SCWDS BRIEFS

A Quarterly Newsletter from the

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2017 HD Update: Still Trending North?

The 2017 hemorrhagic disease (HD) season has not yet come to a close, but it already has been a noteworthy year. To date, we have isolated nearly 150 epizootic hemorrhagic disease viruses (EHDV-1, -2, & -6) and bluetongue viruses (BTV-2, & -3), and we are continuing to receive submissions from multiple states (Figure 1). Several outbreaks have been reported throughout the central and eastern U.S., and we have virus isolates from 18 states. Most notably, there is a widespread and focally severe EHDV-2 outbreak primarily associated with the Appalachian Plateau physiographic region in Kentucky, Ohio, Pennsylvania, Tennessee, and West Virginia. For example, the Kentucky Department of Fish and Wildlife Resources has received reports of more than 4,500 sick or dead deer, mostly in the eastern portion of the state. SCWDS also has isolated HD viruses from deer in parts of Alabama, Maryland, North Carolina, and Virginia that are adjacent to affected areas in the above states. Once again, there have been reports of cattle infected with EHDV in areas where it was detected in wild deer; a finding that is becoming more common during regional EHD outbreaks.

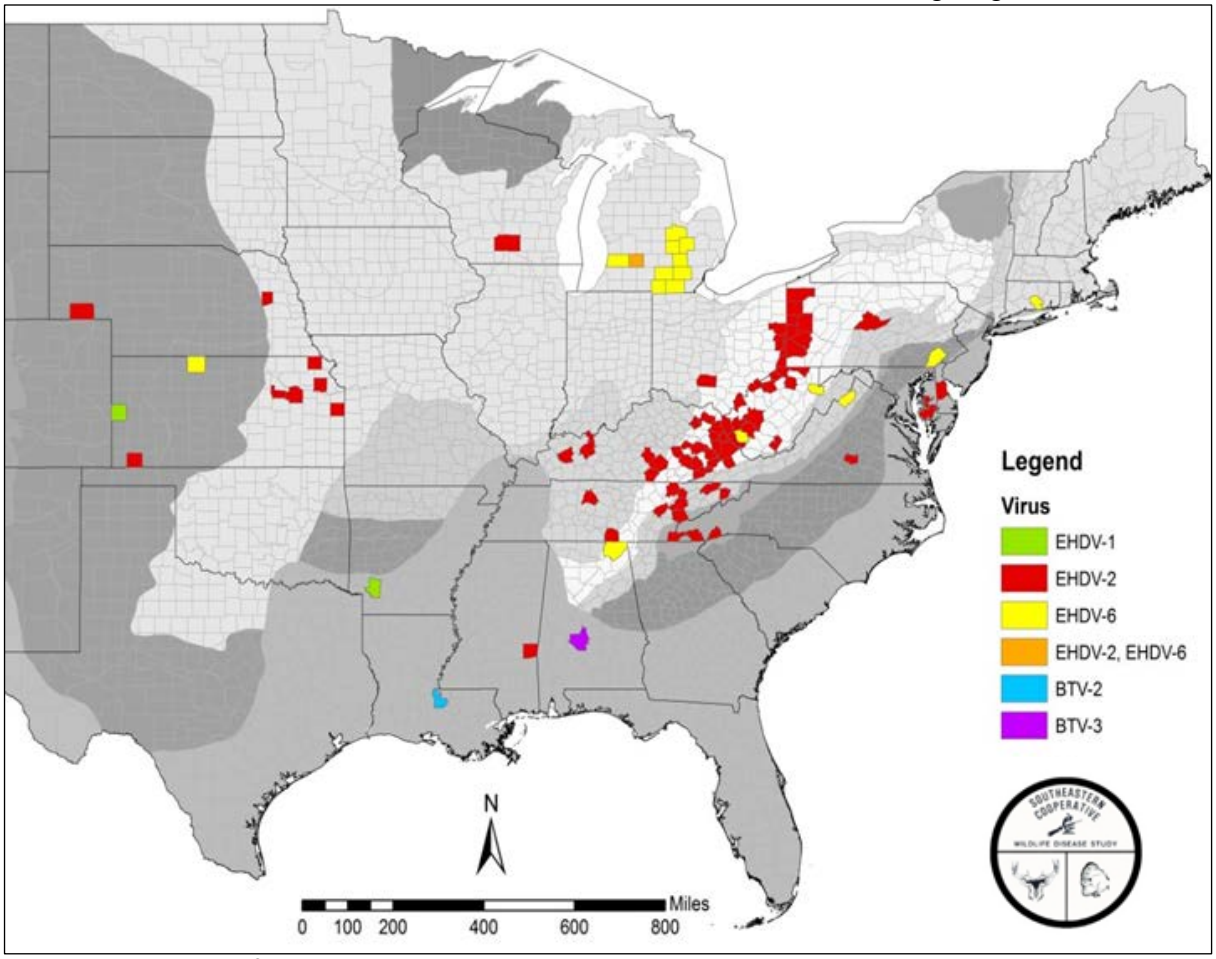

Figure 1. Distribution of EHDV and BTV isolations in 2017. Shaded areas indicate distinct physiographic regions.

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This year's data reinforce our concerns regarding the northern expansion of HD. For the third time in the last 11 years, parts of the upper Midwest and Northeast have experienced intense HD outbreaks. This year, we have isolated EHDV from multiple northern states, and the isolation of EHDV-6 from a white-tailed deer in Connecticut is the first confirmation of any EHDV in the state. Further, the Canadian Wildlife Health Cooperative and the Canadian Food Inspection Agency confirmed EHDV-2 infection in white-tailed deer in southern Ontario, a first for the Province: These developments show that we need a better understanding of the potential causes, as well as the impacts on wild deer populations, of the northern expansion of HD.

Interestingly, EHDV-6 has been isolated in the U.S. every year since its first detection in 2006. In addition to Connecticut, 2017 marks the first detection of EHDV-6 in Alabama, Pennsylvania, and West Virginia. And speaking of exotic HD viruses, BTV-2 and BTV-3 were isolated from white-tailed deer in Louisiana and Alabama, respectively. This was the second consecutive year BTV-2 was isolated from Louisiana and the first detection of BTV-3 in Alabama. The increased detection of atypical BTV serotypes in the HD-endemic areas of the United States continues to be a concern. Many state wildlife agencies are working to gather data to better describe the impacts of this year's outbreak, and hopefully we will have a better idea of the extent of the 2017 outbreak in the near future. Stay tuned… (Prepared by David Stallknecht and Mark Ruder)

CWD Research Update, 2017

Numerous studies are shedding more light on chronic wasting disease (CWD) epidemiology and its impacts on wild cervid populations. We've included summaries of selected studies below; unfortunately, space does not allow us to cover all of the recent developments.

In September 2017, researchers with the USDA-Agricultural Research Service, Oak Ridge Institute for Science and Education, and Iowa State University published results of a trial in which two-month-old domestic pigs were inoculated intracerebrally or orally with the CWD agent. Pigs were euthanized at eight months of age (at typical slaughter weight), or at six years post inoculation, and tested for the presence of CWD prions by a number of methods. The authors summarized the results of the study: "*Disease-associated prion protein (PrP^{Sc}) was detected in brain and lymphoid tissues… as early as 8 months of age (6 months post-inoculation). Only one pig developed clinical neurologic signs suggestive of prion disease. The amount of PrP^{Sc} in the brains and lymphoid tissues of positive pigs was small, especially in orally inoculated pigs. Regardless, positive results in orally inoculated pigs suggest that it may be possible for swine to serve as a reservoir for prion disease under natural conditions.*"

The results of this study have raised concerns regarding the potential for feral hogs to further complicate the epidemiology and management of CWD in wild populations as well as the potential for swine to represent a source of CWD exposure through domestic animal and human food chains. The full article by Moore et al. can be found at http://jvi.asm.org/content/91/19/e00926-17.

Researchers with the University of Calgary and Canadian Food Inspection Agency, in collaboration with German scientists, presented preliminary results from a study in which they inoculated cynomolgus (crab-eating) macaques with the CWD agent via four different routes (intracerebral, oral, blood transfusion, and skin scarification). As of May 2017, 10 of 21 macaques had died or were euthanized, and complete results were available for five of the animals. Two macaques that were intracerebrally inoculated with brain tissue from deer or elk clinically affected with CWD, had microscopic lesions and positive immunohistochemical (IHC) staining in the central nervous system; one had neurological signs prior to death. One macaque that was fed brain tissue and two macaques that were fed muscle from clinically normal white-tailed deer that tested positive for CWD via ante-mortem tests developed neurological disease and all three had microscopic lesions and positive IHC staining in the nervous system. The authors have not published or summarized the study, and plan to do so after its completion in 2018.

The genetic similarities between cynomolgus macaques and humans have increased concern for the potential transmission of CWD to humans

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via consumption of affected cervids. This potential has been a point of concern for many years and fortunately, the species barrier appears to be strong and currently there is no evidence that CWD is transmissible to humans. However, public health authorities, including the U.S. Centers for Disease Control and Prevention (CDC), recommend avoidance of exposure to the CWD agent while they continue to assess the risk. The CDC recently revised its guidance to hunters in view of the preliminary results from the macaque study: *"Hunters harvesting wild deer and elk from areas with reported CWD should check state wildlife and public health guidance to see whether testing of animals is recommended or required in a given state or region. In areas where CWD is known to be present, CDC recommends that hunters strongly consider having those animals tested before eating the meat."* It should be noted that the available CWD tests are tools for disease surveillance and are not food safety tests. More information on CWD can be found at https://www.cdc.gov/prions/cwd/index.html.

The findings from a study published by DeVivo et al. in October 2017 support CWD as a significant contributor to regional mule deer population declines. The study was conducted in an area in Wyoming where CWD is endemic in mule deer with an annual prevalence exceeding 20%. Mule deer were captured from 2010-2014, tested ante-mortem for CWD by tonsil biopsy, released, and monitored by radio telemetry. The researchers found the mean annual survival rate for CWD-positive deer was 0.32 compared to 0.76 for CWD-negative deer. They did not observe any effects on pregnancy or fawn recruitment. The authors estimated an annual population decline of 21% and ran a population model that indicated a stable population if CWD were absent. This study adds to the long-suspected and growing body of evidence indicating that CWD can have significant impacts on free-ranging cervid populations. In view of the difficulty or impossibility of eradicating CWD with our current tools and knowledge, the authors' "*best recommendation for control of this disease is to minimize spread to new areas and naïve cervid populations."* The publication can be found at https://doi.org/10.1371/journal.pone.0186512.
(Prepared by John Fischer)

Wildlife-Associated Recreation Still Growing

Preliminary results of the 2016 "National Survey of Fishing, Hunting, and Wildlife-Associated Recreation" published in August showed that 101.6 million people 16 and older (40% of the U.S. population) participated in one or more forms of fish and wildlife-associated recreation during 2016, with many engaging in more than one activity. Active participation grew by 13% since the last survey in 2011 and was fueled by increased numbers of people fishing and watching wildlife; hunting participation was down from 2011.

The national survey began in 1955 and is conducted every five years at the recommendation of the state fish and wildlife agencies. It is sponsored by the U.S. Fish and Wildlife Service (USFWS) and is conducted by the U.S. Census Bureau, with funding provided through Multistate Conservation Grants. The purpose of the survey is to provide accurate state-level estimates of the importance of wildlife-based recreation. The survey determines how many people participate, their demographics, and the economic impacts of fishing, hunting, and wildlife watching. Those who enjoy fish and wildlife resources are well aware of the quality-of-life values associated with these activities. Importantly, the National Survey also shows that related expenditures are significant to the economy: They create and support jobs and communities across the country.

In 2016, recreationists spent $156.3 billion (1% of the gross domestic product) on fishing, hunting, and wildlife watching activities: One of every hundred dollars of all goods and services produced in the United States in 2016 was spent on fish and wildlife-related recreation. As in previous surveys, non-consumptive wildlife-related activities, such as wildlife watching and feeding, were more popular than fishing or hunting, with more than 86 million people 16 and older participating (an increase of 20% since 2011) and spending nearly $76 billion (a 28% increase). The 35.8 million people who fished (an increase of 8% since 2011) spent $46.1 billion on trips, equipment, licenses, and other items.

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Hunters numbered 11.5 million in 2016 (a decrease of 16% from 2011), and spent $25.6 billion on trips, equipment, licenses, and other related items.

The decrease in participation in hunting is a serious concern because hunters have funded much of the wildlife conservation efforts in the U.S. through a program that began in 1937 with the passage of the Pittman-Robertson Wildlife Restoration Act. Federal excise tax is collected on equipment and gear manufactured for hunters (10-11% on handguns, sporting arms, ammunition, and archery equipment) and is distributed to states and territories using a formula based on the land mass of the state and the number of licensed hunters. Decreased hunting participation hurts conservation in two ways: decreased equipment sales reduce the excise taxes collected, and lower hunter numbers reduce the allocation a state receives (as well as revenue from license fees). A similar program for sport fish restoration (under the Dingell-Johnson Act of 1950) provides funds collected on angling and boating equipment to states and territories for conservation and public recreation needs in fresh, estuarine, and marine waters. Combined, the Wildlife and Sport Fish Restoration Program (WSFR) has provided more than $16 billion for restoration and management of our country's fish and wildlife resources. Unfortunately, a similar program does not exist for collection of excise tax on equipment and supplies used by wildlife feeders, watchers and photographers, despite several efforts over the last two decades. It would be a boon to the conservation of non-game species, which have benefited indirectly through habitat improvements for fish and game species under the WSFR program.

Preliminary findings from the 2016 survey can be accessed at https://wsfrprograms.fws.gov/subpages/nationalsurvey/national_survey.htm; the final report should be available in December 2017. It is important that we all do everything we can to maintain healthy, well-managed populations, and everyone can help. Think about buying licenses even if you don't fish or hunt. The licenses will figure into the distribution of WSFR funds to your state. (Prepared by John Fischer and Gary Doster)

A Note to Our Readers

We thank you for your sustained interest in our quarterly newsletter, the SCWDS BRIEFS. We continue to receive positive feedback from many readers, which lets us know that we are still providing items of interest to you in each issue.

One difficult aspect of putting out a publication such as the BRIEFS is maintaining the mailing list. We want to reach as many of you as we can, but can do so only if you let us know you want to be included on the mailing list, notify us of any address changes, or inform us of someone else you know who would like to be added to the mailing list. Of course, if you want to reduce the volume of mail coming into your home or office, you may opt to be removed from the regular mailing list and have your name added to our email list to be informed when each new issue is posted on our website. This way, you usually can read the newsletter at least 10 days before a mailed copy would arrive. As always, if you have suggestions for improvement of the BRIEFS, please let us hear from you. Our goal is to provide information of interest to you.

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 7, and check the appropriate box to receive either an electronic copy or a hard copy and return it to us: SCWDS, College of Veterinary Medicine, University of Georgia, Athens, GA 30602 or email at brewton@uga.edu.

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