



# KENTUCKY PEST NEWS

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## CORN

### CORN INSECT UPDATE

By Ric Bessin

Now is the time to begin monitoring corn for European corn borer larvae. Pay particular attention to the earliest planted fields. Weather conditions this spring have been favorable for European corn borer mating and egg laying. While all fields that have been planted with Bt-corn hybrids should be highly resistant to attack by the first generation of the European corn borer, it is still important to monitor those fields as well.

For a list of economic threshold guidelines, see **ENT-49, Corn Borers in Corn**. Growers that are raising Bt-corn should also check their refuge areas as well as the Bt-corn. Before deciding to treat the refuges for European corn borer larvae, keep in mind that one purpose of the Bt-corn refuge is to provide a source of Bt-susceptible corn borer moths that can mate with any potentially Bt-resistant corn borer moths that may emerge from the Bt-corn. Generally, if more than 60% of the corn acreage on a farm is planted with Bt hybrids, then corn borer treatments are discouraged.

Pheromone traps in Tennessee maintained by Dr. Russ Patrick have begun to capture Southwestern

corn borer moths. Moth emergence for this pest tends to run one to two weeks behind that of the European corn borer. Growers should begin to monitor corn fields for this pest beginning in early June.

### TIMING OF POSTEMERGENCE HERBICIDES RELATIVE TO CORN GROWTH

By James R. Martin

The size of corn is often a critical factor in determining when it is safe to apply postemergence herbicides. Labels of postemergence herbicides use plant height or growth stage or both when discussing timing of applications relative to corn growth.

The common method for determining corn height is done by using free standing plants and measuring to the arch of the highest leaf that is more than 50 % emerged. Staging corn during vegetative growth is usually done by counting the number of leaves that have collars. The collar is the part of the leaf the joins the leaf blade and leaf sheath and appears as a discolored line.

The first leaf that emerges is characteristically oval-shaped and is the reference point for counting leaves. Once plants reach stage V5 (5 leaves with

visible collars), the leaf and ear shoot initiation will usually be complete and a small tassel is initiated in the stem apex tip. During tassel initiation, corn will be about 20 inches tall and the stem apex will be just at or beneath the soil surface. Once plants reach V6 the growing point and tassel will be above the soil surface and the stalk elongation will be rapid.

The use of drop nozzles can limit the risk of injury from certain herbicides, especially as the corn canopy develops. Directed applications help in some instances by keeping the herbicide from being intercepted in the top of the canopy where it can be

funneled into the whorl and increase exposure to the growing point. This is particularly a problem with certain sulfonyluera herbicides. In cases involving contact herbicides such as Gramoxone Extra, the directed sprays must be fairly precise to limit the amount of contact with the corn plants.

The recommended timings for several postemergence herbicides used in field corn are summarized in the following table. Always check the product label for specific directions.

<b>Table 1. Timing of Postemergence Herbicides Relative to Corn Growth.</b>		
	<b>Corn Height / Growth Stage</b>	
<b>Herbicide</b>	<b>Broadcast</b>	<b>Directed</b>
Accent	Up to 20" tall or 6 collars.	Between 20" to 36" tall. Do not apply when corn exceeds 30" tall or has 10 or more collars.
Accent Gold	Up to 12" tall or 6 collars whichever is more restrictive.	
Aim	Up to 8 leaf collar.	
Atrazine	Up to 12" tall.	
Banvel	0.5 - 1pt/A: Fifth leaf stage or 8" tall whichever is more restrictive.	Use directed application if: 1) Corn leaves limit spray coverage of weeds. 2) Sensitive plants are nearby. 3) Tank mixing with 2,4-D.
	0.5 pt/A: 8 to 36" tall, if 6 leaf is emerging, or 15 days before tassel emergence.	
Basis Gold	Up to 12" tall.	
Beacon	4 to 20" tall.	After corn is 20" tall or 6 collars (whichever occurs first) and before tassel emergence).
Buctril	Prior to tassel emergence.	
Celebrity	Up to 20" tall or 6 collars, whichever occurs first.	Between 20" to 36" tall corn.
Clarity	16 oz/A rate: Up to fifth leaf stage or to 8" tall, whichever occurs first.	Use directed application if: 1) Corn leaves limit spray coverage of weeds. 2) Sensitive plants are nearby. 3) Tank mixing with 2,4-D.
	8 oz/A rate: From 8" to 36" tall or 15 days before tassel emergence whichever occurs first.	
2,4-D	< 8" tall.	> 8" tall and before tassel emergence.
Distinct	6 oz/A rate: 4" to 10" tall.	

	4 oz/A rate: 10" to 24" tall.	
Exceed	Between 4" and 30" tall.	To limit injury apply as a directed spray when field corn is 20" to 30" tall or exhibits more than 6 collars V6 (whichever occurs first).
Gramoxone Extra		Apply only as a directed treatment after smallest corn is 10" tall.
Hornet	Spike stage up to 20" tall.	
Liberty (LL-corn)	Up to 20" tall or 7 collars whichever comes first.	24 to 36" tall.
Liberty Atz (LL-corn)	Up to 12" tall.	
Lightning (IMI-corn)	Up to 18" tall.	
Marksman	Through fifth leaf stage or 8" tall whichever occurs first.	
Permit	Spike through layby.	
Poast Plus or Poast (PP-corn)	Until onset of pollen shed.	
Roundup Ultra (RR-corn)	Through V8 stage or 30" tall whichever occurs first.	
Scorpion III	Up to 8" tall.	> 8" tall but prior to tasseling.
Spirit	Between 4" to 24" tall.	To limit injury apply as a directed spray when field corn is 20" to 24" tall or exhibits more than 6 collars V6 (whichever occurs first).

## WHEAT

### ECONOMICAL WHEAT STORAGE TIPS

By Sam McNeill

Preventing insect damage is one of the biggest challenges to economical grain storage. Insect infestations in stored wheat can cost hundreds or even thousands of dollars in elevator discounts for infested grain or pest treatment costs. Small insect infestations can grow to profit-robbing proportions under the right environmental conditions.

The costs associated with insect problems can usually be avoided, however, by following preventive management practices from harvest until grain is delivered to the mill or elevator for sale. These include good sanitation practices and

conscientious equipment management before, during and after harvest. As with other situations around the farm, it's usually more economical to prevent a problem than it is to fix that problem.

The first step to avoid costly insect problems is to thoroughly clean all equipment wheat will pass through from the field to a storage bin. This long list includes combines, grain carts, trucks or gravity wagons, dump pits, transport augers or bucket elevators, hopper tanks, dryers, conveyors and storage bins. It will help to use a small wet-dry vacuum cleaner for hard-to-reach ledges and other areas on most of this equipment.

If compressed air or a high-pressure sprayer was used to clean combines and hauling vehicles last fall, inspect areas that might have been missed. Pay close attention to areas in the rear of the

combine where insects can overwinter in small pockets of debris or grain dust.

If the first load of wheat is used to clean out handling equipment, this grain lot should be kept separate and sold soon after harvest no matter what the price. It's better to lose a few cents on a few hundred bushels than to risk infesting an entire bin of wheat worth several thousand dollars.

The most cost-effective way to protect stored grain from insect infestations is to follow good sanitation practices in and around the bin. Apply bin sprays before adding wheat to protect it from insects during storage. Be sure to cover all interior bin surfaces thoroughly.

The few hours of time and energy spent on cleaning and sanitation will go much further than other more costly options. A concise list of economical practices for insect control in stored wheat follows:

1. Harvest wheat at a manageable moisture level for your particular operation. Harvest at a moisture level of 15 percent or lower if heated-air drying isn't available.
2. Adjust combines before and during harvest to reduce kernel damage and limit trash.
3. Dry wheat to 12.5 percent moisture content if you're planning to hold it a month or longer to discourage insect activity during warm weather.
4. Clean wheat before storing it.
5. Run fans to cool stored wheat thoroughly after drying.
6. Remove peaked wheat from storage bins to provide uniform air flow through the grain.
7. Apply a "cap out" treatment to the top 12 inches of wheat.
8. Inspect wheat frequently for insect activity and changes in temperature or moisture.
9. Use fans as soon as possible in September and at least once a month during the fall.
10. Fumigate only when all other options fail to control insect activity.

Following all these tips represents a lot of work and diligence, but the rewards will be fewer insect problems during storage and lower discounts when the crop is sold.

## **ARMYWORMS IN WHEAT**

### **By Doug Johnson**

So far this season armyworms have not been much of a problem. Colleagues in Missouri indicate that their season is very similar. However, there are numerous reports of armyworm problems in Arkansas. Though the chances of serious armyworm problems in Kentucky wheat are quite small, we must remember that the season is not over and trouble spots may still pop up.

Armyworm moth flight and egg lay will continue long after wheat is no longer available. The females will just choose an alternative host plant. Be especially aware of areas of lodged wheat. This has been quite a problem in some areas of western Kentucky. Armyworms do best in dark, moist, places and lodged wheat provide this environment. Producers should consider making an insecticide application if armyworm populations reach a level of 16 non-parasitized, 1/2"-3/4" larvae per 4 square feet.

From information on sampling and control see: ID-125 Wheat Management in Kentucky, IPM-4 Kentucky IPM scout manual for Small Grains, and ENT-47 Insecticide Recommendations for Small Grains - 1999.

## **VEGETABLES**

### **TOMATO MOSAIC VIRUS OUTBREAK IN STAKED TOMATOES**

**By William Nesmith**

Several commercial vegetable growers are experiencing outbreaks of Tomato Mosaic Virus (ToMV) in their staked tomato crops this year. In the cases submitted to our labs the past two seasons, it appears that most new outbreaks started in heirloom varieties then spread to commercial hybrids on the same farm. Both local-grown and commercial sources of heirloom seed have been implicated.

Symptoms associated with ToMV are highly variable, but include the following: mosaic patterns on the leaves mainly involving various shades of green and some yellowing, leaf distortion including "fernleaf" effects, and severe stunting. Plants submitted to date this year have not been mature enough for fruit, but this virus can impact yield and quality of fruit based on our experience last year. Normally, ToMV does not markedly disfigure fruit. However, expect

discoloration of fruit as they ripen and marked reduction in fruit size and numbers. Internal quality of fruit can be significantly impacted by ToMV infections including discolored walls, internal browning of fruit, and ripening disorders. Last year in one of our experimental trials we observed fruit distortion with ToMV in some, but not most cultivars.

This virus is readily transmitted by human activities associated with producing a tomato crop. Touching the plant is the most practical means of spread, so once contaminated with the virus, it is spread within the crop by workers, clothing, equipment, tools, etc. Frequent washing of hands with soap and water during all aspects of plant handling should be practiced. Smoking is not considered a major means of spreading ToMV, but it can be associated with spreading TMV (a closely related virus). Infected seed appear to be involved now as the major source of introducing the virus into Kentucky's commercial tomato operations. Recent observations have implicated contaminated seed (newly purchased as well as homegrown) of some of the popular and rare heirloom varieties. The commercial hotwater-treatments in use for bacterial diseases are not sufficient to eradicate this virus from seed. However, the bleach and acid treatments in use should be very helpful. The standard treatment of eradicating ToMV from the surface of tomato seed is soaking in a 10% solution of trisodium phosphate for 15 minutes. Once ToMV is on the farm, be aware that carry-over is long term in soil, roots, stakes, greenhouses and weeds. We urge County Extension Agents to contact us directly with cases of ToMV to help the grower develop management plans for their particular operation.

Once on the farm, this is a very difficult disease to manage. Thus, the main aim should be to avoid introduction into a crop by using ToMV-free seed, ToMV-free transplants, planting into ToMV-free sites, and using ToMV-free workers, tools, and equipment. Once on the farm, reducing spread within the crop becomes critical, requiring a regimented sanitation program. Roguing of infected plants has merit, but seldom works as well as it should because the virus has usually been spread widely by the time symptoms are found; plus there is a delay between contamination, infection and symptoms. Tomato fields infested with ToMV will remain so for two or more years, because infected roots and weeds serve as sources of the virus. Eradication of the

pathogen between crops is important and rotation and sanitation are critical. Few of the popular cultivars recommended for commercial production in Kentucky have resistance to ToMV. However, ToMV-resistant cultivars are available and growers with problem sites may wish to plant them on problem sites.

In several cases, we have identified the virus in transplant production situations this year. Even with warnings to the contrary, the grower has elected to set infected plants anyway, and asked for any help possible to reduce spread. In those cases, we have made some individual recommendations of experimental approaches. That might be helpful, centered around the steps listed above and including the use of milk or milk products. For the County Agents and growers involved with those cases, these are standard recommendations, because they are unproven and are simply our "best shot" at helping you deal with a very serious problem. Those are not options we extend to the general public, because they are experimental at best. When you elect to transplant infested/infected plants, proven treatment options are not available.

## **ORNAMENTALS AND SHADE TREES**

### **WHITE PINES—PREMATURE NEEDLE DROP MAY BE CAUSED BY AIR POLLUTION**

**By John Hartman**

In many areas of central Kentucky, white pines, especially those growing in Christmas tree plantations and nurseries, are now showing symptoms of browning and premature loss of last year's needles. This has left many trees quite bare, with the only foliage remaining being the needles emerging from the still-elongating candles. On affected trees, clumps of dead needles are easily combed out of the branches and although most of the needles are brown, a few that have not yet completely desiccated are still a faded green color with bands of yellow. The trees themselves are still very much alive and the newly emerging needles are healthy. Thus, in a few weeks, the trees could appear to be fairly healthy, but with foliage less dense than normal.

Based on site visits in Fayette and Clark Counties and laboratory specimens from Woodford and Shelby Counties, the problem is appearing over a widespread area in central Kentucky. Within the

individual plantings, perhaps 10-25% of the trees are affected and the severity of the affected trees varies from almost complete defoliation to loss of perhaps half of last year's needles. Affected trees would not be attractive specimens for transplanting now, and even with new needle growth, lack of density may make these trees unattractive for Christmas sales as well.

What is causing defoliation of these white pines? It is likely that this problem stems from an air pollution event sometime in the latter part of last summer. The symptoms we are seeing are typical of oxidant air pollutants such as ozone. Injury to pines often occurs during warm weather when pollutants accumulate in stagnant air. The yellow banding of needles may be inconspicuous during the growing season but the problem often intensifies during the winter and spring in the form of browning and defoliation. Since these pollutants are not usually confined to a small area, one would expect symptoms to appear over a wide area of the state. Although the exposure was general, not all trees within a field were affected. This variation within a planting reflects genetic differences between trees grown from seedlings and it is normal to see these different responses to air pollution damage within a population of white pines.

When did the air pollution event(s) occur? The following information is based on consultations with Tom Priddy, our U.K. Agricultural Meteorologist and information obtained by him from Jerry Suddath at the Kentucky Department of Air Quality. Air quality standards (ozone more than 0.08 ppm for 8 hours or longer) were exceeded in 1998 in central Kentucky on August 7, and September 4-6 and 12-13. A brief, but potent hourly episode of 0.75 ppm on October 16 may also have contributed. For sensitive plants, daily averages of 0.05 ppm or hourly exposures of up to 0.1 ppm are sufficient to cause symptoms. Thus, our best guess of when the damage we are seeing now originated is late last summer. Although conditions for a few warm days in December were also favorable for air stagnation, readings were not taken then, and it is generally thought that pines are not sensitive to air pollution during the dormant season.

What is the prognosis for affected white pines? The affected trees are not dead or even dying. They will undoubtedly be growing under stress, at least until the new needles are fully functioning,

and even then they will have fewer energy reserves than unaffected trees. Growers will need to be sure that the affected trees receive adequate water through the season and that infectious diseases, insect pests, and weeds are managed. For now, affected trees will not be as marketable as they would have been, but perhaps will be back to normal in another year.

## LAWN AND TURF

### DOLLAR SPOT ON CREEPING BENTGRASS

By Paul Vincelli

Dollar spot disease, caused by *Sclerotinia homoeocarpa*, was very active last week on many creeping bentgrass swards. Drought stress enhances susceptibility to dollar spot, so the generally dry conditions that prevailed last week may have enhanced disease pressure in many locations throughout the region. Managers of many golf courses, croquet greens, and other high-maintenance swards probably have enough disease pressure to treat with fungicides.

One case of dollar spot diagnosed on a golf course near Lexington was particularly noteworthy. Normally, the mycelium—the cottony fungal growth of *S. homoeocarpa*—can be seen with the naked eye when the dew is still wet, but it is sparse and not very dense. Often one has to get down on one's hands and knees to really see it well. However, in this outbreak, the mycelium of *S. homoeocarpa* was extremely dense and fluffy and growing aggressively. For those familiar with Pythium cottony blight, this outbreak of dollar spot had mycelium that, to the naked eye, looked exactly like a cottony blight outbreak. Upon overnight incubation in the laboratory, we found mycelium of *S. homoeocarpa* growing at least a half-inch beyond any tillers with symptoms, a growth rate I've never seen before with dollar spot.

I am not sure why this case was so aggressive. I've collected cultures so that we can test some possibilities through laboratory tests. One possibility is that the strain of *S. homoeocarpa* is somehow uniquely aggressive. Another possibility is that some management factor or combination of factors triggered an unusually aggressive outbreak. After reviewing the management program with the superintendent, one factor worth mentioning is that Heritage

fungicide had been applied a week before the outbreak was recorded. A number of studies, including those at the UK Turf Center, have reported enhanced dollar spot pressure in many instances where Heritage is used. We also have published research showing enhanced mycelial activity by *S. homoeocarpa* in the field following Heritage applications, so this fits. However, even in those studies I have not seen “*Pythium*-like” mycelium from *S. homoeocarpa*, so I don’t know if this is the only reason for the aggressiveness of the outbreak observed.

The aggressiveness of the outbreak is noteworthy in and of itself. However, another noteworthy element of this case is the fact that the superintendent reports having applied Bayleton 50WDG fungicide at 1 oz/1000 ft<sup>2</sup> eight days before the aggressive outbreak was observed, on a course with a significant history of use of DMI fungicides. Given this, we are most likely dealing with a strain of *S. homoeocarpa* that is somewhat insensitive to DMI fungicides. DMI fungicides include the following active ingredients (and product names): cyproconazole (Sentinel), fenarimol (Rubigan), myclobutanil (Eagle), propiconazole (Banner), and triadimefon (Bayleton, Proturf Fungicide VII). Earlier in the decade, we detected strains of *S. homoeocarpa* with reduced sensitivity to DMI fungicides on several golf courses in Lexington, so we know that such strains can be found here. This simply appears to be another instance of these, although we will be conducting laboratory work to test this in the future.

In any case, this case can be a reminder to all managers of creeping bentgrass swards to reduce the pressure for development of DMI-resistant strains of *S. homoeocarpa*. Strategies for doing this include: using all available cultural practices for reducing dollar spot pressure; tank-mixing or alternating among fungicides with different modes of action, especially with contact fungicides; and limiting the use of DMI’s to peak periods of dollar spot pressure.

Fungicides and other cultural practices for managing dollar spot are provided in the UK Extension publication, *Chemical Control of Turfgrass Diseases*, PPA-1. Maintaining adequate nitrogen fertility and the use of practices that disperse early morning dew (mowing, poling, etc) are important

cultural practices for reducing dollar spot pressure. Another important cultural practice is to avoid the use in Kentucky of creeping bentgrass varieties which are unusually susceptible to dollar spot. The variety ‘Crenshaw’ is a notable example, but there are other such varieties on the market.

## DIAGNOSTIC LAB - HIGHLIGHTS

### By Julie Beale

Diseases/disorders diagnosed on field crops this week have included: zinc deficiency on corn; head scab, take-all and barley yellow dwarf virus on wheat; *Pythium* root rot, target spot and black shank on tobacco.

On fruits, we are still seeing many samples of fire blight on both apple and pear; also seen this week were bacterial blight (*Pseudomonas*) of cherry; nitrogen deficiency and frost damage on nectarine; black knot of plum; and peach leaf curl.

On ornamentals, we have seen *Rhizoctonia* stem rot on vinca; *Pythium* root rot and *Botrytis* blossom blight on marigold; brown patch, dollar spot and red thread on turfgrass; black root rot on holly; anthracnose on maple and ash; leaf scorch on dogwood (environmental); and ozone damage on pines (see article in this issue of KPN).

## INSECT TRAP COUNTS

### UKREC, Princeton, KY, May 14-21

European corn borer . . . . .	3
Black cutworm . . . . .	3
True armyworm . . . . .	17

### Tennessee - May 18

<i>Southwestern Corn Borer</i>	
Lauderdale County . . . . .	27 moths
Obion County . . . . .	6 moths

### Lexington, May 9-16

Black cutworm . . . . .	0
European corn borer . . . . .	29
Fall armyworm . . . . .	0
Corn earworm . . . . .	4
Diamondback moth . . . . .	2
Cabbage looper . . . . .	0
Beet armyworm . . . . .	4
Squash vine borer . . . . .	0

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