Root adaptive responses for improvement of abiotic stress tolerance in Pennycress

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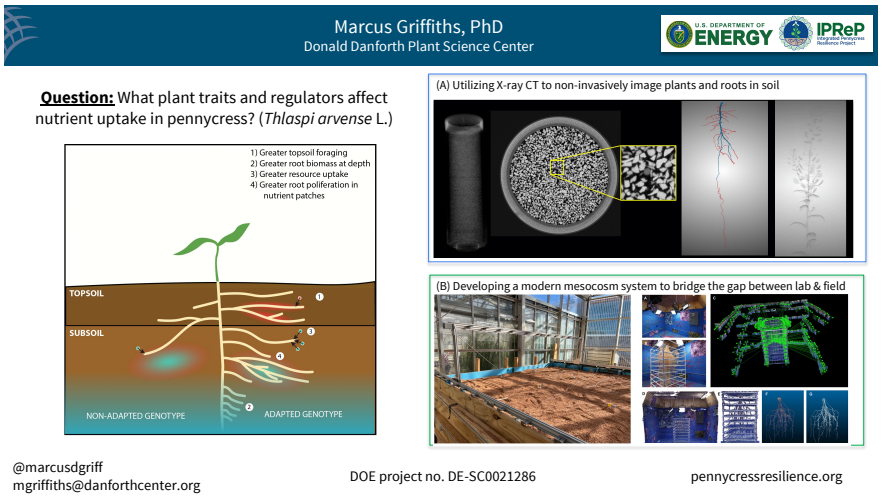
Abstract

Roots are the interface between the plant and the soil and play a central role in multiple ecosystem processes. With intensification of agricultural practices, rhizosphere processes are being disrupted and are causing degradation of the physical, chemical, and biotic properties of soil. Improvement of ecosystem service performance is rarely considered as a breeding trait due to the complexities and challenges of belowground evaluation. Advancements in root phenotyping and genetic tools are critical in accelerating ecosystem service improvement in cover crops. Here I will present root phenotyping approaches for assessing ecosystem service in a prospective cash cover crop; pennycress (Thlaspi arvense L.). In development is a large format mesocosm system that will allow 3D root system architecture analysis of multiple plants. Using this system, we will be assessing how variation in pennycress root system architecture can affect ecosystem service and abiotic stress tolerance with the plant to scale from single plant to canopy level traits.



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