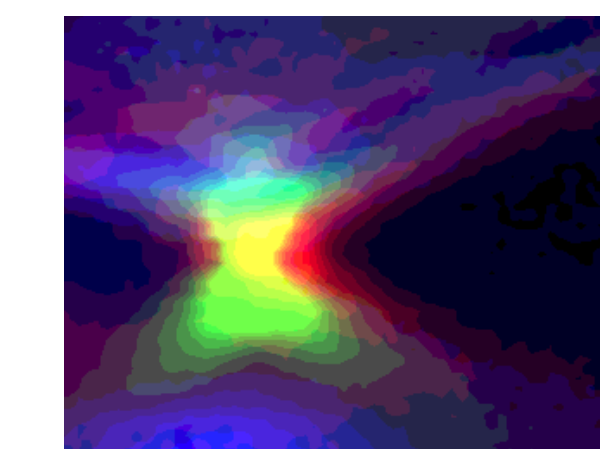


IRON WOMEN WORK ON ELEVATED CO₂

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Bio-Imaging Camp
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GIRLS
ADVENTURES IN
MATHEMATICS,
ENGINEERING
AND
SCIENCE



INTRODUCTION AND OBJECTIVE

We did this experiment to find out if plants will survive in elevated CO₂ levels.

To complete this, we looked at the cell structure, specifically the chloroplasts and mitochondria.

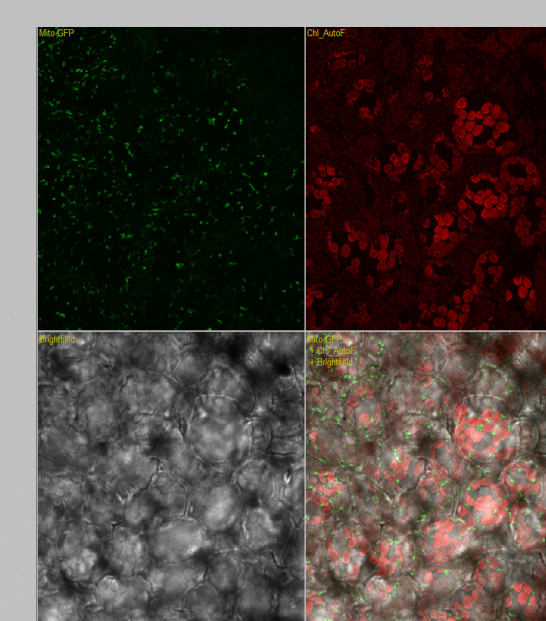
Our hypothesis was if plants were grown in an elevated CO₂ environment, then the area occupied by the mitochondria and chloroplasts will increase, because there will be more CO₂ to take in and use in photosynthesis.

MATERIALS AND METHODS

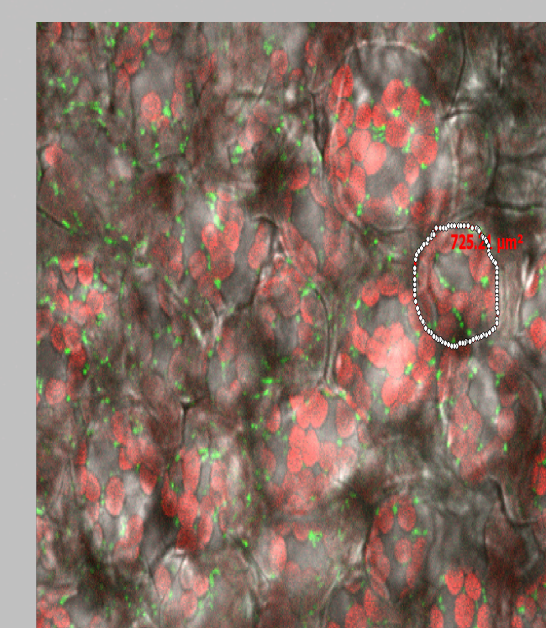
- Dissecting Microscope- To get leaf sample
- IGB Fluorescence - Take pictures of chloroplasts and mitochondria, 488 nanometers for exciting GFP and chloroplasts, 520 nanometers for GFP emission, 650 nanometers for chloroplasts
- Axiovision- Analyze 2D data
- Confocal Microscope- Get a 3D image of cell
- Imaris- Edit 3D image

RESULTS

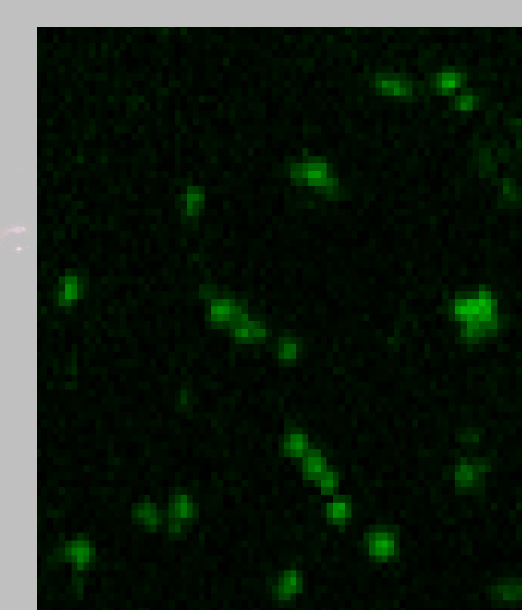
Positions/ Sample	Mitochondria Area (μm ²)	Chloroplast Area (μm ²)	Cell Area (μm ²)	Mitochondria/Cell %	Chloroplast/ Cell %
Ambient CO ₂					
Pos-1	1.88E+02	1.17E+01	725.21	2.59E+01	1.62E+00
Pos-2	1.95E+01	6.04E+01	1341.07	1.45E+00	4.51E+00
Pos-3	2.82E+01	27.24597	1831.91	1.54E+00	1.49E+00
Mean	7.86E+01	3.31E+01		9.64E+00	2.54E+00
Elevated CO ₂					
Pos-1	1.55E+01	1.15E+00	2343.15	6.63E-01	4.90E-02
Pos-2	4.54E+00	5.62E+00	2258.8	2.01E-01	2.49E-01
Pos-3	5.02E+00	400.598	1272.21	3.94E-01	3.15E+01
Mean	8.36E+00	1.36E+02		4.19E-01	1.06E+01



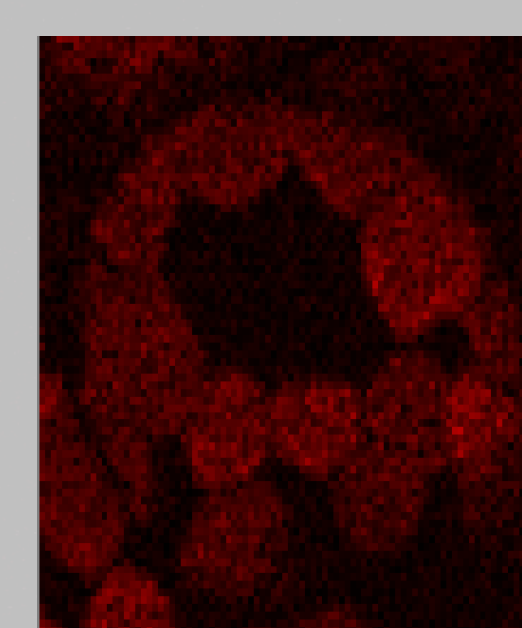
Gallery View



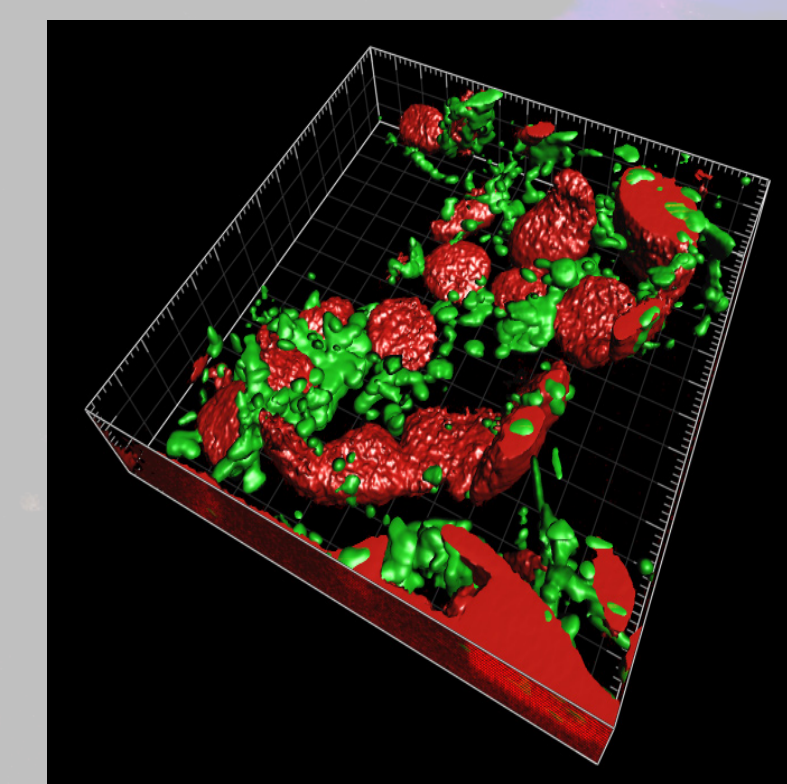
Brightfield Channel



Mitochondria Channel



Chloroplast Channel



3-D View

DISCUSSION AND CONCLUSION

The mitochondria/cell percentage was 9.64 in the ambient CO₂ sample and 0.419 in the elevated CO₂ sample. Based on these results we can conclude that the first part of our hypothesis was incorrect, and elevated CO₂ levels decrease the amount of mitochondria in the cell.

The chloroplast/cell percentage in the ambient CO₂ sample was 2.54 and in the elevated CO₂ sample it was 10.6. This tells us that the second part of our hypothesis was correct, and the elevated CO₂ levels increase the chloroplast count in an average plant cell. However, due to the small number of samples we had, more would have to be tested to have an accurate conclusion.

ACKNOWLEDGEMENTS

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