

SUMMARY OF THESIS

DETERMINATION OF SOIL PROPERTIES BY COLOR MEASURING

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ABSTRACT

The utilization of soil color as a means of categorizing soil and identifying its characteristics is a widespread technique. Soil moisture, defined as the quantity of water contained within the soil, is a fundamental characteristic of soil that plays a vital role in both the hydrological cycle and plant development. The objective of this study is to establish the correlation between soil moisture and color across various saturation levels, as well as to evaluate the reliability of low-cost colorimeters in the measurement of soil color. A total of 15 sets of soil samples were examined, resulting in the generation of a thorough dataset consisting of 375 color scans conducted using the Nix color sensor. The present study aimed to examine the influence of varying water content on soil by employing the CIELAB color space to assess changes across several saturation phases. The method under consideration has the potential to be utilized for the calibration of discrepancies in soil color acquired by digital scans. Consequently, this would enable a more uniform, unbiased, and precise categorization and assessment of soil samples exhibiting various degrees of moisture content.

This study's methodology broadens the range and applicability of soil color information derived from digital scans, making it an easy, fast, and effective way to conduct on-site land and crop research. The color parameters "L," "a," and "b" that were acquired by using the Nix Pro equipment were selected for the analysis because, at each stage, they showed a better correlation with each other than the results obtained from other parameters. We may conclude from the process of analyzing the values that the sole factor that contributes to determining the moisture content of the soil is the "L" value, which stands for lightness. Even though the values of "a" and "b" were similar to the values of other samples that had been taken in the identical conditions, they nevertheless showed a considerable degree of variability at each degree of saturation. The information on the moisture content of the soil is unreliable since there are no discernible patterns in the variations of the "a" and "b" values at each phase.

No disturbances were caused during the collection of the soil samples, and no pre-treatment of any type was applied to the materials in the investigations. Consequently, there's a good chance that the samples had extra materials, which could account for any differences. It is recommended that soil color data be gathered from a range of soil samples situated in a range of locations in addition to the recommended procedure for calibrating the soil color. This will enable the investigation's conclusion to be made more persuasively. Furthermore, it is advised to examine whether variations in "L" values indicate recurring trends in both the current and future situations. It is imperative that an inquiry be conducted into the relationship between soil color and moisture content, utilizing a wider range of soil samples and operating within the constraints of the framework described in this study.