Veterinary Medicine Extension
Washington State University Extension

ag animal health
VETERINARY MEDICINE EXTENSION
Fall 2015

WASHINGTON STATE UNIVERSITY EXTENSION & WSU COLLEGE OF VETERINARY MEDICINE

In This Issue

View Past Issues of *ag animal health* at:
http://vetextension.wsu.edu/newsletters/

From the Editor – So many people to thank for all the help with this newsletter – the students for being so smart, Dr. Evermann and his team for the bluetongue article, Dr. V. Kasimanickam for the PED article, Dr. Baker, our State Veterinarian, the researchers, AND the practitioners and members of the Washington State Veterinary Medical Association for the faculty of the year award (See the picture below)! Makes me humble and also realize that the road trips are worth every mile…. *DA Moore*

The ag animal health newsletter is devoted to the transfer of current, relevant information to food animal owners and veterinarians.

Congratulations are in Order!

Alex Beck (CVM Class of 2016) was honored with not one but TWO awards at the 48th Annual Conference of the American Association of Bovine Practitioners this September in New Orleans. The awards are the Cargill and the AABP Foundation-Zoetis scholarships. **Benjamin Baird** ALSO won an AABP Foundation-Zoetis Scholarship this year. **Abbi Olson** was there to receive her Merck Animal Health Student Recognition Award. The "Coug" team won the **AABP Quiz Bowl!** The group includes (Right to Left) **Benjamin Baird, Kirk Ramsey, Kevin Gavin, and Devon Kartchner**.

Photo by Geni Wren, AABP

What's New at WADDL? Bluetongue Virus Outbreak in NW US Affecting both Sheep and Deer

by J. F. Evermann, S. M. Parish, D. S. Bradway, K. G. Mansfield, G. M. Barrington, and A. R. Bredenberg

Overview -- Bluetongue virus (BTV) has been recognized in the Northwestern United States for over 60 years (Parish, 1982). The clinical effects of BT disease are most pronounced in sheep, with some spillover into cattle and goats (Westly, 1995). On rare occasions the BTV has been reported to cause disease in wildlife, predominately white tailed deer and mule deer (Mellor, 2012). A related orbivirus to BTV, referred to as Epizootic Hemorrhagic Disease (EHD), has been the predominant virus affecting wildlife (primarily deer), with occasional spillover into domestic livestock, such as cattle (Evermann, 1998).

Two years ago, as part of the BTV and EHD surveillance through the testing at the Washington Animal Disease Diagnostic Lab (**WADDL**), an outbreak of BTV-associated disease was reported in South American Camelids (llamas and alpacas) that were pastured in Eastern Washington. This outbreak coincided with an outbreak of BTV in domestic sheep (Allen, 2015), as well as BTV infection in two sentinel cattle herds in British Columbia. The 2013 outbreak was determined to be due to BTV type 11, based upon molecular analysis conducted at the national lab (NVSL) in Ames, Iowa.

This fall, the Northwest has again experienced an outbreak of what initially was reported as EHD, because of the high mortality observed in the deer populations in Eastern Washington and Northern Idaho. However, since domestic sheep were also reported to be clinically affected, the true identity of the causal virus was important to track down. Through the efforts of the Department of Veterinary Clinical Sciences, WADDL and NVSL-Ames, an investigation was initiated.

The virus that was identified at WADDL was BTV using the PCR test. Selected isolates from both the wildlife (WTD, mule deer, and bighorn sheep), as well as domestic sheep and cattle were confirmed at NVSL-Ames as BTV type 17. In addition to the above mentioned cases, there was a case of bluetongue disease in a group of captive yaks (Bos grunniens). There were four yaks clinically affected. The BTV has been previously reported in captured yaks in Belgium in 2006 (Mauroy, 2008).

Clinical observations -- Most BTV infections in ruminants are clinically 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 (Figure 1). 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.waddl.vetmed.wsu.edu/ for more information on submitting samples.

Figure 1. Sheep with BTV infection – Mouth ulcer and facial swelling.

Figure 2. Erosions in the vulva.

Treatment options -- Treatment options are primarily support of affected animals which includes: maintainence of hydration, prevention of secondary infections and anti-inflammatory drugs (NSAID's). There is only one vaccine for BT in sheep which contains only BTV type 10, and since the current serotype is BTV 17, we would not recommend vaccination.

Current course of disease in the NW -- Bluetongue sporadically occurs in central Washington (and southern Idaho and much of the west). It is speculated that the recent wind storms blew the carrier insects – *Culicoides* – into our area. In addition, the drought could have had an influence on the appearance of the disease, as it can cause clusters of infected *Culicoides* to develop. The disease can occur in defined periods of time because the infected insect females move into a reproductive mode after a blood meal, taking about 2 weeks for this to occur. Apparently there is a point in time when there is high exposure and infection of sheep, followed by a decreasing one.

The good news is that the recent frosts and cold weather should lessen further expansion of the vectors and thereby the disease. However, some sheep may still be incubating the virus so additional cases may be identified. Surviving animals can carry the virus for up to 6 weeks and generally are considered immune to subsequent infection by the same serotype. Cattle have been documented to carry the virus for longer periods of time (Evermann, 1998) and may serve as an overwintering mechanism for the virus. We do not know the exact mechanism by which the virus overwinters but likely occurs in insects in temperate regions (White, 2005). A current review article regarding BTV is located at: http://www.cfsph.iastate.edu/Factsheets/pdfs/bluetongue.pdf

For testing information, contact: Dr. Jim Evermann, Jfe@vetmed.wsu.edu or 509-339-3607

References

Allen, AJ et al. Bluetongue disease and seroprevalence in South American camelids from the northwestern region of the United States. J Vet Diag Invest. 27: 226-230, 2015

Evermann JF. Bluetongue virus: testing strategies and what the results tell us about the infection. NW Livestock Hlth Conf, WSU, 1998.

Mauroy A et al. Bluetongue in captive yaks (Bos grunniens). Emerg Infec Dis 14: 675-676, 2008.

Mellor PS, 2012. Overview of Bluetongue. In: The Merck Veterinary Manual http://www.merckvetmanual.com/mvm/index.html

Parish SM et al. A bluetongue epizootic in Northwestern United States. JAVMA 181: 589-591, 1982.

Westly RC et al. An unusual case of bluetongue viral infection in beef cattle. AAVLD, San Diego, 1995.

White DM et al. Studies on overwintering of bluetongue viruses in insects. J Gen Virology 86: 453-462, 2005.

Porcine Epidemic Diarrhea: An Update

By Vanmathy Kasimanickam DVM, MS, DACVPM

What is Porcine Epidemic Diarrhea (PED)? PED is a corona virus disease and affects pigs of all ages. It is an acute, contagious enteric disease that results in severe enteritis, diarrhea, vomiting, and dehydration. PED virus (PEDV) was identified in the US in 2013. PED is mainly a production disease and it can reduce the growth and performance gain. PED clinically resembles transmissible gastroenteritis (TGE). PED only affects pigs and it is not zoonotic. There will be no risk to food safety.

Is PEDV a new virus? No. The virus was first diagnosed in England in 1971. Since then, it has become widespread in a number of European countries and very recently in China, Korea and Japan. It is an enveloped, positive-sense, single-stranded RNA virus and belongs

to the family Coronaviridae, genus Alphacoronavirus. There are various strains with different clinical presentations. The original North American PEDV strain that closely resembles the Chinese strain AH2012 caused severe illness and deaths in piglets in 2013. The second North American PEDV variant-INDEL strain (OH851) that has a spike gene deletion, correlated with less severe clinical presentations. The third strain was reported as PEDV strain (S2aa-del) with the two amino acids deletion at positions 55 and 56.

How is PEDV transmitted? PEDV is transmitted via fecal oral route with acute diarrhea within 12 to 36 hours of onset. PED is mostly seen in suckling and weaned piglets. Mortality is higher in young pigs and morbidity is higher in finishing pigs. Symptoms are severe when there are other stress factors.

Suckling piglets affected by PED

Photos courtesy of Drs. Joe Connor & Lisa Becton

How can we diagnose PED?
Clinical differentiation from other diarrheal diseases is difficult. Laboratory testing can confirm the diagnosis. PCR testing on feces or intestine from acutely affected pigs or immunohistochemistry on formalin fixed intestine can be performed. ELISA is available to detect viral antigen in intestinal contents and antibodies in paired serum samples.

What are the control measures to prevent the spread of PED?
There is no specific treatment. Symptomatic treatment is recommended, including

free access to water to diminish dehydration, and withholding feed, particularly in growing pigs. Biosecurity practices will be critical to prevent the introduction of virus since the virus is spread easily during an epidemic outbreak. All-in-all-out growing to finishing operation can eliminate the virus from the herd without depopulation. Zoetis was granted for a conditional license for Porcine Epidemic Diarrhea Vaccine in September 2014. PED killed virus vaccine with a conditional license, is now available as pre-farrowing vaccination for healthy pregnant sows and gilts, against this diarrheal disease in their neonatal pigs caused by PEDV. Efficacy and potency studies are in progress at the Zoetis website.

Current Research on PED

1. Various virus strains are being identified and severity of clinical presentations is being associated with different strains of the virus.
2. Airborne spread of PEDV: Infectious PEDV have been identified in the environment of experimentally infected pigs. Therefore, airborne infection should be included as a potential route of PEDV dissemination.
3. PEDV in feed: Feed ingredients are researched for PEDV viability. Investigations by Pipestone Veterinary Services and South Dakota State University's Animal Disease Research and Diagnostic Laboratory examined several ingredients commonly found in commercial swine diets, for the survivability and viability of PEDV. Interestingly, some of the feed ingredients harbored the virus.
4. Origin of PEDV: Researchers at Virginia Tech tried to identify the origin of PEDV and their study resulted in a likely origin from China's Anhui Province. Genetic and phylogenetic analyses confirms the close relationship between the original North American strain and the Chinese strain. The other two lineages in the US, result from the evolutionary divergence.
5. Diagnostic tests and vaccines are developed.

Federal Order and Reporting Information on Swine Enteric Coronavirus Diseases (SECD) including PED from the USDA website (Effective June 5, 2014)

1. Producers, veterinarians, and diagnostic laboratories are required to report all cases of novel SECD to USDA or State animal health officials.
2. Herds/premises confirmed to be affected with these viruses must work with a veterinarian – either their herd veterinarian, or USDA or State animal health officials – to develop and implement a reasonable herd/premises management plan to address the detected virus and prevent its spread.

Key Points

The true prevalence of PED is underestimated. Epidemic outbreak of PED can occur again and therefore a response plan is essential. Continued monitoring of PED is critical. Cooperation and collaboration among all sectors of industry and government are needed.

References

Stevenson GW, Hoang H, Schwartz KJ, Burrough ER, Sun D, Madson D, Emergence of porcine epidemic diarrhea virus in the United States: clinical signs, lesions, and viral genomic sequences. J Vet Diagn Invest. 2013;25:649–54.

International Committee on Taxonomy of Viruses. Virus taxonomy: classification and nomenclature of viruses; ninth report of the International Committee on Taxonomy of Viruses. In: King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ, editors. San Diego: Elsevier Academic Press; 2012.

www.aphis.usda.gov/animal-health/secd

https://www.aasv.org/aasv%20website/Resources/Diseases/PorcineEpidemicDiarrhea.php

WSDA Corner

by Dr. Joe B. Baker, State Veterinarian

Washington State Department of Agriculture

As has become the "norm" in the Animal Services Division, we have spent a good bit of time reviewing our response efforts to the cases of highly-pathogenic avian influenza that the state experienced in late 2014 and winter of 2015, and making improvements in our level of preparedness for the upcoming "bird flu season". As you may know, the virus that hit a small number of backyard flocks, along with a sizeable game bird farm in Washington, evolved into an outbreak in a cluster of Midwestern states that was of historic proportions. In the course of the disease outbreak and control, over 10% of our nation's layer inventory, and over 7% of its turkey inventory were lost. It will be years before industry has fully recovered in the hardest-hit areas. The disease was brought into North America by migratory waterfowl, and those beautiful birds are returning to the Pacific Northwest, and we are urging ALL flock owners to implement measures to protect their flocks from direct contact with the wild waterfowl and their droppings.

HPAI is not our only concern, and there have been some other livestock disease issues that have come up over the past several weeks. This has been a fairly active year for bluetongue virus, which is spread by small biting insects (gnats, or midges). WA Department of Fish and Wildlife has responded to reports of deer die-offs and found a number of dead whitetail deer positive for the disease, and WADDL has also confirmed the infection in some WA cattle and sheep. Bluetongue is a concern not only because of the effects it can have on livestock, but because it can mimic signs of foot and mouth disease. The temperatures in the eastern part of the state are dropping close to freezing, and a good hard freeze or two will pretty much stop the progress of the disease for this year.

We had a problem with bovine trichomoniasis on a large Washington dairy this summer. We generally think of trich as a disease of beef cattle, but this was a reminder that dairy cattle can be affected. In this case both dairy and beef animals were involved. The dairy had brought in over 100 beef bulls to use as clean-up bulls, i.e. to breed cows that failed to conceive by artificial insemination. The 111 bulls had been sent from four states and a handful were less than 12 months of age and thus had been exempted from trich testing. The remainder had all been trich tested negative prior to entry, most by individual testing, a few by pooled testing. A number of the bulls were trich tested for shipment from the dairy to another state and over 1/3 of them were trich positive. All of the bulls were subsequently tested and in the end, 36 positive bulls were identified. The entire group of 111 bulls was sent to slaughter and the dairy has agreed to restrict movement of any cows that would present an elevated risk of carrying trich off the dairy.

We are currently involved in an interesting case of equine abortion that appears to have been caused by equine viral arteritis (EVA). This virus is most commonly spread by the respiratory route. In addition, many infected stallions can chronically shed the virus in their semen after recovery from the acute infection and infect mares during breeding. The virus causes inflammation of blood vessels, and in pregnant mares this can affect the placental blood flow and result in abortion, typically about a month after exposure. We are working with the veterinarian who reported the case to us to hopefully confine the virus to the affected farm and keep it from spreading to other horses.

We have drafted proposed changes to WAC 16-54 and 16-86 pertaining to bovine trichomoniasis, this in response to calls for more uniformity in the testing requirements for interstate shipment of bulls. We are proposing to change the age limit for exemption from testing to bulls < 18 months of age (it is currently < 12 months of age), and would require a signed statement that the bull has not had breeding exposure. Most of the western states have either changed their rules are in the process of doing so. There are a few other changes proposed as well. We have distributed the proposed changes through as many channels as we could think of to get them in the hands of producers and have asked for producer input. If you would like a copy, please contact me (jbaker@agr.wa.gov or (360) 902-1881) Public hearings for these proposed changes are scheduled in November.

As always, we are interested in the concerns and opinions of our livestock producers, and I invite you to contact the State Veterinarian's Office or your regional WSDA Field Veterinarian to discuss them.

WSU Ag Animal Health Research Abstracts

1) Spencer SE, Besser TE, Cobbold RN, French NP. 'Super' or just 'above average'? Supershedders and the transmission of Escherichia coli O157:H7 among feedlot cattle. J R Soc Interface. 2015 Sep 6;12(110). pii: 20150446. doi: 10.1098/rsif.2015.0446.

Supershedders have been suggested to be major drivers of transmission of Escherichia coli O157:H7 (E. coli O157:H7) among cattle in feedlot environments, despite our relatively limited knowledge of the processes that govern periods of high shedding within an individual animal. In this study, we attempt a data-driven approach, estimating the key characteristics of high shedding behavior, including effects on transmission to other animals, directly from a study of natural E. coli O157:H7 infection of cattle in a research feedlot, in order to develop an evidence-based definition of supershedding. In contrast to the hypothesized role of supershedders, we found that **high shedding individuals only modestly increased the risk of transmission**: individuals shedding over 10(3) cfu g(-1) feces were estimated to pose a risk of transmission only 2.45 times greater than those shedding below that level. The data suggested that shedding above 10(3) cfu g(-1) feces was the most appropriate definition of supershedding behavior and under this definition supershedding was surprisingly common, with an estimated prevalence of 31.3% in colonized individuals. We found no evidence that environmental contamination by feces of shedding cattle contributed to transmission over timescales longer than 3 days and **preliminary evidence that higher stocking density increased the risk of transmission**.

[From the Editor: Much has been hypothesized about cattle supershedders of E coli O157:H7 in the feedlot. This is one of the first papers to look specifically at the risk for transmission from supershedders.]

2) Gordon CJ, Wenz JR, Moore DA. Presence of back arch in headlocks: an indicator of lameness and hoof lesions in dairy cattle? Bovine Practitioner. 2015;49(1):25-31.

Observation of an arched back while standing and walking is 1 criterion for assessing dairy cow lameness. Objectives of these projects were to evaluate back arch and its association

with locomotion score (LS) and hoof lesions. On a single 200-cow farm, digital photographs were taken of cows with locomotion scores >1 while stanchioned and walking, and analyzed for degree of back arch. One pen of cows was observed 5 times while stanchioned to evaluate "time in headlock" effect on presence of back arch. Angle of deviation from flat-back was not significantly associated with LS; however, there was a trend for cows with a score of >2 to have back angles deviating from flat. **The proportion of time a cow was observed with a back arch was greater for lame cows vs non-lame cows.** In a second herd, back arch data were collected on 233 cows while stanchioned, and hoof lesion data were collected on 141 cows. **Cows with a back arch were 2.1 times more likely to have a hoof lesion** ($P = 0.04$), and there were more cows with hoof lesions with increasing LS ($P < 0.0001$). Back arch could be used as a screening test for lameness.

[From the Editor: Although the sensitivity of using the back arch observation as a "test" for lameness is not very high, the more times we make the observation, the more likely we are to find lame cows earlier - and we can do it when we have cows locked up for other reasons!]

Continuing Education in Our Region

Veterinarians

WSU College of Veterinary Medicine Homecoming CE Event will be from 9:00AM – 12:00PM, October 17, 2015, in Pullman, WA. Three FREE CE credit hours – TWO tracks: Small animal and large animal. For more information go to: http://cvme.vetmed.wsu.edu/Homecoming2015/

Producers

Washington State Dairy Federation Annual Meeting is November 10-11, 2015, in Wenatchee, WA. For more information go to:
http://wastatedairy.com/events/dairy-industry-annual-meeting-and-trade-show/

Washington Cattlemen's Association Annual Meeting is November 11-14, 2015, Cle Elum, WA. For more information go to:
http://www.washingtoncattlemen.org/new-events/2015/11/13/wca-wcw-2015-state-convention-1

Send newsletter comments to the Editor: ***ag animal health***
Veterinary Medicine Extension - Washington State University
P.O. Box 646610
Pullman, WA 99164-6610
(509) 335-8221 VetExtension@vetmed.wsu.edu