SCWDS BRIEFS

A Quarterly Newsletter from the

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Wildlife Disease Association International Conference is Coming to Athens

The 71st Wildlife Disease Association International Annual Conference hosted by SCWDS and the UGA Warnell School of Forestry and Natural Resources will be held July 29th-August 4th 2023 in Athens, Georgia. The last time SCWDS hosted the WDA conference was 1999! The WDA is a scientific association dedicated to promoting healthy wildlife and ecosystems, biodiversity conservation, and environmentally sustainable solutions to One Health challenges. The theme of the conference is People, Passion and Purpose: The Pathway to Wildlife Health. We expect to have approximately 400-500 people working in the field of wildlife health come to Athens for an entire week of state-of-the-art science, workshops and networking, as well as some thought-provoking keynote speakers. For more information, including the preliminary program and a list of our sponsors, please visit our conference website www.wda2023.com. Please note that this year the WDA Conference Deadlines have changed significantly. We look forward to seeing you in Athens!

December 15th — Early bird registration opens
December 15th — Call for abstracts opens
March 1st — Call for abstracts closes
March 31st — Presenters are announced
April 1st — Student and international member travel awards announced
April 15th — Final detailed program available
April 30th — Early bird registration closes

SCWDS BRIEFS Will Soon Be Digital ONLY

If you are currently receiving a hard copy of the *SCWDS BRIEFS* by mail, then this issue may be the last you ever read if you do not act now! Beginning January 2023, the *BRIEFS* will only be available online and distributed by email. To continue receiving the *BRIEFS*, **you must subscribe to our *SCWDS BRIEFS* email distribution list** by sending an email to Betsy Kurimo-Beechuk (elizkuri@uga.edu). We will only use our email distribution list to send our quarterly *SCWDS BRIEFS* Newsletter, so you will only receive four emails each year. You do not need to subscribe if you are on our current email distribution list.

Highly Pathogenic H5 Influenza in North American Ducks: A New Disease on An Unknown Course

Infections with clade 2.3.4.4b Goose/Guangdong1/1996 (GsGD) lineage of highly pathogenic (HP) H5N1 influenza A virus (IAV) in North American wild birds were routinely detected

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throughout 2022. In the last issue of the *SCWDS BRIEFS*, we highlighted unknowns related to what the future may hold in terms of the course and impacts of this new North American wildlife disease. There are several areas that research efforts should focus on as fall migration occurs. Fall migration coincides with a period of peak influenza prevalence in wild ducks, which relates to the annual influx of susceptible, naïve, juvenile birds into the population. This expected scenario of increased wild duck mortality in conjunction with fall migration is currently underway; however there have been some surprises. In September, we sampled blue-winged teal in Minnesota, Louisiana, and Texas. Birds in Minnesota were sampled in collaboration with the Minnesota Department of Natural Resources during their annual banding activities. To date, we have tested 130 of these samples with 86 (66%) testing positive for HP H5. In hunter-harvested birds sampled in Louisiana and Texas, 23 of 103 (22%) and 34 of 135 (25%) tested birds were positive for HP H5, respectively. These prevalence estimates exceeded all the low pathogenic (LP) IAV prevalence estimates that we have observed at these same sites during the last 10+ years. These HP H5 detections do not appear to be restricted to the Mississippi Flyway with numerous recent detections in other flyways reported by USDA (https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/hpai-2022/2022-hpai-wild-birds) and Canada (https://cfia-ncr.maps.arcgis.com/apps/dashboards/89c779e98cdf492c899df23e1c38fdbc).

The extent of this spread with migration is unknown, but HP H5 already has been detected in Mexico and Colombia. What the future looks like for HP H5 in North American ducks is uncertain but if these high observed prevalence estimates reflect what is happening in the continental duck population, we may see a decrease in prevalence related to increasing immunity. However, the limited recent data from most waterfowl species, including geese, continues to provide much uncertainty. Additionally, this is more than a waterfowl disease, as evident from the ongoing infections and mortality that have been occurring in black vultures throughout this year, as well as the seabird and mammalian cases that are being increasingly reported in North America and many other areas of the world. (Prepared by Becky Poulson and Dave Stallknecht)

CWD Management – Some Successes and Failures

A report titled “Chronic Wasting Disease Detection and Management: What Has Worked and What Has Not?” recently was posted on the website of the CWD Alliance (https://cwd-info.org/management-strategies/). It is the product of a partnership between the CWD Alliance, and the Association of Fish and Wildlife Agencies (AFWA) and was formed to provide ongoing, authoritative, and defendable guidance on science-based CWD management for state and provincial wildlife management agencies. More specifically, the report was assembled under a project titled “National Coordination and Technical Assistance for the Prevention, Surveillance, and Management of Chronic Wasting Disease” that was funded by the AFWA Multistate Conservation Grant program and was administrated by the CWD Alliance. One of the objectives of this project was to document examples of CWD detection and management approaches that have thus far proven to be successful, as well those that have been implemented unsuccessfully.

Reports of CWD detection and management actions were collected, reviewed, and summarized from six states (Colorado, Illinois, Iowa, Minnesota, Missouri, New York) affected by CWD in free-ranging cervids, along with peer-reviewed publications describing current management successes or lack thereof. The anecdotal reports and publications referenced in the report, or links to them, are provided in the appendix of the complete report, which can be found at https://cwd-info.org/management-strategies/.

This review identifies management techniques that have effectively aided in early detection of CWD foci (and the agency response to them), reduced or stabilized CWD infection rates, or slowed the expansion of affected foci. These techniques are consistent with CWD management recommendations of the *AFWA Best Management Practices for the Prevention, Surveillance, and Management of Chronic Wasting Disease* and the Western Association of Fish and Wildlife Agencies’ *Recommendations for Adaptive Chronic Wasting Disease Management in the West.* The review also identifies management approaches that appear to have been unsuccessful.

Based upon the synthesis of the reports and publications included in this report, there appear to be general best practices that lead to greater

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success in managing CWD in wild cervids by state and provincial wildlife management agencies. These include, but are not limited to:

- Strong, cooperative, working relationships between state wildlife management and animal agriculture agencies that have or share regulatory authority over captive cervids.
- Rapid implementation of a previously prepared CWD response plan following the first CWD detection within a jurisdiction as well as subsequent detections in additional locations.
- Characterization of geographic distribution and CWD prevalence prior to determination of management approach(s).
- Designation of a CWD Management Zone with special restrictions and regulations under the authority of the state wildlife agency.
- A robust surveillance program capable of detecting CWD when prevalence is low, geographic distribution is limited, and the disease is more amenable to management.
- Effective public education programs that clearly state management goals while facilitating hunter and landowner support for, and compliance with, CWD-related actions, recommendations, regulations, and policies.
- A sustained and sustainable, long-term approach to CWD management, i.e., planning, funding, and implementing CWD management efforts for 10-20 year timelines.
- Harvest pressure and post-season culling that limit epidemic growth and are conducted over 10-20 year timelines.

In addition to the above management approaches, other factors were identified that appear to facilitate or contribute to the successes documented in the reports and publications:

- State wildlife agency authority over fenced, shooting facilities with mandatory CWD testing of all animals that die within the enclosures.
- Mandatory participation in a state CWD Herd Certification program for intrastate movement of captive animals.
- Ability to compare and analyze data from several jurisdictions with differing harvest management practices over a long period of time (10-20 years).
- Aerial examination of newly detected areas to determine deer density and factors that confound CWD management such as artificial congregation of deer at baiting, feeding, mineral lick, or other sites.
- Availability of an agency CWD Response Team to address concerns and interests of the public, landowners, and hunters.
- One-on-one agency staff interactions at CWD sampling stations to educate and inform hunters submitting animals for sampling.
- Quick turn-around on CWD test results to accommodate taxidermists and processors (and ensure their livelihoods) and hunters waiting to consume their venison.
- Participation and remuneration of taxidermists for collection of samples for CWD testing.

The following issues were identified as likely contributors to the apparent failure of some CWD management programs:

- Surveillance programs for first detection of CWD within a jurisdiction that were too short-lived, sampled too few animals, or did not adequately cover the geographic area needed to conclusively determine disease absence.
- Use of inappropriate statistical tables in the analysis of surveillance data that falsely support a conclusion that CWD is absent within an area.
- Implementation of CWD management responses that failed due to inadequate characterization of the prevalence and geographic extent of a newly detected CWD focus.
- Management efforts that were inadequate in scope and scale, were too short-lived, or management effort assessments were made too soon to detect measurable impacts in the target population.

The CWD Alliance was founded in 2002 as a joint project of the Boone and Crockett Club, the Mule Deer Foundation, and the Rocky Mountain Elk Foundation. These organizations recognized the critical need to promote responsible and accurate communications regarding CWD, and to support strategies that effectively control CWD to minimize its impact on native, free-ranging cervids including deer, elk, and moose.

The CWD Alliance has several ongoing and recently completed projects in support of its mission statement above, and we look forward to bringing additional information to your attention in the future. Projects to be covered in future issues of the

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SCWDS BRIEFS include the CWD Alliance's Applied CWD Research Program and a series of interactive mapping tools developed to help document, track, and manage CWD available at (CWD-INFO.ORG). (Prepared by John Fischer and Matt Dunfee, WMI)

For more information:
https://www.fishwildlife.org/application/files/5215/3729/1805/AFWA_CWD_BMPS_12_September_2018_FINAL.pdf

Pasteurellosis in Eastern Cottontails

In 2020, an ongoing outbreak of rabbit hemorrhagic disease virus serotype 2 (RHDV2) began spreading across the United States. Because of concern over RHDV2 and increased passive surveillance efforts, the number of rabbit submissions to SCWDS has increased significantly. Between 2013 and 2019, SCWDS received between 2 and 4 rabbits (primarily eastern cottontails) per year. However, SCWDS received 19 rabbit submissions in 2020, 52 submissions in 2021, and as of October 2022, 27 rabbit cases had been submitted. While RHDV2 has not been detected in any diagnostic cases submitted by SCWDS member states, the rising number of eastern cottontail submissions has contributed to a growing body of knowledge of causes of disease and mortality in this species.

In July 2021, five young eastern cottontails were found dead on private property in Sarpy County, Nebraska. Two of these rabbits had nasal bleeding (epistaxis). Combined with the history, this finding prompted concern for RHDV2, and one of these rabbits was submitted to the SCWDS Research and Diagnostic Service for evaluation. The rabbit was a young, male eastern cottontail in fair to good nutritional condition with no evidence of injury externally. However, skinning the carcass revealed two full-thickness puncture wounds over the right side of the chest cavity (Figure 1). The underlying lungs were coated extensively in an easily removed sheet of tan-white, soft material, consistent with fibrin. The lungs were mottled with small hemorrhages distributed throughout all lobes. Beneath the right forelimb was a slightly granular, white-tan abscess. Microscopically, the rabbit had a severe pleuropneumonia (pneumonia centered on the external [pleural] surfaces), with occasional, scattered bacteria. The nodule beneath the forelimb was confirmed to be a bacterial abscess. Cultures of both the lung and forelimb abscess yielded heavy growth of *Pasteurella multocida.* Additionally, the liver had small areas of cell death (necrosis) with fibrin, and small clots (thrombi) within sinusoids. Liver samples tested negative for both *Francisella tularensis* (cause of tularemia) and RHDV2 by PCR. The liver lesions were thus attributed to early bacterial sepsis, which likely originated in the chest cavity. The small puncture wounds in the chest raised suspicion for a predator-induced injury, such as a cat-bite.

Figure 1. Opened carcass of an eastern cottontail, with head towards the right. The yellow arrows indicate two puncture wounds in the body wall over the chest cavity. The opened chest cavity is filled with fibrinous exudate, covering the lungs.

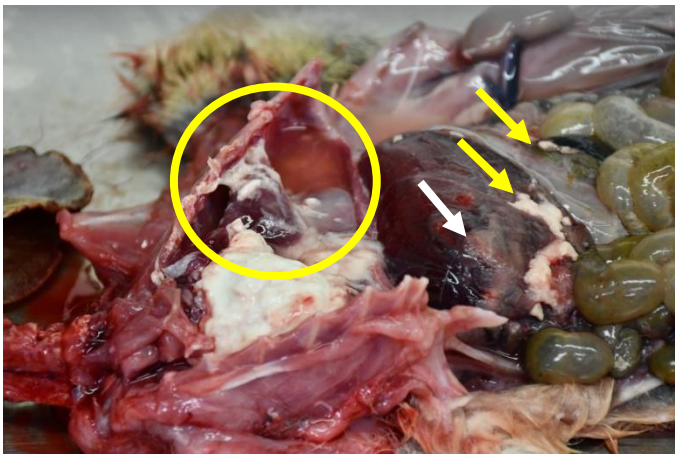

Figure 2. Opened carcass of an eastern cottontail, with head towards the left. The yellow arrows indicate some of the fibrinous exudate on the surface of the liver and spleen. The white arrow indicates a large area of inflammation and necrosis in the liver. The chest cavity is filled with similar, white-yellow fibrinous exudate. The yellow circle shows some of the adhesions between the lungs and the inner surface of the chest cavity wall. Below the circle, the heart is obscured by abundant fibrin.

In 2022, a similar case was submitted by the Georgia Department of Natural Resources. An adult, female eastern cottontail was found dead near a chicken coop in Columbia County, Georgia. This rabbit was in poor nutritional condition with scant dried blood along the muzzle and the right ear. An abscess overlaid the right scapula and a similar abscess was adhered to the skin along the sternum. The ventral aspects of the liver lobes contained scattered,

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approximately 2 cm in diameter, soft, pale tan foci and there were numerous fibrinous adhesions between the liver, stomach, small intestines, spleen, body wall, and diaphragm (Figure 2). The chest cavity was filled with abundant fibrinous exudate and a small to moderate amount of pale tan fluid and the fibrinous material surrounded and obscured the heart (Figure 2). Microscopic evaluation revealed severe inflammatory and necrotizing lesions with intralesional bacteria in the heart, liver, diaphragm, and abscessed soft tissues. Similar, milder inflammatory lesions also were present in other organs. A sample of affected heart was submitted for aerobic culture, and a moderate growth of *P. multocida* was isolated, as well as light growth of *Escherichia coli*. RHDV2 and tularemia test results were both negative. These findings confirmed cause of death as bacterial sepsis due to *P. multocida,* or pasteurellosis.

Pasteurellla multocida is a relatively common cause of abscesses and systemic infection or sepsis in a variety of wildlife species. Infections are often opportunistic, affecting individuals with decreased immune system function. This pathogen can be spread directly between animals, through contaminated food or water, via aerosols, or via bite wounds, as is suspected in the first case described. Pneumonia is a common presentation in many species. In wild lagomorphs, significant mortality due to *P. multocida* is most commonly reported in European brown hares (*Lepus europaeus*), whereas in the eastern cottontail, descriptions in the literature are less common. At SCWDS, a few cases have included reports of multiple rabbits found dead on site. One such submission involved three rabbits, two of which were juvenile cottontails in poor nutritional condition that had evidence of acute bacterial sepsis attributed to *P. multocida*. Thus, pasteurellosis should remain an important differential in cases where one or multiple rabbits are sick or found dead. Clinical signs can presumably vary significantly based on the organs affected. Because of the presumed rapid progression of septic cases, gross lesions are not always present, and microscopic findings and bacterial culture are necessary to reach a diagnosis. Some cases, as in the two described here, may have highly visible lesions in multiple organs. Variation in lesion patterns could be attributable to age, immune status, concurrent disease or environmental stressors, nutritional condition, method of infection, and other variables.

In numerous species, including domestic rabbits, cats, dogs, and multiple ruminant and livestock species, *P. multocida* can be part of their normal respiratory tract microflora or carried subclinically. In domestic rabbits, pasteurellosis can cause acute and fatal sepsis, conjunctivitis and/or rhinitis, middle or inner ear infections (otitis media/interna), and pneumonia, amongst other conditions. In domestic rabbits, *P. multocida* is considered highly contagious and it can spread via direct contact. However, most of these infected rabbits are apparently asymptomatic or subclinically affected. In humans, *P. multocida* infections are often caused by infected bite wounds, especially from cats. Infection can develop rapidly, and evaluation by a medical professional and treatment with antibiotics is recommended as more severe infections could develop in immunocompromised individuals. (Prepared by Alisia Weyna, Tori Andreasen, Nicole Nemeth)

Snake Health Assessment in the Southeast

Snake health research is critically needed to conserve snake populations and protect ecosystem health. Snakes contribute to overall biodiversity as intermediate predators, maintaining trophic webs, and increasing ecosystem productivity. Many snakes consume small mammals such as rodents, thus assisting in the control of zoonotic pathogens they may harbor. Currently, numerous factors threaten snake health, including habitat destruction and fragmentation, invasive species, human persecution, and infectious diseases.

Fungal diseases of wildlife pose significant threats to global biodiversity. Ophidiomycosis (also known as snake fungal disease) is caused by the fungus *Ophidiomyces ophidiicola* and has been documented in more than 40 snake species worldwide, including species of conservation concern. Recent surveillance efforts encompassing numerous species and geographic regions have demonstrated that ophidiomycosis is widespread in the eastern United States and that the prevalence of *O. ophidiicola* and clinical disease vary spatially and among snake taxonomic groups. However, these studies neglect the evaluation of co-infections, which are key considerations in wildlife health and likely impact ophidiomycosis-associated morbidity and mortality. Previous work in Lake Erie watersnakes with ophidiomycosis found evidence of comorbidities, including endo- and ectoparasites

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and concurrent bacterial infections, but did not identify specific co-pathogens. Co-pathogens of interest in wild snake populations in the southeastern U.S. include viruses (serpentoviruses and ranaviruses), parasites (*Raillietiella orientalis*, *Cryptosporidium serpentis*, and *Hepatozoon* spp.), and bacteria (*Mycoplasma, Salmonella*, and *Chlamydia).* Snake-associated serpentoviruses and the invasive pentastome *R. orientalis* have been reported in native snakes in Florida, presumably introduced by invasive python species, and are likely widespread in the southeastern U.S. Co-infections with these pathogens have been documented in snakes, but little is known about their prevalence and impact in wild snakes.

To better understand snake health in the southeastern U.S., SCWDS has initiated a collaborative project pairing ophidiomycosis surveillance with multi-pathogen surveillance and analyses of blood parameters. This project is partially funded by the Morris Animal Foundation, as well as crowd funding resources through the Wildlife Disease Association. The project involves live capture and sampling of a diversity of snake species at three field sites with wetland habitats: Whitehall Experimental Forest (Athens, Georgia), Lake Woodruff National Wildlife Refuge (DeLand, Florida), and Savannah National Wildlife Refuge (Hardeeville, South Carolina). Snakes are live captured, visually examined, and biological samples (swabs, blood, feces) are collected. To date, we have sampled 82 individual snakes, representing 21 different species. Laboratory testing is ongoing and results from physical examinations, pathogen testing, blood analysis, and fecal parasitology will be used to investigate if the presence of co-infections alter the severity of ophidiomycosis.

Concurrently, we are incorporating a passive surveillance approach using dead snakes that are either opportunistically collected by agency personnel or submitted to the SCWDS Research and Diagnostic Service as part of mortality investigations. Full postmortem examinations and targeted sample collections for specific pathogen testing are performed. In 2022, SCWDS examined 15 snakes of seven different species from North Carolina, South Carolina, Louisiana, and Florida. Findings have included bacterial sepsis, ophidiomycosis, disseminated *Hepatozoon* sp. infection, a subcutaneous *Eustrongylides* sp. nematode, multiple gastrointestinal parasites, and a heavy pentastome burden. We will evaluate associations between pathogen detection and necropsy findings to assess how pathogens are impacting snake health and will determine the likelihood of pathogen detection by swab/tissue type to make recommendations about surveillance methods. Our comprehensive, multi-pathogen approach will help inform the development of snake conservation strategies, especially in fragile wetlands and for imperiled species, to mitigate the impacts of snake fungal disease and other pathogens on snake health and biodiversity. (Prepared by Ellen Haynes, Corinna Hazelrig, Chris Cleveland, and Nicole Nemeth)

Field Evaluation of NalMed-A for Immobilizing Raccoons

Chemical immobilization is an essential tool for wildlife researchers and veterinary professionals. Proper selection of immobilizing agents is crucial to the safety of both animals and personnel. Certain pharmaceuticals are strictly regulated by the U.S. Drug Enforcement Administration (DEA) due to the potential for human abuse (e.g., ketamine), creating challenges for wildlife professionals to obtain, store, and use certain chemical immobilization drugs during wildlife management and research activities. A promising solution to this problem is NalMed-A; a drug combination containing nalbuphine (40 mg/mL), medetomidine (10 mg/mL), and azaperone (10 mg/mL) developed by Wildlife Pharmaceuticals (Windsor, CO) as an effective alternative to drug combinations containing DEA-regulated compounds. It was first evaluated in Rocky Mountain elk, and more recently a variety of other species including aoudad, American beaver, American black bear, American bison, and feral swine. NalMed-A induced effective immobilization in these species, except for American beaver and feral swine.

SCWDS personnel began using NalMed-A in 2020 as an alternative to ketamine/xylazine for immobilization of raccoons for biological sampling during field research and surveillance activities. In order to improve our field sedation protocols using NalMed-A in raccoons, we conducted a study to determine the effectiveness of this drug combination for field use. Adult raccoons were sedated as part of ongoing parasite and pathogen surveillance projects in multiple states from May 2021-February 2022. A total of 16 raccoons were captured via cage trap and sedated with NalMed-A (0.3 mL) hand injection. Once sedated, biological sampling included ectoparasite removal, ear-tagging, and blood

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collection. Rectal temperature, heart rate, respiratory rate, and blood oxygen saturation levels were monitored during immobilization. Time until immobilization, degree of sedation, and time until complete reversal were assessed for each individual. Sedation was reversed using 0.6 mL of atipamezole (25mg/mL) and 0.15 mL of naltrexone (50mg/mL) after 20 minutes of immobilization.

Heart rate, respiration rate, and oxygen saturation remained within normal limits for the species. Body temperature gradually decreased over the 20-minute period, and we recommend using supplemental heat when immobilizing animals for prolonged periods. Collectively, the mean induction time was 6 minutes (range: 4 -17 minutes) and the mean reversal time was 10 minutes (range: 6-18 minutes). Reversal times were generally shorter than those observed using ketamine/xylazine and did not require a waiting period for reversal. Fifteen individuals in this study received a desirable sedation score. The single animal that did not reach a desirable state of sedation became briefly aroused during initial handling but settled with time and did not require an additional dose. This individual was the heaviest animal in the study, so received the lowest dose per weight (2.2 mg/kg) and had the longest induction time (17 minutes). Overall, the average dose given was 3.0 mg/kg (range: 2.2 - 4.1mg/kg). All other raccoons in the study achieved quality sedation suggesting 3.0 mg/kg as an effective dose for raccoons. In summary, NalMed-A provided a safe and effective short-term chemical immobilization for raccoons in this study. Lack of DEA-regulated compounds in NalMed-A coupled with short induction and reversal times make this drug combination an ideal option for use in raccoons by wildlife professionals in the field. (Prepared by Emily Doub, Chris Cleveland, Mark Ruder, Michael Yabsley)

National 2-Day Symposium on Asian Longhorned Tick August 23rd-24th 2022

Recently, SCWDS worked with the National Cattlemen's Beef Association (NCBA) and the United States Department of Agriculture (USDA) to organize a two-day virtual symposium focused on the Asian longhorned tick (*Haemaphysalis longicornis,* Figure 3) and its potential impact on the U.S. cattle industry.

Figure 3. The invasive Asian longhorned tick on a domestic cow (left) and on the underside of vegetation (right).

In addition, other ticks of importance to the cattle industry were also discussed. This symposium brought together researchers, USDA and state veterinary personnel, and cattlemen to present on aspects of the epidemiology of ticks and their pathogens, treatment and diagnosis of tick-borne pathogens, and practical methods for tick control and prevention. There were also discussions on responses to the Asian longhorned tick by a panel of state veterinarians. SCWDS faculty presented on ticks of veterinary importance and how to identify ticks from livestock. More details on the symposium and free links to all talks are available on the NCBA's website: https://www.ncba.org/producers/tick-symposium-registration. SCWDS has been conducting active and passive surveillance for the Asian longhorned tick since it was first noted in the United States in 2017. A frequently updated map of the distribution of the Asian longhorned tick and a host list is available on the SCWDS website at https://scwds.shinyapps.io/haemaphysalis/.
(Prepared by Michael Yabsley)

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