Horizon Scanning Internship

January – March 2023

Alice Peace

Aims & Objectives

- This project aims to identify and understand future pest threats to the expansion and future health of Britain's woodlands

- Large-scale tree planting and woodland creation are widely recognized as essential tools in combating climate change

- Horizon scanning and critical analysis will determine potential pest risks associated with new woodland creation schemes and priority tree species and identify the most likely invasion pathways for skey invasive pests

Kew Workshop & Trip to Alice Holt

- A workshop that allowed me to gain a better understanding of how the Horizon Scanning project fits into the wider work of the CFP and DEFRA

- Chance to meet the other interns and learn about everyone's projects.

- Chance to meet my team, who are based down at Alice Holt

Visit to Alice Holt

Stripping bark to feed the many bark beetles in the Alice Holt laboratories

▶ Visit to Alice Holt Lodge for 2 days

▶ Tour of the Entomology laboratories and new quarantine facilities

▶ Getting a better understanding of the project and how to start investigating

▶ Practical work! Stripping bark to feed the beetles in the new AH quarantine labs

A normal day: working at NRS

Workspace at NRS
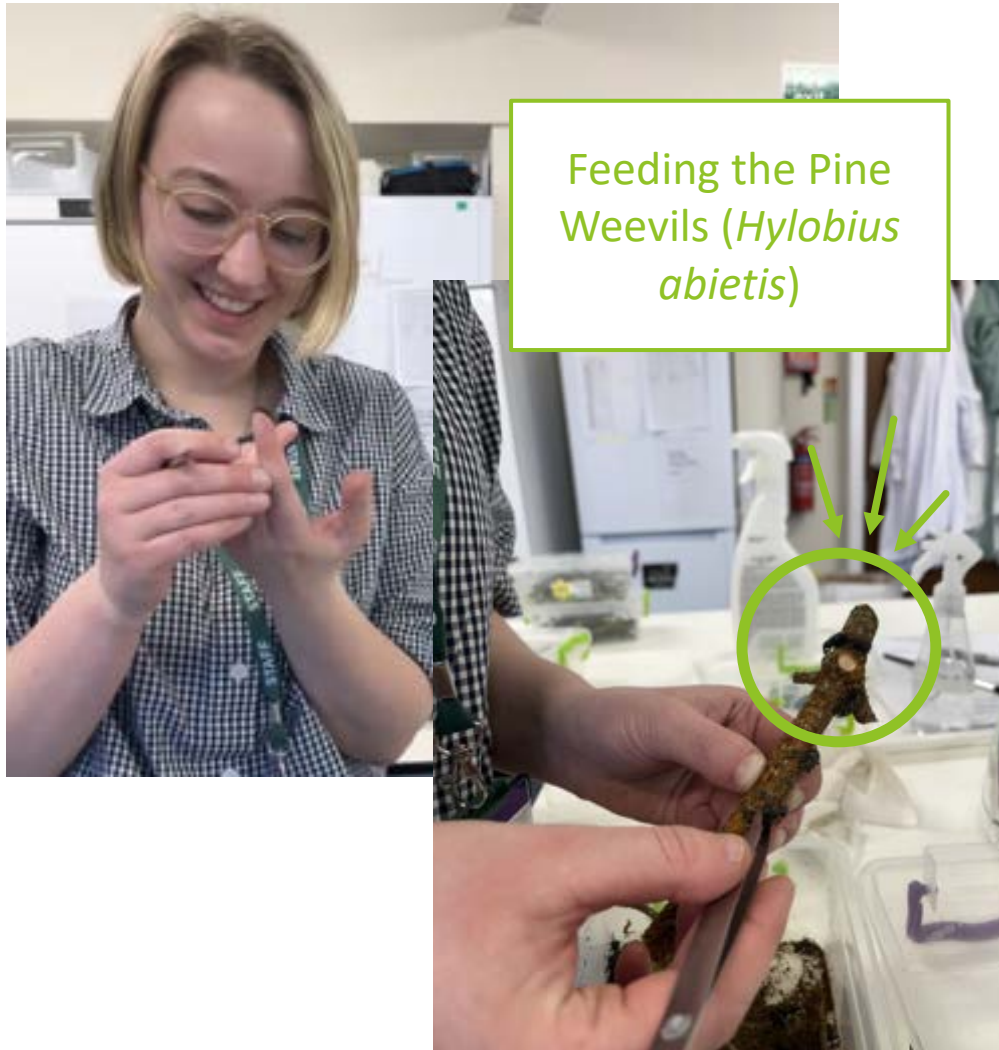
Feeding the Pine Weevils (*Hylobius abietis*)

▶ Most of my project is desk-based, conducting research and compiling data in the form of an Excel spreadsheet ready for analysis in R

▶ Skills I am improving include:

  ▶ Research: how to find answers when they aren't easily available online.

  ▶ Communication: visiting archives, communicating with other research teams to discuss their data

  ▶ Self-organization: managing my own time and staying self-motivated.
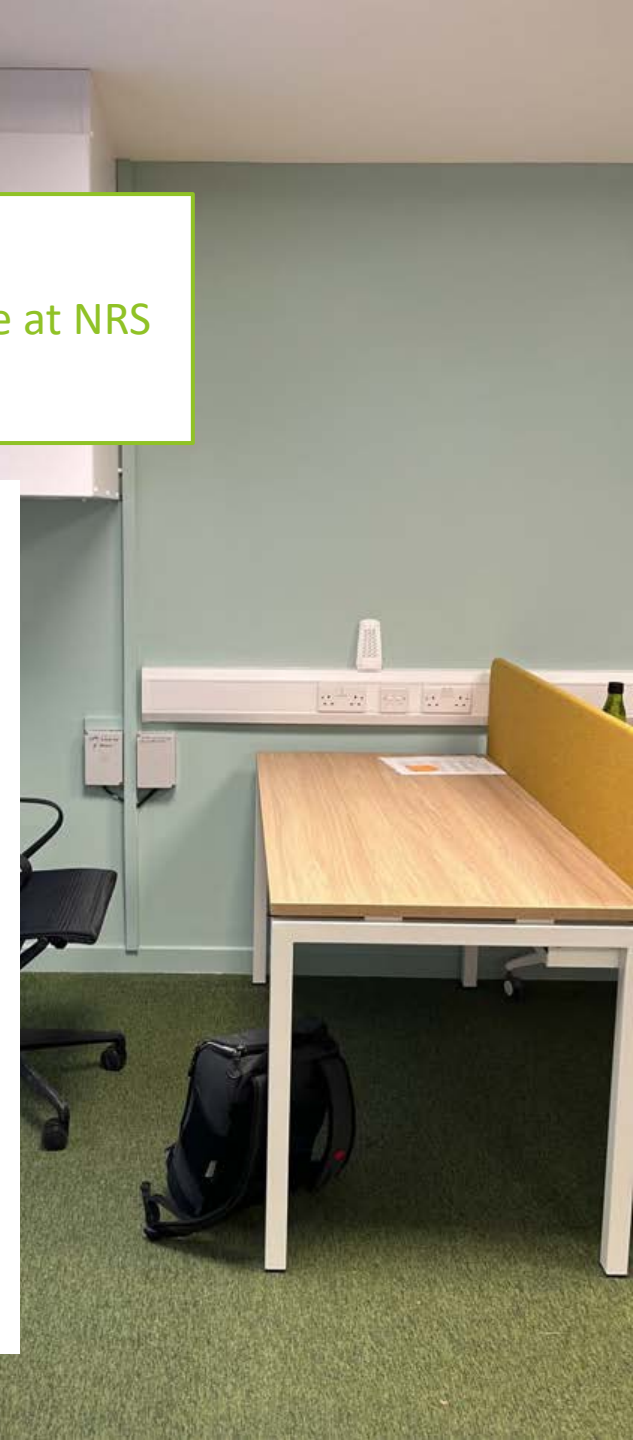
Field Work in Norfolk

What?

- 3 days of field work in Norfolk and Suffolk

Why?

- To find a tree suffering from Acute Oak Decline, which also contained larvae of *Agrilus biguttatus,* a bark-boring beetle suspected to have a role in AOE. This tree can then be felled and the beetles used for Entomological and Pathological research for the next 12 months

- To check on an experiment run by the Pathology team to investigate how trees respond to infection with bacteria or colonization by *A. biguttatus* under different stressors.

Field Work in Norfolk

What did I learn?

- A good understanding of the likely causes of AOD and how this disease progresses when trees are under stress, e.g. drought, climate change, temperature increases.

- Detecting the symptoms of AOD in oak trees.

- Detecting the presence of *A. biguttatus* in oak trees

- Taking a panel from an infected tree using a mallet and chisel (and the essential health and safety for this!)

- Understanding of forest management through working with various landowners and land managers.

- Cultivating tree pathogens in a laboratory
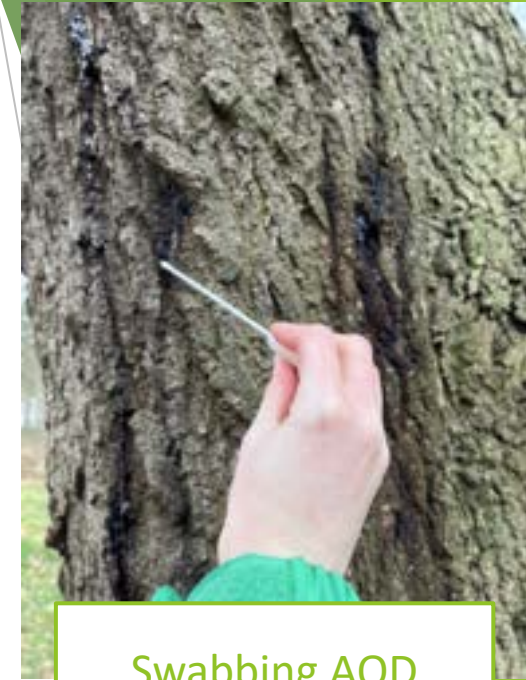
Swabbing AOD lesions for bacteria to culture in the lab

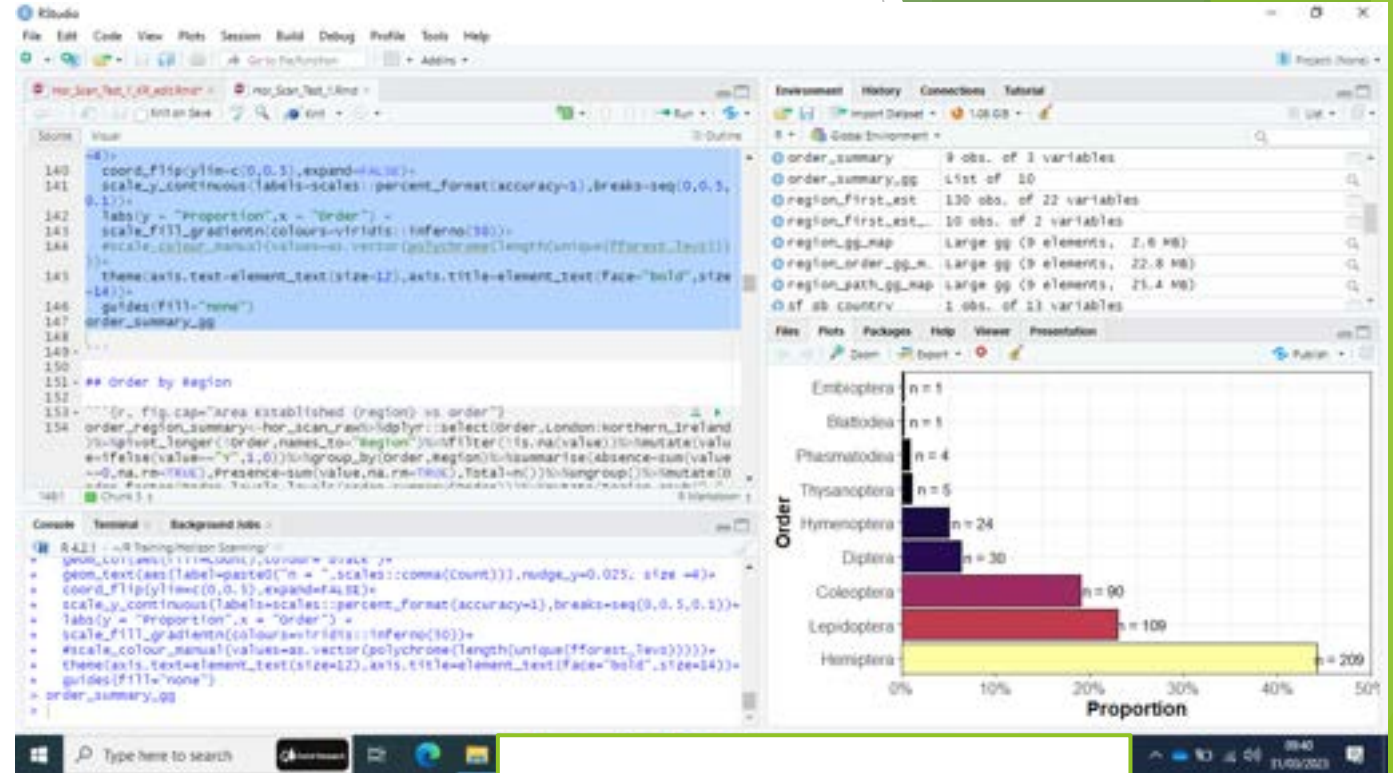Measuring man-made injuries to infected oak trees under stress to see how healing time is affected

Data Analysis

What did I do?

▶ Completed FR R Training Course

▶ Data analysis in R (with help!)

What did I learn?

▶ How to make graphs and charts in R

▶ How to manipulate data in R

▶ The extent of what R can do!

Working in R to analyse data

Final report

What did I do?

▶ Wrote a final report, including introduction, methods, results, analysis, discussion and conclusion for DEFRA with aim to publish in the future

What did I learn?

▶ Working under pressure

▶ Working as part of a team – a very different experience to team work at university!

▶ How to write a report for publication

How will this internship help my career?

▶ I am interested in the effects of climate change on tree health, so this internship has been the perfect stepping-stone between my MSc and a longer term job.

▶ I've gained essential field skills that were lacking in my MSc due to the unpredictable nature of the Covid-19 pandemic

▶ I've improved my research skills, especially when trying to find information that isn't widely/freely available!

▶ I have confirmed (for myself) that tree health and climate change is an area I would like to continue working in long-term