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Dr. Frederick W. Oehme retires

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A mere half century after arriving at Kansas State University, Dr. Fred Oehme retired on June 13 from the College of Veterinary Medicine. Dr. Oehme came to K-State in 1959 after receiving his D.V.M. degree from Cornell University in 1958 and practicing briefly in Maryland. Dr. Oehme received a M.S. degree in toxicology and medicine from K-State in 1962 and then studied pathology in Germany and radioisotopes at the Oak Ridge Institute of Nuclear Studies in Tennessee before attending the University of Missouri where he earned a Ph.D. degree in toxicology in 1969.

Dr. Fred Oehme

Dr. Oehme is a diplomate of the American Board of Veterinary Toxicology, the American Board of Toxicology, and the Academy of Toxicological Sciences. Since 1969, Dr. Oehme has been the director of the Comparative Toxicology Laboratory and the primary instructor for the toxicology course in the D.V.M degree program at K-State. Dr. Oehme has mentored more than 60 postdoctoral residents and M.S. and Ph.D. students in toxicology. For well over 30 years Dr. Oehme has been recognized as an international expert in veterinary toxicology.

He has more than 800 scientific publications, including three books and numerous book chapters, and has made more than 700 presentations at scientific meetings. From 1973 to 1977 Dr. Oehme edited *Veterinary Toxicology*, a journal published by the American College of Veterinary Toxicologists. In 1977 the scope of the journal was expanded and the name changed to *Veterinary and Human Toxicology* and Dr. Oehme remained as editor through 2004.

Dr. Oehme has been active in research and has participated in study sections of various Institutes of the National Institute of Health and on advisory panels for the Environmental Protection Agency, the Food and Drug Administration, the World Heath Organization, the National Research Council, and other organizations. His awards at the university, local, national, and international levels are too numerous to list here.

Dr. Oehme's retirement truly marks the end of an era. The coming school year will be the first in 40 years that Dr. Oehme will not be teaching clinical and diagnostic toxicology to veterinary students. As someone who took his course 31 years ago, I can say that he has done an excellent job in preparing budding veterinarians for the real world. Because of his desire to help people and their animals, Dr. Oehme instituted and coordinated for more than 20 years a 24 hours per day, 7 days a week hotline where veterinarians and animal owners could call free-of-charge concerning veterinary toxicological problems. His veterinary interests have not been limited entirely to toxicology as Dr. Oehme coedited *The Textbook of Large Animal Surgery* published in 1973 and edited the second edition published in 1988. Dr. Oehme's teaching and willingness to help people will be sorely missed. Kansas State has been fortunate to have had his services for all of these years.

Leptospirosis in a 5-week-old puppy

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We received several tissues from a five week-old Labrador retriever puppy from western Missouri. Prior to the death of this pup, two other puppies in the litter of nine had died. The submitting veterinarian performed the necropsy. On postmortem examination the puppy was icteric and had diffusely congested lung.

Histologically, there was tubular degeneration, necrosis, regeneration and mineralization in the kidney. In the lung, there was mineralization of the septa and bronchial walls. Liver was not affected. These changes were suggestive of acute renal failure. The kidney was positive for pathogenic *Leptospira* spp. by polymerase chain reaction (PCR). Following the diagnosis of leptospirosis, serum from all littermates and the mother was tested for the titers against six *Leptospira* serovars using microscopic agglutination test (MAT). Based on the titers, all the pups and the mother were negative for leptospires. The mother was vaccinated in November, 2008. As the mother and other puppies were negative, the affected pup in this case, probably got infected by exposure to urine from a rodent or a raccoon. This case is not intended to provide a detailed review of canine leptospirosis, instead, to highlight the importance of considering leptospirosis in young pups with icterus and acute renal failure. A detailed review of canine leptospirosis can be found in the last of issue of *Veterinary Quarterly* (Spring 2009; Volume 12, Number 2). Details about the six serovars MAT and PCR testing for leptospirosis offered by the KSVDL can be obtained by calling 866-512-5650.

First reported herd outbreak of *Streptococcus equi* ssp. *zooepidemicus* polyserositis occurs in Kansas alpacas

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Recently, a local alpaca farm owner presented three dead alpacas, ranging from one to six years of age, to the KSU Veterinary Diagnostic Laboratory for necropsy. Ten and 30 days later, two other animals from the same farm were presented to the Veterinary Medical Teaching Hospital for acute recumbency.

These five animals had been acquired three weeks prior to the initial presentation, along with 62 other male alpacas from a farm in Oregon. They were transported to Kansas and housed on a farm where they were co-mingled with approximately 200 alpacas, originating from two farms. One of the two animals presented alive survived after aggressive fluid, antimicrobial, anti-inflammatory and analgesic therapy.

Clinical and necropsy examinations of these animals revealed combinations of bacteremia, fibrinous pleuritis, peritonitis, bronchopneumonia, aortic valve endocarditis and suppurative meningitis. Streptococcus equi ssp. zooepidemicus was cultured from all cases.

S. equi ssp. *zooepidemicus* is a Lancefield group C *Streptococcus* that causes acute, subacute, and chronic disease in camelids. It is considered to be a commensal organism of alpacas in South America1, but not in North America[2,3]. It is the etiologic agent of "alpaca fever" in Peru, where it reportedly causes serositis of the thoracic and abdominal cavities and is associated with high mortality.[1] This organism also may be carried in clinically normal horses in the nasopharynx[4], and also has been reported in a variety of other species, including dogs[5] sheep[6] and goats[7].

Peritonitis and pleuritis are common clinical manifestations of *S. equi* ssp. *zooepidemicus* bacteremia in South American camelids.[8,9]. It is hypothesized that stressors, including transport, may result in subclinical carriers developing systemic infection or that infection may be acquired via the respiratory tract from camelids or other species.[9]

The source of this outbreak has not been determined. Possibilities include recrudescence of a carrier state in the newly acquired animals, transmission of the bacterium to the new animals via fomites (e.g. trailer) during transport, or transmission of the bacterium from the resident herd to the naïve recently acquired animals.

In both horses[10] and camelids,[8] transport or experimental inoculation generally results in acute disease within 24 hours. We suspect transmission from the resident herd to the new animals occurred, considering the three-week delay from transport to disease.

This bacterium should be considered an emerging infectious disease in camelids in North America.The severity and acuteness of the disease, and the associated high mortality rate, make this of particular concern. Should you have any additional questions regarding this or any other agricultural animal health issue, please contact the KSU Veterinary Medical Teaching Hospital Large Animal Clinic at 785-532-5700.

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Survey of large animal veterinarians' biosecurity practices

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The introduction of infectious or contagious diseases remains an important concern for farms and ranches. Biosecurity practices are aimed at prevention of the introduction of infectious and contagious organisms onto animal facilities. Further, the spread of these agents from contaminated facilities should be prevented as well. In an attempt to gain insight into current "standards of practice" among veterinarians regarding biosecurity protocols, an electronic survey was conducted of private practice veterinarians working with livestock farms.

This survey was conducted using an electronic survey distributed using e-lists targeted at bovine practitioners and e-lists targeted at small ruminant practitioners. Practitioners were asked to provide details of biosecurity protocols they personally used when visiting client farms.

Veterinarians were specifically asked not to discuss idealized protocols, were discouraged from projecting what they thought an optimal program would be, or to discuss any practice they were not actually performing. Instead, practitioners were asked to describe specifically what they actually do on a day-to-day basis for biosecurity and to make specific reference to practice type, state, country, coveralls/aprons, boots, head covers, truck maintenance, separation of animals, facilities maintenance, needle use e.g. for vaccinations, instrument maintenance, and any other specific item.

Detailed survey data was obtained from 26 veterinarians working with bovine clients only (BV) and 27 veterinarians working in mixed-practices (MLA). Data was compiled and stratified by those practices aimed at personal hygiene, equipment hygiene, and farm or ranch control practices.

Personal hygiene practices included use of coveralls, boots, and hats. Of 26 BV's, 14 (54%) changed coveralls between farms, sometimes between building on the same farm, and 12 (46 %) changed coveralls "as needed" based on appearance of cleanliness. Of 27 MLA's, 13 (48%) changed coveralls between every farm, [1] (4%) changed coveralls between all cattle client farms, but only as needed based on cleanliness between small ruminant farms, and 13 (48 %) changed coveralls on an as-needed basis. Data revealed that boots were cleaned and disinfected between farms by 22 (85%) of BV's and 4 (15%) cleaned boots as needed for clean appearance. Of MLA's, 22 (81%) cleaned boots between every farm, 4 (15%) indicated use of disposable boot covers, especially if a problem has been identified at the farm, and 5 (19%) cleaned boots on an as-needed basis. Of those 5, 2 cleaned boots after every cattle call, but only cleaned as needed for small ruminant farms.

Only 2 BV respondents indicated hat use; both wore the same hat to all farms without cleaning unless obviously dirty. Only 2 MLA respondents indicated use of a hat, both wore the same hat to all farms without cleaning unless obviously dirty.

Practices regarding biosecurity practices involving equipment included ambulatory truck maintenance, needle usage, and equipment care. Of 26 BV's, 4 (15%) washed their truck regularly (1 – daily, 3 – weekly), 3 (12%) did not use their vehicle in animal areas, and 19 (73%) had no specific vehicle maintenance or cleaning program. Of 27 MLA's, 5 (19%) did not allow vehicle to drive onto farms, 2 (7%) cleaned truck weekly, and 20 (74 %) had no specific truck maintenance plan.

Needle usage data reported by BV's revealed that 8 (31%) used 1 needle per cow, and 9 (35%) used the same needle for multiple cows (range, 1 needle per 4 head to 1 needle per 20 head). Among MLA's, 10 (37%) used one needle per animal, and 4 (15%) used the same needle for multiple animals.

Instrument maintenance primarily involved field surgical equipment for laparotomy, dehorning, calf castration, etc. Among BV's, 11 (42%) autoclave instruments and 6 (23%) used cold sterilization solutions or "sanitized" their instruments before use. Among MLA's, 4 (15%) indicated that instruments are autoclave sterilized and 8 (30%) used cold sterilization or "sanitized" instruments before use.

Veterinarians provided a wide range of comments regarding factors that influence application of biosecurity principle in field settings. These included the following:

- Change rectal sleeves between pens.
- Try not to leave windows down and spread flies.
- Work with the most susceptible populations first, then move to the sick animals.
- Let the individual client set the pace for this. If the client continues to buy cows from dealers and dispersal auctions despite warnings, I do not bother to put clean coveralls on for his farm. In fact some of these type clients tell me not to do any thing that will increase their call charge just for biosecurity reasons!
- Use the clients' supplies as much as possible.
- Avoid going to a contaminated farm and a non-contaminated farm on the same day.
- Wash hands.
- Use as much disposable equipment (gloves, boots, ultrasound, etc) as possible.
- Eyeball health check of every animal every day.
- Shear healthy sheep first then shear sick or sheep with known abscesses last.

The results of this survey suggest a wide variation in biosecurity practices among private practitioners. An interesting observation surfaced among responses from mixed large animal veterinarians. There appears to be a difference among species of livestock regarding the level of concern for hygiene. Mixed-practice veterinarians commented that biosecurity measures are most stringent for cattle operations as compared with those involving small ruminants.

This survey highlights the need for developing biosecurity practices that can be readily implemented in field settings such that they will be accepted by practitioners. The challenges faced by large animal practitioners serving multiple clients on the same day create obstacles to acceptance and implementation of recommendations that are often created in controlled environments under strict oversight by individuals having specific training in biosecurity procedures.

Comparative toxicology expands analytical capabilities

The Comparative Toxicology Laboratory at Kansas State recently acquired an inductively coupled plasma mass spectroscopy (ICP-MS) instrument. ICP-MS was introduced in the late 1980s and combines the ease of sample preparation and the quick turnaround time of ICP technology with the accuracy and sensitivity of MS technology.

The instrument does not identify compounds, but the elements that make up compounds. It is capable of rapidly and accurately identifying and quantifying at very low levels the individual elements in a sample. ICP-MS has always excelled in the detection of low levels of most metals and other elements that are of toxicological and nutritional relevance, but recent technological advances overcame earlier limitations so that ICP-MS can now also be used for routine analyses of previously problematic elements such as selenium and iron.

The machine can be used to quantify a single element, such as copper, or it can be programmed to quantify a group of elements from a single sample, such as a trace mineral panel. The combination of a wide dynamic range and low detection limits makes it suitable for assaying toxic levels and levels indicating deficiencies without additional sample preparation.

Any acid digestible solids and liquid samples can be analyzed so the technology has found wide usage in analysis of a wide variety of animal, human, plant, and environmental samples, including all organ tissues, blood, bone, milk, urine, water, feed and soil. The Comparative Toxicology Laboratory has designed several panels for a variety of samples and situations. They can also design panels for specific situations.

For more information concerning ICP-MS analysis, its uses and limitations, sample submission requirements and pricing contact Dr. Deon van der Merwe at the K-State Veterinary Diagnostic Laboratory at 785-532-5650 or *dmerwe@vet.k-state.edu*.

Equine piroplasmosis: Foreign animal disease close to home

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Equine piroplasmosis (EP), a tick-borne foreign animal disease of Equidae, was diagnosed at Kansas State University in early June in a horse from Jackson County, Missouri. On June 2, 2009, a 7-year-old Quarter Horse was examined at the Kansas State University Veterinary Medical Teaching Hospital for clinical signs including anorexia, lethargy, pyrexia, and anemia.

Following identification of piroplasms in the peripheral blood film, appropriate state authorities were notified and the horse was isolated and quarantined. Blood samples were submitted the following day to the National Veterinary Service Laboratory (NVSL) in Ames, Iowa. On June 6, the Missouri Department of Agriculture quarantined the premise where the horse had been stabled. On June 9, the premise and resident horses were examined for ticks, and blood samples for EP testing were obtained from 63 equids on the premise. The following day, NVSL confirmed *Theileria equi* (formerly *Babesia equi*) infection of the index horse, and the World Organization for Animal Health (OIE) was notified.

On June 11, NVSL confirmed six additional horses from the property as infected, and the index case was transported back to the Missouri property under quarantine. Five of the infected horses were euthanized with their owners' consent; however, two of the infected horses were illegally removed from quarantine.

An investigation and search was initiated that involved multiple agencies including Missouri law enforcement agencies, the Missouri Department of Agriculture, the United States Department of Agriculture, and the Federal Bureau of Investigation. Subsequently, a horse that was epidemiologically linked to the infected premise tested positive, was quarantined, and illegally removed from quarantine.

The remaining horses on the property have since re-tested negative and the quarantine order has been lifted, but the search for the illegally removed infected horses continues. USDA epidemiological investigations found no evidence of infected ticks on the property, and concluded that disease transmission was associated with poor management practices that resulted in the transfer of whole blood between horses (needle sharing). Currently, Canada has import restrictions on horses that are from Missouri or have been in Missouri in the last 21 days (including transport through Missouri).

The last outbreak of EP in the United States was in Florida with the first infected horse identified in August 2008 and the last quarantine lifted in February, 2009. In that outbreak, 25 premises were quarantined and over 200 horses tested. Twenty horses on 7 premises were found to be infected and were euthanized. The infected horses were epidemiologically linked to 2 horses that entered Florida from Mexico, and transmission of the disease was also associated with poor management practices. Before the Florida outbreak, the United States had been considered free of EP since 1988.

Equine piroplasmosis is a tick-borne disease of Equidae with two possible causes: *Theileria equi* and *Babesia caballi*. The incubation period ranges from 7 to 22 days and clinical signs vary from mild, non-specific signs to acute, severe disease characterized by fever, anemia, hemoglobinuria, icterus, and in some cases, death.

Theileria equi and *B. caballi* are endemic in many parts of the world; however, the United States, Australia, New Zealand, Canada, Japan, England, and Ireland are considered to be free of the disease. The increasingly international nature of the horse industry presents potential risks for introduction of equine piroplasmosis from foreign countries. Many areas of the United States have climates suitable for foreign tick vectors or other ticks that could act as vectors. Additionally, because EP is not endemic, U.S. horses are highly susceptible to acute forms of the disease. Tick vectors known to transmit EP include *Dermacentor* spp., *Hyalomma* spp., *Rhipicephalus* spp., and *Boophilus* spp. Furthermore, as suspected in this outbreak, iatrogenic transmission can occur via sharing of contaminated needles and syringes or transfusion of infected blood. Of the two species, *T. equi* is considered the more pathogenic, with mortality rates reported to range from 10 to 50%. Animals that survive the acute disease usually become lifelong carriers.

Equine piroplasmosis organisms are usually abundant in blood from acutely infected horses; however, in chronically infected animals no or only rare organisms are found. Although there are morphologic differences between the two organisms, differentiating them via light microscopy may be difficult and further diagnostic testing is required for a definitive diagnosis. The complement fixation test is the serological test that is most widely used for diagnostic screening; however serologic immunofluorescent assays (IFA), enzyme-linked immunosorbent assays (ELISA), and polymerase chain reaction (PCR) also are available.

For more information on piroplasmosis see the APHIS fact sheet at the end of this issue.

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APHIS Factsheet

Veterinary Services

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Equine Piroplasmosis

Equine piroplasmosis (EP) is a tick-borne disease that affects horses, donkeys, mules, and zebras. The disease is transmitted via tick bites or through mechanical transmission by improperly disinfected needles or surgical instruments. EP is not endemic to the United States; native tick species do not currently carry the parasites that cause the disease.

Likewise, EP is not endemic to Australia, Canada, England, Iceland, Ireland, and Japan. The disease is, however, found in Africa, the Caribbean (including Puerto Rico), Central and South America, the Middle East, and Eastern and Southern Europe.

The increasingly international nature of the horse industry presents potential risks for EP's introduction from foreign countries. Many areas of the United States have climates suitable for foreign tick vectors or other ticks that could act as vectors. Additionally, because EP is not endemic, U.S. horses are highly susceptible to acute forms of the disease.

Protecting Equine Health

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) protects the U.S. equine industry against the entry and spread of EP. APHIS' Veterinary Services (VS) program regulates equine importation and maintains tick control and surveillance programs.

Recently, the United States won the bid to hold the 2010 World Equestrian Games in Kentucky, making it the first time that the games will be held outside of Europe. For the event, VS officials will use specific safeguarding measures to safely allow horses with EP and horses from EP-endemic areas to enter the United States. VS officials will closely monitor EP-positive horses to prevent disease transmission and maintain the health of U.S. equine.

Transmission

EP is a tick-borne disease caused by the parasites *Babesia caballi* and *B. equi.* Ticks ingest blood from infected equine and then bite uninfected equine, spreading the disease through blood contact. Ticks carrying the parasites can be moved via hay, bedding, feed, and vegetation.

The only known natural vector of EP in the United States is the tropical horse tick, *Dermacentor nitens*, found in the southern United States. *B. caballi* and *B. equi* have been experimentally transmitted by three other U.S. tick species: *D. albipictus*, the winter tick; *D. variabilis*, the American dog tick; and *Boophilus microplus,* the southern or tropical cattle tick.

Because the disease spreads through contact with blood, EP can also be transmitted through contaminated needles and other skin-penetrating instruments. Intrauterine infection from mother to foal is also common.

Signs

An EP-infected horse can take 7 to 22 days to show signs of the disease. Cases of EP may be mild or acute. Mild forms of the disease cause equines to appear weak and show lack of appetite. More acute cases can occur where EP is not common and horses have not built up a resistance to the disease. Signs of the acute phase include fever, anemia, jaundiced mucous membranes, a swollen abdomen, and labored breathing. Other signs of EP include central nervous system disturbances, roughened-hair coats, constipation, colic, and hemoglobinuria—a condition which gives urine a red color. In some cases, death may occur. Some infected horses, however, may show few or no symptoms in the acute phase and may not experience any decrease in performance.

Horses that survive the acute phase of infection may continue to carry the parasites for long periods of time. These horses are potential sources of infection to other horses through tick-borne transmission or mechanical transfer by biting ticks, needles, or surgical instruments.

Diagnosis

Because the clinical signs for EP are non-specific and similar to many other diseases and conditions, it is difficult to diagnose; the disease, however, can be diagnosed with laboratory tests. If EP is suspected, State or Federal animal health officials should be notified before veterinarians collect any samples.

If an outbreak of EP occurs, APHIS must notify the World Organization for Animal Health (OIE) and indicate the steps it is taking to eradicate the disease. The OIE is the international organization that establishes standards for the safe international trade of animals and their products.

Treatment

Currently, there is no vaccine for EP. In endemic regions, symptoms of EP are treated with drugs.

While disinfectants and proper sanitation are often crucial to preventing the spread of animal disease,

these practices are not necessarily effective against the spread of EP and other tick-borne infections. Preventing the transfer of blood between animals through biting ticks or surgical instruments is crucial to preventing the transmission of EP.

History

In 1960, VS and the State of Florida began a disease investigation after backyard horses in south Florida became ill with progressive anemia, jaundice, and fever. The investigation determined that the illness was EP and that it was carried by tropical horse ticks. A State-Federal EP control program was initiated in 1962 in south Florida to eradicate the disease. The program used quarantine and drug treatment for infected equines, spray treatment for infected and exposed animals, and movement controls to prevent disease spread of EP. As a result of the eradication campaign, the United States was declared EP-free in 1988.

Additional Information

For more information about EP, contact:
USDA, APHIS, Veterinary Services, National Animal Health Programs
4700 River Road, Unit 43
Riverdale, MD 20737
Telephone (301) 734–6954
Fax (301) 734–7964
Current information on animal diseases is also available on the Internet at www.aphis.usda.gov/.