

## **Waterlog Variety Trial – Year 2**

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The “excess” wet weather we usually experience in the late fall in northwestern Washington causes many fields to flood or become waterlogged. Waterlogging occurs when the soil profile becomes fully saturated to the point that standing water may appear on the soil surface. Rarely will an entire field be waterlogged; usually it is only seen as ponded areas in the lower lying areas of a field where water can no longer move through the soil profile.

Basically, waterlogging is when water replaces the air in the soil pore spaces. Among other problems, waterlogging causes 1) lack of oxygen in the soil, 2) restriction of aerobic respiration by the growing roots, 3) changes in soil chemical properties and the availability of soil elements and 4) decrease in nutrient uptake. Under warm soil conditions when plants are actively growing, damage may occur after being underwater for just a few days. But when they are dormant and soils are frozen or very cold as they are in the late fall or winter of northwestern WA, the plants survive for much longer because the amount of oxygen required for root respiration is greatly reduced. Literature contains many references showing varietal differences exist in the response of small grains to waterlog situations, but studies conducted under controlled conditions often obtain results contrary to what actually happens in the field. Predicting the effect of environmental stresses in the field is an inexact science. The best information is that which is collected in field trials on or near your farm where the soil and environmental conditions are similar to yours.

Over several years, general observations of the winter wheat variety testing trials at the Washington State University – Mount Vernon location occasionally noted that a variety, located in a small waterlogged area of the field, may have had a better plant stand coming out of the winter than the varieties surrounding it. In the fall of 2014 a winter wheat nursery was planted in a low-lying area of a field (known for water ponding) to specifically identify the response of winter wheat varieties grown in waterlogged soil. This trial was repeated in the fall of 2015 using the same varieties.

Twenty varieties were planted on October 20, 2015 in a randomized complete block with four replications. The seeding rate was approximately 100 lbs/acre, no fall fertilizer was applied, and the herbicide Diuron was applied preemergence five days later. On April 6 and May 10, a split application of NPKS was applied totaling 130 lbs N/acre. Axial, Maestro 2EC and Harmony Extra SG were applied at labeled rates for weed control. The nursery was harvested on August 8 and the results were as follows:

### 2015-16 Waterlog Study Yield and Test Weight.

2015 Rank	2016 Rank	Variety	Mkt Class*	Yield (bu/ac)	Yield with same letter are not significantly different	Test weight (lbs/bu)
2	1	Colonia	HRW	114.1	A	58.9
4	2	Estica	HRW	99.1	AB	55.8
5	3	NW 553	HRW	97.0	AB	60.3
3	4	W7	HRF	92.0	ABC	58.2
7	5	Barok	SRW	85.7	BCD	57.4
6	6	Ovation	SWW	83.3	BCDE	55.7
10	7	Skagit 1109	HRW	82.8	BCDE	59.1
15	8	W4	HRF	81.2	BCDEF	54.3
1	9	Bobtail	SWW	78.0	BCDEF	54.6
17	10	Pactole	HRW	75.9	BCDEF	57.7
19	11	Renan	HRW	74.6	BCDEF	57.5
13	12	Skiles	SWW	69.1	CDEF	57.9
16	13	Biancor	SWW	68.0	CDEF	58.5
20	14	Druchamp	SWW	66.8	CDEF	56.9
18	15	Crescent	SWC	61.1	DEF	56.4
11	16	Madsen	SWW	61.1	DEF	55.9
12	17	Cashup	SWW	59.4	EF	57.7
8	18	Rosalyn	SWW	59.3	EF	52.7
14	19	NSA10-7208	HRW	58.6	EF	52.3
9	20	Cara	SWC	55.8	F	56.1
	Ave.			76.1		56.7
	CV%			24.1		2.0
	LSD(.05)			26.0		1.6

\*SWW – Soft White Winter, HRW – Hard Red Winter, HRF – Hard Red Facultative, SRW – Soft Red Winter, SWC – Soft White Winter Club

This data are one year's results under the field and environmental conditions experienced during the 2015-16 crop year. However, the rankings seem to confirm the anecdotal observations of years past. This study will be continued for at least one more year in order to obtain three year's data and observe longer term varietal response to waterlogged field conditions.

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For additional variety testing results visit: <http://thebreadlab.wsu.edu/western-washington-variety-trials/>.

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