MacClade 4.08a

See **http://macclade.org** for the latest updates.

Hardware and system software requirements

MacOS

Computer: any Macintosh that can run MacOS X up to version 10.6. MacClade is not compatible with MacOS X 10.7.

Hard disk and CD drive: required.

Printer: any Macintosh-compatible printer (e.g., ink jet, laser); however, some of MacClade's tree-printing features require a PostScript® printer.

System: Mac OS X 10.0 through 10.6; MacClade is not compatible with MacOS X 10.7.

Installing MacClade

To install MacClade on a MacOS computer, unzip the downloaded files on to your hard disk. We suggest you copy both the program and documentation onto your hard drive. If you copy the documentation, copy the entire MacClade Manual folder, otherwise the movies and example files will work be available.

Updates

You should regularly check MacClade's World Wide Web site

http://macclade.org

as at this site we will post any updates to MacClade 4.

Problems running MacClade?

MacClade has been extensively tested, but in any program this large there will remain bugs. If MacClade seems to be giving you incorrect results in its phylogenetic calculations or in storing your data, then please attempt to understand the problem, learn how to reproduce it, and contact us at **clade@arizona.edu** with a bug report. If MacClade appears the be crashing your computer, then please attempt to determine if MacClade is the culprit, learn how to reproduce it, and send us a bug report. Before sending us a bug report, please refer to the section "Reporting bugs" in the "Introduction" chapter of the manual.

MacClade's World Wide Web site (http://macclade.org) has the latest information on compatibilities and bugs. Updated versions will be posted as bug fixes are made.

Electronic mail and World Wide Web addresses

Technical support

For technical support (including bug reports) please use the electronic mail address clade@arizona.edu.

News, information and updates
MacClade's World Wide Web site is at

http://macclade.org

This site contains general information about MacClade, information about bugs, frequently asked ques-tions and answers, and so on. At times there may be files posted which you can download to update your copy of MacClade.

How to cite MacClade

MacClade serves as a calculating tool and yet it also contains new ideas, implicit suggestions, and new methods. Use of ideas in this manual or in MacClade should be acknowledged as with any other published paper. MacClade should also be cited in your Materials and Methods as a source of the calculations or output used in your papers. We recommend a citation like the following, which can be used both for the program and this accompanying manual:

Maddison, D. R. and W. P. Maddison, 2005. MacClade 4: Analysis of phylogeny and character evolution. Version 4.08a. http://macclade.org.

Note that the version you receive on disk may be a more recent one than 4.08, or you may have updated MacClade using an updater available from MacClade's web site. You should therefore alter the citation if appropriate to include the number and date of the version you used. The version number and date should be evident from the About MacClade window within MacClade.

Learning how to use MacClade and contents of the manual

The manual for MacClade is at http://macclade.org, as a downloadable PDF file. You can print out the manual, or examine it on your computer. We strongly recommend that you examine the manual, not only to answer questions you might have, but also to discover aspects of MacClade with which you are unfamiliar. It is likely that you would thereby discover tools in MacClade that would be valuable to you.

MacClade is a large and complex program. If you are just getting started with MacClade, we advise you to follow through the examples in Chapter 2 of the manual, "A Tutorial Overview of MacClade". This will guide you step by step through simple data files, and thereby introduce you to some of the basic functions of MacClade.

Chapters 3 and 4 concern phylogenetic theory. Chapter 3, "Overview of Phylogenetic Inference", defines terms of relevance to MacClade, discusses methods of inference of phylogenies, and of patterns and processes of character evolution. Chapter 4, "Reconstructing Character Evolution Using Parsimony", describes the assumptions and methods MacClade uses in reconstructing character evolution. We recommend that you read the relevant sections of these chapters before using MacClade to study character evolution.

Chapters 5 through 25 of this manual provide more detailed guidance about using MacClade. Although we hope that many of MacClade's features will be obvious from the program itself, some important ones will not. So that you may discover these features, and thoroughly understand MacClade's analyses, we strongly recommend that you at least glance through Chapters 5 through 25.

Chapters 5 through 10 introduce some basics of using MacClade. "Getting Started with MacClade" gives an overview of hardware and software requirements, installation, memory

management, and setting preferences. "Managing Data Files" tells how to create, open, and save data files. "NEXUS Files and Blocks" describes how to select options for saving NEXUS files, and how to manage NEXUS blocks. "Importing and Exporting Text Files" describes how to share files with Clustal, NONA, PHYLIP, and other programs, as well as import and export files in NBRF, Genbank, GCG/MSF, and other formats. "MacClade's Windows" introduces the windows of MacClade, including the data editor window, the tree window, and the list windows. "List Windows" explains how items like taxa, characters, and trees can be manipulated using the list windows.

Chapter 11, "Taxa", describes how observed taxa are created and manipulated. Taxa are the basic units with which characters are associated (via data matrices) and whose relationships are shown by trees.

Chapters 12 through 16 give detailed information about manipulating character data and assumptions. "Characters and Their States" describes MacClade's data formats and how characters and their states can be named and manipulated. "Entering and Editing Data" explains the use of MacClade's spreadsheet data editor. "Display of Data" tells how the data editor's display can be adjusted. "Assumptions About Characters" details the various assumptions used in MacClade's calculations, such as weighting of characters and how states transform one to another. "Preparing Molecular Data" focuses on data formats and other issues related to molecular data, including sequence alignment.

Chapters 17 through 23 describe working with phylogenetic trees and the relationship between character data and the tree. "Trees and Tree Manipulation" introduces MacClade's tree window, and how trees can be manipulated, stored, and retrieved. In "Tracing Character Evolution", methods for reconstructing the ancestral states (and thereby pathways of character evolution) are discussed. In "Basic Tree and Character Statistics", simple statistics of treelength and indices such as the consistency index are outlined. MacClade's charting facility is described in "Charting Tree and Character Statistics". Use of continuous-valued characters is explained in "Continuous Characters". The next chapter discusses "Patterns of Correlated Character Evolution", particularly the concentrated-changes test for phylogenetic character correlation. MacClade's randomization facilities, which can be used in various statistical tests, are discussed in "Generating Random Data and Random Trees".

Chapter 24, "Note Keeping" explains how to attach notes and pictures to various parts of the data file. Chapter 25, "Recording Your Work: Printing, Graphic, and Text Files" gives strategies for keeping records. Printing facilities are described there.

The remaining chapter ("Using MacClade and PAUP* Together") describes how to use MacClade in combination with Swofford's PAUP* program (Swofford, 2001).