

Destination Density: Brazilian Pepper Plant Fruit Density

Evans, Alexander; Kim, Jake; Marshall, Christopher; Meneses, Alexandria; Sydow, Rachel

ABSTRACT

- BPP occupies more than 700,000 acres in Central and South Florida (Florida Fish and Wildlife Conservation Commission).
- Transforming our environment into a combustible forest.
- The nonnative species are forming forests that eliminate all other plants life by outgrowing an impenetrable field of their own.
- Causes human allergic skin reactions.
- We focused on the allelopathy, the main harassing effects of the Brazilian Pepper Plant on other native plants.

PROJECT DESCRIPTION

Throughout the spring 2016 semester our team of Embry Riddle students has conducted 3 field days at the Spruce Creek Park, located in New Smyrna Beach, Florida. During those field days, the tasks were executed in the following order:

- Search the forest for Brazilian Pepper Tree
- Measure circumference of the trunk
- Record coordinates of the tree
- Mark the perimeter around the tree (1 square meter)
- Conduct a count of the plant's seeds inside the perimeter
- Record all other plants growing inside the perimeter

The data collected during the field days was then used to study correlation between the number of Brazilian Pepper Plant's seeds and the diversity of other plant life around it.

LEARNING OBJECTIVES

- SWBAT locate the plant out in nature given the right habitat with great confidence.
- SWBAT describe the appearance of the plant to others when asked without error or question.
- SWBAT value a balance of plant diversity after studying the variety of plants in the pepper plant's habitat by the completion of the class.
- SWBAT compare the biodiversity of areas of high density pepper plant seeds to areas of low density pepper plant seeds given equal plots of land with different plant compositions to determine if there is a correlation.
- SWBAT use the knowledge gained from this project to determine which plants can best withstand growing in an environment with the pepper plant three out of four times through comparing the different areas of measured land.
- SWBAT develop group communication skills in order to be an effective part of a team by contributing to group discussions on a group messaging system.

PROCESS & DATA

Methods

- Define 1 meter x 1 meter quadrat
- Count the number of Brazilian Pepper Plants in the quadrat
- Count the number of other plants growing in the quadrat
- Gather the GPS and altitude information
- Take the measurement of the circumference 6 inches above the ground

Table 1: Plant Growth in Quadrats

| Quadrat # | List of other species |
|-----------|---|
| 1 | Scrub Oak (1), Baby BPP (1) |
| 2 | Sprout A (23), Sprout B (1), BPP Sprout (2) |
| 3 | Sprout A (2), BPP Sprout (18), Fountain Grass (8) |
| 4 | Fountain Grass (11), Young BPP (1) |
| 5 | Young Palm (1), Sprout C (319), Sprout A (13), BPP Sprout (5) |
| 6 | Young BPP (1), Fountain Grass (10), Sprout A (4), Sprout B (6), Grass (1) |
| 7 | Unknown Trees (7), Grass (1), Young BPP (6), Sprout A (66), Weed (1), Grass Sprout (11), Vine (1) |
| 8 | Grass (9), Sprout A (55), Sprout C (2), Vines (2) |

This table lists the other species growing in the quadrats that were studied.



Brazilian Pepper Plant (left), Holly (center), Holly Seed & Brazilian Pepper Plant Seeds (right)

RESULTS

- There is no measured correlation between the size of the tree and the number of seeds produced.
- There is no correlation to the number of plants growing in the vicinity of the Brazilian Pepper tree.
- The samples collected do not support a correlation between the size of the tree and the biodiversity.
- With the eight plants studied the team was unable to make any definite conclusions relating the fruit density of the Brazilian Pepper Plant to the biodiversity of the area.

CHARTS

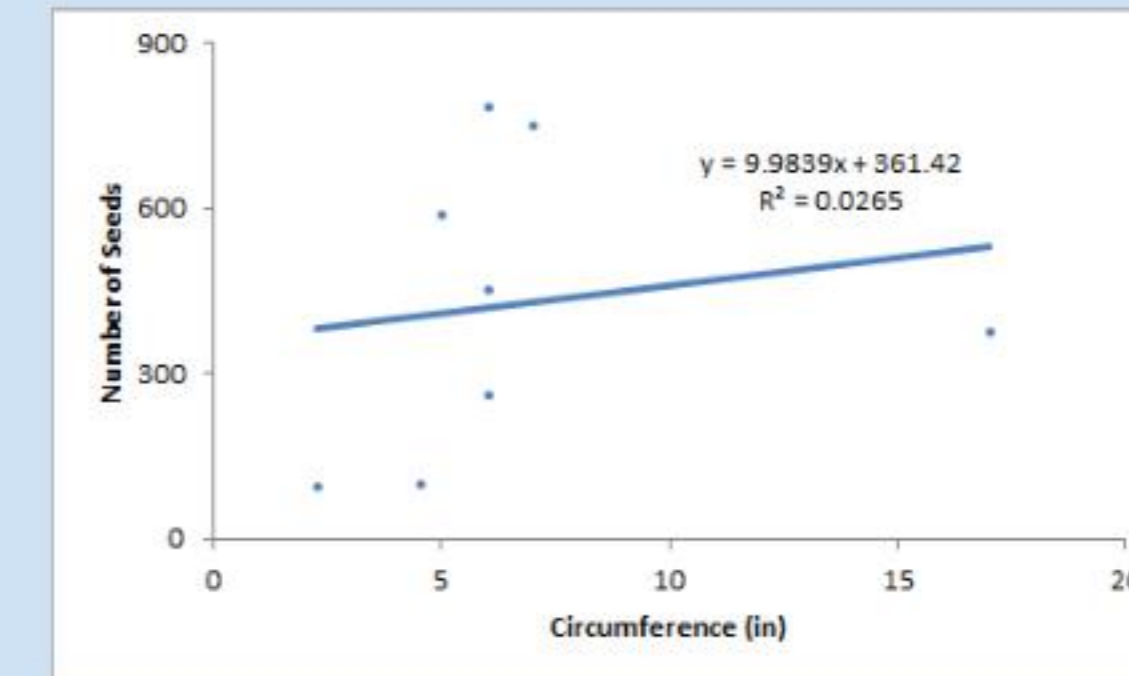


Figure 1: Seeds & Circumference

Figure 1 depicts the relationship between the circumference of the tree and the number of seeds found in the plot. With an r^2 value of 0.0265 it cannot be concluded that there is a correlation between size of the tree and the number of seeds produced..

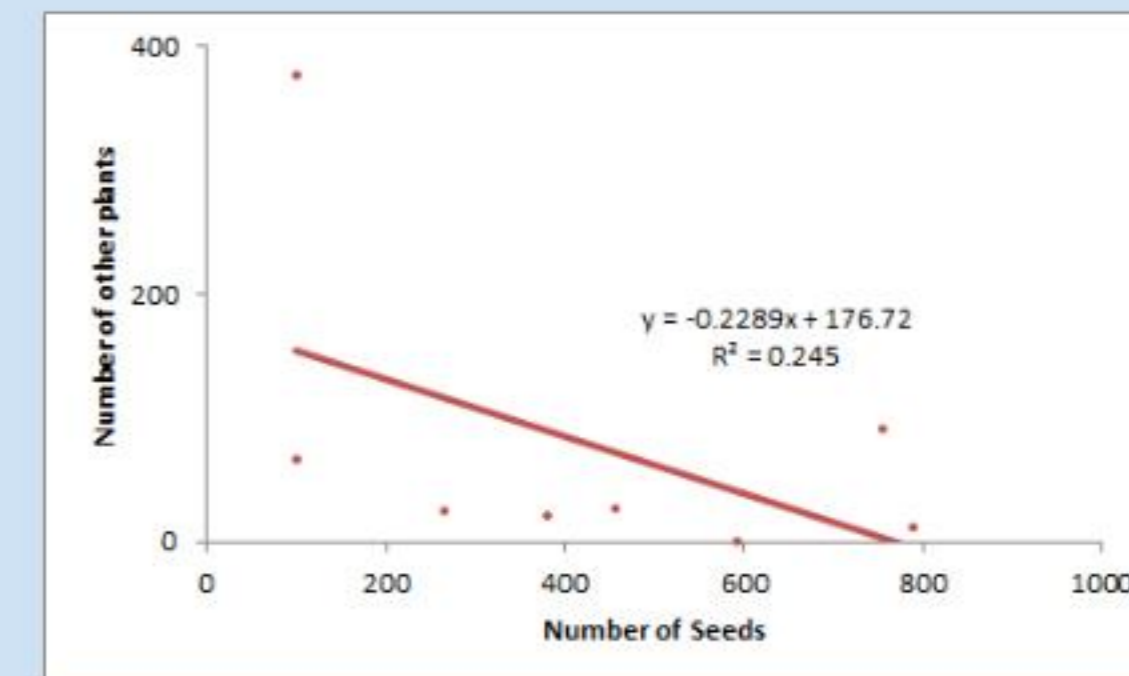


Figure 2: Seeds & Other Vegetation

Figure 2 depicts the relationship between the number of other plants growing and the number of seeds. With an r^2 value of 0.245 it cannot be concluded that there is a correlation between number of seeds and the number of other plants growing..

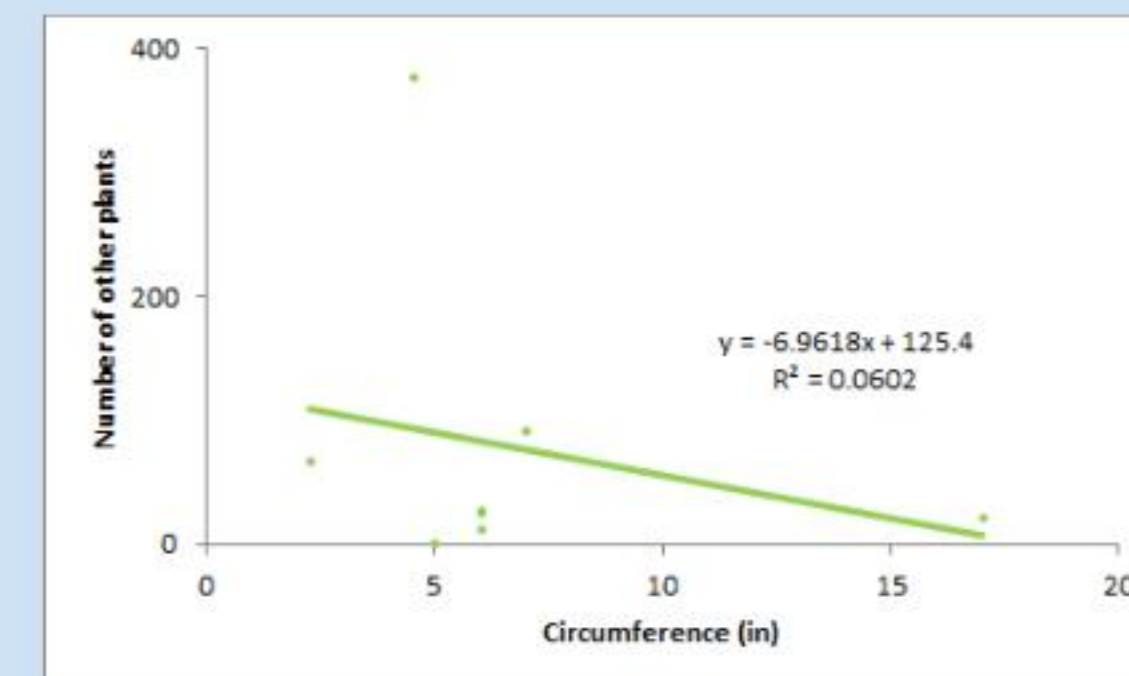


Figure 3: Other Vegetation & Circumference

Figure 3 depicts the relationship between the number of other plants growing and the circumference of the tree. With an r^2 value of 0.0602 it cannot be concluded that there is a correlation between the number of other plants growing and the size of the tree..

CONCLUSIONS

- According to our research, there was no major correlations between Seeds, Trunk Circumference and Other vegetation.
- The highest correlation was between number of seeds and number of other vegetation ($R^2=0.245$).
- Maybe our research data sample was too small to prove the correlation or other factors could be more correlated with the allelopathy of the Brazilian pepper plants.

January 21, 2016
Project began

January 28, 2016
Submission of
Project Proposal

February 16, 2016
Submission of
Midterm Report

February 20, 2016
Second trip to the
field to collect data
points

February 20, 2016
Second trip to the
field to collect data
points

March 5, 2016
Third trip to the
field to collect data
points

March 29, 2016
Submission of
Final Report.

April 13, 2016
Discovery Day.