BLACKLANDS IPM UPDATE

D. TYLER MAYS, EXTENSION AGENT-IPM, HILL AND MCLENNAN COUNTIES
ZACH T. DAVIS, CEA-AG/NR, HILL COUNTY

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GENERAL:

Wheat across the area is greening up nicely thanks to the recent rains, and warmer temperatures. Current, pest issues in wheat remains low with the biggest issues currently being weeds. Aphids are present in area wheat fields, but are currently well below their respective economic threshold. I have not found or heard of leaf rust being north of Waco at this point, but I have found stripe rust in wheat north of Waco late last week. As we continue to stay on the mild to warm side of the thermometer rust, could soon be hitting wheat in Hill and surrounding counties.

Figure 1. Stripe rust pustules on a wheat leaf.

Figure 2. Leaf rust on wheat leaf. Photo credit: Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

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126 SOUTH COVINGTON STREET
P.O. BOX 318
HILLSBORO, TEXAS 76645
PHONE: 254-582-4022
FAX: 254-582-4021
MOBILE: 979-482-0111
EMAIL:TYLER.MAYS@AG.TAMU.EDU

LEAF RUST AND STRIPE RUST

Late last week I saw my first few pustules of stripe rust (**Figure 1**) in Hill County, and this is likely the start of rust infestations in area wheat fields for this area. The recent rains and current temperatures could lead to the infection of both leaf rust (**Figure 2**) and stripe rust. Leaf rust like the temperatures a little warmer with the optimum temperature being between 60-80°F, while stripe rust is favored by temperatures between 45-60°F. Both leaf and stripe rust require the leaf surface to be wet for an extended period to facilitate infection. Looking at the forecast it is just a matter of time before we start seeing leaf rust, and possibly stripe rust in our area wheat fields. Since most of the wheat in the area has not started jointing yet the yield loss from stripe rust can be severe, and it justifies watching fields closely and spraying in a timely manner.

Stripe rust infections that start at the jointing stage/first node visible yield loss can be between 25%-85% for a resistant and susceptible variety, respectively. Leaf rust is typically more of an issue later in the season as we reach the boot stage, and can also drastically reduce yields. Taking action now to manage leaf or stripe rust can preserve the yield potential of the field, but also help reduce the future inoculum load for your field and the fields around it. Currently, we have two ways to manage leaf rust and stripe rust in wheat including planting resistant varieties, and foliar fungicide treatments. Planting a rust resistant variety is a good management option but tit has two challenges. The first challenge is that most of the resistance genes in Hard Red Winter Wheat are adult plant resistance which does not kick in until after the plant has jointed, however, in our Soft Red Winter Wheat varieties these resistance genes typically are effective throughout the entire season. The second challenge is that the strain of the rust pathogens are changing constantly due to multiple factors like relying on a single or the same rust resistance genes in an environment. When we plant a variety or varieties that utilize the same resistance genes, we are selecting for the spores of the rust strains that are not susceptible to the resistance genes we utilize.

Fungicides are also a valuable tool in managing leaf rust and stripe rust in the season. However, not all fungicides are created equal some work better when applied before the infection and some are better at managing disease after the infection has taken place. Strobilurin based insecticides (i.e. azoxystrobin, pryaclostrobin) are better when applied before the infection occurs. Triazole fungicides (i.e. propiconazole, tebuconazole) are have both a preventative activity and can managing some diseases after the infection has started. Another key difference between the two common fungicide classes is length of residual activity. The Strobilurin fungicides can provide residual activity out to about 28 days after application, while the Triazole based fungicides only provide about 14 days of residual activity. However, weather conditions, coverage, and the exact active ingredient can impact the length of residual activity you can expect from either fungicide class.

Over the last two years we have evaluated four three fungicide programs for their ability to manage leaf rust and stripe rust, minimize yield loss from these rust pathogens, and which had the greatest net returns. Last year (2022) we evaluated the fungicide programs on a rust resistant variety and a rust susceptible variety, however, due to low yields due to Hessian fly in the rust resistant variety and low disease pressure these results are not shown. In 2021 we looked at the three fungicide programs on a wheat variety that was susceptible to stripe rust and moderately resistant to leaf rust, and saw a significant reduction in stripe rust severity in all fungicide programs (**Table 1**). However, when we look at the yield protection component of fungicides in rust management, there was no statistical difference between the propiconazole followed by tebuconazole, but statistical differences between the untreated Alto followed by Trivapro or Trivapro followed by Alto. This difference in yield also related to the difference in net return (value of grain-fungicide cost).

Table 1. Impact of different fungicide programs on stripe rust severity and yield loss in wheat, Hill County, TX 2021

Treatment[1]	Fungicide Cost[2]	Stripe Rust Severity	Yield	Test Weight	Gross Return[3]	Net Return[4]
Untreated Check	$0.00	83.3 a	45.26 b	53.4	271.53 b	271.53
Propiconazole @ 4 fl oz/acre, fb Tebuconazole @4 fl oz./acre	$3.56	24.3 b	55.35 ab	57.58	332.07 ab	328.51
Alto @ 3 fl. oz./acre, fb Trivapro @ 13.7 fl oz./acre	$19.89	7.3 b	60.28 a	57.98	366.65 a	341.76
Trivapro @ 9 fl. oz./acre, fb Alto @ 3 fl. oz./acre, fb	$14.34	2.4 b	62.82 a	57.7	376.89 a	362.55

[1] - Treatments were applied at Feekes 7 (two nodes visible) and Feekes 10.5 (head emergence)
[2] - Cost were averaged across three different chemical distributors in the area
[3] - Calculated based on wheat prices at $6.00 pe bushel and not dock for test weights
[4] - Calculated by subtracting the cost of fungicide from the gross return

APHIDS:

Aphid numbers remain light, but are starting to increase in some areas thanks to the warmer temperatures. At this time I have not found a field or are of a field that has a aphid population high enough to justify treatment, and thanks to beneficial insects these populations may take awhile to reach an economic damaging population. Most of the aphids I have found are the bird cherry-oat aphid (**Figure 3**), but there is the occasional greenbug (**Figure 4**) being found. There currently in not an economic threshold for bird cherry oat aphids in Texas Wheat, but it is recommended to use the economic threshold established by the University of Nebraska. This threshold is based on a rough growth stage of the field, and the number of aphids per tiller. Based on this threshold bird cherry-oat aphid population in wheat between the seedling stage and head emergence ranges between 20 and 30 aphids per tiller. Over the last few years, I have only had to call for bird cherry-oat aphids once, most of the time these populations will build and then rapidly decline due to natural enemies and reaching the population capacity for the aphid. If you do need to spray for aphids, we have historically used chlorpyrifos, but after February of 2022, all chlorpyrifos wheat labels and others had their labels revoked. Thankfully, there are a number of other effective insecticides that we can use to manage aphids in wheat, including pyrethroids, dimethoate, malathion, Sivanto, and Transform.

Figure 3. Bird-cherry oat aphids showing the reddish brown spot around the base of the cornicles.

Figure 4. Greenbug, with the characteristic dark green stripe down its back. Photo credit: Rick Grantham, Oklahoma State University.