IPSIM's objective is to elucidate the fundamental mechanisms controlling the hydro-mineral nutrition of plants and their responses to abiotic constraints of the environment, particularly those related to climate change.

WATER
Membrane transport
IONS abiotic stress
environmental constraints
CHANGEMENT CLIMATIQUE
root development

Plant culture

The growth of various plant species (*Arabidopsis,* lupin, rice, wheat, maize, grapevine, etc.) under controlled conditions is the basis of IPSIM experimental activity.
The Unit's growth facilities are divided into two categories: equipment with artificial climatic conditions, and S2 type greenhouses where transgenic plants can be reproduced under legal conditions of confinement.

IPSiM Institute for Plant Sciences of Montpellier

2023

Research areas

STUDY OF ACTION MECHANISMS OF WATER AND IONS MEMBRANE TRANSPORTERS IN PLANTS

These analyses are performed at the physiological and genetic level but also via specific transport measurements by electrophysiology in Xenopus oocytes, by elemental analysis in plasma spectroscopy and isotope mass spectrometry and by pressure chamber for water flows.

STUDY OF PLANT MOLECULAR RESPONSES IN RESPONSE TO ENVIRONMENTAL CONSTRAINTS

IPSiM studies the molecular actors and regulatory pathways leading to plant adaptation to stresses such as mineral deficiency, drought and elevated atmospheric CO^2.

STUDY OF ROOT DEVELOPMENT

The unit is interested in the functioning of the root, in particular with respect to hydro-mineral nutrition, but also in the adaptation of its architecture to environmental constraints. IPSiM has recently acquired a root phenotyping robot which will allow, via large-scale quantitative genetic approaches, to the identification of genes controlling the root response.

Main projects

HyArchi

Targeting root hydraulic architecture to improve plant tolerance to drought.
Christophe Maurel, European funding (ERC)

CALCLIM

Adaptation of plants to calcareous soil as a function of climate change.
Stéphane Mari and Jean-Philippe Reichheld , Agropolis Fondation funding

INRAE cnrs MUSE MONTPELLIER UNIVERSITÉ D'EXCELLENCE L'INSTITUT agro Montpellier

It's:

10 research teams

150 persons

80 researchers, engineers, technicians and administrative staff

70 doctoral students, student trainees and fixed-term contracts

Two scientific platforms

Histocytology and plant cell imaging

PHIV PLATEFORME D'HISTOCYTOLOGIE ET D'IMAGERIE CELLULAIRE VÉGÉTALE

MRI Montpellier Ressources Imagerie

Plant anatomy, histocytology, in situ hybridization, immunofluorescence, imaging of living organisms by photonic micoscopy, confocal and luminescence microscopy, spectral imaging, biosensors.

Proteomics

MSPP Mass Spectrometry Proteomics Platform

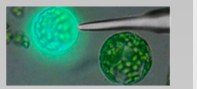
PPM

Mass Prot' INRA

Identification of proteins, molecular characterization of their post-translational states and quantification by mass spectrometry.

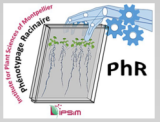
Four technical workshops

Heterologous expression and electrophysiology



Molecular analysis of membrane transport of water and mineral ions in plants. Measurement of the electrical signature of membrane transport proteins activity.

Root phenotyping



Non-destructive and kinetic analysis of the growth of root system growth of seedlings of various species grown *in vitro*.

Stable isotope analysis

AQUI ISOTOPES QUANTIFICATIONS

Analysis of the content of stable isotopes of nitrogen and carbon (^{15}N and ^{13}C) in plant samples. Measurement of the flux of nitrogen and carbon compounds between the external environment and the plant, and between the different organs of the plant.

Multi-elemental analysis

Elemental content analysis (phosphorus, calcium, magnesium, sodium, iron, zinc, manganese...) of plant and soil samples.