UTILIZATION OF THE W38 RESISTANCE OF WHEAT TO HESSIAN FLY

Resistance of wheat to hessian fly, *Phytophaga destructor* Say, was discovered in W38, a selection from the spring wheat Illinois 1, by the two senior authors in cooperation with W. B. Noble in 1935 (2). The inheritance of this resistance was studied by Caldwell et al. (1) and the gene pair controlling resistance designated as *H*$_H$,$H_S$. This hessian fly resistance is now commercially available in the soft red winter wheat variety, Dual (C.I. 13083), which was distributed by the Purdue University Agricultural Experiment Station and the U. S. Department of Agriculture in the fall of 1955. Hessian fly resistance in the variety Dual is combined with resistance to leaf rust caused by *Puccinia recondita* Rob. ex Desm. (3), resistance to soil-borne mosaic in Indiana, high yielding capacity, winter hardiness, stiff straw and superior soft wheat milling and baking qualities. Dual is the first commercial winter wheat variety possessing the W38 type of resistance and also the first hessian fly resistant variety of any type developed for the eastern soft winter wheat region. The spring wheat varieties, Java (C.I. 10051), Dixon (C.I. 6049), and Marvel (C.I. 8876), which have hessian fly resistance similar to that reported for W38 (5) have been commercially grown in the past. The resistance of Java to the Indiana fly population was shown in a cross with W38–6 to be controlled by the *H*$_H$,$H_S$ gene pair (6). Field reactions of Dual and Vigo (C.I. 12220), a susceptible check variety, to hessian fly infestation in the eastern soft winter wheat region, extending from Missouri to Maryland, are summarized in table 1.

Although Dual has been highly resistant to hessian fly in the field, it is susceptible to a specialized race of hessian fly selected in greenhouse studies by Cartwright and Noble (5). Since the native population includes a very small portion of individual flies capable of attacking varieties possessing the W38 resistance, the widespread production of Dual may be expected to provide a screening mechanism favorable to the propagation of such individuals. This in time may result in populations capable of attacking the Dual variety. Programs are now in progress to combine other resistance factors from wheat lines resistant to the W38-attacking hessian fly races with the *H*$_H$.

W38 shows decreased resistance to hessian fly in the seedling stage at higher than normal temperatures (4). Observations of Dual in the late summer of 1956 substantiate the earlier work indicating that the increased infestation of Dual at high temperatures may have some practical importance in fields planted extremely early. However, such naturally infested plants of Dual have been less stunted in growth than those of infested susceptible varieties. The puparia developed under these conditions are generally smaller and less viable than those from susceptible varieties. Under cooler conditions prevailing during the emergence of the spring hessian fly brood no significant infestations have occurred in the Dual variety even though exposed to heavy attack.

Hessian fly damage to susceptible varieties has been reduced in Indiana for many years by delaying the seeding of wheat until after the average hessian fly free date in the fall. The use of Dual currently provides protection from both fall and spring broods of hessian fly, results in increased production of grain from more timely seeding, and permits early seeding for pasture.—RALPH M. CALDWELL, Professor of Plant Pathology, Purdue University, LEROY E. COMPTON, Agronomist, Crops Research Division, A.R.S., U. S. Department of Agriculture, and JOHN F. SCHAEFER, Assoc. Professor of Plant Pathology, and FRED L. PATTERSON, Professor of Agronomy, Purdue University.

**LITERATURE CITED**


**EARLY REFERENCES TO GIANT WHITE CLOVER**

The giant form of white clover, generally known as Ladino, was described as *Trifolium repens f. giganteum* in 1847 (3). It was grown at the North Carolina Agricultural Experiment Station from Italian seed in 1891 and described as *T. repens* var. *latus* in 1894 (4). The dates 1847 and 1891 are considered as the earliest known use of giant white clover in Europe and the United States respectively. Three references give circumstantial evidence of earlier knowledge and use of this plant.

The oldest is from an anonymous English book printed in 1760 and now generally credited to John Ball. The author, after discussing the possibility of transplanting young red clover plants 18 inches apart, adds this sentence:

1 Contribution from the Departments of Botany and Plant Pathology and Agronomy, Purdue University Agr. Exp. Sta., and the Crops Research Division and Entomology Research Division, A.R.S., U.S.D.A., as Purdue Journal Paper No. 1087. Received April 27, 1957.

1 Received May 10, 1957.

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**Table 1.**—Average infestations of Dual and Vigo wheats with hessian fly where epidemics occurred in the soft red winter wheat region in 7 crop years.

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<tbody>
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<td></td>
</tr>
<tr>
<td>Dual</td>
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<td>8.0</td>
<td>0.7</td>
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<td>1.3</td>
<td>1.6</td>
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<td>Vigo</td>
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<td>80.0</td>
<td>53.0</td>
<td>63.5</td>
<td>60.0</td>
<td>67.4</td>
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<td>71.2</td>
<td>43.0</td>
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</table>

*Data obtained in the Uniform Hessian Fly Nursery, ARS, Entomology Research Division and represent a total of 21 fall tests and 23 spring tests during the 7 year period.*

*Tests prior to 1955 are on the immediate parent strain, C.I. 12750, from which Dual was selected.*