Provincial Veterinarian Update

By: Dr. Betty Althouse, Chief Veterinary Officer
Saskatchewan Ministry of Agriculture

As I write this, I am completing my first six months as the provincial veterinarian. So far, it has been busy, challenging, rewarding and even fun. The animal health unit has a small staff of six people, including three veterinarians, an animal science agrologist, a food safety specialist and a support technician. I am proud to lead such a committed team.

Previous reports from our group have focused on animal welfare. It remains a priority, with staff involved in the review and dissemination of codes, working nationally on humane religious slaughter standards and emergency depopulation guidelines and locally on livestock emergency response. Changes to the domestic meat inspection program have been required by Canadian Food Inspection Agency (CFIA) and to the domestic inspection standards have been a priority to ensure we continue to have an effective post mortem and antemortem inspection system in domestic slaughter plants.

Monitoring the provincial livestock herd for disease is something that is often overlooked or misunderstood. We have no formal ongoing provincial disease surveillance program. However, we partner with others, providing assistance with coordination, sample collection and lab diagnostic funding. This way, we have assisted with disease surveys in dairy and sheep flocks and initiated a Bovine Virus Diarrhea (BVD) screening program for beef herds. In bison, a mortality study is underway that will provide insight into bison diseases. The Ministry funds Chronic Wasting Disease (CWD) surveillance in domestic cervids. Early detection of emerging diseases is facilitated by our support to the Disease Investigation Unit (DIU) at Western College of Veterinary Medicine (WCVM). Any practitioner can contact the unit for diagnostic assistance for unusual or complex cases. This year, a new-to-Canada tick-borne disease, Babesia odocoilii, was detected in an elk herd in North Central Saskatchewan. The DIU is available to assist in any further investigations.

Surveillance is also important at the wildlife-domestic interface. The Ministry has contracts with Prairie Diagnostic Systems (PDS) for surveillance for avian influenza in wild birds and disease detection in wild boar. At the human and animal health interface laboratory, West Nile Virus (WNV) positive horse results contribute to human health risk assessments. The animal health unit helped with blood collection from domestic sheep to look for Cache Valley virus and collated tick surveillance results.

Better information extraction from diagnostic labs is coming. We have been exploring increased collaboration amongst Western Canadian veterinary diagnostic labs, better use of the Canadian Animal Health Surveillance Network (CAHSN) and the creation of a provincial reportable/notifiable disease list. All will help us better understand our current livestock health issues, as well as contribute to early detection of new diseases or presentations.

Biosecurity remains critical to prevent and control disease. Currently, we are supporting a swine biosecurity project and have helped the equine industry create a horse biosecurity booklet. We are awaiting the on-farm implementation guide to accompany the new beef biosecurity standard. Future programs related to biosecurity may be considered.

Outbreaks of diseases such as swine influenza seen at fairs in the U.S. this fall and on-going reports of E.coli infections in children related to petting zoos prompted us to look at biosecurity measures in place at fairs and exhibitions in our province. We are pleased to support the Saskatchewan Association of Agricultural Fairs and Exhibitions (SAASE) in presenting a workshop on preventing such infections. We will also add some related information on biosecurity measures to prevent the spread of animal diseases.

Our goal remains improved animal health and welfare for Saskatchewan livestock, to support the production of safe food and facilitate exports.

For more information, contact Dr. Betty Althouse, Chief Veterinary Officer, at (306)787-5547.

Fundraising Campaigns in 2012

In November 2012 PDS employees and friends raised $756.00 for the C95 Breast Cancer Marathon.

Another PDS spearheaded campaign raised a total of $2,575.50 for the “Movember” campaign, through web and anonymous donations; the sale of decorative wine stoppers crafted by Brent Wagner (Department Assistant Veterinary Microbiology, WCVM); the sale of soup and cookies prepared by Vivian Pulga and Vesna Milovanovic (Glass and Media Preparation, Veterinary Microbiology, WCVM); an auction for a dinner prepared by Drs. Bruce Grahn (Veterinary Ophthalmologist, Small Animal Clinical Sciences and Associate Dean [Academic], WCVM) and Vikram Misra (Department Head, Veterinary Microbiology, WCVM) and the sale of seasoning for butter chicken prepared by Anju Tumber (Head Technologist, Molecular Diagnostics, PDS). The funds raised are directed to programs run by Movember and their men’s health partner, Prostate Cancer Canada.

In December 2012, PDS employees and friends sent several boxes of needed items to the Saskatoon Ronald McDonald House in Saskatoon.
When the PDS summer student position was announced, I could think of no better way to spend the summer before my second year of veterinary school. I had the opportunity to work closely with the veterinary pathologists and learn valuable skills I hope to carry into my veterinary career.

My most rewarding experience was presenting my summer student poster which focused on copper toxicosis in sheep (Figure 1). The report described cases of copper toxicity in two groups of Suffolk sheep on the same feed. Necropsy examination was performed on seven sheep with evidence of copper toxicity and two additional suspected, but unconfirmed, cases. Eight additional sheep from one of the groups were euthanized as part of a research project and brought into the PDS for routine postmortem examination. The sheep that died of copper toxicity were described as weak, disoriented, uncoordinated and icteric prior to death. Gross necropsy findings included: general icterus (Figure 2); yellow or pale-colored livers with distended gallbladders; dark bloody-colored urine; and dark grey kidneys.

Mineral levels in the livers were assessed in most cases and the copper levels were found to be in the high-normal to toxic ranges, while molybdenum levels were low. The sheep that were euthanized lacked clinical signs prior to death and did not have gross pathological lesions of copper toxicity; however, their liver copper levels were in the toxic range.

Hepatopathy due to copper toxicosis was confirmed as the final diagnosis for the seven sheep that died. For the eight euthanized sheep, it was concluded that there was a chronic build-up of copper in their liver, and they were likely very close to the threshold for copper accumulation which would lead to a hemolytic crisis and death from acute copper toxicity.

Investigation of the feed sources revealed normal molybdenum levels in all feed sources, and normal copper levels in the hay and grain feed, but toxic levels of copper in the pellet ration at 26 ppm (normal 5-10 ppm). Thus over supplementation of copper appeared to be the primary factor. Feed sources are currently being investigated to mitigate any additional copper toxicity cases.

I want to thank the pathologists, technicians and everyone who helped me develop, learn and grow over the summer; the experience was truly an honor!
Lois Ridgway
Receives CAAHTT/ACTTSA Recognition Award

Lois Ridgway (RVT, Pathology Supervisor, PDS) received the Canadian Association of Animal Health Technologists & Technicians / Association Canadienne des Techniciens et Technologistes en Sante Animale (CAAHTT / ACTTSA) Recognition: ‘Making A Difference’ award at the 28th annual meeting of the Saskatchewan Association of Veterinary Technologists (SAVT) on November 6th, 2012. The award recognized Lois’s professional conduct and 29 years of active participation in promoting veterinary technicians and animal health at a national level. Lois is a 1983 graduate of SIAST Kelsey Campus and continues to teach veterinary students and technicians. Lois is a strong advocate for veterinary technicians and their integral role in the animal health field. She attended the first CAAHTT organizational meeting, has served on both provincial and national boards during her years of membership and has served on several advisory committees.

Everyone at PDS extends their congratulations to Lois on this well-deserved acknowledgment from her peers.

2012 Testing Results for Equine West Nile Virus Infections

By: Dr. Dale Godson, Microbiology Laboratory (Immunology/Virology), PDS

West Nile virus is a flavivirus that is spread by mosquitoes and can infect and cause neurologic disease in horses. Detection of IgM antibodies to West Nile virus (indicating a recent infection) in a horse with neurologic signs is considered diagnostic for West Nile virus disease in horses. This past summer and fall we saw an increase in the number of positive tests for IgM antibodies to West Nile virus in horses compared to recent years. Since 2007, when we had 112 positive cases, we have only had 1 – 3 positive cases/year. However in 2012, there were 17 positive cases from 52 submissions (Fig. 1). The first positive case occurred in the week ending Aug 8, 2012 and was followed by 2 to 4 positive cases/week through the rest of August (Fig. 2). The final positive case occurred in the week of Oct 19, 2012. While the history noted that the horse was in the recovery phase, indicating that the infection had probably occurred a few weeks earlier, it demonstrates that cases can be seen after the first frost of the season.

Most of the positive cases were submitted from Saskatchewan and Manitoba and occurred in the southern part of the province (Table 1).

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Table 1. WNV Submissions and Results by Province

West Nile virus infection is a notifiable disease and PDS reports positive results to the Canadian Food Inspection Agency. The Public Health Agency of Canada maintains a summary of surveillance data for West Nile virus infections on their website (http://www.phac-aspc.gc.ca/wn-no/surveillance-eng.php)
Experiences with Test Performance of real-time Polymerase Chain Reaction for Johne’s disease at Prairie Diagnostic Services (PDS)

By: Dr. Musangu Ngeleka, Microbiologist, PDS

Johne’s disease is caused by Mycobacterium avium ssp. paratuberculosis (MAP). The diagnosis of Johne’s disease is based on clinical signs and postmortem and histopathologic examinations. Confirmation of disease status relies on the isolation of the organism by culture using solid media such as Herrold’s Egg York agar Medium (HEYM) supplemented with mycobactin J, or liquid media such as the Trek ESP and BACTEC diagnostic systems.

Most laboratories use HEYM with mycobactin J for culture and this has been considered the “gold standard test” for MAP cattle strain (sensitivity 65%, specificity 100%; accuracy 91%). The turn-around-time for positive test results is 5 to 9 weeks while reporting of a negative test can take up to 16 weeks. The long turn-around-time remains the major limiting factor of the test. Sensitivity of culture can be increased to approximately 73% if more than one culture medium is used e.g.: HEYM supplemented with mycobactin J; HEYM supplemented with mycobactin J and sodium pyruvate; Middlebrook 7H11 supplemented with mycobactin J; Löwenstein-Jensen supplemented with mycobactin J. The combination of these four culture media may allow detection of all types of MAP strains (i.e. type I/III (sheep) and type II (cattle) strains) provided that the incubation period is extended to 8 months (Appl Environ Microb 72:5927, 2006). This approach can be beneficial for epidemiological studies such as determining the true prevalence of disease in a herd but it may not be appropriate for diagnostic testing because of the increased cost for testing and long turn-around-time.

The conventional PCR test targeting the IS900 gene sequence for Johne’s disease (sensitivity 13%, specificity 89%) was introduced in the late 1990’s, but had its limitation mostly due to the inhibitory effects of fecal material on test performance and to the controversial specificity of the insertion element (IS900) for MAP. In contrast to the conventional PCR, the new generation rt PCR targets the heat shock protein X (hspX gene sequence) specific for MAP including type I/II and III. The test performance appears similar to culture (sensitivity 65%, specificity 97%; accuracy 90%) and has improved detection of MAP directly from feces thus, reducing its cost and the turn-around-time to 24-48 h (Vet Microbiol 136:177, 2009). The use of a positive internal control allows detection of false negative results from fecal samples. The test is also offered for pooled samples (maximum of 5 samples) for surveillance testing. Sample pooling must be performed at the diagnostic laboratory as individual fecal samples are mixed with an extraction buffer first and five, related, individual buffer solutions are pooled for the test.

Another advantage of the test is the availability of ready-to-use test kits for the detection of MAP in intestinal tissues or fecal samples. Kits are marketed by different biotechnology companies and this allows standardization of the test and interpretation of results across diagnostic laboratories that offer the test.

A real-time Polymerase Chain Reaction (rt PCR) for Johne’s disease has been evaluated for over a year at the PDS Molecular Diagnostics Laboratory (Animal Health Perspectives, May 2011). Since the introduction of the rt PCR for Johne’s disease, 324 diagnostic samples from cows, bison and small ruminants (sheep and goats) suspected of having Johne’s disease have been tested. One hundred and five of these samples tested positive. Thirteen samples collected at necropsy from animals with intestinal lesions characteristic of Johne’s disease were positive by rt PCR; whereas 7 samples from suspected animals without characteristic intestinal lesions of Johne’s disease, were negative. In addition, 14 other fecal samples from cows with significant antibody titers to MAP on ELISA (sample to positive S/P ratio over 0.6) were positive by rt PCR, confirming, at a smaller scale, a good correlation of Johne’s disease test results obtained from necropsy, ELISA and rt PCR. In conclusion, due to similar sensitivity and specificity of rt PCR as compared to culture, and due to specificity of the hspX target sequence for MAP sheep and cattle strains, along with lower cost and better turn-around-time, we suggest that rt PCR be considered for diagnosis and confirmation of Johne’s disease status.