1. Linkage test of genes for Helminthosporium turcicum resistance

A search for genes for Helminthosporium turcicum leaf blight resistance was conducted utilizing L. F. Randolph's multiple dominant and multiple recessive marker gene stocks. The stocks were crossed with the resistant inbreds NC34 and Mo21A. The F_1 involving the multiple dominant stock was backcrossed to the resistant parent. In the F_1 involving the multiple recessive it served as the recurrent parent. These crosses provided suitable marker genes for all chromosomes except 5 and 7.

Highly significant associations were found for seven regions involving six chromosomes in the Mo21A crosses. Of these four were positive and three were negative. Genes for H. turcicum leaf blight resistance were found linked with bm_2 and Pr in chromosome 1, lg in chromosome 2 and su in chromosome 4. Negative associations were found for the genes cr, j and g located in chromosomes 3, 8 and 10, respectively.

In crosses involving NC34 a highly significant positive association was found for j. A highly significant negative value also was found for or in crosses with this inbred.

The results suggest that factors governing resistance to H. turcicum are located at least in chromosomes 1, 2 and 4 of Mo21A and in chromosome 8 of NC34. Apparently the cr gene is linked with a factor for resistance present in the multiple recessive stock or contributes a pseudo-type of resistance associated with its effect on plant morphology. Genes for susceptibility to H. turcicum evidently are located in chromosomes 8 and 10 of Mo21A, linked with genes j and g. A negative association was not obtained for the latter locus in the multiple recessive NC34 backcrosses.

It should be pointed out that the above results are based on one year's data. Genotype environmental interactions may give different results in another season.

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