



Effect of phosphate fertilization on the bioavailability of iron in calcareous soils

A.R. Sánchez-Rodríguez, M.C. del Campillo, V. Barrón, and J. Torrent

Department of Agronomy, University of Córdoba, Córdoba, Spain (l02saroa@uco.es)

Iron (Fe) chlorosis is the most important nutritional problem in sensitive plant species cultivated in calcareous soils, its main symptoms being interveinal yellowing in the younger leaves due to lack of chlorophyll and reduced growth. Fe chlorosis has been related to the content of poorly crystalline Fe oxides in soil. The effect of other nutrients, especially phosphorus (P), is, however, a matter of debate. In this work we examined whether fertilization with P alters the availability of Fe to sensitive plants growing in two different Fe chlorosis-inducing calcareous soils. Phosphate at rates of 0 (control), 25, 50, 100 and 200 mg P kg⁻¹ soil was applied to pots where six-months-old olive trees cv. Arbequina were grown. The experiment lasted three years and took place in a shaded house. Chlorophyll concentration in the young leaves was estimated with the SPAD value (using a Minolta apparatus) three-four times per year. Furthermore, shoot length, dry weight of annual pruning and mineral element concentration were measured at the end of each year. In one of the soils, SPAD and leaf Fe concentration decreased with increasing P dose. However in the other soil, SPAD was not correlated with the rate of applied P. In both soils, potassium and zinc concentrations in plants fertilized with P were lower than those in the control plants.

This work was funded by the Spanish Ministry of Science and Innovation, Projects: AGL 2005-06691-C02-01 and AGL 2008-05053-C02-02, and the European Regional Development Funds. ARSR acknowledges the financial support from the Spanish Ministry of Education as a fellow of the program "Training of University Teachers" (Formación del Profesorado Universitario, AP2008-04716)