

# Integrated Pest & Crop Management

## Discolored Soybean Leaves: Sunburn, Cercospora, or What?

By *Laura Sweets*

Over the last two weeks we have received numerous phone calls and samples related to various types of discoloration of soybean leaves. The first round of calls and samples were leaflets with discoloration on the lower leaf surface. The veins were reddish-brown in color and some of the interveinal leaf tissue was reddish-brown to tan in color. In most cases only a portion of the leaflet showed the symptoms and it was almost possible to see how the leaflet had been turned so that the lower leaf surface was exposed to the sun. This reddish-brown discoloration of veins and interveinal tissue on the lower surface of a portion of a leaflet appears to be sunburn. Why this symptom has been so widespread this year is not clear. Perhaps the few days of intense sun during a mostly cool July contributed to the higher than usual level of sunburn in soybean.

Now calls have switched to ones concerning the yellow discoloration around margins of leaves in the mid to upper canopy. *Cercospora* leaf spot can be involved in this problem. If dry conditions during pod fill are followed by a rain or period of rainy weather, *Cercospora* leaf spot may develop. Premature yellowing and then blighting of the youngest, uppermost leaves over large areas of affected fields may develop fairly rapidly. Small, brown to reddish-brown spots or lesions may be evident in the yellowed tissue. Symptoms typically do not progress down the plants more than one to two nodes.

Over the last few years there has also been discussion that potassium deficiency may be contributing to the yellow discoloration of leaflet margins, particularly in the mid canopy of older plants. Tissue analysis on some samples has shown low levels of potassium in the leaf tissue and soil samples from the affected areas of some fields have shown low levels of potassium. Other soil samples have had adequate potassium levels. It is important to carefully dig some of the affected plants and check root systems for evident of shallow rooting, bent or j-roots and discolored or deteriorated roots. Wet or dry soils, poorly developed root systems, compaction, rotted roots or soybean cyst nematode may limit uptake of available potassium leading to some of this late season yellowing of mid canopy leaves. It would be prudent to submit soil samples for analysis of both nutrient levels and soybean cyst nematode. Results of soil tests may help pinpoint the cause of the problem or eliminate possible causes.

Finally, *Cercospora* may also cause a reddish-purple to reddish-brown discoloration of the upper leaf surface. Upper leaves in the canopy that are exposed to sun start to show a pink to red to purple discoloration from the leaf tip extending

back toward the base of the leaflet. The discoloration may darken and eventually cover the entire upper surface of the leaflet. Leaflets may have a leathery texture and a dark, reddish-purple color highlighted with bronze.

*Cercospora* leaf blight may be confused with sunburn on the upper leaflet surfaces. Generally *Cercospora* begins at the leaf tip and moves towards the base of the leaflet. There may be a gradient in discoloration but it is usually not a sharp line of color change. Sunburn on the upper surface of soybean leaves may also cause a reddish-brown discoloration but there is usually a fairly sharp line between discolored and green leaf tissue. This may be caused by a leaf shading the affected leaf, etc.

Although some of the foliar fungicides labeled for use on soybean do have *Cercospora* listed on their labels, it is getting a little late in the season for good control. Labels should be checked prior to application for any restrictions as to growth stage at time of application or days from application to harvest.

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# Evaluate Winter Wheat Seed Quality Prior to Planting

By Laura Sweets

Fusarium head blight or scab was widespread, and in some fields severe, this season. The fungus which causes this disease may infect kernels and can affect stands if infected seed is planted. If wheat is going to be saved for seed, this is certainly a year to pay careful attention to the quality of seed being saved. Initial reports from both the Missouri Seed Improvement Association and the Missouri Department of Agriculture indicate poor germination test results on wheat from this year's crop. Samples with germination rates of 50-60% and visibly fungus infected seed are common.

Fusarium head blight or scab infection may result in shriveled and shrunken kernels, lightweight bleached or tombstone kernels or kernels that have a pinkish cast or discoloration. Lots with high levels of scab may have lower germination rates. The fungus that causes scab can also cause a seedling blight of wheat. If scab infected seed is used for planting, seedling blights and stand establishment problems may occur. Management of Fusarium seedling blight is through the planting of disease-free seed or a combination of thoroughly cleaning the seed lot, having a germination test run, adjusting the seeding rate to compensate for germination rate and using a fungicide seed treatment effective against seed-borne Fusarium or scab (see accompanying table of wheat seed treatment fungicides).

Because scab can decrease germination, a germination test may be especially useful in determining if a particular lot should be used for seed. The minimum germination rate for certified seed is 85% germination. It is possible that lower germination rates might be successfully used for seed if the seeding rate is adjusted to compensate for the low germination rate. But this can be risky, especially if weather conditions at and after planting are not favorable for germination and emergence. Fungicide seed treatments can provide some benefit but they cannot resurrect dead seed.

If seed from a field that had Fusarium head blight or scab is being considered for use as seed this fall, it is important to

get an accurate germination test and use this information in deciding whether or not to use the lot for seed, whether the seeding rate will need to be increased and whether or not to apply a seed treatment fungicide.

Before submitting a sample for a germination test it is important to thoroughly clean the seed. The wheat seed should be cleaned to remove small and damaged seed and to eliminate weed seeds. With the amount of scab is some lots this year, thoroughly cleaning a lot may clean out 25-30% of the seed in the lot. But a thorough cleaning will give more reliable germination test results and removing small and damaged seed will not only aid in crop establishment it will also provide a more uniform wheat seedling stand. Removing small and damaged seed will also increase the thousand-kernel weight (TKW), which serves as a measure of seed quality. Wheat seed lots with TKW values greater than 30 grams tend to have increased fall tiller number and seedling vigor.

The next step is to perform a germination test. Germination tests can either be completed at home or by sending a sample to the Missouri Seed Improvement Association or the Missouri Department of Agriculture.

A home test can be performed by counting out 100 seeds and placing them in a damp paper towel. Place the paper towel into a plastic bag to conserve moisture and store in a warm location out of direct sunlight. After five days, count the number of germinated seeds that have both an intact root and shoot. This will give the grower an estimate of % germination. It is important to choose random seeds throughout the entire seed lot and conduct at least five 100 seed counts.

The Missouri Seed Improvement Association performs germination tests. The test requires one pound of seed and costs \$13.75. For details email [MOSEED@AOL.com](mailto:MOSEED@AOL.com) or check the Missouri Seed Improvement Association web site at <http://www.moseed.org/>.

The State Seed Control Laboratory at the Missouri Department of Agriculture also performs germination tests. The test requires one pint to one quart of seed. From June 1 through August 31 tests are free but between September 1 and November 1 there is a \$12.00 fee per sample and a limit of four samples per farmer. Information and a submission form can be obtained on the Missouri Department of Agriculture web site, <http://mda.mo.gov/plants/seed/> and then clicking on Submitting Seed Service Samples.

If germination is below 85% it is important to increase the seeding rate to compensate; however seeding any wheat with a germination test below 80% would not be recommended.

The next step is to decide whether a fungicide seed treatment is necessary. A number of fungicides are labeled for use as seed treatment fungicides on winter wheat. These seed treatment fungicides protect germinating seed and young seedlings from seedborne and soilborne pathogens. Seed treatment fungicides will not improve germination of seed that has been injured by environmental factors and will not resurrect dead seed. A correct assessment of the cause of poor seed quality or poor germination rates is the first step in deciding if a seed treatment fungicide is necessary.

Fungicide seed treatments for winter wheat are included in the accompanying table as well as in the 2009 Pest Management Guide: Corn, Grain Sorghum, Soybean and Winter Wheat, Extension Publication M171. Printed copies of this bulletin are available from the Extension Publications Distribution Center, 2800 Maguire Blvd., Columbia, MO, 573-882-7216.

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# Sudden Death Syndrome of Soybean

By Laura Sweets

Although symptoms of sudden death syndrome (SDS) started appearing the first of August, they have been slower to develop than last season. Because of the wet conditions after planting throughout the state, SDS should be expected to occur anywhere in the state. Symptoms may become more evident during the next few weeks.

Symptoms of SDS may appear several weeks before flowering but are more pronounced after flowering. Foliage symptoms begin as scattered yellow blotches in the interveinal leaf tissue. These yellow blotches increase in size and merge to affect larger areas of leaf tissue. Veins typically stay green. The bright yellow blotches between the green veins give affected leaves a striking appearance. The yellow areas may turn brown. As the interveinal leaf tissue turns brown, it also dries out. Upper trifoliolates become brown and dry out. Severely affected leaflets may drop from the plant, leaving the petiole attached or they may curl upward and remain attached to the plant. Infected plants may wilt and die prematurely. Root systems may show deterioration and discoloration of lateral roots and taproot. When split open, internal tissues of the taproot and lower

stem may show a light-gray to light-brown discoloration.

Currently symptoms in fields through the state range from slight yellow flecking between the veins of leaflets to leaflets in which the interveinal tissue has turned brown, dried out and curled up. Infected plants may be scattered through a field, concentrated in low areas of a field or along drainage patterns in a field or widespread throughout the field. Potential yield losses from SDS are difficult to estimate. Because the symptoms are so striking there is a tendency to overestimate the losses which will occur. Weather conditions during the remainder of the season will also influence losses due to SDS. Mild temperatures with adequate moisture or conditions which do not stress soybean plants should reduce losses from SDS. Periods of hot, dry weather that further stress plants might lead to more defoliation and even pod abortion on infected plants.

Field observations suggest that SDS is more likely to occur and to be more severe with high soil moisture. High soil moisture during vegetative stages of growth seems to be the most conducive for disease development. This year much of the state had unusually high rain fall through July.

So even later planted soybean fields were likely to have received rain when plants were in the vegetative stages of growth. The onset of SDS symptoms frequently is associated with wet conditions and below normal temperatures at or near bloom. The weather this season has been favorable for the development of SDS and for expression of SDS symptoms.

There are no rescue treatments for SDS. Management options for SDS include selecting varieties that have performed well where SDS has been a problem, improving drainage in poorly drained fields, avoiding compaction, staggering planting dates and delaying planting until soils are warm and dry, rotating crops and maintaining good crop vigor.

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# Update on Corn Foliage Diseases

By Laura Sweets

This season has been an interesting one for the corn foliage diseases. With the wet conditions for much of the season throughout most of the state, one might have expected corn foliage diseases to be widespread and severe.

**Gray leaf spot** occurred early in the season and lower in the canopy than normal. In many fields the lowest leaves had fairly high levels of gray leaf spot. But in some of the fields the disease didn't continue to move up in the canopy and the leaves just below the ear leaf as well as the ear leaf have remained relatively free of gray leaf spot. In other fields, the

disease did continue to move up in the canopy and infection levels on the leaves just below the ear leaf and the ear leaf are high. In those fields a foliar fungicide application might have been warranted.

**Common rust** is present in low levels but doesn't seem to be increasing. **Southern rust** has come into the state over the last few weeks and in some fields is building up to potentially damaging levels. Disease incidence, stage of growth of the crop, days prior to harvest and weather forecast should be taken into consideration if decisions are still being made on foliar fungicide application.

Last year the cool, wet weather favored the development of **northern corn leaf blight** in many regions of the state. Because of the record cool July, I expected to see northern corn leaf blight again this season. But so far I have seen only a few scattered lesions on random plants in a few fields.

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# Corn Growers—Don't Let Aflatoxin Ruin Your 2009 Corn Harvest

By Allen Wrather

Corn harvest will soon begin in the upper Mississippi delta region, and I want to warn farmers to take precautions to avoid aflatoxin problems in their crop. Farmers in this region have not had serious problems with aflatoxin since 1998, and the problem is not likely to develop this year since the corn in this area did not suffer due to drought. However, farmers should take some precautions to avoid this problem.

Here is the situation. The problem occurs when a mold called *Aspergillus flavus* feeds on the starch inside corn kernels and produces aflatoxin. This mold gains access to the starch through openings in the kernel hull due to drought caused stress cracks and/or injury due to ear worm feeding. Aflatoxin is a poison to humans and animals. Grain buyers will reject corn containing 20 parts per billion or more aflatoxin due to FDA regulation. The FDA developed this regulation to

prevent this toxin from being introduced into our food supply.

This mold can grow on corn kernels in the field, and it grows rapidly on kernels in storage. The mold prefers to grow on wet (18-20% moisture) corn kernels at around 85° F. To reduce the risk of aflatoxin, farmers should dry freshly harvested corn to 15% moisture within 24 hours of harvest.

I suggest that farmers first harvest some corn in the corners of center pivot irrigated fields or harvest some of their dryland corn and have it tested for aflatoxin. If it is not contaminated with aflatoxin then the rest of the irrigated corn will probably not be contaminated.

Corn farmers that irrigated their corn this year and planted Bt varieties will experience fewer problems with aflatoxin than others. This is because the kernels from irrigated corn will have fewer stress cracks due to drought and will have less

injury from ear worm. Bt varieties are not resistant to ear worm but will experience less ear worm feeding injury.

Again, corn farmers should beware of this problem and always dry their corn to 15% moisture within 24 hours of harvest.

Following these suggested procedures will give corn farmers a better chance of producing aflatoxin-free corn during 2009. For more information, you may call me at 573-379-5431 or visit the web at <http://aes.missouri.edu/delta/croppest/aflacorn.stm>.

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## Seed Treatment Fungicides Labeled for Use on Winter Wheat

By Laura Sweets

Table 1. Seed Treatment Fungicides Labeled for Use on Winter Wheat

Trade Name Company	Common Chemical Name	% Active Ingredient	Rate	Additional Label Information
Allegiance Dry Chemtura (formerly Trace Seed Protection Products)	metalaxyl	12.50%	1.5 to 2.0 oz per 100 lb of seed	For Pythium damping-off control. Treat only those seeds needed for immediate use, minimizing the interval between treatment and planting. Do not carry over excess treated seed to next season. Do not use this product on seed that has been commercially treated with metalaxyl (Allegiance) fungicide. Hopper box seed treatment.
Allegiance-FL Bayer CropScience	metalaxyl	28.35%	28.35%	Allegiance-FL is a systemic fungicide seed dressing specifically for control of downy mildews, Pythium and Phytophthora spp. For control of other soilborne diseases, combination of Bayer CropScience Captan registered formulations are compatible. Do not use with other seed treatment products unless previous experience assures compatibility. Reduced rates in combination with other fungicides: to aid in the control of seed decay and damping-off caused by Pythium, apply 0.10 to 0.375 fl oz per 100 lb of seed only in combination with EPA registered rates of Bayer CropScience broad-spectrum seed treatment fungicides. Allegiance-FL may be applied as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry or mist-type commercial seed treatment equipment.

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**Seed Treatment Fungicides Labeled for Use on Winter Wheat** *continued from page 118*

<p><b>Allegiance LS</b> Bayer CropScience</p>	<p>metalaxyl</p>	<p>17.70%</p>	<p>1.2 fl oz per 100 lb of seed</p>	<p>Allegiance LS is a systemic fungicide seed dressing specifically for control of downy mildews, Pythium and Phytophthora spp. For control of seedborne and other soilborne diseases, the combination of Bayer CropScience Captan and Thiram registered formulations are compatible. Do not use with other seed treatment products unless previous experience assures compatibility. Reduced rates in combination with other fungicides: to aid in the control of seed decay and damping-off caused by Pythium, apply 0.175 to 0.66 fl oz per 100 lb of seed only in combination with EPA-registered rates of Bayer CropScience broad-spectrum seed treatment fungicides. Allegiance LS may be applied as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry or mist-type commercial seed treatment equipment. Allegiance LS may be applied at planting time by thoroughly mixing with seed in the planter box or by application through on-farm seed treatment equipment.</p>
<p><b>Apron XL LS</b> Syngenta</p>	<p>mefenoxam</p>	<p>33.30%</p>	<p>0.32 to 0.64 fl oz per 100 lb of seed</p>	<p>Apron XL LS is a systemic fungicide seed dressing used specifically for protection against systemic downy mildews and diseases caused by soilborne Pythium and Phytophthora spp. When a rate range is specified, use higher rates of Apron XL LS when the disease pressure is expected to be high. For Pythium damping-off protection in wheat when applied in combination with Dividend or other seed treatment products labeled for disease control in this crop: apply Apron XL LS as a seed treatment at 0.0425 to 0.085 fl oz per 100 lb of seed. Apron XL LS may be applied as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry- or mist-type commercial seed treatment equipment.</p>
<p><b>Captan 400</b> Bayer CropScience  <b>Captan 400-C</b> Bayer CropScience</p>	<p>captan  captan</p>	<p>37.40%  37.40%</p>	<p>1.5 to 4.0 fl oz per 100 lb of seed  1.5 to 4.0 fl oz per 100 lb of seed  of seed</p>	<p>Captan 400 and Captan 400-C Seed Protectants are flowable concentrates especially formulated for treatment of seed prior to storage and planting to protect seed from molds and other fungi causing storage loss and to protect seed from seedborne and soilborne fungi which cause seed decay, damping-off and seedling blights. Not for control of bunt and smut diseases of wheat. Thoroughly mix the recommended amount of Captan 400 or Captan 400-C Seed Protectant into the required amount of water for the slurry treater equipment and dilution rate to be used.</p>
<p><b>Charter</b> BASF</p>	<p>triticonazole</p>	<p>2.40%</p>	<p>3.1 fl oz per 100 lb of seed</p>	<p>Charter Fungicide is a liquid seed treatment used for the control of loose smut and common bunt in wheat; will generally increase emergence and plant stands by controlling seedling blights and will also suppress early-season infections caused by Fusarium crown and root rot and control seed rot and seedborne seedling blight caused by Fusarium sp. Do not store treated seed for more than 18 months. Charter Fungicide may be applied using standard commercial seed treatment equipment or on-farm seed treatment equipment, but is not intended for direct application into a planter box.</p>
<p><b>Charter PB</b> BASF</p>	<p>triticonazole thiram</p>	<p>1.25% 12.50%</p>	<p>5.5 fl oz per 100 lb of seed</p>	<p>Charter PB is a liquid seed treatment used for the control of loose smut and common bunt in wheat. It will increase emergence and plant stands by reducing seed and soilborne seed rots (Cochliobolus spp.) seedling blights (Fusarium spp.) and damping-off (Pythium spp.). Charter PB may be applied using standard commercial seed treatment equipment (such as, but not limited to, slurry or mist-type equipment) or on-farm seed treatment equipment including "On the Go" type air seeder treatment systems. This product is not intended for direct application into a planter box.</p>

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**Seed Treatment Fungicides Labeled for Use on Winter Wheat** *continued from page 119*

<b>CruiserMaxx Cereals</b> Syngenta	thiamethoxam mefenoxam difenoconazole	2.80% 0.56% 3.36%	5.0 fl oz per 100 lb of seed	For winter wheat: diseases controlled include general seed rots, seedling blight, root rot and damping-off caused by seedborne and soilborne Fusarium and soilborne Pythium, common and dwarf bunt and loose smut. Diseases suppressed include common root rot, Fusarium crown and foot rot and take-all. For additional Pythium protection, add 0.0425 fl oz of Apron XL LS per 100 lb of seed. CruiserMaxx Cereals is a ready-to-use water-based formulation for use in commercial seed treatment facilities utilizing closed-system application techniques. In addition, CruiserMaxx Cereals may also be applied by on-site/on-farm applications.
<b>Dithane DF Rainshield</b> Dow AgroSciences	mancozeb	75.00%	2.3 to 3.5 oz. per 100 lb of seed	For control of bunt, damping-off, seed rots and seedling blights. May be applied to dry seed with conventional slurry or mist seed treating equipment or as a planter box application.
<b>Dithane M45</b> Dow AgroSciences	mancozeb	80.00%	2.2 to 3.3 oz. per 100 lb of seed	
<b>Dividend XL</b> Syngenta	difenoconazole mefenoxam	16.50% 1.38%	1.0 fl oz per 100 lb of seed or 2.0 fl oz per 100 lb of seed	Dividend XL is a combination of Dividend and Apron XL LS. The Apron XL LS provides Pythium damping-off activity and the Dividend provides activity on the remaining diseases claimed on the label. The 1.0 fl oz rate of Dividend Extreme and the 2.5 fl oz rate of Dividend XL RTA are for control of common bunt and loose smut. The 1.0 fl oz rate of Dividend XL is for control of common bunt, dwarf bunt, flag smut, seedborne Septoria, loose smut, general seed rots, Fusarium seed scab and Pythium damping-off and for early-season control of common root rot and Rhizoctonia root rot. The 2.0 fl oz rate of Dividend XL is for control of common bunt, dwarf bunt, flag smut, seedborne Septoria, loose smut, general seed rots, Fusarium seed scab and Pythium damping-off and for early-season control of common root rot, Fusarium root rot, Fusarium crown rot, take-all and Rhizoctonia root rot as well as fall season powdery mildew, leaf rust and Septoria leaf blotch. Dividend XL provides control of the fall season foliage diseases for the first six weeks after planting. Green wheat forage may not be grazed until 55 days after planting. Apply Dividend XL or Dividend Extreme as a water-based slurry through standard slurry or mist-type seed treatment equipment. Dividend XL RTA is especially formulated for on-farm treatment, using standard mechanical slurry- or mist-type seed treatment equipment.
<b>Dividend XL RTA</b> Syngenta	difenoconazole mefenoxam	3.21% 0.27%	2.5 fl oz per 100 lb of seed	
<b>Dividend Extreme</b> Syngenta	difenoconazole mefenoxam	7.73% 1.93%	1.0 fl oz per 100 lb of seed	
<b>Dynasty</b> Syngenta	azoxystrobin	9.60%	0.153 to 0.382 fl oz per 100 lb of seed	Target diseases: seedborne and soilborne fungi causing decay, damping-off and seedling blight; seedling damping-off caused by Rhizoctonia solani, dwarf bunt and common bunt. Where appropriate use Dynasty in combination with Dividend Extreme and/or Maxim seed treatment products. Apply as a water-based slurry using seed treatment application equipment that will provide uniform coverage on the seed surface.
<b>Enhance</b> <b>Enhance AM</b> Chemtura (formerly Trace Seed Protection Products)	captan carboxin	19.55% 20.00%	4.0 oz per 100 lb of seed	Enhance Seed Protectant and Enhance AM are formulations specifically designed for treatment of wheat on the farm at planting time. They control covered smut (Tilletia caries and Tilletia foetida) and loose smut (Ustilago nuda) on wheat. Apply as a planter box treatment (including air and vacuum planters), mixing thoroughly with the seed before planting. For best results, follow application directions on label. Do not graze or feed livestock on treated areas for 45 days after planting.
<b>FLO-PRO IMZ</b> Bayer CropScience	imazalil	31.00%	0.25 to 0.5 fl oz per 100 lb of seed	For the control of common root rot. It is recommended for use in combination with Vitavax-200 or other flowable suspension seed treatments to provide additional protection against diseases. Apply using commercial slurry or on-farm seed treating equipment.

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**Seed Treatment Fungicides Labeled for Use on Winter Wheat** *continued from page 120*

<b>Gaucho XT</b> Bayer CropScience	imidacloprid metalaxyl tebuconazole	12.70% 0.82% 0.62%	3.4 fl oz per 100 lb of seed	Early-season disease control of Pythium damping-off, stinking smut, flag smut, loose smut, early-season Septoria disease complex, early-season Rhizoctonia root rot, early-season common root rot, early-season Fusarium root rot, early-season suppression of powdery mildew and early-season suppression of leaf rust as well as control of certain insects. Do not graze or feed livestock on treated areas for 45 days after planting. See label for rotational crop restrictions. Apply as a slurry treatment prior to planting.
<b>Grain Guard</b> Chemtura (formerly Trace Seed Protection Products)	mancozeb	50.00%	2.0 oz per bushel of seed	For control of bunt of wheat, and damping-off and seedling blights. Treat only those seeds needed for immediate use, minimizing the interval between treatment and planting. Do not store excess treated seeds beyond planting time. Apply as a drill box treatment mixing thoroughly so all seeds are covered.
<b>Incentive RTA</b> Winfield Solutions LLC	difenoconazole mefenoxam	3.21% 0.27%	2.5 fl oz per 100 lb of seed or 5.0 fl oz per 100 lb of seed or 10.0 fl oz per 100 lb of seed	Incentive RTA is a combination of Incentive and Apron XL LS. The Apron XL LS provides Pythium damping-off activity and the Incentive provides activity on the remaining diseases claimed on the label. The 2.5 fl oz rate of Incentive RTA is for control of common bunt and loose smut. The 5.0 fl oz rate of Incentive RTA is for control of common bunt, dwarf bunt, flag smut, seedborne Septoria, loose smut, general seed rots, Fusarium seed scab and Pythium damping-off and for partial control of common root rot and Rhizoctonia root rot. The 10.0 fl oz rate of Incentive RTA is for control of common bunt, dwarf bunt, flag smut, seedborne Septoria, loose smut, general seed rots, Fusarium seed scab and Pythium damping-off and for partial control of common root rot, Fusarium root rot, Fusarium crown rot, take-all and Rhizoctonia root rot as well as fall season powdery mildew, leaf rust and Septoria leaf blotch. Incentive RTA provides control of the fall season foliage diseases for the first six weeks after planting. Green wheat forage may not be grazed until 55 days after planting. Incentive RTA is especially formulated for on-farm treatment, using standard mechanical slurry- or mist-type seed treatment equipment.
<b>Kodiak HB</b> Chemtura (formerly Trace Seed Protection Products)	Bacillus subtilis	0.30%	4.0 to 8.0 oz per 100 lb of seed	For suppression of root diseases caused by Fusarium and Pythium. Contains bacteria that colonize the developing root system, suppressing disease organisms such as Fusarium and Pythium that attack root systems. When used with a chemical seed treatment, the combination of chemicals and Kodiak provides protection to the root for a much longer time than with chemicals alone. Kodiak HB is a hopper box seed treatment.
<b>LSP</b> Bayer CropScience	thiabendazole	30.00%	2.0 to 4.0 fl oz per 100 lb of seed	For control of seedborne and soilborne common bunt (stinking smut). For ready mix or slurry seed treaters, disperse 2.0 fl oz of Bayer CropScience LSP for seedborne common bunt or 4.0 fl oz per 100 lb of seed for soilborne common bunt. For wheat seed having high infection levels of seedborne Fusarium scab, a lower rate of 0.25 fl oz per 100 lb of seed is recommended. Bayer CropScience LSP should be used as a co-fungicide combined with Raxil or broad-spectrum fungicides to include seed and seedling protection against the broad spectrum of diseases associated with the wheat crop. For use only by commercial seed treaters.
<b>Manex</b> DuPont	maneb	37.00%	3.5 to 5.2 fl oz per 100 lb of seed	For protection against bunt, damping-off, seed rots and seedling blights. Manex may be applied to dry seed with conventional slurry or mist seed treating equipment or as a planter box application.
<b>ManKocide</b> Griffin L.L.C.	mancozeb copper hydroxide	15.00% 46.10%	4.0 oz per 100 lb of seed	Target diseases: Pseudomonas syringae, Xanthomonas translucens and Tilletia caries. ManKocide may be applied to dry seed with conventional slurry or mist seed treating equipment or as a planter box application.

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## Seed Treatment Fungicides Labeled for Use on Winter Wheat *continued from page 121*

<b>Manzate Pro-Stick</b> DuPont	mancozeb	75.00%	2.2 to 3.3 oz per 100 lb of seed	For protection against bunt, covered smut, damping-off, seed rots and seedling blights.
<b>Manzate Flowable</b> Griffin L.L.C.	mancozeb	37.00%	3.5 to 5.2 fl oz per 100 lb of seed	For commercial seed treatments, seeds should be clean and well-cured before treatment. Apply to dry seed with conventional slurry or mist seed treating equipment. Manzate Pro-Stick may also be applied as planter box applications.
<b>Maxim XL</b> Syngenta	fludioxonil mefenoxam	21.00% 8.40%	0.167 to 0.334 fl oz per 100 lb of seed	For protection against damping-off caused by <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp. and <i>Pythium</i> spp. and general seed rots caused by <i>Aspergillus</i> spp. and <i>Penicillium</i> spp. and for protection against <i>Tilletia</i> (common bunt). Maxim XL at the 0.084 fl oz may be combined with labeled rates of Dividend XL for a broader spectrum of seedling disease protection. Apply Maxim XL as a water-based slurry using standard slurry seed treatment equipment that provides uniform coverage.
<b>Maxim 4FS</b> Syngenta	fludioxonil	40.30%	0.08 to 0.16 fl oz per 100 lb of seed	For protection against seedborne and soilborne fungi that cause seed decay, damping-off and seedling blight. Cereal forage may not be grazed until 30 days after planting. Apply Maxim 4FS as a water-based slurry using standard slurry seed treatment equipment.
<b>MetaStar ST</b> Chemtura (formerly Trace Seed Protection Products)	metalaxyl	28.35%	0.75 fl oz per 100 lb of seed	For <i>Pythium</i> damping-off control. MetaStar ST is a systemic fungicide seed dressing specifically for control of systemic downy mildews, <i>Pythium</i> and <i>Phytophthora</i> spp. For control of other soilborne diseases, combination of Captan and Vitavax registered formulations are compatible. Do not use with other seed treatment products unless previous experience assures compatibility. MetaStar ST may be applied as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry or mist-type commercial seed treatment equipment.
<b>Penncozeb 75DF</b> Cerexagri	mancozeb	75.00%	2.3 to 3.5 oz per 100 lb of seed	For control of bunt, damping off, seed rots and seedling blights.
<b>Penncozeb 80WP</b> Cerexagri	mancozeb	80.00%	2.2 to 3.3 oz per 100 lb of seed	For planter box treatment only.
<b>Prevail</b> Chemtura (formerly Trace Seed Protection Products)	carboxin PCNB metalaxyl	15.00% 15.00% 3.12%	1.5 to 3.0 oz. per bushel of seed	For protection against <i>Pythium</i> and <i>Rhizoctonia</i> seedling disease complex and loose smut and common bunt or stinking smut. Do not graze or feed livestock on treated areas for six weeks after planting. Prevail may be applied at planting time, using an on-farm mechanical treater to maximize seed coverage.
<b>Raxil MD</b> Bayer CropScience	tebuconazole metalaxyl	0.48% 0.64%	5.0 to 6.5 fl oz per 100 lb of seed	Aids in the control or suppression of the following seed, seedling and soilborne diseases of wheat: stinking smut, flag smut, loose smut, early-season <i>Septoria</i> disease complex, general seed rots, <i>Pythium</i> damping-off, early-season <i>Rhizoctonia</i> root rot, early-season common root rot, seedborne <i>Fusarium</i> scab, early-season <i>Fusarium</i> foot rot, early-season suppression of powdery mildew and rust. Wheat green forage may be grazed or harvested for hay 31 days after seeding. Applications should be made using standard slurry or mist-type seed treatment equipment. This product is for commercial or on-farm application. This product is not intended for direct application into a planter box.
<b>Raxil-Thiram</b> Bayer CropScience	tebuconazole thiram	0.60% 20.00%	3.5 to 4.6 fl oz per 100 lb of seed	Targeted diseases: stinking smut, flag smut, loose smut early-season <i>Septoria</i> complex, general seed rots, <i>Pythium</i> damping-off, early-season <i>Rhizoctonia</i> root rot, early-season common root rot, seedborne <i>Fusarium</i> scab, early-season <i>Fusarium</i> foot rot, early-season suppression of powdery mildew, early-season suppression of wheat leaf rust. Wheat green forage may be grazed or harvested for hay 31 days after seeding. Application should be made using standard slurry or mist-type seed treatment equipment.

*Continued on page 123*



## Seed Treatment Fungicides Labeled for Use on Winter Wheat *continued from page 122*

<b>Raxil XT Wettable Powder</b> Bayer CropScience	tebuconazole metalaxyl	15.00% 20.00%	0.16 to 0.20 oz per 100 lb of seed	Targeted diseases: stinking smut, flag smut, loose smut, early-season Septoria disease complex, early-season Rhizoctonia root rot, early-season common root rot, early-season Fusarium foot rot, early-season suppression of powdery mildew, early-season suppression of wheat leaf rust, seedborne Fusarium scab, general seed rots and Pythium damping-off Wheat green forage may be grazed or harvested for hay 31 days after seeding. The pouches of Raxil XT are water soluble. Applications should be made using standard slurry or mist-type seed treatment equipment.
<b>Raxil 2.6F</b> Bayer CropScience	tebuconazole	28.30%	0.1 fl oz per 100 lb of seed	On wheat for stinking smut, flag smut, loose smut, early-season Septoria disease complex, early-season Rhizoctonia root rot, early-season common root rot, early-season Fusarium root rot, early-season suppression of powdery mildew and early-season suppression of leaf rust. Apply Raxil 2.6F as a water-based slurry through standard slurry or mist-type commercial seed treatment equipment. Prepare a slurry by mixing the specified dosage in 9.0 to 20.0 fl oz of water per 100 lb of seed. Add dye to the resulting slurry. Mix the slurry thoroughly with the seeds to provide uniform coverage. Wheat may be grazed or harvested for hay 31 days after seeding.
<b>RTU-Baytan-Thiram</b> Bayer CropScience	triadimenol thiram	5.00% 15.30%	4.5 to 9.0 fl oz per 100 lb of seed	Target diseases: scab, stinking smut, flag smut, loose smut, glume blotch, foot rot, take-all, Pythium rot; as well as early-season powdery mildew, leaf rust and stripe rust. Apply the 4.5 fl oz rate for control of smuts and the 9.0 fl oz rate for control or suppression of the other diseases. Green forage may be grazed 40 days after seeding. Ready-to-use seed treatment and application should be made using standard slurry or mist-type commercial seed treatment equipment. Not for use on agricultural establishments in hopper box, planter box, slurry box or other seed treatment applications at or immediately before planting.
<b>42-S Thiram</b> Bayer CropScience	thiram	42.00%	2.0 fl oz per bushel of seed	Used according to directions, Bayer CropScience 42-S Thiram will usually increase stands and yields by reducing losses from seed decay, damping-off and seedling blights caused by many seedborne and soilborne organisms. It will usually control covered smuts or bunt of wheat. 42-S Thiram should be applied with water as a suspension in the slurry-type treated specifically designed and approved for this use.
<b>VITAFLO-280</b> Chemtura (formerly Trace Seed Protection Products)	carboxin thiram	14.90% 13.20%	3.5 to 5.0 fl oz per 100 lb of seed	Combination of a systemic fungicide (carboxin) and a contact fungicide (thiram) providing plant protection against seedborne and soilborne seedling diseases including damping-off and seed decay as well as loose smut and common bunt. The 3.5 fl oz rate will give partial control of true loose smut. Use the 5.0 fl oz rate for control of true loose smut. Do not graze or feed livestock on treated areas for six weeks after planting. For use only by commercial seed treaters. VITAFLO-280 can be diluted with water for use in slurry treaters. Use closed loading system. For use only by commercial seed treaters. Not for use on agricultural establishments in hopper box, planter box, slurry box or other seed treatment applications at or immediately prior to planting.
<b>Vitavax CT</b> Helena Chemical Corporation	carboxin thiram	5.70% 5.70%	9.0 to 12.0 fl oz per 100 lb of seed	Provides control of loose smut and common bunt. Use the higher rate under conditions of expected heavy disease pressure. Do not graze or feed livestock on treated area for six weeks after planting. Ready-to-use seed treatment for hopper box application.
<b>Vitavax M</b> Helena Chemical Corporation	carboxin thiram	5.70% 5.70%	9.0 to 12.0 fl oz per 100 lb of seed	Provides control of loose smut and common bunt. Use the higher rate under conditions of expected heavy disease pressure. Also contains the micronutrient molybdenum. Do not graze or feed livestock on treated area for six weeks after planting. Ready-to-use seed treatment for hopper box application.

# Weather Data for the Week Ending August 17, 2009

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Aug 1 - Aug 17	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	86	67	91	62	76	+2	3.09	+0.74	2467	+41
St. Joseph	Buchanan	85	67	88	66	76	+1	7.32	+5.72	2397	-47
Brunswick	Carroll	84	66	89	62	75	+1	6.76	+4.67	2458	-19
Albany	Gentry	86	66	89	64	76	+2	4.41	+2.32	2324	-100
Auxvasse	Audrain	85	64	87	60	74	0	2.63	+0.97	2450	-51
Vandalia	Audrain	86	64	89	60	74	-1	2.93	+0.83	2435	-45
Columbia-Bradford	Boone	86	63	89	59	74	-1	3.12	+1.18	*	*
Columbia-Jefferson Farm	Boone	86	65	88	62	75	0	3.28	+1.35	2489	-100
Columbia-South Farms	Boone	85	65	88	61	75	0	3.39	+1.45	2485	-103
Williamsburg	Callaway	86	64	89	60	74	-1	2.33	+0.40	2433	-18
Novelty	Knox	82	64	86	61	73	-1	4.97	+3.02	2215	-214
Linneus	Linn	85	65	89	61	75	+1	7.17	+5.21	2290	-84
Monroe City	Monroe	84	64	88	59	74	0	4.78	+2.91	2348	-130
Versailles	Morgan	88	66	91	62	75	0	2.67	+0.77	2615	-15
Green Ridge	Pettis	86	66	88	62	75	+1	1.99	-0.15	2501	+66
Lamar	Barton	88	66	92	63	76	-1	0.99	-0.49	2648	-85
Cook Station	Crawford	90	60	94	54	74	-2	1.32	-0.73	2428	-221
Round Spring	Shannon	89	62	92	57	73	-2	0.36	-1.46	2450	-73
Mountain Grove	Wright	87	63	90	58	74	-1	0.38	-1.06	2397	-93
Delta	Cape Girardeau	87	64	90	58	75	-2	2.53	+1.03	2735	-190
Cardwell	Dunklin	87	67	90	64	76	-3	3.45	+2.02	3035	-129
Clarkton	Dunklin	87	66	90	61	76	-2	1.42	+0.25	2939	-185
Glennonville	Dunklin	87	67	90	61	77	-1	1.81	+0.62	2974	-137
Charleston	Mississippi	87	66	91	60	77	0	2.50	+1.17	2880	-32
Portageville-Delta Center	Pemiscot	87	68	90	62	78	0	1.37	+0.21	3072	-50
Portageville-Lee Farm	Pemiscot	88	68	91	61	78	+1	1.35	+0.13	3088	-12
Steele	Pemiscot	89	68	92	62	78	0	1.21	-0.28	3148	+24

\* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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