

A JOINT PROJECT  
BETWEEN

USDA APHIS  
WILDLIFE SERVICES

AND

INDIANA DNR  
DIVISION OF FISH AND  
WILDLIFE

# Indiana Wildlife Disease News



Volume 2, Issue 2

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## Special points of interest:

- Diseases of wild turkey
- Feral swine update
- Avian influenza surveillance in 2007

## Avian Pox

Avian pox is a mild to severe, slow developing disease of birds caused by an avipoxvirus and three common strains have been identified. The three strains are fowl pox virus, pigeon pox virus and canary pox virus. The strains vary in their virulence and have the ability to infect other avian species. However, many of the strains are group specific. Approximately sixty species of birds from 20 families have been diagnosed with avian pox. The strain seen in wild turkeys is the fowl pox virus.

Avian pox lesions (wart-like growths) occur on the unfeathered parts of the bird's body and, in some cases, the mouth, larynx, and/or trachea.

**Distribution** - Avian pox has been observed in a variety of avian hosts worldwide. The disease is most common in the temperate (warm and humid) parts of the world and is usually observed in relation to seasonal mosquito cycles.



Avian pox on the head of a wild turkey.  
Photo: Indiana DNR

Avian pox has been diagnosed in upland game birds, songbirds (mourning doves and finches), marine birds, pet birds (canaries and parrots), chickens, turkeys, occasionally raptors and rarely in waterfowl. In Michigan, it has been diagnosed in the brown-headed cowbird, American goldfinch, ruffed grouse, mourning dove, broad-winged hawk, common raven, wild turkey, trumpeter swan, bald eagle, house sparrow, American robin, European starling, sandhill crane and American crow. Avian pox has been identified in birds since earliest history but it is still currently considered to be an emerging viral disease. All North American cases have been relatively recent.

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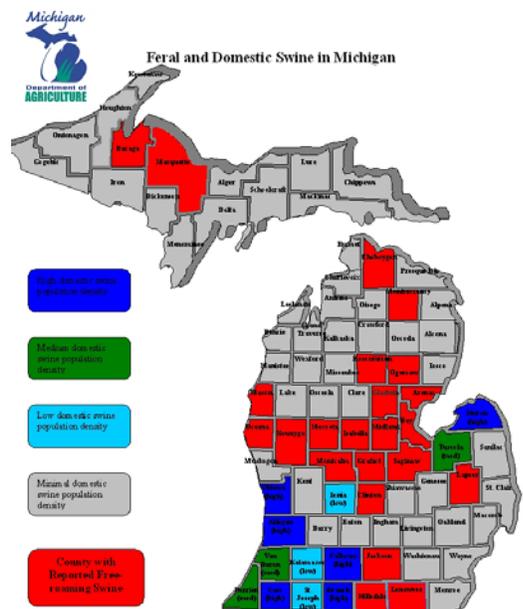
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## Close to home: feral swine borders several Indiana counties

In the April 2006 issue of the Indiana Wildlife Disease News, we focused on feral swine. The following is an update from new information on the Michigan feral swine population and management efforts.

Hunters in Michigan with a valid hunting license of any type can now shoot feral swine (free-ranging wild pigs) in 23 Michigan counties. History has shown that in other states where feral swine have become established, they can cause significant damage to crops and other personal property, can spread disease to domestic livestock, negatively impact wildlife populations, and endanger humans. Therefore, managing feral swine population through hunter-harvest can provide a

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Source Michigan DNR, updated on 11/01/06. Counties in red report free-ranging feral swine.

## Avian Pox (continued from Pg. 1)

**Transmission** - Transmission of the avian pox virus can occur in a number of ways. The disease can be spread via mechanical vectors, primarily by species of mosquitoes (at least 10). Transmission occurs when the mosquito feeds on an infected bird that has a viremia (pox virus circulating in the blood) present or on virus-laden secretions from a pox lesion and then feeds on an uninfected bird. Mosquitoes can harbor and transmit the virus for a month or longer after feeding on an infected bird. Experimentally, stable flies have shown the capability of being able to transmit the pox virus.

Avian pox can also be transmitted by direct contact between infected and susceptible birds. The virus is transmitted through abraded or broken skin or the conjunctiva (mucous membrane covering the anterior surface of



Avian pox on the feet of a wild turkey.  
Photo: MDNR

the eyeball). Indirect transmission of the pox virus can also occur via ingestion when food and water sources, feeders, perches, cages, or clothing are contaminated with virus-containing scabs shed from the lesions of an infected bird. The pox virus is highly resistant to drying and may survive months to years in the dried scabs. Indirect transmission can also occur via inhalation of pox virus infected

ander, feather debris and air-borne particles.

Mosquitoes are probably responsible for transmission within local areas, while wild birds are responsible for outbreaks over greater distances.

**Clinical Signs** - Clinical signs observed with avian pox are weakness, emaciation, difficulty in swallowing and breathing, vision problems, a reduction in egg production, soiled facial feathers, conjunctivitis, edema of the eyelids and the presence of the characteristic wart-like growths on the unfeathered portions of the skin and/or formation of a diphtheritic membrane on the upper portion of the digestive tract.

**Diagnosis** - A presumptive diagnosis of avian pox can be made due to the gross lesions on the body. Confirmation of avian pox is accomplished by microscopic examination for the characteristic Bollinger bodies.

Virus isolation by transmission of the organism via egg inoculation, serological results and polymerase chain reaction can also be a means of confirming the disease.

**Treatment** - There is no known treatment for avian pox in wild birds. In captive situations, there are a variety of treatments that have been used along with supportive care to treat the pox

lesions and to prevent secondary infections in various avian species. These treatments consist of removing skin lesions and utilizing sodium bicarbonate or Lugol's solution of iodine washes, removing the diphtheritic membrane from the mouth and throat and swabbing the area with Lugol's solution of iodine, bathing the eyes with a 1-2% saline solution, and raising the environmental temperature. In all cases, providing assistance for recovery may spread the infection to other parts of the skin or to other birds.

**Control** - The best control for avian pox in captive (turkeys, pheasants, threatened and endangered species) and domestic (chickens and turkeys) birds is vaccination with a modified live vaccine. In wild birds, vaccination is not a feasible method of control.

Avian pox is a highly contagious disease and there are three primary control methods that can be used if infected birds are present. Eliminating standing water will control the primary vector, the mosquito. Infected birds should be isolated or culled to remove the source of the virus. Feeders, waterers, birdbaths and cages should be decontaminated with a 10% bleach solution.

**Significance** - There is no evidence that the avian pox virus can infect humans and therefore it is not a public health concern. In some populations of birds (wild turkey, bald eagle and albatross), avian pox may be a significant mortality factor.

Source: Michigan Wildlife Disease Manual

## Feral swine in Michigan (continued from Pg. 1)

significant benefit to efforts to protect agriculture, property, and wildlife in Michigan.

The following locations have had at least one feral pig reported: Arenac, Bay, Baraga, Clinton, Cheboygan, Gladwin, Gratiot, Hillsdale, Isabella, Jackson, Lapeer, Lenawee, Marquette, Mason, Mecosta, Midland, Montcalm, Montmorency, Newaygo, Oceana, Ogemaw, Roscommon, and Saginaw counties. Because state law protects livestock that may be running at large, special precautions are

necessary to guard the rights of farmers. County prosecutors are aware that shooting feral swine in these counties is permitted and any potential owners of the feral swine have been contacted and do not claim ownership. For more information on feral swine management in Michigan, visit their website at <http://www.michigan.gov>.



Feral swine will often roam in large herd that can cause significant damage.

Article by J. Caudell,, Source Michigan DNR

## Blackhead

Blackhead is a disease caused by a protozoan parasite, *Histomonas meleagridis*. The parasite is carried by the common poultry cecal worm, *Heterakis gallinarum*, found in the ceca (blind pouches of the large intestine) of a high percentage of chickens. The parasites can live for long periods in the cecal worm. It has recently been found that earthworms also carry *Heterakis*, and are thus of major importance in transmitting blackhead.

### Distribution

Although primarily a disease of domestic turkeys, it has been found in chickens, wild turkeys, grouse, quail, pheasants, and other gallinaceous birds. Its geographic distribution is limited mainly to the eastern and midwestern United States. Outbreaks are most common in the spring and fall and are usually more serious in wet seasons than in dry ones. It is thought that wild turkeys acquire the disease by ranging on abandoned chicken or domestic turkey yards.

### Transmission and Development

Occasionally, a bird will ingest the naked organisms in contaminated feed or water, or while picking gravel or preening itself. In most instances a second parasite, the cecal worm is ingested. This worm, which is one-third to one-half inch long and as thick as a thread, lives in the ceca of chickens, turkeys, and several other birds. The worm itself, or its eggs, which are microscopic, can harbor the black-

head organisms and carry them from one bird to another. The blackhead organisms are fragile and cannot live alone outside the bird host for more than a few hours.

However, in the eggs of highly resistant cecal worms, they may remain viable and infective for over four years. The organisms are passed from infected birds in their feces, alone or within the cecal worm and its eggs. These are then ingested by susceptible birds, resulting in infection.

### Clinical Signs

The symptoms of blackhead are quite distinctive, but the name is misleading in that the head of the bird does not always turn dark.

The first symptoms are not specific but are suggestive of blackhead. The birds stand with their heads tilted downward or drawn to the body. Their feathers are ruffled; their wings droop. Their eyes are partly closed. At first the birds are alert when they are disturbed but they quickly become indifferent if they are seriously ill. Young birds may die within two or three days after the first signs of illness, but older birds may suffer for several days before dying or starting a slow recovery. The passage of thin, sulphur-



Wild turkeys are a common sight in Indiana. Photo: USDA

colored droppings is characteristic of blackhead, but the disease is well advanced in turkeys before this is conspicuous; this does not often appear as a symptom in chickens. The period of incubation after contact with infection is 15 to 21 days.

### Treatment and Control

The current low level of infection in wild birds does not warrant attempts at treatment. However, if the disease should become significant, it is conceivable that medicated feed and water could be made available for wild flocks.

### Significance

There is no threat to human health from blackhead. It does not infect humans. Wild birds, particularly turkeys, and to a lesser degree, pheasants, quail, grouse and others are susceptible to blackhead. Because they are free-ranging, the disease does not affect whole populations as it may with confined domestic flocks.

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](http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220---.00.html)

Source: Michigan Wildlife Disease Manual

## Avian influenza surveillance continues in Indiana in 2007

Surveillance for the H5N1 highly pathogenic strain of avian influenza (HPAI) will occur again in 2007 with a few changes compared to last year.

Some of the major changes will be two swabs (one from the oral cavity and one from the cloaca) for each bird, samples will no longer be pooled in the lab, surveillance will be targeted primarily on waterfowl

that showed the highest prevalence of H5 low pathogenic avian influenzas. All of these changes have been made to enhance our ability to achieve early de-



tection of the H5N1 HPAI. This means that samples will continue to be taken, delivered to the lab, and analyzed within

a few days. This emphasis on early detection is the primary method by which USDA APHIS can meet its objective of protecting American agriculture.

USDA APHIS Wildlife Services and Indiana Department of Natural Resources Wildlife Resources Division will once again partner to achieve the sampling goals in Indiana. Approximately 750 samples will be col-

lected in Indiana this year. Sampling in Indiana will consist primarily of investigation of morbidity and mortality events, hunter harvested birds, and live-bird capture. Approximately 30% of the sampling will occur during the nesting season and the remaining 70% will occur primarily in during the migratory season. Morbidity and mortality events of waterfowl will occur year-round. Any mortality events consisting of waterfowl or shorebirds can be reported to USDA APHIS Wildlife Services Wildlife Conflicts Information Hotline at 1-800-893-4116.

Article by J. Caudell, USDA APHIS



## Midwest Wildlife Disease Update

**West Nile Virus (WNV)** is still with us despite reduced news coverage. According to the Southeast Cooperative Wildlife Disease Study, there were 4,261 human cases of WNV reported in 43 states during 2006. The virus was also detected in 4,106 birds, 1,086 horses and at nearly 12,000 mosquito pools. These numbers are similar to 2005.

**Viral Hemorrhagic Septicemia (VHS)**, a disease of fish, was highlighted in last quarter's issue of the Indiana Wildlife Disease News. As a reminder, a federal action was taken by the USDA, Animal and Plant Health Inspection Service. The federal order lists 37 species of fish that may not be transported live out of the eight Great Lakes states of Indiana, Illinois, Minnesota, Wisconsin, Michigan,

Ohio, Pennsylvania and New York. The federal order also prohibits importing these live fish from the Canadian provinces of Ontario and Quebec. The listed fish include numerous species of high commercial, recreational and ecological importance. The order, list of restricted species and other background information can be viewed at [www.aphis.usda.gov/vs/aqua/](http://www.aphis.usda.gov/vs/aqua/).

**Be Careful Out There** - According to the Executive Director of the Consortium for Conservation Medicine, there are approximately 1,400 known microbes that cause illness in humans, and 61 percent can be linked to animals.

**Pseudorabies in Wisconsin Swine Herd** - In mid-April the National Veterinary Services Laboratory confirmed that pseudorabies was confirmed in a swine

herd in Clark County, Wisconsin. This is unusual because there have been no outbreaks in commercial swine herds in the U.S. since 2003. About a week later a second outbreak occurred in another herd that used a boar from the first outbreak site. A 5-mile quarantine zone was established around each site, and 68 area herds were tested which produced no additional positives. The two infected herds were destroyed, and USDA APHIS personnel disinfected the facilities.

**Indiana Raccoon Incident** - A raccoon was removed from a household shipping container by a private nuisance wildlife control operator (NWCO) in Carroll County. The container originated from overseas and the raccoon apparently had stowed away in the container when it was being inspected at a port on the east coast. This is one

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### In Focus

## Indiana Wildlife Disease Surveillance Network

The Indiana Wildlife Disease Surveillance Network (IWDSN) is a cooperative volunteer organization managed by the

USDA APHIS Wildlife Services Wildlife Disease Surveillance and Emergency Response Program. Partners include the Indiana Department of Natural Resources, Indiana Board of Animal Health, and Indiana State Department of Health. The purpose of the group is to expand the wildlife disease surveillance capability of state and federal agencies in Indiana. The program relies on individuals who have close contact with wildlife and are willing to donate a small amount of their time for training and surveillance activities. Currently, membership consists of nuisance wildlife control operators in Indiana and researchers from Purdue University. Future plans are to expand the organization to include wildlife rehabilitation professional and



Current distribution of the Indiana Wildlife Disease Surveillance Network.. Note: dots only indicate presence in county, not exact location.

others who care for wildlife. Currently, the IWDSN collects samples for tularemia and rabies. Agencies and organizations who conduct wildlife disease surveillance or research and would like to discuss the potential for the IWDSN to collect samples can contact the Indiana Wildlife Services Wildlife Disease Biologist, Dr. Joe Caudell ([joe.n.caudell@aphis.usda.gov](mailto:joe.n.caudell@aphis.usda.gov)). All requests for samples are approved through the Indiana Division of Wildlife prior to passing the requests to the IWDSN. If you are interested in volunteering for the IWDSN, contact Dr. Joe Caudell at [joe.n.caudell@aphis.usda.gov](mailto:joe.n.caudell@aphis.usda.gov) or 765-496-3913.



Training is provided on sample and data collection, proper packaging and shipping, and PPE.

Article by: Dr. J. Caudell

# 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)

of the ways that wildlife managers predict that rabies or other novel wildlife disease could make their way into Indiana. Thanks to the quick thinking of the NWCO, who is also part of the Indiana Wildlife Disease Surveillance Network, the raccoon was tested for rabies and tularemia and then properly disposed of. The raccoon tested negative for rabies and the tularemia test is pending.

**Ohio Immune Barrier Working** - A multi-agency effort has successfully slowed the spread of raccoon strain



rabies into Ohio from Pennsylvania and West Virginia. In 2006, only 10 rabid raccoons were confirmed from Cuyahoga, Lake and Geauga counties, down from 34 rabid raccoons identified in 2005. The annual spring oral rabies baiting vaccination program began in mid-April to continue providing the immune barrier over a 1,149 square mile area in northeast Ohio. About 249,000 baits will be distributed. Baits used in rural areas resemble small ketchup packets, and two by two inch fish-meal blocks are used in urban areas. The bait is not harmful to humans, pets or livestock.

**Indiana Rabies Case** - Last quarter we reported on the Indiana girl who died November 2 after contracting rabies from a bat bite or scratch in mid-June. A ProMed list article of April 20, 2007 reports that "After genetic sequencing of the amplicons obtained from the patient's skin and saliva on October 14<sup>th</sup>, the CDC characterized the infecting agent as a rabies virus variant associated with the silver-haired bat, *Lasiurus noctivagans*." This bat species is typically found throughout much of Indiana along wooded edges, stream corridors and over pastures near woodlands. They seldom roost inside or on the outside of buildings.

Column by D. Zimmerman, IDNR