PHENOTYPING AND CATALOGUING OF HYSTORICAL ITALIAN RICE GERMPLASM

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Rice (Oryza sativa L.) is one of the most important cereal crop, and the staple food of more than half the world’s population. Rice genetic resources, represented by traditional and modern varieties, genetic stocks and breeding lines, are the basis of world food security. Characterisation, conservation and rejuvenation of these genetic resources are important to limit genetic erosion and to help in developing new varieties in different breeding programmes.

A field experiment was conducted in order to study the diversity in morphological, phenological and quality traits of historical Italian rice germplasm and to investigate the possible relationships between these traits. The experiment were carried out at C.R.A-Istituto Sperimentale per la Cerealicolatura at Vercelli, during 2006. A total of 112 rice varieties were grown: seventy-one of these varieties represent the historical rice germplasm released in Italy between 1850 and 1940, and 41 varieties represent the modern rice varieties, released in the last 10 years. Rice varieties were sowed in single plots 4-5 m long, in 6 rows (two rows for each variety). Rice was drill seeded at approximately 5 g of seed per row, in dry conditions. Permanent flooding was established at 3-4° leaves development stage and the soil was then kept submerged until 1 month before harvest.

During the cropping season, the main morphological and phenological traits were evaluated following the “Standard Evaluation System for Rice, IRRI 2002“ (www.irri.org) and the “Guidelines for the conduct of tests for distinctness, uniformity and stability, 2004” (www.upov.int).

At maturity, rice samples were collected and evaluated for some important grain quality traits, such as amylose and protein content, milling yield and processing quality (amylographic profile using Rapid Visco Analyzer-Foss).

Results showed there was considerable genetic variation between groups (historical and modern) and among rice varieties for each group, for all traits examined. Rice varieties varied greatly in term of total plant height from the old varieties, in which plant height ranged from 74,5 to 137,2 cm, being 72% of these higher than 100 cm. The group including modern varieties, clearly showed the effect of the exploitation of sd-1 gene (semidwarf) and plant height ranged from 67,0 to 110,0 cm. Most of these varieties (84%) were shorter than 100 cm. Difference among varieties were also observed in terms of: growth cycle (sowing-maturity interval), panicle length, panicle type and plant architecture. There was large variation among genotype for all traits concerned with grain size and shape. Brown rice grain length ranged from 4,29 to 6,97 mm into historical rice group and 5,01 to 8,05 mm for modern rice group. Grain length – to – width ratio ranged from 1,43 to 2,66 mm, and from 1,65 to 3,39 for the old varieties and modern varieties respectively. Grain length was
negatively correlated with grain width but positively correlated with length–to–width ratio. In year 2007 another set of about the same number of genotypes will be analyzed thus completing the survey which will result in a complete data base that will be available on line.

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