



DEEP FRONTIER

Challenging one last frontier: Understanding and improving deep rooting

Unique research facilities

Are you already studying deep roots and their nutrient uptake using, e.g., isotope tracers?
Or are you studying root development and intercropping systems of deep rooted crops?
Or even microbial or organic carbon dynamics in deep soils?

With some unique facilities at hand, we are looking for collaboration with researchers to generate scientific knowledge of deep-rooted crops and cropping systems. Please contact:
Prof. Kristian Thorup-Kristensen at University of Copenhagen (ktk@plen.ku.dk)

The Deep Frontier project (www.deepfrontier.org) carry out research into deep root exploitation of subsoil resources in order to enhance food production in a sustainable way. Research on deep roots down to 5 meters is the focus of Deep Frontier. For this purpose, the project has established unique research facilities at University of Copenhagen, Højbakkegård, in Taastrup, Denmark:

- **12 root towers**, each being 4 meters tall, and
- **24 field plots** with ingrowth cores and minirhizotrons down to 5 meters.



12 root towers

- Semi-natural conditions
- 4 meters tall filled with soil
- Testing of deep rooted crops grown in replication
- Water irrigation and sensors in each tower
- Sliding boards covering transparent walls to allow for visually observation, injecting tracers and for taking samples



24 field plots with in-growth cores

- Natural conditions
- Testing of deep rooted crops grown in replication
- By use of ingrowth cores and minirhizotrons the life of microbes, roots and uptake of nutrients can be studied down to 5 meters.



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Developing methods for research in deep soil layers in towers and field plots

Ingrowth cores for soil and root sampling. Tubes placed at 30° angles and down to 5 meters.

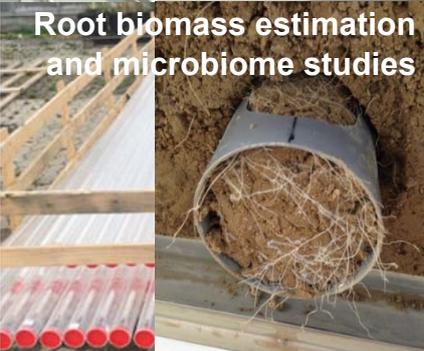
Minirhizotrons to observe root growth at different depths and study root interaction with the environment.



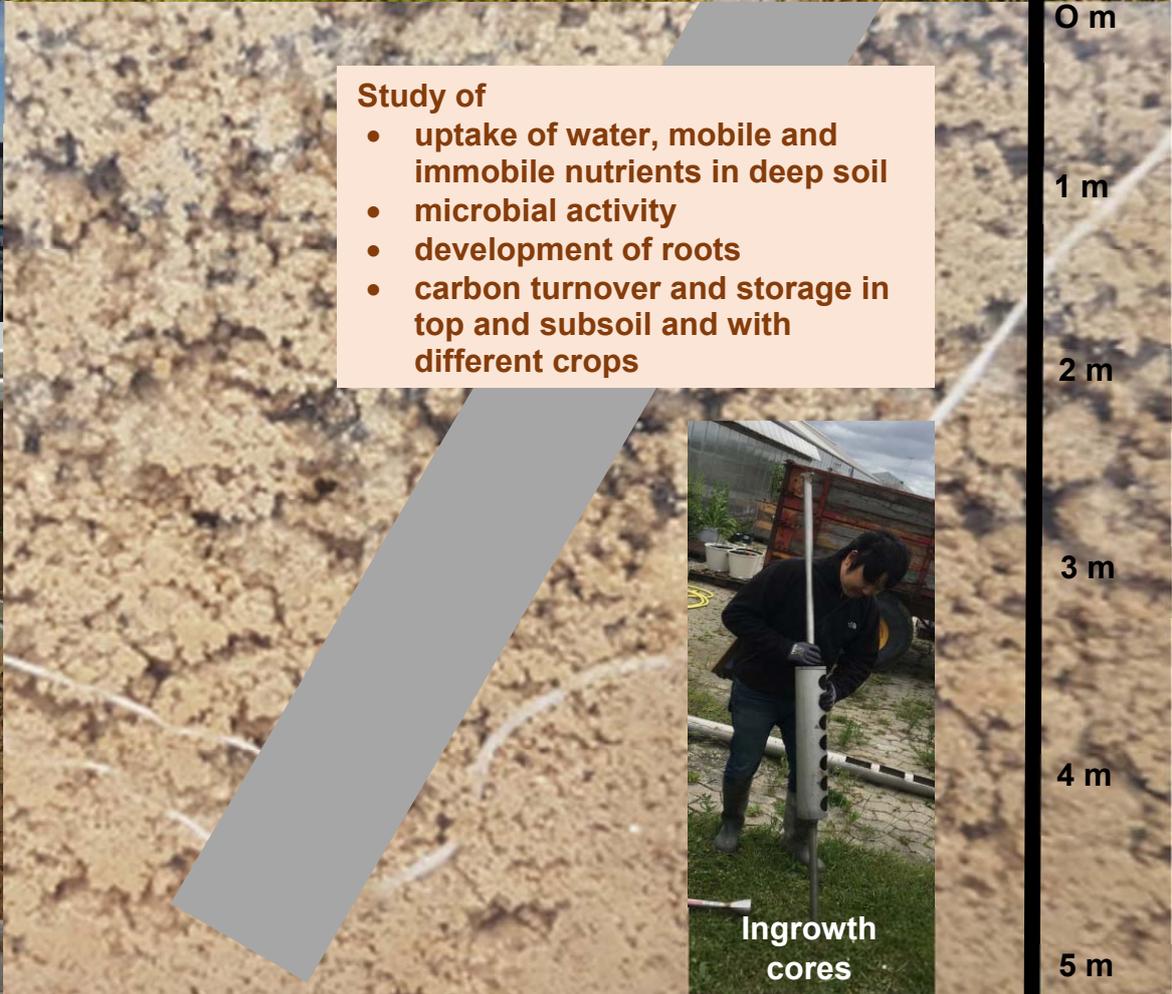
Isotopic labelled water to study water uptake and transpiration



Isotope tracers for studying plant nutrients



Root biomass estimation and microbiome studies



Study of

- uptake of water, mobile and immobile nutrients in deep soil
- microbial activity
- development of roots
- carbon turnover and storage in top and subsoil and with different crops



Ingrowth cores

For more information please contact:

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Or go to the project website:

<http://projects.au.dk/deepfrontier/>



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