Registration of RU8703196 Disease-Resistant Rice Germplasm

Rice (Oryza sativa L.) line RU8703196 (Reg. no. GP-78, PI 574487), developed from the cross 'Leah'/RU8003050, combines improved sheath blight resistance and superior blast resistance in a semidwarf plant type with typical U.S. long-grain size, shape, and cooking quality characteristics (1). RU8003050 is a relative of 'Lemon', derived from the cross 'Lebonnet'/CI 9881/PI 331581. Like Lemont (2), it is highly susceptible to Rhizoctonia solani Kühn (the sheath blight pathogen) and resistant to most U.S. pathotypes of Pyricularia grisea (Cooke) Sacc. (the rice blast pathogen). Leah (3) is a short-statured U.S. long-grain cultivar with moderate resistance to sheath blight and resistance to most pathotypes of blast fungus. Both parents lack major-gene resistance to races IB-49 and IC-17; Leah also lacks major-gene resistance to races IB-1 and IB-54. PI 574487 inherited the major-gene blast resistance of Leah. When challenged with virulent races of P. grisea under blast nursery conditions (4), Lemont showed excellent field resistance to leaf blast, Leah showed less (but still greater than most U.S. cultivars), and PI 574487 ranked between them in field resistance.

A 3-yr study (1987-1989) was conducted to relate yield losses to sheath blight severity. Yield reductions were calculated from yields of side-by-side inoculated and check plots replicated four times each year. Disease indices (DIs) were based on visual estimates of the percentages of harvested area in severity classes 5, 7, and 9 using a standard 0-9 scale (5). Disease index and percent yield reduction were highly correlated in this study ($r^2 = 0.92$). The DIs of Lemont, Leah, and PI 574487 averaged 7.3, 4.7, and 3.7. Average yields of 5633 ($-16\%$) kg ha$^{-1}$ in inoculated plots, 574487 yields were similar to those of Lemon, but 38\% higher in the presence of sheath blight. Regional yield trials conducted in Arkansas, Mississippi, and Texas during 1987-1989, Lemont averaged 7021 kg ha$^{-1}$, compared with 6395 kg ha$^{-1}$ for PI 574487. A comparative study with high and low N-rates (112 and 190 kg ha$^{-1}$) was conducted in 1987 to explain the yield differences between the plots. Again, the Lemont yields were higher than those of PI 574487, regardless of N-rate vs. 4728 and 4990 kg ha$^{-1}$ at the 112 and 190 N-rates, respectively.

Milling yields are inferior to those of Lemont. Yield trials, Lemont averaged 62\% milled compared with 54\% for PI 574487. PI 574487 is 3 d later maturing and 4 to 9 cm shorter than Lemon, the relationship between plant height and sheath blight has been demonstrated previously (6). Although shorter than the plant height considered optimal, PI 574487 consistently improved sheath blight resistance, another indication of superior resistance.

PI 574487 was released jointly on 6 June by the USDA-ARS and the Texas A&M Agricultural Station, Beaumont, TX. For an initial 5-yr period, the USDA-ARS will be distributed for research purposes upon written request to the USDA-ARS Rice Research Unit, Rt. 7, Box 999, Beaumont, TX 77713-8530. Seed will be maintained by the USDA-ARS National Small Grains Collection, P.O. Box 307, Aberdeen, ID 83210. Appropriate recognition of source should be given when this germplasm contributes to research or the development of new germplasm.

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References and Notes

4. Cytoplasmic male sterile Vulcan and fertility restorer R35733 provided by Cargill Seeds, Tamworth, Australia.
5. P.M. Banks, Queensland Wheat Res. Inst., P.O. Box 2282, Toowoomba, QLD 4350, Australia; P.J. Larkin, CSIRO Division of Plant Industry, GPO Box 1600, Canberra ACT 2601, Australia. Contribution of CSIRO in collaboration with the Chinese Academy of Agricultural Sciences, Bejing. Registration by CSSA. Accepted 31 July 1994. *Corresponding author.

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