National Wildlife Disease Surveillance and Emergency Response Program

THE CARRIER

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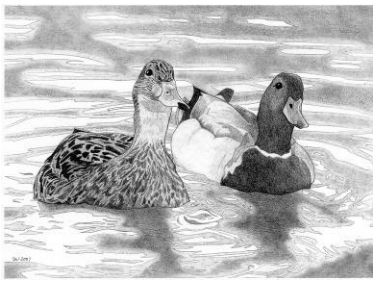

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COORDINATOR COMMENTARY

By Dr. Thomas DeLiberto

I wish to thank all of the participants who made this year's NWDP Emergency Response and Surveillance Preparedness Training a huge success. I especially want to thank our guest speakers from WS-NWRC, APHIS ESF-11/Dispatch desks, APHIS Safety Officers, APHIS IS Mexico Office, CIIDIR-National Polytechnic Institute, the CDC, the Native American Fish and Wildlife Society, Colorado State University, and Wildlife Trust. With their help, we provided our Wildlife Disease Biologists training in One Health, disease surveillance, emergency response, and biological risk management, as well as providing their annual respirator fitted-testing requirements. At this year's meeting, we introduced the Wildlife Disease Biologist of the Year Award. The first recipient of this award was Paul Wolf (MN). Paul's energy, enthusiasm, dedication, and attention to detail during surveillance and emergency response activities exemplify the excellence we all strive to achieve. The award itself is an engraved plaque with artwork created by Sarah Norton, a biological technician with the NWDP. Her original drawing will be framed and placed in the program office, with a plaque of each year's recipients.

In April, we began implementing the Wild Bird HPAI Early Detection System for the 2009 Biological Year. Although the threat from HPAI H5N1 still exists, it was another influenza virus, H1N1, which has been of most concern over the last several months. Recently the WHO raised the worldwide pandemic alert level to phase 6, indicating a global pandemic is underway with more than 70 countries reporting cases of human infection with the novel H1N1 flu. Currently, no animal reservoir of the H1N1 flu virus has been found.

Over the last few months the NWDP has been meeting with the Centers for Disease Control to review our collaborative sylvatic plague and tularemia surveillance projects. Over the last five years, we have obtained a wealth of data on the distribution of these diseases in various wildlife species. This information will be used to develop scientific reports on the diseases and to enhance our surveillance activities by targeting species and regions that will produce valuable information in protecting wildlife and human health. These projects, along with others such as the HPAI Early Detection System, typify the capa-

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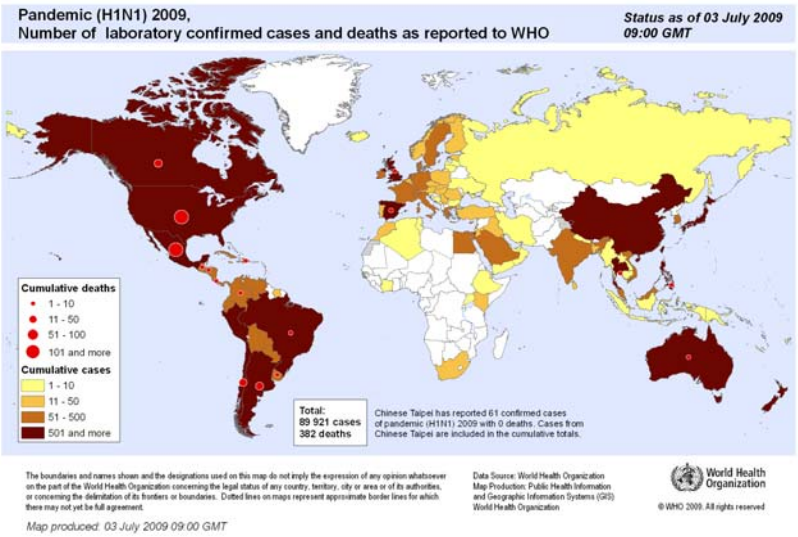
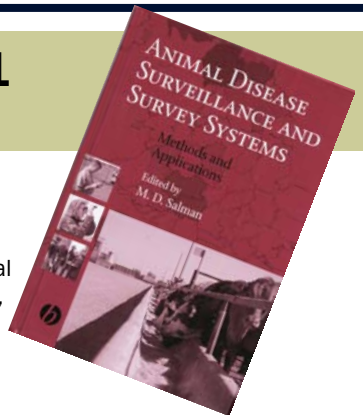


The wildlife drawings on this page are original artworks created by the National Wildlife Disease Program's Administrative Support Assistant Erika Kampe (prairie dog) and Wildlife Technician Sarah Goff (ducks).

Disease Surveillance Terminology 101

By Seth R. Swafford and Dr. Sarah Tomlinson



Wildlife biologists and veterinarians often use terminology that is variable between the fields of study and might cause confusion. Terminology describing disease surveillance needs to be standardized and well understood, especially when wildlife disease biologists are working with domestic animal veterinarians. The purpose of this article is to clarify some of the commonly used terms and describe how they are applied in Wildlife Services' (WS) daily activities.

From a compilation of surveillance references, *surveillance* can be described as: the ongoing systematic collection, collation, analysis, and interpretation of data and dissemination of information to those who need to know so that a directed action can be taken. Purposes of surveillance are rapid detection of introduced diseases and emerging issues, monitoring and providing actionable information for endemic diseases, and measuring regional prevalence of trade-significant diseases. Similarly, *monitoring* [1] is defined as the ongoing assessment of the health and disease status of a population through routine observations. The purpose of monitoring is to collect information on health, productivity, and environmental factors that influence disease status. A key difference between surveillance and monitoring is that surveillance leads to an action or a decision. Another key difference is that monitoring is often a longer-term investment which can take years to assess trends in incidence or prevalence.

The comprehensive feral swine disease surveillance project provides examples of surveillance and monitoring. WS biologists collect samples from feral swine to provide an early warning if classical swine fever was introduced in the US. The resulting action would be an attempt to stamp-out the virus or at least enhance surveillance to provide epidemiological data for the outbreak. This information would also lead to an adjustment in domestic swine management practices.

Data collected from pseudorabies and swine brucellosis testing is considered monitoring, because trends are being assessed and an action rarely exists if a detection is made in feral swine. The plague and tularemia projects in WS are mainly examples of monitoring. Data collected for these projects are important to understand changes in prevalence and distribution. However, on some occasions, these projects are designed to investigate die-offs of wildlife, and the result or action may be the application of a pesticide or increased awareness for human symptoms.

Surveillance can be further described as passive or active surveillance. *Passive surveillance* [1] can be defined as watching for disease or a change in health status and reporting if it is observed. Passive surveillance is often incorporated into routine activities, with someone reporting the occurrence of an unusual event or suspect observation. *Active surveillance* [1] is exactly how it sounds—more active. Active surveillance can be observational, when a trained individual is actively watching for disease or clinical signs with a pre-determined action planned if disease exceeds expected levels or clinical signs are noted. Unfortunately, to add to the confusion, passive surveillance is used synonymously with monitoring. However, these terms do not have to be equal. Again, it is the purpose and the action to be taken that distinguishes between surveillance and monitoring.

Surveillance for highly pathogenic avian influenza in wild, migratory birds has both passive and active components. The passive component is the investigation, documentation, and reporting of bird die-offs when observed. The active surveillance components are those in which wild bird or environmental samples are collected and subsequently tested for avian influenza.

One method for applying active surveillance is risk-based or targeted surveillance. This refers to how surveillance is designed. Populations are selected for surveillance based on their risk of disease; there is an increased probability of detecting disease in these populations, should it exist. An example of targeted surveillance is the testing of wild birds that commonly maintain the low pathogenic avian influenza reservoir. Moribund or dead birds are also targeted for surveillance purposes and subsequently tested after a field investigation is conducted. A third example of risk-based surveillance is the testing of feral swine for classical swine fever around landfills and international airports, which have been identified as possible points of entry of some foreign animal diseases.

While all of this may seem like semantics, these terms are best related to the purpose and objectives of an animal health project. Both monitoring and surveillance are integral in informing disease status and guiding decision making for both animal and public health.

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[1]Salman MD, Ed. 2003. Animal Disease Surveillance and Survey Systems: Methods and Applications. Blackwell Publishing, Ames.

(Coordinator Commentary, Continued from page 1)

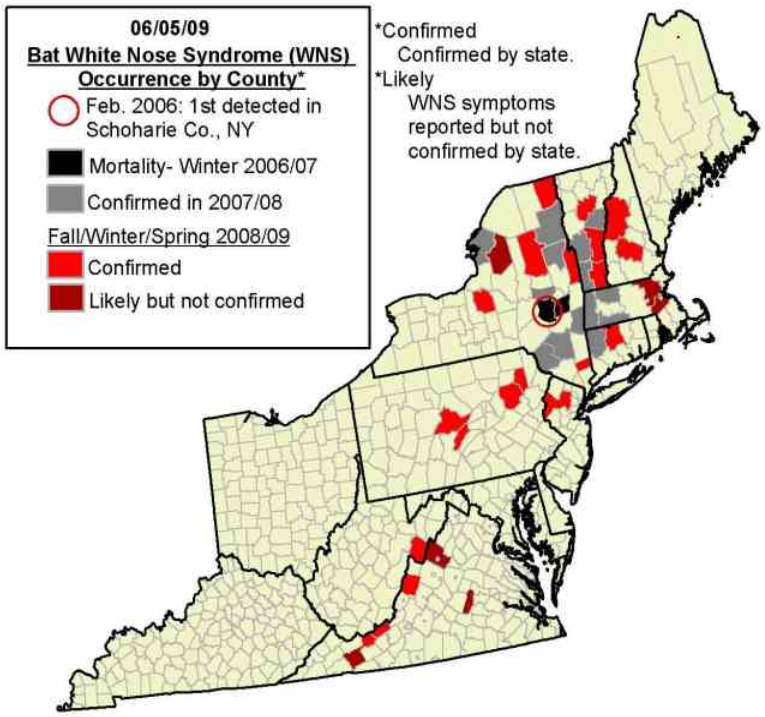
bilities of the NWDP in collaboratively designing and implementing disease surveillance systems supporting One Health programs.

In this issue, we have included articles co-authored by Veterinary Services scientists. This is the first time we have had colleagues outside the NWDP develop articles for the Carrier, and I hope to include guest articles in future issues. Any thoughts on potential guest writers, as well as suggestions for improving the Carrier would be greatly appreciated.

Update on White-nose Syndrome in Bats

By Dr. C. LeAnn White and Dr. Joe N. Caudell

White-nose syndrome (WNS) was named for the characteristic white fungus that appears on muzzle, ears, and/or wing membranes of affected bats. The first case of WNS was identified in February 2006, in Howes Cave located approximately 50 miles west of Albany NY (Blehert et al. 2009). Since the winter of 2006-2007 bat declines of more than 75% (90 – 100 % in some cases) have been observed in several surveyed hibernacula (Blehert et al. 2009). It has been estimated that several hundred thousand bats with WNS-symptoms have died (Cohn 2008). The majority of cases and deaths have been in little brown bats (*Myotic lucifugus*) (Cohn 2008). The symptomatic white fungus has also been observed in northern long-eared bats (*M. septentrionalis*), Indiana bats (*M. sodalis*; federally endangered species), big brown bats (*Eptesicus fuscus*), tricolored bats (*Perimyotis subflavus*) and small-footed bats (*M. leibii*). As of March 2009 WNS cases have been confirmed in bats from Connecticut, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Virginia, Vermont, and West Virginia (Figure 1; Gargas et al. 2009).



The characteristic white fungus, which has been isolated from several bat species, has recently been identified as a new species of *Geomyces*, which has been named *Geomyces destructans*. Species in the *Geomyces* genus are psychrophilic (capable of growing in cold climates) and the optimal growth parameters fungus seems to be temperatures between 5° and 10°C (Blehert et al. 2009) and humidity levels >90%. Therefore, caves and other bat hibernacula may serve as excellent reservoirs for year-round maintenance of the fungus. Although *G. destructans* has not been confirmed as the etiological agent of WNS (i.e., fulfilled Koch's postulates), is it the leading hypothesis for the cause of WNS. During bacteriological and virological (including rabies) analyses, examination of intestinal tracts for disease-causing parasites, and gross and microscopic examination of internal organs for gross lesions, no known pathogens common to a large percentage of the WNS-affected bats has been found (Blehert et al. 2009). The pattern of fungal skin penetration by *G. destructans* has been consistent among more than 90% of the bats submitted for disease investigation from the WNS-affected region.

Cases of WNS are currently being confirmed through gross and histological examination of symptomatic bats. Upon gross examination, affected bats exhibit a cutaneous infection consisting of fungal hyphae (vegetative portion of fungus) and distinctive asymmetrically curved conidia (asexual spores of fungus) of *G. destructans* on their muzzles, wings membranes, and/or ears. Histological examination reveals fungal hyphae that fill hair follicles and sebaceous glands of affected bats and penetrate into surrounding tissues (Blehert et al. 2009; Gargas et al. 2009). Interestingly, the fungus does not typically solicit inflammation or an immune response in the infected tissue of hibernating bats (Gargas et al. 2009).

In addition to the visible white fungus, WNS-affected bats also appear severely emaciated; although the exact mechanism is unknown, a leading hypothesis is that WNS results in aberrant hibernation behaviors resulting in emaciation. For example, many of the affected bats emerge from hibernation before the end of winter and die in their caves (many affected bats have been found at cave entrances) or leave (presumably) to begin hunting for food when there are few if any insects available (Cohn 2008). Therefore, WNS may lead to a depletion of fat reserves during hibernation (Cohn 2008, Blehert et al. 2009). Research on how WNS may cause depletion of fat reserves during hibernation includes examination of immune response, metabolic rates, and frequency and duration of arousals during hibernation of WNS-affected bats. Another hypothesis is that WNS may affect fat stores in bats before hibernation (e.g., not finding enough food to build sufficient fat stores (Rush 2009). Current research on how WNS may affect bats before hibernation includes comparison of intestinal flora of affected and non-affected bats and comparison of pre-hibernation body condition with historical body condition data. Other important research areas currently being investigated include whether WNS can be transmitted through direct contact and/or the environment.

Current research on the origin of the fungus includes investigating whether a fungus in Europe, observed on the faces, ears, and wings of bats but which does not cause mortality, is connected to *G. destructans*. It is also possible that the fungus was already present in North America (*Geomyces* spp. are common in caves) but has recently mutated resulting in a new infectious agent. Although fungal infections generally occur as secondary infections in mammals (e.g., invading once the animal has been nutritionally or immune

(Continued on page 4)

Field Skills: Necropsy and Biological Specimen Collection

By John Baroch

In June, Wildlife Services (WS) National Wildlife Disease Program (NWDP) sponsored its 6th annual 3-day workshop on necropsy and biological specimen collection at WS National Wildlife Research Center (NWRC), in Fort Collins, Colorado. The course was designed and presented by a staff of wildlife veterinarians and pathologists from the Southeastern Cooperative Wildlife Disease Study (SCWDS), affiliated with the University of Georgia.

The blended learning format included brief lectures on avian and mammalian necropsy, specimen collection and sterile techniques, emergency response to disease outbreaks, biosecurity, shipping procedures and regulations, laboratory diagnostics, avian influenza, and feral swine diseases. The morning lectures were followed by demonstrations and hands-on practice in necropsy and sample collection. On the final day, participants divided into small teams for a mock emergency response exercise. The teams were presented with an infectious disease outbreak scenario at a local farm, and went through a complete field exercise as first responders. Teams were evaluated by the instructors at the site and debriefed at the end of the exercise.

Participants in the 2009 NWDP Necropsy Training.

This year's enrollment included 10 NWDP biologists, nine scientists from the NWRC, a student intern with the NWDP, a Colorado State University research associate, and an invited scientist from Mexico, for a total of 22 participants. NWDP biologists repeat the course every three years to maintain proficient field skills and ensure current knowledge of wildlife disease issues.

(WNS ~ Continued from page 3)

compromised by a viral or bacterial infection), characteristics of hibernating bats such as clustering, lowering body temperatures to a few degrees above ambient temperature, and shutting down portions of their immune system may allow this fungus to play a primary role in this disease. Bats periodically arouse from torpor during hibernation presumably to drink, urinate, mate, relocate, and possibly to periodically re-activate their partially shutdown immune system. Natural periodic arousals can account for 80 – 90% of a bat's total winter energy budget. Therefore, it is prudent to explore interventions to reduce WNS-associated mortality by lessening heat loss during periodic arousals. The success of such intervention would depend on factors such as the ability of bats to detect and travel to the thermal refugia (areas with increased temperatures) in the hibernacula. Nevertheless, an individual-based population model was developed to examine the survival benefits of thermal refugia for bats with either increased frequency of arousals or increased duration of arousals. Results from the preliminary model suggest that thermal refugia could substantially increase survival of WNS-affected bats, particularly if the duration of arousals increase (Boyles & Willis 2009). The model illustrates the usefulness of disease modeling for testing possible management interventions, particularly since models can usually be modified to include several variables and interactions among variables as more information on the disease becomes available. As for the practical use of thermal refugia as a stop-gap intervention that is ready for implementation, researchers have emphatically stated that more information is needed on the ecology and epidemiology of the disease because of the potential disastrous outcome of increasing the survival of infected bats if it also increases the spread of the WNS.

The life history characteristics of bats is often referred to as "life in the slow lane" because they are long-lived species, with high survival rates, low mortality rates, and low annual reproductive rates (~ 1 pup/female), thereby creating low potential for population growth. More than half of the bat species occurring in the U.S. rely on hibernation as a strategy to survive the winter months when insects are not available as a food source. There are four endangered bat species in the U.S. (Ozark big-eared bats [*Corynorhinus townsendii ingens*], Virginia big-eared bats [*C.t. virginianus*], Gray bats [*M. grisescens]*, and Indiana bats) and all of them are at risk for WNS. Therefore, the unprecedented mass mortality events in hibernating bats associated with WNS could have major long-term consequences for bat populations as they are unlikely to recover quickly and could have major ecological consequences in terms insect control (including forest and agricultural pests) and cave biota dependent on bats for nutrients.

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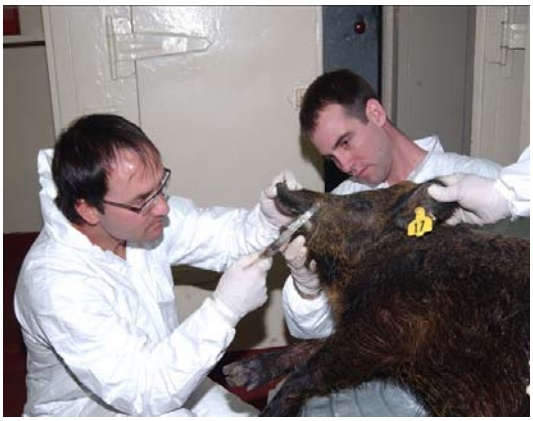
Are Feral Swine Susceptible to Foot-and-Mouth Disease?

By Brandon Schmit and Dr. Samia Metwally

Foot-and-mouth disease (FMD), a highly contagious acute vesicular disease of cloven-hoofed animals, represents a significant threat to American agriculture. This threat would be intensified if an introduction of FMD into feral swine (Sus scrofa) populations were to occur within the United States. The estimated 4 million (Pimental et al, 2000) feral swine inhabiting 38 states (Wykoff et al., 2009) represent an expanding potential foreign animal disease reservoir.



Examination of feral swine for clinical signs of FMD.

Feral swine populations are comprised of a continuum of genetic diversity ranging from escaped domestic swine (Sus scrofa domestica) to European wild boar (Sus scrofa scrofa) and the hybrids of these subspecies (Mayer and Brisbin, 1991; Seward et al., 2004; McCann, unpublished data). This genetic diversity may present unforeseen problems for wildlife management agencies due to population variation in disease susceptibility and pathogenesis as well as population level traits that influence disease spread and maintenance.

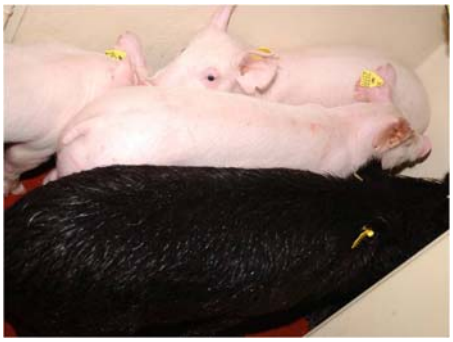
Management of a potential outbreak of FMD in feral swine requires early detection of the outbreak through adequate surveillance, and established response strategies to control an outbreak once it has occurred. Hence, an understanding of disease dynamics and virus shedding in feral swine populations and the potential of disease spread from feral swine to domestic swine is critical in developing countermeasures for disease control and eradication.

A number of modeling studies have been conducted worldwide looking at the role feral swine may play in the spread and persistence of FMD upon entry into FMD-free countries (e.g. Pech and Hone, 1988; Pech and McIlroy, 1990; Pech et al., 1992, 1995; Caley, 1993a; Dexter, 2003; Doran and Laffan, 2005; Madin, 2005; Ward et al., 2007a; Cowled and Garner, 2008; Ward, 2009). These studies relied on established scientific data in regards to disease pathogenesis, latency and transmission, and knowledge of animal population levels, density, and geographic distribution. Unfortunately, studies of FMD in feral swine are limited and data for disease transmissibility and clinical manifestations (Ruiz-Fons et al., 2008) do not exist. While the abundant documented data derived from FMD infection in domestic swine (Sus scrofa domestica) can be utilized to establish epidemiological logistic models for feral swine that escaped from domestic populations, inferences for feral swine populations with predominantly Eurasian wild boar heritage may not be adequately supported.

In an effort to begin filling the knowledge gaps associated with feral swine disease surveillance and modeling requirements, a study of FMD in feral swine was conducted at the Foreign Animal Disease Diagnostic Laboratory, APHIS, at Plum Island Animal Disease Center (PIADC), in collaboration with Wildlife Services. The main premise of the study was to compare the susceptibility of feral swine to FMD with that of domestic swine and to gain knowledge on virus transmission between feral and domestic swine.

Inter-digital vesicular lesion in feral swine.

Three groups of animals, consisting of two sets of 2 feral swine and one set of 2 domestic swine, were inoculated in three individual rooms at the BSL-3 facility with 100 porcine heel bulb infectious dose 50 of A24-Cruzeiro FMD. Forty eight hours



Co-mingled domestic and feral swine.

post inoculation, four naïve feral or domestic swine were introduced and allowed to mingle with each of two inoculated feral swine, and 4 naïve feral swine were introduced and mingled with the inoculated domestic swine. Animals were monitored daily for clinical signs and fever. Serum, whole blood, oropharyngeal swabs, nasal swabs and air samples were collected at different time intervals through 35 days post inoculation.

Preliminary findings indicated that feral swine are highly susceptible to A-24 Cruzeiro FMD virus by intradermal inoculation and by contact with infected domestic and feral swine. Typical clinical signs included transient fever, lameness, and vesicular lesions in the coronary bands, heel bulbs, tip of the tongue and snout. Feral swine transmitted the disease to domestic swine through contact in less than 24 hrs. Feral swine showed clinical signs of FMD 24-48 hrs after contact with infected domestic swine. Further data analysis is ongoing and will be concluded by the fall of 2009.

(Continued on page 6)

(FMD in Feral Swine, Continued from page 5)

Coronary band lesions in feral swine.

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Meet the New Guys! NWDP's new hires

By Mark Lutman

Illinois: Timothy (Tim) White was recently selected as the Illinois Wildlife Disease biologist. Tim is originally from Wisconsin, where he received his BS and MS degrees from the University of Wisconsin - Stevens Point. Tim's MS research was focused on the survival and dispersal of American Marten (*Martes americana)*. After completing his education, Tim worked with Wildlife Services in Maryland for over two years before accepting the his current position in Illinois.

Illinois WDB Tim White

Virginia: Marcus Gray has recently been selected as the Virginia Wildlife Disease Biologist. Marcus received his BS degree from Unity College in Maine and recently completed his MS degree in Wildlife Science from South Dakota State University, where he conducted research on barriers to black-tailed prairie dog colony expansion. Marcus was a Biological Technician with the US Fish and Wildlife Service at Chincoteague National Wildlife Refuge before joining the Virginia program.

Virginia WDB Marcus Gray

New Jersey: Adam Randall was selected as the New Jersey Wildlife Disease Biologist. Adam grew up in New York where he later attended St. Lawrence University. While attending St. Lawrence University, Adam earned a BS degree with a double-major in Biology and Environmental Studies. Before joining WS, Adam worked a variety of jobs from machinist to an environmental lab technician.

New Jersey WDB Adam Randall

South Carolina: Jesse Lujan was recently selected as the South Carolina Wildlife Disease Biologist. Jesse received his BS degree in Wildlife Management from New Mexico State University in Las Cruces, New Mexico. Jesse worked three Student Career Experience Program (SCEP) internships for Wildlife Services (his first internship was in Idaho, the second in New Mexico, and the third in Arizona), before accepting his current position with the South Carolina program.

South Carolina WDB Jesse Lujan

State Highlights

Western Region

Toxoplasmosis

Toxoplasma gondii is a protozoan parasite that can infect many animals. Transmission is by the fecal-oral route and by eating contaminated meat. Felids are the definitive hosts, while many animals may be intermediate hosts. Humans can become seriously ill from eating contaminated meat that has not been properly frozen or cooked. David Sinnett is collecting tissue samples from black bears and brown bears in Alaska to assist the Alaska Department of Fish and Game investigating the role of bears in *Toxoplasma* transmission. In Colorado, Todd Felix is participating in a similar study investigating *Toxoplasma* in American Kestrals.

E. coli O157:H7

In California, Shannon Chandler and other WS biologists have been active conducting surveillance for *Escherichia coli* O157:H7 in a wide variety of wildlife. Tissue samples have been collected recently from blackbirds, Canada geese, cottontail rabbits, coyotes, crows, deer, feral swine, ground squirrels, jackrabbits, opossums, raccoons, and skunks. There has been heightened interest in the role of wildlife in the maintenance and transmission of *E. coli* 0157 since 2006, when contaminated spinach from fields in central California led to 3 deaths and 205 cases of illness in 26 states and Canada. Cattle are the primary reservoir of *E. coli* O 157, but wildlife at the agricultural-wild land interface may also play a part in the disease ecology.

Reference: Jay MT, Cooley M, Carychao D, **Wiscomb GW**, Sweitzer RA, Crawford-Miksza L, et al. *Escherichia coli* O157:H7 in feral swine near spinach fields and cattle, central California coast. Emerg Infect Dis [serial on the Internet]. 2007 Dec [June 5, 2009]. Available from http://www.cdc.gov/EID/content/13/12/1908.htm

Raccoon Roundworm

Following-up on the report in the last edition of The Carrier (Vol. 1, (2)) about raccoon roundworm surveillance in Wyoming, recent statewide surveillance has found an apparent prevalence rate of 61% (22/36) in raccoons. Mike Pipas and other WS personnel are collecting raccoon fecal samples as well as raccoon fore limbs, and submitting samples to the Wyoming State Veterinary Laboratory. Fecal flotation will provide a more accurate indication of prevalence than direct examination of the intestine alone. Raccoon limbs will be subjected to radiography to determine age (juvenile vs. adult). Radiography clearly shows the degree of ossification of the epiphyseal cartilage of the radius and ulna, readily separating individuals into the proper age class. Knowledge of age will shed light on the disease ecology of *B. procyonis*, as juveniles show different shedding patterns and often completely clear the gut of parasitic roundworms prior to their first winter.

Techniques - Pinniped Immobilization

Darren Bruning participated in Handling and Gas Anesthesia training for pinnipeds with Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and National Marine Mammal Laboratory-National Oceanic and Atmospheric Administration in Astoria, Oregon. Nine California sea lions were handled – chemically sedated, gas anestized, blood drawn, urine collected, and examined for herpes virus lesions.

Eastern Region

Tick-borne diseases

James Cumbee has been working with Dr. Andrea Varela-Stokes, researcher at Mississippi State University, College of Veterinary Medicine, to collect data for her investigations on tick-borne disease and their wildlife host. The most common tick in Mississippi is *Amblyomma americanum,* the lone star tick. This is also the most aggressive tick and accounts for most of the human tick bites. This tick is responsible for transmitting *Ehrlichia chaffeensis,* the causative agent of human monocytic ehrlichiosis (HME) as well as *E. ewingii,* which causes human and canine ehrlichiosis. Dr. Stokes chose to sample a variety of wildlife, with an emphasis on deer, to determine whether they had antibodies to *Ehrlichia chaffeensis* and *B. lonestari* or evidence of any other disease agents in the blood. James traveled across the state using dry ice to capture a variety of ticks. These efforts provided Dr. Stokes with a large data set which she will use to gain a better idea of the prevalence of tick-borne diseases in Mississippi and increase awareness of these diseases among physicians and the public.

Photo source: internet

Anthony Musante has been assisting the Maine Medical Center Research Institute to investigate tick-borne disease in the New England area. The Maine Medical Center Research Institute initiated a project to determine if the tick-borne pathogen, *Anaplasma phagocytophilum,* is infecting winter ticks (*Dermacentor albipictus*), tick-infested moose, and also the possibility that larval winter ticks may be vectors for human infection. Tony assisted with the collection of ticks from sick and recently dead moose in New Hampshire during the winter and early spring of 2009 and will continue through 2010. With the cooperation from the NH Fish and Game Department, radio-collared moose from a separate study were tracked and ticks also collected from wintering moose beds. For analysis, ticks were shipped to the Maine Medical Center's Vector-borne Disease Lab.

Collecting ticks from winter-killed moose.

National Wildlife Disease Surveillance and Emergency Response Program

For more information on the Wildlife Services Wildlife Disease Program in your state, call 1-866-4-USDA -WS, or contact the following staff:

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For All-Hazard Emergencies Involving Wildlife
Call: 970.266.6363
or toll-free
1.877.303.6363

WS Response to an LPAI Outbreak

By J.D. Freye

In April and May, three different poultry operations in Kentucky and Tennessee had positive serum test results for low pathogenic avian influenza (LPAI). The geographically isolated breeder houses discovered the results during a regularly scheduled testing for influenza virus. However, clinical signs were minimal with no significant increase in mortality and only a slight decrease in egg production.

In early April a breeder facility in Kentucky was found to be positive for LPAI. At the end of April, a breeder facility in Tennessee reported its first positive case, and the Tennessee Department of Agriculture (TDA) and USDA, APHIS, Veterinary Services (VS) set up a Command Post and implemented the Incident Command System (ICS). WDB J.D. Freye was invited to participate and work with the epidemiologist investigating possible causes for the outbreak. In the first week of May, a second breeder facility in TN reported positive LPAI results. All three facilities, including the one in KY, had the virus typed as H7N9. All three companies had bio-security policies and procedures in place at the time of infection and there was no apparent common link between the facilities. Thus, the investigators became suspicious of wild birds possibly causing the infections, so Wildlife Services (WS) was asked to conduct wild bird surveillance around the two TN facilities.

The virus was determined to have infected the facilities some time in March. March is also the time when several birds begin their nesting season and birds like starlings and sparrows commonly nest in or around buildings. Therefore, WDB Freye concentrated the wild bird sampling on birds that were nesting, roosting, or loafing at the infected facilities. Several bird species were tested using blood serum, looking for influenza titers. All of the samples tested negative. Under direction of the ICS, WS also aided TDA and VS with collecting domestic birds in backyard flocks for surveillance within a three mile radius of the infected premises.

Wild bird and backyard surveillance did not produce any positive titers for avian influenza, resulting in the cause of the outbreak to remain undetermined. After the incident in TN, there were more H7N9 virus infections found in poultry facilities in other states, so wild birds are still suspected of being the cause of the outbreaks. This outbreak has been devastating for the involved states' poultry industry, costing the producers and companies millions of dollars in loses. In addition, other producers within the affected states also lost millions of dollars because of increased biosecurity and testing, as well as losing the ability to export poultry products to several countries. These LPAI outbreaks are a good example of how a seemingly small or local event indeed can be serious enough to cause negative impacts to agricultural producers and businesses. These responses also highlight the importance of testing wildlife prior to making an epidemiological determination of the source of infection.

Pilot Project to Address Employee Safety

By Seth R. Swafford and Kerri Pedersen

Wildlife Services National Wildlife Disease Program and Veterinary Services National Animal Health Laboratory (NAHLN) staff coordinated a pilot project to evaluate new vials for collecting biological samples from wild, migratory birds. Some NAHLN laboratories and wildlife biologists had expressed concern with the current vials because the brain-heart-infusion media aerosolizes when the vial is opened. The potential aerosolization presented a safety concern and is currently being addressed. In order to anticipate any potential problems before changing to a new vial, 4 states were asked to collect samples using the new vial and provide feedback. The new vials are 4 ml externally threaded vials with a square bottom. Collection of samples for the pilot study concluded the third week in June and a final decision has been made to change vials. The new vials were determined to be an acceptable alternative and will be included in the next shipment of sampling kits for collecting biological samples from wild birds.