Characteristics of Leaf Rust Resistance Transferred from Rye to Wheat

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A NUMBER of recently produced alien addition lines and substitution lines of common wheat (Triticum aestivum L.) possess genetic material in the alien chromosome that confers resistance to specific wheat pathogens. Transfer of such alien genes to wheat chromosomes is important, as they might provide a long-standing barrier to the evolution of virulent races of the pathogen. For this reason the understanding of the behavior of these alien genes has become more critical.

This paper reports on cytological confirmation of an induced transfer to a wheat chromosome of one such alien gene as well as a description of some of the characteristics of this particular resistance.

MATERIALS AND METHODS

The line involved in this study is the Cornell Wheat Selection 82a1—2—4—7 whose parentage, as described by Jensen and Kent (2), traces back to a cross between common wheat × rye (Secale cereale L. 'Rosen'). As described by Sebesta (3), this line possesses 22 pairs of chromosomes including a pair of telocentric chromosomes derived from rye that bear genetic material for resistance to wheat leaf rust (Puccinia recondita Rob. ex Desm.). As detected by Sears (4), a second telocentric is also involved in this selection, namely the left arm of chromosome 2A (formerly XIII). The lack of vigor which usually results from loss of the right arm of chromosome 2A has been circumvented in this line by the presence of the closely related (homoeologous) rye telocentric. Selection 82a1—2—4—7 is therefore more accurately classified as an alien telocentric substitution line rather than an addition line.

In utilizing this line in the examination of a method for detecting induced intergeneric translocations, Driscoll and Jensen (1) detected two Xa lines, 20r—148—5—11 (referred to as line A) and 15r—137—1—11 (line B), that possibly possessed the alien gene for resistance translocated to a wheat chromosome. Lines A and B

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