Biotic and abiotic factors in an ecosystem

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Introduction

Biotic factors comprise the living part of the ecosystem while the abiotic factors comprise those features of the environment that are non-living. The biotic and the abiotic factors display a complex but interesting interaction phenomenon. Their existence in the environment complements each other (Klanderud, Vandvik, and Goldberg 2).

Method

The study of their inter-relationship was done in a three meter by the three-meter garden marked using a string. The site was visited twice a week during varying times of the day. A record of biotic and abiotic factors present, aspect, slope of the land and direction it faced was taken. The temperature, rainfall, wind speed and the number of hours of sunlight received were taken into account. The number of each species present, for example, grass species was also recorded and any impact human had on the site was identified.

Apparatus

A string

A thermometer

A rain gauge

An anemometer

A soil pH meter.

Results

The abiotic factors present in the garden comprise of the soil, moisture, precipitation, sunlight, water and temperature. The garden is on flat ground, facing the northwest region with a rich loamy soil. The pH of the soil of the soil is an acidic pH of approximately 6. 0. The temperatures of the area vary from hot and hot to cool and wet depending on the season. However, the majority of the temperatures recordings range from 18-25 degrees centigrade.

The area receives moderate to high rainfall throughout the year. It has an average annual rainfall of 1618mm. According to the Beaufort scale of wind speed, the area has a moderate wind speed as supported by the fact that there is raised dust with the movement of the small branches. The area receives an estimated sunlight of six hours. O many occasions the area is covered by clouds. The humans have had the greatest impact on the environment. Klanderud, Vandvik, and Goldberg 5, argue that the human impact result from the various economic activities that the people are involved in. Notable is the agricultural activities and their farming practices. The pH of the soil can be greatly attributed to the farming practices. There is extensive use of the farming chemicals, especially fertilizers. Most fertilizers are laden with nitrogen that reacts with the air in the soil leading to the formation of the nitric oxide which combines with water to form nitric acid. There is the use of fluorocarbons to get rid of the weeds and the various organisms that destroy the crops like grasshoppers and moths. The rainfall received by the area has a relationship with the human activities. There is a great investment in the environment conservation. Agroforestry has been

encouraged, and most farm owning families have at least twenty percent of their farms under planted trees. Soil erosion is minimal due to the heavy forest cover.

Analysis and Discussion

There is a combination of biotic species of animal and plant. The interaction of the different biotic organisms can be witnessed. Animals depend on the plants for shelter. Notable among them is the different species of the insects that can be witnessed on the garden. The ants in the garden have but their hills around some small tree in the middle of the garden. The mechanism fact that there is an anthill around the tree has given it some protection against the interference by the activities of the other organisms like the humans. The animals have depended on the plants from food. They consume plants, on the other hand, acquire nutrients from these animals when they die

The interaction between the biotic and the abiotic factors cannot be disputed. The plant depends on the soil for support and nutritional supply. The water, necessary for the manufacturing of food comes from the roots to the every part of the plant. Temperature is a necessity for the growth of the plant. The process of photosynthesis requires the presence of sunlight. Moisture must be present for the plants to grow. The living systems have both direct and indirect effects on the abiotic systems. For example, the rainfall can be affected indirectly by the manipulation of nature. All process of the planting of trees, the input of fertilizers and other farming activities have had both positive and negative consequences of the soil and

temperatures. The adoption of inorganic farming has raised the soil ph. The farming methods have led to soil erosion which has been stabilized through the increased tree planting efforts.

There are no clear forms of symbiotic relationship between the various organisms in the garden (Klanderud, Vandvik, and Goldberg 8). Nonetheless, it can be deduced that these relationships exist owing to the dynamism of the interactive mechanisms. Mutualism can, however, be vividly depicted. Mutualism is that symbiotic interface of benefit top both organism. The balanced existence of the living phenomena on the garden can be attributed to mutualism. Without it, there can be the extinction of the weaker species. Parasitism is a dependence system where one organism depends on the other entire without it being beneficial to the other. It cannot be pointed out directly from the garden. Commensalism exists where an organism depends on the other for various services without any form of harm on the other organism (Klanderud, Vandvik, and Goldberg 13). Its existence requires a deep dissection of the other organisms. But throughout the study, there was no any commensalism identified.

The study of the relationship between biotic and the abiotic factors can be improved through various ways. The areas of the improvement can be done by looking at the limitations of the study. The limiting factors in the study included time, the size of the area covered and the knowledge of the researcher on the various aspects of the living and the non-living systems. Time of eight to ten weeks of research is never enough time to gain or get concrete data on the relationship between the biotic and the abiotic factors in the environment. The study should be a long term project of more than a

year. It will also enhance the pointing out of the dynamics of interaction of the organisms.

An area of three by three meters is a very small representative. It can have a limited number of organisms to be studied. Furthermore, the different kinds of the relationship may not exist within one small area. Inevitable limitation of the study can be the knowledge and skill of the researcher regarding data collection. Knowledge of the various plant and animal species proves a challenge. Nevertheless, it can be improved through pre-study training to improve on the data collection skills and also improve on reliability. It also calls for greater research on the naming systems of the various organisms. It will serve to enhance data accuracy and validity.

Conclusion

In summary, there exist a wide range of interactive mechanisms for the biotic and abiotic factors in the environment. The interdependence phenomenon can be between biotic and other biotic factors or biotic and abiotic factors. The interaction between biotic factors is very vast unlike with biotic factors. The biotic factors can have both positive and negative influences on the abiotic factors. It can be concluded that the two factors of the environment, the living, and non-living parts require to play a mutual role towards their existence.

Work cited

Klanderud, Kari, Vigdis Vandvik, and Deborah Goldberg. “ The importance of biotic vs. abiotic drivers of local plant community composition along regional bioclimatic gradients.” PloS one 10. 6(2015): e0130205.