**Phylogeny computer practical**

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**Software required:**

* Figtree
* R/ R Studio
* Any text editor
* Any software where you can view/resize images (Open Office, Powerpoint, Word)

**Background**

In this practical we will learn to visualize and manipulate phylogenetic trees in Figtree and R.

The *Cyanistes caerulus/teneriffae* species complex (blue tits) is a group of birds found in Africa, Canary Islands and Eurasia. Even though it has been widely studied for decades using morphological and molecular data, taxonomists still cannot agree on how many species there are! In this practical we will visualize the latest available phylogeny for the blue tits using Figtree and R. We will use the “splits” R package in R to apply the GMYC method (generalized mixed Yule coalescent) to optimize genetic clusters in our tree – in other words, we will try to identify and delimit how many species are contained in this tree. We will then use Figtree to try and plot the results of GMYC to produce a nice figure of a phylogenetic tree where we can see the different hypothetical species.

**GOAL: Using Figtree and R, produce a figure of a phylogeny of blue tits showing the different potential species that are inferred using GMYC.**

1. Download and install Figtree and R. If you prefer, you can use RStudio
2. Open the nexus file ‘Cyanistes.tre’ using a text editor first. Try and identify the different features of a tree file (this example is a nexus file).
3. Open your tree using Figtree. Play around with Figtree to try and identify different features and options.
   * Where is the root?
   * How old is the group in million years?
   * What are the posterior probabilities?
4. Play with visualisation options (adding scale, re-rooting, zooming, expanding, colouring).
5. Now let’s open R. Open the ‘Cyanistes\_R\_code’ using R or any text editor. Follow the instructions inside that file. The text starting with # is comment text that is not read by the R program.
6. Once you have run gmyc in R and have identified the samples that belong to which species, you can use Figtree to draw and highlight those clusters to produce a figure. The figure can be exported as a pdf for example.