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A JOINT PROJECT
BETWEEN

USDA APHIS
WILDLIFE SERVICES

AND

INDIANA DNR
DIVISION OF FISH AND
WILDLIFE

Indiana Wildlife Disease News



Volume 5, Issue 1

February 2010

Special points of interest:

- Meet the new Indiana State Department of Health Epidemiologist
- CWD in Virginia
- Update on TB and CWD Surveillance in Wild Deer
- White-nose Syndrome in Bats now in Tennessee

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Disease in Focus

Abscesses in wildlife

Description

Abscesses are circumscribed collections of purulent material (pus) found in several species of animals in a variety of locations. This purulent inflammation is usually caused by one of four pyogenic (pus producing) bacteria: *Corynebacterium*, *Pseudomonas*, *Streptococcus* and *Staphylococcus*. Abscesses formed in mammals generally contain white, green or yellow creamy material whereas, because of the high body temperature of birds, their abscesses generally have a caseous (cheesy) exudate, are walled-off and are painless. An abscess may be acute or chronic, focal or multiple, and may range in size from microscopic to unlimited dimensions. An abscess occurring on the footpads of avian species is called bumblefoot.

Distribution

Abscesses are found in mammals, birds and reptiles throughout North America. In Michigan, abscesses are usually seen in white-tailed deer, but have also occurred in beaver, Eastern fox squirrel, snowshoe hare, raccoon, muskrat, red-tailed hawk, great horned owl, cottontail rabbit,

black squirrel, mink, ruffed grouse, mute swan, trumpeter swan, elk, moose, Canada geese, wood duck, wild turkey, common loon, mallard, Cooper's hawk, snowy owl, double-crested cormorant, ring-necked pheasant, great blue heron, Sichuan pheasant, mourning dove, American robin, striped skunk, woodchuck and opossum.

Bumblefoot has been observed in great horned owl, sandhill crane, bald eagle, red-tailed hawk and Hungarian partridge.

Transmission and Development

In mammals, injuries such as gunshot or arrow wounds, or wounds acquired while fighting, will often result in abscess formation.

In birds, abscesses may arise from infected wounds, injuries to the foot pads (bumblefoot), damaged feather follicles, blocked sebaceous glands, pressure and friction points, or in the area beneath damaged skin. Abscesses may also be seen in the liver and spleen of avian species.

The above mentioned injuries may be the result of either physical or chemical damage. These injuries produce tissue damage which

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Indiana Releases Third TB Quarantine

INDIANAPOLIS (17 December 2009)—The Indiana State Board of Animal Health (BOAH) has released the third, and final, quarantine of three cervid farms that housed animals that tested positive for bovine tuberculosis (commonly called "TB," or more formally known as *Mycobacterium bovis*).

All three sites, located in Franklin, Wayne and Harrison counties, had to be depopu-

lated, cleaned, then disinfected under BOAH supervision for the quarantines to be lifted. The operations were identified as part of a disease investigation after cervids on the Franklin County farm tested positive for TB in May. "Cervid" is a category of animals that includes elk and various species of deer.

To date, Indiana's TB status for cervids has not changed. Under U.S. Department of Agriculture

guidelines, because all three premises are linked, this remains one case.

More information about the disease and the investigation, as it develops, will be available on the BOAH website at: www.boah.in.gov.

About Bovine TB

Bovine tuberculosis is a chronic bacterial disease that affects primarily cattle, but can be

Continued on pg. 4

Abscesses in wildlife (continued from pg 1)

causes cells to die in the center of the injured area. This area is then invaded by pyogenic bacteria which produce a purulent (suppurative or pus-forming) inflammation. The cells become liquefied by the proteolytic enzymes which are present in the area. The liquefied area is encircled by a cavity, walled off by a combination of fibrous connective tissue, proliferating capillaries and leukocytes.

The purulent exudate may be green, blue-green, yellow, white, red or black in color. Certain bacterial species typically cause characteristically colored pus: *Corynebacterium* (green), *Pseudomonas* (blue-green), *Streptococcus* and *Staphylococcus* (yellow or white). Pus from an abscess found in a canid is usually of a thin and watery consistency while an abscess from a ruminant has viscid pus. Avian pus is usually dry and caseous due to the presence of an antitryptic enzyme.

If an abscess is not firmly enclosed and consequently remains active, it will protrude into surrounding tissues along the route of least resistance. This is due to the increased pressure caused by the addition of material to the abscess. If the abscess enters a muscle sheath or along muscle planes, as often occurs in deer, it will spread along the muscle layers for a considerable distance. If the abscess reaches the surface of the skin, an ulcer or open sore will form and will emit purulent material onto the skin.

Clinical Signs and Pathology

In mammals the effects of an abscess are generally non-existent, as the material is usually localized. Abscesses that spread along the muscle layers, or metastasize into various organs may cause pathological conditions that are hazardous to the animal's well being.

In birds, abscesses usually form enlarged spherical areas that may hinder movement or feeding ability. Often the feet are involved (bumblefoot) and the enlarged areas result in an inability to stand and to capture prey.

Diagnosis

The appearance of considerable numbers of neutrophilic leukocytes in or on a tissue justifies a diagnosis of purulent inflammation. Culturing the abscess material for members of the genera *Corynebacterium*, *Pseudomonas*, *Streptococcus* and *Staphylococcus* confirms the diagnosis and the causative organism.

Treatment and Control

In mammals the usual treatment would consist of drainage and antibiotic therapy. In time, abscesses may become inactive or enclosed (sterile); the body defenses having killed all of the causative bacteria. The accumulated pus, with no route of escape, will slowly become liquefied and be absorbed.

In birds the abscess must be opened and the accumulated pus scraped out manually. The abscessed area should then be cleaned with an antiseptic solution and wound medication placed on the site. Bandaging of the wound will aid in preventing further infection.

Significance

An abscess is a localized infection which may result in pain, tissue damage, septicemia and death. However, in most cases, an animal's defense mechanisms take care of abscesses with little or no long-term effects.

Concerning the edibility of the affected animal, generally, if the abscessed area is removed, it is safe to consume the remaining meat. If, however, the abscessed area is widespread, has an offensive odor, or is aesthetically displeasing, it may be better to refrain from consuming the affected meat.

Source: Michigan DNR Wildlife Disease Manual found at http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220---.00.html (last accessed on February 8, 2010). See article on page 3 for more information about the Michigan Wildlife Disease Manual.



Both of these abscesses were in the neck of a deer. The one on the left was from a puncture wound, the one on the right was from a tuberculosis infected deer. While the presence of an abscess is useful for recognizing an infection in the field, culture or other laboratory diagnostic should be performed to determine the nature of the infection. Photo: USDA APHIS WS and VS.

Wildlife Disease Update

Chronic Wasting Disease Found in Virginia

White-tailed deer

The Virginia Department of Game and Inland Fisheries (VDGIF) received laboratory confirmation on January 19, 2010, that a white-tailed deer tested positive for chronic wasting disease (CWD). This is the first confirmed case of CWD in Virginia. The deer was killed by a hunter in Frederick County less than one mile from the West Virginia line. With this case, Virginia now joins 17 other states and Canadian provinces with CWD, five of which are east of the Mississippi River.

"This was not unexpected," stated VDGIF Executive Director Bob Duncan. "Our wildlife professionals have been preparing for this for some time. The surveillance efforts have been critical and we appreciate the hunters, check station operators, and other cooperators who have supported our efforts."

CWD is a disease of deer and has not been found to be transmitted to humans or other animals. To learn more about CWD in Virginia and about the agency's CWD Response Plan visit www.dgif.virginia.gov/cwd.

This is the first positive test sample out of nearly 5,000 deer tested in the Commonwealth since 2001. VDGIF has been sampling hunter-killed and road-killed deer from the Active Surveillance Area in western Frederick and Shenandoah counties since 2005, when CWD was first detected near Slanesville, West Virginia, within ten miles of the state line. Between 2005 and 2009, CWD has been detected in 62 deer in Hampshire County, West Virginia, out of nearly 10,000 total deer sampled during that time. Several have been found within five miles of the Virginia line.

Agency officials from West Virginia Division of Natural Resources (WVDNR) and VDGIF continue to share information and coordinate their responses. For more information on CWD in West Virginia please see the WVDNR website at <http://www.wvdnr.org/>. VDGIF is also working in consultation with the U.S. Department of Agriculture and the Virginia Department of Agriculture and Consumer Services.

How did VDGIF detect CWD in Virginia?

Since 2002, when CWD was first detected east of the Mississippi River (in Wisconsin), the Department developed a CWD Response Plan. Parts of the plan have been activated since 2005, after West Virginia discovered CWD. The Response Plan has been updated and revised several times, as recently as December 2009, as new information becomes available. The VDGIF CWD Response Plan is designed to define the magnitude and geographic extent of a CWD

outbreak and control the transmission of the disease.

The 2-year-old female deer that tested positive was killed by a hunter on November 14, 2009, on private land west of Gore, Virginia, in Frederick County less than one mile from the West Virginia line. As part of VDGIF's CWD surveillance program, the hunter submitted the harvested deer for tissue sampling by VDGIF staff working at a local check station. VDGIF submitted samples to two different laboratories, first for initial testing, and then for independent confirmation.

Testing generally takes 6-8 weeks

VDGIF obtained 206 samples from hunter-killed and road-killed deer in the Active Surveillance Area near West Virginia during the 2009-10 hunting season. The agency is awaiting initial laboratory results for 37 of these samples taken at the end of the season. Hunters who submitted deer heads for tissue samples to test for CWD can check on results by visiting the Department's website at www.dgif.virginia.gov/cwdresults. VDGIF cannot guarantee that all hunter-submitted animals were tested.

What is CWD? Are people at risk?

CWD is a slow, progressive neurological (brain and nervous system) disease found in deer, elk, and moose in North America. The disease ultimately results in death. Species known to be susceptible include elk, red deer, moose, mule deer, white-tailed deer, and black-tailed deer. CWD belongs to a family of diseases known as transmissible spongiform encephalopathies. There is no evidence that CWD can be naturally transmitted to livestock or other (non deer) animals.

There is no current scientific evidence that CWD has ever infected humans. However, it is recommended that human exposure to the CWD agent be avoided, and the Department recommends that hunters take simple precautions such as not consuming any deer that appear abnormal or sick, and wearing gloves when field dressing and boning out the meat. In addition, it is recommended that hunters avoid consuming meat and tissues from known CWD-infected animals.

It must be remembered that the CWD test is designed for surveillance purposes and is not a food safety test. The CWD tests will detect the causative agent at a certain level in the tissue, and a result of "not detected" does not guarantee that the agent is not present at low levels.

How is VDGIF addressing CWD detection in Virginia?

The new detection in Frederick County, Virginia, will further activate the VDGIF CWD Response Plan which enhances surveillance and disease control meas-

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New case of CWD (yellow) found in Virginia white-tailed deer close to the West Virginia case. Map from www.CWD.info.org

Update on Bovine Tuberculosis Surveillance in Wild White-tailed Deer

The Division of Fish and Wildlife, along with the help of the Indiana Board of Animal Health and the United States Department of Agriculture - Animal and Plant Health Inspection Service Wildlife and Veterinary Services mobilized staff to collect and test free ranging white-tailed deer at check stations during the opening weekend of firearms season in counties where captive cervids were identified as positive for bovine tuberculosis earlier in 2009. A total of 431 hunter harvested deer were sampled in these and surrounding counties. A total of 56 deer were determined to have visibly lesioned lymph nodes that weekend, and tissue from those deer were immediately sent to the National Veterinary Services Laboratory (NVSL) in Ames, IA for culturing. Those deer have all been classified as TB free. An additional 14 deer were identified as having lesioned lymph nodes by Purdue's Animal Disease and Diagnostic Lab. Preliminary tests failed to detect the presence of bovine tuberculosis. Those samples, and the tissue from the remaining 361 deer are currently being cultured and awaiting final results from NVSL.



Collecting samples for analysis. Photo: USDA

TB Quarantine Released (Continued from pg. 1)

transmitted to any warm-blooded animal. TB is difficult to diagnose through clinical signs alone. In the early stages of the disease, clinical signs are not visible. Later, signs may include: emaciation, lethargy, weakness, anorexia, low-grade fever and pneumonia with a chronic, moist cough. Lymph node enlargement may also be present. Cattle owners who notice these signs in their livestock should contact their private veterinarian.

A TB-positive beef cow that was traced to a Franklin County farm in December 2008, although in the vicinity of the index cervid herd, was not declared to be a TB-positive cattle herd

by USDA. That herd, which was fully tested two times over 60 days, did not yield any positive animals, leaving Indiana's cattle status unchanged since 1984.

Indiana's Free status for cattle and bison remains unaffected. USDA maintains a separate status rating for the two species groups. Only when two unrelated cases of bovine tuberculosis are identified in cattle within 48 months will a state's status change.

News release by Denise Derrer, Indiana State Board of Animal Health

CWD in Virginia Deer (Continued from pg. 3)

ures. The CWD Response Plan is available on the Department website at www.dgif.virginia.gov/cwd.

VDGIF Executive Director Bob Duncan noted, "For many years, Department staff and our Board of Game and Inland Fisheries have been proactive in working to reduce Virginia's CWD risk."

Prevention and early detection remain important components of Virginia's CWD program. Given that CWD is likely transmitted deer-to-deer or through environmental contamination by infected deer, activities that unnaturally concentrate deer or move deer or deer carcasses likely increase the risk of spreading CWD. Therefore, since 2002, VDGIF has:

- 1) Actively conducted CWD surveillance activities throughout Virginia, and targeted surveillance of suspected risk factors;
- 2) Changed regulations and permit conditions to ban the im-

portation of live deer and elk into and within Virginia;

- 3) Strengthened captive deer requirements related to animal marking, record keeping, facility inspections, and mortality reporting;
- 4) Prohibited the importation of whole deer carcasses and selected parts into Virginia from states known to have CWD;
- 5) Prohibited the feeding of deer in Virginia from September 1 through the first weekend in January each year;
- 6) Prohibited the relocation of rehabilitated deer out of Frederick or Shenandoah counties;
- 7) Provided accurate and timely information about CWD to deer hunters and the general public through news releases, pamphlets, magazine articles and other media outlets.

Persons who have questions or need additional information about CWD should visit the Department's website at www.dgif.virginia.gov/cwd.

Indiana Chronic Wasting Disease Surveillance Update

Chronic Wasting Disease (CWD) is one of a group of diseases called transmissible spongiform encephalopathies, which is a variant of scrapie in sheep and Creutzfeldt-Jakob disease in humans. The agents of CWD are called prions which are abnormal, protease-resistant forms of cellular proteins normally synthesized in the central nervous system and lymphoid tissues. Prions that cause CWD are highly resistant to heat or disinfectant. No study has ever proven that CWD is transmissible to humans.

CWD has been reported in Wisconsin, Illinois, West Virginia, and most recently Virginia, among other states. In 2002, Indiana created a monitoring program to detect the presence of CWD, which focused on removing the obex or the retropharyngeal gland from random hunter harvested deer throughout the state, deemed active surveillance. Reports of outwardly noticeable sick deer have also been tested, named targeted surveillance. This monitoring continues today, and well as testing random samples of road killed deer which was instituted in 2007.

Results from the Division of Fish and Wildlife's 2009 CWD sampling have been completed, and tests failed to detect CWD in 835 deer during the 2009 year. CWD has not been detected in over 11,000 deer during this monitoring period.

Year	Number of samples Analyzed		
	Targeted	Active	Road Killed Deer
2002	0	1,176	0
2003	2	4,231*	0
2004	7	1,087	0
2005	7	1,218	0
2006	13	1,287	0
2007	5	522	88
2008	5	651	213
2009	8	634	193
Total	47	10,806	494

* includes samples collected in 2002.

Table 1. Number of deer analyzed for CWD in Indiana between 2002 and 2009.

In Focus

Jennifer House, Epidemiologist Indiana State Dept of Health

Dr. House received a B.S. in Animal Science and a veterinary degree from North Carolina State University. She has also received a master's degree in public health from the University of Iowa and completed a certificate program in Community Preparedness and Disaster Management from the University of North Carolina. Prior to working in Indiana Dr. House served as a Veterinary Specialist for the Emergency Programs Division of the North Carolina Department of Agriculture and Consumer Services. In 2004, she began the North Carolina Veterinary Response Corps, a group whose mission is to train and prepare professionals in the animal care community to respond to disaster events that affect both production and companion animals, she lead this group until 2009 when she relocated to Indiana. Dr. House currently makes her home in Indianapolis and serves as the state's public health veterinarian.

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Midwest Wildlife Disease Update

February 2010

VHSV Now Found in All Great Lakes-

The deadly fish virus VHSV has been found for the first time in fish from Lake Superior, according to Cornell researchers. Dr. Paul Bowser, professor of aquatic animal medicine at Cornell's College of Veterinary Medicine, and colleagues tested 874 fish from seven sites in Lake Superior both in Michigan and Wisconsin waters.

The virus has been identified in 28 freshwater fish species in the Great Lakes watershed. While no significant fish mortality due to VHSV was observed in 2008 and 2009, Bowser stated that "It is important to note that the fish are still harboring the virus and essentially the infection proceeds even though no mortalities are being observed. This is important because it suggests that these infected fish may serve as a reservoir for the virus in the Great Lakes ecosystem. While we don't fully understand the lack of recent mortality, the potential presence or absence of stressors on the fish may be playing a role." (Source- Media Newswire, 1/31/10, edited)

Minnesota Deer Positive for Bovine Tuberculosis-

A deer harvested during the hunting season in northwest Minnesota has tested positive for bovine tuberculosis (TB), according to the Minnesota DNR. The deer was one of 1400 samples collected from hunters during the fall, and was a 3.5 year old buck taken within three miles of previous TB cases.

There have now been 27 positive bovine TB cases in Minnesota deer since the disease was first found in the state in 2005. Despite the new case, DNR officials said it doesn't appear bovine TB is spreading much within the deer population. The DNR said surveillance efforts and sharp shooting for deer in the targeted area of northwestern Minnesota will continue in 2010 along with a special late season deer hunt. (Source- ProMED, 12/21/09, edited)

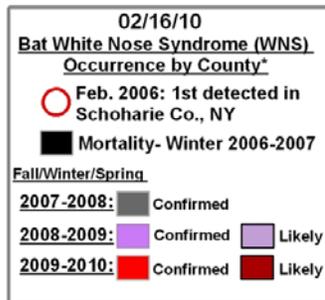
No Additional CWD Found in Michigan Deer- A single captive breeding farm deer tested positive for CWD in 2008 in Kent County, Michigan. The Michigan DNR set up a nine township surveillance zone around the farm, and Steve Schmitt, a wildlife veterinarian for the DNR reports, "All of the deer we

have tested have come back negative for the disease." So far in 2009, the agency tested 131 Kent County deer, 89 of which were killed in the surveillance zone. In 2008 Schmitt's lab tested 1,523 wild deer from the nine township surveillance zone, 1,878 deer were tested in Kent County, and 1,845 deer were tested in counties surrounding Kent County. (Source- mlive.com article by Howard Meyerson, 10/10/09, edited)

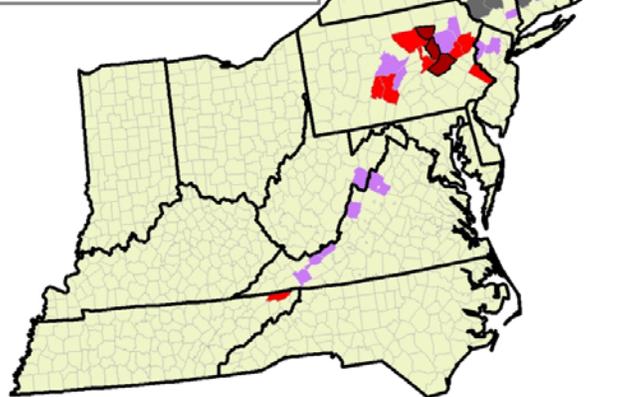
CWD Prions in Deer Feces- Research recently published in the journal *Nature* confirms that mule deer infected with the prion that causes chronic wasting disease (CWD) shed the infectious particles in feces for months before they develop clinical signs. It previously has been reported that urine, saliva, muscle, blood, and antler velvet from clinically affected animals contain the prions that cause CWD, but the role of these sources in sustaining CWD epidemics remains unclear. However, long-term exposure of susceptible animals to the causative agent shed in feces could explain the apparently efficient horizontal transmission of this disease. (Source- Southeast Cooperative Wildlife Disease Study Newsletter, October 2009)

WNS Now in Tennessee

State biologists in Tennessee have recently confirmed the presence of white-nose syndrome. Three tri-colored bats were found dead near Worley's cave, a private cave in northeast Tennessee that is frequented by cavers and other visitors. This is the furthest south the fungus has been found. Last year, the fungus made it as far as southern Virginia, just across the Tennessee border, so the presence here was not unexpected. There are 15 species of bats found in Tennessee, 2 of which are endangered species (the Indiana bat and the gray bat). Biologists believe that humans can spread the disease, but currently the primary transmission is thought to be from bat to bat.



*Confirmed Confirmed by state.
*Likely WNS symptoms reported but not confirmed by state.



Map by: Cal Buichkoski, PA Game Commission

Swine Brucellosis Infects Florida Hog Hunters- The Centers for Disease Control and Prevention (CDC) recently reported three human cases of swine brucellosis (undulant fever) that were associated with feral hog hunts in Florida in December 2007 (CDC MMWR June 12, 2009/58: 617-621). Two of the hunters were exposed on the same hunt-

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Indiana Wildlife Disease News

A joint project between:

Indiana DNR
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and

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National Wildlife Disease Surveillance and Emergency Response Program

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

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The Indiana Wildlife Disease News is only published in electronic format. To add or remove you name from the mailing list, please send an e-mail to jcaudell@aphis.usda.gov

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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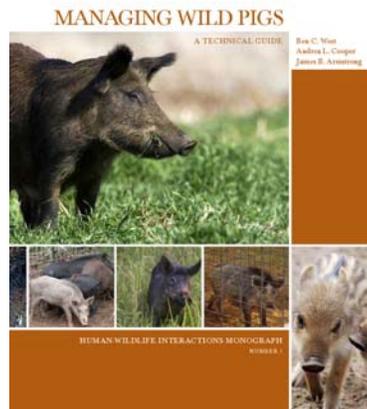


Midwest Wildlife Disease Update (Continued from pg. 6)

ing trip, while the third acquired the disease in a separate event. All three became infected after field dressing and butchering feral swine without adequate personal protective equipment; one person cut his hand while field dressing a feral hog.

Swine brucellosis is caused by *Brucella suis*, a zoonotic bacterial pathogen carried by swine. Historically, in humans it was seen primarily in swine slaughterhouse workers. Since 1972, when the USDA's National Brucellosis Eradication Program was expanded to include swine herds in addition to cattle, the disease has been eliminated from domestic swine. There are far

fewer human cases in the United States today, due to elimination of *B. suis* from commercial swine, and most infections are associated with exposure to infected feral swine. (Source- Southeast Cooperative Wildlife Disease Study Newsletter, July 2009)



New Monograph on Feral Swine

The Jack H. Berryman Institute's Human Wildlife Interactions has just published its first monograph on feral swine management, including feral swine disease. The monograph, *Managing Wild Pigs* can be found at <http://www.berrymaninstitute.org/publications/index.html> at no cost.

Column by D. Zimmerman, IDNR