## **Squirrelpox in north Wales**

### **Craig Shuttleworth Bangor University**

photo Sarah McNeil



## Tell tale signs it's a grey





Three main red squirrel populations:

1. The island of Anglesey

2. Clocaenog Forest

3. Mid Wales forest matrix



Grey squirrels first arrived on Anglesey in the mid 1960s and by 1998 the red squirrel was almost extinct with only 40 animals remaining in Mynydd LLwydiarth



#### Looking west along the Menai Strait from Bangor toward Caernarfon











## Mainland Gwynedd





# Collins et al. (2014) Plos One



**Figure 3. Squirrelpox prevalence.** The effect of (**A**) species and (**B**) season for overall disease status i.e. percentage presence of antibodies from ELISA and/or viral DNA from qPCR ±95%CIs. Sample sizes (n) are shown in the bars.

"Most squirrels with SQPV DNA were negative for SQPV antibodies, suggesting that at the time of testing they were in the earlier stages of infection before any host antibody immune response could develop"

## Squirrelpox summary

- 60-90% of grey squirrels have viral antibodies.
- One pathological infection recorded.
- Schuchert et al. 2014 found culling associated with depressed infectior rates.
- Inter-specific infection can lead to high mortality rates in reds.









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#### Fears red squirrels may be wiped out in one of their last British strongholds after first suspected case of a deadly virus reaches Anglesey

Squirrel pox has helped destroy 95 per cent of native reds in England and Wales But it had never been seen on the island of Anglesey, off the north coast of Wales Fears have been raised the disease has now spread to the red squirrel stronghold A a dead red squirrel with facial lesions typical of the disease was discovered on the island on Wednesday

By VICTORIA ALLEN SCIENCE CORRESPONDENT FOR THE DAILY MAIL PUBLISHED: 16:53, 13 October 2017 | UPDATED: 17:03, 13 October 2017



Red squirrels could be almost wiped out in one of their last British strongholds by the deadly squirrel pox virus.



#### DEADLY SQUIRREL POX OUTBREAK IN BANGOR

Posted by The Bangor Aye | Sep 30, 2017 | Bangor News | 0 . | +++++



The Red Squirrel population in Bangor and Anglesey is under threat after an outbreak of the deadly squirrel pox virus, Red Squirrel Trust Wales have confirmed.

Lab tests have confirmed that a dead red squirrel that was found in Treborth Gardens in Bangor, had the highly infectious squirrel pox virus. Because red squirrels can move between the mainland and Anglesey there is now a chance



Monday, Jan 17th 2022 6PM 8°C 🧉 9PM 8°C 🤘 5-Day Forecast

OVER 1 SEMEN

#### Third case of squirrel pox heightens fears for red colony on Anglesey

While there are no confirmed cases of the virus in the red squirrel colony on the island it is feared the disease could strike

COMMENTS By <u>Gareth Wyn-Williams</u> Local Democracy Reporter 15:53, 7 DEC 2017 UPDATED 16:33, 7 DEC 2017 NEWS

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### Fears of Anglesey and Gwynedd red squirrel virus outbreak

() 6 October 2017



People are being asked to keep a look out for sick squirrels on Anglesey and in Gwynedd.

It comes after a red squirrel was found to have died from squirrel pox virus in Treborth Botanic Garden, Bangor.

Conservationists fear that if the virus spreads, it could wipe out large numbers

that the infection will reach the island.







# 2017 three cases of squirrel pox virus in Gwynedd coastal woodlands



Article



An Opportunistic Assessment of the Impact of Squirrelpox Disease Outbreaks upon a Red Squirrel Population Sympatric with Grey Squirrels in Wales

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Simple Summary: In Europe, squirrelpox virus is carried by non-native grey squirrels and spread into native red squirrel populations. The virus causes a large proportion of infected red squirrels to die and contributes to local declines and the replacement by grey squirrels. There are relatively few published studies quantifying the impact of disease amongst red squirrels. We present findings from a short-term study in north Wales, United Kingdom.

Abstract Native red squirrels (*Sciurus vulgaris*) persisted in the coastal mainland woodlands of northern Gwynedd whilst sympatric with an invasive grey squirrel (*Sciurus carolinensis*) population suppressed by culling. Squirrelpox disease in the red squirrel population was recorded in 2017



## **Conservation Dogs**



Figure 8: Detection dog Max indicating on red squirrel scent. Dogs possess more than 220 million olfactory receptors in their nose © Paul Harry



Figure 9: Dogs can search an area up to the size of a football pitch in under an hour  $\ensuremath{\mathbb{C}}$  Holly Peek

- 17% June 20 animals alive in March 21
- 14% October animals alive in March 21
- June survivors: 4 females and 1 male
- No data on ELISA so no understanding of exposure in survivors



#### Land access restrictions mean fate of dark circle animals unclear



### ELISA (0.2 cut off) antibody tests on pox 'survivor'



**Figure 2** – Enzyme-Linked Immunosorbent Assay (ELISA)  $OD_{450}$  Results (Feb 1997 to August 1998) for an adult male red squirrel (PiT identification BDDO) following treatment for TEM confirmed pathological SQPV infection.  $OD_{450} > 0.2$  was taken as the cut off for a positive result. The squirrel was first released into the wild 7/12/1996 and following capture, treatment for squirrel pox and confinement from late January 1997 it was re-released on 12/12/1997.

- 1st Outbreak confirmed in 2017.
- 2nd Sept 2020 Jan 2021.
- Land access problems.
- Challenge of confounding infections



Dermatophilosis

Fatal Exudative Dermatitis



Predation co-efficient



## What next

- Assess impact of further pox outbreaks in Gwynedd.
- Continue with pine marten translocation.
- Publish genetic and viral infection data to quantify origins and threat posed by greys on Anglesey.