Comparing Lichen Growth on Trees Near a Well-Traveled Road to Lichen Growth on Trees in a Park

Lichen Growth is Greater on Trees Near the Road than Trees in a Heavily Wooded Area

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INTRODUCTION

Lichens are composed of a symbiotic relationship between an alga and a fungus and live on everything from wood to soil to rocks. Although lichens are organisms that grow most everywhere, they do still require certain conditions to grow well. Distance from the road can affect many of these environmental factors, such as air quality and composition. Lichen can be used to determine degree to which the environment is polluted due to their sensitivity to the amount of airborne nitrogen and sulfur (Conti, Cecchetti, 2001).

This experiment tested if distance from the road affected the growth of *Canoparmelia texana* on the bark of trees by North Parkway and 500 meters from the road. From previous experiments, it can be surmised that there is a indirect correlation between the distance from the road and the growth of lichen, in that as you travel further into the park, there would be an increase in the growth of lichen found on trees (Brown & Beckett 1984). Based on this information, we hypothesized that the growth of lichen on the roadside will be less than the growth of lichen 500 meters into the park. The null hypothesis would be that the growth of lichen is unaffected by the distance from the road.

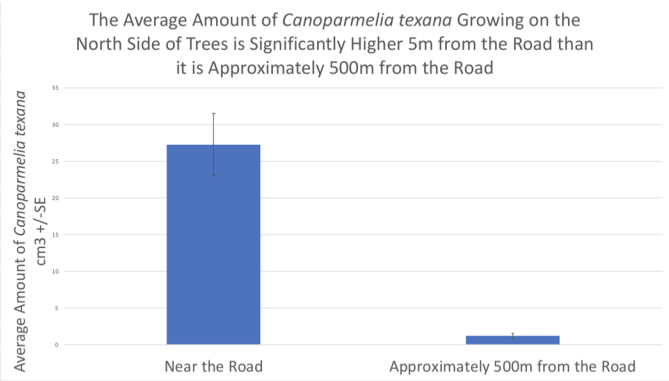
METHODS

Trees were categorized into either roadside or forrest conditions depending on their location. Roadside trees were generally up to three meters away from an active road while those in the forest condition were typically isolated at least thirty meters away from any active road. During a sunny day with mild weather, the amount of lichen on twenty five trees was recorded for each condition, totaling fifty trees. Measurement only took place on the side of the tree facing north at around 5-6 feet from the ground. The amount of lichen recorded was determined by the number of areas on a gridded sheet lichen was observed to be present. The gridded sheet was transparent with 1 inch X 1 inch squares drawn on it.

Using SPSS, an independent t-test was then run on the two sets of data in order to determine whether the sets were statistically different and to investigate possible correlations between the different environmental conditions and the amount of lichen observed

Figure 2 – The figure to the right shows the average amount of *Canoparmelia texana* growing on trees – This graph shows that on average, lichen growth was greater on trees near the busy road. Standard error bars represent the margin of error that may have been encountered and are represented on the graph by the lines above and below the bars.

Figure 1 – Two trees showing *Canoparmelia texana* growth: one near the road and one 500m into the forest – The tree depicted on the left, one of 25 measured near the road, shows significant lichen growth. The tree on shown on the right, one of 25 measured in the park, shows little to no lichen growth.



RESULTS

We found that there was significantly more lichen growth next to the road than in the middle of the heavily wooded park. Trees near road had significantly more lichen with a P-value of 0.000 (Figure 2). Figure 1 gives a visual representation of a typical lichen sample near the road and in the forest.

DISCUSSION

We hypothesized that *Canoparmelia texana* growth would increase directly with distance from the road. Our results showed that the trees near the road had a significant amount of lichen, where those 500m into the forest did not (Figure 1). Therefore, the results did not support our hypothesis.

Our results did not agree with Conti (Conti, Cecchetti, 2001) in that our experiment showed an indirect correlation between lichen growth and distance from a polluted environment, where theirs showed a direct correlation. The fact that our results deviated so much from previous experiments could be due to the fact that the trees farther from the road were also somewhat shaded because taller trees provided an umbrella. In the future, we would probably try to find trees farther removed from the road but with access to direct sunlight, which is important for lichen growth.

CONCLUSION

-The amount of lichen growing on trees within the park was significantly less than the amount growing near the busy road.
-It's possible that lichen grew less in the park because the canopy of trees blocked light from the trunks of the trees.

LITERATURE CITED

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