PhD SEMINAR 2024

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The Effect of Transparent Nano Coating for Rhizotron Application

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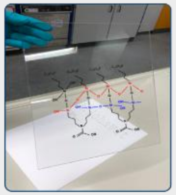
Objective: Exploring the effects of shoot and root growth under various rhizotron transparent plate conditions

Nanocoating & rhizotron application

Nanocoating properties

- ❑ Enhanced scratches, hardness, and adhesion of the coating layer.
- ❑ Made of colloidal nanoparticles (silica, titanium, zirconium).
- ❑ Introduced the silane additives solution for anti-fingerprint, anti-dust, and hydrophobicity.
- ❑ Lower cost than physical vapor deposition or thermal evaporation.
- ❑ Simplified coating protocol.
- ❑ Scalable production.



Rhizotron experimental design

- ❑ Cultivated barley plants (*Hordeum vulgare)* in the A4 size of the rhizotron substrate and inclined to 45° with a transparent plate of the rhizotron facing downwards.
- ❑ 3 different rhizotron transparent plates: *pristine PC (P), nanosilica-coated PC (PC), nanosilica-coated PC with FAS (PCF).*
- ❑ n = 7 repetitions.
- ❑ Experimental period: 15 days.

Plant phenotyping studies

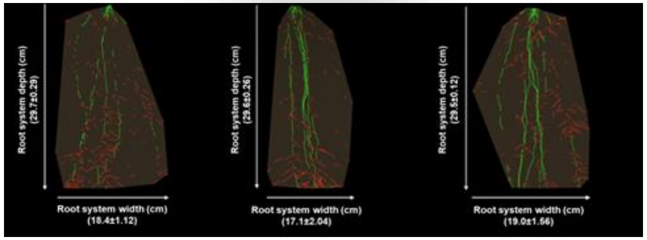
Shoot phenotyping

Root phenotyping

Root-system architecture analysis via GrowScreen-root

Phenotyping result

- Pristine PC, nanosilica-coated PC, and nanosilica-coated PC with FAS did not affect shoot growth like length of the longest leaf and dry shoot biomass and root growth like total root length and dry root biomass significantly.
- Nanosilica-coated PC and nanosilica-coated PC with FAS showed a clear observation in the root system architecture, as analyzed via GrowScreen-root, with both main roots and lateral roots appearing more intense compared to the pristine PC.



Representative (a-c) color-coded images with main roots (in green) and lateral roots (in red).