call WSDA at 360-902-1987. Use any tag vendor to order 840 tags.

3. **Electronic Database**
To trace diseased animals rapidly, WSDA built a system called “Animal Tracks” to record animal health, animal movement, and change of ownership information. This database is electronic, searchable, secure, and confidential. **RCW 42.56.380 Agriculture and livestock** provides information protection for all ADT information, including animal ownership, numbers of animals, locations, contact information, movements of livestock, financial information, purchase and sale of livestock, account numbers or unique identifiers issued by government to private entities, and information related to livestock disease or injury that would identify an animal, person, or location.

![Key components of ADT System](source: WSDA)

**What Are Other Countries Doing for ADT?**
Canada has had a mandatory RFID Program in cattle and slaughter facilities since 2001; sheep, pigs, and poultry since 2006. Cervids and goats have been mandated this year. Mexico implemented a mandatory national cattle ID program in 2017 and cattle operators have tagged eight million head. Canada and Mexico do not subsidize tags or equipment associated with their mandatory RFID programs. Australia, New Zealand, Brazil, Uruguay, and the European Union all have mandatory electronic ADT programs. Many countries tie indemnity (government payment for diseased animals) to ADT programs. USDA has indicated that the same will be true in the U.S. in the future.

**Why ADT Now?**
Despite improvements in genetics and rapid adoption of technology on farms to gain production efficiencies, the U.S. animal agricultural industries have not universally adopted a system that can rapidly, accurately, and electronically trace individual animal movement to control a disease outbreak. National Meetings in 2017 indicated EID will be mandated by many states in the next few years. The USAHA Committee on Livestock Identification put forth a resolution to USDA to eliminate availability of free metal official identification tags as of 2020, which would promote EID systems for cattle.
WSDA is seeking input and an industry-led task force to develop an implementation plan for ADT in Washington. WSDA needs producer input to inform “how” we can best protect our industries as we move forward. We really value your input and welcome all viewpoints.

If you have questions or would like to provide input, please don’t hesitate to contact the State Veterinarian’s Office (360) 902-1878, WSDA’s ADT Program (360) 725-5493 or myself, Dr. Amber Itle (360) 961-4129 or by email at aitle@agr.wa.gov.

FAQ’s
https://agr.wa.gov/FoodAnimal/AnimalID/RFIDFAQ.aspx

Informational handout.

References


New Species Specific Abortion Panels at WADDL
by Danielle Nelson, WADDL Pathologist

The Washington Animal Disease Diagnostic Laboratory is offering new abortion diagnostic panels on a species-specific basis for horses, camelids, sheep, goats, and cattle. These species specific panels are designed to detect common and high consequence causes of reproductive disease in the Pacific Northwest. For example, detected pathogens for reproductive disease in cattle include Bovine Viral Diarrhea Virus, bacterial or fungal placentitis including Campylobacter spp., and selenium deficiency. Other common abortifacient agents such as protozoa (Neospora caninum) or Infectious Bovine Rhinotracheitis Virus can be detected histologically and confirmed with additional testing. A new combined abortion panel tissue checklist designed to maximize diagnostic sensitivity can be used in the field by veterinarians to clarify what fixed and fresh tissues and specific fluids to submit. Submission of placenta, in any state, is strongly recommended since some pathogens may only be detected in placental tissue. Submission of a fetus or entire organs (ideally with placenta) for necropsy evaluation and sample collection is also available for an additional fee. Submission of paired sera from the dam or herdmates is also recommended, and abortion serological profiles are also available, by affected species. For more information about testing, pricing, and recommended sample submission, please reference the web test search tool...
Recommendations for bovine mycoplasma culture CO2 concentrations are varied and were not empirically derived. The objective of this study was to determine whether the growth measures of bovine mycoplasma isolates differed when incubated in CO2 concentrations of 10 or 5% or in candle jars (2.7 ± 0.2% CO2). Growth of Mycoplasma bovis (n = 22), Mycoplasma californicum (n = 18), and other Mycoplasma spp. (n = 10) laboratory isolates was evaluated. Isolate suspensions were standardized to approximately 108 cfu/mL and serially diluted in pasteurized whole milk to achieve test suspensions of 10² and 10⁶ cfu/mL. One hundred microliters of each test dilution was spread in duplicate onto the surface of a modified Hayflick's agar plate. Colony growth was enumerated on d 3, 5, and 7 of incubation. A mixed linear model included the fixed effects of CO2 treatment (2.7, 5, or 10%), species, day (3, 5, or 7), and their interactions, with total colony counts as the dependent variable. Carbon dioxide concentration did not significantly affect overall mycoplasma growth differences, but differences between species and day were present. Colony counts (log10 cfu/mL) of M. bovis were 2.6- and 1.6-fold greater than M. californicum and other Mycoplasma spp., respectively. Growth at 7 d of incubation was greater than d 3 and 5 for all species. These findings were confirmed using field isolates (n = 98) from a commercial veterinary diagnostic laboratory. Binary growth responses (yes/no) of the field isolates were not different between CO2 treatments but did differ between species and day of incubation. On average, 57% of all field isolates were detected by 3 d of incubation compared with 93% on d 7. These results suggest that the range of suitable CO2 culture conditions and incubation times for the common mastitis-causing Mycoplasma spp. may be broader than currently recommended.


BACKGROUND: There is an increasing push for dairy production to be scientifically grounded and ethically responsible in the oversight of animal health and well-being. Addressing underlying challenges affecting the quality and length of productive life necessitates novel assessment and accountability metrics. Human medical epidemiologists developed the Disability-Adjusted Life Year metric as a summary measure of health addressing the complementary nature of disease and death. The goal of this project was to develop and implement a dairy Disease-Adjusted Lactation (DALact) summary measure of health, as a comparison against cumulative disease frequency. METHODS: A total of 5694 cows were enrolled at freshening from January 1st, 2014 through May 26th, 2015 on 3 similarly managed U.S. Midwestern Plains’ region dairies. Eleven health categories of interest were tracked from enrollment until culling, death, or the study’s completion date. The DALact accounted for the days of life lost due to illness, forced removal, and death relative to the average lactation length across the participating farms. RESULTS: The DALact consistently identified mastitis as the primary disease of concern on all 3 dairies (19,007-23,955 days lost). Secondary issues included musculoskeletal injuries (19,559 days), pneumonia (11,034 days), or lameness (8858 days). By comparison, cumulative frequency measures
pointed to mastitis (31-50%) and lameness (25-54%) as the 2 most frequent diseases. Notably, the DALact provided a robust accounting of health events such as musculoskeletal injuries (5010-19,559 days) and calving trauma (2952-5868 days) otherwise overlooked by frequency measures (0-3%).

CONCLUSIONS: The DALact provides a time-based method for assessing the overall burden of disease on dairies. It is important to emphasize that a summary measure of dairy health goes beyond simply linking morbidity to culling and mortality in a standardized fashion. A summary measure speaks to the burden of disease on both the well-being and productivity of individuals and populations. When framed as lost days, years, or lactations the various health issues on a farm are more comprehensible than they may be by frequency measures alone. Such an alternative accounting of disease highlights the lost opportunity costs of production as well as the burden of disease on life as a whole.


Two experiments were conducted to determine (i) factors influencing calf temperament at weaning, (ii) association between heifer-calf temperament at weaning and temperament at breeding and (iii) effect of heifer-calf temperament on pregnancy rate per artificial insemination (P/AI). In experiment 1, beef cows and their calves (n = 285) from three farms were used. Sire docility estimated progeny difference (EPD) score, birth type (normal or assisted), calf gender, calf behaviour (during 1st 4 weeks) and calf health status (until weaning) were recorded. Cows and calves were assigned a temperament score (0-calm; 1-excitable), and all cows were given a body condition score (BCS, 1-9; 1-emaciated; 9-obese) at weaning. Calf’s illness (p < .05), low sire docility EPD score (p < .05), altered gait (p < .05), altered resting behaviour (p < .01), reduced/no play behaviour (p < .05) and cow excitabile temperament (p < .001) increased calf excitabile temperament at weaning. In experiment 2, replacement heifer-calves (n = 758) from 12 farms were assigned a temperament score at weaning and later at breeding. Blood from 40 calves at weaning and 31 heifers at initiation of synchronization (same animals) was collected by coccygeal venipuncture for determination of circulating cortisol and substance P concentrations. Heifers were assigned a BCS and reproductive tract score (RTS, 1-5; 1-immature, acyclic; 5-mature, cyclic), synchronized for fixed time AI, observed for oestrus and were artificially inseminated. Cortisol concentrations were increased in excitabile heifer-calves compared to calm heifer-calves at weaning (p < .05), and substance P was increased in excitabile compared to calm females both at weaning and breeding (p < .05). Low sire EPD docility score (p < .01), heifer-calf excitabile temperament at weaning increased excitabile temperament at breeding (p < .01). Controlling for BCS categories (p < .01), oestrous expression (p < .0001) and temperament at breeding by oestrous expression (p < .05), the calf's excitabile temperament at weaning (p < .001) reduced P/AI (Calm, 62.7 (244/389) vs. Excitable, 53.4% (197/369); p < .01). In conclusion, selection of docile cows and sires with greater docility EPD score should be given consideration to reduce calf excitement. Temperament in beef female can be detected earlier in their life and could be used as a tool in the selection process and to improve their performances.


An increase in the prevalence of commensal Escherichia coli carrying blaCTX-M genes among dairy cattle was observed between 2008 and 2012 in Washington State. To study the molecular epidemiology of this change, we selected 126 blaCTX-M-positive and 126 blaCTX-M-negative isolates for determinations of the multilocus sequence types (MLSTs) and antibiotic resistance phenotypes from E. coli obtained during a previous study. For 99 isolates, we also determined the blaCTX-M alleles using PCR and sequencing and identified the replicon types of blaCTX-M-carrying
plasmids. The blaCTX-M-negative E. coli isolates comprised 76 sequence types (STs) compared with 32 STs in blaCTX-M-positive E. coli isolates. The blaCTX-M-positive E. coli isolates formed three MLST clonal complexes, accounting for 83% of these isolates; 52% of blaCTX-M-negative E. coli isolates clustered into 10 clonal complexes, and the remainder were singletons. Overall, blaCTX-M-negative E. coli isolates had more diverse genotypes that were distinct to farms, whereas blaCTX-M-positive E. coli isolates had a clonal population structure and were widely disseminated on farms in both regions included in the study. Plasmid replicon types included IncI1 which predominated, followed by IncFIB and IncFIA/FIB. blaCTX-M-15 was the predominant CTX-M gene allele, followed by blaCTX-M-27 and blaCTX-M-14. There was no significant association between plasmid replicon types and bacterial STs, and neither clonal complexes nor major plasmid groups were associated with two discrete dairy-farming regions of Washington State.

**IMPORTANCE** Infections caused by extended-spectrum β-lactamase (ESBL)–producing Escherichia coli occur globally and present treatment challenges because of their resistance to multiple antimicrobial drugs. Cattle are potential reservoirs of ESBL-producing Enterobacteriaceae, and so understanding the causes of successful dissemination of blaCTX-M genes in commensal bacteria will inform future approaches for the prevention of antibiotic-resistant pathogen emergence.

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**Veterinary Feed Directive Survey**

Are you a producer over the age of 18? Interested in providing feedback about the Veterinary Feed Directive? Michigan State University would like to hear from you. Here is the link to the survey: [https://msu.co1.qualtrics.com/jfe/form/SV_eY83E3DiinngljD](https://msu.co1.qualtrics.com/jfe/form/SV_eY83E3DiinngljD)

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**Continuing Education**

**Veterinarians**

**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/](https://apps.vetmed.wsu.edu/CVME/)

**CVM Spring Conference**, March 29-31, 2019. SAVE THE DATE!! Pullman, WA.

**Producers**


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**Send newsletter comments to the Editor:** *ag animal health*

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