

A JOINT PROJECT
BETWEEN

USDA APHIS
WILDLIFE SERVICES

AND

INDIANA DNR
DIVISION OF FISH AND
WILDLIFE

Indiana Wildlife Disease News



Volume 4, Issue 3

August 2009

Special points of interest:

- WNS Syndrome Update
- Conference Announcement
- Pro-Med
- Human health study on bird banders
- DNR to hold meetings to discuss TB

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Disease in Focus

White-nose syndrome in bats

White-nose syndrome (WNS) was named for the characteristic white fungus that appears on muzzle, ears, and/or wing membranes of affected bats. The first case of WNS was identified in February 2006, in Howes Cave located approximately 50 miles west of Albany NY (Blehert et al. 2009). Since the winter of 2006-2007 bat declines of more than 75% (90 – 100 % in some cases) have been observed in several surveyed hibernacula (Blehert et al. 2009). It has been estimated that several hundred thousand bats with WNS-symptoms have died (Cohn 2008). The majority of cases and deaths have been in little brown bats (*Myotis lucifugus*) (Cohn 2008). The symptomatic white fungus has also been observed in northern long-eared bats (*M. septentrionalis*), Indiana bats (*M. sodalis*; federally endangered species), big brown bats (*Eptesicus fuscus*), tricolored bats (*Perimyotis subflavus*) and small-footed bats (*M. leibii*). As of March 2009 WNS cases have been confirmed in bats from Connecticut, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Virginia, Vermont, and



Characterist white fungus on the muzzle of a bat. (Photo: Al Hicks, NYDEC)

West Virginia (Figure 1; Gargas et al. 2009).

The characteristic white fungus, which has been isolated from several bat species, has recently been identified as a new species of *Geomyces*, which has been named *Geomyces destructans*. Species in the *Geomyces* genus are psychrophilic (capable of growing in cold climates) and the optimal growth parameters for the fungus seem to be temperatures between 5° and 10°C (Blehert et al. 2009) and humidity levels >90%. Therefore, caves and other bat hibernacula may serve as excellent reservoirs for year-round maintenance of the fungus. Although *G. destructans* has not been confirmed as the etiological agent of WNS (i.e., fulfilled Koch's

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Indiana DNR Protocol for Dead Bats

All DNR employees that encounter or hear about sick bats, dead bats or bats behaving oddly are required to report the incident to the Division of Fish and Wildlife mammalogist, Scott Johnson at 812-334-1137 or sjohnson@dnr.in.gov. No other action regarding the bats, including calling in a rehabilitator, is to be taken before contacting Mr. Johnson's office and receiving instructions. A pro-

tol is in place to provide guidance when Mr. Johnson is not available during normal business hours. For weekends and after hours Mr. Johnson's cell phone number is 812-322-4028.

Currently, all bats in the Eastern United States are in danger of contracting a fatal disease known as White Nose Syndrome. Mr. Johnson is the DNR contact with the US Fish and Wildlife Service and other

states that are using the best scientific information available, as it becomes available, to combat this catastrophic syndrome. Your help and cooperation with this effort is expect and greatly appreciated.

White-nose syndrome in bats (continued from pg 1)

postulates), is it the leading hypothesis for the cause of WNS. During bacteriological and virological (including rabies) analyses, examination of intestinal tracts for disease-causing parasites, and gross and microscopic examination of internal organs for gross lesions, no known pathogens common to a large percentage of the WNS-affected bats has been found (Blehert et al. 2009). The pattern of fungal skin penetration by *G. destructans* has been consistent among more than 90% of the bats submitted for disease investigation from the WNS-affected region.

Cases of WNS are currently being confirmed through gross and histological examination of symptomatic bats. Upon gross examination, affected bats exhibit a cutaneous infection consisting of fungal hyphae (vegetative portion of fungus) and distinctive asymmetrically curved conidia (asexual spores of fungus) of *G. destructans* on their muzzles, wings membranes, and/or ears. Histological examination reveals fungal hyphae that fill hair follicles and sebaceous glands of affected bats and penetrate into surrounding tissues (Blehert et al. 2009; Gargas et al. 2009). Interestingly, the fungus does not typically solicit inflammation or an immune response in the infected tissue of hibernating bats (Gargas et al. 2009).

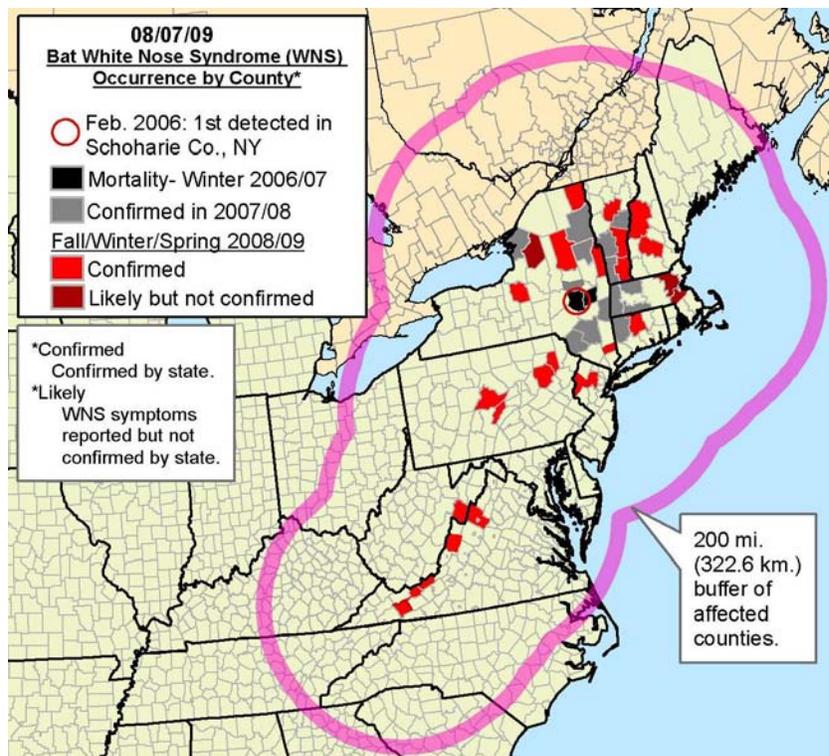
In addition to the visible white fungus, WNS-affected bats also appear severely emaciated; although the exact mechanism is unknown, a leading hypothesis is that WNS results in aberrant hibernation behaviors resulting in emaciation. For example, many of the affected bats emerge from hibernation before the end of winter and die in their caves (many affected bats have been found at cave entrances) or leave (presumably) to begin hunting for food when there are few if any insects available (Cohn 2008). Therefore, WNS may lead to a depletion of fat reserves during hibernation (Cohn 2008, Blehert et al. 2009). Research on how WNS may cause depletion of fat reserves during hibernation includes examination of immune response, metabolic rates, and frequency and duration of arousals during hibernation of WNS-affected bats. Another hypothesis is that WNS may affect fat stores in bats before hibernation (e.g., not finding enough food to build sufficient fat stores (Rush 2009). Current research on how WNS may affect bats be-

fore hibernation includes comparison of intestinal flora of affected and non-affected bats and comparison of pre-hibernation body condition with historical body condition data. Other important research areas currently being investigated include whether WNS can be transmitted through direct contact and/or the environment..

Current research on the origin of the fungus includes investigating whether a fungus in Europe, observed on the faces, ears, and wings of bats but which does not cause mortality, is connected to *G. destructans*. It is also possible that the fungus was already present in North America (*Geomyces* spp. are common in caves) but has recently mutated resulting in a new infectious agent. Although fungal infections are generally occur as secondary infections in mammals (e.g., invading once the animal has been nutritionally or immune compromised by a viral or bacterial infection), characteristics of hibernating bats such as clustering, lowering body temperatures to a few degrees above ambient temperature, and shutting down portions of their immune system may allow this fungus to play a primary role in this disease.

The life history characteristics of bats is often referred to as “life in the slow lane” because they are long-lived species, with high survival rates, low mortality rates, and low annual reproductive rates (~ 1 pup/female), thereby creating low potential for population growth. More than half of the bat species occurring in the U.S. rely on hibernation as a strategy to survive the winter months when insects are not available as a food source. There are four endan-

gered bat species in the U.S. (Ozark big-eared bats [*Corynorhinus townsendii ingens*], Virginia big-eared bats [*C.t. virginianus*], Gray bats [*M. grisescens*], and Indiana bats) and all of them are at risk for WNS. Therefore, the unprecedented mass mortality events in hibernating bats associated with WNS could have major long-term consequences for bat populations as they are unlikely to recover quickly and could have major ecological consequences in terms



Currently affected WNS counties with a 200 mile reference buffer. Courtesy Cal Butchkoski, PA Game Commission.

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Wildlife Disease Resources

ProMED

ProMED-mail - the Program for Monitoring Emerging Diseases - is an Internet-based reporting system dedicated to rapid global dissemination of information on outbreaks of infectious diseases and acute exposures to toxins that affect human health, including those in animals and in plants grown for food or animal feed. Electronic communications enable ProMED-mail to provide up-to-date and reliable news about threats to human, animal, and food plant health around the world, seven days a week.

By providing early warning of outbreaks of emerging and re-emerging diseases, public health precautions at all levels can be taken in a timely manner to prevent epidemic transmission and to save lives.

ProMED-mail is open to all sources and free of political constraints. Sources of information include media reports, official reports, online summaries, local observers, and others. Reports are often contributed by ProMED-mail subscribers. A team of expert human, plant, and animal disease moderators screen, review, and investigate reports before posting to the network. Reports are distributed by email to direct subscribers and posted immediately on the ProMED-mail web site. ProMED-mail currently reaches over 40,000 subscribers in at least 185 countries.

A central purpose of ProMED-mail is to promote communication amongst the international infectious disease community, including scientists, physicians, epidemiologists, public health professionals, and others interested in infectious diseases on a global scale. ProMED-mail encourages subscribers to participate in discussions on infectious disease concerns, to respond to requests for information, and to collaborate together in outbreak investigations and prevention efforts. ProMED-mail also welcomes the participation of interested persons outside of the health and biomedical professions.

ProMED-mail was established in 1994 with the support of the Federation of American Scientists and SatelLife. Since October 1999,

ProMED-mail has operated as an official program of the International Society for Infectious Diseases, a nonprofit professional organization with 20,000 members worldwide.

ProMED-mail is also available in Portuguese, ProMED-PORT, and in Spanish, ProMED-ESP. Both of these lists cover disease news and topics relevant to Portuguese- and Spanish-speaking countries in Latin America, respectively. ProMED-RUS offers Russian-language reports relevant to the independent states of the former Soviet Union. PRO/MBDS offers reports in English on countries in Southeast Asia bordering the Mekong river. Under a recent grant from Google.org, ProMED-mail is working to enlarge our networks in West Africa (ProMED-FRA) posted in French, and East Africa (ProMED-EAFR) posted in English.

ProMED-mail and ISID are grateful to Google.org, the Gates Foundation, the Rockefeller Foundation, the Oracle Corporation, the Nuclear Threat Initiative, and many individual donors for financial support. Please consider a donation by clicking on the Donations link on the left.

Web services for ProMED-mail are provided as a public service by the Oracle Corporation. E-mail services are provided by the Harvard School of Public Health.

Publications and Presentations by ProMED Authors

http://www.isid.org/publications/promed_mail_publications.shtml

ProMED in the News

http://www.isid.org/publications/promed_mail_inthenews.shtml

The preceding and more information can be found on ProMED's website: <http://www.promedmail.com/pls/otn/f?p=2400:1000:2546397326277755::NO::>

White-nose syndrome (Continued from pg. 2)

insect control (including forest and agricultural pests) and cave biota dependent on bats for nutrients.

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Article by: Dr. J. Caudell and C. LeAnn White USDA APHIS Wildlife Services. LeAnn currently works for USGS National Wildlife Health Center in Madison, Wisconsin.

14th International Congress on Infectious Diseases

Dear Members, Colleagues, Sponsors and Friends:

In this ever shrinking world where people, products and pathogens move rapidly around the globe, our collective expertise and experience will enable us to find answers to the infectious disease challenges confronting us all. It is in this shared spirit of scientific excellence and collegial collaboration that preparations have begun for the 14th International Congress on Infectious Diseases to be held in Miami, Florida from March 9-12, 2010. Building on the unqualified successes of our most recent biannual meetings in Lisbon and Kuala Lumpur, the International Society for Infectious Diseases is delighted to return to North America for the 14th ICID.

We are very excited about coming to Miami, an internationally recognized multicultural, multilingual and dynamic city that serves as a welcoming entry point into the United States. Miami also is home to outstanding universities and medical centers, and has a worldwide reputation as a pioneer city in international medicine, infectious diseases research and practice.

Whether you are a clinician, researcher, educator, public health official or practitioner of any of the disciplines that contribute to the care of patients with infectious diseases, please mark your calendars and make plans to join thousands of your colleagues from approximately 100 different countries in Miami at the Congress.

The 14th ICID will continue the unique educational approach that distinguish International Congresses on Infectious Diseases from other meetings, namely a scientific program that runs the spectrum from cutting edge science to state-of-the-art practices to



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global infectious disease control, all presented by a truly international faculty and attended by participants whose diverse backgrounds create an incomparable opportunity for the worldwide exchange of information for the benefit of our patients and societies.

Plenary lectures by world leaders in infectious disease and microbiologic research, clinical practice and health policy will be complemented by symposia organized, moderated and presented by experts in their respective fields, interactive meet-the-professor sessions headed by engaging faculty and daily oral and poster presentations based on submitted abstracts. Importantly, the Congress allows members to renew and expand their participation in the Society and non-members to become members that contribute to its future. The Congress also provides a perfect environment for stimulating intellectual exchange and camaraderie, essential elements for the creation of new ideas and partnerships.

We look forward to your participation in Miami in March 2010, and to working together on the world's premier multispecialty global infectious diseases conference.

Wildlife Disease Research

Bird Banders are Invited to Participate in a Research Study

The University of Iowa's College of Public Health is conducting a nation-wide study of US bird banders. The researchers are trying to determine if bird banders have evidence of avian influenza (flu) infections. They hope to enroll bird banders throughout the United States in a 12-month study. Study questionnaires will be completed online while some study procedures will be conducted at healthcare clinic.

You may be eligible to participate if you:

1. are a Master permit and Subpermit holder who has been engaged in non-passerine bird banding activities in the last 12 months and is expecting to continue the activity,
2. are 18 years of age or older, and
3. have no immunocompromising chronic disease and not receiving chemotherapy.
4. are not participating in the "UCLA Avian Influenza Project" at the American Ornithological Union conference in Portland, Oregon in August 2008

For more information please contact Dwight Ferguson, tel: 319-335-4983, email: Dwight-ferguson@uiowa.edu or visit the enrollment website: <https://www.public-health.uiowa.edu/CEID/birdbanderstudy/>



Meetings Planned to Discuss Bovine TB

The Indiana Department of Natural Resources and the Indiana State Board of Animal Health (BOAH) have scheduled three public meetings to address the current status of bovine tuberculosis in Indiana and outline proposed actions the two agencies have planned for the upcoming deer hunting seasons.

The meetings will be from 7 to 9 p.m. local time and scheduled for:

- Sept. 28, Laurel Middle School, Laurel (Franklin County)
- Sept. 29, Wayne County Fairgrounds, Richmond (Wayne County)
- Sept. 30, Corydon Middle School, Corydon (Harrison County)

State officials will provide updates on the presence of bovine TB in captive cervid (deer and elk) operations and discuss plans for testing of free-ranging white-tailed deer taken during the upcoming hunting seasons.

Bovine TB is a chronic bacterial disease that affects primarily



Indiana State Board of Animal Health and USDA APHIS Wildlife Services personnel collecting samples from deer culled by DNR Conservation officers. Photo: USDA

cattle but can be transmitted to any warm-blooded animal.

The disease was identified at a captive cervid operation in Franklin County in May. The animals at that facility, mostly elk and non-native deer species, have been euthanized.

BOAH subsequently quarantined two additional facilities – one in Harrison County and one in Wayne County – for exposure to the disease because they had purchased cervids from the Franklin County site. Animals at the Wayne County site have been euthanized. Plans are in the works to depopulate the Harrison County site this fall.

DNR conservation officers culled 30 deer in the vicinity of the Franklin County site in August. Preliminary tests showed no significant findings of bovine TB in the samples. Results from more extensive tests are pending.

Media contact: Phil Bloom, DNR Division of Communications, (317) 232-4003 or cell, (317) 502-1683.

In Focus

Mark Reiter to Lead DNR Fish and Wildlife Division

Mark Reiter, who spent most of the last 22 years in various jobs with the Indiana Department of Natural Resources, has been named director of the agency's Division of Fish and Wildlife.

He succeeds previous division director Glen Salmon, who took a position with the U.S. Fish & Wildlife Service in June.

As head of one of DNR's largest divisions, Reiter will manage a staff of 230 employees that includes biologists, property managers, staff specialists, and natural resource educators. The division oversees 21 fish and wildlife areas, eight fish hatcheries, numerous other conservation areas, and hundreds of public access boat ramps. The division also is responsible for the management of wildlife populations on public and private lands in Indiana.

Reiter spent the last six years as public lands program manager for DNR, supervising more than 80 full-time employees to develop and facilitate programs to help ensure the future of fishing, hunting, trapping and shooting sports heritage in Indiana. He was named the division's Program Manager of the Year in 2008.

Reiter began his DNR career in 1977 as a laborer at Willow Slough Fish and Wildlife Area, and in 1979 became property manager of public access sites and fishing areas in southern Indiana.

From 1982 to 1991, Reiter was staff specialist for the division's Properties Section. He was promoted in 1991 to Wildlife Section chief, a position in which he supervised public and private lands programs and research activities.

Reiter left DNR in 1994 for a three-year stint as Indiana field representative for the National Rifle Association.

He returned to the DNR in 1997 and spent the next six years as staff specialist in the Wildlife Section, coordinating land acquisition, public land management programs, managing federal aid grants, and providing technical guidance for the DNR Shooting Range Grant Program. He chaired several internal committees, including the Career Development Program.

A 1977 graduate of Purdue University with a degree in wildlife science, Reiter also has an associate's degree in science from Fullerton College in California.

Media contact: Phil Bloom, DNR Division of Communications, (317) 232-4003 or cell, (317) 502-1683.



Midwest Wildlife Disease Update

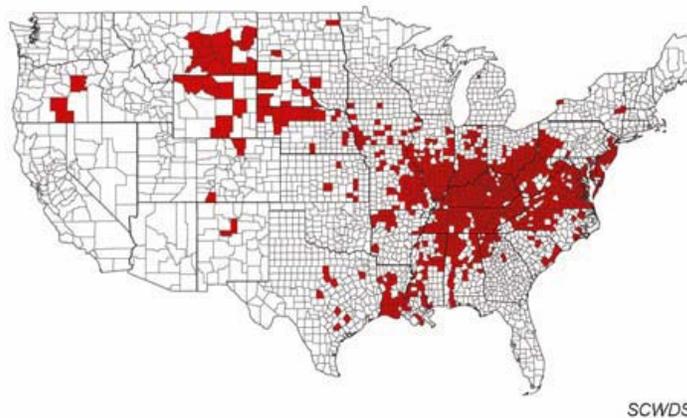
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Epizootic Hemorrhagic Disease Wide Spread In 2007-

The Southeastern Cooperative Wildlife Disease Study reports they received an unprecedented number of submissions for hemorrhagic disease (HD) and bluetongue virus (BTV) in 2007. They ended the year with 283 isolations of these viruses. Their annual hemorrhagic disease survey of wildlife management agencies, veterinary diagnostic labs, and other collaborators from all 50 states showed that 2007 had the heaviest HD activity ever documented.

Counties where HD was reported during 2007 are shown on the accompanying map. Nationwide, suspected or confirmed HD activity was reported from 812 counties in 31 states, approximately twice the number of counties that normally report HD. Estimated mortality of more than 100 deer per county was reported in eleven states including Illinois, Indiana, Ohio, Kentucky and Missouri. Overall, more than 65,000 deer mortalities were reported. (Source: SCWDS Briefs, Quarterly Newsletter, January 2009, edited)

Hemorrhagic disease reported during 2007



SCWDS

Rate of Chronic Wasting Disease Up in Wisconsin Deer

According to an article in the Milwaukee Journal Sentinel, the rate of chronic wasting disease (CWD) infection in Wisconsin's white-tailed deer herd increased last year. The prevalence rate for adult bucks 2.5 years or older in the first epicenter of the outbreak (western Dane and eastern Iowa County), increased from 10% in 2007 to 15.5% last year, according to figures released by the Wisconsin DNR. The infection rate for yearling bucks increased from 3% to 6% in the same period.

Wisconsin has tested 152,000 deer, with 1,172 free-ranging deer testing positive for CWD. "Five to 10 years in the future, we will know better whether this was just a one-year blip on the chart or the beginning of a trend of increase CWD prevalence in Wisconsin," population ecologist Robert Rolley said in a statement. (Source: Milwaukee Journal Sentinel article by Meg Jones, August 2009. Edited)

Anaplasmosis- A New Tick Disease Surfaces In WI

La Crosse area health officials are seeing more cases of a new tick-borne infection carried by the same deer tick that causes Lyme disease. Gundersen Lutheran researchers have been monitoring anaplasmosis the last three years and report 50 human cases in the La Crosse area.

"It is an emerging infection in this area," said Dean Jobe, researcher and supervisor of Gundersen Lutheran's laboratories.

"In collecting ticks, we have found it in 10-15 percent of the ticks." Anaplasmosis is an infection of the white blood cells, he said.

Dr. Todd Kowalski, a Gundersen Lutheran physician specializing in infectious diseases, said symptoms are similar to Lyme disease with fever, headache, and body aches, but people don't get a rash with anaplasmosis. Kowalski said anaplasmosis is treated the same way as Lyme, with a tetracycline antibiotic. Patients respond well within 24-36 hours. (Source: ProMED, posted September 9, 2009, edited)

Susceptibilities of Nonhuman Primates to Chronic Wasting Disease

The Centers for Disease Control and Prevention (CDC) posted the following abstract and research paper on their "Emerging Infectious Diseases" website, on September 9, 2009. Note particularly the last line of the abstract. The entire research paper may be viewed at this website:

<http://www.cdc.gov/eid/content/15/9/1366.htm>

Title: Susceptibilities of Nonhuman Primates to Chronic Wasting Disease

Author: Brent Race, Laboratory of Persistent Viral Diseases, Rocky Mountain Laboratories, 903 South 4th St, Hamilton, MT 59840, USA; email: raceb@niaid.nih.gov

Abstract

Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy, or prion disease, that affects deer, elk, and moose. Human susceptibility to CWD remains unproven despite likely exposure to CWD-infected cervids. We used 2 nonhuman primate species, cynomolgus

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Indiana Wildlife Disease News

A joint project between:

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National Wildlife Disease Surveillance and Emergency Response Program

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

Editorial Staff

Editors

Joe N. Caudell, Wildlife Services
jcaudell@aphis.usda.gov

Dean Zimmerman, IDNR DFW
dzimmerman@dnr.IN.gov

Reviewers

Judy Loven, Wildlife Services
APHIS—LPA

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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.

DNR- Div. Fish and Wildlife
402 W. Washington St., Room W-273
Indianapolis, IN 46204
Phone: 317-232-4080
Website: www.wildlife.IN.gov

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.

USDA APHIS Wildlife Services
Purdue University, SMTH Hall, 901 W. State Street
West Lafayette, IN 47907-2089
Phone: 800-893-4116
Website: www.entm.purdue.edu/wildlife/wild.htm



Midwest Wildlife Disease Update (Continued from pg. 6)

macaques and squirrel monkeys, as human models for CWD susceptibility. CWD was inoculated into these 2 species by intracerebral and oral routes. After intracerebral inoculation of squirrel monkeys, 7 of 8 CWD isolates induced a clinical wasting syndrome within 33–53 months. The monkeys' brains showed spongiform encephalopathy and protease-resistant prion protein (PrPres) diagnostic of prion disease. After oral exposure, 2 squirrel monkeys had PrPres in brain, spleen, and lymph nodes at 69 months postinfection. In contrast, cynomolgus macaques have not shown evidence of clinical disease as of 70 months postinfection. Thus, these 2 species differed in susceptibility to CWD. Because humans are evolutionarily closer to macaques than to squirrel monkeys, they may also be resistant to CWD.



Column by D. Zimmerman, IDNR