The Effect of Soil Conditions on Plant Health at UCF main campus

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Introduction

Soil is proposed to rapid urbanisation and is a good indicator of ecosystem health. Myakka, the native soil type of Central Florida’s flatwoods, is comprised of sandy topsoil and partially organic subsoil. Soil compaction is the compression of particles that reduces porosity, decreases water infiltration, and increases runoff. Soil compaction can be caused by heavy traffic, construction, or improper irrigation. Compaction negatively influences water drainage, which diminishes the capacity for roots to receive proper water uptake / fertiliser efficiency is reduced in sandy soil types due to leaching and inability to retain moisture. In addition to the acidic nature of sandy soil, pH can be critical to plant health. Compaction reduces the available area for root growth, which can lead to decreased plant vigour and reduced productivity. Soil compaction also increases the possibility of water runoff causing unintentional chemical and nutrient dispersal. Myakka, the native soil type of Central Florida, is comprised of sandy topsoil and partially organic subsoil. Soil compaction is the compression of particles that reduces porosity, decreases water infiltration, and increases runoff. Soil compaction can be caused by heavy traffic, construction, or improper irrigation. Compaction negatively influences water drainage, which diminishes the capacity for roots to receive proper water uptake / fertiliser efficiency is reduced in sandy soil types due to leaching and inability to retain moisture. In addition to the acidic nature of sandy soil, pH can be critical to plant health. Compaction reduces the available area for root growth, which can lead to decreased plant vigour and reduced productivity. Soil compaction also increases the possibility of water runoff causing unintentional chemical and nutrient dispersal.

Methods

- Seven randomly selected plots were chosen in each of the four irrigation zones at the UCF main campus (44 total).
- Data was collected in a 6 week period and analyzed using Excel.
- A local expert determined plant health based on a scale of 1 to 5.
- Plots were categorized as sandy, mixed, organic, and construction rubble.
- Equipment included a double-ringed infiltrometer, core sampler, compaction tester, moisture and pH device, and nutrient kit.

Objective

The aim of this study was to evaluate randomly selected plant beds for a variety of abiotic conditions that potentially influence plant health. Direct measurement of soil health included soil type, pH value, infiltration, compaction, moisture, and macronutrients present (nitrogen, phosphorus, and potassium). Factors such as sunlight and weather were also taken into consideration. We expect soil compaction and infiltration to affect plant health. We also predict that soil type, classified by particle size, will influence the content of macronutrients (N-P-K) and plant health. Our goal was to collect data necessary for the prospective increase in plant fitness and appearance at the University of Central Florida.

Results

The Effect of Soil Type on Macronutrients and Plant Health

![Figure 1](image1.jpg)

![Figure 2](image2.jpg)

Discussion

This study demonstrated that soil conditions such as construction and soil type were indicators of plant health in an urban environment. sandy soils had the highest average macro nutrient content (Figure 1). Sandy soil types had the highest average macro nutrient content. This may be due to the higher abundance of sandy soil types found in plots on recent fertilization prior to the study. All plots were in the green compaction zone (0-200) at 3 inches shown in Figure 2. Indicating that immediate topsoil was not highly compacted. Plots with a maximum plant health of five had the most plant beds in the green compaction zone (15%), with only one highly compacted plot at 15 inches. Plots with a health of four had the highest compaction in the green compaction zone (50%) (Figure 2). A total of thirty-nine ornamental plants were analyzed in the study. Five plants occurred more than twice and one species, Indian Hawthorn (Ilex opaca), appeared in ten plant beds. The moisture readings were inconsistent with observable soil conditions. A different device would be encouraged if replicated. Future studies could be focused on individual plant species to determine which do better in the above soil conditions.

LITERATURE CITED


Acknowledgements

We would like to thank the following people for their help or guidance on this project: Alaina Bernard, Jennifer Elliott, Amanda Lindsay, Tina Richards, Courtney Keckberck, Ray Jerrer, Jason Toedter, and Danny Gomez.