SoilPhorLife Research Platform

Does innovative P-fertilization enhance P use efficiency and plant stress tolerance?

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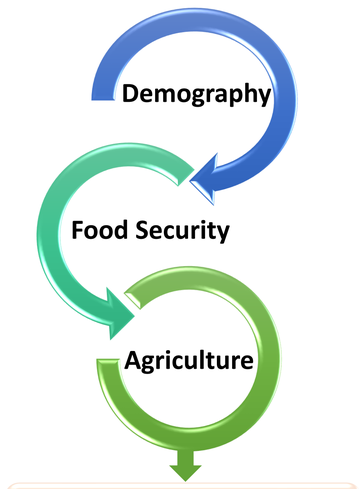
CONTEXT

In Africa, agriculture is by far the most important economical sector regarding local development and employment incomes. However, water scarcity, nutrient deficiency, soil salinity and plant diseases are, among others, severe biotic and abiotic constraints to crop productivity. These constraints impact plant growth by affecting key physiological, biochemical and molecular functions. In addition, many soils exhibit an inherent low fertility level, in particular for phosphorus (P) which represents an adverse constraint to achieve better yields.

Keywords: Phosphorus, P-fertilizers, Root exudates, Root development, P use efficiency, Salt stress, Modeling, Diseases, Microbiota, Food security



RESEARCH QUESTIONS

- What will be the effects of P application on plant growth, P use efficiency and what are the key rhizosphere mechanisms explaining these effects?
- Is there an optimum P supply in order to alleviate the plant stresses related to excess of salts?
- What are the effects of P fertilization on plant disease development and on rhizosphere microbial communities?

OBJECTIVES

- Understanding root responses to different P sources and elucidate mechanisms involved in rhizosphere functioning for a better phosphate nutrition.
- Assessing specific crop needs in P under salt stress condition and developing a multifunctional model of interaction between salinity stress, soil type and fertility.
- Evaluating the dual impact of P fertilization on disease development and rhizosphere microbial communities.

Soil degradation | Water resources & quality | Biotic and Abiotic stresses | Plant nutrition | Climatic changes

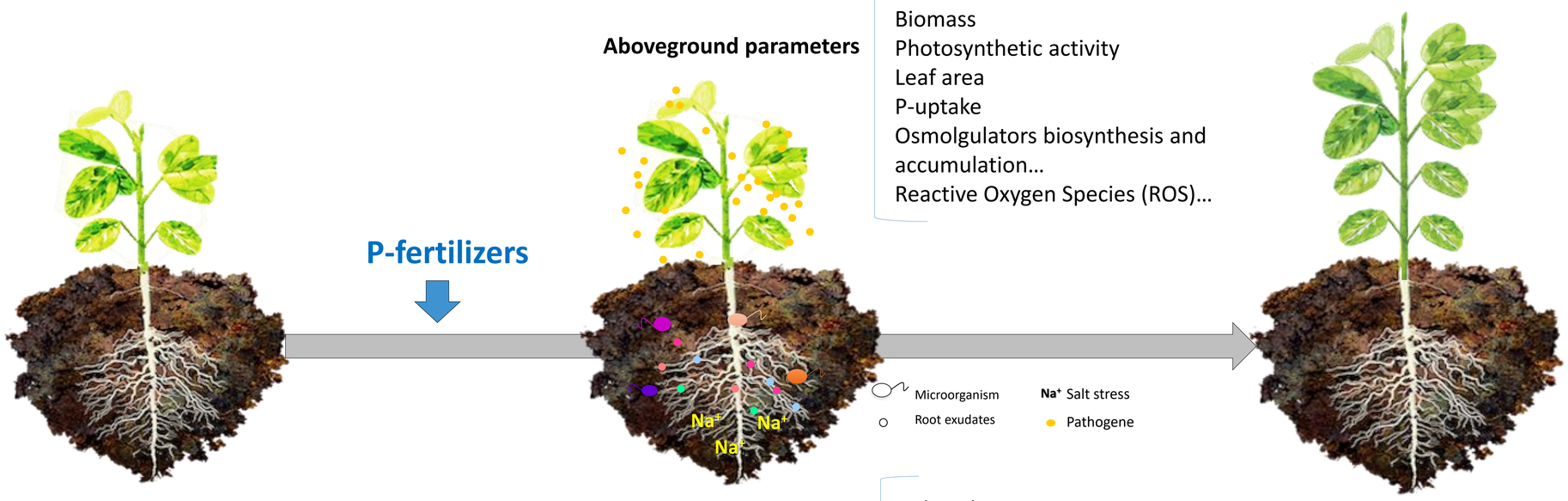
Soil-Plant-Microbe Interactions P-fertilization

P availability in soil-plant-microbe continuum

Testing different **P fertilizers**

- Salt-stressed plants tolerance
- Alleviation of plant diseases
- Root architecture and root exudates

Need of plant in Phosphorus under stress conditions: **Optimal fertilization**



Management of plant diseases through optimising P fertility | New practical model for salinity tolerance with optimal fertilization | Exploring functional root traits for better phosphorus nutrition

Determination of P-fertilizer recommendation through developing an innovative approach allowing better monitoring of plant growth under biotic and abiotic stresses

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