

ROLLBAR

Project ID: 839542

Funded under: [H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility](#)

Roots in armour - a barrier induced to protect against intrusion of soil phytotoxins?

From 2019-09-02 **to** 2021-09-01, ongoing project

Project details

Total cost:

EUR 207 312

EU contribution:

EUR 207 312

Coordinated in:

Denmark

Topic(s):

[MSCA-IF-2018 - Individual Fellowships](#)

Funding scheme:

MSCA-IF-EF-ST - Standard EF

Objective

ROLLBAR focuses on the role of two contrasting strategies against sulfide toxicity of saltmarsh plant species: i) root radial oxygen loss (ROL) and ii) formation of a root barrier to ROL. Plants inhabiting tidal environments with frequent floods possess internal gas-filled spaces in their tissues (aerenchyma), facilitating oxygen (O₂) diffusion from shoot to roots. This trait enables tolerance to the inherently low O₂ availability in flooded soils. Such soils show high levels of reduced compounds harmful for plants, amongst which sulfide is a potent phytotoxin. The role of ROL and a root ROL barrier in flood tolerance is widely recognised whereas the function of these traits in protecting roots from phytotoxin intrusion in plant tissues is still controversial. The ROLLBAR project aims to shed light on this topic. O₂ escapes from roots via ROL and oxidises the rhizosphere; sulfides are chemically oxidised to sulfate and reduced iron [Fe(II)] is oxidised to Fe(III), which can precipitate on root surfaces as iron minerals called iron plaques. Both ROL and iron plaques can protect plants from sulfide intrusion. When the root ROL barrier (suberin depositions in the outer cell layer) is developed, oxidation of sulfides occurs inside roots, as a result of the better O₂ status further enhanced by photosynthesis in light. The ROL barrier could impede sulfide intrusion acting as a shield, although there is no experimental evidence to support this function. The project aims to address three major scientific questions: i) which chemical compounds trigger the formation of a root barrier to ROL? ii) can the ROL barrier prevent sulfide intrusion into roots? and iii) can ROL and iron plaques reduce sulfide intrusion into roots? The novelty of the project relies on obtaining direct measurements of O₂ and sulfides at the root-rhizosphere interface of key species using advanced contemporary technology such as microsensors, root-sleeving electrodes and planar optodes.

Coordinator

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[See on map](#)

Denmark

EU contribution: EUR 207 312

Activity type: Higher or Secondary Education Establishments

[Contact the organisation](#)

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