

Sida cordifolia Spatial Distribution and Abiotic Factors Lab Report

Posted on October 25, 2019

Lab Report

Abstract

The soil solar voltage and soil depth showcased a negative correlation, respectively, according to the quantitative analysis. Quantitative analysis of solar voltage and soil depth was gathered using solar panels and flagged stakes, respectively. *S. cordifolia* was determined to exhibit clumped distribution (σ^2). Also, the types of dispersion patterns in *S. cordifolia* can be exhibited to show whether the abiotic factors tested in this experiment contribute to their dispersion patterns by the statistical analysis (Vaz et al., 31).

Introduction

The report explored the concepts of spatial patterns of plants and abiotic variables using *Sida cordifolia* as a model organism. Density and dispersion were the spatial parameters measured. Density is the number of individuals per unit (e.g., Number per m²), while dispersion shows how the individuals are arranged in space (Deng et al., 8603). Solar voltage and soil depth are the non-geographical data concerns. Shallow soils tend to host the weakest plant competitors, with density being its function. Soil depth influences water transpiration in plants, that is, how much water is taken in by the plant and then expelled from leaves. Variations in total water available to plants are determined by the variation in soil depth (Cruz et al., 310).

Other studies of flat fields, which are topographically more similar to our habit study, show that soil moisture depletion was related to plant density and root depth (Esson, Tanko, Adebola, and Musa, 9). Moss abundance was positively associated with water content, and the plant studied in our lab is vascular, unlike mosses and lichens in arctic conditions. Other studies show the correlation across all plants. Photosynthesis is mainly driven by the sun, but its variation can directly affect growth through resource availability or indirectly by changing the behaviors or success of herbivory predators (Heil, 43).

The main objective of the lab was to learn about cluster techniques such as explicit spatial patterning and random sampling and then subsequently use the information to draw conclusions on the abiotic factors that affect spatial patterns for *Sida cordifolia*. Looking into the solar voltage and soil depth at

random samples, an accurate assessment of the effects of the variables on dispersal and density may be attained (Rosell and Sanz, 132). The purpose of this lab test was to learn about biological and geographical data.

The hypothesis was that *Sida cordifolia* would show a random dispersion, and the soil depth would be correlated with density, while there would not be any correlation in the case of solar voltage. Our prediction was that soil depth, and thus soil moisture, would be consistent across our samples, leading to fewer pockets of resources and, consequently, a random dispersion pattern, with Gifford Arboretum's topography being extremely flat. Most competition would be exhibited by higher soil depth, but on the other hand, shallow soils would have the lowest resources available and would exhibit low densities of the weakest competitors. Solar voltage is correlated with density due to the plant vigor hypothesis, which states that any benefits from increased sunlight would be negated by high predation (Mitchell et al., 43).

Discussion

S. cordifolia had clumped distribution, and this suggested limited dispersal abilities or patchily distributed food resources, and this leads us to reject our hypothesis that distribution is random (Scalon, 599). Also, *Sida cordifolia* determined a negative correlation between soil depth and the number of individuals. Due to the flow in our thinking, we had hypothesized a positive correlation, but the results showed otherwise. Soil moisture content and transpiration rates should be less heavily emphasized in the study of *S. cordifolia* as Coral Gables is a sub-tropical climate with high precipitation and high humidity (Kumar, Rajwar, Sharma, and Soil..., 19).

A more individualistic study could measure *S. cordifolia* size and dispersion patterns within samples. Other factors limiting the experiment are testing the landscape at only one particular time of day and at only one particular time of year. Light levels, through the effects of light on energy resource availability, can directly impact plant growth can affect plant growth (Rejmanek, 66). Light levels can vary depending on the point in time data is being taken.

Recording data in the fall, spring, summer, or winter will result in different solar voltage data and soil depth depending on the climates of each season. In our lab, *S. cordifolia* abundance showed no correlation with solar voltage, supporting our hypothesis that the positive photosynthetic effects of increased sunlight may be compounded by other variables that we did not measure, i.e., predation (Schulz and Michael, 634). Our objectives of learning about cluster techniques, implicit and explicit spatial patterning, and random sampling were met in the way we gathered our data and the figures that organized them.

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