# Cornfield
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Abstract

I wanted to create a depiction of a corn field to which various animations could be added to show the effects of the European corn borer on crop yield. I used VPython for my project. Professor George Francis took the image of a corn plant (shown below), made the black area transparent, and turned it into a targa file so I could use it as a texture. This way, I was able to apply the texture to a flat box, creating the image of a corn plant. By duplicating this box, I was able to create a cornfield of several corn plants

- This was the image that I used in my project.
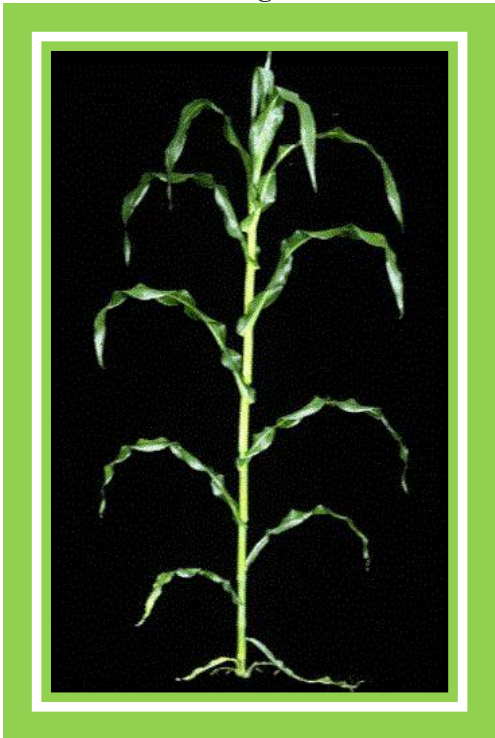
- The European Corn Borer is a major pest in Illinois. Its larva eat through the leaves and stems of corn plants causing them to fall over, or lodge, greatly reducing yield. Here is a link to a picture of the adult European Corn Borer from Iowa State University: Integrated Crop Management .
- Here is a picture of my project. As you can see, I have "planted" four rows of ten plants each. It can be found at
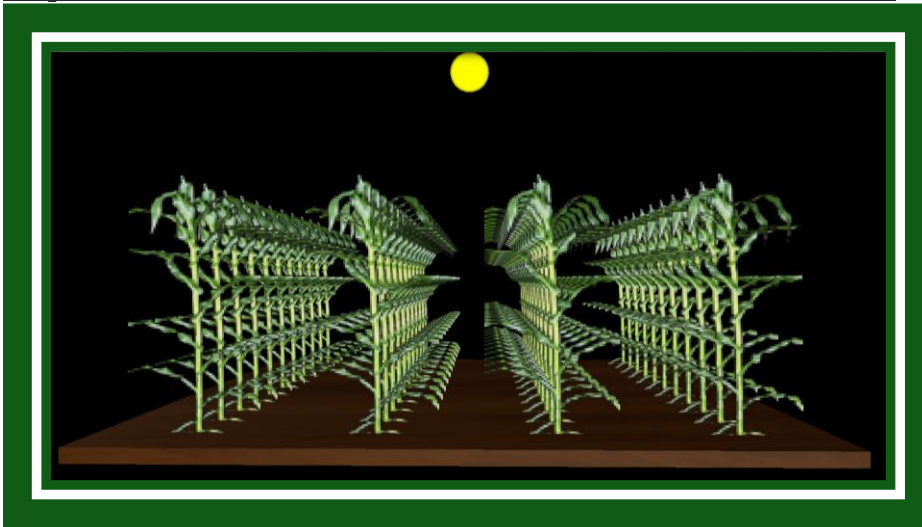
Documentation

I started out with the simple box from the bounce2.py example, as explained above. I got rid of all walls except for the floor, to act as my field. Then I started placing simple boxes onto my field with the code: box = box (pos=(4, -3, 2), length=1, height=6, width=.01, material=materials.rough, color=color.green), which created flat green rectangles standing out in my field. I also added a yellow sphere to act as a sun above the field.

At this point, to aid in which boxes were where, I renamed each box with the row number (1-4), and then a letter a-k with "a" being the plant closest to the front and "k" the farthest in the back. Professor George Francis took the image I picked for my corn plants and made the background transparent while turning it into a targa file. This enables it to be used with the python imaging library, or PIL, to create a texture, which can then be applied to an object in VPython.

I then moved my code to this program with the targa file texture so I could apply the texture to my simple green rectangles that were acting as corn plants. I tried just applying the texture, but it would not work. Instead of a picture of a corn plant, the image was made up of blurry horizontal lines, not even remotely resembling the original picture. I edited my code to more match the code Professor Francis had used so it now looked like this: row3a = box (axis=(0,0,1), up=(0,-1,0), size=(0.05,18,9), material=tex). Now I had a corn plant, but it was immovable. The only movement I could accomplish was inverting the image or turning along a plane while maintaining the same central position.

Finally, I realized that I would have to add a position factor to each plant so I could change where they appeared on the field. My code now looked like this: row3a =

box (pos=(6,-3,20), axis=(0,0,1), up=(0,-1,0), size=(0.05,18,9), material=tex). Using this code, I created the rest of my field, only changing the name and the position of each so each plant was the same size and shape, just merely in a different position. After this, I edited the color of the floor wall to a brown color, to act as the field dirt.

Future Goals/Edits

I would like to add animations to this project. I originally wanted to have one half of the field, the non-biotech part, fall over when the field was invaded by European corn borers, while the other half, the biotech half, would remain standing. Also, I would like the sun to rise and set while the animation on the field plays.