

LAB 2: MODEL SELECTION USING MODELTEST

## 1 Preliminaries

At this point, everyone should have a computer account within the Statistics Department and you should have logged into the system and reset your passwords. As a reminder, you will first need to use a secure shell (ssh, putty, etc.) to connect to

```
mordor.stat.osu.edu
```

and login with your username and password. Next, be sure you have copied all the data files to your own directory. If you have not already done this, then you should issue the following commands at the prompt once you're logged in:

```
cp /home/lkubatko/WWW/stat882/primates.nex primates.nex
cp /home/lkubatko/WWW/stat882/primates.tre primates.tre
cp /home/lkubatko/WWW/stat882/hpv.nex hpv.nex
cp /home/lkubatko/WWW/stat882/rokas14_sequential.nex rokas14_sequential.nex
cp /home/lkubatko/WWW/stat882/rokas14_interleaved_mb.nex rokas14_interleaved_mb.nex
```

You will also need one additional file for today's exercises. So you should do the following:

```
cp /home/lkubatko/WWW/stat882/modelblockPAUPb10 modelblockPAUPb10
```

## 2 About Modeltest

Modeltest is a software package written by David Posada, available for free download at <http://darwin.uvigo.es/software/modeltest.html>. It works with PAUP\* to select the substitution model that best fits the data according to one of several possible criteria. A newer version of Modeltest, called jModeltest, is now available. This incorporates several new features, including a GUI, and uses PhyML in place of PAUP\*. We will briefly discuss a few of the criteria available in Modeltest by looking at the basic use of the program.

## 3 Running Modeltest

There are two steps involved in selection of the best fit evolutionary model using Modeltest:

1. Compute the likelihood under each of the possible substitution models (using PAUP\*).

2. Select the best-fit model (using Modeltest).

Let's test things out on the primate data set. To carry out step 1, launch PAUP\* (type `paup` at the prompt) and then issue the following commands:

```
exe primates.nex
exe modelblockPAUPb10
```

You will then see information being written to your screen as PAUP\* fits each model. The info will also be written to a file called "model.scores". This will be the input for Modeltest.

To carry out step 2, first quit PAUP\* (type `quit`). Check to see that the model.scores file was created (type "ls" at the unix prompt and look through your file list). To run Modeltest, type the following at the unix prompt:

```
modeltest3.7 < model.scores > primates.out
```

The output has been written to the file "primates.out". You can look at it by typing

```
more primates.out
```

at the unix prompt.

## 4 On Your Own

Try working through the steps involved in model selection on your own using one of the other two data sets we introduced last time (either "hvp.nex" or "rokas14\_sequential.nex"). Compare the selected model using hLRT to that selected using the AIC.