1987 Row Crop Weed Control Guide

This guide is based on the results of research conducted by the University of Illinois Agricultural Experiment Station, other experiment stations, and the United States Department of Agriculture (USDA). Consideration has been given to the soils, crops, and weed problems of Illinois.

The effectiveness of herbicides is influenced by rainfall, soil factors, weed spectrum, method of application, and formulation. Under certain conditions, some herbicides may damage the crop to which they are applied. In some cases, herbicide residues in the soil may damage crops that are grown later; and some herbicides may move outside the target area, affecting desirable plants.

Precautions

When selecting a herbicide, consider both the risk involved in using the herbicide and the yield losses caused by weeds. You can reduce risks by taking the following precautions:

- Apply herbicides only to those crops for which use has been approved.
- Clean tanks thoroughly when changing herbicides, especially when using a postemergence herbicide. Use a 1-percent ammonia wash to clean out traces of 2,4-D or dicamba from the tank before spraying soybeans. Note that some herbicide labels provide cleaning suggestions.
- Correctly calibrate the sprayer and check the nozzle output and adjustment before adding herbicide to a tank.
- Use recommended rates. Applying too much herbicide is costly and, in addition, may damage crops and cause illegal residues. Using too little herbicide can result in poor weed control.
- Apply herbicides only at times specified on the label. Observe the recommended intervals between treatment and pasturing or harvesting of crops, as well as recommended intervals between application and subsequent planting of crops.
- Wear goggles, rubber gloves, and other protective clothing as suggested by the label.
- Guard against drift injury to nearby susceptible plants, such as ornamentals and vegetables, as well as agronomic crops. Mist or vapors from 2,4-D and dicamba sprays may drift several hundred yards. Whenever possible, operate sprayers at low pressure with tips that deliver large droplets. Spray only on calm days or make sure that the wind is not moving toward susceptible crop plants and ornamentals. Use special precaution with Command.
- Apply herbicides only when all animals and persons not directly involved in the application have been removed from the area. Avoid unnecessary exposure.
- Check the label for the proper method of container disposal. Triple rinse, puncture, and haul metal containers to an approved sanitary landfill. Haul paper containers to a sanitary landfill or burn them in an approved manner.
- Promptly return unused herbicides to a safe storage place. Store them in the original containers away from unauthorized persons, particularly children.
- Because formulations and labels are sometimes changed and government regulations modified, always refer to the most recent product label.

This guide has been developed to help you use herbicides as effectively and safely as possible. Because no guide can remove all the risk involved, however, the University of Illinois and its employees assume no responsibility for the results of using herbicides, even if they have been used according to the suggestions,

recommendations, or directions of the manufacturer or any governmental agency.

Cultural and mechanical control

Good cultural practices that aid in weed control include adequate seedbed preparation, adequate fertilization, crop rotation, planting on the proper date, use of the optimum row width, and seeding at the rate required for optimum stands.

Planting in relatively warm soil helps crops compete better with weeds. Good weed control during the first 3 to 5 weeks is extremely important for both corn and soybeans. If weed control is adequate during that period, corn and soybeans will usually compete quite well with most of the weeds that begin growing later.

Narrow rows will shade the centers faster and help the crop compete better with the weeds. If herbicides alone cannot give adequate weed control, however, then keep rows wide enough to allow for cultivation. Some of the newer herbicides are improving the chances of achieving adequate control without cultivation.

If a preemergence or preplant herbicide does not appear to be controlling weeds adequately, use the rotary hoe while weeds are still small enough to be controlled.

Use the rotary hoe after weed seeds have germinated but before most weeds have emerged. Operate it at 8 to 12 miles per hour and weight it enough to stir the soil and kill the tiny weeds. Rotary hoeing also aids crop emergence if the soil is crusted.

Row cultivators also should be used while weeds are small. Throwing soil into the row can help smother small weeds. Cultivate shallowly to prevent injury to crop roots.

Herbicides can provide a convenient and economical means of early weed control and allow for delayed and faster cultivation. Furthermore, unless the soil is crusted, it may not be necessary to cultivate some fields at all if herbicides are controlling weeds adequately.

Herbicide incorporation

Soil-applied herbicides are incorporated to minimize surface loss, reduce dependence upon rainfall, and provide appropriate placement of the herbicide. Herbicides such as Sutan+ and Eradicane are incorporated soon after application to minimize surface loss from volatilization. Treflan and Sonalan are incorporated within a few hours to minimize loss due to photodecomposition and volatilization. Triazine herbicides such as atrazine and Bladex and acetamide herbicides such as Lasso and Dual may be incorporated to minimize dependence upon timely rainfall; but because these herbicides are not lost as quickly from the soil surface, the timing of incorporation is less critical.

Incorporation should place the herbicide uniformly throughout the top 1 or 2 inches of soil for best control of small-seeded annual weeds that germinate at shallow depths. Slightly deeper placement may improve the control of certain weeds from deep-germinating seed under relatively dry conditions. Incorporating too deeply, however, tends to dilute the herbicide and may reduce the effectiveness. The field cultivator and tandem disk place most of the herbicide at about one-half the depth of operation. Thus for most herbicides, the suggested depth of operation is 3 to 4 inches.

Thorough incorporation with ground-driven implements requires two passes. Single-pass incorporation can result in streaked weed control, especially in moist soils. Single-pass incorporation may be adequate with some herbicides that tend to move laterally in the soil. It may also be adequate with some equipment, especially if rotary hoeing, cultivation, or subsequent herbicide treatments are used to improve weed control. If the first pass sufficiently covers the herbicide to prevent surface loss, the second pass can be delayed until immediately before planting.

The depth and thoroughness of incorporation depend upon the type of equipment used, the depth and speed of operation, the texture of the soil, and the amount of soil moisture. Field cultivators and tandem disks are commonly used for incorporation; however, disk-chisels and other combination tools are being used in some areas.

Field cultivators

Field cultivators are frequently used for herbicide incorporation. They should have three or more rows of shanks with an effective shank spacing of no more than 8 to 9 inches (a spacing of 24 to 27 inches on each of three rows). The shanks can be equipped with points or sweeps. Sweeps usually give better incorporation, especially when soil conditions are a little too wet or dry for optimum soil flow and mixing. Sweeps for "C" shank cultivators should be at least as wide as the effective shank spacing.

The recommended operating depth for the field cultivator is 3 to 4 inches. It is usually sufficient to operate the field cultivator only deep enough to remove tractor tire depressions. The ground speed should be at least 6 miles per hour. The field cultivator must be operated in a level position so that the back shanks are not operating in untreated soil, which would result in streaked weed control. Two passes are recommended to obtain uniform weed control. If single-pass incorporation is preferred, the use of wider sweeps or narrower spacing with a 3- to 5-bar harrow or rolling baskets pulled behind will increase the probability of obtaining adequate weed control.

Tandem disks

Tandem disk harrows invert the soil and usually place the herbicide deeper in the soil than most other incorporation tools. Tandem disks used for herbicide

incorporation should have disk blade diameters of 20 inches or less and blade spacings of 7 to 9 inches. Larger disks are considered primary tillage tools and should not be used for incorporating herbicides. Spherical disk blades give better herbicide mixing than do conical disk blades.

Tandem disks usually place most of the herbicide in the top 50 to 60 percent of the operating depth. For most herbicides, the suggested operating depth is from 3 to 4 inches. Two passes are recommended to obtain uniform mixing with a double disk. A leveling device (harrow or rolling baskets) should be used behind the disk to obtain proper mixing. Recommended ground speeds are usually between 4 and 6 miles per hour. The speed should be sufficient to move the soil the full width of the blade spacing. Lower speeds can result in herbicide streaking.

Combination tools

Several new tillage tools combine disk gangs, field cultivator shanks, and leveling devices. Many of these combination tools can handle large amounts of surface residue without clogging and yet leave considerable crop residue on the soil surface for erosion control. Results indicate that these combination tools may provide more uniform one-pass incorporation than does a disk or field cultivator, but one pass with them is generally no better than two passes with the disk or field cultivator.

Chemical weed control

Plan your weed-control program to fit your soils, tillage program, crops, weed problems, and farming operations. Good herbicide performance depends on the weather and on wise selection and application. Your decisions about herbicide use should be based on the nature and seriousness of your weed problems. The herbicide selectivity tables at the end of this guide indicate the susceptibility of our most common weed species to herbicides.

Corn or soybeans may occasionally be injured by some of the herbicides registered for use on those crops. To reduce injury to crops, apply the herbicide uniformly, at the time specified on the label, and at the correct rate. (See the section entitled "Herbicide rates.") Crop tolerance ratings for various herbicides are also given in the tables at the end of this guide. Unfavorable conditions such as cool, wet weather, delayed crop emergence, deep planting, seedling diseases, soil in poor physical condition, and poor-quality seed may contribute to crop stress and herbicide injury. Hybrids and varieties also vary in their tolerance to herbicides and environmental stress factors. Once injured by a herbicide, plants are prone to disease.

Crop planting intentions for next season must also be considered. Where atrazine or simazine is used, you should not plant spring-seeded small grains, small-seeded legumes and grasses, or vegetables the following year. Be sure that the application of Treflan or similar herbicides for soybeans is uniform and sufficiently early to reduce the risk of injury to wheat or corn following soybeans. Note that certain cropping restrictions apply for Command, Scepter, Classic, Preview, and Lorox Plus. Refer to the herbicide label for information about cropping sequence and appropriate intervals to allow between different crops.

Names of some herbicides

Trade	Common (generic)
AAtrex, Atrazine	atrazine
Amiben	chloramben
Banvel	dicamba
Basagran	bentazon
Bicep	metolachlor plus atrazine
Bladex	cyanazine
Blazer, Tackle	acifluorfen
Bronco	alachlor plus glyphosate
Buctril, Brominal	bromoxynil
Butoxone, Butyrac	2,4-DB
Classic	chlorimuron ethyl
Command	FMC 57020
Conquest	cyanazine plus atrazine
Dowpon M	dalapon
Dual	metolachlor
Eradicane	EPTC plus safener
Eradicane Extra	EPTC plus safener and extender
Evik	ametryn
Extrazine	cyanazine plus atrazine
Furloe Chloro IPC	chlorpropham
Fusilade 2000	fluazifop
Gramoxone	paraquat
Hoelon	diclofop
Laddok	bentazon plus atrazine
Lasso	alachlor
Lorox, Linex	linuron
Lorox Plus	chlorimuron ethyl plus linuron
Marksman	dicamba plus atrazine
Modown	bifenox
Poast	sethoxydim
Preview	chlorimuron ethyl plus metribuzin
Princep, Simazine, Caliber 90	simazine
Prowl	pendimethalin
Ramrod	propachlor
Rescue	naptalam plus 2,4-DB
Reward	vernolate plus extender
Roundup	glyphosate
Scepter	imazaguin
Sencor, Lexone	metribuzin
(several)	2,4-D
Sonalan	ethalfluralin
Surflan	oryzalin

Sutan+, Genate Plus ..... butylate plus safener
Sutazine, Rhino ..... butylate plus atrazine
Tandem ..... tridiphane
Treflan ..... trifluralin
Turbo ..... metribuzin plus metolachlor
Vernam ..... vernolate

Some herbicides have different formulations and concentrations under the same trade name. *No endorsement of any trade name is implied, nor is discrimination against similar products intended.*

Herbicide combinations

Herbicides are often combined to control more weed species, reduce carryover, or reduce crop injury. Some combinations are sold as a "package mix," while others are tank-mixed. Tank-mixing allows you to adjust the ratio to fit local weed and soil conditions. If you use a tank-mix, you must follow restrictions on all products used in the combination.

Problems sometimes occur when mixing emulsifiable concentrate (EC) formulations with wettable powder (WP), water-dispersible liquid (WDL), or water-dispersible granule (WDG) formulations. These problems can sometimes be prevented by using proper mixing procedures. Fill tanks at least one-third full with water or liquid fertilizer before adding herbicides that are suspended. If using liquid fertilizers, check compatibility in a small lot before mixing a tankful. The addition of compatibility agents may be necessary. Wettable powders, WDGs, or WDLs should be added to the tank and thoroughly mixed before adding ECs. Emulsify ECs by mixing with equal volumes of water before adding them to the tank. Empty and clean spray tanks often enough to prevent accumulation of material on the sides and the bottom of the tank.

The user can apply two treatments of the same herbicide (split application) or use two different herbicides, provided such uses are registered. The use of one herbicide after another is referred to as a sequential or overlay treatment. Sequential treatment can be done in a number of ways. For example, a preplant application may be followed by a preemergence application, or a soil-applied treatment may be followed by a postemergence treatment. One herbicide may be broadcast, while the other is banded or directed.

Herbicide rates

Herbicide rates vary according to the time of application, soil conditions, the tillage system used, and the seriousness of the weed infestation. Sometimes lower rates are specified for preemergence application than for preplant incorporated application. Postemergence rates may be lower than preemergence rates if the herbicides can be applied at either time. Postemergence rates often vary depending upon the size and species of the weeds and whether or not an adjuvant is specified. Rates for combinations are usually lower than rates for herbicides used alone.

The rates for soil-applied herbicides usually vary with the texture of the soil and the amount of organic matter the soil contains. For instance, light-colored, medium-textured soils with little organic matter require relatively lower rates of most herbicides than do dark-colored, fine-textured soils with medium to high organic-matter content. For sandy soils the herbicide label may specify "do not use," "use a reduced rate," or "use a postemergence rather than soil-applied herbicide," depending on the herbicide and its adaptation and on crop tolerance.

The rates given in this guide are, unless otherwise specified, broadcast rates for the amount of formulated product. If you plan to band or direct herbicides, adjust the amount per crop acre according to the percentage of the area actually treated. Many herbicides have several formulations with different concentrations of active ingredient. Be sure to read the label and make the necessary adjustments when changing formulations.

Postemergence herbicide principles

Postemergence herbicides applied to growing weeds generally have foliar rather than soil action; however, some may have both. The rates and timing of applications are based on weed size and climatic conditions. Weeds can usually be controlled with a lower application rate when they are small and tender. Larger weeds often require a higher herbicide rate or the addition of a spray additive, especially if the weeds have developed under droughty conditions. Herbicide penetration and action are usually greater when the temperature and relative humidity are high. Rainfall occurring too soon after application (1 to 8 hours, depending on the herbicide) can cause poor weed control.

Translocated herbicides can be effective with partial foliar coverage, whereas contact herbicides require more complete coverage. Foliar coverage increases as water volume and spray pressure are increased. Spray nozzles that produce small droplets also improve coverage. For contact herbicides, 20 to 40 gallons of water per acre are often recommended for ground application and a minimum of 5 gallons per acre for aerial application. Spray pressures of 30 to 50 psi are often suggested with flat-fan or hollow-cone nozzles to produce small droplets and improve canopy penetration. These small droplets are quite subject to drift.

The use of an adjuvant such as a surfactant, crop-oil concentrate, or fertilizer solution may be recommended to improve spray coverage and herbicide uptake. These spray additives will usually improve weed control but may increase crop injury. Spray

additives may be needed, especially under droughty conditions or on larger weeds.

Crop size limitations may be specified on the label to minimize crop injury and maximize weed control. If weeds are smaller than the crop, basal-directed sprays may minimize crop injury because they place more herbicide on the weeds than on the crop. If the weeds are taller than the crop, rope-wick applicators or recirculating sprayers can be used to place the herbicide on the top of the weeds and minimize contact with the crop. Follow the label directions and precautions for each herbicide.

Conservation tillage and weed control

Conservation tillage refers to tillage methods that provide efficient crop production along with adequate control of soil erosion caused by wind and water. Erosion is controlled by protecting the soil surface with plant residue. The amount of tillage is less than that used in conventional moldboard plowing. Chisel plowing, ridge tilling, or no tillage can be used; several other systems are also available.

With reduced tillage systems, there is often a greater reliance upon herbicides for weed control. With these systems, herbicides cannot be incorporated without covering much of the residue that is necessary for effective erosion control. The early application of preplant, preemergence, and postemergence herbicides is an alternative to incorporation.

Early preplant herbicides may be applied several weeks before planting. Early application may reduce the need for a contact herbicide at planting. However, early preplant application may require additional herbicides (preemergence or postemergence) or cultivation for satisfactory weed control.

Compared with preplant incorporated herbicides, preemergence herbicides require less tillage, but their performance is more dependent upon timely rainfall. Preemergence herbicides, however, have performed better than herbicides that are poorly incorporated. With conservation tillage, a higher application rate of surface-applied herbicides may be required for satisfactory weed control, especially in fields with considerable weed infestation or crop residue. Do not, however, use a higher rate than that stated on the label. Use great care when selecting herbicides and choosing application rates.

The use of effective postemergence herbicides, which depend upon foliar rather than soil action, may be a logical choice with some conservation tillage systems.

No-till and double-crop

Corn, sorghum, and soybeans can be planted without seedbed preparation, either in last year's crop residue (no-till) or as a second crop after a small-grain harvest or forage removal (double-crop). Because it conserves soil, soil moisture, and time, no-till planting has greatly improved the probability of success with double-cropping.

Several precautions should be observed in no-till cropping systems. Crop seed should be planted to the proper depth and adequately covered to avoid possible contact with herbicide sprays. (Several herbicide labels give the planting depths that are necessary to avoid possible injury.) Preemergence applications may give better weed control than preplant applications because the planting process may expose untreated soil that contains viable weed seed. The total reliance on chemical weed control and the large amounts of crop residue present under no-till cropping systems may require that the higher labeled herbicide rates be used to obtain acceptable weed control.

Control of existing vegetation in reduced tillage programs

Existing vegetation may be a perennial grass sod, a legume or legume-grass sod, an annual cover crop, or weeds. Perennial legume sods can often be controlled prior to planting corn or sorghum by preplant applications of 2,4-D or Banvel. Applications in the fall or relatively early in the spring may help to reduce risk of injury to the crop. Perennial grass sods can sometimes be controlled with preplant applications of Roundup. If a cutting of forages such as alfalfa or clover is removed before no-till planting, control of sod may be poor if herbicides are applied before there is sufficient regrowth.

Existing vegetation that consists of small annual weeds less than 2 inches tall may not require the use of Gramoxone or Roundup as a knockdown herbicide. Residual herbicides that also have postemergence activity may often control existing vegetation. Bladex, atrazine, Sencor or Lexone, and Lorox or Linex have both preemergence and postemergence activity. Also, postemergence herbicides can often be used to control existing vegetation. Poast is labeled to control existing grass weeds before planting soybeans.

Early preplant application of labeled residual herbicides can often prevent vegetation from being a problem before planting. The earlier that applications are made before planting, the shorter the length of control after planting. To strengthen or lengthen control, an additional application of the same or another herbicide at planting can be considered.

Gramoxone (1½ to 2½ pints per acre) plus a *nonionic* surfactant can be used to "knock down" existing foliage before crop emergence. Smartweed, giant ragweed, and fall panicum may not be controlled if they are more than 4 to 6 inches high. A minimum of 40 gallons or more of spray per acre is suggested to ensure adequate coverage of the foliage. Gramoxone can be applied with certain liquid fertilizers. *Do not apply* with suspension or high-phosphate liquid fertilizers. *Gramoxone is a restricted-use pesticide.*

Roundup (3 to 8 pints per acre) is another alternative for control of existing vegetation before crop emergence in situations where fall panicum, smartweed, or certain

perennial weeds are a problem. Roundup can translocate to the roots to give better control of perennials. Use 10 to 40 gallons of spray volume per acre. Roundup plus 2,4-D can be used in some situations to improve broadleaf control.

For control of small annual weeds, Roundup can be used at a rate of 12 to 16 ounces per acre plus 0.5-percent nonionic surfactant in 5 to 10 gallons of spray solution per acre. Do not mix the Microtech formulation of Lasso with Roundup.

Bronco is a formulated mixture of glyphosate (Roundup) plus alachlor (Lasso). Application rates are 4 to 5 quarts per acre. Bronco may be applied in 10 to 30 gallons of water or in 10 to 50 gallons of 28-percent or 32-percent liquid nitrogen solutions. Applications with a nitrogen solution should be made only for control of annual weeds that are less than 6 inches tall.

Roundup, Gramoxone, and Bronco are registered for use in combination with the preemergence herbicides indicated in Table 1. See the sections entitled "Herbicides for corn" and "Herbicides for soybeans" for more information about these products.

For control of broadleaf weeds in no-till programs for soybeans, 2,4-D may be used prior to 30 days before planting, with Surflan or Poast for grass control.

Herbicides for corn

Herbicides mentioned in this section are registered for use on field corn and also on silage corn unless otherwise specified. See Table 2 for registered combinations. Herbicide suggestions for sweet corn and popcorn may be found in Circular 907, *1987 Weed Management Guide for Commercial Vegetable Growers.* Growers producing hybrid seed corn should check with the contracting company or inbred-seed producer about tolerance of the parent lines.

Preplant not incorporated

Interest in early preplant application is increasing, especially with the trend toward reduced tillage. Bladex and atrazine have postemergence as well as residual activity. Early weeds such as smartweed can be controlled while they are small, and emergence of other weeds can be curtailed.

With **AAtrex, Dual, or Bicep**, preplant surface application may be made using a two-thirds rate as long as 45 days before planting, followed by a one-third rate at planting. A single application can be made within 30 days before planting.

Bladex may be applied early preplant at labeled rates, but if applied earlier than 15 days before planting, a split application or use of another herbicide at or after planting is suggested. Banvel or 2,4-D is labeled in mixture with Bladex, Bladex plus atrazine, and Bicep for corn with minimum or no tillage.

Banvel (dicamba) can be used as a preplant herbicide before planting corn or sorghum. The rate is 1 to 2 pints per acre. It is suggested that you delay planting corn 1 week and sorghum 1 to 2 weeks after application.

Roundup can be used preplant to corn or sorghum at ¾ to 1 pint (12 to 16 fluid ounces) per acre to control small annual weeds. Use 5 to 10 gallons of water per acre plus a nonionic surfactant. Roundup may be mixed with Banvel or 2,4-D.

Preplant incorporated herbicides

Some herbicides may be applied prior to planting and incorporated. The time of application will depend upon the label directions and field conditions. Herbicides with sufficient residual activity, such as AAtrex,

Table 1. Registered No-Till Herbicide Combinations

	Alone	Combination			
		Dual	Lasso	Surflan	Prowl
Soybeans					
Amiben	GR	GR	GR	GR	GR
Lorox	GBR	GR	GBR	GR	G
Lexone	GBR	GR	GBR	GR	G
Scepter	GBR	GBR	GBR	—	GBR
Sencor	GBR	GR	GBR	GR	G
Turbo	GR	—	—	—	—
Corn					
Atrazine	GBR	GR	GBR	—	—
Bladex	GBR	G	GBR	—	—
Princep	BR	GR	GBR	—	—
Atrazine + Bladex	B	G	GB	—	—
Atrazine + Princep	GBR	GR	GBR	—	—
Bicep	GR	—	—	—	—

Knockdown herbicides:
G = Gramoxone (paraquat)
R = Roundup (glyphosate)
B = Bronco = Roundup + Lasso
— = Not registered

Table 2. Registered Herbicide Combinations for Preplant Incorporated (PPI), Preemergence (Pre), or Early Postemergence (EPoE) Application in Corn

	Atrazine	Bladex	Princep	Atrazine + Bladex	Atrazine + Princep
PPI only					
Eradicane, Eradicane Extra	1	1	1	1	—
Genate Plus	1	1	—	1	—
Sutan +	1	1	1	1	—
PPI or Pre or EPoE					
Used alone	1,2,3	1,2,3	1,2	1,2,3	1,2
Dual	1,2,3	1,2	1,2	1,2	1,2
Lasso	1,2,3	1,2	2	1,2	—

1 = Preplant incorporated
2 = Preemergence
3 = Early postemergence
— = Not registered

Bicep, and Dual, may be applied early preplant, as long as 45 days before planting. If these herbicides are applied too early, however, weed control may not last as long as desired after planting. Incorporation should distribute the herbicide uniformly throughout about the top 2 inches of soil. Do not apply herbicides too early or incorporate them too deeply.

Sutan+, Genate Plus (butylate), Eradicane, and Eradicane Extra (EPTC) contain crop safening-agents. Crop injury is unlikely but may occur when growing conditions are unfavorable or when certain hybrids are used. Eradicane Extra also contains an extender to lengthen weed control. These herbicides control annual grass weeds and at higher rates can control or suppress shattercane and johnsongrass. The rate for Sutan+ and Genate Plus is 4¾ to 7⅓ pints per acre. The rate for Eradicane 6.7E is 4¾ to 7⅓ pints per acre. The rate for Eradicane Extra 6E is 5⅓ to 8 pints per acre. Use the higher rates for heavy infestations of shattercane and yellow nutsedge and for johnsongrass.

Although these herbicides should be incorporated into the soil soon after application, some labels allow up to 4 hours for incorporation if applied to dry soil. Even though some labels allow application up to 4 weeks before planting, application close to planting time is generally preferable.

Research results indicate that satisfactory weed control may be achieved by applying some of these products directly on soybean stubble in the spring and using one- or two-pass incorporation.

Sutan+, Genate Plus, Eradicane, or Eradicane Extra can be tank-mixed with atrazine or Bladex to improve broadleaf control. Sutan+, Eradicane, or Eradicane Extra can be tank-mixed with Princep. The atrazine rate is 2 to 3 pints of 4L or equivalent amounts of 80W or 90WDG per acre. The Bladex rate is 3 to 4 pints of 4L or 2 to 2½ pounds of 80W per acre. Three-way combinations with atrazine plus Bladex are also registered. These herbicides can be applied with liquid fertilizer or impregnated on dry bulk fertilizer.

Sutazine+ 6-ME is a 4:1 mixture of Sutan+ and atrazine. The application rate is 5½ to 10½ pints per acre. Sutazine+ 18:6G and Sutan+ 10G are as granular formulations. Sutazine has 4.8 plus 1.2 pounds per gallon. Rhino also is a butylate-plus-atrazine combination with 4.3 pounds plus 1.7 pounds per gallon.

Preplant or preemergence herbicides

Incorporation of the following herbicides is optional, depending upon the weeds to be controlled and the likelihood of rainfall. Incorporation of these herbicides should be shallow but thorough.

AAtrex, Atrazine (atrazine), or Princep (simazine) can be applied anytime during the 2 weeks before planting or soon after planting. If rainfall is limited, incorporation may aid performance. Corn tolerance of atrazine and simazine is good, but carryover to subsequent crops can occur.

Princep controls fall panicum and crabgrass better than atrazine does but is less effective in controlling cocklebur, velvetleaf, and yellow nutsedge. Princep is less soluble and more persistent than atrazine; thus Princep is usually applied preplant. Princep plus atrazine can be used in 1:1 or 2:1 combinations; the total rate is the same as for atrazine used alone.

The rate for atrazine used alone is 2½ to 3¾ pounds of atrazine 80W, 4 to 6 pints of 4L, or 2.2 to 3.3 pounds of AAtrex Nine-0. Atrazine controls annual broadleaf weeds better than it does grasses, and it is often used at reduced rates in tank-mix combinations to improve broadleaf weed control. The rate for atrazine in combinations is 1½ to 2 pounds of atrazine 80W, 2 to 3 pints of atrazine 4L, or 1.1 to 1.8 pounds of AAtrex Nine-0. These rates may not provide adequate control of cocklebur, morningglory, and velvetleaf but can reduce the risk of carryover.

You can minimize carryover injury by mixing and applying the herbicides accurately, by applying them early, by using the lowest rates consistent with good weed control, and by tilling the soil to dilute the herbicide. The risk of carryover is greater after a cool, dry season and on soils with a pH over 7.3.

If you use atrazine at more than 3 pounds of active ingredient per acre (lbs a.i./A) or if you apply after June 10, plant only corn or sorghum the next year. If you use atrazine in the spring and must replant, then plant only corn or sorghum that year. Do not plant small grains, small-seeded legumes, or vegetables in the fall or the following spring. Soybeans planted the year after an application of atrazine can also be affected by carryover, especially if you use Sencor or Lexone.

Bladex (cyanazine) does not persist in the soil as long as atrazine, but atrazine does have the advantage of better corn tolerance. Bladex provides better control than atrazine of fall panicum, giant foxtail, and some other grass weeds but may not be quite as good as atrazine on some broadleaf weeds, especially pigweed. Bladex can be combined with atrazine in a 3:1, 2:1, or 1:1 ratio of Bladex to atrazine (see label for rates). The higher ratios will provide better grass control, while the 1:1 ratio will provide better broadleaf weed control. Prepackaged combinations include Extrazine (2:1 ratio) and Conquest (3:1 ratio).

Rates of Bladex must be selected accurately on the basis of soil texture and organic matter to reduce the possibility of corn injury. The rate for Bladex is 1½ to 6 pounds of 80W, 1.35 to 5.3 pounds of Bladex 90DF, or 1¼ to 4¾ quarts of 4L. You can lessen the risk of injury to corn by using reduced rates of Bladex in combinations.

Bladex can be tank-mixed with Lasso, Dual, Ramrod, or Prowl to improve grass control. The Lasso or Dual combination can be applied immediately before planting or after planting. Do not incorporate the Prowl or Ramrod combinations.

Three-way combinations of Bladex plus atrazine plus Lasso, Dual, Sutan+, Eradicane, or Eradicane Extra are registered. The addition of a limited amount

of atrazine should improve broadleaf control without increasing concern about carryover. *Bladex is classified for restricted use by certified applicators.*

Lasso (alachlor) or Dual (metolachlor) can be preplant incorporated or applied preemergence at planting time. Preplant incorporation of these herbicides can improve control of yellow nutsedge and can lessen dependence upon rainfall. Incorporation should distribute the herbicide evenly throughout the top 2 inches of soil.

Lasso and Dual control annual grasses and help control yellow nutsedge. You can improve broadleaf weed control by using atrazine, Bladex, or both in either a preplant or a preemergence combination.

Lasso can be applied any time during the week before planting corn and shallowly incorporated, or it can be used after planting but before the crop and weeds emerge and within 5 days after the last tillage operation. The rate is 2 to 4 quarts of Lasso 4E or 16 to 26 pounds of Lasso 15G. Use the higher rate suggested for the type of soil if you plan to incorporate Lasso.

Dual can be applied any time during the 2 weeks before planting corn and shallowly incorporated, or it can be used soon after planting. The rates are 1½ to 4 pints of Dual 8E or 6 to 16 pounds of Dual 25G per acre.

Lasso or Dual plus atrazine can be preplant incorporated or applied after planting until corn is 5 inches tall and grass weeds have not passed the 2-leaf stage. *Do not apply with liquid fertilizer after the crop emerges.* The suggested rate is 1½ to 4 quarts of Lasso or 1¼ to 2½ pints of Dual 8E plus 1½ to 2½ pounds of atrazine 80W, 1 to 2 quarts of atrazine 4L, or 1.1 to 2.2 pounds of AAtrex Nine-O. Dual is also cleared in a combination with atrazine plus Princep.

Dual and Lasso are both formulated as packaged mixes with atrazine. Bicep contains a 5:4 ratio of metolachlor (Dual): atrazine per gallon. The rate is 1½ to 3 quarts of Bicep 6L per acre. **Lasso/atrazine** (flowable) contains 2½ pounds of alachlor (Lasso) and 1½ pounds of atrazine per gallon. The rate is 3½ to 4½ quarts per acre.

Dual or Lasso plus Bladex can be applied before planting and incorporated, or they can be applied preemergence at planting. The rate is 2 to 4 quarts of Lasso 4E or 1¼ to 2½ pints of Dual 8E plus 1 to 3¾ pounds of Bladex 80W or 1 to 3 quarts of Bladex 4L. Adjust the rate carefully according to soil texture and organic matter.

Preemergence herbicides

Ramrod (propachlor) can be applied alone before crop or weeds emerge or with atrazine after the corn is planted but before grasses reach the 2-leaf stage and corn emerges. Granular formulations should be applied before crop or weeds emerge. Ramrod performs well on soils with more than 3-percent organic matter.

Ramrod is irritating to the skin and eyes, so observe label precautions. Corn tolerance is good. Ramrod controls annual grasses and pigweed. The rate is 4 to 6 quarts of Ramrod 4L or 20 to 30 pounds of 20G per acre.

Banvel (dicamba) can be applied alone after planting as long as corn is no more than 5 inches tall. Banvel is approved for use in combinations with Lasso, Dual, atrazine, or Bladex. Banvel may injure corn, especially if recommended rates are exceeded, if applications are not accurate and uniform, or if corn is planted too shallow (less than 1½ inches). Do not use this treatment on coarse-textured soils or soils that are low in organic matter. The rate on fine-textured soils with more than 1½-percent organic matter is one pint of Banvel.

Prowl (pendimethalin) is registered only for use on corn after planting. Incorporation of Prowl may result in serious injury to corn. Use only where it is possible to cover seed adequately with soil. Prowl can control annual grasses, pigweed, and lambsquarters; and it may provide some control of smartweed and velvetleaf. You can improve broadleaf weed control by combining Prowl with atrazine, Bladex, or Banvel. Prowl plus atrazine or Bladex may be applied in the early postemergence period before grasses are in the 2-leaf stage. These combinations may also help reduce the competition from wild proso millet. But avoid postemergence application when corn is under stress from cool, wet weather; otherwise, injury to corn may result. The rate for such combinations is 1 to 1½ quarts of Prowl 4E. Do not use Prowl plus Banvel on sandy soils or soils with less than 1½-percent organic matter.

Postemergence herbicides

Lasso, Dual, Ramrod, or Prowl may be combined with atrazine for application after planting to very early postemergence. The same is true for Lasso or Dual combined with Banvel. To obtain satisfactory control, apply before grasses reach the 2-leaf stage. For more information about postemergence principles, see the section entitled "Postemergence herbicide principles."

Atrazine can be applied when grass weeds are no more than 1½ inches high. Many annual broadleaf seedlings are more susceptible than grass weeds and may be treated until they are 4 inches tall. For control of some broadleaf weeds, 1.2 pounds active ingredient of atrazine may be insufficient. In most cases, this rate will need to be increased to 2 pounds for control of annual grass weeds.

The addition of oil-surfactant mixes or surfactants has generally increased the effectiveness of postemergence atrazine. Crop-oil concentrates (80-percent oil and 20-percent surfactant) are used at the rate of one quart per acre. Surfactants are usually added at 0.5 percent of the total spray volume or at a rate of about one pint per acre. Results with the oil-surfactant mixes have generally been better than those with surfactants.

An atrazine-and-oil mix sometimes damages corn that has been under stress from prolonged cold, wet weather or other factors. Do not use more than 2½ pounds of atrazine 80W, 2 quarts of atrazine 4L, or 2.2 pounds AAtrex Nine-O per acre if you mix with oil or oil concentrate. *Do not add 2,4-D to the atrazine-oil treatment,* or severe injury may result. Mix the atrazine with water first, and add the oil last. If atrazine is applied after June 10, do not plant any crop except corn or sorghum the next year.

Bladex (cyanazine) can be applied until the fifth leaf of corn is visible and before grass weeds exceed 1½ inches in height. The Bladex rate is 1½ to 2½ pounds of 80W or 1.1 to 2.2 pounds of 90DF per acre. *Do not use Bladex 4L* because it contains oil and can increase the potential for injury. Injury to corn may occur under cold, adverse growing conditions. The injury may be only temporary yellowing but can be more severe. Under droughty conditions, certain agricultural surfactants or vegetable oils may be added to Bladex 80W to improve weed control. Do not use petroleum crop oils or apply with liquid fertilizers for postemergence application. Do not apply Bladex postemergence on corn that is under severe stress.

One may combine Bladex 80W with atrazine 80W, substituting atrazine for 30 percent of the Bladex. Also registered is a Bladex plus Banvel combination that allows for the addition of one-half to two-thirds pint of Banvel per acre; no surfactant or any type of oil should be added to this combination. *Bladex is classified as a restricted-use pesticide.*

Tandem (tridiphane) may be used with atrazine, Bladex, or both for postemergence control of both annual grass and broadleaf weeds in field corn. These combinations should be applied when annual grass weeds are in the 1- to 3-leaf stage and actively growing. Tandem rates are 1 to 1½ pints per acre. Atrazine 80W, 90DF, or 4L may be used; but only Bladex 80W should be used with Tandem. Atrazine 4L rates are 1½ to 4 pints, and Bladex 80W rates are 1 to 2½ pounds per acre. Rates are adjusted for soil, type of weeds, and tank-mixture being used. Crop oil or crop-oil concentrate should be added to the Tandem-atrazine combination. Do not apply combinations containing Bladex to corn with more than four true leaves or to corn under stress from cold or wet weather. Do not spray if rain is expected within 3 hours. Precautions for avoiding injury to subsequent crops are similar to those for atrazine.

Banvel (dicamba) can be applied from emergence until corn is 36 inches tall or until 15 days before tassel emergence, whichever comes first. Best results can be expected by using one-half to one pint of Banvel per acre when the corn is in the spike to 5-inch stage. Application at this time can offer several weeks of soil (residual) activity when the 1-pint rate is used. With this timing, crop tolerance is better than with preemergence treatments of Banvel. In addition, application rates can be higher than with the later postemergence treatment, and the likelihood of injury to nearby soybeans is diminished. For applications on corn from 5 to 36 inches tall, the rate is one-half pint per acre. Banvel is labeled as an overlay (sequential) treatment following Sutan+, Eradicane, Lasso, Dual, Bicep, Ramrod, atrazine, Bladex, Princep, Roundup, Bronco, or paraquat.

Banvel is also labeled for postemergence use as a tank-mix with atrazine, Bladex 80W, or 2,4-D. The postemergence rate for Banvel is one-half pint (one-fourth pound active ingredient) per acre after corn is 5 inches tall. The label allows for the addition of one-eighth to one-fourth pound of 2,4-D acid equivalent per treated acre. If Banvel or Banvel plus 2,4-D is used on corn that is taller than 8 inches, drop pipes should be used to help keep the spray off the corn leaves and out of the whorl.

For best results, use Banvel before June 20 with a spray volume of 20 gallons per acre and a spray pressure of no more than 20 psi to help reduce the risk to plants outside the target area.

Do not apply Banvel when soybeans are growing nearby if corn is more than 24 inches tall, soybeans are more than 10 inches tall, or soybeans have begun to bloom.

To aid in the control of hemp dogbane, Banvel is approved for use at one-half pint with one pound acid equivalent per acre of 2,4-D LV ester or amine after corn is in the brown silk stage but at least 7 days before harvest.

Marksman (dicamba plus atrazine) is a formulated mixture of 1.1 pound dicamba (active ingredient of Banvel) and 2.1 pounds of atrazine per gallon. The rate is 2 to 3.5 pints per acre, depending on the soil texture and organic-matter content. On most Illinois soils, the rate is 3.5 pints per acre or 0.48 pound of dicamba and 0.92 pound of atrazine per acre. Marksman is cleared as a tank-mix and in sequential combinations with many other herbicides.

Marksman may be applied to actively growing weeds before, during, or after planting but before corn exceeds the 5-leaf stage. In most conventional tillage applications, the recommended timing is from emergence to the 5-leaf stage of corn. Most annual broadleaf weeds should be controlled, and some perennial broadleaf weeds should be suppressed. This formulated mixture will be targeted at the velvetleaf market in Illinois, where Banvel has needed some help.

2,4-D is effective in controlling many broadleaf weeds in corn. If corn is more than 8 inches high, use drop nozzles to decrease the possibility of injury. If you direct the nozzles toward the row, adjust the spray concentration so that excessive amounts are not applied to the corn.

Do not apply 2,4-D to corn from the tasseling stage to the dough stage. After the hard dough to dent stage, you can apply 1 to 2 pints of certain 2,4-Ds by air or high-clearance equipment to control some broadleaf weeds that may interfere with harvest or to

suppress certain perennial weeds. Do not forage or feed fodder for 7 days after treatment.

The suggested broadcast rate is one-third to one-half pint of ester or one pint of amine for formulations with 3.8 pounds of 2,4-D acid equivalent per gallon. Use equivalent rates with other formulation concentrations. Use proportionately less 2,4-D when using directed nozzles.

The ester forms of 2,4-D can vaporize and injure nearby susceptible plants. This vapor movement is more likely with high-volatile esters than with low-volatile esters. Spray particles of either the ester or the amine form can drift and cause injury.

Corn is often brittle for 7 to 10 days after application of 2,4-D and thus is susceptible to stalk breakage from high winds or cultivation. Other symptoms of 2,4-D injury are stalk bending or lodging, abnormal brace roots, and failure of leaves to unroll. Injury problems are unlikely once corn has reached the brown silk stage.

High temperature and high humidity can increase the potential for 2,4-D injury, especially if corn is growing rapidly. If it is necessary to spray under these conditions, it may be wise to reduce the rate by about 25 percent. Corn hybrids differ in their sensitivity, and the probability of injury increases when corn is under stress.

Buctril or Brominal (bromoxynil) may be used to control broadleaf weeds in field and silage corn. It is important to treat when the weeds are small. For ground applications, use 20 gallons of water per acre, a spray pressure of 30 psi, and flat-fan nozzles.

Bromoxynil will not volatilize and cause the drift injury associated with 2,4-D or Banvel. Bromoxynil, under some conditions, may cause some burning of corn leaves, but the effects are usually temporary. Do not add a surfactant or crop oil to Buctril or Brominal used alone or in combination.

Buctril 2E rates are 1 to 1½ pints per acre when corn and weeds are in the 3- to 8-leaf stage. Brominal 4E rates are one-half to one pint per acre when corn is in the 2-leaf to 14-inch stage and before weeds are 4 to 6 inches tall. Use the higher rate on larger corn and weeds. Most annual broadleaf weeds are controlled. Larger pigweed and velvetleaf may require the higher rate or a combination with atrazine. Atrazine 4L at 0.5 to 1.0 quart (or equivalent rates of 80W or 90DF) can be combined with Buctril or Brominal. Do not add Bladex to bromoxynil.

Buctril plus atrazine is a formulated combination of 1 pound bromoxynil plus 2 pounds atrazine active ingredient per gallon for application at 1½ to 2 pints per acre at the 3- to 8-leaf stage of corn or at 3 pints at the 4- to 8-leaf stage. The lower rates are for smaller weeds.

Brominal and atrazine have been packaged in separate containers in a Torch twin-pack.

Basagran (bentazon) is registered for postemergence use in corn, with recommendations similar to those given for use with soybeans. (See the section entitled "Herbicides for soybeans.") The rate is 1½ to 2 pints of Basagran 4S per acre. Crop-oil concentrate may be added at one quart per acre. Basagran is also cleared at the rate of 1 to 1½ pints per acre in combination with atrazine at 0.6 to 1.0 pound of 80W, 0.6 to 0.9 pound of 90DF, or 1 to 1½ pints of 4L per acre. Laddok is a 1:1 ratio mix of bentazon and atrazine for use in corn. Crop-oil concentrate is added at one quart per acre. This combination controls only annual broadleaf weeds and not annual grasses. The combination provides better control of pigweed and lambsquarters than does Basagran alone and will create less risk of carryover than does atrazine alone.

Roundup (glyphosate) may be applied as a spot treatment in corn prior to silking. For applications made on a spray-to-wet basis, use a 1- to 2-percent solution of Roundup in water. For motorized spot treatments in which less than complete coverage of weeds may result, use a 5-percent solution. Avoid contact of spray with the corn. Add a dye for increased visibility.

Postemergence soil-applied herbicides

Prowl, Treflan, or Lasso can be applied to the soil as a postemergence treatment in corn. It may be necessary to use drop nozzles to avoid interference from corn leaves and to ensure uniform application to the soil.

Prowl (pendimethalin) or Treflan (trifluralin) may be applied to the soil and incorporated after field corn is 4 inches tall (for Prowl) or 8 inches tall (for Treflan) and up to the time of the last cultivation. The field should be cultivated to control existing weeds and cover the roots at the base of the corn before application. The herbicide should then be thoroughly and uniformly incorporated into the top inch of the soil with a sweep-type or rolling cultivator. Prowl may not need to be incorporated if irrigation is used or rainfall occurs soon after application. Prowl or Treflan can be combined with atrazine.

These Prowl or Treflan treatments may help control late-emerging grasses such as shattercane, wild proso millet, fall panicum, or woolly cupgrass.

Lasso (alachlor) may be used alone or with atrazine as a soil-applied postemergence treatment to help control midseason annual grass weeds in corn that is grown for seed. Application should preferably be made after cultivation — before weeds emerge and before the crop is 40 inches tall.

Dual (metolachlor) or Bicep (metolachlor plus atrazine) may be used for postemergence "layby" treatments in corn. For Dual, as much as 3 pounds active ingredient per acre may be used in a single application, up to a total of 6 pounds active ingredient in one year. With Bicep, as much as 3 quarts of 6L may be used per acre.

Directed postemergence herbicides

Directed sprays are sometimes needed for emergency situations, especially when grass weeds become too tall to be controlled by cultivation. Weeds, however, are often too large for directed sprays to be effective. Directed sprays cannot be used on small corn because a height difference between corn and weeds is needed to keep the spray off the corn. Corn leaves that come into contact with the spray can be killed, and injury may affect yields.

Lorox or Linex (linuron) may be applied as a directed spray after corn is at least 15 inches tall (freestanding) but before weeds are 8 inches tall, preferably when weeds are no more than 5 inches tall. Linuron controls broadleaf and grass weeds.

The broadcast rate is 1¼ to 3 pounds of Lorox 50W (or 50DF) or 1¼ to 3 pints of 4L per acre, depending on weed size and soil type. Add Surfactant WK at the rate of 1 pint per 25 gallons of spray mixture. Cover the weeds with the spray, but keep it off the corn as much as possible. *Consider this an emergency treatment.*

Evik 80W (ametryn) is registered for directed use when corn is more than 12 inches tall and weeds are less than 6 inches tall. Evik should not be applied within 3 weeks of tasseling. The rate is 2 to 2½ pounds Evik 80W per acre (broadcast) plus 2 quarts of surfactant per 100 gallons of spray mixture. Extreme care is necessary to keep the spray from contacting the leaves. *Consider this an emergency treatment.*

Herbicides for sorghum

Many herbicides used to control weeds in corn can also be used in sorghum.

Atrazine may be used for weed control in sorghum (grain and forage types) or sorghum-sudan hybrids. Application may be made preemergence or postemergence. A preplant surface application may be made using a single application within 30 days of planting or a two-thirds plus one-third split application within 45 days of planting. Plant seed at least one inch deep. Do not use preplant or preemergence on soils with less than 1-percent organic matter. Incorporated treatments may cause injury if rainfall occurs before or shortly after sorghum emergence.

Injury may occur when sorghum is under stress from unusual soil or weather conditions or when rates are too high. The rate of application for preplant and preemergence is 2 to 3 pounds of atrazine 80W per acre. The postemergence rate is 4 to 6 pints 4L per acre without crop oil or 2.4 pints 4L (broadleaf control only) with crop oil or crop-oil concentrate. Use equivalent rates of atrazine 80W or AAtrex 90DF formulations. Rotational crop recommendations and weed control are the same as for atrazine used in corn. Failure to control fall panicum has been a major problem.

Ramrod (propachlor) may be used alone or in combination with atrazine, Milogard, Bladex, or Modown for sorghum. Ramrod can improve grass control; but rates must not be skimpy, especially on soils that are relatively low in organic matter. For specific rates, consult the label. Do not graze or feed forage to dairy animals.

Lasso (alachlor) alone or plus atrazine may be preplant incorporated or used preemergence for grain sorghum if seed is treated with Screen (flurazole). This use also applies to Lasso/atrazine and to Bronco.

Dual (metolachlor) or Bicep (metolachlor plus atrazine) can be used for sorghum if seed has been treated with Concep. These herbicides will control grasses better than will atrazine applied alone. An early preplant treatment of Dual or Bicep may be used in a similar manner as for corn, but it is still necessary to use seed that has been treated with Concep.

Modown 4F (bifenox) may be used preemergence at 3 to 4 pints per acre for all soil types. Broadleaf weeds controlled include nightshade, jimsonweed, lambsquarters, smartweed, pigweed, and velvetleaf.

Basagran (bentazon) is registered for postemergence use in sorghum in a manner similar to that for corn. (See the section entitled "Herbicides for corn.") Because sorghum is quite tolerant of Basagran up to and including early boot stage, the addition of a crop-oil concentrate is considered relatively safe. Do not apply to grain sorghum that is heading or blooming. Apply Basagran at the rate of 1 to 1½ pints in combination with atrazine at 0.6 to 1.0 pound of 80W, 0.6 to 0.9 pound of 90WDG, or 1 to 1½ pints of 4L per acre.

2,4-D may be applied postemergence for broadleaf control in sorghum that is from 4 to 24 inches tall. Use drop pipes on nozzles if sorghum is more than 8 inches tall. Rates are similar to those for use in corn. (See the section entitled "Herbicides for corn.")

Banvel (dicamba) may be applied postemergence to sorghum up to 21 days after emergence but before sorghum is 15 inches tall. The rate is one-half pint per acre. Do not graze or feed treated forage or silage before the mature grain stage. Sorghum can be injured by Banvel, and seed development can be affected.

Brominal or Buctril (bromoxynil) can control broadleaf weeds in grain sorghum that is past the 3-leaf stage and as much as 14 inches tall and before weeds are 4 to 6 inches tall. It is generally safer than 2,4-D on grain sorghum. Combinations with atrazine are also registered to improve pigweed control and provide some residual control of germinating seedlings.

Buctril plus atrazine may be used postemergence for grain sorghum at 1½, 2, or 3 pints per acre from the 2-, 3-, or 4-leaf stage, respectively, up to the 10-leaf stage — but not on sorghum that is more than 10 inches tall. The Torch twin-pack, with separate containers of Brominal and atrazine, is also approved for sorghum as well as corn.

Prowl (pendimethalin) may be applied to grain sorghum from the 4-inch growth stage to as late as

the last cultivation, primarily for control of late-season annual grass weeds. For more information, see the section entitled "Herbicides for corn," subsection on postemergence soil-applied herbicides.

Roundup (glyphosate) may be applied as a spot treatment in sorghum (milo) prior to heading. For applications on a spray-to-wet basis, use a 1- to 2-percent solution of Roundup in water. With motorized spot treatments from which less complete coverage of weeds may result, use a 5-percent solution. Avoid contact with the sorghum. Add a dye for increased visibility.

Bronco (glyphosate plus alachlor) may be used alone or with atrazine where grain sorghum is to be planted directly into a cover crop or in the residue of the previous crop. Bronco can control emerged annual weeds and suppress many emerged perennial weeds, as well as give preemergence control. Grain sorghum seed must be treated with Screen, as it is when Lasso is used.

Gramoxone may be used for control of annual weeds where grain sorghum is to be planted into the residue of the previous crop.

Herbicides for soybeans

Consider the kinds of weeds expected when you plan a herbicide program for soybeans, especially when growing soybeans in narrow rows. The herbicide selectivity table lists herbicides and their relative weed control ratings for various weeds. (See Table 5 at the end of this guide.)

Although soybeans may be injured by some herbicides, they usually outgrow early injury with little or no effect on yield if stands have not been significantly reduced. Significant yield decreases can result when injury occurs during the bloom to pod-fill stages. Excessively shallow planting may increase the risk of injury from some herbicides. Accurate rate selection for soil type is especially essential for Lorox, Linex, Lexone, Sencor, or Turbo. Do not apply Lorox, Linex, Lexone, Sencor, Turbo, or Modown after soybeans begin to emerge. Follow label instructions for rates, timing, incorporation, and restrictions. For registered combinations, see Table 3.

Preplant not incorporated

Early preplant application can be used in many conservation tillage programs — such as no-till, ridge-till, or mulch-till — to minimize existing vegetation problems at planting and thus reduce the need for knockdown herbicides. Lorox or Linex (linuron) and Sencor or Lexone (metribuzin) have both postemergence and residual activity, but postemergence activity varies with climatic conditions. If weeds have emerged before preplant application, the use of a foliar knockdown herbicide such as Gramoxone or Roundup may be necessary. (See the section entitled "Conservation tillage and weed control," subsection on no-till and double-crop.)

Several preemergence herbicides are registered for application before planting soybeans.

Surflan (oryzalin) can be applied any time before planting no-till soybeans. Surflan can be applied in fully tillered wheat before heading, and soybeans can then be planted no-till into wheat before harvest or in wheat stubble immediately after harvest.

Surflan is also labeled for tank-mixing with 2,4-D prior to 30 days before planting to control established winter weeds where soybeans are to be planted no-till. To control existing vegetation, Gramoxone or Roundup combinations with Surflan plus Sencor or Lexone can be applied before planting no-till soybeans. Surflan plus Lexone can be applied as much as 30 days before planting.

Dual (metolarchlor) can be applied within 30 days before planting soybeans or as a split application using a two-thirds rate as long as 45 days before planting, followed by a one-third rate at planting.

Either Turbo alone or Sencor applied with Dual or Lasso can be applied 15 to 30 days before planting soybeans when using a sequential (split) preemergence application: the first made early, followed by the second at planting.

Some foliar postemergence herbicides can also be used before planting soybeans.

Roundup (glyphosate) can also be used preplant in soybeans to control small annual weeds. The rate is 12 to 16 fluid ounces (¾ to 1 pint) per acre in 5 to 10 gallons of water, with the addition of a surfactant.

Poast (sethoxydim) may be applied before planting soybeans, with no time interval restriction.

Poast plus 2,4-D (LVE) as a tank-mix may be applied prior to 30 days before soybean planting. Recommended use rates per acre are ½ pint Poast and 1 pint 2,4-D (½ pound acid equivalent) with 2 pints crop-oil concentrate in 5 to 10 gallons of spray solution.

Preplant incorporated herbicides

Incorporation is required for Treflan, Sonalan, Vernam, and Reward. Incorporation of Command will be required to reduce movement outside the target area. Incorporation is optional for Amiben, Preview, Dual, Lasso, Modown, Prowl, and Scepter when used alone or in some combinations. Lorox Plus, Lorox, and Surflan should not be incorporated.

Incorporation can improve performance if rainfall is limited and may increase the effectiveness of Dual or Lasso in controlling nutsedge. Incorporation should distribute the herbicide evenly in the top 1 to 3 inches of soil. Deep incorporation or very early application of the herbicide can cause significant reductions in weed control. For more information, see the section entitled "Herbicide incorporation."

Dinitroaniline herbicides registered for weed con-

Table 3. Registered Herbicide Combinations for Preplant Incorporated (PPI) or Preemergence (Pre) Use in Soybeans

	Amiben	Sencor or Lexone	Preview[b]	Lorox	Scepter	Command	Command + Sencor or Lexone
PPI							
Sonalan	1	1	1	—	—	1	1
Treflan	1	1	1	—	1	1	1
Command	—	1	—	—	—	—	—
PPI or Pre							
Dual	1,2	1,2	1	2	1,2	—	—
Lasso	1,2	1,2	1	2	1,2	—	—
Prowl	1,2	1,2	1	2	1,2	—	—
Surflan[a]	2	2	—	2	1,2	—	—

1 = Preplant incorporated
2 = Preemergence
— = Not registered
[a] Not for preplant incorporation
[b] Pending

trol in soybeans are Treflan, Prowl, Sonalan, and Surflan. Treflan and Sonalan should be incorporated because they have low solubility and are subject to loss by vaporization and photodecomposition. Incorporation is optional with Prowl, but variable weed control and soybean injury may result if Prowl is not incorporated. Incorporation should distribute the herbicide uniformly throughout the top 2 to 3 inches of soil (see label for implement settings). Do not incorporate Surflan. (See the subsection about preemergence herbicides.)

The dinitroaniline herbicides control annual grasses, pigweed, and lambsquarters and may provide some control of smartweed and annual morningglory. Prowl and Surflan may also partially control velvetleaf. Acceptable control of most other broadleaf weeds requires combinations or sequential treatments with other herbicides.

Soybeans are sometimes injured by dinitroaniline herbicides. Plants that have been injured by incorporated treatments may be stunted and have swollen hypocotyls and shortened lateral roots. Usually, such injuries are not serious. At the level of the soil surface, plants injured by preemergence applications may have stem calluses, which can cause lodging and yield loss.

Corn, sorghum, and small grains may be injured if they are grown after a soybean crop that has been treated with a dinitroaniline herbicide. The symptoms are poor germination and stunted, purple plants with poor root systems. To avoid carryover, use no more than the recommended rates and be sure that application and incorporation are uniform. The likelihood of carryover increases with double-cropping or late application and after a cool, dry season. Adequate tillage may help dilute herbicide residue, which helps alleviate a carryover problem.

Treflan (trifluralin) may be applied alone any time in the spring. Combinations with Sencor or Lexone should be applied no more than 2 weeks before planting. Incorporate as soon as possible, but do not delay incorporation more than 24 hours (or more than 8 hours if soil is warm and moist). The rate is 1 to 2 pints of Treflan 4E or MTF, 0.8 to 1.6 pints of Treflan Pro-5, or 5 to 10 pounds of Treflan 10G per acre. Treflan MTF is a multitemperature formulation that helps to avoid problems associated with freezing in storage. Treflan Pro-5 contains 5 pounds trifluralin per gallon.

Treflan may be tank-mixed with Scepter as a preplant incorporated (PPI) treatment or applied alone PPI followed by Scepter after planting but before soybean emergence.

Treflan may be tank-mixed with Command or Command plus Lexone or Sencor.

Sonalan (ethalfluralin) may be applied within 3 weeks before planting and should be incorporated within 2 days after application. The rate for general weed control ranges from 1½ to 3 pints per acre, depending on soil texture. Sonalan may provide some control of nightshade at rates of 3 to 3½ pints per acre, but for this purpose it should be used in conjunction with Amiben, Dual, or Lasso or followed with Blazer or Tackle. Sonalan provides more risk of injury to soybeans than does Treflan; however, Sonalan is less likely to injure corn following soybeans than is Treflan. Sonalan may be tank-mixed with Amiben, Lasso, Dual, metribuzin, Reward, Command, or Scepter. Scepter may be tank-mixed with Sonalan or used preemergence or early postemergence following Sonalan. Sonalan may be tank-mixed with Command or Command plus Lexone or Sencor.

Sencor or Lexone (metribuzin) plus Treflan, Sonalan, or Prowl can be tank-mixed and applied within 7 to 14 days of planting. Incorporate uniformly into the top 2 inches of soil. The rate of Sencor or Lexone in these combinations is one-half to one pint of 4L or one-third to two-thirds pound of 75DF. Use the normal rate, or slightly less, of the dinitroaniline herbicide (see labels).

The application of Sencor or Lexone can also be

split, one part being incorporated and the other part applied to the surface preemergence. This method requires two applications but can give better broadleaf control and less injury than incorporating the same total amount of Sencor or Lexone in a single application.

Command (FMC-57020) was initially marketed as a 6EC but will be a 4EC in 1987. It will be registered for use in combination with Sencor/Lexone by FMC and for use with Treflan or Sonalan by Elanco. Rates will be three-fourths to one pound of active ingredient (1½ to 2 pints) per acre for Command alone or in the combinations on the Command label and three-eighths to three-fourths pound of active ingredient on Treflan and Sonalan labels. The Elanco labels also include three-way combinations with metribuzin. Command should be incorporated to reduce movement outside the target area. Incorporation should preferably be done immediately, and it should provide uniform distribution. If a delay for incorporation is necessary, it should not exceed 3 hours. Command may be followed by some surface-applied preemergence herbicides or a postemergence treatment.

Soybeans have good tolerance to Command, and at adequate rates it can give good control of annual grass weeds. Command is exceptionally good on velvetleaf and can give good control of lambsquarters, smartweed, jimsonweed, common ragweed, and venice mallow. It needs help on pigweed, cocklebur, and black nightshade. Control of ivyleaf and tall morningglories should not be expected.

Command should not be followed by small grain or alfalfa in the fall or next spring, and some other small-seeded legumes may be questionable. Other rotational crops, including corn and sorghum, should not be planted for 9 months following application of Command. In the next season, do not follow with corn for seed production. Cover crops may follow, but stand reductions may sometimes occur. Applications should be accurate and uniform to avoid overlaps and excessive rates, especially on field ends and odd-shaped fields. Under some weather and soil conditions, and with certain corn hybrids, some effects may be noted the following season, especially if excessive amounts are applied or applications are not uniform.

Some desirable plants — including ornamentals, trees, vegetables, and agronomic crops such as small grains and alfalfa — are sensitive to Command. Spray drift or vapors moving outside the target area may cause visible symptoms of chlorosis or bleaching of sensitive plants growing near treated fields. Do not spray where there is risk of the herbicide's moving to desirable plants that are sensitive to Command. Avoid windy conditions and conditions in which moisture evaporating from moist soil may carry the herbicide. Use care in rinsing equipment to avoid movement to desirable plants and to avoid tank contamination that can affect crops sprayed later.

Amiben (chloramben) can be incorporated with Treflan, Sonalan, or Prowl. The rate is 4 to 6 quarts of Amiben 2S or 2.4 to 3.6 pounds of 75DS per acre. Amiben can also be applied and incorporated with Treflan or Prowl plus Sencor or Lexone as a three-way combination.

Reward (vernolate plus extender) and Vernam (vernolate) control annual grasses and pigweed. They sometimes provide fair control of annual morningglory, velvetleaf, and yellow nutsedge. Some soybean injury may occur in the form of delayed emergence, stunting, and leaf crinkling. Vernam 7E or Reward 6E can be applied within 10 days before planting and should be incorporated immediately. The broadcast rate is 2⅓ to 3½ pints of Vernam 7E, 20 to 30 pounds of Vernam 10G, or 2⅔ to 4 pints Reward 6E per acre. Vernam or Reward plus Treflan is labeled at the rate of 1 pint of Treflan plus 2⅓ to 3 pints of Vernam 7E or 2⅔ to 4 pints Reward 6E per acre. The combination may reduce the risk of injury to soybeans. For yellow nutsedge and velvetleaf control, use at least 3 pints of Vernam 7E or 3⅓ pints of Reward 6E per acre. Other labeled combinations include Vernam or Reward plus Amiben, Sonalan, Prowl, Lasso, Furloe, Treflan/Sencor or Lexone. Reward and Vernam can be applied with liquid fertilizer or impregnated on dry bulk fertilizer.

Preplant or preemergence herbicides

Prowl (pendimethalin) can be applied within 60 days before planting soybeans or applied after planting when used alone; Prowl with Sencor or Lexone can be applied within 7 days before planting soybeans or applied after planting. (See the subsection about preemergence herbicides.) Preplant treatments should be incorporated within 7 days of application. Mechanical incorporation may not be necessary if adequate rainfall occurs. Rates are 1 to 3 pints of Prowl 4E per acre, although rates for combinations with Sencor or Lexone are lower than when the herbicide is used alone.

Prowl (pendimethalin) may be applied preemergence in combination with Amiben, Lorox, Lexone, or Sencor. When applied to the soil surface, Prowl may cause stem callusing, which can lead to soybean lodging. (For more information, see the subsection about preplant herbicides.)

Lasso (alachlor) or Dual (metolachlor) may be applied to soybeans as a preplant incorporated or preemergence treatment. Lasso may be applied within one week of planting. In a single treatment, Dual may be applied to the soil surface early preplant within 30 days before planting. Or a two-thirds rate can be used within .45 days of planting, along with a one-third rate at planting. Soybeans are quite tolerant of Lasso or Dual. The first- to second-trifoliolate leaves often appear crinkled and have a drawstring effect on the middle leaflet, but these symptoms should not cause concern.

Lasso or Dual controls annual grasses and pigweed and can help control nutsedge and black nightshade. These herbicides can be combined with Lexone, Sencor,

or Amiben (incorporated or preemergence) and with Lorox (preemergence only) to improve broadleaf weed control.

The rate for Lasso is 2 to 4 quarts Lasso 4E or Microtech 4L or 16 to 26 pounds of Lasso II 15G per acre. The rate for Dual 8E is 1½ to 4 pints per acre, and the rate for Dual 25G is 6 to 12 pounds per acre. Use the higher amount for the soil when incorporating or when black nightshade or yellow nutsedge is to be controlled. The rate for combinations is slightly less than that for the herbicide used alone (see labels). Lasso may be applied after soybean emergence but before soybeans pass the unifoliolate stage.

Amiben (chloramben) can control annual grasses and many broadleaf weeds in soybeans when used at the full rate. Do not expect control of cocklebur or annual morningglory. Control of velvetleaf and jimsonweed is often erratic. Amiben occasionally injures soybeans, but usually the damage does not affect yield. Injured plants may be stunted and have abnormal, shortened roots. If rain does not occur within 3 to 5 days of an Amiben preemergence application, a rotary hoe should be used over the field. Amiben is best suited to soils that have more than 2.5-percent organic matter.

Amiben can be applied alone or with Dual, Lasso, or Prowl as a preplant incorporated or preemergence treatment. Amiben plus Sencor can also be mixed with Lasso, Dual, or Prowl as a preplant or preemergence treatment. Amiben can be applied as a preemergence treatment with Lorox, Lexone, or Sencor.

The broadcast rate for Amiben alone is 20 to 30 pounds of 10G, 4 to 6 quarts of 2S, or 2.4 to 3.6 pounds of 75DS per acre. The Amiben rate in combination is 3 to 6 quarts of 2S (1.8 to 3.6 pounds of 75DS) per acre. Use the higher rate where black nightshade, velvetleaf, or common ragweed is a problem weed.

Sencor or Lexone (metribuzin) can be applied any time during the 2 weeks before planting and can be incorporated with Command, Dual, Lasso, Prowl, Sonalan, or Treflan. Incorporation should distribute the herbicide evenly throughout the top 2 inches of soil. Sencor or Lexone can be applied preemergence by itself or with Amiben, Dual, Lasso, Prowl, or Surflan.

Sencor or Lexone can control many annual broadleaf weeds but does not control annual morningglory. Control of giant ragweed, jimsonweed, and cocklebur is marginal at the reduced rates necessary to minimize soybean injury.

Accurately adjust rates according to soil conditions. *Do not apply to sandy soil that is low in organic matter.* Combinations allow for reduced rates and thus reduce risk of soybean injury. The combination rate of Sencor or Lexone is one-half to one pint of 4L or one-third to two-thirds pound of 75DF. You can use higher amounts as a split preplant and preemergence application. The higher amounts can improve broadleaf control but also increase the risk of soybean injury.

One symptom of soybean injury is yellowing (chlorosis) of the lower leaves at about the first-trifoliolate stage or later; it may be followed by browning of leaves and death of plants, depending upon the severity of the injury. Seedling diseases, weather stress, and atrazine carryover may increase the possibility of soybean injury. Injury may be greater on soils with a pH over 7.5. Accurate, uniform application and incorporation are essential. Some soybean varieties are more sensitive than others. Injury has sometimes occurred when organophosphate insecticides such as Thimet, Counter, Dyfonate, Lorsban, or Mocap were left in applicators used for corn planting and were applied to soybeans that were then being treated with metribuzin.

Turbo 8EC (metolachlor plus metribuzin) is a formulated mixture (9:2 ratio) with 6.55 pounds of metolachlor and 1.45 pounds of metribuzin per gallon. The rate is 1½ to 3½ pints per acre, depending on soil texture and organic matter.

Scepter (imazaquin) is formulated with 1.5 pounds active ingredient per gallon. The use rate is two-thirds pint or one-eighth pound of active ingredient for all methods of application — including preplant incorporated, preemergence, postemergence, and in the various combinations. Approved tank-mix combinations include Prowl, Treflan, Sonalan, Lasso, or Dual. For systems with little or no tillage, it may be used with Prowl, Lasso, or Dual; and Gramoxone, Roundup, or Bronco may be added.

It is preferable to use another herbicide with Scepter to improve grass control. Broadleaf weeds controlled by Scepter include pigweed, lambsquarters, smartweed, jimsonweed, and common ragweed. Scepter can give relatively good control of cocklebur and may help on bur cucumber. Incorporation is recommended to improve control of velvetleaf and giant ragweed. Scepter may provide partial control of ivyleaf and tall morninglories. Although labeled for postemergence use, primarily for control of pigweed and cocklebur, primary emphasis in Illinois will likely be soil-applied use.

Scepter may be soil-applied within 30 days before planting or at planting but before crop emergence. Rainfall is relatively important for good performance. Initial labeling has indicated a waiting period of 4 months before planting small grain and 11 months before planting corn or grain sorghum. Research on persistence in the soil suggests that uniform and accurate applications are important. Under certain weather or climatic conditions, excessive rates on field ends and lack of uniformity may result in some effect on sensitive crops (such as corn) the following season. Do not apply Classic, Preview, or Lorox Plus the same year as Scepter because of possible additive residual effects.

Modown (bifenox) can control pigweed, lambsquarters, and smartweed and can provide some control of velvetleaf. Modown 4F rates are 2½ to 4 pints per

pecially from preemergence use followed by cold, wet soil conditions during early growth stages. Injury symptoms are cupping and crinkling of the first few leaves. Usually, soybean injury is not reflected in yield.

Furloe Chloro IPC (chlorpropham) can be preplant incorporated with Treflan or Vernam; or it can be applied preemergence by itself or with Lasso to improve smartweed control. Preplant application should be done within a few days of planting soybeans, and incorporation should distribute the herbicide uniformly throughout the top 1 to 2 inches of soil. The rate in sequential or tank-mix combinations is 2 to 3 quarts of Furloe 4E per acre. Furloe 20G is used preemergence at 10 to 15 pounds per acre.

Preview (metribuzin plus chlorimuron ethyl) is a premix herbicide formulated as a 75-percent dry flowable in a ratio of 1 part chlorimuron ethyl to 10 parts metribuzin. It can be used preemergence in combination with Lasso, Dual, or Prowl or preplant incorporated into the top 1 or 2 inches of soil with a dinitroaniline herbicide such as Treflan or acetanilides such as Lasso or Dual. In systems with little or no tillage, Preview can be used preemergence to soybeans and postemergence to small weeds with the addition of 0.25-percent nonionic surfactant or one quart of crop oil as a burndown treatment. Preview can be applied with Roundup, Gramoxone, or Bronco for added postemergence weed control.

Preview controls a wide range of broadleaf weeds, including velvetleaf, cocklebur, jimsonweed, sunflower, pigweed, common ragweed, lambsquarters, and smartweed. Morningglory, giant ragweed, and black nightshade are controlled only partially.

Preview can be used on soils with pH of 7.0 or less with organic matter between 0.5 and 5.0 percent. Rates range from 6 to 10 ounces per acre, depending on soil texture.

When Preview is used, attention should be given to crop rotational plans. Wheat may be grown 4 months after Preview applications; but corn recropping is restricted to 10 months and sorghum to 12 months if normal rainfall occurs. Consult the Preview label for complete recropping information.

Preemergence herbicides

Lorox or Linex (linuron) is best suited to silt loam soils that contain 1- to 3-percent organic matter. *Do not apply to very sandy soils.* Linuron controls broadleaf weeds better than grass weeds. It does not control annual morningglory, and control of cocklebur and jimsonweed is variable. Accurate and uniform application and proper rate selection are necessary to minimize the risk of crop injury. Tank-mix combinations allow the use of a reduced rate of linuron to decrease the risk of soybean injury, but this reduced rate may also decrease the degree of weed control.

Linuron is registered in tank-mix combinations with Amiben, Lasso, Dual, Prowl, or Surflan to improve grass control. The rate of linuron in these combinations is 1 to 1⅔ pounds of linuron 50DF or 1 to 1⅔ pints of linuron 4L on silt loam soils that have less than 3-percent organic matter.

Surflan (oryzalin) can control annual grasses, pigweed, and lambsquarters if rainfall is adequate. You should rotary hoe to control emerging weeds if adequate rain does not fall within 7 days after application. Surflan can be used as an early preplant application for no-till soybeans. Do not use on soils that have more than 5-percent organic matter. The rate is 1 to 2 pounds per acre of Surflan 75W (¾ to 1½ quarts AS, aqueous suspension) used alone or ⅔ to 1⅔ pounds of Surflan 75W in combinations. Surflan is also available as an 85DF. Surflan can be tank-mixed with Amiben, Lorox, Lexone, or Sencor, to improve control of broadleaf weeds. Surface application may be made within 2 days after planting, prior to emergence. Surflan may cause stem callusing, which can lead to soybean lodging. Do not allow Surflan to contact the soybean seed. For no-till soybeans, Surflan can be applied in fall or early spring over undisturbed stubble from the previous crop. When combined with 2,4-D, it may be applied prior to 30 days before planting.

Prowl (pendimethalin) may be applied preemergence in combination with Amiben, Lorox, Lexone, or Sencor. When applied to the soil surface, Prowl may cause stem callusing, which can lead to soybean lodging. (For more information, see the subsection about preplant herbicides.)

Lorox Plus (linuron plus chlorimuron ethyl) is a 60-percent, premixed, dispersible granule formulation with linuron and chlorimuron ethyl in a 16:1 ratio. Lorox Plus can be used preemergence in combination with Lasso or Dual or following preplant incorporated applications of grass control herbicides such as Treflan or Prowl. Use in the Midwest should be restricted to soils with pH of 6.8 or lower and with ½- to 3-percent organic matter. Consult the label for further information on soil restrictions.

Lorox Plus controls a variety of broadleaf weeds including cocklebur, velvetleaf, jimsonweed, pigweed, common ragweed, and smartweed. Control of annual morningglory, giant ragweed, and sunflower is partial.

Before using Lorox Plus, consider crop rotational plans. In the Midwest, wheat may be grown 4 months after applications of Lorox Plus, corn or sorghum after 10 months, if Lorox Plus is applied before June 15. Consult the Lorox Plus label for complete information on rotational cropping restrictions.

Postemergence herbicides

Research suggests that soybean yields will probably not be reduced if weeds are controlled within 3 to 4 weeks after the soybeans are planted. Postemergence herbicides are most effective when their use is part of a planned program and when they are applied while the weeds are young and tender; they should not be considered simply as emergency treatments. It is especially important to use timely treatments when using

postemergence herbicides in narrow-row soybeans. Postemergence herbicides have been helpful for controlling some problem weeds such as cocklebur, annual morningglory, and volunteer corn. It is important to know what specific weeds are present in the field and the size of those weeds. Select herbicides and rates accordingly. Usually, smaller weeds are easier to control.

Registered combinations are shown in Table 4. For more information about conditions affecting application, see the section entitled "Postemergence herbicide principles" and refer to labels.

Basagran (bentazon) can control many broadleaf weeds, such as cocklebur, jimsonweed, and velvetleaf; but it is weak on pigweed, lambsquarters, and annual morningglory. It can be used at higher rates for control of yellow nutsedge and Canada thistle. It does not control annual grasses.

The suggested rate for Basagran is three-fourths to one quart per acre, depending on the weed size and species. Specifics on weed size and rates are indicated on the label. Application, however, preferably should be made when weeds are small (no more than 2 to 3 inches tall) and actively growing. These conditions usually exist when the soybeans are in the unifoliolate to second-trifoliolate stage or within 2 to 3 weeks of planting. Spraying during warm, sunny weather can also improve performance. Do not spray if rain is expected within 8 hours. Use a minimum of 20 gallons of water per acre and 40 psi spray pressure to get complete weed coverage. Adding a crop-oil concentrate to Basagran may increase performance on most weeds but may cause some soybean injury. Morningglory that is up to 10 inches long can be controlled with the addition of 2 fluid ounces of 2,4-DB (Butyrac 200) with Basagran. Do not add crop oil when mixing with 2,4-DB. Do not mix or apply Basagran with other pesticides or liquid fertilizer except as specified on the product label.

A 28-percent UAN (urea ammonium nitrate) solution — commonly referred to as 28-percent nitrogen solution — may be added to the spray mixture instead of crop-oil concentrate for improved velvetleaf control. The UAN solution may be added to the tank with Basagran plus Blazer when velvetleaf is the primary target weed. Do not use brass or aluminum nozzles when spraying Basagran and 28-percent nitrogen solution.

Basagran may be applied as a split application of one pint plus one pint per acre. Apply the first pint of Basagran before weeds reach the maximum size or leaf stage as indicated on the label. Make the second application of one pint 10 to 14 days after the first application.

Blazer or Tackle (acifluorfen) should be applied when broadleaf weeds are in the 2- to 4-inch stage and actively growing. Weeds controlled include annual morningglory, pigweed, jimsonweed, and black nightshade. Cocklebur and morningglory control can be improved with the addition of 2 fluid ounces of 2,4-DB. Apply the mixture when cocklebur and morningglory measure no more than 10 or 12 inches. Surfactant addition is recommended when combining Blazer and 2,4-DB, but not with Tackle plus 2,4-DB.

The rate is 2 pints of Blazer 2L or Tackle per acre. Blazer requires the addition of a nonionic surfactant at a minimum of 1 pint per 100 gallons of spray. Use of surfactant is also recommended with Tackle. The rate of surfactant may be increased to 2 to 4 pints per acre to improve control of small escaped grasses.

Because Blazer and Tackle are contact herbicides, leaf burn often occurs; however, the crop usually recovers within 2 to 3 weeks. With Blazer, do not spray if rain is expected within 6 hours; with Tackle, do not spray if rain is expected within 4 to 6 hours.

Basagran plus Blazer or Tackle provides a means of broadening the spectrum of control because Blazer or Tackle is better on pigweed and annual morningglory, while Basagran is better on cocklebur. The rate is 1 to 2 pints of each product in the combination. Addition of an adjuvant (crop-oil concentrate or surfactant) is suggested. To improve velvetleaf control with Blazer plus Basagran, one quart of 10-34-0 liquid fertilizer or 28-percent nitrogen solution at labeled rate can be used to replace the surfactant or crop-oil concentrate (COC). Do not add COC when using 10-34-0 or 28-percent nitrogen solution. A mixture of Blazer plus Basagran plus 2 fluid ounces of the amine formulation of 2,4-DB can be used to improve control of cocklebur and morningglory under dry weather conditions. Do not add COC or any other additives when using 2,4-DB with Basagran plus Blazer. Refer to individual product labels for specifics.

Classic (chlorimuron ethyl) is formulated as a 25-percent dispersible granule for spraying in a minimum of 10 gallons of water per acre postemergence. It can be applied from after crop emergence to 60 days before soybean maturity. Aerial application is not included on initial labeling. The rate is one-half to three-fourths ounce of product per acre, equivalent to one-eighth to three-sixteenths ounce active ingredient. Do not exceed one ounce per season if more than one application is made.

Classic can control pigweed, cocklebur, smartweed, jimsonweed, common ragweed, and common (wild)

Table 4. Registered Postemergence Herbicide Combinations for Broadleaf Weed Control in Soybeans

	Amiben	Basagran	Blazer	2,4-DB
Alanap	X	—	—	X
Amiben		—	X	X
Basagran	—		X	X
Blazer	X	X		X
Classic	—	—	X	—
Tackle	—	X	—	X

X = Registered
— = Not registered

sunflower. It can also help to control ivyleaf morningglory, tall morningglory, and yellow nutsedge. It should be applied when most weeds are 2 to 4 inches tall, but when morningglories and giant ragweed are 1 to 2 inches tall. It can be applied to common sunflower up to 8 inches tall and to cocklebur up to 12 inches tall. Control of velvetleaf is weak; and it does not control lambsquarters, prickly sida, or venice mallow. Control of black nightshade is questionable, and Classic does not appear to control bur cucumber. Another herbicide should be programmed for control of grass weeds, and provision for control of lambsquarters should be considered.

A surfactant at 0.25 percent by volume should be used with Classic. Apply within 24 hours of mixing; and, if the mixture is allowed to settle during this time, re-agitate well. Classic may cause some temporary yellowing and retardation of soybean growth, with these effects generally most evident 5 to 7 days after application to soybeans under stress. Conditions that put weeds under stress, such as cultivation, may decrease effectiveness. Do not apply Classic if rain is expected within 4 hours.

Determine soil pH before applying Classic, and do not apply to soils with a pH over 6.8. Do not plant wheat within 3 months after application of Classic; do not plant corn or sorghum within 9 months. If Classic is applied after August 1, do not plant corn the next season and do not plant sorghum within 11 months. If Classic is used following Preview or Lorox Plus, the interval before planting corn or sorghum will be extended. Be certain that the correct rate of Classic is applied very uniformly because the residual from excessive rates may affect subsequent crops, such as corn.

Classic may be tank-mixed with Blazer according to label instructions. Do not mix with any other crop production chemicals except as directed by the label. If Scepter is used the same season as Classic, do not recrop (except to soybeans) within 18 months of the last herbicide application. When corn injury occurs, it may be evident when corn is 8 to 10 inches tall, with some stunting and color change.

Amiben (chloramben) can be used for postemergence application on soybeans in the cracking to fourth-trifoliolate stage, but only within 33 days after planting. This treatment can be especially helpful in controlling velvetleaf; but smartweed, common ragweed, and pigweed may also be controlled or suppressed. Velvetleaf may be 1 to 8 inches tall, and the others may be 1 to 3 inches tall. For ground applications, 10 to 20 gallons of water per acre, a spray pressure of 30 psi, and flat-fan nozzle tips are suggested. The rate of Amiben 2S alone is 6 quarts; it is 5 to 6 quarts per acre in combination with either 2 to 3 fluid ounces of Butyrac 200, 2 to 3 quarts of Alanap, or 1½ to 2 pints of Blazer per acre. Crop-oil concentrate should be used at one quart per acre with the Amiben alone or tank-mixed with Alanap. Do not add crop oil when tank-mixing with Butyrac. The Amiben plus Alanap or 2,4-DB should be applied when soybeans are in the third- to sixth- trifoliolate stage. Apply the Amiben tank-mixed with Blazer at the appropriate rate for the weed size indicated on the Blazer label, but within 33 days after planting. If Amiben is also soil-applied, do not use more than a total of 12 quarts per season.

Rescue (naptalam plus 2,4-DB) can be used for midseason to late-season postemergence control of cocklebur, giant ragweed, and wild sunflower; it may also suppress annual morningglory. Apply 3 quarts per acre after soybeans are about 14 inches tall or after first bloom. The addition of a crop-oil concentrate or surfactant can improve control. Application before the weeds flower is suggested for best control. The water volume per acre is 10 to 25 gallons for ground application and a minimum of 5 gallons for aerial application. If rain occurs within 6 hours, effectiveness may be reduced. Activity may not be very noticeable until 10 to 14 days after application; maximum activity should occur 20 to 30 days after application. Crop injury such as leaf twisting and terminal droop may occur. To avoid possible yield losses, do not apply Rescue to soybeans under stress from drought, disease, or injury from another herbicide. *Do not apply Rescue within 60 days of harvest.*

Poast (sethoxydim) can be used for postemergence control of annual and perennial grasses in soybeans. The rate is one pint per acre to control foxtails or most other annual grasses that are 3 to 8 inches tall. Apply one-half pint per acre when wild proso millet is 4 to 10 inches tall. For control of volunteer cereals as tall as 6 inches, apply 1½ pints per acre before tillering. Poast is not recommended for spring control of volunteer cereals that emerged the previous fall. Wirestem muhly up to 6 inches tall can usually be controlled by a single application of 1¼ pints per acre. Poast can also be used as a rescue treatment for controlling selected annual grasses. Apply Poast at a rate of 1½ pints per acre for control of actively growing foxtails or seedling johnsongrass (up to 16 inches tall), fall panicum or barnyardgrass (up to 12 inches tall), and crabgrass or goosegrass (up to 8 inches tall). For control of actively growing wild proso millet up to 24 inches tall, apply Poast at one pint per acre.

The addition of ammonium sulfate in the spray solution at 2½ pounds per acre may improve grass control. Use high-quality, readily soluble ammonium sulfate to avoid plugging spray nozzles. Components of the tank-mixture should be added slowly, with agitation, in the following sequence: (1) ammonium sulfate, (2) crop-oil concentrate, and (3) Poast. After use, rinse the entire spray system with water to reduce corrosion.

Use 5 to 20 gallons of spray solution per acre for ground application and a minimum of 5 gallons per acre for aerial application. Note that the lower application volumes often result in more consistent control

of grass weeds. Use only standard high-pressure hollow-cone or flat-fan nozzles, with pressure at the nozzle adjusted to a minimum of 40 psi and a maximum of 60 psi. Always add crop-oil concentrate at 2 pints per acre. Do not cultivate within 5 days before Poast application or within 7 days after application.

Poast can be tank-mixed with Basagran, provided the Poast rate is increased by 50 percent to compensate for the reduced grass control that often occurs with this treatment. Sequential applications at least 24 hours apart may be more economical and practical, depending upon the weeds to be controlled and their size. Do not apply Poast if rainfall is expected within 1 hour. Do not apply Poast to grasses under stress from hot, dry weather or herbicide injury.

Blazer may be tank-mixed with Poast (Blazer label) for postemergence control of broadleaf and annual grass weeds in soybeans. For fall panicum and giant foxtail that are 3 to 8 inches tall, the rate per acre is 1½ to 2 pints of Blazer plus 1 pint of Poast plus 2 pints of crop-oil concentrate. For other annual grasses listed on the Poast label, increase the rate of Poast by 50 percent. Sequential applications should always be used instead of the tank-mixtures for perennials and may be more economical for many annuals.

Fusilade 2000 (fluazifop) can be used for postemergence control of annual and perennial grass weeds in soybeans. And it is very effective on volunteer corn. Apply only to actively growing grasses before they tiller. The rate is 1½ pints per acre when giant foxtail is 2 to 6 inches tall and other annual grass weeds are 2 to 4 inches tall. Use ¾ pint per acre when volunteer corn is 12 to 24 inches tall, shattercane is 6 to 12 inches tall, or wild proso millet is 6 to 12 inches tall. For control of volunteer cereals, apply 1 pint per acre before plants are 2 to 6 inches tall. To control wirestem muhly, apply 1½ pint per acre when plants are 4 to 12 inches tall. Fusilade can also control johnsongrass and quackgrass, but sequential applications may be needed. (See the section entitled "Specific weed problems.")

The spray volume should be a minimum of 10 gallons per acre for ground application and 5 gallons per acre for aerial application. Add either crop-oil concentrate at one percent by volume (1 gallon per 100 gallons of spray) or a nonionic surfactant at 0.25 percent of spray volume. For aerial application, add one pint of crop-oil concentrate or surfactant per acre. Apply before soybeans bloom. *Do not tank-mix Fusilade with other postemergence herbicides intended for control of broadleaf weeds, except as specified.* A tank-mix of Fusilade 4E and Blazer 2L is labeled for use without an increase in the Fusilade rate.

Roundup (glyphosate) can be applied through several types of selective applicators — recirculating sprayers, wipers, or rope wicks. This application is particularly useful for control of volunteer corn, shattercane, and johnsongrass. Roundup may also suppress hemp dogbane and common milkweed. Weeds should be at least 6 inches taller than the soybeans. Avoid contact with the crop. Equipment should be adjusted so that the lowest spray stream or wiper contact is at least 2 inches above the soybeans. For equipment calibration, refer to the Roundup label. For recirculating sprayers and wipers, use the rates given on the label. For rope-wick applicators, mix 1 gallon of Roundup in 2 gallons of water. A spot treatment with Roundup is also a good option in many fields. For application made on a spray-to-wet basis, use a 1- to 2-percent solution of Roundup in water. For motorized spot treatments in which coverage of weeds may be less than complete, use a 5-percent solution. Avoid contact of the spray with the soybeans. Add a dye for increased visibility.

Gramoxone harvest aid

Gramoxone is registered for drying weeds in soybeans just before harvest. For indeterminate varieties of soybeans (most varieties planted in Illinois), apply when 65 percent of the seed pods have reached a mature brown color or when seed moisture is 30 percent or less. For determinate varieties, apply when at least one-half of the leaves have dropped and the rest of the leaves are turning yellow.

For the new formulation of Gramoxone Super with 1.5 pounds active ingredient per gallon, the rate is 11 to 21 fluid ounces per acre. Use the high rate on cocklebur. The total spray volume per acre is 2 to 5 gallons for aerial application and 20 to 40 gallons for ground application. Add 1 quart of nonionic surfactant per 100 gallons of spray. Do not pasture livestock within 15 days of treatment; and remove livestock from treated fields at least 30 days before slaughter.

Specific weed problems

Yellow nutsedge

Yellow nutsedge is a perennial sedge with a triangular stem. It reproduces mainly by tubers, which begin sprouting about May 1 in central Illinois. For the most effective control, soil-applied herbicides should be incorporated into the top 2 inches of the soil.

For soybeans, a delay in planting until late May allows time for two or three tillage operations to destroy many nutsedge sprouts. These operations help deplete food reserves in nutsedge tubers. Row cultivation is helpful. Preplant incorporated applications of Dual, Lasso, or Reward will also help.

Lasso (alachlor) preplant incorporated at 1½ to 4 quarts per acre can often give good control for nutsedge.

Dual (metolachlor) can be applied at 2 to 3 pints per acre to control nutsedge. Preplant incorporated treatment is preferred to treatment at the preemergence stage.

Reward 6E (vernolate) applied preplant at 4 pints per acre is effective against yellow nutsedge. Immediate incorporation is necessary with Reward.

Basagran (bentazon) applied postemergence can also help control nutsedge in soybeans. When nutsedge is 6 to 8 inches tall, three-fourths to one quart per acre can be applied. If needed, a second application can be made 7 to 10 days later. The addition of a crop-oil concentrate to Basagran improves performance.

For corn that is planted relatively early, preplant tillage before nutsedge sprouts is of little help in control. Timely cultivation gives some control, but a program of herbicides plus cultivation has provided the most effective control of nutsedge.

Several preplant treatments are available. **Eradicane Extra** at 5⅓ to 8 pints or **Eradicane, Sutan+**, or **Genate Plus** at 4¾ to 7⅓ pints per acre is effective for control of yellow nutsedge in corn. These products must be incorporated immediately. **Lasso** or **Dual** applied in corn as for soybeans can also be quite effective.

The combinations of Lasso, Dual, Sutan+, Genate Plus, Eradicane, or Eradicane Extra incorporated with atrazine may improve control of nutsedge while also controlling broadleaf weeds.

Atrazine or Bladex (cyanazine) may be used as a postemergence spray to control emerged yellow nutsedge when it is small. Split applications of atrazine plus oil have been more effective than single applications. **Basagran** may be used in corn in a manner similar to that for soybeans. **Lorox or Linex (linuron)** as a directed postemergence spray has also given some control.

Johnsongrass

Johnsongrass can reproduce both from seeds and by rhizomes. Both chemical and cultural methods are needed to control johnsongrass rhizomes.

Much of the rhizome growth occurs after the johnsongrass head begins to appear. Mowing, grazing, or cultivating to keep the grass less than 12 inches tall can reduce rhizome production significantly.

Control of johnsongrass can also be improved with tillage. Fall plowing and disking bring the rhizomes to the soil surface, where many of them are winter-killed. Disking also cuts the rhizomes into small pieces, making them more susceptible to chemical control.

Johnsongrass rhizomes can be controlled or suppressed with the use of certain herbicides in various cropping programs. Several herbicides can provide control of johnsongrass seedlings in soybeans or corn. (See the table at the end of this guide.)

Treflan (trifluralin) or Prowl (pendimethalin) used in a 3-year soybean program has been fairly successful in controlling rhizome johnsongrass. Either can be used at 1½ to 2 times the normal rate each year for 2 years; in the third year, either they are used at the normal rate or another suitable herbicide is used before a regular cropping sequence is resumed. Thorough preplant tillage and incorporation are necessary for satisfactory control. Be certain not to plant crops such as corn or sorghum the year following application of these herbicides at the higher rates.

Fusilade 2000 (fluazifop) can control johnsongrass in soybeans. Apply 1½ pints per acre when the weed is 8 to 18 inches tall. Apply before the boot stage of growth. If new shoots or regrowth occurs, make a second application of one pint per acre when johnsongrass is 6 to 12 inches tall. Add crop-oil concentrate at 1 percent of volume or add nonionic surfactant at 0.25-percent volume.

Poast (sethoxydim) can control johnsongrass in soybeans. Apply 1½ pints of Poast plus 1 quart crop-oil concentrate per acre when the johnsongrass is 15 to 25 inches tall. Use of ammonium sulfate at 2½ pounds per acre, in addition to the crop-oil concentrate with Poast, and use of low spray volume of 5 to 10 gallons per acre are suggested for best control. If regrowth or new growth occurs, apply one pint per acre when the johnsongrass is 6 to 12 inches tall.

Eradicane Extra can help control rhizome johnsongrass in corn when used at a rate of 8 pints per acre with a tillage program; or Eradicane 6.7E can be used at 7⅓ pints per acre.

Roundup (glyphosate) can be used as a spot treatment to control johnsongrass in corn, soybeans, or sorghum. Apply a 1-percent solution when johnsongrass has reached the boot to head stage and is actively growing. Use of Roundup in rope-wick applicators or recovery-type sprayers is effective for control of johnsongrass in soybeans. (See the section entitled "Herbicides for soybeans," the subsection about postemergence herbicides.)

Roundup may be applied in small-grain stubble when johnsongrass is in the early head stage. Fall applications should be made before the first frost. At least 7 days should be allowed after treatment before tillage.

Quackgrass

Quackgrass is a perennial grass with shallow rhizomes. In Illinois, it is found primarily in the northern part.

Atrazine is quite effective when used as a split application in corn. Apply 2 quarts of atrazine 4L per acre in the fall or spring and plow 1 to 3 weeks later. Another 2 quarts per acre should be applied as a preplant or preemergence treatment. Postemergence application is usually less effective. A single treatment with 3 to 4 quarts per acre can be applied either in the spring or fall 1 to 3 weeks before plowing, but the split application usually gives better control of annual weeds. Use equivalent rates of other formulations. If more than 3 pounds of atrazine active ingredient is applied per acre, plant no crops other than corn or sorghum the next year.

Eradicane Extra can be used to suppress quackgrass in corn if more flexibility in cropping sequence is desired. A rate of 5⅓ pints per acre of Eradicane Extra can be used on light infestations, while 8 pints per acre is suggested for heavier infestations. Some risk of injury to corn occurs, especially at the higher rate. A tank-mix with atrazine should improve control. If Eradicane 6.7E is used, the rate range is from 4¾ to 7⅓ pints per acre.

Fusilade 2000 (fluazifop) may be used for quackgrass control in soybeans at 1½ pints per acre. Apply when quackgrass is 6 to 10 inches tall. If regrowth occurs, a second application of one pint per acre may be made. Best results are obtained with Fusilade and most other treatments if rhizomes are cut up by preplant tillage to stimulate maximum emergence of grass shoots. Always add crop-oil concentrate or nonionic surfactant to Fusilade.

Poast (sethoxydim) may be applied in soybeans at the rate of 2½ pints plus 1 quart of crop-oil concentrate per acre when quackgrass is 6 to 8 inches tall. If regrowth occurs or new plants emerge, apply 1½ pints per acre when the quackgrass is 6 to 8 inches high.

Roundup (glyphosate) may be used for controlling quackgrass before planting corn, sorghum, or soybeans. Apply 1 to 3 quarts per acre when quackgrass is 8 inches tall and actively growing (fall or spring). For annual cropping systems, apply 1 quart per acre in 5 to 10 gallons of spray with surfactant added. Delay tillage for at least 3 days after application.

Wirestem muhly

Primarily, wirestem muhly is a problem in northern and western Illinois. A perennial, it reproduces by seeds and scaly rhizomes. These rhizomes are often moved by chisel plows, field cultivators, and shovel cultivators. Many farmers report that delayed seedbed preparation, where possible, can provide some control of wirestem muhly; but wirestem muhly does not start growth until late spring.

Roundup (glyphosate) can be used early preplant (early June) or after harvest when wirestem muhly is at least 8 inches tall and actively growing. Do not till before fall or spring applications. The rate is 1 quart of Roundup in 5 to 10 gallons of water per acre, with surfactant added at 2 to 4 quarts per 100 gallons. Use flat-fan nozzles. After applying, wait 3 days before tilling.

Atrazine at high rates may provide a little help on wirestem muhly in corn. Rates must be at the highest labeled rates for soil. (See the subsection about quackgrass.)

Fusilade (fluazifop) may be used postemergence to control wirestem muhly in soybeans. The rate is 1½ pints per acre when wirestem muhly plants are 4 to 12 inches tall.

Poast (sethoxydim) may also be used postemergence in soybeans to control wirestem muhly that is 6 inches tall. The rate is 1½ pints per acre. Addition of ammonium sulfate at 2½ pounds per acre and a low spray volume of 5 to 10 gallons per acre are suggested to improve control. (See the section entitled "Herbicides for soybeans," the subsection about postemergence herbicides, for more information about Poast and Fusilade.)

Canada thistle

Canada thistle is a perennial weed that has large food reserves in its root system. Canada thistle has several varieties, which differ not only in appearance but also in their susceptibility to herbicides.

2,4-D may give fairly good control of some strains. Rates will depend on where the thistle is growing. For example, higher rates can be used in grass pastures or in noncrop areas than can be used in corn.

Banvel (dicamba) often is a little more effective than 2,4-D and may be used alone or in combination with 2,4-D. Banvel can be used as an after-harvest treatment in wheat, corn, or soybean fields or in fallow fields. Rates vary from 1 to 2 quarts of Banvel alone or in tank-mix combinations with 2,4-D or Roundup. Fall treatments should be applied before killing frosts. For best results, thistles should be fully emerged and actively growing. Fields treated in the fall with Banvel may be planted to corn, sorghum, or wheat the next season.

Atrazine and oil applied postemergence has been fairly effective in controlling Canada thistle in corn. Make the application before thistles are 6 inches tall.

Basagran (bentazon) can be used for control of Canada thistle in soybeans or corn when the thistles are 8 to 12 inches tall. Apply three-fourths to one quart per acre in a single application; or, for better control, make two applications of three-fourths to one quart per acre each, 7 to 10 days apart.

Roundup (glyphosate) can be used at 2 to 3 quarts per acre when Canada thistle is at or beyond the early bud stage. Fall treatments must be applied before frost for best results. Allow at least 3 days after application before tillage.

Black nightshade

Increasingly, black nightshade has become a problem for Illinois soybean growers. The berries, which are about the same size as soybeans at harvest, contain a sticky juice that can gum up a combine.

Black nightshade can be controlled more easily in corn than in soybeans. Herbicides such as atrazine, Bladex, Banvel, Lasso, and Dual are helpful for controlling this weed in corn.

If possible, plant suspect fields to corn rather than to soybeans. If soybeans are planted, plant suspect fields last so that the herbicide is more nearly at full strength when nightshade seed germinates.

For control in soybeans, Lasso, Dual, Amiben, or

Table 5. Relative Effectiveness of Herbicides on Major Weeds

This table gives a general comparative rating. Under unfavorable conditions, some herbicides rated good or fair may give erratic or poor results. Under very favorable conditions, control may be better than indicated. Type of soil is also a very important factor to consider when selecting herbicides. Rate of herbicide used also will influence results. G = good, F = fair or variable, and P = poor.

	Grasses								Broadleaf weeds									
	Crop tolerance	Foxtail	Barnyardgrass	Crabgrass	Fall panicum	Johnsongrass seedlings or Shattercane	Volunteer corn	Yellow nutsedge	Annual morningglory	Cocklebur	Jimsonweed	Lambsquarters	Nightshade, black	Pigweed	Ragweed, common	Ragweed, giant	Smartweed	Sunflower, wild	Velvetleaf
SOYBEANS																			
Prelant																			
Command	G	G	G-F	G	G	F	F	F	P	F	G	G	P	P	F-G	P	G	P	G
Treflan, Sonalan	F-G	G	G	G	G	G	F	P	P-F	P	P	G	P-F	G	P	P	P-F	P	P
Sencor, Lexone + dinitroaniline	F	G	G	G	G	G	F	P	F	F	F-G	G	P	G	G	F	G	F	F-G
Vernam, Reward	F	G	G	G	G	G	P-F	F	P-F	P	P	F	P	G	P	P	P	P	F
Preplant or preemergence																			
Amiben	F-G	G	F-G	F-G	F-G	F	P	P	P	P	P-F	G	F-G	G	F-G	F	F-G	P	F
Lasso, Dual	G	G	G	G	G	P-F	P	F-G	P	P	P	F	F-G	G	P-F	P	P-F	P	P
Lasso or Dual + Sencor or Lexone	F	G	G	G	G	P	P	F	P	F	F-G	G	F-G	G	F	F	G	F	F-G
Lasso or Dual + Lorox,[1] Linex[1]	F	G	G	G	G	P	P	P-F	P	F	F	G	F-G	G	G	F	G	F	F
Lorox,[1] Linex[1]	F	F	F	F	F	P	P	P	P	F	F	G	F	G	G	F	G	F	F-G
Surflan,[1] Prowl	F-G	G	G	G	G	G	F	P	P-F	P	P	G	P	G	P	P	P-F	P	P-F
Scepter	G	F-G	F	F	P-F	F	F	F	F	G	G	G	F-G	G	G	F-G	G	G	F-G
Scepter + Prowl, Treflan, or Sonalan	G	G	G	G	G	G	F	F	F	G	G	G	F-G	G	G	F-G	G	G	F-G
Scepter + Lasso or Dual	G	G	G	G	G	F	F	F-G	F	G	G	G	G	G	G	F-G	G	G	F-G
Sencor, Lexone	F	F	F	F	F	P	P	P	P	F	F-G	G	P	G	F-G	F	G	F	F-G
Postemergence																			
Basagran	F-G	P	P	P	P	P	P	F	P-F	G	G	F-P	P	P	F	F	G	G	F-G
Blazer, Tackle	F	P-F	P	P-F	P	P	P	P	F-G	F	G	F-P	F-G	G	F-G	F-G	G	F	P-F
Classic	F-G	P	P	P	P	P	P	F	F	G	G	P	P	G	G	F-G	G	G	F
2,4-DB	P-F	P	P	P	P	P	P	P	F-G	G	P-F	F	P	F	F	F	P	F	P
Poast, Fusilade	G	G	G	G	G	G	G	P	P	P	P	P	P	P	P	P	P	P	P
Rescue	F-G	P	P	P	P	P	P	P	F	G	F	P-F	P	F-G	P	G	P	G	P

[1] Do not use for preplant incorporation.

linuron at full rates or a combination of Amiben or linuron with Lasso or Dual is helpful. Scepter can also be effective. Suspect fields should be monitored and a postemergence application of Blazer considered. Blazer 2L at 2 pints per acre can control nightshade when applied at the 2- to 4-leaf stage. Tackle is also effective.

Harvest-aid sprays generally do not solve the problem because they do not make the berries fall before the soybeans are harvested.

Additional information

Not all available herbicides and herbicide combinations are mentioned in this guide. Some are relatively new and are still being tested. Some are not considered to be well adapted to Illinois or are not used very extensively. For additional information about field crop weed control, consult your county Extension adviser or write to the Department of Agronomy, University of Illinois at Urbana-Champaign, N-305 Turner Hall, 1102 South Goodwin Avenue, Urbana, Illinois 61801.

Table 5. Relative Effectiveness of Herbicides on Major Weeds (continued)

	Grasses								Broadleaf weeds										
	Crop tolerance	Foxtail	Barnyardgrass	Crabgrass	Fall panicum	Johnsongrass seedlings or Shattercane	Volunteer corn	Yellow nutsedge	Annual morningglory	Cocklebur	Jimsonweed	Lambsquarters	Nightshade, black	Pigweed	Ragweed, common	Ragweed, giant	Smartweed	Sunflower, wild	Velvetleaf
CORN																			
Preplant																			
Butylate, EPTC	F-G	G	G	G	G	F-G		F-G	P	P	P	P-F	F	G	P	P	P	P	F
Butylate, EPTC + atrazine, Bladex	F-G	G	G	G	G	F-G		F-G	F-G	F-G	G	G	G	G	G	F	G	F-G	F-G
Princep + atrazine	G	F-G	F-G	F	F	P-F		P	F-G	F-G	G	G	G	G	G	G	G	G	F
Preplant or preemergence																			
Atrazine	G	F-G	F	P	P	P		F	G	F-G	G	G	G	G	G	G	G	G	F-G
Bladex	F-G	F-G	F-G	F-G	G	P		P	F	F-G	G	G	G	F	G	F-G	G	F-G	F-G
Bladex + atrazine	F-G	F-G	F	F	F-G	P		P	F-G	F-G	G	G	G	G	G	F-G	G	F-G	F-G
Lasso, Dual	F-G	G	G	G	G	P-F		F-G	P	P	P	F	F-G	G	P-F	P	P-F	P	P
Lasso or Dual + atrazine or Bladex	F-G	G	G	G	G	P		F-G	F-G	F	G	G	G	G	G	F	G	F-G	F
Prowl + atrazine or Bladex[1]	F	G	G	G	G	F		P	F-G	F	G	G	G	G	G	F	G	F-G	F-G
Ramrod[1]	G	G	F	F-G	F	P		P-F	P	P	P	F	P	G	P	P	P	P	P
Postemergence																			
Atrazine + oil	F-G	F-G	G	P	P	P		F	G	G	G	G	G	G	G	F	G	G	G
Banvel	F-G	P	P	P	P	P		P	G	G	G	G	G	G	G	G	G	G	F
Basagran	G	P	P	P	P	P		F	P-F	G	G	F-P	P	P	F	F	G	G	F-G
Bladex	F-G	G	G	F	F-G	P		F	F	F-G	G	F	G	F-G	G	F	G	F	F-G
Buctril, Brominal	F-G	P	P	P	P	P		P	G	G	G	G	G	F	G	F	G	F-G	F
Tandem + atrazine	G	G	G	F	P	P		F	G	G	G	G	G	G	G	G	G	G	G
2,4-D	F	P	P	P	P	P		P	G	G	F	G	F	G	G	G	P-G	G	F-G

[1] Do not use for preplant incorporation.

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