

Registration of Six Sets of Near-Isogenic Spring Oat Germplasm Lines Differing in Tolerance to Barley yellow dwarf virus

Six sets of spring oat (*Avena sativa* L.) germplasm lines (Reg. No GP-94 to GP-121, PI 641972 to PI 641999) with lines within a set differing for tolerance to barley yellow dwarf virus (BYDV) were developed and released by the Illinois Agricultural Experiment Station of the University of Illinois and the USDA-ARS.

Barley yellow dwarf virus (BYDV) infects a wide range of host species and causes economic losses in small grain cereal crops around the world (D'Arcy, 1995; Lister and Ranieri, 1995). Symptoms of BYDV infection in oats include chlorosis, blasting of florets, stunting, and reduction in root growth (Jensen and D'Arcy, 1995; Kolb et al., 1991a). Host plant resistance or tolerance (as defined by Cooper and Jones, 1983) is an important control strategy for reduction of losses due to the BYDVs (Burnett et al., 1995). The near-isogenic lines differing in tolerance to BYDV were developed for use in research on BYDV, to study the inheritance of BYDV, and for use in the discovery of molecular markers associated with genes for tolerance to BYDV.

The six sets of lines (28 lines total) listed in Table 1 and released in 2003 were developed using four different BYDV tolerant parents. The four BYDV tolerant parents involved are IL86-1156, IL86-5698, IL86-6404, and Ogle. Two of the BYDV tolerant parents (IL86-5698 and IL86-6404) were released as BYDV tolerant germplasm lines (Kolb et al., 1991b), and Ogle (Brown and Jedlinski, 1983) is a well-known spring

oat cultivar with good BYDV tolerance. In all crosses, Clintland 64 was the BYDV susceptible recurrent parent. Each group of lines consists of either four or six lines. Within a group the lines differ only in BYDV tolerance. The range in BYDV tolerance varies among the groups. Within a group all of the lines trace to a single F₂ plant in the original cross. In 1995 and 1996, 110 BC₅ lines were evaluated in randomized, inoculated hills using three replications each year. The hills were inoculated at Feekes GS 1 using viruliferous aphids [*Rhopalosiphum padi* (Linnaeus)] carrying BYDV-PAV-IL. The lines (plus the parents and checks) were evaluated twice in the field using three replications of paired control and BYDV-PAV inoculated hills in each evaluation. The BYDV tolerance of the hills was evaluated several times each year using a scale in which 0 = no symptoms and 9 = very severe symptoms. The 28 lines proposed for release were selected from the total of 110 lines. Each line originated from a single BC₅F₄ plant. It is not known if the BYDV tolerance genes in the four tolerant parents are the same or different. These lines will be useful primarily for research purposes, but will not be useful for cultivar development. The lines have already been used for research on the detection of molecular markers associated with genes for BYDV tolerance.

Small quantities of seed (≤ 3 g) of each germplasm line are available for research and parental purposes on request to the corresponding author. The source of the germplasm should be appropriately recognized if a germplasm line contributes to the development of germplasm, a cultivar or a publication. Seed will be maintained by the Department of Crop Sciences, University of Illinois for at least 5 yr, and seed has been deposited in the USDA-ARS National Plant Germplasm System.

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Table 1. Barley yellow dwarf virus evaluations for oat near-isogenic lines and parents.

ID Number	PI Number	Pedigree	BYDV		
			Year 1	Year 2	Mean
			0-9†		
2246-5	PI 641972	Clintland 64	8.2	8.7	8.5
2246-15	PI 641973	*5/IL86-1156	2.7	4.0	3.4
2246-16	PI 641974		8.7	8.0	8.4
2246-20	PI 641975		3.5	2.7	3.1
2250-3	PI 641976	Clintland 64	7.5	5.0	6.3
2250-14	PI 641977	*5/IL86-5698	3.1	4.0	3.6
2250-15	PI 641978		8.1	9.0	8.6
2250-18	PI 641979		2.2	4.3	3.3
2256-2	PI 641980	Clintland 64	4.5	4.7	4.6
2256-8	PI 641981	*5/IL86-5698	8.6	8.0	8.3
2256-12	PI 641982		5.7	5.3	5.5
2256-17	PI 641983		3.6	4.3	4.0
2256-20	PI 641984		7.6	8.0	7.8
2256-22	PI 641985		7.0	7.0	7.0
2273-5	PI 641986	Clintland 64	7.4	7.3	7.4
2273-6	PI 641987	*5/Ogle	5.4	5.0	5.2
2273-23	PI 641988		8.7	8.7	8.7
2273-26	PI 641989		5.0	4.0	4.5
2273-27	PI 641990		6.9	6.3	6.6
2273-29	PI 641991		7.8	7.0	7.4
2277-1	PI 641992	Clintland 64	8.2	7.0	7.6
2277-2	PI 641993	*5/Ogle	4.7	4.3	4.5
2277-3	PI 641994		4.3	4.3	4.3
2277-16	PI 641995		6.8	8.0	7.4
2294-1	PI 641996	Clintland 64	9.0	8.7	8.9
2294-2	PI 641997	*5/IL86-6404	8.6	8.0	8.3
2294-3	PI 641998		4.9	4.0	4.5
2294-8	PI 641999		3.1	4.0	3.6
Clintland 64	CI 7639	Susceptible parent	8.6	8.7	8.6
Ogle	CI 9401	Tolerant parent	4.0	3.5	3.8
IL86-5698	PI 539875	Tolerant parent	2.4	3.5	3.0
IL86-6404	PI 539874	Tolerant parent	1.7	2.2	2.0
IL86-1156-1	-	Tolerant parent	2.3	3.0	2.7
Mean			6.4	6.2	6.3
LSD (0.05)			1.2	1.9	-
CV (%)			8.8	14.1	-

† Scale: 0 = no symptoms, 9 = very severe.

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