

## **DEVELOPMENT AND CHARACTERIZATION OF IMPROVED RICE VARIETIES FOR CULTIVATION IN THE MEDITERRANEAN REGION**

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The development of improved cereal germplasms and varieties that are more adapted to dry conditions in the Mediterranean region through combined genetics, physiology, breeding and biotechnology expertise is the major goal of the Eu-funded project CEDROME (INCO 015468). Within its framework, the development of rice cultivars with improved tolerance to cultivation under reduced water regimes (simil-upland), with turnated irrigation, is a major objective. An evaluation of 7 italian rice cultivars for the main agronomical, quality and phytosanitary traits was performed in a two year experimental design, comparing the conventional agrosystem with the simil-upland. Under this water regime it was estimated that plants received 1/5 of the total water volume needed for culture in submersion. Water shortage caused a yield reduction of 40% average when compared to conventional submersion; this resulted from a decrease in the 1000 seed weight (-19%), tiller density (-34%) and panicle sterility (+54%). However, three cultivars showed a considerably good performance under stress: cv. Eurosis, SI R215 and Augusto showed a yield and milling yield reaching values of about 80% compared to conventional culture, with highest values of WUE. Grain quality traits and phytosanitary conditions of the seed were also evaluated for further characterization. Dry land conditions stimulate in rice roots a colonization with Arbuscular Mycorrhizal (AM) fungi. In general, under natural conditions, in plants they provide a partnership in which a complex system of intra-radical and extra-radical hyphae is involved. The symbiotic system contributes to the uptake of water and nutrients and creates a modified rhizosphere which confers protection to the plant under stress condition. Two cultivars, one chosen among those with the highest performance and one among those with the lowest performance were chosen for AM evaluation. The presence of AM fungi in the roots of the two cultivars grown in different water regimes was checked by morphological observation, followed by quantification. No AM fungi colonization was found in both cultivars grown in paddy fields under submersion, whilst in roots of plants grown in dry land conditions, all the typical AM structures, like intracellular hyphae, arbuscules and vescicles, were observed. The degree of colonization and arbuscularization was rather low and similar in the two cultivars. AM fungi taxa colonizing the two cultivars in simil-upland condition are being investigated through molecular analysis.