

In This Issue

| | |
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| From the Editor – BRD | 1 |
| Kudos to the Theriogenology Group! | 1 |
| Current WSU – Faculty Research | 2 |
| Environmental influence on antibiotic resistance | |
| Use of a preventive antibiotic for calves | |
| WADDL | |
| Why are we seeing copper deficiency in goats? | 3 |
| Bluetongue Virus in Ruminants | 5 |
| Beef Cattle – Mothering Ability and Temperament | 7 |
| WSDA Corner | 8 |
| Continuing Education Opportunities | 9 |
| YOU CAN VIEW PAST ISSUES OF <i>ag animal health</i> : http://extension.wsu.edu/vetextension/Pages/Newsletters.aspx | |

From the Editor - *Bovine respiratory disease complex - BRD - shipping fever - pneumonia* - by any other name we know it as the biggest health problem of cattle in the feedlot. But did you know it can also be a problem in pre-weaned beef calves? The WSU Extension Beef Team, coordinated by Dr. Andy Allen and yours truly, have developed a set of educational materials and a plan to deliver them to cattlemen and women in the state. The Team also created a ranch-based risk assessment tool that producers can use to identify areas in which they might consider changes to increase resistance of their cattle or reduce exposure to pathogens. The team will be presenting the BRD Cow-Calf Curriculum in at least 4 locations over the next year. Look for further announcements. Come hear what the Beef Team has to say about BRD and how to reduce the risks. For information, see: <http://extension.wsu.edu/vetextension/brd/Pages/default.aspx>

Kudos to the Theriogenology Group!

The WSU:CVM Theriogenology Group was well-represented at the 2013 Society for Theriogenology/American College of Theriogenology Annual Conference. A list of their accomplishments (and Congratulations!):

1. The WSU student chapter won second prize in the Student Quiz Bowl 2013 and second prize in the Student Chapter of the Year award.
2. Stephanie Schroeder (Class of 2016) presented results from her research study “Influence of modified 2-point temperament score on AI pregnancy in beef heifers” co-authored by Dr. Ram Kasimanickam in the conference’s opening abstract session.
3. Kathleen Gutierrez (Class of 2015) presented results of her research study, “Association of reproductive tract scoring of beef heifers and reproductive efficiency in AI and natural service and natural service only beef herds” co-authored by Dr. Ram Kasimanickam and Dr. Ahmed Tibary in the competitive abstract category.
4. Katilyn Hanson (Class of 2015) presented results from her research study, “Detection of genes encoding multidrug resistance and biofilm virulence factor of uterine pathogenic bacteria in postpartum dairy cows” co-authored by Dr. Vanmathy Kasimanickam and Dr. Ram Kasimanickam in the food animal abstract session.
5. Dr. Campbell Alexis presented results of, “Cesarean section in alpacas and llamas at a referral center - technique, survival, and postoperative fertility: 24 cases (2000-2012)”

co-authored by Drs. Tibary and Pearson and Shirley Sandoval in the conference's opening abstract session

6. Dr. Lisa Pearson presented the result of "Laparoscopic-assisted ovariectomy in alpacas (*Vicugna pacos*)" co-authored by Drs. Tibary and Campbell Alexis and Shirley Sandoval in the competitive abstract category.
7. Dr. Ram Kasimanickam presented, "Mucin1 and cytokines mRNA in endometrium of dairy cows with uterine diseases" co-authored by Dr. Vanmathy Kasimanickam, Dr. John Kastelic and Dr. Ahmed Tibary in in food animal abstract session.
8. Dr. Ram Kasimanickam presented, "Effect of GnRH at CIDR insertion on Day 0 and number of PGF2a doses at CIDR removal on Day 5 on A.I. pregnancy rate in heifers synchronized with 5-d CO-Synch +CIDR program" co-authored by Drs. G. Schuenemann, B. Whitlock, D. Moore, J. Hall, W. Whittier in the food animal abstract session.
9. Dr. Ram Kasimanickam presented, "Exogenous and endogenous retinoic acid modulates meiosis-associated genes expression in canine testis, an *in-vitro* model" co-authored by Dr. Vanmathy Kasimanickam in small animal abstract session.
10. Dr. Ahmed Tibary presented, "Resident Training" in the Therio Educators Forum.
11. Drs. R. Kasimanickam and Tibary served on the Job Task Analysis committee of the American College of Theriogenologists in 2010 and were recognized for their contribution to the college.
12. Dr. Ram Kasimanickam served on the Board of Directors for the American College of Theriogenologists from 2010 to 2013 and was recognized for his contribution to the college.
13. Erika Larsonberg (Class of 2016) won 3rd place in the poster session for presentation of "Uterine horn torsion associated with a mummified fetus in a ewe." She was mentored in this project by Drs. Kasimanickam, Campbell, and Tibary.

Current WSU - Faculty Research

(1) Our own Dr. Doug Call worked with investigators in Scotland and Texas to model the role of ceftiofur antibiotics in the environment on transmission in cattle populations. Call DR, Matthews L, Subbiah M, Liu J. 2013. Do antibiotic residues in soils play a role in amplification and transmission of antibiotic resistant bacteria in cattle populations? *Front. Microbiol.* 2013 Jul 11;4:193. doi: 10.3389/fmicb.2013.00193. Print 2013.

When we consider factors that contribute to the emergence, amplification, and persistence of antibiotic resistant bacteria, the conventional assumption is that antibiotic use is the primary driver in these processes and that selection occurs primarily in the patient or animal. Evidence suggests that this may not always be the case. Experimental trials show that parenteral administration of a third-generation cephalosporin (ceftiofur) in cattle has limited or short-term effects on the prevalence of ceftiofur-resistant bacteria in the gastrointestinal tract. While this response may be sufficient to explain a pattern of widespread resistance to cephalosporins, approximately two-thirds of ceftiofur metabolites are excreted in the urine raising the possibility that environmental selection plays an important additive role in the amplification and maintenance of antibiotic resistant *E. coli* on farms. Consequently, we present a rationale for an environmental selection hypothesis whereby excreted antibiotic residues such as ceftiofur are a significant contributor to the proliferation of antibiotic resistant bacteria in food animal systems. We also present a mathematical model of our hypothesized system as a guide for designing experiments to

test this hypothesis. If supported for antibiotics such as ceftiofur, then there may be new approaches to combat the proliferation of antibiotic resistance beyond the prudent use mantra. **What does this mean? Although the use of an antibiotic within an animal can result in selection of resistant bacteria, the group proposes that the use of an antibiotic alone is not responsible for the persistence of antibiotic resistance to that drug, that environmental selection may play a role. As an example, the environment may serve as a source of resistant bacteria for young dairy calves and not just a result of antibiotic treatment. (D. Moore)**

(2) Our own Dr. Larry Fox worked with a group at the University of Guelph on a study of preventive treatment for dairy calves and assessment of *Mycoplasma* in those calves. Stanton AL, Kelton DF, Leblanc SJ, Wormuth J, Fox LK, Leslie KE. Effects of tulathromycin on incidence of various diseases and growth of young heifers. J Vet Med Assoc. 2013;243(2):267-276.

Objective-To determine the effects of administration of 1 dose of tulathromycin on the incidence of various diseases and growth, identify risk factors for slow growth, and determine the association of *Mycoplasma bovis* status with the incidence of otitis media in calves. **Design-**Randomized controlled trial and cross-sectional study. **Animals-**788 dairy heifer calves (median age, 3 days). **Procedures-**Calves received tulathromycin or a saline (0.9% NaCl) solution control treatment once. Calves were observed daily for 8 weeks by farm staff to detect diseases. Nasal swab specimens were collected from some calves for *Mycoplasma* spp culture. **Results-***Tulathromycin-treated calves had significantly lower odds of developing otitis media (OR, 0.41; 95% confidence interval, 0.58 to 0.82) versus control calves. Control calves had significantly higher odds of developing diarrhea (OR, 1.8; 95% confidence interval, 1.2 to 2.6) versus tulathromycin-treated calves. Control calves and those with failure of passive transfer, fever, lameness, respiratory tract disease, or diarrhea had significantly lower average daily gain versus other calves.* Seventeen of the 66 (26%) calves that underwent repeated testing had positive *Mycoplasma* spp culture results, but positive results were not associated with otitis media. One of 42 calves with otitis media tested for *Mycoplasma* spp had positive results, and 1 of 43 age-matched calves without otitis media had positive results. **Conclusions and Clinical Relevance-**Tulathromycin-treated calves in this study had a lower incidence of diarrhea and otitis media versus control calves. Various diseases had negative effects on average daily gain. *Mycoplasma bovis* status was not associated with otitis media in calves.

What's New at WADDL?

Why are we seeing Copper Deficiency in Goats?

By Drs. D.A. Moore and P. Talcott

WADDL has diagnosed copper deficiency in goats on more than one occasion, and recently found it in one flock that lost five kids. We know that goats and sheep have low requirements for copper and with too much supplementation can develop copper toxicity, but how do you know if your goats are just right when it comes to copper?



Although we can see copper deficiency at any age, we tend to see it in the young most often. There are a couple of different ways kids might present clinically. One is the result of abnormal bone growth that makes for more fragile bones and fractures and the other is a neurological condition that results in weakness and back-leg incoordination. The neurologic form can happen if copper deficiency occurs in utero (the pregnant doe is deficient) or right after the kids are born, and could be confused with caprine arthritis-

encephalitis virus infection (CAE). More non-specific signs are poor-doing, scouring, poor growth rate, rough dull coat, increased disease susceptibility and in older animals, and trouble getting bred. Kids may be born dead or be unable to suckle or keep up with the doe. The clinical signs of copper deficiency can vary widely from place to place.

If copper deficiency is suspected, blood and/or liver samples can reveal the condition. Liver copper is the best method to determine deficiency. However, blood samples are useful as well. Plasma copper levels are considered more reliable than serum copper. If serum is the only thing available, if copper is very low in an unstressed animal, it is most likely due to copper deficiency. Stress can falsely elevate blood copper levels. If a herd problem is suspected, both affected and healthy goats should be tested. It is recommended that a number of samples be taken from the herd to gauge copper status.

Examining or evaluating the ration for copper levels is really key and prevention lies in getting just the right amount of copper in the diet. Supplementation with copper sources in the diet should be based on levels available in the current feed. Copper levels in the diet that are marginal might result in a chronic deficiency. Even normal diet levels could result in deficiency if the copper absorption is interfered with by molybdenum, sulfur or iron levels. Knowing the levels of all these minerals in the whole diet is important to discovering the root cause of the copper deficiency.

Copper deficient areas have been recognized in Washington for some time. Soils that might be deficient include severely leached soils, areas with high water tables, sandy soils, alkaline soils or peat soils. But, knowing that an area is deficient is only one piece of the puzzle and only addresses the forages grown on that soil.

The exact amount of copper necessary for goats is not exactly known. However, recent research has indicated that higher amounts are tolerated by goats than by sheep. In one study, levels of 100-150 ppm in the diet improved average daily gain in young does by 28% without resulting in toxicity. Supplementation may include oral supplements, copper oxide

needles in gelatin capsules, a trace mineral mixture added to the diet, or injectable copper.

Be mindful when trying to reduce the risk of copper *toxicity* in the goat herd that copper *deficiency* is not induced.

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Bluetongue in Ruminants

By Drs. D. A. Moore and J. Evermann

Recent diagnosis of fatal bluetongue virus (BTV) infection in a llama herd in Washington reminds us that this viral disease of ruminant livestock, South American camelids, and some other ruminant species is here in Washington State and is endemic in specific areas east of the Cascades. Cattle are usually less affected by infection than sheep and white-tailed deer, and South American camelids in the Americas were once considered resistant to disease. However, the first US fatal infection in an alpaca was reported recently (2010) in California. Non-clinical, carrier-state infections may also occur. Since there are 26 distinct serotypes of the virus described worldwide, and seven within the United States, it is important for producers, veterinarians and diagnosticians to determine which one is active in the Northwest region at this time.

Most BTV infections in ruminants are inapparent. However, it is the severe disease with high mortality that gets our attention. Clinical BTV infection in sheep may result in mouth erosions and ulcers, lameness, weakness and depression, and facial swelling. Small hemorrhages may be seen in the nose and mouth. Some cases may develop severe, fatal disease of the respiratory and cardiovascular system and vasculitis. Infection of a pregnant animal can result in hydranencephaly or 'dummy' calves or lambs. The disease can be confirmed by the diagnostic laboratory by a blood sample (usually both serum and whole blood are submitted) and fresh tissues. Search: http://www.vetmed.wsu.edu/depts_waddl/ for more information on submitting samples.

Treatment of clinically-affected animals is supportive care. For prevention, a modified live vaccine exists but its release is controlled by the state because of potential adverse consequences of vaccination (abortion or malformation of the fetus) and because vaccination with the wrong strain will not provide cross-protection.

Although transmission of the virus through semen and colostrum is possible, *Culicoides* spp. biting midges are responsible for most of the transmission of the virus between animals. They are found primarily in moist and low-lying areas where damp soil, rotting vegetation

or manure are present. The females lay their eggs in the moist area and the eggs hatch and develop into larvae which feed on organic material.

The midges tend to be swarming insects; they pester the animals and bite through the skin to lap a blood meal and are most active in summer and fall. The BTV can replicate in the fly's thorax and can be secreted in the saliva in about a week and then transmitted to another ruminant.

Preventing the midges from biting, and thereby transmitting BTV, is difficult. Most of the pyrethoid insecticides only provide temporary protection. The most effective means of control includes drainage of swampy areas, removal of livestock from the low-lying, midge-infested areas (more than two miles), or stabling the animals during midge season. In some cases, "decoy" cattle have been placed with sheep to provide a more resistant target.



<http://southernfireantcontrol.com/faqs.php>

In temperate climates such as in the Pacific Northwest, where the midges are not active in the winter, potential ways for the virus to "overwinter" have been proposed. Transmission of the virus from one stage of the midge to another is proposed but not yet documented. An overwintering cycle that involves another animal

reservoir has also been proposed but not substantiated. The most likely means for overwintering is the persistence of the virus in adult midges that survive the winter. There may be other mechanisms not yet documented. Overwintering indicates that each year, during active midge feeding, there could be BTV transmission.

Bluetongue virus is here in Washington State, although it appears as a problem cyclically, rather than annually. There are a few things that may reduce transmission through midge control. "Keeping Your Distance" from midge breeding areas might be the best method.

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Beef Cattle – Mothering Ability and Temperament

By Dr. D.A. Moore



There is strong evidence that for feedlot cattle, temperament can affect performance and carcass quality. In this month's issue of the Journal of Animal Science, investigators from the United Kingdom reported a study of temperament and mothering ability in beef cows. Our Theriogenology group has been looking at the effects that temperament (as classified by chute exit speed) has on conception rate in heifers and cows (See Schroeder S, Kasimanickam R. Influence of modified 2-point temperament score

on AI pregnancy in beef heifers. *Clin. Therio.* 2013;5(3): <http://st.omnibooksonline.com/index.html>) and has found that excitable animals have lower pregnancy rates. But, if we select for calmer temperaments, would we select against 'mothering ability'?

In the UK research, they recorded cow chute speed before calving and maternal defensiveness within 4 days after calving during handling of the calf. They measured average daily gain (ADG) of the calf over 7 months. They found that temperament and defensiveness were not associated with the amount of maternal behavior shown to the calf. On one farm, more excitable cows (exited the chute faster) had calves with a lower birth weight and cows that were agitated when isolated had calves with a lower ADG.

This research provides some evidence that we could select cows or heifers for calmer temperament without giving up the mothering ability we need in them to wean a calf successfully. The study also suggests that temperament has wider implications, not just in pregnancy rates, but also in the birth weight and gain of her calf.

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WSDA Corner

By Dr. Paul Kohrs, Acting State Veterinarian

ANIMAL DISEASE TRACEABILITY

After some anxious moments the end of June, the legislature passed a budget that included funding to develop an Animal Disease Traceability system for Washington State. \$881,000 was secured through the capital budget to provide funding through 2015 for several components related to animal disease traceability. The department is currently working on drafting an implementation plan, timeline, and goals for the system.

PERSONNEL CHANGES

As many of you know, Dr. Leonard Eldridge retired as the State Veterinarian. Dr. Eldridge is currently spending time with friends and family and spending a lot of time fishing!

Dr. Jerry Pospisil, field veterinarian for the Southwest Region retired on April 30th after six years with the department. We were very fortunate to hire Dr. Thomas Gilliom to replace him. Dr. Gilliom has extensive mixed animal practice experience in Hood River, Oregon and Stevenson, Washington area. He has proven to be a real asset to WSDA. His helpful attitude and eagerness to learn the regulatory side of veterinary medicine have allowed him to quickly understand the book of business that WSDA does each day.

Dr. Jeff Howlett, field veterinarian for the Northwest Region retired July 31st after 23 years with the department. We were fortunate again to find a very competent replacement in Dr. Amber Itle. Dr. Itle has extensive experience in mixed practice in Whatcom County. She has an interest in Animal Welfare and is completing her Master's Degree in Animal Welfare at University of British Columbia.

On July 1, Director Bud Hover temporarily split the State Veterinarian/Assistant Director position into two positions; Acting State Veterinarian, Dr. Paul Kohrs, and Acting Assistant Director, Mark Johnson. Mark Johnson has held the position of Chief Financial Officer for the agency for the last 20+years. This split of positions will allow the division to focus on developing and implementing an Animal Disease Traceability system for Washington and train and support our new staff.

Dr. Cynthia Faux, Reserve Veterinary Corps Coordinator, accepted a full time position with Washington State University. We are currently recruiting for a Reserve Veterinary Corps Coordinator (Epidemiologist 2) within the Animal Services Division. This is a full-time permanent position located in Olympia. If anyone is interested in this position please review the job description and application process at Reserve Veterinary Corps Coordinator (Epidemiologist 2).

Continuing Education

Veterinarians

Academy of Dairy Veterinary Consultants Fall 2013 Meeting. New Models for Dairy Practice. October 11 and 12, 2013. Long Beach, CA. For more information contact Dale Moore at damoore@vetmed.wsu.edu or go to: <http://www.vetmed.wsu.edu/orgADVC/>

Producers

Washington Cattlemen's Association – November 13-16, 2013. Pasco, WA.
<http://washingtoncattlemen.org/Convention.html>

Washington State Dairy Federation – November 4-5, Centralia, WA.
<http://www.wadairyfederation.org/?p=9>

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