The leaf designer (LeafDS) software

The LeafDS software is used to design the leaf surface in three-dimensional space. To use the LeafDS software, double click the icon.

Figure C-72: The leafDS icon.

The main program is shown in Figure C-73. The grid 5x3 points is initialized. There are six sides of leaf, there are left side, right side, top side, bottom side, front side, and back side.

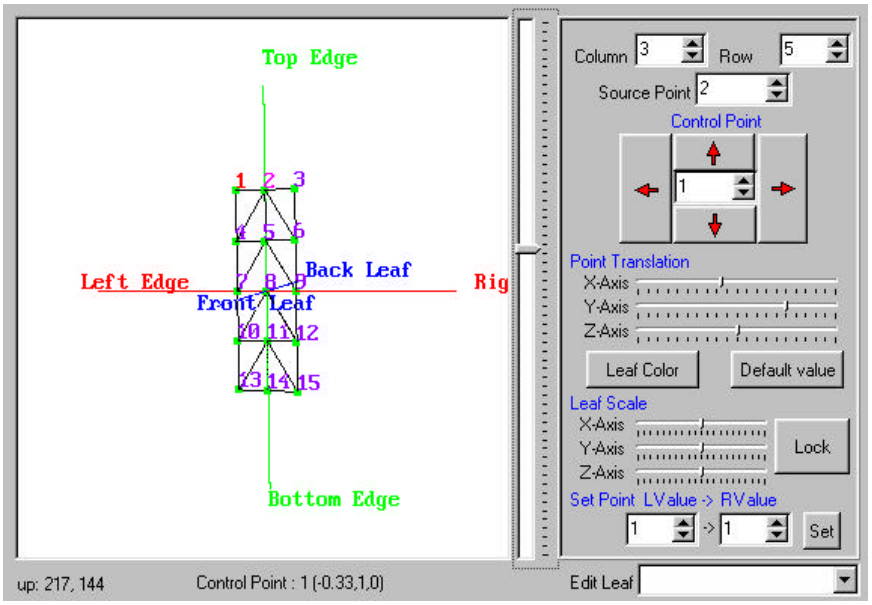

Figure C-73: The main program of LeafDS.

The control panel of the LeafDS consists is shown in Figure C-74. There are the column grid, the row grid, the source point, the control point button, the point translation, the leaf scaling, the setting point operation, the leaf color button, the default value button, the lock button, the set button, the edit leaf combo box. All component is described as follows:

1. The column grid and row grid are used to set the number of leaf grid. The default value is 5x3 points.
2. The source point is used to set the joint point to attach with the internode in the PlantVR software.
3. The control panel is used to select the control point that is controled by some operations. There are left, right, up, and down direction.

4. The point translation consists of translation on X, Y, Z axis. They are used to set the coordination of the leaf control point.
5. The leaf scaling is used to resize the leaf grid on X, Y, Z axis.
6. The setting point operation is used to set a point coordination similar to another point coordination.
7. The leaf color button is used to set the color of leaf surface.
8. The default value button is used to set the default value of control point.
9. The lock button is used to lock the grid size before designing.
10. The set button is used to set the the setting point operation.
11. The edit leaf combo box is used to select the surface from the leaf library.

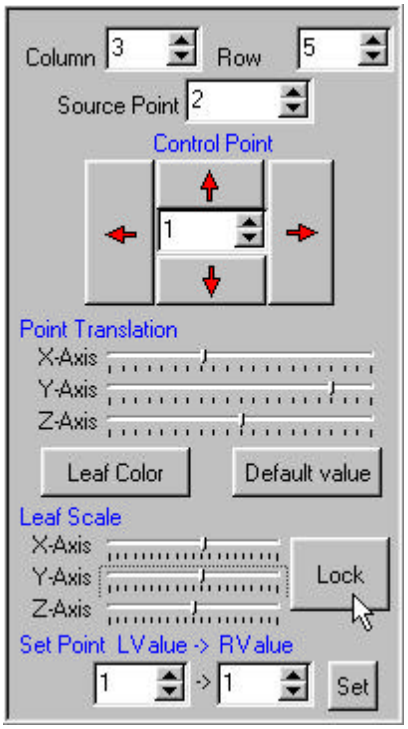

Figure C-74: The control panel of leaf designer.

To show the XYZ axis, right click on the the output view. Select the popup menu “Hide Leaf Axis” as Figure C-75. The result is shown in Figure C-76.

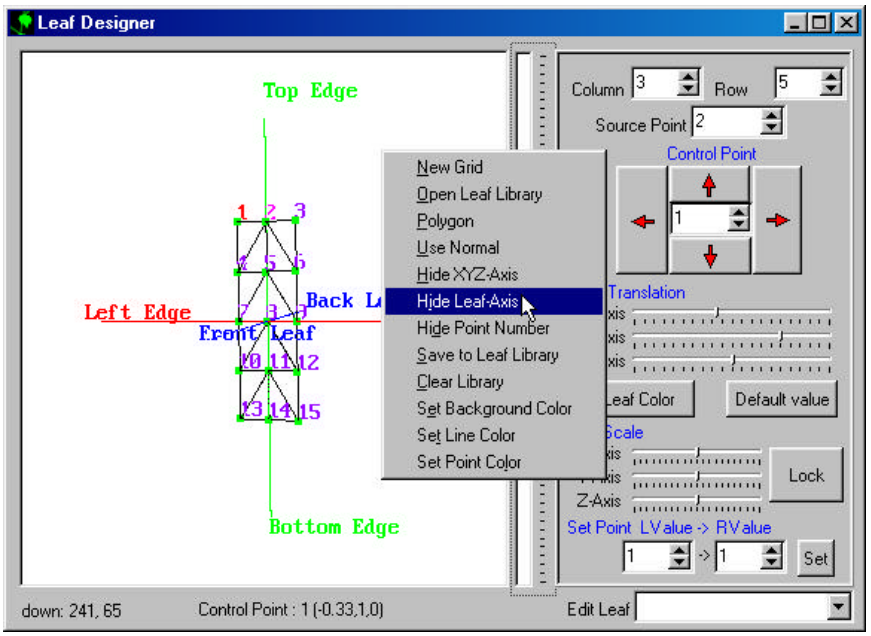

Figure C-75: Hide the leaf axis to XYZ axis.

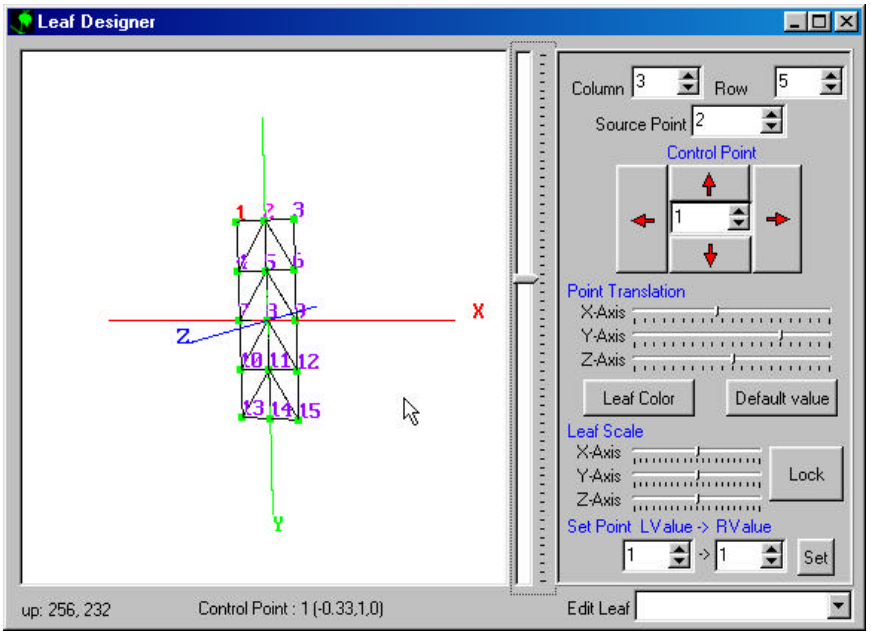

Figure C-76: The result after change the axis.

To zoom in and out the leaf structure, click the vertical trackbar as Figure C-77.

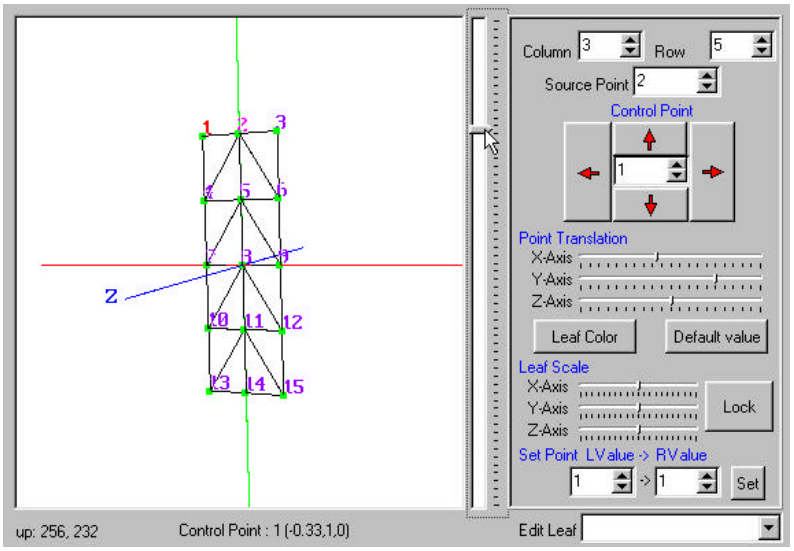

Figure C-77: Zoom in and out.

To set the grid size of the leaf, adjust the horizontal trackbar at “Leaf Scale”, adjust the X-axis to resize along X-axis as Figure C-78, adjust the Y-axis to resize along Y-axis as Figure C-79, adjust the Z-axis to resize along Z-axis. Then click “Lock” button to lock the grid size as Figure C-80.

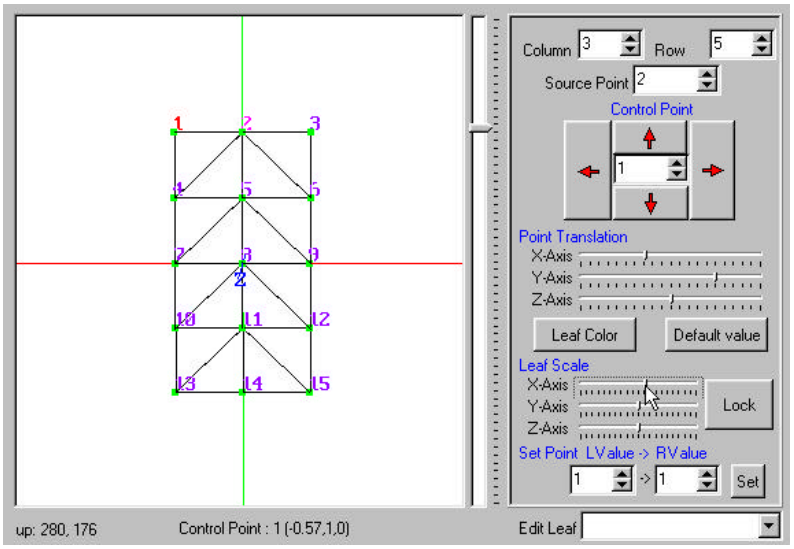

Figure C-78: Adjust X-axis to resize the leaf.

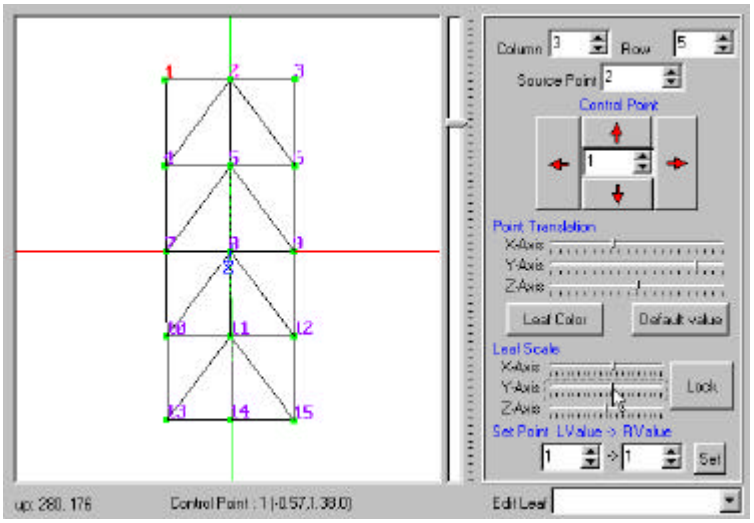

Figure C-79: Adjust Y-axis to resize the leaf.

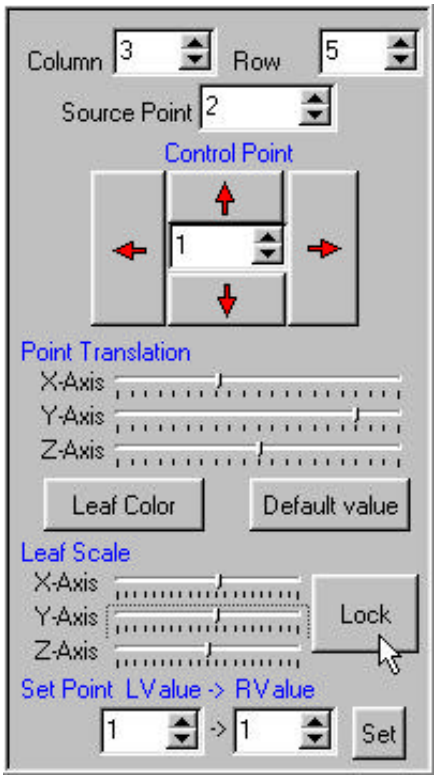

Figure C-80: Lock the grid resize.

To set the grid to the leaf shape, first, set the first point and third point similar to second point as Figure C-81 and Figure C-83. The results are shown in Figure C-82, and Figure C-84, respectively.

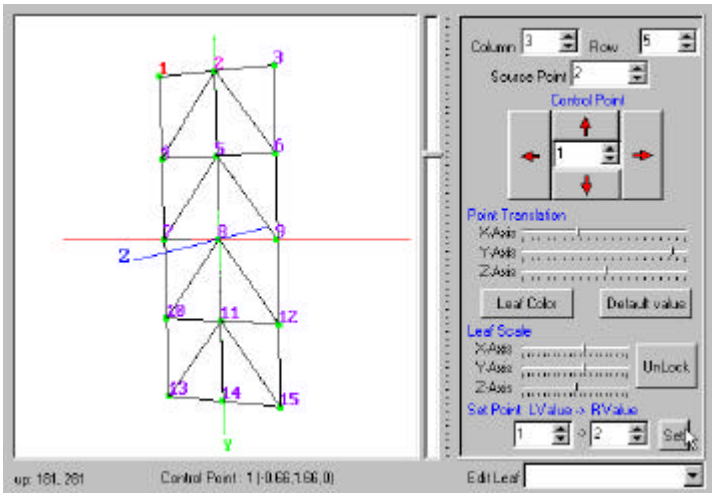

Figure C-81: Set the first point to second point.

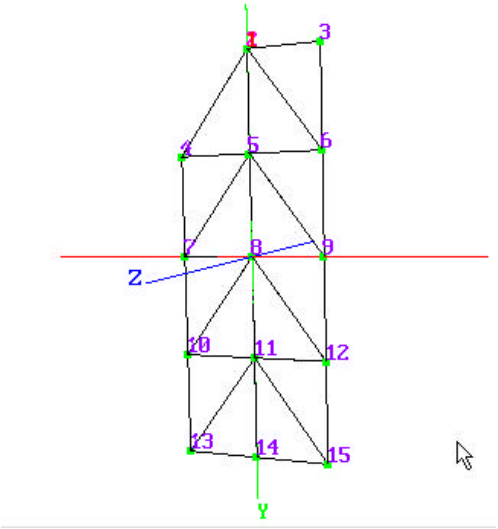

Figure C-82: The result after setting the first point to second point.

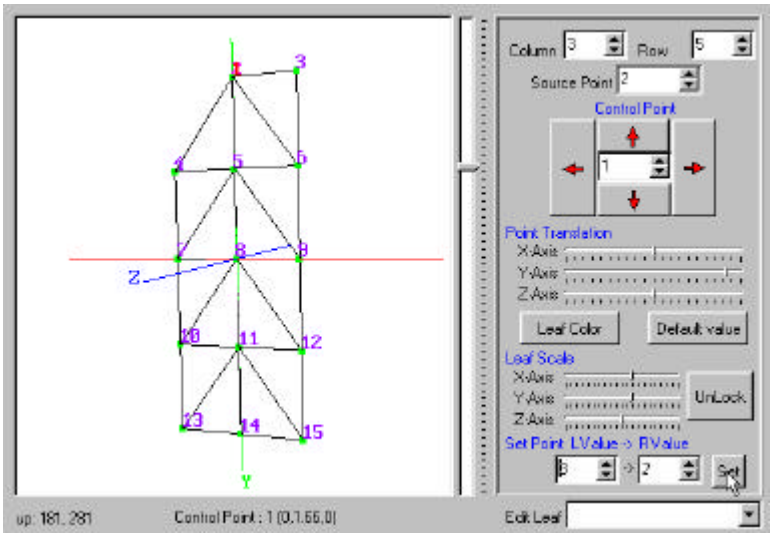

Figure C-83: Set the third point to second point.

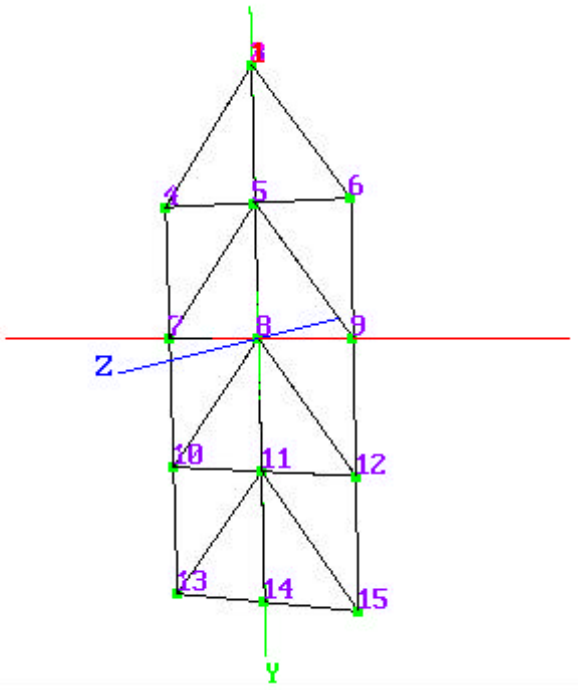

Figure C-84: The result after setting the third point to second point.

In the similar way, set the 13th point and 15th point similar to the 14th point as Figure C-85. The result is shown in Figure C-86.

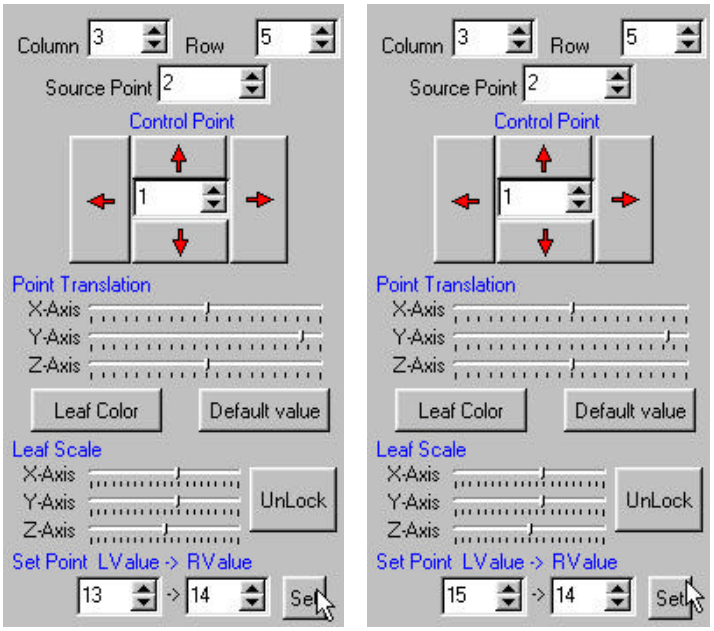

Figure C-85: Set the 13th and 15th point to 14th point.

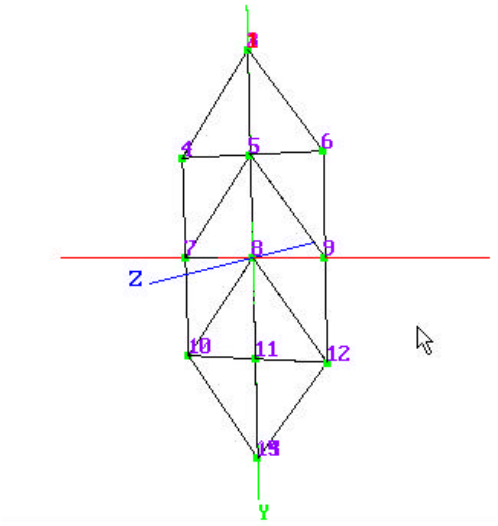

Figure C-86: The result after setting the 13th point and 15th point to 14th point.

To move the seventh point to the left direction, select the control point as Figure C-87, and adjust the “Point Translation” on X-axis trackbar to the leaf side. The result is shown in Figure C-88.

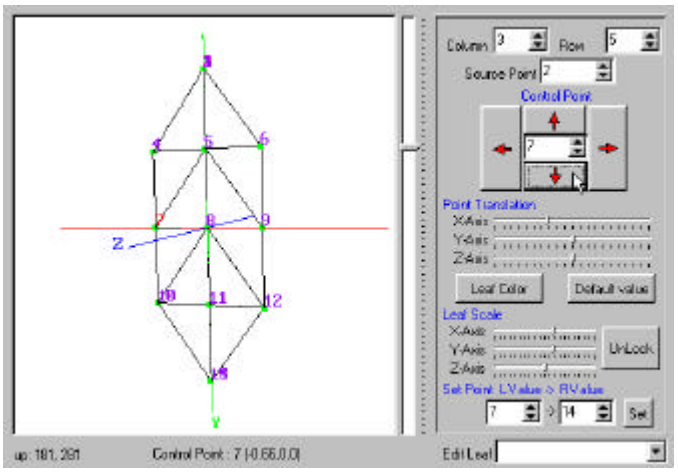

Figure C-87: Select the senventh control point.

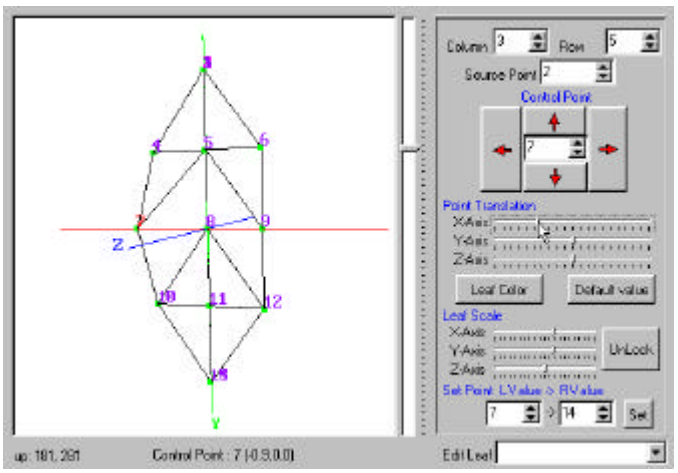

Figure C-88: Move the seventh control point.

In the same way, select the ninth point and move to the right size on the X-axis as Figure C-89.

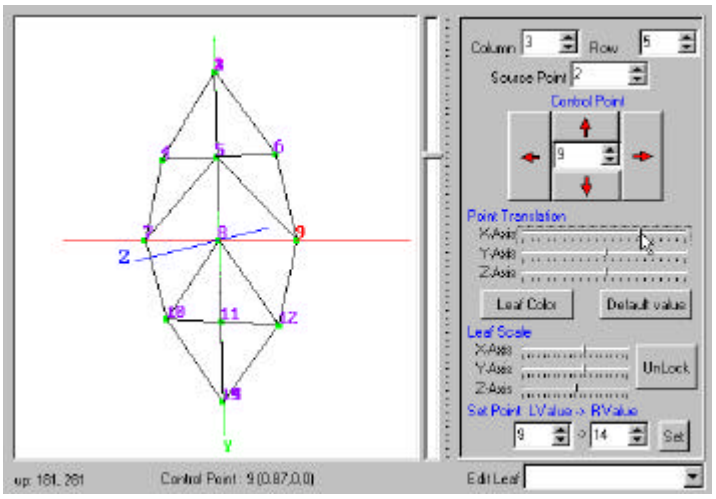

Figure C-89: Move the ninth control point.

To change the perspective view, move and drag the mouse over the output view as Figure C-90.

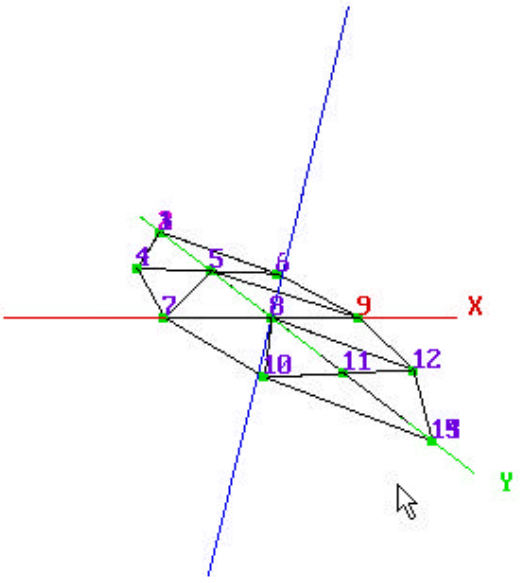

Figure C-90: New perspective view.

The leaf is now flat on the Z-axis, to set the mid rib upward, select the fifth control point and move upward as Figure C-91.

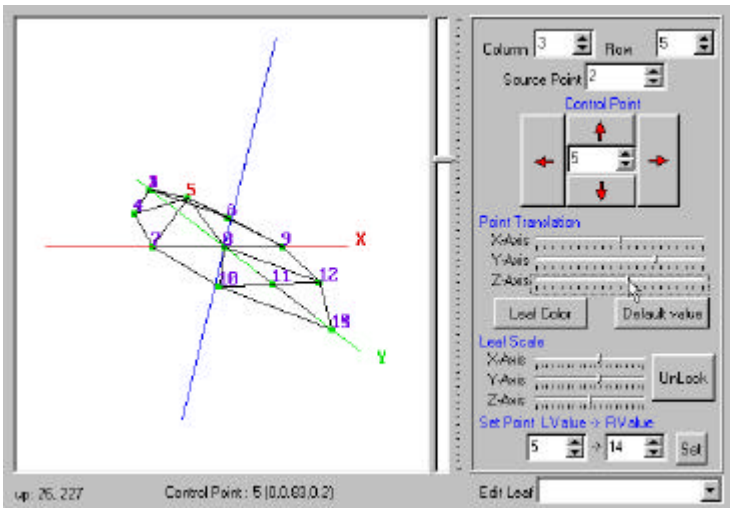

Figure C-91: Move the fifth point upward.

To move the eighth control point, select the eighth control point and adjust the trackbar to move to the appropriated position as Figure C-92.

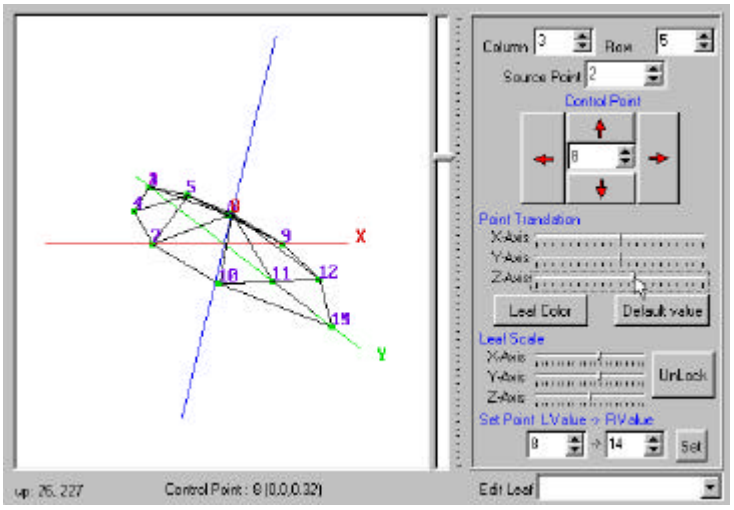

Figure C-92: Move the eighth point upward.

In the similar way, to move the 11th control point upward, select the 11th control point and adjust the trackbar on Z-axis to the right size for upwarding as Figure Figure C-93.

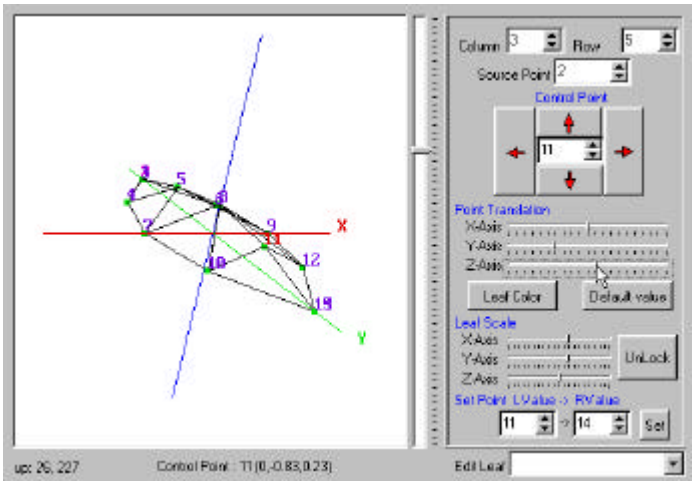

Figure C-93: Move the 11th point upward.

The result of the leaf shape is shown in Figure C-94. The fourth, sixth, seventh, ninth, 10th and 12th control points are now on the same Z value or the same plane. Setting to the perfect leaf, move these control point upward.

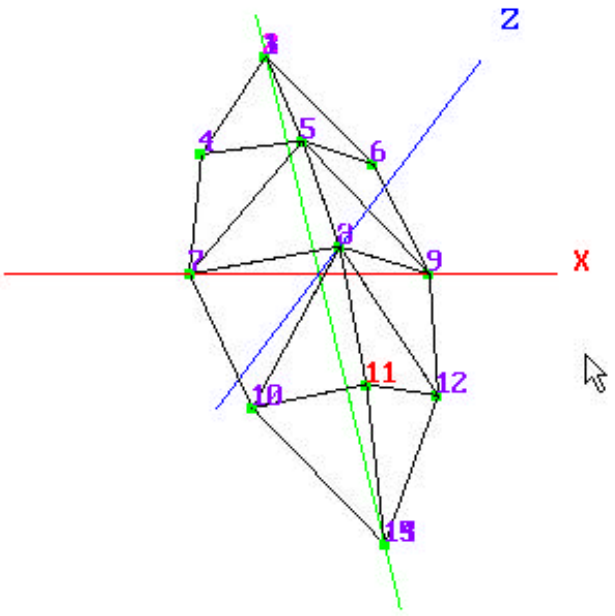

Figure C-94: The leaf shape.

The XZ-plane of leaf shape is shown in Figure C-95 and move the fourth control point upward.

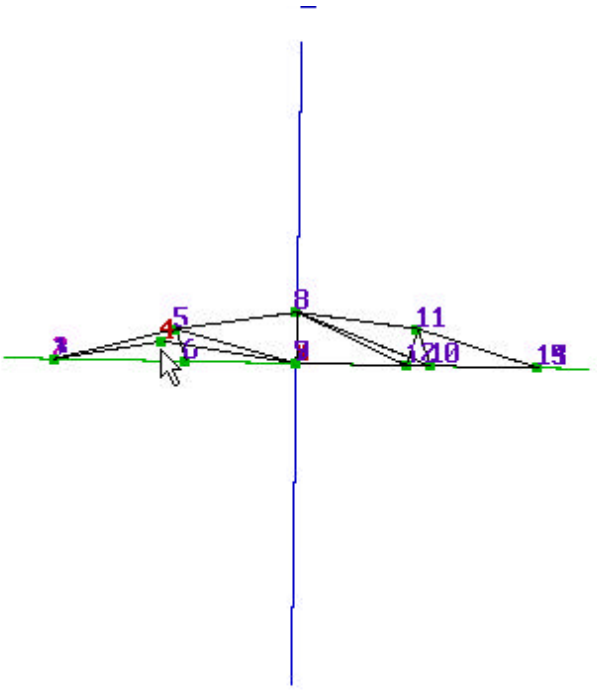

Figure C-95: The leaf shape.on XZ-plane.

Select the sixth control point and move the sixth control point to upward as Figure C-96.

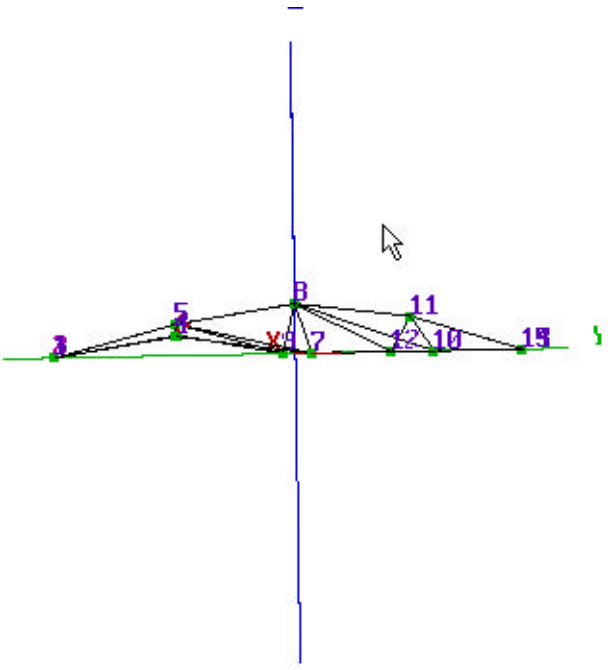

Figure C-96: Move the sixth point upwarding.

Select the seventh control point and move upward, and the same way, select the ninth control point and move upward as Figure C-97. The result is shown in Figure C-98.

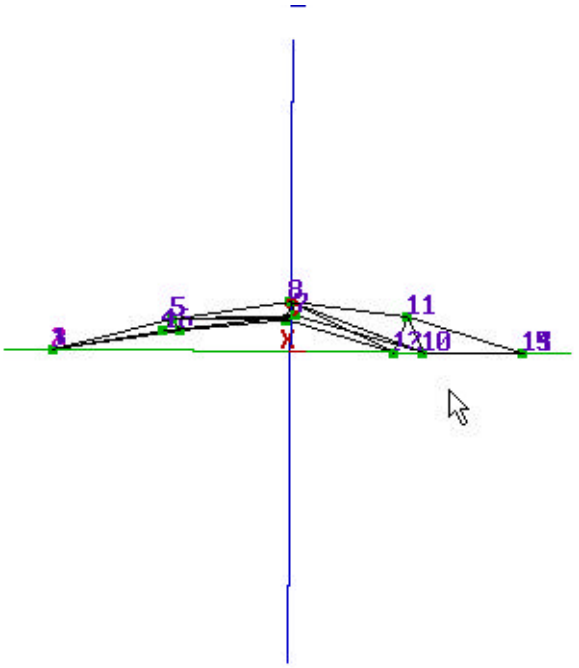

Figure C-97: Move the seventh and ninth point upward.

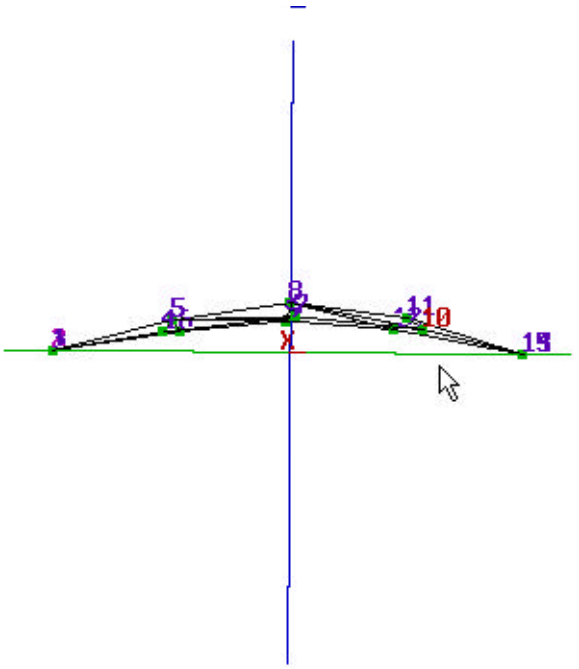

Figure C-98: The result after move upward.

The new perspective view is shown in Figure C-99.

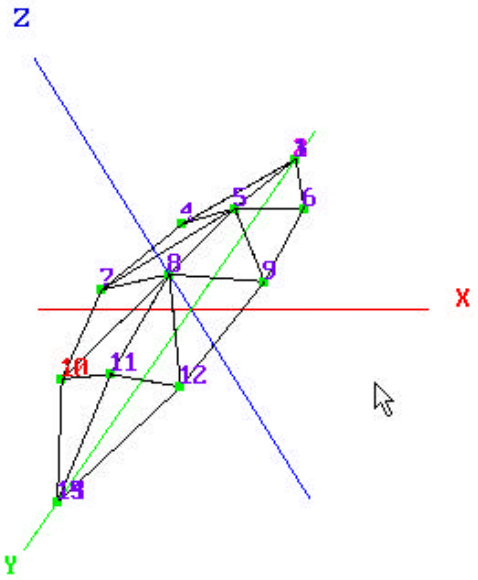

Figure C-99: The new perspective view.

To show the polygon on the leaf surface, right click on the output view and select the popup menu “Polygon” as Figure C-100. The result of the polygon is shown in Figure C-101.

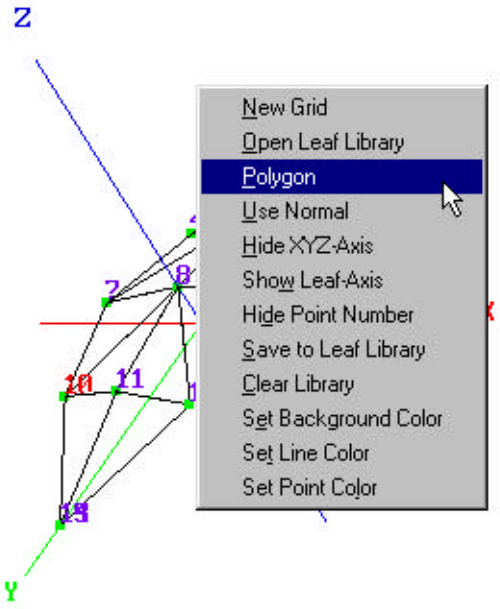

Figure C-100: Set the polygon to the leaf surface.

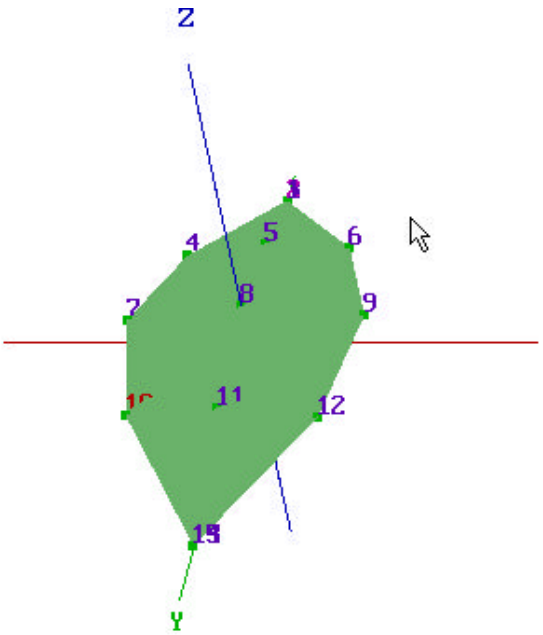

Figure C-101: The flat shading leaf using triangular rendering.

The new perspective of leaf shape is shown in Figure C-102.

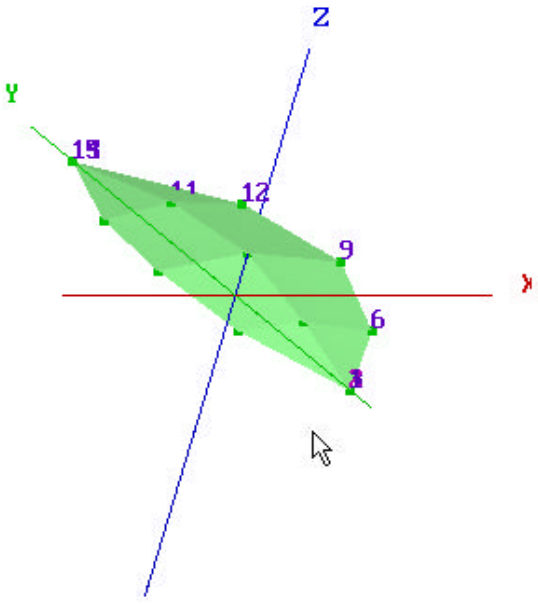

Figure C-102: The new perspective of leaf.

To hide the XYZ-axes, right click on the output view and select the popup menu “Hide XYZ-axis” as Figure C-103. The result is shown in Figure C-104.

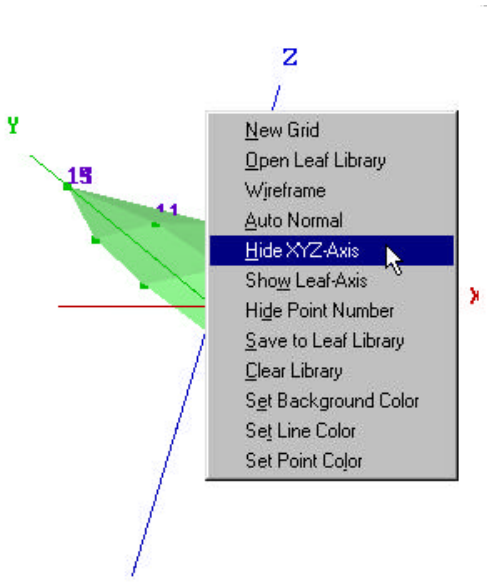

Figure C-103: Hide the XYZ-axes.

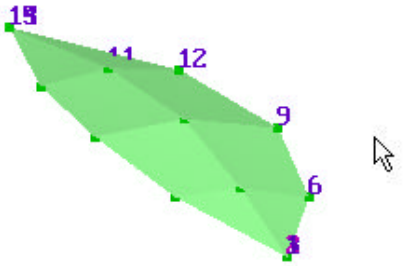

Figure C-104: The result output after hiding XYZ-axes.

To save the perfect leaf to the library file, right click on the output view and select the popup menu “Save to Leaf Library” as Figure C-105.

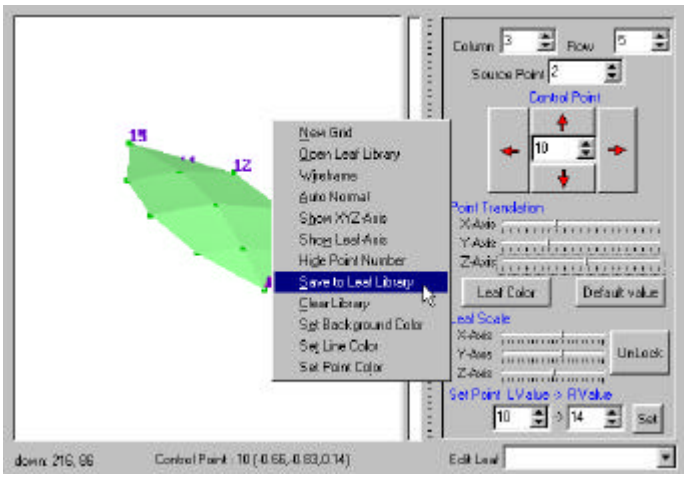

Figure C-105: Save to the leaf library.

Enter the surface type and the type name to the input box as Figure C-106, such as “Leaf, TestLeaf” for the leaf surface and the testleaf name. Enter “petal, flowerleaf” for the flower surface

Figure C-106: Input the surface type and name.

Enter the filename of the surface to the “Save As” window as Figure C-107. It is used to import to the PlantVR software.

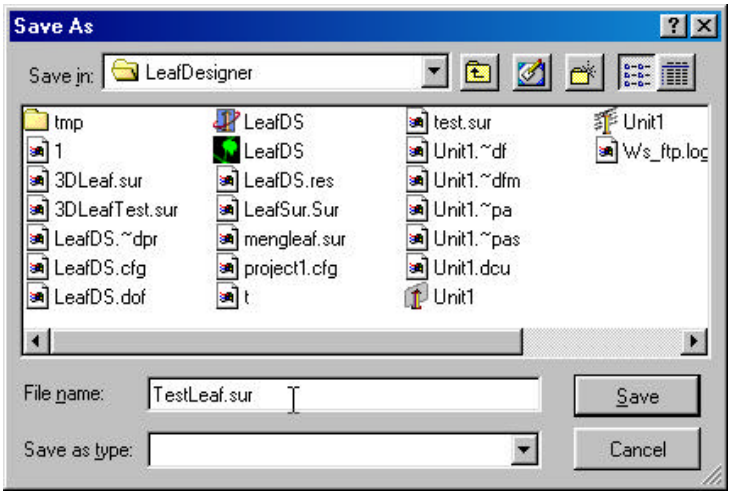

Figure C-107: Save the library name.

To create the new grid, right click on the output view and select the popup menu “New Grid” as Figure C-108.

Figure C-108: The Popup Menu.

To design the complexity of leaf shape, the grid is changed as the preferred leaf. The grid is designed for 3x3 to 11x11 points, and set or adjust the control point as the previous example leaf. For example, the grid 7x5 is used in Figure C-109.

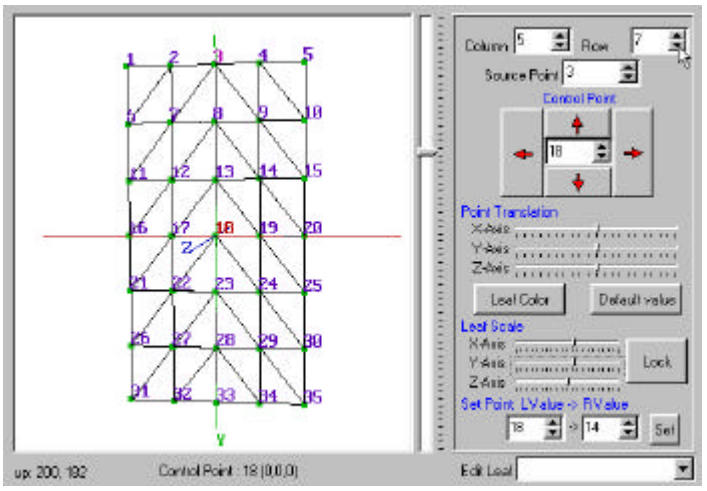

Figure C-109: The new leaf design grid.

The LeafDS is used to design the leaf and flower library, they should be stored in the same or different file.