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using preemergence

**HERBICIDES**



PREEMERGENCE HERBICIDES ARE CHEMICALS APPLIED BEFORE EMERGENCE of the crop or weeds. The ones most commonly used are selective, that is, they can kill weeds without seriously injuring the crop. To control weeds most preemergence herbicides must be moved into the soil where they contact the very small weed seedlings. Most have little or no effect on the weed seed, but kill the very small seedling shortly after the seed germinates. Since most weed seeds that germinate are in the upper 2 inches of the soil, this is where the herbicide should be. Most pre-emergence herbicides are applied to the soil surface and moved into the upper 2-inch zone by rainfall.

Although it is a relatively new practice, the use of preemergence herbicides has increased rapidly. About 5 percent of the corn and soybean acreage in Illinois was treated in 1960 and five years later, in 1965, preemergence herbicides were used on a third of the acreage.

If you use preemergence herbicides, remember these safety rules:

- Use herbicides only on crops for which they are specifically approved and recommended.
- Use only recommended amounts. Applying too much herbicide may damage the crop, may be unsafe if the crop is to be used for food or feed, and is costly.
- Apply herbicides only at times specified on the label. Observe the recommended intervals between treatment and pasturing or harvesting of crops.
- Wear goggles, rubber gloves, and other protective clothing as recommended on the label.
- Guard against possible injury to nearby susceptible plants.
- Store herbicides in a safe place where children, unauthorized persons, and livestock do not have access to them.

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## **Who Should Use Preemergence Herbicides?**

Only those who have had or expect to have a relatively serious weed problem that cannot be controlled by cultivation or other practices should look to preemergence herbicides for help.

Don't use preemergence herbicides just to be fashionable. If you are hill dropping or drilling corn, as are most Illinois farmers, controlling weeds in the row — especially annual grasses — is sometimes difficult and preemergence herbicides can help. If having a large acreage of row crops makes timely cultivation on the entire acreage difficult, preemergence herbicides can help hold some of the weeds in check until you get there with the cultivator. If other jobs such as haymaking come at the same time as cultivation and you'd like more flexibility in your cultivation schedule, preemergence herbicides can help.

But remember that preemergence herbicides are relatively new. They do not always give satisfactory weed control. Some of them are irritating to the skin and eyes. Some may damage the crop to which they are applied. Some may leave residue in the soil to cause damage to subsequent crops. These are some of the risks involved in using them and anyone not willing to assume some risk should not plan to use them.

Some people are more sensitive to some herbicides than are others. A person who suspects or knows that he is particularly sensitive to certain herbicides should consider this when selecting herbicides.

Always store herbicides safely where children and livestock do not have access to them.

## **Are Preemergence Herbicides a Good Investment?**

Successful herbicide application to control a serious weed infestation can be a good investment. For example, research shows that 50 giant foxtail plants per foot in the corn or soybean row can reduce yields by approximately 25 to 30 percent. Most people are willing to invest \$5 per acre if more than the amount invested is returned in increased yields.

Most preemergence herbicides cost \$2 to \$5 per acre for band application. If you can achieve economical and satisfactory weed control without preemergence herbicides you probably would be wise to invest the money for other needs, such as fertilizer. Remember that in some years a preemergence herbicide may not give satisfactory weed control and you may not have a satisfactory return on your investment.

Preemergence herbicides are sometimes called "wet weather insurance." It's in the wet years when weeds grow best and cultivation may

be delayed that you really need help and that is when preemergence herbicides often work best. When it's dry for a few weeks after planting, the herbicide may not be very effective, but weeds are usually not as serious then and cultivation can be timely. If you could predict the weather, you wouldn't need to buy "preemergence insurance" in the dry years.

### ***Where Should Preemergence Herbicides Be Used?***

Use preemergence herbicides only where you expect a weed problem. If you had problem areas last year, chances are you can expect a problem there again this year. Treat only the problem areas and don't waste money where you don't have a problem.

Weeds such as giant foxtail are often most serious on field ends. Where this is the case, application can be made only on the ends at planting time or shortly after.

If your main problem is broad-leaved weeds in corn, you usually can obtain more economical control by using 30 to 50 cents worth of 2,4-D per acre as an early postemergence application. But preemergence herbicides are helpful for controlling annual grass weeds and some will control certain annual broad-leaved weeds. Preemergence herbicides often provide one of the best controls for both grass and broad-leaved weeds in soybeans.

### ***When Should Preemergence Herbicides Be Applied?***

They are most commonly applied through attachments on the planter as the crop is planted. Applying as the crop is planted not only saves an extra trip over the field, but makes certain the application is completed in case of rain. They may be applied within a few days after planting.

The point to remember is that most of them need to be applied soon enough for rain to move them into contact with the very young weed seedlings just after the weed seeds germinate. In moist soil the weed seeds usually germinate during the first week after planting.

Some herbicides with sufficient residual activity may be applied before planting. This would normally mean a more expensive broadcast application rather than banding. Treflan, which needs thorough incorporation in the soil, may be applied several weeks before planting. On research plots where Atrazine has been applied to the surface a few weeks prior to planting, the planting operation did not appear to disturb the performance of the herbicide, but control of some of the more

tolerant weeds was not quite as good. This was partially caused by the delay in shading from the corn.

In special cases some herbicides can be applied after the crop has emerged, but before the weeds emerge. Although a crop may tolerate some herbicides applied postemergence, it might be damaged by others.

Atrazine can be applied after planting until weeds are 1½ inches high. Although such applications are sometimes satisfactory, there is some risk that wet weather will prevent timely application. Weed control has been more erratic with postemergence applications of atrazine than with preemergence applications. Cultivation can often give more positive control of small weeds.

### **Should Spray or Granules Be Used?**

If the manufacturer makes both granular and liquid or wettable powder formulations, you can expect weed control to be approximately the same from either the dry or spray application. Although most herbicides are available as liquids or wettable powders, a few manufacturers have not perfected and do not sell granules.

The liquid or wettable powder forms of herbicides are applied as spray, using water as the carrier. Most herbicides are also available in dry granular form. The manufacturer mixes the active ingredient with granules, usually clay, and these merely serve as a carrier to allow uniform application of the herbicide.

There are advantages for both sprays and granules and the choice is mainly up to the individual.

#### Advantages of sprays:

- Cost approximately 20 percent less.
- More uniform application, especially if surface is uneven.
- Calibration sometimes is considered easier.
- Require less storage and handling.

#### Advantages of granules:

- Considered by many to be more convenient.
- Reduce but do not eliminate irritation to operators from certain herbicides.
- Do not require hauling water.
- Do not require spray pumps, hoses, and tanks.

Either form when applied in a band can result in a faster first cultivation, since shovels do not need to be set as close to the row.

## **How Are Preemergence Herbicides Applied?**

The spray or granules are most commonly applied through attachments behind the planter. Tanks may be mounted on the planter or tractor for spraying.

Most granular applicators apply a 14-inch band. Spray attachments are usually set to apply a 12- to 14-inch band. Some farmers use a narrower band to reduce costs. But if the band is too narrow, part of the advantage for allowing a faster first cultivation is lost.

A boom-type sprayer may be used after the crop is planted. Those who prefer fewer attachments on the planter may have another person spraying right after planting, but as a separate operation. Most booms have nozzles spaced 20 inches apart. For spraying a band over 40-inch rows, every other nozzle is plugged and the boom height is adjusted to give the desired band width. Since it is more difficult to center the spray over the row after planting, a 20-inch band is sometimes used.

Although it seems logical that a level surface is preferable, especially for application of granules, it is often difficult to see much improvement in weed control with the use of various leveling devices.

For additional information on application ask your county extension adviser for University of Illinois circulars 791, "Band Spraying Pre-emergence Herbicides," and 839, "Calibrating and Adjusting Granular Row Applicators."

## **How Much Water Do You Use for Spraying?**

Seven to 10 gallons of water per acre for banding or 20 to 30 gallons for broadcasting are suggested.

Adequate water is needed to give a uniform application and, in the case of wettable powders, to give a suitable suspension of the particles for spraying. Adequate water gives larger spray droplets that help prevent drift. This allows a higher percentage of the herbicide to be sprayed where it is intended and helps reduce, but does not eliminate, the irritation from some herbicides. Using more water than indicated would increase time and cost for hauling and is of no benefit.

The small amount of water in the spray mixture is of no significance for moving the herbicide into the soil to improve performance. To apply the equivalent of  $\frac{1}{2}$  inch of rain to move the herbicide into the soil would require about 13,500 gallons of water per acre.

## **Should Herbicides Be Worked Into the Soil?**

Research suggests that incorporation of most herbicides, especially the more soluble ones, may be detrimental.

A rather heavy rainfall following incorporation of a relatively soluble herbicide may move the herbicide too deep, past the zone where it can do the most good. Results usually are more satisfactory where the herbicide is applied to the soil surface and is moved into the soil by rainfall to give relatively even distribution in the soil.

Although incorporation of a herbicide with low solubility, such as Atrazine, has given results about equal to surface application for weed control, there is some evidence that incorporation has resulted in more Atrazine residue in the soil to cause possible damage to subsequent crops.

Unless the label specifically indicates that incorporation is necessary, as for Eptam and Treflan, it is usually best to make the application to the soil surface and to rely on rainfall to move the herbicide into the soil. Several types of devices or implements are being used for those that need incorporation. Although the harrow, rotary hoe, and disc may not always be ideal for incorporation, they usually are the most readily available. The type of incorporation and appropriate depth will vary for various herbicides.

Rotary tillers sometimes give fairly uniform and satisfactory mixing, but they are not always readily available. Watch for new developments.

### ***How Well Do Preemergence Herbicides Kill Weeds?***

Any one of the present preemergence herbicides does not kill all weed species. Some do a better job of controlling grasses than others, but do not give good control of broad-leaved weeds. For others the opposite is true. Most preemergence herbicides have little effect on perennials such as Canada thistle and Johnsongrass except for control of new plants sprouting from seed. One of the major exceptions is use of Atrazine for quackgrass control.

How well a specific herbicide performs depends on such factors as soil texture, organic matter content of the soil, rainfall, susceptibility of various weeds to the herbicide, depth at which the weed seeds germinate, accuracy of application, soil moisture, and soil and air temperature.

With so much variation in these factors, preemergence herbicides give satisfactory results only about 75 percent of the time.

### ***How Will Herbicides Perform More Consistently?***

There is a constant search for ways to improve the performance of preemergence herbicides. But the three most important things you can do are:



Select the herbicide that is likely to work best on your soil type.

Select the herbicide that is likely to give the best control of your weed problem without injuring the crop.

Apply the recommended rate accurately and uniformly.

### **How Do Soil Types Affect Herbicide Choice?**

Herbicides such as Atrazine perform best on soils low in organic matter and clay content, while others such as Randox perform best on soils relatively high in clay and organic matter. Part of the explanation for this is the solubility of the herbicide, as well as the capacity of the soil to hold the herbicide.

A relatively low rate of Atrazine can give satisfactory control on sandy soils low in organic matter. In such soils Atrazine is readily available for uptake by weed seedlings. On soils higher in clay and organic matter a higher rate of Atrazine is needed. But be sure not to exceed the recommended rate.

Some of the more soluble herbicides, such as 2,4-D and Randox, are not recommended for sandy soils low in organic matter because there is too much chance of rainfall leaching them too deeply, past the zone where weed seeds are germinating. With some, such as 2,4-D, there is also more chance of leaching down to the crop seed and causing injury to the young crop seedling.

When choosing a herbicide, select one that is likely to perform well on your soil type and apply at the rate recommended for your soil. See Table 1 on pages 14 and 15 for soil type recommendations.

### **How Do Weed Problems Affect Herbicide Choice?**

If annual grass weeds are the main problem, Randox and Ramrod will often give good control, but they do not do a good job of controlling many of the broad-leaved weeds. Randox may give some control of pigweed, and Ramrod may help control pigweed and lambs-quarter. (Ramrod is cleared for corn, but not for soybeans except those raised for seed as of 1965.) Supplementing these herbicides with an early postemergence application of 2,4-D is an economical and practical way to control many of the broadleaves in corn.

If the main problem is broad-leaved weeds such as annual morning-glory or cocklebur in corn, a postemergence application of 2,4-D should be quite effective and no preemergence would be needed.

If control of both annual grass and broad-leaved weeds is desired, then Atrazine, Randox-T, Knoxweed, and 2,4-D ester are possibilities for corn. Amiben, Alanap, and Lorox are possibilities for soybeans.



Amiben often does a good job of controlling many broad-leaved weeds, as well as grasses in soybeans, but annual morningglory is one of the more resistant. It can be controlled quite easily by using a post-emergence application of 2,4-D when the field is planted to corn.

Although Atrazine and Randox are quite effective on many weeds, they do not control Johnsongrass seedlings or wild cane. On the other hand, Eptam can control these weeds in corn and Treflan, Amiben, and Vernam can control them in soybeans.

The tables on pages 14 and 15 and on page 16 can help you select a herbicide on the basis of your weed problem.

### **How Necessary Are Accurate Applications?**

The old saying, "If a little is good, more is better," does not hold for herbicides. Applying too much herbicide may damage the crop or leave excessive herbicide residue in the soil to damage subsequent crops. Applying too little may mean poor weed control or none at all. If applications are not uniform, there may be some spots with poor weed control and some with crop damage.

When you apply a herbicide you are usually applying only a few pounds of active ingredient per acre. However, only a trifle can have a tremendous influence on reactions inside plants, so be certain that proper amounts are accurately applied.

### **Will Preemergence Herbicides Damage Crops?**

Some do not, others might. It is desirable to have herbicides that are selective enough to kill weeds without damaging the crop. Atrazine is a good example. The commonly raised corn hybrids have such good tolerance to Atrazine that there is very little chance of injuring corn with Atrazine. Corn is also quite tolerant of Randox, but occasionally Randox-T may injure corn seedlings and cause some onion-leafing and leaning of corn. 2,4-D also may occasionally cause twisting and abnormalities of corn seedlings. For preemergence application of 2,4-D use only the ester form and not the amine form since the amine form is more soluble, more subject to leaching, and therefore more likely to injure corn.

Soybeans have good tolerance to Randox. Although Amiben is one of the best preemergence herbicides for weed control, it may occasionally cause stunting of soybeans and abnormal root systems. Alanap sometimes stunts beans and causes abnormal root growth. Treflan and Vernam may sometimes reduce the stand of beans, cause some swelling of the primary root near the crown of the plant, and cause a reduction in the number of secondary roots.

Damage rarely occurs with some herbicides. But under certain soil and climatic conditions damage may be serious. Often herbicide damage is hardly noticeable and it's questionable if a little early season damage has much effect on final yield, especially in soybeans.

In some cases a farmer will need to decide if he prefers to risk yield reduction from weeds or possible crop damage from a herbicide. For example, Eptam is not recommended for corn in most areas because of possible injury. But where there is a serious Johnsongrass or wild cane problem, any possible damage to corn from Eptam is usually insignificant compared with the damage from the weeds.

Some herbicides have a very narrow range of selectivity. That is, applying 1½ or 2 times the recommended amount may cause serious injury, so accurate application is extremely important.

Until more selective herbicides are available, the possibility of crop damage is one risk that those using some preemergence herbicides should be willing to assume.

### ***Will Herbicide Residues Be Left in the Soil?***

Herbicides remain in the soil for various lengths of time. Soil microorganisms and reactions in the soil and plants help to break down herbicides. Moisture, temperature, light, tillage, and aeration are some of the factors influencing the rate of break down. The herbicide should last long enough to give weed control for several weeks, but it should not remain to damage subsequent crops.

Most preemergence herbicides such as Randox, 2,4-D, and Alanap usually remain for less than 2 months and do not present a residue problem. Amiben lasts a little longer and may give weed control most of the growing season. Research and observations on farmers' fields do not indicate any serious problem for fall-seeded wheat or other crops following soybeans treated with Amiben as long as excessive amounts are not applied. Similar tests with Lorox suggest that wheat can follow soybeans treated with Lorox. More research is needed on persistence of Treflan in the soil.

The major residue problems have been with Atrazine and to a lesser extent with Randox-T. The T part (TCBC) of Randox-T sometimes carries over and causes damage to vegetable crops or soybeans the following year. Injury to soybeans from Randox-T appears as stunted plants with leaf buds that do not open normally at the top, and as cupped and crinkled leaves, but there is no noticeable change in color of the leaves. Why Randox-T injury occurs in some cases and not in others is often difficult to explain.

Such injury may not necessarily reduce yields. In tests at DeKalb where up to three times the recommended rate of Randox-T was applied to corn one year, symptoms were evident on soybeans early the next season, but soybean yields were not reduced.

Atrazine applied to corn sometimes remains long enough to damage other crops such as small grain and soybeans the following season. Stand reductions, especially in small grains, have sometimes been severe enough to reduce yields. Soybean roots may begin growing normally, but as Atrazine is taken up soybean leaves may turn brown and the tops may die back. Small grain damaged by Atrazine may grow a few inches and then die.

Although Atrazine is one of the best preemergence herbicides for corn, as far as corn tolerance and weed control are concerned, the possibility of soil residue problems calls for certain precautions:

- Apply no more than the recommended rate for the soil type.
- Provide adequate agitation of the wettable powder in the spray tank and apply uniformly.
- Apply in bands rather than broadcast to reduce the total amount of Atrazine per acre.
- Rotate herbicides and do not use Atrazine continuously.
- Where Atrazine is used, plant the field to corn again the following year with no additional Atrazine before raising small grain or soybeans.
- Shut off the applicator when turning on field ends and avoid overlapping, doubling applications on ends, and spilling.
- Adequate tillage, such as plowing before planting soybeans or small grain, appears to be helpful.
- Do not use any formulations except those specifically approved by the basic manufacturer with label clearance for corn.

Even though these precautions are taken, under certain soil and climatic conditions a problem with soil residue may occur.

### ***How Soon Should a Rotary Hoe or Row Cultivator Be Used?***

As long as the preemergence herbicide is controlling weeds adequately, there is no need to rush cultivation of the treated area. However, if it has been dry for approximately 1½ to 2 weeks after application, or if for some other reason the herbicide is not effective, it is best to use the rotary hoe or cultivator soon enough to control weeds. If one of the more soluble herbicides, such as Randox or 2,4-D, is not effective within 2 weeks after application, it probably will not be effec-

tive later and it's best to control the weeds while small with cultivation.

When a herbicide of fairly low solubility, such as Atrazine, is not effective during the first 2 weeks, rotary hoeing can help to control the first weeds. Sufficient herbicide may remain to become activated and to help control later weeds.

Where Atrazine is used weeds sometimes emerge and then die soon afterward. In dry weather if it looks as if your preemergence herbicide is not working, don't hesitate to cultivate.

Control from a band application allows a faster first cultivation since cultivator shovels do not need to be set as close to the row. It also may allow some delay of the first cultivation. But don't wait too long before cultivating the centers between the rows. If control is adequate in the row there is no need for close cultivation; but, don't hesitate to disturb the band and throw soil into the row if weeds start growing and need smothering.

### ***Can Broadcasting Herbicides Eliminate Row Cultivation?***

Some herbicides may persist long enough to provide season-long weed control in some situations.

Several studies with corn have shown that on the majority of Illinois soils, under most climatic conditions, there is usually little or no benefit from cultivation other than for weed control. This is especially true on the darker soils with moderate amounts of organic matter and good structure. At the present time a broadcast application of Atrazine and elimination of all cultivations is not considered wise in most cases because: (1) broadcast application may increase the soil residue problem; (2) any one herbicide does not control all weed species; and (3) preemergence applications are not always effective.

As herbicides with proper persistence in the soil are developed to obtain more consistent control of additional weed species, herbicides may replace still more tillage. For the present, one or two cultivations are usually considered helpful.

More research is needed to determine the feasibility of replacing cultivation with herbicides for soybeans.

### ***Can You Mix Herbicides?***

Mixing reduced rates of more than one herbicide offers possibilities for increasing consistency of performance under a wider variety of soil and weather conditions, controlling more weed species, and reducing herbicide residue problems. Although preliminary research results are

encouraging, more research is needed and several problems need to be resolved.

There are many possible herbicide combinations. Some may give results better than an individual herbicide alone. However, some will not give effective weed control and some may increase the chance of crop injury. Watch for new developments.

### ***Can You Mix Herbicides With Other Chemicals?***

Because most soil insecticides are applied in a narrow band in the soil, while most preemergence herbicides are applied in a wider band on the soil surface, the difference in physical placement makes a mixture of these chemicals impractical.

When insecticides for surface application or herbicides that can be incorporated are developed, additional research will be needed to determine the feasibility of such mixtures. A problem that would need to be resolved would be selection of an appropriate band width for both chemicals.

Because most preemergence herbicides are applied to the soil surface and phosphorous and potassium are usually placed in the soil, mixing a herbicide with a fertilizer containing these elements would not be very practical. The primary consideration for fertilizer-herbicide mixtures would be to use non-pressure liquid nitrogen as a carrier instead of water. Research with nitrogen solution as a carrier for Atrazine has shown no significant advantage in weed control when compared with water as a carrier. Results with both carriers have been about the same.

### ***What Preemergence Herbicides Should You Use?***

The table on pages 14 and 15 can help guide your selection of preemergence herbicides. Ask your county extension adviser for the most recent supplemental information on herbicides and control of specific weed problems.

**Table 1. — Selection Chart for Preemergence Herbicides**

Herbicide	Crop clearance for corn and soybeans	Soil considerations	Weeds controlled	Crop tolerance	Persistence in soil	Handling information and precautions
<b>Atrazine</b>	Corn	Performs best on light-colored soils low in clay and organic matter. Adjust rate for soil type.	Annual grasses and broadleaves. Poor on crabgrass and panics, and sometimes weak on foxtail under unfavorable conditions.	Excellent	May damage subsequent crops such as small grain or soybeans.	Available only as wettable powder.
<b>Randox</b>	Corn and soybeans	Performs best on soils relatively high in clay and organic matter. Do not use on sandy soils.	Primarily annual grasses.	Very good	4 to 6 weeks.	Granules preferred over liquid to reduce irritation.
<b>Ramrod</b>	Corn Soybeans used for seed	More satisfactory than Randox on light-colored soils low in organic matter. Performs well on dark-colored soil.	Good control of annual grasses, pigweed, and lambsquarters.	Good	6 to 8 weeks. No apparent problem.	Available as wettable powder and granules. Less irritating than Randox.
<b>Randox-T</b>	Corn	Performs best on soils relatively high in clay and organic matter. Do not use on sandy soil.	Annual grasses and fair on broadleaves.	Fair	T part may injure vegetable crops or soybeans the following year.	Granules preferred over liquid to reduce irritation.
<b>2,4-D ester</b>	Corn	Do not use on sandy soils.	Fair on annual grasses. Fair to good on broadleaves.	Fair	4 to 6 weeks.	Both granules and liquid available. Do not use near susceptible desirable plants. Do not use amine form of 2,4-D for preemergence.
<b>Knoxweed</b>	Corn	Does not need incorporation.	Annual grasses and broadleaves.	Fair	4 to 6 weeks.	Available as liquid and granules.

Table 1. — Continued

Herbicide	Crop clearance for corn and soybeans	Soil considerations	Weeds controlled	Crop tolerance	Persistence in soil	Handling information and precautions
<b>Eptam</b>	Corn	Needs incorporation.	Good to control wild cane and Johnsongrass from seed.	Fair	6 to 8 weeks.	Available as liquid and granules.
<b>Amiben</b>	Soybeans	3-pound rate gives better weed control than 2 pounds.	Annual grasses and broadleaves.	Good, but occasional injury	8 to 12 weeks.	Both liquid and granules easy to handle.
	Corn			Poor		
<b>Alanap</b>	Soybeans	Do not use on sandy soils.	Annual grasses and broadleaves. Mixture with CIPC available to improve smartweed control.	Fair	4 to 6 weeks.	Both liquid and granules easy to handle.
<b>Treflan</b>	Soybeans	Adjust rate for soil type. Must be thoroughly incorporated.	Very good control of annual grasses, Johnsongrass from seed, and wild cane. Good on lambsquarter and pigweed, but poor on most other broadleaves commonly found in soybeans.	Fair	8 to 12 weeks.	Yellow dye stains skin and clothes. Usually applied before planting.
<b>Lorox</b>	Soybeans	Adjust rate for soil type.	Grasses and broadleaves. Better than most on velvetleaf.	Fair	6 to 8 weeks.	Available only as wettable powder.
	Corn			Poor		



Table 2. — Control of Major Weed Species With Herbicides

(This chart gives a general comparative rating. Under unfavorable conditions some herbicides rated good or fair may give erratic or unfavorable results. Under very favorable conditions control may be better than indicated. In these tables G = good, F = fair or variable, and P = poor.)

	Control for Soybeans											
	PREEMERGENCE	Amiben	Randox	Alanap	Alanap + CIPC	Sodium PCP	Lorox	Treflan	Ramrod	CIPC	Vernam	POSTEMERGENCE 4-(2,4-DB)
<b>Grasses</b>												
Giant foxtail	G	G	G	G	F	G	G	G	G	G	G	P
Green foxtail	G	G	G	G	F	G	G	G	G	G	G	P
Yellow foxtail	G	G	G	G	F	G	G	G	G	G	G	P
Barnyard grass	G	G	F	F	F	G	G	G	G	G	G	P
Crabgrass	G	G	G	G	F	G	G	G	G	G	G	P
Johnsongrass from seed	F	P	P	P	P	F	G	P	F	F	F	P
Wild cane	F	P	F	F	P	F	G	P	F	F	F	P
<b>Broadleaves</b>												
Cocklebur	F	P	F	F	F	F	P	F	F	P	P	G
Jimsonweed	F	P	F	F	F	G	P	P	F	P	P	P
Lambsquarter	G	F	F	F	G	G	G	G	F	G	G	P
Annual morningglory	P	P	P	F	F	P	F	P	F	F	F	F
Pigweed	G	G	G	G	G	G	G	G	F	G	G	P
Ragweed	G	F	G	G	G	G	P	F	P	F	F	F
Smartweed	G	P	P	G	G	G	F	P	G	P	P	P
Velvetleaf	F	P	F	F	F	G	P	P	F	P	P	P
Soybean tolerance	F	G	F	F	F	F	F	G	F	F	F	F

	Control for Corn								
	PREEMERGENCE	Atrazine	Ramrod	Randox	Randox-T	2,4-D ester	Eptam	Knoxweed	POSTEMERGENCE 2,4-D
<b>Grasses</b>									
Giant foxtail	F	G	G	G	G	F	G	G	P
Green foxtail	G	G	G	G	G	F	G	G	P
Yellow foxtail	G	G	G	G	G	F	G	G	P
Barnyard grass	G	G	G	G	G	F	G	G	P
Crabgrass	F	G	G	G	G	F	G	F	P
Panicum	F	G	G	G	G	F	G	F	P
Johnsongrass from seed	P	P	P	P	P	P	G	F	P
Wild cane	P	P	P	P	P	P	G	F	P
Yellow nutsedge	F	F	P	P	P	P	F	F	P
<b>Broadleaves</b>									
Cocklebur	F	F	P	F	F	F	P	F	G
Jimsonweed	F	P	P	F	F	F	P	F	F
Lambsquarter	G	G	F	G	G	G	G	G	G
Annual morningglory	F	P	P	F	F	F	P	F	G
Pigweed	G	G	G	G	G	G	G	G	G
Ragweed	G	F	F	G	G	G	F	F	G
Smartweed	G	P	P	F	F	F	P	F	F
Velvetleaf	F	P	P	F	F	F	F	F	F
Corn tolerance	G	G	G	F	F	F	F	F	G