DEPARTMENT OF
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PLANT·PATHOLOGY
PURDUE UNIVERSITY • WEST LAFAYETTE IN

Fall-Applied Herbicide Applications in Indiana

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In recent years, applications of herbicides during the fall months have been on the rise. These applications generally target winter annual weeds common to Indiana. The primary culprit for turning corn and soybean fields green prior to planting in the spring is common chickweed (*Stellaria media*), Figure 1. Purple deadnettle (*Lamium purpureum*), Figure 2, and henbit (*Lamium amplexicaule*), Figure 2, are primarily responsible for many purple colored fields across the state. Reasons for the robust growth of the winter annuals across the state in recent years may include (1) mild winters which favor the growth of these weeds, (2) reduced use of in-season, soil-residual herbicides whose persistence in past years may have controlled many of these weeds in the fall, (3) reduction in fall tillage, which is an effective control of these weeds, or (4) a combination of these factors. Regardless of the reason for their occurrence, some issues concerning fall-applied herbicide programs should be addressed. Therefore, the objectives of this document are to discuss factors to consider before using fall-applied herbicide programs and to provide research findings from test sites within Indiana where a number of fall-applied treatments were evaluated in 2000-'01.

Factors to Consider Before Using Fall-Applied Herbicides

Have winter annual weeds caused your soils to warm or dry slower in the spring? Consider the life cycle of winter annual weeds. These weeds usually emerge in the fall after harvest, increase their vegetation during the winter, and complete their life cycle as temperatures warm during the spring and early summer… *usually the same time as soils need to dry and warm up for planting*. So, during the spring months the weeds

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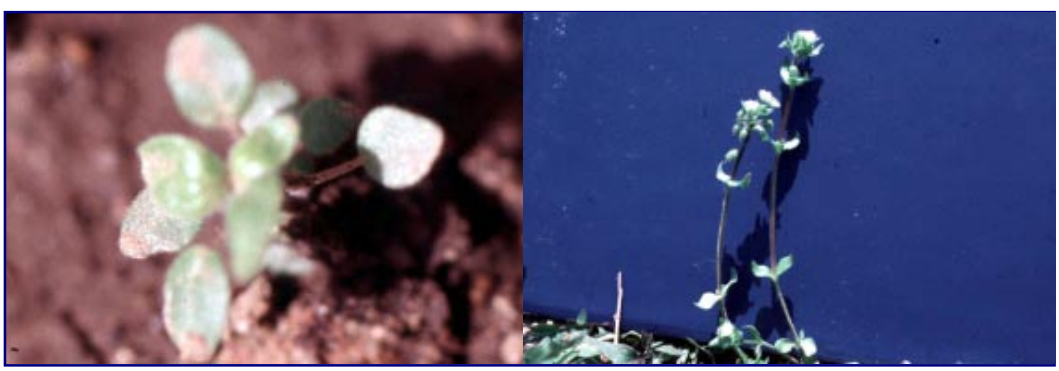

*Figure 1. Common chickweed (*Stellaria media*) is perhaps the most common winter weed problem in Indiana. Seedling (left) and mature plant (right).*

*Figure 2. Purple deadnettle (*Lamium purpureum*) (left) and henbit (*Lamium amplexicaule*) (right) are members of the Mint family. These winter annuals are responsible for the purple coloration of many Indiana fields during the winter months.*

have formed a thick mat on the soil surface (blocking sunlight from warming the soil) and have almost completed their life cycle (they are not actively growing so they do not use the excess soil moisture and help dry the soil).

Does your burndown program before planting fail to control the winter annuals, or are you forced to make multiple applications? Herbicides are most effective when applied to actively growing weeds. Cool daytime and nighttime air temperatures, poor spray coverage due to excessive growth, and reduced vigor of winter annuals during the corn and soybean planting season often lower the performance of spring burndown herbicides. Applying herbicides in the fall when air temperatures are still warm, when weeds are actively growing, and when good spray coverage can be achieved can increase herbicide performance and eliminate the need for or increase the effectiveness of any burndown herbicide program in the spring.

Are you strapped for time during the spring burndown and planting season? Are you delaying corn planting because you still need to spray burndown herbicides? Fall applications may help you spread out the workload and allow time to farm more land or plant earlier in the spring.

Do winter annual weeds increase the likelihood of insect pests in next year's corn or soybean crop? The answer is maybe. Although the presence of winter annuals does not increase the chances of some insects, certain pests are more likely to overwinter or be a problem earlier the next season due to the presence of winter annual weeds. Many producers believe the occurrence of seedcorn maggots and black cutworm is greater when winter annual weeds are allowed to thrive in fields.

Do your soil conditions justify using the fall-applied herbicide programs? The use of residual herbicides, which typically breakdown slower under cold temperatures (i.e. during the winter), may be a greater risk to the environment than can be offset by weed control benefits. For example, herbicides with high water solubility pose a threat to ground water sources if applied to highly permeable soils or land with high water tables. Likewise, soils conducive to erosion (not necessarily highly erodible soils) may benefit from winter annual weeds, as these weeds generally provide effective soil cover to help prevent erosion.

How will you alter your current weed control system if you incorporate a fall-applied herbicide program? This depends on the present program and its success. If spring tillage has effectively controlled the winter annuals in the past, will a fall-applied herbicide program ease tillage in the

Figure 3. Most treatments evaluated adequately control the winter annual weeds. In White County (left), fall applications resulted in excellent control of common chickweed and the elimination of a burndown herbicide application before planting. On the right is a check of common chickweed.

spring? If not, the herbicide may only be applied for aesthetic purposes.

Are the winter annual weeds providing effective suppression of more troublesome, early-emerging summer annual weeds? We know that vegetation cover, regardless if it is crop or weed, will suppress germination and growth of other weeds. Therefore, burndown of a solid stand of low lying winter annuals prior to no-till planting may result in an effective "weed control mat" during the winter and for the first few weeks of the growing season before planting.

Will the fall-applied system lock you into a single cropping system the following spring? The rotation restriction of many residual, fall-applied corn products is too long to allow one to plant soybean the following spring. The same is true for many residual, fall-applied soybean products when planting corn the next spring. Therefore, before spraying a residual product in the fall, be committed to planting the labeled crop regardless of fluctuations in the commodity markets.

Do the fall-applied programs fit your personal environmental goals? If the control of the winter annuals offsets such things as reduced erosion due to presence of winter annuals, and/or increases potential off-site movement of herbicides through runoff or leaching, then this program may not be for you.

Results of Fall-Applied Herbicide Trials Conducted in 2001

During late October and early November of 2000, six experiments were established around Indiana to evaluate various fall applications of currently labeled corn and soybean herbicides for controlling winter annual weeds. Herbicides were applied to actively growing weeds 2 to 6 inches in height. Herbicide efficacy was evaluated on common chickweed and purple deadnettle. Following are the results of this research (Table 1). Keep in mind, these results are based on one year of research and may vary significantly due to environmental conditions within a given year or between years.

Several excellent herbicide options are available for winter weed control in the fall prior to planting soybean or corn in the spring (Figure 3). When choosing a herbicide treatment, consider first the crop that will be planted next year and the potential of switching to another crop before next year's planting season. For example, only soybean can be planted following fall application of treatments that contain Backdraft, Canopy XL, Classic, Command 3ME, FirstRate, Sencor 75 DG, or Squadron. Only corn can be planted following fall application of treatments that contain Princep 4L or Simazine 90 DF.

Weed infestations at the time of application should also be considered. Gramoxone Extra and Roundup Ultra Max have no soil activity and must contact weed foliage at application to be affective. Similarly, products such as 2,4-D and Sterling, although active in the soil, are most effective if applied to the foliage of weeds.

Table 1. Weed control data from fall applications of currently labeled corn and soybean products. Tolerance of corn and soybean to spring treatments may differ.

Product	Rate	Unit	Common chickweed	Purple deadnettle	Labeled for Application before[1]	
					Corn	Soybean
—	—	—	<------- % Control ------->		<------- % Control ------->	
Roundup Ultra Max® Ammonium Sulfate	1.21 17	pt/A lb/100 gallons	83	95	X	X
Roundup Ultra Max® 2,4-D Ester® Ammonium Sulfate	1.21 1 17	pt/A pt/A lb/100 gallons	96	90	X	X
Canopy® XL Express® 2,4-D Ester® Crop Oil Conc.	4.5 0.15 1 1	oz/A oz/A pt/A % v/v	92	95		X
Squadron® 2,4-D Ester® Crop Oil Conc.	3 1 1	pt/A pt/A % v/v	89	95		X
Backdraft® 2,4-D Ester® Ammonium Sulfate Nonionic surfactant	3 1 17 0.25	pt/A pt/A lb/100 gallons % v/v	91	75		X
Python® WDG Sencor® 75DG 2,4-D Ester® Crop Oil Conc.	1 4 1 1	oz/A oz/A pt/A % v/v	91	95	X	X
Sencor® 75DG 2,4-D Ester® Crop Oil Conc.	8 1 1	oz/A pt/A % v/v	86	95	X	X
Gramoxone® Extra 2,4-D Ester® Sencor® 75DG Nonionic surfactant	1.5 1 4 0.25	pt/A pt/A oz/A % v/v	93	100	X	X
Command® 3ME 2,4-D Ester® Crop Oil Conc.	2 1 1	pt/A pt/A % v/v	98	83		X
Sterling® Crop Oil Conc.	16 1	fl oz/A % v/v	62	90	X	
Sencor® 75DG Sterling® Crop Oil Conc.	6 8 1	oz/A fl oz/A % v/v	91	90	X	X
Valor® Crop Oil Conc.	2 1	oz/A % v/v	75	95		X
Valor® Classic® Crop Oil Conc.	2 2 1	oz/A oz/A % v/v	91	100		X
Valor® FirstRate® Crop Oil Conc.	2 0.6 1	oz/A oz/A % v/v	84	100		X
Basis® 2,4-D Ester® Crop Oil Conc.	0.5 1 1	oz/A pt/A % v/v	99	Data not available	X	X

Product	Rate	Unit	Common chickweed	Purple deadnettle	Labeled for Application before[1]	
					Corn	Soybean
—	—	—	<------- % Control ------->		<------- % Control ------->	
Basis® Princep® 4L Crop Oil Conc.	0.33 1 1	oz/A qt/A % v/v	100	Data not available	X	
Express® Princep® 4L Crop Oil Conc.	0.33 1 1	oz/A qt/A % v/v	100	Data not available	X	
Basis® Princep® 4L Crop Oil Conc.	0.5 1 1	oz/A qt/A % v/v	100	Data not available	X	
Simazine® 90DF Crop Oil Conc.	1.1 1	lb/A qt/A	100	Data not available	X	
Simazine® 90DF Sterling® Crop Oil Conc.	1.1 8 1	lb/A fl oz/A qt/A	100	Data not available	X	

[1] Some of the herbicides listed can carry over in certain environmental conditions. Treatments with an "x" are either labeled for the crop or are within a 4 month rotation restriction. Please read the labels before use.

NEW 9/01