

Location

UMR ISPA (Villenave d'Ornon, France) and UMR Biogeco (Cestas-Pierroton, France)

Mission

In the context of climate change, the sustainability and development of forest ecosystems depends on their capacity to survive and adapt to multiple risks, particularly storms. Trees have the capacity to modify their development according to chronic wind conditions (thigmomorphogenesis) to increase their resistance to strong winds. Such phenomena are observed for roots and improve the anchorage of trees. This project aims to better understand the mechanisms of wind acclimation of root systems, to characterize the stimuli experienced by the roots and the response of tissues according to the type of stimuli in order to deduce a first model of wind acclimation at the root system scale. The model species of the project is Maritime Pine in the Landes massif. The project combines two parts. A first experimental part aims at a detailed knowledge, for 10 individuals, (i) of the stimuli perceived by the roots when the tree swings under winds and (ii) of the growing response of the roots induced by these stimuli (radial growth and nature of the tissues formed). A second part of the project consists in extending these response laws obtained for a few trees to a wider range of individuals. This will be based on the analysis of an already existing database of about 1000 maritime pine root architectures obtained by 3D scanning. We will also rely on numerical simulations to model the stimuli perceived by the roots under different wind conditions.

Skills

-Degree required: Master of Science or Engineering with relevant background in environmental sciences or forestry.

-Strong appetite for experimental approaches and inter-disciplinary research.

- Knowledge of programming softwares (R, Python, C++, etc.) are appreciated.

- Capacity to work in English is required. Knowledge of the French language appreciated.

Applications and inquiries should be sent to:

Pauline Défossez, researcher (pauline.defossez@inrae.fr)

Application deadline: June 2nd 2021