

A JOINT PROJECT
BETWEEN

USDA APHIS
WILDLIFE SERVICES

AND

INDIANA DNR
DIVISION OF FISH AND
WILDLIFE

Indiana Wildlife Disease News



Volume 1, Issue 4

October 2006

Special points of interest:

- Report on the EHD outbreak in wild and captive deer
- CWD surveillance continues in 2006
- Update on WNV
- Tick-borne disease study in Indiana

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Epizootic Hemorrhagic Disease

Epizootic hemorrhagic disease (EHD) is an acute, infectious, often fatal viral disease of some wild ruminants. This malady, characterized by extensive hemorrhages, has been responsible for significant epizootics in deer in the northern United States and southern Canada.

A similar hemorrhagic disease called bluetongue also occurs throughout the U.S. and Canada. The two diseases are antigenically different.

Distribution

Since 1890, deer die-offs from diseases which might have been EHD have occurred in various parts of North America. These early die-offs were variously diagnosed as blackleg, black-tongue, bluetongue, mycotic stomatitis or hemorrhagic septicemia or they were undetermined. The causative agents were never confirmed. A review of the case histories, signs and lesions, seasonal occurrence, and lack of a bacterial agent suggests that they might have been EHD.

The first occurrence and subsequent identification of EHD occurred in 1955 when several hundred white-tailed deer (*Odocoileus virginianus*) succumbed in both New Jersey and in Michigan. It was considered a new disease of deer and the name 'epizootic hemorrhagic disease' was suggested to describe its main clinical and patho-

logical features.

Since these initial confirmed outbreaks of EHD, documented epizootics have occurred in white-tailed deer in South Dakota, North Dakota, Wyoming and Alberta, Canada. Suspected EHD outbreaks have occurred in Missouri, Washington, Nebraska, Iowa and British Columbia. South Dakota, Missouri and Nebraska have experienced periodic outbreaks of EHD and the disease might be considered enzootic in these areas.

Since the initial 1955 outbreak, this malady has occurred primarily among white-tailed deer, although occasionally mule deer (*O. hemionus*) and pronghorn antelope (*Antilocapra americana*) have succumbed.

Transmission and Development

The mode of transmission of EHD in nature is via a *Culicoides* biting fly or gnat. *Culicoides variipennis* is the most commonly incriminated vector in North America. A common observation in



White-tailed deer are susceptible to EHD. Photo: USDA

Continued on pg. 2

Epizootic Hemorrhagic Disease Confirmed in Free-ranging Deer From West-Central Indiana

Reports of white-tailed deer found dead for no apparent reason started in late August 2006 and climbed steadily during September. Frequently, the deer were found near or in water. Biologists with the Indiana Department of Natural Resources Division of Fish and

Wildlife quickly concluded that another outbreak of epizootic hemorrhagic disease (EHD) was underway. In late October, samples sent to the Southeast Wildlife Disease Lab in Athens, Georgia, came back positive for EHD confirming our suspicions.

Concerned landowners and

hunters reported over 300 dead deer discovered, and biologists believe the actual loss was several times that because many more dead deer probably went undetected. A total of 15 west-central and southern Indiana counties reported dead deer including: Clay, Fountain,

Continued on pg. 2

Epizootic Hemorrhagic Disease (continued from Pg. 1)

outbreaks involving large numbers of deer - as in Michigan, New Jersey and Alberta - is that they are single epizootics which do not recur. Die-offs involving small numbers of deer - as experienced in South Dakota and Nebraska - occur almost annually, and the disease appears to be enzootic in these areas. All documented outbreaks of EHD have occurred during late summer and early fall (August-October) and have ceased abruptly with the onset of frost.

Experimentally, the disease can be transmitted to susceptible deer by the inoculation of virus-laden material from infected deer by subcutaneous, intramuscular, intravenous or oral routes.

Clinical Signs

Clinical signs of EHD and bluetongue are very similar (see article on bluetongue in this issue).

White-tailed deer develop signs of illness about 7 days after exposure. A constant characteristic of the disease is its sudden onset. Deer initially lose their appetite and fear of man, grow progressively weaker, often salivate excessively, develop a rapid pulse and respiration rate, and finally become unconscious. Hemorrhage and lack of oxygen in the blood results in a blue appearance of the oral mucosa, hence the name 'bluetongue'. Eight to 36 hours following the onset of observable signs, deer pass into a shock-like state, become prostrate and die.

Pathology

The gross and histological lesions of EHD have been characterized by, as its name implies, extensive hemorrhage. The hemorrhages range from pinpoint to massive in size, and involve different tissues and organs in individual animals. No organs appear to be exempt from hemorrhage, with the most regularly involved being the heart, liver, spleen, kidney, lung and intestinal tract. Extensive hemorrhaging is the result of interference with the blood-clotting mechanism together with degeneration of blood vessel walls.

Generalized edema and increased pericardial fluid are consistently found in EHD. These changes also reflect the widespread interference with normal blood circulation.

The virus can be recovered from a variety of tissues of animals which have succumbed to EHD. These include blood, liver, spleen, kidney, lung, heart and muscle.

Diagnosis

A combination of case history, characteristic signs and lesions, and the isolation of the virus is necessary for a diagnosis of EHD. Useful aids in obtaining a diagnosis are the epizootic nature of the disease, its seasonal occurrence, and its spectacular hemorrhagic lesions. Because of the similarity of its symptoms to other diseases, such as bluetongue and malignant catarrhal fever, the isolation and identifi-

cation of the virus is essential.

Methods to be used for virus isolation are: (1) inoculation of cell cultures; (2) inoculation of susceptible sheep or deer combined with serologic monitoring; and (3) intravenous inoculation of embryonating chicken eggs.

Treatment and Control

There is no known effective treatment or control of EHD. Theoretically, an oral vaccine could be developed for administration through a supplementary winter feeding program, but this is presently impossible, impractical and unwarranted.

Significance

Because of its very high mortality rate, EHD can have a significant effect upon the deer population in a given area, reducing numbers drastically. Hemorrhagic disease can be transmitted to other wild ruminants. The EHD virus can infect domestic animals but rarely causes disease. In all probability the virus does not infect humans.

This article is from the Michigan Wildlife Disease Manual. This Manual contains a list of diseases, a description of the disease, photos, and species affected. It is an excellent on-line reference for wildlife diseases and it can be found on-line at http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220---,00.html

Source: Michigan Wildlife Disease Manual

EHD in Free-ranging Indiana Deer (continued from Pg. 1)

Greene, Jackson, Montgomery, Morgan, Ohio, Owen, Parke, Posey, Putnam, Sullivan, Vermillion, Vigo and Warren County (see map on page 3). Putnam, Clay, Parke and central Vermillion seemed hardest hit. A few cases are suspected east of Indianapolis in Henry County, but were unconfirmed. Hunters and outdoor enthusiasts may notice fewer deer in some parts of these counties.

Indiana had outbreaks of EHD in 1985, 1987, 1996, and 2004, all in the west-central and south-central part of the

state. This vector borne viral disease typically shows up in autumn when the weather pattern is dry, but wet weather was the norm this year through the summer and fall. This contributed to an early emergence of the biting midge that transmits the disease. With our first hard frost holding off until mid-October, we had a longer period of disease activity resulting in significant losses of deer in some isolated areas.

Hunters and others are not at risk to contract the disease. Cattle, sheep, and

goats have been known to test positive for EHD antibodies, but typically have not developed symptoms of the disease. A closely related disease, bluetongue (see article on page 3), is caused by a similar virus that affects domestic livestock, but rarely affects deer.

Article by D. Zimmerman, IDFW

Bluetongue

Bluetongue is an insect-borne, viral disease primarily of sheep, occasionally goats and deer and, very rarely, cattle. The disease is non-contagious and is only transmitted by insect vectors. The disease is caused by a virus belonging to the family Reoviridae.

Species Affected

Primarily a disease of sheep but other species such as goats, cattle, buffaloes, camels, antelopes and deer can be infected. Humans are not infected.

Distribution

The virus is present in most countries of Africa, the Middle East, India, China, the United States, and Mexico. Bluetongue virus infection, without associated clinical disease, is present in Southeast Asia, Papua New Guinea, northern South America and northern Australia.

Key Signs

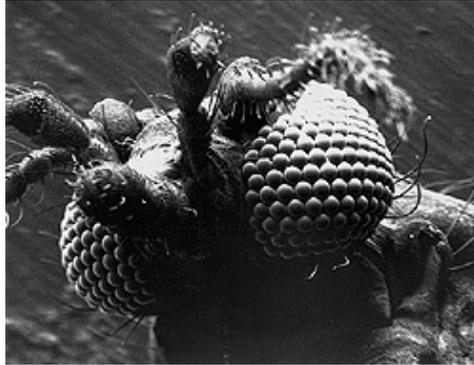
The disease is characterized by fever, widespread haemorrhages of the oral and nasal tissue, excessive salivation, and

nasal discharge. In acute cases the lips and tongue become swollen and this swelling may extend below the lower jaw.

Lameness, due to swelling of the cuticle above the hoofs and emaciation, due to reduced feed consumption because of painful inflamed mouths, may also be symptoms of this disease. The blue tongue that gives the disease its name occurs only in a small number of cases. Convalescence of surviving sheep is slow. The high fever in sheep results in wool breaks, which adds to production losses.

Spread

The virus cannot be transmitted between susceptible animals without the presence of insect carriers. The incidence and



Culicoides sonorensis is a tiny, biting midge that can infect livestock with the virus that causes bluetongue. Photo: USDA

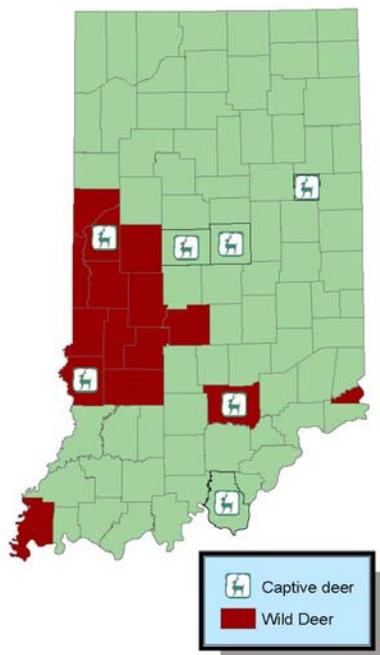
geographical distribution of bluetongue depends on seasonal conditions, the presence of insect vectors, and the availability of the susceptible species of animals. The insect carriers, biting midges, prefer warm, moist conditions and are in

their greatest numbers and most active after it rains.

Persistence of the Virus

Bluetongue virus does not survive outside the insect vectors or susceptible hosts. Animal carcasses and products, such as meat and wool, do not spread the virus. Survival of the virus within a location is dependent on whether the vector can over winter in that area.

Source: USDA



Cases and suspected cases of EHD in wild and captive deer in Indiana. Source: BOAH and IDFW

Epizootic Hemorrhagic Disease in Indiana Captive Deer

In late August, the Indiana State Board of Animal Health (BOAH) began receiving telephone calls reporting dead free-ranging deer, including several reports regarding multiple animals.

Soon after, we received reports of similar problems in captive white-tailed deer. In December, we received one report of losses to a captive fallow deer herd. Other than these 2 species, there have been no reports of the disease in other species of deer.

Areas reporting losses in captive deer herds included:

Hamilton County – one herd lost 5 to 10 deer (adults and fawns) from an inventory of about 30 animals.

Boone County – one owner lost his only deer, an adult buck.

Fountain County – an owner lost 4 adults (undetermined if losses were due to

EHD).

Blackford County – non-confirmed report from a veterinarian who was called by an owner.

Jackson County – one herd with classical signs (lost 6 of 42 animals with another one very ill).

Harrison County – one owner lost up to 15 deer.

Sullivan County - one owner lost between 50 - 60 fallow deer in early December.

Losses in free-ranging deer populations were more severe than the captive population (except for a few herds with high death loss). From the reports received by BOAH personnel, west-central and southwestern Indiana had the highest number of death loss in free-ranging deer.

Article by J. Johnston, BOAH

West Nile Virus Update

The Indiana State Department of Health (ISDH) has had a sophisticated disease surveillance system in place since 2000 to monitor mosquitoes and birds that can potentially carry West Nile virus (WNV). Crows, blue jays, hawks, and falcons are highly sensitive to the virus and provide an early warning system for detecting West Nile Virus activity in a community.

ISDH surveillance system also includes infectious disease physicians, infection control practitioners, and hospital laboratories that test for mosquito-borne diseases.

ISDH reported a significant increase in WNV cases late in the season (September); however, with the on-set of freezing temperatures, new cases of WNV virus have slowed.

The map to the right shows the location of WNV activity in 2006. An updated map of Indiana can be found at <http://www.in.gov/isdh/healthinfo/westnile/counties/92mapx.htm>. National data for WNV may be viewed at <http://diseasemaps.usgs.gov>.

November 27, 2006

Statewide Totals:

Human Cases: 69 Birds: 81
Mosquitoes: 283 Horses: 29

For county information, please click your mouse on a county of interest.

County Data:

Information on positive results for horses is provided by the Board of Animal Health. Updates on all positive results in horses in Indiana will be updated weekly.

For more information on West Nile virus in horses [Click here](#)



Information from ISDH Web Site

Chronic Wasting Disease Testing Continues in Indiana

Testing for chronic wasting disease (CWD) in Indiana's deer herd will continue this fall. The Indiana Division of Fish and Wildlife (IDFW), Indiana State Board of Animal Health, and USDA-APHIS will be providing man power and funds. The goal this year is to collect 1,100 samples in ten northwest Indiana counties closest to the Illinois CWD area, and 12 additional counties with greater than nine deer



CWD deer from Wisconsin. Photo: Wisconsin Department of Natural Resources

farms. In addition, ten samples will be collected in each county where a biologist is manning a deer check station resulting in about 300 more samples. Since the IDFW began surveillance through 2005, 7,712 samples have been tested for CWD and

all were negative.

Biologists will collect a retropharyngeal lymph node from the sinus area of hunter killed deer. The samples are placed in 10% formalin and taken to the Purdue Animal Disease Diagnostic Lab to test for CWD. Samples are labeled by county, and with the hunter's name and address. Northern Illinois is the closest area with CWD present, and there is some concern that a deer from that area could travel into Indiana. The other mode of entry could be from deer brought into the state from CWD infected areas, such as by someone who keeps deer in captivity.

Column by D. Zimmerman, IDNR

Chronic Wasting Disease Herd Certification Petitions and Request for Comments

Chronic Wasting Disease Herd Certification Program and Interstate Movement of Farmed or Captive Deer, Elk, and Moose; Petitions and Request for Comments

AGENCY: Animal and Plant Health Inspection Service, USDA.

ACTION: Notice of receipt of petitions and request for comments; extension of comment period.

SUMMARY: We are extending the comment period for our notice that announced the receipt of three petitions requesting

that we delay implementation of, and reconsider provisions in, a recent final rule establishing a herd certification program and interstate movement restrictions for cervids to control the spread of chronic wasting disease. This action will allow interested persons additional time to prepare and submit comments.

For more information about this proposed rule change and for instruction on how to comment, please see the following web site

<http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/E6-19662.htm>

Source: USDA

Avian Influenza Updates



National HPAI Early
Detection Data System



For updates on avian influenza surveillance throughout the United States, visit the National HPAI Early Detection Data System at their website at <http://wildlifedisease.nbii.gov/ai/>. The public can use this system to monitor the progress and results of the national avian influenza surveillance effort. Note that there is lag time between when the samples are collected and when they appear on the system.

Long term study of tick-borne disease in Indiana

Dr. E. Raizman from Purdue University School of Veterinary Medicine with his graduate student L. Keefe are conducting a long term study of tick-borne diseases for the state of Indiana. Overall, the goal is to maintain a surveillance system for these diseases over the next few years in order to better understand the geographical factors that determine the distribution of these diseases, especially Lyme disease.

In the last 2 years, we collected data on the opening weekend of deer hunting (firearm) season. Volunteer students in groups of one or two were posted at approximately 25 Indiana Division of Wildlife (IDFW) check-in stations. They checked deer for ticks and recorded information. This was a phenomenal learning opportunity for the students and participants really enjoyed working with IDFW personnel and felt that they gained invaluable experience.

In 2005, we found a high concentration of ticks in the northwestern quadrant of the state. However, a few isolated patches

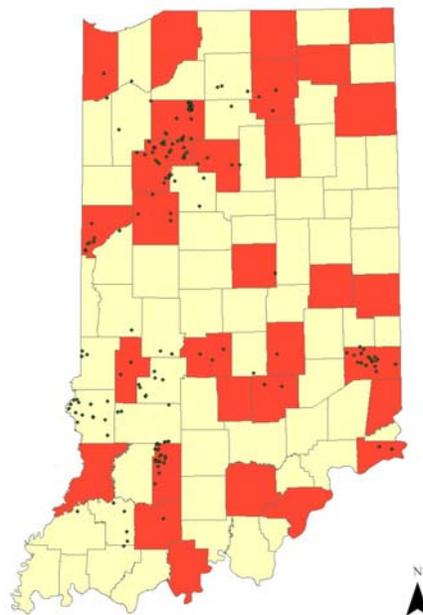
exist and are of concern. Each dot represents one of approximately 400 deer that were infested with the deer tick (*Ixodes scapularis*), the tick that can carry the bacteria that cause Lyme disease (*Borrelia burgdorferi*). Partial results from 2005 indicate that Lyme disease was found in 30% and 21% of the deer that were infested with deer tick in Jasper Pulaski SP and White county, respectively. Soon all the ticks that were collected in November 2006 will be identified analyzed for the disease and added on to our database from last year.

We will greatly appreciate, however, any additional information in the form of ticks that will be sent to us with the exact location of their collection.

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Each dot represents deer that were infested with the tick that carries Lyme disease in 2005. The counties in red are the locations of the check stations worked by students.

Article by: E. Raizman, Purdue University



Midwest Wildlife Disease Update

Indiana - State health officials this fall announced the first human case of rabies in Indiana since 1959. A ten year old Marshall County girl was apparently bitten by a bat in June, but didn't develop clinical symptoms until early October. The young lady survived a few weeks, but a news release reported she passed away on November 2. Several family members and friends have undergone post exposure rabies treatment because the virus is transmitted in saliva. If a person has been bitten by a bat, or a bat is discovered in the room of a child or disabled person, try to capture the bat in a sealable container and submit

it to your local health department for testing.

Chronic Wasting Disease Transmission - According to a news release from the Dow Jones Newswire, a scientist has confirmed a long-suspected theory that deer spread CWD through their saliva. Edward Hoover, a researcher at Colorado State University, used hand-raised fawns at an indoor facility in Georgia to conduct the experiment. Three fawns were each fed three tablespoons of saliva from known infected deer, and all developed CWD after 18 months. Additional tame deer were exposed to blood, urine and feces from CWD-infected deer. Those given a single transfusion of blood

from infected deer also developed CWD. Those exposed to urine and feces did not develop the disease. This reinforces warnings to hunters and those handling deer in CWD infected states to take precautions to protect themselves during exposure to saliva and blood.

Abscesses In Deer - Any wildlife biologist who has worked a deer check station has probably observed golf ball to volleyball sized abscesses on deer. They can be found in a variety of locations, but usually near the brisket or on the flank. These are simply abscesses (also called a seroma or hydrocyst). They typically contain a yellow seral fluid (pus) and are located between

Continued on pg. 7

Indiana Animal Disease Diagnostic Laboratory

The Animal Disease Diagnostic Laboratory (ADDL) serves the people of Indiana by diagnosing disease in livestock, poultry, companion animals and wildlife, as well as providing blood testing of animals for federally mandated disease programs such as brucellosis or pseudorabies.

ADDL is under joint jurisdiction of the State Board of Animal Health and the Purdue University Board of Trustees. It was physically established at Purdue University in 1945. The original ADDL building at Purdue-West Lafayette was one of the first buildings in the U.S. completely dedicated to veterinary diagnostic activities.

With the resources available to ADDL, it is capable of successfully meeting its objective. Simply stated ADDL's objective

is: "Provide accurate and prompt diagnostic service to veterinary practitioners, animal producers, companion animal owners, wildlife conservationists, animal researchers and state/federal regulatory officials."



The Indiana Animal Disease Diagnostic Lab is located on the campus of Purdue University (Photo: Purdue Univ.)

ADDL is a full-service diagnostic facility with state-of-the-art equipment and nationally/internationally recognized faculty and staff. The main laboratory is located at Purdue University in West Lafayette; a branch laboratory is located at the South-

ern Indiana Purdue Agricultural Center (SIPAC) in Dubois County.

To assure the quality of our services, the laboratories voluntarily undergo accreditation procedures every five years by the American Association of Veterinary Laboratory Diagnosticians. Six senior faculty are diplomates of the American College of Veterinary Pathologists; one is a diplomate of the European College of Veterinary Pathologists; one is a diplomate of the American Board of Veterinary Toxicologists; one is a diplomate of the American College of Veterinary Poultry Veterinarians; and one is a member of the American Society of Microbiologists. ADDL works closely with the graduate and undergraduate programs of Purdue's Veterinary School by offering students practical experience in the various aspects of diagnostic procedures.

Various sections of the ADDL participate in check tests conducted by the National Veterinary Service Laboratory and other quality control evaluations; they consistently rank in the upper percentile of the nation. Because of ADDL's nationally/internationally recognized facilities and staff, Indiana's practitioners and animal producers can be assured of quality service.

Indiana Wildlife Disease News

A joint project between:

Indiana DNR
Division of Fish and Wildlife

and

USDA APHIS Wildlife Services
National Wildlife Disease Surveillance and Emergency Response Program

to provide information on wildlife diseases in Indiana and surrounding states.

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Submissions or Participation

If you would like to submit a wildlife disease related article, ideas, comments, or other information, please contact one of the editors.

We welcome individuals or agency representatives to act as reviewers or to provide assistance in the production of this newsletter. To assist, please contact one of the editors.

Providing information on wildlife diseases in Indiana and surrounding states



Indiana Department of Natural Resources Division of Fish and Wildlife

The mission of the Division of Fish and Wildlife is to professionally manage Indiana's fish and wildlife for present and future generations, balancing ecological, recreational, and economic benefits. Professional management is essential to the long term welfare of fish and wildlife resources, and providing for human health and safety. Communication between agency professionals and educating the public are important aspects of professional management.

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USDA APHIS Wildlife Services NATIONAL WILDLIFE DISEASE SURVEILLANCE AND EMERGENCY RESPONSE PROGRAM

The mission of the National Wildlife Disease Surveillance and Emergency Response Program is to provide Federal leadership in managing wildlife disease threats to agriculture, human health and safety, and natural resources by assisting Federal, State, Tribal, and Local governments, private industry, and citizens with management of zoonotic and other wildlife diseases of concern.

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Midwest Wildlife Disease Update (Continued from pg. 6)

the skin and muscle tissue. This inflammation is usually caused by one of four pus producing bacteria, including those in the genera *Streptococcus* and *Staphylococcus*. These abscesses result from an antler wound acquired during fighting, injury from an arrow or bullet or other injury where the skin is broken. These unsightly growths usually don't harm the deer and disappear in time. Generally, if the abscess is removed and there is no offensive odor, the meat is safe to consume.

EHD - The adjoining states of Michigan and Illinois have reported outbreaks of EHD in 2006. Michigan reported losses in their southwestern region with 50 deer reported dead

along streams and marshes. Illinois' EHD area moved from east central to west central Illinois this year. Outside the Midwest, EHD has been reported this fall in Oregon, Wyoming, Texas, Missouri, and Georgia.

For more on EHD throughout the rest of the country, visit the Southeastern Cooperative Wildlife Disease Study and view the volume 22, issue 3 newsletter at <http://www.uga.edu/scwds/briefs.htm>.

Michigan Wildlife Disease Manual - The Michigan DNR maintains an excellent wildlife disease manual which is accessible through its website: <http://www.michigan.gov/dnr>. Go to the search box in the top right hand corner and type

in "Wildlife Disease Manual." A "Google-like" list of search results comes up. Simply click on the top listing or one that indicates their wildlife disease manual. That should get you to a list of 50 wildlife diseases or ailments. Great photos and descriptions are provided.

Updated Field Manual of Wildlife Disease Available - The Southeastern Cooperative Wildlife Disease Study has updated its Field Manual of Wildlife Diseases (now in its 3rd edition). It is available for \$25.00 by calling AAVIM in Winterville, Georgia. Their number is 1-800-228-4689. This book is an excellent reference for field biologists.

Column by D. Zimmerman, IDNR