University of Idaho
Extension

Stripe rust of barley was found last week in Twin Falls County in AB Voyager, at low levels. Stripe rust of barley will not infect wheat, and wheat stripe rust will not infect barley. This does, however, emphasize that conditions continue to be excellent for the development of stripe rust in both crops. Dr. Xianming Chen (USDA-ARS scientist in Pullman, WA) provides excellent guidelines below in the stripe rust update that I included (below).

Pretty much you can expect stripe rust to develop in moderately susceptible (MS) and susceptible (S) winter and spring wheat varieties. Fungicide applications are recommended at herbicide timing for MS and S varieties, and probably again later in the season, especially to protect the flag leaf for optimum grain fill. Susceptible varieties can suffer significant yield and quality losses (test weight).

Please report new occurrences of both wheat and barley stripe rust. Scouting of all fields is highly recommended. Always read and follow label directions when applying fungicides. Included on the website is a fungicide efficacy chart for use as a general guide. (Inclusion of specific products does not indicate endorsement, and there are many other products available that are not included.)

cheers,
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Stripe Rust Update May 5 2016

Xianming Chen

Stripe rust in the Pacific Northwest

Stripe rust has been spreading and developing quickly since the last update on April 13. The disease is now everywhere in the Pacific Northwest. When we took the early season note at Mount Vernon (Skagit County) in northwestern Washington on April 18, stripe rust reached 60% severity on susceptible winter wheat varieties, as usual for this region. On April 27, stripe rust was very easy to found on low leaves of susceptible winter wheat varieties in our experimental fields on Conservation Farm, north of Pullman (Whitman County) in eastern Washington, where stripe rust was not found on April 12.

Yesterday, we checked fields along the way to Walla Walla and Hermiston in Oregon, and found stripe rust in several fields in Whitman, Garfield, Columbia, and Walla Walla counties in Washington and Umatilla County in Oregon. In commercial fields, winter wheat ranged from Feekes 8 to 10.5, and stripe rust was generally low in incidence and severity, thanks to growing resistant varieties and early application of fungicides. In our experimental field north of Walla Walla, we took the second-time note of stripe rust in the winter wheat nurseries. Stripe rust reached 95% severity on susceptible varieties (**Figure 1**), much earlier than normal. The previous cases of which we were able to finish stripe rust note on winter wheat at the peak of stripe rust in this location were 2005 and 2011. The data of the WSU Winter Wheat Variety Trial is attached (**Table 1**) for you to know the reaction categories and ratings of specific varieties this year. You may use the data to figure out the potential highest level of stripe rust severity for the varieties you grow. Stripe rust was also reached the peak in our experimental plots in Hermiston with susceptible varieties had 100% severity and some varieties were even dried out by rust.

Based on the Walla Walla data (**Table 1**), most varieties are similar to the data of last year, but we notice significant changes on some varieties. ORCF-102 is rated as "MS" and 7 (vs. "MR" and 3 last year), becoming more susceptible. Similarly, Xerpha is "S" and 8 (vs. MR-MS and 5), Keldin "MS" and 7 (vs. "MR" and 4), CuriosityCL+ "MS" and 6 (vs. "MR" and 4), and WB-Junction "MS" and 6. The increased susceptibility is mainly due to the early start of disease and under the weather conditions so far, high-temperature adult-plant (HTAP) resistance did not reach to its highest level in these varieties. These changes are unlikely due to race changes, as the samples collected in March at this location are identified as PSTv-52 and PSTv-37, similar to last year.

As many fields were sprayed with fungicides more than a month ago, stripe rust starts to re-develop. Please check your fields to see if you can found new growth of active rust pustules (rust spores can stick on your figures if you rub the stripes). Based on the forecast, weather conditions will continue to be favorable for stripe rust (but not as bad as in 2011). It is better to spray fungicide again if you see rust incidence (number of leaves or plants with rust) at 5% or higher and the variety is in the MS and S categories or rated 5 or higher. For varieties in the MR category or rated 3 and 4, if they have more than 20% severity in **Table 1**, it is worth to spray fungicide as these varieties will likely to have yield losses in the range of 5-15%. Varieties of

the R category or rated 1 and 2 do not need to spray unless they apeear much different from what expected in this category (such as more than 5% leaves have active rust pustules). Timing of the second application is important as it should protect the crop through the rest of the growth season. Ideally it is at the boot to flowering stage, but can be influenced by many factors, such as the susceptibility of the variety, yield potential, and schedule of air application.

HTAP resistance has been working, but the weather conditions and plant growth stages have not allowed this type of resistance to reach its highest capability of fighting against stripe rust. This type of resistance will not completely get rid of stripe rust this year, as necrotic stripes can reduce grain yield. Based on the previous forecast and current situation of stripe rust, plus the weather forecast for the next two to three weeks, highly susceptible varieties (not commercially grown) would have about 60% yield loss, and commercially grown MR, MS, and S varieties would have 5 to 40% yield loss (such as Xerpha, Tubbs, and ORCF-102 for the high end).

Spring wheat and barley ranged from being planted to Keekes 4. Stripe rust was found in our nurseries in Walla Walla. Fungicide application is recommended for fields grown with MS and S varieties (or rated 4 to 9 on the Seed Buyer's Guide).

Physiological leaf spot (PLS) is found in some winter wheat fields (**Figure 2**). Do not confuse it with necrotic stripes caused by stripe rust (**Figure 3**) as fungicides do not control PLS.

Stripe rust throughout the country

Stripe rust has occurred almost throughout the entire inland U.S. Since the last update, several states have been reported to have stripe rust. Right now, the following 23 states have reported stripe rust and many states have stripe rust as a number one problem, and fungicides have been used widely to control the disease: Texas, Oregon, Louisiana, Arkansas, Oklahoma, Washington, Colorado, Kansas, Mississippi, California, Virginia, Montana, Indiana, Idaho, North Carolina, Tennessee, South Dakota, Kentucky, Nebraska, Minnesota, Delaware, Florida, and Michigan. The early samples from Texas and Louisiana this year were identified mostly as race PSTv-52 and some as PSTv-37, similar to the last year.

Note on stripe rust sample collection and shipping

We would like to thank many of you who have collected and sent us stripe rust samples and welcome you to continually send samples. Please note that stripe rust samples are better to collect when leaves are dry. If not dry, leave picked leaves open for few minutes to get rid of water before put into a glassine or paper envelop. Please do not use plastic bags to contain leaf samples as leaves will become rot and rust will die in plastic bags. One to five leaves are enough for one sample (a variety or breeding line in a field), and multiple samples can be collected from fields but from different varieties or lines. Please do not dig out roots or have stems in samples. For occasional cases when leaves are free of rust but heads get infected, collect one to three heads. Keep samples as cool and dry as possible before shipping. As stripe rust fungus is easy to lose viability, overnight mail (FedEx or UPS) is preferred. However, sending through air mail is fine if samples are kept cool and dry and arrive within a week. My shipping address is: Xianming Chen, 361 Johnson Hall, Washington State University, Pullman, WA 99164-6430 (phone: 509-335-8086). Thank you for your cooperation.

Figure 1. Stripe rust on susceptible winter wheat varieties in an experimental field in Walla Walla, WA, May 4, 2016.

Figure 2. Physiological leaf spot on a wheat leaf.

Figure 3. Necrotic stripes caused by the stripe rust fungus

Table 1. Infection types, severity (%), and ratings of stripe rust on entries in the 2016 winter wheat variety trial nurseries at Walla Walla, WA

Ext Seq #	Variety	Class	2016 PLOT	4/7/2016 Stem elongation IT	%	5/4/2016 Heading IT	%	Reaction category*	Rating**
1	LCS Colonia	HRW	1	0	0	0	0	R	1
2	LCS Jet (NSA10-7208)	HRW	2	0	0	0,8	0,30	R	2
3	Keldin	HRW	3	5	2	7	40	MS	7
4	WB-Arrowhead	HRW	4	0	0	2	2	R	1
5	OR2120012R	HRW	5	8	2	0,8	0,15	R	2
6	OR2120276H	HWW	6	2	2	0,8	0,10	R	2
7	04PN028B-3	HRW	7	2	2	0	0	R	1
8	SY Clearstone CL2	HRW	8	8	5	3-5	30	MR	4
9	Whetstone	HRW	9	5	2	2-3	10	R	2
10	IDO1101	HWW	10	8	10	3	20	MR	3
11	HE181/3	HRW	11	0	0	3	15	R	2
12	AP503 CL2	HRW	12	8	5	7	15	MR-MS	5
13	Bauermeister	HRW	13	2	2	8	30	MS	6
14	Earl (WA 8184)	HWW	14	3	2	0,8	0,5	R	2
15	Farnum	HRW	15	0	0	2	2	R	1
16	Finley	HRW	16	8	5	2	10	R	2
17	WA 8180	HRW	17	0	0	2	2	R	1
18	WA 8197	HRW	18	8	5	2	5	R	1
19	WA 8207	HRW	19	0	0	0	0	R	2
20	WA 8228	HRW	20	0	0	0	0	R	3
CHK	**PS279**	**CHECK**	**21**	**8**	**15**	**8**	**90**	**S**	**9**
21	WA 8229	HRW	22	0	0	2	2	R	1
22	WA 8246	HRW	23	0	0	2	2	R	1
23	WA 8247	HRW	24	8	10	2,8	2,30	MR	2
24	WA 8250	HRW	25	0	0	2	5	R	1
25	LCS-Azimut	HRW	26	0	0	0	0	R	1
26	NSA10-2196	HRW	27	2	2	3	5	R	1
27	Norwest 553	HRW	28	0	0	0	0	R	1
28	OR2110664	HWW	29	0	0	0,8	0,10	R	2
29	WB-Rimrock	HRW	30	2	2	8	50	MS	7
30	WA 8231	HRW	31	0	0	0	0	R	1
31	WA 8248	HRW	32	0	0	0	0	R	2
32	WA 8249	HRW	33	0	0	0	0	R	3
33	LCS Aymeric		34	0	0	0,8	0,5	R	2
M	**HUNDRED BARLEY**	**FILLER**	35	0	0	0	0	R	1
35	LCS Evina	HRW	36	2	2	0	0	R	1
36	WB 4059		37	0	0	8	80	S	8
M	**HUNDRED BARLEY**	**FILLER**	38	0	0	0	0	R	1
38	OR2110679		39	0	0	0	0	R	1
39	Esperia	HRW	40	8	2	5	40	MR	4
CHK	**PS279**	**CHECK**	**41**	**8**	**15**	**8**	**90**	**S**	**9**
40	Mandala		42	8	15	2	5	R	1

41	Rebaldi		43	2	2	0	0	R	2
42	LOR-092		44	2	2	2	5	R	3
43	LOR-913		45	2	2	0	0	R	4
44	LWW14-73163	SWW	46	2	2	0	0	R	5
45	WB 1376CLP	SWW	47	0	0	2	2	R	6
M	**HUNDRED BARLEY**	**FILLER**	48	0	0	0	0	R	7
M	**HUNDRED BARLEY**	**FILLER**	49	0	0	0	0	R	8
46	WB 1529	SWW	50	5	5	5	25	MR	4
47	WB 1604	SWW	51	0	0	0	0	R	1
48	WB-Junction	SWW	52	8	10	8	20	MS	6
49	LOR-334	SWW	53	2	2	3	15	R	2
50	Mary	SWW	54	0	0	5	40	MR	4
51	ORCF-102	SWWI	55	0	0	8	40	MS	7
52	Legion	SWW	56	2	2	0	0	R	1
53	SY 107	SWW	57	8	20	5	40	MR	4
54	IDN 07-28017B	SWW	58	0	0	0	0	R	1
55	IDO1108DH	SWW	59	0	0	2	10	R	2
56	UI Castle CL+	SWWI	60	0	0	0,8	0,20	MR	2
CHK	**PS279**	**CHECK**	**61**	**8**	**15**	**8**	**95**	**S**	**9**
57	UI Magic CL+	SWWI	62	0	0	3	15	R	2
58	UI Palouse CL+	SWWI	63	0	0	3	10	R	2
59	UI-WSU Huffman (IDN-03-29902A)	SWW	64	0	0	5	10	MR	3
60	ARS-Crescent	WC	65	8	5	3	20	R	3
61	Madsen	SWW	66	2	2	0,5	0,10	R	2
62	CuriosityCL+ (WA 8143)	SWWI	67	0	0	7	20	MS	6
63	Jasper (WA 8169)	SWW	68	0	0	0,5	0,20	MR	2
64	KXB-01	SWWI	69	2	2	7	20	MS	6
65	MelaCL+ (WA 8155)	SWWI	70	2	2	7	20	MS	6
66	Puma	SWW	71	3	2	3	15	R	2
67	Xerpha	SWW	72	8	10	8	60	S	8
68	LWW14-71032	SWW	73	8	5	0	0	R	1
69	LWW14-73161	SWW	74	2	5	2	10	R	2
70	WB 1843	SWW	75	3	2	8	60	S	8
71	ORCF-103	SWWI	76	8	5	5	30	MR	4
72	04PN066-7	SWW	77	3	2	2	10	R	2
73	09PN005#25	SWW	78	0	0	0	0	R	1
74	4J0713366C	WC	79	0	0	3	10	R	2
75	ARS06135-9C	WC	80	5	2	3	20	MR	3
CHK	**PS279**	**CHECK**	**81**	**8**	**10**	**8**	**90**	**S**	**9**
76	ARS20060123-31C	WC	82	2	2	2	2	R	1
77	Coda	WC	83	2	2	2-3	15	R	2
78	Bruehl	WC	84	2	2	2	2	R	1
79	Eltan	SWW	85	0	0	5	30	MR	4
80	WA 8251 (KXB-04)	SWW	86	8	10	7	60	S	8
81	Masami	SWW	87	2	2	2-5	10	R	2
82	Otto	SWW	88	2	2	2	5	R	1
83	WA 8202	SWW	89	5	5	2	10	R	2
84	WA 8226	SWW	90	0	0	2	5	R	1

85	WA 8227	SWW	91	0	0	0	0	R	1
86	WA 8243	SWW	92	0	0	5	30	MR	4
87	WA 8244	SWW	93	0	0	3	20	MR	3
88	LCS-Artdeco	SWW	94	5	2	3	25	MR	3
89	WB 523	SWW	95	0	0	3	15	R	2
90	WB 528	SWW	96	8	5	0,8	0,15	R	2
91	Bobtail	SWW	97	0	0	2	5	R	1
92	LOR-833	SWW	98	2	2	2	2	R	1
93	Rosalyn	SWW	99	8	5	2	2	R	1
94	OR2110526	SWW	100	8	5	3	10	R	2
CHK	**PS279**	**CHECK**	**101**	**8**	**10**	**8**	**95**	**S**	**9**
95	Skiles	SWW	102	0	0	2	2	R	1
96	04PN096-2	SWW	103	0	0	3	5	R	1
97	09PN062#18	SWW	104	0	0	3	15	R	2
98	AP700 CL	SWW	105	3	2	2	2	R	1
99	SY Ovation	SWW	106	0	0	3	15	R	2
100	IDN 01-10704A		107	0	0	2	2	R	1
101	IDN 06-03303B		108	0	0	2	2	R	1
102	IDN 06-18102A		109	3	2	2	5	R	1
103	ARS06136-49C	WC	110	0	0	2	2	R	1
104	ARS-Selbu	SWW	111	0	0	2	2	R	1
105	Cara	WC	112	0	0	0	0	R	1
106	WA 8187	SWWI	113	0	0	0	0	R	1
107	WA 8206	SWW	114	0	0	0	0	R	1
108	WA 8232	SWW	115	5	5	0	0	R	1
109	WA 8233	SWW	116	0	0	2	10	R	2
110	WA 8234	SWW	117	0	0	0	0	R	1
111	WA 8235	SWWI	118	0	0	0	0	R	1
112	WA 8245	SWW	119	5	2	2	10	R	2
113	KWS 034		120	5	5	7	30	MS	6
CHK	**PS279**	**CHECK**	**121**	**8**	**15**	**8**	**95**	**S**	**9**
114	KWS 040		122	5	2	8	30	MS	6
M	**HUNDRED BARLEY**	**FILLER**	123	0	0	0	0	R	1
116	LWW14-71195		124	5	5	0	0	R	1
117	WB 456	SWW	125	0	0	2,8	2,30	R	2
118	OR2090473	SWW	126	2	2	2	10	R	2
CHK	**PS279**	**CHECK**	**127**	**8**	**20**	**8**	**95**	**S**	**9**
CHK	**PS279**	**CHECK**	**128**	**8**	**20**	**8**	**95**	**S**	**9**
CHK	**PS279**	**CHECK**	**129**	**8**	**20**	**8**	**95**	**S**	**9**
END	**Hundred Barley**	**END**	**130**	**0**	**0**	**0**	**0**		

*** R = resistant, MR = moderately resistant, MS = moderately susceptible, and S = susceptible.**

**** 1 = most resistant and 9 = most susceptible.**