

FIELD EVALUATION OF TEMPERATE RICE GERMPLASM FOR BLAST RESISTANCE

CAVIGIOLO S.*, FAIVRE-RAMPANT O.***, GREPPI D.*, LUPOTTO E.*

*) CRA - Unità di Ricerca per la Risicoltura, Vercelli (Italy)

**) Rice Genomics group, CERSA, Parco Tecnologico Padano, Lodi (Italy) and CIRAD - Montpellier (France)

blast, Pyricularia grisea, temperate rice germplasm, disease evaluation

Blast disease, caused by the fungal pathogen *Pyricularia grisea* (Cooke) Sacc. is one of the most important biotic stress in rice (*Oryza sativa* L.). Blast affects both temperate and tropical rice varieties grown under different environmental conditions, showing higher rates of infection in areas where high-input rice cultivation is practiced. Development of resistant varieties and utilization of chemical fungicides are considered to be the most effective methods against blast disease. Italian rice germplasm, including old traditional and modern varieties, is characterized by a medium-high level of blast susceptibility. The identification of genetic sources of broad spectrum and durable resistance in the temperate and exotic rice germplasm collection, is of major importance in the breeding programmes in view of identifying valuable parents in crosses.

Field experiments are conducted in order to evaluate blast resistance of different temperate rice genetics resources at CRA-RIS in Vercelli. In year 2007, a total of 112 rice varieties (Italian rice varieties, exotic varieties and advanced CRA lines) were grown in a field nursery assembled in plots where natural infection was obtained with alternate rows of cv. Maratelli (susceptible check and infection source) and tested genotypes. The rice varieties were sowed in miniplots (1.5 m long and 0.12 m row spacing) with 8 rows (one row for each variety). Rice was drill seeded at approximately 5 g of seed for each row, in dry soil conditions. Permanent flooding was established at 3-4° leaves development stage and the soil was then kept submerged until 1 month before harvest. A total of 300 kg N/ha (supplied by urea fertilizer) were distributed into soil, to enhance susceptibility and create the proper environment for disease spreading.

The disease scores were visually investigated using a 1-6 infection scale according to international protocols, where 1 indicated no blast lesions and 6 indicated high susceptibility. Data were collected one time during the growing season, at physiological maturity stage, when the susceptible reference variety was totally destroyed by fungus. The collection was also tested with direct infection of 3-4 leaf stage seedlings by three selected blast strains (It2, It3, and It 10), representative for pathogenicity in the Mediterranean area.

Results showed a considerable variation among the rice varieties for disease reaction. Only two rice varieties scored value 1 of the infection scale: the Chinese *indica* variety TeQing (blast resistance gene *Pi-b*) and advanced CRA line ISC597. Value 2 of the infection scale was assigned only to 25 rice varieties. Twenty nine varieties scored value 3, 12 varieties rated 4. The high susceptibility to blast disease (values 5 and 6 of the infection scale) was assigned to 44 rice accessions. The *Pyricularia* field experiment revealed the existence of rice genetics resources with high resistance score for the natural pathotypes occurring, thus providing valuable data on genetic material to be used into breeding program. Molecular analyses of the collection are also underway

in order to genotypize the rice germplasm available for known resistance genes (genes *Pi*) by means of molecular markers.

This work is performed within the framework of the EU project EURIGEN (049 AGRI GEN RES) and the project VALORYZA financially supported by Italian MIPAAF (D.M. 301/7303/06).