SCWDS BRIEFS

A Quarterly Newsletter from the

SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY
COLLEGE OF VETERINARY MEDICINE
THE UNIVERSITY OF GEORGIA
ATHENS, GEORGIA 30602

GARY L. DOSTER, EDITOR

Phone (706) 542-1741
FAX (706) 542-5865

Volume 23 **April 2007** **Number 1**

SCWDS History Continued: The Domestic Animal Connection

See the last issue of the SCWDS BRIEFS for the first article in this series. As knowledge of wildlife diseases expanded, it became apparent that native diseases and parasites were unlikely to devastate deer or other wildlife populations in the Southeast. Even hemorrhagic disease (HD), the deer killer that spurred the southeastern state fish and wildlife agencies to establish SCWDS in 1957, did not significantly impact the Southeast's deer restoration programs, as today's deer numbers readily attest.

However, foreign animal diseases were recognized as a dangerous threat to valuable wildlife resources, as well as to livestock and poultry. Wildlife could be directly impacted by the accidental or intentional introduction of exotic diseases such as rinderpest, heartwater, and foot-and-mouth disease (FMD). Or, wildlife could be indirectly affected if it became necessary to destroy large numbers of wild animals to prevent spread of an introduced exotic disease to susceptible domestic and wild animals. To address this threat, an alliance between wildlife and domestic animal interests was established in 1967 when a program was sponsored by USDA to train wildlife biologists in the surveillance of foreign animal diseases and emerging diseases. The 3-day event was called "Foreign and Emergency Disease Surveillance Training" and was held at the University of Georgia Center for Continuing Education. SCWDS conducted the program with assistance from internationally recognized disease experts. On the third day a test exercise was staged in which wildlife biologists and APHIS officials from 15 states reacted to a hypothetical introduction of FMD into a southeastern deer population. APHIS-VS continues to sponsor this highly successful seminar each year, and wildlife managers and state and federal veterinarians from throughout the country gather in Athens, Georgia, for three days to learn from the world's experts about the wildlife aspects of emergency disease surveillance and response, as well as salient diseases in wildlife.

Unfortunately, exotic disease introductions have not always been hypothetical. Recognizing SCWDS capabilities and the potential role of wildlife in foreign animal diseases, APHIS-VS enlisted SCWDS in the early 1970s to respond to outbreaks of an exotic strain of Newcastle disease among domestic poultry in California and Texas. In 1983-84, SCWDS participated in the task force to eradicate a highly pathogenic avian influenza virus (H5N2) that was killing poultry in Pennsylvania and the neighboring states. In each of these cases, SCWDS worked with state and federal animal health authorities and wildlife biologists to capture and test wild birds in the outbreak areas to determine if they were reservoirs or disseminators of the viruses; fortunately they were not.

An interesting phenomenon revealed through wildlife surveillance during the exotic Newcastle disease outbreak in California in 1972 is of key interest today as the world prepares for a possible influenza pandemic. Capture and testing of wild birds for Newcastle disease virus yielded the first information showing that ducks are major natural reservoirs for the low pathogenicity avian influenza viruses that typically cause mild or no disease. This finding was further explored by scientists specializing in influenza research and has been essential in developing science-based surveillance strategies for the H5N1 highly

continued…

pathogenic avian influenza virus strains that recently have spread through Africa, Asia, and Europe.

SCWDS worked with APHIS-VS on specific disease projects throughout the 1970s and began consecutive annual cooperative agreements in 1979. Although the relationship with APHIS-VS was initiated in the context of emergency response to foreign animal diseases, SCWDS service to APHIS has broadened considerably. Each year a work plan is developed that provides the flexibility to respond to emerging issues while addressing long-recognized disease interactions between wildlife and domestic animals. The SCWDS/APHIS-VS work plan has four primary objectives:

- Assist in preparation and surveillance for foreign and emerging animal diseases
- Develop and disseminate information regarding diseases transmissible between wild animals, domestic livestock, poultry, and humans
- Advise APHIS-VS on wildlife management and its relationship to diseases of domestic animals
- Act as liaison among state, federal, and private sector organizations responsible for the health and well-being of the livestock, poultry, and wildlife resources of the United States

The long-term relationship between SCWDS and USDA has been mutually beneficial and it continues to strengthen and expand. Long-term collaborative projects between SCWDS and USDA's Agriculture Research Service (ARS) continue to investigate the epidemiology of avian influenza viruses in wild birds, the role of wildlife in the natural history of exotic ticks that serve as foreign animal disease vectors, the epidemiology of vesicular stomatitis virus, and other wildlife aspects of significant domestic animal diseases. And in 2004 SCWDS began working with USDA-APHIS-Wildlife Services (WS) under consecutive annual cooperative agreements to train WS personnel involved in disease work with wildlife. At SCWDS we look forward to continuing these collaborative relationships in the interest of domestic animal and wildlife health. (Prepared by John Fischer)

WNV Still With Us: Other Arboviruses May Follow

This summer marks the 8-year anniversary since West Nile virus (WNV) was first detected in the United States. Between 1999 and the end of 2006, 23,967 human cases were reported in the United States. Of these, 959 were fatal. During this same period, WNV was detected in over 57,000 dead birds, 48,000 mosquito pools, and 24,000 equines. During 2006 alone, there were 4,261 human cases of WNV reported from 43 states and the District of Columbia. Additionally, WNV was detected in 4,106 dead birds, 1,086 horses, and 11,898 mosquito pools. These numbers are similar to those reported during 2005, indicating that WNV is still extremely active in the United States. However, due to a combination of factors including, but not limited to, decreased funding for surveillance, general apathy, shifting public health priorities, and the news media's intense focus on highly pathogenic H5N1 avian influenza virus, one would hardly know that West Nile fever/encephalitis continues to kill people, horses, and birds in North America.

The Centers for Disease Control and Prevention (CDC) has always recommended that state and local health departments have functional arbovirus surveillance and response units. However, in 1999, when WNV was first detected in the United States, it rapidly became apparent that despite CDC's earlier recommendation, the infrastructure of arbovirus laboratories in the United States had deteriorated significantly, not only in terms of the total number of functional laboratories, but also in terms of the staffing and financial support for many of the remaining laboratories. In some states the ability to conduct arbovirus surveillance never existed.

Since 1999, Congress has appropriated more than $150M for WNV surveillance by providing the funds to states to restore, supplement, or build sustainable arbovirus surveillance units. Unfortunately, as federal funding for WNV surveillance has declined in recent years, so have

continued…

the surveillance efforts of most states. In many instances this is because surveillance programs are entirely funded with federal money with no state support at all.

It is possible that in many states arbovirus surveillance capabilities and/or efforts will cease once federal supplemental funding ends. This is disturbing because WNV is not the only exotic arbovirus that has been introduced into the United States and there likely will be others in the future. For example, Bluetongue virus 1 (BTV-1) recently was detected in a white-tailed deer in Louisiana. BTV-1 is found in many parts of the world, including Central America and the Caribbean, but prior to 2004 it had never been detected in the United States. It is not known whether BTV-1 has become established here, therefore its significance of to the United States livestock industry or to native wildlife currently is unknown.

Additionally, in 2005-2006 Chikungunya virus, a mosquito-borne virus indigenous to Africa and Asia that causes Chikungunya fever in humans, was detected in the United States in 38 people with international travel history. This virus is naturally transmitted by a mosquito species that currently is found in at least 28 states, making it entirely possible that, given the right circumstances, an outbreak of Chikungunya fever could occur in the United States. Other emerging arboviruses that have the attention of public health and/or agricultural officials include Dengue viruses, Rift Valley fever virus, and the bluetongue/epizootic hemorrhagic disease viruses.

A popular saying at the CDC – "Because we do not know what new diseases will arise, we must always be prepared for the unexpected" - serves to remind us to look for the emerging or re-emerging diseases. This is good advice, but in following it we must also remember to pay attention to the diseases we already have (e.g. West Nile virus). With declining funding and laboratory capacity to detect and control arboviral diseases in the United States, we risk losing the ability to look for the unexpected arbovirus or to keep track of those we already have. (Prepared by Danny Mead)

Avian Influenza Update – Spring 2007

Avian influenza remains in the news, as highly pathogenic avian influenza virus (HPAI) H5N1 continues to affect humans and poultry in parts of Africa, Asia, and the Middle East. As of April 11, 2007, there have been 28 human cases of illness this year, with 14 deaths in six countries: Cambodia (1), China (1), Egypt (4), Indonesia (5), Lao People's Democratic Republic (2), and Nigeria (1). Since 2003, there have been 291 human cases with 172 deaths. Outbreaks in poultry in 2007 have been documented in Japan, in several countries in southeast and central Asia, as well as in Bangladesh, Hungary, Kuwait, Russia, Turkey, and the United Kingdom. This is the first time it has been seen in Japan since 2004. In the United Kingdom a domestic turkey flock was affected in late January, which was the first detection of HPAI H5N1 in the UK since it was found there in wild birds in January 2006.

In late 2005 and early 2006, HPAI H5N1 spread rapidly to the West from Asia and was reported in wild birds in several eastern European countries, as well as Austria, Denmark, France, Germany, Greece, Italy, Sweden, and the United Kingdom. This has not been observed in early 2007; however, the rapid spread of the virus in wild birds, primarily swans and ducks, heightened concerns last year that migratory birds could bring Asian HPAI H5N1 to North America from Asia through Alaska or from Europe through Greenland and into Canada and the Eastern Seaboard.

The sense of urgency regarding the potential introduction of Asian HPAI H5N1 virus strains into North America does not appear to be as great as it was at this time last year. This may be due to the absence of widely publicized outbreaks in wild birds in western Europe during this past winter and spring, unlike 2005-06, and the failure to detect the virus in wild migratory birds in North America after extensive surveillance.

In order to detect the possible introduction of HPAI H5N1, in early 2006 a group representing USDA, the U.S. Department of the Interior (DOI), the U.S. Department of Health and Human Services, and state wildlife management, animal

continued…

health, and public health agencies and associations drafted the *U.S. Interagency Strategic Plan for the Early Detection of HPAI H5N1 in Wild Migratory Birds* (SCWDS BRIEFS Vol. 21, No. 4). Following protocols of the strategic plan, state and federal wildlife biologists have collected and tested samples from wild birds and the environment in all 50 states.

In 2006, USDA-Animal and Plant Health Inspection Service–Wildlife Services (APHIS-WS) initiated cooperative agreements with all 50 state wildlife agencies and native American tribes to facilitate sample collection and submission to laboratories within the National Animal Health Laboratory Network. Through this system, 84,414 wild bird samples and 50,184 environmental samples have been collected to date. In addition, DOI, in cooperation with state wildlife agencies, has collected over 27,000 samples from wild birds, with an emphasis on Alaska. These samples were tested at the National Wildlife Health Center (NWHC) of the U.S. Geological Survey in Madison, Wisconsin.

Highly pathogenic H5N1 avian influenza virus was not detected. However, APHIS-WS and DOI announced 16 presumptive positive and/or confirmatory test results in 2006 for North American H5 and N1 virus strains of low pathogenicity in 10 states. Wild birds, particularly waterfowl, are well-recognized reservoirs of avian influenza viruses of low pathogenicity, and detection of these viruses was expected. The finding of low pathogenicity H5N1 viruses in wild birds originally was announced through press releases; such detections now are announced through publication on the internet and are listed as part of the National Highly Pathogenic Avian Influenza Early Detection Data System (HEDDS) (http://wildlifedisease.nbii.gov/ai/).

HEDDS contains results of sample testing of live birds, hunter-killed waterfowl, birds from mortality investigations, and sentinel birds, as well as samples collected from the environment. As of April 17, 2007, the database contains results for 143,133 samples, which are listed state-by-state. Samples tested from most states generally numbered from 1,000 to 3,000, except Alaska, which totaled more than 21,000. Surveillance is underway for 2007, and further testing will occur throughout the upcoming year. Additional information on avian influenza can be found at the websites of SCWDS (www.scwds.org), APHIS (www.aphis.usda.gov), and the National Wildlife Health Center (www.nwhc.usgs.gov). (Prepared by John Fischer)

Scholarship in Memory of Ed Couvillion

We still grieve for our friend Ed Couvillion as much as we did when he left us so unexpectedly 15 years ago at age 43. He was the best of the best and his death was a tremendous loss to his loving family and his many friends.

Ed was a native of Baton Rouge, Louisiana, and he received his B.S. degree from Louisiana State University in 1971. The next year he entered vet school at Auburn University and completed his D.V.M. degree in 1976. Ed joined the U.S. Army Veterinary Corps and served for two years followed by a short stint in private practice in Monroe Louisiana. He then yielded to a life-long interest in wildlife and joined the SCWDS staff in 1979 as our wildlife disease diagnostician and enrolled part-time in graduate school at the University of Georgia (UGA). Ed completed his M.S. and Ph.D. degrees in parasitology under the direction of the late Frank A. Hayes, Director of SCWDS from its establishment in 1957 until his retirement in 1987.

When he finished his Ph.D. in 1985, Ed accepted a position on the faculty at Mississippi State University (MSU), College of Veterinary Medicine with a connection to the MSU Department of Wildlife and Fisheries. Ed's star shined just as brightly at MSU as it did at UGA, and he shortly became recognized as one of the university's leading researchers in the diseases of wildlife and domestic livestock. One of his last research studies was on the endangered sandhill crane in Mississippi. He received the Dean's Pegasus Award for Research in 1990, the SmithKline

continued…

Beecham Award for Research Excellence in 1991, and the Norden Distinguished Teacher Award in 1992. Because of his dedication to teaching, service, and research, there is no doubt there would have been a great deal more recognition to follow, had he not died on March 8, 1992. At Ed's death, Dean Dwight Mercer said, "Dr. Couvillion was one of our most outstanding researchers. He was a wealth of knowledge, and our students and faculty members were fortunate to have been able to work with and learn from such an exceptional person."

Ed was very dedicated to his family - wife Linda, sons Ben, Joe, Neil, and Steve, and daughter Justine – and he also had an impact on the lives of many others. To recognize his many accomplishments and to honor and perputate his memory, Ed's family recently established the *C. Edward Couvillion, DVM, PhD, Endowed Graduate Scholarship*. This is the first endowed graduate scholarship in the MSU College of Veterinary Medicine Office for Research and Graduate Studies. Efforts are underway to raise at least $25,000 to fully fund the scholarship. The Couvillion scholarship will be awarded each year to a deserving graduate student enrolled in the College of Veterinary Medicine at MSU. The student must be actively involved in research, and those studying parasitology and/or wildlife diseases will be favored. The scholarship is an open fund in the MSU Foundation and may be increased through contributions to the foundation.

Ed had many friends among our readers and we encourage you to contribute to this worthwhile cause. Make your check payable to MSU Foundation, Inc. and inscribe "Couvillion Endowment Scholarship" on your check memo line. Mail to: Mr. Keith Gaskin, College of Veterinary Medicine Development Office, P. O. Box 6100, Mississippi State, MS 39762-6100. For additional information on the Couvillion scholarship, contact Keith Gaskin, College of Veterinary Medicine development director, at 662-325-3815 or email kgaskin@foundation.msstate.edu. (Prepared by Gary Doster, with details on the endowment furnished by Melissa Montgomery at MSU)

Chronic Lead Poisoning in Raptors

On January 19, 2007, a flightless bald eagle was found in Hampton County, South Carolina. It was observed for several days before it was captured and submitted to the International Center for Birds of Prey (ICBP). The adult female was weak and emaciated at the time of submission. Blood lead levels were abnormally elevated at 46 µg/dl. The bird died on January 27, despite supportive care. The carcass was frozen and shipped to SCWDS on January 31, 2007.

At the time of necropsy the emaciated eagle weighed 6.3 lb. The gall bladder was distended with bile, but no other gross lesions were observed. Microscopically a loss of muscle fibers in the heart was evident, with replacement of the damaged muscle by fibrous connective tissue. Degenerative changes also were present in the kidneys. Both the heart and kidney lesions are consistent with the chronic effects of lead toxicosis. The kidneys contained 1.3 ppm lead.

Since 1989, SCWDS has diagnosed 15 cases of lead toxicosis in raptors. Twelve of the cases (80%) were bald eagles. The other cases were a northern harrier, a red-tailed hawk, and a golden eagle. Of 97 bald eagles submitted to SCWDS from 1989 to the present, 12.2% were suffering from lead toxicosis. The bald eagles diagnosed with lead toxicosis were submitted from Alabama, Florida, Georgia, South Carolina, and Virginia. Georgia and South Carolina together represented 75% of the submissions. The majority (87%) of cases occurred from October to March, during and following the fall hunting season.

Lead toxicosis, also known as plumbism, is well documented in waterfowl and other avian species. Due to the toxin's heavy metal characteristics, it is not easily degraded and consequently acts as a cumulative metabolic poison. Chronic lead toxicosis results from the slow corrosion of ingested lead in the acidic environment of the avian digestive tract. Over time, small amounts of lead leach into the blood stream, causing physiologic abnormalities. Chronic exposure to ingested lead can result in clinical signs of weakness, emaciation, ataxia, blindness, and

continued…

seizures. Reproductive, hematologic, and immunologic abnormalities also have been associated with chronic lead toxicosis in birds.

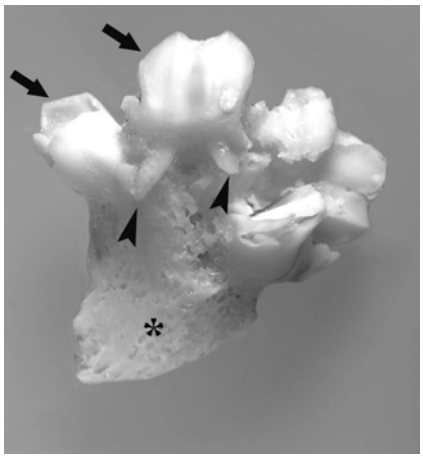
One of the main routes of lead exposure for raptors is the ingestion of live prey or carrion containing lead. Prey may be exposed to lead via ingestion of lead pellets or fishing weights, or implantation of lead pellets in tissue via gunshot. Poisoning of eagles or other raptors that consume lead-laden animals is termed secondary toxicosis. The prevalence of chronic lead toxicosis in raptor species has not been established, but is considered a common global occurrence. The lead itself is rarely evident in the gastrointestinal tract of eagles, although it has been recovered at necropsy in some cases. In 1997, a .40 caliber lead bullet was recovered at SCWDS from the gastrointestinal tract of a bald eagle that apparently had ingested an animal that had been euthanized by gunshot.

In response to continuing reports of lead poisoning of waterfowl and raptors, the U.S. Fish and Wildlife Service began to phase in a ban on the use of lead shot for hunting waterfowl during the 1987-88 hunting season, and in 1991 the ban became nationwide. Some states have additional restrictions on the use of lead shot in designated areas. Following this ban, a decrease in concentrations of lead in the tissues of waterfowl was documented. Despite this decline, previously spent lead shot remains in the environment and continues to serve as a potential source of toxicosis to waterfowl. Additionally, the lead that is used legally in fishing weights, target shooting, and upland game hunting is receiving increased attention from wildlife managers. (Prepared by Bridget Fitzpatrick and Kevin Keel)

Unusual Deer Tumor

During the 2006 fall hunting season in Missouri, a hunter killed a 3.5-year-old male white-tailed deer that had an odd subcutaneous growth on the inner side of the thigh just below the groin. It was visible even before the skin was removed. The mass was removed and delivered to Missouri Department of Conversation personnel who submitted it to SCWDS for diagnosis.

The mass was 5.5 x 4.5 x 1.5 cm and consisted of remarkably well-differentiated teeth and bone. Each of the four teeth had a root and crown, just as a normal tooth would have, and each crown was similar to the shape of the premolar teeth of deer. The roots were embedded in the bone similar to the manner in which the roots of teeth are normally embedded in the jaw.



The crowns of teeth (arrows), tooth roots (arrowheads) and lacy bone (asterisk) are all visible.

The development of normal tissue in an abnormal location is termed a choristoma; in this case it is called a dental choristoma. This mass apparently developed from germ cells that persisted in this location after early embryonic development. Germ cells are normal primordial cells with the ability to differentiate into any type of tissue. They are most abundant in the developing embryo and serve as a source of cells that differentiate into all the major tissues and organs. Occasionally some of these fail to migrate all the way to their intended location and do not cause any problem unless they form a tumor, as in this case. These rests (fragments of embroyonic tissue retained within the adult organism) of germ cells typically are found along or near the midline of the body.

Teeth also are found in masses called teratomas, which usually develop in ovaries. However, as with the choristoma described here, teratomas can occasionally develop in embryonic rests and may be found along the midline of the body, even

continued…

in males. A teratoma differs from this dental choristoma in that it includes other tissue types, frequently brain, hair and epithelial structures.

Choristomas are very rare and do not pose any threat to human health or to deer populations as a whole. As far as is known, they develop spontaneously. (Prepared by Kevin Keel)

Kevin Keel Receives Award

We are proud to announce that Dr. Michael Kevin Keel is this year's winner of the Young Achiever Award presented annually by the Alumni Association of the University of Georgia's College of Veterinary Medicine. The award was given to Kevin "for excellence in veterinary medicine, community involvement and active support of the Alumni Association."

Kevin is a native Georgian and earned undergraduate and graduate degrees and a D.V.M. at the University of Georgia - B.S. 1990, M.S. 1993, and D.V.M. 1997. Dr. Randy Davidson served as Kevin's major professor for his M.S., and Kevin was associated with SCWDS from 1991 until he completed his D.V.M. in 1997. After a 3-year residency at the University of California-Davis, Kevin went on to earn a Ph.D. at the University of Arizona and in 2003 he became certified as a veterinary pathologist by the American College of Veterinary Pathology. We welcomed Kevin back home in October 2004 when he accepted a position on the SCWDS faculty.

With his many former achievements and awards, it is not surprising that Kevin has received this recognition and we anticipate more in the future. Congratulations, Kevin! (Prepared by Gary Doster)

New Edition of Wild Bird Diseases Book

Recently emerging diseases and new zoonotic forms of older diseases have brought increasing global attention to the health of wild bird populations. Recognition and management of these diseases is a high priority for all those involved with wildlife health. Therefore, it is very timely that the second edition of *Infectious Diseases of Wild Birds* has just become available. Years in the making, it provides wildlife health professionals and researchers with a comprehensive reference on biotoxins and infectious viral, bacterial, and fungal diseases affecting wild birds. It tremendously expands and updates the first edition that was published in 1971 and is long out of date. Although the first edition included parasitic diseases, there is too much new information to treat both topics in a single volume. Therefore, the current edition does not include parasitic diseases, which are being compiled into a separate text that will be available at a later date.

The book is comprised of 23 chapters written by leading researchers and experts from around the world and was edited by Drs. Nancy Thomas, D. Bruce Hunter, and Carter T. Atkinson; all well-known wildlife disease scientists. Four chapters were authored by SCWDS staff members. The chapters address major diseases, their history, and the significance and impact of the diseases on wild populations and include discussions on disease processes and epidemiology.

The price for this 496-page text is $89.99. It can be ordered from Blackwell Publishing, 2121 State Avenue, Ames, IA 50014-8300, by calling 800-862-6657, or by visiting the publisher's website at www.blackwellpublishing.com. (Prepared by Page Luttrell)

SCWDS BRIEFS

Southeastern Cooperative Wildlife Disease Study
College of Veterinary Medicine
The University of Georgia
Athens, Georgia 30602-4393

RETURN SERVICE REQUESTED

Nonprofit Organization
U.S. Postage
PAID
Athens, Georgia
Permit No. 165