

# Squirrelnox outbreak detected in north Wales: Without a vaccine, the disease will keep decimating red squirrels

December 22 2022, by Craig Shuttleworth

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Red squirrel with squirrelnox virus. Credit: [Peter Trimming / Flickr](#), [CC BY](#)

Concerns over the spread of squirrelnox have increased after a [sick red squirrel was found in Bangor, Wales, in late November](#).

It's not the first time an outbreak has happened in the area—back in 2020/21, the disease caused a loss of [70%-80% of its red squirrel population](#). Such major outbreaks are devastating and lead to [dramatic and ongoing red squirrel declines](#).

Conservationists have a formidable task to ensure that similar losses do not happen again. The current national strategy is simple: [cull gray squirrels](#) in areas where red squirrels persist. However, there is no single, straightforward way to safeguard the future of this native mammal at the moment.

It is the gray [squirrel](#) which [carries squirrelpox virus infection](#), but it does not cause them obvious harm. When they were first introduced from North America during the Victorian era, [gray squirrels brought the virus to Britain](#) and Ireland.

Gray squirrels compete for resources with [native red squirrels](#), which is a species with [little immunity to the virus](#). The infection produces extensive skin lesions around the eyes, muzzle and mouth, on the digits and around the genitalia. The sores become infected by bacteria and are a major source of viral particles which contaminate the environment.

This increases the likelihood of sick red squirrels spreading infection to other reds. Squirrelpox leads to [death within three weeks](#) of infection.

## **Does culling work?**

On the island of Anglesey, off the northern coast of Wales, culling between 1998 and 2013 led to the [eradication of gray squirrels](#). As those efforts steadily reduced gray squirrel numbers, the proportion of remaining grays exposed to squirrelpox virus and showing [antibodies progressively dwindled](#) to zero, revealing that the virus eventually disappeared from their population.

With fewer hosts to infect, eventually the infection was simply unable to spread between hosts. Although red squirrels were reintroduced before the gray squirrel eradication was completed, the steady decline in levels of infection among gray squirrels explains why no diseased reds were found on the island.

Across Wales, an [estimated 1,500 red squirrels](#) may remain. Whereas there were only [40 on Anglesey in 1998](#), today there are perhaps 800.

In 2009, red squirrels were first recorded on the Gwynedd mainland having [crossed the narrow Menai Strait from Anglesey](#). This population expanded but since 2017, there have been repeated [squirrelpox outbreaks](#) there.

The problem with culling outside of a closed environment like an island is that, to be effective, control has to be coordinated over ever-larger areas, which is expensive and time-consuming. Sporadic or localized mainland gray squirrel culling simply leads to [rapid re-invasion](#).

Red squirrels also naturally return to the habitats from where grays are removed. This inevitably leads to mixing and continued risk of infection.

## **Birth control**

So what more can be done? A complementary, non-lethal population control method is being developed. This is an oral contraceptive bait which, if consumed, makes gray squirrels infertile. It would be deployed in hoppers designed to only allow gray squirrels access.

Although this is an exciting prospect, research suggests effective use would [require gray populations to be reduced first by culling](#), before the contraceptive is presented. Using bait will also require coordination between a multitude of landowners, not all of whom may wish to be

involved or pay for control.

It is therefore an important part of a future solution, but not a simple panacea.

## **Pine marten to the rescue?**

Another interesting possibility could be to use pine martens to control the gray population. The pine marten is being reintroduced into many parts of Britain [including woodlands adjacent to Anglesey](#). The occasional individual has been [detected on the island](#) too.

Pine marten predation is more pronounced upon gray than red squirrels, and this fact could lead to the suppression of the squirrelpox pathogen.

Recent [mathematical modeling](#) has reinforced the potential role for this native predator in reducing the impact of invasive gray squirrels and the infectious diseases they harbor. [Research by myself and colleagues](#) suggests that gray squirrels would decline if pine martens are reintroduced, and often their numbers would then be insufficient for the virus to be maintained.

One uncertainty is exactly how much of an effect this predator would have, because it is omnivorous and hunts a wide variety of prey. When vole populations are high, for example, pine martens may focus their hunting on this prey, and [less on gray or red squirrels](#). Nevertheless, [pine marten](#) recovery is likely to be a positive contribution to gray squirrel management and our modeling predictions are dramatic.

Unfortunately, both this and commercial contraceptive use are only likely to assist in the medium to long term. Consequently, we are currently left with expensive ongoing local culling programs.

## A vaccine is essential

A big gap in our ability to fight squirrelpox comes from the fact there is currently [no vaccine available for the disease](#). The [Wildlife Ark Trust](#) funded a vaccine development program, but insufficient funding meant this research stopped a decade ago.

With no way to inoculate [red squirrels](#) against the pox virus, we can do little in the face of inevitable future squirrelpox outbreaks such as that which occurred near Bangor. It is to our collective shame that research halted because of insufficient funding and political will.

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