

Phenotype Screening

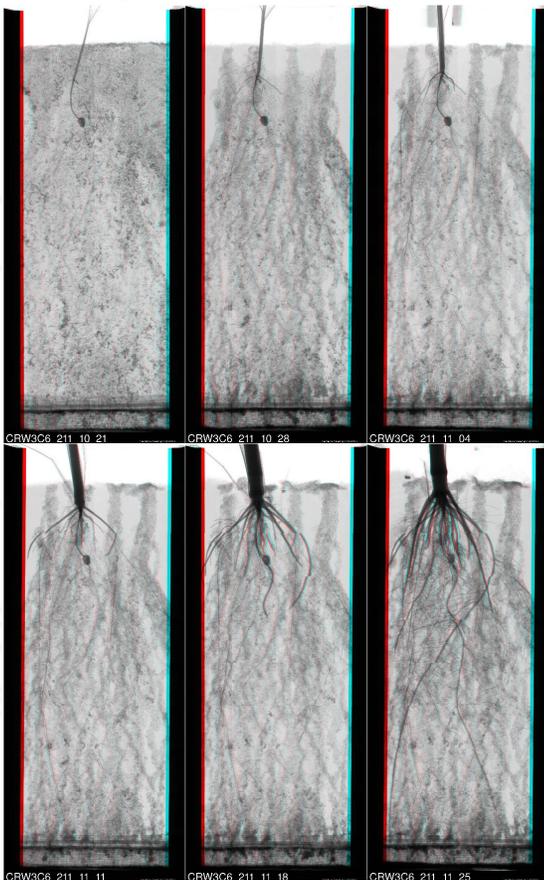
C O R P O R A T I O N

enabling discovery

Service Description

Growth Substrate and Containers for Non-destructive Imaging

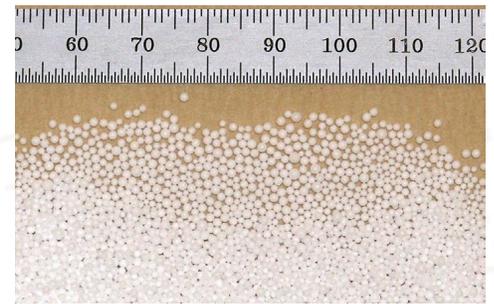
Phenotype Screening Corporation provides a soft-tissue X-ray imaging service which allows non-destructive imaging (the plant is not destroyed in the process of acquiring plant root data) Non-destructive imaging allows a plant to be imaged repeatedly over time to study root system development.



For non-destructive imaging the plant is grown in our Root Lab in a plant container and a growth substrate selected for supporting healthy plant growth and for very low X-ray attenuation properties. This combination allows imaging and analysis of the entire root system and opens new possibilities for phenology studies.

Both the substrate and the container are manufactured of expanded polystyrene (EPS).

EPS is non-toxic and totally inert. EPS resists degradation by the absorption of water. EPS has no nutritional value and thus does not directly support the growth of fungi or other microorganisms. EPS presents no danger to human health. It is recyclable and has low negative impact on the environment.



The growth substrate is made of spherical EPS beads with a mean bead diameter of ~1 mm. The growth substrate has a relatively open pore structure and closely resembles sandy soils in water-holding capacity. All nutrients, toxins, or symbionts required by a plant experiment are provided externally or directly to the root zone via a drip irrigation system.

RootViz FS utilizes plant containers engineered to provide extremely low attenuation of X-rays, sufficient air permeability for root zone gas exchange and adequate durability to support repeated handling over the course of an experiment.

RootViz FS plant containers are manufactured to a density of 1.0 - 2.0 pounds per cubic foot. This combination of the inherent low X-ray attenuation properties of polystyrene and the very low mass density of the containers makes the containers almost transparent to X-rays.

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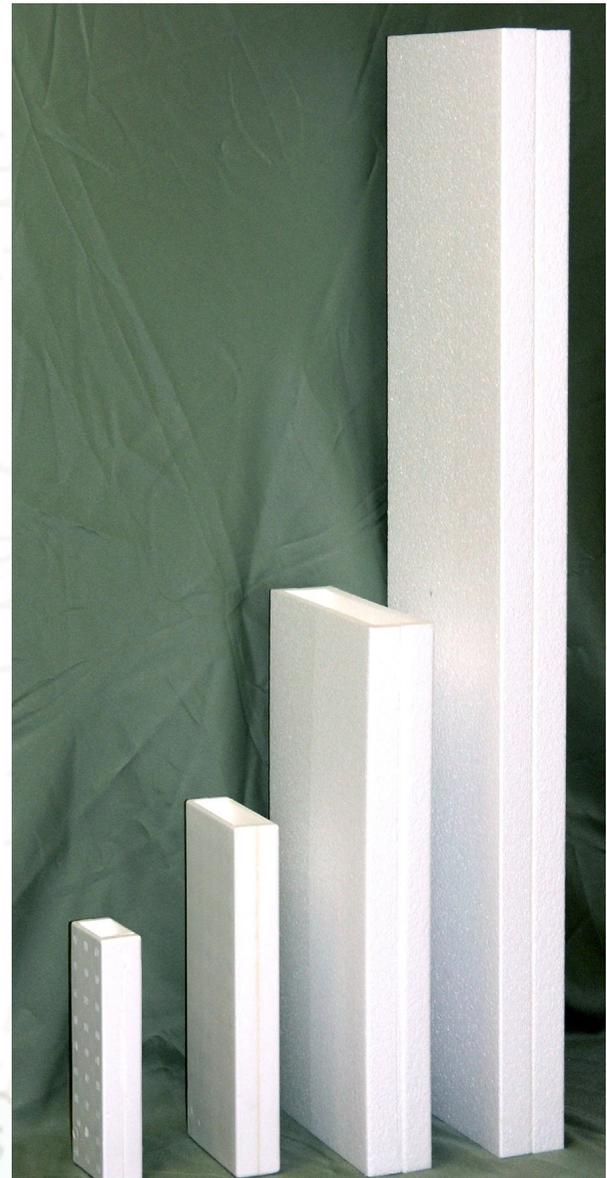
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(continued)



Plant containers are available in a range of sizes and may be custom manufactured in a size to suit the experimenter's needs. We presently provide sizes from our smallest container of 30x50x200 mm (used primarily for early root emergence and seed treatment evaluation studies) up to the largest container of 45x200x1000 mm (used for larger plant species and longer duration experiments.)

An inherent trade-off for container size selection is between the size of the root volume to be imaged and the image acquisition time (throughput) with larger volumes requiring longer imaging times. Choosing the right container size for the experiment assures cost effective utilization of the system.



Our Application Specialists are available to help the experimenter balance root volume selection requirements for the plant of interest against the image acquisition times and throughput requirements.