

Soil and Water Sciences Department Graduate Student Exit Seminar

Speaker: **John Santiago**
M.S. Thesis Degree Candidate



Advisors: Sarah Strauss, Ph.D.
Andrew Ogram, Ph.D.

Title: **Influence of Rootstock, Propagation Method, and Soil Type on Citrus Rhizosphere Composition**

Date: Monday, April 15, 2019

Time: 3:00 pm – 4:00 pm

Location: McCarty Hall A, Room 3177

Rootstocks are important for tree crops due to their influence on vigor, fruit quality, harvestable yield, and tolerance against environmental conditions. Propagation of rootstocks occurs via seeds, stem cuttings, and tissue culturing, and differences in root conditions between propagation methods may influence rhizosphere composition. In addition, although it is recognized that the rhizosphere can significantly impact plant growth and nutrient uptake, the development process of rhizosphere microbial communities is still not well understood. The purpose of this study was to determine the influence of propagation methods, rootstock genotype, and soil environment on citrus microbial community development. It was hypothesized that the rootstock rhizosphere propagated by cuttings would be more diverse compared to those propagated by tissue culture and seed, as seed coats were sterilized before planting and tissue culture plants were generated in a sterile environment. It was also hypothesized that rootstocks grown in soil environments with the greatest microbial diversity and nutrient concentrations would have more diverse citrus rhizosphere concentrations. A greenhouse experiment determined the impact of soil type on rhizosphere development. To examine the influence of genotype on the rhizosphere composition, the microbial community composition of three citrus rootstock genotypes, each propagated by seed, stem cuttings, and tissue culture, was assessed. Rhizosphere DNA was extracted and sequenced using Illumina high-throughput amplicon sequencing, and data was analyzed using QIIME2 and R. The compost treatment, which had the greatest soil nutrient content, had significantly greater rhizosphere bacterial diversity compared to the other soil treatments. Surprisingly, citrus plants propagated by cuttings had a significantly less diverse bacterial community compared to the other propagation treatments. Results suggest that soil environment, rootstock, and propagation method all play a role in shaping the rhizosphere composition.

This seminar can be viewed live via this link: [John Santiago](#). A recorded link will be provided on the Soil and Water Science seminar website a couple days after the seminar. In addition, all seminars are archived for viewing on our [SWSD Seminar Page](#).