



EMBO Global Lecture Series

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Uncovering how roots sense environmental stresses using hormone signals

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Graduate School of Horticulture, Chiba University,
Matsudo, Japan

Tojogaoka Hall
15:00 pm

Plants exhibit a remarkable ability to modify their growth and development in response to environmental signals and stresses. This ability is particularly striking during root development where they forage in highly heterogeneous environments. I will describe how plant hormones enable roots to sense and/or respond to soil environmental signals. Examples include discovering how plants sense soil moisture availability by linking intercellular water fluxes with movement of hormones auxin and ABA, triggering changes in root branching designed to maximise capture of soil resources (Orosa et al, 2018, Science; Mehra et al, 2022, Science). Plant roots also employ volatile signals like ethylene to sense changes in soil physical properties like compaction stress using a novel gas diffusion based mechanism (Pandey et al, 2021, Science). I will conclude by describing how mechanistic insights about hormone-regulated root plasticity, combined with advances in technologies including single cell expression profiling, are helping design stress resilient crops.