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MANAGEMENT OF EUCALYPTS COOPERATIVE

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"*Regnans*": A program to predict *Eucalyptus regnans* growth in New Zealand.
Version 2.0

C.M. MacLean and A. van Zyl

NZFRI

Report No. 36 October 1997

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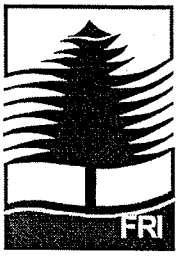
REGNANS VERSION II

EUCALYPTUS REGNANS GROWTH MODEL; USER GUIDE



REGNANS VERSION II

EUCALYPTUS REGNANS GROWTH MODEL: USER GUIDE

CONTENTS

INTRODUCTION

Regnans is an upgrade of the DOS based *Eucalyptus regnans* growth model supplied to Management of Eucalypts Cooperative members in May 1997. Growth model functions from the MacLean and Lawrence *Eucalyptus regnans* growth model have been incorporated into this Windows based software utility.

A batch processing option is available, and up to five management induced reductions in stocking have been catered for. The utility allows for up to 10 runs to be current at any one time, with the results displayed in both tabular and graphical form.

COPYRIGHT NOTICE

WARNINGS

The model is based on growth data from *Eucalyptus regnans* permanent sample plots located throughout the country. The data is however dominated by stands located in the Central North Island. The majority of the data used in the development of this model was obtained from stands less than 20 years old, and accordingly extreme care must be exercised when using the model beyond this age.

INSTALLATION

Included with this manual is one floppy disk labelled *Regnans Version 2.0.*

Insert this disk into the floppy disk drive on the computer and run the install programme either using the run utility on the WIN95 Start Menu/File Manager, File Run option (Windows 3.1).

The program is called INSTALL.

The following directory will be created on your hard disk if it does not already exist:

For Windows95 users: **c:\program files\fri growth models\regnans**

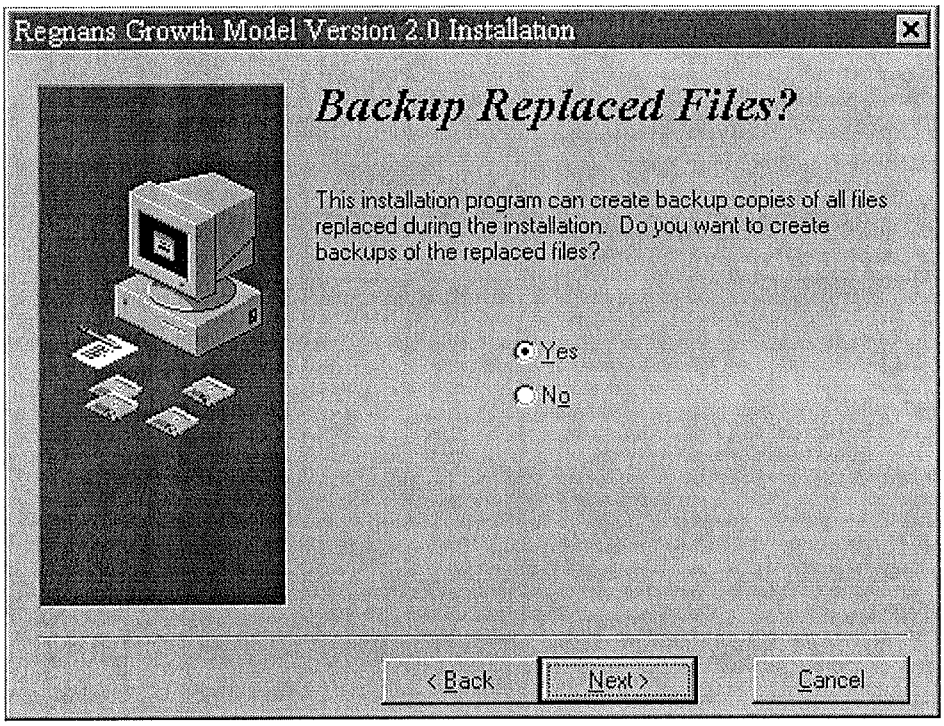
For Win 3.1 users: **c:\fri_models\regnans**

A copy of the application will be sent to this directory. To install *Regnans V 2.0* to a directory other than the default, you can supply your own path name to an existing directory using the browse button (Figure 1).

Figure 1: Installation to default Directory

If you have an earlier version of the Windows *Regnans* utility you may wish to backup these files. If so, select "yes" (Figure 2), or else "no".

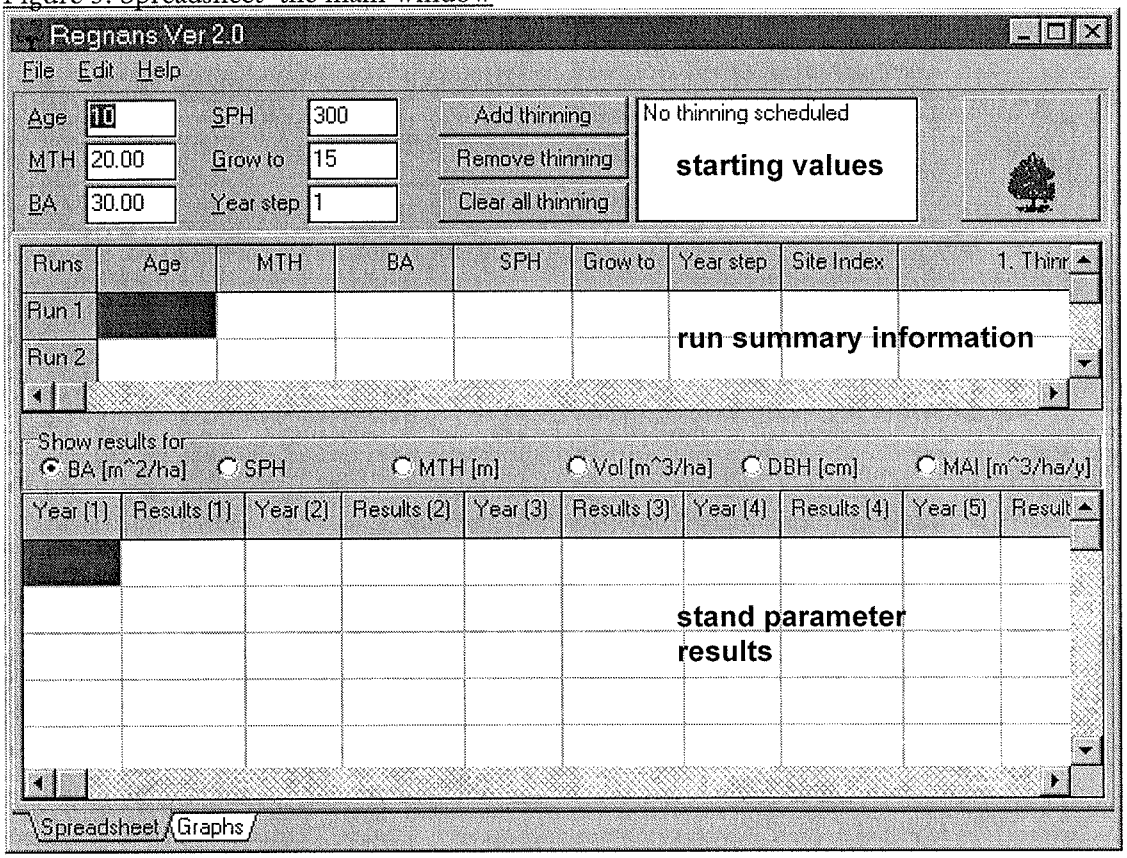
Figure 2: Backup replaced files



On startup the first "page" (spreadsheet) of *Regnans* is displayed. There are three parts to this window as shown in Figure 3.
The second "page" of *Regnans* (graphs) displays results of growth model runs from the current session in a graphical form (Figure 9).

SPREADSHEET

Figure 3: Spreadsheet- the main window



STARTING VALUES

Enter starting values to initiate the growth model:

Age: The minimum age to initialise the growth model is 2. Age must be entered as an integer number (ie no decimal places).

Mean top height (MTH): MTH is taken as the mean height of the hundred largest trees per hectare. Minimum MTH allowed to initialise growth model runs is 1 m, maximum 90 m.

Basal area: Allowable values for entry are from 0 to 200 m^2/ha

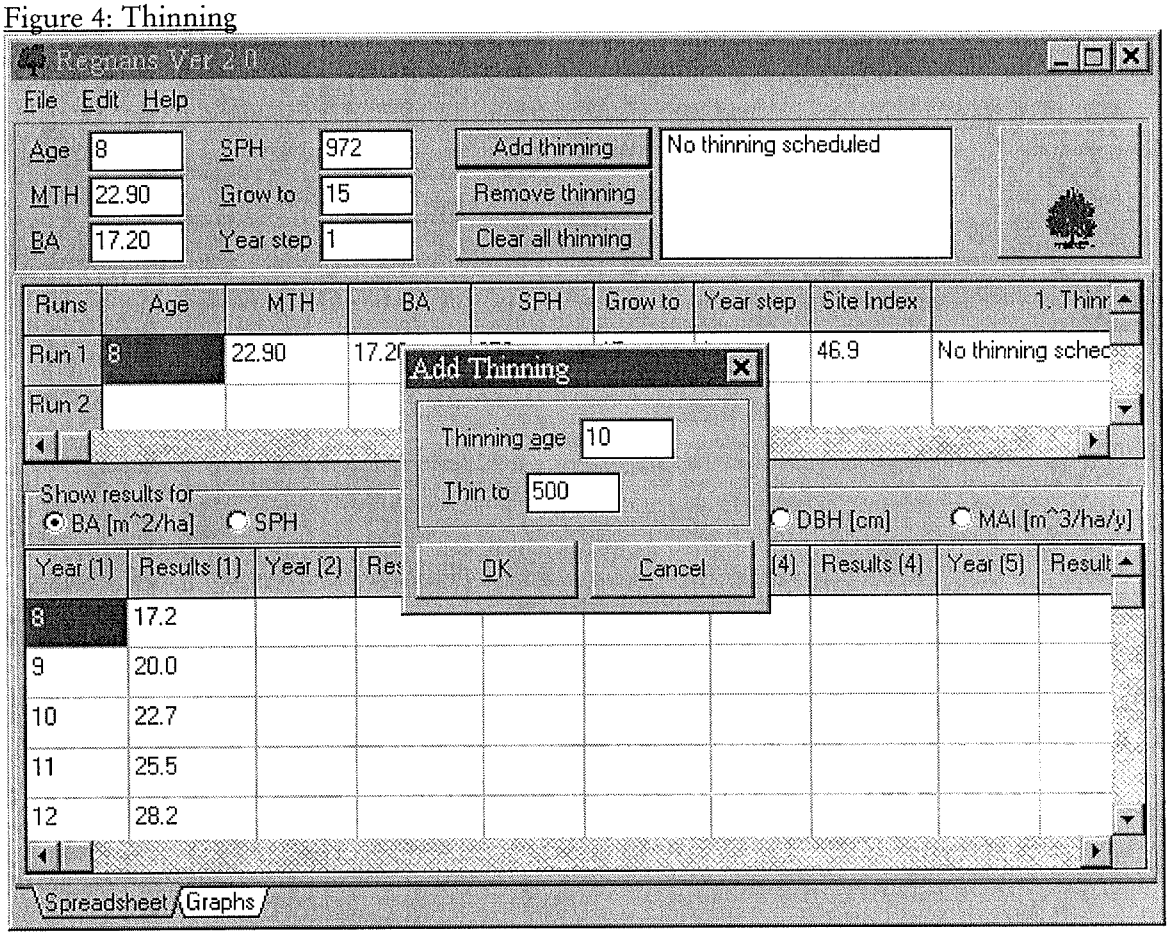
Stocking: The number of live stems per hectare in the stand. Maximum value is 5000.

Grow To: the age at which you wish to terminate the simulation

Year Step: the increment used to display results. Restricted to 1 for *Regnans.*

Thinning: Selecting the thinning option using the "Add Thinning" button, allows for the incorporation of up to five separate thinning events. The dialog box (figure 4) prompts for information regarding the age at which the stand is to be thinned and the post-thinning stocking (stems per hectare).

Figure 4: Thinning



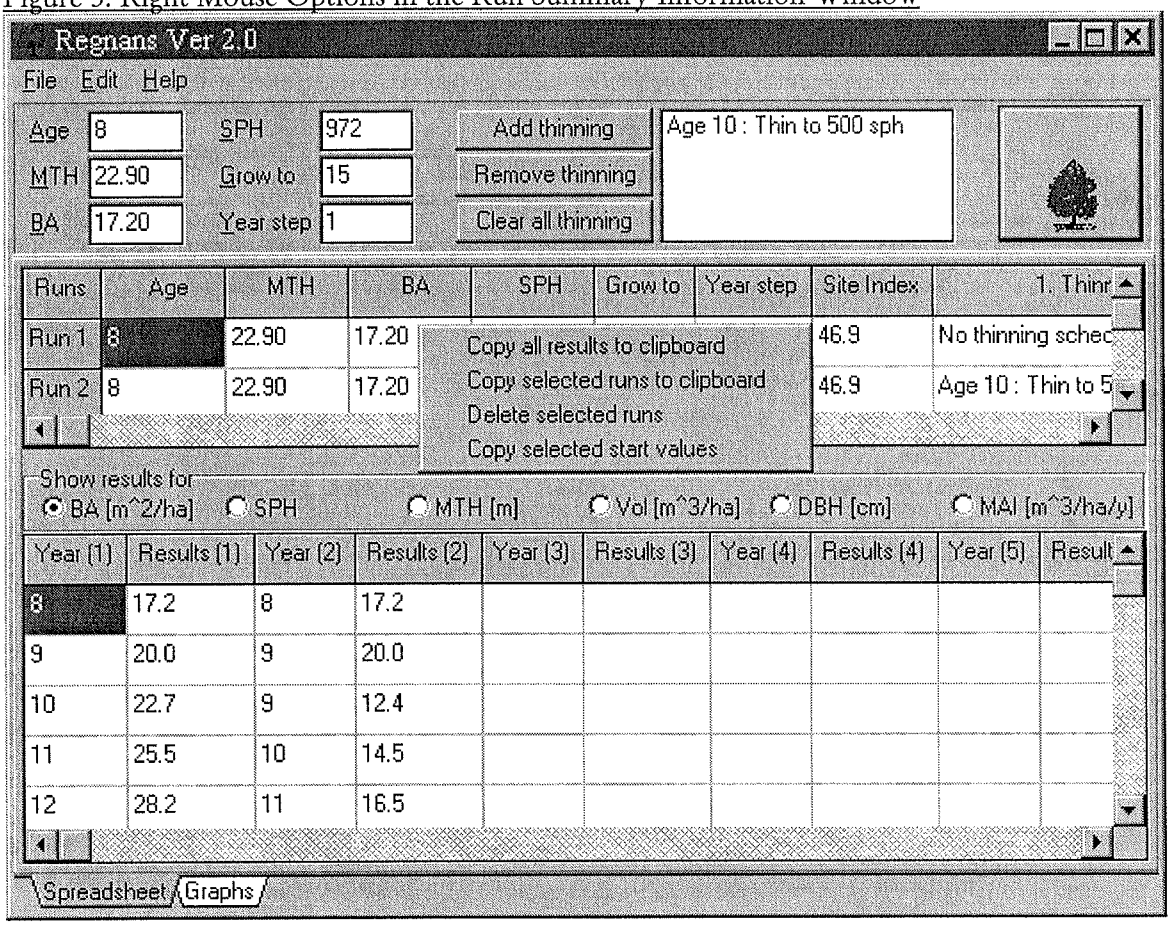
To run the Regnans, enter the necessary starting values and left mouse button "click" the coloured tree that "grows" on the upper right hand side of the window. Alternatively for larger numbers of runs, use the batch processing option described on page 13.

RUN SUMMARY INFORMATION

This window holds information used to initialise growth model runs from the current session. Thinning information, including the calculated basal area and volume removed as well as calculated site index (mean top height at age 20) is stored.

A number of data transfer and management options are available in this window using the right mouse button when the cursor resides within the window (Figure 5).

Figure 5: Right Mouse Options in the Run Summary Information Window



Copy all Results to Clipboard

This feature allows you to copy all stand parameter and thinning summary information for runs in the current session to the Windows clipboard, thus allowing transfer to, for example, a spreadsheet package via a "paste" option for further data analysis (Figure 6).

Figure 6: Results of single growth model run transferred to MS Excel

All runs for all parameters						
Run 1:						
Age	BA [m^2/ha]	SPH	MTH [m]	Vol [m^3/ha]	DBH [cm]	MAI [m^3/ha/yr]
8	17.2	972	22.9	135.1	15	16.9
9	20.1	969	25.3	168.9	16.2	18.8
10	22.9	967	27.7	212.5	17.4	21.2
10	14.2	500	27.7	131.5	17.4	21.2
11	16.3	499	30	164.6	20.4	15
12	18.4	497	32.2	200.9	21.7	16.7
13	20.5	496	34.4	240.6	22.9	18.5
14	22.7	494	36.5	283.7	24.2	20.3
15	24.9	493	38.6	330.5	25.4	22
Site index	48.2					
Thinning event	Age 10 : Thin to 500 sph	No thinning scheduled	No thinning scheduled	No thinning scheduled	No thinning scheduled	
BA removed [m^2/ha]	8.7	0	0	0	0	
Volume removed [m^3/ha]	81	0	0	0	0	

Copy selected results to Clipboard

This feature facilitates the transfer of information about single (selected) runs to the Windows clipboard as in the *Copy all results*, above.

Delete Selected Runs

Selected runs are deleted. A confirmation is required before deletion takes place. There is no undo option available.

Copy selected start values

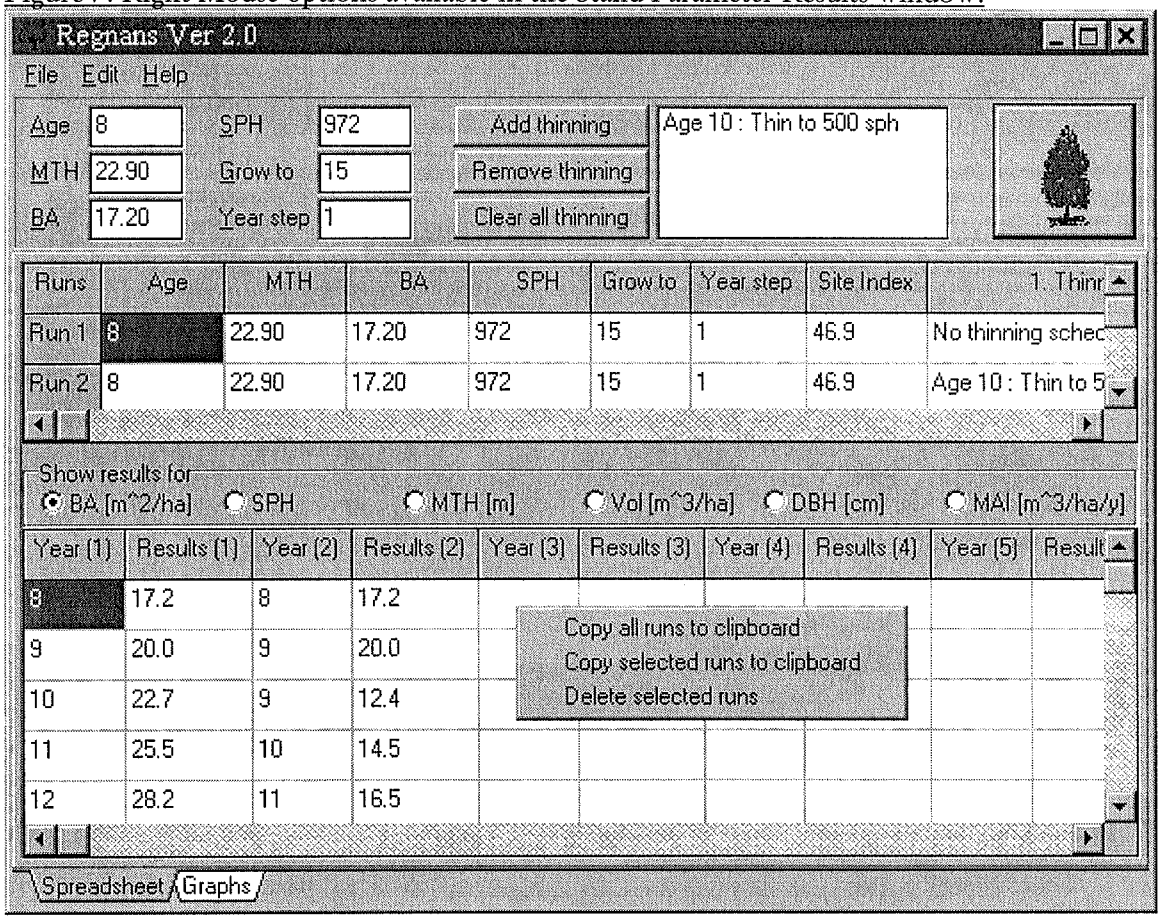
This option allows you to re-initialise the growth model using starting values from an existing run.

INDIVIDUAL STAND PARAMETER RESULTS

This window contains information for all runs by stand parameter. To change the parameter in focus, select the desired radio button.

As with the previous window, use of the right mouse button allows the user to manage and transfer information to other applications (Figure 7).

Figure 7: Right Mouse options available in the Stand Parameter Results window.



Information copied to the Windows clipboard is from the active sheet only. For example, as in Figure 7, the active sheet contains basal area information for all runs, and thus only basal area information is copied (Figure 8).

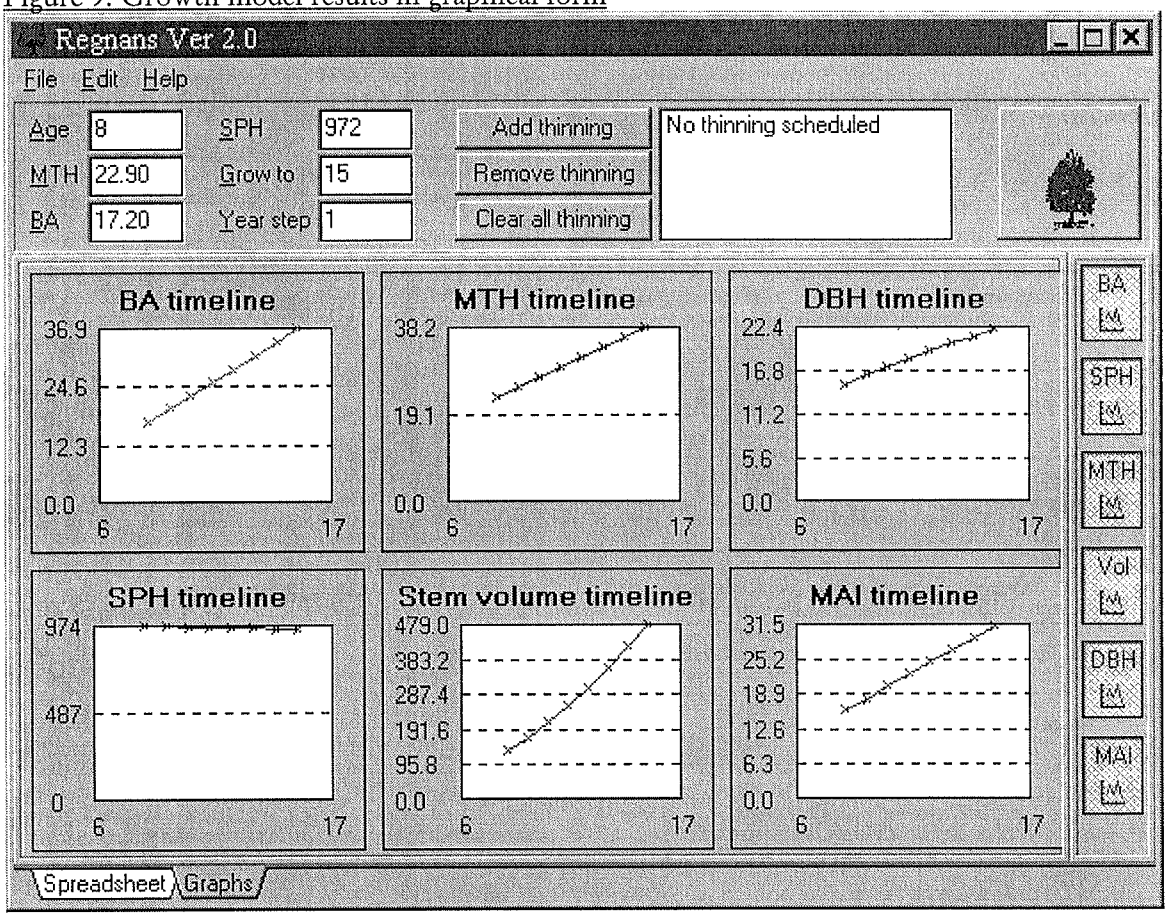
Figure 8: Basal area information transferred from *Regnans* to MS Excel

All runs for parameter BA [m^2/ha]			
Year(1)	Results(1)	Year(2)	Results(2)
8	17.2	8	17.2
9	20.1	9	20.1
10	22.9	10	22.9
10	14.2	11	25.8
11	16.3	12	28.6
12	18.4	13	31.5
13	20.5	14	34.5
14	22.7	15	37.5
15	24.9		

GRAPHS

The second "page" of *Regnans Version 2* displays results from growth model runs in the current session. Results for basal area, mean top height, mean DBH, stocking , total volume and mean annual increment are displayed as a default (Figure 9).

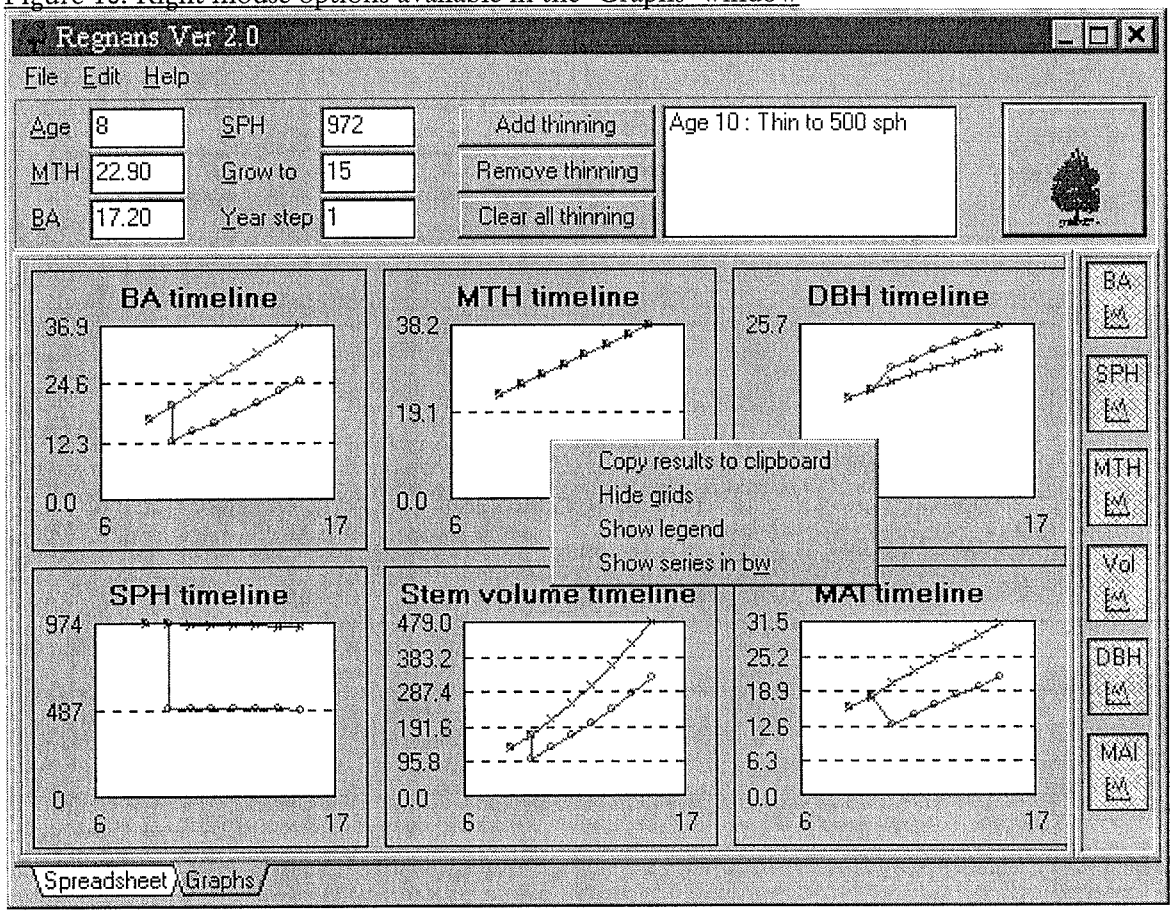
Figure 9: Growth model results in graphical form



Up to 10 growth model runs can be shown on these graphs. To view one, or a selection of graphs, select/deselect the buttons to the right hand side of the window.

Limited customisation of graphs is available using the right mouse button on the chart of interest (Figure 10).

Figure 10: Right mouse options available in the 'Graphs' window



Options available are:

Copy results to Clipboard

This copies results from the selected stand parameter to the Windows clipboard for use in other applications.

Hide/Show Grids

Inserts/removes y-axis gridlines for the selected chart.

Hide/Show Legend

Inserts/removes a legend at the base of the selected chart. The default is with a hidden legend.

Show series in black and white/colour

Displays results in either colour or black and white.

BATCH PROCESSING

Batch files can be created using a number of applications including Excel and the Windows notepad. Figure 11shows an example of a batch file created using Excel, and Figure 12 a batch file using notepad. It is important to save these as comma separated files ie *.csv, or *.dat extensions.

Figure 11: Creating a batch file in Excel

5	15	9	500	15	1		
5	15	9	500	15	1	Age 12 : Thin to 300 sph	
5	15	9	500	15	1	Age 12 : Thin to 300 sph	Age 14 : Thin to 150 sph

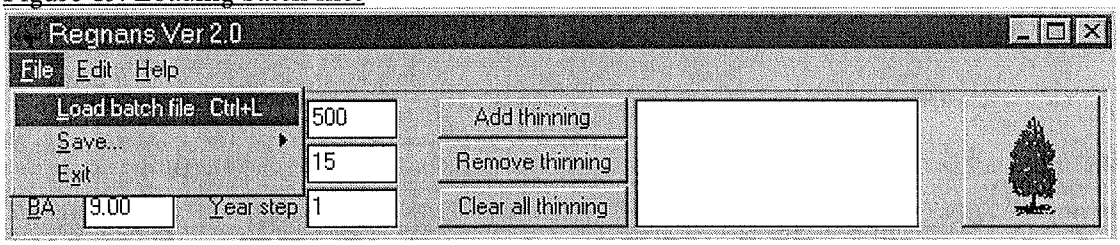
Figure 12: Creating a batch file in Notepad

5,15,9,500,15,1
5,15,9,500,15,1,Age 12: Thin to 300 sph
5,15,9,500,15,1,Age 12: Thin to 300 sph, Age 14: Thin to 150 sph

In both situations, to incorporate thinning the format is:
Age xx: Thin to xxxx sph

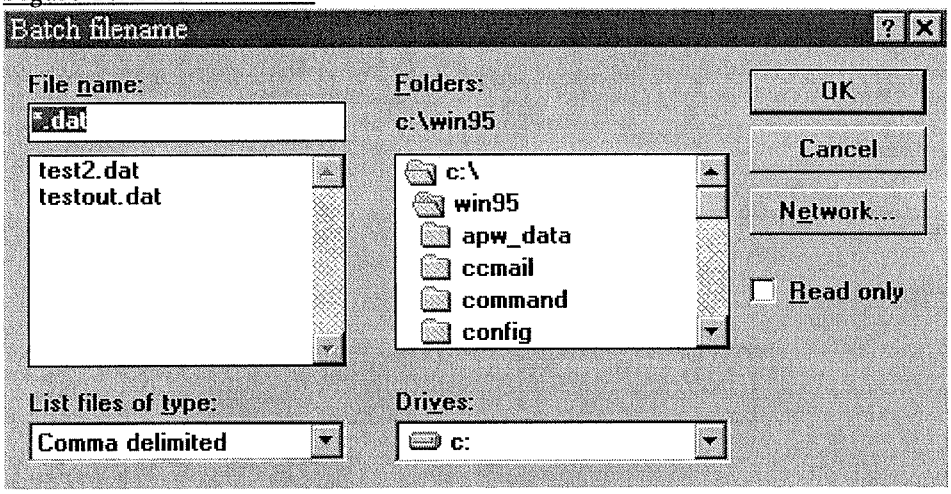
Batch processing is limited to a maximum of 10 lines of data.
The batch processing option in *Regnans* is found under file/load batch file (CTRL L) (Figure 13).

Figure 13: Loading batch files



The default file type searched for is the *.dat (Figure 14), however other file extensions may be specified.

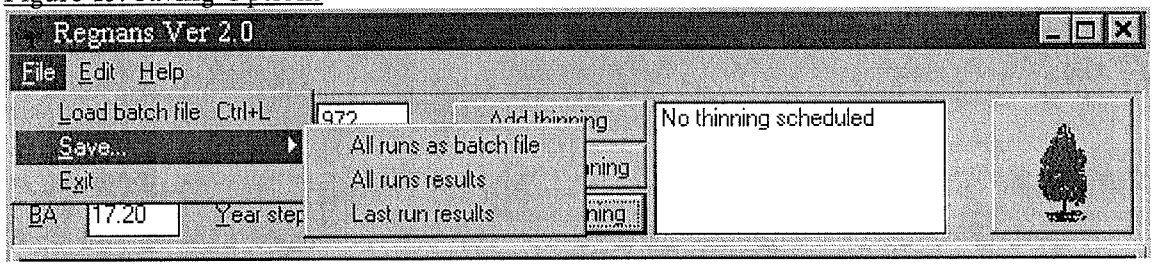
Figure 14: Batch filename



SAVING

Information from growth model runs can be saved in three different forms (Figure 15).

Figure 15: Saving Options



All runs as batch file

Creates a batch file with the file extension .dat containing growth model initiating information from the current session (last 10 runs).

All runs results

Creates a file with the .txt file extension. This contains the growth model results for all runs in the current session (last 10 runs).

Last run results

Creates a file with the .txt file extension. This contains the growth model results for the last run in the current session.

EDIT OPTIONS

Options available under the edit menu include the deletion of all or the last run completed and the option to copy all results, runs or data for growth model runs in the current session (Figures 16 & 17).

Figure 16: Copy all runs for selected stand parameter to clipboard

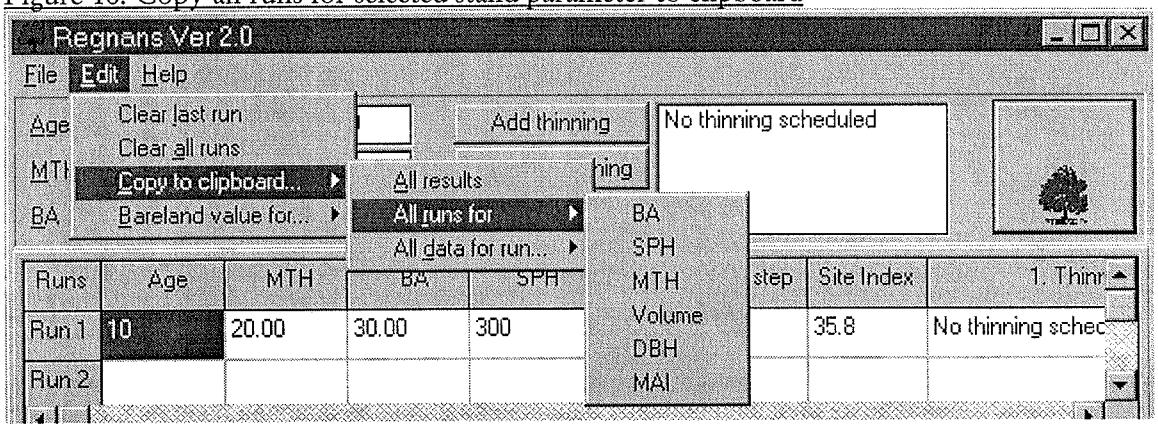
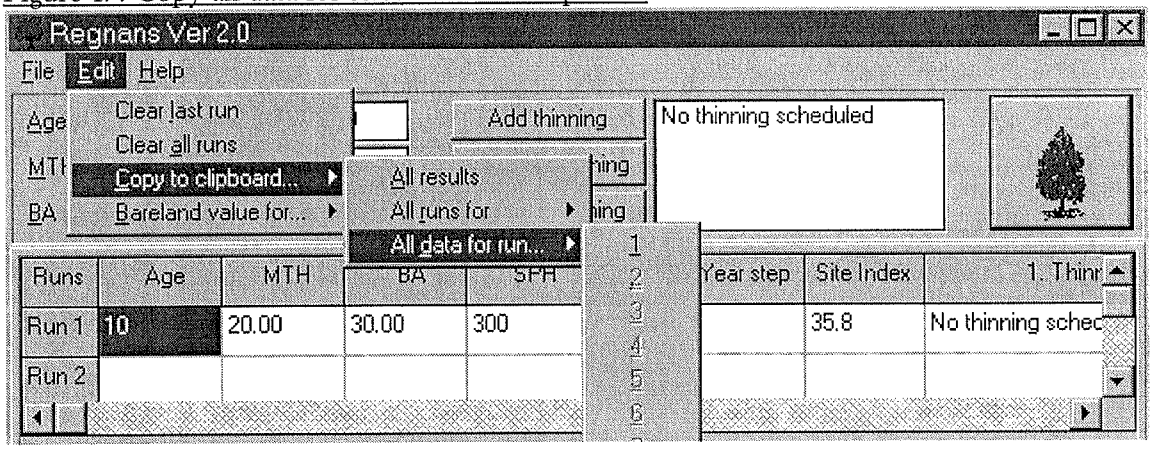


Figure 17: Copy all data for selected run to clipboard



Bareland value for...

This option allows the user to use site index (mean top height at age 20) as a user input. Site index can then be used to modify the starting value for AGE or MTH (Figures 18 & 19).

Figure 18: Adjusting the starting age given MTH and Site Index as user inputs.

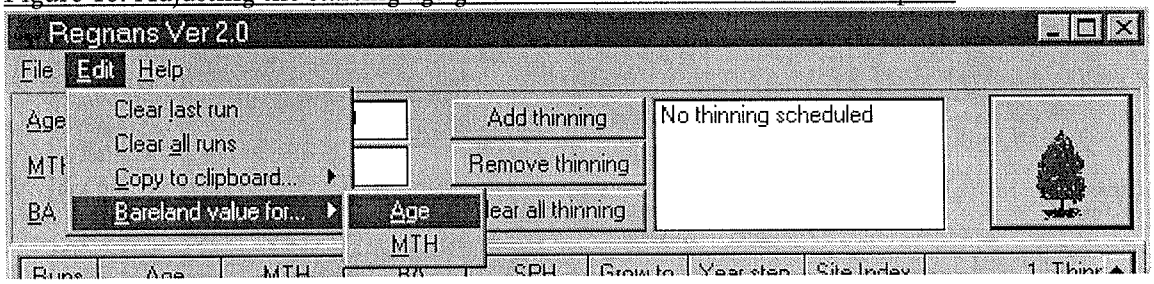
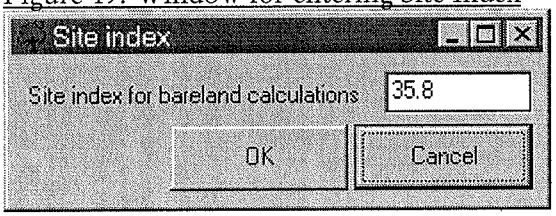


Figure 19: Window for entering Site Index



The usual scenario would be to use this option in a new land situation where the site is unplanted. Using the age and site index inputs a Mean Top Height can be calculated. Basal area and stocking are still required user inputs.

HELP

The help menu provides information on the systems resources, as well as the copyright notice. Typing *PROGRAMINFO* when the window is active will provide information about the programmer.

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