

Rust Update San Angelo April 2, 2015.

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### Summary

The potential for a rust outbreak in central Texas certainly exists and treatment may be necessary but each field and situation needs to be examined. Growing conditions for wheat have been excellent through the winter but the moist conditions also brought disease. Very high levels of stripe rust have been observed in many fields of seedling wheat and the orange powdery spores, that gives the disease the name “rust”; have been coating lower leaves and the boots of those that venture into the field. This is not necessarily alarming because many wheat varieties will get the disease on seedling leaves but not on the upper leaves. Disease resistance by wheat breeders is evaluated on the upper leaves and in many resistant varieties the fungal spores that land and germinate on a leaf will leave marks but will not grow or produce a pustule with the characteristic spores or powder. This is a dead end for the disease but the spots or marks sometimes cause concern and fields are sprayed out of over-precaution. Results of Texas A&M AgriLife Extension trials annually fail to show an advantage of treating a resistant variety with a fungicide. Conversely, Susceptible varieties with good yield potential have shown increased yields and test weights in several years from a treatment. In the Concho valley and Big Country areas the last leaf or flag leaf is just beginning to emerge or has just emerged. This leaf is very important to protect in terms of grain yield and fields should be evaluated as soon as possible. To evaluate a field for treatment several questions should be considered before applying a fungicide. 1. Does the expected yield of the wheat crop justify the expense of protection? 2. Is this variety susceptible to disease? 3. Is the disease present or has it been reported in other neighboring areas? 4. What is the plant growth stage? 5. What are the predicted moisture and weather conditions? 6. What treatments are available, what is the cost, and when will the application actually occur? There are many fields in Central Texas and the Concho valley area that are being treated for the reasons above. However, there are also many that should not be treated because one or more the above questions is not favorable for treatment. More specific information on rust and decision aids can be found at <http://varietytesting.tamu.edu/wheat> and at <http://sickwheat.tamu.edu>

### Detailed points to consider in evaluating wheat rust fungicide applications.

1. Does the expected yield of the wheat crop justify the expense of protection? Fungicides only protect what is there and will not give an increase in return like a fertilizer. The 2014-2015 winter has produced some favorable potential and there may be room in some budgets for an application cost. The historic yield and fertilizer inputs should be high enough to reach the expected yield target. There should be sufficient irrigation water or soil moisture to finish the crop.
2. Is this variety susceptible to disease? Treating a resistant variety is a waste of money and will not give a yield increase. The latest rating on disease resistance can be found in the variety characteristics table in the 2014 Wheat Variety Trial results at <http://varietytesting.tamu.edu/wheat>. Results of fungicide

trials and other wheat growing information can also be found on the same page. If the variety is unknown it should probably be considered to be susceptible. Some varieties are not resistant to both stripe and leaf rust and a variety that susceptible to leaf rust would lend extra rationale to spray for a stripe rust condition depending on the expected weather conditions.

3. Is the disease present or has it been reported in other neighboring areas? Stripe rust has been present throughout the state in 2014 but it requires lower temperatures, below 60° F. Leaf rust occurs at higher temperatures and has not been as widely reported. With warmer weather both the incidence of stripe rust and moisture are expected to decrease.

4. What is the plant growth stage? Since protection of the last or flag leaf is the goal, fungicide application labels usually start just before flag leaf emergence (Feekes growth stage 7) and go to when the head is fully emerged and flowering (Feekes 10.5). The best stage for a one time application is when the flag leaf is fully emerged (Feekes 9) or in the boot stage (Feekes 10). This should protect the plant through the rest of the head growth and grain production. Early applications may need to be repeated and later applications may not have sufficient positive economic benefit. Pay attention to rate and repeat application restrictions.

5. What are the predicted moisture and weather conditions? Rust is not an issue much of the time in West Texas as hot dry conditions are not conducive to fungal growth. Continued vigilance is needed if the wheat is irrigated or if there are heavy dews and rain in the forecast. As temperatures increase and stay above 60° F the growth of stripe rust will decrease and leaf rust risks potentials need to be considered.

6. What treatments are available, what is the cost, and when will the application actually occur? Several generic fungicides are available at low product cost around \$2-3 per acre. Other products go above \$20 per acre. Recent efficacy trials show that all treatments provide good control with two general classes of fungicides triazoles (examples: propiconazole and tebuconazole) which are curative and strobilurins (example: azoxystrobin) which are preventative and provide protection from germinating spores. The triazoles are less costly and are at times mixed with the strobilurins to provide a lower price dual-action product. With the low cost of generic fungicides many producers are electing to treat to take a lower risk position. Lower risk positions come at a cost and in the current production year with lower wheat and grain prices the economic outcome may not be positive. There are also environmental concerns with unnecessary treatments including the loss of fungicide effectiveness from resistant races. Late in the season applications for ground sprayers will cause crop damage. Aerial applications cause less crop damage but application costs are higher and there may be a long wait time.

All of these points need to be considered and if any one of them does not favor a disease outbreak or a positive economic return then the cost and effort of a treatment may not be warranted. For more information on rust and other plant diseases can be found at <http://sickwheat.tamu.edu> and <http://varietytesting.tamu.edu>.

Here are some observed 2015 scenarios.

1. Well maintained crop following wheat with a 60 bushel yield potential has signs of rust (orange pustules) in lower leaves but upper leaves are clean or have white spots or stripes. The crop is resistant to both stripe and leaf rust.

Recommendation: do not treat with a fungicide - it is resistant

2. Well maintained crop following wheat with a 50 bushel yield potential has signs of rust (orange pustules) in lower leaves, upper leaves have pustules, white spots, or stripes. The variety is unknown or is susceptible to both stripe and leaf rust. The flag leaf has just fully emerged and is still clean.

Recommendation: treat with an inexpensive fungicide – it has yield potential and the variety is susceptible or unknown.

3. Pale yellow, late (Nov) planted wheat following cotton with a “VNS” variety. Heavy rust on lower leaves. 20 bushel yield history.

Recommendation: very difficult decision, this could be a crop failure and an application might only increase losses

Useful Figures and Tables:

Figure 1. The Feekes scale of wheat development.

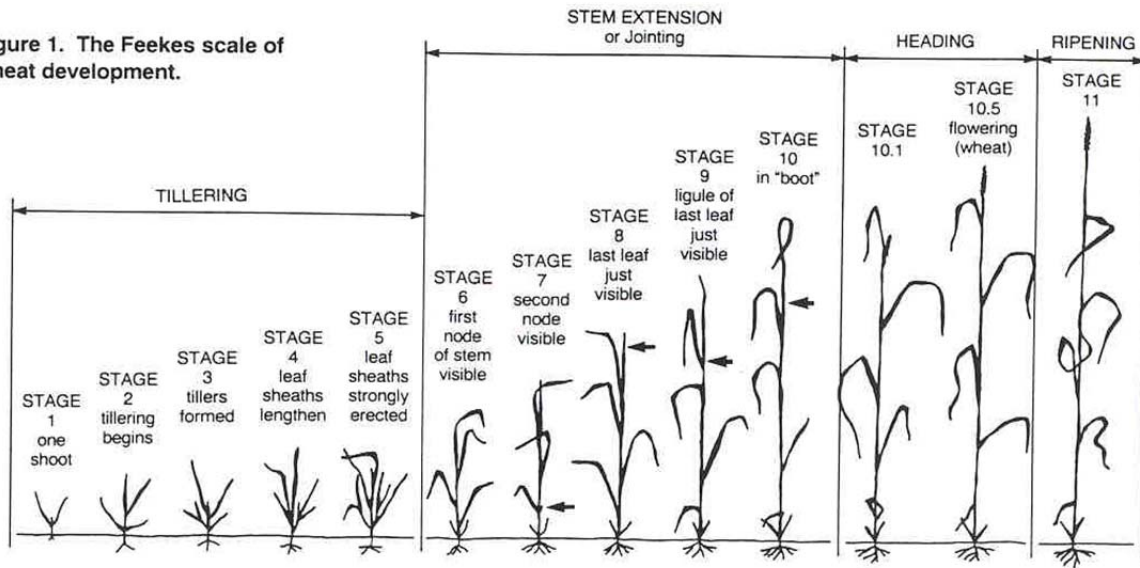


Table 1. Texas 2014 Hard Wheat Characteristics from <http://varietytesting.tamu.edu/wheat>

Texas 2014 Hard Wheat Characteristics <sup>1</sup>													
Variety	Source	First Year Sold	Maturity Group	Height (inches) <sup>2</sup>	Leaf Rust	Stripe Rust	Stem Rust	Septoria Leaf Blotch	Powdery Mildew	Wheat Streak Mosaic	Barley Yellow Dwarf	Green-bug	Hessian Fly
Armour	Mons anto	2008	Med Early	25	MR	MS	R	MR	R	S	MS	S	MS
Billings	OSU	2009	Early	25	MR	MR	R	MR	MS	S	MR	S	MS
Brawl CL2	CWRF	2011	Medium	28	MS	MS	MS	-	MS	-	-	-	-
Byrd	CSU	2011	Medium	28	S	S	S	-	MR	-	-	-	-
CJ	Syngenta	2011	Medium	30	S	R	R	-	-	-	-	-	-
Coronado	Syngenta	1994	Medium	28	S	MR	R	-	MS	-	-	S	MR
Denali	CSU	2011	Medium	28	S	MR	R	-	MS	-	-	-	-
Doans	Syngenta	2007	Medium	27	MR	R	R	MR	MR	-	-	S	S
Duster	OSU	2006	Med Early	26	R	MR	R	MS	MR	S	MR	S	R
Endurance	OSU	2004	Medium	27	MS	MS	R	MS	MR	S	MR	S	MS
Everest	KSU	2010	Early	25	R	MS	R	-	MR	-	-	-	-
Fannin	Syngenta	2005	Early	27	MS	R	R	-	R	-	-	S	S
Gallagher	OSU	2013	Medium	28	MR	R	R	-	MR	-	-	-	-
Garrison	OSU	2013	Medium	26	MS	S	R	-	MR	-	-	-	-
Greer	Syngenta	2010	Medium	27	S	MR	R	-	MS	-	-	-	-
Hatcher	CSU	2004	Medium	26	S	MS	R	-	MS	-	-	-	-
Iba	OSU	2013	Medium	26	R	R	R	-	MR	-	-	-	-
Jackpot	Syngenta	2008	Medium	26	S	MR	R	-	MS	-	MS	S	S
LCS Mint	Limagrain	2012	Med Late	29	S	MR	MS	-	MS	-	-	-	-
LCS Wizard	Limagrain	2012	Med Late	27	R	MR	-	-	R	-	-	-	-
Razor	Syngenta	2014	Medium	30	R	R	-	-	R	-	-	-	-
Ruby Lee	OSU	2011	Medium	28	S	MS	R	-	MS	-	-	-	-
T153	Limagrain	2012	Medium	25	MS	MR	R	-	R	-	-	-	-
T158	Limagrain	2009	Medium	25	S	MR	S	-	MR	-	-	-	-
TAM 111	TAMU	2003	Medium	28	S	MR	R	MR	MR	MS	MS	S	MS
TAM 112	TAMU	2005	Med Early	27	S	S	R	MR	R	MR	MS	MR	S
TAM 113	TAMU	2012	Medium	26	R	R	R	-	MS	MS	-	-	-
TAM 114 (TX07A001505)	TAMU	2014	Medium	27	R	R	R	-	R	MS	-	S	MR
TAM 204 (TX06V7256)	TAMU	2014	Medium	27	MS	MR	R	-	MR	MR	-	MR	R
TAM 304	TAMU	2007	Med Early	25	R	MR	R	-	MR	MS	MS	S	S
TAM 305	TAMU	2013	Med Early	25	R	R	R	-	MR	-	-	-	-
TAM 401	TAMU	2008	Early	27	MR	R	R	-	MR	MS	-	S	S
TAM W-101	TAMU	1971	Med Late	27	MS	MR	R	-	S	-	-	-	-
WB4458	Mons anto	2013	Med Early	28	MS	MR	R	-	MS	-	-	-	-
WB-Cedar	Mons anto	2011	Early	24	R	MR	R	-	R	-	-	-	-
WB-Grainfield	Mons anto	2013	Medium	29	MS	R	R	-	MS	-	-	-	-
WB-Redhawk	Mons anto	2013	Medium	28	R	MS	R	-	MS	-	-	-	-
Weathermaster 135	Unknown	Unknown	Medium	27	MR	MS	S	-	MS	-	-	-	-
Winterhawk	Mons anto	2007	Medium	28	S	MS	S	-	MS	-	-	-	-

<sup>1</sup>S-Susceptible, MS-Moderately Susceptible, MR-Moderately Resistant, and R-Resistant. ALL ratings are subject to change as re-evaluation occurs.

<sup>2</sup>Heights are an average across the Texas Panhandle.

Pictures from the field March 2015

Figure 2. Heavy stripe rust infection in lower canopy – San Angelo, TX March 2015



Figure 3. Fungal spores on boots – San Angelo , TX March 2015



Figure 4. Leaves from a resistant variety that has stripe rust pustules on the lower seedling leaf but the upper leaves have hypersensitive infection spots but no orange pustules. Abilene, TX March 2015





Figure 5. Leaves from a resistant wheat variety that stripe rust pustules have not developed on or have been washed off by irrigation. Veribest, TX March 2015

