WASHINGTON STATE UNIVERSITY
VETERINARY MEDICINE EXTENSION

ag animal health
VETERINARY MEDICINE EXTENSION

Winter 2008

WASHINGTON STATE UNIVERSITY EXTENSION & WSU COLLEGE OF VETERINARY MEDICINE

In This Issue

From the Editor

Ag animal health is in the news

Malignant Catarrhal Fever *(MCF) in cattle* is the featured article in this issue due to the recent outbreak of the disease in the state. What is most pertinent is the importance of education about diseases like this to help producers and others make decisions about prevention. As we mentioned in the last newsletter, one important mechanism for education about disease prevention and providing quality ag animal products is the Beef Quality Assurance (BQA) program. For the next few issues, we'll highlight some of the "modules" or "chapters" in the BQA curriculum. The entire BQA manual is at (along with dates of upcoming BQA events) http://www.bqa.wsu.edu/states/wa/index.htm

Featured Faculty

Dr. Dale Moore, DVM MPVM PhD
Director – Veterinary Medicine Extension

Hello, this is me. When we were discussing who should be the next featured faculty, my staff said "Why not you?" So, here I am. For those of you I have not yet met, I serve WSU and the state of Washington as the Director of Veterinary Medicine Extension. I spent the last 25 years working with the dairy industry as a veterinarian, teacher and as an epidemiologist. I have a broad mandate here at WSU to provide outreach in agricultural animal health and preventive medicine to a variety of audiences and for a variety of species. My passion is working with dairy calves but I find that all of animal agriculture is home. In this position, I enjoy connecting with people and really appreciate feedback about how Veterinary Medicine Extension is doing and how we can best serve producers and veterinarians in the state.

Malignant Catarrhal Fever Outbreak in WA Cattle

By: Drs. Leonard Eldridge, Paul Kohrs and Cynthia Faux, WSDA; Dr. Pete Sathre, Plateau Veterinary Services; Dr. Tim Baszler, WADDL, WSU; Dr. Hong Li, USDA:ARS; &Dr. Dale Moore, Vet Med Extension, WSU

Twenty-one head of cattle were affected by a sheep-associated herpes virus (Malignant Catarrhal Fever Virus) after showing at the Puyallup Fair in September. Nineteen of those died of Malignant Catarrhal Fever

(MCF) and two appear to be recovering from the disease. Of the 19 cattle that died, 16 belonged to students in FFA. Eleven different veterinarians were called by cattle owners located in 10 different areas in the state to look at these cattle. These veterinarians either submitted samples to the diagnostic laboratory at WSU (WADDL) for confirmation of MCF or made a diagnosis based on clinical signs.

> *"MCF-like disease is reportable because it can look similar to some foreign animal diseases like rinderpest…"*

The diagnostic laboratory made a rapid diagnosis on the first sample submitted and worked with practitioners and the WA Department of Agriculture (WSDA) to help coordinate testing of the other cases. WSDA, WSU-WADDL (WA Animal Disease Diagnostic Lab) and USDA/ARS (Animal Disease Research Unit) in Pullman all collaborated to provide funding assistance for laboratory testing of the cattle. The number of cattle fatally infected with sheep-associated MCF virus during the outbreak was unusually high compared to other published reports of the disease in cattle. The reason for the high level of fatal infection is currently under investigation.

How did these cattle get infected?

The most likely scenario for the high level of transmission of the MCF virus was close contact with sheep of the right age (lambs 5-9 months of age), at the right time of year (fall) and under the right environmental circumstances (warm and humid). Although additional follow-up with veterinarians and owners is needed to assess *all* the potential risk factors, the MCF investigation to date suggests virus was spread to cattle at the fair.

Why did some cattle get sick and some did not?

Whether or not cattle died or became ill as a result of MCF virus infection during the outbreak most likely was dependent upon differing levels of exposure (number of viral particles received) and differing individual animal susceptibility to the disease. Experimental research has shown that the number of viral particles needed to produce MCF in cattle is relatively large. Researchers are capable of inducing the disease in cattle with a relatively high dose of MCF virus; however, they failed to do so when the dose was reduced by 10 times. Even so, one of two calves inoculated with the high dose of virus escaped the disease. According to previous studies, some cattle exposed to sheep-associated MCF virus survive and become immune to subsequent infections. Thus, close physical proximity of cattle to sheep shedding large amounts of virus was likely critical to the development of this outbreak. The circumstances of this outbreak remind us of the possibilities for disease transmission whenever animals congregate.

What can we do in the future to prevent disease transmission?

Prevention of disease transmission is important not only for a disease like MCF (one species to another) but also for other diseases that can be transmitted between animals of the same species (like club lamb fungus in sheep or Herpes Mammilitis Virus in dairy cattle) and those that can be transmitted between animals and people (such as *E. coli, Salmonella* and sore mouth). There are many routes of transmission of disease agents which need to be addressed in a prevention program. **The following table describes the potential routes of transmission and possible ways to curtail transmission.**

Route of Disease Transmission	*Prevention Step*
Direct contact	Barriers to prevent nose to nose contact such as solid fencing or distance; disinfection of pens between animals
Aerosol (through respiratory droplets)	Increase distance between animals so they are not sharing the same airspace
Fomites (objects like brushes, boots, peoples' hands)	Do not use same equipment between groups of animals or disinfect after use; wash boots, use footbaths or different boots between groups; hand-washing
Vectors (flies, mosquitoes, ticks)	Reduce insects through appropriate pest control measures
Feed/Water	Prevent contamination of feed/water or restrict sources to specific groups of animals

(Hemorrhages and erosions in the roof of the mouth)

For some diseases, the risk for transmission is greater by one route over another. However, having all the prevention steps in place will reduce the risks for a number of diseases at the same time. Although mentioned as a potential fomite, the role that people play in disease transmission cannot be emphasized enough. People wear the boots, touch the animals, and use the equipment. Maybe *"education of everyone in contact with the animals at fairs, shows and on farms"* should also be on our list of prevention steps to prevent disease transmission.

• Report any unusual diseases/deaths to a veterinarian or the state veterinarian
• To prevent MCF, keep cattle separated from sheep, particularly young lambs
• MCF is not transmitted between cattle

Resources

Taus, N. S., J. L. Oaks, K. Gailbreath, D. L. Traul, D. O'Tole, and H. Li. Experimental aerosol infection of cattle (*Bos taurus*) with ovine herpesvirus 2 using nasal secretions from infected sheep. Veterinary Microbiology. 2006, 116:29-36.

USDA: ARS MCF Research:
http://www.vetmed.wsu.edu/mcf/MCFOverView.htm

WSDA Animal Health:
http://agr.wa.gov/FoodAnimal/AnimalHealth/default.htm

WADDL: http://www.vetmed.wsu.edu/depts_waddl

WSU VetMed Extension: http://vetextension.wsu.edu

Beef Quality Assurance Program Series: Cattle Marketing

By: Jack Field, WCA Executive Vice President
Ed Field, WCFA Executive Director

There are a number of different marketing options for cattle producers here in Washington State. Cow-calf producers market either spring or fall calves. Spring calves are born December-May and Fall calves are born August-October. Both Spring and Fall calves are generally marketed as weaned calves off the cow.

Producers have a number of opportunities to market these calves. Traditionally the Public Livestock Market has brought buyer and seller together facilitating this transaction with the seller paying a sales commission,

Beef Check-off assessment, and brand inspection on each animal sold.

Another marketing option for producers is video and internet auctions. These sales are focused on truckload lots of cattle. A truck load consists of 40,000-50,000 lbs of cattle. Full loads of steers and full loads of heifers are marketed on these sales as well as some mixed loads. These sales allow buyers from throughout the country to view your cattle and bid on them. The seller pays a commission, Beef Checkoff assessment, and brand inspection on each animal sold. Producers also work directly with order buyers and/or feedlot operators and broker deals direct to the feedlot.

These arrangements sometimes include provisions where the buyer covers all or a portion of the hauling. Many times with a direct agreement with a feedlot the buyer will include a "slide". A slide is used to provide the buyer some level of certainty that the animals they are purchasing will weigh the appropriate weight. A slide is computed by multiplying the slide rate by the pounds over the agreed-upon net purchase price. For example, let's say the slide rate is $.04/lb, the purchase price is $100/cwt, and the agreed upon purchase weight is 600#. If the calf has a net weight of 620#, you multiple 20# (lbs over purchase price) times the slide rate of $.04, which equals $.80. The agreed purchase price is $100/cwt minus $.80 = $99.20/cwt or $.992/lb. The buyer and seller agree ahead of time on the purchase price and slide rate.

Producers have the option of "retaining ownership" in the feedlot and sharing some of the risk in feeding and finishing cattle. In a retained-ownership setting the producer will outright sell a percentage of his/her cattle and retain the other percentage as their own. As a result, the producer will be responsible for his/her percentage of all associated costs and fees to feed, finish, and harvest their percentage of the cattle. The cattle are then sold on the grid. The "grid" is a pricing mechanism between the producer and packer for cattle sold on the rail as opposed to live marketing. They agree on a price per pound for each quality and yield grade (YG). For example, a Choice YG 3 is priced differently than a Choice YG 1 or a Select YG 3. There are usually discounts for underweight and overweight cattle, and a discount for cattle that are over an YG 3. There can also be discounts for stags and bulls, dark cutters, and other defects. There is usually a deduction if the cattle do not yield a certain %. These "grids" are negotiated, and are usually updated and modified several times a year depending on the needs of the parties involved.

There is a growing interest from producers of all sizes to market their cattle directly to consumers. This is done when producers have their cattle harvested, cut, and wrapped at a USDA-inspected facility. Once the meat is USDA-inspected, producers may sell it directly to consumers.

For more information - see the BQA notebook at: http://www.bqa.wsu.edu/states/wa/index.htm

Beef Quality Assurance Program Series: Cattle Processing

By: Jack Field, WCA Executive Vice President

Cattle processing is an important part of cattle management that must not conducted without some forethought. Cattle processing should be done as quietly and stress-free as possible for both cattle and producers.

When processing cattle they should be identified in one or more ways, and for various reasons. An individually numbered, visual identification tag can be placed in the animal's ear to be used to track and store production data. It can also be used to trace back the animal in the event of a disease outbreak. The animal can also be branded with a hot iron or freeze brand for proof of ownership and to deter

theft. If using a hot iron brand, it should be as small as possible and placed high on the hip. Rib brands should be avoided if possible to reduce damage to the hide.

At processing any injections should be made subcutaneously in the neck region. The syringes should be in good working order, needles should be changed at least every ten (10) animals, and any broken or bent needles should be replaced immediately. The syringes should be cleaned and disinfected after use, and should be bagged and stored in a freezer if possible to prevent contamination. Any time medications are used, the label directions should be followed very closely. Effective drug use involves using the proper site, proper dosage, proper duration, and proper withdrawal time. Record-keeping is essential to ensure that all vaccinations and medications are documented and that proper withdrawal periods are followed.

Implants are an effective tool if used properly. Proper response depends on good sanitation practices and implanting requires using the appropriate equipment and placing the implant in the correct position in the ear.

Processing chutes and alleys should be free of sharp corners that can cause deep muscle bruising and other injury. Producers should watch how the cattle behave when they are released from the squeeze chute. Cattle should not run out of the chute, but should walk out. If cattle are running out of the chute, handlers need to change the way they are moving the cattle. It is important for producers to maintain a quiet and calm working environment to avoid excessive stress on the cattle. Cattle that are stressed do not perform as well. Producers and other working with the cattle should take their time when processing. Cattle work much better at a slower and quiet pace.

For more information – see the BQA notebook at: http://www.bqa.wsu.edu/states/wa/index.htm

Calf Science Program Online!

By: Ms. Katy Tellessen, BS, Vet Med Extension

The WSU Veterinary Medicine Extension Calf Science (CS) program is off and running! Dr. Bill Sischo began research leading up to this educational program 10 years ago in California. The research has examined dairies and calf ranches and their use of antibiotics in calf health and moved into looking at alternatives to using antibiotics in calf rearing. The CS program was born when the research was compiled into educational materials by Dr. Dale Moore, Director of WSU's Veterinary Medicine Extension and her staff. Since March of 2008, the program has grown into an educational website that contains: a calendar of events, courses, key research findings, research abstracts, resources & links, sponsors & funding, and an introduction to the research team. There are three online educational courses that are tailored to veterinarians, producers, and students.

This fall, the CalfScience educational team took the material on the road. In late October the program was delivered to veterinarians and students in meetings in California. The veterinary program was provided to members of the Academy of Dairy Veterinary Consultants in Ventura, CA. The student course was provided to four very different student audiences at Cal Poly-SLO, CSU-Fresno, Western University-Pomona, and Cal Poly- Pomona. Students ranged from freshman Animal Science 101 to veterinary students. The material is more appropriate for upper division animal science students but, surprisingly, brought awareness to the younger audience of students about this current issue in animal agriculture and how it might have far-reaching implications. The trip also served as a great recruiting method for getting Freshman/Sophomore level students to think about a more directed career in animal agriculture and

why research is important in agricultural animal health.

Dr. Bill Sischo presenting "Colostrum supplementation for two weeks"

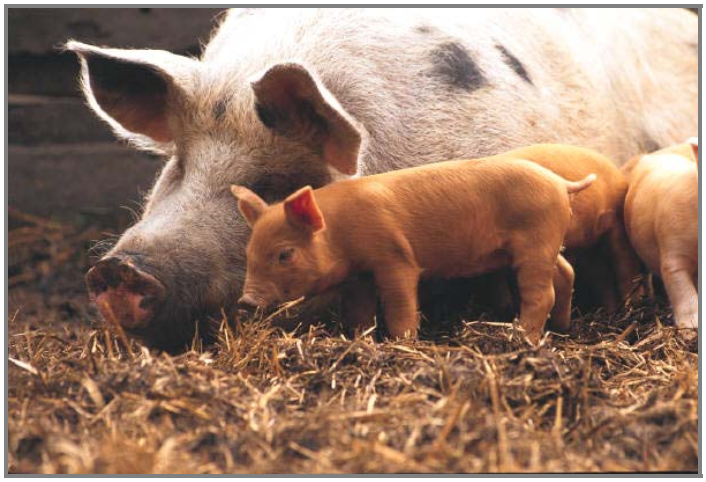
We encourage you to come check out the website at: http://vetextension.wsu.edu/programs. We hope that you will take a look at the courses and give us some feedback on the program.

Lactating Sow Study – Heat Stress Remediation

Johnson AK, et al. Effects of shaded versus unshaded wallows on behavior, performance, and physiology of the outdoor lactating sow.
J Anim Sci **2008.86:3628-3634.**

ABSTRACT: The objectives of this study were to determine the effects of shading wallows during the summer months on lactating sow behavior, performance, and physiology. A total of 128 sows were used during warm weather (May to August 2001) to determine the effects of unshaded (control; n = 8) vs. shaded (SH; n = 8) wallows. Sows ranged over 6 parities and were fed a completely balanced sorghum-based diet. Behavioral data were collected by 15-min scan samples over a 24-h period/wk for a total of 16 wk. All sows were observed twice when litter age was 5 and 15 d, respectively. Respiration rates (breaths/min) were collected on 50 sows (control, n = 25; SH, n = 25)
over an 8-wk period when the maximum temperature exceeded 32°C. Ten milliliters of clotted blood and 20 mL of whole blood were obtained by jugular puncture from each sow on the day of weaning to determine total white blood cells, acute phase proteins, packed-cell volume, and chemotaxis and chemokinesis. Descriptive water temperature profiles were measured by using data loggers positioned at 3 levels per wallow: surface water, shallow mud, and deep mud.

Behavioral, postural, location, performance, and physiological measurements did not differ ($P > 0.05$) among wallow treatments. Regardless of treatment, sows spent approximately 82% of their total time budget inside the farrowing hut and only approximately 7% of their total time budget in the wallow. A total of 428 piglets died, 219 in the control treatment and 209 in the SH treatment. The majority of piglets in both treatments died of crushing within



the first 72 h after parturition, and most of the piglets had suckled. Shade kept the shallow water profile cooler during the hotter afternoon temperatures compared with the control wallows. In SH for both the shallow and deep mud profiles, temperatures were consistent throughout the day. In conclusion, sows spent a large percentage of their daily time budget inside the farrowing hut and spent only brief episodes in the wallow. Shading the wallow did not result in increased wallow use time or improvements in sow physiology and overall performance.

This study indicates that in hot weather, sows housed outdoors did not use shaded wallows more than non-shaded ones but instead, spent more time in the farrowing huts, increasing the risk of crushing mortalities among their piglets. Alternatives to reducing heat stress in sows are needed, but ones that reduce sow time in the farrowing huts.

Light and Dairy Ewes

D. Morrissey, et al. Artificial lighting during winter increases milk yield in dairy ewes.
J. Dairy Sci. 2008 91: 4238-4243.

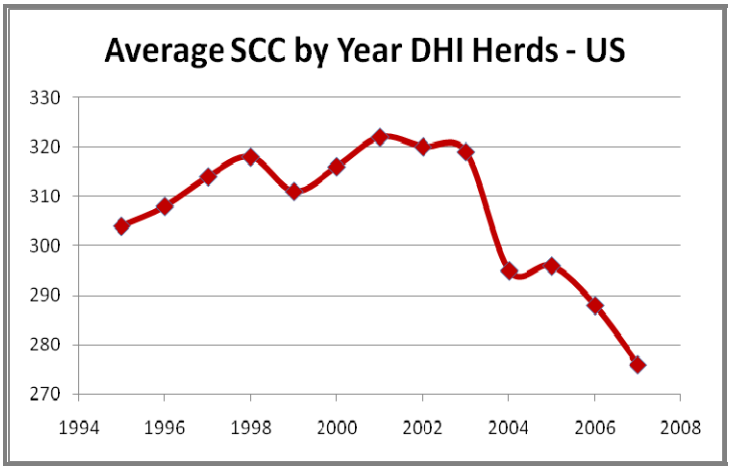
An Australian research group studied milking ewes to see if increasing photoperiod (amount of light) would improve milk production in winter. From the abstract: "One group of ewes was kept indoors under a long-day photoperiod (16 h of light), whereas the other group was kept indoors under a naturally declining day length. Ewes were maintained under these conditions for 8 wks. Milk yield was measured twice weekly, and ewe weight and condition were measured at weekly intervals..Mean daily milk yield was analyzed as a percentage of pre-experimental milk yield because the milk yield of ewes housed under the long photoperiod was lower than that of ewes under a declining day length when the treatments began." **The ewes under a long photoperiod yielded 91.7% of their starting yield by wk 8 of treatment, whereas ewes under a declining day length yielded 76.25% of their initial value.** This divergence in yield was apparent by wk 2 of treatment. The increase in milk production due to the longer photoperiod appears to be mediated through prolactin hormone production.

Picture from: Sooner Ag Research Station, Univ. of Wisconsin.
http://www.uwex.edu/ces/sars/menu.htm

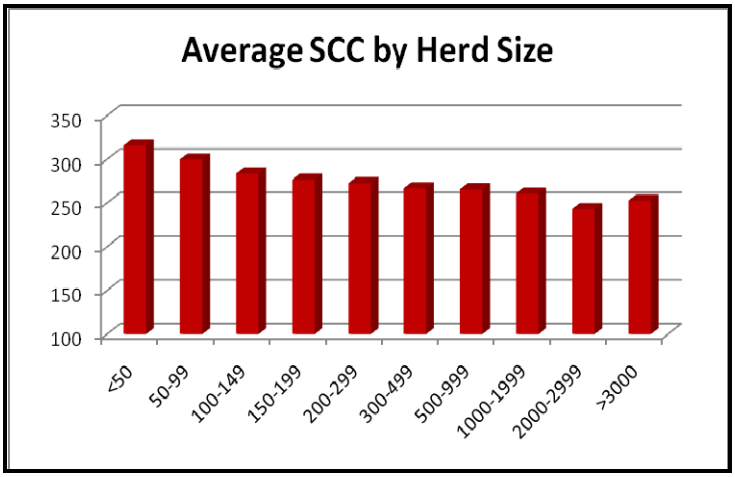
DHI Somatic Cell Counts in 2007

Miller RH, et al. Somatic cell counts of milk from Dairy Herd Improvement herds during 2007. Ani Improvement Programs Lab, ARS-USDA, Beltsville MA
http://www.aipl.arsusda.gov/publish/dhi/current/sccrpt.htm

Across the country, milk somatic cell counts are lower, indicating better quality milk reaching the processor. A recent report from USDA Animal Improvement Programs Laboratory highlighted somatic cell count statistics for 2007 from **Dairy Herd Improvement** (DHI) herds across the country. The following chart shows average somatic cell count (X1000) by year for the United States DHIA herds.



Herd size and daily milk production have increased over the years, from 50 to 125 cows per herd. Also notable is that as average herd size has increased, average SCC (X1000) has decreased).

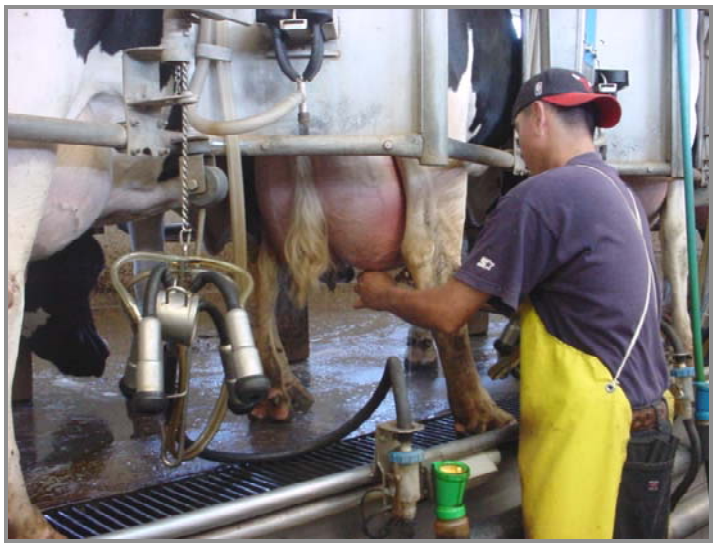


The following table provides the statistics for Idaho, Oregon and Washington compared to the US.

State	Cows per Herd	Average Daily Milk (Lbs)	Average SCC (X1000)	Herd Test Days w/SCC >500,000
ID	685	75.5	255	8.1
OR	154	67.6	228	7.6
WA	240	74.4	237	4.6
US	125	71.4	276	13.4

Ag Animal Contributions to the WA State Economy in 2007

In October of this year, the USDA National Agricultural Statistics Service released their 2007 Washington agriculture production records. Record high values of production were set for four of the five top ag commodities: Coming in at No. 1 was **Apples** ($1.75 billion). **Milk** production captured $1.06 billion (up from $688 million in 2006). **Fifth** was **Cattle and Calves** for $580 million. **Egg** production was No. 14 at $105 million, **Aquaculture** No. 15 at $87 million, and **Broilers** No. 19 for about $64 million. **The total for livestock and products was almost $2 billion in 2007.**



Pneumonia in Adult Dairy Cattle

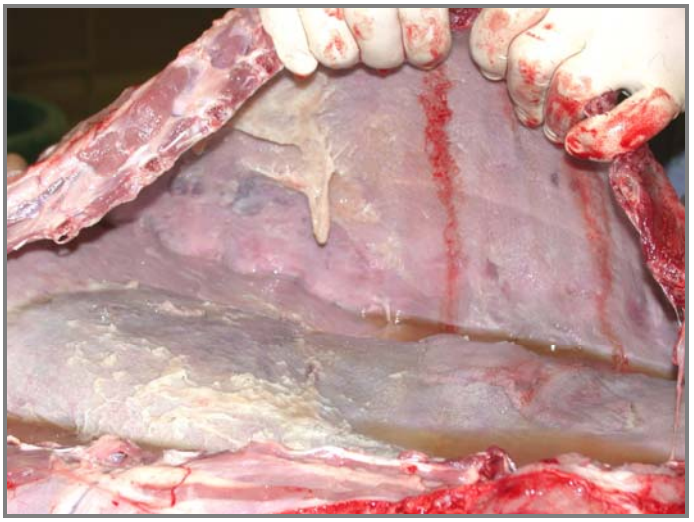
By Dr. Steve Parish, WSU College of Vet Medicine

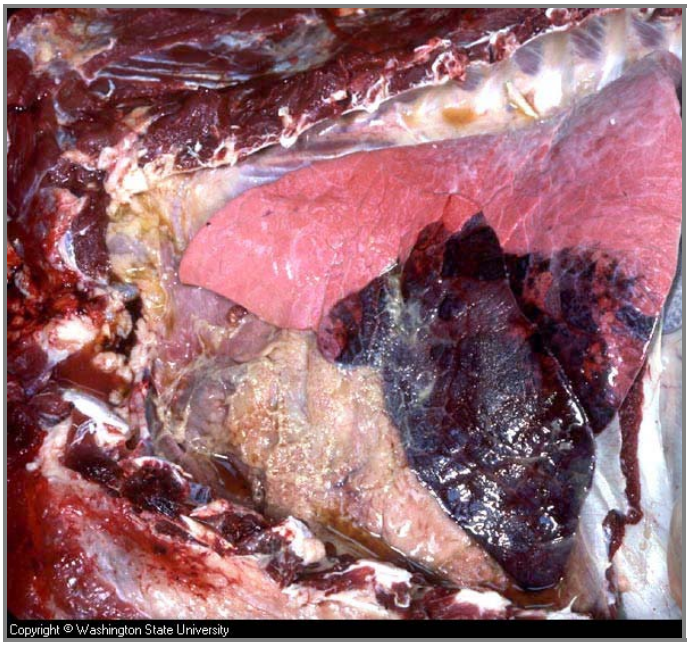
Early morning herd check and everything has been going fine. After all, it's the middle of July and the weather has been great.. Until you find one of your top producing cows dead. Over the next two weeks you lose another one of your best cows and you end up treating 10% of your peak to mid-lactation cows for bronchopneumonia. Losses tally up to $900.00 per cow in lost milk production for this lactation. You've seen pneumonia before, but usually in your calf barn, not your adult cow herd.

When we discuss the problem of pneumonia (or bronchopneumonia) in cattle, we commonly refer to a disease process affecting young cattle less than a year of age. Bovine Respiratory Disease Complex, BRD complex or just BRD is a disease process related to a combination of events, stressors and infections resulting in disease of the respiratory tract. Calf-hood pneumonia occurs in young calves either in a dairy replacement environment or in yet-to-be weaned beef calves and is potentially life threatening. Weaned calves are also at risk for pneumonia. In the case of beef cattle we often call this "shipping fever" which defines a disease state that occurs during a stressful times in a beef calves' life – the time of weaning and movement to a sale-yard or feedlot.

Rarely do we see the typical manifestation of BRD in adult dairy cattle. However, this summer and fall, the clinic and diagnostic laboratory received a number of cases, some in "outbreak" form. Rather than the classic appearance of BRD in calves, the disease process appeared to be confined to adult cattle and even specific age groups or lactations. Similar to the disease process in calves, several cows were simultaneously affected and some died. After starting in adults, the disease spread into younger age groups in at least one herd.

The problem may first be identified as one dead cow or a cow in severe distress. A producer might believe that the cow died or is dying from a gastrointestinal disorder, hardware disease or a systemic infection but will rarely think of bronchopneumonia. The key to getting the right diagnosis is through a necropsy (autopsy). Necropsies involving recent adult cattle cases revealed lesions typical of bronchopneumonia with fibrin and fluid in the chest, or collapsed, red lungs (see picture on page 9).





In the hospital and at WADDL, we have seen clusters of adult cattle, both beef and dairy, with rapid onset of distress, depression, increased respiratory effort, fever, decreased feed intake, occasional cough and a drop in milk production. Closer physical examination of these cattle revealed lung sounds typical of pneumonia. Some but not all adult cattle may have free air underneath their skin along their backs (subcutaneous emphysema), a sign of severe lung damage caused by minor ruptures in the lung tissues and the release into of air into the tissues.

Many of the herds experiencing clusters of adult cow pneumonia have been well-vaccinated for cattle respiratory viruses. Samples of respiratory fluids obtained at necropsy and from live animals had a variety of results including the "typical respiratory viruses", with Bovine Respiratory Syncytial virus (BRSV) in some cases. In a number of cases, no specific evidence of a viral infection was found. Many different bacteria were found in lung cultures from affected cattle but *Mannheimia hemolytica* was most common. This bacterium is one of the most pathogenic (disease-causing) bacteria seen in bronchopneumonia in young cattle. In some of the adult outbreaks, treatment was more effective if the disease was detected early and aggressive therapy and supportive care provided. However, not all cattle affected with bronchopneumonia show enough clinical signs to be detected and may develop chronic lung damage and eventually be culled for poor production or poor condition. At slaughter, cattle with evidence of bronchopneumonia are condemned. Some of the long term lung problems could extend all the way back to calf hood but many of these likely represent undetected cases of adult bronchopneumonia.

Risk factors for BRD in cattle include dust inhalation, changes in environmental temperatures, and stressors such as weaning and transport. Vaccination is to provide protection through specific immunity. What is different in the recent cases of BRD in adult cattle, is that they are in well-managed and vaccinated herds. At this point, there is no new agent or organism identified. However, we can provide producers with some preventive steps for BRD:

- Review the vaccination program. Vaccines are good management tools but not the only answer. Read the vaccine label and make sure they are used as recommended.
- Review nutritional programs with emphasis on minerals. Deficiencies in elements such as copper or selenium have been associated with increased risk for infectious diseases in cattle.
- Practice strict BioSecurity and avoid bringing in high risk cattle. Assessing the BioSecurity weak spots is the first step to closing the gaps in the operation.
- Cattle detected early and treated appropriately are much more likely to respond. A veterinarian can set up examination and treatment protocols for a consistent approach to herd health.
- Follow label directions for antibiotics: right drug, right dose, right duration of treatment and right route of administration and proper withdrawal times for milk and meat.
- Have any unknown death investigated by conducting a necropsy. Only if we know what we are treating can we hope to get the upper hand on a problem.
- For more information and pictures of lung lesions, see: http://www.cvmbs.colostate.edu/ilm/proinfo/necropsy/notes/lungleasions.html

Dr. Parish: smp@vetmed.wsu.edu

Items of Interest and C.E.

Calf Science – Veterinarian Presentation
December 19, 2008: Dinner is included!! Best Western in Prosser, WA. Contact Katy Tellessen ktellessen@vetmed.wsu.edu or (509) 335-8221.

Washington State Dairy Industry Meeting
January 6-8, 2009: Red Lion Inn in Olympia, WA. Visit the WA State Dairy Federation website for more information: www.wadairyfederation.org

Beef 300 Hands-On, Short Course
January 7-10, 2009: Sponsored by WSU and UofI Meat Labs. Contact Dr. Jan Busboom or Sarah Smith for more information: busboom@wsu.edu or (509) 335-2880 / smithsm@wsu.edu or (509) 754-2011.

Klickitat Winter Cattlemen's Meeting
January 15, 2009: Klickitat County. Contact Dr. Susan Kerr for more information at: kerrs@wsu.edu or (509) 773-5817.

Country Living Expo & Cattlemen's Winterschool
January 31, 2009: Stanwood, WA. Contact Norm Suverly for more information at: suverly@wsu.edu or (509) 422-7245.

Calf Science – Student Presentation
January 23, 2009: Central Washington University. Dr. Moore and Dr. Sischo will also be meeting with Pre-Vet students. Contact Katy Tellessen for more information at: ktellessen@vetmed.wsu.edu or (509) 335-8221.

Sustaining Agriculture in the PNW Conference
February 10-12, 2009: Shilo Inn in Richland, WA. Contact Don Nelson for more information at: nelsond@wsu.edu or (509) 335-2922.

All Extension Conference at WSU
March 10-13, 2009: Hosted at WSU's main campus in Pullman. Contact Susan Butts for more information at sbutts@wsu.edu or (509) 335-4097.

Western Dairy Management Conference
March 11-13, 2009: Reno, NV. Contact Dr. John Smith for more information at jfsmith@ksu.edu or (785) 532-1203.

Annual Conference for Vets & Vet Techs
March 27-29, 2009: Spokane Convention Center Spokane, WA. Contact Katie Kimmitt: (509) 335-7070 or kkimmitt@vetmed.wsu.edu

Dairy Employee Education Materials Online
A link to the producer version of ***DairyBeef: Maximizing Quality & Profits*** is available as well as down-loadable employee education programs in English and Spanish on market cow quality. To view or download these files visit: http://www.bqa.wsu.edu/DairyBeef/index.htm

Send newsletter comments to the Editor:
ag animal health
Veterinary Medicine Extension
Washington State University
P.O. Box 646610
Pullman, WA 99164-6610
(509) 335-8225
VetExtension@vetmed.wsu.edu