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EFFECTS OF ORGANIC AND ANORGANIC SUBSTANCES ON SOIL PRODUCTIVITY

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Abstract:
The article presents a comprehensive overview of soil minerals, both organic and inorganic substances, and their pivotal roles in the growth and development of plants.

Keywords: Fertility, soil composition, minerals, organic matter, compounds, biochemical processes, humus, horizon.

Introduction:
Soil fertility, a key differentiator from rocks, plays a crucial role in the cultivation of agricultural crops essential for human sustenance. Soil fertility not only serves as a cornerstone of agricultural productivity but also a determinant of land utility. The fertility of soil is intricately intertwined with various factors such as soil composition, nutrient availability, moisture movement, soil structure, granulometric makeup, and environmental conditions, collectively influencing plant growth and development significantly. Notably, soil fertility is contingent upon the composition of organic and inorganic substances, as well as mineral and organic-mineral compounds resulting from biochemical transformations within the soil matrix.

Research Findings and Discussion:
Soil composition encapsulates an amalgamation of minerals, organic matter, organic-mineral compounds, and essential nutrients within the soil matrix. The

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mineral constituents of soil comprise primary minerals such as quartz, feldspars, amphiboles, pyroxene, and mica, alongside secondary minerals including montmorillonite, kaolinite, hydromica, and others. Conversely, the organic fraction of soil predominantly comprises humus, characterized by a variable composition encompassing hemic acids and other organic materials. Noteworthy variations exist in the organic content across soil horizons, with pale gray soils typically exhibiting humus levels of 1-1.5% and nitrogen content ranging from 0.08-0.14%, while typical gray soils may possess 1.5-3.5% humus and 0.1-0.2% nitrogen. Additionally, barren soils may contain 0.3-0.8% humus and 0.03-0.06% nitrogen, with brown clay soils exhibiting even lower percentages. The soil environment harbors a diverse array of organic and mineral constituents, including dissolved energies in ionic, molecular, and colloidal forms, mineral compound anions like KQ, NQ, gases such as SO2, O2, and organic compounds like organic acids, sugars, amino acids, enzymes, and hemic substances. These complexities underscore the dynamic interplay between organic and inorganic components in soil, crucial for sustaining biochemical processes essential for plant growth and development.

The gaseous part of the soil (in volume percentages) consists of 78.1 N, 19-21 O2, 0.1-1.0 SO2; ammonia, and hydrogen sulphide, methane and hydrogen are found in gley and swamp soils as additions. The main composition of the soil is organic and inorganic substances, minerals, water and air. Minerals, organic and inorganic substances in the soil allow mankind to produce food, raise animals, plant trees and plants, and obtain water and minerals. Therefore, the continuous development of ecosystems also depends on the soil. The growth and development of soil plants is important for the efficiency of productivity, because it performs the function of aeration of plant roots, water retention and supply of necessary nutrients. Therefore, soil and its components are the main elements that allow life to exist on the planet. The main minerals in the soil are phosphorus, potassium, calcium and magnesium, which make up the largest component of the soil, accounting for almost 49% of its total volume. Quartz, clay, carbonates, sulfates, and oxides and hydroxides of iron, manganese, and aluminum are also common. Organic matter is represented by the remains of plants, fungi, worms, insects and other animals growing in the soil. One of the main elements of organic matter is humus, which consists of a mixture of organic molecules formed by the decomposition of these substances. This mixture is vital because it collects water to hydrate the soil, hold it to facilitate ion exchange with plant roots, plant performs functions such as feeding water, protecting the soil from compaction, and increasing its porosity.

CONCLUSION

In short, the composition of the soil is rich in mineral, organic and inorganic substances, each of them has its own characteristics to increase productivity and has its place in the biocenosis. Microorganisms that create organic substances in the soil usually exceed 20,000. Simple animals, invertebrates and insects. to break down organic matter, and fungi and bacteria break down matter and turn it into its main nutrient. In addition, these microorganisms also perform the function of soil aeration, water retention, and the formation of pores that allow plant roots to grow. As a result of biochemical processes, it enriches the soil with phosphorus, sulfur and nitrogen and helps to make the soil fertile. Water is from 2 to 50% of the soil volume. It contributes to the growth of plants and is important for the progress of chemical and biological decomposition processes and the transport of nutrients. Air occupies the same volume as water in the soil. The main gases that make up the soil are oxygen, nitrogen and carbon dioxide. Oxygen helps plants maintain tissues, transport necessary nutrients, evaporate water, and carry out nutrition processes. Nitrogen stimulates above-ground growth of plants and gives them their characteristic natural bright green color. Carbon is a source of energy for microorganisms. It should be noted that soil is the largest carbon store available in the atmosphere. All these compounds serve to increase the fertility of the soil and increase the productivity of plants.

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