

DOMANHYC

Domesticating the first MANGanese Hyperaccumulator Crop

ABSTRACT

The Anthropocene has seen a dramatic change in metal cycling and restoring soils left bare by mining activities or polluted by toxic elements has become a major challenge to maintain ecosystem services and sustainable food production. Some plants naturally exposed for millions of years to high concentrations of metals, have developed particular adaptations including metal accumulation.

Year : 2017

Project number : 1702-017

Type of funding : AAP

Project type : AAP YOUNG SCIENTISTS

Research units in the network : AGAP

Start date : 2018-05-01

End date : 2019-12-31

Flagship project : no

Project leader : Yohan Pillon

Project leader's institution : IRD

Project leader's RU : LSTM AMAP

Budget allocated : 19980 €

Total budget allocated (including co-financing) : 19980 €

Funding : Labex

GOAL

The shrubs of the genus *Hakea* are plants that naturally occur on the nickel mining site of New Caledonia and are manganese accumulator. Their metal rich biomass can be used to catalyse chemical reactions in the chemical industry. The project is aiming at characterising the genetic, ecological and chemical diversity of the genus *Hakea* in New Caledonia. This will allow to identify the most appropriate genotypes to use in ecological restoration and identify the best candidate for farming as a metal accumulator crop to provide the chemical industry with metal rich biomass.

RESULTS

The genetic study will allow to clarify the taxonomy of the genus *Hakea* in New Caledonia which has not been updated for 50 years and is disputed. It will provide information on the genetic structure of these plants since the landscape of New Caledonia is strongly fragmented. This information will guide the choice of ecotypes to transplant on each mining sites depending on its geography and ecological setting (elevation, precipitations, etc.). Measures of manganese concentration in *Hakea* leaf will allow the identification of the strongest metal accumulator in New Caledonia. Such plants would be prime candidates for large scale planting to produce large amount of metal rich biomass.

PERSPECTIVES

The project should pave the way for the domestication of the first manganese accumulating crop, and the first New Caledonia endemic plants. This is promising avenue to diversify the economic activity of this overseas territory with a novel cash crop.

