Introduction

Overview

This introduction explains the purpose and function of NCSA GelReader and outlines its capabilities on the Macintosh. The organization and use of the manual are described and notational conventions explained.

What Is NCSA GelReader?

NCSA GelReader is a software tool developed to help scientists extract information from digitized *electrophoretic gel* images. It was specifically designed for molecular biologists doing genome analysis, but its usefulness extends to anyone who needs to do electrophoretic gel data analysis.

Specifically, NCSA GelReader employs the color-imaging capabilities of the Macintosh to help the molecular biologist estimate the molecular weights of electrophoretically separated DNA fragments.

NCSA's Software Tool Group (STG) are gratefully indebted to the Center for Prokaryotic Genome Analysis (CPGA) at the University of Illinois for their collaboration on the development of this program. When STG was assessing the demand of software for microbiologists in 1989, they were having trouble pinpointing the specific needs of these scientists. CPGA, with their extensive expertise in the area of genome analysis and microbiology, assisted STG at this point and throughout GelReader's growth with ideas and continual feedback. In addition to CPGA, STG would also like to acknowledge, Dr. Thomas Jacobs, Assistant Professor of Plant Biology from the University of Illinois Plant Biology Department, and Dr. Patrick Gillevet, Resident Scientist of Microbiology, for never hesitating to answer any questions, offer advice, or test multiple beta versions of the program. Once again, STG acknowledges and thanks the entire CPGA staff for helping to propel NCSA GelReader from a mere idea to a concrete software tool.

Special Features

NCSA GelReader allows you to:

- trim unnecessary or "garbage" information from the edges of your digitized gels
- view the *bands*, made by restriction enzyme digestion of DNA

- specify the expected number of *lanes* to be displayed in an image, or allow the software to determine them
- interactively add or delete lanes in the image
- perform histogram equalization to improve contrast in the image
- perform a shadowing operation to identify areas of higher magnitude
- vary the sensitivity of band searching
- interactively add or delete bands from any lane
- identify standard lanes and assign molecular weights to the bands in that lane
- review the molecular weights assigned to the bands in the standard lanes
- generate reports of molecular weight (using curves fit to the molecular weights in the standard lanes). Alternatively, GelReader can generate a report that indicates for each band, what percentage of the distance down the lane the site is located
- select a color (high contrast) to be used to indicate band and lane location in the gel
- use a variety of gray scale or color shades

System Requirements

To use NCSA GelReader you need a Macintosh with 256 color or gray-scale capabilities, at least one megabyte of RAM and a monitor.

Use of This Manual

This section describes the organization of this manual and the conventions and nomenclature used in developing it.

This manual assumes that you are familiar with the Macintosh user interface, that is, that you know how to position the pointer, click and drag using the mouse, select items from the menus, and locate files using the directory dialog boxes. If you need information regarding these procedures, refer to your Macintosh user's guide.

Manual Contents

The manual is organized into the following chapters:

Chapter 1, "Getting Started," introduces NCSA GelReader and provides a tutorial to guide you through the following basic steps used in NCSA GelReader: installing and invoking the application, loading images from files, changing palettes, manipulating the display of lanes and bands in

an image, generating a molecular report, and exiting the program.

Chapter 2, "The NCSA GelReader Menus," provides more detailed information about the operations performed by the menu items and how to use them.

Chapter 3, "Windows and Technical Details" provides insights about how searches are performed and what the various windows contain.

Form of Presentation

The material in this manual is presented in text, screen displays, or command line notation.

Text

In explaining various features and commands, this manual often presents a word within a paragraph in *italics* to indicate that the word is defined within the paragraph. Italics may also signify a term that should be noted and/or is being mentioned for the first time.

Portions of this manual refer to other portions of the manual where the other portions explain related topics. These cross references usually mention the title of sections or chapters enclosed in quotation marks, such as, See Chapter 1, "Getting Started."

Command Line Format Notation

Throughout this manual, many explanations instruct you to make entries by typing on the keyboard. These entry instructions are printed in **courier bold type** and appear within a paragraph or on a separate line. The command lines in this manual are normally shown in lowercase, except in rare instances where uppercase is required.

When it is necessary for you to press a key that is labeled with more than one character (such as the RETURN key), this manual identifies the key with all capital (uppercase) letters. Keys to be entered are printed in bold type. Keys that are pressed simultaneously or in succession are linked with a hyphen. For example, press CONTROL-A.

The meaning of each special notation applied to format lines is listed in Table 1.

Table I.1 Meaning of Entry Format Notations

Appearance	Example	Entry Method
On separate line; lowercase, courier bold type	**dothis**	Enter the keys for each character.
Within a text line; uppercase	RETURN	Press the single key indicated.
Within a text line; uppercase; hyphens between key names	CONTROL-A	While holding down the first one or two key(s) indicated, press the last key indicated.
On separate line or within a text line; italic, lowercase,	***filename***	This notation is a variable, which represents a certain kind of entry, but may consist of

courier bold type		different characters every time you make the entry.
Square brackets; bold type	[ ]	Do not enter the square brackets. Material presented between brackets is optional and should be entered only in certain cases.
Ellipses; bold type	. . .	Do not enter ellipses. Ellipses indicate you may enter more material similar to the material preceding the ellipses.

Figure 1 shows you how to read and enter a command line.

Figure I.1 Reading and Entering a Command Line