Pest e-alerts

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Wheat Disease Update

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Friday (13-Apr) I visited the variety trial at Marshall (30 miles west of Stillwater) and at Lahoma (10 miles west of Enid). This was followed by visits to many fields north and northeast of Enid (Kremlin, Billings) and north of Ponca City (Tonkawa, Kildare and Newkirk). Wheat development varied across these locations. The earliest I saw had heads emerging and the latest was through flowering. On average, I would say wheat was in the middle of full bloom.

Leaf rust (LR) pustules were found at nearly all stops, but were at low incidence along the entire route. In Stillwater, I have seen incidences in the 40-65% range, but not in all plots.

Barley yellow dwarf (BYD) spots were present, but as in previous weeks, were not as severe as I have seen it in trials here at Stillwater. No or little dwarfing was associated with the spots, indicating spring infection.

Powdery mildew (PM) was observed at many stops; mostly was on lower leaves. The exception to this was the variety trial at Marshall, where PM was severe (≥65%) on lower leaves and could be found on F-1 leaves.

Stripe rust (YR) at Marshall and Lahoma was severe on the varieties observed to be susceptible this year, including Armour, Garrison, Everest, and Pete. Most of the fields I stopped at along the route were Duster, where only an occasional YR stripe was observed. Be sure to read James Swarts and Erick De Wolf's commentaries below regarding stripe rust. I concur with their statements regarding race change, but have not observed stripe rust as severe on Jagger and its relatives as on the other varieties.

Tan spot (TS), Septoria leaf blotch (SLB), physiological leaf spot (PLS): Leaf blight caused by these diseases (and the non-pathogen-caused PLS) were observed in many fields, especially in Duster. However, in some fields and trials minimal leaf blight due to these diseases and PLS was present. A good example of this was at Marshall and Lahoma, where SLB was readily found only on lower leaves of nearly all varieties. TS and PLS were mostly absent. In many fields visited north and northeast of Enid, the entire complex was common from lower to upper leaves at various levels of severity. On some of these, SLB and TS were highly suspected, but PLS also appeared to be involved. Leaf tip necrosis (LTN), which is associated with the leaf rust resistance gene Lr34 in Duster, exasperates the appearance. Correlation of specific environmental and/or fertility components with PLS remains elusive.

Pyrenophora (the fungus that causes tan spot) was isolated from nearly all the samples collected last week from southwestern Oklahoma. Pseudothecia and pycnidia, which are the "resting bodies" of the fungi that cause TS and SLB, also were found on residue in these fields. However, I do not believe that all of the blight/spotting in these fields is due to TS and SLB because of the high incidence of blight on upper leaves and the low incidence of isolation.

Texas: Jim Swart (Entomologist-IPM, Texas AgriLife Extension) 13-Apr: The regional wheat crop is maturing rapidly, with most varieties developing well ahead of normal. The latest maturing varieties are flowering, and the earliest varieties are well into the grain filling period. Russell Sutton, Research Associate with AgriLife Research, and I cannot remember a year where there were as many days difference in heading between the early and late maturing varieties.

USG 3295 SRWW, a variety that had previously shown good resistance to both leaf and stripe rust, is showing heavy stripe rust infections in some fields. Based on reports across the southern wheat belt, this is likely a reflection of a race change in the stripe rust pathogen. At the first sign of this infection, we suggested that growers consider a fungicide application on this variety, and many fields were sprayed last week.

Infection from the stripe rust pathogen (*Puccinia striiformis*) has slowed in the past few days, but infection could recur if weather conditions cool down a bit. Stripe rust is typically a cool weather pest, but some reports suggest this new race may be tolerant to warmer conditions than the rust race we have seen in past years.

Leaf rust (*Puccinia recondita*) infection levels remain low, even in susceptible varieties. Jackpot HRWW, a variety that has been highly susceptible to leaf rust, still shows low infection levels in the mid to upper leaf canopy. I expect infection levels to increase as the season progresses.

Glume blotch (*Stagonospora nodorum*) is more prevalent this year than usual, likely triggered by the warm, wet, humid conditions of the past month. The tebuconazole that was sprayed earlier for stripe and leaf rust is still providing flag leaf and head protection, but unsprayed fields are at greater risk. Unfortunately, there are no fungicides that are labeled to be applied

after flowering, so this option is unavailable except in the very latest maturing varieties. This is a weather driven pathogen that will subside if we experience dry weather (it is spread by splashing rain drops).

Some local suppliers have been disseminating misinformation on foliar fungicides. Claims are being made that Alto lasts "twice as long as tebuconazole", and produces "5 more bushels per acre than tebuconazole". This is simply not true. Since the research trial that is being used to misinform growers is based on our work from last year, I will clarify the results of this experiment. There were no differences in leaf rust control between any of the fungicides in this study. There were also no differences in yield, bushel weight, and thousand kernel weight between the fungicide treatments. TebuStar® 3.6 L, Alto® 100 SL, Quilt®, Quilt Xcel®, Prosaro® 421 SC, TwinLine®, and Tilt® all provided better leaf protection than the untreated plots but none were different from one another. I am including the leaf rating table from this study for your information. This rating was made at physiological maturity, 43 days after the single applications. The variety used was highly susceptible to rust, and would not be recommended to plant commercially.

Kansas: Dr. Erick De Wolf (Wheat Extension Pathologist, Kansas State University): 13-Apr: The wheat in Kansas is now heading and beginning to flower in Southeast and South Central Kansas. Wheat in central KS is now at the boot stage and will likely begin to head soon. In fact, it is likely that some fields are already beginning to head out in central region of the state. As we move north and west in the state, the wheat is moving toward flag leaf emergence to boot stages of development.

My own scouting and reports from other KSU agronomists and agents indicates that stripe is generally at low levels in many fields throughout central Kansas. The stripe rust was generally limited to the F-2 and F-1 leaves and less than 1% incidence. This afternoon; however, I have received reports that stripe rust has now moved to the flag leaf and the severity of disease has increased dramatically in some fields. Here are some specific reports: Stripe rust was reported on the flag leaf in Montgomery, Labette, Crawford and Wilson counties (Southeast, KS). Stripe rust was reported on the upper canopy (F-1 and Flag) with a noted increase in the incidence in many fields this past week in Saline, McPherson, Harvey, Reno and Ellsworth county (central KS). Stripe rust was observed on the flag leaf in Sedgwick County (South central, KS) with severe stripe rust developing in a field of Armour wheat in the southeast portion of this county. I have also seen stripe rust in north central KS including Cloud, Mitchell counties. The disease appears to be limited to the F-2 and F-1 leaves currently in north central KS.

Varieties with the Jagger based pedigree that have Yr17 are being affected by stripe rust. Varieties such as Everest, Armour, and TAM111 are also being affected by stripe rust this year. This strongly suggests that the stripe rust population has changed to overcome these sources of genetic resistance.

My assessment of the situation is that stripe rust is widely established in central Kansas this year. The weather has been conducive for disease development and the weather forecast appears to favor continued development. The disease is still at low levels in many fields, however, the severity of disease will likely increase dramatically in the next 10 days. I think there is high risk of severe yield loss to stripe rust for wheat in at least the eastern 2/3 of Kansas. Based on my current information I believe there is at least a moderate risk of severe disease in western KS. I will attempt to get more information about western Kansas next week.

Plant Disease Corner – Problems with Ornamentals

Jen Olson, Assistant Extension Specialist

Spring has arrived early in Oklahoma. The flowers are blooming and so are plant diseases. The following is a summary of some of the problems that we are seeing in the Plant Disease and Insect Diagnostic Laboratory. You can also stay current by following us on Twitter .

twitter @OSUsickplants

Viruses

The moderate temperatures and overcast days are great for the development of virus symptoms. Plant viruses manifest themselves with chlorotic spots, streaks, ringspots, mosaic and mottling. (Fig 1). In some cases, necrotic spots may be observed. We offer many tests for plant viruses, but tests have not been developed for all of them. In the past few weeks, we have received samples with the following plant viruses.

Fig 1. Chlorotic ringspots and line patterns are symptoms of Rose Mosaic Virus Complex.

Bleeding heart	Tobacco rattle virus
Coleus	Impatiens necrotic spot virus
Fig	Fig mosaic virus
Hosta	Hosta virus X
Rose	Rose rosette virus
Rose	Rose mosaic virus complex

There is no cure for plants that are infected with a virus and symptomatic plants should be removed and discarded. It is often helpful to have the virus identified because some viruses can be spread in the landscape by plant parasitic nematodes or insects. If the plant is small, we suggest that the entire plant be sent to the PDIDL for testing. For larger specimens, symptomatic leaves should be collected. Results for virus tests are generally available in 2-3 days.

Leafspots, Anthracnose and Rust

We did not receive many foliar fungal samples last year because weather conditions were not favorable for disease development. Most fungi require free water and/or high humidity to cause infections. The moderate temperatures and rainy weather this spring have resulted in many fungal foliar diseases. Symptoms include small spots on the leaves which may expand and coalesce so that the entire leaf is discolored (Fig 2). In severe cases, the twigs may also become infected. Here is a summary of some of the leaf spots, anthracnose and rust problems that we have observed this week. You should expect to see many cases of this type of problem in the next month.

Fig 2. Necrotic spots and leaf tip blight suggest that this ash sample has anthracnose.

Ash	Anthracnose
Hollyhock	Rust
Maple	Tar spot
Pine	Dothistroma needle blight
Rose	Downy mildew and black spot

The control methods for foliar fungal problems vary and each case should be addressed individually. For certain situations, fungicides will be recommended. In other cases, cultural methods such as removing fallen leaves and debris and increasing air circulation by pruning are sufficient. We suggest that you take digital images of the problem or place the leaves on a flatbed scanner to generate a digital image. The images can be sent to sickplants@okstate.edu and we will let you know if a physical sample is needed.

Fire Blight

Fire blight is a bacterial disease that affects plants in the rose family including pyracantha, apple, crab apple and pear. Plants are generally infected during flowering when bees visit the plants and transfer the bacteria, *Erwinia amylovora* to the plant. Weather conditions during the flowering period were optimum for infection throughout most of the state and we expect to see this disease frequently this spring. The early symptoms appear as wilting and discoloration of the shoots. Overtime, the entire shoot may discolor and dieback.

Each year, we receive digital images and samples of Bradford pear with black discoloration (Fig 3). Although Bradford pears are tolerant to fire blight, they are not immune. The symptoms are generally less severe than on highly susceptible trees, however they can appear unsightly. If you suspect that a plant has fire blight, samples which include discolored shoots should be collected and submitted to the PDIDL.

Fig 3. Blackening on this Bradford pear shoot is a symptom of fire blight.

Dieback of Evergreens

The PDIDL has received many samples of conifers from across Oklahoma with needle discoloration and branch dieback (Fig 4). Many of these are Eastern red cedars which are generally able to withstand Oklahoma's weather extremes. We have also received samples from Blue Atlas cedar, Arizona cypress, Leyland cypress, Alaskan Cypress, Deodora cedar and Arborvitae.

Fig 4. Discoloration on needles of cedar is due to environmental stresses and possibly a pathogen.

In general, we have not identified any aggressive plant pathogens on the majority of the samples. We have observed fruiting structures containing spores of *Seiridium* around a resinous canker on one of the Leyland cypress samples (Fig 5). Seiridium canker can cause flagging of branches, dieback and eventually plant death. Although other conifers can be attacked by Seiridium canker, it is most damaging on Leyland cypress.

Most of the conifer samples we have received have not had any evidence of an aggressive plant pathogen. We have identified a few opportunistic fungi, but these organisms generally indicate that there are other problems with the plant. It should be noted that in most cases, we only receive small shoots that measure 12 inches or less in length and diameter of less than a ½ inch.

In cases where we have received larger branch sections (2-3 feet long or greater than 1 inch in diameter), we have found *Botryosphaeria* spp. This genus of fungi is known to cause cankers and dieback on many plants. *Botryosphaeria* species are opportunistic and generally attack plants that have been weakened by environmental factors including drought. We suspect that environmental stresses (drought, extreme heat) are the main cause of the discoloration on the plants, but Botryosphaeria canker is attacking and speeding the rate of decline.

If you are examining trees with needle discoloration and dieback, be sure to examine the branches and trunk. Look for broken or sunken areas along the branches and select these for sampling. Many of these conifers exude resin in the vicinity of canker sites. Place these branch pieces in a plastic bag and ship them to the PDIDL.

Fig 5. Canker oozing resin on a branch of a Leyland Cypress.

More trouble with Oak trees

Over the past 3 months, we have received many samples and images of oak trees where the bark has fallen off and unusual colors or structures are visible. This problem is Hypoxylon canker and indicates that the tree is dead or near death. The fungi that cause Hypoxylon canker are unusual in that they often colonize the tree months or even years before they kill the tree. When the trees become water stressed, they are able to invade the tree. The end result is branch dieback, large cankers and/or death of the tree.

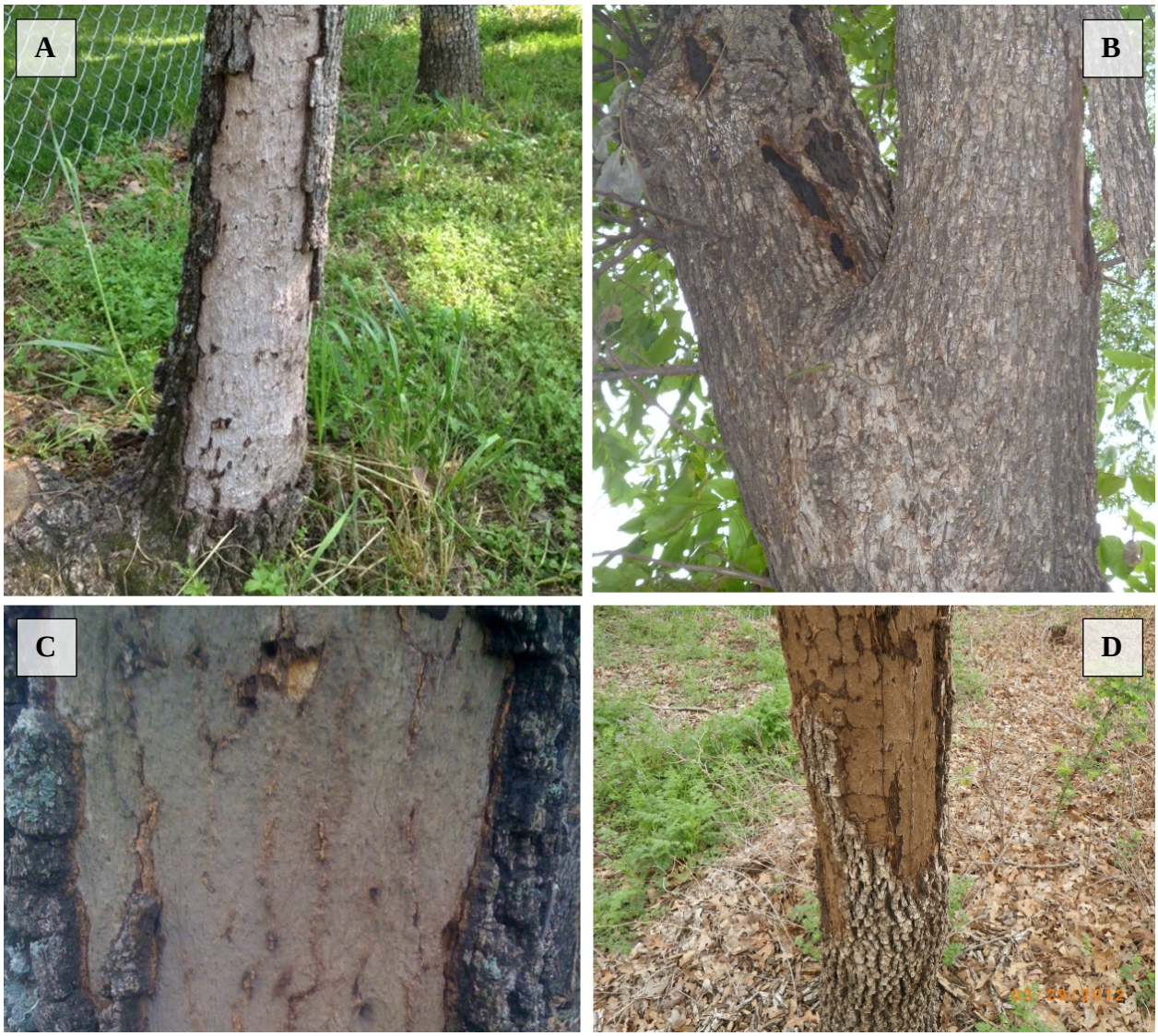

Fig 6A-D. Different color variations of the stroma that indicates Hypoxylon canker; (A, C, D - oak, B - pecan). The brown stage (D) has been common this year.

As the fungus develops, it will form a fruiting structure called a stroma under the bark. As the stroma develops, the bark is loosened and falls off the tree. The stroma varies in color and most often we find the "white" or "black" stages of Hypoxylon canker (Fig 6A-D). This year, the "tan-gray" and "brown" stages have been common. The main fungus that causes Hypoxylon canker is *Biscogniauxia atropunctata* var. *atropunctata* (synonym *Hypoxylon atropunctatum*), but other *Biscogniauxia* species could also be responsible. The end result is the same and the tree will ultimately die. Infected trees should be removed before they become hazardous.

Most of the time, we find Hypoxylon canker on oak trees. This year, we have observed the disease on pecan in a few counties. If you observe symptoms and signs of Hypoxylon canker on trees other than oak, we would be interested in hearing from you. Please take digital images and send them to sickplants@okstate.edu. We may also request a sample from the stroma which can be removed by chipping with a hatchet or using a handsaw.

We look forward to working with you this season and encourage you to take pictures of the problem(s) in the landscape. If you have any questions regarding this information, please contact the PDIDL at 405-744-9961 or sickplants@okstate.edu.

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