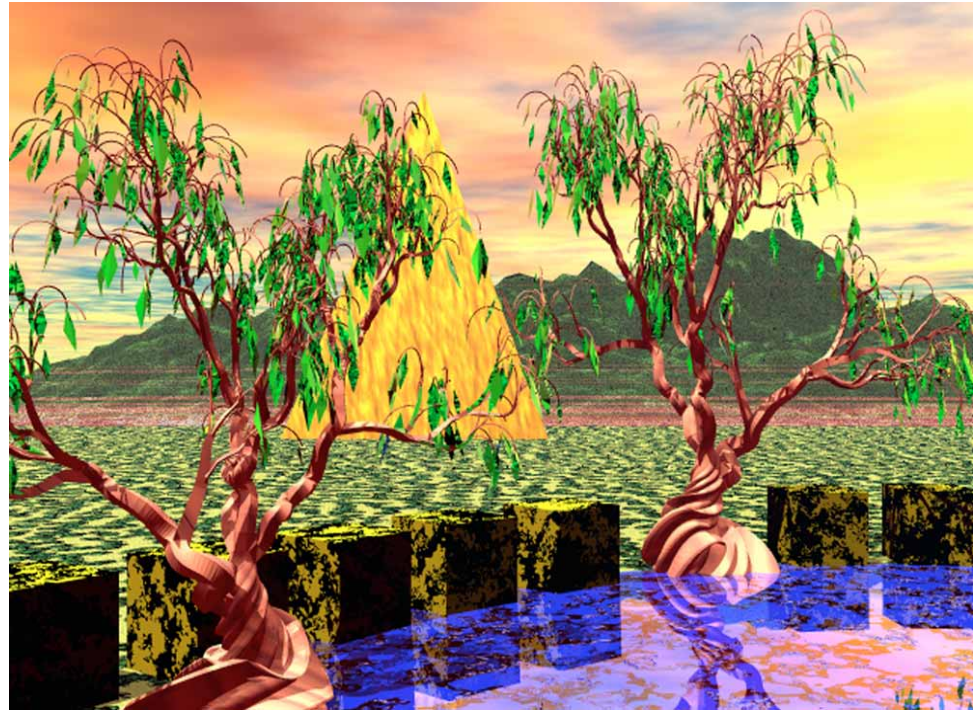


Tree Professional version 4

Mastering 3D Graphics ~ issue #1

R. Shamms Mortier

Ever since I can remember, the two things I loved most to draw have been trees and rocks. This is really pretty unusual, since most of my younger years were spent in Chicago, where both trees and rocks are in rather short supply. Perhaps it preconfigured my later move to Vermont however, where both can be found in abundance. For those of us who became involved in computer graphics and animation early on, the wait for applications that could help us design objects that emulated forms in the real world was long. During the initial years of our involvement, we had to be satisfied with reflective spheres moving over a checkered ground plane, and the design of more mechanical hard-edged objects. Several years ago, when I first became aware of and then purchased Onyx Software's Tree Professional, I was elated to discover a design application devoted to the



creation of one of my favorite natural world objects, trees. My excitement has not abated during the intervening years, and Tree Professional still helps me populate my otherwise barren landscapes with tree personalities of every type.

Tree Professional works on both the PowerMac and Windows 95/NT platforms. I have it installed on both, though the graphics used for the figures in this article reference the Mac. I use a Apple PowerMac G3 with 384 MB RAM, though Tree Pro itself needs only 4 MB of RAM to function. It is important that we spend a little time looking at the Tree Pro interface so that you know where to find things when I describe what to do in this tutorial.

The following descriptions detail the keyletters in [Figure 1](#).

- A. Height and Width of the tree in meters.
- B. Angle of current view vertically and horizontally. Note that you can interactively rotate the previewed tree on the Y (vertical) and X (horizontal) axis.
- C. Buttons for selecting what should be viewed, from trunk through bough and branch levels to twigs and stems and leaves. I work on fast machines with lots of RAM, so I usually keep everything here toggled on. Toggle

some items off to get a clearer view of specific tree parts.

- D. How the preview should be rendered: lines, wireframe, solid, and area indicators. A good default is solid, since it displays the tree as it would render in your targeted 3D application. Slower machines might opt for line or wireframe previews.
- E. Tools: Zoom in/out (magnifying glass), Pan Camera (hand), cutter (Saw), and Paintbrush for rendering the preview.

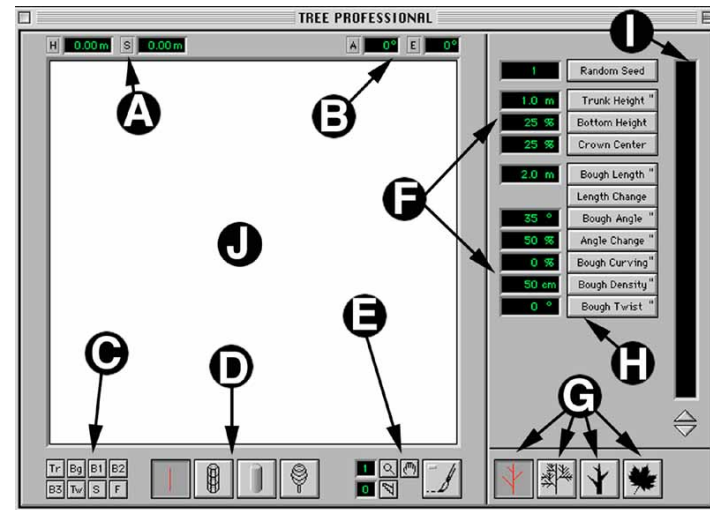


Figure 1: The main Tree Pro Interface, with important buttons called out.

- F. Parameter numbers, indicating the sizes of the selected parameter.
 - G. Parameter Groups, indicating what parts of the tree are to be worked on. Each of the four global Parameter options brings up different parameter adjustment settings above. From left to right: Trunk and Boughs, Branches and Twigs, Trunk and Branch Width and Color, and Foliage.
 - H. Parameter Items. Select the item to be modified.
- Sliderbar.** This bar is moved interactively to set the general parameter quantity shown in the input areas represented by letter F.
- J. This is the preview area, displaying the tree as you are building it.

Since it is expected that you own a copy of Tree Pro (or will soon purchase one) if you are following along in this tutorial, we are not going much further in detailing the Tree Pro documentation, since you can read that from the manual included on the CD.

Tree Pro allows you to create three types of trees: Broadleaf (Deciduous), Conifer, and Palm. Because of this,

the parameter indicators change according to the type of tree you select to build. You may save out your creation as a Tree Pro Parameter file, as a DXF Model, or as a rendering. The CD contains over a hundred Parameter files, consisting of many types of trees, bushes, and customized plants. There are also over 140 MB of rendered images, ready to use as composited backdrops in your 3D scenes.

In this exercise, we'll walk you through the creation of a Tree Pro Broadleaf tree. At every step of the way, once you get the hang of it, you can alter the settings we propose here Dragon_1 to create an infinite number of variations. There are really two ways to explore tree creation in Tree Pro. One is to load in one of the Parametric files, look at what tree it creates, and modify the settings. The way we will explore the process however calls for adjusting all of the parameters one at a time, though a default tree is loaded in at the start with every project. So follow along, and do the following:

First, make sure that "Broadleaves" is selected in the Type menu bar, since this is the first tree type we will create. Broadleaves is usually the default setting anyway. Turn on all of the buttons indicated by callout C in [Figure 1](#). A default tree will be visible in the preview area. Select the Solid Preview Rendering option. If you notice a sluggish

response, use the Wireframe Rendering option instead. See [Figure 2](#).

Leave random Seed set to the default of 1 for now. Double Click on the Trunk height parameter, bringing up an input dialog. Using the sliders in the dialog, input the following settings:

Winding Step = 20 cm
Winding Angle = 60
Winding Twist = 32

In the bottom of the dialog, set Curving Resolution and Trans Resolution to 6. Note how the trunk curves in the preview. Select OK to apply the settings. See [Figure 3](#) as an example.

What these settings mean

Winding Step sets the winding period of the trunk. Winding Angle determines the angle of the trunk, and Winding Twist sets the amount of twist around the center. Curving Resolution and Trans Resolution, in fact all Resolution settings, set the

number of polygonal faces used. As we'll see later, all Resolution settings can be altered when we save out the model.

Using the slider control, set the Bottom height Parameter to 70. Look at the preview. Note that you've caused the boughs to separate. You have moved the position of the first Bough along the trunk. See [Figure 4](#).

Activate the Crown Center parameter, and move the slider to 70. This sets the position of the longest bough along the trunk. See [Figure 5](#).

Double-clicking on the Bough Length Parameter brings up its dialog, where you can set the Minimum Length by moving the slider. Set it to a maximum of 50 cm. See [Figure 6](#).

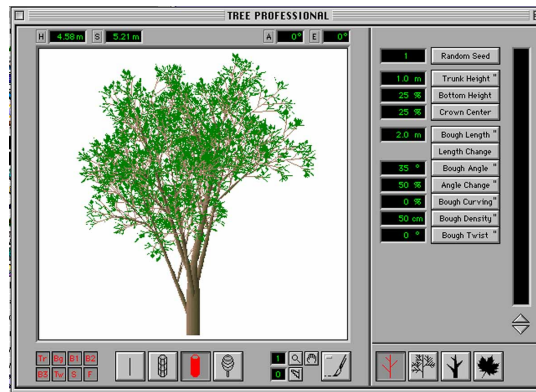


Figure 2: At the start, your Tree Pro screen should look like this.

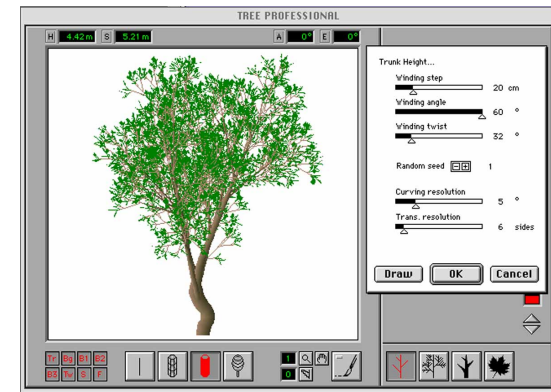


Figure 3: Here is an example of the settings entered in the Trunk height dialog.

Double-click on the Length Change Parameter to set the convexity. Upper Convexity sets the bough length change from the crown center to the top of the trunk. Set it to 40%. Lower Convexity sets the bough length change from the crown center down to the bottom of the tree crown. Set it to 30%. See [Figure 7](#).

Double-click on the Bough Angle Parameter. Move the slider to 100, which sets the bough-to-trunk angle of the last (top) bough along the trunk. See [Figure 8](#).

With Bough Angle still selected, but without double-clicking on it, set the slider to 50. This alters the bough angle for the first bough along the trunk. See [Figure 9](#).

Click on the Angle Change Parameter, and move the

slider to 25. Double-click on the same Parameter, and set the Angle Change Starts At slider to 10. This further adjusts the bough angles. See [Figure 10](#).

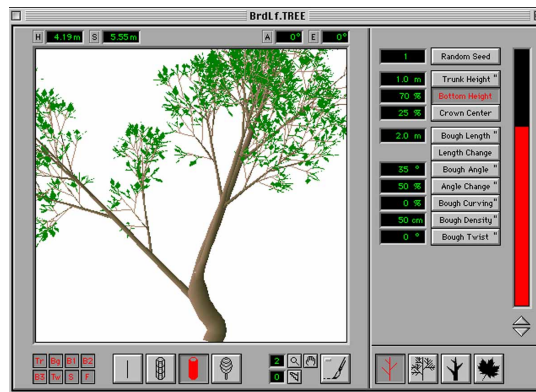


Figure 4: Note that the first bough has been moved along the trunk.

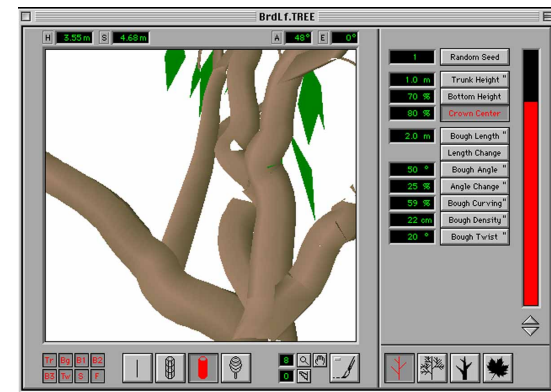


Figure 5: The Crown Center has been moved to 70.

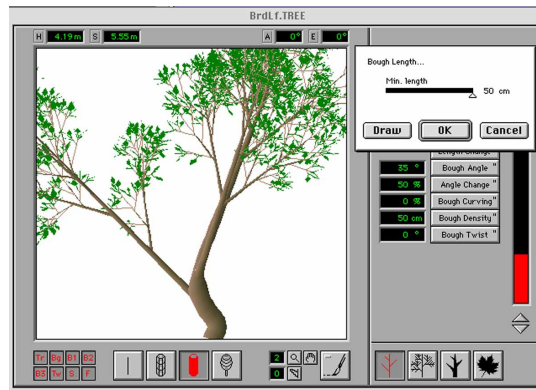


Figure 6: The Minimum Bough Length is set to 50 cm.

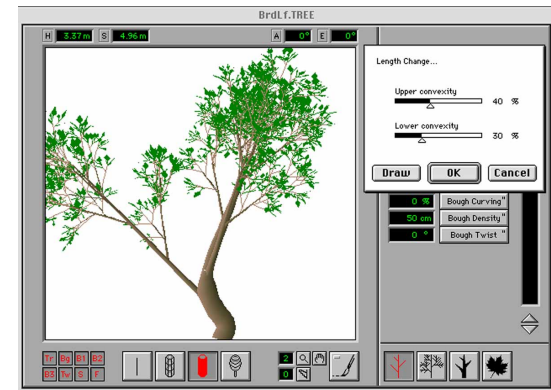


Figure 7: The Convexity is set.

Click on the Bough Curving Parameter, and move the slider to 152. Now double-click on the same Parameter, bringing up its extensive dialog. Adjust the values as follows: Winding Step 10, Winding Angle 22, Winding Twist 122, Curving 59, Curving Change 60. Leave the resolutions defaulted to 5. Notice that the tree is now developing a definite personality. See [Figure 11](#).

Click on the Branch Density Parameter, and move the slider to 22. Double-click on the same parameter, bringing up its dialog. Adjust the values as follows: Max Group of Boughs 3, Random Offset 8, and Pruning 50%. Max Group increases the bough quantity, while Pruning cuts it back. See [Figure 12](#).

The last Parameter in this Parameter Group is Bough

Twist. Do not double-click on it, since this just allows you to Randomize the settings. Instead, click on it and move the slider to 20. See [Figure 13](#).

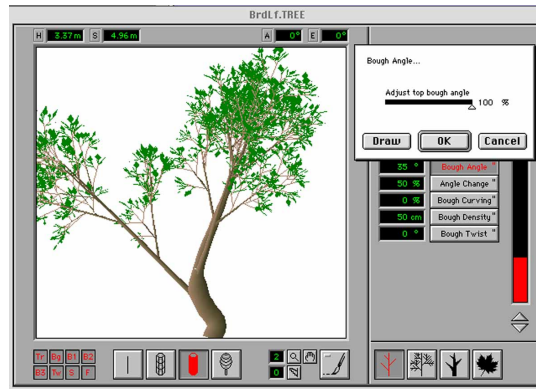


Figure 8: The Bough Angle Parameter is set.

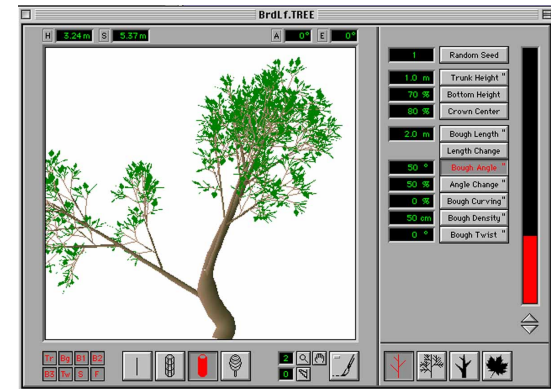


Figure 9: The Bough Angle for the first bough is altered by using the slider.

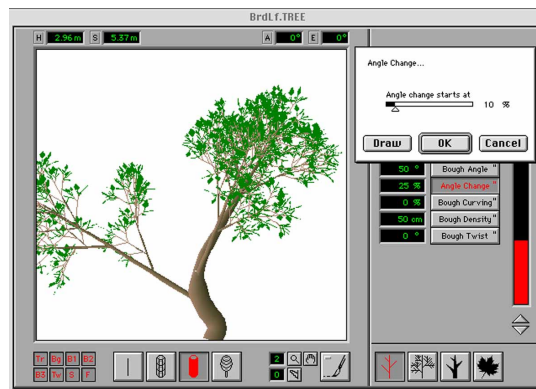


Figure 10: The Bough Angles are refined with the Angle Change settings.

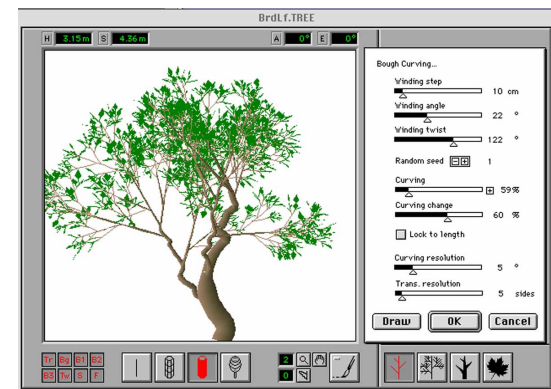


Figure 11: Altering the values in the Bough Curving Parameter dialog brings noticeable changes to the tree.

After the Trunk and Boughs are customized, Branches and Twigs are next in the fractal hierarchy. Make sure the icon for the Branch and Twigs parameters is activated.

Skip Random Seed, and activate Branch Length. Set it to 60% in the slider, and then double-click to bring up the dialog. In the dialog, set the G1, G2, and G3 parameters to 70, 50, and 35 respectively. Set Minimum Length to 7, and click on OK. See [Figure 14](#).

Skip length Change, and click on Branch Angle, setting the slider to 60. Double-click on it to bring up the dialog. Set the sliders in the dialog as follows: G1, G2, and G3 to 70, 50, and 35 respectively. Look at the preview to see what your alterations have accomplished. See [Figure 15](#).

Set Angle Change to 100 with the slider, and click on Branch Curving. This brings up a dialog for three Branch Levels: G1 Winding, G2 Winding, and G3 Winding. In turn set G1, G2, and G3 Winding as follows: Winding

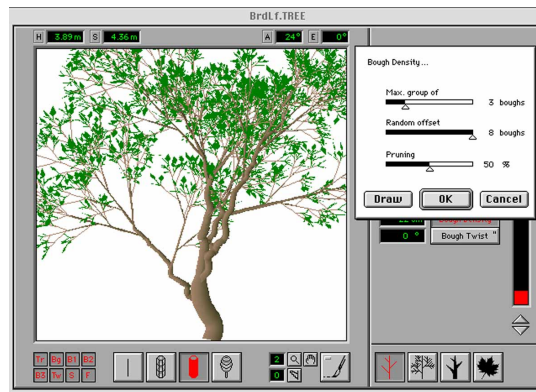


Figure 12: Branch Density is altered.

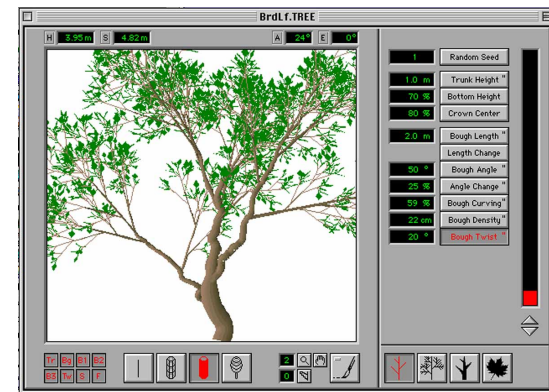


Figure 13: A Twist is added to the boughs.

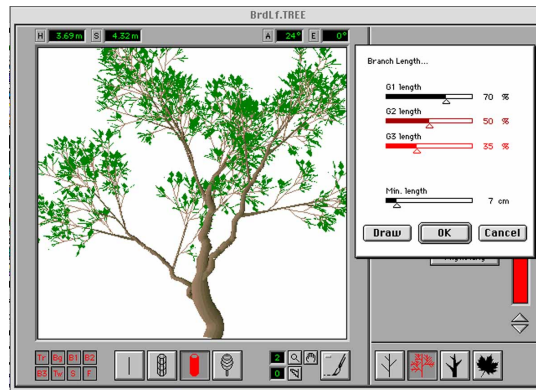


Figure 14: The Branch Length parameters are altered.

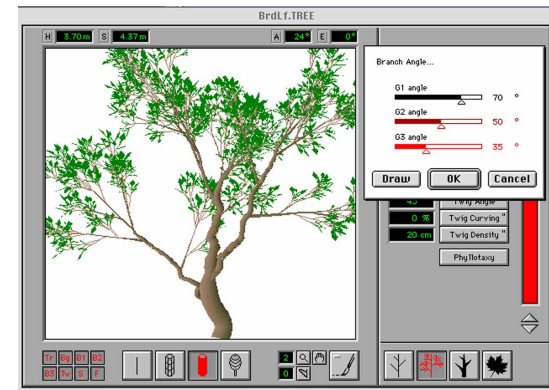


Figure 15: The Branch Angles are adjusted.

Step 10, Winding Angle 50, Winding Twist 32, Curving 51, and Curving Change of 50. Use these values for G1, G2, and G3. See [Figure 16](#).

Set Twig length to 30, and Random to 100 by double-clicking and bringing up the dialog. Note that the higher Twig Length is set, the more twigs, and hence the more foliage, is on the tree. See [Figure 17](#).

Click once on Twig Angle, and use the slider to set it to 90. This fans out the foliage. See [Figure 18](#).

Click on Twig Curving, and use the slider to set its value at -99. This gives the twigs a noticeable droop. Positive values would make the twigs stand up straighter. Double-click the Twig Curving parameter to bring up the dialog. Set the slider

values as follows: Winding Step 100, Winding Angle 20, Winding Twist 25, and Curving to 99. All this adds variance to the drooping twigs. See [Figure 19](#).

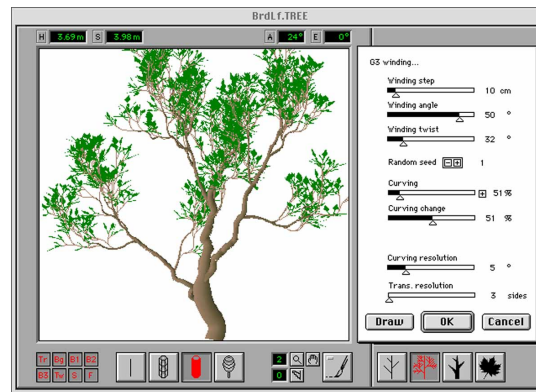


Figure 16: Branch Curving is added.

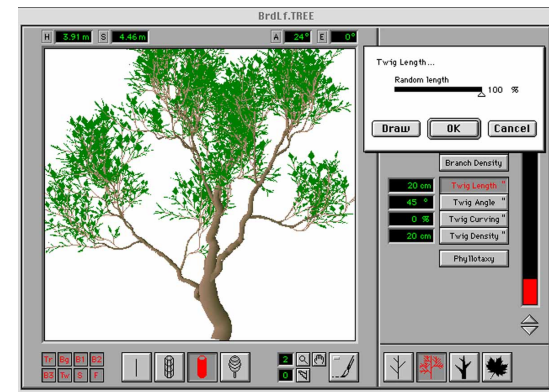


Figure 17: The Twig Length is increased, creating more foliage.

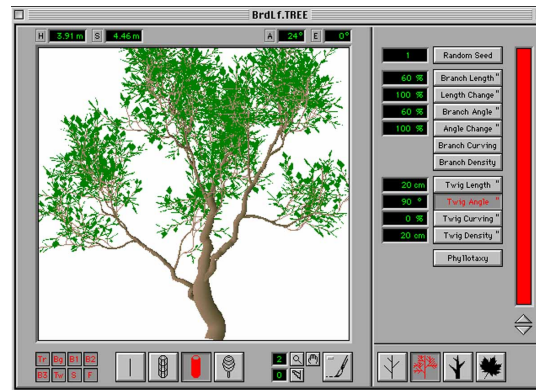


Figure 18: Increasing the Twig Angle fans out the foliage, preventing clumping.

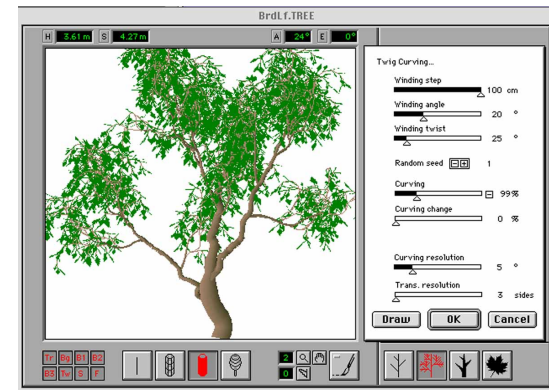


Figure 19: Droopy variance is added to the twigs with Twig Curving alterations.

Set Twig Density to 99 with the slider, then double-click to bring up the dialog. Set Pruning to 70. Increasing the density and then using Pruning spreads the twigs out in a more interesting fashion. See [Figure 20](#).

Clicking on Phyllotaxy, the last setting in this Parameter Group, brings up its dialog. Phyllotaxy describes the way tree elements are placed around their parents. In this case there are two choices, two elements opposite each other or three in a triangular pattern. Two elements creates a wider view of the elements, and suffices for most uses. If you plan to take the camera very close to the tree in your 3D application however, the three element Phyllotaxy looks better distributed. For our purposes, use the two element Phyllotaxy, and leave all of the options checked (they represent three branch levels and the twig level). See [Figure 21](#).

Skip the Random setting, and click on Trunk Width, setting its slider value to 100. Double-click on the same Parameter, bringing up the Trunk Width dialog. This is where you can add variance to the width of the trunk. You can set the

width values for six regions, or slices, around the trunk. Set the values, starting at the top, at 18, 22, 24, 30, 45, and 60. This creates a tree that is wider at the bottom than at the top of the trunk. Later on, you can explore other variations to create some very bizarre tree trunks.

There is another button in this dialog called Mold which transports you to yet another dialog. Click on it. At the top are two cross-sections that your tree may exhibit. Select the second one. Next to that are a red and blue icon, for clockwise and counter-clockwise options. Select the red one. In the sliders that follow, set the values as: Mold Angle 45, Mold Width 83, Mold Height 100, Mold Convexity 6, and Spiral 500. Note the beautiful convolutions exhibited now by the trunk. Click OK. See [Figure 22](#).

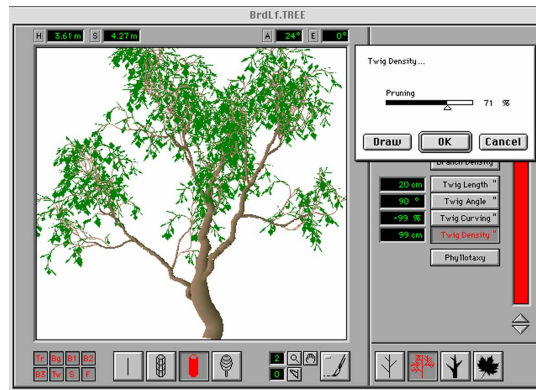


Figure 20: Increase the density and then Prune for a better twig look.

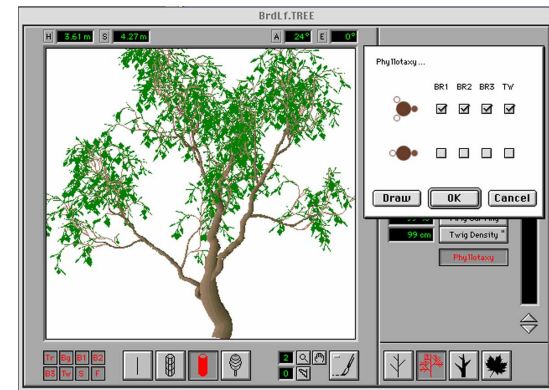


Figure 21: Phyllotaxy is kept at two in this example.

Click on Branch Width, and set the slider to 100. Double-click on it, and set the Minimum Value to 10. This thickens all of the branches. See [Figure 23](#).

a dialog that displays various Leaf Types. Note that some are made from one polygon, and some from more. Using lower polygon types of leaves can have a great effect

Clicking on the Color parameter brings up an RGB palette controller. Using Color will be important only if you plan to save out images. When saving out DXF models, it is assumed that you will want to colorize and texture the tree in a target application. We have adjusted the palette controls and colorized the tree in [Figure 24](#) simply to show that it can be done. The palette controls work in a similar manner to the system palette controls, and take just a few minutes to get used to.

Skip the Random parameter, and click on the Leaf Type button. This brings up

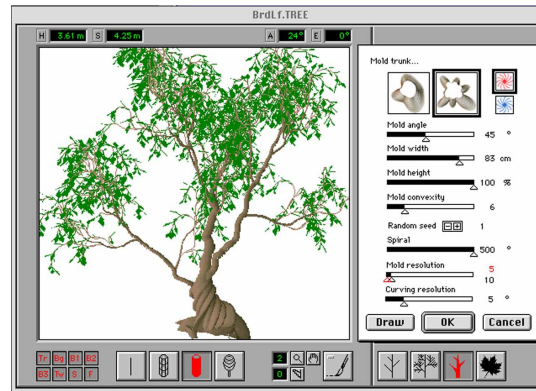


Figure 22: Using the Mold functions in the Trunk Width Parameter dialog, you can add twisted convolutions to the trunk.

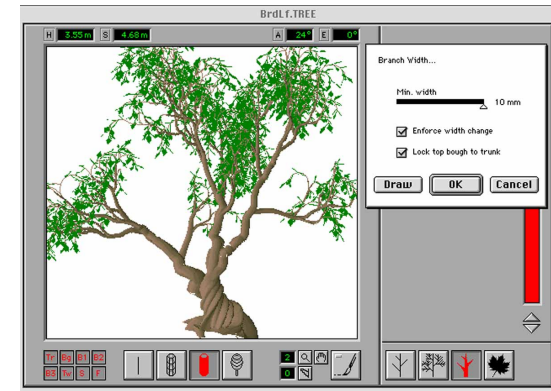


Figure 23: Add thickness to the Branches by adjusting the Branch Width parameters.

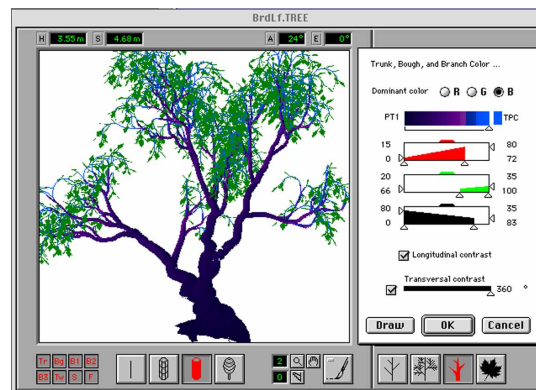


Figure 24: When saving out the tree as an image, adjusting the palette creates all sorts of variations.

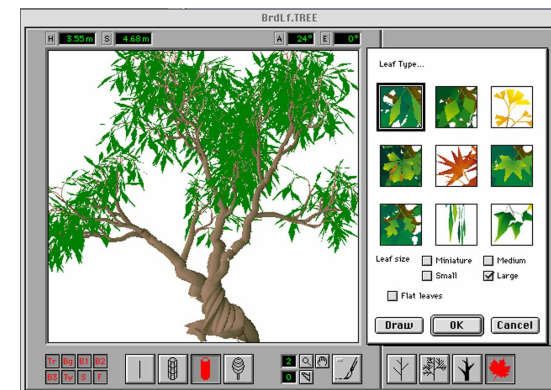


Figure 25: Altering the Leaf Type changes the tree dramatically.

on your model's file size. Select the first Leaf Type, and click Large, then on OK. See [Figure 25](#).

Double-click on Leaf Density to bring up a Pruning dialog. Set the value to 60%. Pruning leaves often makes a better looking model because you can appreciate individual leaves more. See [Figure 26](#).

Using the slider, set Stem Length, Stem Angle, and Stem Curving to 50, 20, and -90 respectively. If you like, you can colorize the leaves in the same way you colorized the rest of the tree with the Color Parameter. Save the Parameter file to disk. See [Figure 27](#).

Using similar techniques in Tree Pro, you can just as easily create conifers and palms, and customized surreal variations. All that really changes are the parameter types to fit the tree type being worked on. See [Figure 28](#).

The only option Tree Pro allows for model format saves is DXF as of version 4. Although not the best choice when it comes to applying UV textures, DXF is a format that

can imported into all 3D rendering applications. Some applications even allow you to apply smoothing to the faceted DXF models, and also to export them as 3DS, OBJ, or other higher end formats.

The Tree Pro DXF export dialog is a study in high-end options, allowing you all sorts of decision making power before finally committing to a file save. All of the Tree elements can be reduced in quantity and/or size (number of "sides" to each el-

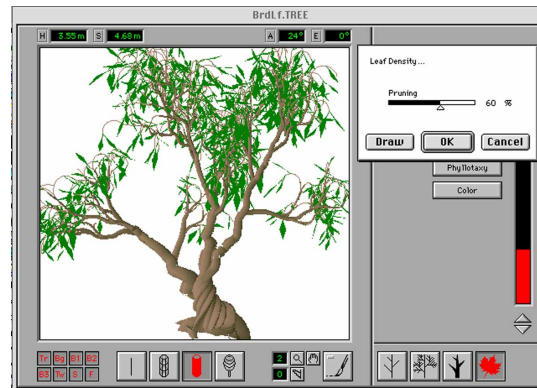


Figure 26: 60% of the leaves are pruned away.

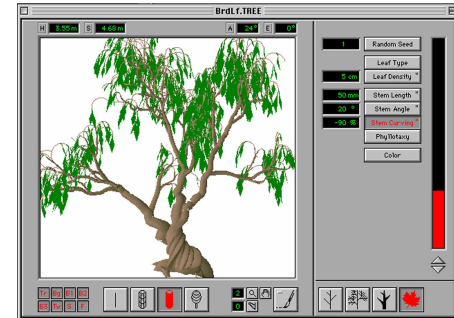


Figure 27: The finished Tree Pro Broadleaf, as seen in the interface above, and as a rendering below.

ement. A separate "Count" button tells you exactly how many polygons are in your model, and what its file size will be. From there, you can alter some of the elements in the tree object, until both the polygon count and file size are where you want them. I don't know of any other 3D application that gives you this much control over the make-up of your model file. See [Figure 29](#).

The two elements that have the biggest impact on polygon count and file size, as far as a Broadleaf tree is concerned, are Twigs and Leaf Stems. The tree that we created in this tutorial for instance has a little over 61,000 polygons, with a weight just over 13 MB. Of that, Twigs make up for almost 25,000 polygons (about 40% of the overall file size), and Stems come in at almost 17,000 polys (about 27% of the file). If you leave these



Figure 28: A mix of Conifers and Palms created in Tree Pro, using methods similar to those described for the Broadleaf tutorial.

two items unchecked, the resulting model will have only about 21,000 polys. On the negative side, close-ups of the model will reveal the missing parts. Remove these elements only if you will remain at a good distance from the tree.

The second way to reduce the file size of the model is to reduce the number of sides of elements. Three sides is sufficient for most 3D environments and fly-arounds, while more sides (4 to 6 are usually sufficient) are better for extreme close-ups, since they emulate a smooth oval shape better. See [Figure 30](#).

The DXF dialog offers you yet another reduction option, which is a final Pruning control for cutting back the Foliage. I would suggest that you use this option

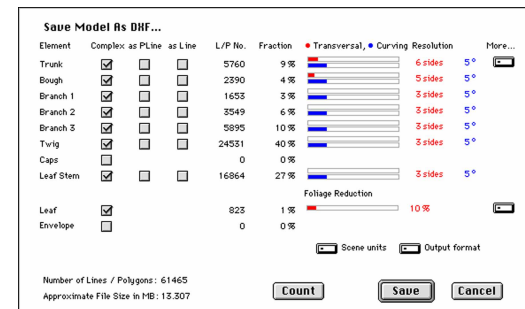


Figure 29: The Tree Pro DXF Export dialog.

sparingly, since it is the foliage that gives a tree its unique personality. Besides, cutting back on the foliage seldom does as much for the file size as the Twig or Stem options. Just before saving out the model, the dialog allows you to choose among three DXF flavors: Mac, PC, or Unix.

The DXF model that exports to your favorite 3D rendering application comes in with all of the elements grouped, so separate textures can be applied to each family of items (Trunk, Branches, Twigs, Stems, and Foliage). Some of these elements have multiple families, so it's possible to create quite a variety of textured variability for any single tree.

My suggestion for texturing the "wood" of the tree is to explore the use of bump mapped marble and wood textures. Use bump mapping at its highest value when you want to have a look of striated bark. Explore different mapping options, though UV mapping and front plane mapping seem to work best. As far as the foliage go, determine the season first. If spring/summer, and the tree is a Broadleaf, then green is the obvious choice. Instead of applying

a single color however, apply a gradient of greens. This adds more interest and dimension, especially in close-ups. For autumnal splendor, use a brown to orange gradient. Frontal mapping works well, as does UV mapping. Experiment.

For a truly alien look, I like to explore applying metallics with a low reflectance and some bump mapped interest.

After you have created the trees and bushes and other plants you need in Tree Pro, here are some suggestions for their use.

If your trees are going to remain in the background, do not import them as 3D models. Instead, render them in Tree Pro, and import the pictures. Map the pictures to

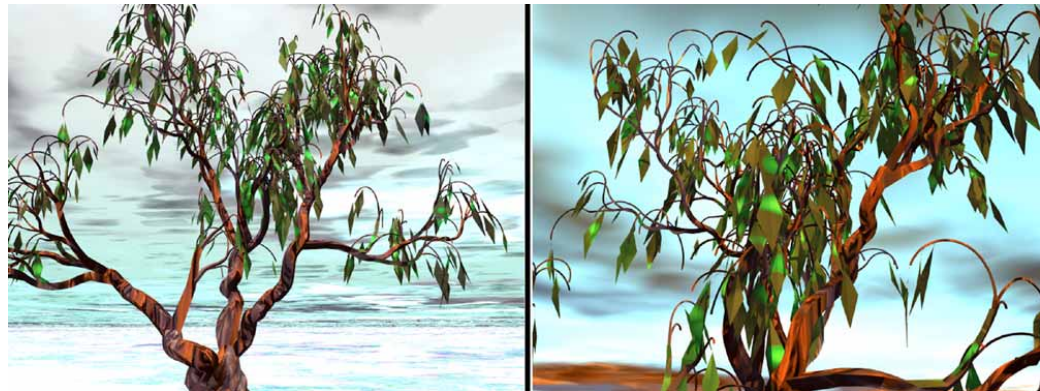


Figure 30: As you can see in these close-ups, exporting the model with Stems and Twigs in tact adds to the realism when the camera draws near.

planes, which will save you a lot of memory and rendering time.

When you need a forest of trees, and all of them have to be 3D models, consider creating just a few. Even one tree can suffice in many instances. Import the tree into your 3D application, and immediately duplicate as many as you like. To vary their appearance, rotate them on the Y (vertical) axis, and resize some of them. If your 3D application has a Bend effect, use it on some of the duplicates in different amounts. From the one, many.

Apply textures and colors to trees in the foreground, but apply only dark browns or even black to any trees in the background. If you apply color and full textures to all of your trees, the result will be an indistinguishable mess. You can also use the full tree models in the foreground and mapped tree planes in the background.

Consider placing a reflective puddle or even a stream close to your foreground tree(s). Reflections accentuate the interesting shapes of your tree objects.

Complex tree objects cast wonderful shadows, so make sure you place other objects (rocks, for instance) to receive the tree shadows. This also defines the 3D nature of the objects in proximity to the tree.

To emphasize the desolate nature of a scene, place a few trees without foliage in the picture. Nothing says desolation more than a tree stripped of life.

Tree Professional version 4

Mac and Windows 95/NT

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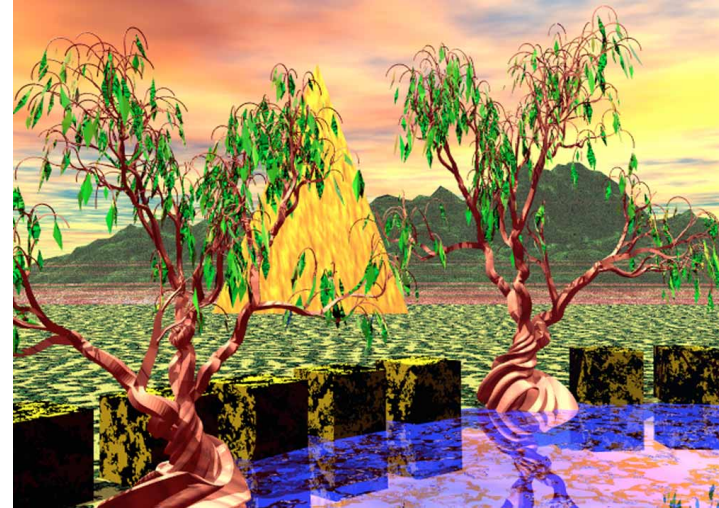
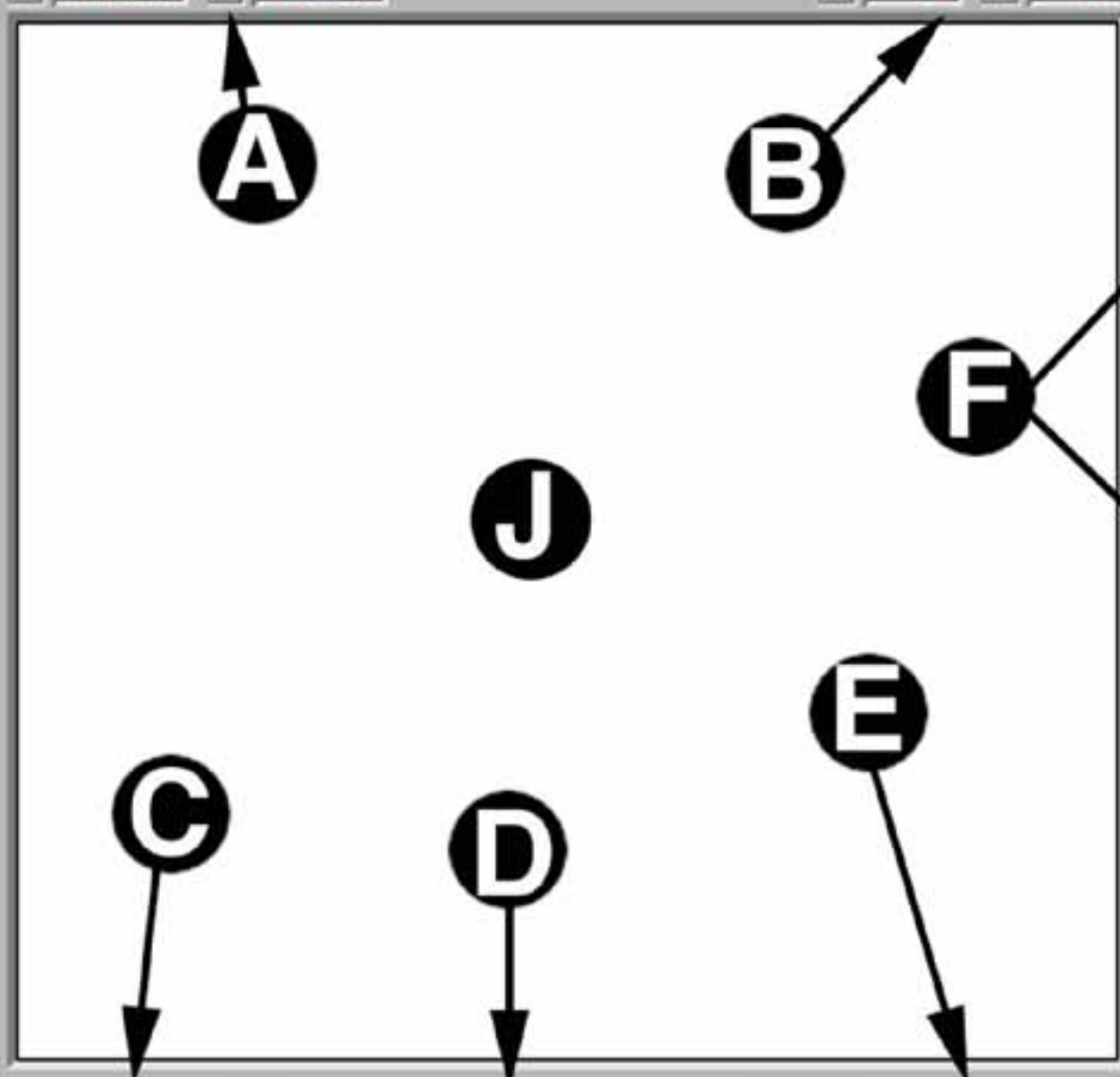


Figure 31: Here is the tree we created in this tutorial, placed in a Bryce 3D world. The same tree was duplicated, rotated, and used twice. The wood was mapped with a wood texture with large bands to emphasize the curves, and the foliage mapped with a subtle green gradient.

H 0.00m S 0.00m

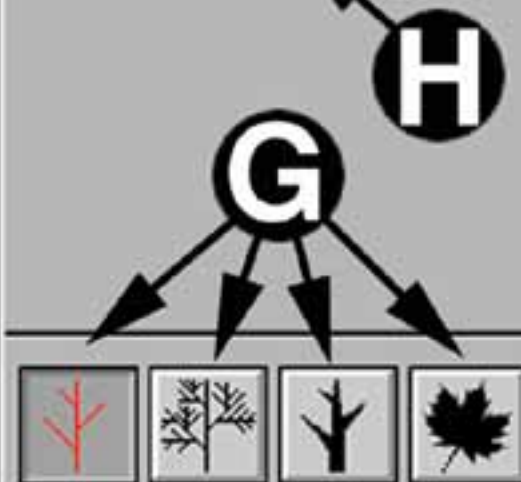
A 0° E 0°



Tr Bg B1 B2
B3 Tw S F

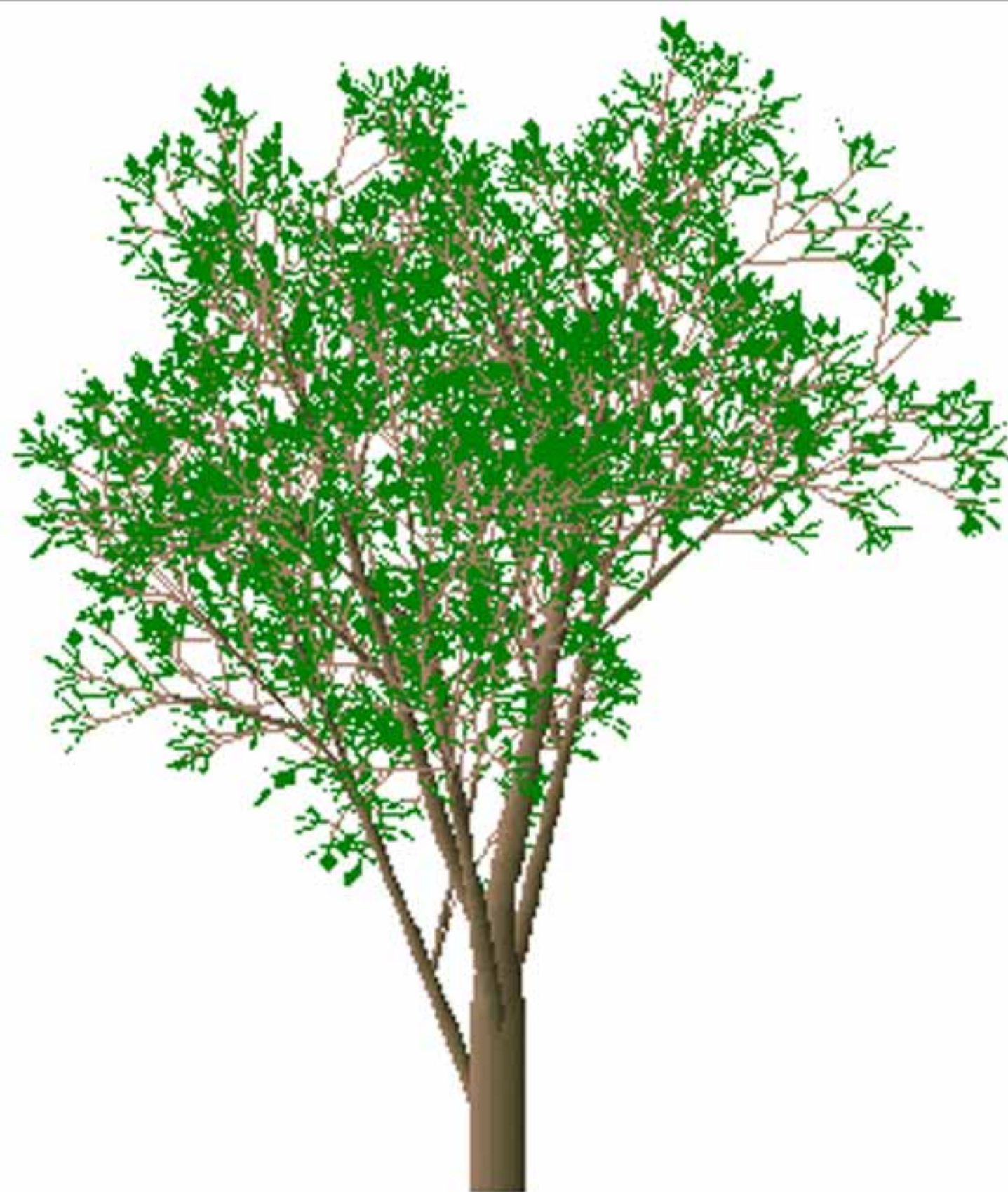


1	Random Seed
1.0 m	Trunk Height "
25 %	Bottom Height
25 %	Crown Center
2.0 m	Bough Length "
	Length Change
35 °	Bough Angle "
50 %	Angle Change "
0 %	Bough Curving "
50 cm	Bough Density "
0 °	Bough Twist "



TREE PROFESSIONAL

H 4.58 m S 5.21 m A 0° E 0°



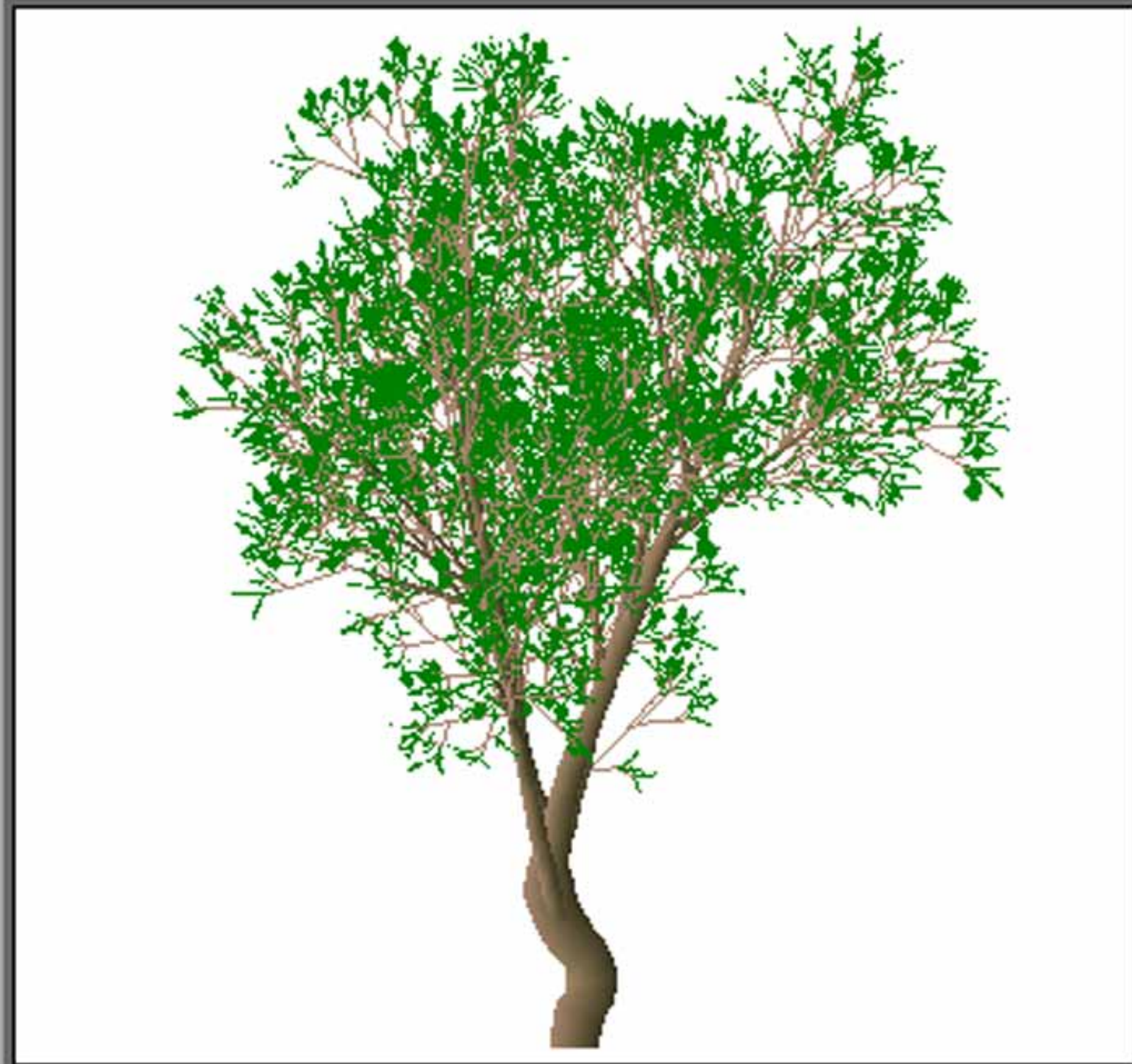
1	Random Seed
1.0 m	Trunk Height "
25 %	Bottom Height
25 %	Crown Center
2.0 m	Bough Length "
	Length Change
35 °	Bough Angle "
50 %	Angle Change "
0 %	Bough Curving "
50 cm	Bough Density "
0 °	Bough Twist "

Tr	Bg	B1	B2
B3	Tw	S	F



TREE PROFESSIONAL

H 4.42 m S 5.21 m A 0° E 0°



Trunk Height...

Winding step 20 cm

Winding angle 60 °

Winding twist 32 °

Random seed ☐ ☐ 1

Curving resolution 5 °

Trans. resolution 6 sides

Draw

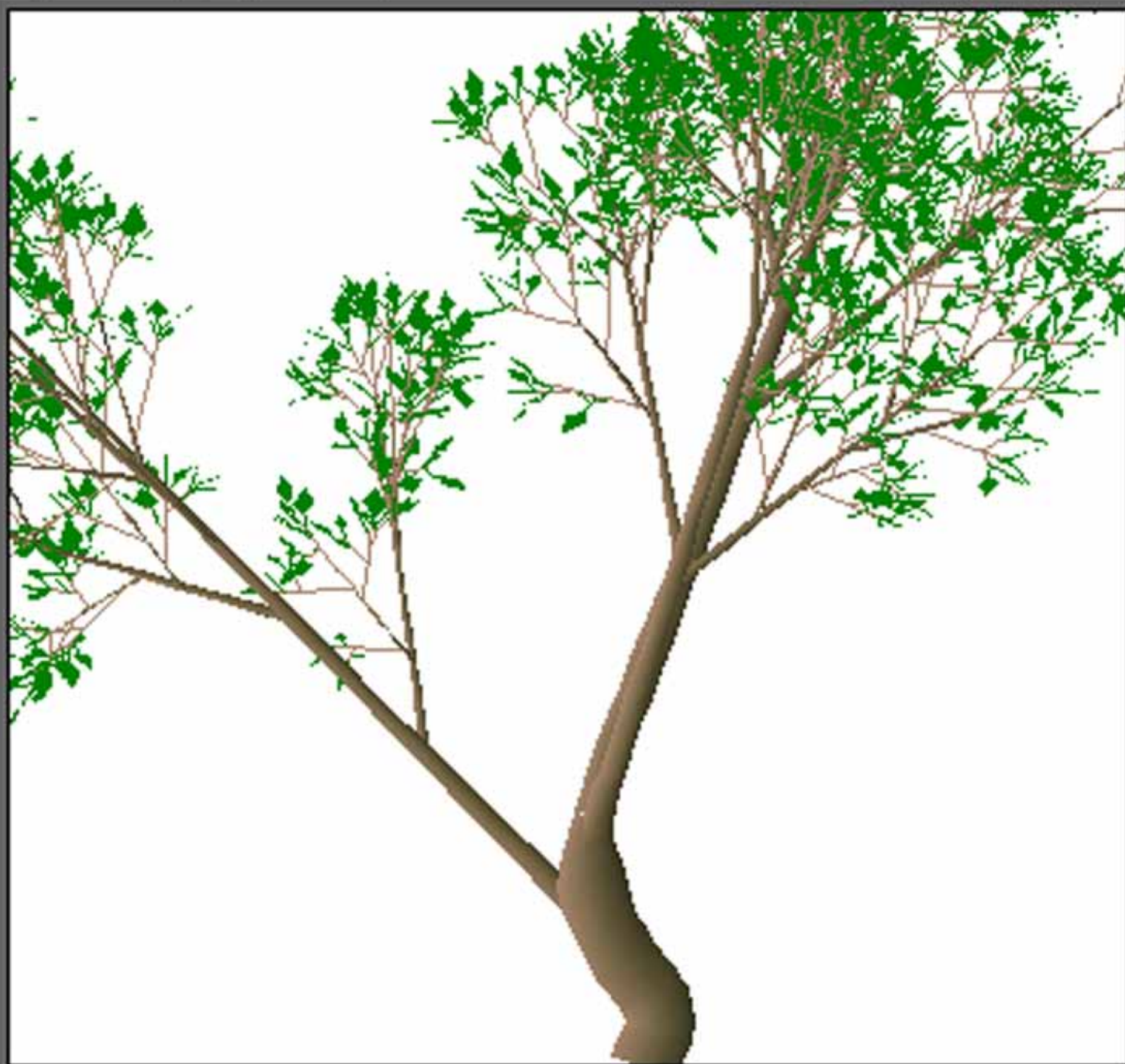
OK

Cancel

Tr Bg B1 B2
B3 Tw S F



H 4.19 m S 5.55 m A 0° E 0°



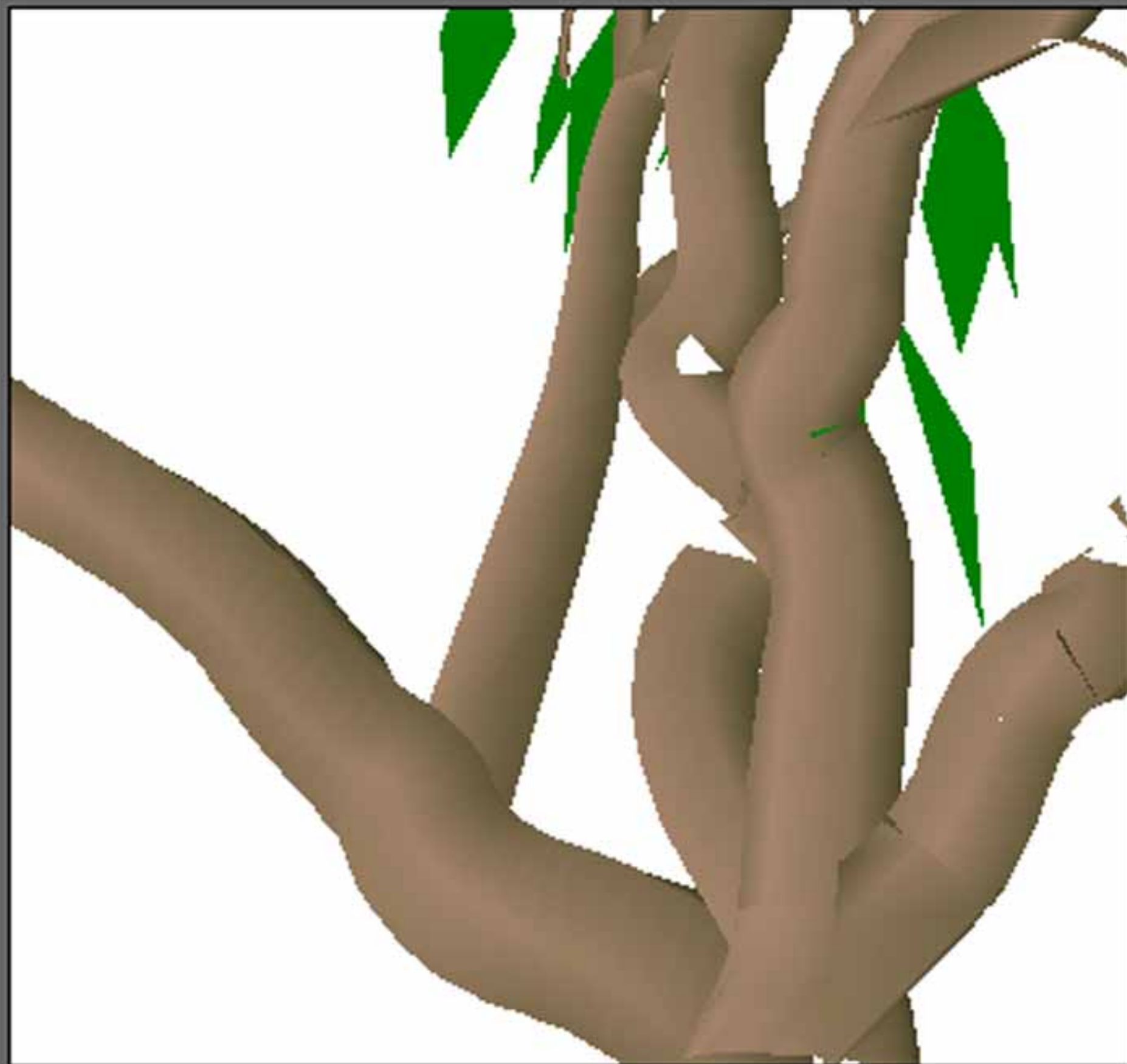
1	Random Seed
1.0 m	Trunk Height "
70 %	Bottom Height
25 %	Crown Center
2.0 m	Bough Length "
	Length Change
35 °	Bough Angle "
50 %	Angle Change "
0 %	Bough Curving "
50 cm	Bough Density "
0 °	Bough Twist "



Tr Bg B1 B2
B3 Tw S F



H 3.55 m S 4.68 m A 48° E 0°



1 Random Seed

1.0 m Trunk Height "

70 % Bottom Height

80 % **Crown Center**

2.0 m Bough Length "

Length Change

50 ° Bough Angle "

25 % Angle Change "

59 % Bough Curving "

22 cm Bough Density "

20 ° Bough Twist "

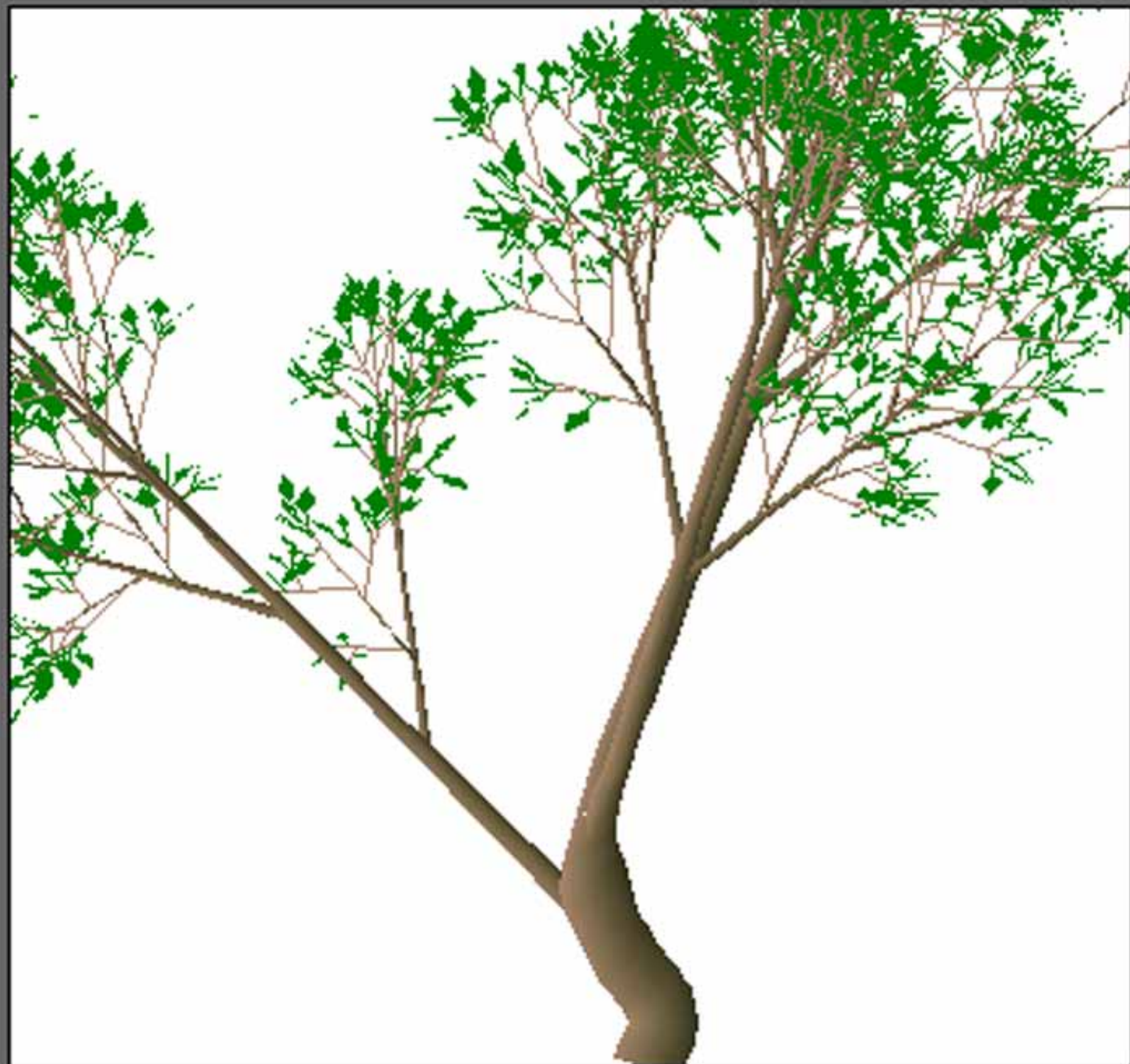


Tr Bg B1 B2
B3 Tw S F



BrdLf.TREE

H 4.19 m S 5.55 m A 0° E 0°



Bough Length...

Min. length



50 cm

Draw

OK

Cancel

Length Change

35 °

Bough Angle "

50 %

Angle Change "

0 %

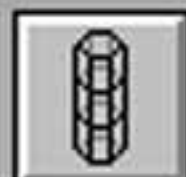
Bough Curving "

50 cm

Bough Density "

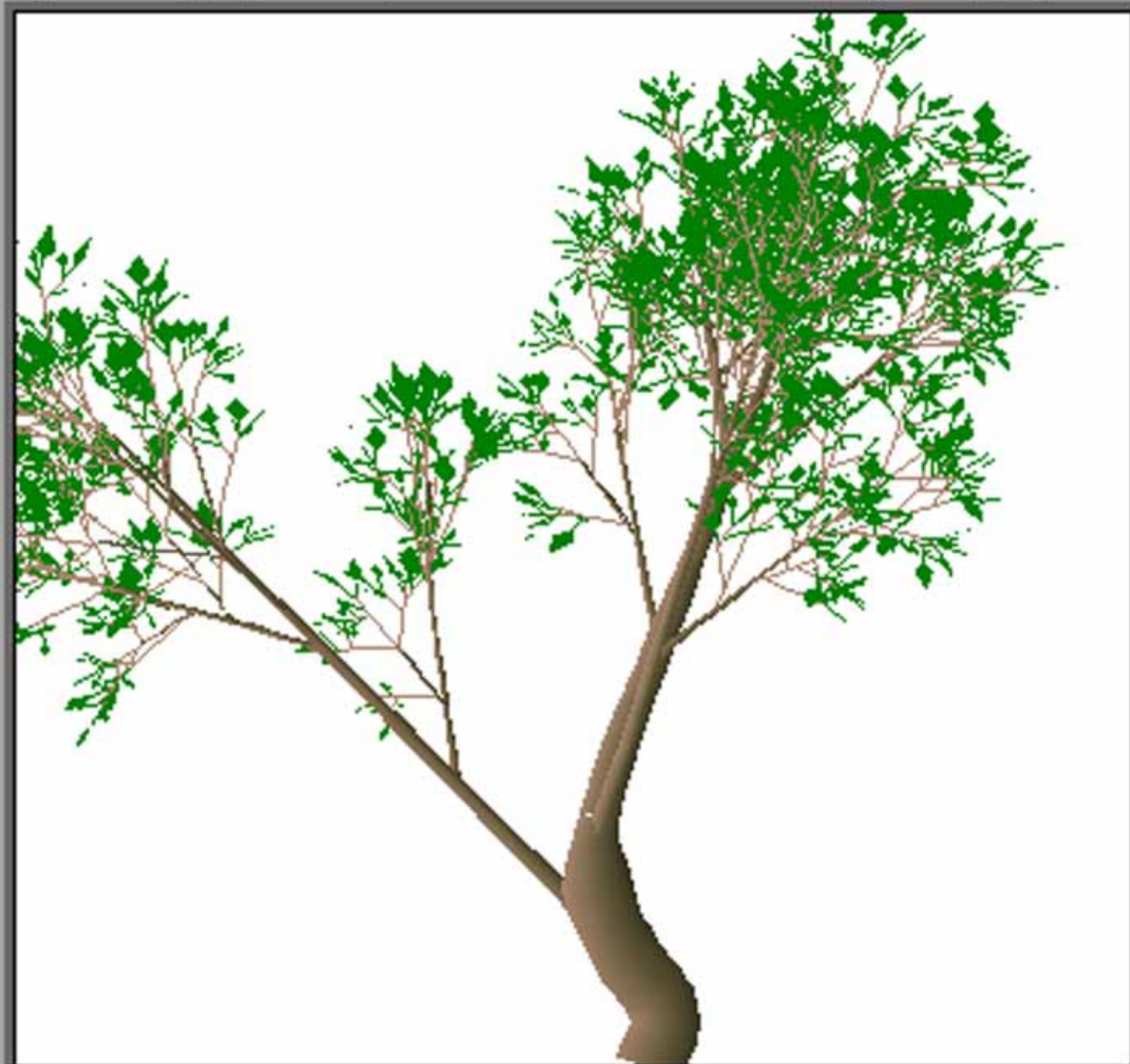
0 °

Bough Twist "

Tr Bg B1 B2
B3 Tw S F2
0

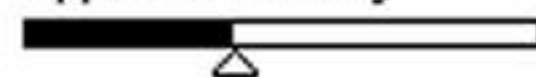
BrdLf.TREE

H 3.37 m S 4.96 m A 0° E 0°



Length Change...

Upper convexity



40 %

Lower convexity



30 %

Draw

OK

Cancel

0 %

Bough Curving"

50 cm

Bough Density"

0 °

Bough Twist "

Tr Bg B1 B2
B3 Tw S F

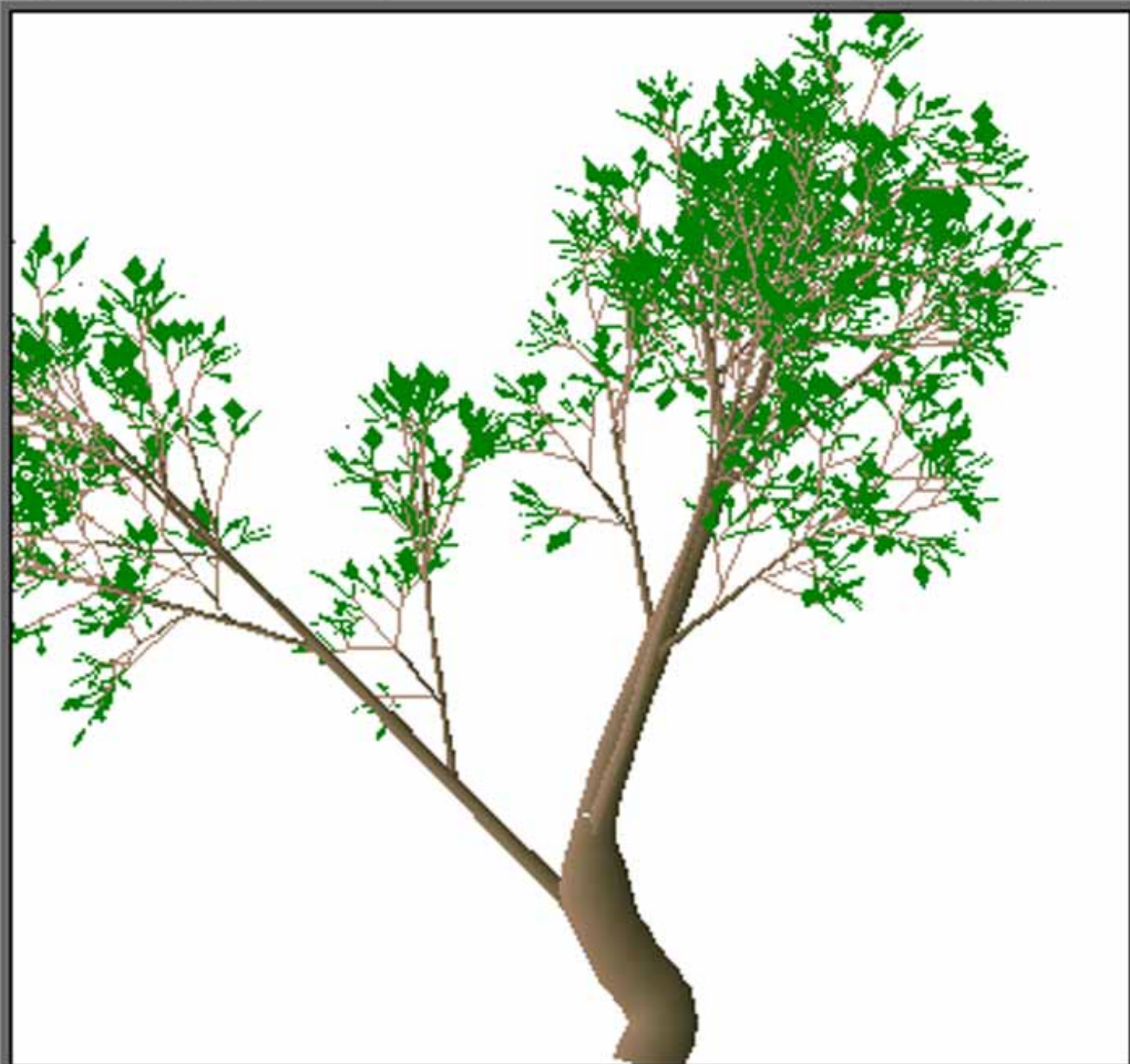


2
0



BrdLf.TREE

H 3.37 m S 4.96 m A 0° E 0°



Bough Angle...

Adjust top bough angle

 100 %

Draw

OK

Cancel

35 °

Bough Angle "

50 %

Angle Change "

0 %

Bough Curving "

50 cm

Bough Density "

0 °

Bough Twist "

Tr	Bg	B1	B2
B3	Tw	S	F



H 3.24 m S 5.37 m

A 0° E 0°



1	Random Seed
1.0 m	Trunk Height "
70 %	Bottom Height
80 %	Crown Center
2.0 m	Bough Length "
	Length Change
50 °	Bough Angle "
50 %	Angle Change "
0 %	Bough Curving "
50 cm	Bough Density "
0 °	Bough Twist "



Tr	Bg	B1	B2
B3	Tw	S	F



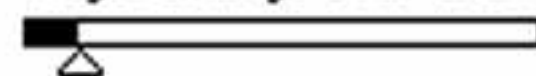
BrdLf.TREE

H 2.96 m S 5.37 m A 0° E 0°



Angle Change...

Angle change starts at



10 %

Draw

OK

Cancel

50 °

Bough Angle "

25 %

Angle Change "

0 %

Bough Curving "

50 cm

Bough Density "

0 °

Bough Twist "

Tr Bg B1 B2
B3 Tw S F



2
0



BrdLf.TREE

H 3.15 m S 4.36 m A 0° E 0°



Bough Curving...

Winding step

 10 cm

Winding angle

 22 °

Winding twist

 122 °Random seed 

1

Curving

  59 %

Curving change

 60 %☐ Lock to length

Curving resolution

 5 °

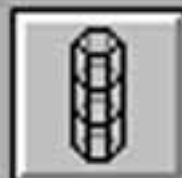
Trans. resolution

 5 sides

Draw

OK

Cancel

Tr Bg B1 B2
B3 Tw S F2
0

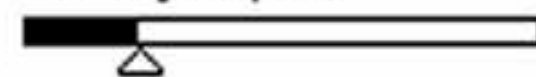
BrdLf.TREE

H 3.89 m S 4.36 m A 24° E 0°



Bough Density ...

Max. group of



3 boughs

Random offset



8 boughs

Pruning



50 %

Draw

OK

Cancel

Add View

Bough Density

0°

Bough Twist "

Tr Bg B1 B2
B3 Tw S F



2
0



H 3.95 m S 4.82 m A 24° E 0°



Tr Bg B1 B2
B3 Tw S F



2
0



1

Random Seed

1.0 m

Trunk Height "

70 %

Bottom Height

80 %

Crown Center

2.0 m

Bough Length "

Length Change

50 °

Bough Angle "

25 %

Angle Change "

59 %

Bough Curving "

22 cm

Bough Density "

20 °

Bough Twist "



BrdLf.TREE

H 3.69 m S 4.32 m A 24° E 0°



Branch Length...

G1 length  70 %

G2 length  50 %

G3 length  35 %

Min. length  7 cm

Draw

OK

Cancel

Tr Bg B1 B2
B3 Tw S F



2
0



BrdLf.TREE

H 3.70 m S 4.37 m A 24° E 0°



Branch Angle...

G1 angle 70 °

G2 angle 50 °

G3 angle 35 °

Draw

OK

Cancel

+

0 %

20 cm

Twig Angle

Twig Curving "

Twig Density "

Phyllotaxy

Tr Bg B1 B2
B3 Tw S F

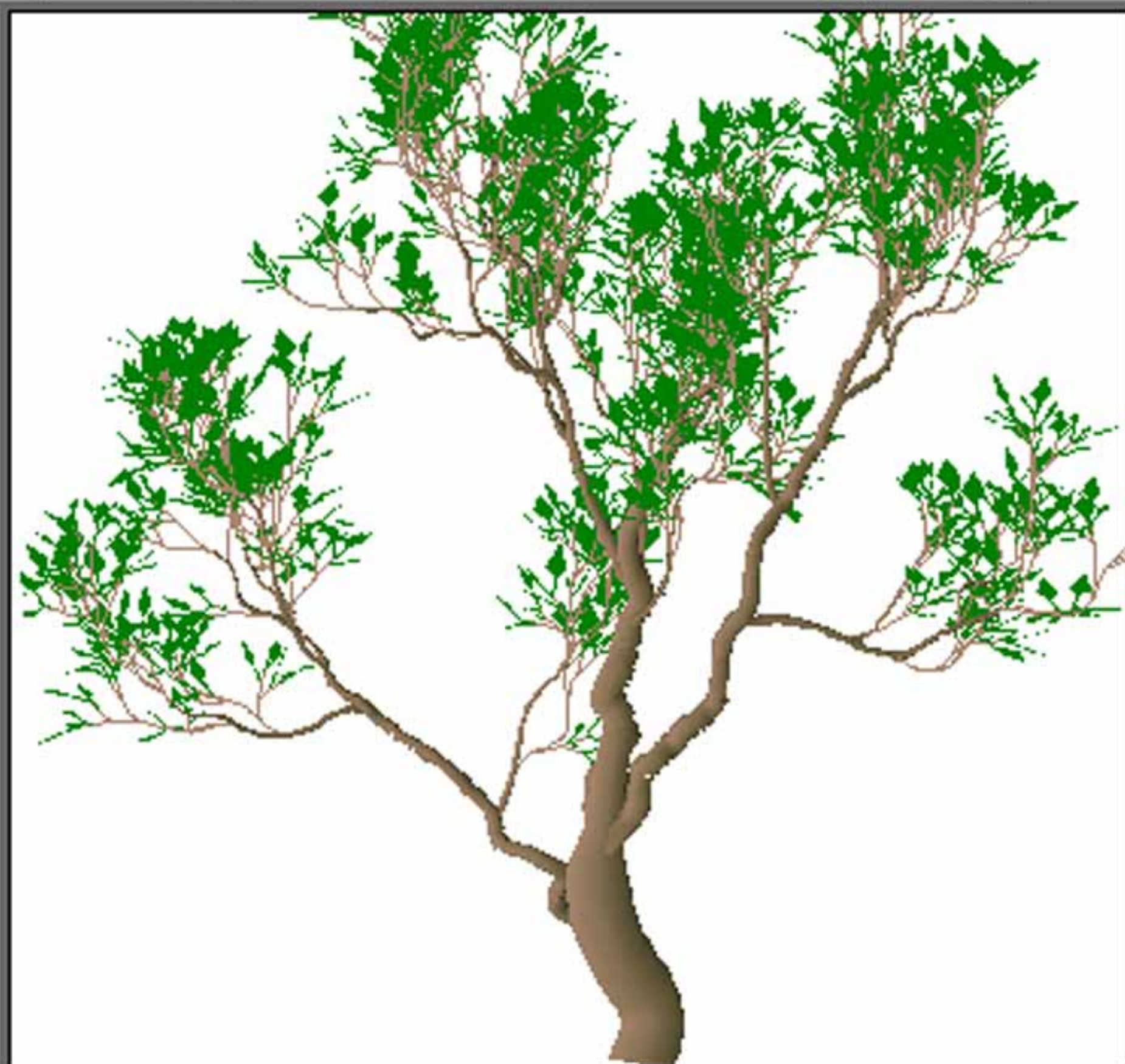
2

0



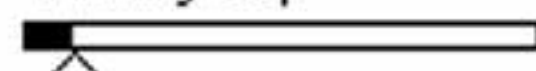
BrdLf.TREE

H 3.69 m S 3.98 m A 24° E 0°



G3 winding...

Winding step



10 cm

Winding angle



50 °

Winding twist



32 °

Random seed ☐ ☒

1

Curving



+ 51 %

Curving change



51 %

Curving resolution



5 °

Trans. resolution



3 sides

Draw

OK

Cancel

Tr Bg B1 B2
B3 Tw S F

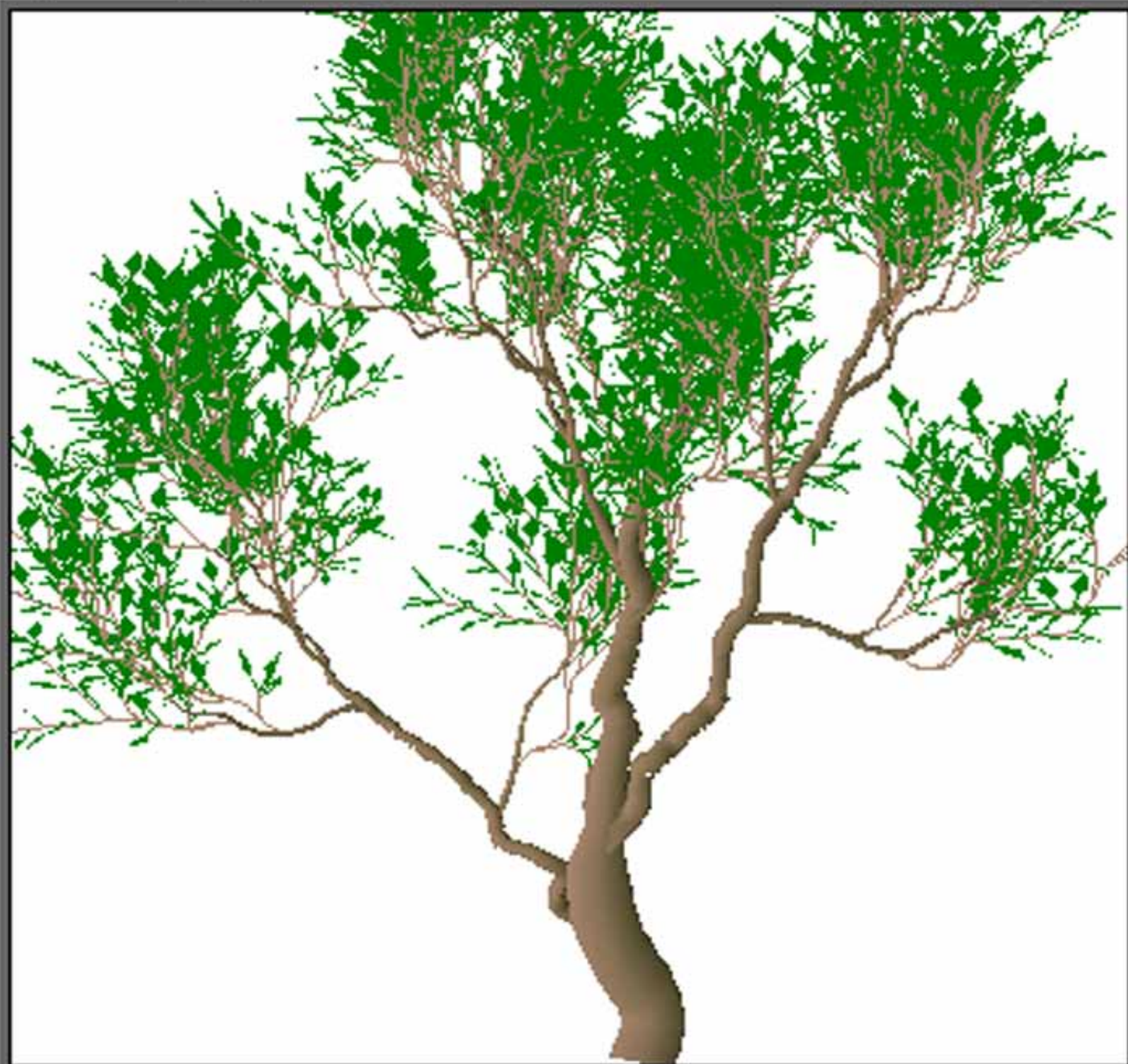


2
0



BrdLf.TREE

H 3.91 m S 4.46 m A 24° E 0°



Twig Length...

Random length

100 %

Draw

OK

Cancel

Branch Density

20 cm

Twig Length "

45 °

Twig Angle "

0 %

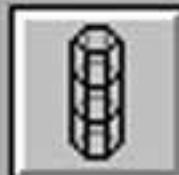
Twig Curving "

20 cm

Twig Density "

Phyllotaxy

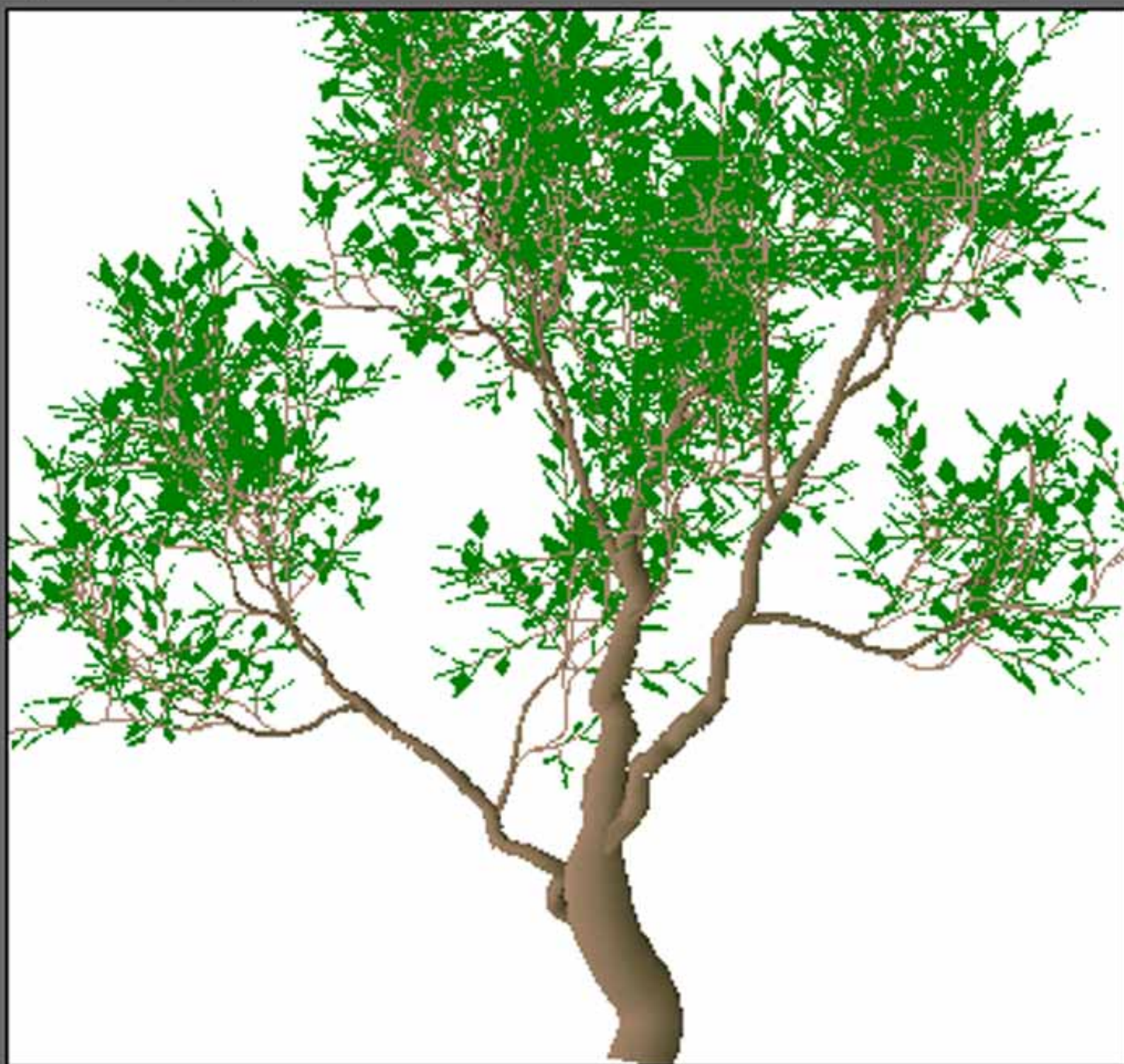
Tr Bg B1 B2
B3 Tw S F



2
0



H 3.91 m S 4.46 m A 24° E 0°



Tr Bg B1 B2
B3 Tw S F



1 Random Seed

60 % Branch Length "

100 % Length Change "

60 % Branch Angle "

100 % Angle Change "

Branch Curving

Branch Density

20 cm Twig Length "

90 ° **Twig Angle "**

0 % Twig Curving "

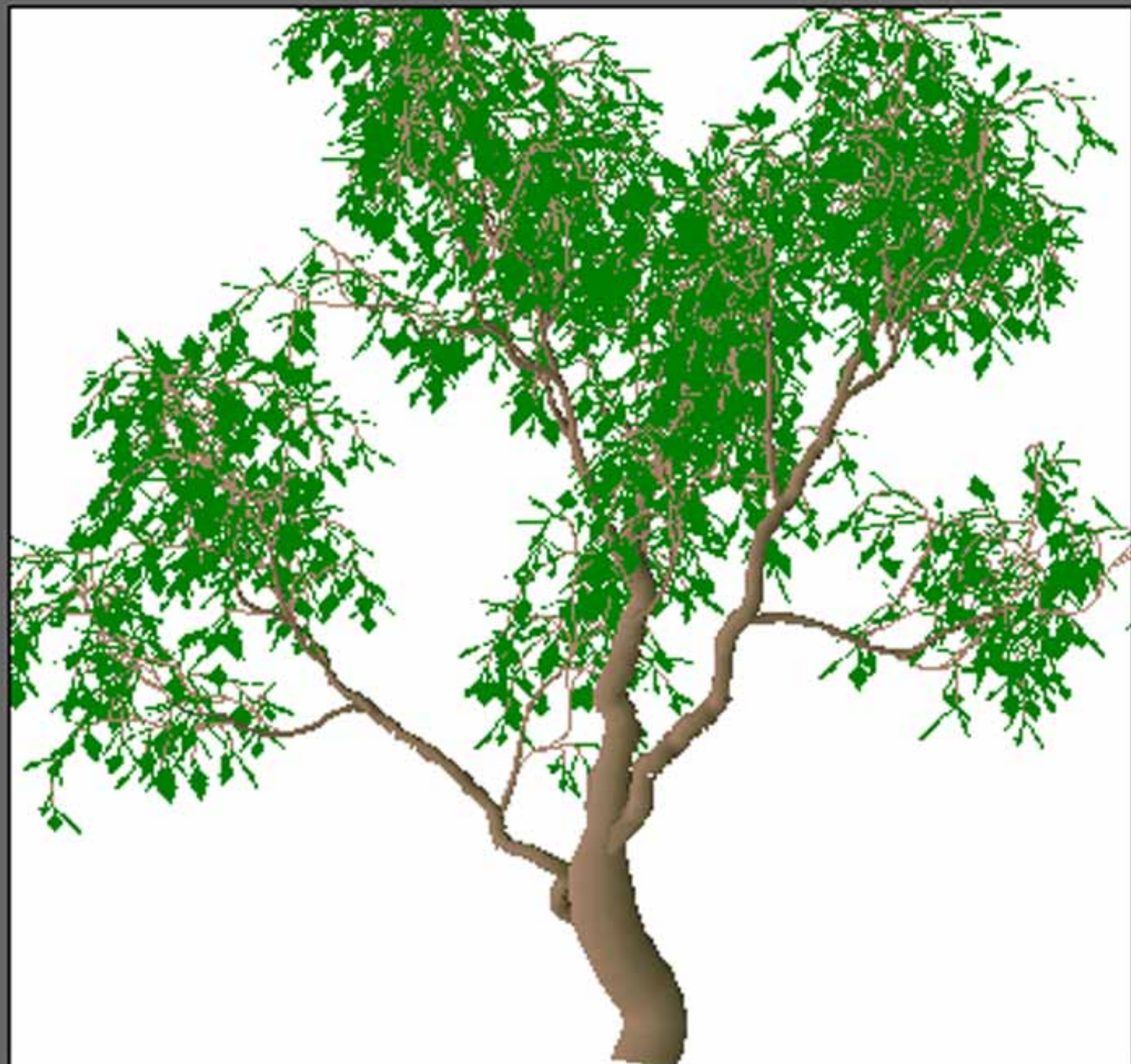
20 cm Twig Density "

Phyllotaxy



BrdLf.TREE

H 3.61 m S 4.27 m A 24° E 0°



Twig Curving...

Winding step
100 cmWinding angle
20 °Winding twist
25 °Random seed ☐ ☒ 1Curving
99 %Curving change
0 %Curving resolution
5 °Trans. resolution
3 sides

Draw

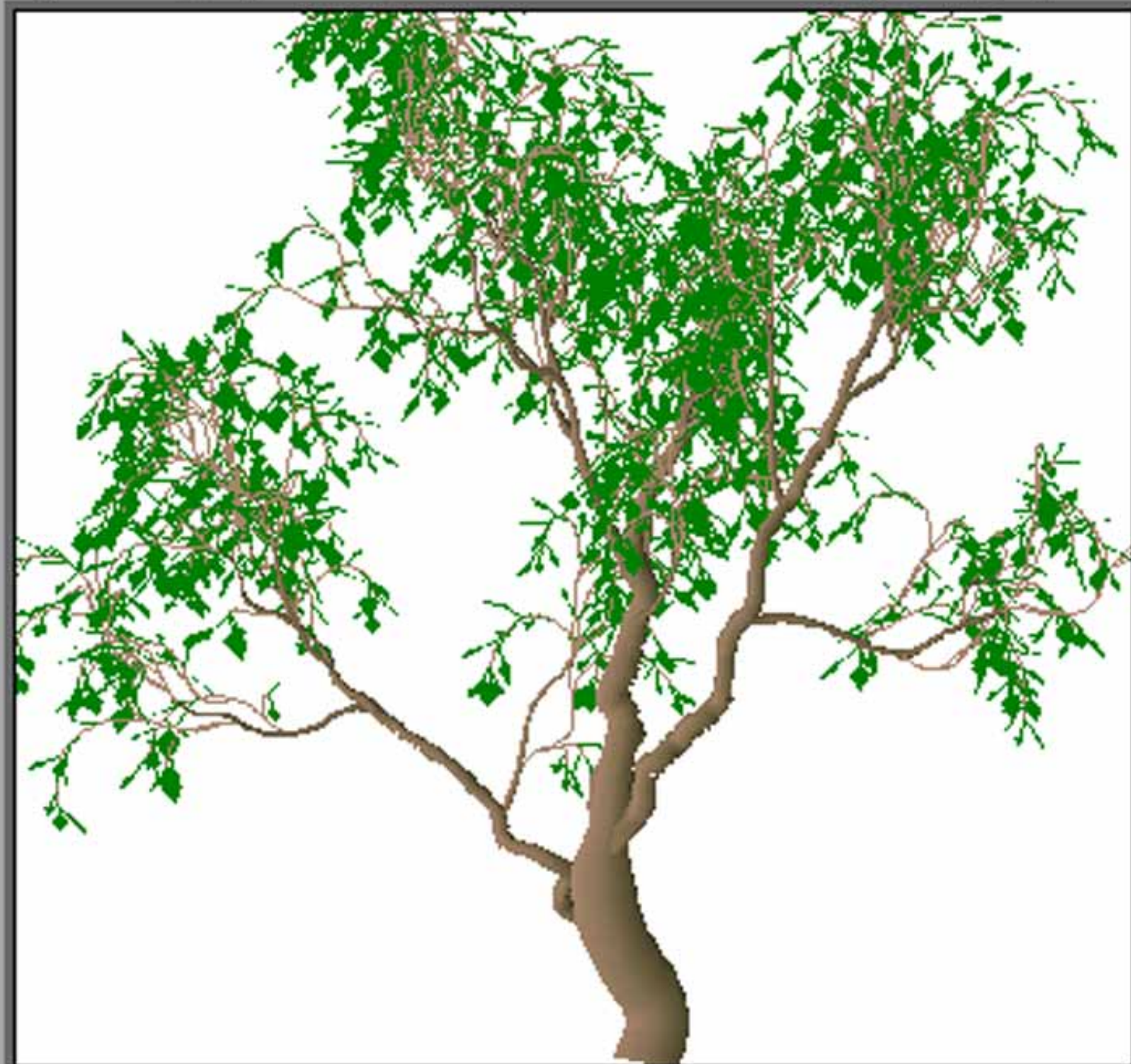
OK

Cancel

Tr Bg B1 B2
B3 Tw S F

BrdLf.TREE

H 3.61 m S 4.27 m A 24° E 0°



Twig Density ...

Pruning



71 %

Draw

OK

Cancel

Branch Density

20 cm

Twig Length "

90 °

Twig Angle "

-99 %

Twig Curving "

99 cm

Twig Density "

Phyllotaxy

Tr Bg B1 B2
B3 Tw S F

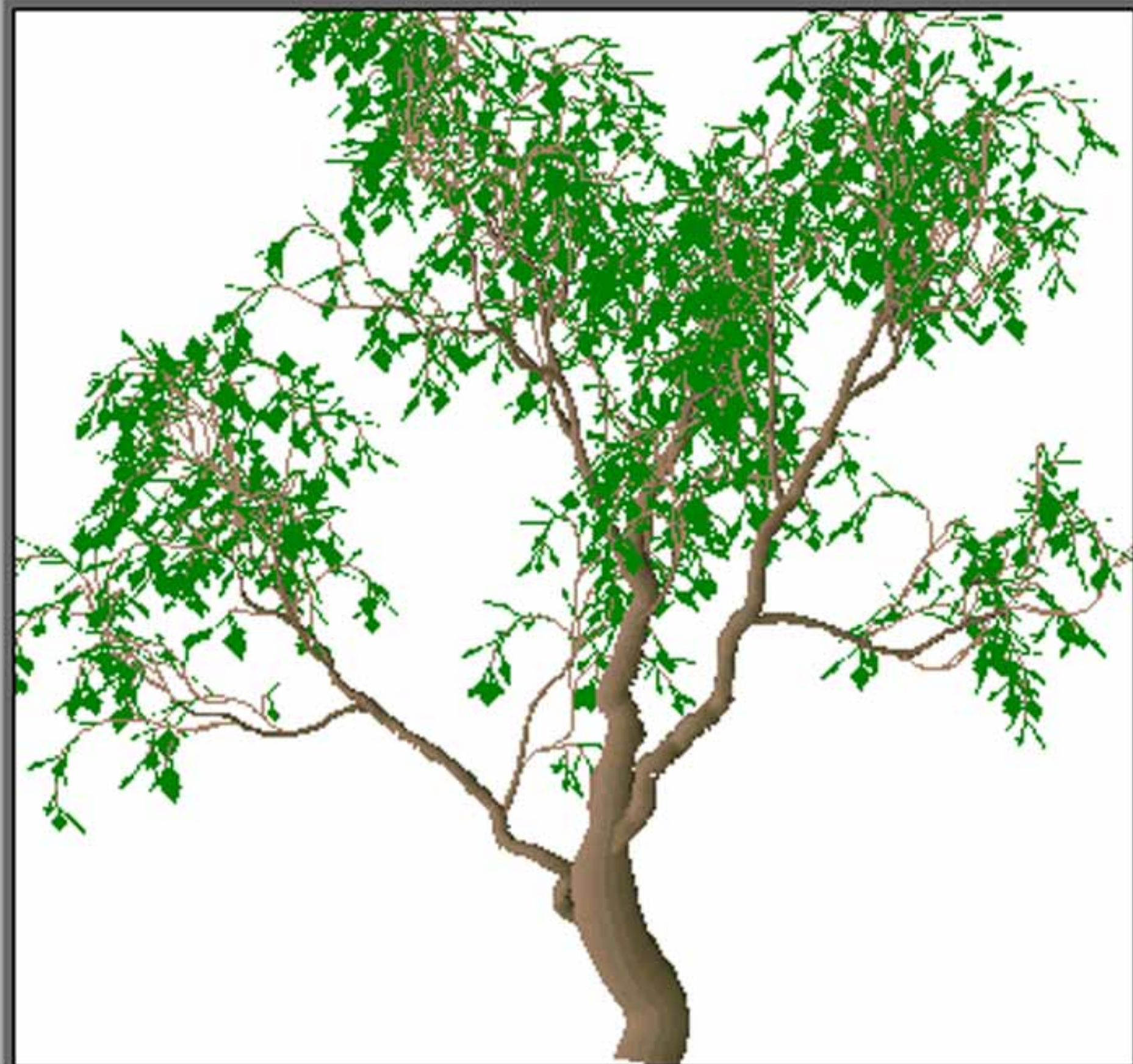


2
0



BrdLf.TREE

H 3.61 m S 4.27 m A 24° E 0°



Phyllotaxy ...

BR1 BR2 BR3 TW

☒ ☒ ☒ ☒☐ ☐ ☐ ☐

Draw

OK

Cancel

99 cm

Twig Density "

Phyllotaxy

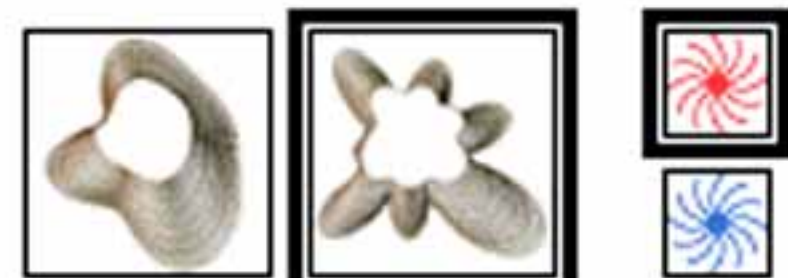
Tr Bg B1 B2
B3 Tw S F2
0

BrdLf.TREE

H 3.61 m S 4.25 m A 24° E 0°



Mold trunk...



Mold angle 45 °

Mold width 83 cm

Mold height 100 %

Mold convexity 6

Random seed ☐ ☒ 1

Spiral 500 °

Mold resolution 5 10

Curving resolution 5 °

Draw

OK

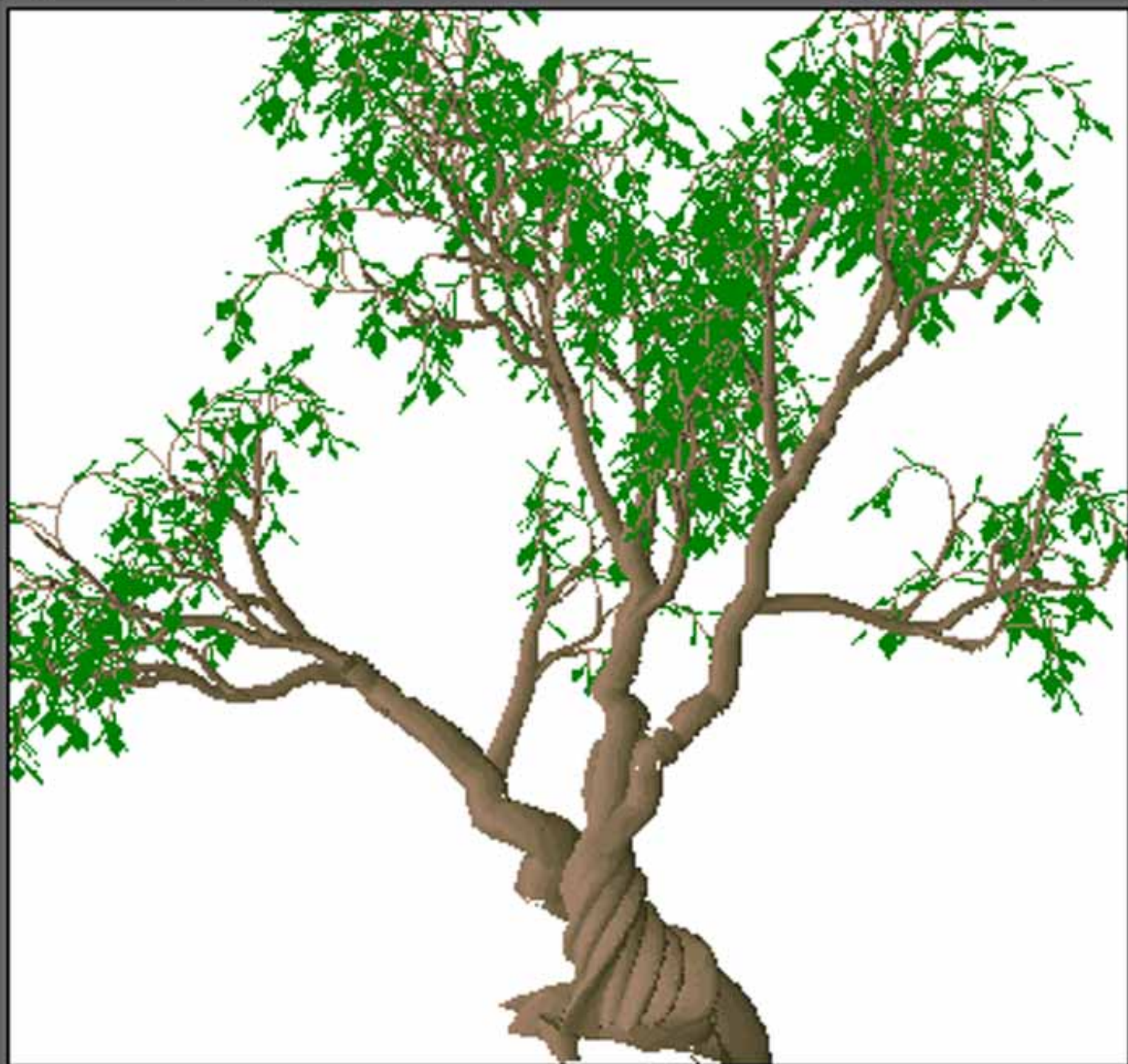
Cancel

Tr Bg B1 B2
B3 Tw S F



BrdLf.TREE

H 3.55 m S 4.68 m A 24° E 0°



Branch Width...

Min. width



10 mm

☒ Enforce width change☒ Lock top bough to trunk

Draw

OK

Cancel

Tr	Bg	B1	B2
B3	Tw	S	F

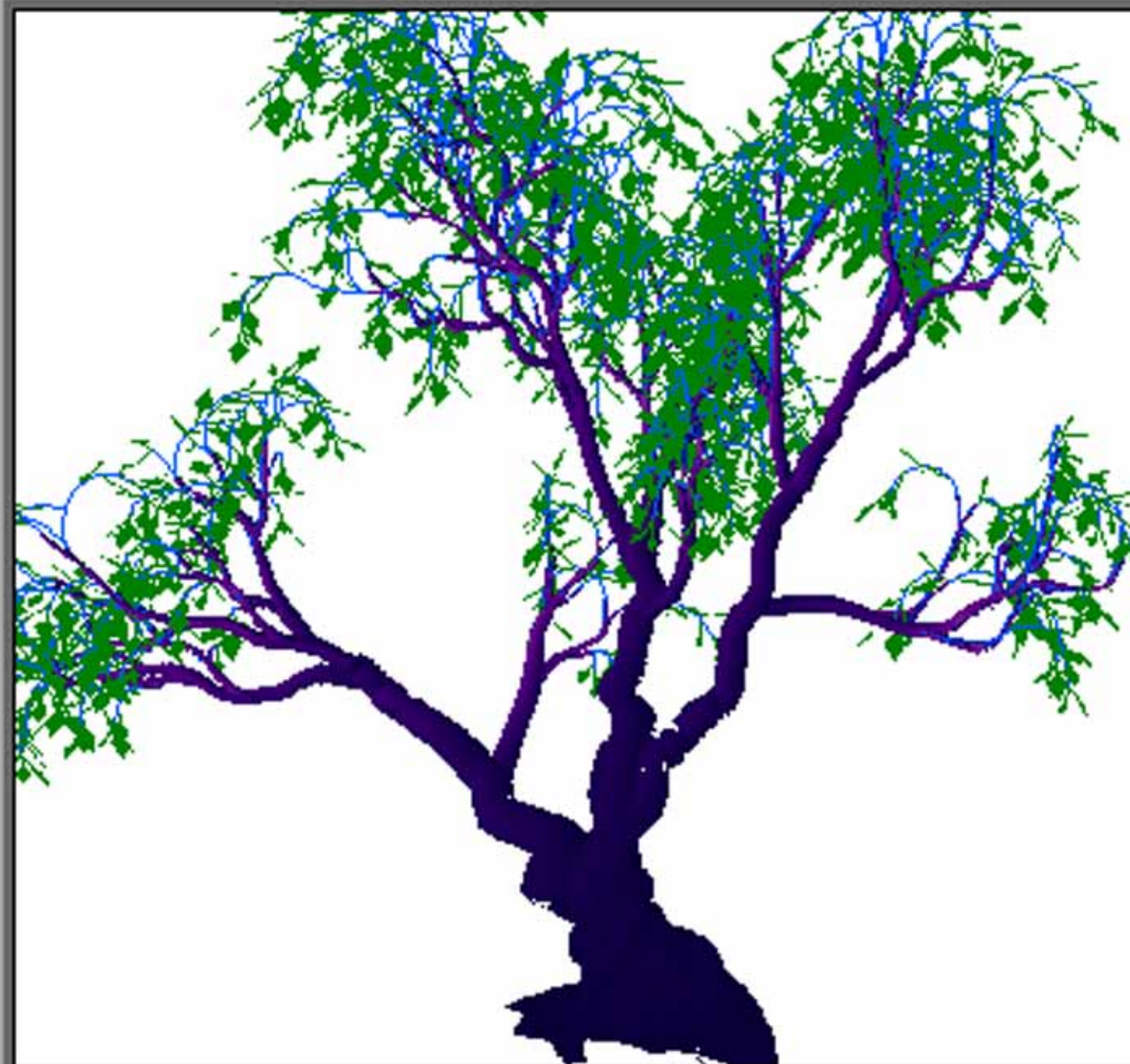


2
0



BrdLf.TREE

H 3.55 m S 4.68 m A 24° E 0°



Trunk, Bough, and Branch Color ...

Dominant color ☐ R ☐ G ☒ BPT1  TPC15  80
0  7220  35
66  10080  35
0  83☒ Longitudinal contrast☒ Transversal contrast 360 °

Draw

OK

Cancel

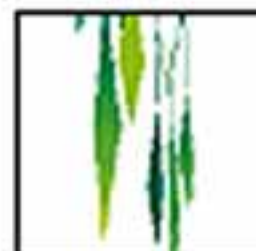
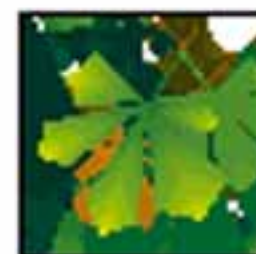
Tr Bg B1 B2
B3 Tw S F

BrdLf.TREE

H 3.55 m S 4.68 m A 24° E 0°



Leaf Type...



Leaf size

☐

Miniature

☐

Medium

☐

Small

☒

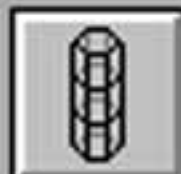
Large

☐ Flat leaves

Draw

OK

Cancel

Tr Bg B1 B2
B3 Tw S F

2



0



BrdLf.TREE

H 3.55 m S 4.68 m A 24° E 0°



Leaf Density ...

Pruning



60 %

Draw

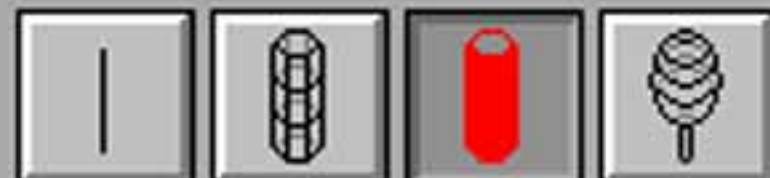
OK

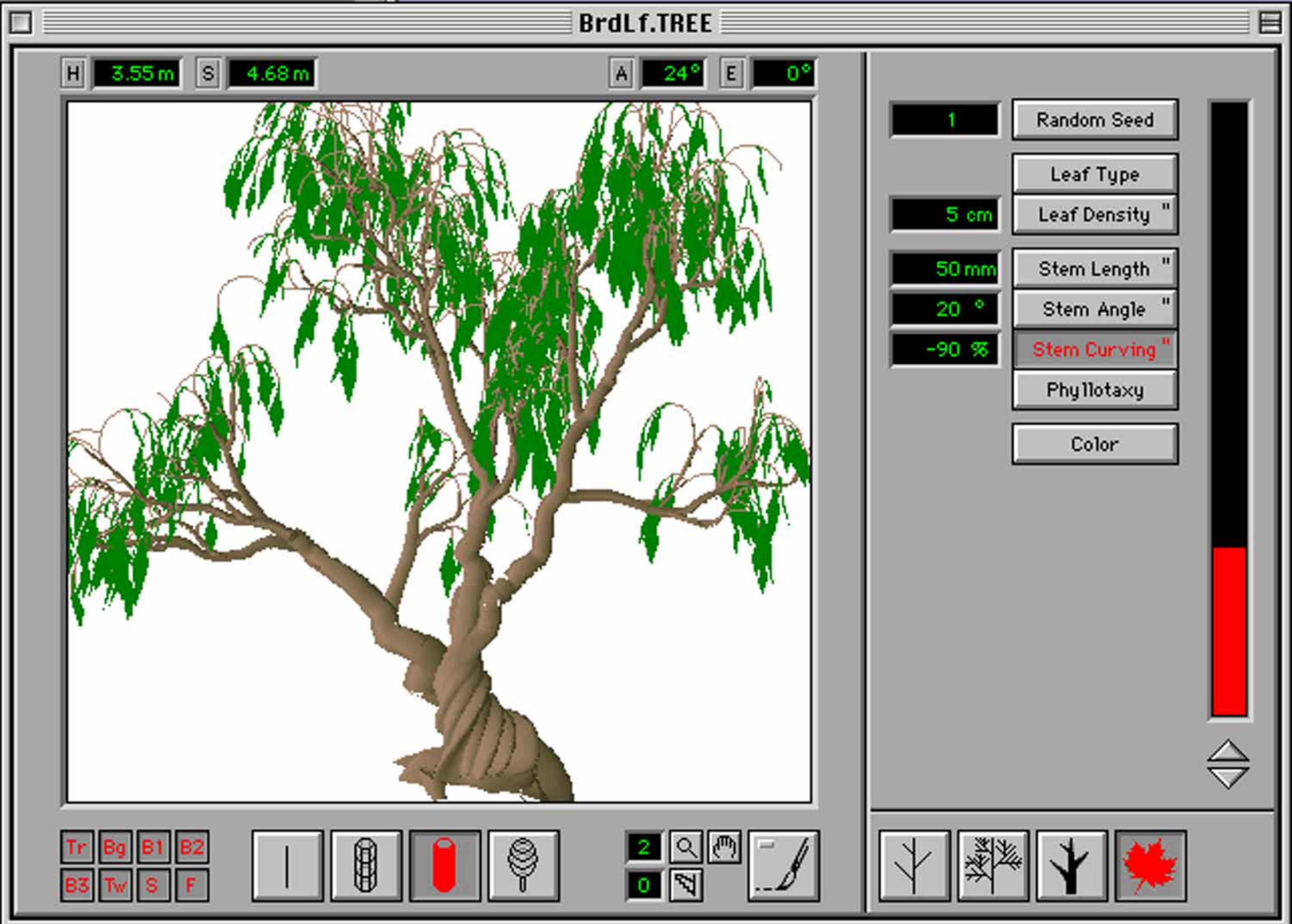
Cancel

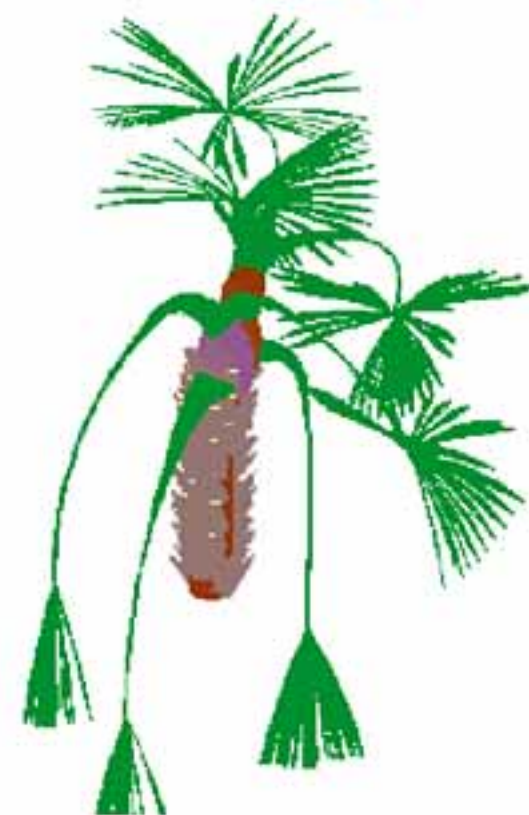
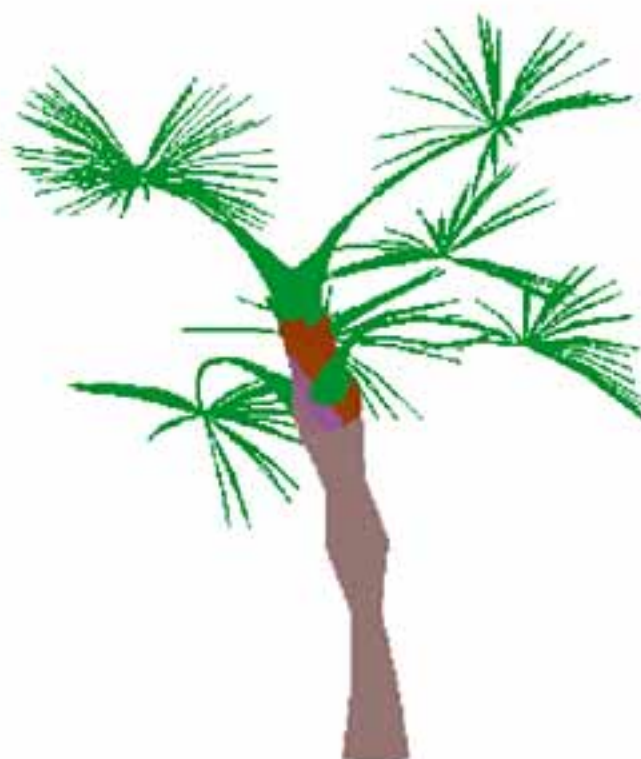
Phyllotaxy

Color

Tr	Bg	B1	B2
B3	Tw	S	F







Save Model As DXF...

Element	Complex	as PLine	as Line	L/P No.	Fraction	● Transversal, ● Curving	Resolution	More...
Trunk	☒	☐	☐	5760	9 %		6 sides 5°	
Bough	☒	☐	☐	2390	4 %		5 sides 5°	
Branch 1	☒	☐	☐	1653	3 %		3 sides 5°	
Branch 2	☒	☐	☐	3549	6 %		3 sides 5°	
Branch 3	☒	☐	☐	5895	10 %		3 sides 5°	
Twig	☒	☐	☐	24531	40 %		3 sides 5°	
Caps	☐			0	0 %			
Leaf Stem	☒	☐	☐	16864	27 %		3 sides 5°	
Foliage Reduction								
Leaf	☒			823	1 %		10 %	
Envelope	☐			0	0 %			

 Scene units  Output format

Number of Lines / Polygons: 61465
Approximate File Size in MB: 13.307

Count

Save

Cancel



