



# The Effects of Water Pollution on Algae in Black Rock

## Forest and Central Park

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### Abstract

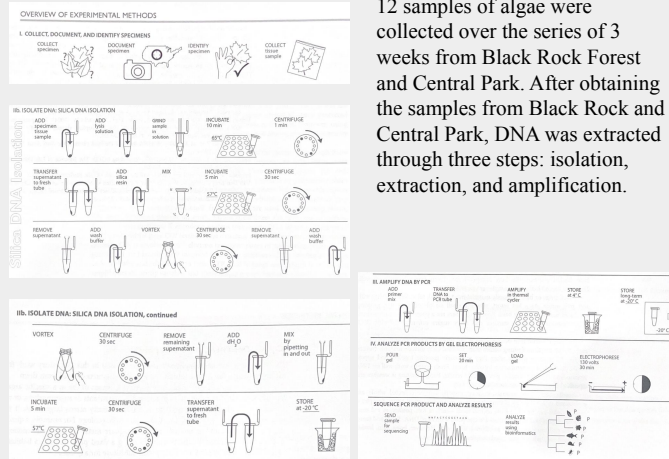
DNA mutations can be caused by environmental factors such as pollution. Thus, we hypothesized that algae samples collected in Black Rock Forest will have fewer DNA mutations than those of Central Park, given Central Park's close proximity to New York City and thus pollution. Samples were collected and DNA was isolated, extracted, and amplified. Unfortunately, our gel electrophoresis did not show defined bands, meaning we were unable to send our samples to be analyzed. This experiment did not return any meaningful results.

### Introduction

We are testing both water and algae in Black Rock Forest and Central Park as it is an indicator of water quality. Algae is highly correlated to nutrients in its environment such as phosphorus and nitrogen. Moreover the plant grows rapidly, providing a continuous new stream of the organism, and making it easy to collect at almost any time. Algae is also sensitive to outside factors, meaning its change is parallel to environmental ones. For all these reasons algae is being used to compare pollution in Central Park and Black Rock Forest (*Algae Can Function*, n.d.).

Therefore, we wanted to examine the effects of Central Park compared to Black Rock Forest, given their varied surroundings. Our question was: does pollution affect genetic mutations in the DNA of algae? We hypothesized that Central Park's algae would have a greater frequency of mutations compared to Black Rock Forest, given Central Park's higher level of pollution from New York City.

### Methods



12 samples of algae were collected over the series of 3 weeks from Black Rock Forest and Central Park. After obtaining the samples from Black Rock and Central Park, DNA was extracted through three steps: isolation, extraction, and amplification.

### Results

Gel electrophoresis results. No defined bands of DNA (aside from the ladder) were visible.



### Results

	Water from Central Park	Water Black Rock Forest (Trial 1)	Water Black Rock Forest (Trial 2)
pH value	6.0	6.0	6.0
Hardness	25	25	25
Zinc	5	0	5
Alkalinity	80	0	0
Nitrate	0	0	0
Nitrite	0	0	0
Sulfate	200	0	200
Harmful Bacteria	Yes	No	No

Table 1: Water Testing Results from Black Rock Forest vs. Central Park

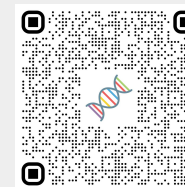
No other results were obtained in this experiment due to undefined gel electrophoresis bands.

### Discussion

The purpose of this experiment was to determine if water pollution affects DNA mutations in algae. Out of our 12 samples collected from Black Rock Forest and Central Park, unfortunately none bore visible gel electrophoresis results. This resulted in the inability to sequence the genetic material collected and therefore our experiment had no results. This is most likely the result of two reasons. The first being that our group paused for significant periods of time in between each method. The samples were stored in the fridge in their natural water for the months between collection and extraction which could have resulted in the degradation of material. Then the isolation, extraction, and amplification protocols were not executed in one class period, pausing in between steps by placing the samples in the fridge or freezer. This could have resulted in the degradation of materials as well. Our water pollution results indicate that the Central Park algae was living in harmful bacteria. Based on these results, it could be inferred that the Central Park algal DNA may have been mutated by the harmful bacteria, although we do not have further evidence to support this.

If this experiment were to be repeated, the protocol would be monitored to ensure the correct preservation of materials in order to produce results.

### References



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