BAT CONTROL AND PREVENTION OF RABIES AND HISTOPLASMOSIS

NOTE: To reduce exposure to rabies and histoplasmosis, practical and protective measures are necessary. These measures include sanitation and cleanup, the use of proper personal protection equipment, wearing a properly test fitted respirator with hepa filter, and avoiding physical contact with bats and their guano. Details on bat control, and rabies and histoplasmosis prevention and risk reduction techniques are contained in this document. For further information or assistance, contact Brian Villalobos, GRTEs Integrated Pest Management Coordinator @ 307-739-3483.

Bats in Grand Teton National Park (GRTE)

There are more than 40 species of bats in the United States but only a few species cause people problems. Colonial bats usually become pests in and around buildings because of the large amount of guano that accumulates under their roosts and their potential rabies transmission. Common colonial bats in GRTE include the little brown Myotis (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), long-legged Myotis (*Myotis volans*), long-eared Myotis (*Myotis evotis*), and other solitary bats that may frequent structures. Bats are present in GRTE from about May through September and may enter holes under building eaves, fly under porches of historical buildings, and dead and dying bats are sometimes found on the ground or in buildings. They sometimes roost under building porches during the day. From these locations, they may find their way into a structure through small holes around loose-fitting doors or windows, cracks and holes in the building exterior, gaps around water pipes or electrical conduits, and through open attic vents. Bats are beneficial animals because they feed on a variety of insect pests such as mosquitoes and are often seen at night flying around buildings hunting for insects attracted to exterior lighting.

Potential damage and health concerns

Bats rank third in this country, behind raccoons and skunks, in the incidence of wildlife rabies. According to Centers for Disease Control and Prevention, the total number of cases of rabies diagnosed in human beings in the United States between 1990 and 2002 equals 33. Seven of these 33 were infected outside the US. Laboratory information indicated that 24 of these remaining 26 (92.3%) persons were infected with variants of the rabies virus associated with bats. For many years, more humans have contracted rabies from bats than from any other animal. Rabies is a viral infection of mammals that is usually transmitted via the bite or scratch of an infected animal, does not respond to antibiotic therapy, and is nearly always fatal once symptoms occur. The virus enters the central nervous system of the host, causing an encephalomyelitis that is almost always fatal. Prompt vaccination following exposure can prevent the disease in humans. Even though every bat bite or contact with a bat must be considered a possible exposure to rabies, the overall infection rate of rabies in bats is less than one percent, and finding one rabid bat in a colony does not imply the entire colony is rabid, thus bat killing is unjustified. Bats acquiring rabies go through a disease incubation period of 2 weeks to 6 months. Following that, the animals become increasingly ill for a week or two and sometimes sick bats are seen on the ground, in buildings, or flying during daylight hours. Most human cases of rabies result from accidental or careless handling of grounded or sick bats. Rabid bats are usually not aggressive, and disease transmission usually occurs when bats are handled, if bitten or scratched by a bat, or if diseased nervous tissue or saliva comes in contact with human mucous membranes or wounds. Bats should never be touched with bare hands. Anyone bitten or scratched by a bat should seek immediate medical attention, capture the bat without damaging the head, and submit it for rabies virus testing. Airborne or aerosol forms of rabies occur in structures or caves where there are accumulated bat guano, however only two people have contracted the disease and then in caves containing millions of bats where air was very humid, and two cases of rabies have been attributed to probable aerosol exposures in laboratories. All possible measures should be taken to assure bats cannot enter buildings occupied by humans. Rabies vaccinations for pet cats and dogs should be kept up-to-date. All persons who are at risk of contracting rabid bats should receive a rabies pre-exposure vaccination. If an infestation or colony of bats is found in your building, contact Brian Villalobos, GRTEs Integrated Pest Management (IPM) Coordinator, @ 307-739-3483.

Several arthropods and ectoparasites can be associated with bat roosts in buildings and sometimes affect people who live or work in the structure. Bats can harbor a number of different kinds of bat bugs (*Cimex*

spp.) which are commonly found in bat roosts. Bats carry fleas, ticks, and mites and bat guano attracts flies and other manure-eating insects. If an infestation of bats is eliminated by exclusion through bat-proofing a structure, it is usually necessary to remove guano deposits and manage the ectoparasites and other arthropods which may remain in bat roosts. Before removing guano or if building is infested with bat bugs, contact Brian Villalobos, GRTEs IPM Coordinator @ 307-739-3483.

Bat guano which accumulates under roosts creates pungent, musty, acrid odors in attics and other enclosed places. Bat guano is readily distinguishable from mouse feces because it contains shiny insect parts, never contains white and chalky material, is much more fragile, and crushes with only very slight pressure. Once bats deposit guano in an area, the odor attracts additional bats to the site and makes bat elimination difficult. Bat guano contaminates stored food, possessions, and work surfaces, and provides a good growth medium for microorganisms, some of which are pathogenic to humans, including histoplasmosis which is caused by a soil fungus-like mycobacterium (*Histoplasma capsulatum*) that is airborne through spores in bat guano and affects human lungs. The vast majority of infected people have no apparent ill effects or they experience symptoms so mild they do not seed medical attention. If symptoms do occur, they will usually start within 3 to 17 days after exposure, with an average of 10 days. Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including malaise (a general ill feeling), fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pain, chills, and hoarseness. A chest X-ray can reveal distinct markings on an infected person's lungs. Chronic lung disease due to histoplasmosis resembles tuberculosis and can worsen over months or years. The most severe and rare form of this disease is disseminated histoplasmosis, which involves spreading of the fungus to other organs outside the lungs. **THEREFORE DO NOT DISTURB THE BAT GUANO**. To prevent infection, persons working in dusty areas where bats or birds roost should be careful to not stir up or breathe dusts. Most infections in normally healthy individuals are benign and self-limiting, do not require specific therapy, and treatment with an antifungal agent may be prescribed in more severe cases. People working in areas known or suspected to be contaminated with *H. capsulatum* should always wear a properly fit tested respirator filtering particles as small as two microns, wear non-permeable disposable gloves, boots, hats, and coveralls. Wear respirator while changing clothes and shower ASAP. If deposits of guano in a building must be removed contact the Pesticide Hotline @ 301-671-3773 and /or the US Centers for Disease Control @ 404-639-3235 for information or consult with GRTEs IPM Coordinator Brian Villalobos @ 307-739-3483, and he will consult with the Regional IPM Coordinator.

Although histoplasmosis is rare in northern states and Canada, sanitation or sterilization of bat guano should be done once bats have left a roost site through bat exclusion of the structure or migration. This can be accomplished by spraying contaminated areas with a disinfectant of chlorine solution, i.e. 1-1/2 cups of Ultra Clorox Bleach to one gallon of water and wait 10 minutes before beginning cleanup. Following disinfection of guano, scoop it up along with other associated debris and place the material in sealed plastic bags. Dispose of the material in accordance with local sanitation and solid waste codes. Where possible, wash any surfaces contaminated with bat guano or urine with soap and water. When surfaces are dry, disinfect them with the same chlorine solution, as stated above. Ventilate the roost site to allow odors and moisture to escape.

Inspection and monitoring

Always wear approved personal protective equipment and follow the Federal Centers for Disease Control guidelines for personal safety especially when inspecting attics and other structural voids during the daytime to find roosting colonies or accumulations of guano. To confirm bats are actively using a specific hole, monitor the site at dusk and dawn to see if bats can be observed entering or leaving the building. Observations of flying bats should begin about 30 minutes before dark or about an hour before sunrise, and it may be necessary to watch bats leaving and entering a building for more than one night or morning. Sounds heard in attics, under eaves, behind walls, and between floors of bat vocalizations, grooming, scratching, or crawling, or climbing can indicate the presence of either bats or rodents. Bats are more active and noisy on hot days, just before leaving the roost at dusk, and upon returning to the roost at dawn. Rodents are usually noisiest throughout the night. Monitor the relative abundance of bats present from the amount of guano found around or inside buildings, by counting the bats as they fly in and out of holes in the building, or by estimating the numbers of bats seen around lights at night.

Bat control - non-chemical management

LEGAL: Lethal control of bats, even when there is a proven potential danger to humans, is often subject to close scrutiny and requires interagency coordination. Many bat species are protected under the Federal Migratory Bird Treaty Act and the Endangered Species Act of 1973 as amended. If the legal status of a bat is unknown, confer with the US Fish and Wildlife Service (USFWS) and the appropriate state agency. Depending on the legal status of the species, a Section 7 Consultation with the USFWS may be needed.

EXCLUSION: The best and most long-lasting control of bats and prevention of rabies exposure and histoplasmosis is good exclusion or denial of reentry and batproofing. Carefully inspect buildings from October through April when bats are not present and close all possible points of access that is, holes ¼ inch or more in diameter. After bats have returned in the spring, inspect the attic during the day for roosting bats and watch for bats entering or leaving the building during dawn or dusk. Mark any holes bats use for subsequent repair. Bats do not gnaw holes into structures and can be excluded by filling the entry holes in building sidings and around the eaves and roof with ¼ inch mesh hardware cloth, caulking, metal or wood flashing, screen, fiberglass insulation, or stainless steel wool.

IMPORTANT: Only exclude bats from buildings they roost in before they establish maternity colonies, before May, or after the young are weaned, after September. If, after excluding bats, a few bats remain, close all but one of the access used by bats and install a one–way door such as Franz' checkvalve. This allows bats to leave the structure but not re-enter. Keep the excluder in place for 3 to 5 days after the last animal has been seen to be sure all bats have left. Screen chimneys during the seasons when bats are present with ¼ inch hardware cloth and remove the screening during winter for proper operation of the chimney or install a commercial chimney cover. Cover open porches or other open areas with bat netting.

If a bat accidentally enters a room inside of a building, dim the lights and try to confine the bat to one room and then open all the doors and windows which lead to the outside so the bat can escape. If the bat cannot escape, try to catch it in a long-handled net. Or, when the bat comes to rest, cover it with the open end of a box or coffee can and slide a cardboard or magazine between the can and the wall. Take the captured bat outdoors and release it from populated areas, preferably after dark. Do not handle live bats unless absolutely necessary and only then with thick, leather work gloves. For help or more information, contact Brian Villalobos, GRTEs IPM Coordinator, @ 307-739-3483.

HABITAT MODIFICATION: Bats are rather selective as to where they roost and choose locations with specific environmental conditions such as temperature, light, and humidity needed for maternity colonies. Coarse fiberglass batting nailed to surfaces under porches or other areas preferred by bats as roosting sites often discourages them. Illumination by floodlights strung through an attic, air drafts by opening doors or windows, or create strong breezes by use of electric fans, heaters, or coolers installed in attics prior to the time bats arrive often changes conditions enough to keep bats from roosting or establishing maternity colonies in attics. If such sites have been previously used by bats, old guano will be a powerful attractant for new bat invasions. Be aware, air movements with fans can disperse histoplasmosis spores. Remember, sanitation and cleanup accompanies bat-proofing and exclusion measures, it does not replace them.

Website for Bat Conservation International:
http://www.batcon.org

Website for National Center for Infectious Diseases
http://www.cdc.gov/ncidod/ncid/ncid.htm

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