REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS

Chair: James F. Evermann, WA
Vice Chair: Chuck E. Massengill, MO

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The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 pm to 5:30 pm. There were 10 members and 32 guests present. Chairman Evermann welcomed members and guests and the agenda, procedures and expectations outlined. The new Vice Chair, Chuck Massengill was introduced by Dr. Evermann.

The Committee membership was asked if they desired to continue the Bovine Viral Diarrhea Virus (BVDV) subcommittee co-chaired by Evermann and Ridpath. The Committee voted unanimously to continue that subcommittee. The report of that Subcommittee is included at the end of this report.

Dr. Sabrina Swenson, National Veterinary Services Laboratory (NVSL) gave the committee an update on the move to the new laboratory facilities at NVSL. She reported that Phase I of the transfer began in 2004. The move to the High Containment facility occurred in 2007 and the move to the Low Containment facility occurred in 2009. A total of 654 employees were relocated and there was no disruption in the delivery of diagnostic services.

Swenson reported that NVSL customers can now request email reports and preliminary reports are also available.

Dr. Pat Long, of Camelid Healthcare Services, Corvallis, Oregon gave a report on problems of camelids that included infectious, contagious, and management related issues. Dr. Long estimated that the numbers of alpacas and llamas in the U.S. are probably equal at about 200,000. He commented that most alpaca farms are single species facilities and therefore very little likely hood of exposure to diseases from other species. However the alpaca show circuit may bring over 1500 animals together at a single event. Dr. Long reported that vaccine trials have been completed in alpacas in England (Bovilis BTV8-Intervet) and has been shown to produce antibodies after 2 doses of the vaccines. Regarding EEE, a vaccine study has been done—no adverse events and antibody response demonstrated, but no challenge studies have been done. Dr. Long discussed a neonatal diarrhea complex and respiratory disease associated with a novel corona virus that appears to be related to exposure of animals at shows. Corona virus studies are being conducted at U.C. Davis and Oregon State University. He also reported on an emerging problem with E. Mac. This large coccidia has increased pathogenicity and a long pre-patent period as well as not being detected by common fecal flotation procedures. Both giardia and cryptosporidia affect camelids and have a zoonotic potential for animal care givers. BVD is a disease for which owners are becoming less vigilant and has the potential to become a much bigger problem. The current EHV-1 situation in horses could pose a problem for camelids. *Mycoplasma haemolamae*, formally called Eperythrozoonosis with incidence reports of approximately 20% in Switzerland, US and South America is probably a secondary concurrent problem. The anemia can be striking. PCR is best means to diagnosis, and current research funded by MAF and Alpaca Research Foundation.

Mr. Clint Peck, Montana State University gave an overview on the use and need for farm and ranch bio-security programs. He described the goals of such a program to be reducing animal disease and illness there by reducing the need for treatment, increase production security for animal industries, increase consumer confidence in animal production systems and products. Mr. Peck described the three key components of a bio-security program to be maintaining immunity, maintain surveillance for potential risks, and maintain control over movement. He reviewed the Montana State University outreach that

concentrates on providing educational programs that demonstrate innovative community-based bio-security and bio-containment practices for ranches and feedlots and provides a general awareness of threats from foreign animal disease and introduction of catastrophic diseases. Herd biosecurity plans are based on risk for *diseases of concern.* Plans are constructed by producers in consultation with an attending veterinarian and/or a bio-security resource team. Animal management records are designed for each unique livestock premise.

Biosecurity plans are confidential and become the personal property of the livestock owner/manager.

Dr. Bob Hillman, Executive Director, Texas Animal Health Commission, gave a report on hemoparasitic diseases related to the livestock/wildlife interface. He discussed the diseases of Heartwater, Cattle Tick Fever, and Ehrlichosis. The common vector for the disease heartwater in Africa and the Caribbean is the Bont tick, *Amblyomma variegatum.* In addition, the Gulf Coast Tick, *Amblyomma maculatum* which is widely distributed throughout the U.S. gulf coast as well as Oklahoma and Kansas is also a proven vector for heartwater Disease. The causative organism *Erlichia ruminantium* infects cattle, sheep, goats, and waterbuffalo. However, every ruminant species is believed to be susceptible. The movement of cattle egrets infested with Bont Ticks from Caribbean islands to the U.S. gulf coast has been documented. Feral swine tick infestations have disclosed numerous species of ticks. White tail deer and exotic ungulates are also good hosts for a number of these ticks. Therefore there is a very real risk for introduction of this disease into the U.S. livestock and/or wildlife population. Cattle Tick Fever caused by *B. bovis or B. bigemina* and vectored by *Boophilus microplus* and *B. annulatus* was eliminated from the U.S. by an eradication program that began in 1906 and ended with eradication of the vector ticks in 1943. Following the eradication, a permanent tick quarantine zone was established along the Rio Grande river in Southern Texas. This was intended to be a buffer zone to mitigate the risk posed by the continuing presence of the boophilus ticks in Mexico. The large number of wild ungulates which are capable of hosting the tick and the lack of the preferred host (cattle) have resulted in the spread of boophilus ticks resulted in temporary additional quarantine zones on several occasions since 2006. One hundred forty five new tick infestations were reported in Texas in the federal fiscal year 2009. Reports indicate that up to 50% of cattle imported from Mexico may carry the etiological agent, there is a serious risk for re-establishment of Cattle Tick Fever if the organism and vector tick meet. Dr Hillman described the numerous efforts that Texas is making to prevent the movement of ticks out of the expanded quarantine area and the efforts to control the ticks on wildlife. He also gave an overview of current USDA research efforts on tick elimination. Dr. Hillman reminded the audience that development of control measures are of little value unless those measures are approved and sanctioned for use in the battle against the fever ticks.

Dr. Jim England, University of Idaho-Caldwell, provided a report of potential IBR vaccine induced bovine abortions. He described a case that involved the introduction of 55 purchased cows (4-7 months pregnant) were added to a herd of 170 pregnant spring calving cows. The 170 cows had a history of being vaccinated as calves, pre-breeding heifers with MLV IBR vaccine. Those cows also received an annual re-vaccination with the MLV IBR vaccine in December. The purchased cows were included in the December 2008 MLV IBR vaccination along with the original cow herd. In January and February 5 of the purchased aborted. Conversation with the previous owner disclosed that the purchased cattle had not been vaccinated for IBR while he owned them, however some of the cows had been purchased by him and he did not have any vaccination history when they were purchased.

- Conclusions:
    - Current MLV vaccines safer?
    - Previous reports (pre 1990) indicate upwards Of 40% abortion rate due to IBR.
    - Previous vaccination with MLV protects against vaccine induced abortion, 0/170 abortions in home herd during 2009 season
    - Has averaged 0.03% fetal wastage in past 10 years. No infectious causes identified
    - <10% abortion in previously unvaccinated pregnant cows 5/55

Dr. Dave Hunter, Turner Enterprises, presented a variety of events involving infectious disease concerns in bison, including:

- Bacterial diseases such as Johne's, Brucellosis, TB, Mycoplasma, Pasteurella & Anthrax, Leptospirosis, Fusobacteurium, Staph, Strep & Clostridium

- Prion diseases, like Spongiform encephalopathy
- Nutritional diseases including, micro, and macro-mineral, TDN
- Viral diseases like BVD, IBR, BRSV, PI3, Bluetongue, EHD

He described the application of the “Conservation Medicine Concept”. The interactions between the host, the agent, and the environment and how they affect the balance between health and disease were the basis for the examples he used. Dr. Hunter emphasized the need to separate correlation and causation in evaluating health problems in bison. He used the example that treatment is often directed at the symptom or clinical signs and not the “problem”. He described how his approach looks at disease as another “predator”. He described how management changes used in their ranch operations had very positive outcomes on various infectious disease related problems. The intrinsic difficulties of dealing with a large number of wild animals in large expanses of land make it necessary to use innovative means for problem mitigation.

Committee Business:

The Committee approved three resolutions;

- Investigation of Risk posed by Emerging Pestiviruses
- Biosecurity Education
- Compliance with OIE guidelines

The Committee charged the chair with the formation of a subcommittee to develop an outline of a National livestock biosecurity education/demonstration system.

Report of the Subcommittee on Bovine Viral Diarrhea Virus

Co- Chairs: James Evermann, Julia Ridpath,

Dr. Dave Dargatz of USDA presented a summary of the BVD Control Practices and BVD Test results portion of the NAHMS 2007-08 Cow-Calf Study.

The study consisted of Phase 1 when information was collected by a questionnaire administered by NASS. Phase 1 included 2159 operations. The survey included producers in 24 states. The operations consisted of herds that had at least 70% of their calves born between November 1 and June 30. Producers were asked about their knowledge of BVD. Thirty two percent considered themselves to be "fairly knowledgeable" and 32.4 % felt that they knew the basics about BVD, however, 12.3% indicated that they had never heard of BVD. Forty one percent of the producers administered BVD vaccine at some point in their production system. Testing for PI calves had occurred in 4.2 % of the operations in the three years preceding the survey. Fifty seven percent of those that removed PI calves felt that it resulted in improved health in the remaining cattle. However, only 15% of those that removed PI calves felt they received a financial benefit from that action. Knowledge about BVD, use of BVD vaccine, and PI testing were all herd size dependent with larger herds being more active in each of the categories. Phase 2 was a facility visit by a VMO. Phase 2 herds were offered the opportunity to submit ear notch samples. Of the 472 eligible herds, 205 herds submitted samples. Samples were collected by the producers, dry frozen until shipped overnight. The samples were tested using IDEXX Antigen Capture ELISA® following IDEXX protocols. Two hundred five operations submitted a total of 44,150 samples. There were 53 positive samples for a prevalence of 0.12%. There was no strong relationship between calf age and PI positive status. The positive samples came from 18 of the 205 herd, for a herd prevalence of 8.8%. Dr. Dargatz presented the conclusions that:

1) Herds represented in BVD PI testing were the more progressive producers
2) Individual prevalence was low (0.12%), herd prevalence was moderate (8.8%)
3) Few operations test for BVD PI, possibly uncertain of the value of testing

Dr. John Neill of USDA, ARS made a presentation on Pestivirus Strain Diversity.

Pestiviruses have been recognized to cause significant losses to livestock producers for many years. Members of the Pestivirus genus of the *Flaviviridae* include bovine viral diarrhea virus, border disease virus as well as the foreign animal disease agent classical swine fever disease virus. The pestiviruses are differentiated from other flaviviruses by the presence of an additional protein encoded at the start of the single, large viral protein. This additional protein, Npro, plays a role in the inhibition of the interferon response in infected cells.

Recently, several new pestiviruses have been isolated that do not neatly fit with the pre-existing Pestivirus species. These viruses possess significant differences at the genetic as well as the antigenic levels that make them difficult to categorize. To date, there are 5 new virus groups that have temporarily been termed 'atypical' pestiviruses. These include the giraffe, Tunisian, pronghorn, Bungawannah and Hobi pestiviruses. To date, little is known concerning these viruses. All have had their genomic RNAs sequenced which has allowed their genetic relationships to be determined. However, most of the basic knowledge concerning these viruses has not been determined. There is little data available about their host ranges, mode of transmission, severity of disease, or antigenic cross-reactivity. There are currently no diagnostics tests available for most of these viruses. Based on this, there is little information available to gauge how great a risk these new viruses pose to the US livestock industry. New research is required that first of all examines the basic biology of these 'atypical' pestiviruses. Studies examining the host species, mode of transmission and severity of disease in domestic livestock species is required. Next, the ability of commercially available diagnostic assays to detect and differentiate these viruses from other pestiviruses must be evaluated. Once diagnostic tests have been validated a survey should be conducted to determine if any of these viruses are present in the US. If so, vaccines that confer protection to the identified viruses must be developed. It is not certain at this time how great a threat these agents are to US livestock herds but they certainly should not be ignored.

Ms. Lisa A. Shimeld, Crafton Hills College, Alpacas del Valle Cereza, reported on a serological survey of alpacas living or breeding in Southern California. She gave a short history of the introduction, uses, population and history of BVDV in alpacas in the US. Serum neutralization testing was used to detect seropositive animals in her study. The purpose of the study was to identify seropositive alpacas

from 21 ranches in Southern California, identify seropositive alpacas from facilities outside Southern California that were breeding in Southern California (11 additional facilities), and determine the BVDV seroprevalence of alpacas in Southern California. Ms. Shimeld discussed the transmission of BVDV in alpacas and the means by which alpacas could become exposed/infected. She commented on the absence of information indicating that transmission of BVDV in alpacas was different that transmission in cattle.

Four hundred twenty nine alpacas living in Southern California, or present in Southern California to breed, were included in this study, the majority being located in either Riverside (288) or Los Angeles (88) county. Herd size ranged from four to 280 alpacas. All alpacas appeared clinically normal at the time of sampling. The samples were shipped to the California Animal Health & Food Safety Laboratory System in Davis, California for serum neutralization testing for BVDV .The use of BVDV vaccines was not reported in any of the alpacas in this study. Serum virus neutralization (SN) was performed to measure the titer of circulating antibody to BVDV type 1 and to BVDV type 2, using NADL and c125 BVDV as reference strains, respectively. Results were reported as the endpoint serum dilution that demonstrated no observed cytopathic effect in the assay. Fifteen of the alpacas seropositive to BVDV type 1 were seronegative to BVDV type 2. BVDV type 1 titers ranged from 1:8 to $\geq$1:8192 and BVDV type 2 titers were between 1:8 and 1:2048. Three PI alpaca crias were identified and were born on different ranches participating in this study.

Discussion and Conclusions from this study were:

1) This study was designed to determine the prevalence of alpacas seropositive to BVDV in Southern California.
2) The results of the current study suggest that alpacas seroconvert when exposed to BVDV but clinical disease is unusual
3) 20.0% of the alpacas SN tested in this study were seropositive for one or both BVDV genotypes
    a. 18.6% of males tested were seropositive to one or both BVDV genotypes
    b. 20.6% of females tested were seropositive to one or both BVDV genotypes