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Rapeseed reaches 4 meters depth – but does it escape drought stress?

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Deep-rooted crops, such as rapeseed have access to deep stored soil moisture unavailable to more shallow-rooted crops. However, it appears that the presence of deep roots in moist soil does not necessarily ensure full water supply and prevent drought stress during progressive soil drying. Thus, there is a need to quantify the contribution of deep roots to water uptake and investigate the role of deep roots in delaying drought stress.

In large parts of Europe, climate change will lead to lower precipitation in the growing season and higher outside the growing season. This imbalance can be levelled out by growing summer crops on winter precipitation. However, it requires crops that a capable of utilizing previous surplus precipitation stored deep in the soil profile.

We grew rapeseed in a large-scale semi-field setup, allowing root growth down to 4 meters depth. We monitored the development in root growth, water uptake, stomatal conductance, leaf ABA, photosynthesis, and soil water content during progressive soil drying. This allowed us to investigate the ability of rapeseed to compensate for a lack of water in the upper root zone with water uptake in the deeper root zone and to identify the onset of stress responses.