Pest e-alerts

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Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist

Oklahoma: Over the last week I have examined trials and plots around Stillwater several times. Although the wheat appears to be in good condition, soil moisture is quickly being depleted. Most of the wheat I examined was close to GS 7. The biggest difference I saw in the wheat yesterday around Stillwater was a slight increase in the level of powdery mildew, but only on the lowest leaves in thick wheat. There also perhaps was a slight increase in leaf rust, but nothing striking. Barley yellow dwarf (BYD) also is present in earlier planted wheat, and aphids (greenbugs and bird cherry-oat aphids) could be found in some areas. Yesterday I and Brian Olson visited wheat near Marshall (about 30 miles west of Stillwater) and at Lahoma (about 10 miles west of Enid). We saw no powdery mildew, rust, or any disease other than symptoms indicative of wheat soilborne mosaic/wheat spindle streak mosaic and BYD. Wheat in this area was mostly around GS 6 and looked green, healthy, but with the need for moisture coming quickly. Roger Gribble (Area Ext Agron Spec, NW District) confirmed that in his area he has seen only WSBM/WSSM and BYD. Drought conditions are worse in western and southwestern OK with no samples coming from those areas to our diagnostic lab so far this spring.

Leaf rust (top) and soilborne or spindle streak (bottom) on wheat.

Kansas (Dr. Erick De Wolf, Wheat Plant Pathologist, KSU), Mar 21: The wheat crop in Kansas has been greening up this past week. Trace amounts of leaf rust were found in research plots near Manhattan Kansas (Northeast, KS) on Friday March 18. This disease probably started last fall and has survived the winter with the wheat crop. This overwintering of leaf rust is not unusual for this part of Kansas. The disease is still on the lowest leaves of the wheat canopy, which will naturally senesce as the plants put out new growth. The contribution of the overwintering leaf rust will be minor if the infected leaves die before the fungus can spread to the new growth. The overwintering leaf rust could become important however, if the fungus spreads to the new growth during the next few weeks. This early spread of leaf rust will require moderate temperatures and one or more rain showers. Wheat soilborne mosaic was also present in some breeding plots near Manhattan. No stem rust of stripe rust was observed.

Arkansas (Dr. Gene Milus (Small Grains Pathologist, University of Arkansas), Mar 22: Two overwintering foci of wheat stripe rust were found in plots of susceptible checks at Kibler near Fort Smith. Wheat ranged from growth stage 6 to 8. Powdery mildew was heavy on a few hard red winter varieties. A few lesions of Septoria tritici blotch and possibly Stagonospora blotch were found on the lowest leaves. Where no fall insecticide was used, there were several hundred bird-cherry oat aphids per foot of row. No BYD symptoms evident yet. Wheat seems a bit ahead of normal where fertilizer was applied on time. Last week, Jason Kelley from Extension found “heavy” leaf rust in a 120-acre field of Jackpot HRWW near Lonoke (east of Little Rock) that is being grown for seed. This is the only know finding of leaf rust in Arkansas.

Louisiana (Dr. Stephen Harrison, Wheat and Oat Breeder, LSU), Mar 24: I rated plots at Winnsboro in north Louisiana yesterday, Baton Rouge earlier in the week, and received reports on several other locations from Boyd Padgett, Don Groth, and others. Leaf rust has been reported across all regions of Louisiana and is actively increasing but levels of infections are relatively low at this stage. We did have about 7 consecutive days of heavy dews, morning fogs, and lows in the 60 – 70 F range with highs around 80, so I expect to see pustules continue to develop from infections that occurred in the past week. We are quite dry in terms of rainfall/ soil moisture, with leaf curling and rolling in some varieties. However, rust will continue to develop leaf rust as long as Gulf moisture results in dews that last for several hours. Wheat varieties range from boot to headed in most fields. Stripe rust is still active although temperatures are getting a little warm for continued development, although you could convince me otherwise from the infections in some plots at Winnsboro. From a pathologists perspective, there are some interesting observations on stripe rust this spring (or frustrating from a breeders perspective). The line LA01139D-56 that we planned to release last summer was absolutely ‘pounded’ by stripe rust last spring. We kept a few bushels as a stripe rust spreader/ check in our nurseries and discarded the rest. This spring it is completely clean as are several commercial varieties that

were hurt last spring, and some varieties / lines that were clean last spring are susceptible. So we either had another change in race structure / virulence (like we had last spring) or there is an odd interaction going n between the unusual weather patter (very cold and then very hot with not many days in the 'normal temperature range').

Pacific Northwest (Dr. Xianming Chen, Res Plant Pathologist, USDA-ARS, Pullman, WA), March 18: Stripe rust has survived the cold February and started actively growing in many locations in the southeastern and central Washington. Yesterday, we checked wheat fields in counties of Garfield, Columbia, Walla Walla, Benton, and Adams in the State of Washington and found stripe rust in most checked fields. From Central Ferry to Walla Walla, stripe rust appeared to be more active than the rust found in the Horse Heaven Hills. Rust incidence (percentage of plants with rust) ranged from less than 1% to 5%, with field of most rust found in Walla Walla. In the Horse Heaven Hills, more fields were found to have stripe rust than the last November, but generally less than 1% incidence and rust pustules were generally not actively sporulating (producing spores). In the same fields where I found stripe rust on November 9, 2010 and February 17, 2011, we found rust, but not as easy as a month ago. Rust survival was reduced by the cold period in the last week of February due to the lack of snow cover in this region. In contrast, snow cover in much of the Walla Walla and Dayton areas during that cold period might help rust survive. In a field east of the conjunction between HW 26 and HW 395 in Adams County, stripe rust was easily found even when it quite dark, although rust pustules appeared not to be very active. Nationally, stripe rust has been reported in Louisiana, Texas, Oregon, and Washington. According to Dr. Jorge Dubcovsky, stripe rust has started developing in the Davis area of California. Yesterday, we also found a couple of wheat leaves with few leaf rust pustules in the Horse Heaven Hills. In the fields where we found stem rust last November, we could not find any stem rust yesterday. Stem rust could have been completely eliminated from the fields by the winter.

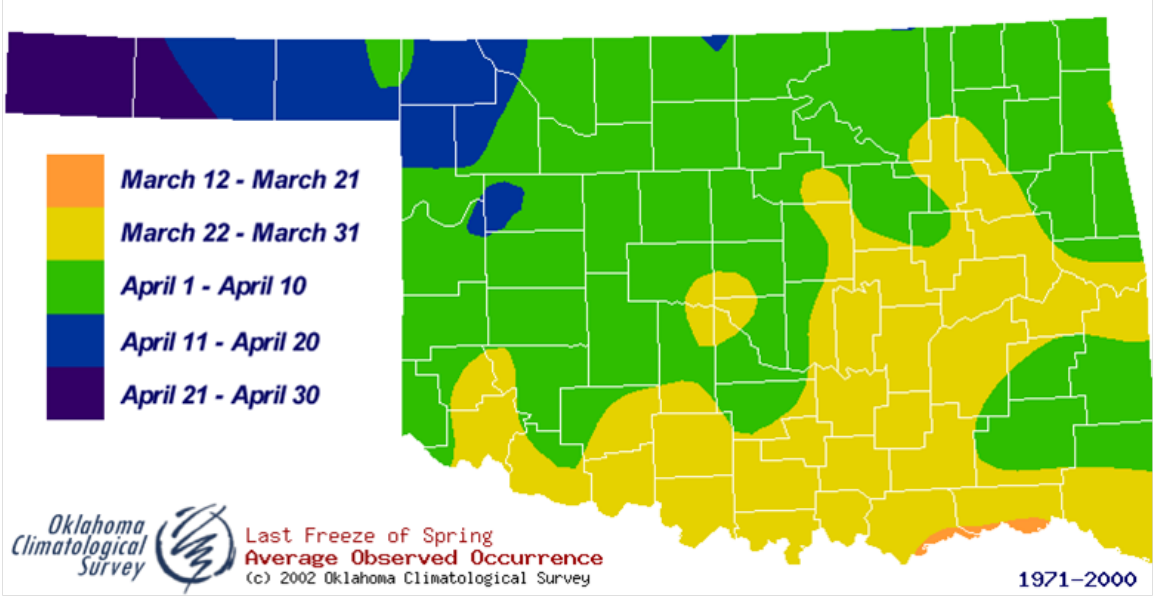
Horn Flies and Insect Growth Regulators (IGR)

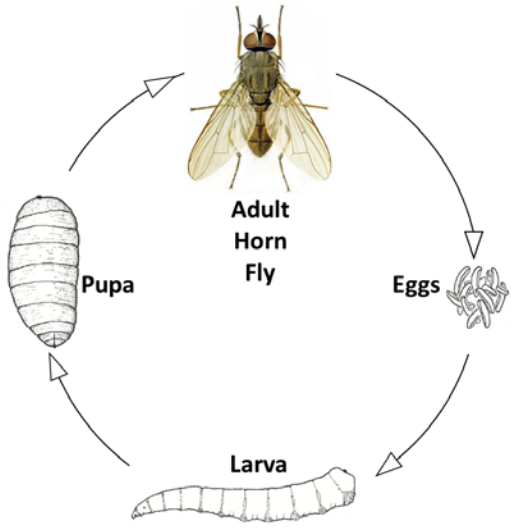
Justin Talley, Extension Livestock Entomologist

As spring arrives and temperatures start to creep up it is time to make horn fly control decisions. Especially, if you plan to utilize an insect growth regulator (IGR) products to suppress horn fly populations. IGR's are commonly found in mineral supplements and are passed through the animal. The IGR products are present in the manure where horn flies lay their eggs. IGR products are effective against horn flies because they lay their eggs in only fresh manure where the IGR is actively killing the immature stages. Developing larvae are not able to complete their development to the pupal stage. When considering IGR supplements the cost can be fairly efficient if you are already feeding

mineral supplements. Some supplements will only increase by a $1.00 /hd if you are only adding a IGR to your mineral. However, if you are located in an area where anaplasmosis is a problem then the supplement cost can go up substantially mainly due the anaplaz medication that is included with the mineral.

Horn flies are a common fly species associated with livestock. They are a small black fly and feed on cattle in an inverted position with their head facing down. Both male and female horn flies take blood from the host and feed 20 to 30 times a day. Horn flies continually stay on the animal and only leave the animal for short periods to lay eggs. Typical feeding areas on cattle include the back, side, belly and legs of cattle. Horn fly populations begin building up in the spring as early as April and last until the 1st frost. The life cycle of horn flies lends itself to building large populations on cattle if control is not implemented.





Horn flies complete an entire generation in as few as 14 days during the summer months, which leads to numerous generations of flies over six or seven months. Horn flies have complete metamorphosis which consists of eggs, larvae, pupae, and adults. The adult female fly must lay her eggs in fresh cow manure. The eggs hatch within 48 hours into 1st instar larvae which feed in the manure pat and progressively grow into 2nd and 3rd instar larvae. Larvae of the horn fly develop only in fresh cattle manure. Third instar larvae crawl from the manure pat to a drier area and pupate. Inside the pupal case the adult fly forms and the adult will emerge from the pupal case and seek a suitable host, which are typically cattle. During mid-fall adults do not emerge

and the horn fly spends the winter in the pupal stage.

Horn flies can have significant impacts on growing cattle. The main impact is the reduction in weight gain especially in weaning weights for spring born calves. Some studies have attributed a 1.5 lb. of extra gain per week when horn flies are controlled. The reduction in weight occurs mainly because of stress on the cow which can then result in reduced milk flow or production. This stress is caused by horn flies because they are a blood feeding insect. The loss of blood and stress from biting activity results in direct economic impacts (reduced weights). Considering today's market value for cattle the impact is even larger.

Mineral supplements that have IGR's are effective only when most of the cattle in a herd are consuming the required amount and mineral supplements work best when non treated cattle are not nearby as populations of horn fly will exchange from one herd to another. Some other things to consider when applying IGR's to control horn fly populations:

1) Start before you have a horn fly problem
2) Start feeding supplements with IGR's within 15-20 days after the last hard freeze
3) If large adult populations start to build up on your cattle consider using additional control strategies such as pour-ons, insecticide ear tags, or spraying the animals with an approved insecticide

The role of IGR's in a horn fly control program can be very significant if used in a more preventative manner. Since IGR's only control immature stages and if your neighbors are doing nothing for horn flies then you may want to consider alternative control strategies.

Grape Berry Moths Are Emerging Early in 2011

Eric J. Rebek, State Extension Specialist for Horticultural Insects

This week we received our first report of grape berry moth (GBM), *Endopiza viteana*, activity for 2011. Two adult moths were caught on pheromone traps placed in a vineyard in Cleveland County that has a history of trouble with this pest. Grape berry moth is a key pest of grapes from the eastern U.S. to the Rocky Mountains in the west. This native caterpillar pest co-evolved with wild grapes in eastern North America and feeds exclusively on wild and cultivated grapes. Larvae cause extensive damage by feeding on flowers and fruit clusters, and damaged berries are associated with infections of sour rot and bunch rot. What follows is a brief description of this pest, its biology and life cycle, feeding damage it causes, and best management strategies for Oklahoma.

Description

Adult moths are small with a wingspread of about 3/8 inch. The front wings are brown with a slight purplish sheen. The head is brown, and the center portion of the forewings may appear to have a dark saddle-like band running across them. Young larvae are either yellowish green or dull white with a black head capsule. The coloration of mature larvae ranges from olive green to brown. They measure about 3/8 inch long when fully grown. When disturbed, caterpillars wiggle and squirm vigorously and will drop to the ground to escape.

Life Cycle

Grape berry moths overwinter as pupae in a cocoon. Larvae form the cocoon by cutting out a small piece of leaf tissue and folding it over to form a cavity, lining it with silk. Cocoons may remain attached to grape leaves or break off and fall to the ground. Some of the overwintering pupae are killed when temperatures drop below 10° F. Typically, adults emerge in late spring, coinciding with bloom of grapes (April). However, this year we have experienced above average temperatures for March, so the moths are off to an early start! Females deposit flattened, circular, cream-colored eggs on the fruit, stems, flower clusters, or newly formed grape berries. First-generation larvae feed on flowers or very young fruit clusters. This early activity is relatively unimportant in most vineyards. Later generations feed on developing or ripening grapes, often webbing several fruits together and tunneling inside berries. Each larva may destroy three or four fruits. It takes GBM an average of five weeks to develop from egg to adult. There are as many as three generations per year in Oklahoma.

Hosts

Grape berry moth caterpillars feed exclusively on cultivated and wild grapes and prefer tender-skinned varieties with tight fruit clusters.

Damage

Damage is caused by the larvae feeding in flowers and fruit. Once damaged, small fruits turn dark purple and drop from the stems. Larger fruits are usually webbed into the cluster and shrivel or rot in place. Larvae will tunnel into the berries and feed on the fruit internally. Damaged berries are susceptible to sour rot and bunch rot.

Damaged berry (L) and grape berry moth larva and damage (R). Texas Winegrape Network, Texas AgriLife Extension, http://winegrapes.tamu.edu/grow/berrymoth.html

Monitoring

A monitoring program for adults should be implemented in vineyards with a history of GBM or those located adjacent to woodland. Pheromone traps are used commonly to monitor adult moth activity. Pheromone traps consist of sticky traps containing female sex pheromones (attractants), which attract adult males. Control strategies need to be considered once adults are caught in traps. In Oklahoma, place three traps at the edge of woods adjacent to the vineyard on March 15. If the vineyard is not located near forested habitat, place the traps around the perimeter of the vineyard. Traps should be checked weekly for adult moths. In mid-May, move traps to the center of the vineyard and place on the top wire to monitor second- and third-generation moths. Monitoring becomes more important at this time because damage sustained by second- and third-generation caterpillars is most severe. Check for larvae or webbing on fifty clusters along the edge of the vineyard and another fifty clusters in the 10th row in to the vineyard. Insecticides should be applied if >1% of sampled clusters are infested.

Effective monitoring also includes knowledge of when GBM are present at key stages of development. This is done by logging accumulated degree days beginning January 1. The degree day model for GBM uses a development threshold of 50° F (DD50), which is the minimum temperature required for this species to develop. Use the following equation to calculate DD50 for GBM:

DD50 = (maximum temp + minimum temp) / 2 – threshold temp

For example, if the maximum temperature on a given day was 86° F and the minimum temperature was 46° F, the average temperature would be 65.5° F. Subtracting the threshold temperature of 50° F from the average temperature results in 15.5 degree days. Results of zero or less are recorded as 0 degree days. Remember, the daily degree day values are summed over time beginning January 1 to generate accumulated degree days. While simple, this model is sufficient for monitoring GBM development and timing management strategies. The table below summarizes development of GBM and any necessary management actions when GBM is detected during monitoring efforts.

Accumulated DD_{50}	GBM Development / Management Actions
300 – 600	Insecticides applied to vineyard perimeter vines, especially for vineyards located adjacent to woodland (see below for details)
~ 400	1st generation larvae feeding on buds or wild hosts in adjacent woodland
1200+	Later generations of larvae present; check for larvae or webbing on 50 clusters along edge and 50 clusters in 10th row in to vineyard; insecticides applied if >1% of clusters infested (see below for details)

Control

Several non-chemical control strategies exist for GBM. Partial control may be accomplished through proper sanitation—thoroughly cleaning up around the vineyard and raking and burning fallen leaves during the fall or winter. Soil spreading or light plowing to a depth of one or two inches in the spring will cover some cocoons, preventing emergence of adults produced from those cocoons. Light infestations can be controlled by hand-picking infested berries.

Mating disruption is a somewhat novel, non-chemical control strategy that has been used successfully for large vineyards (i.e., ≥ 5 acres) in Arkansas. This strategy employs pheromone-laced ropes placed in high-risk vineyards at a rate of 200-400 ropes/A. The vineyard is thus swamped with GBM sex pheromone, which confuses males and makes it difficult for them to locate mates. This results in a large proportion of unmated females, which deposit unfertile eggs that never hatch. However, most vineyards in Oklahoma are not large enough to employ this strategy effectively.

Control with insecticides should accompany GBM detection following a monitoring program. If adults are caught in pheromone traps, begin spraying the perimeter vines between 300 and 600 degree days, which targets any larvae emerging from eggs deposited by females that move in from adjacent wooded habitats. Perimeter sprays should be made twice, spaced 10 days apart. However, the most important applications are made later in the season to target second- and third-generation larvae, which are the most damaging. If >1% of inspected clusters are infested, apply insecticides to the entire vineyard between 1200 and 1600 DD (2nd generation) and between 2400 and 2700 DD (3rd generation).

Conventional insecticides used for GBM control include phosmet (Imidan) and carbaryl (Sevin). However, these are broad-spectrum compounds that can harm more than just the target pest

so consider using reduced risk chemistries that are safer for the applicator and the environment. These options include Bacillus thuringiensis subsp. kurstaki, B.t. (Dipel), spinosad (SpinTor), and methoxyfenozide (Intrepid), an insect growth regulator. Products containing Bt are highly specific to caterpillar pests, so there are no harmful non-target effects. Like B.t., spinosad is another microbial product that must be ingested by the target pest to be effective. Methoxyfenozide is an IGR that disrupts the molting process in immature larvae. The following table lists recommended insecticides and application rates for GBM control in Oklahoma.

Product	Active Ingredient	Application Rate	Notes
Imidan 70W	Phosmet	1.3 to 2.1 lbs/A	Reentry interval (REI) = 14 days
Sevin 80 WSP	Carbaryl	2.5 lbs/A	Do not concentrate spray on bunch to avoid visible residues
Dipel DF	B.t. subsp. kurstaki	0.5 to 1.0 lbs/A	Works best on small larvae
SpinTor 2SC	Spinosad	4 to 8 fl oz/A	Works best on small larvae
Intrepid 2F	Methoxyfenozide	8 to 16 fl oz/A	Only works on immatures

References:

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