



# Pest e-alerts



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## Horticulture Disease Updates

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Now that the rain has stopped we have been out in the field surveying the status of our research plots. While the week of liquid sunshine was much needed to help alleviate some of the drought that had set in on Oklahoma, it has also brought us the first diseases of the year on several horticulture commodities. I have seen *Gymnosporangium* rusts (cedar-apple rust is in this group) and also large patch on Zoysiagrass this week. The almost continuous rain and moderate temperatures over the last week have made for environmental conditions highly conducive for both diseases. Below you will find some previously reported information on both diseases and some new data on fungicide evaluations for controlling large patch.

### Gymnosporangium rusts



This is the time of year when rusts including cedar-apple rust caused by the fungus *Gymnosporangium juniperi-virginianae*, hawthorn rust caused by the fungus *Gymnosporangium globosum*, and quince rust caused by the fungus *Gymnosporangium clavipes*, cause the formation of telia (orange gelatinous structures) from galls on eastern red cedar trees (*Juniperus virginiana*). While these rusts are different species and cause slightly different symptoms, the life cycle is very similar. All require two hosts to complete their life cycles with the common host being *Juniperus* species. Alternate hosts include apple, hawthorn, crabapple, and quince among other rosaceous plants. On cedar hosts, typical symptoms include galls and twig dieback. In the spring, cedar-apple rust telia will typically appear as large masses of orange tendrils that erupt from, round growths (galls) after periods of rain and high humidity (Figs. 1 and 2). Galls formed by hawthorn rusts are generally smaller, more rounded and brownish in color. The gelatinous spore structures (telia) that develop after spring rains are brownish in color and have rounded tips (Fig. 3). Quince rust produces a spindle-shaped swelling on branches of *Juniperus* species. Gelatinous spore producing structures (telia) are

orange in color, cushion-like, and appear to “ooze” from cracks in the gall (Fig. 4). Spores (basidiospores) that are released from telia serve as inoculum, which infect rosaceous plants. Damage to rosaceous plants includes lesions on leaves and young twigs and fruit. Under severe infection defoliation can result. In summer spores (aeciospores) form on rosaceous plants and will infect *Juniperus* plants. Galls form during the next year after infection and telia may not form until 22 months after infection.



**Fig 1.** Hundreds of cedar-apple rust galls on eastern red cedar trees.



**Fig 2.** Close-up of a cedar-apple rust gall with mature gelatinous spore tendrils.

Management strategies for the rusts described above include the use of resistant junipers, hawthorn, apples, crabapples, and quince varieties. In addition, spatial separation of rosaceous plants and junipers can help reduce the cycling of spores between alternate hosts so that the fungus cannot complete its life cycle. This latter strategy can be difficult to achieve as spores can move considerable distances (up to tens of miles). Fungicides should be used preventatively on desirable rosaceous plants. Fungicides should be applied to these plants prior to, or as soon as telia (orange, gelatinous structures on junipers) are first observed. Multiple applications of fungicide may be necessary if wet weather persists. Consult the

publication E-832 "Extension Agents' Handbook of Insect, Plant Disease and Weed Control" for fungicide recommendations.



**Fig 3.** Close-up of a hawthorn rust gall with mature gelatinous spore tendrils on an eastern red cedar tree.



**Fig 4.** Close-up of spindle-shaped stem swellings (galls) caused by quince rust on an eastern red cedar tree.

### **Large Patch**

I was scouting and rating turfgrass plots at our turfgrass research center this week and noticed that large patch was active in our 'Meyer' zoysiagrass plots. Large patch can occur in residential, landscape, and recreational warm-season turfgrass areas. In Oklahoma, the disease is most noticeable in early spring when turfgrasses are breaking dormancy and weather conditions are wet and mild. In some years, the disease is evident in the fall; however, activity by the pathogen may not always result in visible symptoms. Zoysiagrass is most susceptible to large patch, but bermudagrass and St. Augustinegrass can also be damaged.

The turf in affected areas will thin and individual grass leaves may appear bleached or yellow (Fig. 5). Large circular, semi-circular, or arcs of damaged turf will be apparent. When large patch is active, diseased turf may appear bright orange (Fig. 6). Leaf lesions, a white, cottony

growth (mycelium) and smoke rings at the edge of the diseased areas will be absent. Patches are perennial, typically expand in size and often can reach several yards in diameter. Affected shoots can be easily pulled from sheaths or point of attachment and the base of the shoot may appear water soaked. As plant stand density is reduced, weed encroachment is common both during and after disease activity.

The fungus that causes large patch, *Rhizoctonia solani*, overwinters as dormant mycelium (body of the fungus) in infected plants or as special survival structures. In Oklahoma, infection of susceptible grasses can begin in late September when soil temperatures are above 50° F and moisture is adequate and continue until dormancy. Fungal activity can resume in early spring but is suppressed by soil temperatures greater than 85° F. Turfgrass grown under high nitrogen fertility that is applied too late in the year or very early in the spring is more prone to the development of large patch. Turfgrass that is also excessively irrigated has abundant thatch, or low air movement above the canopy can be predisposed to disease. Extended periods of wet, mild weather can lead to severe epidemics. During summer months the disease subsides and the fungus typically survives in thatch or in resting structures.



**Fig 5.** Thinning and bleached leaves on turf plants indicative of large patch on Zoysiagrass.



**Fig 6.** A bright orange active patch symptom of large patch on Zoysiagrass.

### Large patch management:

Large patch usually does not kill the stolons or rhizomes and surviving plants can fill in the affected areas during summer months. Do not apply nitrogen fertilizers in early spring when the pathogen is active; wait until soil temperatures are warmer. Do not apply nitrogen after September 15th. When water is required, apply a sufficient amount to wet the soil and then water as infrequently as possible without causing drought stress between irrigation events. Wait and remove excessive thatch or aerify in the summer; these activities may help reduce disease severity. For chemical control to be effective, fungicides should be applied in the fall before disease development is evident. Remember the pathogen is active in the fall and into the winter and early in the spring. A repeated fungicide application 30 days later may be required if environmental conditions are still conducive for disease. It is recommended that the affected areas are photographed in the spring and that fall fungicide applications are targeted to only those areas where the disease was present. Spring applications are generally not effective.

Below are some data from a fungicide trial that was initiated on September 18, 2009. For treatments with two applications of fungicide, spray intervals were 14-, 21-, or 28-days after the initial treatment. All fungicide treatments were applied to 'Meyer' Zoysiagrass. Large patch severity and also overall quality were evaluated on May 21, 2010.

Highest levels of disease severity were recorded in plots treated with OSU experimental, which was not significantly different from plots treated with polyoxin-D (Endorse), one application each of flutolanil (Prostar) and triticonazole (Chipco Triton), and the non-treated control. All plots treated with fluoxastrobin (Disarm) exhibited no disease symptoms. Plots treated with two applications of flutolanil (Prostar) and triticonazole (Chipco Triton) had levels of disease that were similar to plots treated with fluoxastrobin, but were not significantly different from the non-treated control.

On the final rating, turf quality was lowest for plots treated with OSU experimental, polyoxin-D (Endorse), one application each of flutolanil (Prostar) and triticonazole (Chipco Triton), and the non-treated control. All other plots treated with fungicide had significantly higher turf quality compared to the non-treated control with the exception of plots treated with flutolanil (Prostar/21-day interval), triticonazole (Chipco Triton/21-day interval, reduced rate on the second application), and triticonazole (Chipco Triton/21-day interval, high rate). While two applications of triticonazole were effective at controlling large patch at an acceptable level in this trial, fluoxastrobin offered comparable control even with just one application.

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## Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist

**Oklahoma:** Barley yellow dwarf definitely is the most prevalent disease across Oklahoma. Dr. Brett Carver (OSU wheat breeder) observed widespread BYD symptoms in breeder plots across northern Oklahoma. The same is true here around Stillwater and to the west of Stillwater. Around Stillwater and west to Marshall, wheat is past flowering with berries being fully formed to milky. The nearly 2 inches of rain this past weekend likely will start some foliar diseases, but the only place I could find significant leaf rust in trials around Stillwater was in a strip of Jagalene that was planted early last fall. This strip, which has leaf rust in the 25-65% range on the flag leaves, was also hit hard with powdery mildew and BYD. Scattered leaf rust pustules can be found in susceptible varieties in other fields/plots. In the diagnostic lab over the last week, samples have been diagnosed with brown wheat mite damage (southwestern, OK), with wheat streak mosaic virus, high plains virus, Triticum mosaic virus (panhandle), and with BYDV (northeastern OK). Rick Kochenower (Area Res & Extn Spec – Panhandle) confirmed that only virus diseases such as BYD, WSM, etc. are appearing in the panhandle.



Barley yellow dwarf



**Texas:** (Rex Herrington, Research Associate, TAMU): On Saturday the 23rd, I stopped by our McGregor TX nursery, and found numerous single pustules of wheat stem rust on leaves in the McNair 701 trap. Wheat leaf rust is much lighter than normal, due to the drought. This is a dryland nursery, and is extremely drought stressed.

**Another Texas report** (Dr. Yue Jin, Research Scientist, USDA-ARS Cereal Disease Lab, St. Paul, MN): This is the first time for CDL staff to conduct rust survey trips in Rio Grande Valley since the early 1990s. Dr. Goolsby, an entomologist at ARS Weslaco, hosted me during my surveys on April 20-21. Dr. Goolsby is very knowledgeable on this unique and diverse agriculture system in Rio Grande Valley. He has worked in this region for a number of years.

**Wheat stem rust:** Stem rust was found on emmer, barley and triticale plants used in windbreaks of watermelon fields in Rio Grande Valley in southern TX. According Dr. Goolsby, there are about 35,000 acres of watermelon planted in this region, thus acreage of small grain cereals as windbreaks is substantial. Varieties of these small grains planted in the windbreaks were unknown. Majority of the fields were emmer only, some fields with emmer and barley alternating, and a few fields with triticale only. Windbreaks were generally planted in November last year. As of mid-April, barley plants were over-matured (dried up), emmer was at late milk to soft dough stages, and triticale was from flowering to early milk. The barley and emmer appeared to be resistant to stem rust race(s) present in those fields as majority of plants were free from stem rust. Infected emmer and barley plants were sparse and infections ranged from trace up to 20% in severity. The triticale was highly susceptible with stem rust severity up to 80S.

**Wheat leaf rust:** Common wheat was not observed as a windbreak in the lower Rio Grande Valley (near McAllen) but an awnless variety of common wheat was observed as windbreak in a watermelon field near Laredo. Leaf rust was not observed on this common wheat or on emmer and triticale in the lower Rio Grande.

**Arkansas** (Dr. Gene Milus, Small Grains Pathologist, UA): Wheat growth stages in Arkansas range from soft dough in the south to flowering in the north. Our drought ended quickly with up to 15 inches of rain during the past 6 days. The southeast corner received the least rain at 2.5 inches. Some wheat has been damaged by wind, rain, hail, and/or flood. More flooding is likely as rivers, creeks and ditches back up. Stripe rust is the most prevalent disease, but still at low levels. Temperatures are still favorable for stripe rust (upper 30s last night in Fayetteville). There is concern about scab, but none has been reported at this time. Septoria has been reported to be moving up plants but is still only at mid



canopy. There have been reports of BYD from all across the state, but incidence and severity appear to be low. No new reports of leaf rust. No report of stem rust.



**Kansas** (Dr. Erick De Wolf, Wheat Plant Pathologist, KSU): The wheat in southeastern and south central Kansas is beginning to head out. The growth stage of wheat in other areas of the state ranges between the boot and jointing. Most areas of the state have been very dry this season and these dry conditions appear to be slowing the development of most fungal diseases. I continue to find low levels of leaf rust in central Kansas despite these dry conditions. Most recently, I found leaf rust in Sumner county, which is just south of Wichita in south central Kansas. The incidence of leaf rust was less than 1% but the disease was present on the flag-1 leaves. I have not been able to find stripe rust or stem rust to date in Kansas.

Other diseases: Parts of southeastern Kansas have received frequent rains this week, which may increase the risk of Fusarium head blight (FHB) in this region. Maps of FHB risk in Kansas and other states can be found on-line at: [http://www.wheatcab.psu.edu/riskTool\\_2011.html](http://www.wheatcab.psu.edu/riskTool_2011.html).

Severe powdery mildew has been reported in southeastern Kansas, and I observed mildew in demo plots near Wichita. Barley yellow dwarf also appears to be common in many areas of Kansas this spring, but I will need to do some additional surveys to determine how wide spread this viral disease may be.

**Nebraska** (Dr. Stephen Wegulo, Plant Pathologist, UNL): Yesterday I surveyed wheat fields in southeastern Nebraska (Saunders, Lancaster, Gage, Saline, and Jefferson Counties). Wheat was just starting to joint in most of the fields I visited. According to a report by the Nebraska Wheat Board which referenced a USDA source, wheat jointed statewide was 10% on April 25. Dry conditions before mid-April and lower than normal temperatures in March and April slowed wheat development somewhat. Much needed rain over the last two weeks has considerably improved the wheat crop condition. I found disease only at Mead in Saunders County. Leaf spots were starting to develop and powdery mildew was evident in the lower canopy. There was a low incidence (less than 1%) of barley yellow dwarf. I did not find any rust diseases.



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