The Essential

BAT GUANO Report

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www.GetBatsOut.com
Protecting Your Family: Histoplasmosis In Your Home

Relocating bats is only half the battle won. When they are gone you will have to deal with their waste and might find yourself facing an entirely new dilemma.

There are many reasons to clean up bat guano.

• As with any other droppings the odor is offensive.
• Guano can cause stains when it leaks through ceiling boards and walls.
• A large accumulation of droppings can be heavy enough to cause structural damage and eventually collapse.
• The droppings can attract other insects and rodents.

All of these are serious considerations that certainly present reason enough to get the guano out. There is however a bigger problem that is very real even though it is invisible.

Histoplasmosis is a fungal infection (caused by Histoplasma capsulatum) which is spread by spores. A spore is a very hardy reproductive structure that is specialized for dispersal and for surviving extended periods of time in unfavorable conditions. Guano with its high nitrogen content is considered an encouraging environment for fungal growth. So while it is rare and difficult to contract any disease directly from a bat, the guano
inevitably left behind wherever bats have roosted can be a time bomb waiting to be disturbed by cleaning or construction. Once it becomes airborne it can enter your body or that of your neighbors (it is easily carried a long way by wind) through your airways – where your body temperature will detonate it.

While the disease is not contagious, anyone in your family exposed to the fungus can contract Histoplasmosis. If you disturb the guano the spores of the fungus will become airborne and you and your family can easily inhale the spores.

While infection with Histoplasmosis does not always result in symptoms, exposure to the spores can result in flu-like signs appearing anything from 3 to 17 days. While the disease, which first affects the lungs, may simply run its course it can also result in long-term problems resembling tuberculosis and in rare cases death. Anyone with a weakened immune system (including the elderly and small children), heavy smokers and people who have had the disease before are especially at risk.

Past infection will afford limited immunity.

Accurate testing for Histoplasmosis is time consuming and it is imperative that you contact your health practitioner as soon as you suspect
exposure. You will need advice regarding anti-fungal medications and will be monitored for disseminated Histoplasmosis (when the disease spreads throughout the blood system)

It quickly becomes clear that the easiest way to deal with Histoplasmosis is to avoid it. Making sure your guano clean up procedure is up to standard is the first important step.

**Histoplasmosis**
The Essential facts

Discovered in 1905 by Darling, Histoplasmosis is endemic to certain parts of the United States. Histoplasmosis capsulatum is a fungus that exists in the mycelial phase in nature and then changes into yeast at body temperature. Major Histoplasmosis outbreaks have taken place between 1978 and 1993 in Indianapolis, Indiana.

"90% of human cases of Histoplasmosis in the United States occur in the Ohio and Mississippi drainage areas. Bird roosts are the most prevalent source of human infection. Hot, dry attics where bats may roost do not usually provide conditions favorable for fungal growth." - [http://www.dnr.state.md.us/wildlife/bats/nphpatdisease.asp](http://www.dnr.state.md.us/wildlife/bats/nphpatdisease.asp)
“Histoplasma capsulatum. This fungus lives in soil enriched by bird or bat droppings. Human infection is common in and adjacent to the Ohio and Mississippi River drainages where warm, humid climates favor fungal development. The fungus is rare in dry western and cool northern climates.” -

Histoplasmosis is a fungus that needs optimal conditions of temperature, humidity, and spores to grow. These conditions do not appear in scattered droppings of bat guano found on surfaces other than soil. Because bats (unlike birds) can become infected with Histoplasmosis, their dropping may contain some of the fungus. The only way for this fungus to thrive and produce spores is if the guano accumulates and ‘piles up’. (http://www.cdc.gov/niOSH/docs/2005-109/default.html#d).

Hundreds of thousands of people have been infected and a number of people have died. Between 1988 and 1993 patients with immune deficiencies accounted for nearly 50% of infection cases.

95% of the 500,000 infections in humans occurring annually in the U.S. will be asymptomatic and will not require treatment due to the fact that the spores are introduced in very small quantities.

If the exposure is high then spores will germinate in the alveoli and conversion to the yeast phase occurs, with multiplication through binary fission resulting in Acute Pulmonary Histoplasmosis.

In Chronic Pulmonary Histoplasmosis the condition deteriorates quickly and presents with symptoms ranging from shortness of breath to pain around the lungs. Untreated this can result in heart failure or death from bacterial pneumonia months later.

This is however not the most severe infection. When the yeasts are spread throughout the body by your vasular system you have Acute Disseminated Histoplasmosis.

Histoplasmosis can not be spread from person to person. Other animals can also suffer from Histoplasmosis. Alternative names for this disease include "Histo", "cave disease", "cave fever", "Darling's disease", "Ohio Valley disease", "Tingo Maria fever", "reticuloendotheliosis" and "reticuloendothelial cytomycosis".

There is currently no vaccination against Histoplasmosis.
Clean Up Costs And How To Keep Them Down

What might look at first glance like the kind of unpleasant work you would prefer to assign to the National Geographic’s Dirty Jobs team can potentially be an extremely tricky and bio hazardous task.

The cost of guano removal is directly related to the fact that it may harbor dangerous disease. This means that you can not use ordinary cleaning practices and will have to invest in specialized equipment.

To clean effectively and safely you will need to have essential knowledge and equipment. If you decide that your problem is too big to handle yourself, do make very sure that your clean up company is specialized and insured.

The most cost effective way to clean up your own guano will incorporate the following standard steps:

STEP 1
Exclusion of bats
This step is essential. It can only be legally completed with a permit in certain states and at specific times during the year. It is best done by insured professionals.

STEP 2
Risk assessment
There are various risks associated with guano removal and each has to be assessed cautiously and individually. The following questions are designed to assist with the different areas of risk assessment.

**CONTRACTING A DISEASE**

# How much guano is there?
(Anything more than scattered guano will require you to take additional health safety precautions as Histoplasmosis becomes a serious consideration)

# How significant is the risk of Histoplasmosis?
If you are at all concerned you will have to take into account that you must protect yourself from a fungus that reproduces by releasing spores that are only 2 – 5 microns in size. Before starting a job or activity having a risk for exposure to H. capsulatum, consult the NIOSH/NCID Document Histoplasmosis: Protecting Workers at Risk. This document contains information on work practices and personal protective equipment that will reduce the risk of infection. A PDF copy of this NIOSH Publication No. 2005-109 can be downloaded from the same page.

# Have other potentially harmfull insects/ animals made the guano their home or dining room?
Typically flies, beetles, bugs, millipedes, cockroaches, worms, mites and moths inhabit the guano and are in turn preyed on by scorpions, spiders and finally rodents.

**ASSOCIATED HEALTH RISKS & RISK OF INJURY**

# How likely is the risk of an allergic reaction?
# How safe is the area structurally?
Risk management should take into account an overview of the likelihood of bodily injury which increases when the amount of guano compromises the integrity of the building.

# How much physical work will be involved and is it reasonable to complete this task bearing in mind your current state of fitness?

# Does it include working over heights? If so do you have appropriate equipment to do so safely and effectively?

# Are all the guano accessible and if the removal includes working in confined spaces do you have appropriate knowledge and equipment to complete the entire job safely and effectively?

# Do your insurance cover any injury sustained, disease contracted and/or damage to your house that can possibly occur during guano clean up?

STEP 3
**Getting the right equipment**
If you decide that you are happy to accept the risks and demands of the job you will need to consult the following equipment list and ensure that you are appropriately dressed and have acquired or hired the correct equipment and the approved disinfectants from reputable sources.
Equipment list:

~ Disposable overalls with a hood and tape to secure your legs and arms to your boots and gloves.

~ A HEPA-equipped respirator or self contained breathing apparatus with the capability of filtering out particles at least as small as two microns in diameter.

~ A hard hat (if working in an attic)

~ Goggles

~ Hard wearing gloves (nitrile gloves)

~ Metal scraper and a wire brush suitable for the surface that needs to be cleaned

~ A shovel

~ A hand brush

~ A sprayer for water and disinfectant

~ Approved disinfectant (Solutions such as formalin can be used to treat contaminated sites but application requires proper training and specialized equipment)

~ Waste bags that can carry a heavy load securely

~ A HEPA Vacuum
(High pressure spray is not recommended as it can encourage the dispersal of spores)

STEP 4
Timing and Communicating warnings
While you can remove guano at any time once the bats have been excluded it might be good to wait a while for the guano to dry out which can minimize health risks. It is important to advise neighbours, visitors and family members about when you plan to execute the project, the dangers associated with it and to make sure they know which symptoms to look for an who to see about them if they suspect that they have contracted a disease.

STEP 5
Dust control
Wetting down the area is an important dust control measure to avoid a situation where contaminated material becomes aerosolized and can be inhaled. Carefully wetting the area with a water spray will reduce the amount of aerosolized dust. You can also add a surfactant or wetting agent to the water to increase its efficacy.

STEP 6
Guano Collection
Collection of the guano must be done in double, heavy-duty plastic bags that can be transferred to secure containers for immediate disposal. Only dispose of the guano once you are clear about the waste disposal regulations of your local Environmental Agency.
Only remove your respirator once you have bagged and disposed of all of your overalls.

**STEP 7**

**Sterilisation**
You can re-spray the area with approved disinfectant or apply residual insecticide (do not mix chemicals – always follow instructions carefully!). This step will kill parasites such as lice and mites and/or fungus associated with bat colonies.

**STEP 8**

**Redecorating**
Finally if staining is a concern you might have to invest in a coat of paint or special surface cleaners.

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**Guano through History**
Guano has long been recognized for its soil enriching qualities. The Inca’s of Peru gave us the word Guano – it was such an important commodity in their civilization that harming the birds and bats providing these treasured droppings was punishable by death.

The high nitrate concentration in Guano also made it a key ingredient in late 19th Century explosives.

**On August 18, 1856,** Congress passed the Guano Islands Act to allow citizens who discovered a source of guano the right of possession and exclusive rights to remove the guano (although its use was limited to citizens of the United States.)

Guano is of especial interest today due to its high concentration of scarce phosphates.
The Importance of Timing

While Guano clean up can be achieved at any time of year you might want to remember that removing the material is not the first step. Bat removal should be effected by professionals. In some countries and in certain US states, bat exclusion is regulated by law and can only be done with a permit.

The timing of the exclusion work is important. An ill timed bat removal project can result in the death of young (flightless) bats, nursing bats that are separated from their young will make every effort to reunite with their pups and the nursing bats who stay with the pups will continue to wait for the return of the hunting bats until they perish from malnutrition and dehydration.

Once the bats have been successfully removed you can leave the guano to dry out for a couple of months as *H. capsulatum* spores only pose an exposure risk when the spores become airborne during a cleaning operation. When no urine or guano is deposited while the guano dries out the likelihood of *H. capsulatum* fungus being present is also diminished.

Liability risks and labor costs associated with guano removal are usually less during the winter should you
decide to contract the work out. This is due to the fact that bat exclusion work is seasonal, and attics are cooler in the wintertime.

Any clean up operation should be carefully timed for when your home and environment is as deserted as possible. It is important to allow time for any airborne spores to die and for the chemicals used to reach safe levels.

Why bats have legal rights!

While it might be well known that bats consume millions of pounds of insect pests nightly that is not the only reason bats are protected.

~They are absolutely critical to ecosystems ranging from rain forests to deserts.
~The development of navigational aids for the blind has been inspired by studies of bat navigation.
~Fruit bats are responsible for over 450 commercial products and 80 medicines through pollination and seed dispersal.
~A staggering 95% of rainforest regrowth is attributed to seeds spread by fruit bats.

All the facts above add up to the realization that bats are active combatants in our fight to preserve our precious planet!
Insulation

Re-infestation might be the last thing you would like to think about when you plan to have your guano removed but it makes sense to ensure that you are protected. While insulating against bats generally falls under bat exclusion it might not be possible to insulate until the guano has been removed.

The damage that bats can do to insulation includes contamination with urine and guano. The adequate insulation of your attic (especially the attic floor) will of course also improve heating control and cooling costs, ultimately reducing your homes energy bills substantially. Adequate insulation protects the environment but will not ensure that animals do not return (bats need only about 3/8 of an inch of space to get in and out and are very comfortable burrowing through insulation) There are various forms of insulation to choose from. Loose-fill insulation can be blown into small spaces with special equipment and is ideal for areas where it isn’t possible to install rolled insulation.

The uses of Guano

Guano is not all bad news. If you are sure that the guano does not contain H. capsulatum the guano can be recycled as follows:
It can be safely used as a slow release fertilizer of indoor and outdoor plants and soil. — The composition of guano is 10% nitrogen (assisting plants in having a shiny green color and rapid growth) 3% phosphorous (promoting root growth and flowering) and 1% potassium (strong stems)

If you use it as a foliar spray it can help combat fungus

The bio remediation microbes can clean up toxic spills on the soil

Guano can control harmful nematodes in the soil.

It is an excellent compost pile activator