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Texas South Plains Wheat & Leaf Rust Interim Report

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This is an initial summary of leaf rust in wheat and current South Plains conditions. This information will be updated as needed pending new field information and input from others.

Since Monday we've had four inquiries from south of Lubbock about leaf rust in wheat. We've also observed some forage trial plots in northeast Howard Co. with significant rust. If we have seen anything in the A&M forage trials at Halfway in Hale Co. it was minor at this point. Attached are two items on foliar fungal diseases (leaf rust, stripe rust, and powdery mildew). The standard TCE "Growth Stages of Wheat" may be accessed at http://lubbock.tamu.edu/wheat This latter document describes the stages of growth and how or when herbicide or fertilizer applications might be effective, when yield potential is determined, etc.

Our comments here will provide additional information to complement the content of the two attached documents from Gaylon Morgan, TCE small grains specialist, and Bob Hunger/Ken Jackson, Oklahoma State Univ.

Current condition of wheat:

Much of the wheat in spite of all the rain we have had looks only average. Much of this is due to all the rain we had last Fall, and we believe a lot of nitrogen may have been lost (leached) below the root zone. There were many fields that could have benefitted from an earlier than usual topdress application of N fertilizer. This N should probably have been applied in early February, or several weeks prior to jointing (which is otherwise typically in the first week of March for the South Plains). N applications at this point, even on late planted wheat, will have marginal benefit (mostly seed size, maybe test weight, but not potential number of seed).

What is the general grain yield potential of late-planted wheat?

Where wheat grain production is sought, the late wheat planting (late November and December) can be expected to reduce wheat yields significantly. A five-year irrigated study conducted by Dr. Brent Bean at TAES-Bushland beginning in 1996 noted extremes in yield when October vs. November vs. December/early January seedings were compared.

In one year early planted wheat had a late spring freeze and yields were hammered so in this case late planted wheat actually yielded more than October planted wheat. This is the exception. In another year, due to poor stand establishment conditions NO grain yield was achieved with the late planting. That leaves us three 'typical years.' The approximate average grain yield for months of seeding were: October, 71 bu/A; November, 53 bu/A; and 40 bu/A.

Somewhat to our surprise, the irrigated yields did not improve for higher plant population seeding rates above 60 lbs./A at the later planting dates. Still, conventional wisdom—and Extension recommendations!—would suggest that higher rates will compensate for reduced tillering in late fields.

Some fields had a lot of rust in Fall 2004. Will those fields have a lot of rust in Spring 2005?

Considerable wheat last fall was infested with leaf rust, but this is not a problem for grazing cattle. The commonly shared thoughts then were that just because we had rust in the fall, doesn't mean it will be problem in the spring. Last fall some A&M colleagues in the High Plains suggested that the leaf rust pathogens would freeze out during winter and we would have to have re-infection. Leaf rust, however, survives in most fields every winter, even north of Lubbock. The big factor that triggers the rust is spring weather conditions. South of Lubbock, however, we have strong doubts that any 'freezing out' of rust may have occurred. Leaf rust likes moist conditions above all, and temperatures up to about 70 F foster its growth. The few fields we have looked at so far where we knew of rust in Fall 2004 seem to have it this Spring, too.

I have leaf rust starting now. What should I do? Do I have to spray a fungicide?

Leaf rust may be occurring earlier this year than others. Gaylon Morgan reports that in Central Texas in 2005 leaf rust is appearing in significant levels up to five weeks earlier than last year.

What wheat variety is planted?

There is some leaf rust resistance among wheat varieties, and this resistance lasts until the rust fungus changes. According to Oklahoma State and other sources, in general:

Resistant (R)--Cutter, Jagalene, and Lockett (a beardless wheat that probably shouldn't be taken to grain due to lower yield potential)
Moderately Resistant (MR)—Ogallala, Longhorn, TAM 202
Moderately Susceptible (MS)—Coronado, Jagger, Dumas (might be MR)
Susceptible (S)—TAM 105, TAM 110, TAM 111, TAM 200

Other varieties—Weathermaster 135, Winmaster, El Dorado, and other Russian beardless selections, S to MR, however, these are not good grain yielding varieties compared to the above grain varieties so their grain yield potential is lower.

As Gaylon Morgan notes, however, it appears in other areas of Texas that leaf rust races may be changing (or have already changed) hence resistance ratings will not necessarily reflect new conditions with new ratings. We all know that resistance does not mean immunity. One producer in Yoakum Co., though, reports significant rust on TAM 110 but none on Cutter right across the road (22 March 2005), but Cutter downstate is having trouble with leaf rust, likely new races.

What is my yield potential and what is expected price of grain at harvest?

Oklahoma research suggests that in order to justify the cost of fungicides that a minimum per acre yield of 40 bushels (and possibly 50 bu/A) and price at least $3.00-3.50/bu is necessary to justify spraying. For the Texas South Plains this probably eliminates consideration of spraying dryland fields.

Spraying fungicide will not increase your yields rather it preserves your yield potential.

How important is a healthy flag leaf for wheat grain yield potential? And what level of infestation warrants spraying?

Some research shows that the flag leaf contributes as much as 75% or more of grain yield. So keeping it healthy is of utmost importance for realizing grain yield potential. Both the Morgan and Oklahoma documents have table demonstrating approximate percent leaf rust infection covering the flag leaf beginning at flowering and the expected subsequent yield loss.

For example, a wheat crop at flowering with 40% of the flag leaf covered with leaf rust has an estimated yield loss of 20%.

What fungicide products are used for leaf rust?

See either of the accompanying documents on diseases for details. Familiar products include active ingredients of triazole (Tilt, Propimax), strobilurin (Headline, Quadris), or both (Stratego, Quilt). Literature suggests that products with strobilurin may have better control but also cost more. Basic sprays can probably be accomplished for about $11-12 per acre minimum for triazole.

What stage of growth is usually most important for fungicide sprays to control leaf rust?

The growth stages that warrant consideration for spraying to protect yield potential are from flag leaf fully emerged (Feekes growth stage 9.0) to flowering to full boot to milk. Sprays at soft dough and hard dough don't offer much control because they are late. Spraying from the stage of flag leaves fully emerged to full boot is best, but this probably applies more to when leaf rust is developing vs. already infesting a field and the lower leaves on the wheat plant.

If leaf rust is already strongly present would fungicide sprays best be applied sooner than all flag leaves fully emerged?

If leaf rust is already strongly present like it appears to be in some South Plains fields as of March 22, 2005, then earlier spraying is probably warranted, provided that yield potential criteria, etc. are met. If leaf rust is already strongly present then waiting until (all) flag leaves are fully emerged risks infection of leaf rust on the flag leaf—and fungicides work best at prevention rather than curing an existing problem.

Gaylon Morgan and Brent Bean suggest that in fields where leaf rust is already strongly present on lower leaves that spraying earlier is probably best. Gaylon suggests that when half of the flag

leaves are fully emerged would be a good target, and we believe this could be 3-6 days sooner. Early emerging flag leaves, however, most likely represent the main head and those heads have the most grain yield potential compared to tiller heads. The amount of leaf rust infection moving to the flag leaf from lower leaves will be reduced when conditions are dry and warm to hot. Anticipating weather favorable to rust development on the flag leaf is the most important factor.

Overall, keep in mind that leaf rust does the most damage when infection is high during heading, flowering, milk stage, but foliar fungicides after the fact have less value.

If I have to spray earlier to control leaf rust will my window of effective control run out? Would I possibly have to spray again if I sprayed early in the presence of high leaf rust?

We believe the window of effective control is at least 14 days and an additional level of control may be available up to 21 days. Even if a field that is severely infected has a high yield potential (>70-80 bu/A?) it is doubtful that a second spray would be justified in the South Plains. Remember as you progress through the season and rust encounters drier conditions and more heat, the spread of infection slows down. Again, if a spray is warranted spraying earlier is probably better than spraying later.

How much wheat in the South Plains currently has some degree of flag leaf emergence, i.e. how soon might sprays be warranted if spraying criteria are met?

As of 22 March 2005 most of our wheats for grain, even our early maturity varieties such as TAM 110 and Jagger, are still probably about two weeks away from significant full flag leaf emergence (this is a guess until I can check some fields). So I think we have some time to investigate level of infection and make any needed decisions.

If I am uncertain about taking a current crop to grain or whether I should spray. Can I graze or bale? (Gaylon Morgan contributed to this answer.)

As noted above, we have little concern about grazing wheat with leaf rust infection. The longer rust is present, the more shriveled leaves become, and reduced forage production may occur.

If it looks like a wheat crop won't be worth much for grain then baling is an option. Baling saves fungicide costs as well combine costs in lieu of mowing and baling costs.

But what about forage yield and forage quality if I bale a rusty bunch of wheat forage? If leaf rust pressure is high then older leaves will be severely affected and could shrivel up and dry out. If this happens a lot then forage yields could decline some, and the lost leaves diminish forage quality. Overall, we would suspect that forage yield and quality would be lower under heavy leaf rust pressure. We don't have any data on this, but the amount of yield loss will be dependent on the level of rust infestation. Considering the lower leaves become brittle and are completely destroyed by the rust it would seem that the nutrient content of the desiccated leaves would be reduced.

Current Texas Wheat conditions are posted every 2-3 weeks by Dr. Gaylon Morgan, statewide Extension small grains specialist, College Station, at http://croptesting.tamu.edu/smallgrains/resources.htm#diseases