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## Registration of Eight Hessian Fly Resistant Common Winter Wheat Germplasm Lines (Carol, Erin, Flynn, Iris, Joy, Karen, Lola, and Molly)

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lines (Table 1) were developed by the Purdue University Agricultural Experiment Station in cooperation with the USDA-ARS, with release in 1993. Newton is the source of the cytoplasm of the germplasm lines. Newton has a moderate level of winterhardiness suitable for commercial production in Kansas. The germplasm lines have not been tested adequately for level of winterhardiness, but survived two winters during seed increase at Lafayette, IN.

The resistance source parental lines (Table 1) include the cultivars 'Larned' (CI 17650), 'Arthur 71' (CI 15282), 'Knox 62' (CI 13701), and 'Luso'; the germplasm line Ella (CI 17938); and Purdue University-developed lines IN 76529 and IN 916. The final line, with resistance from *H13*, was obtained from the Wheat Genetics Resource Center, Kansas State University, Manhattan, KS. The *H13* resistance is derived from KU 2076, *Triticum tauschii* (Coss.) Schmal., via a synthetic hybrid KU 221-19 developed at Kyoto University, Japan (1). The sources of the resistance genes described here have been recently published (2).

The eight germplasm lines (Table 1) were developed by two to six backcrosses to a single typical plant of Newton, Selection 207 or its selfed progeny, followed by three to five generations of plant selection. During the development of the resistant lines, seedling plants were tested for reaction to Biotype L if the gene provided resistance to Biotype L, to Biotype D if the gene provided resistance to Biotype D, but not to Biotype L, and similarly to Biotype B or Biotype C if the gene provided resistance to only one of these biotypes. The Hessian fly biotypes were those maintained by some of the authors at the USDA-ARS Insect and Weed Control Research Unit, Purdue University. Reactions of genotypes in the Newton background were generally typical of those in the original sources. The genotypes at final multiplication for release were in the F<sub>5</sub> to F<sub>8</sub> generation of selfing following the final backcross.

The eight germplasm lines were tested as seedlings at 18 °C to Biotypes, B, C, D, and L of Hessian fly to verify recovery of typical resistant reactions (Table 2). Our procedures have been previously described in detail (3). Reactions were typical of those expected. Plants of lines carrying *H10* or *H12* gave a more pronounced stunting than others, but most plants grew out of the stunting and were resistant; however, some plants were susceptible (Table 2). In other tests, the degree of this stunting reaction and expression of resistance has varied with Hessian fly biotype, temperature, and infestation level. Lines with gene *H9* have been inconsistent in reaction to Biotype C. In some other tests, selections with gene *H9* gave susceptible reactions.

All the lines appear somewhat similar to Newton, but range from 0 to 4 d later in heading and from 10 cm shorter to 7 cm taller than Newton. Similarity to Newton is related to number of backcrosses to Newton. All lines are awned.

The eight germplasm lines offer single-gene resistance to Hessian fly in a background of Newton hard red winter wheat. These offer adequate winterhardiness for testing in many areas of the USA for determining the value of the individual genes in providing resistance to local populations of Hessian fly. They also provide genes in a hexaploid background for use in breeding resistant cultivars or for genetic studies.

Germplasm amounts of seed of these lines may be requested from the corresponding author for five years and thereafter from the National Small Grains Collection, USDA-ARS, P.O. Box 307, Aberdeen, ID 83210.

### Registration of Eight Hessian Fly Resistant Common Winter Wheat Germplasm Lines (Carol, Erin, Flynn, Iris, Joy, Karen, Lola, and Molly)

Eight genes for resistance to Hessian fly, *Mayetiola destructor* (Say), were transferred individually by backcrossing and selfing into 'Newton' (CI 17715) wheat (*Triticum aestivum* L.), a commercial hard red winter cultivar susceptible to all Hessian fly biotypes to which it has been tested. The eight germplasm

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Table 1. Pedigrees and parentages for eight winter wheat germplasm lines with different sources of resistance to Hessian fly.

Germplasm line†	Resistance gene	PI no.	Reg. no.	Pedigree	Parentage
Carol	H3H3	562612	GP-381	IN86910A1-1-1	Newton-207*5/Larned
Erin	H5H5	562613	GP-382	IN85132A2-1-1	Newton-207*7/Arthur 71
Flynn	H6H6	562614	GP-383	IN85135D7-2-1	Newton-207*7/Knox 62
Iris	H9H9	562615	GP-384	IN85138D1-3-3	Newton-207*7/Ella
Joy	H10H10	562616	GP-385	IN85153A2-1-3-3	Newton-207*3/IN76529A5-3-3
Karen	H11H11	562617	GP-386	IN85144A2-4-1	Newton-207*4/IN916-1-3-1-47-1
Lola	H12H12	562618	GP-387	IN841453H15-1-1-1-2	Newton-207*4/Luso
Molly	H13H13	562619	GP-388	IN85141B1-2-2	Newton-207*7/3/KU221-19/'Eagle'//KS806

† The names were chosen so that the first letter of the name has the same position in the alphabet as the H gene number. Thus, for Carol the letter C corresponds to the 3 in H3.

Table 2. Seedling plant reactions of eight winter wheat germplasm lines to four biotypes of Hessian fly.

Germplasm line†	Resistance gene	Reactions to biotypes							
		Biotype B		Biotype C		Biotype D		Biotype L	
		R‡	S	R	S	R	S	R	S
no. plants									
Carol	H3H3	0	28	28	1	0	22	1	26
Erin	H5H5	28	0	28	0	25	0	0	27
Flynn	H6H6	28	1	0	26	0	21	0	28
Iris	H9H9	29	1	25	2	28	0	26	0
Joy	H10H10	30	0	16	6	27	0	25	3
Karen	H11H11	27	0	28	0	26	0	0	27
Lola	H12H12	28	0	17	8	24	0	24	3
Molly	H13H13	28	0	26	0	29	0	31	0

† The names were chosen so that the first letter of the name has the same position in the alphabet as the H gene number. Thus, for Carol the letter C corresponds to the 3 in H3.

‡ R = resistant, S = susceptible.

#### References and Notes

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