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January 2000

SCWDS BRIEFS: Volume 15, Number 4 (January 2000)

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SCWDS BRIEFS

A Quarterly Newsletter from the
Southeastern Cooperative Wildlife Disease Study
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Volume 15

January 2000

Number 4

More TB in Michigan

Bovine tuberculosis (TB) recently was confirmed in three wild deer in the Michigan counties of Antrim, Mecosta, and Osceola. These three counties are distant from the area in the northeastern portion of the lower peninsula where TB has been documented annually in deer since 1994 (SCWDS BRIEFS Vol. 14, No. 1). TB also has been diagnosed in two additional northeastern Michigan cattle herds...a beef herd and a dairy herd, both in Presque Isle County, bringing the total number of TB-infected cattle herds in Michigan to five. The beef herd has been depopulated.

During the fall and winter of 1999-00, heads from more than 19,000 hunter-killed deer were examined for TB lesions. Most of the deer were from a 20-county area in northeastern Michigan, including the current quarantined area bounded by I-75, Michigan Highway 55, and Lake Huron. At least 25 deer were tested in nearly every county in the state, and it was through this statewide surveillance that the three positive counties outside the quarantined area were identified. Preliminary results from 1999 show that 55 of nearly 10,000 deer tested positive for TB in the quarantined area compared with 78 positive deer among approximately 9,000 sampled in 1998. Since 1997 the percentage of positive deer has been decreasing in the five-county area in northeastern Michigan, which includes the core TB area. Additional TB surveillance in wildlife has detected a coyote and a red fox with bovine TB infections, bringing the total number of positive carnivores to 11. Bovine

TB has not been found in nearly 600 hunter-killed elk tested since 1998. The elk range in the quarantined area is in close proximity to free-ranging deer with TB. (Prepared by John Fischer with information from the Michigan Department of Natural Resources [www.dnr.state.mi.us])

New Tick-borne Disease in the South

Most people who participate in outdoor recreation or work in woodland settings in the southeastern United States have their own personal accounts of encounters with ticks and/or the infections that ticks can transmit to people. In addition to the irritation of uncomplicated tick bites, the list of human illnesses that can be acquired via tick bites is impressive. It includes: 1) tick paralysis caused by neurotoxins secreted by feeding ticks, especially adult ticks in the genera *Dermacentor*, *Amblyomma*, and *Ixodes*; 2) Rocky Mountain spotted fever, transmitted in this region mainly by the common American dog tick (*Dermacentor variabilis*); 3) human monocytic ehrlichiosis, transmitted by the lone star tick (*Amblyomma americanum*); 4) human granulocytic ehrlichiosis, transmitted by the black-legged tick (*Ixodes scapularis*); and 5) Lyme disease, also transmitted by the black-legged tick. Considering this list, it is not surprising that another tick-borne illness has been identified in the southeastern United States.

The Division of Vector Borne Infectious Diseases at the Centers for Disease Control and Prevention coined the term "Southern Tick-Associated Rash Illness" or "STARI" for this newly recognized disease. Coincidentally, but fittingly, the occurrence of this disease has been associated

with bites by the lone star tick. A potential causative agent and previously unknown spirochete bacterium, *Borrelia lonestari*, has been identified in lone star ticks from several states. *Borrelia lonestari* is related to *B. burgdorferi*, the causative agent of Lyme disease, and causes an acute rash similar to Lyme disease but without the more severe chronic manifestations of Lyme disease. In fact, although *B. burgdorferi* has been identified in *Ixodes* ticks and wild mammals in the Southeast, isolates of the Lyme agent from suspected human cases have not been obtained in this region. Currently, there is a debate within the scientific community as to the actual cause(s) of Lyme disease-like illnesses in the Southeast. Clearly, additional research will be required in order to fully understand the current situation.

The good news is that the newly recognized illness responds to the same regime of antibiotic therapy used for Lyme disease and ehrlichiosis. In addition, the same preventive measures to avoid tick bites apply here, including use of tick or insect repellents, wearing long pants and long-sleeve shirts, and prompt removal of ticks. Informing your physician of any recent tick bites also will be helpful in the diagnosis and treatment of febrile illnesses with accompanying rash. (Prepared by Randy Davidson)

Exotic Tortoise Ticks in Florida

Heartwater is an acute disease of wild and domestic ruminants including cattle, sheep, goats, deer, and antelope that is caused by the rickettsia *Cowdria ruminantium* and is spread by ticks of the genus *Amblyomma*. Heartwater is native to Africa but also occurs on three islands in the Caribbean. All domestic and wild ruminants in the Western Hemisphere probably are fully susceptible. In one experimental trial, all untreated white-tailed deer inoculated with *C. ruminantium* died. If this organism becomes established in the United States, mortality rates among susceptible species such as cattle could be high. Because there is no officially recognized treatment or practical vaccine, prevention relies on control of the tick vectors. To complicate the situation, three tick species native to the southeastern United States (*A. cajennense*, *A.*

dissimile, and *A. maculatum*) have been shown experimentally to be capable vectors.

During December 1999, researchers with the University of Florida collected exotic *A. sparsum* ticks from tortoises that recently had been imported into Florida from Africa. These ticks contained DNA compatible with *C. ruminantium*. Even though this was the first time that evidence of *C. ruminantium* has been detected in the United States, it is important to note that heartwater has not been diagnosed in any domestic or wild species. Nevertheless, the discovery of *C. ruminantium* DNA in the ticks is a serious matter and, as a result, the Florida Department of Agriculture and Consumer Services (FDACS) announced an emergency rule requiring captive wildlife species, including reptiles and amphibians, to be inspected and certified free of ticks prior to entry into Florida. At the same time, the Florida Fish and Wildlife Conservation Commission announced an emergency rule temporarily banning the importation of African spurred tortoises (*Geochelone sulcata*) and leopard tortoises (*Geochelone pardalis*) into Florida.

Importation of exotic ticks on certain species of reptiles being brought into the United States for the commercial pet trade is commonplace. For example, during a two-month period in 1994-1995, USDA inspectors found that 97 of 349 shipments (27.5%) of exotic reptiles arriving at the Miami International Airport were infested with ticks. In 1995, about 2.5 million live reptiles were legally imported into the United States. A breeding population of *A. marmoratum* was found at the home of an importer/breeder of exotic tortoises in 1997. Active surveillance of captive exotic reptiles by the FDACS and the University of Florida and wildlife surveillance by SCWDS at sites with tick-infested exotic reptiles have been ongoing since 1997.

The potential for wildlife involvement at sites infested with exotic ticks and potentially with *C. ruminantium* is troubling. Although most of the imported reptiles are housed indoors, some in southern Florida are kept outdoors where these

exotic ticks will survive. In fact, reproducing populations of exotic ticks have been found in at least two facilities where captive exotic reptiles are held. Wildlife use of the infested areas has been documented by SCWDS, but infestations of native wildlife by exotic ticks have not been detected. The emergency rules enacted in Florida may temporarily reduce the import of exotic ticks and tick-borne diseases via the reptile trade; however, long-term solutions to this disease threat are being sought by federal and state agencies. (Prepared by Joe Corn)

***E. coli* O157:H7 in Deer and Cattle**

Outbreaks of *Escherichia coli* O157:H7 among humans often are associated with consumption of undercooked contaminated beef, although human cases also have been associated with other food products, contaminated water supplies, and swimming pools. In 1995, a small cluster of human infections in Oregon was associated with consumption of home-prepared venison jerky contaminated with *E. coli* O157:H7. The bacterium subsequently was isolated from deer feces collected near the Oregon location where hunters killed the source deer. *E. coli* O157:H7 with indistinguishable DNA fingerprints also was isolated from deer and cattle feces collected from the ground on a Texas ranch. Subsequent studies conducted by SCWDS and The University of Georgia's Center for Food Safety and Quality Enhancement (CFSQE) showed that experimentally inoculated white-tailed deer carried and shed *E. coli* O157:H7 in feces similarly to inoculated cattle and sheep (SCWDS BRIEFS Vol. 13, No. 1).

In 1997, SCWDS and CFSQE surveyed deer in Georgia and other southeastern states for *E. coli* O157:H7. Over 400 individual deer were sampled, and only three positive animals were found, all at one northwest Georgia location (SCWDS BRIEFS Vol. 13, No. 4). In 1998, SCWDS and CFSQE sampled twice as many deer and more than 300 domestic cattle at that northwest Georgia location, and, although 4% of the cattle were positive, *E. coli* O157:H7 was not isolated from deer. Furthermore, genetic analysis showed that DNA fingerprints of the isolates

from the cattle did not match the fingerprints of the deer isolates from the previous year. These results indicate there was no apparent relationship between *E. coli* O157:H7 in sympatric cattle and wild deer sampled in this study, and it appears unlikely that deer were serving as a reservoir of *E. coli* O157:H7 for the cattle at this location.

Recent research suggests that there may be differences in the transmissibility and virulence of strains of *E. coli* O157:H7 isolated from cattle compared with strains from humans. Studies conducted at the University of Nebraska comparing *E. coli* O157:H7 isolates from cattle and humans revealed that most human and bovine isolates were of two separate genetic lineages (on the internet at www.pnas.org, see Jaehyoung et al., Vol. 96, Issue 23, pp. 13288-13293). Deer isolates were not evaluated. The Nebraska researchers suggested that a large portion of *E. coli* O157:H7 strains from cattle may belong to a genetically distinct population that is not readily transmissible or virulent to humans. Nevertheless, the fact that several outbreaks of human disease have been linked to contaminated beef indicates that virulent strains can occur in cattle, and measures should be taken to prevent exposure of humans to contaminated products. (Prepared by John Fischer)

Health Check of Kansas Bobwhites

As part of a study on the population dynamics of bobwhites in Kansas by the University of Wisconsin and the Kansas Department of Wildlife and Parks, SCWDS provided assistance by conducting health evaluations of bobwhites during 1997 and 1998. The health assessments included necropsy, serologic testing for selected diseases, and parasitologic examinations on 25 bobwhites; less detailed examinations were done on an additional 44 bobwhites. An impetus for this work was previous submissions of bobwhites to SCWDS for diagnosis of small whitish lesions seen occasionally in the breast muscle of hunter-harvested bobwhites from the study site. These lesions were caused by encysted larval nematodes in the genus *Physaloptera*.

No evidence was found of avian pox, quail bronchitis, mycoplasmosis, avian cholera,

salmonellosis, or ulcerative enteritis. Only a few parasites were found including low numbers of intestinal coccidia; a few specimens of two species of proventricular nematodes; and low numbers of ticks, lice, chiggers, feather mites, and nasal mites. Lesions caused by encysted larval *Physaloptera* were found in the breast muscles of four bobwhites. There are many species of *Physaloptera*, and the adult forms infect a variety of carnivores and omnivores including coyotes, foxes, opossums, raccoons, skunks, and raptors. The lesions caused by these larval nematodes were not judged harmful to the bobwhites.

Compared to bobwhites examined by SCWDS from the southeastern United States (e.g., GA, FL, LA, NC, SC, TN), the prevalences and intensities of various disease agents and parasites among these Kansas bobwhites were very low. The single exception was the occurrence of the larval *Physaloptera*, which we have found very infrequently in bobwhites elsewhere. (Prepared by Randy Davidson)

HD and CWD Surveys

All but 11 states have returned their 1999 surveillance questionnaires for hemorrhagic disease (HD) and chronic wasting disease (CWD) in wild Cervidae. Although there was substantial HD activity, fortunately, there were no new problems with CWD.

Twenty-one states reported confirmed or suspected HD, viz., AL, AR, DE, GA, IL, KS, LA, MD, MS, MT, NC, ND, NE, NJ, OK, SC, SD, TX, VA, WA, and WV. British Columbia also had activity. Reports in many states were confirmed by virus isolations. Serotype 1 epizootic hemorrhagic disease virus (EHDV-1) was recovered from whitetails in GA, MD, NC, NJ, and VA, and EHDV-2 was found in deer in MD, MS, NC, SD, and VA. A single serotype 13 bluetongue virus was isolated from a deer in North Carolina. Untyped EHD viruses were reported from animals in Colorado and British Columbia. Sizable mortality events were reported in AL, DE, GA, MD, MO, MT, NC, NJ, OK, VA, WA, and British Columbia.

Thirty-one states responding to the CWD surveillance questionnaire reported that "target" animals were not identified. A "CWD target animal" is: *A deer or elk 18 months of age or older that is emaciated and showing some combination of signs including abnormal behavior, increased salivation, tremors, stumbling, incoordination, difficulty in swallowing, excessive thirst, and excessive urination.* Only six states reported that they had identified and pursued diagnostic evaluation of "target" animals, which is disturbingly low. Fortunately, all the target animals that were evaluated were negative for CWD. On a more positive note, at least eight states are conducting surveys for CWD utilizing brains collected from hunter-killed deer or elk. Approximately 2,300 deer and elk were reported on the 1999 CWD questionnaire, and the only positive results to date were from animals in the endemic area in Wyoming.

A preliminary (draft) report for the HD and CWD surveys will be mailed to all participants in February for their review. We anticipate that this mailing will stimulate new information which can be added to produce Final Reports for 1999. Once again, we would like to extend our appreciation to the many wildlife biologists and veterinarians who have taken time to provide the information for these nationwide surveillance efforts. Persons interested in copies of the 1999 reports can contact SCWDS. (Prepared by Victor Nettles)

WDA Conference

The 49th Annual Conference of the Wildlife Disease Association (WDA) will be held June 4-8, 2000, at Jackson Lake Lodge in Grand Teton National Park in Jackson Hole, Wyoming. The WDA Conference is THE event of the year for wildlife disease professionals, and many leaders in the field will attend from throughout the world. Pre-registration is required and must be completed by March 1, 2000; requests to present a paper or poster at the meeting must be received by April 1, 2000. For information regarding a paper or poster, check the WDA web site at <http://www.vpp.uga.edu/wda>. For details

regarding registration, travel, hotel accommodations, and planned activities, contact Becky Russell, Box 3312, University Station, Laramie, Wyoming 82071; telephone 307-766-5616; FAX 307-766-5630; or e-mail rrussell@uwyo.edu

New USGS Field Manual

A new book was recently produced by the staff at the National Wildlife Health Center (NWHC) in Madison, Wisconsin, entitled *Field Manual of Wildlife Diseases: General Field Procedures and Diseases of Birds*. This is an update of a similar manual published in 1987, but at 425 pages, this new edition is almost double the size of the earlier book. As the subtitle indicates, the book covers procedures on collecting data and specimens in the field and has chapters on the various diseases

and other maladies of birds. Although the book concerns itself mostly with waterfowl and raptors, much of the information applies to other avians. The book is replete with scores of high-quality color photographs and has a comprehensive Index and Glossary. Price is \$48. Additional information, including the Table of Contents, is available on the web site of the NWHC at emtc.nbs.gov/http_data/nwhc/man-toc.html. An order form can be downloaded from this site, or the book can be ordered by telephoning the NWHC at 608-270-2402.

Address Changes/Additions

Address changes or requests to be added to the SCWDS BRIEFS mailing list can be sent to dwood@calc.vet.uga.edu.

Information presented in this Newsletter is not intended for citation in the scientific literature. Please contact the Southeastern Cooperative Wildlife Disease Study if citable information is needed.

Recent back issues of *SCWDS BRIEFS* can be accessed on the Internet at SCWDS.org.