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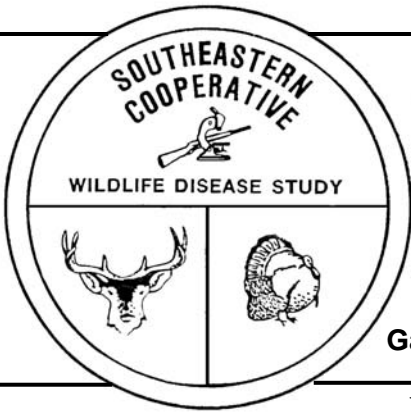
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SCWDS BRIEFS

A Quarterly Newsletter from the
Southeastern Cooperative Wildlife Disease Study
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Geese as Sentinels for AIV

During the past two years, we have been evaluating Canada geese as sentinels for detecting areas where avian influenza virus (AIV) transmission is occurring by comparing the prevalence of AIV antibodies in Canada geese to prevalence of AIV isolated during previous studies on dabbling ducks. Serum samples from 3,207 Canada geese were collected with the assistance of numerous state and federal wildlife agencies during the summers of 2008 (947) and 2009 (2260) from nine states (Georgia, Massachusetts, Minnesota, Mississippi, New Jersey, North Carolina, Pennsylvania, Washington, and West Virginia). Each sample was analyzed for antibodies to AIV using two serological assays: the agar gel immunodiffusion (AGID) assay, and a commercially available blocking enzyme linked immunosorbent assay (bELISA). We have previously shown that the bELISA has greater sensitivity for AIV antibodies in numerous avian species when compared with the AGID assay (see *SCWDS BRIEFS* Vol. 25, No. 4). The samples collected in 2008 were tested using both assays to determine agreement and sensitivity of the bELISA. When the results were negative, the two assays were 91% in agreement; however, with positive samples, the bELISA detected significantly more positives than the AGID assay, which is consistent with our previous comparisons.

When we evaluated the geographic origins of the 481 samples from 2008 and 2009 that had AIV antibodies, we found an increasing trend in AIV exposure with increasing latitude. This corresponds with the greater prevalence of viral shedding documented in dabbling ducks on northern breeding areas (>10%) than on southern wintering grounds (1%-2%) in the

northern hemisphere. And when we analyzed geographic origins of the Pennsylvania samples collected in 2009, we found that Canada geese sampled in urban areas were 3.2 times more likely to be exposed than those sampled from rural areas.

Collectively, these findings suggest that Canada geese can serve as effective sentinels for regional transmission of AIV. To further refine and evaluate this surveillance system, we recently became partners with the Center of Excellence for Emerging Zoonotic and Animal Diseases at Kansas State University, which is funded through the Department of Homeland Security. Over the next three years we will continue to examine transmission of AIV among Canada goose populations throughout the United States. In addition, we will investigate possible local effects on the transmission of AIV, such as movement of flocks, urbanization, and interactions with other avian species. (Prepared by Whitney Kistler and Michael Yabsley).

Feral Swine Issues Survey

Feral swine control programs and the shooting of "wild" swine behind high fences are of growing concern to natural resource managers, animal health agencies, domestic animal and crop producers, and others. In 2005, the Association of Fish and Wildlife Agencies (AFWA) (comprised of the fish and wildlife agencies of all 50 states and the federal government and provinces of the United States, Canada, and Mexico) passed a resolution urging the president and congress of the United States to adequately fund efforts to control feral swine because of their detrimental impacts. Because the resolution was adopted only after considerable debate and disagreement, AFWA surveyed its member agencies regarding the

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status and management of feral swine in order to develop background information for a “white paper” and a possible position statement or additional resolution regarding feral swine.

The survey was administered in 2009, and responses were obtained from 43 state and six Canadian provincial wildlife agencies. Several questions were answered only by state/provinces that have free-ranging feral swine or shooting of fenced “wild” swine, so the respondent numbers vary with individual questions. The following summarizes responses that addressed distribution, impacts, jurisdiction, and policy.

Regarding feral swine distribution and impacts:

- Twelve states/provinces (25%) did not have feral swine and two had feral or “wild” swine only in captivity.
- Feral swine populations were classified as localized (19), regional (9), or state/province-wide (7).
- In 35 states/provinces with feral swine, populations were increasing in 63%, stable in 20%, and decreasing in 17%.
- The most commonly identified problems when multiple responses were allowed were habitat damage (91%), agricultural damage (89%), disease spread (89%), and competition/predation of native wildlife.
- The most important problems selected by the most respondents were habitat damage (37%), followed by disease (26%), and agricultural damage (20%).

Regarding jurisdictional issues:

- 71% had authority over feral swine or shooting swine behind high fences.
- 48% allowed shooting swine behind high fences in their state/province.
- Wildlife agencies had primary management authority for feral swine in 48% of responses, followed by agriculture agencies in 22%. (Remaining respondents said some other agency is responsible or jurisdiction is shared).
- Primary jurisdiction over shooting swine behind high fences rested with the wildlife agency in 45% of the responses and with the agriculture agency in 31%.

Regarding management of feral swine by wildlife agencies:

- Classifications for feral swine ranged from game animal to exotic, agricultural, or nuisance species. No single classification was selected by more than 25% of respondents, and the most common response was “other.”
- Feral swine are managed as a nuisance species by 74% of respondents with feral swine populations, but only 29% of all 49 respondents had a management plan specifically for free-ranging feral swine.
- A hunting permit is required to hunt free-ranging feral swine by 15 of 35 (43%) states/provinces with populations.
- Many agencies could not quantify annual swine-related license revenues, but the highest estimate was \$900,000, and the highest number of estimated hunters was 100,000. However, no agencies indicated that free-ranging feral swine had a positive economic impact, six agencies indicated positive and negative impacts, and six were not sure. Overall impacts were considered negative by the remaining 21 respondents.

Regarding future policies concerning feral swine and feral swine shooting enclosures:

- Legislation regarding free-ranging swine management or shooting swine behind high fences is being considered or being planned in 15 of 31 state/provinces responding.
- Management efforts were divided nearly evenly between limiting shooting behind fences, controlling free-ranging populations, and prohibiting release of swine in the wild.
- Most agencies are opposed to having populations of feral swine in the wild, shooting feral swine behind high fences, transporting feral swine, and they discourage licensed hunting of feral swine.
- A minority of respondents supported adopting a new AFWA resolution (stronger or weaker) to replace the current resolution.

The variety of answers to nearly every question in the survey reflects the complexity of feral swine issues across North America. One of the rare unanimous responses was that none of the agencies regarded free-ranging feral

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swine as providing an overall economic benefit to their state or province. However, the classification of feral swine in some jurisdictions as game animals that may provide up to \$900,000 in annual hunting license revenues, while most other states and provinces manage feral swine as a nuisance species, is a strong indication of the disparity of opinions and approaches to the presence of feral swine. These results suggest that it could be very difficult to reach consensus among the jurisdictions when it comes to setting policies and managing feral swine. (Contributed by Alan G. Clark, Assistant Director, Utah Division of Wildlife Resources)

A Spate of Footrot

Deer feet are remarkable in that they support all of the animal's weight on a small surface area and endure all sorts of rough terrain. Consequently, they are not immune to injury and infection, and we occasionally receive reports of various anomalies and lesions in deer feet. During the winter of 2009-2010, we received a flurry of such reports regarding deer over a large area of the country. Most cases came from the Midwest. One such example came from a hunter-killed Kansas deer with deep ulcers on the rear feet. One foot was delivered to personnel with the Kansas Department of Wildlife and Parks, who sent it to SCWDS for examination.

When we removed the skin just above the lateral side of the foot, only dried, bare connective tissue was visible (figure, arrows).



Just above the lateral dewclaw, the skin had lost a significant amount of hair and was darkly pigmented (the skin has been removed in the

image provided). The tissue underneath this area was soft and fluctuant, and when it was incised an abscess approximately 3.5-cm-diameter was revealed (figure, asterisk). The connective tissue and ligaments around the abscess were severely inflamed. In addition, the tissue beneath the hoof walls was necrotic, and the hoof walls were loosely attached.

A pure culture of *Fusobacterium necrophorum* was isolated from the abscess. This is an anaerobic bacterium commonly associated with foot and oral lesions in domestic ruminants, but infection of internal organs also occurs. The disease has been known by many names, but "footrot" is most commonly used, although that is a less specific term, and other bacteria can contribute to footrot, with or without *F. necrophorum*. Necrobacillosis is the term used when the condition is due exclusively to *F. necrophorum* infection.

Although isolated cases occur in a variety of species, the disease typically occurs in large outbreaks. Predisposing conditions include high densities of animals (as around focal sources of feed) or wet conditions that soften the feet and permit bacterial invasion. *Fusobacterium necrophorum* is a commensal organism of the gastrointestinal tract and can be shed in the feces. Thus, high densities of animals results in increased environmental contamination by bacteria and increases the likelihood that an outbreak will occur. The bacterium does not produce a spore form but is environmentally hardy. If the animals congregate in a wet environment, the likelihood of the occurrence of necrobacillosis, or footrot, is greatly increased.

The bacteria produce toxins that cause necrosis of the tissues, encourage production of an anaerobic microenvironment conducive to further bacterial growth, and protect against the host inflammatory response. Co-infections with other bacteria are common (although not evident in this case), and such co-infections can exacerbate the disease.

Details of the conditions that resulted in what seemed to be multiple cases of necrobacillosis last winter were never fully apparent, however, the time of year may have been a factor. Many of the cases were observed in late fall and early

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winter, when deer may have been congregating around whatever food sources they could find. Previous outbreaks have been associated with water holes, penned deer in wet conditions, or gathering together at feed sites.

We thank the personnel with the Kansas Department of Wildlife and Parks who submitted this excellent case material, and we thank all the other individuals who submitted e-mails and photos describing similar cases in the past year. (Prepared by Kevin Keel)

Some Recent SCWDS Awards

Dr. Dawn Roellig was the winner of the prestigious Ashton Cuckler New Investigator Award given at the 85th Annual Meeting of the American Society of Parasitologists (ASP) in Colorado Springs, Colorado, in June 2010. The award is presented to a graduate who has completed an MS or PhD degree in parasitology within the past two years. The award consists of travel and accommodation expenses to the annual meeting of the ASP and \$2,500 cash. Dawn received her PhD in 2009 for her work on *Trypanosomi cruzi*, the protozoan parasite that causes Chagas disease in humans and a number of other mammalian species, most commonly the domestic dog. Her research was conducted under the direction of Dr. Michael Yabsley, and her dissertation is entitled "Molecular and Biologic Characterization of *Trypanosomi cruzi* from the United States of America." She currently is working as a Research Fellow with the U.S. Centers for Disease Control and Prevention in Atlanta, Georgia, and is conducting research on *T. cruzi* in Peru, South America.

Dr. Taiana Costa won the Terry Amundson Student Presentation Award at the 59th Annual Meeting of the Wildlife Disease Association held in Puerto Iguazu, Argentina, May 31-June 4, 2010. The title of her paper was "Effect of Homo- and Heterosubtypic Low Pathogenic Avian Influenza Exposure on Highly Pathogenic Avian Influenza H5N1 Virus Infection in a Highly Susceptible Host." This award is given at the annual meeting of the WDA each year to acknowledge the most outstanding oral presentation of research findings by a graduate student. Dr. Costa holds a veterinary degree

from her home country, Brazil, and presently is completing the requirements for her PhD degree at UGA under the direction of Dr. Buffy Howerth.

Congratulations to Dawn and Taiana. We are proud of your achievements and wish you well in your future endeavors. (Prepared by Gary Doster)

Some Worthwhile Causes

From time-to-time we bring to your attention some programs of merit that we support and ask that you consider supporting them as well. At this time, we want to revisit three such projects.

Tom Thorne & Beth Williams Memorial Fund:

In the July 2005 issue of the *SCWDS BRIEFS* (Vol. 21, No. 2), we reported that the Wildlife Disease Association (WDA) and the American Association of Wildlife Veterinarians (AAWV) had established a memorial fund honoring Drs. E. Tom Thorne and Elizabeth S. Williams. Tom and Beth's contributions to wildlife health research and wildlife veterinary medicine are legendary, and the fund is used to endow an award named for the husband and wife team. It is given "in acknowledgment of an exemplary contribution either combining wildlife disease research with wildlife management policy implementation, or elucidating particularly significant problems in wildlife health." Tom and Beth died in a tragic automobile accident on December 29, 2004.

Anyone who wishes to make a contribution to this joint WDA/AAWV memorial fund can send a check to the WDA at P.O. Box 1897, Lawrence, KS 66044, or to AAWV Treasurer Dr. Mark Drew with the Idaho Department of Fish and Game, 16569 S. 10th Ave., Caldwell, ID 83607.

Ed Couvillion Scholarship Fund:

In the April 2007 issue of the *BRIEFS* (Vol. 23, No. 1), we reminded you of the untimely death of our dear friend Ed Couvillion, who died in 1992 at age 43, and told you about the establishment by his family of the *C. Edward Couvillion, DVM, PhD, Endowed Graduate Scholarship*. This is the first endowed graduate

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scholarship in the Mississippi State University College of Veterinary Medicine Office for Research and Graduate Studies. Efforts were aimed at raising at least \$25,000 to fully fund the scholarship. Even though the final goal has not been reached, the Couvillion Scholarship has been awarded each of the last four years to a deserving graduate student who has presented his or her research at national and international veterinary meetings. To qualify, the student must be enrolled in a PhD program at the College of Veterinary Medicine at MSU and must be pursuing a graduate degree as his or her primary focus; those studying parasitology and/or wildlife diseases are favored. The benefactor for 2010 is Dr. Gail Moraru, who is conducting research on the Gulf Coast tick, *Amblyomma maculatum*, the vector for *Rickettsia parkeri* in wild rodents and birds, with implications for both veterinary science and public health.

Ed was very dedicated to his family – wife Linda, four sons, and one daughter – and he also had an impact on the lives of many others. Ed had many friends among our readers and we encourage you to contribute to this worthwhile cause. Checks should be made payable to MSU Foundation, Inc., identified as being for the Ed Couvillion Scholarship Fund, and mailed to: Melissa Montgomery, Office of Development, College of Veterinary Medicine, P.O. Box 6100, Mississippi State, MS 39762-6100. Or contact Keith Gaskin at 662-325-3815 or kgaskin@foundation.msstate.edu.

Southeastern Wildlife Health Development Fund:

The Southeastern Wildlife Health Development Fund was started several years ago to establish a funding base to help SCWDS achieve its long-term goals. SCWDS is constantly vulnerable to budget upheavals in both state and federal governments because we depend largely on annual contracts from supporting state and federal agencies. This makes long-term scientific studies and personnel continuity more challenging. Large gifts can be placed in trust to provide sustained support. For example, the principal from previous gifts is preserved, and accumulated interest can be used to supplement the salary of

a graduate student or to support pilot research projects.

Such contributions are vital to help SCWDS continue to serve wildlife resources and the agencies and individuals that manage them. Our ultimate goal is to use gifts to endow permanent SCWDS graduate student and faculty positions. We thank our previous donors and encourage other SCWDS friends to consider a contribution. All contributions are appreciated. And, of course, all gifts are tax deductible. For more information please contact SCWDS Director Dr. John Fischer. (Prepared by Gary Doster)

Personnel Changes

We are losing some top quality people who are moving on to “greener pastures,” but some more first class folks are coming in to replace them.

After a one-year post-doctoral position as a wildlife disease diagnostician and coordinator of our chronic wasting disease testing service, Dr. Steven Kubiski recently started a three-year pathology residency at the University of California at Davis. Steven’s position has been filled by Dr. Brandon Munk, who just received his DVM degree at Colorado State University in May 2010.

Brandon received an undergraduate degree in biology at Colgate University in 1999 and completed his masters on mating system evolution through the Department of Zoology and Physiology at the University of Wyoming in 2006. Brandon gained experience in a variety of professional fields throughout his education and has traveled a great deal, including stints in Australia and Thailand.

After nearly three years of excellent service to SCWDS, we are sorry that Deena Lopez has left us and is returning to Brooklyn, New York. Deena was an integral member of our laboratory staff and was responsible for processing many thousands of samples submitted to SCWDS for chronic wasting disease testing. Deena wants to enter graduate school and continue her career. Taking over for Deena is Beth Stelzleni.

Beth received an associate degree in science from Santa Fe Community College in Gainesville, Florida, in 2002. She graduated from the University of Florida *cum laude* with a BS degree in Animal Science in 2004. She stayed on and completed her MS degree in Animal Science in 2006. From September 2007 to February 2010, Beth worked as an equine nutritionist and came to the University of Georgia in February 2010 to accept a temporary job as a research assistant in another department.

Andrea Howey-Newcomb finished her graduate degree in wildlife management at the University of Pretoria in South Africa in 2004 and went to work for Tri-State Bird Rescue & Research (TSBRR), a nonprofit conservation organization dedicated to wild bird rehabilitation headquartered in Newark, Delaware. TSBRR is best known for the rescue and rehabilitation of wildlife affected by oil spills. After four years as the Senior Clinic Supervisor at TSBRR, Andrea came to work at SCWDS in August 2008 as a Research Technician. At SCWDS, Andrea has worked on several projects, including collecting samples from waterfowl, passerines, and shorebirds for avian influenza research; mist netting wild birds and collecting fecal samples for *Salmonella* research; and assisting on deer herd health evaluations. Andrea has accepted a temporary job with her old employer, TSBRR, to help out with the oil spill in the Gulf of Mexico. She will be stationed in Venice, Louisiana.

After a two-year program of study under Dr. Michael Yabsley, Dr. Aaron Hecht has completed the requirements for his master's degree and has taken a job as the first wildlife veterinarian hired by the Kentucky Department of Fish and Wildlife Resources (KDFWR). Aaron's research focused on the distribution of epizootic hemorrhagic disease virus serotype 6 among free-ranging white-tailed deer in the United States. Aaron will be stationed at the main office in Frankfort, and will be working with all divisions of the KDFWR. As an employee of one of SCWDS's original member states, we expect to enjoy regular contact with Aaron in the future.

Dr. Nicole Nemeth began a three-year pathology residency on July 1 with SCWDS and the Pathology Department at the University of

Georgia's College of Veterinary Medicine. Nicole received her BS degree from Grinnell College in Louisiana in 1995. She received her DVM and PhD degrees from Colorado State University in 2004 and 2008, respectively. Nicole served an externship at SCWDS during the summer of 2003 when she was a senior in veterinary school. For her PhD research, Nicole designed and conducted research on West Nile virus (WNV) in birds. After graduation, Nicole worked for USDA's National Wildlife Research Center, where she was involved in research on low pathogenicity avian influenza viruses in mammals and birds. With an enviable record of work experience, publications, professional presentations, and awards and recognition, she comes to us more than well qualified, and we are fortunate and pleased that she has decided to return and become a member of the SCWDS "family."

Another "new kid on the block" is Dr. Maria Araujo Teixeira from Brazil. Maria is a tenured professor at the Universidade Federal de Mato Grosso do Sul, where she earned her undergraduate degree in veterinary medicine. She also holds MS and PhD degrees from the Universidade de Sao Paulo at Sao Paulo. Maria is spending an 18-month sabbatical at SCWDS to work with Dr. Michael Yabsley in developing a research program on *Trypanosoma cruzi*. She has an impressive array of publications, presentations, and awards, and has served in an advisory capacity for numerous graduate students. It will be a pleasure to have her with us.

In addition to all the newcomers, we have two students – Barbara Shock and Whitney Kistler – who recently completed their MS degrees under the direction of Dr. Michael Yabsley and are staying on to earn their PhD degrees with Michael.

For her master's research, Barbara conducted comprehensive research on the distribution and prevalence of the protozoan parasite *Cytauxzoon felis* among bobcats and cougars in much of the United States. Through the generous cooperation of many individuals in 14 states, Barbara collected samples from 698 bobcats (13 states) and 7 cougars (3 states) and used molecular methods to differentiate between the strains of *C. felis* she found. Barbara hasn't

settled on a research project for her PhD, but it will be some form of vector-borne disease investigation.

Whitney's research also ranged over a large expanse of the country, securing blood samples from Canada geese from nine states: Georgia, Massachusetts, Minnesota, Mississippi, New Jersey, North Carolina, Pennsylvania, Washington, and West Virginia. The title of his thesis is "Evaluation of Canada Geese as Sentinels to Detect Transmission of Avian Influenza Viruses." Whitney intends to expand this project for his PhD research.

We welcome our new students and staff members to SCWDS and wish our outgoing folks all the best. (Prepared by Gary Doster)

Recent SCWDS Publications Available

Below are some recent publications authored or co-authored by SCWDS staff. Many of these can be accessed online from the web pages of the various journals. If you do not have access to this service and would like to have a copy of any of these papers, let us know. Many can be sent to you electronically with minimum effort; others will be mailed to you. For your convenience, please indicate requested publications, fill out the form on page nine, and check the appropriate box to receive either an electronic copy or a hard copy and return it to us: Southeastern Cooperative Wildlife Study, College of Veterinary Medicine, University of Georgia, Athens, GA 30602.

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