



## Wildlife Management Health Concerns

What pest management professionals should know about diseases associated with wildlife pests. *By Donald L. Burton*

Animals and humans share more than 175 known communicable diseases. The term “zoonosis” identifies any disease transmitted from vertebrate animals to humans. Wild animals serve as primary or secondary reservoirs for many zoonoses.

Many diseases readily controllable with preventive health programs in domestic species (e.g., leptospirosis) go largely unchecked in wild free-ranging populations. Transmission of zoonotic diseases can occur by direct means via contact with the animal or its saliva, urine or feces or indirectly by air, soil and water contaminated with the infectious agent.

Domestic animals also may become infected through contact with wildlife and serve as the immediate reservoir for human exposure. Vectors, such as ticks and mosquitoes, also play an important role in the transmission of diseases from wildlife to humans.

Most of our attention in this article focuses on the practical means of awareness

and prevention that provide the front line of defense against common wildlife-related diseases. Some uncommon but potentially life-threatening diseases are reviewed in this article to emphasize the importance of their prevention. In any situation where exposure to a zoonotic disease is suspected, recommend to your customers that they consult their private physician and public health officials.

### INFECTION FROM PHYSICAL INJURIES.

When a wild animal is held against its will, it will use all available defenses to resist restraint. Without proper restraint techniques and equipment, bites, scratches and other injuries to humans are likely to occur.

If a technician is bitten or scratched, immediately clean the wound by thoroughly scrubbing with soap and water. Flush or irrigate the wound liberally using clean tap water if sterile solutions are unavailable. Proper and early wound scrubbing and irrigation significantly reduce the incidence

of wound infections.

Irrigation provides mechanical removal of potentially infectious microorganisms, being most effective immediately after injury. Wounds should be cleaned again with iodine or chlorhexidine based solutions and liberally irrigated under medical supervision.

A physician should examine all wounds caused by a wild animal. Puncture wounds are often more serious than may appear at the skin surface and usually require antibiotic therapy. When obtaining medical help for a bite wound, your health care provider should discuss your tetanus immunization history and recommend treatment based on your age and vaccination history. Immediate medical care helps reduce wound infections.

### BUBONIC PLAGUE (*Yersinia pestis*)

*Hosts: Prairie dogs and ground squirrels*

Plague is rarely reported in the United States. Ninety percent of the reported cases though are found in New Mexico, Arizona, California and Colorado. When rodent numbers are great and are accompanied by dense flea populations, periodic epizootics occur. These outbreaks result in high mortality to the rodents, which in turn can increase the possibility of exposure to domestic pets and humans as fleas look for alternate hosts. Bubonic plague is primarily a flea-transmitted disease but can be acquired through direct contact with infected animals and their tissues, or by inhalation. Feral and outdoor domestic cats in endemic areas have been sources of infected fleas and responsible for transmission of the pneumonic form of plague to humans.

It is important to educate the public in plague areas about the nature of the disease and its transmission. Control of rodent populations, through exclusion and habitat management, should begin before populations have a chance to increase to high levels. Technicians and customers should be aware that rodent die-offs might signal the start of a period of special concern. Customers should take appropriate steps to protect themselves and their pets. Pet protection is achieved by controlling fleas. Finally, people judged to be at high risk and people who live in plague-endemic areas should consider immunization.

### HISTOPLASMOSIS

(*Histoplasma capsulatum*)

*Hosts: Soil in vicinity of established bird and bat roosting sites*

Histoplasmosis cannot technically be considered a true zoonosis but must be

designated as a saprozoonosis (environmentally acquired disease). Soil enriched with droppings from roosting sites serves as the primary reservoir, especially if the roost has been established for a minimum of three to five years.

Histoplasmosis frequently has been linked to roosting sites of birds and bats. Winter assemblages of blackbirds, nesting gull colonies, pigeon roosts and bat roosting areas such as caves, mines or bridges have all been documented as point sources of environmental histoplasmosis.

In all these instances, the animals' excrement enriches the soil, thus promoting the growth of *Histoplasma*. Birds display a remarkable resistance to infection but do act as mechanical transport hosts of the fungus. Bats, on the contrary, can become clinically infected as well as serve as transport hosts. Transmission occurs mechanically, usually through inhalation of spores produced by the mycelial free-living branching form of *Histoplasma capsulatum*.

The first line of defense in preventing exposure is to minimize potential contact by avoiding soil contaminated with either bird or bat droppings. If it is necessary for

technicians to be in such areas, they should wear boots and use a mask or self-contained breathing apparatus. Properly bag clothing for washing and block places where a bat may have access to the home. When roosting sites are deemed a necessary public health hazard, use humane dispersion strategies such as selective tree trimmings for removal of urban bird roosting sites. As a last resort, treat heavily contaminated soil with three percent formalin solution on three consecutive days to kill the fungal spores.

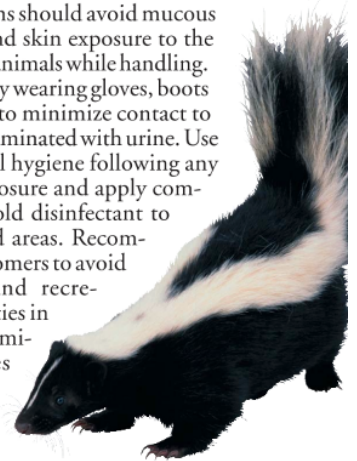
**LEPTOSPIROSIS** (*Leptospira interrogans* and more than 200 serotypes or gemnospecies)

*Hosts: Striped skunks, raccoons and rodents and many other animals*

Striped skunks, raccoons and rodents are significant reservoirs for leptospirosis with some populations demonstrating a prevalence rate greater than 50 percent. In these species, leptospires commonly localize in the kidneys where they cause slow chronic pathologic changes and are shed into the environment for long periods of time.

Skunks can shed leptospires in their urine for up to 300 days. Transmission occurs by direct contamination of mucous membranes or broken skin by infected urine. Indirectly, leptospirosis can be acquired through contaminated soil and water. Leptospires can survive for three months in alkaline stagnant or slower moving water, thus serving as an available point source for both humans and other wildlife.

Technicians should avoid mucous membrane and skin exposure to the urine of wild animals while handling. Protect skin by wearing gloves, boots and clothing to minimize contact to surfaces contaminated with urine. Use good personal hygiene following any potential exposure and apply common household disinfectant to contaminated areas. Recommend to customers to avoid swimming and recreational activities in known contaminated bodies of water. Pet owners should





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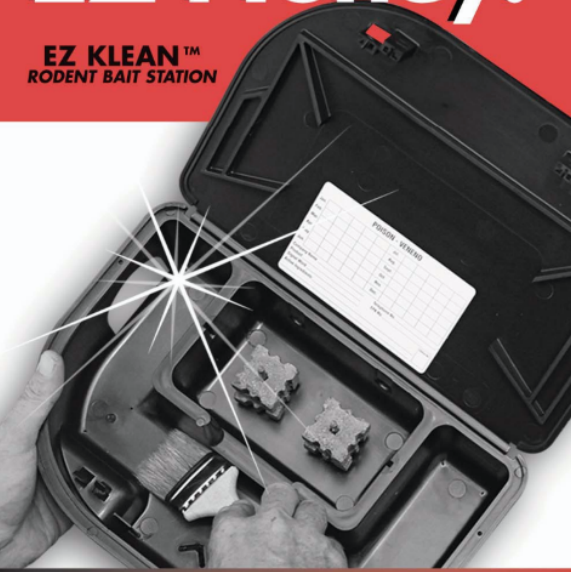
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vaccinate dogs for the prevalent serovar found in the wildlife of that geographic area.

**RABIES (Bite wound disease)  
(Lyssavirus)**

*Hosts: Any mammal can carry rabies, but the primary carriers in North America are raccoons, striped skunks, bats, foxes and coyotes*

Rabies is a rapidly progressive and commonly fatal viral disease that produces incurable encephalitis in humans and domestic and wild mammals. Historically, it is known as a bite wound disease because with a rare exception, it is transmitted by the bite of an infected mammal. The rabies virus has seven distinct variants or strains that affect land mammals as well as a number of distinct viral variants associated with a particular bat species. This helps explain why different species are responsible for being primary dominant carriers of the disease in different geographic areas. Other less commonly infected species, such as woodchucks within these regions, usually become infected with rabies as a

result of a "spillover" from the dominant carrier often serving as "dead-end" hosts though not transmitting the virus to other potential carriers.

Humans are considered exposed to rabies only when the virus is introduced by a bite wound to the skin or with viral contamination on cuts in the skin or onto mucous membranes. Any penetration of the skin by teeth constitutes a bite exposure. All bite exposures should be equally considered a potential risk for rabies regardless of the bite location. Bites of some species (bats having small teeth) may inflict only minor injury and may go frequently undetected. Non-bite exposures are much less frequent but may constitute a sufficient risk of exposure to consider post exposure prophylaxis (PEP). Rabies exposures have occurred by aerosol route in the laboratory and in caves occupied by millions of Mexican free-tailed bats. Casual contact by customers with a wild animal, such as petting or even exposure to feces, urine or blood does not comprise a real exposure to merit PEP. Organ transplantations of corneas and recently livers and kidneys have led to clinical rabies in

humans in the United States.

Persons recognized at risk for rabies exposure by occupation or by avocation (e.g., wildlife rehabilitators or others involved in the direct handling of rabies vector species) should be protected by pre-exposure vaccination by one of three approved human rabies vaccines. The vaccines are labeled for intramuscular use on days zero, seven and 21 or 28 for pre-exposure. Re-vaccination with one dose or checking blood titers should be repeated every two years for the demonstration of antibody presence. Titers above 1:25 correspond to 0.5 IU recommended by the World Health Organization as being adequate for protection. Subsequent exposure to rabies after pre-exposure vaccination does not eliminate the post-exposure treatment but simplifies treatment by eliminating the need for rabies immunoglobulin (RIG) administration. In cases of potential or known human exposure, timely post-exposure prophylaxis has been 100 percent effective in preventing human rabies. The treatment consists of rabies antiserum injected at the bite wound when possible and in the gluteal muscles, [see WILDLIFE HEALTH CARE on page 138]

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plus five vaccinations given in the upper arm over one month's time.

### RACCOON ROUNDWORM (Cutaneous, Visceral, Ocular and Neural Larval Migrans) (*Baylisascaris procyonis*)

*Hosts: Primarily raccoons*

Larval migrans is a disease process started by the ingestion of the eggs of the raccoon roundworm, *Baylisascaris procyonis*. It involves the prolonged migration and persistence of the larval parasite in internal organs and tissues. Different syndromes are named for the primary tissue involved: cutaneous (skin), ocular (eyes), neural (brain, spinal cord) or visceral (organs) larval migrans.

The key to preventing exposure to raccoon roundworm is to avoid contact with feces or areas where fecal matter has lain. The eggs are highly resistant to environmental and chemical disinfectants and can adhere to interior surfaces and remain dormant in soil for long periods (years) of time. Old wood piles that have been used as latrine sites by raccoons particularly

need to be recognized as outdoor sources of contamination and should be removed by technicians or customers using protective clothing (e.g., coveralls and gloves) to handle logs or any exposed material. Indoor cages where raccoons have been housed or in areas where they have deposited scats (fecal material) should be cleaned and disinfected with a 1:30 solution of household bleach. While not inactivating the eggs, bleach will help remove the sticky protein coat that makes eggs adhere to most surfaces and will facilitate mechanical removal through washing or brushing.

**CONCLUSION.** This article is not intended to alarm or frighten but to cultivate an understanding and respect for potential means of disease transmission and preventative actions that can be taken to avoid transmission. By becoming knowledgeable of zoonotic diseases, pest control professionals can work cooperatively with a physician or health care team to arrive at an earlier diagnosis and treatment in the unlikely event of themselves, or customers, becoming infected with one of these diseases. 🐾

*The author is M.S., D.V.M., and executive director of the Ohio Wildlife Center (OWC), Columbus, Ohio. Learn more about OWC by visiting [www.ohiowildlifecenter.org](http://www.ohiowildlifecenter.org).*

#### References Cited

Acha, Pedro and Boris Szyfres. *Zoonosis and Communicable Diseases Common to Man and Animals*. 3rd Edition, Volumes 1-3, 2001, 2003 Pan American Health Organization.

Heyman, David. *Control of Communicable Diseases Manual*. American Public Health Association. 2004.

#### Web Sites

Centers for Disease Control and Prevention: <http://www.cdc.gov/>

Morbidity and Mortality Weekly Reports: <http://www.cdc.gov/mmwr/>

Emerging Infectious Diseases: <http://www.cdc.gov/ncidod/EID/index.htm>

Zoonosis References: <http://medicine.bu.edu/dshapiro/zooref.htm>

*Editor's note: This article was adapted from a presentation Burton gave at NPMA PestWorld 2005 titled "Health Concerns in Working with Wildlife." To review summaries of other zoonotic diseases covered by Burton during this presentation visit [www.pctonline.com](http://www.pctonline.com).*



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