Inheritance of Susceptibility to *Helminthosporium victoriae* in Crosses Involving Victoria and Other Crown Rust Resistant Oat Varieties

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Prior to the discovery of *Helminthosporium victoriae* Meehan and Murphy (4) many new improved oat varieties were derived from crosses with Victoria as one parent. These varieties contained the gene combination from Victoria for crown rust resistance but as was shown by Murphy and Meehan (5) and also by Litzenberger (3) this same gene combination for the Victoria type of crown rust resistance conditioned susceptibility to *H. victoriae*. This linkage between the Victoria type of crown rust resistance and susceptibility to *H. victoriae* has not been broken, which has led some to believe the reaction to these two diseases was a pleiotropic effect of a single gene. If this was the case it was conceivable that some other factor combination for crown rust resistance which was epistatic to the Victoria type of crown rust resistance might also be epistatic to the *H. victoriae* reaction. Such a combination would be very valuable in a variety since it would maintain the Victoria type of crown rust resistance to any races to which the other type might not be resistant and at the same time would be resistant to *H. victoriae*.

Cochran et al. (1), Litzenberger (3) and Weetman (6) have shown the Victoria factor for crown rust resistance and the two complementary factors for crown rust resistance from Bond to be independent. Litzenberger (3) found the Bond type of resistance was epistatic to the Victoria type of resistance for crown rust race 1 to which both parents were resistant. He further showed the addition of the Victoria type of resistance to the Bond type gave resistance to race 45 of crown rust to which the Bond type was not resistant. The addition of the Victoria gene however always resulted in susceptibility to *H. victoriae*.

MATERIALS AND METHODS

From studies of inheritance of resistance to race 57 of crown rust, Finkner (2) established that the varieties Ukraine and Landhafer had crown rust resistance factors which were epistatic to the Victoria type of crown rust resistance. The Victoria type of crown rust resistance was found to be epistatic to the type of crown rust resistance from the varieties Klein 69B and Anthony-Bond × Boone and dominant to susceptibility in Reselect Clinton. Victoria was susceptible to *H. victoriae* and all other parents were resistant. F3 lines from crosses of the above varieties were inoculated with crown rust race 57 and later with a mycelial suspension of *H. victoriae*. Individual plants in each F3 line were therefore classified as to their rust reaction and further classified as to their reaction to *H. victoriae*.

RESULTS AND CONCLUSIONS

The summarized data for reaction to *H. victoriae* of F3 lines from five crosses having Victoria as one parent are presented in table 1. It was assumed susceptibility to *H. victoriae* was dominant and conditioned by a single factor pair. A satisfactory fit was obtained in three crosses but not in two. In the crosses of Ukraine and Landhafer with Victoria, too many lines were classified as susceptible and too

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