



Amphibian Disease Precautions: A Guide for UK Fieldworkers

Version 2, revised March 2017

Background

Amphibians are one of the most rapidly declining groups of animals globally, and infectious disease is a major cause of these declines in some areas. Fieldworkers have a key role to play in combating this; they can help detect disease, and through good practice they can reduce the risk of introducing and spreading disease.

This note advises field workers and others who may come into contact with amphibians (through ecological survey and monitoring, training, research or education activities) on simple procedures to substantially reduce the risk of introducing and spreading amphibian pathogens. The advice is based on the latest available evidence relating to fungal and viral pathogens, but this should also be effective for many other types of pathogen and may also help reduce the spread of invasive animals and plants.

Three key findings from research underpin the advice in this note: (1) amphibian diseases are frequently found to be spread by human activity, and amphibian fieldworkers therefore have a particular responsibility; (2) amphibian disease emergence is commonly associated with the introduction of non-native species; and (3) signs of infection are not necessarily evident on visual inspection.

Given the alarming situation regarding amphibian diseases overseas, and the poor understanding of disease impacts in the UK, this advice note advocates a precautionary approach to minimise the chance of introducing and spreading amphibian pathogens. Controlling disease outbreaks in the wild is practically impossible except under very particular circumstances, and so prevention is the best strategy. Alongside prevention, this note highlights the importance of reporting signs of infection, so that we can learn more about diseases and their effects and develop an early warning system for detection of novel threats.

Growing numbers of amphibian diseases have been described in recent years. The most notable of these are chytridiomycosis and ranavirus. Chytridiomycosis is caused by two species of microscopic fungi *Batrachochytrium dendrobatidis* ("Bd") and *B. salamandrivorans* ("Bsal"), which are often simply referred to as "chytrid". Chytrid infection has been responsible for mass mortalities of amphibians with declines and extinctions in some species on six continents, including Europe. Ranavirus (ranaviral disease), caused by infection with one of many types of ranavirus, also has a wide global distribution, though it appears to cause population declines less frequently than chytridiomycosis. Other infectious agents, about which much less is known, include herpesvirus and the parasitic infections *Amphibiocystidium* and *Ribeiroia*. It is likely that additional, currently undescribed diseases will emerge in the future.

In the UK, a number of pathogens and infected amphibians have been detected, yet the implications for conservation remain largely unclear. Perhaps the most obvious concern relates to ranavirus. This is now commonly reported from parts of England, and infection can lead to local population declines of 80% in common frogs. Whilst Bd is now known to be widespread in Great Britain, it does not appear to have caused the types of mass die-offs reported overseas. However, the lack of evidence for mass mortalities should not lead to complacency; such events can be difficult to detect even when they are occurring, and in any case it can take many years for the full effects of disease introduction to manifest. Whilst Bsal is known to be present in captive amphibians in the UK, it has not yet been detected in the wild. However, it is believed to be a major potential

threat to newt health should it become established, particularly the great crested newt which is known to be highly susceptible.

General guidance is given here, followed by recommendations for specific activities. The advice may be revised in future in the light of further research findings. Presently there is no evidence to suggest that amphibian diseases found in the UK present a hazard to human health.

General guidance

- Handle amphibians only when necessary.
- If handling amphibians, or if contact with pond water is necessary, wear powder-free disposable vinyl gloves which you rinse before contact with the amphibians. Use vinyl rather than latex or nitrile because the latter two may be harmful to amphibians.
- Use a fresh pair of gloves for each site¹ visited. For higher risk activities, it may be appropriate to change gloves between handling individual amphibians, even within the same site (see below).
- Disinfect survey equipment or containers used to hold amphibians between each site¹ visited (see disinfection procedures below).
- If entering the water, footwear should be washed and disinfected (see disinfection procedures below) immediately after the site visit. If you do not enter the water, there is no need to disinfect footwear unless visiting a high risk site (see guidance on specific activities below).
- Wash all clothing on a 40°C cycle with biological detergent, after exposure to amphibians or pond water. If visiting several sites bring a change of clothes. Use a lower temperature wash if care instructions indicate this may be harmful to your clothing, and take additional precautions such as washing twice or spraying with disinfectant before next use.
- Do not release amphibians anywhere except at the place of capture.
- If travelling by vehicle, park on hard standing (rather than vegetated areas) and walk to the pond.
- Treat dead or sick amphibians as a high infection risk and do not handle unless necessary.

Guidance on specific activities

In addition to the general guidance given above, the following additional precautions are recommended for specific activities, which may carry a higher risk of introducing or spreading disease:

Activity	Additional precautions
Monitoring an amphibian population.	At a site where amphibians are monitored from one year to the next: <ul style="list-style-type: none"> • Ensure that all surveyors are aware of disease issues and precautions. • Use survey equipment and footwear dedicated solely to the target site. • Store field equipment on site where possible. • Some sites may already have risk assessments in place so it is important to check for these before commencing field work.
Amphibian survey work at several sites. This is most common among ecological consultants surveying sites to inform the planning process.	<ul style="list-style-type: none"> • Ensure that all field workers are aware of disease issues and precautions. • Disinfect field equipment between sites. • Consider allocating a set of field equipment and footwear to each site within a season, rather than using the same equipment at different sites. • Consider having two sets of field gear, so that one can be in the disinfection and drying process while the other is in use.

¹ Ponds within 1km of each other and not separated by major barriers to dispersal can be considered as a single site. This working guide is equivalent to the distance over which amphibians may disperse and spread pathogens in a single generation.

<p>Translocating (moving) amphibians. This should be avoided where possible, but occasionally it is desirable for conservation, research or mitigation purposes.</p>	<p>In general translocation of amphibians should be avoided. It may be acceptable if:</p> <ul style="list-style-type: none"> • There is a strong case for the benefits of the translocation; and • There is no satisfactory alternative; and • Rigorous efforts to analyse and minimise disease risks are taken and independently assessed, and any residual risk is outweighed by the benefit of translocation.
<p>Training courses or educational dip-netting for amphibians.</p>	<p>Training and educational work is important and disease risks should not prevent these activities occurring if simple precautionary measures are taken. The following points should be observed:</p> <ul style="list-style-type: none"> • For training courses, ensure that all participants are aware of disease issues and precautions. • Ensure that all participants thoroughly scrub and disinfect footwear before going on site. • Use equipment (nets, trays and tanks) dedicated to the site only. • Where training or educational work is undertaken at several sites within a season, and the equipment cannot be assigned to a specific site, ensure all equipment is thoroughly disinfected and allowed to dry between sites. • Disposable gloves should be worn by the instructor. • Allow trainees to view amphibians but try to minimise handling as far as possible (realistically, it is impossible to prevent all handling). • Ensure that all participants wash hands thoroughly with soap or hand sanitising gel and water after the visit.² <p>Use the event to discourage movements of all life stages of amphibians including spawn, whilst still giving positive messages (e.g. the value of garden ponds).</p>
<p>Fieldwork at infected sites.</p>	<p>Restrict fieldwork to essential activities only (e.g. research to track the progress of infection or to assess amphibian population status).</p> <ul style="list-style-type: none"> • Use field equipment dedicated to the target site only. • Store field equipment on site where possible. • Keep the number of survey visits to the minimum necessary. • Minimise the number of field workers, and visit no more than one site per day. • Disinfect equipment between individual ponds within the site. • Use a fresh pair of gloves for each amphibian handled (or if that is not feasible, at least every 2-5 individuals), to minimise the chance of amplifying infection levels.
<p>Fieldwork at other high risk sites. These include sites near to an area where disease has been detected or where non-native amphibian species are present.</p>	<ul style="list-style-type: none"> • Use field equipment dedicated to the target site only. • Store field equipment on site where possible. • Keep the number of survey visits to the minimum necessary. • Minimise the number of field workers, and visit no more than one site per day.

² This is also good practice to prevent infection with disease agents that are pathogenic to humans including Weil's disease and tetanus

Fieldwork by persons who keep non-native amphibian species in captivity.

- Implement rigorous barrier methods (gloves, minimal handling, disinfection, change of clothes and footwear, etc.) to minimise the risk of transmitting pathogens from captive stock to wild sites.
- Regularly screen captive stock to detect infection.
- Do not bring native amphibians into captivity, or release animals that have been in captivity back into the field.
- Consider curtailing fieldwork that involves handling amphibians at sites supporting important native populations.
- Do not use any equipment in the field that has been previously used in captive facilities, even if it has been cleaned.
- If the above points are not feasible, then such persons should consider refraining from undertaking fieldwork at amphibian sites.

Disinfection procedures

Disinfect all field equipment that has come into contact with amphibians or pond water. This includes footwear (boots or waders), pond nets and aquatic trapping equipment such as bottle-traps and canes or the box section of Dewsbury traps. Note: water may be drawn up into canes, and so we recommend that the whole cane is soaked in a disinfectant solution.

To disinfect equipment in the field the following will be required:

- a bucket or washing up bowl
- a brush
- disinfectant (bleach³ or Virkon⁴)
- disposable or washing up gloves (to wear while disinfecting)
- a source, or container, of clean water
- bin bags for waste and wrapping field equipment.

1. Use brush to scrub off any debris, plant fragments, mud etc.
2. Rinse with water (pond water will suffice).
3. Soak in bleach solution for at least 5 minutes, or Virkon for at least one minute (5 minutes where Bsal is suspected).
4. Rinse with clean water.
5. If possible, allow to dry for before next use.
6. Keep field equipment inside plastic bags during transit and storage (after thorough drying) to reduce the chance of transmitting pathogens.

Disinfection solutions

Bleach (diluted with water to produce a 4% solution).

Virkon (10mg/ml, as per supplier's instructions).

Virkon-S (licensed for veterinary/animal livestock applications but not human use) can also be purchased in tablet form. One 5mg tablet can be dissolved in 500ml of water.

Pond water can be used to make up solutions so long as it contains little or no organic matter (as this reduces disinfectant efficacy).

Dispose of disinfectant solutions following the supplier's instructions. Unless otherwise stated, it is recommended that used disinfectant solutions should be poured directly into a drain connected to the sewerage system⁵ and flushed with clean water (note that not all drains are connected to sewerage systems), or disposed of as hazardous waste. Used gloves should be disposed of as domestic rubbish. Fabrics including clothes worn while

³ Sodium hypochlorite is the active ingredient in household bleach, and concentrations vary between brands typically from 8-15%. It is important you check the concentration of the brand you are using, and adjust your dilution rate to arrive at 4%.

⁴ Virkon is a disinfectant sold as a powder or in tablet form and used in large animal husbandry (readily available online and at farm supply stores or outlets aimed at horse owners).

⁵ Surface water drains, including road and car park drains, often discharge into rivers or the sea without treatment, so only dispose of disinfectant in this way if you are sure the drain is connected to the foul sewer. The sewerage undertaker – usually the water company – maintains a map of public sewers.

doing amphibian fieldwork can be washed on a 40°C cycle with biological detergent (see comments above regarding clothing requiring colder washes).

Investigating dead amphibians

The *Garden Wildlife Health* project has been established to investigate disease in a range of native wildlife species in Great Britain, and in some cases the project vets, based at the Wildlife Epidemiology Unit at the Institute of Zoology, may be able to carry out post mortem examinations on dead amphibians.



Reports of sick and dead amphibians are valuable to help gather information about the diseases that affect native species and to monitor their impact. Photographs of affected animals and the site in which they are found can be very helpful, along with information on the potential disease symptoms observed. Reports of amphibian ill health from all sites are welcome, and are not limited to gardens. Please report sightings via the project web portal www.gardenwildlifehealth.org.

When freshly dead amphibian carcasses in a good state of preservation are available, it may be possible to test them for disease. Where appropriate, arrangements for submission are made with the GWH veterinary surgeons and all costs covered by the project. If you are concerned about a sick or injured amphibian, please contact your local veterinary surgeon, or experienced wildlife rescue centre for guidance. Disease factsheets on the common conditions affecting British amphibians are available at www.gardenwildlifehealth.org.

Further information

Amphibian Ark www.amphibianark.org/the-crisis/chytrid-fungus.

Amphibian and Reptile Conservation, www.arc-trust.org/habitat-management-handbooks

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