

HOST PLANT RESISTANCE TO STORED-PRODUCT INSECTS IN VARIETIES AND HYBRIDS OF RICE

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Abstract

Differential susceptibility to stored product insects was observed among commercial U.S. varieties of rice in 1972. Subsequently about 1,000 varieties of rice from the U.S.D.A. World Collection were assembled and screened for resistance to Sitotroga cerealella and about 30 varieties were selected as potential sources of resistance. Three of the most promising varieties were crossed with the susceptible cultivar 'Vista' for genetic studies.

The inheritance of resistance to Sitotroga cerealella was studied in segregating populations of Vista x CI 7097 and Vista x PI 1670849 through the F₃ generation. Inheritance studies in the cross Vista x Mutica (CI 12273) have been conducted through five generations and are continuing. Resistance appears to be controlled polygenically, with some evidence of partial dominance. The correlation coefficient between the reaction to S. cerealella of F₂ plants and the means of F₃ lines derived from them was 0.7, and the coefficient of determination, i.e., r², was 0.49. There was a strong tendency for lines that were resistant to S. cerealella to be also resistant to Rhizopertha dominica and Sitophilus oryzae, the correlations between reactions to the different insects being greater than 0.9.

The only resistance base that has been positively identified derives from the integrity of the rice hull. However, weak correlations between resistance and some physico-chemical characteristics suggest that chemical or nutritional factors might be involved in resistance.

Mutica is the most promising source of resistance to stored-product insects yet discovered. It is being used in the breeding programs at Beaumont in an attempt to develop resistant rice cultivars.