

REPORT OF THE COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES

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The Committee on Bluetongue and Related Orbiviruses met at the Sheraton Greensboro Hotel, Greensboro, North Carolina on October 25, 2008 at 1:00 p.m. There were 16 members and 34 guests in attendance. James E. Pearson, Chair, and William C. Wilson, Vice Chair, conducted the meeting.

Dr. Christian Griot, Institute of Virology and Immunoprophylaxis (IVI), National Reference Laboratory for Exotic Diseases, Switzerland, presented Bluetongue in Europe: The Swiss Perspective. This paper is included in its entirety at the end of this report.

Summary of USDA sponsored symposium on Bluetongue Virus type 8

Eileen Ostlund, United States Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

USDA-APHIS-VS held a symposium on bluetongue virus 8 (BTV-8) on July 10, 2008, Denver, Colorado. Featuring presentations by international experts, the meeting was attended by State animal health officials; academic researchers; animal industry representatives; USDA, Agricultural Research Service (ARS) scientists; and VS personnel. The symposium provided an overview of the virus and its effect on animal agriculture, discussed Europe's experience with the virus, reviewed the latest research, and explored possible disease management and trade implications for North America. Participants contributed observations on gaps in research, diagnostics, surveillance, and vaccines. Symposium attendees also discussed potential ways to prevent and mitigate the entry and spread of BTV-8 in the United States. Finally, the need for collaboration with international counterparts, State and Federal governments, and industry was emphasized. A summary of the symposium findings has been posted on the APHIS website. http://www.aphis.usda.gov/vs/ceah/ncahs/nsu/outlook/issue19_sep08/

Update on Diagnostic Observations for Bluetongue, and Epizootic Hemorrhagic Disease in the United States

Eileen Ostlund, NVSL-VS-APHIS-USDA

Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/polymerase chain reaction (PCR) positives are as follows for Calendar Year 2007:

Bluetongue virus or ribonucleic acid (RNA) was detected in 51 samples submitted during calendar year 2007. The positive bluetongue virus isolation and PCR test results from submissions to the NVSL in 2007 are listed below in Table 1:

Table 1. BT virus isolation (VI) / PCR positives, Calendar year 2007

<i>State</i>	<i>No.</i>	<i>Species</i>	<i>PCR</i>	<i>VI</i>
CA	3	Cattle	Pos	Neg
FL	2	Deer	Pos	BTV-24

FL	1	Deer	Pos	Autolyzed
FL	1	Deer	Pos	Neg
IA	10	Cattle	Pos	Neg
MO	5	Cattle	Pos	Not done
MO	2	Cattle	Pos	Neg
MT	3	Deer	Pos	BTV-17
MT	3	Antelope	Pos	BTV-17
MT	4	Sheep	Pos	BTV-17
MT	2	Sheep	Pos	Neg
NM	1	Cattle	Not done	BTV-11
SC	1	Cattle	Pos	Not done
SD	1	Deer	Pos	Neg
SD	1	Antelope	Pos	Neg
UNK	11	Cattle hemoglobin	Pos	Neg

During calendar year 2007, 62 samples tested positive for EHDV by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to the NVSL in 2007 are listed in Table 2.

Table 2. EHDV isolation (VI)/ PCR positives, Calendar year 2007

<i>State</i>	<i>No.</i>	<i>Species</i>	<i>PCR</i>	<i>VI</i>
DC	1	Deer	Pos	EHDV-2
FL	1	Deer	Pos	EHDV-2
FL	2	Deer	Pos	Neg EHD; BTV-24
IN	1	Cattle	Pos	EHDV-2
IN	1	Deer isolate	Not done	EHDV-2
IA	2	Deer	Pos	EHDV-2
KY	4	Cattle	Pos	Neg
KY	2	Deer	Pos	EHDV-2
KY	1	Deer isolate	Not done	EHDV-2
MO	1	Deer isolate	Pos	Neg
NJ	2	Deer	Pos	EHDV-2
NY	5	Deer	Pos	EHDV-2
NY	2	Deer	Pos	Neg
NY	1	Deer	Pos	Autolyzed
OH	2	Deer	Pos	EHDV-2
OH	2	Cattle	Pos	EHDV-2

OH	5	Cattle	Pos	Neg
PA	2	Deer	Pos	EHDV-2
PA	2	Deer	Pos	Not done
PA	1	Deer	Pos	Neg
PA	4	Deer isolate	Not done	EHDV-2
SD	2	Deer	Pos	EHDV-2
SD	2	Deer	Pos	Not done
TN	1	Cattle	Pos	EHDV-2
TN	2	Elk	Pos	EHDV-2
TN	1	Cattle	Pos	Neg
TX	1	Deer isolate	Not done	EHDV-1
WV	1	Deer	Pos	EHDV-2
WV	1	Deer isolate	Not done	EHDV-2
WI	4	Deer	Pos	EHDV-2
UNK	2	Deer isolate	Not done	EHDV-2
UNK	1	Deer isolate	Pos	Neg

Calendar year 2008 (January 1– October 21)

Bluetongue virus or viral RNA has been detected by PCR from 10 specimens submitted thus far in 2008 are listed in Table 3.

Table 3. BT virus isolation (VI) / PCR positives, January 1 - October 21, 2008

<i>State</i>	<i>No.</i>	<i>Species</i>	<i>PCR</i>	<i>VI</i>
AR	1	Deer isolate / tissue (received from Southeastern Cooperative Wildlife Disease Study)	Pos	BTV-3
CA	1	Sheep	Pos	Neg
TX	1	Deer isolate (year unknown)	Pos	BTV-17
UNK	6	Cattle hemoglobin	Pos	Neg
UNK	1	Cattle BSA	Pos	Neg

As of October 21, 2008, EHDV has been detected in nine samples submitted to NVSL. The positive EHDV isolation and PCR test results are listed in Table 4.

Table 4. EHDV isolation (VI)/ PCR positives, January 1 – October 21, 2008

<i>State</i>	<i>No.</i>	<i>Species</i>	<i>PCR</i>	<i>VI</i>
IN	1	Deer isolate (year unknown)	Not done	EHDV-2

IN	1	Deer isolate	Not done	EHDV-2
MT	1	Antelope (liver)	Pos	No Test / Toxic
SD	4	Deer	Pos	EHDV-2
SD	1	Deer	Pos	Pending
TX	1	Deer isolate	Not done	EHDV-2

2008 Bluetongue serology proficiency test

Fifty-six laboratories participated in the 2008 BT proficiency test. The panel consisted of 20 serum samples. The passing score was one or zero samples missed. Four laboratories failed the 2008 bluetongue proficiency panel on the first attempt. All 4 laboratories passed the retest. As of October 2008, there are 56 laboratories approved to conduct official export BT serology tests.

Bluetongue and Hemorrhagic Disease Surveillance, Update

David E. Stallknecht and Andrew Allison, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update on hemorrhagic disease (HD) in wild ungulates in the U.S. was presented. Last year (2007), there were numerous reports of HD and an unprecedented number of virus isolations ($n=283$) were made. Serotypes isolated during 2007 included EHDV-1, EHDV-2, EHDV-6, BTV-10, BTV-11, and BTV-17. Based on reports of disease that were received from state fish and wildlife agencies during the winter and spring of 2008, there were two major outbreaks; EHDV-2 in white-tailed deer in the Eastern United States and BTV-17 in deer and pronghorn in the Western United States. The EHDV-2 outbreak probably represented the most extensive orbivirus outbreak in U.S. history and it affected deer in some areas where HD does not historically occur.

To date in 2008, SCWDS has isolated EHDV-1 (Texas), EHDV-2 (Texas, Indiana), EHDV-6 (Texas, Kansas) and BTV-3 (Arkansas). The BTV-3 isolate was confirmed by NVSL. This is the third consecutive year where EHDV-6 was isolated and the second report of BTV-3; the first isolation of BTV-3 from white-tailed deer in the U.S. came from a wild deer in Mississippi during 2006. Sequence analyses of the 2006-2008 EHDV-6 isolates suggest that this virus may be derived from an EHDV-6/ EHDV-2 reassortment. The origin of this virus and BTV-3 are currently unknown but their repeated isolation suggests that they are now established in the U.S.

Bluetongue in Europe And Its Risk on Animal Movement – The European Food Safety Agency’s Scientific Opinion

M. D. Salman, Colorado State University and scientific panel member of European Food Safety Authority (EFSA) – Animal Health and Animal Welfare

The European Food Safety Authority (EFSA) involvement in producing a scientific opinion on blue tongue in Europe and its vaccines and control strategies among the European community was presented. The EFSA was legally established by a European Parliament and Council Regulation in 2002. EFSA, as independent agency for the European community, is solely engagement in scientific opinion by conducting risk assessment on various topics related to food security and food safety including animal health issues.

EFSA has contributed in producing scientific opinion on bluetongue current episodes through published reports that can be found via the following websites;

http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620770577.htm and http://www.efsa.europa.eu/EFSA/efsa_locale-178620753812_1178620770784.htm. There is also a scientific publication through a special issue in August 2008 of Preventive Veterinary Medicine (Elsevier publication) dedicated to this work.

The presentation included the main scientific conclusion items from these reports which are:

- *Culicoides* constitute a numerous and widespread group and act as important vectors of many pathogens including BTV
- knowledge of the life cycle of most species of *Culicoides* in Northern Europe remains incomplete

- European countries show that there is now almost continuous emergence of fresh adult midges through the winter at the northern latitudes affected by BTV
- multiple blood feeding events by *Culicoides* are crucial to the initiation and subsequent spread of BTV
- *Culicoides* are able to travel much longer distances (>100 km) and so may be able to introduce pathogens like BTV into regions remote from the source
- infection rate in vectors is generally low with the potential of transmission from a viraemic host to the vector is much less in magnitude than from the vectors to animals
- the level of protection provided by insecticide treatment is not determined but it is unlikely to eliminate the risk of BTV transmission
- all BTV inactivated vaccines, when administered in two separate doses, are able to fully protect animals for a long period. However, a single dose of BTV-4 inactivated vaccine only partially reduced viremia in cattle when challenged 7 months later
- numerous Modified Live Virus (MLV) vaccines have been used under a wide range of conditions in the field
- all were found to induce viremia allowing for the potential infection, and possible subsequent transmission, of MLV strains of BTV by insects
- in general, the use of vaccines which prevent viremia after challenge is recommended
- the use of MLVs can be considered only after a comprehensive risk/benefit analysis has been made
- the vaccines are also suitable tools to facilitate the safety of movements of animals in infected areas when several factors are taken into consideration
- the circulation of BTV in wild ruminants can compromise a vaccination campaign and for this reason it is essential to establish what their precise role might be in the epidemiology of the disease.

Gaps in scientific knowledge and scientific advice on bluetongue have been identified and were also presented. EFSA contributed this month to a revision and update of previous opinions on vectors, viremia and over-wintering mechanisms. The conclusion from this scientific opinion was presented as following:

- no sufficient field data are available for assessing the probability of *Culicoides* presence with animals and their environment during transportation
- the risk assessment model suggested that increase of treatment efficacy may lead to a reduction of the risk
- the effect of treatment of the vehicles and animals with insecticides or repellent was difficult to assess due to lack of sufficient data and involvement of several inter-related and poorly understood factors such as temperatures, midge density and prevalence of infectious vectors.

European Union Legislation and Policy on Bluetongue. The Risk Management Response

Francisco Javier Reviriego Gordejo, European Commission, Health and Consumers Directorate-General, Directorate D - Animal health and welfare, Unit D1 – Animal Health and Standing Committees, Head of Sector Disease control and animal identification. Brussels, Belgium

There are some specific features in Europe that should be taken into account: the European Union (EU) single market, the high volume of international intra-community trade on live ruminants, sheep and cattle are bred together in many countries, there is an important dairy sheep and goat industry and chiefly the fact that the EU has fully harmonized rules on animal health (Brussels).

EU rules are the result of the managers' response to an evolving situation:

As a response to the 1999-2000 incursions, basic legislation (Council Directive 2000/75/EC) was adopted and contains general control measures, movement restrictions, provisions after suspicion, confirmation, for demarcation of protection and surveillance zones and also general provisions for vaccination.

As a response to 2006-2007 epidemic and the available scientific advice there was a major change (Regulation 1266/2007) that is based on experience gained and scientific advice and lays down more sustainable, proportionate and science-based measures that are more into line with international standards and reduces obstacles to trade while maintaining guarantees. It also presents a new approach to vaccination.

However, once there was scientific evidence of the relative high frequency of trans-placental transmission of serotype, it was necessary to review rules for the movements of pregnant animals from a restricted zone. In summary the cows must be vaccinated or naturally immunized before insemination/mating.

Again, once experience demonstrated that proper protection against attack by vectors were not easily achievable, rules for animal movements were reviewed allowing in general the movement of vaccinated or naturally immunised animals.

Finally, the objective of the future EU policy on BT is to control BT by containing disease spread and protecting susceptible animals in order to limit economic losses caused by the disease, not precluding a hypothetical eventual disease eradication. The strategy should be reviewed in 2010, when it will be clearer whether eradication in the EU is an achievable objective or not.

The measures will be based on three pillars: surveillance, movement restrictions and vaccination.

Impact of Bluetongue on Exports

Ellen Buck, National Center for Import-Export (NCIE), VS-APHIS-USDA

The following is the USDA-APHIS-VS-NCIE role in trade:

- import regulations prevent introduction of foreign diseases
- export activities meet requirements of receiving countries
- export activities facilitate trade

Bluetongue Virus -Trade Implications include:

- no requirements for imported cattle
- export testing requirements vary by country
- requirements are on APHIS website - iRegs
- some countries have semen export testing requirements

The following are the five top countries for bovine exports and the number of exports for fiscal year 2007:

Canada:	17,220
Saudi Arabia:	8,520
Mexico:	4,566
Morocco:	1,105
Honduras:	255

Bovine semen and embryo exports:

2005	11,782,537
2006	11,186,017
2007	12,693,767

FY 2005-2007 bluetongue testing requirements for export:

- typically antibody test, e.g. ELISA
- does not differentiate from active infection
- U.S. would prefer elimination of BTV testing requirements
- PCR, virus isolation tests preferred over antibody tests

The following have no bluetongue export test requirements:

Canada
Mexico
Saudi Arabia
Honduras

The bluetongue import requirements varies from very strict to none

***Culicoides* Surveys in the Southeast**

Joseph L. Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update on surveys for *Culicoides* sp. in the Southeastern United States was provided. These surveys are being conducted as part of a Cooperative Agreement for Exotic Arthropod Surveillance with USDA-APHIS-VS. Surveys are ongoing in Florida, Georgia, Alabama, Mississippi, Louisiana, and Arkansas. The survey sites in southeastern Arkansas and northern Mississippi include two sites where bluetongue virus (BTV-3) positive deer were found. The sites in Florida include one site where sheep have died over a several years period due to bluetongue. Contents of light traps are counted and sorted for *Culicoides* sp., and then processed and

identified at SCWDS. During January – October, 2008, traps were set for 1,141 trap nights at 69 premises in 52 counties throughout the Southeastern United States. A total of 376,504 have been counted from traps set out during 2008; 7,980 of these were *Culicoides* sp. During this time period, 564 *Culicoides* specimens were processed and 494 have been identified. These specimens included representatives of 22 species: *Culicoides insignis*, *C. furens*, *C. bickleyi*, *C. torreyae*, *C. barbosai*, *C. stellifer*, *C. haematopotus*, *C. edeni*, *C. baueri*, *C. niger*, *C. hinmani*, *C. knowltoni*, *C. crepuscularis*, *C. sonorensis*, *C. debilipalpis*, *C. paraensis*, *C. beckae*, *C. mulrennani*, *C. arboricola*, *C. floridensis*, *C. venustus*, and *C. guttipennis*. Additional field collections and identification of *Culicoides* sp. collected during 2008 are underway and this survey will continue in 2009.

Bluetongue Virus Vaccines – The Good, the Bad and the Ugly

N. James MacLachlan, School of Veterinary Medicine, University of California-Davis

Bluetongue vaccines were first developed in California shortly after isolation of the virus in the early 1950's. Initial vaccines were propagated in embryonated chicken eggs, according to procedure pioneered in South Africa. These vaccines were teratogenic and caused unacceptable fetal mortality, thus they were quickly replaced by cell culture adopted live attenuated vaccines. Live attenuated vaccines to BTV serotypes 10, 11 and 17 are available in California, but only to serotype 10 elsewhere in the U.S. There is no vaccine for serotype 13.

There are inherent potential problems associated with the use of live attenuated vaccines, including, transmission by vector insects, reassortment of genes with field strains of BTV, and reversion to virulence. Inactivated vaccines exclusively have been used to control BTV serotype 8 infection in Europe, but inactivated BTV vaccines are not commercially available in the U.S. New generation vaccines have been developed, including virus-like particles composed of baculovirus expressed BTV proteins and canarypox and other pox virus recombinants. A recombinant canarypox virus co-expressing the VP2 and VP5 genes of BTV serotype 17 induces sterilizing immunity in sheep. Effective and affordable vaccines will be absolutely needed for the future control of BT outbreaks in the U.S.

New Strategies for Preventing Bluetongue in Sheep

W.K. Reeves, Arthropod-Borne Animal Diseases Research Laboratory (ABADRL), Agricultural Research Service (ARS), USDA

Bluetongue disease is a sporadic and unpredictable disease in the northern Rocky Mountains. Epizootics can be separated by decades of little to no disease activity. Woolgrowers need access to control technologies that can be used after an outbreak is detected. We tested six formulations of midge repellent pesticides against *Culicoides sonorensis*, the primary vector of bluetongue in the western U.S. Synthetic pyrethroids with PBO (a synergist) applied with both ear tags and a low-volume spray were effective in repelling biting midges for up to 5 weeks. These pesticides are low cost and can be applied during an outbreak and might protect sheep during the autumn until freezing weather sets in and kills the biting midges.

Investigation of an Outbreak of Bluetongue Serotype 17 in Sheep in Wyoming

M.M. Miller*, ABADRL, ARS-USDA

A report was provided on investigation of an outbreak of bluetongue virus serotype 17 in sheep from the Big Horn Basin of Wyoming. A new BTV intrusion into a naïve population and elevation might be the primary barrier to vector movement. The infection rate closely reflected the reported morbidity. Disease varied between locations suggesting that ranch level vector control strategies might be effective in minimizing infections. The investigation indicated that sheep naturally infected are not a long-term source of infectious virus.

Update on bluetongue antigen detection in *Culicoides* cells

James Mecham, ABADRL-ARS-USDA

An update was provided to the Committee on research at ABADRL to develop improved techniques for detecting bluetongue virus (BTV) in insect cells. He reported on the development

of both an endpoint titration and an agarose overlay assay using *In situ* immune infrared fluorescent staining techniques to directly detect and titrate BTV in *Culicoides* cell culture. The sensitivity of these assays for detection and titration of virus in *Culicoides* cells was comparable or superior to that obtained by standard techniques in vertebrate cell culture. These assays will have application for both virus isolation and research using the insect cells lines.

Improved RNA extraction increases sensitivity of the bluetongue and epizootic hemorrhagic virus multiplex real-time RT-PCR

William Wilson, ABADRL-ARS-USDA

An update on improved protocols for the Multiplex real-time RT-PCR for detection of all serotypes of BTV and EHDV was provided. The assay can distinguish between BTV and EHDV RNA.

The Arthropod-Borne Animal Diseases Research Laboratory: Research Program: Update and Current Status

Barbara S. Drolet, ABADRL-ARS-USDA

The ABADRL is located in Laramie Wyoming. Currently the ABADRL staff of 30 consists of microbiologists, virologists, entomologists, and veterinarians, as well as staff who support the laboratories, administration and facilities. The Research Leader position became vacant in August of 2007 and remains so today with three ABADRL research scientists rotating as Acting Research Leaders every two months. The ABADRL's Biosecurity Level 3 Agriculture (BSL-3Ag) Large Animal Isolation Building (LAIB) was closed after September 11, 2001 due to insufficient security. In 2003, after security upgrades were in place, the LAIB was inspected and it was determined that it did not meet current requirements for a BSL-3Ag level biocontainment laboratory. In January of 2006, after costly retrofit attempts, the LAIB was officially downgraded to BSL-2 based on its degraded physical structure. The ABADRL's BSL-3Ag laboratory for small animal/lab/insect work (the Round Building; RB) was closed in January of 2002 due to catastrophic system failures after several days of extreme cold temperatures. In 2004, 75 percent of the RB was re-opened as a BSL-2 laboratory-only space. During 2004-2005, attempts were made to return the remaining 25 percent of the building to BSL-3 laboratory space. However, at the end of 2007, a degraded, inadequate roofing support system was identified putting in question the ability of the roof to support the existing air handling equipment, as well as the anticipated winter snow load. At this point, efforts to return the space to BSL-3 were abandoned. Currently the facilities have been renovated and approved by APHIS for BSL-2 laboratory, small animal, insect, and large animal work. To accomplish their BSL-3 research mission, the ABADRL is contracting work out, establishing more collaborations with scientists who have access to BSL-3 facilities, and spending a significant amount of time and budget resources traveling to collaborator locations to conduct research. Collaborator locations include Fort Collins, Colorado; Fort Detrick, Maryland; Winnipeg Canada; and South Africa.

The ABADRL has three five-year project plans under two ARS National Research Programs. One project plan under the Animal Health National Program is entitled Countermeasures to Control and Eradicate Rift Valley Fever. Research objectives in this plan are 1.) to determine the vector competence of North American mosquito species for both wild type and vaccine strains of eradicate Rift Valley fever virus (RVFV); 2.) to develop vaccine and diagnostic expression and delivery systems for RVFV; and 3.) to develop operator safe, sensitive diagnostic tests for the early detection of RVFV, including assays to distinguish infected from vaccinated animals. A second project plan under the animal health national program is entitled Virus-Vector-Host Interactions of Arboviral Diseases of Livestock, and focuses primarily on BTV and vesicular stomatitis virus (VSV). Research objectives in this plan are 1.) to identify biological determinants of disease susceptibility associated with arboviral infections; and 2.) to determine the host-range specificity of exotic bluetongue viruses, namely the susceptibility of North American sheep and white-tailed deer to the European strain of BTV type 8.

The project plan, under the Veterinary Medical, and Urban Entomology National Program, is entitled Vector Competence and Protection of U.S. Livestock and Wildlife from Arthropod-Borne Diseases, which includes research on important vector insect species of mosquitoes, midges,

and sand flies and important arboviruses such as BTV, RVFV, and epizootic hemorrhagic disease virus (EHDV). Research objectives in this plan are 1.) to determine the importance of North American biting insects as vectors of endemic and exotic pathogens; 2.) to determine the biological factors that influence the risk of pathogen transmission by vector species; and 3.) to develop strategies for protecting livestock and humans from biting insects.

The President's FY2009 budget recommendations included a 7.5 percent cut for ARS, \$84 million below 2008 funding, affecting 8 percent of the ARS workforce. This accounts for 108 employees in the North Plains Area alone. The funding cut would result in significant reductions and re-allocations across ARS and the closure of 11 ARS locations around the country including ABADRL in Laramie, Wyoming. The recommendation is to relocate ABADRL from Laramie, Wyoming to Ames, Iowa. ABADRL research programs would be consolidated with the National Animal Disease Center for program efficiency and use of the new state-of-the-art facility. The current facilities at Laramie can not support high containment research and funds are not available to replace the current facility. The response of the U.S. Senate to these recommendations was a request for more information. Exact language from the Senate was as follows: "Before deciding whether it is appropriate to relocate the laboratory, the Committee requests ARS to provide a report describing the current status of the laboratory's facilities and research. Additionally, the Committee requests ARS to provide an assessment of no fewer than two locations that could serve as the new location of ABADRL. When selecting the locations to assess, ARS should consider the facilities, capacity, expertise, and synergies relevant to fulfilling and expediting the ABADRL mission that are offered by each potential location. Remarkable fiscal issues should also be noted."

The study is being conducted by ARS headquarter National Program, Biosafety, and Engineering Staff as well as our Assistant North Plains Area Director. The study is starting November 1, 2008, following their visit to Laramie to evaluate current capacity. Sites in the report will include: Ames, Iowa; Manhattan, Kansas; Moscow, Idaho; Pullman, Washington; and Fort Collins, Colorado. The report will be submitted to the Senate by March of 2009 for consideration. In spite of the uncertain future for ABADRL, the laboratory currently has the highest level of funding in its history, thanks to additional funding sources such as the Department of Homeland Security. Additionally the laboratory has the largest number of national and international collaborations in its history, and continues to have a productive research program addressing the needs of our stakeholders.

Business meeting:

The meeting was called to order at 5:35 p.m. by Dr. Pearson. There was one Resolution: "Surveillance for bluetongue and epizootic hemorrhagic disease in the United States and Caribbean Region" submitted. There were proposals to broaden its scope but the Committee decided to leave it as submitted. The resolution was approved.

Dr. Pearson stated that he had been Chair of the Committee for 5 years, which the maximum allowed by the United States Animal Health Association, and called for nominations of a new Chair. Dr William Wilson was nominated. There were no other nominations and the Committee voted unanimously to recommend Dr. Wilson for Chair; Dr. Wilson will appoint a Co-Chairman before the 2009 meeting.

Dr. Pearson thanked members of the Committee and guests for their excellent support in making this a very productive Committee.

Bluetongue in Europe: The Swiss Perspective

Christian Griot*, Valerie Chaignat, Gaby Worwa, Lukas Bruckner, Martin Hofmann, Barbara Thür
Institute of Virology and Immunoprophylaxis (IVI), National Reference Laboratory for Exotic
Diseases, Middelhäusern, Switzerland

Jim Maclachlan, Lukas Perler
Department of Pathology, Microbiology and Immunology, School of Veterinary Medicine,
University of California, Davis, U.S.A.

Since 2006, Bluetongue disease (BT) caused by Bluetongue virus (BTV) serotype 8 was rapidly spreading across Europe and finally reached Switzerland in October 2007. The route of introduction into Europe remains at this time still unclear. As early as 2003, a BT surveillance program, due to the outbreaks of BT in Southern Europe, and a disease awareness campaign were initiated in Switzerland. The first case in Switzerland was recognized by the farmer and the state veterinarian, and samples were submitted to the IVI. BTV-8 virus was detected in numerous animals and a single animal was euthanized due to the severe clinical symptoms (Hofmann et al, 2008). In 2008, numerous BT-8 cases were found in Europe as well as in Switzerland. As of October 2008, BTV-6, a serotype new to Europe has also been detected in the Netherlands. In June 2008, a mandatory mass vaccination was initiated in Switzerland in which all susceptible livestock (cattle, goats, and sheep) needed to be vaccinated. Several field trials were performed in Switzerland in order to have an estimate on the efficacy and potency as well as on possible vaccine side effects. Estimated livestock vaccination coverage of 80 percent was foreseen. Several European Union member states initiated vaccine campaigns either on a compulsory or voluntary basis.

It is known that clinical disease of BT in sheep may differ depending on breed, age and immunity of infected sheep and may also vary between serotype and strain of BTV. Since there were no data available on the susceptibility of Swiss sheep breeds for BTV-8, experimental infection of the 4 most common Swiss sheep breeds and the highly susceptible Poll Dorset sheep with the current BTV-8 was performed. Clinical signs were assessed regarding severity, localization, progression and time point of their appearance. The results clearly show that the Swiss sheep breeds investigated were susceptible to BTV-8 infection (Worwa et al, 2008). They developed moderate, BT-characteristic symptoms, which were similar to those observed in Poll Dorset sheep. Regardless of breed, the majority of infected animals showed fever, swelling of the head as well as erosions of the mouth and subcutaneous hemorrhages. In addition, these *in vivo* experiments gave samples for further test validation as well as excellent documentation material for students, private and government veterinarians.

In 2007, on the occasion of the mandatory testing of an export shipment of goats from Switzerland a novel BTV, named (according to the location of its first detection) Toggenburg Orbivirus (TOV) was detected by using real-time reverse transcription-PCR. Laboratory analysis and dendrogram construction showed that TOV is closely related to BTV, although some genome segments were distinct from the 24 known BTV serotypes. Because the gene encoding outer capsid protein 2 (VP2), which determines the serotype of BTV, is placed within the BTV serogroup in the dendrogram, we proposed that TOV represents a so far unknown 25th serotype of BTV (Hofmann et al, 2008).

In 2009, Switzerland will continue the active (e.g. sentinel herds, vector trapping) and passive surveillance program which is in concordance with the European Union legislation. It will include a mandatory vaccination program of livestock commencing February 2009. However it is currently unclear, if on a long term BT can be eradicated by these measures.

References:

Hofmann M, Griot C, Chaignat V, Perler L, Thuer B 2008. Bluetongue disease reaches Switzerland. *Schweiz Arch Tierheilkd* 150, 49-56.

Hofmann MA, Renzullo S, Mader M, Chaignat V, Worwa G, Thuer B. Genetic characterization of Toggenburg Orbivirus, a new Bluetongue Virus, from Goats, Switzerland. *Emerg Infect Dis.* 2008 December; [Epub ahead of print]

Worwa G, Thuer B, Griot C, Hofmann M, Maclachlan JN, Chaignat V. 2008. Clinical signs observed in Swiss sheep after experimental bluetongue virus serotype 8 infection. *Schweiz Arch Tierheilkd* 150, 491-498.