

Integrated Pest & Crop Management

Virus Diseases Beginning to Show Up in Missouri Wheat Fields

By Laura Sweets

This is the time of the year when symptoms of wheat spindle streak mosaic, wheat soilborne mosaic and barley yellow dwarf may be quite evident in winter wheat fields. So far only a few questions on wheat have come in. One sample did test positive for wheat soilborne mosaic virus. Several reports of plants and/or fields showing symptoms of barley yellow dwarf virus have been received. Both wheat spindle streak mosaic and wheat soilborne mosaic tend to be more severe when wet conditions occur after planting in the fall or in the late winter/early spring months. Cool spring temperatures also enhance symptom development of both wheat spindle streak mosaic and wheat soilborne mosaic. Although most of the state was dry last fall, this spring has been unusually wet and cool for most of the state. So it is difficult to predict how widespread and severe wheat spindle streak and wheat soilborne might be this season. Although there are no rescue treatments for wheat virus diseases, it is still a good idea to scout fields for plants showing virus symptoms and to send in samples to identify the virus or combination of viruses that are present so that proper preventative management measures can be used the next time wheat is planted in that field. The University of Missouri Plant Diagnostic Laboratory is set up to run ELISA tests for the wheat virus diseases.

Descriptions of the wheat virus diseases most likely to occur on winter wheat in Missouri are given in the following paragraphs.

Symptoms of wheat spindle streak mosaic appear in early spring as yellow-green streaks or dashes on the dark green background of the leaves. These lesions usually run parallel to the leaf veins and tend to be tapered at the ends giving the lesions a spindle shaped appearance. Foliage symptoms are most obvious when air temperatures are about 50 degrees. As temperatures warm-up, foliage symptoms of wheat spindle streak mosaic tend to fade. Plants may be slightly stunted and have fewer tillers than normal. Wheat spindle streak mosaic tends to be more prevalent in lower, wetter areas of a field. The virus that causes this disease is soilborne and is spread by the soil fungus *Polymyxa graminis*. Wet falls tend to favor outbreaks of wheat spindle streak mosaic the following spring.

Wheat soilborne mosaic causes light green to yellow green to bright yellow mosaic patterns in leaf tissues. Symptoms are most evident on early spring growth and warmer temperatures later in the season slow disease development. Symptoms of wheat soilborne mosaic are not always particularly distinctive and might occur as a more general yellowing similar to that caused by nitrogen deficiency. Infected plants may be stunted. This disease may be more severe in low-lying, wet areas of a field. The soilborne wheat mosaic virus survives in the soil and is spread by the soil fungus *Polymyxa graminis*. Again, wet falls tend to favor outbreaks of wheat soilborne mosaic the following spring.

Barley yellow dwarf is an extremely widespread virus disease of cereals. Symptoms include leaf discoloration ranging from a light green or yellowing of leaf tissue to a red or purple discoloration of leaf tissue. Discoloration tends to be from the leaf tip down and the leaf margin in towards the center of the leaf. Plants may be stunted or may have a rigid, upright growth form. Symptoms are most pronounced when temperatures are in the range of 50-65 degrees. The barley yellow dwarf virus persists

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Cool, Wet Soils Increase the Likelihood of Corn Injury with Preemergence Herbicides

By Kevin Bradley

Corn can exhibit a variety of injury symptoms at or soon after emergence as a result of preemergence herbicide applications. This injury is usually a result of the environmental conditions at the time of herbicide application and/or corn planting. For example, under the cool and wet soil conditions that have persisted throughout most of Missouri this year, herbicidal injury is more likely to occur. This is because corn plants are able to take up the herbicides at a rapid rate, but are not able to metabolize or break down these herbicides at a similar pace. Some injury may also be attributable to the herbicide coming into direct contact with the seed as a result of wet soil conditions and/or failure to close the seed row.

Herbicide injury to corn as a result of cool and wet soil conditions is perhaps most common with the soil-applied grass herbicides like metolachlor (Dual II Magnum/Cinch/Stalwart), acetochlor (Degree, Harness, TopNotch), alachlor (Lasso, MicroTech), dimethanamid (Frontier, Outlook), and flufenacet (Define), and also with any of the

various atrazine pre-mixes that contain these herbicides (Bicep II Magnum, Lumax, Lexar, Cinch ATZ, Stalwart Xtra, Degree Xtra, Harness Xtra, FulTime, Keystone, Bullet, Guardsman or Guardsman Max). In rare cases, corn seedlings may fail to emerge from the soil and “leaf out” underground as a result of injury from these herbicides (Figure 1). Corn that has emerged and has been injured as a result of one of these herbicides will appear malformed and have twisted leaves that do not unroll properly. This is often referred to as “buggy-whipping” (Figure 2). Fortunately, this injury is usually short-lived and rarely causes yield reductions. Most plants that have been injured as a result of these herbicides will grow out of this injury once soil drying occurs.

Flumetsulam is another herbicide that has the potential to cause injury to corn as a result of cool, wet soil conditions. Flumetsulam is the active ingredient in Python and one of the ingredients in Hornet. Corn that has been injured as a result of Python or Hornet applications may be slightly yellowish (chlorotic) in color and will have both stunted roots and shoots. The short lateral roots are a key symptom of flumetsulam injury, which is often referred to as “bottle-brushed roots” (Figure 3). As with the soil-applied grass herbicides, injury from flumetsulam is usually short-lived and plants typically grow out of this injury once soil drying occurs.

Dinitroaniline herbicides such as pendimethalin (Prowl) can also cause injury to emerging corn plants if cool, wet soil conditions persist after planting. Injury from this herbicide is also common when corn seed has been planted too shallow and/or comes into direct contact with the herbicide solution. Perhaps one of the most characteristic symptoms of corn plants that have been injured as a result of pendimethalin is the inhibition of main, and to a greater extent, lateral, root

formation. This typically results in short and thick, or “clubbed,” lateral roots (Figure 4). Affected corn plants may also have leaves with a red or purplish color around the margins although certain corn hybrids, compaction or carryover of imidazolinone herbicides may exhibit similar symptoms on young corn plants.

Isoxaflutole and mesotrione are some other preemergence herbicides that may cause injury to corn as a result of cool and wet soil conditions. Isoxaflutole is the active ingredient in Balance Pro, and is one of the ingredients in Epic and Radius. Mesotrione is the active ingredient in Callisto and is one of the ingredients in Lumax, Lexar, Camix and Halex. Corn that has been injured as a result of these herbicide applications will have leaves with anywhere from a chlorotic to a completely bleached-white appearance (Figure 5). Injury will usually appear on the older leaves while new leaves often appear normal and unaffected. Although symptoms of these herbicides are perhaps more noticeable than any other type of herbicidal injury, this injury is usually short-lived and often confined to low areas or wet spots within a field. In severe cases where a high percentage of the foliage has a chlorotic or bleached-white appearance, the plants may eventually turn brown (necrotic) and die.

Similar “bleaching” symptoms can occur on emerging corn plants due to carryover of the herbicide clomazone (Command) in the soil solution. Command is not labeled for use on corn, but residues from the previous soybean crop are capable of injuring emerging corn plants when inadequate breakdown of this herbicide occurs. Conditions that favor the carryover of this herbicide include excessive dry periods after application and soils with a pH less than 6.0. Unlike the specific bleached areas that are characteristic of



Figure 1. Corn injury as a result of a preemergence grass herbicide.

Line up Support System for Late Planting Operations

By William Casady

Think twice before tracking fields to plant. Planting conditions are far from perfect when the ground is wet enough that the planter and tractor leave tracks in the field. Seeds planted into a muddy soil will emerge poorly and non-uniformly and could struggle to grow in a smeared and compacted seed furrow.

So far, it hasn't paid very well to be in the field. I remember a spring where we were not so fortunate. The weather turned off cool and wet like this for weeks. Much corn that had been planted early sat in the ground and faltered. Some emerged and took off only to be stunted by a long cool period similar to the one we have all witnessed this spring.

The natural variations in weather we have seen this spring are a part of our climate. They are certainly nothing to be alarmed about, but there is a lot of field work to be done in a short time. When the time is finally right, we must be more prepared than ever to keep the planters rolling.

Engineers use the probability of the occurrence of days suitable for planting to help optimize equipment complements. Records show that we can expect many good days in April to plant, and we select equipment that is large enough for a typical year. In that process, we also assume certain field efficiencies will exist and that we will plant for a reasonable number of hours

each day. It is not typical for planters to run day and night.

Now that planting will not even begin for most of us until May, we must develop strategies to make up the difference in working days to complete planting in a timely manner. The strategies we develop will depend on the available resources.

The key to achieving timely planting in a late spring is to further optimize the parameters we usually work by. These are number of hours of operation per day, field efficiency, operator efficiency, and downtime.

When the weather permits good planting conditions, plan to have at least two people available to run the planter and at least one support person to help with maintenance, supplying seed and assisting in helping correct any unforeseen problems. Use the following checklist as a guide for delayed planting:

Seed plans should always be completed early. If not, then lay out a plan now so that every bag of seed and every field are accounted for. There will be little time for last minute calculations or adjustments.

Hire additional labor. Unforeseen breakdowns or obstacles to keeping the planter in the field can often be offset by having someone on the ground to assist as necessary.

If you farm near wooded areas, check field edges for any cleanup required before planting begins. Stopping to move fallen limbs significantly reduces field efficiency.

Keep the planter rolling. At least two people should be available to keep the planter running from dawn to dusk or as long as conditions permit.

Use technology to communicate effectively. Plan to take breaks as necessary and have a partner meet you at the field to relieve you for a good lunch break or for supper.

Use extra labor to check planter performance. When the operator is standing behind the planter digging for seed to verify good performance or to make adjustments, the planter is idle and field efficiency drops. Keep a crew ready to help fill the planter as necessary or use bulk seed tenders.

Finally, when the pressure is on, it is even more important to review and consider safe practices. Shortcuts or hurrying to get in and out of the tractor or when filling the planter, especially when you are already tired, can cause accidents, and accidents cause downtime. Share this article with your spouse and your farming partners. Tensions can run high when seasonal stress begins to hit. Be safe.

Bill Casady
573 882-4370

Potential for Black Cutworm Damage to Field Corn throughout North and Central Missouri

By Wayne Bailey

Each spring black cutworm moth flights are monitored in Missouri using wing and Texas cone traps. These traps are designed to capture migrating male moths using a pheromone attractant. At present, several trappers across Missouri monitor traps every few days to determine when intensive captures of moths occur at trap sites. An intensive capture occurs when eight or more moths are captured over a two night

period in a wing trap or when 17 or more moths are captured in a single night in a Texas cone trap. These trap capture data are combined with a 30 year average of temperatures along with real time meteorological data to predict when first cutting of seedling corn by 4th instar larvae (worm stage) may occur in the area in which the moths were captured. This is the insect growth

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Correction

In the last issue Laura Sweets' article titled *Foliar Fungicides on Wheat in Missouri* included an incorrect photo labeled "Stagonospora glume blotch on head." The photo should have been labeled "Loose Smut." We apologize for any inconvenience this may have caused.

Applying Preemergence Herbicides to Emerged Corn

By Kevin Bradley

With the wet conditions throughout most of the state, I have already received a few calls about producers sacrificing their preemergence corn herbicide applications in order to try to get as much corn planted as possible. It seems likely that this situation will only get worse

and that many growers will not be able to get back on these fields until well after the corn has emerged. Luckily, many of our preemergence corn herbicides have labels that allow them to be applied to emerged corn fields. One notable exception to this is Balance Pro, which

cannot be applied to emerged corn or injury will occur. Table 1 provides a list of the preemergence herbicides that can be applied to emerged corn, as well as information about the maximum corn height and/or stage in which these applications should be made.

Table 1: Preemergence herbicides that can be applied to emerged corn

Herbicide Trade Name	Active Ingredient(s)	Maximum Corn Height/ Stage for Broadcast Applications	Maximum Weed Height/Stage for Broadcast Applications
Aatrex/Others	atrazine	12 inches	Apply before weeds exceed 1.5 inches in height. When applied with crop oil, apply before weeds reach 4 inches in height.
Bicep II Magnum/ Cinch ATZ	atrazine + metolachlor	5 inch	Apply until weeds reach the 2-leaf stage. Applications made beyond the 2-leaf stage will not provide satisfactory weed control.
Bullet	atrazine + alachlor	5 inch	Apply until weeds reach the 2-leaf stage. Applications made beyond the 2-leaf stage will not provide satisfactory weed control.
Callisto	mesotrione	30 inches or 8-leaf stage	Apply to weeds that are less than 5 inches in height.
Camix	metolachlor + mesotrione	5 inches	Apply before grass emergence but will control some broadleaf weeds less than 3 inches in height.
Degree, Harness, Surpass, TopNotch	acetochlor	11 inches	Apply before weed emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Cinch, Dual II Magnum	metolachlor	40 inches	Prior to emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Frontier, Outlook	dimethenamid	12 inches	Apply before weed emergence. Will not provide postemergence weed control and requires a tank--mix partner.
Degree Xtra, FulTime, Keystone	atrazine + acetochlor	11 inches	Apply prior to weed seedling emergence or in a tank mixture that controls emerged weeds.
G-Max Lite	atrazine + dimethenamid	12 inches	Apply before broadleaf weeds are greater than 1.5 inches tall and before grass weeds emerge.
Guardsman	dimethenamid	12 inches	Apply before weeds are greater than 1.5 inches tall or in a tank mix with products that control emerged weeds.
Guardsman Max	atrazine + dimethenamid	12 inches	Apply before weeds are greater than 1.5 inches tall or in a tank mix with products that control emerged weeds.
Harness Xtra	atrazine + acetochlor	11 inches	Apply before grass weeds reach the 2-leaf stage or in a tank mixture with a herbicide that controls emerged weeds.
Hornet	flumetsulam + clopyralid	20 inches or V6 stage	Apply to specified weeds up to 8 inches in height.
Lasso	alachlor	before emergence	Apply before weed emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Lexar	atrazine + metolachlor + mesotrione	12 inches	Apply to broadleaf weeds less than 5 inches in height. Will not provide adequate control of most grasses that are emerged at the time of application.
Lumax	atrazine + metolachlor + mesotrione	12 inches	Apply to broadleaf weeds less than 5 inches in height. Will not provide adequate control of most grasses that are emerged at the time of application.
MicroTech	alachlor	5 inches	Apply before weed emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Prowl H2O	pendimethalin	30 inches or 8-leaf stage	Apply before weed emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Python	flumetsulam	2 inches or before first leaf is unfurled (spike stage)	Apply before weed emergence. Will not provide postemergence weed control and requires a tank-mix partner.
Resolve	rimsulfuron	12 inches or exhibiting 6 leaf collars, whichever is more restrictive	Apply to grasses 1 to 2 inches in height and broadleaf weeds 1 to 3 inches in height. Will provide postemergence weed control of labeled weeds and some residual control of later-emerging weeds.
SureStart	acetochlor + flumetsulam + clopyralid	11 inches	Apply before weed emergence up to 1 to 2 inch weeds. If weeds are emerged, apply in combination with another herbicide with contact activity.

Kevin Bradley, BradleyKe@missouri.edu, 573-882-4039

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Figure 2. "Buggy-whipping" injury on corn as a result of a Define herbicide and cool, wet soil conditions after planting.

mesotrione or isoxaflutole, carryover of clomazone often results in plants that eventually turn completely bleached white in appearance and die.

Although rare, some injury may also occur to corn as a result of misapplications of atrazine or environmental conditions like cool and wet soil that favors atrazine injury. These conditions slow the rate of atrazine degradation considerably, creating some slight injury that is not usually an issue following atrazine applications. Severe rainfall events may also drive corn leaf tips into the soil causing greater amount

of foliar uptake than would normally occur. Atrazine symptoms appear as chlorosis and necrosis along the edges of the lower leaves. These symptoms are usually insignificant and transient in nature.

Corn can exhibit a variety of symptoms as a result of a mistake made during a preemergence burndown application of a growth regulator herbicide. Some of the more common growth regulator herbicides used in corn are 2, 4-D, dicamba and clopyralid, but several other growth regulator herbicides are available and registered for use in other settings. Clopyralid is the active ingredient in Stinger and one of the active ingredients in Hornet. Dicamba is the active ingredient in Banvel and Clarity, and one of the active ingredients in Distinct, Status and Marksman. 2, 4-D is sold under a variety of trade names. If a misapplication of a growth regulator herbicide has occurred prior to planting, corn plants can leaf out underground or show symptoms very similar to the chloroacetamide herbicides. Usually this type of injury is due to the plantingslot not being properly closed and/or corn being planted too shallow. Each of these scenarios most often causes the herbicide to come into direct contact with the germinating corn seed. These symptoms can also occur because the proper corn



Figure 4. "Root-clubbing" injury on corn as a result of shallow planting and a preemergence application of Prowl.

planting rotational interval has not been followed. For example, most 2, 4-D product labels indicate that at least 7 days should elapse between application and planting. Similarly, dicamba has specific rotational intervals that are based on the preplant rate applied.

Kevin Bradley
BradleyKe@missouri.edu
573-882-4039



Figure 3. "Bottle-brush" roots as a result of sandy soils and cool, wet soil conditions following an application of Hornet.



Figure 5. Bleaching injury on corn as a result of a preemergence application of Balance Pro and cool, wet soil conditions after planting.

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in small grains, corn and perennial and annual weed grasses. More than twenty species of aphids can transmit the barley yellow dwarf virus. Symptoms may be more severe and yield losses higher if plants are infected in the fall or early in the spring. Infections developing in late spring or summer may cause discoloration of upper leaves but little stunting of plants or yield loss.

The other virus disease likely to occur on winter wheat in Missouri is wheat streak mosaic, but symptoms of this disease are not usually evident until later in the season when air temperatures increase. Wheat streak mosaic causes a light green to yellow green mottling

and streaking of leaves. Symptoms may vary with variety, virus strain, stage of wheat growth when plants are infected and environmental conditions. Plants may be stunted. As temperatures increase later in the spring, yellowing of leaf tissue and stunting of plants may become more obvious. The wheat streak mosaic virus is spread by the wheat curl mite. Symptoms are frequently found along the edges of fields where the mite vector first entered the field. Both the wheat streak mosaic virus and the wheat curl mite survive in susceptible crop and weed hosts. Thus, the destruction of volunteer wheat and weed control

are important management options for wheat streak mosaic.

A management program for virus diseases of wheat should include the following steps.

- ♦ Plant good quality seed of resistant varieties.
- ♦ Avoid planting too early in the fall to minimize opportunity for insect vectors to transmit viruses to young plants.
- ♦ Destroy volunteer wheat and control weed grasses.
- ♦ Maintain good plant vigor with adequate fertility.

Laura Sweets
573-884-7307

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stage at which the larvae are capable of cutting corn plants above and below the soil surface. Smaller instars will often leaf feed causing minor defoliation of corn seedlings, but damage increases significantly as the larvae grow to 4th instar or larger stages and begin cutting plants. The predicted date of first cutting may change by location as current 2008 meteorological data are entered into the model. Scouting activities should occur from first emergence of corn plants and continue through the 5th leaf stage of plant development. If this is not possible, then scouting of fields should begin a minimum of one week prior to the predicted date of cutting.

At this time in the season, intensive captures of black cutworm moths have been reported in the following counties:

- ♦ **Vernon County** (Nevada): Intensive capture date, 3/28/2008. Predicted first cutting, 5/10/2008
- ♦ **Henry County** (Clinton): Intensive capture date, 4/4/2008. Predicted first cutting, 5/15/2008
- ♦ **Franklin County** (Union): Intensive capture date, 4/10/2008. Predicted first cutting, 5/11/2008
- ♦ **Franklin County** (Union): Intensive capture date, 4/11/2008. Predicted first cutting, 5/12/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/17/2008. Predicted first cutting, 5/18/2008
- ♦ **Audrain County** (Mexico): Intensive capture date, 4/18/2008. Predicted first cutting, 5/17/2008
- ♦ **Linn County** (Linneus): Intensive capture date, 4/18/2008. Predicted first cutting, 5/19/2008
- ♦ **Linn County** (Linneus): Intensive capture date, 4/21/2008. Predicted first cutting, 5/20/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/21/2008. Predicted first cutting, 5/19/2008
- ♦ **Audrain County** (Mexico): Intensive capture date, 4/21/2008. Predicted first cutting, 5/18/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/22/2008. Predicted first cutting, 5/20/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/23/2008. Predicted first cutting, 5/22/2008

- ♦ **Audrain County** (Mexico): Intensive capture date, 4/23/2008. Predicted first cutting, 5/21/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/24/2008. Predicted first cutting, 5/23/2008
- ♦ **Knox County** (Edina): Intensive capture date, 4/25/2008. Predicted first cutting, 5/24/2008
- ♦ **Linn County** (Linneus): Intensive capture date, 4/25/2008. Predicted first cutting, 5/25/2008

The potential for black cutworm damage is elevated in the state in 2008 due to several factors including (1) the late planting of corn, (2) the presence of substantial black cutworm moths as indicated by "intensive" captures, (3) the presence in some fields of heavy vegetation such as henbit prior to planting, and (4) the potential for large black cutworm larvae to be present when seedling corn plants are emerging or small in size. All of these factors favor the black cutworm population and may result in substantial cutting of corn seedlings in the northern 2/3 of Missouri. Areas represented by multiple "intensive" captures are most at risk of black cutworm damage, although corn producers in all northern and central

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Missouri counties should monitor emerging and seedling corn plants for damage. Black cutworm infestations may occur in scattered areas within a field or be found throughout the entire field. When scouting be sure to check all areas of the field, but focus some effort on those areas of the field where black cutworm infestations have been found in the past. Although the economic threshold for black cutworm varies from state to state, under normal conditions in Missouri, treatment is recommended when cutting of corn seedlings reach or exceed 2-4 percent of plants cut. Due to the location of the plant growing point, plants cut below ground level will sustain greater damage than plants cut

above ground. Cut plants may be left on the soil surface or partially pulled into the soil by the larvae. If the economic threshold is reached, then treatment with a recommended insecticide is justified. It is possible for a field of corn to be infested more than once by black cutworm due to migratory patterns of arriving moths.

Management of the black cutworm with insecticides may occur by several methods. (1) Seed treatments are the most common method used as a very high percentage of corn seed planted in Missouri will contain either Poncho 250 or Cruiser 250 applied on seed. These products do kill some larvae, but may not be able to keep large larvae or

high numbers of larvae from causing economic to field corn. In Missouri insecticide evaluations using heavy black cutworm pressure found an average of about 50 percent control when seed treatments were the only management strategy employed. (2) Most transgenic events using Bt do not provide control of this insect in field corn. The exception is Hercules, which provides good control under most situations. (3) Another management option is the destruction of any weedy vegetation in the field at least 10-14 days prior to planting. The destruction of the larval food source is an effective control strategy, but with the high moisture conditions and late planting dates experienced in spring of 2008, it may not be a feasible insect management option for use at this time. (4) A fourth option is to apply a preplant or planting time granular or liquid insecticides in order to reduce numbers of black cutworm larvae if present in the field at time of planting. This is not a preferred IPM method as it goes against the IPM philosophy of monitoring the crop and applying an insecticide when pest populations reach or exceed economic threshold levels. However, in those areas with high potential for damage, this is a viable option. (5) The preferred IPM management option would be to scout the emerging corn seedlings to determine damage levels. If the economic threshold of 2-4 percent cutting is reached or exceeded in a field, then a foliar applied insecticide may be used to rescue the crop. Regardless of what management option selected, producers are encouraged to actively scout corn fields from time of emergence through the 5th leaf stage of corn growth.

For more information on the black cutworm predictive model and the counties currently monitoring for black cutworm, please visit our Web site at: <http://ppp.missouri.edu/pestmonitoring/bcw/index.htm>.

Insecticides Recommended for preplant, planting-time, & rescue applications for Black Cutworm larval Control in Field Corn			
Chemical name	Trade name	Rate of Formulated Material/Acre	Placement/Comments
esfenvalerate	*Asana XL	5.9 to 9.6 fl oz/acre	foliar broadcast - rescue
tebupirifos plus cyfluthrin	*Aztec 2.1G *Aztec 4.67G	6.7 oz/1000 ft row 3 oz/1000 ft row Aztec 4.67G only applied	T-band, see label for placement T-band, see label for placement through Smartbox system
beta-cyfluthrin	*Baythroid XL	0.8 to 1.6 fl oz/acre	foliar broadcast - rescue
bifenthrin	*Capture 2EC	1.47 to 2.2 fl oz/acre (See MO label)	foliar broadcast - rescue
bifenthrin	*Capture LFR	3.4 fl oz/acre	foliar broadcast - rescue
bifenthrin	*several products	see specific labels 0.15 to 0.30 fl oz/1000 ft row	foliar broadcast - rescue planting in 5- to 7-inch T-band
chlorpyrifos plus gamma-cyhalothrin	*Cobalt *Cobalt	13 to 38 fl oz/A 1.89 fl oz/1000 ft row	broadcast T-band
deltamethrin	*Delta Gold	1.0 to 1.5 fl oz/A	broadcast
tefluthrin	*Force 3G *Force CS	4 to 5 oz/1000 ft row 0.34 to 0.46 fl oz/1000 ft row	see label for placement see label for placement
chloroethoxyfos	*Fortress 2.5G	6 to 7.5 oz/1000 ft row	T-band or in-furrow, incorporate
chloroethoxyfos	*Fortress 5G	3 to 3.75 oz/1000 ft row 5G applied only through the	T-band or in-furrow, incorporate Smartbox system
chlorpyrifos	*Lorsban 4E	2 to 4 pts/acre see specific labels	foliar broadcast - rescue preplant soil surface broadcast
chlorpyrifos	*numerous products	see specific labels see specific labels	foliar broadcast - rescue preplant soil surface broadcast
chlorpyrifos	*Lorsban 15G	8 oz/1000 ft row	T-band
zeta-cypermethrin	*Mustang Max EC	1.28 to 2.8 fl oz/acre	foliar broadcast - rescue
permethrin	Pounce 3.2EC	4.0 to 8.0 fl oz/acre	foliar broadcast - rescue
permethrin	*numerous products	see specific labels	foliar broadcast - rescue
permethrin	*Pounce 1.5G *Pounce 1.5G	6.7 to 13.3 lb/A 8 oz/1000 ft row	preplant incorporate/broadcast 4- to 15-inchband at planting
gamma-cyhalothrin	*Proaxis	1.92 to 3.20 fl oz/acre	foliar broadcast - rescue
Lambda-cyhalothrin	*Warrior	1.92 to 3.20 fl oz/acre	foliar broadcast - rescue
Read and follow all label direction, precautions, and restrictions. * Designated a restricted use product.			

Weather Data for the Week Ending April 28, 2008

By Pat Guinan

Station	County	Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Apr 1-28-Apr	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	66	41	78	33	53	-3	3.3	0.45	97	21
St. Joseph	Buchanan	64	44	74	34	53	-4	5.06	1.79	89	-9
Brunswick	Chariton	68	47	80	35	57	0	4.69	1.63	120	15
Albany	Gentry	65	43	76	34	53	-3	5.85	2.59	81	4
Auxvasse	Audrain	69	48	81	35	58	1	3.69	0.18	138	32
Columbia	Boone	69	48	81	37	58	0	4.09	0.2	143	10
Sanborn Field	Boone	69	50	82	38	59	1	4.35	0.47	157	14
Williamsburg	Callaway	68	48	80	36	58	1	3.45	-0.67	144	39
Novelty	Knox	67	46	77	32	56	-1	4.58	1.44	111	16
Linneus	Linn	66	46	77	33	56	-1	5.25	2.16	108	22
Monroe City	Monroe	67	46	78	34	57	0	4.76	1.57	127	18
Versailles	Morgan	70	48	81	36	59	0	4.74	0.74	153	-13
Green Ridge	Pettis	68	47	80	35	57	1	6.28	2.54	128	31
Lamar	Barton	68	48	80	36	58	-1	7.38	3.31	137	-30
Cook Station	Crawford	72	46	86	31	59	0	4.93	1.07	163	-10
Alley Spring	Shannon	75	45	86	30	59	1	5.94	2.26	152	-1
Round Spring	Shannon	75	46	89	33	59	1	5.97	2.27	154	0
Mountain Grove	Wright	69	46	82	33	58	0	6.5	2.31	130	-4
Delta	Cape Girardeau	72	52	83	40	62	1	6.96	3.4	180	-32
Cardwell	Dunklin	72	54	84	44	63	0	5.74	1.41	227	-39
Clarkton	Dunklin	72	52	82	40	62	0	5.23	1.31	201	-57
Glennonville	Dunklin	72	52	82	39	62	0	4.14	0.33	212	-50
Charleston	Mississippi	72	52	85	40	62	2	5.9	1.96	198	-8
Portageville-Delta Center	Pemiscot	72	54	84	42	63	1	5.63	1.49	228	-31
Portageville-Lee Farm	Pemiscot	72	54	84	42	63	1	6.12	1.99	227	-27
Steele	Pemiscot	73	55	84	42	64	2	6.19	1.8	238	-19

* 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.

Pat Guinan
 Commercial Agriculture Program
 573.882.5908
 GuinanP@missouri.edu