The zip file simulation\_scripts.zip contains all the scripts needed to run the simulations under the range of models explored in the paper.

**To set up:**

1) Prepare a directory with the following subdirectories. Note that the path settings within each script will need to be adjusted to match your directory structure.

scripts – This is the subfolder where the scripts are kept.

outputs – This is the subdirectory to which the simulation results are written (as .RData files) by the simulation scripts.

results – This is the directory to which the data summaries are written (as .csv files) by the data summarization scripts.

final\_results – This is the directory to which the final data summaries, with parameter settings, are written (as .csv files) by the parameter summarization scripts.

2) Copy the scripts into the scripts folder.

**To run a simulation:**

1) Execute the *setup.R* script. This provides core functions. Note that two lines in the “Helper function to simulate quasse trees with regimes” control whether or not the simulations run under a tree size constraint.

2) Execute the relevant simulation script. These scripts provide the parameter settings for a particular simulation and execute the simulations. The results of each simulation are written to a list which is saved as a .RData file. The provided simulation scripts are:

*uniform.R*

*static\_Gaussian\_speciation.R*

*static\_skewed\_speciation.R*

*static\_Gaussian\_extinction.R*

*shifting\_Gaussian\_speciation.R*

*shifting\_neg\_skewed\_speciation.R*

*shifting\_pos\_skewed\_speciation.R*

*shifting\_Gaussian\_extinction.R*

**To summarize the results of a simulation:**

1) Execute the *summarize.R* script whose purpose is to summarize the results of simulations run under a particular model/parameter combination.The results are written to a .csv file. Note that, as written, these scripts summarize more tree attributes than those used in the paper.

2) Execute *summarize\_parameters.R* script whose purpose is is to furnish the result summary .csv files with the appropriate parameter settings underlying each simulation. Note that you will need to select the appropriate simulation type at the top of the file and in some places ensure that the correct parameter set is chosen.