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Plant Diversity and Soil Properties

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Introduction

We can learn more about community succession by looking at patterns of change in species diversity and soil conditions. However, the relationship between soil conditions and plant variety in tropical coastal secondary forests remains a mystery. On Hainan Island in southern China, we assessed plant diversity and soil nutrients across two years (2012 and 2019) to assess trends of species diversity and correlations between soil nutrients and species diversity. From 2012 to 2019, the soil pH and total nitrogen (TN) fell dramatically, whereas Soil Organic Matter (OM) and Total Phosphorus (TP) grew significantly. In 2012, plant species diversity was substantially larger than in 2019, and the dominating species shifted significantly in two years [1].

Description

Tropical forests have a lot of biodiversity and biomass above ground, and they grow on heavily worn soils. The distribution of plant species and soils is remarkably diverse even within a tropical region. The interplay between plants and soil is a major internal driver of ecosystem evolution. Many studies have documented the unidirectional effects of soil nutrients on plant diversification. Plant diversity has been influenced by environmental factors such as climate, soil features, and herbivore and plant community expansion is largely dependent on soil nutrient availability. Changes in soil nutrients can impact plant community traits as plant biomass, vegetation cover, and species composition, resulting in compositional dissimilarity at the local, landscape, and regional scales. However, there are still enough of them. TNNR is a 44-square-kilometer natural reserve with a tropical monsoonal environment at 338 metres above sea level. May to October is the wet season, whereas November to April is the dry season. The average annual temperature is 23.9 degrees Celsius, with 1721.6 millimetres of rain. Lateritic soils are found in the tropical evergreen monsoonal forest. All of these forests had been deforested and turned to shrubs or secondary forests prior to 1980. Deforestation was outlawed with the formation of TNNR in 1983, and forests rebounded quickly [2,3].

Plants are multicellular, photosynthetic organisms that can be found in both water and land. They are primary producers (autotrophs) and play a critical role in the food chain. Plants range in size from a few millimetres to 90-meter-long enormous sequoias in California. The smallest rootless aquatic angiosperm is Wolffia, whereas *Eucalyptus regnans* is the tallest. Different-sized particles make up soil. The size of the particles that make up the soil is determined by the percentage of sand, silt, and clay-sized particles as well as organic matter in the soil. When you rub sandy soil between your fingers, it feels gritty. Silts have a smooth texture, similar to flour. Most clay is tacky and easy to work with. You'll recognise the sensation if you've ever worked with ceramic clay. Soils are made up of various sand, silt, and clay particle combinations. Loams are soils that contain a mixture of sand, silt, and clay. The main particle is often identified by the soil's name; for example Timaru silt loam specifies a soil with silt preponderance [4,5].

Conclusion

Over time, the interactions of climate, flora, and other species on existing geologic elements on varying topography result in soil development. Soils are similar in most cases when all five formation components (parent material, climate, topography, biological processes, and time) are present. Soils are comparable in similar conditions in different regions. This consistency enables the placement of many distinct types of soil to be predicted (Soil Conservation Service, 1993). In the United States, most soils contain distinct layers or soil horizons. Each horizon has a unique relationship to the horizon just above and/or below it. The soil-forming mechanisms occurring on the undisturbed soil material produce these correlations.

The way sand, silt, and clay particles clump together is described by soil structure. Soil structure is influenced by organic matter (decaying plants and animals) and soil organisms such as earthworms and bacteria. Aggregates are formed when clays, organic debris, and compounds secreted by soil organisms bind soil particles together. Soil structure affects plant growth by regulating air and water circulation, influencing root development, and impacting nutrient availability. Squeezing good quality soil breaks it up quickly because it is friable (crumbly) and has fine particles. Coarse, very solid clods or no structure at all characterise poor soil structure.

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