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Gary L. Doster , Editor, SCWDS Briefs
University of Georgia, gdoster@vet.uga.edu

Michael J. Yabsley
University of Georgia, myabsley@uga.edu

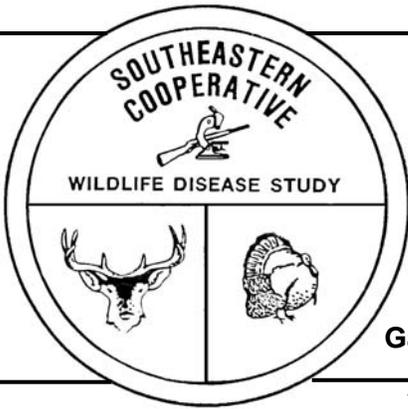
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SCWDS BRIEFS

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

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White Nose Syndrome Response Plan

The U.S. Fish and Wildlife Service (USFWS), other federal and state agencies, and tribal governments have proposed a national management plan to deal with huge losses of bats due to white nose syndrome (WNS). The proposal has been published in the Federal Register (<http://edocket.access.gpo.gov/2010/2010-27340.htm>) and is available for review and comment through November 29, 2010. WNS in bats has rapidly developed into perhaps the most catastrophic disease to affect North American bats. Since it was first identified in 2006, the disease has spread from an isolated region of New York to bat hibernacula in 12 states from New Hampshire to Tennessee, as well as to Quebec and Ontario. The fungus associated with this disease also has been found on bats in Oklahoma and Missouri. Although much remains unknown about the fungus that causes this disease, it is clear that colonies of hibernating bats affected by WNS for multiple years have been nearly eliminated, with cumulative mortality rates approaching 100%.

The draft plan is a joint effort of more than 50 agencies intended to provide efficient use of resources and rapid response to the threat posed by WNS. It will provide a strategy for learning more about the cause of WNS and for developing efficient, effective management strategies. Seven program areas are delineated: communications, scientific and technical information dissemination, diagnostics, disease management, research coordination, disease surveillance, and conservation and recovery of affected species. The necessary actions and roles of federal and state agencies in addressing WNS also are described in the draft.

An electronic copy of the proposed plan is available online at <http://www.fws.gov/WhiteNoseSyndrome/>. Written comments on the draft plan are requested and will be considered in

the final plan. In addition to the formal commenting protocol through the Federal Register, comments can be sent to Dr. Jeremy Coleman, White Nose Syndrome National Coordinator, New York Field Office, 3817 Luker Road, Cortland, NY 13045, or by e-mail to WhiteNoseBats@fws.gov. (Prepared by Kevin Keel)

Newcastle Disease in Cormorants

The recent mortality of more than 700 double-crested cormorants across Minnesota, North Dakota, and Wisconsin has been attributed to a strain of virulent Newcastle disease virus (vNDV). Mortality was first reported in late July 2010 at Marsh Lake in Minnesota. Cormorants were observed with unilateral wing paralysis, droopy heads, inability to fly, and no fear of humans. Over the next few weeks, birds displaying similar signs were found in several lakes across the state and in Saskatchewan, Canada. The National Wildlife Health Center, with assistance from the Southeastern Poultry Research Laboratory, officially diagnosed vNDV in the sick birds. Newcastle disease also is suspected as the cause of mortality in approximately 500 ring-billed gulls and 1,000 American white pelicans in the affected areas; however, this has not been confirmed.

Newcastle disease is caused by a highly contagious paramyxovirus that affects many species of birds. There are 9 serotypes of avian paramyxoviruses, but only type 1 has been documented to cause severe disease. This virulent strain causes high mortality in cormorants and poses a greater risk for introduction into commercial poultry.

Newcastle disease is not considered a serious threat to human health, but close contact with affected birds can lead to conjunctivitis or mild flu-like symptoms in people. The primary concern with this virus is its potential effect on commercial poultry flocks. Not only are poultry very

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susceptible to vNDV and can suffer high mortality rates (up to 100%), but the potential trade restrictions resulting from an outbreak in domestic flocks would have a significant economic impact. Outbreaks of vNDV in wild cormorants do not generally result in commercial flock infections, but the potential for disease transfer remains a risk for poultry in the area. An outbreak in 2008 killed approximately 2,400 cormorants in Minnesota without affecting domestic birds. However, a more extensive outbreak of vNDV in 1992 resulted in mortality of more than 35,000 cormorants across the Midwest and spilled over into domestic turkeys on range in the region.

Disease transmission among birds can occur via ingestion or inhalation of feces, nasal excretions, or other materials containing the virus. Clinical signs of vNDV in double-crested cormorants include torticollis (twisting of the head and neck), ataxia, tremors, clenched toes, paresis, and unilateral or bilateral weakness of the legs and wings. These signs are more common in juveniles or nestlings. In poultry, clinical signs depend on the strain of the virus, but may include respiratory signs (coughing, gasping, and nasal discharge), swollen head, systemic hemorrhage, diarrhea, neurologic signs, and discolored or misshaped eggs. Pet birds have only mild, non-specific signs or none at all.

State and national wildlife officials are working to investigate the outbreak and minimize the potential for disease transmission to wild or domestic flocks. Any additional information regarding sick birds in the region can be reported to the National Wildlife Health Center in Madison, Wisconsin, at http://www.nwhc.usgs.gov/mortality_events/reporting.jsp. (Prepared by Laura Adams, senior veterinary student, University of Georgia's College of Veterinary Medicine)

***Baylisascaris* in Florida Raccoons**

Historically, surveys failed to detect *Baylisascaris procyonis* in more than 375 raccoons and raccoon fecal samples examined from many areas throughout Florida. Recently, however, SCWDS documented the occurrence of the parasite in northwestern and southeastern Florida. From 2006 to 2008, nine large roundworms were collected from the feces of an unknown number of raccoons admitted to a wildlife rehabilitation center in northern Florida and submitted to SCWDS for identification. At the same wildlife rehabilitation center in September 2008, December 2009, and

June 2010, a large roundworm was found in the feces of each of two juvenile raccoons from Leon County, Florida, and one juvenile raccoon from Wakulla County, Florida, following routine treatment with pyrantel pamoate, a de-worming agent. In July 2010, a juvenile raccoon from Broward County admitted to a rehabilitation center passed several worms in its feces following treatment with ivermectin for mange. All worms subsequently were identified as *B. procyonis*. Interestingly, *B. procyonis* was detected in a kinkajou (*Potos flavus*) in the summer of 2010 that had originated in south Florida and was purchased from a pet store in Tennessee. Taxonomically, kinkajous are in the raccoon family, Procyonidae.

Baylisascaris procyonis is a common roundworm parasite of raccoons in several regions of North America, Europe, and Asia. This parasite is recognized as an important cause of larva migrans in humans, and infection may result in death or severe neurologic disease. In addition, larva migrans has been documented in more than 90 species of wild and domestic birds and mammals. In the United States, the highest prevalence rates in raccoons are in the Midwest, Northeast, and Pacific states. Numerous surveys in the southeastern United States have shown *B. procyonis* to be most common in the mountainous regions of Kentucky, Virginia, and West Virginia. The presence of *B. procyonis* recently was documented in Georgia; first by researchers at the Centers for Disease Control and Prevention in 2002 and recently by SCWDS researchers, who found that 10% of 116 raccoons from Clarke County, Georgia were positive. An additional 196 raccoons from other counties in Georgia were negative for the parasite. It currently is unclear whether this apparent expansion into Georgia is due to natural spread of the parasite among raccoons or via translocations of infected raccoons into naïve areas.

It is not known how the parasite became established in Florida, but it could be from natural dispersal of infected raccoons from endemic areas or from the movement of infected raccoons, natural wildlife intermediate hosts, or exotic pets (e.g., kinkajous, which could serve as alternative definitive hosts). Additionally, because domestic dogs can serve as definitive hosts, an infected dog from a *B. procyonis* endemic area may have passed eggs into the environment.

The only effective way to prevent contamination of an area with raccoon feces and

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B. procyonis is to restrict raccoon activity in the area. If raccoons defecate in an area potentially used by people, feces should be removed immediately because it requires about 10 days for the eggs to develop into the infective stage. Normal household cleaners (including chlorine bleach) are not effective for killing the eggs; the only proven methods to decontaminate an area are to burn it, treat it with steam, or douse the area with boiling water. Pet food should be secured from raccoon access, and garbage should be stored in proper containers. Additionally, raccoon habitat, such as hollow trees, should be removed from the property, and access to attics and crawl-spaces under the house or deck should be prevented. Wildlife rehabilitators need to be aware that raccoons may be infected and should take appropriate precautions, including dedicating pens to only house raccoons, and decontaminating areas when raccoons have been removed. Numerous outbreaks of *Baylisascaris* larval migrans have been reported in animals in rehabilitation centers that were housed in cages or pens that previously contained infected raccoons.

In response to the detection of *B. procyonis* in Florida, the Florida Fish and Wildlife Conservation Commission (FFWCC), SCWDS, and USDA are conducting state-wide surveillance for the parasite in raccoons. Anyone interested in submitting samples for this study should contact Michael Yabsley at SCWDS (myabsley@uga.edu) or Dr. Mark Cunningham with FFWCC (mark.cunningham@myfwc.com). (Prepared by Michael Yabsley)

EHDV-6 Surveillance

During the fall of 2006, SCWDS isolated an exotic epizootic hemorrhagic disease virus (EHDV-6) from white-tailed deer (WTD) from Illinois and Indiana (see SCWDS BRIEFS Vol. 23, No. 2). Since then, EHDV-6 has been detected from deer in the United States every year through 2010, with isolates from Arkansas, Kansas, Michigan, Missouri, and Texas. Genetic analysis conducted at SCWDS revealed that this virus is a novel reassortment of EHDV-2 and EHDV-6. Because this virus is novel to the United States and WTD, we have little knowledge regarding its introduction or distribution. Recently, we completed a study to determine the distribution of neutralizing antibodies to EHDV-6 in WTD populations in close proximity to areas where the virus previously was isolated. In addition, we tested deer from selected southern populations where EHDV-1 and EHDV-2 commonly are found in order to determine if

EHDV-6 was or still is circulating in WTD populations that routinely are exposed to these viruses.

To assess the prevalence and distribution of EHDV antibodies in deer populations since the initial detection of EHDV-6, serum samples were analyzed from 1,067 WTD from 149 locations. The samples came from hunter-killed WTD from 10 states (Alabama, Arkansas, Georgia, Indiana, Illinois, Kentucky, Louisiana, Michigan, Missouri, and Tennessee) during the 2008 and 2009 hunting seasons and from deer collected during SCWDS herd health evaluations in 2006 and 2007. To determine if antibodies to EHDV-6 were present in WTD populations prior to the initial detection in 2006, we included 78 EHDV-positive serum samples that were collected from 2000 to 2005 from 23 locations in eight states where EHDV-1 and/or EHDV-2 commonly circulate in deer (Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee).

From 2006 through 2009, EHDV antibodies were detected in WTD in all physiographic regions tested, and, in general, antibody prevalence decreased as latitude increased. The prevalence rates were significantly higher (35%) in the Coastal Plain regions of Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, and Tennessee, which is consistent with previous studies. The lowest prevalence was in the Central Lowland region, including Michigan and northern Indiana, Illinois, and Missouri, with only 3% of deer testing positive for antibodies against EHD viruses. A significant decrease in EHDV antibody prevalence was apparent between 2008 and 2009 in all of the sampled regions, except for the Central Lowland, where transmission is uncommon. The most significant declines were noted in the Coastal Plain region and Interior Low Plateau regions of Alabama, Indiana, Kentucky, and Tennessee.

Overall, from 2000 through 2009 antibodies to EHDV-6 were observed in samples from 32 WTD, only three of which were positive at dilutions \geq 1:20, the cutoff for evidence of previous infections. These included two deer from the Coastal Plain region of Louisiana in 2000 and one from the Coastal Plain region of Alabama in 2008. All other EHDV-6 antibody-positive samples also tested positive to EHDV-1 and/or EHDV-2 (a potential cross reaction), or tested positive at a minimum serum dilution of 1:10 (a potential false positive)

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and were not considered evidence of previous EHDV-6 infection.

These data demonstrate that from 2000 to 2009 WTD populations were exposed to all three EHDV serotypes known to occur in North America. Only three deer were considered seropositive for EHDV-6, which suggests that EHDV-6 infection is difficult to detect based on antibody presence or this may relate to the combined effects of low prevalence and mortality associated with EHDV-6 infection. Based on virus isolation results, it is clear that EHDV-2 is the predominant EHDV detected in the United States. In addition, the majority of the EHDV-6 virus isolations have been from states where HD activity is rare or historically absent. Consequently, the animals have no natural immunity, resulting in significant mortality (e.g., Indiana, Illinois, and Michigan) precluding or reducing the number of seropositive survivors. Results also suggest that EHDV-6 had been circulating in WTD in the southern United States for at least six years prior to the first isolation from sick deer in Indiana and Illinois. Currently, the driving forces for the introduction, establishment, and successful transmission of EHDV-6 in the United States remain unknown. Future work should include studies on the susceptibility of deer to EHDV-6, vector competence, and the extent of cross immunity related to previous infection with EHDV-1 and/or EHDV-2. (Prepared by Aaron Hecht and Michael Yabsley)

The Hunchback Mite

It often seems like the more one looks, the more one realizes how little we really know. For instance, our diagnostic service is continually turning up cases of surprising or completely undescribed conditions among the variety of animal species we examine. Some of these are species that are thoroughly studied, such as the brown-headed cowbird, an example of which recently was submitted to our Diagnostic Laboratory by a Tennessee Wildlife Resources Agency wildlife biologist who was trapping doves when he incidentally captured this bird with a strange skin condition. He euthanized the bird and submitted it to SCWDS for a postmortem examination.

The cowbird was an adult female in good nutritional condition. However, dozens of tan, nodular skin lesions of 0.3 - 1.5 cm diameter were present over the breast, under the wings, and around the vent (see Figure 1). The contents of the

nodules were pasty and yellow. No other lesions were apparent in any other tissues.



Figure 1.

Microscopic examination of the pasty material inside the nodules revealed thousands of small mites with a very unusual dorsal hump. These mites were unlike any seen at SCWDS, but a literature search revealed a single report of this mite from Florida, also in a brown-headed cowbird. This report represents the only known occurrence of this mite, although brown-headed cowbirds are extremely numerous and often are observed or examined by many people.

The mites from the index case were thoroughly described and assigned the eponymous name *Harpirhynchus quasimodo*, in reference to the morphology of the mite and its resemblance to the Notre Dame bell ringer created by Victor Hugo. It is unknown if this mite infests other species of birds. Given the apparent rarity of lesions resulting from infestation, it is unlikely that it causes significant population problems. It is more of a curiosity than anything else and is indicative of just how much there is to learn about even the most visually apparent diseases of wild birds. (Prepared by Kevin Keel)

North American Model of Wildlife Conservation

A recent special issue of The Wildlife Society's (TWS) quarterly magazine, *The Wildlife Professional* (Volume 4, Number 3), is dedicated to the North American Model of Wildlife Conservation (the Model) and is "meant to inform a wide audience—policymakers, the general public, and TWS members—about the fundamental role that hunting plays in wildlife management and in the success of the Model." The magazine does a

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commendable job of doing just that in 15 feature articles written in easy-to-understand language by some of the top wildlife professionals in North America.

The Model was not drafted and adopted like a charter, but rather evolved with wildlife management over a long period of time. Its roots are in the actions taken by hunters in response to the over exploitation of wildlife by market hunters in the 19th century, and the Model's guiding principles "ensure that wildlife remains available to all, conserved for future generations." Several of the principles were developed in order to prevent wildlife from becoming the private property of the elite landed gentry, as it was in the European cultures that many North American settlers had left. The Model's underlying principles, which all arose independently, are:

1. Wildlife as a public trust resource.
2. Elimination of markets for game.
3. Allocation of wildlife by law.
4. Kill only for legitimate purposes.
5. Wildlife as an international resource.
6. Science-based wildlife policy.
7. Democracy of hunting.

Several of the Model's laudable principles are under threat. Some of these threats are black and white, while others fall into large gray areas, and how these threats are addressed will have a strong bearing on the future success of the Model. The basic principle, that wildlife is a public resource owned by no one but held in trust by the government to benefit everyone, is jeopardized by claims of private ownership of native wildlife, commercial sale of living wildlife, high-fence enclosures, and other limits to public access. These issues also threaten the democracy of hunting, another pillar of the Model. Shooting animals within fenced enclosures can threaten the future success of the Model because it also raises questions about ethical hunting, as does shooting wildlife over bait. As stated by TWS Executive Director Michael Hutchins, "The Model will only stay strong if the practices of modern hunters are legal, ethical, and ecologically sound..."

Another looming threat to the future of the Model is the potential for lack of adequate, sustained funding. Wildlife conservation in North America has been funded primarily by hunters through proceeds from hunting license sales and a unique self-imposed federal tax. The Pittman-

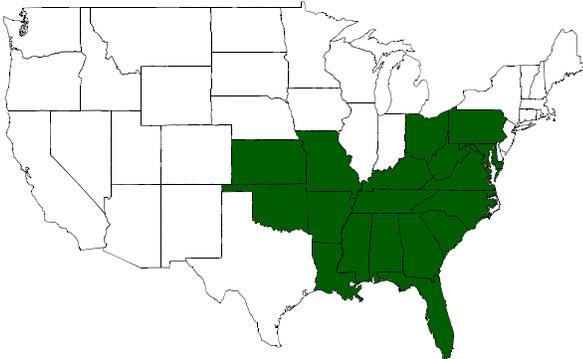
Robertson Act (P-R) of 1937 created an excise tax on firearms and ammunition that provided nearly \$900,000 to state wildlife agencies in its first year. Archery equipment was later added to the list of taxable items, and in the past five years the annual apportionment to the states has ranged from \$233 million to \$472 million. These funds are spent on eligible projects such as wildlife research, restoration, conservation, management and enhancement of wildlife and its habitat, and hunter education. The formula for allocating P-R funds to each state is based on the geographic size of the state and the number of certified hunting licenses sold in the state. And here is where the problem lies: hunter numbers are declining and will result in the loss of conservation funding, not only from decreased license sales, but also from altering the formula for distributing P-R funds, i.e. a "double whammy" on state financial resources for wildlife conservation.

The wildlife conservation research, management, habitat purchases, and improvements funded primarily by hunters have benefited all wildlife, not just the game species they pursue. And non-hunters who appreciate and enjoy wildlife also reap the benefits while hunters bear the cost. Although many "non-consumptive" wildlife recreationists, such as bird watchers and feeders, wildlife photographers, and hikers, regularly contribute to non-governmental conservation organizations, efforts to create an excise tax on equipment and supplies used by these wildlife enthusiasts have been unsuccessful. As stated by Steve Williams, President of the Wildlife Management Institute and former Director of the U.S. Fish and Wildlife Service, in his article on wildlife funding, "The main challenge is to engage the multi-billion dollar wildlife-associated recreation industry and its consumers to put their collective shoulders to the wheel of conservation alongside the hunters and anglers of this nation."

Articles in this issue of *The Wildlife Professional* cover a broad array of wildlife conservation issues, including the successes of the Model, as well as some of the setbacks and challenges now and in the future. The Wildlife Society is making this special issue available to everyone, and we encourage you to read it at http://issuu.com/the-wildlife-professional/docs/twp_fall2010. (Prepared by John Fischer)

New SCWDS Members

We are quite pleased to announce that two additional state wildlife management agencies became members of the Southeastern Cooperative Wildlife Disease Study on July 1, 2010. The Oklahoma Department of Wildlife Conservation and the Pennsylvania Game Commission are the newest SCWDS members, bringing the total number to 18.



SCWDS Members, 2010-2011

We are proud of the confidence they have shown in SCWDS and look forward to assisting their biologists, managers, and administrators with the management of healthy wildlife populations.

AFWA Resolution on Lead

Concern over the use of lead ammunition and fishing tackle has been growing due to wildlife mortality associated with consumption of lead bullets, pellets, or fishing sinkers and reports of lead fragments in hunter-donated venison. Due to these concerns and others, the Association of Fish and Wildlife Agencies (AFWA), which includes in its membership the state fish and wildlife agencies from all 50 states, adopted the following resolution at its annual meeting:

LEAD AMMUNITION AND FISHING TACKLE

WHEREAS, lead is used for ammunition and fishing tackle due to its unique properties and ease and cost of manufacture; and

WHEREAS, lead from ammunition and fishing tackle under certain circumstances of exposure may pose health risks to wildlife; and

WHEREAS, state fish and wildlife agencies have primary trust responsibilities for most fish and wildlife resources in this country; and

WHEREAS, the Association of Fish and Wildlife Agencies, which represents the collective perspectives of the state fish and wildlife agencies, played a key leadership role in resolution of the debate over regulation of lead shot for waterfowl hunting in the 1970s and '80s; and

WHEREAS, state fish and wildlife agencies have been proactive in implementing regulations, educational initiatives, and other efforts to reduce lead exposure to fish and wildlife in cases where population-level impacts have been documented;

NOW, THEREFORE, BE IT RESOLVED that the Association of Fish and Wildlife Agencies adopt the following principles regarding future regulation of lead ammunition and lead fishing tackle:

1. Future regulation of lead ammunition and lead fishing tackle is best addressed by the individual states, rather than federal agencies.
2. State fish and wildlife agencies should proactively address issues associated with wildlife population health, and cooperate with the respective state health agencies where human health issues have been substantiated, related to lead ammunition and lead fishing tackle.
3. Decisions related to future regulation of lead ammunition and lead fishing tackle should be based on the best available science related to wildlife population health.
4. Effective human dimensions strategies should be developed to ensure good communication and understanding by hunters, anglers, and shooting sports interests.
5. Collaboration with industry, conservation organizations, hunting, angling, and shooting sports interests is essential, and AFWA and the states should continue to lead efforts to bring this about.
6. State agencies should focus regulation efforts where population-level impacts to wildlife are substantiated.
7. Public education and voluntary programs may be used where appropriate in lieu of regulation.
8. Any new regulations that restrict use of lead ammunition or lead fishing tackle should include multi-year phase-in periods to allow industry, retailers, and hunters and anglers

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necessary time to transition and phase-in non-lead substitutes.

9. *State fish and wildlife agencies should lead efforts to develop the best science, and AFWA should provide this information to members for their use in bringing hunters, anglers and various interests together to determine the need for and nature of any needed management approaches to use of lead ammunition and lead fishing tackle.*

International Feral Swine/Wild Boar Conferences

Feral swine issues continue to grow in importance throughout the United States and other parts of the world, and two international conferences held this year were dedicated solely to feral swine and wild boar. It is important to note that although feral swine in the United States are an introduced exotic species descended from domestic swine, or in some instances Eurasian wild boar, the wild boar is a native wildlife species in Europe and parts of Asia and Africa. The 2010 International Wild Pig Conference was held in Pensacola, Florida, on April 11-13, 2010, and the 8th International Symposium on Wild Boar and other Suids was held in York, United Kingdom, on September 1-4, 2010. Differences in the substance of these conferences relate to differences in the origin of feral swine/wild boar in different parts of the world. The conference in Florida was attended mostly by wildlife managers and biologists from the United States, with presentations given by persons from the United States, England, and Australia. Sessions focused on biology, genetics and behavior, as well as diseases, baits delivery systems, control measures, damage assessment, human dimensions and wild pig distribution. The conference in York was attended mostly by scientists representing 27 countries on six continents. Sessions focused on diseases, ecology and behavior, population management and density estimation, and human dimensions.

Diseases were an important issue in both conferences. Presentations at the Florida meeting were focused on surveys for domestic diseases such as trichinosis, bacterial zoonoses, and pseudorabies, and on two foreign viral diseases:

classical swine fever (CSF) and foot and mouth disease. Presentations on diseases at the meeting in York addressed the impact of CSF on livestock production and wildlife management, the presence of bovine tuberculosis in boar in the Iberian Peninsula, risk factors related to wild boar-livestock interactions in Spain, efforts to control and eradicate CSF in Europe through oral vaccination and other methods, and contingency planning for reportable diseases.

Presentations on efforts to control CSF in wild boar in Europe were of particular interest. CSF is not present in the United States, but is considered a significant threat to our domestic swine industry. In the event of CSF introduction into the United States, feral swine in some areas could become involved in farm-to-farm transmission and dispersal of the disease among geographic areas. Feral swine also may become maintenance hosts over periods of time. Presentations at the York meeting indicated that:

- CSF appears to fade out in small wild boar populations, but may become endemic in larger populations.
- Persistence of CSF depends on the proportion of wild boar that recover from infection, the existence of chronic infections, and the social structure of the population.
- Hunting is not an efficient method for CSF control in wild boar, and relatively small harvests by hunters (<60% of the population removed) may actually promote persistence and spread of disease.
- High hunting harvests (>70-80% of the population removed) are needed to reduce virus spread via local extirpation of wild boar.
- In some cases vaccination may facilitate persistence, but vaccination in buffer zones over a radius equivalent to the area of spread in one year was sufficient for controlling spread.

Full abstracts, presentations, and/or proceedings from these two international conferences can be found at <http://www.wildpigconference.com/index.asp> and <https://secure.fera.defra.gov.uk/wildboar2010/>. (Prepared by Joseph Corn)

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

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