

## Introduction

Bromeliads and Orchids are very similar flowering plants, but they split off in the family taxonomic group. In tropical areas they are known as epiphytes that attach themselves to trees and use them as a host, but not in a parasitic type nature. They are known as air plants since they use nutrients from the air and dead materials on the tree branches as their food source. In tropical areas both plants can be found on different trees such as orange tree groves found in Belize. Both species can survive on the same tree, but which plant is denser in a given area?

Bromeliads come from the family Bromeliaceae which consists up to 2,000 species. They are usually seen as medium sized herbal plants with thick upturned leaves. Most of them are epiphytes, but there are a couple that come in the forms of trees that can reach 11 meter high. They are found in tropical and subtropical areas ranging from southern North America down to the bottom of South America mostly in coastal areas. The most famous known Bromeliad is *Ananus comosus* or pineapple. They are also xerophytes which are plants that are used to conditions where water is scarce. They are made to absorb as much water as possible with scales in the grooves of the epidermis that look like open umbrellas. The large deep bridge like shape of their leaves also help in the collection of water. They are CAM plants that close their stoma during the day and then open the stoma to finish photosynthesis at night. They have these adaptations because they appear in the crown of the forest, and in the morning receive direct sunlight that quickly evaporates the water. They are very attractive plants with bright colored flower that attract birds and insects that help pollinate them.

Orchids are the family Orchidaceae that over 18,000 different species making them one of the two largest families of flowering plants. Approximately there are 10,000 to 12,000 species

that have yet to be discovered. 70 percent of orchids grow as epiphytes. Their roots have a large surface that absorbs nutrients and water. They have secondary stems that store water and allow them to live through dry periods. They have incredibly small seeds, which allows them to produce many and they are easily dispersed by the wind. They use insects to pollinate. Most of them have a different smell that attracts different kinds of insects. Their leaves are mostly alternate, but there are some with opposite or whorled leaves, but they all have a base.

Both of these species have adaptations that make them ideal plants for living in the rainforests of Belize. In my experiment I will look to see if the populations of bromeliads or orchids are denser in a given area of an orange tree orchard. I chose an orchard that had full grown trees that was part of an orchid and bromeliad placement. The orchids were relocated one year before I took my data to see how far the plants dispersed. Based upon the information I learned, I hypothesized that even though the orchids have more species, the bromeliads would be denser. They have broader succulent leaves that I feel can collect water better than the orchids, and they also are able to hold water in their bases.

Materials-

Camera

Memory card

Pencil

Paper

Meter stick

Method-

1. Find the location of the orange groves where orchids and bromeliads have been relocated.
2. Draw a map of trees that is 4 rows and 7 columns so there are a total of 28 trees.
3. At the grove make sure to mark trees that orchids or bromeliads were relocated to. Keep track of how many of each species were present and survived the year after relocation.
4. Starting with the first tree look for orchids or bromeliads on the tree and mark down as many B's for Bromeliads found on the tree and O's for Orchids found on the tree.
5. Take a picture of each one that you find for reference later on.
6. Continue through the grove going down the columns and then moving to the next row marking how many are on each tree.
7. Once all the trees are finish take the meter stick and measure the distance between the trees on all four sides and record the measurement.
8. With the measurement figure out how many trees occupy an acre.
9. Then count how many trees are in the grove by counting the rows and multiplying it by the columns.

Results-

Between each tree there was approximately 5 meters going all directions. So for every 25 meters squared there was a tree. Their fields consist of about 160 trees per acre. In the grove we were at there was a total of 315 trees so it was approximately 2 acres. I did a total of 28, and four of them had the bromeliads and orchids that were transported from the year before.

Out of the 24 trees there were a total of 43 orchids and bromeliads. 13 of them were orchids and 30 bromeliads. If we took squares that had 16 trees there would be a total of 29 orchids and bromeliads. In an entire acre there would be approximately 290 orchids and bromeliads. 20 of them would be bromeliads or 200/acre while 9 were orchids or 90/acre.

X- 2O 1B	X-1O	X	X-2B
X- 1B	X-1O 2B	X	X-1O
(X)	X-1B	X-1O	X-2O 3B
(X)	X-2B	X-3B	X-3b
(X)	(X)	X-1O 2B	X-1O
X- 1O	X-1O	X-1B	X-2B
X- 1B	X-1B	X-1O 3B	X-1B

### Conclusion-

The bromeliads made up 70% of the population found in the orange grove so the bromeliads were denser than the orchids. There is room for error since it is hard to see into the higher branches of the trees and accurately count the number of organisms, and I could have missed some.

### Sources-

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