

# **BIOL365: Marine and Terrestrial Ecology**

## **Practical 3: Genetic alignments and phylogenies**

A photograph of a brown wallaby perched on a thick, moss-covered tree branch. The wallaby is looking directly at the camera with a curious expression. The background is a soft-focus forest scene with green leaves and tree trunks.

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# What to expect today

1. Script preparation
2. Prepare GenBank data
3. Filter sequences
4. Align sequences
5. Make a phylogeny



# Script preparation

- Usually, you will do this every time you open a project
- Consider good practice and what's easiest in the long run
  - Questions about HOW you set your working directory



# Prepare GenBank data

- You will use my finch data version from Moodle
  - We will also download an **OUTGROUP** species
  - This helps us “root” our phylogenetic tree and better-determine the relationships within our clade of interest



# Filter sequences

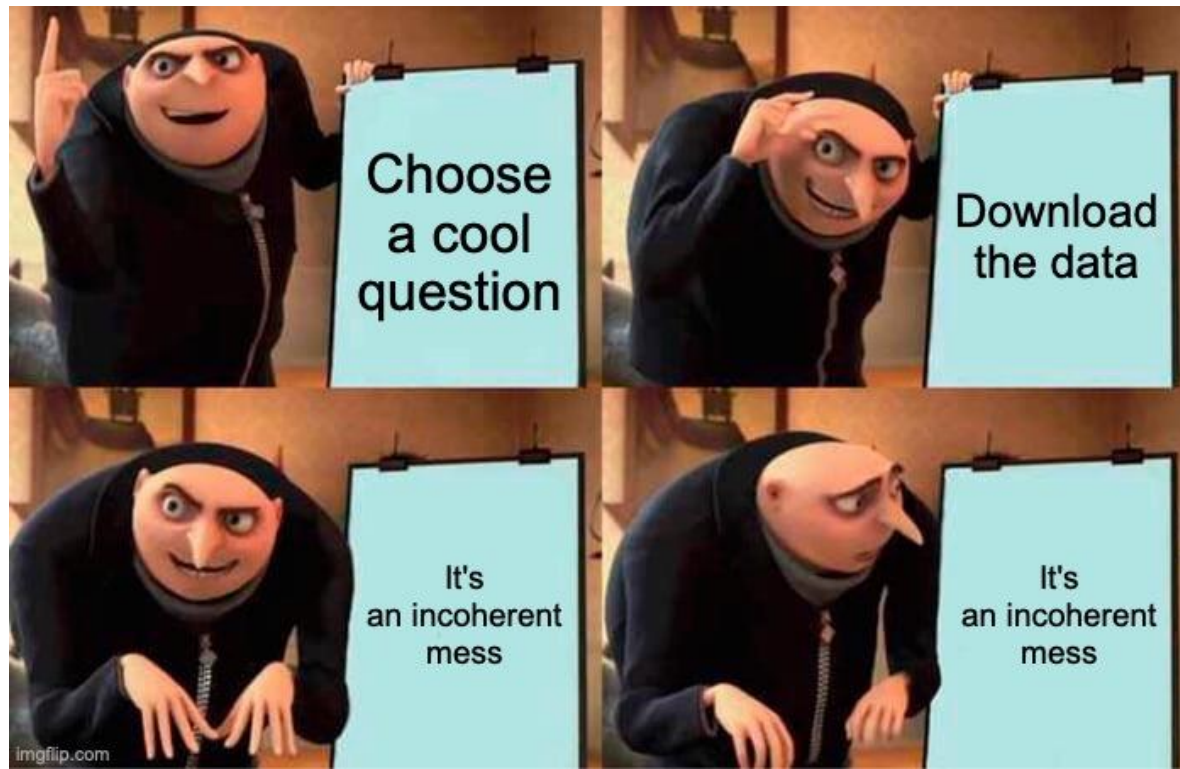
- Filter sequences to simplify our analyses (one individual per species)
  - There will be data management along the way
  - You can almost read *tidyverse* code like a flowing sentence
  - Much of this code is useful, but you should remember **WHAT** you can do and decide if you want to use it for your assignment





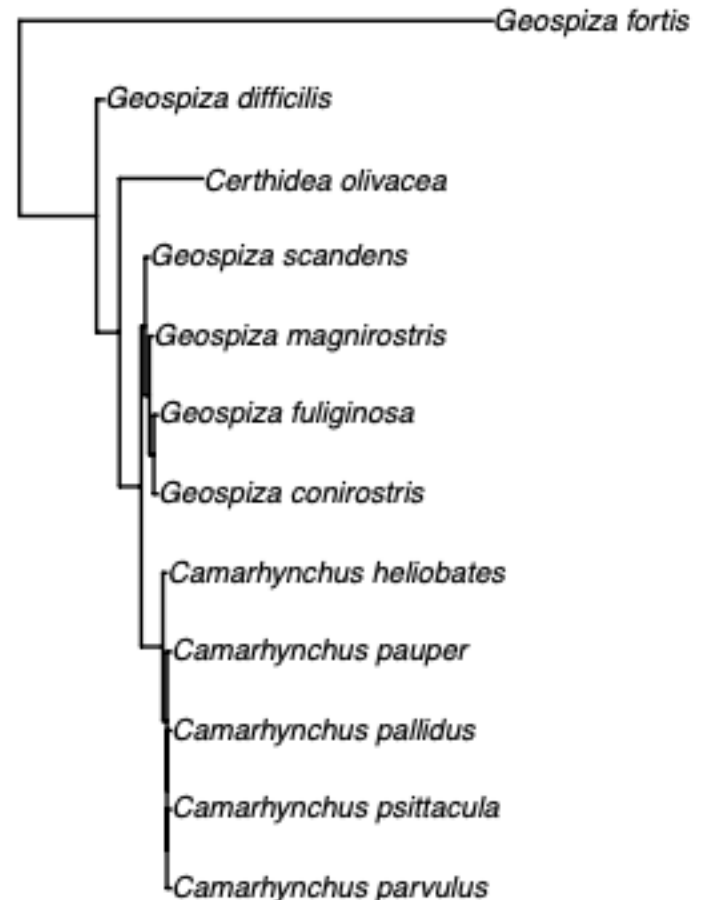
# Align sequences

- Sequences don't come aligned so that they are identical by descent (**homologous**)
  - Most geneticists have fancy programs for this... we'll be simple (and cheap)



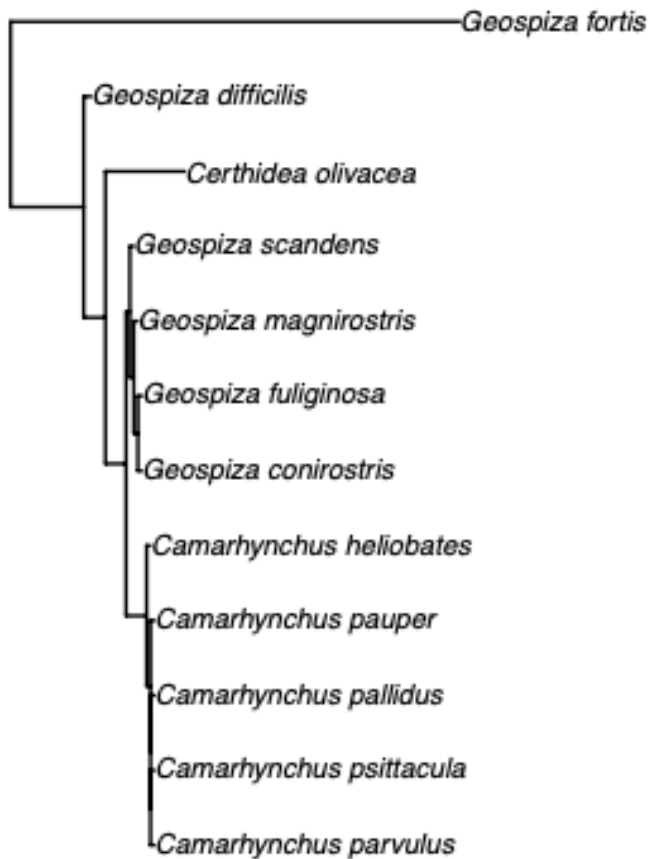
# Make a phylogeny

- Use genetic data to examine the patterns of relatedness between individuals
- We will use two methods today:
  - Distance tree (very simple)
  - Maximum likelihood (much more complex)
- Model testing (for models of evolutionary change)
- Rooting the tree

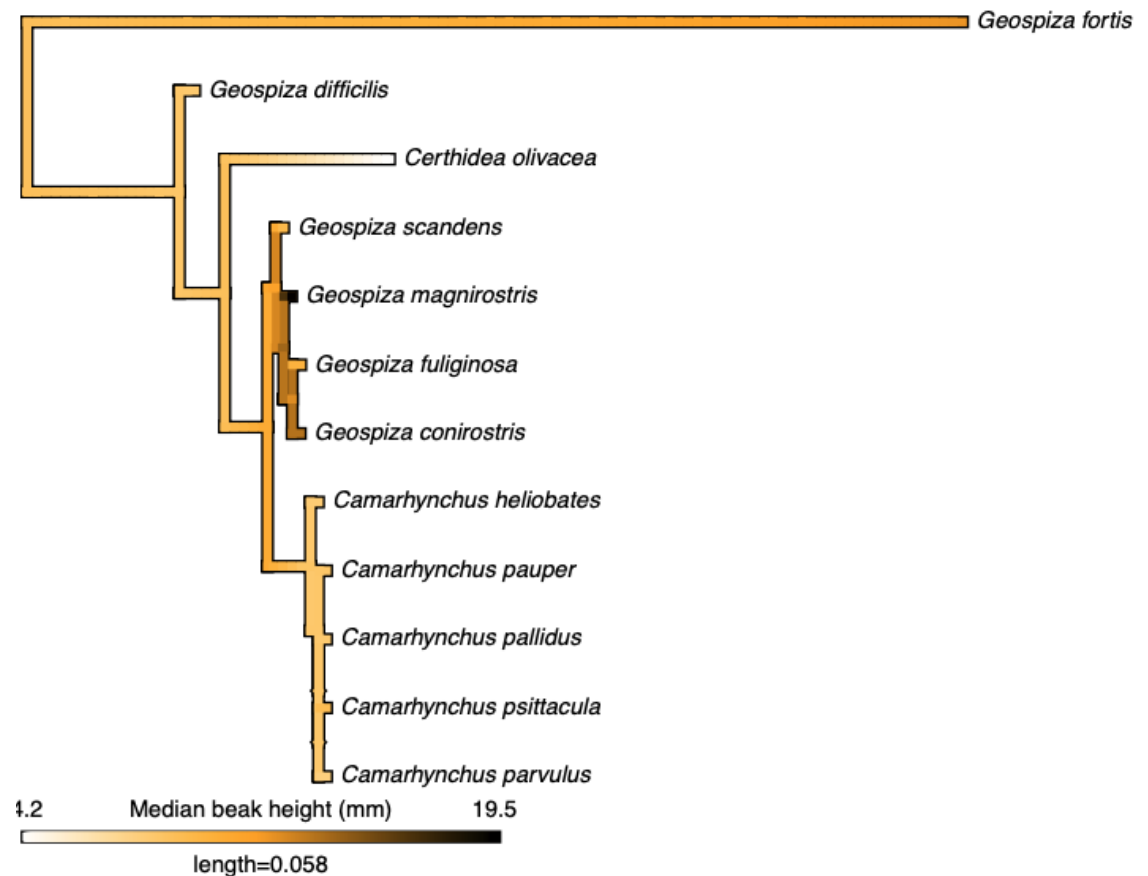


# Make a phylogeny

This week:



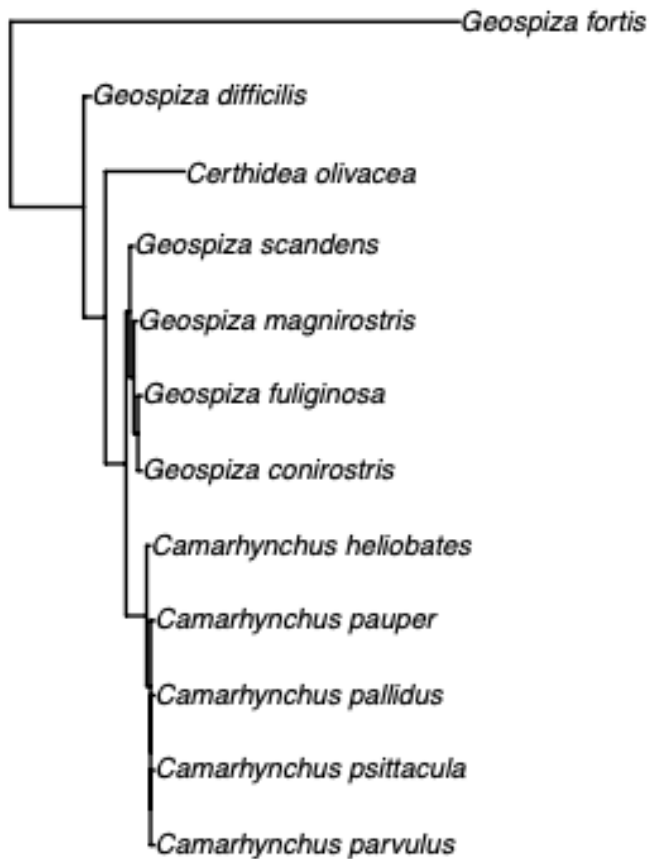
Next week:



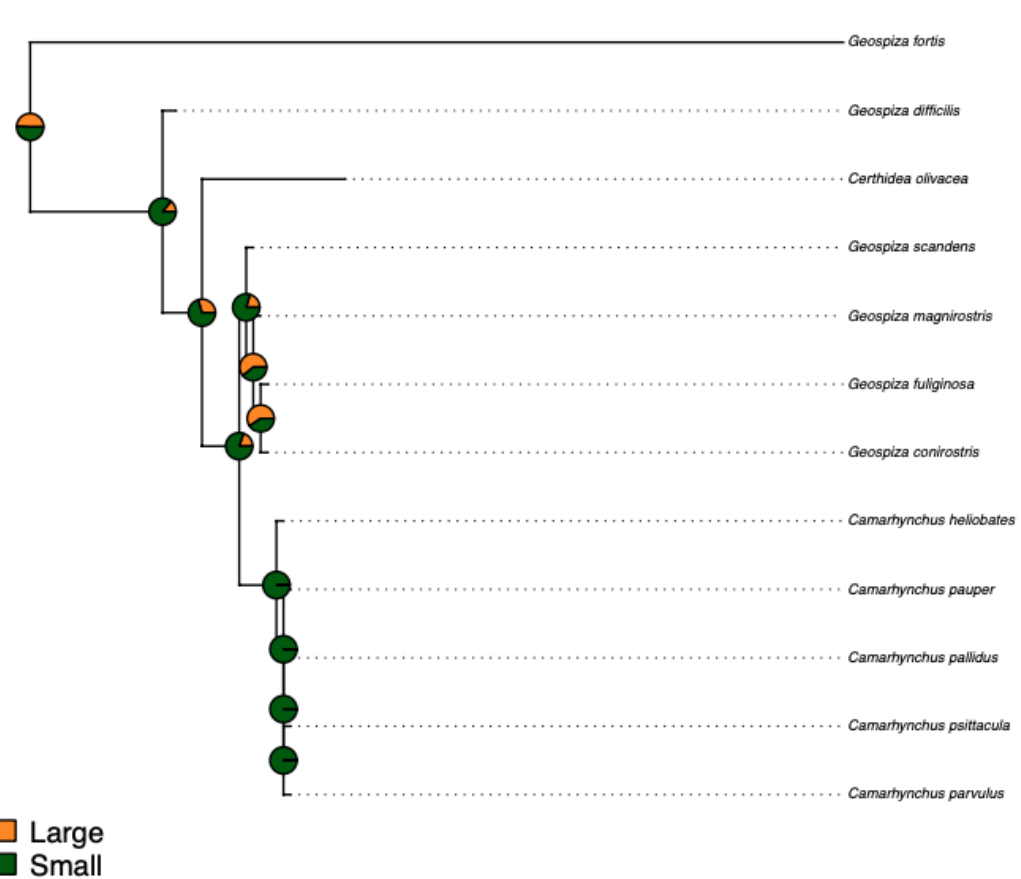


# Make a phylogeny

This week:



Next week:



# Did you finish early?

1. Help your neighbour
2. Work on your assignment and seek help or advice (keeping in mind that others doing the prac might need more help)
3. ???
4. Okay, fine you can go if you've checked with your demonstrator

