Lichen Study Final Report

Field Ecology

This report is an individual assignment. It should be written in the PAST TENSE (because you will be completing this report after your project is complete). When you are done, submit your work through Showbie.

Introduction:
This section of your report consists of a description of our class question along with background information about your project.

In one paragraph, explain the "What is the Relationship Between" question that we were trying to answer with our study. Add some supporting details to clarify the purpose of your proposed question.

In another paragraph, summarize the information you've learned about lichens. This will come largely from the "Lichen Questions" and "Lichen Bioindicator Activity" assignments.

In a third paragraph, explain what you think the answer to our question might be and describe why you think your hypothesis is correct.

Methods:
This section of your report will describe how we collected your data. Your methods should take the form of two step-by-step lists. The first list should describe where we collected the lichens and how we chose those locations (given the potential air quality in each location). The second list should describe what we measured about lichens and how we measured them – specifically, you should discuss the measurements and calculations we made in order to determine the tolerance ratings for each of the lichen collections we made.

Make sure that your instructions are clear, detailed, and describe the actual steps you took to make your measurements.

Results:
This section of your report will describe the information we found and should include data tables (NOT graphs!) that summarize the measurements and calculations you made.

This section should include a data table showing the lichen tolerance ratings for each stick we collected as a class. There should also be a summary data table showing the average lichen tolerance ratings for "Near" and "Far" sites.

You might also include other data tables as you see fir.

This section of your report should also include a paragraph or two that verbally describes the data we collected (see below for an example).

Discussion:
In this section of your report, you will use our data to answer our question. This section will include graphs that show the trends in your data along with your interpretation of those graphs and an overall critique of your study.

You will need to have at least one graph showing your results – an x-y scatterplot that compares distance from the road to the lichen tolerance rating for all the sticks collected by the class. **You will need to use a numeric code for "Near" and "Far"** as scatterplots don't work with words (use the number 0 for "Near" and the number 1 for "Far". You might also include a bar graph comparing the average tolerance rating of "Near" sites to "Far" sites.

For your written analysis, answer the following questions (in paragraph form) for your graphs:

1. What was the correlation that our data shows – positive (up and to the right); negative (down and to the right); or none (horizontal line)?
2. What does this correlation tell you about the answer to your question?
3. What is the R^2 for your scatterplot and what does this tell you?
4. What ecological factors do you think might have influenced the correlation (or lack thereof) that you see?

Your response to these questions should be about one paragraph each.

Here is an example of what your final report might look like (keep in mind that this example is for a different question than we asked):

Lichen Study Final Report – Mr. Bregar

Introduction:
The question I asked for my study was "What is the relationship between the types of lichens and the height of the trees that they grow on?" My goal was to collect data to determine if different types of lichens tend to grow on different sizes of trees. I decided to focus on three tree species that I was able to identify, and I collected data about seven different types of lichens.

There are certain lichen species that are sensitive to specific air quality parameters. For example, some species can survive with higher atmospheric nitrogen levels than others. I found that many species are affected by this and are unable to survive. Lichens are also influenced by rainfall patterns and sun intensity. Because of these interactions, I believe that there is a possibility that different tree heights might also have an impact on lichens.

My hypothesis is that I will see different amounts of abundance of lichen species on the different sizes of trees. This might be because lichens are influenced by sun intensity – in different types of trees, the lichens would be exposed to different amounts of sunlight because of leaf area and branching patterns. If my hypothesis is correct, more lichens will be found on taller trees, where they are exposed to more rain and sunlight than the smaller trees they surround.

Methods:
Tree height –

1. We made a 6 foot measuring rod by cutting a 1" x 1" piece of wood to size.
2. For each tree, we measured the height of the tree up to 12 feet by using our measuring rod.
3. For trees taller than 12 feet, we estimated the additional height by having one person stand 25 feet away from the tree while the other person held the measuring rod up to a height of 12 feet.

Lichen Sampling –

1. We selected 3 mature trees of each species for our samples and marked each tree for later identification. We picked one small tree, one medium-sized tree, and one large tree. Each tree was located in an area with similar amounts of shade and sun exposure.
2. At each selected tree, we tied a string around the trunk at a height of 6 feet from the ground.
3. We counted each lichen species that we could find on the tree trunk below the string and noted the abundance of that species (we counted each separate lichen patch as a unique individual). We recorded the total number of species that we found.

On each day of data collection, we picked different trees to study. That way, we were able to combine our data for the two days in order to create a third data table.

Results:

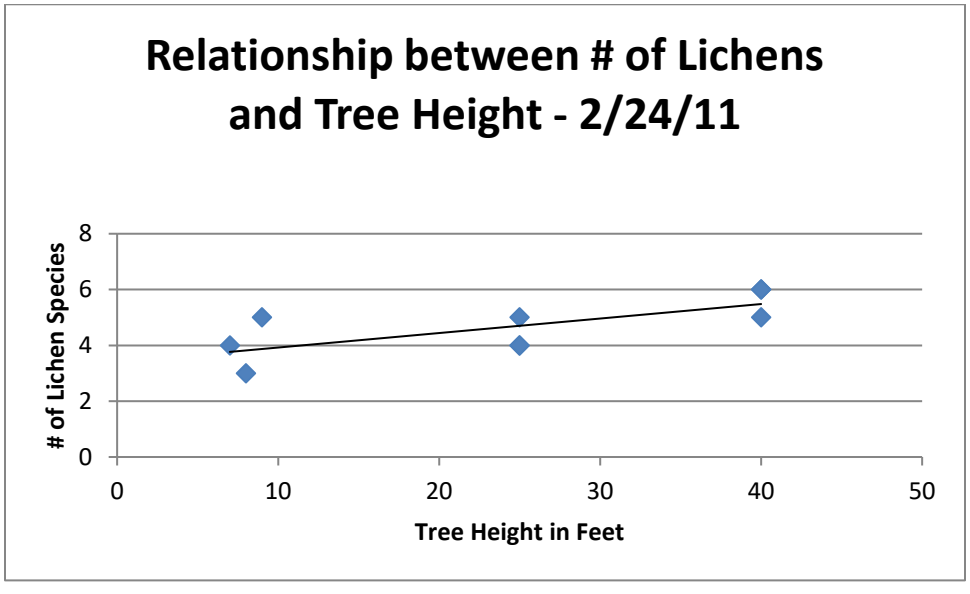
The tables below show the results we found on the two days of data collection.

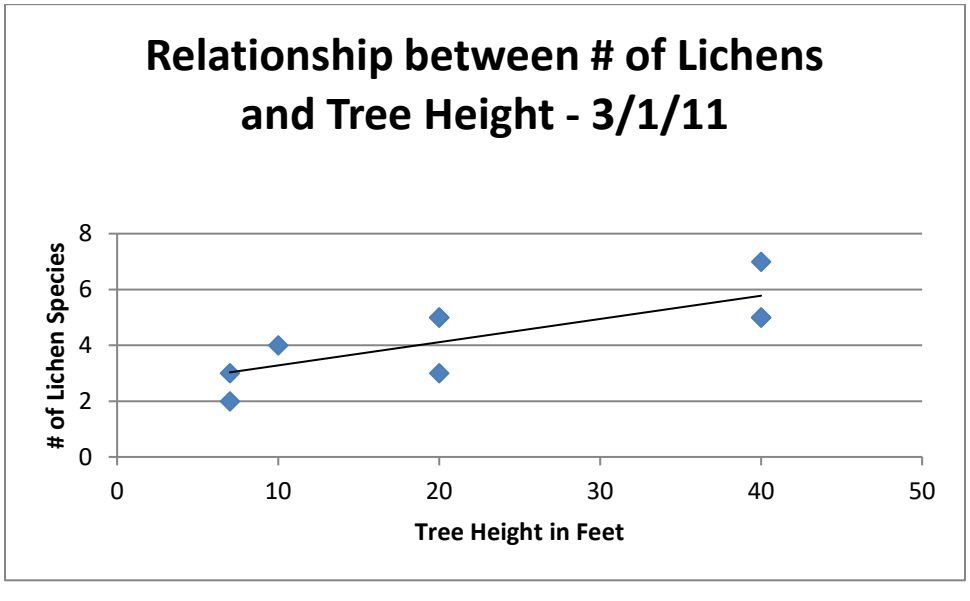
Date	Tree Species	Tree Height (Feet)	# of Lichen Species
2/24/2011	Garry Oak	25	5
2/24/2011	White Alder	25	4
2/24/2011	Oregon Ash	25	4
2/24/2011	Garry Oak	7	4
2/24/2011	White Alder	9	5
2/24/2011	Oregon Ash	8	3
2/24/2011	Garry Oak	40	5
2/24/2011	White Alder	40	6
2/24/2011	Oregon Ash	40	6

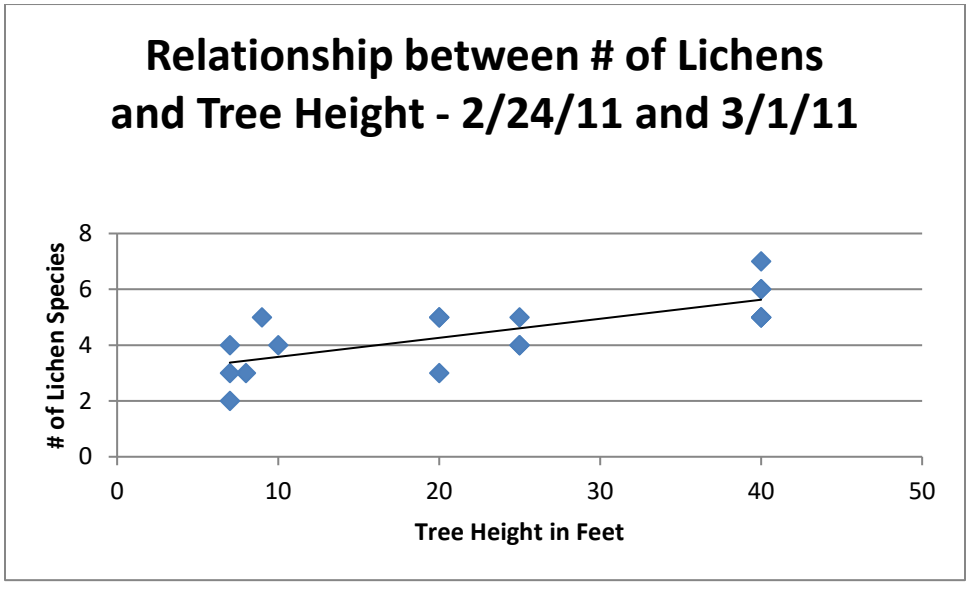
Date	Tree Species	Tree Height (Feet)	# of Lichen Species
3/1/2011	Garry Oak	20	3
3/1/2011	White Alder	20	5
3/1/2011	Oregon Ash	20	5
3/1/2011	Garry Oak	10	4
3/1/2011	White Alder	7	3
3/1/2011	Oregon Ash	7	2
3/1/2011	Garry Oak	40	5
3/1/2011	White Alder	40	7
3/1/2011	Oregon Ash	40	5

For trees taller than 12 feet, we estimated their height, which is why all the medium-sized trees and all the large trees have the same height. We only found one tree with all seven species on it – a 40 foot White Alder. In general, the most abundant species we found were *Usnea s.* and *Ramalina f.*, although in certain spots *Ramalina m.* and *Parmelia* were also quite abundant.

Discussion:
We graphed our data using x-y scatterplots. We created three graphs – one for each day of data collection and one for both days combined. The graphs are shown below.







All three of our graphs show a positive correlation, telling us that as the height of the trees we looked at increased, the number of lichen species we found increased as well. We believe that this supports our hypothesis and we think that the increased sunlight and water could possibly contribute to the increased diversity of species on taller trees. It is also possible that air quality played a role, although we are doubtful that there would be a significant different in the quality or air over a height difference of 20-30 feet. However, more research and testing would be necessary in order to be sure.