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# Does the Fe-acquiring strategy of plants influence the uptake and translocation of REE in plant tissues?

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## Résumé

Rare Earth Elements (REE) composed of La-Lu, have a unique set of electro-magnetic and optical properties which make them profitable to exploit for technology. As their utility has increased, so too has their circulation in the biosphere. Emanating from increasing concerns about the toxicity of REE, this research is devoted to determining the fate and transport of REE in the planted environment. In particular REE tends to associate with key plant nutrients such as phosphate and iron. Iron is an essential nutrient for plant growth and ubiquitous in the environment. The phytoavailability of iron is subject to plant manipulations of mineral phases present in the rhizosphere. These manipulations are further classified as Strategy I or Strategy II Fe-acquisition. Where most monocotyledon and dicotyledon plants perform Strategy I and graminaceous plants perform Strategy II. Recent field studies have implicated Fe-acquiring strategies in the mobility and transfer of REE in plant tissues. This study aims to isolate the effects of Fe-acquiring strategies on REE uptake using a hydroponic system and comparing a system fed with Fe-sufficient and Fe-depleted nutrient solution and three progressively high levels of REE. A barrier to this study was the speciation of REE in nutrient solutions, over the course of the study REE precipitated from solution. REE forms strong associations with many components of the nutrient solution. However, by the end of the study REE was chelated back into solution and plant available, showing the potency of plant nutrient acquiring strategies on ancillary metals in the environment. The resultant REE signature is presented, showing the preferential assimilation or occlusion of particular REE and relating the data using chemical associations recorded in existing literature.

**Mots-Clés:** Keywords: REE, Plants, Fe, Strategy, Uptake, Translocation

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