



White-nose syndrome: Guidelines for bat carers

What is white-nose syndrome?

White-nose syndrome (WNS) is the name used to describe a group of symptoms associated with the deaths of millions of bats since 2006 across 40 states in the USA and eight Canadian provinces¹. These symptoms are:

- bats with a white fungus (*Pseudogymnoascus destructans*), particularly around the nose, but also on the wings, ears and/or tail (see photos in Appendix I)
- bats clustered near the entrances of hibernacula, or in areas not normally identified as winter roost sites
- bats flying outside during the day in temperatures at or below freezing, and/or
- dead or dying bats in or near hibernation sites

In isolation, the symptoms do not necessarily indicate WNS; for example bats with a white fungus might otherwise be perfectly healthy. Conversely, not all bats affected with WNS will necessarily be found with white fungus on them.

What causes WNS?

WNS is caused by the fungus *P. destructans*². It is a soil fungus that grows optimally at the temperatures found in winter hibernacula, which irritates the bats and causes energetically expensive arousals from hibernation, loss of body fat and starvation. Research has also suggested that infections on the wing membranes of bats may lead to dehydration thereby increasing the frequency of arousals³. Additionally where the fungus causes lesions in the wing membrane, this may affect the fitness of bats that survive the hibernation period. It is likely that *P. destructans* was introduced into North America from Europe.⁴

Have there been any cases of WNS in the UK, Europe or in other parts of the world?

In Europe the fungus *P. destructans* was originally identified on a single hibernating bat in France in 2009. It has now been identified in over 20 European countries (from molecular analysis). This includes the UK where the fungus was first discovered in Kent in 2013 and has been found at multiple sites since, through a combination of active and passive surveillance projects. Unlike North America, there have been no reports of

¹ US Fish & Wildlife Service Figures. See: <http://www.whitenosesyndrome.org/about-white-nose-syndrome>

² Lorch, J. M. *et al.* (2011) Experimental infection of bats with *Geomyces destructans* causes white-nose syndrome. *Nature* doi:10.1038/nature10590

³ Willis, C.K.R., *et al.* (2011) Evaporative Water Loss Is a Plausible Explanation for Mortality of Bats from White-Nose Syndrome. *Integrative and Comparative Biology* 51(3): 364-373

⁴ Warnecke, L. *et al.*, (2012) Inoculation of bats with European *Geomyces destructans* supports the novel pathogen hypothesis for the origin of white-nose syndrome. *PNAS* online; available at: www.pnas.org/cgi/doi/10.1073/pnas.1200374109

mass die offs and therefore there is no evidence of the syndrome itself in the UK or mainland Europe. It is thought probable that European bats have a resistance to the fungus, possibly evolved over thousands of years of exposure⁵.

The fungus has also been confirmed in north-eastern China⁶ and across Russia⁷. Despite some of the ways research has been presented there is no evidence that the fungus is causing mass mortality.

What does the presence of *P. destructans* in the UK mean for our bats?

We have positive confirmation of the presence of the fungus at multiple sites in the Midlands, East, South East and North East England, through a combination of active and passive surveillance projects. There have been no significant mortalities reported from any of the sites from which samples (swab samples from bats and environmental samples) have been collected, or mass mortalities at any other hibernation site in the UK.

The presence of the fungus in the UK without the mass mortalities observed in North America, mirrors that seen across the rest of Europe. This allows us to be optimistic that in the UK, like elsewhere in Europe, our bats have lived alongside the fungus for a long time and have developed a resistance to it.

One of the bats brought into my care has white fungus around its nose, wings, ears and/or tail. What should I do?

1. Ensure that the bat is isolated from all other bats in your care*
2. Any equipment used for this individual (e.g. gloves, food, and water containers) should also be kept separate and used for this individual only
3. All equipment should be sterilised when no longer in use. Decontamination advice given in Appendix III should be followed
4. Take a photo of the affected bat(s)
5. Complete the form in Appendix II
6. Wearing single-use gloves, take a sample of the external fungus with a sterile fine-tipped swab
7. Carefully package the sample and post to the Animal and Plant Health Agency (APHA) (see contact information below); and contact BCT immediately to report the sighting

If the bat is dead on arrival, or needs to be euthanized for welfare reasons, the entire body can be sent off for testing rather than following the sample procedure above. However please note that only dead bat specimens that are still fresh will be tested.

- Please send fungal samples, drawings of fungal lesions (see Appendix II) and/or fresh dead suspect bats chilled/frozen to: Catherine Man, Veterinary Lead, Wildlife Expert Group, APHA Veterinary Investigation Centre, Staplake Mount, Starcross, Exeter, Devon, EX6 8PE

⁵ Peuchmille, *et al.* (2011). White-nose syndrome: is this emerging disease a threat to European bats? Trends in Ecology and Evolution, 26(11): 570-576

⁶ Hoyt, *et al.* (2016). Widespread Bat white-nose syndrome fungus in northeastern China [letter]. Emerging Infectious Diseases. Jan. Available online at: http://wwwnc.cdc.gov/eid/article/22/1/15-1314_article

⁷ Kovacova, *et al.* (2018) White-nose syndrome detected in bats over an extensive area of Russia. BMC Veterinary Research, 18;14(1):192. Available online at: <https://www.ncbi.nlm.nih.gov/pubmed/29914485>

- Any dead bats should be placed in a sealed package such as a plastic sample tube (available from the BCT helpline on 0345 1300 228).
- The dead bat and/or sample must then be placed in a plastic grip bag.
- This should then all be placed in a padded envelope, which should be clearly marked with the code **UN3373** (this is a royal mail request) and additionally marked as **“Suspected White-Nose Syndrome”**, and **“Pathological specimen. Handle with care”**.
- Write the sender’s name, address, and phone number on the rear of the envelope.
- Please telephone or email Catherine Man first, if possible, on 03000 600020 or email starcross@apha.gov.uk

Please then submit observational data as soon as possible by sending the form in Appendix II (also available as a word document on the BCT website at: <https://www.bats.org.uk/about-bats/threats-to-bats/white-nose-syndrome/information-for-bat-workers>) via email to enquiries@bats.org.uk or in the post to: WNS Team, Bat Conservation Trust, Studio 15 Cloisters House, Cloisters Business Centre, 8 Battersea Park Road, London SW8 4BG.

* Please note that all bats suitable for eventual release should be kept isolated from other individuals, see the BCT Bat Care Guidelines for more information, <https://www.bats.org.uk/resources/guidance-for-professionals/bat-care-guidelines-a-guide-to-bat-care-for-rehabilitators>.

Appendices

Appendix I: Photo examples of *P. destructans*

Photo examples of *P. destructans* in the UK



Daubenton's bat: confirmed fungus on ear tip, Kent, 2013

Photo courtesy of Shirley Thompson, Kent Bat Group

The images below, and other photographs, were taken from the U.S. Geological Society website originally. However, the page is no longer available but similar images can be found at:

<https://www.whitenosesyndrome.org>



Little brown bats in NY cave.

Photo credit: Al Hicks, NY Dept of Environ. Conservation.



Little brown bats in NY hibernation cave. Most of the bats exhibit fungal growth on their muzzles.

Photo credit: Nancy Heaslip, NY Dept of Environ. Conservation.



Little brown bat with fungus on muzzle.

Photo credit: Al Hicks, NY Dept of Environ. Conservation.



A little brown bat found in a New York cave exhibits fungal growth on its muzzle, ears and wings.

Photo credit: Al Hicks, NY Dept of Environ. Conservation.

Appendix II: Bat Carer Pd/WNS Surveillance Form

If you observe any of the symptoms associated with WNS, please complete this form and submit your observations via email to enquiries@bats.org.uk or call 0345 1300 228 during office hours (09.30-16.30 Monday-Friday).

PART 1: Your Details	
Name	
Address	
Postcode	
Daytime telephone	
Email	
PART 2: Details of the site at which the bat was found (if known)	
Site name	
Site location (including county)	
Grid reference	
Date found	
Name and contact details of finder	
PART 3: Observations in relation to suspect fungus	
Bat species	
Age (juvenile / adult)	
Sex	
Body weight (grams)	
Body condition (very good / good / moderate / bad / emaciated)	
Colour of fungus	
Number of fungal patches	
Size of fungal patches (min and max, in mm)	
Sample taken?*	
Photograph(s) taken?	

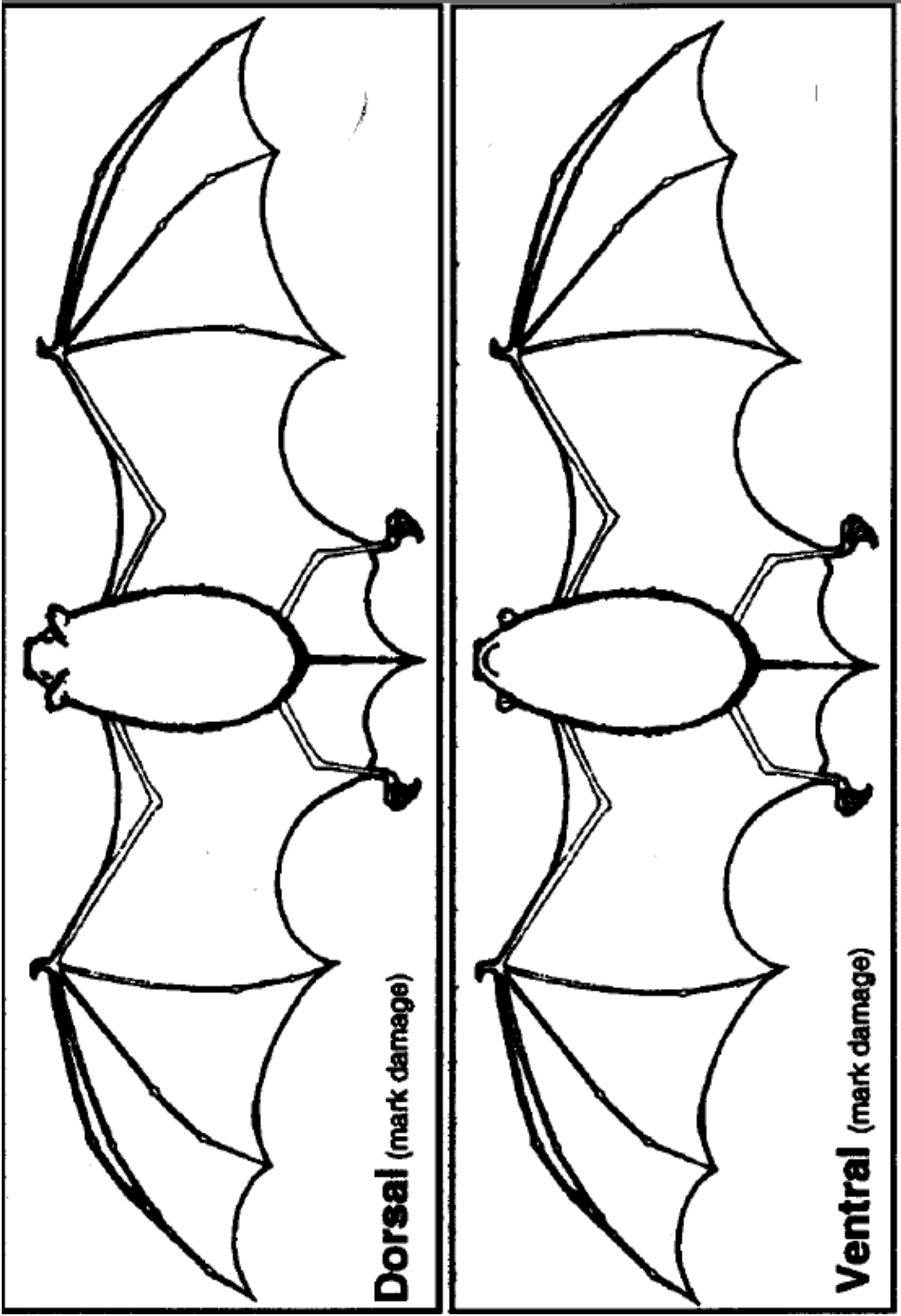
***Sampling method**

Wearing single-use gloves, take a sample of the external fungus using a sterile fine-tipped swab. Gently touch the tip of the fine tipped swab onto the fungus letting only the superficial fungal structures adhere; try to avoid getting other matter mixed in with the sample. Finally, remove gloves, spray them with disinfectant and dispose of them in a sealed bag.

Fine tipped swabs for sample collection are available from Catherine Man at APHA by telephone 03000 600020 or email starcross@apha.gov.uk and single swabs are also available from BCT – please contact the National Bat Helpline on 0345 1300 228 or email enquiries@bats.org.uk (please make sure you allow plenty of time ahead of your site visit for the swabs to be sent to you).

Alternatively (based on the protocol developed by Leibniz Institute for Zoo and Wildlife Research), wearing single-use gloves, gently touch the visible fungal lesion with the adhesive tape, letting only the superficial fungal structures adhere. Try to avoid getting other matter mixed in with the sample. Gently, press your adhesive tape onto a transparent piece of plastic, for example a food storage bag, making sure there are no air bubbles or gaps between the spore sample and plastic. Taking care not to squash it, store the sample until it can be securely packaged between two bits of card and posted to the APHA (along with the bat, if dead).

Localisation of fungal infection(s) (please mark in the sketch)



Please return this page to the APHA with the fungal sample

Appendix III: Recommended decontamination procedure for bat carers handling bats with suspect fungus

The recommendations below are targeted at UK bat carers who have identified a suspect fungus on live or dead bats and those who are likely to encounter other bats during roost visits or education work.

Quarantine

- If you have more than one bat in care, the suspect bat should be kept in a separate room until the APHA result has been confirmed.
- All equipment used for this bat should be kept separate and only used for this individual.

If you handle a suspect bat please:

- Use a pair of disposable gloves to handle the bat or, alternately, keep one pair of gloves in the room with the suspect bat for re-use. Wash these with the hottest cycle possible for the material, using conventional detergents before use elsewhere.
- Clothing – Ark-KLens is a powerful disinfectant that can be used to decontaminate boots and clothes. It is available online from <https://www.vetark.co.uk/products/hygiene-feeding-products/ark-klens> (the 'ready to use' 500ml product is £7.06 and 250ml concentrate £9.64; November 2023 price). For easy application, we suggest making up concentrate in accordance with manufacturer's instructions into a trigger spray container, such as those available from hardware stores (check usage instructions on the product you have purchase). For example <https://www.arco.co.uk/Web-Taxonomy/Cleaning-and-Hygiene/Cleaning-Tools/Empty-Bottles/Hozelock-Spraymist-1L-Trigger-Spray-Bottle/p/PIM000000000019673> – cost £7.00 (inc. VAT; November 2023 price).
- Disinfect any hard equipment that has come into contact with the bat using $\geq 0.3\%$ concentration of quaternary ammonium compounds such as Lysol® All-purpose Professional Cleaner, Lysol® disinfecting wipes or the antibacterial form of Formula 409® (available from various suppliers including online from www.amazon.co.uk in various sizes and prices); or use sodium hypochlorite bleach (i.e. household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- Clean exposed skin (arms, face, neck, hands, etc.) with hand sanitizer* before leaving the room. The skin cleaner Hibiscrub is also a useful antifungal for use on hands. This is available from various suppliers including via Amazon (125ml £5.98 November 2023 price). You can, alternatively, wash your hands thoroughly with soap and water.

* Please note: general antibacterial hand gels are NOT effective against fungal spores.