Dermocystid Parasites in Amphibians

Agents

Amphibiocystidium and *Amphibiothecum* are single-celled parasitic organisms belonging to a group of organisms called dermocystid protozoa that can only be differentiated using molecular genetic methods.

Species affected

Diseases caused by *Amphibiocystidium* and *Amphibiothecum* parasites have been reported in a range of amphibians, including frogs, toads, newts and salamanders. Evidence suggests that some amphibian species may be more susceptible to infection than others, but all amphibians should be considered at risk.

Signs of disease

Infection with dermocystid parasites can cause a range of disease outcomes, from mild disease and recovery to death. Infection commonly results in the development of nodular skin lesions that are visible to the naked eye. These vary from small blisters to multiple nodules and large tumour-like lesions, which can become red and ulcerated. The skin lesions can occur anywhere on the body, including the head, tail and legs (see Figures 1 and 2). Sometimes, the lesions caused by *Amphibiocystidium* are clustered around the vent or cloaca, whereas the ones caused by *Amphibiothecum* tend to be observed on the animal's back. Additionally, these dermocystid parasites can infect the liver, in which they form tumour-like lesions of varying sizes.

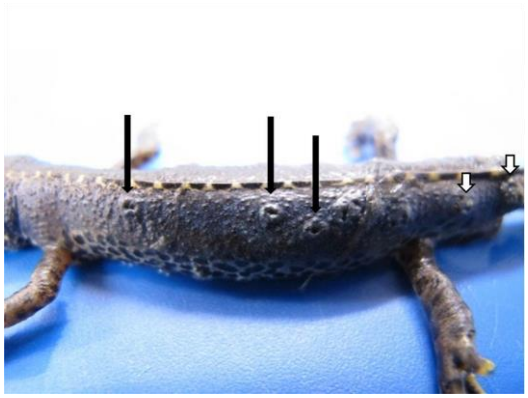

Figure 1. Alpine newt (*Ichthyosaura alpestris*) infected with *Amphibiocystidium*. Long black arrows – ulcerative lesions on back. Short white arrows – coalescent blisters at base of tail. Photo credit: Zoological Society of London.

Figure 2. Palmate newt (*Lissotriton helveticus*) infected with *Amphibiocystidium*. Long black arrows – single blisters on body and tail. Short white arrows – coalescent blisters on body. Photo credit: Shaun Denney.

Disease transmission

The lifecycles and means of transmission of these dermocystid parasites are unknown.

Distribution

Disease consistent with *Amphibiocystidium* infection was first described in Europe at the beginning of the 20th Century in frogs and newts and has since also been found in North America. There has been an increase in the number of

reports of amphibians infected with either of the dermocystid parasites in recent years in Great Britain and elsewhere in Europe; however, this might be due to the large increase in the number of people studying amphibian diseases.

In Great Britain, dermocystid parasitic diseases are suspected to be present in both native and introduced species of newts in multiple sites across the country and their distribution and impact are currently under investigation.

Risk to human health

Amphibiocystidium and *Amphibiothecum* dermocystid parasites are only known to infect amphibians. There is no known risk to human health.

Risk to domestic animals

Dermocystid parasites are known to infect various species of amphibian. As such, pet amphibians should be regarded as being susceptible to infection.

Diagnosis

A tentative diagnosis of dermocystid parasitic disease can often be made based on the appearance of the lesions found in affected amphibians. However, a definitive diagnosis and differentiation between *Amphibiocystidium* and *Amphibiothecum* infection can only be made using specialist laboratory tests.

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

There are no known effective treatments for dermocystid parasitic diseases. The movement of infected animals should be avoided to help prevent the unintentional spread of the parasite to new areas.

Further information

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

Scientific publications

Pascolini, R., Daszak, P., Cunningham, A.A., Tei, S., Vagnetti, D., Bucci, S., Fagotti, A. and Di Rosa, I. (2003) Parasitism by *Dermocystidium ranae* in a population of *Rana esculenta* complex in Central Italy and description of *Amphibiocystidium* n. gen. *Diseases of Aquatic Organisms* **56(1):** 65-74. doi: 10.3354/dao056065.

Raffel, T. R., Bommarito, T., Barry, D.S., Witiak, S.M., and Shackelton, L.A. (2008) Widespread infection of the Eastern red-spotted newt (*Notophthalmus viridescens*) by a new species of Amphibiocystidium, a genus of fungus-like mesomycetozoan parasites not previously reported in North America. *Parasitology* **135(2):** 203–215. doi:10.1017/S0031182007003708.

Duffus, A.L.J. and Cunningham, A.A. (2010) Major disease threats to European amphibians. *The Herpetological Journal* **20(3):** 117–127. http://www.ingentaconnect.com/content/bhs/thj/2010/00000020/00000003/art00002.

González-Hernández, M., Denoël, M., Duffus, A.J.L., Garner, T.W.J., Cunningham, A.A. and Acevedo-Whitehouse, K. (2010) Dermocystid infection and associated skin lesions in free-living palmate newts (*Lissotriton helveticus*) from Southern France. *Parasitology International* **59(3):** 344–350. doi:10.1016/j.parint.2010.04.006.

Fiegna, C., Clarke, C.L., Shaw, D.J., Baily, J.L., Clare, F.C., Gray, A., Garner, T.W.J. and Meredith, A.L. (2017) Pathological and phylogenetic characterization of *Amphibiothecum sp.* infection in an isolated amphibian (*Lissotriton helveticus*) population on the island of Rum (Scotland). *Parasitology* **144(4):** 484-496. doi.org/10.1017/S0031182016001943

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