Rice (Oryza sativa L.) is the most diverse crop in the world and it can be grown under irrigated (lowland) or rainfed (upland or lowland) conditions. Rainfed rice occupies about 45% of the global rice area and accounts for about 25% of the rice production. During the last years in Italy, water shortage occurring early in the cropping season represents an important problem for rice production, and therefore the identification of varieties which adapt better to sudden water deficit is a major requirement. The major objective of this research is to evaluate the performance of Italian rice cultivars under simil-upland conditions with turnated irrigation, in comparison with the flooded system, as far as the main agronomical, phitosanitary and quality traits are concerned.

The field experiments were conducted throughout two years (2004-2005) at C.R.A. - Rice Research Section, in Vercelli, Italy. During the cropping season, in the experimental field under similar dry conditions, three irrigation treatments by flushing method were performed. Total water supply (rainfall plus irrigation) was 3491 m³/ha in 2004 and 3907 m³/ha in 2005. Water Use Efficiency (WUE) representing the quantity of paddy rice produced (kg ha⁻¹) for mm of total water used, was calculated. This study showed that, when compared to the flooded system, the water shortage caused an average 43% yield reduction, which was the result of a variation of the grain yield components (i.e. panicle sterility +54%, tiller density -34% and 1000 seed weight -19%). However, under water shortage conditions, the highest yields were obtained by Eurosis (6.07 t/ha), Augusto (5.50 t/ha) and SIS R215 (5.47 t/ha), which showed the best WUE value as well. The results related to quality traits indicated that water shortage caused a reduction in the milling grain, with the cv. SIS R215 being the less affected. In addition, the amylose content increased significantly in some varieties (Eurosis and Gange) if compared to the flooded system. The culture morpho-phenological evaluation showed an average 20% increase in the cultural cycle and an average 20% decrease in the plant height. Although the infection degree of the seed increased under the simil-upland system, if compared to the conventional culture, it did not correlate with presence of any important mycotoxin (DON, ZEN, FB1).

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