11-2010

Indiana Wildlife Disease News, Vol 5, Issue 3 -- November 2010

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Deer nose botflies have been reported from nearly all areas of the continental U.S. and Canada. They have not been reported from the Great Plains, Ohio, Kentucky, Tennessee or Alabama. An unidentified species has been reported from white-tailed deer in Florida. Interestingly, the known distribution of the parasites does not completely cover the geographic range of potential cervid hosts.

**Description and Distribution**

Aristotle almost certainly described larvae of *Cephenemyia*, commonly known as deer nose bots, when he wrote, "Without any exception stags are found to have maggots living inside the head, and the habitat of these creatures is the hollow underneath the root of the tongue, and in the neighborhood of the vertebrae to which the head is attached. These creatures are as large as the largest grubs; they grow altogether in a cluster, and they are usually 20 in number".

**Disease in Focus**

**Nasal bots in White-tailed Deer**

Deer nose bots in the nasal cavity of a deer. Photo MDNR.

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**Wildlife Management Update**

**Recent Changes to the Indiana DNR Division of Fish and Wildlife**

Reiter, was named DFW director after serving a number of years as the Public Lands Program Manager where he had oversight of public lands owned by the DFW, and the personnel who manage them. This past summer, James Kershaw was promoted to that Public Lands Program Manager position. He had been serving as the supervisor of Public Access Sites in the Public Lands unit.

In March 2010, Wayne Bivans retired from a long career in DNR, serving most recently as the Chief of Wildlife. Mitch Marcus, who had been serving as Wildlife Staff Specialist under Wayne, was named the new Chief. The Chief of Wildlife oversees Indiana’s public and private land wildlife management and research activities, plus the Wildlife Diversity unit which focuses on non-game wildlife.

Article by D. Zimmerman
Nasal bots (continued from pg 1)

There are at least five species of Cephenemyia in North America: C. apicata in the west, infecting mule deer; C. jellisoni in the northwest, infecting mule deer, white-tailed deer, moose and elk; C. phobifer in the northeast, infecting white-tailed deer and moose; C. pratti in the southwest infecting mule deer and white-tailed deer; and C. trompe in the north, infecting white-tailed deer and caribou.

C. phobifer is the only species known to occur in Michigan. A survey in the 1970’s showed the parasite was quite common in adult deer in both Regions I and II in the spring, and rare in those from Region III. Deer less than 1 year old are not quite as apt to have nose botfly larvae as are adults.

Transmission and Development

The eggs of Cephenemyia hatch in the uterus of the female fly and while in flight she ejects minute larvae into the nostrils of the host deer. The larvae migrate to the retropharyngeal pouches which lie on either side of the throat at the base of the tongue. There they become attached in clusters and develop.

Developing larvae are white; while fully developed larvae are about 25 to 36 mm long and yellowish-brown. When the larvae have completed their development, they are expelled from the throat. They then seek a suitable place in the soil to pupate and after a relatively short pupal period (2 to 3 weeks) adult flies emerge. The adult flies have no mouth parts for feeding so they are short-lived and must mate shortly after emerging, thus completing their life cycle.

There may be two generations a year of C. phobifer in Ontario and Michigan white-tailed deer. In these areas, the winter cycle requires about 6 months of development and the summer cycle about 3 months.

Clinical Signs and Pathology

External signs of the presence of deer nose bots are seldom noticeable. Behavior such as snorting and lowering of the head may indicate the migration of released mature larvae within the nasal passages. Nasal discharge and giddiness may also become evident. Occasionally, heavy infections may cause death by suffocation. Death may also result from detached larvae migrating to the lungs.

The retropharyngeal pouch is usually enlarged in infected deer and may become markedly inflamed. The epithelium of the pouch appears pitted or eroded and may become partly detached, necrotic and edematous.

Diagnosis

Diagnosis of nasopharyngeal myiasis (nose bots) consists merely of finding the larvae within the host. In order to identify the larvae to species, it is usually necessary to rear them to the adult stage.

Treatment and Control

Treatment and control of nose bots in wild deer is impractical and apparently unwarranted. In penned deer, the application of pine tar to the muzzle has been recommended.

Significance

Cephenemyia species are known to infect only deer, and meat from these animals is suitable for human consumption, thus there is no public health significance. They are apparently well tolerated by white-tailed deer and cause no problems. However, C. trompe is considered to be a serious problem in domestic reindeer management in Scandinavia. It is estimated that in Sweden, the losses due to C. trompe and the grub fly (Oldemagena tarandi) amount to about 2 million Swedish crowns per year, which is approximately 15% of the income from reindeer production.

Two New Wildlife Health Reporting Tools

Two new tools that enable the public to report sick or dead wild animals could also lead to the detection and containment of wildlife disease outbreaks that may pose a health risk to people.

The Wildlife Health Event Reporter (WHER) is a new website that enables anyone with an Internet connection to report sightings of sick or dead wildlife.

HealthMap.org has enhanced its mobile phone application “Outbreaks Near Me” to accept and relay wildlife health reports to the WHER site. The application continues to accept reports of human illness.

Researchers in the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison and the U.S. Geological Survey National Wildlife Health Center in Madison created the WHER so that people around the world can easily share information about possible health threats to wildlife and humans.

“Avian influenza, SARS, West Nile virus, and rabies are just a few of the rogues’ gallery of human diseases in which wildlife play a role. Seventy-five percent of recent emerging infectious diseases in humans began as animal infections, and most of these have involved wildlife,” explains USGS scientist Joshua Dein, one of the WHER’s developers.

“If these tools had been available 10 years ago, we might have had an earlier identification of West Nile virus by people reporting that they were seeing dead crows in their backyards,” said Dein. “We don’t know what the next emerging disease outbreak will be, but given recent history, it will likely be preceded by wildlife health events.”

Users of the WHER create accounts online to register sightings of sick or dead wildlife. Anyone can visit the site to see what others have reported and can subscribe to an RSS feed to receive new reports via e-mail. Reports can be limited to specific states, and data can be readily exported or sent through special feeds to other websites.

Local wildlife officials who wish to be notified of observations also can subscribe and, when available, their contact information will be given to those who submit reports.

“Outbreaks Near Me,” created by Children’s Hospital Boston researchers Clark Freifeld and John Brownstein, is available at no cost and can be previewed online.

“These tools are the first with the capacity to accept wildlife health reports from anywhere on earth and deliver wildlife disease information to the wildlife and medical communities,” said Lewis Gilbert, associate director of the Nelson Institute. “We hope that they will help the public act as an army of observers looking for signs of new or emerging diseases at both the national and international level.”

Dein notes that the WHER is experimental and will require high participation rates over a considerable period of time to provide useful data. He adds that despite the connections between human and animal diseases, people should not view wildlife as a threat to human health.

“A more accurate vision is that we all share risks from these disease threats,” said Dein. “These new tools can help researchers use wildlife as sentinels to alert us to diseases in the environment.”

Dein points out that toxic contamination of soil, air and water is often first recognized by reports of dead fish and wildlife and that animals also can serve as models of the progression of an emerging disease in people and how a new disease might spread in human populations.

Both the WHER and “Outbreaks Near Me” are designed to advance One Health, a worldwide initiative to expand interdisciplinary collaborations and communications in all aspects of health care for humans, animals, and the environment.

The new tools also are examples of “citizen science,” which capitalizes on the public’s ability to help record and map natural phenomena, providing timely information to researchers.

Article from information on the USGS National Wildlife Health Center web site.

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Note from the Editors

No Summer 2010 Issue of Indiana Wildlife Disease News

Just a quick note in case you were wondering why you did not receive a summer issue of the Indiana Wildlife Disease News. There was none. We strive to produce this publication 4 times per year, but occasionally, our other duties get in the way of producing Indiana Wildlife Disease News. In those cases, we roll up any information that was slated for a particular issue into the next issue, as we did with this one.

Cheers. Joe Caudell and Dean Zimmerman, Co-editors, Indiana Wildlife Disease News.

New Contact at National Wildlife Health Center for Central US States - Dr. LeAnn White

LeAnn White attended the College of William and Mary from 1995 – 1998 where she earned a bachelor’s degree in biology. After graduating, she worked for the Virginia Institute of Marine Science until she began a master’s degree at the University of Florida in the Department of Wildlife Ecology and Conservation in the fall of 1999. After completing her Master of Science degree in 2003, she worked on a gopher tortoise project studying factors associated with Upper Respiratory Tract Disease. She began her doctorate in August 2005 in the Department of Infectious Diseases and Pathology and completed her Ph.D. in December 2009. She also completed her Masters of Public Health with a concentration in Epidemiology in May 2008. She is currently a member of the Field Investigation Team at the United States Geological Survey, National Wildlife Health Center in Madison, Wisconsin. She is the NWHC contact for morbidity and mortality events occurring in the Central U.S. states.

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Two Kentucky Cows Test Positive for TB - Two beef cattle in Kentucky have tested positive for bovine tuberculosis, and state veterinarian Robert Stout said results are pending on a third animal. The two infected cows were in a Fleming County herd in northern Kentucky. Stout said the disease was discovered when a cow from the farm was slaughtered in Pennsylvania and tested positive. The rest of the Fleming County herd was tested, and two other cattle were suspected of having the disease, one being confirmed positive. Kentucky had been bovine tuberculosis free since 1987, and Stout indicated that status would likely not change if no other animals test positive in the next six months. Bovine tuberculosis causes severe coughing, fatigue, emaciation, and debilitation in cattle, along with reduced milk and meat production. (Source - Joe Caudell, USDA APHIS, August 2010, personal communication, edited)

Ohio Dairy Cow TB Positive - Ohio Department of Agriculture Director Robert Boggs announced in a July 2010 news release that preliminary tests performed by the department’s Animal Disease Diagnostic Laboratory revealed a positive result for bovine tuberculosis in a Paulding County (county just east of Ft. Wayne, IN) dairy herd. There is no known human illness associated with this occurrence. The herd was found positive after routine tuberculosis testing by the department. The herd was depopulated, and the department is currently conducting a trace-in and trace-out investigation to determine if other livestock may be affected. Steps were being taken to determine the origin of the affected cattle. (Source - Ohio Dept. of Agriculture News Release, July 7, 2010, edited)

Vaccine Targets CWD in Deer and Elk - The University of Saskatchewan is working toward commercializing a vaccine that targets chronic wasting disease (CWD) in domesticated and wild deer and elk populations. The vaccine, developed by the Vaccine and Infectious Disease Organization and International Vaccine Centre (VIDO) at the U of S, is in the last stages of development and will be tested in domesticated elk and deer within the year. Researchers admit they won’t know how successful the new vaccine is for several years, according to Andrew Potter, CEO of VIDO. He said, “With chronic wasting disease, it can take years to develop in a population. In order to accurately measure what the vaccine does in deer and elk, it will take a period of years. We have a pretty good idea of what it will do, but it’s only a prediction.” Deer and elk are injected with the vaccine, which should immunize the animals from CWD by eliminating the disease-causing abnormal proteins from the body. (Source - Article from The StarPhoenix by Jeremy Warren, May 20, 2010, edited)

EHD Shows Up in Chicago Suburbs - A deadly deer disease is causing problems in Chicago’s south suburbs where residents are finding dead or dying deer in their backyards and in nearby forest preserves. Officials with the Illinois Department of Natural Resources say more than 30 deer have been discovered to be dying from an insect-born virus known as EHD, or epizootic hemorrhagic disease. The department began monitoring the situation near Crete, Illinois late last month. Some residents have found deer frothing at the mouth, approaching homes and humans, and dying near creeks. Those are all signs of EHD. The last major outbreak of EHD in Illinois in 2007 killed 1900 deer in 57 counties. Indiana officials report a few cases of dead deer in Lake County where evidence points to EHD. (Source - ProMed Email, August 16, 2010 posting, edited)

Newcastle Disease In Minnesota and Wisconsin Water Birds - Since late July, the USGS National Wildlife Health Center (NWHC) has confirmed that at least 800 double-crested cormorants have died in Minnesota, North Dakota, and Wisconsin from virulent Newcastle Disease virus (vNDV). Ring-billed gulls and White-tailed deer can live in close proximity to humans in suburban neighborhood. Photo USDA

Continued on pg. 6
American white pelicans have also been found dead in these same areas, but vNDV has not been confirmed as the cause of death. This virus sporadically cycles through nesting and juvenile cormorants in summer nesting colonies. The designation of vNDV indicates that this strain has the potential to cause illness or mortality in poultry, although transmission of wild bird vNDV to poultry is probably rare based on similar historic events.

Newcastle Disease (NDV) is caused by infection with an RNA virus within the avian paramyxovirus-I (APMV-I) group. Not only is NDV highly contagious, but there is great variation in the severity of disease caused by different strains of NDV. NDV had not been reported as a cause of mortality in free-living native birds of the U.S. or Canada prior to 1990. Clinical signs of NDV in wild birds have only been observed in sick nesting or juvenile double-crested cormorants and include twisting of the head and neck, paralysis of the legs and wings, lack of muscular coordination, and tremors. The virus can be transmitted by direct contact, feces, and excretions from infected birds. (Source: USGS Wildlife Health Bulletin, 2010-06, by Dr. Jonathan Sleeman)