# Quantification of Root-Root Interactions

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**Abstract**

Root-root interactions alter the architectural profiles of individual root systems, therefore impact nutrient foraging . Past reports have shown detrimental as well as beneficial effects to the yielding abilities of crops as they avoid or prefer belowground competition . With little research done into this nuanced system there is still much to discover about the intricacies of root-root interactions and their impact on root development. Quantifying architectural traits of root system interactions would provide invaluable insight to root researchers worldwide. We have begun to develop a mesocosm system to perform a series of preliminary studies that utilizes 3D imaging to quantify metrics of root-root interaction using common beans (*Phaseolus vulgaris* ). Common beans have a relatively fast growing adventitious and basal root system, making them a suitable organism for this study. Our first mesocosms were fruitful but were not a suitable environment for quality imaging. To fine tune our mesocosm we have improved the mesh system to provide better root support, while utilizing light-weight, low-visibility materials to allow our imaging systems better access to the roots. Traits that we aim to extract include root growth angle, rooting depth, and root volume relative to neighbors, because these spatial qualities determine the soil areas that the root system will be foraging in. Our data will allow for the quantification and association of root plasticity in the presence of belowground competition.

**Works Cited**