Western Washington
Spring Triticale Trial, 2010

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There has been a strong and increasing interest in triticale as an alternative small grain crop for western Washington. This interest has come mostly from the egg and poultry industry because triticale is viewed as an adapted, high-yielding, high-protein feed crop. As triticale has never been formally tested by Washington State University (WSU) in western Washington, 84 accessions of spring triticale were ordered from the GRIN system and hand-planted on 4/22/2010 at the WSU Northwest Research and Extension Center (WSU-NWREC) in Mount Vernon, WA (Latitude: 48.440179; Longitude: -122.386325). Each accession (5 grams of seed) was planted in a single 4 foot row without replications at a seeding depth of 1 inch and a row spacing of 14 inches. The alley spacing between passes was 2 feet. One surface application of sulfur-coated urea at a rate of 100 lbs/ac was made immediately after planting. Alleys were maintained by mowing, and plots were hand-weeded.

Field notes consisted of stripe rust disease scoring at the early dough stage, as well as plant height, percent stand development and spike (head or ear) length at maturity. Rains and subsequent sprouting damage made it impossible to take yield and protein measurements. The following accessions looked to have a winter habit as no heading was observed: 605416, 520477, and 386156. The following accessions had very high segregation ratios and looked to be early generation breeding material: 611846, 611830, 520470, 611426, 611852, and 611819. Accession 611769 was observed to be far later in heading and maturity than the other accessions. All of the above-mentioned accessions were excluded from phenotypic analysis.

Disease pressure on wheat and barley by stripe rust (*Puccinia striiformis* f. sp. *tritici*) is particularly severe in western Washington, so it is no surprise that the disease impacted the spring triticale accessions. Rust scoring was performed at the early dough stage. Scores were on a 0 to 100 scale, and measured percent of leaf developing rust infections, thus a score of 100 means that the leaves were completely covered in fungal structures. No notes were made of hypersensitive reactions to determine potential resistance to regional races of stripe rust. The mean rust score was 35.5 with a standard error of 3.8 and a confidence interval of 7.6. All accessions showed some rust structures, thus the minimum score observed was 5, describing the following accessions: 611834, 611845, 611838, 611844, 611824, 611749, 611832, 611837, 611848, 611818, 611428, 611833, 611843, 611827 and 611849. The maximum score observed was 100, describing only accession 611451. However, those accessions scoring from 80-100 (those showing severe rust disease) were the following: 611339, 611278, 527340, 611853, 611854, 520469, 520475, 611304, 520463, 520476, 611306, 520465, 611447, 611453, 656390, 520462 and 611451.

Percent stand development observations made at crop maturity determined the percentage of a plot containing living triticale plants. Obvious environmental conditions which could impact stand development, including standing water, frost or snow cover, were not observed during the growing season. Weed pressure was minimized throughout the growing season by hand-weeding and mowing, no herbicides were applied. The mean stand development score was 97.5 with a standard error of 1.2 and a confidence interval of 2.4. One accession, 611843, had only 30% stand development, and two accessions, 552974 and 611304, had 60% and 75% stand development respectively. All other accessions had stand development falling within the 80-100% range.

Plant height observations made at crop maturity determined the average plant height of each triticale accession in inches. The mean height was 45.4 inches with a standard error of 1.2 and a confidence interval of 2.4. The minimum height observed was 28 inches for accession 611711, and the maximum height observed was

72 inches for accessions 611863 and 611851. The following accessions were short, ranging from 28-35 inches: 611834, 611840, 611813, 611818, 611428, 611811, 611711, 611833 and 611816. The following accessions were tall, ranging from 60-72 inches: 611851, 611865, 611832, 620763, 218251, 611863, 611858 and 611697. All other accessions were intermediate in height, ranging between 36-59 inches. Stripe rust severity is not correlated with plant height based on a Pearson Product Moment Correlation test.

Spike length observations made at crop maturity were based on five randomly selected spikes within each triticale accession. The mean spike length was 4.5 inches with a standard error of 0.1 and a confidence interval of 0.2. The minimum spike length observed was 3 inches for accession 611430, and the maximum spike length observed was 6 inches for accessions 611814. The following accessions had long spikes, ranging between 5-6 inches: 611824, 611832, 611848, 611818, 611833, 611839, 611823, 611820, 611815, 611816, 520474, 611339, 611278, 611863, 611851, 611862, 218251, 611849, 611797, 611835, 611812, 611297, 520434, 527340, 611780 and 611814. Stripe rust severity is negatively correlated with spike length, showing a Pearson's correlation coefficient of -0.46 ($P < 0.0001$). Plant height is positively correlated with spike length, showing a Pearson's correlation coefficient of 0.26 ($P < 0.05$). Because the direct effect of spike length on grain yield has been found to be positive but low (0.1272) in triticale grown under Mediterranean conditions,[1] it is not advisable to assume yields based on the spike length observations.

Reference:

1. Yağbasanlar, T. and H. Özkan, 1995. Correlation and Path Coefficient Analysis for Ear Characters in Triticale Under Mediterranean Climatic Conditions. Journal of Agronomy and Crop Science 174, 297-300.

GRIN Accession	Stripe Rust (%)	Height (in)	Stand Develop. (%)	Spike Length (in)
218251	40	65	100	5.25
520434	60	51	100	5.5
520461	75	49	100	4.5
520462	90	44	100	3.5
520463	80	44	100	3.75
520465	90	42	100	4
520466	50	40	100	3.5
520468	30	43	100	3.5
520469	80	42	100	3.75
520474	30	49	100	5
520475	80	40	100	4
520476	90	38	100	3.5
520480	50	40	100	4.25
520485	50	54	100	4.75
520486	75	42	100	3.5
520487	75	47	100	4
527340	80	42	100	5.5
552974	20	54	60	4.75
590945	20	46	100	4.5
611278	80	44	100	5
611297	40	46	100	5.5

611304	80	38	75	4
611306	90	37	80	4
611339	80	47	100	5
611428	5	32	100	4.5
611430	30	36	100	3
611447	90	39	100	3.25
611451	100	40	100	3.5
611453	90	42	100	4
611697	10	65	100	3.75
611711	10	28	80	4.25
611749	5	49	100	4.75
611780	10	57	100	5.75
611797	10	52	100	5.5
611809	30	39	100	4
611811	10	34	100	4.75
611812	20	50	100	5.5
611813	30	35	100	4
611814	10	39	100	6
611815	10	42	100	5
611816	10	33	100	5
611818	5	34	100	5
611820	10	38	100	5
611823	10	39	100	5
611824	5	40	100	5
611827	5	37	100	4.5
611828	10	36	100	4.5
611829	10	40	100	4.5
611832	5	63	100	5
611833	5	35	100	5
611834	5	31	100	3.5
611835	10	38	100	5.5
611837	5	37	100	4.75
611838	5	38	100	4.25
611839	10	39	100	5
611840	10	35	100	4.25
611841	10	58	100	4.75
611843	5	46	30	4.75
611844	5	42	100	3.5
611845	5	49	100	4.5
611848	5	43	100	5
611849	5	46	100	5.5
611851	20	72	100	5.25
611853	80	47	90	3.5

611854	80	48	100	4
611858	10	66	100	4.75
611860	20	58	100	4.5
611862	20	56	100	5.25
611863	10	72	100	5.25
611865	30	70	100	4
611874	60	48	100	4
620763	10	67	100	4.5
656390	90	51	100	4.5
Maximum:	**100**	**72**	**100**	**6**
Minimum:	**5**	**28**	**30**	**3**
Mean:	**35.5**	**45.4**	**97.5**	**4.5**
Std. Error:	**3.8**	**1.2**	**1.2**	**0.1**