



'Winterkill' in Amphibians

Agents

Infectious diseases are not the only cause of amphibian mortality. Dead amphibians, sometimes in large numbers, can also be the result of non-infectious events such as 'winterkill'. Some amphibians, mostly common frogs (*Rana temporaria*), might overwinter in the silt and vegetation in the bottom of ponds, which usually does not harm the animals. However, sometimes they don't survive hibernation due to winterkill, which usually occurs if the pond becomes frozen over. The exact cause of this is not yet known, but it is thought to be caused by lack of oxygen or potentially the toxic effect of gases produced by decomposing organic material beneath the ice during long cold spells. Alternatively, winterkill can affect frogs overwintering in very shallow ponds if the entire water body freezes.

Species affected

Winterkill has been reported in a range of amphibians, typically affecting common frogs overwintering in ponds. It can, however, occasionally be observed in other species. Common toads (*Bufo bufo*) tend to hibernate in hedges and ditches, whereas newts mostly take up residence under logs and stones, in crevices in walls, or buried in soil.

Signs

The most common signs of winterkill are single or multiple dead, grey and bloated, common frogs floating on the surface of the pond after the frost has gone. Although observing a large number of dead amphibians in your pond or local water body can be distressing, the death of a few individuals during prolonged periods of freezing is a natural process and does not affect the population of this species.

Distribution

Winterkill can be expected wherever and whenever extended periods of freezing occurs. It is, therefore, a widespread natural cause of mortality in amphibians.

Risk to human health

Winterkill does not pose any risks to human health.

Risk to domestic animals

There is no known risk to the health of domestic animals. However, dead frogs should be removed from the pond to prevent water contamination from carcass decomposition.

Diagnosis

A tentative diagnosis of winterkill as a cause of death in amphibians can often be made based on the history, time of the year, recent weather patterns and the appearance of the affected animals. Please report cases of suspected winterkill to us to help us develop a better understanding of this phenomenon.

If you wish to report finding a dead amphibian, or signs of disease in amphibians, please visit www.gardenwildlifehealth.org. Alternatively, if you have further queries or have no internet access, please call the Garden Wildlife Health vets on 0207 449 6685.

Control and prevention

In the past, garden pond owners have been encouraged to maintain holes in the ice of frozen ponds to allow exchange of gases with the air for all wildlife hibernating underneath the surface. However, oxygen levels may not be depleted under ice as long as sunlight reaches the pond allowing plants or algae to release oxygen into the water (through photosynthesis). Therefore, sweeping snow from the pond surface to allow sunlight to reach below the frozen surface might help reduce the risk of winterkill.

Maintaining a hole in the ice can be used as a precautionary measure that may release noxious gases; however, the effectiveness of these holes in allowing escape of harmful gases has not been evaluated. This can be achieved e.g. by leaving a ball floating on the pond before it freezes over, or by placing a bowl with hot water on the surface and allowing the ice to thaw underneath. Do not crack the ice manually as this sends harmful shock waves through the water body and can distress hibernating animals.

NB. PLEASE ONLY ATTEMPT ANY OF THE ABOVE ACTIONS IF SAFE TO DO SO.

Further information

More advice on amphibians in your garden can be found on the Garden Wildlife Health website www.gardenwildlifehealth.org.

Scientific publications

Bradford, D. F. (1983) Winterkill, oxygen relations, and energy metabolism of a submerged dormant amphibian, *Rana muscosa*. *Ecology* **64**(5): 1171-1183. [doi:10.2307/1937827](https://doi.org/10.2307/1937827)

Tattersall, G. J. and Ultsch, G. R. (2008) Physiological ecology of aquatic overwintering in ranid frogs. *Biological Reviews* **83**(2): 119-140. [doi:10.1111/j.1469-185X.2008.00035](https://doi.org/10.1111/j.1469-185X.2008.00035)

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