Purdue Cooperative Extension Service

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In This Issue

Insects, Mites, And Nematodes

Winter Temperatures, Corn Flea Beetle Survival, and Potential for Stewart's Wilt - *(Christian Krupke, John Obermeyer and Kiersten Wise)*

- Corn flea beetle winter survival is expected to be ***low*** throughout the state.
- ***Moderate*** survival is possible for extreme southern Indiana counties.
- Corn flea beetle is a vector of Stewart's wilt of corn.
- Management guideline for susceptible corn is given below.

Corn flea beetle is a sporadic corn pest and has little impact on Indiana's corn production the last several years. This is mainly because winter temperatures, which have been frigid for this pest since 2006, have lowered overwintering populations. Corn flea beetle can transmit the bacterium that causes Stewart's disease in corn, which survives in the gut of the overwintering beetles. As is the case with many insects that overwinter as adults, warmer temperatures result in higher beetle survival. This, in turn, leads to a greater potential for Stewart's disease. To determine the potential severity of Stewart's disease, add the average daily temperatures for the months of December, January, and February. If the sum is below 90, the potential for disease problems to develop is low. If between 90 and 100, moderate disease activity is a possibility. Sums above 100 indicate a high probability that beetles will survive the

Length and depth of snow cover often determines the corn flea beetle's overwintering success

winter and vectoring of Stewart's disease will occur. To help you better gauge the potential for corn flea beetle activity in your area (and the potential severity of the threat of the disease) in 2010, we have created the state map shown below. According to the temperature model, there is low probability of corn flea beetle activity and subsequent disease throughout most of Indiana, and only moderate activity in the Ohio River Valley.

This temperature model for corn flea beetle has been in use for many years and has been fairly accurate in predicting the activity of this pest the following spring. However one flaw is that the model is based on ambient air temperatures, not temperatures under leaf litter and grass clumps where this pest is actually overwintering. If snow cover is present, this provides an insulating blanket for the insect, and may protect some beetles from winterkill. Even with this "disclaimer" statement, we think the 2009/2010 winter was cold enough to have negatively impacted overwintering beetles in most of Indiana. Also, flea beetle numbers have been low statewide, in general, for the last 4-5 years – meaning less beetles going into winter to begin with.

As for the disease, there are two phases of Stewart's wilt: a seedling wilt phase and a leaf blight phase. In the wilt phase, plants wilt rapidly, usually at an early stage of growth. Leaves emerging from the whorl of infected plants are often the first to wilt. Internal tissues at the growing point are discolored or hollowed out. Faint green to yellow streaks containing corn flea beetle feeding marks are visible on one or more leaves. If stalks of wilted plants are cut, it may be possible to see yellow beads of bacteria ooze from the vascular tissue. Sweet corn hybrids are especially susceptible. Some dent corn inbreds, and occasionally dent corn hybrids, and some popcorn lines are susceptible as well. Dent corn hybrids rarely show symptoms of the wilt phase after growth stage V5.

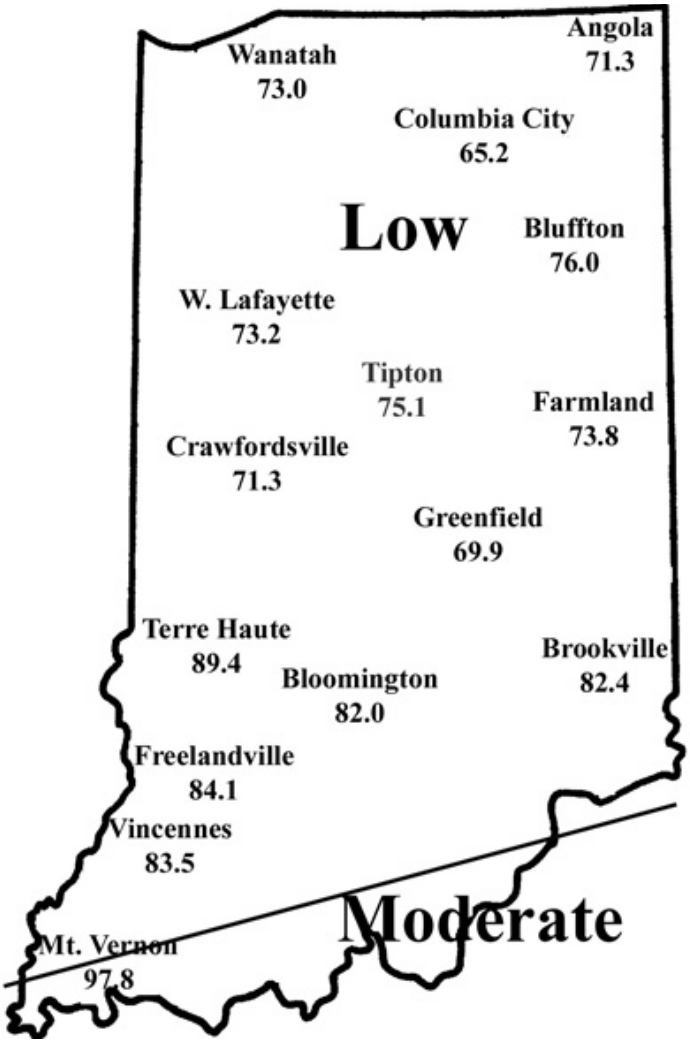
The leaf blight phase can occur at any time during the growing season, but often does not appear until after tasseling. Lesions are typically long and narrow, with greenish-yellow streaks and irregular or wavy margins. Lesions will become straw-colored, and infected leaves may die prematurely. Hybrids with resistance to Stewart's wilt may have smaller lesions that are limited to the tissue surrounding the feeding site of the beetle. These lesions can be confused with the fungal diseases gray leaf spot or northern corn leaf blight. Stewart's wilt is also commonly confused with another bacterial disease, Goss's wilt. One way to differentiate between these diseases and Stewart's wilt is to look for the beetle feeding scars associated with Stewart's wilt.

For *highly susceptible corn,* sample field edges and in-field areas of grass weed residue (i.e., overwintering sites) before planting to assess overwintering beetle survival and potential beetle movement to emerging corn plants. Often, beetles will be found on foliage during warm, sunny days. They will usually jump off when disturbed, and this habit (along with their large hind legs) give them their name. A sweep net is an ideal sampling tool for this pest. If any beetles are discovered at this time, an at-planting insecticide application is warranted. Most of the corn seed currently sold in Indiana is already protected from corn flea beetle at the time of purchase: Cruiser and Poncho insecticide-treated seed are systemic insecticides that should give good control of flea beetle in the early seedling stage. The low rates of the seed treatments are expected to provide protection from emergence to 2-leaf corn, whereas the higher rate (eg. Poncho 1250 and Cruiser Extreme 1250, also called the "rootworm rate") should protect corn through the 5th leaf stage.

If insecticide-treated seed is not an option, broadcast application of foliar insecticides at the time when corn spikes should provide 7-10 days of residual protection from beetle feeding.

CAUTION: *treating of field edges and waterways for beetle control may be an off label application. Avoid movement of insecticides, including soil-bound materials into aquatic environments.*

Expected Flea Beetle Winter Survival



Preceived Threat of Stewart's Disease from Winter Temperatures						
Site	**Dec.**	**Jan.**	**Feb.**	**Sum**	**Disease Threat**	**Total Snowfall**
Angola	26.1	21.9	23.3	71.3	Low	34.6
Wanatah	27.0	22.1	23.9	73.0	Low	33.6
Bluffton	29.4	22.8	23.8	76.0	Low	26.8
W. Lafayette	28.5	21.7	23.0	73.2	Low	17.9
Tipton	29.2	22.6	23.2	75.1	Low	30.7
Farmland	29.4	22.1	22.3	73.8	Low	17.2
Crawfordsville	28.1	21.5	21.7	71.3	Low	27.4
Greenfield	29.0	18.1	22.8	69.9	Low	31.0
Terre Haute	24.9	27.1	27.4	89.4	Low	9.0
Brookville	31.6	25.4	25.4	82.4	Low	28.8
Bloomington	31.1	24.7	26.2	82.0	Low	24.1
Freelandville	32.3	25.0	26.8	84.1	Low	15.4
Vincennes	32.6	24.6	26.3	83.5	Low	22.6
Mt. Vernon	36.4	30.7	30.7	97.8	Moderate	10.6

Weeds

Herbicide Update Revisited – (*Glenn Nice, Bill Johnson, Tom Bauman, and Tom Jordan*)

The last *Pest&Crop's* issue of the article "2010 Herbicide Update" needs to be revisited for a correction, some clarification, and due to some upcoming label changes. To start this off we will make a correction.

Correction:

In Table 3, "List of available generic herbicides," the herbicide Stalwart C was listed under s-metolachlor + safener and Stalwart Xtra and Trizmet II were listed with Bicep II Magnum. This is in error. Stalwart C uses metolachlor as its active ingredient with a safener. Stalwart Xtra and Trizmet also use metolachlor as their active ingredients not the s-metolachlor isomer. It should be noted that Bicep II Magnum uses s-metolachlor as its active ingredient.

Clarification:

In the section for the herbicide Integrity, it might be beneficial to note that Integrity is being marketed to be used in a Preemergence plus Postemergence weed management program. Many of the products sold for preemergence applications require some postemergence follow up treatments to provide season long control. This may not always be clear in presenting information about these products.

In the article the herbicide "group" number is presented after the product header. These groupings are in response to the development of herbicide resistant weeds. The grouping is a tool to identify herbicides that have different modes of action. Although not mandatory, some companies have started including these systems on their labels. There are two conventions of grouping, the Herbicide Resistance Action Committee (HRAC) system and the Weed Science Society of America (WSSA) system. For information regarding both these methods please see the HRAC web publication "Classification of Herbicides According to Mode of Action" <http://www.hracglobal.com/Publications/ClassificationofHerbicideModeofAction/tabid/222/Default.aspx>. In the article we use the number system proposed by WSSA. For example group 2 are herbicides that have active ingredients inhibit the ALS enzyme thus production of branched chain amino acids.

Upcoming Label Changes:

In the section for products that use Kixor (saflufenacil), it is mentioned that it should be applied with either methylated seed oil (MSO) or crop oil concentrate (COC). The manufacturer of these products will be changing the labels to restrict use only with MSO or a high load MSO.

The Formation of an Indiana State Invasive Species Council – (*Glenn Nice*)

Not to long ago, a law has been passed to setup the "Invasive Species Council" (IC 15-16-10). The Invasive Species Council has a fairly large job. It is the role of the Invasive Species council to make recommendations regarding invasive species to governmental agencies and legislative committees; seek funding; provide education and outreach programs; monitor and inventory invasive species in the state of Indiana; and set up a dialogue with other states regarding prevention, detection, response to and the management of invasive species. The Invasive Species Council does not have any regulatory authority, meaning they do not regulate or can they make laws. Also, the Invasive Species Council does not have any authority to hear any appeals or grievances.

The Council is made up of 11 members. The Invasive Species Council consists of:

1) The Dean of the Purdue University College of Agriculture or designee.
2) The Director of the Indiana State Department or Transportation or designee
3) The State Veterinarian or designee
4) An employee of the Division of Fish and Wildlife designated by the Director.
5) An employee of the Division of Entomology and Plant Pathology designated by the Director of that division
6) One representative of research on invasive species
7) Two individuals representing the hardwood tree industry, the horticulture industry, the agriculture industry and the aquaculture industry.
8) Two individuals representing organization or local government agencies concerned with land trusts, biodiversity conservation, aquatic conservation, and local parks and recreation.

There are several other laws in the state of Indiana that address weeds. The first is the Indiana Seed Laws, this one deals with labeling on seed sold in the state for seeding and sowing; the Destruction of Detrimental Plants; Formation of county Weed Boards; and laws dealing with multiflora Rose, johnsongrass and purple loosestrife.

If you would like more information regarding the above laws please see the following article <http://www.ag.purdue.edu/btny/weedscience/Pages/default.aspx>. If you would like to read the actual laws you can go to the Indiana General Assembly web side <http://www.in.gov/legislative/ic/code/>

Considering Your Burndown? – (*Glenn Nice*)

If you are a no-tiller then you are probably considering your burndown options for this year. Your burndown herbicides can be applied with your early pre-plant or separate. However, it is important to have a clean slate for the up coming planting season. A wooly field interferes with planting and planting timing. Some of the products that you might want to consider for a burndown program this coming season are listed in the table below.

Glyphosate or paraquat (Gramoxone inteon) can be applied almost any time before planting in the spring, however allow 7 to 10 days for glyphosate to do its job. Due to the widespread occurrence of glyphosate resistant horseweed (marestail) it is recommended to mix at least 1 pt/A 2,4-D ester with your burndown. When using 2,4-D at 1 pt/A or less (< 0.5 lb ai/A) you have to wait 7 days before the planting of soybean. If you use more than 1 pt/A (>0.5 pt ai/A), most labels specify a 30 day preplant interval. Extreme, Canopy DF, or Canopy EX can only be used before soybean. Simazine can only be used before corn. Atrazine, Sencor, Scepter, and FirstRate will have some burndown ability when COC is added to the mix. Always read and follow pesticide labels.

The following pages are the burndown section available in The Weed Control Guidelines for Ohio and Indiana, Mark M. Loux, Doug Doohan, Anthony F. Dobbles, Bill Johnson, Glenn Nice, Tom Jordan and Tom Bauman, 2010. <http://www.btny.purdue.edu/Pubs/WS/WS-16.pdf>.

Table 1. Weed Response to "Burndown" Herbicides

This table gives a general comparative rating of "burndown" herbicides used in no-till corn and/or soybean production. Under unfavorable conditions, some herbicides may not perform as well as indicated below. Under very favorable conditions, control may be better than indicated. Herbicide rate, weed size and stage of growth, and environmental conditions interact to influence herbicide performance.

Weed control rating:
9 = 90% to 100%
8 = 80% to 90%
7 = 70% to 80%
6 = 60% to 70% control, and - = less than 60% control, not recommended.

Ratings are for control of existing vegetation only (not residual control). Treatments containing glyphosate should be applied with AMS (and surfactant if required by the glyphosate product label). Most other treatments should be applied with a COC or MSO (plus UAN if recommended by the label). Ratings for 2,4-D are based on a rate of 0.5 lb ai/A unless otherwise indicated - increasing the 2,4-D rate to 1.0 lb ai/A will improve control of legumes, dandelion, marestail, and some other weeds.

	Giant Foxtail	Lambsquarters	Common Ragweed	Giant Ragweed	Annual Smartweeds	Common chickweed	Mustards, Shepherd's-purse	Winter Wheat, Rye Cover	Orchardgrass/Fescue Sod	Canada Thistle	Red Clover	Alfalfa	Hairy Vetch	Marestail (glyphosate-resistant)[1]	Prickly Lettuce	Annual Bluegrass	Deadnettle, henbit	Carolina Foxtail	Dandelion	Cressleaf groundsel
Fall application																				
2,4-D (0.5 lb/1.0 lb)	-	-	-	-	-	-	9	-	-	-/6	6/8	-/7	6/8	8/9	8/9	-	-/8	-	6/7	9/9
2,4-D + dicamba	-	-	-	-	-	7	9	-	-	7	9	8	9	9	9	-	8	-	7	9
Autumn + glyphosate	-	-	-	-	-	9	9	-	-	-	6	-	6	9	9	9	9	9	8	9
Basis + 2,4-D	-	-	-	-	-	9	9	-	-	6	6	-	6	9	9	9	8+	9	8	9
Canopy/Cloak DF + 2,4-D	-	-	-	-	-	7	9	-	-	-	6	-	6	9	9	9	9	-	9	9
Canopy/Cloak EX + 2,4-D	-	-	-	-	-	9	9	-	-	-	6	-	6	9	9	9	9	-	9	9
Express/Nuance + 2,4-D (1.0 lb)	-	-	-	-	-	9	9	-	-	6	6	-	6	9	9	-	8	-	7	9
Glyphosate	-	-	-	-	-	9	9	9	9	9	8	8	8	7	8	9	8	9	8	9
Glyphosate + 2,4-D	-	-	-	-	-	9	9	9	8	8	9	9	9	9	9	9	9	9	8	9
Metribuzin + 2,4-D	-	-	-	-	-	7+	9	-	-	-	-	-	6	9	9	-	9	7	7	9
Simazine + 2,4-D	-	-	-	-	-	9	9	-	-	-	-	-	6	9	9	8	8+	8	8	9
Spring application																				
2,4-D (0.5 lb/1.0 lb)	NR	9	9	9	7/8	-	8/9	-	-	-	7/8	7/8	8/9	7/8	8/9	-	-/7	-	6/7	7/8
2,4-D + dicamba	NR	9	9	9	9	6	9	-	-	6	9	8	9	9	9	-	-	-	8	9
Atrazine + 2,4-D	7	9	9	9	9	8+	9	-	-	-	8	7	8	9	9	8	9	9	6	8
Atrazine + paraquat	9	9	9	9	9	9	9	8	6	-	7	-	8	9	9	9	9	9	-	9
Atrazine + Hornet	7	9	9	9	9	8	8	-	-	8	6	6	7	8	9	8	9	9	-	8
Balance/Corvus + atrazine + 2,4-D	8	9	9	9	9	9	9	-	-	-	6	-	8	9	9	8	9	9	6	9
Balance/Corvus+atrazine+glyphosate	9	9	9	9	9	9	9	8	-	6	7	6	7	8	9	9	9	9	7	9
Basis/Resolve/Prequel + atrazine + 2,4-D	9	9	9	9	9	9	9	-	-	-	7	7	8	9	9	8	9	9	8+	8
Canopy/Cloak + glyphosate	9	8	9	9	9	7	8	9	-	6	7	6	6	8	8+	9	9	9	8+	9
Canopy/Cloak + glyphosate + 2,4-D	9	9	9	9	9	7	9	9	-	6	8	8	8	9	9	9	9	9	8+	9
Dicamba	NR	9	9	9	9	6	7	-	-	-	9	8	8	7	9	-	-	-	7	-
Expert	9	9	9	9	8	8	8	8	-	-	6	-	7	8	8	9	8	9	7	8
Expert + 2,4-D	9	9	9	9	9	8	9	8	-	6	7	7	8	9	9	9	9	9	8	9
Gangster + glyphosate + 2,4-D	9	9	9	9	9	7	9	9	-	6	8	8	8	9	9	9	8	9	8	9
Glyphosate	9	8	9	8	7	7	8	9	-	6	7	6	6	6	8	9	-	9	7	7
Glyphosate + 2,4-D	9	9	9	9	8	7	9	9	-	6	8	8	8	8+	9	9	7	9	8	9
Ignite + atrazine or metribuzin	9	9	9	9	9	9	9	-	-	6	-	-	6	8+	9	8	9	9	8	8
Integrity + atrazine + glyphosate	9	9	9	9	9	9	9	9	-	6	7	6	8	9	9	9	9	9	8	8
Lumax/Lexar	6	9	9	9	9	9	8	-	-	6	-	-	7	8	9	8	9	9	8+	8
Lumax/Lexar + 2,4-D	6	9	9	9	9	9	9	-	-	6	7	7	8	9	9	8	9	9	8+	9
Metribuzin + paraquat + 2,4-D	9	9	9	9	9	9	9	7	-	-	7	7	8	8+	9	9	9	9	6	9
Sharpen/Optill + glyphosate/Ignite	9	9	9	9	9	8	9	8	-	6	7	6	6	9	9	9	8	9	8	8
Sonic/AuthorityFirst+glyphos+2,4-D	9	9	9	9	9	7	9	9	-	6	8	8	8	9	9	9	8	9	8	9
Valor XLT/Envive + glyphosate	9	8	9	9	9	7	8	9	-	6	7	6	6	8	8+	9	9	9	8+	9
Valor XLT/Envive+glyphosate+2,4-D	9	9	9	9	9	7	9	9	-	6	8	8	8	9	9	9	9	9	8+	9

[1]Ratings are for control of emerged marestail only. Marestail emerges in fall, spring, and early summer, and use of burndown plus residual herbicides in early spring results in most effective control. See "horseweed (marestail)" in the "Problem Weed" section for more information.

Burndown Herbicides in No-Tillage Corn and Soybeans

Herbicide	Formulation	Product Rate Range
2,4-D Amine	Various	0.5 - 1 lb ai/A
2,4-D Ester	Various	0.5 - 1 lb ai/A

- Apply in fall or spring for control of emerged annual broadleaf weeds, including ragweeds, lambsquarters, mustard species, marestail, prickly lettuce, and dandelion. Controls or suppresses perennial broadleaf weeds and legume sods (alfalfa, clover).
- Mode of action: group 4 (see pages 12-13).
- 2,4-D ester or amine can be applied preplant or preemergence to corn, but labels vary with regard to specific recommendations on timing of application. Labels for some products recommend application either 7 to 14 days before planting or 3 to 5 days after planting before the corn has emerged, while others specify application any time after planting.
- Applications of 2,4-D around the time of planting can injure corn. This is more likely to occur in coarse-textured soils with low organic matter content, and when above-average rainfall and prolonged soil moisture occur within a week after planting. When applied preemeergence, 2,4-D amine is more likely to injure corn than 2,4-D ester. Labels for some products do not allow preplant or preemergence use of 2,4-D on light, sandy soils. Injury may be more severe when 2,4-D is applied with chloracetamide herbicides.
- Many 2,4-D products are labeled for use in the spring prior to no-till soybean planting. OSU and Purdue University recommend the use of only 2,4-D low-volatile ester (LVE) or similar products for this application. 2,4-D amine products are more water soluble and may leach into the seed zone. For 2,4-D LVE, rates up to 0.5 lb active ingredient per acre must be applied at least 7 days before soybean planting. Application rates of more than 0.5 lb up to 1.0 lb active ingredient per acre generally must be applied at least 30 days before planting. Several 2,4- ester products, including E-99, Salvo, and Weedone 650, can be applied at a rate of 1.0 lb ai/A up to 15 days before planting. Do not apply more than 1 lb ai per acre. Only one spring application is allowed per year.
- 2,4-D is more effective than glyphosate for control of legume sods, marestail, dandelion, and prickly lettuce. For best control of alfalfa prior to corn planting, apply in combination with 1/2 pint of dicamba. If legume sods are cut prior to application of 2,4-D or 2,4-D plus dicamba, allow sufficient regrowth (4 to 6 inches) before herbicide application, or poor control may result.
- When applied at rate of 1 lb ai/A in the fall, 2,4-D will control mustards, marestail, purple deadnettle, and many other broadleaf weeds. Add glyphosate for effective control of common chickweed, wild carrot, poison hemlock, cressleaf groundsel, Canada thistle, dandelion, and grasses.
- Rage D-TECH is a premix of 2,4-D and carfentrazone (Aim) that results in more rapid herbicide injury to weeds, but does not improve control compared with 2,4-D alone.

Herbicide	Formulation	Product Rate Range
Autumn	10 WDG	0.3 oz

- Autumn (iodosulfuron-methyl) can be applied in fall before corn or soybeans planting, or early spring up to 30 days before corn planting, for control of winter annual weeds and dandelion. Most effective control occurs when mixed with glyphosate or 2,4-D and applied in the fall. Apply with 2,4-D for control of ALS- or glyphosate-resistant marestail.
- Mode of action: group 2 (see pages 12-13).
- Apply with COC (1% v/v) plus UAN (1.5 - 2 qts/A) or AMS (1.5 - 3 lbs/A).
- Do not apply to frozen ground.

Herbicide	Formulation	Product Rate Range
Rimsulfuron + thifensulfuron (active ingredient)		
Basis	75DF	1/3 - 1 oz
Thifensulfuron + tribenuron (active ingredient)		
Harmony Extra	50DF	0.75 - 0.9 oz
Nimble, TNT Broadleaf	75WDG	0.5 - 0.6 oz
Tribenuron (active ingredient)		
Express	50DF	0.25 - 0.5 oz
Nuance	75WDG	1/6 - 1/3 oz

Table 2. Application Intervals for Early Preplant Herbicides

This table gives the time interval, in days, that herbicides and herbicide combinations can be applied before planting corn or soybeans. Herbicide rates may increase when applied early preplant; consult labels for detailed information on application rates. Soil-applied herbicides not included in this table are not labeled for early application, and should be applied close to the time of planting or as directed by the label. Fall applications are usually targeted for control of emerged winter annuals, biennials, and dandelion, and herbicides applied in fall usually provide only limited control of weeds that emerge the following spring.

Corn	Single Preplant Application in Spring	Labeled for Fall Application
AAtrex, atrazine	up to 30 days	No
Acetochlor, acetochlor+atrazine	up to 30 days	No
Alachlor, alachlor+atrazine	up to 30 days	No
Authority MTZ	Not labeled in spring prior to corn	Yes (up to 14 oz)
Balance Flexx, Corvus, Prequel	up to 21 or 30 days[2]	No
Guardsman Max, Outlook	up to 30 days[1]	No
Hornet	up to 30 days	No
Integrity, Sharpen	up to 30 days	No
Lumax, Lexar	up to 14 days	No
metolachlor, metolachlor+atrazine	up to 30 days	No
s-metolachlor, s-metolachlor+atrazine, Expert	up to 30 days	No
Metribuzin	up to 14 days	Yes
Princep/simazine	up to 14 days	Yes
Python	up to 30 days	Yes
SureStart	up to 30 days	Yes
Topnotch/FulTime	up to 40 days	No

Soybeans	Single Preplant Application in spring	Labeled for Fall Application
Authority First, Authority MTZ, Authority Assist	up to 45 days, no later than 3 days after planting	Yes
Canopy/Cloak DF	up to 45 days	Yes
Canopy/Cloak EX	at least 7 to 14 days before planting[3]	Yes
Command3ME	up to 30 days	No
Envive	anytime, but no later than 3 days after planting	Yes
FirstRate	up to 28 days	No
Outlook	up to 30 days[1]	No
Gangster	up to 14 days	Yes
Metolachlor/s-metolachlor	up to 30 days	No
Metribuzin	up to 15 days	Yes
Optill, Sharpen	Up to 30 days	No
Pendimethalin	up to 45 days	Yes
Prefix	up to 15 days	No
Python	up to 30 days	Yes
Scepter	up to 45 days	Yes
Sonic	anytime	Yes
Spartan, Spartan Advance	anytime, but no later than 3 days after planting	Yes
Synchrony XP	up to 30 days	No
Valor	up to 14 days	Yes
Valor XLT	anytime, but no later than 3 days after planting	Yes

1 Early application not recommended in areas where average annual rainfall exceeds 40 inches.

2 Can be applied 30 days before planting if followed with planned postemergence treatments - otherwise it can be applied 21 days before planting.

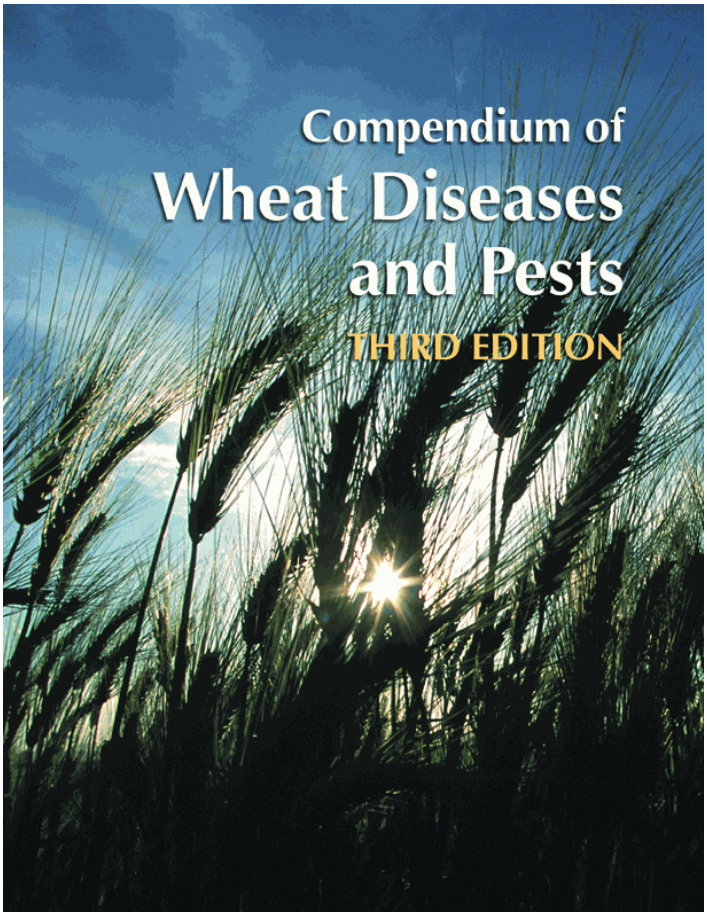
3 Canopy/Cloak EX rates of 2.2 oz or less should be applied at least 7 days before planting; rates of 2.2 to 3.3 oz should be applied at least 14 days before planting.

Plant Diseases

The New Edition of the Wheat Disease Compendium is Off the Press – (*Kiersten Wise and Greg Shaner*)

Compendium of Wheat Diseases and Pests, Third Edition is the definitive publication on diseases of wheat, completely updated since the previous edition published in 1987. Twenty years of advances and new discoveries about wheat diseases are delivered in this new edition, making it the largest compendium ever in the 40-book series.

More than 70 contributing plant pathologists and entomologists, all experts in their fields, have contributed to this authoritative compendium. A new section on major insect and mite pests of wheat has been added to make this a truly comprehensive reference. This new third edition is re-designed to be easier to use than ever before. It incorporates 50% more images integrated with the corresponding descriptions of disease symptoms, causes, life cycles, and control practices.



What's New in this Third Edition?

- 32 new chapters – all other chapters are up-to-date
- A major section on insects and mites covers 16 of the most important to control
- 88 more images than the previous edition – Nearly all images are new!
- 90% of the images are in color
- 70 authors writing chapters in their expertise area

It can be ordered online at <http://www.shopapspress.org/coofwhdiandp.html> or toll free 1-800-328-7560.

Bits & Pieces

2010 Popcorn Agri-Chemical Handbook – (*Genny Bertalmio, The Popcorn Board*)

The 2010 *Popcorn Agri-Chemical Handbook* is now available at <http://www.popcorn.org/handbook> to ensure everyone in the popcorn industry is informed about products registered for use on popcorn or in popcorn storage facilities. The handbook lists agri-chemicals registered, special use restrictions and the status of a chemical under special review by the Environmental Protection Agency (EPA). The International Maximum Residue Level (MRL) Database, <http://www.mrldatabase.com>, includes popcorn and denotes established levels by the US, Codex, EU and 27 countries.

The Popcorn Board urges you to provide the above links to your growers or download, print and distribute the updated version of this critical information to them. Contact Genny Bertalmio, +1-312-673-4883 or <gbertalmio@smithbucklin>, for further information or if you require a hard copy.

The Popcorn Board accepts voluntary contributions to ensure continued funding of its efforts to provide this important information to the popcorn industry. Checks should be mailed to The Popcorn Board, 401 N. Michigan Avenue, Chicago, IL 60611, FAX: 312.527.6783.