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# 1989

# WEED CONTROL GUIDE

# FOR FIELD CROPS

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COOPERATIVE EXTENSION SERVICE

MICHIGAN STATE UNIVERSITY

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# 1989 WEED CONTROL GUIDE for Field Crops

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COOPERATIVE EXTENSION SERVICE

MICHIGAN STATE UNIVERSITY

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Pesticides must be registered with the U.S. Environmental Protection Agency and the Michigan Department of Agriculture before they can be legally used in Michigan. This bulletin suggests using pesticides in the management of crop pests. Purchase only those pesticide products that are labeled for, 1.) the crop you wish to use it on and 2.) the pest you wish to manage on that crop. Remember that the pesticide label is the legal document on pesticide use. The label must be read carefully and all instructions and limitations followed closely. The use of a pesticide in a manner not consistent with the label can lead to the injury of crops, humans, animals, and the environment, and also lead to civil fines and/or condemnation of the crop. Pesticides are good management tools for the control of pests on crops but only when they are used in an effective, economical, and environmentally sound manner.

**See pesticide emergency information — Inside back cover.**

**W**eeds reduce crop yields by competing for water, nutrients and light. Some weeds release toxins that inhibit crop growth, and others may harbor insects, diseases, or nematodes that attack crops. Weeds often interfere with harvesting operations, and sometimes contamination with weed seeds or other plant parts may render a crop unfit for market. Profitable crop production depends on effective weed control.

Effective weed control in field crops requires the use of a combination of management techniques, including cultural methods and herbicides. Growing the same crop year after year and using the same weed control techniques encourage the development of problem weeds. Rotation of crops, herbicides, and tillage methods helps reduce this problem.

## Cultural Control of Weeds

Crop competition is a very useful method of weed control. By maintaining production practices that optimize crop growth, the crop plants can more effectively compete with weeds. Several crop management practices can improve the competitive ability of the crop. These practices include crop and variety selection, planting date and population, fertility, drainage, etc. Recommended crop production practices are also beneficial weed control practices.

Crop and herbicide rotation may also be helpful in maintaining adequate weed control. Many weeds cannot tolerate crop rotation. Using the same herbicide program each year allows weeds tolerant of the herbicides to expand. Rotate herbicide programs to prevent this problem and to reduce the likelihood of resistant weeds (i.e., triazine-resistant weeds) becoming a problem.

## Cultivation

Timely, shallow cultivation may be necessary following herbicide treatment. Be sure to cultivate as shallow as possible to prevent bringing new weed seeds from

below the herbicide layer to the soil surface.

Do not cultivate most preemergence herbicides for at least 3 weeks after application unless weeds appear that are resistant to the chemical. If weeds appear and dry weather persists for 2 weeks after herbicide application, rotary hoe or cultivate shallow. Delay cultivation after postemergence herbicide applications for at least 7 to 10 days to allow the chemical to move into stems and roots of the weed plants.

## Chemical Control of Weeds

No one chemical used as an herbicide will kill all species of weeds. Therefore, select the right herbicide for the job. The first step for successful weed control with herbicides is to identify the weed species present. Note that some weed species are resistant to all of the present selective herbicides.

Annual weeds are easier to kill when they are small seedlings and when conditions favor rapid growth. However, crop plants are also easily injured under these conditions. Selective herbicides should control the weeds with little or no injury to the crop.

Timing and rate of application are very important with chemical weed control. Spraying at the wrong time often results in poor weed control and crop injury. No crop plant is completely resistant to injury from herbicides. Too much chemical will cause crop damage.

## Types of Herbicides

Chemical control of weeds can be obtained with either preplant incorporated, preemergence, or postemergence herbicides. Many herbicides can be applied by more than one of the above methods.

**Preplant incorporated herbicides** are compounds incorporated into the soil prior to planting. Incorporation of some of these compounds is necessary to prevent losses of volatile active ingredients (ex. Treflan, Eptam) or to overcome

photodecomposition losses which would occur if the materials were left on the soil surface. Other preplant incorporated herbicides insure good activity in the absence of the rainfall otherwise required to move the herbicide into the weed-seed germination zone. This concept is often referred to as herbicide "activation." Incorporation is also often required to obtain perennial weed control from soil applications of herbicides.

### *Advantages of preplant incorporated herbicides:*

- (1) No weed competition to the crop with early control of weeds;
- (2) Weeds already controlled in cases where late wet weather delays cultivation or spraying;
- (3) Less reliance on rainfall to position the herbicides in the soil. Generally more reliable weed control than preemergence sprays;
- (4) Much more effective control of some perennial weeds (nut-sedge) than with preemergence sprays.

### *Disadvantages of preplant incorporated herbicides:*

- (1) Incorporation operation represents added cost and fuel usage in herbicide application;
- (2) Soil compaction is increased by the incorporation operation;
- (3) Herbicide may be diluted by improper incorporation (too deep) resulting in reduced weed control;
- (4) "Streaking" pattern of good and poor weed control can result from incomplete incorporation. Crosswise incorporation helps prevent this problem;
- (5) Planting operations may be slowed somewhat due to herbicide application and incorporation operation.

**Preemergence herbicides** are compounds that are applied to the soil surface after the crop has been planted but before the crop seedlings appear above the ground.

### *Advantages of preemergence herbicides:*

- (1) No weed competition to the crop with early control of weeds;
- (2) Weeds already controlled in cases where wet weather delays

cultivation or spraying;

(3) Planting and herbicide application may be done in one operation;

(4) In the case of corn, herbicides can be used which will not present a hazard to nearby 2,4-D- or Banvel-sensitive crops and plants.

#### ***Disadvantages of preemergence herbicides:***

(1) Preemergence applications are generally ineffective under dry soil conditions. Some preemergence herbicides are ineffective if dry conditions persist for only a few days; other herbicides may give weed control after as much as 10 days to 2 weeks of dry weather;

(2) On sandy soil, heavy rains may leach the herbicide down to the germinating crop seed and cause injury;

(3) Perennial weeds usually are not controlled by preemergence herbicide applications.

**Postemergence herbicides** are compounds applied to the foliage of weeds. They may burn off the above-ground parts of weeds (contact herbicides) or they may be translocated throughout the plants and kill the growing points (translocated or systemic herbicides).

#### ***Advantages of postemergence herbicides:***

(1) Can be used in an emergency, since they are not applied until the weeds are above the soil;

(2) Can be used on any soil type, and soil moisture conditions are usually not a problem;

(3) Are usually more effective (though also more injurious to the crop) at high temperatures.

#### ***Disadvantages of postemergence herbicides:***

(1) Should not be applied to weeds when the foliage is wet with dew or rain;

(2) There is a greater risk of crop injury on certain crops;

(3) With many postemergence herbicides, timing of application is critical for effective control;

(4) There is a risk that rain may prevent application at the

proper time.

Temperature greatly influences the effectiveness and volatility of many herbicides. Ideally, herbicides should be applied when temperatures range between 65° and 80°F. Low temperatures (below 60°F.) can result in reduced weed control, while temperatures above 80°F. can result in crop injury. Late afternoon herbicide applications are less likely to result in herbicide injury than are early morning applications. Early morning application predisposes the crop plant to danger periods of high temperatures, which increases the potential for herbicide injury.

Volatile herbicides, such as dicamba (Banvel), or ester formulations of 2,4-D may vaporize at temperatures as low as 70°F. Once they are vaporized, wind may move sufficient vapors to areas with sensitive crops to cause crop injury. Amine formulations may eliminate some of the danger of vapor drift; however, spray drift (droplets) may still occur. Extreme caution is required when applying herbicides near sensitive crops.

### **Formulations of Herbicides**

Herbicides are available in a variety of formulations; granular and those mixed in water are most common. Usually, equal weed control can be expected from granular and those mixed in water. In some cases, however, granules have given less control. Generally, this has been due to (1) use of equipment giving nonuniform distribution of the granules or (2) formulations with too high a concentration, resulting in inadequate volume for uniform distribution.

The use of granular formulations does not eliminate the need for calibration. Various materials will "feed" differently because of variations in carrier and particle size. Therefore, granular applicators, like sprayers, should be accurately calibrated.

### **Registration of Herbicides**

Recommendations in this bulletin are based on field trials conducted

in Michigan and other North Central states over a period of several years. Herbicides must be registered with the U.S. Environmental Protection Agency and the Michigan Department of Agriculture before they can be legally used in Michigan. The pesticide label is the legal document on pesticide use. The label must be read carefully and all the instructions followed closely. Use of an herbicide in a manner not consistent with the label can lead to civil fines and/or condemnation of the crop. Do not mix and apply together any pesticides and fertilizers if forbidden on either label.

### **Combinations of Herbicides**

Two or more herbicides are usually applied as a tank mix versus separate applications. Combinations are used to give more consistent or broader spectrum weed control, to decrease herbicide residue (for example, atrazine carryover) or to obtain adequate season-long weed control. Growers and commercial applicators are responsible for poor weed control, crop injury and/or unwanted herbicide residue from herbicides labeled for single application but misused in combinations.

### **Compatibility of Pesticide-Fertilizer Combinations**

Combinations of herbicides, insecticides and/or fungicides applied in either water or liquid fertilizer carriers decrease trips over the field and application costs; however, compatibility is critical. Always test the compatibility of each mixture to be applied even though the product labels allow mixing. Follow the label instructions closely during any mixing operation after you have tested for compatibility.

A single compatibility test requires only a glass quart jar and the pesticides and liquid fertilizer to be mixed. Place one pint of liquid fertilizer in the quart jar and add two teaspoons of the liquid pesticide. If the pesticide is a wettable powder, add two teaspoons of powder sufficient water to form a

slurry and add the slurry to the fertilizer. Cover the jar, shake well, and observe the mixture for 30 seconds. Check the mixture again after 30 minutes. If the mixture does not separate, it is compatible; however, check each batch of liquid fertilizer, as they may vary in mixing properties. Also, check compatibility if water source changes, as water pH and mineral content influence compatibility.

If more than one pesticide is to be mixed with liquid fertilizer or water, the pesticides should be premixed in liquid fertilizer or water and tested for compatibility by mixing appropriate proportions of all components. The combination should be thoroughly agitated before each additional pesticide is added, and a specific mixing order should be followed. Generally, unless label directions state otherwise, add the pesticides being tested in the following order:

1. wettable powders or dispersible granules,
2. flowables or aqueous liquids,
3. emulsifiable concentrates,
4. crop oil concentrates.

Spray tanks should be at least half filled with the carrier before the pesticide premixes are added. If the mixture foams excessively, separates or becomes syrupy, do not apply the mixture. Compatibility agents are available which may be added to improve mixing ability.

Even if all components appear compatible, the field tank mixture will require constant, vigorous agitation to prevent separation or improper pesticide distribution in the tank. Be sure the entire tank is agitated and mixed before spraying. Do not store pesticide mixtures overnight unless they are constantly agitated. Best results are obtained by applying the entire mixture in one day. (See Extension Bulletin E-1858, "Using Spray Additives with Herbicides.")

### Additives for Herbicides — Some Definitions

- (1) Adjuvant — any substance which enhances the herbicide effectiveness, an "added ingredient."
- (2) Surfactant — a surface active

material which can facilitate emulsifying, dispersing, spreading, wetting, sticking, or other surface-modifying characteristics of herbicide solutions.

- (3) Emulsifier — an agent that promotes the dispersion of one liquid in another.
- (4) Wetting Agent — reduces water surface tension causing better contact between spray solution and treated surfaces (spreader).
- (5) Soap — sodium or potassium salts of fatty acids. Can form insoluble materials in hard water. *Detergents* are synthetic materials used for cleaning.
- (6) Sticker — deposit builder, increases herbicide adhesion to plant surfaces.
- (7) Defoaming Agent — "self-explanatory"
- (8) Compatibility Agent or Cosolvent — may aid in dispersion of otherwise incompatible mixtures.

During the development of an herbicide, the chemical company attempts to formulate the active ingredient to optimize performance, mixing, and handling under diverse conditions. Every commercially available herbicide formulation contains its own particular set of additives to accomplish this. However, sometimes additional additives are required for specific applications or when compatibility or mixing problems occur. The herbicide label will describe the need and use of these additives. The indiscriminate use of additives should be avoided since it may not improve herbicide performance and may actually reduce weed control, or cause crop injury.

Additives can be referred to as "adjuvants." This term merely denotes an added ingredient. Surface active additives are called surfactants. Therefore, all surfactants are also additives or adjuvants. All herbicide formulations contain surfactants. Emulsifiable concentrates contain emulsifiers which aid in the dispersion of the formulation into the water phase. Wettable powders contain wetting agents and dispersants which facilitate moistening the tiny particles and prevent clumping. Postemergent

herbicides, such as 2,4-D and Roundup, contain wetting agents which help spread the spray over the leaf surface.

### When to Use Additives

Herbicides may be applied either to the soil or to the foliage so the addition of a surfactant is left to the user. Sometimes, additives are only required for postemergence treatments made during adverse climatic conditions. In other cases, the nature of the herbicide may necessitate addition of the surfactant to the spray mixture rather than the formulation. The herbicide label always gives directions for such additive requirements.

Although claims have been made that additives increase the effectiveness of soil-applied herbicides, there is no independent data to support these claims. Research in this area was conducted at several universities across the country. These experiments failed to show any benefit from the inclusion of spray additives with soil applied herbicides. Additives are used with postemergence applications to aid coverage of leaf surfaces and increase penetration into the leaf. Use of additives for soil applications of herbicides can help prevent clogging of lines and nozzles.

### Crop Oil Concentrates

Crop oil concentrates contain a mixture of emulsifiers and surfactants. A common ratio is 80% oil and 20% surfactant. Crop oil concentrates are generally recommended at a rate of 1 quart per acre or less.

These additives are recommended for use with postemergence applications of several herbicides. They should also be used in postemergence applications on sugarbeets when large weeds are present or the weeds are not vigorously growing. Herbicide labels contain specific directions on the use of additives.

There is a greater risk for crop injury when using additives with postemergence atrazine applications. Injury is frequently associated with cold, wet or cloudy conditions. The injury appears as a temporary stunting plus necrosis of the

leaf margins. Banvel, 2,4-D, or Bladex should not be included in a spray mix of atrazine plus crop oil concentrate or severe injury to the crop may occur.

### Adjuvants, Surfactants, Wetting Agents, Soaps

Many spray additives are currently available and many exaggerated claims have been made for them. In most cases, these materials are no better than crop oil concentrates. In fact, under poor environmental conditions for postemergence weed control, the crop oil concentrates can be slightly superior. Remember that any benefit comes only in postemergence, not preemergence applications. Also, they aid performance of the herbicide in adverse conditions, but are not a way to use less herbicide.

The Bladex 90DF and 80W labels call for the addition of a non-ionic surfactant for postemergence applications under drought conditions. Weeds can become more difficult to kill under these conditions. However, because of the increased chance of crop injury and the infrequency of these conditions in the spring, additions of surfactants or oils are not recommended for postemergence Bladex 80W or 90DF use in Michigan.

Roundup is formulated with a surfactant. Additional surfactant is needed with low volume application (refer to the Roundup label). The addition of a defoaming agent can be a help if excessive foaming is a problem. This addition is explained in the "Mixing" portion of the Roundup label.

### Compatibility Problems

Compatibility problems in tank mixing herbicides usually occur when mixing directions are not followed. Some common causes of compatibility problems: mixing two herbicides in concentrated form, adding an EC to the spray tank before suspending the wettable powder, insufficient agitation, excessive agitation, and air leaks. Problems are much more likely when mixing herbicides with fluid fertilizers. The fertilizer solution is already loaded to near capacity

with nutrients. Adding a herbicide to the already loaded solution may cause problems. Also, the fertilizer may interfere with the herbicide formulation additives. Since fertilizer may vary greatly from batch to batch, the only safe procedure is to test for compatibility in a small container before mixing a large quantity. If compatibility problems are encountered, the addition of *compatibility agents* may help.

Foaming is usually due to excessive agitation or a bypass line that empties above the spray solution level in the spray tank. When foaming is a problem, addition of a *defoamer* can help.

Pre-slurry the powder if you have problems in getting a wettable powder to wet and become suspended in solution. Adding a wetting agent to the spray tank will sometimes correct a floating powder problem.

### Application Equipment

Sprayer Implements — A good weed control sprayer should be made of non-corrosive materials, easy to clean, and have the following features:

- (1) A *tank* with a volume of 100 to 300 gallons to reduce filling and mixing operations.
- (2) A *pump* with a capacity of at least 4 gallons per minute and pressure up to 100 pounds per square inch (PSI).
- (3) An *agitation system* — The bypass from the pressure control is a good source of agitation. Direct the bypass line into the bottom of the tank.
- (4) *Screens* — There should be 50-mesh screens in the intake line and at each nozzle.
- (5) *Pressure gauge* — The pressure gauge should be able to accurately measure pressures up to 100 PSI.
- (6) *Adjustable spray boom* — The boom should be adjustable from 18 to 36 inches above the ground.
- (7) *Nozzles* — Flat fan nozzles of 73 to 95° angle with replacement tips are best suited for most weed control work. Nozzle volume can vary from 1 to 10 gallons per minute,

depending on the applications. Good general-use nozzles are 8002 or 8004. These nozzles permit the boom to be carried closer to the ground and thus reduce spray drift.

### Incorporation Implements —

Disks, especially large tandem disks, are poor tools for incorporation. Depth and riding are difficult to control and non-uniform distribution of the herbicide in the soil is likely.

A disk does have a place for special applications. It does a good job of chopping the quackgrass rhizomes required for good Eradicane activity. The disk should be used at a depth of 4 to 5 inches and a speed of 4 to 6 mph. Incorporation must be done in two directions.

A field cultivator can give acceptable one-pass incorporation of herbicides if special care is taken in set-up and operation. Wide sweeps, set up so they meet, give better incorporation than points. Shanks should be close enough to allow for this, and three sets of sweeps are also required. It is important to follow with a leveling tool, such as a flex tine drag or spring tooth harrow, to smooth out ridges behind the cultivator.

The speed of the cultivator should be at least 6 mph, at a depth of 3 to 4 inches. Actual incorporation will occur at one-half the tool depth. Caution must be taken not to run the rear portion of the cultivator lower than the front. If the back of the tool is lower, untreated soil can be brought to the surface, burying the herbicide.

Danish-type harrows equipped with "S" tines and rolling baskets can do a good job of one-pass incorporation. Rolling baskets outperform other trailing operations.

Operation considerations are similar to those with the field cultivator. Again, good soil tilth is a prerequisite for one-pass incorporation.

PTO driven tools do a good job of one-pass incorporation. However, their application in Michigan may be limited. These tools are operated at lower speeds and are not as wide as other implements.

## Soil Types

Soil texture (sand, silt, clay) and organic matter influence the effectiveness of soil-applied herbicides. In general, lower rates of herbicides are used on sandy (coarse textured) soils than on clays or soils high in organic matter (fine textured) to obtain the same level of control. Herbicide rate recommendations in this bulletin are given for medium-textured soils with greater than 3% organic matter. Clay and organic matter adsorb herbicides, making them less available to kill weeds. Soils with high clay and organic matter content require greater herbicide rates for adequate weed control. Sandy soils with low organic matter content require careful herbicide rate selection to avoid crop injury.

Soil pH can influence the activity of soil applied herbicides. Some herbicides (metribuzin) are more available at higher soil pH. Rates must be reduced to avoid crop injury. Knowledge of the soil pH is needed to determine proper rate.

Organic matter analysis is available through county Cooperative Extension Service offices or directly through the MSU Soil Testing Laboratory. Organic matter analysis may be determined on soil samples submitted for N-P-K analysis for an additional charge. Organic matter levels change slowly and may need to be checked every four years.

Organic matter analyses are only as accurate or representative as the soil sample, so each field should be checked individually. See Extension Bulletin E-498, "Sampling Soils," for proper soil sampling procedures.

Remember, follow herbicide label recommendations and adjust herbicide rates for soil texture and organic matter as specified on the label.

## Accurate Calibration

Accurate applicator calibration is essential for effective chemical weed control, without crop injury. Calibrate a new sprayer before use and routinely re-calibrate the sprayer during the growing season.

**Use the following steps as a guide to calibrate a ground**

## sprayer for broadcast application.

1. Determine the desired application volume of carrier (usually water) in gallons per acre (GPA). For most weed control applications, 5-30 GPA at 30-40 PSI is sufficient.

2. Adjust the boom height so that the spray overlaps about 30% at the ground (or other surface to be sprayed). With 80 ft. nozzles, this places the nozzles about 20 inches apart on the boom; and 20 inches above the sprayed surface. Check each nozzle at the recommended pressure for output. Replace any defective nozzles and screens. All nozzles should deliver within 10% of each other.

3. Fill the spray tank and system with water.

4. Spray a measurable area in the field, at a fixed speed and at the desired pressure. Spray at least 20% of the total tank volume and at least 2 acres of area.

5. Measure the volume of water (in gallons) needed to refill the tank.

6. Determine the area (in acres) that was test sprayed, using the following formula: length of area sprayed (in feet  $\times$  boom width (in feet)  $\div$  43,560 = acres sprayed.

7. Divide the volume sprayed by the area sprayed to obtain the actual output of the sprayer in gallons per acre.

8. Make adjustments to tractor speed, pressure, or nozzle size and repeat steps 3-7 to change application rate to the recommended values.

9. Calculate the amount of formulated pesticide needed to treat the desired area.

**The following procedures can be used to calibrate a ground sprayer for either banded or broadcast applications.**

(1) Determine the desired application volume of GPA.

(2) Check each nozzle at the recommended pressure for output. Replace any defective nozzles and screens. All nozzles should deliver within 10% of each other.

(3) For band application, accurately determine the width, in inches, of the band sprayed. For broadcast application, measure the

distance, in inches, between adjacent nozzles.

(4) Locate this width in the table below and read off the corresponding course distance.

<u>WIDTH</u> (inches)	<u>COURSE DISTANCE</u> (feet)
8	510
10	408
12	340
14	291
16	255
18	227
20	204
22	185
24	170
26	157

(5) In the field to be sprayed, mark off the course of the proper distance.

(6) Fill the tank completely with water only.

(7) Tie a quart container (graduated in ounces) to one nozzle on the sprayer to catch all of that nozzle's spray.

(8) Start a distance back from the beginning of the course to get up to operating speed, and turn the sprayer ON at the beginning of the course and OFF at the end.

(9) Remove the quart container, and read the volume collected IN OUNCES.

(10) OUNCES Collected = GPA.

## Pesticide Use Precautions

Herbicides, like all pesticides, should be handled with extreme caution and respect. There are three important reasons for using pesticides safely and wisely:

- To protect yourself and others from poisoning.
- To avoid harming and polluting the environment.
- To avoid crop injury.

***These three points can not be emphasized enough.***

Pesticide accidents occur most often during mixing and tank filling operations. Although accidental ingestion of chemicals is considered to be the greatest health hazard, there is also great danger of poisoning when pesticides contact skin or eyes, or when the dust or vapors are inhaled. Protective clothing should be worn at all times during the handling and application of



pesticides and the cleaning of spray equipment. Such equipment should include full coverage clothing, chemical resistant rubber gloves and boots, splash-guard goggles, and a MSHA/NIOSH approved respirator for the chemical compound being used. Care for these items as you would your implements. Heed all the precautionary statements on the product label and cover up to protect yourself.

Using more chemical than is recommended on any label is illegal and can result in the carryover of residues in the soil. Pesticides may also leach into ground and surface water. Herbicide residues can also damage sensitive crops the following year. Some long-residual herbicides last more than one year in the soil; keep this in mind when planning a crop rotation program. The herbicides recommended in this bulletin should dissipate in one growing season unless otherwise noted. Check the product labels for precautions on rotational crops.

Herbicides offer an effective and economical means of weed control. Crop plants are seldom completely resistant to herbicide injury, but have some level of tolerance. The ability of an herbicide to kill weeds without harming crop plants (selectivity) may be partially lost under unfavorable weather conditions. Herbicide drift to non-target crops often results in crop injury. Do not spray under windy conditions.

## Herbicide Residues and Bioassay

With the advent of preplant and preemergence herbicides which give season-long weed control, the accumulation of herbicides in the soil and their influence on subsequent crops in the rotation have become important in crop management. This fact is particularly true since atrazine has come into common use on corn and for many of the new soybean herbicides. However, when used at recommended rates in seasons of normal rainfall and temperature, most recommended herbicides for field crops do not present a problem on crops planted the following season. Ex-

ceptions are listed in the "Remarks" column of Table 1 for each herbicide combination.

There have been reports of injury to crops following atrazine applications on corn. There is more likely to be a problem with herbicide residues in a season of limited rainfall and cool temperatures, due to the slow dissipation of the herbicide (see Extension Bulletin E-1215 "A Quick Test for Atrazine Carryover").

Carryover problems have been most commonly reported for two groups of herbicides, the triazines (ex. atrazine) and the dinitroanilines (ex. trifluralin). If soybeans follow corn, or sugar beets follow a crop treated with a dinitroaniline or atrazine and if herbicide carryover is a possibility, a bioassay can be done. This will indicate whether enough herbicide is present to harm the crop. Do this late in the fall prior to freeze up or early in the spring. The bioassay procedure is a relatively simple test but a few basic steps should be followed.

(1) Collect soil from several locations in the field as when taking soil samples. Reliability of the assay depends on accurate sampling. Sample soil to the depth the field has been tilled. Approximately 5 lb. of soil are needed for each sample. Collect an equal amount of soil from an adjacent field where it is known no herbicide has been applied. This second sample is used as a "check."

(2) Start the bioassay within one or two weeks after soil is collected to prevent the loss of herbicide under warm conditions. If the assay cannot be run immediately, store the soil in a cool place, or even allow it to freeze.

(3) If the soil is wet, allow it to dry so that it may be worked easily. If the soil is cloddy, crush the clods but do not pulverize.

(4) Partially fill two, 1-qt. containers with soil, one with the soil being tested and the other with soil from the "check" field. Punch holes in the bottom of the containers to allow drainage. Tin cans or milk cartons make satisfactory containers.

(5) Plant 15 seeds of a sensitive crop in each container and cover

with  $\frac{1}{2}$  inch of soil. Wet the soil, but do not saturate. Oats are very sensitive to both triazines and dinitroanilines. Place exactly the same number of seeds in each container. By knowing the exact number of seeds planted, seedling emergence can be measured. Do not plant too many seeds or the seedlings may compete for the herbicide and decrease the injurious effects.

(6) Place containers in a warm place (70 to 75° F.), preferably in a window to receive as much sunlight as possible. Additional artificial light should also be supplied to obtain approximately a 15-hour day length. Water plants sparingly, but do not let the soil dry out.

(7) Determine plant emergence, and monitor plant growth for at least three weeks after planting. Compare "check" plants with those in the soil being tested.

(8) Atrazine injury may cause yellowing of the oat leaves, with the plant becoming droopy and finally dying, or if carry-over is marginal, stunting may occur. Stunting can be determined by a comparison with "check" plants. Dinitroaniline injury may result in a decrease in seedling emergence and/or stunting of the seedlings.

(9) If any evidence of herbicide carry-over is observed, it is advisable to plant a resistant crop.

*Note.* Soil can also be analyzed in a laboratory for the amount of herbicide remaining in the soil. This procedure is more expensive than a plant bioassay. Consult your county Cooperative Extension Service agent for a listing of commercial laboratories.

## Application of Herbicides

### Herbicide Spray Volumes and Rates

Table 1 lists chemicals which will give satisfactory weed control without injury to crops, except as noted under "Remarks." The volume of water to use will vary with the herbicide, although generally 10 to 40 gal per acre and a spraying pressure of 30 to 40 psi is recommended for the phenoxy herbicides (2,4-D, MCPA, 4-(2,4-DB). With wettable powders such as atrazine

and linuron, use nozzles that deliver at least 15 gal per acre. Use 30 to 40 gal of spray per acre when spraying quackgrass with atrazine or dalapon. Use 10 gal of spray per acre or less when spraying quackgrass or annual grasses with *Poast*.

Some contact type postemergence herbicides (Basagran, Blazer) require a minimum of 20 gallons per acre spray volume and 40 psi spray pressure to insure adequate coverage. Flat fan nozzles are effective for herbicide applications. Hollow cone nozzles can also give good results, especially for post-emergence applications at higher pressures. If higher pressures are used, be sure the nozzles are designed to be operated at the increased pressure. Operating nozzles beyond the specified pressure range will result in a poor spray pattern, insufficient coverage, and lack of weed control.

Herbicides are available in a number of different formulations and concentrations. For this reason, the recommended rates in Table 1 (col. 3) are given as pounds of active ingredient per acre. Thus, when a liquid formulation contains 4 lb of active ingredient (or acid equivalent) per gallon, 1 pt will provide ½ lb of active ingredient, or 1 qt. will provide 1 lb of active ingredient.

### **Band Application**

In cultivated crops, spraying narrow bands of herbicide over the rows will take less material per acre, cutting the cost per acre for the chemical. Where chemical costs are high, band spraying may be justified. However, with band spraying, timely cultivation of weeds in the unsprayed area between rows is necessary.

In seasons when the soil is too wet to cultivate, overall spraying has the advantage of controlling weeds between the rows.

When band spraying, be very careful to maintain the proper rate of application on the area sprayed. (If you lower the spray boom to narrow the area covered by a given nozzle, remember that each nozzle is still delivering the same amount of spray mixture as it did on the wider area.)

### **Herbicide Incorporation**

The most consistent incorporation (no streaking), especially when using a disk or field cultivator alone, is achieved with two passes at an angle to each other. However, new tillage implements have made one-pass incorporation of herbicides a possibility. Many growers are asking for the best way to achieve one-pass incorporation.

### **Soil Conditions**

Although a majority of the questions concerning incorporation concern the best implement to use for one-way incorporation, soil condition influences the success of incorporation more than the tool used. The reliability of one-pass incorporation will also be influenced by the tillage system used.

In clean tillage (low crop residue) situations, preemergence applications made on wet soil will likely perform as well or better than two-pass incorporated treatments. One-pass incorporation is not a good approach with less than optimum soil tilth.

High crop residue levels (corn stalks disked or chisel plowed with one or two secondary tillage operations) make one-pass incorporation difficult. If the residue level is great enough to clog the incorporation tool, two-pass incorporation is advisable. The soil should also have good tilth, as outlined above.

Where ridges are left from fall plowing or use of a chisel plow in the spring, it is advisable to level the ground before herbicide application. Streaking is favored by application of the herbicide to rough ground.

### **Cleaning of Pesticide Sprayers**

It is important to clean weed control sprayers after each use, especially if they are used for more than one crop and for the application of insecticides and fungicides. The need for extensive cleaning can be minimized if one sprayer is dedicated to herbicide application only.

Do not use a sprayer to apply insecticides or fungicides if the sprayer has been used to apply

2,4-D type herbicides.

When cleaning a sprayer that is used for only soil applications of herbicides, usually only a thorough water rinse is necessary. Exceptions are sulfonil urea herbicides, such as chlorimuron-ethyl (*Classic*), *Lorox Plus*, and *Preview*, and also *Command*. A thorough cleaning with ammonia is required. Consult these specific herbicide labels for detailed spray tank cleaning procedures. Rinse the entire sprayer, inside and out, including the boom, hoses, and nozzles. Partially fill the spray tank with water and keep the pump running so that the water is circulated throughout the entire system. Spray the water rinsate out through the nozzles. This process should be repeated when changing soil-applied herbicides and at the end of each day. Money can be saved and the environment protected if the water rinsing is done in the field using a water-filled nurse tank and if the water rinsate is applied to the crop according to label rates. Many herbicide labels have specific instructions for cleaning the spray system. Always read and follow these directions carefully.

Unless otherwise specified, thoroughly wash the entire spray system after all postemergence applications. Use one of the following cleaning agents in 100 gal of water:

- (1) 1 gal household ammonia (allowed to stand in spray tank and system overnight);
- (2) 5 lb of sal soda;  
or
- (3) 8 lb trisodium phosphate.

Run the pump so that the cleaning solution is circulated throughout the entire system for at least 2 hours and then pump it out through the nozzles. Do not dump this cleaning solution and do not apply it to any crop (crop land). Discard the cleaning solution in an appropriate pesticide rinsate degradation pit. Rinse the entire system with water after all the cleaning solution has drained from the sprayer. Do not leave pesticide solutions or cleaning solutions in the tank overnight.

Corrosion and mechanical damage to pumps, tanks, nozzles, etc.

may result from leaving water in the spray system over the winter. To prepare the spray equipment for storage, disconnect all the hoses, and allow all water to drain out. Coat all bare metal parts with oil or a rust inhibitor. Disassemble metal nozzles, and store them in oil. Prepare the spray pump for storage based on the manufacturer's recommendations.

### **Pesticide Storage and Disposal**

Reduce the need for, and the hazards of pesticide storage and disposal by buying only what will be used during a growing season and mixing only what is needed for each application. In addition, try to apply leftovers, water rinsates, etc. to the appropriate crop rather than storing or disposing of them. Long-term storage may reduce the effectiveness and/or increase the toxicity of herbicides.

If storage is necessary, choose a suitable environment that is dry, cool, and out of direct sunlight. Avoid extreme heat or cold. Place in a location that is not accessible to children and animals and that is not near food, feed, or water. Keep pesticides under lock and key when not in use. Store herbicides separately from insecticides and fungicides to prevent possible interaction. Check the product label for specific storage instructions.

Always triple rinse pesticide containers immediately after emptying. One-third of the container should be filled with water each time. Pour the container rinsate

into the tank solution to be applied to the crop. After a triple rinse, crush or puncture the rinsed containers to prevent any misuse. Dispose of the triple-rinsed containers in a licensed sanitary landfill or recycle through a scrap metal dealer. Consult the telephone directory for scrap metal dealers and contact your nearest county Cooperative Extension office for the nearest landfills. Finally, read the pesticide product label for any important information on disposal procedures.

### **Endangered Species Act**

To minimize the adverse impact of pesticides on endangered species, the EPA has initiated a new program; **The Endangered Species Act**. Every implicated pesticide will have an endangered species warning statement regarding use of the product within the geographic area where endangered species restrictions apply. Users must then obtain a county-specific endangered species bulletin, which will identify the specific area where use restrictions apply. Application of listed pesticides in the identified geographic areas in that county will be restricted or prohibited. In Michigan, farmers in *Berrien County* must consult the county map for areas where the endangered species 'small whorled pogonia' grows. Prohibited herbicides in these areas are: amitrol, ammonium sulfamate, atrazine, cacodylic acid, 2,4-DB, dalapon, dichlobenil, diphenamid, EPTC, fosamine ammonium, glyphosate,

hexazinone, dazomet (mylone), paraquat, picloram, and simazine.

### **SARA Title III Emergency Planning and Community Right to Know Act.**

The Community Right to Know law, under SARA Title III, requires farmers to notify their State Emergency Response Commission (SERC) that they store extremely hazardous materials. Farmers should check with their state department of natural resources or their Cooperative Extension Service to receive a list of EPA established "extremely hazardous substances" and their reportable quantities.

The SERC will then notify the Local Emergency Planning Committee (LEPC), who may request maps of the storage facility and detailed lists of materials stored.

This law also requires that, in the event of a spill, the SERC, LEPC and National Response Commission be notified. The reportable quantities for spills is much less than for storage and can be obtained from the above sources.

### **Herbicide Formulations**

- DF** — *Dry Flowable Granule*
- DG** — *Dispersible Granule*
- DS** — *Dry Soluble Granule*
- EC** — *Emulsifiable Concentrate*
- F** — *Flowable*
- G** — *Granule*
- L** — *Liquid*
- WDG** — *Wettable Dispersible Granule*
- WP** — *Wettable Powder*
- WSP** — *Wettable Soluble Powder*

# TABLE 1 — CHEMICALS FOR WEED CONTROL IN FIELD CROPS

## IMPORTANT: READ THE FOLLOWING BEFORE USING

Rates are expressed in pounds of active ingredient (a.i.) per acre for the area actually sprayed; rates in formulation column are given as pounds or liquid measure of product unless otherwise noted.

(NOTE: Commercial rates are expressed in pt or qt or gal or lb).

Apply all agricultural chemicals in accordance with regulations and labels as to rates, timing and crops for which they may be used.

Rates recommended in this bulletin are for medium textured soils with 3% or greater organic matter.

Many herbicides may also be applied as granules or impregnated on dry fertilizer. With these application methods, uniform application of the herbicide is necessary for acceptable weed control.

*Arena, Bladex, Gramoxone Super, Hoelon, Lasso, and Micro-Tech Lasso* are currently classified as Restricted Use Pesticides. To purchase and legally apply these herbicides, users must be certified in pesticide application.

## CORN

### PREPLANT — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b> (except green foxtail, giant foxtail, fall panicum, witchgrass and crabgrass)	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG	<ul style="list-style-type: none"> <li>Do not plant small grain, small seed forages, sugar beets, field beans or vegetable crops the year following corn.</li> <li>Rates of 2½ to 3 lb/A may be necessary on soil high in organic matter (5 to 8%).</li> <li>Residues more likely to persist if soil conditions are cool and dry.</li> <li>Incorporation is not necessary.</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b> (including green foxtail, giant foxtail, fall panicum, witchgrass, crabgrass and sandbur)	atrazine (commercial product)	1	¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>Must be incorporated or mixed into top 2 to 3 in. of soil.</li> <li><i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, pg. 14.)</li> <li>Commercial prepackaged mixes of butylate and atrazine are available (<i>Sutazine, Rhino</i>).</li> </ul>
<b>Nutsedge</b>	+ butylate ( <i>Sutan Plus</i> or <i>Genate Plus</i> )	+ 4	+ 4¾ pt	<ul style="list-style-type: none"> <li>Increase <i>Sutan Plus</i> rate to 6 pt/A for more effective nutsedge control.</li> <li>Do not use on corn seed stocks (Breeders, Foundation, or Increase).</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b> (including green foxtail, giant foxtail, fall panicum, witchgrass, and crabgrass)	atrazine (commercial product)	1	¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li><i>Eradicane Extra</i> is also available and should be used at the rate of 5 pt/A.</li> <li>Incorporate to a depth of 4 to 5 in. immediately after application with a disk in both directions.</li> <li>Increase <i>Eradicane</i> rate to 6 pt/A for more effective nutsedge control.</li> </ul>
<b>Nutsedge</b>	+ EPTC with protectant ( <i>Eradicane</i> )	+ 4	+ 4¾ pt	<ul style="list-style-type: none"> <li><i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, pg. 14.)</li> <li>Do not apply <i>Eradicane</i> to fields that were treated with a thiocarbamate herbicide (<i>Eptam, Genep, Ro-Neet, Eradicane, Eradicane Extra, Sutan Plus, Genate Plus</i>) the previous year.</li> <li>Do not use on corn stocks (Breeders, Foundation, or Increase).</li> </ul>

(Continued next page)

## CORN — PREPLANT — MINERAL SOIL (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b> <b>Annual grasses</b> (including green foxtail, giant foxtail, fall panicum, witchgrass and crabgrass)	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● Gives better nutsedge control if incorporated 2 to 3 in.</li> <li>● Will be more effective preplant, especially on nutsedge, in areas where soils tend to be dry.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, pg. 14.)</li> <li>● Incorporated <i>Dual</i> rate of one quart may only give fair control of some annual grasses (especially fall panicum) and nutsedge.</li> <li>● A commercial prepackaged mix of <i>Dual</i> plus atrazine (BICEP) is available.</li> </ul>
	+ metolachlor ( <i>Dual</i> )	+	+	
<b>Nutsedge</b>	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● For fair to good control of nutsedge, increase rate of <i>Lasso</i> to 3 qt/A.</li> <li>● Will be more effective preplant, especially on nutsedge, in areas where soils tend to be dry.</li> <li>● 2½ qt/A of <i>Lasso</i> should be used for effective fall panicum control.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks on three-way tank mixes, pg. 14.)</li> <li>● A commercial prepackaged mix of <i>Lasso</i> plus atrazine (<i>Lariat</i>) is available.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> )	+	+	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● Do not use on corn seed stocks (Breeders, Foundation, or Increase).</li> <li>● Must be incorporated or mixed into top 2 to 3 in. of soil immediately after application.</li> <li>● No residue carryover.</li> <li>● Can be used where residue problems have existed with atrazine.</li> <li>● Increase <i>Sutan Plus</i> or <i>Genate Plus</i> rate to 6 pt for more effective nutsedge control.</li> <li>● Both materials weak on pigweed.</li> </ul>
	+ butylate ( <i>Sutan Plus</i> or <i>Genate Plus</i> )	+	+	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● No residue carryover.</li> <li>● Can be used where residue problems have existed with atrazine.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> )	+	+	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● No residue carryover.</li> <li>● Can be used where residue problems have existed with atrazine.</li> </ul>
	+ metolachlor ( <i>Dual</i> )	+	+	

*(Continued next page)*

## CORN — PREPLANT — MINERAL SOIL (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b> <b>Annual grasses</b> (including green foxtail, giant foxtail, fall panicum, witchgrass and crabgrass)	atrazine (commercial product)	1/2	5/8 lb 80W OR 1/2 qt 4L OR 3/5 lb 90% WDG	<ul style="list-style-type: none"> <li>● NOTE SPECIFIC REMARKS ABOVE FOR <i>SUTAN PLUS</i>, <i>ERADICANE</i>, <i>DUAL</i> AND <i>LIASSO</i>.</li> <li>● Can be used to reduce possibility of atrazine carryover.</li> <li>● The preferred treatment where fall panicum is a problem.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● <i>Eradicane Extra</i> is also available and should be used at the rate of 5 pt/A.</li> <li>● Do not apply <i>Eradicane</i> to fields that were treated with a thiocarbamate herbicide the previous year.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
<b>Nutsedge</b>	+ cyanazine ( <i>Bladex</i> )	+	+	
	+ butylate ( <i>Sutan Plus</i> or <i>Genate Plus</i> )	+	+	
	OR	OR	OR	
	EPTC with protectant ( <i>Eradicane</i> )	4	4 3/4 pt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	1 qt	
	OR	OR	OR	
	alachlor ( <i>Lasso</i> , <i>Arena</i> )	2 1/2	2 1/2 qt	

## CORN — PREPLANT FOLLOWED BY POSTEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	<i>Sutan Plus</i> , <i>Genate Plus</i> , <i>Eradicane</i> , <i>Eradicane Extra</i> , <i>Lasso</i> , <i>Arena</i> , or <i>Dual</i> as listed under Corn — Preplant — Mineral Soil section, page 12.			<ul style="list-style-type: none"> <li>● See Corn — Postemergence — Mineral Soil section, page 17.</li> </ul>
	FOLLOWED BY:			

## CORN — PREEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
	atrazine (commercial product)	1	1 1/4 lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● 2 1/2 qt/A of <i>Lasso</i> should be used for more effective fall panicum control.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, pg. 15.)</li> <li>● A commercial prepackage mix of <i>Lasso</i> plus atrazine (<i>Lariat</i>) is available.</li> </ul>
	+ alachlor ( <i>Lasso</i> , <i>Arena</i> )	+	+	
	atrazine (commercial product)	1	1 1/4 lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, pg. 15.)</li> </ul>
	+ metolachlor ( <i>Dual</i> )	+	+	

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## CORN — PREEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves Annual grasses</b> (including fall panicum, green foxtail, giant fox- tail, witchgrass and crabgrass)	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● DO NOT INCORPORATE.</li> <li>● Do not use on sandy soil with less than 1.5% organic matter.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for three-way tank mixes, below.)</li> <li>● Do not use on no-till corn.</li> <li>● A commercial prepackage mix of <i>Prowl</i> plus atrazine (<i>Prozine</i>) is available.</li> </ul>
	+ pendimethalin ( <i>Prowl</i> )	+ 1½	+ 1½ qt	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● No residue carryover.</li> <li>● Can be used where residue problems have existed with atrazine.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> )	+ 2	+ 2 qt	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● No residue carryover.</li> <li>● Can be used where residue problems have existed with atrazine.</li> </ul>
	+ metolachlor ( <i>Dual</i> )	+ 2	+ 1 qt	
	cyanazine ( <i>Bladex</i> )	1¾	2.2 lb 80W OR 1¾ qt 4L OR 1.9 lb 90% DF	<ul style="list-style-type: none"> <li>● Do not use on sandy soils with less than 1.5% organic matter.</li> <li>● Both materials weak on pigweed.</li> <li>● Do not use on no-till corn.</li> </ul>
	+ pendimethalin ( <i>Prowl</i> )	+ 1½	+ 1½ qt	
	atrazine (commercial product)	½	⅝ lb 80W OR ½ qt 4L OR ⅜ lb 90% WDG	<ul style="list-style-type: none"> <li>● Can be used to reduce possibility of atrazine carryover.</li> <li>● See specific remarks for <i>Lasso</i>, <i>Dual</i> and <i>Prowl</i> in combination with atrazine.</li> <li>● The preferred treatment where fall panicum is a problem.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+ cyanazine ( <i>Bladex</i> )	+ 1	+ 1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% DF	
	+ alachlor ( <i>Lasso, Arena</i> )	+ 2	+ 2 qt	
	OR pendimethalin ( <i>Prowl</i> )	OR 1½	OR 1½ qt	
	OR metolachlor ( <i>Dual</i> )	OR 2	OR 1 qt	

*(Continued next page)*

## CORN — PREEMERGENCE — MINERAL SOIL (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b> <b>Annual grasses</b> (including fall panicum, green foxtail, giant fox- tail, witchgrass and crabgrass)	cyanazine ( <i>Bladex</i> )  + atrazine (commercial product)	1¾  + ¾	2.2 lb 80 W OR 1 ¾ qt 4L OR 1.9 lb 90% DF + 1 lb 80W OR ¾ qt 4L OR ¼ lb 90% WDG	Adjust <i>Bladex</i> rate according to soil type (refer to <i>Bladex</i> label for details.). <ul style="list-style-type: none"> <li>Do not use on sands or loamy sands with less than 1% organic matter.</li> <li>Where annual grasses are a severe problem, this program will be less consistent than herbicide combinations including <i>Lasso</i>, <i>Arena</i> or <i>Dual</i>.</li> <li>Will not control yellow nutsedge.</li> <li>Prepackaged mixes of <i>Bladex</i> plus atrazine are available as <i>Extrazine II</i> (3:1).</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum, green foxtail, giant fox- tail, witchgrass and crabgrass)	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG	<ul style="list-style-type: none"> <li>Do not plant small grain, small seeded forages, sugar beets, field beans or vegetable crops the year following this treatment.</li> <li>Rates of 2½ to 3 lb/A may be necessary on soils high in organic matter (5 to 8%).</li> <li>Residues more likely to persist if soil conditions are cool and dry.</li> </ul>

## CORN — PREEMERGENCE FOLLOWED BY POSTEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	<i>Lasso</i> , <i>Arena</i> , <i>Dual</i> as listed under Corn — Preemergence — Mineral Soil section, page 15. FOLLOWED BY: See Corn — Postemergence — Mineral Soil section, page 17.			

## CORN — PREEMERGENCE — ORGANIC SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b>	propachlor ( <i>Ramrod</i> )	5	5 qt	<ul style="list-style-type: none"> <li>Must follow with a postemergence treatment for control of broadleaved weeds.</li> </ul>

## CORN — PREEMERGENCE FOLLOWED BY POSTEMERGENCE — ORGANIC SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b> <b>Annual broadleaves</b>	propachlor ( <i>Ramrod</i> )	5	5 qt	<ul style="list-style-type: none"> <li>Must be followed with a postemergence treatment for control of broadleaved weeds.</li> </ul> <p style="text-align: right;">FOLLOWED BY: See Corn — Postemergence — Organic Soil section, page 20.</p>



## CORN — POSTEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> (except smartweed and wild buckwheat)	2,4-D amine	1/2	1 pt	<ul style="list-style-type: none"> <li>● For corn over 6 to 8 in. use drop nozzles.</li> <li>● Ester formulations will cause more crop injury and are not recommended.</li> <li>● Oil soluble amines of 2,4-D (<i>Dacamine</i>, <i>Weedar E-3</i>) are available and are used at lower rates.</li> <li>● Use drift control additives with some 2,4-D amine products to reduce drift danger. Check product label.</li> <li>● Not effective on smartweed or wild buckwheat.</li> <li>● Hybrids vary in tolerance.</li> <li>● Most effective when weeds are small (2 to 4 in.).</li> </ul>
<b>Annual broadleaves</b> (including smartweed and wild buckwheat)	dicamba ( <i>Barvel</i> )	1/2	1 pt	<ul style="list-style-type: none"> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to 1/2 pt/A.</li> <li>● USE EXTREME CAUTION. DRIFT TO NEARBY SENSITIVE CROPS IS A HAZARD.</li> <li>● Do not apply if the air temperature is expected to exceed 85° F as the risk of volatilization is increased.</li> <li>● For corn over 8 in., use drop nozzles:</li> <li>● Use pressure less than 20 psi.</li> <li>● Do not apply if soybeans in the vicinity are over 10 in. tall or have begun to bloom.</li> <li>● Use drift control agents to reduce danger of drift.</li> </ul>
<b>Annual broadleaves</b>	dicamba ( <i>Barvel</i> ) + atrazine	1/2 + 1	1 pt + 1 1/4 lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● Do not apply if soybeans in the vicinity are over 10 in. tall or have begun to bloom.</li> <li>● Drift control agents may be used to reduce drift danger.</li> <li>● Lower rates should be used on coarser soils or soils low in organic matter.</li> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to 1/2 pt/A.</li> <li>● Treatment must follow a preplant-incorporated or pre-emergence herbicide application for grass control.</li> <li>● Do not use with crop oil concentrate or other additives.</li> <li>● See additional remarks and limitations for dicamba (<i>Barvel</i>).</li> <li>● A commercial prepackaged mix of dicamba and atrazine (<i>Marksmen</i>) is available.</li> </ul>
	bentazon ( <i>Basagran</i> ) + crop oil concentrate	1 + 1 qt	1 qt + 1 qt	<ul style="list-style-type: none"> <li>● Use a minimum of 40 psi and 20 gal/A of water.</li> <li>● Weak on pigweed, nightshade, and lambsquarters.</li> <li>● Controls specific broadleaves. See label.</li> <li>● Corn is tolerant to <i>Basagran</i> at all growth stages. For best results apply early to small weeds.</li> <li>● Urea ammonium nitrate (28% liquid nitrogen) may be used at 1 gal/A instead of crop oil concentrate for improved velvetleaf control. Do not use urea ammonium nitrate if common lambsquarters is present.</li> </ul>
	bentazon ( <i>Basagran</i> ) + atrazine (commercial product) + crop oil concentrate	3/4 + 3/4 + 1 qt	3/4 qt + 0.9 lb 80W OR 3/4 qt 4L OR 0.8 lb 90% WDG + 1 qt	<ul style="list-style-type: none"> <li>● Gives better control of some broadleaf weeds, especially pigweed, than <i>Basagran</i> alone.</li> <li>● Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> <li>● Urea ammonium nitrate (28% of liquid nitrogen) may be used at 1 gal/A instead of crop oil concentrate. Do not use urea ammonium nitrate if common lambsquarters is present.</li> <li>● A commercial prepackage mix of <i>Basagran</i> plus atrazine (<i>Laddok</i>) is available.</li> </ul>

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## CORN — POSTEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b>	bromoxynil ( <i>Buctril</i> )	3/8	1 1/2 pt 2E	<ul style="list-style-type: none"> <li>● Apply to weeds less than 4 in. tall for effective control.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● For ground applications, use minimum of 20 gal water/A and 30 psi.</li> <li>● Apply to corn between the 4-leaf stage (4 visible leaves) and the 8-leaf stage.</li> <li>● Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> </ul>
	bromoxynil ( <i>Buctril</i> ) + atrazine (commercial product)	1/4 + 1/2	1 pt 2E + 5/8 lb 80W OR 1/2 qt 4L OR 0.6 lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply to weeds less than 4 in. tall for effective control.</li> <li>● Apply to corn between the 3-leaf stage (3 leaves visible) and the 8-leaf stage.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● Improved control of redroot pigweed and wild mustard compared to <i>Buctril</i> alone.</li> <li>● Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>● A prepackage mix is available as <i>Buctril-Atrazine</i>.</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b> (except green foxtail, giant foxtail, fall panicum, witchgrass and crabgrass)	atrazine (commercial product)  + crop oil concentrate	2  + 1 qt	2 1/2 lb 80W OR 2 qt 4L OR 2 1/5 lb 90% WDG  + 1 qt	<ul style="list-style-type: none"> <li>● Emergency use.</li> <li>● Grasses must be less than 1 1/2 in. tall.</li> <li>● Timing of application is critical to get best results.</li> <li>● Surfactant at 1 pt/A may be used in place of crop oil concentrate but is somewhat less effective.</li> <li>● Greater chance for residue since treatment is later in season.</li> <li>● Do not add <i>Banvel</i> or 2,4-D as injury may occur.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum and witchgrass)	tridiphane ( <i>Tandem</i> ) + atrazine (commercial product)  + crop oil concentrate	1/2  + 1 1/2  + 1 qt	1 pt  + 1.9 lb 80W OR 1 1/2 qt 4L OR 1.7 lb 90% WDG  + 1 qt	<ul style="list-style-type: none"> <li>● Apply when grass weeds are in the 1 to 3-leaf stage.</li> <li>● Timing is critical for adequate results.</li> <li>● Cultivation 7 to 14 days after treatment may improve results.</li> <li>● Treatment will not provide consistent control of fall panicum, or witchgrass.</li> <li>● May be applied to no-till corn.</li> </ul>
	tridiphane ( <i>Tandem</i> ) + cyanazine ( <i>Bladex</i> )	1/2  + 2	1 pt  + 2.5 lb 80W OR 2.2 lb 90% DF	<ul style="list-style-type: none"> <li>● Apply when grass weeds are in the 1 to 3-leaf stage.</li> <li>● Timing is critical for adequate results.</li> <li>● Cultivation 7 to 14 days after treatment may improve results.</li> <li>● Treatment will not provide consistent control of fall panicum, or witchgrass.</li> <li>● May be applied to no-till corn.</li> <li>● Use 80W or 90% DF formulations of <i>Bladex</i> only.</li> <li>● Do not use with crop oil concentrate or other additives or severe crop injury may occur.</li> </ul>

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## CORN — POSTEMERGENCE — MINERAL SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations	
<i>(continued)</i>					
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum and witchgrass)	tridiphane ( <i>Tandem</i> )	1/2	1 pt	<ul style="list-style-type: none"> <li>● Apply when grass weeds are in the 1 to 3-leaf stage.</li> <li>● Timing is critical for adequate results.</li> <li>● Cultivation 7 to 14 days after treatment may improve results.</li> <li>● Treatment will not provide consistent control of fall panicum, or witchgrass.</li> <li>● May be applied to no-till corn.</li> <li>● Use 80W or 90% DF formulations of <i>Bladex</i> only.</li> <li>● Do not use with crop oil concentrate or other additives or severe crop injury may occur.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available [<i>Extrazine II</i> (3:1)].</li> </ul>	
	+	+	+		
atrazine (commercial product)	3/4	1 lb 80W OR 3/4 qt 4L OR 0.8 lb 90% WDG			
+	+	+			
cyanazine ( <i>Bladex</i> )	0.8	1 lb 80W OR 0.9 lb 90% DF			
<hr/>					
	tridiphane ( <i>Tandem</i> )	1/2	1 pt		
	+	+	+		
	cynazine ( <i>Bladex</i> )	2	2 1/2 lb 80W OR 2.2 lb 90% DF		
FOLLOWED BY: 7-10 days later					
	atrazine (commercial product)	1	1 1/4 lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG		
	+	+	+		
	crop oil concentrate	1 qt	1 qt		
<hr/>					
	cynazine ( <i>Bladex</i> )	2	2 1/2 lb 80W OR 2.2 lb 90% DF	<ul style="list-style-type: none"> <li>● USE WETTABLE POWDER OR DRY FLOWABLE ONLY.</li> <li>● Apply before weeds are 1 1/2 in. tall.</li> <li>● Apply postemergence through the 4-leaf stage of corn (until 5th leaf is visible).</li> <li>● Some temporary setback or stunting of corn may occur, especially in sandy soil.</li> <li>● Do not use with crop oil concentrate or other additives or severe crop injury may occur.</li> <li>● Application rate is lower if treatment follows a previous <i>Bladex</i> or <i>Extrazine II</i> application. See label.</li> </ul>	
<hr/>					
	cyanazine ( <i>Bladex</i> )	1 1/2	1.9 lb 80W OR 1.7 lb 90% DF		
	+	+	+		
	atrazine (commercial product)	1/2	5/8 lb 80W OR 3/8 lb 90% WDG		
<ul style="list-style-type: none"> <li>● USE WETTABLE POWDER OR DRY FLOWABLE ONLY.</li> <li>● Apply before weeds are 1 1/2 in. tall.</li> <li>● Apply postemergence through the 4-leaf stage of corn (before 5th leaf is visible).</li> <li>● Application rate is lower if treatment follows a previous <i>Bladex</i> or <i>Extrazine II</i> application. See label.</li> <li>● Some temporary setback or stunting of corn may occur.</li> <li>● Do not use with crop oil concentrate or other additives as severe crop injury may occur.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>					

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## CORN — POSTEMERGENCE — ORGANIC SOIL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves (except smartweed and wild buckwheat)	2,4-D amine	½	1 pt	<ul style="list-style-type: none"> <li>● For corn over 6 to 8 in., use drop nozzles.</li> <li>● Most effective when weeds are small (2 to 4 in.)</li> <li>● Ester formulations will cause more crop injury and are not recommended.</li> <li>● Oil soluble amines of 2,4-D (<i>Dacamine</i>, <i>Weedar E-3</i>) are available and are used at lower rates.</li> <li>● Drift control additives can be used with some 2,4-D amine products to reduce danger of drift. Check the product label.</li> <li>● Not effective on smartweed or wild buckwheat.</li> <li>● Hybrids vary in tolerance.</li> </ul>
Annual broadleaves (including smartweed and wild buckwheat)	dicamba ( <i>Banvel</i> )	½ lb	1 pt	<ul style="list-style-type: none"> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to ½ pt/A.</li> <li>● USE EXTREME CAUTION. DRIFT TO NEARBY SENSITIVE CROPS IS A HAZARD.</li> <li>● For corn over 8 in., use drop nozzles.</li> <li>● Use pressure less than 20 psi.</li> <li>● Do not apply if soybeans in the vicinity are over 10 in. tall or have begun to bloom.</li> <li>● Drift control agents may be used to reduce drift danger.</li> <li>● Do not apply if the air temperature is expected to exceed 85° F as the risk of volatilization is increased.</li> </ul>
Annual broadleaves	dicamba ( <i>Banvel</i> ) + atrazine	½  + 1	1 pt  + 1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● APPLY AFTER CORN EMERGENCE BUT BEFORE THE PLANTS EXCEED 5 IN. FOR CORN OVER 5 IN., REDUCE <i>BANVEL</i> RATE TO ½ PT/A.</li> <li>● Treatment must follow a preplant-incorporated or preemergence herbicide application for grass control.</li> <li>● Do not use with crop oil concentrate or other additives.</li> <li>● See additional remarks and limitations for dicamba (<i>Banvel</i>).</li> <li>● A commercial prepackaged mix of dicamba and atrazine (<i>Marksman</i>) is available.</li> </ul>
Annual broadleaves (including velvetleaf, cocklebur, and jimsonweed)	bentazon ( <i>Basagran</i> ) + crop oil concentrate	1  + 1 qt	1 qt  + 1 qt	<ul style="list-style-type: none"> <li>● Use a minimum of 40 psi and 20 gal/A of water.</li> <li>● Weak on pigweed, nightshade, and lambsquarters.</li> <li>● Controls specific broadleaves. See label.</li> <li>● Corn is tolerant of <i>Basagran</i> at all growth stages. However, best results are obtained with early applications to small weeds.</li> <li>● Urea ammonium nitrate (28% liquid nitrogen) may be used at 1 gal/A instead of crop oil concentrate for improved velvetleaf control. Do not use urea ammonium nitrate if common lambsquarters is present.</li> </ul>

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## CORN — POSTEMERGENCE — ORGANIC SOIL (continued)

Weed Controlled	Herbicide	Rate lb/A		Remarks and Limitations
		a.i.	Formulation/A	
<b>Annual broadleaves</b>	bentazon ( <i>Basagran</i> )	¾	¾ qt	<ul style="list-style-type: none"> <li>Use a minimum of 40 psi and 20 gal/A of water.</li> <li>Gives better control of some broadleaf weeds, especially pigweed, than <i>Basagran</i> alone.</li> <li>Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if corn is succulent from recent rainfall.</li> <li>Urea ammonium nitrate (28% liquid nitrogen) may be used at 1 gal/A instead of crop oil concentrate. Do not use urea ammonium nitrate if common lambsquarters is present.</li> <li>A commercial prepackage mix of <i>Basagran</i> plus atrazine (<i>Laddok</i>) is available.</li> </ul>
	+ atrazine (commercial product)	+ ¾	+ 0.9 lb 80W OR ¾ qt 4L OR 0.8 lb 90% WDG	
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
	bromoxynil ( <i>Buctril</i> )	¾	1½ pt 2E OR ¾ pt 4E	<ul style="list-style-type: none"> <li>Apply to weeds less than 4 in. tall for effective control.</li> <li>Apply to corn between the 4-leaf stage (4 visible leaves) and the 8-leaf stage.</li> <li>Do not mix with spray additives or liquid fertilizers.</li> <li>For ground application, use minimum of 20 gal water/A and 30 psi.</li> <li>Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> </ul>
	bromoxynil ( <i>Buctril</i> )	¼	1 pt 2E OR ½ pt 4E	<ul style="list-style-type: none"> <li>Apply to weeds less than 4 in. tall for effective control.</li> <li>Apply to corn between the 3-leaf stage (3 leaves visible) and the 8-leaf stage.</li> <li>Do not mix with spray additives or liquid fertilizers.</li> <li>Improved control of redroot pigweed and wild mustard compared to <i>Buctril</i> alone.</li> <li>Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>A prepackage mix is available as <i>Buctril-Atrazine</i>.</li> </ul>
	+ atrazine (commercial product)	+ ½	+ ⅝ lb 80W OR ½ qt 4L OR 0.6 lb 90% WDG	
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum, green foxtail, giant foxtail, witchgrass and crabgrass)	atrazine (commercial product)	3	3¾ lb 80W OR 3 qt 4L OR 3½ lb 90% WDG	<ul style="list-style-type: none"> <li>Emergency use.</li> <li>Grasses should be less than 1½ in. tall.</li> <li>Timing of application is critical to get best results.</li> <li>Surfactants at 1 pt/A may be used in place of crop oil concentrate but are somewhat less effective.</li> <li>Greater chance for residue since treatment is later in season.</li> <li>Do not add <i>Barvel</i> or 2,4-D as injury may occur.</li> <li>Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum and witchgrass)	tridiphane ( <i>Tandem</i> )	½	1 pt	<ul style="list-style-type: none"> <li>Apply when grass weeds are in the 1 to 3-leaf stage.</li> <li>Timing is critical for adequate results.</li> <li>Cultivation 7 to 14 days after treatment may improve results.</li> <li>Treatment will not provide consistent control of fall panicum or witchgrass.</li> <li>May be applied to no-till corn.</li> </ul>
	+ atrazine (commercial product)	+ 1½	+ 1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% WDG	
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
	cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2.2 lb 90% DF	<ul style="list-style-type: none"> <li>USE WETTABLE POWDER OR DRY FLOWABLE ONLY.</li> <li>Apply before weeds are 1½ in. tall.</li> <li>Apply postemergence through the 4-leaf stage of corn (before 5th leaf is visible).</li> <li>Some temporary setback or stunting of corn may occur.</li> <li>Do not use with crop oil concentrate or other additives as severe crop injury may occur.</li> <li>Application rate is lower if treatment follows a previous <i>Bladex</i> or <i>Extrazine II</i> application. See label.</li> </ul>

## CORN — POSTEMERGENCE — ORGANIC SOIL (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Continued</i>				
	cyanazine (Bladex)	1½	1.9 lb 80W OR 1.7 lb 90% DF	<ul style="list-style-type: none"> <li>● USE WETTABLE POWDER OR DRY FLOWABLE ONLY.</li> <li>● Apply before weeds are 1½ in. tall.</li> <li>● Apply postemergence through the 4-leaf stage of corn (before 5th leaf is visible).</li> <li>● Application rate is lower if treatment follows a previous <i>Bladex</i> or <i>Extrazine II</i> application. See label.</li> <li>● Some temporary setback or stunting of corn may occur.</li> <li>● Do not use with crop oil concentrate or other additives as severe crop injury may occur.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+ atrazine (commercial product)	+ ½	+ 5/8 lb 80W OR 3/8 lb 90% WDG	

## CORN — POSTEMERGENCE DIRECTED — ALL SOILS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grass	ametryne (Evik)	1¾	2 lb	<ul style="list-style-type: none"> <li>● CAUTION — KEEP OFF CORN FOLIAGE.</li> <li>● Do not use before corn is 12 in. tall.</li> <li>● Emergency use.</li> <li>● Use drop nozzles or directed spray.</li> <li>● Generally more effective on annual grasses than <i>Lorox</i> or <i>Linex</i>.</li> <li>● See label for maximum weed size. Selectivity is based on tall corn and small weeds.</li> </ul>
	+ surfactant	+ ½%	+ ½%	
	linuron (Lorox or Linex)	1½	3 pt 4L OR 3 lb 50% DF	
	+ surfactant	+ ½%	+ ½%	<ul style="list-style-type: none"> <li>● CAUTION — KEEP OFF CORN FOLIAGE.</li> <li>● Do not use before corn is 15 in. tall.</li> <li>● Emergency use.</li> <li>● Use drop nozzles or directed spray.</li> <li>● Use lower rates on lighter soils or soils low in organic matter.</li> <li>● For control of small weeds not over 2 in. tall. Selectivity is based on tall corn and small weeds.</li> </ul>
	paraquat (Gramoxone Super)	0.28	1½ pt	
	+ surfactant	+ ¼%	+ ¼%	
				<ul style="list-style-type: none"> <li>● CAUTION — KEEP OFF CORN FOLIAGE.</li> <li>● Do not use before corn is at least 10 in. tall.</li> <li>● Emergency use.</li> <li>● Use drop nozzles or directed spray.</li> <li>● Arrange nozzles to spray no higher than the lower 3 in. of the corn stalks.</li> <li>● Leaves exposed to the spray will be burned.</li> <li>● Do not mix with liquid fertilizer.</li> <li>● Do not graze treated areas or feed treated forage to livestock.</li> <li>● Use caution to avoid spray drift.</li> </ul>

## CORN — SPECIAL WEED PROBLEMS — QUACKGRASS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Preplow/ Preemergence	atrazine (commercial product)	4	5 lb 80W OR 4 qt 4L OR 4¾ lb 90% WDG	<ul style="list-style-type: none"> <li>● Split application: Apply 2 lb/A preplow and 2 lb/A preemergence or preplant incorporated to give control of quackgrass and annual weeds.</li> <li>● Wait at least 1 week after application before plowing.</li> <li>● Preplow application can be done in fall or spring.</li> <li>● Quackgrass should be at least 4 in. tall for preplow application.</li> <li>● When a total of 4 lb. of atrazine is used, carryover may persist 2 to 3 years.</li> </ul>

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## CORN — SPECIAL WEED PROBLEMS — QUACKGRASS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● Incorporate to a depth of 4 to 5 in. immediately after application with a disk, 2 times in opposite directions.</li> <li>● Quackgrass control with minimum soil residue or carryover.</li> <li>● Will also give nutsedge control.</li> <li>● <i>Eradicane Extra</i> is also available and should be used at the rate of 4 qt/A.</li> <li>● Do not apply <i>Eradicane</i> to fields that were treated with a thiocarbamate herbicide the previous year.</li> </ul>
	+ EPTC with protectant ( <i>Eradicane</i> )	+	+	
<b>Postemergence</b>	atrazine (commercial product)	2+2	2½ lb 80W OR 2 qt 4L OR 2 ½ lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply when quackgrass is 2 to 4 in. tall, and again 10-14 days later for more complete control.</li> <li>● When a total of 4 lb of atrazine is used, carryover may persist 2 to 3 years.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> </ul>
	+ crop oil concentrate	+	+	
<b>Preplant</b>	glyphosate ( <i>Roundup</i> )	1½	2 qt	<ul style="list-style-type: none"> <li>● Apply in the fall or before planting in the spring.</li> <li>● Fall applications generally more effective.</li> <li>● Apply to actively growing quackgrass at least 8 in. tall.</li> <li>● Use 10 to 40 gal of water/A.</li> <li>● Use flat fan nozzles.</li> <li>● No soil residue.</li> <li>● Can plow or till 3 days after application and plant crop.</li> <li>● Do not plow or till prior to treatment.</li> <li>● <i>Roundup</i> rate of 1 qt may be used for <i>single season</i> quackgrass control. Apply 1 qt in 5 to 10 gal of water/A with 0.5% nonionic surfactant. This treatment is less effective on an undisturbed quackgrass sod.</li> </ul>
	glyphosate ( <i>Ranger</i> )	¾	3 pt	

## CORN — SPECIAL WEED PROBLEMS — NUTSEDGE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>	butylate ( <i>Sutan Plus</i> or <i>Genate Plus</i> )	5	3 qt	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in.</li> <li>● Control of annual grasses.</li> <li>● Combine or follow with another herbicide (see Preplant — Mineral Soil and Postemergence — Mineral Soil sections) for additional broadleaf weed control.</li> </ul>
	EPTC ( <i>Eradicane</i> )	5	3 qt	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in.</li> <li>● Control of annual grasses.</li> <li>● Combine or follow with another herbicide (see Preplant — Mineral Soil and Postemergence — Mineral Soil sections) for additional broadleaf control.</li> <li>● <i>Eradicane Extra</i> is also available and should be applied at the rate of 3½ qt/A.</li> <li>● Do not apply <i>Eradicane</i> to fields that were treated with a thiocarbamate herbicide the previous year.</li> </ul>
	alachlor ( <i>Lasso, Arena</i> )	3	3 qt	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in. for consistent nutsedge control.</li> <li>● Control of annual grasses.</li> <li>● Combine or follow with another herbicide (see Preplant — Mineral Soil and Postemergence — Mineral Soil sections) for additional broadleaf weed control.</li> </ul>
	metolachlor ( <i>Dual</i> )	2½	1¼ qt	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in. for consistent nutsedge control.</li> <li>● Control of annual grasses.</li> <li>● Combine or follow with another herbicide (see Preplant — Mineral Soil and Postemergence — Mineral Soil sections) for additional broadleaf weed control.</li> </ul>
<b>Postemergence</b>	bentazon ( <i>Basagran</i> ) + crop oil concentrate	¾ + ¾ + 1 qt + 1 qt	1½ pt + 1 qt	<ul style="list-style-type: none"> <li>● Two applications required for best nutsedge control.</li> <li>● Controls some broadleaves also. Check label.</li> <li>● Treat when nutsedge is 6-8 in. tall and again 7 to 10 days later.</li> <li>● Use a minimum of 40 psi and 20 gal of water/A. Do not use flood nozzles.</li> </ul>
	atrazine (commercial product) + crop oil concentrate	2 + 2 + 1 qt + 1 qt	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG + 1 qt	<ul style="list-style-type: none"> <li>● Apply 2 lb of atrazine/A when nutsedge is 2 in. tall, and apply 2 lb/A atrazine 10 to 14 days later. On muck soils, apply 2 lb of atrazine/A when the nutsedge is 2 in. tall, then apply 1 lb of atrazine/A 1 week and 2 weeks following the initial treatment.</li> <li>● Surfactants may be used in place of crop oil concentrate but are somewhat less effective.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> <li>● High atrazine carryover potential on mineral soils.</li> </ul>



## CORN — SPECIAL WEED PROBLEMS — CANADA THISTLE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Postemergence</b>	bentazon ( <i>Basagran</i> ) +	1 + 1 +	1 qt +	<ul style="list-style-type: none"> <li>● Two applications required for adequate Canada thistle control.</li> <li>● Treat when Canada thistle is 8 to 10 in. and again 7 to 10 days later.</li> <li>● Use a minimum of 40 psi and 20 gal of water/A. Do not use flood nozzles.</li> </ul>
	crop oil concentrate	1 qt + 1 qt	1 qt	
	<hr/>			
	atrazine (commercial product) +	2 + 2 +	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG +	<ul style="list-style-type: none"> <li>● Apply 2 lb. of atrazine/A when Canada thistle is 6 to 8 in. tall, and again 10 to 14 days later.</li> <li>● Surfactants may be used in place of crop oil concentrate but are somewhat less effective.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> <li>● High atrazine carryover potential.</li> </ul>
	crop oil concentrate	1 qt + 1 qt	1 qt	
	<hr/>			
	dicamba ( <i>Banvel</i> )	¼ + ¼	½ pt + ½ pt	<ul style="list-style-type: none"> <li>● Treat when Canada thistle is 6 to 8 in. tall and again 10 to 14 days later.</li> <li>● Application rate of the first treatment may be increased to ½ lb/A (1 pt/A) if the corn is in the 5-leaf stage (8 in.) or less.</li> <li>● For corn over 8 in., use drop nozzles.</li> <li>● See additional remarks and limitations for dicamba (pg. 17).</li> </ul>

## CORN — SPECIAL WEED PROBLEMS — VELVETLEAF

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>	butylate ( <i>Sutan Plus</i> or <i>Genate Plus</i> ) +	4 +	4¾ pt +	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in.</li> <li>● Do not use on corn seed stocks (Breeders, Foundation, or Increase).</li> <li>● May require a postemergence application for complete velvetleaf control.</li> <li>● Commercial prepackage mixes of butylate plus atrazine are available (<i>Sutazine, Rhino</i>).</li> </ul>
	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	
	EPTC with protectant ( <i>Eradicane</i> ) +	4 +	4¾ pt +	<ul style="list-style-type: none"> <li>● Preplant incorporated to a depth of 2 to 3 in.</li> <li>● May require a postemergence application for complete velvetleaf control.</li> <li>● <i>Eradicane Extra</i> is also available and should be used at the rate of 5 pt/A.</li> </ul>
	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	

(Continued next page)

## CORN — SPECIAL WEED PROBLEMS — VELVETLEAF

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Postemergence</b>	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG	<ul style="list-style-type: none"> <li>● Timing of application is critical for best results.</li> <li>● For best results treat when the largest velvetleaf in the field are 2 in. tall.</li> <li>● Surfactant at 1 pt/A may be used in place of crop oil concentrate but is somewhat less effective.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if the corn is succulent from recent rainfall.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	dicamba ( <i>Banvel</i> )	½	1 pt	<ul style="list-style-type: none"> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to ½ pt/A.</li> <li>● For best results, treat when the largest velvetleaf in the field are 2 in. tall.</li> <li>● USE EXTREME CAUTION. DRIFT TO NEARBY SENSITIVE CROPS IS A HAZARD.</li> <li>● Do not apply if the air temperature is expected to exceed 85° F as the risk of volatilization is increased.</li> <li>● For corn over 8 in., use drop nozzles.</li> <li>● Use pressure less than 20 psi.</li> <li>● See additional remarks and limitations for dicamba (<i>Banvel</i>) under Corn — Postemergence section.</li> </ul>
	dicamba ( <i>Banvel</i> )	½	1 pt	
	+	+	+	
	atrazine	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● For best results, treat when the largest velvetleaf in the field are 2 in. tall.</li> <li>● Do not use with crop oil concentrate or other additives.</li> <li>● See additional remarks and limitations for dicamba (<i>Banvel</i>) under Corn — Postemergence section.</li> <li>● A commercial prepackaged mix of dicamba and atrazine (<i>Marksman</i>) is available.</li> </ul>
	atrazine	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	
	bentazon ( <i>Basagran</i> )	¾	¾ qt	<ul style="list-style-type: none"> <li>● For best results, treat when the largest velvetleaf in the field are 2 in. tall.</li> <li>● Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>● Corn injury is possible during stress conditions (cold, wet, cloudy weather) or if corn is succulent from recent rainfall.</li> </ul>
	+	+	+	
	atrazine (commercial product)	¾	0.9 lb 80W OR ¾ qt 4L OR 0.8 lb 90% WDG	<ul style="list-style-type: none"> <li>● Urea ammonium nitrate (28% liquid nitrogen) may be used at 1 gal/A instead of crop oil concentrate. Do not use urea ammonium nitrate if common lambsquarters is present.</li> <li>● A commercial prepackage mix of <i>Basagran</i> plus atrazine (<i>Laddok</i>) is available.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	bromoxynil ( <i>Buctril</i> )	¾	1½ pt 2E	<ul style="list-style-type: none"> <li>● For best results, treat when the largest velvetleaf in the field are 2 in. tall.</li> <li>● Apply to corn between the 3-leaf stage (3 leaves visible) and the 8-leaf stage.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● Combination reduces risk of carryover from post-emergence application of atrazine alone.</li> <li>● A prepackaged mix is available as <i>Buctril-Atrazine</i>.</li> </ul>
	+	+	+	
	atrazine (commercial product)	¾	0.9 lb 80W OR ¾ qt 4L OR 0.8 lb 90% WDG	

## CORN — SPECIAL WEED PROBLEMS — TRIAZINE RESISTANT LAMBSQUARTERS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Postemergence	dicamba ( <i>Banvel</i> )	1/2	1 pt	<ul style="list-style-type: none"> <li>● Apply postemergence. Treatment must follow a preplant-incorporated or preemergence herbicide application for control of other weed species.</li> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to 1/2 pt/A.</li> <li>● Most effective when weeds are small (4 in. or less).</li> <li>● For best results, treat when the largest lambsquarters in the field are 2 in. tall.</li> <li>● See additional remarks and limitations for dicamba (<i>Banvel</i>) under Corn-Postemergence.</li> </ul>
	dicamba ( <i>Banvel</i> ) + atrazine (commercial product)	1/2 + 1	1 pt + 1 1/4 lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply postemergence. Treatment must follow a preplant-incorporated or preemergence herbicide application for grass control.</li> <li>● Apply postemergence to corn from emergence up to the 5-leaf stage or 8 in. tall, whichever comes first. For larger corn, reduce rate to 1/2 pt/A.</li> <li>● Most effective when weeds are small (4 in. or less).</li> <li>● For best results, treat when the largest lambsquarters in the field are 2 in. tall.</li> <li>● Do not use with crop oil concentrate or other additives.</li> <li>● See additional remarks and limitations for dicamba (<i>Banvel</i>).</li> <li>● A commercial prepackage mix of dicamba and atrazine (<i>Marksman</i>) is available.</li> </ul>
	bromoxynil ( <i>Buctril</i> )	3/8	1 1/2 pt 2E	<ul style="list-style-type: none"> <li>● Apply postemergence. Treatment must follow a preplant-incorporated or preemergence herbicide application for control of other weed species.</li> <li>● Apply to corn between the 4-leaf stage (4 visible leaves) and the 8-leaf stage.</li> <li>● Most effective when weeds are small (4 in. or less).</li> <li>● For best results, treat when the largest lambsquarters in the field are 2 in. tall.</li> <li>● Treatment will not provide residual control.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● For ground applications, use a minimum of 20 gal water/A and 30 psi.</li> </ul>
	bromoxynil ( <i>Buctril</i> ) + atrazine (commercial product)	3/8 + 3/4	1 1/2 pt 2E + 0.9 lb 80W OR 3/4 qt 4L OR 0.8 lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply postemergence. Treatment must follow a preplant-incorporated or preemergence herbicide application for grass control.</li> <li>● Apply to corn between the 4-leaf stage (4 visible leaves) and the 8-leaf stage.</li> <li>● Most effective when weeds are small (4 in. or less).</li> <li>● For best results, treat when the largest lambsquarters in the field are 2 in. tall.</li> <li>● Treatment will not provide residual control.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● For ground applications, use a minimum of 20 gal. water/A and 30 psi.</li> </ul>

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## CORN — SPECIAL WEED PROBLEMS — TRIAZINE RESISTANT LAMBSQUARTERS (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Continued</i>				
	2,4-D amine	½	1 pt	<ul style="list-style-type: none"> <li>● Apply postemergence. Treatment must follow a preplant-incorporated or preemergence herbicide application for control of other weed species.</li> <li>● For corn over 6 to 8 in., use drop nozzles.</li> <li>● Most effective when weeds are small (4 in. or less).</li> <li>● For best results, treat when the largest lambsquarters in the field are 2 in. tall.</li> <li>● Treatment will not provide residual control.</li> <li>● Often less effective than the other recommended herbicides.</li> <li>● Ester formulations will cause more crop injury and are not recommended.</li> <li>● Oil soluble amines of 2,4-D (<i>Dacamine</i>, <i>Weedar E-3</i>) are available and are used at lower rates.</li> <li>● Drift control additives can be used with some 2,4-D amine products to reduce danger of drift. Check the product label.</li> <li>● Hybrids vary in tolerance.</li> <li>● Most effective when weeds are small (4 in. or less).</li> </ul>

## NO-TILL CORN — ALFALFA SOD

*(Predominantly alfalfa with broadleaf weeds and some grasses such as timothy, bromegrass and annual weeds)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations	
<b>Fall application followed by Preemergence:</b>					
<b>Alfalfa sod</b> <b>Annual broadleaves</b> <b>Annual grasses</b>	2,4-D ester	1¼	1¼ qt	<ul style="list-style-type: none"> <li>● Apply 2,4-D in fall.</li> <li>● Alfalfa should be at least 4 in. tall and actively growing at treatment time.</li> <li>● Air temperature should be at least 60° F.</li> <li>● Apply atrazine + paraquat or <i>Roundup</i> at planting time.</li> <li>● Use ½ pt non-ionic surfactant/100 gal of spray solution when using paraquat. Double surfactant rate when using liquid N or liquid fertilizer.</li> <li>● Use 20 to 60 gal/A with paraquat and 20 to 30 gal/A with <i>Roundup</i>.</li> <li>● Paraquat provides quicker burndown. <i>Roundup</i> may provide better control if sod growth is dense.</li> <li>● Postemergence <i>Banvel</i> or 2,4-D may be needed to control alfalfa escapes.</li> <li>● Do not use suspension or high phosphate carriers.</li> <li>● Follow mixing directions for paraquat or <i>Roundup</i>.</li> <li>● <b>Note:</b> In a mixed alfalfa-quackgrass sod an additional 2 lb/A of atrazine may be applied by one of three methods:               <ol style="list-style-type: none"> <li>1) Add 2 lb a.i./A atrazine + 1 qt/A crop oil concentrate to the 2,4-D application, or</li> <li>2) Apply a total of 4 lb a.i./A atrazine at planting time, or</li> <li>3) Apply 2 lb a.i./A atrazine + 1 qt/A crop oil concentrate postemergence (see Corn-Postemergence section)</li> </ol> </li> <li>● When a total of 4 lb/A of atrazine is used, carryover may persist 2 to 3 years.</li> <li>● Quackgrass is usually not at the proper stage of growth (8 in. tall) for maximum effectiveness from <i>Roundup</i> treatment at corn planting. (See "Quackgrass" section for notes on <i>Roundup</i> use.)</li> <li>● <i>Lasso</i>, <i>Arena</i> or <i>Dual</i> may be included if annual grasses are expected to be a serious problem.</li> </ul>	
	FOLLOWED BY:				
	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG		+
	+ paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	0.47 OR 1⅛	+		2½ pt OR 1½ qt

## NO-TILL CORN — ALFALFA SOD (continued)

*(Predominantly alfalfa with broadleaf weeds and some grasses such as timothy, bromegrass and annual weeds)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations	
<b>Spring application followed by Preemergence:</b>					
<b>Alfalfa sod</b> <b>Annual broadleaves</b> <b>Annual grasses</b>	2,4-D ester	1¼	1¼ qt	<ul style="list-style-type: none"> <li>● Apply 2,4-D 7 to 10 days before planting.</li> <li>● Alfalfa should be at least 4 in. tall at treatment time.</li> <li>● Apply atrazine and paraquat or <i>Roundup</i> at planting time.</li> <li>● Use ½ pt non-ionic surfactant/100 gal of spray solution when using paraquat. Double surfactant rate when using liquid N or liquid fertilizer.</li> <li>● Use 20 to 60 gal/A with paraquat and 20 to 30 gal/A with <i>Roundup</i>.</li> <li>● Paraquat provides quicker burndown. <i>Roundup</i> may provide better control if sod growth is dense.</li> <li>● Postemergence <i>Banvel</i> or 2,4-D may be needed to control alfalfa escapes.</li> <li>● Do not use suspension or high phosphate carriers.</li> <li>● Follow mixing directions for paraquat or <i>Roundup</i>.</li> <li>● <b>Note:</b> In a mixed alfalfa-quackgrass sod an additional 2 lb/A of atrazine may be applied by one of three methods:               <ol style="list-style-type: none"> <li>1) Add 2 lb a.i./A atrazine + 1 qt/A crop oil concentrate to the 2,4-D application, or</li> <li>2) Apply a total of 4 lb a.i./A atrazine at planting time, or</li> <li>3) Apply 2 lb a.i./A atrazine + 1 qt/A crop oil concentrate postemergence (see Corn-Postemergence section)</li> </ol> </li> <li>● When a total of 4 lb/A of atrazine is used, carryover may persist 2 to 3 years.</li> <li>● Quackgrass is usually not at the proper stage of growth (8 in. tall) for maximum effectiveness from <i>Roundup</i> treatment at corn planting. (See "Quackgrass" section for notes on <i>Roundup</i> use.)</li> <li>● <i>Lasso</i>, <i>Arena</i> or <i>Dual</i> may be included if annual grasses are expected to be a serious problem.</li> </ul>	
	FOLLOWED BY:				
	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG		+
	+ paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 0.47 OR 1⅛	+ 2½ pt OR OR 1½ qt		+

## NO-TILL CORN — GRASS SOD

(Predominantly bluegrass, timothy, orchardgrass, bromegrass or tall fescue, not quackgrass)

Weed Controlled	Herbicide	Rate lb/A		Remarks and Limitations
		a.i.	Formulation/A	
<b>Grass sod</b> <b>Annual broadleaves</b> <b>Annual grasses</b> (except green foxtail, giant foxtail, fall panicum, witchgrass, crabgrass, and sandbur)	atrazine (commercial product)	3	3¾ lb 80W OR 3 qt 4L OR 3½ lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply at planting time.</li> <li>● Use ½ pt non-ionic surfactant/100 gal of spray when using paraquat. Double surfactant rate when using liquid N or liquid fertilizer.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> <li>● Paraquat provides quicker burndown. <i>Roundup</i> may provide better control if sod growth is dense.</li> <li>● Do not use paraquat with suspension or high phosphate carriers.</li> <li>● Follow mixing directions for paraquat or <i>Roundup</i>.</li> <li>● <i>Lasso</i>, <i>Arena</i> or <i>Dual</i> may be included if annual grasses are expected to be a serious problem.</li> <li>● Carryover problems may occur with atrazine-sensitive crops. Corn should be planted the year following application.</li> </ul>
	+ paraquat ( <i>Gramoxone Super</i> )	+	+	
	OR	OR	OR	
	glyphosate ( <i>Roundup</i> )	1⅛	1½ qt	

## NO-TILL CORN — QUACKGRASS SOD

Weed Controlled	Herbicide	Rate lb/A		Remarks and Limitations	
		a.i.	Formulation/A		
<b>Quackgrass</b> <b>Annual broadleaves</b> <b>Annual grasses</b> (except green foxtail, giant foxtail, fall panicum, witchgrass, crabgrass, and sandbur)	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply atrazine plus crop oil when quackgrass has started growth in spring, 7 to 10 days before planting. Make second application at planting.</li> <li>● High rate of atrazine (4 lb ai/A) will provide some additional annual grass control.</li> <li>● Quackgrass is usually not at the proper stage of growth (8 in. tall) for maximum effectiveness from <i>Roundup</i> treatment at corn planting. (See "Quackgrass" section for notes on <i>Roundup</i> use.)</li> <li>● When 4 lb of atrazine are used, carryover may persist 2 to 3 years.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● 2,4-D ester (1 lb ai/A or 1 qt/A) may be added to initial application of atrazine plus crop oil concentrate for perennial broadleaf weed suppression.</li> <li>● <i>Lasso</i>, <i>Arena</i> or <i>Dual</i> may be included if annual grasses are expected to be a serious problem.</li> </ul>	
	+ crop oil concentrate	+	+		
	1 qt	1 qt			
	FOLLOWED BY				
	atrazine	2	2½ lb 80W OR 2 qt 4L OR 2½ lb 90% WDG		
	+ paraquat ( <i>Gramoxone Super</i> )	+	+		
	OR	OR	OR		
	glyphosate ( <i>Roundup</i> )	1⅛	1½ qt		

## NO-TILL CORN — GRAIN STUBBLE or ROW CROP RESIDUE (With rye or uheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	atrazine (commercial product)	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Paraquat applied to rye before jointing (24 to 36 in. tall) may not provide complete rye control.</li> <li>● Use 3 qt <i>Lasso</i> for heavy grass (especially fall panicum or crabgrass) infestations.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for four-way tank mixes, pg. 32).</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow paraquat or <i>Roundup</i> mixing directions.</li> <li>● Prepackaged mixes of atrazine + <i>Lasso</i> or <i>Roundup</i> + <i>Lasso</i> (<i>Bronco</i>) are available.</li> <li>● A prepackaged mix of atrazine + <i>Dual</i> (<i>Bicep</i>) is available.</li> <li>● Maximum <i>Dual</i> rate in tank mixes is 2½ pt on fine textured soils.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> ) OR metolachlor ( <i>Dual</i> )	+ 2½	+ 2½ qt	
+ paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 0.47 OR 1⅞	+ 2½ pt OR 1½ qt		
cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF		
+ alachlor ( <i>Lasso, Arena</i> ) + paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 2½ + 0.47 OR 1⅞	+ 2½ qt + 2½ pt OR 1½ qt		
cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF		
+ metolachlor ( <i>Dual</i> ) + paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 2 + 0.47 OR 1⅞	+ 1 qt + 2½ pt OR 1½ qt		

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## NO-TILL — GRAIN STUBBLE or ROW CROP RESIDUE (continued)

(With rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual broadleaves Annual grasses	atrazine (commercial product)	¾	1 lb 80W OR ¾ qt 4L OR ¼ lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduces potential atrazine carryover.</li> <li>● Paraquat applied to rye before jointing (24 to 36 in. tall) may not provide complete control.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Prepackaged mixes of atrazine + <i>Lasso</i> or <i>Roundup</i> + <i>Lasso (Bronco)</i> are available.</li> <li>● <i>Bladex</i> rate varies depending on surface residue and soil type (refer to <i>Bladex</i> label for details).</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
	cyanazine ( <i>Bladex</i> )	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% DF	
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> )	2½	2½ qt	
+	+	+		
paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt		
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅛	1½ qt		
<hr/>				
	atrazine (commercial product)	¾	1 lb 80W OR ¾ qt 4L OR ¼ lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduces potential atrazine carryover.</li> <li>● Paraquat applied to rye before jointing (24 to 36 in. tall) may not provide complete control.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow paraquat or <i>Roundup</i> mixing directions.</li> <li>● A prepackaged mix of atrazine + <i>Dual (Bicep)</i> is available.</li> <li>● <i>Bladex</i> rate varies depending on surface residue and soil type (refer to <i>Bladex</i> label for details).</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
	cyanazine ( <i>Bladex</i> )	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% DF	
	+	+	+	
	metolachlor ( <i>Dual</i> )	2	1 qt	
+	+	+		
paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt		
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅛	1½ qt		
<hr/>				
	cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Paraquat applied to rye before jointing (24 to 36 in. tall). May not provide complete control.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow label mixing instructions for paraquat and <i>Roundup</i>.</li> <li>● Adjust <i>Bladex</i> rate according to soil type. Refer to <i>Bladex</i> label for details.</li> <li>● Do not use on sands or loamy sands with less than 1% organic matter.</li> <li>● Where annual grasses are a severe problem, this program will be less consistent than herbicide combinations including <i>Lasso, Arena, or Dual</i>.</li> <li>● Will not control yellow nutsedge.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt	
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅛	1½ qt		



## NO-TILL — GRAIN STUBBLE or ROW CROP RESIDUE

(Without a cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grasses	atrazine (commercial product)	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Use 3 qt Lasso for heavy grass (especially fall panicum or crabgrass) infestations.</li> <li>● <i>Bladex</i> may be included for more effective fall panicum control. (See remarks for four-way tank mixes, pg. 34).</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow paraquat or <i>Roundup</i> mixing directions.</li> <li>● Prepackaged mixes of atrazine + <i>Lasso</i> or <i>Roundup</i> + <i>Lasso</i> (<i>Bronco</i>) are available.</li> <li>● A prepackaged mix of atrazine + <i>Dual</i> (<i>Bicep</i>) is available.</li> <li>● Maximum <i>Dual</i> rate in tank mixes is 2½ pt on fine textured soils.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1½ pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt/A or less (See Label.)</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> ) OR metolachlor ( <i>Dual</i> )	+ 2½ OR 2	+ 2½ qt OR 1 qt	
+ paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 0.47 OR 1⅛	+ 2½ pt OR 1½ qt		
cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF		
+ alachlor ( <i>Lasso, Arena</i> ) + paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 2½ + 0.47 OR 1⅛	+ 2½ qt + 2½ pt OR 1½ qt		
cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF		
+ metolachlor ( <i>Dual</i> ) + paraquat ( <i>Gramoxone Super</i> ) OR glyphosate ( <i>Roundup</i> )	+ 2 + 0.47 OR 1⅛	+ 1 qt + 2½ pt OR 1½ qt		

(Continued next page)

## NO-TILL — GRAIN STUBBLE or ROW CROP RESIDUE (continued)

(Without a cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
(continued)				
<b>Annual broadleaves</b> <b>Annual grasses</b>	atrazine (commercial product)	¾	1 lb 80W OR ¾ qt 4L OR ¼ lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduces potential atrazine carryover.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow paraquat or <i>Roundup</i> mixing directions.</li> <li>● Prepackaged mixes of atrazine + <i>Lasso</i> or <i>Roundup</i> + <i>Lasso (Bronco)</i> are available.</li> <li>● Where no crop cover is present and annual weeds are small, the rate of paraquat may be reduced to 1½ pt/A or the rate of <i>Roundup</i> may be reduced to 1½ qt/A or less. (See Label.)</li> <li>● <i>Bladex</i> rate varies depending on surface residue and soil type (refer to <i>Bladex</i> label for details).</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
cyanazine ( <i>Bladex</i> )	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% DF		
+	+	+		
alachlor ( <i>Lasso, Arena</i> )	2½	2½ qt		
+	+	+		
paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt		
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅙	1½ qt		
<hr/>				
	atrazine (commercial product)	¾	1 lb 80W OR ¾ qt 4L OR ¼ lb 90% WDG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduces potential atrazine carryover.</li> <li>● May substitute <i>Princep</i> for atrazine if fall panicum is a severe problem.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow paraquat or <i>Roundup</i> mixing directions.</li> <li>● A prepackaged mix of atrazine + <i>Dual (Bicep)</i> is available.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1½ pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt/A or less (See Label.)</li> <li>● <i>Bladex</i> rate varies depending on surface residue and soil type (refer to <i>Bladex</i> label for details).</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
cyanazine ( <i>Bladex</i> )	1½	1.9 lb 80W OR 1½ qt 4L OR 1.7 lb 90% DF		
+	+	+		
metolachlor ( <i>Dual</i> )	2	1 qt		
+	+	+		
paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt		
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅙	1½ qt		
<hr/>				
	cyanazine ( <i>Bladex</i> )	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 90% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● See notes above for paraquat or <i>Roundup</i> use.</li> <li>● Follow label mixing instructions for paraquat and <i>Roundup</i>.</li> <li>● Where no cover crop is present and annual weeds are small, the paraquat rate may be reduced to 1½ pt/A or <i>Roundup</i> may be reduced to 1 qt/A or less (see label).</li> <li>● Adjust <i>Bladex</i> rate according to soil type. Refer to <i>Bladex</i> label for details.</li> <li>● Do not use on sands or loamy sands with less than 1% organic matter.</li> <li>● Where annual grasses are a severe problem, this program will be less consistent than herbicide combinations including <i>Lasso, Arena, or Dual</i>.</li> <li>● Will not control yellow nutsedge.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG		
+	+	+		
paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt		
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅙	1½ qt		

(Continued next page)

## NO-TILL — GRAIN STUBBLE or ROW CROP RESIDUE (continued)

(Without a cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
(continued)				
<b>Annual broadleaves</b>	cyanazine ( <i>Bladex</i> )	2.2	2.2 qt 4L	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Use <i>Bladex 4L</i> only.</li> <li>● For small annual weeds <i>no more than</i> 3 in. in height.</li> <li>● <i>Bladex 4L</i> rate must be reduced on sandy soils or soils with less than 3% organic matter to avoid injury.</li> <li>● Use a minimum of 25 gal of spray/A.</li> <li>● 28% liquid nitrogen used as the herbicide carrier will add to the effectiveness of the treatment for burndown. When this carrier is used, substitute ½% surfactant for crop oil concentrate.</li> <li>● 2,4-D ester (½ lb/A or 1 pt/A) may be included if perennial broadleaves are present.</li> </ul>
<b>Annual grasses</b>	+	+	+	
	alachlor ( <i>Lasso, Arena</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	1 qt	
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	cyanazine ( <i>Bladex</i> )	1½	1½ qt 4L	
	+	+	+	
	atrazine (commercial product)	¾	¾ qt 4L	
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	1 qt	
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	cyanazine ( <i>Bladex</i> )	2	2 qt 4L	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Use <i>Bladex 4L</i> only.</li> <li>● For small annuals <i>no more than</i> 3 in. in height.</li> <li>● Adjust <i>Bladex</i> rate according to soil type. Refer to <i>Bladex</i> label for details.</li> <li>● Use a minimum of 25 gal of spray/A.</li> <li>● 28% liquid nitrogen used as the herbicide carrier will add to the effectiveness of the treatment for burndown. When this carrier is used, substitute ½% surfactant for crop oil concentrate.</li> <li>● 2,4-D ester (½ lb/A or 1 pt/A) may be included if perennial broadleaves are present.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine II</i> (3:1).</li> </ul>
	+	+	+	
	atrazine (commercial product)	1	1 qt 4L	
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
				<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Use <i>Bladex 4L</i> only.</li> <li>● For small annuals <i>no more than</i> 3 in. in height.</li> <li>● Adjust <i>Bladex</i> rate according to soil type. Refer to <i>Bladex</i> label for details.</li> <li>● Use a minimum of 25 gal of spray/A.</li> <li>● 28% liquid nitrogen used as the herbicide carrier will add to the effectiveness of the treatment for burndown. When this carrier is used, substitute ½% surfactant for crop oil concentrate.</li> <li>● 2,4-D ester (½ lb/A or 1 pt/A) may be included if perennial broadleaves are present.</li> <li>● Where annual grasses are a severe problem, this program will be less consistent than herbicide combinations including <i>Lasso, Arena</i> or <i>Dual</i>.</li> <li>● Will not control yellow nutsedge.</li> <li>● Prepackaged mix of <i>Bladex</i> plus atrazine is available as <i>Extrazine</i> (3:1).</li> </ul>

# SOYBEANS

## PREPLANT

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses Annual broadleaves Nutsedge	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	3/8	3/4 pt 4L OR 1/2 lb 75% DF	<ul style="list-style-type: none"> <li>● Good control of velvetleaf. Fair control of jimsonweed and cocklebur.</li> <li>● DO NOT use on sands or soils with less than 1/2% organic matter. DO NOT use on loamy sand or sandy loam soils with less than 1% organic matter.</li> <li>● Reduce metribuzin rate if soil pH is above 7.0.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● Note label for rotational crop restrictions.</li> <li>● <i>Lasso</i> rate should be increased to 3 qt/A and <i>Dual</i> to 2 1/2 pt/A for effective nutsedge control.</li> <li>● A prepackaged mix of <i>Sencor plus metolachlor (Dual)</i> is available (<i>Turbo</i>).</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
Annual grasses Annual broadleaves Nutsedge	metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	3/8	1/2 lb 75% DG	<ul style="list-style-type: none"> <li>● SEE <i>PREVIEW</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops can occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than 1/2% organic matter.</li> <li>● Use on soils with organic matter from 1/2 to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● Better control of velvetleaf, cocklebur, and jimsonweed than metribuzin.</li> <li>● <i>Lasso</i> rate should be increased to 3 qt/A and <i>Dual</i> to 2 1/2 pt/A for effective nutsedge control.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Preview</i>. See label for specific instructions.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
Annual grasses Annual broadleaves (including nightshade) Nutsedge	chloramben ( <i>Amiben</i> )	2	1 gal 2L OR 2 1/2 lb 75% DS	<ul style="list-style-type: none"> <li>● <i>Lasso</i> rate should be increased to 3 qt/A and <i>Dual</i> to 2 1/2 pt/A for effective nutsedge control.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
Annual grasses Annual broadleaves Nutsedge	imazaquin ( <i>Scepter</i> )	0.125	3/8 pt	<ul style="list-style-type: none"> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● <i>Lasso</i> rate should be increased to 3 qt/A and <i>Dual</i> to 2 1/2 pt/A for effective nutsedge control.</li> <li>● Velvetleaf and black nightshade control are best when <i>Scepter</i> is incorporated. Common ragweed control is better when <i>Scepter</i> is applied preemergence.</li> </ul>
	+ alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	

## SOYBEANS — PREPLANT (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses	trifluralin ( <i>Treflan</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● Incorporate or mix thoroughly into top 2 or 3 in. of soil within 24 hr after application.</li> <li>● On sandy and sandy loam soils low in organic matter, use ½ lb a.i./A (1 pt/A).</li> <li>● Most effective control if application is made 10 days to 2 weeks ahead of planting and field reworked just prior to planting.</li> </ul>
	pendimethalin ( <i>Prowl</i> )	1	2 pt	<ul style="list-style-type: none"> <li>● Incorporate in top 2 to 3 in. of soil.</li> <li>● Incorporate within 7 days of application unless rainfall occurs.</li> </ul>
	ethalfluralin ( <i>Sonalan</i> )	0.9	2½ pt	<ul style="list-style-type: none"> <li>● Incorporate in top 2 to 3 in. of soil.</li> <li>● Incorporate within 2 days of application.</li> </ul>
Annual grasses Annual broadleaves (except nightshade)	Combine any of the above dinitroanilines ( <i>Treflan</i> , <i>Sonalan</i> , or <i>Prowl</i> ) with metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	¾	¾ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Good control of velvetleaf. Fair control of jimsonweed and cocklebur.</li> <li>● See specific remarks for each dinitroaniline herbicide.</li> <li>● Reduce rate if soil pH is above 7.0.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● Note label for rotational crop restrictions.</li> <li>● A prepackage mix of <i>Sencor</i> plus <i>Treflan</i> is available (<i>Salute</i>).</li> </ul>
	Combine any of the above dinitroanilines ( <i>Treflan</i> , <i>Sonalan</i> , or <i>Prowl</i> ) with metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾	½ lb 75% DG	<ul style="list-style-type: none"> <li>● SEE PREVIEW LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops may occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½ to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● Better control of velvetleaf, cocklebur, and jimsonweed than metribuzin.</li> <li>● See specific remarks for each dinitroaniline herbicide.</li> <li>● This tank mix will not provide nutsedge suppression.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Preview</i>. See label for special instructions.</li> </ul>
Annual grasses Annual broadleaves (including nightshade)	Combine any of the above dinitroanilines ( <i>Treflan</i> , <i>Sonalan</i> , or <i>Prowl</i> ) with chloramben ( <i>Amiben</i> )	2	1 gal 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>● See specific remarks for each dinitroaniline herbicide.</li> <li>● Fair control of velvetleaf. Poor control of jimsonweed and cocklebur.</li> <li>● Preferred on sandy soils low in organic matter where injury from metribuzin or linuron is a problem.</li> </ul>
	Combine any of the above dinitroanilines ( <i>Treflan</i> , <i>Sonalan</i> , or <i>Prowl</i> ) with imazaquin ( <i>Scepter</i> )	0.125	¾ pt 1.5L	<ul style="list-style-type: none"> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● See specific remarks for each dinitroaniline herbicide.</li> <li>● Nutsedge will be suppressed by <i>Scepter</i>.</li> <li>● Velvetleaf and black nightshade control are good when <i>Scepter</i> is incorporated. Common ragweed control is better when <i>Scepter</i> is applied preemergence.</li> <li>● A prepackaged mix of <i>Prowl</i> plus <i>Scepter</i> is available (<i>Squadron</i>). A prepackaged mix of trifluralin plus <i>Scepter</i> is available (<i>Tri-Scepter</i>).</li> </ul>

(Continued next page)

## SOYBEANS — PREPLANT (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b> <b>Annual broadleaves</b> (except yellow nutsedge and black nightshade)	clomazone ( <i>Command</i> ) + metribuzin ( <i>Sencor</i> or <i>Lexone</i> )	¾ + ¾	1½ pt + ¾ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Excellent control of velvetleaf. Fair control of cocklebur and jimsonweed.</li> <li>● SEE <i>COMMAND</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use a drift additive to reduce spray drift.</li> <li>● Consult <i>Command</i> label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● DO NOT apply to very moist soils.</li> <li>● Preplant incorporate immediately on moist soils and within 8 hours on dry soils.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● If soil pH is above 7.0, reduce the metribuzin rate to ¼ lb a.i./A.</li> <li>● On sandy loam soils, or loamy sand soils with greater than 1% organic matter, reduce the metribuzin rate to ¼ lb a.i./A.</li> <li>● DO NOT use on soils with less than ½% organic matter, or on sands or loamy sands with less than 1% organic matter.</li> <li>● Use care to avoid misapplication or overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
<b>Annual grasses</b> <b>Annual broadleaves</b> (except black nightshade)	clomazone ( <i>Command</i> ) + metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾ + ¾	1½ pt. + ½ lb 75% DG	<ul style="list-style-type: none"> <li>● SEE BOTH <i>COMMAND</i> AND <i>PREVIEW</i> LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½ to 5%. Reduce <i>Preview</i> rate on soils with less than 3% organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Excellent control of velvetleaf and cocklebur. Good control of jimsonweed.</li> <li>● Use a drift additive to reduce spray drift.</li> <li>● Consult label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● DO NOT apply to very moist soils. Preplant incorporate immediately on moist soils and within 8 hours on dry soils.</li> <li>● <b>Special precaution:</b> A special sprayer cleanout procedure is required for <i>Command</i> and <i>Preview</i>. See labels for specific instructions.</li> </ul>

## SOYBEANS — PREPLANT (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b> <b>Annual broadleaves</b> (including yellow nutsedge and black nightshade)	clomazone ( <i>Command</i> )	1	2 pt	<ul style="list-style-type: none"> <li>● <i>Lasso</i> rate should be increased to 3 qt/A and <i>Dual</i> to 2½ pt/A for effective nutsedge control.</li> <li>● Excellent control of velvetleaf. Fair control of cocklebur and jimsonweed.</li> <li>● Do not reduce <i>Command</i> rate below 1½ pt/A or poor control of common ragweed can occur.</li> <li>● Do not reduce <i>Lasso</i> rate below 2 qt or <i>Dual</i> rate below 2 pt or poor control of redroot pigweed will occur.</li> <li>● SEE COMMAND LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Do not apply <i>Command</i> to moist soils.</li> <li>● <i>Command</i> must be incorporated immediately on moist soils and within 8 hours on dry soils.</li> <li>● Consult <i>Command</i> label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	2	2 qt	
<b>Annual grasses</b> <b>Annual broadleaves</b> (including yellow nutsedge and black nightshade)	clomazone ( <i>Command</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE BOTH <i>COMMAND</i> AND <i>SCEPTER</i> LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use on soils with less than ½% organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Excellent control of velvetleaf and cocklebur. Good control of jimsonweed.</li> <li>● Use a drift additive to reduce spray drift.</li> <li>● Consult label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● DO NOT apply to very moist soils. Preplant incorporate immediately on moist soils and within 8 hours on dry soils.</li> <li>● Apply 2 pt/A of <i>Command</i> if annual grass pressure is heavy.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● Common ragweed control is best when <i>Scepter</i> is applied preemergence. However, black nightshade control is better when <i>Scepter</i> is preplant incorporated.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
	+	+	+	
	imazaquin ( <i>Scepter</i> )	0.125	⅔ pt	

## SOYBEANS — PREPLANT FOLLOWED BY PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b> <b>Annual broadleaves</b> (including nightshade and nutsedge)	<i>Command</i> as listed above preplant incorporated FOLLOWED BY: alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )			<ul style="list-style-type: none"> <li>● See remarks for <i>Command</i> plusalachlor or metolachlor above.</li> <li>● Alachlor or <i>Dual</i> applied preemergence. DO NOT APPLY <i>COMMAND</i> PREEMERGENCE.</li> <li>● Nutsedge control is better from <i>Lasso</i> and <i>Dual</i> when they are incorporated.</li> <li>● Excellent control of velvetleaf. Fair control of cocklebur and jimsonweed.</li> <li>● SEE <i>COMMAND</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b>	<i>Treflan, Sonalan, Prowl, Lasso, Arena</i> or <i>Dual</i> as listed above preplant incorporated FOLLOWED BY: linuron ( <i>Lorox</i> or <i>Linex</i> )			<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● If heavy rainfall occurs soon after application, injury to crop may result.</li> <li>● DO NOT use on coarse-textured sandy or loamy sand soils or on soils with less than 1% organic matter.</li> <li>● Plant soybeans at least 1¾ in. deep.</li> <li>● Fair control of velvetleaf, jimsonweed, nightshade and cocklebur.</li> <li>● For yellow nutsedge control preplant incorporate <i>Dual</i> or <i>Lasso</i>.</li> <li>● For improved black nightshade control, apply withalachlor.</li> </ul>
	linuron + chlorimuron-ethyl ( <i>Lorox Plus</i> )	¾  0.6	¾ qt 4L OR 1½ lb 50% DF  1 lb 60% DG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● DO NOT use on soils with organic matter greater than 3%.</li> <li>● Plant soybeans at least 1¾ in. deep.</li> <li>● Better control of velvetleaf, nightshade, jimsonweed, and cocklebur than linuron.</li> <li>● For yellow nutsedge control, preplant incorporate <i>Dual</i> or <i>Lasso</i>.</li> <li>● For improved black nightshade control, apply withalachlor.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out is required for <i>Lorox Plus</i>. See label for specific instructions.</li> </ul>

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## SOYBEANS — PREPLANT FOLLOWED BY PREEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grasses	Command, Treflan, Sonalan, Prowl, Lasso, Arena or Dual as listed above preplant incorporated			
	FOLLOWED BY: chloramben (Amiben)	2	1 gal 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>● Preferred on sandy soils low in organic matter where injury from metribuzin or linuron is a problem.</li> <li>● Applied preemergence.</li> <li>● Better ragweed control preemergence with Amiben than when incorporated.</li> <li>● Fair control of velvetleaf. Poor control of jimsonweed and cocklebur.</li> <li>● For yellow nutsedge control preplant incorporate Dual or Lasso.</li> <li>● Control of black nightshade.</li> </ul>
	metribuzin (Lexone or Sencor)	¾	¾ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Good control of velvetleaf. Fair control of jimsonweed and cocklebur.</li> <li>● For yellow nutsedge control preplant incorporate Dual or Lasso.</li> <li>● For black nightshade control, apply with alachlor.</li> <li>● Reduce rate if soil pH is above 7.0.</li> <li>● If soil pH is above 7.4 DO NOT apply metribuzin.</li> <li>● DO NOT use on sands. DO NOT use on soil with less than ½% organic matter. DO NOT use on loamy sand or sandy loam soils with less than 1% organic matter.</li> <li>● Note label for rotational crop restrictions.</li> </ul>
	metribuzin + chlorimuron-ethyl (Preview)	¾	½ lb 75% DG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½ to 5%. See Preview label for specific rates for soil type and organic matter.</li> <li>● Better control of velvetleaf, cocklebur, and jimsonweed than metribuzin.</li> <li>● For yellow nutsedge control preplant incorporate Dual or Lasso.</li> <li>● For black nightshade control, apply with alachlor.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for Preview. See label for specific instructions.</li> </ul>
	imazaquin (Scepter)	0.125	¾ pt 1.5 L	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING SCEPTER APPLICATION. SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● Common ragweed control is best when Scepter is applied preemergence. However, velvetleaf and black nightshade control are better when Scepter is preplant incorporated.</li> <li>● For yellow nutsedge control preplant incorporate Dual or Lasso.</li> </ul>

## SOYBEANS — PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grasses	linuron ( <i>Lorox</i> or <i>Linex</i> )	¾	¾ qt 4L OR 1½ lb 50% DF	<ul style="list-style-type: none"> <li>● If heavy rainfall occurs soon after application, injury to crop may result.</li> <li>● DO NOT use on coarse-textured sandy or loamy sand soils or on soils with less than 1% organic matter.</li> <li>● Plant soybeans at least 1¾ in. deep.</li> <li>● Fair control of velvetleaf. Poor control of jimsonweed and cocklebur.</li> <li>● For black nightshade control, apply with alachlor.</li> </ul>
	+ alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
	chloramben ( <i>Amiben</i> )	2	1 gal 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>● Preferred on sandy soils low in organic matter where injury from metribuzin or linuron has been a problem.</li> <li>● Fair control of velvetleaf. Poor control of jimsonweed and cocklebur.</li> <li>● Control of black nightshade.</li> </ul>
	+ alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	¾	¾ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Good control of velvetleaf. Fair control of jimsonweed and cocklebur.</li> <li>● Reduce metribuzin rate if soil pH is above 7.0.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● DO NOT use on sands or soils with less than ½% organic matter. DO NOT use on loamy sand or sandy loam soils with less than 1% organic matter.</li> <li>● Note label for rotational crop restrictions.</li> <li>● A prepackaged mix of <i>Sencor</i> plus metolachlor (<i>Dual</i>) is available as <i>Turbo</i>.</li> </ul>
	+ alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	
	imazaquin ( <i>Scepter</i> )	0.125	¾ pt 1.5L	<ul style="list-style-type: none"> <li>● Good control of cocklebur and jimsonweed. Fair control of velvetleaf.</li> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● Common ragweed control is best when <i>Scepter</i> is applied preemergence. However, black nightshade and velvetleaf control are better when <i>Scepter</i> is preplant incorporated.</li> </ul>
	+ alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> ) OR metolachlor ( <i>Dual</i> )	+ 2  OR 2	+ 2 qt  OR 2 pt	

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## SOYBEANS — PREEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	linuron + chlorimuron-ethyl (Lorox Plus)	0.6	1 lb 60% DG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than 1/2% organic matter.</li> <li>● DO NOT use on soils with organic matter greater than 3%.</li> <li>● See <i>Lorox Plus</i> label for specific rates for soil type and organic matter.</li> <li>● Plant soybeans at least 1 3/4 in. deep.</li> <li>● Better control of velvetleaf, jimsonweed, and cocklebur than linuron.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out is required for <i>Lorox Plus</i>. See label for specific instructions.</li> </ul>
	+ alachlor (Lasso, Arena or Micro-Tech Lasso) OR metolachlor (Dual)	+ 2  OR 2	+ 2 qt  OR 2 pt	
<b>Annual broadleaves</b> <b>Annual grasses</b>	metribuzin + chlorimuron-ethyl (Preview)	3/8	1/2 lb 75% DG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than 1/2% organic matter.</li> <li>● Use on soils with organic matter from 1/2 to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● Better control of velvetleaf, cocklebur, and jimsonweed than metribuzin.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Preview</i>. See label for specific instructions.</li> </ul>
	+ alachlor (Lasso, Arena or Micro-Tech Lasso) OR metolachlor (Dual)	+ 2  OR 2	+ 2 qt  OR 2 pt	

## SOYBEANS — PREPLANT OR PREEMERGENCE, FOLLOWED BY POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	<i>Treflan, Sonalan, Prowl, Lasso, Arena, Dual</i> or <i>Command</i> as listed above preplant incorporated, or <i>Lasso, Arena</i> or <i>Dual</i> preemergence. FOLLOWED BY: <i>Basagran</i> + acifluorfen. For specific broadleaf weed control, see POSTEMERGENCE section. <i>Amiben, Scepter, Preview</i> or metribuzin as listed above preplant incorporated, or <i>Amiben, linuron, metribuzin, Preview, Lorox Plus</i> or <i>Scepter</i> preemergence. FOLLOWED BY: <i>Assure, Poast, or Fusilade 2000</i> . For annual grass control, see POSTEMERGENCE section.			

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## SOYBEANS — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> (including nightshade, pigweed and jimsonweed)	acifluorfen ( <i>Blazer 2L</i> or <i>Tackle 2L</i> )	½	1 qt	<ul style="list-style-type: none"> <li>• Most effective on small weeds. See label.</li> <li>• Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>• Do not apply if soybeans are under stress from herbicide injury, cold or dry weather, or hail damage.</li> <li>• Addition of 1 qt/A of 10-34-0 (diammonium phosphate) instead of crop oil concentrate will improve velvetleaf control.</li> <li>• DO NOT apply both 10-34-0 and crop oil concentrate.</li> <li>• Increased crop injury may occur with the addition of a surfactant to acifluorfen.</li> <li>• Fair control of cocklebur and velvetleaf. Poor control of lambsquarters.</li> <li>• Delay 7 days between acifluorfen application and <i>Assure</i>, <i>Fusilade 2000</i>, <i>Poast</i>, or <i>Hoelon</i> treatments.</li> <li>• Allow 50 days between acifluorfen application and soybean harvest.</li> </ul>
	+	+	+	
	surfactant	⅛%	⅛%	
<b>Annual broadleaves</b> (including cocklebur, velvetleaf and jimsonweed)	bentazon ( <i>Basagran</i> )	1	1 qt	<ul style="list-style-type: none"> <li>• Most effective on small weeds. See label.</li> <li>• Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>• Do not apply if soybeans are under stress from herbicide injury, cold or dry weather, or hail damage.</li> <li>• Use 1 gal/A of 28% liquid nitrogen (urea-ammonium nitrate) <i>INSTEAD OF</i> crop oil concentrate for improved velvetleaf control. DO NOT use 28% liquid nitrogen if common lambsquarters is present.</li> <li>• DO NOT apply both 28% liquid nitrogen and crop oil concentrate.</li> <li>• Poor control of pigweed and black nightshade. Fair control of common ragweed and lambsquarters.</li> <li>• Delay 7 days between <i>Basagran</i> application and <i>Assure</i>, <i>Fusilade 2000</i>, <i>Poast</i>, or <i>Hoelon</i> treatments.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
<b>Annual broadleaves</b> (except black nightshade and lambsquarters) <b>Yellow Nutsedge</b>	chlorimuron-ethyl ( <i>Classic</i> )	0.0106	¾ oz. 25% DF	<ul style="list-style-type: none"> <li>• DO NOT APPLY TO SOILS WITH A pH GREATER THAN 6.8.</li> <li>• CHECK LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> </ul>
	+	+	+	
	surfactant	¼%	¼%	<ul style="list-style-type: none"> <li>• Most effective on small weeds. Labeled rates of ½ to ¾ oz/A, depending on weed size.</li> <li>• DO NOT apply to soybeans at the cotyledon stage.</li> <li>• DO NOT apply to soybeans or weeds under stress from herbicide injury or cold or dry weather as crop injury or poor weed control may result.</li> <li>• Under hot dry conditions surfactant may be replaced with crop oil concentrate at 1%. However, increased crop injury may result.</li> <li>• Addition of 1 gal/A of 28% liquid nitrogen (urea-ammonium nitrate) or 1 qt/A of 10-34-0 (diammonium phosphate) <i>IN ADDITION TO</i> crop oil concentrate <i>OR</i> surfactant <i>IS REQUIRED</i> for control of velvetleaf.</li> <li>• Use a minimum of 25 psi and 10 gal/A of water. For heavy weed pressure, increase volume to 15 gal/A. Do not use flood nozzles.</li> <li>• Cultivation 14 days after treatment will improve weed control.</li> <li>• A second application may be made 2 to 3 wk after initial application if needed. Do not exceed 1½ oz/A in one growing season.</li> <li>• Allow 60 days between <i>Classic</i> application and soybean harvest.</li> </ul>

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## SOYBEANS — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> (except velvetleaf, smartweed and lambsquarters)	lactofen ( <i>Cobra</i> )	0.195	0.78 pt	<ul style="list-style-type: none"> <li>● Poor on smartweed and lambsquarters. Fair on velvetleaf.</li> <li>● Most effective on small weeds. See label.</li> <li>● DO NOT apply to soybeans in the cotyledon stage.</li> <li>● DO NOT apply if soybeans are under stress from herbicide injury, cold or dry weather, or hail damage.</li> <li>● When weather conditions are good and weeds growing vigorously, a surfactant at ¼% OR 28% liquid nitrogen (urea-ammonium nitrate) at 1 gal/A may be substituted for crop oil concentrate.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>● A timely cultivation one week following application will assist in weed control.</li> <li>● Allow 90 days between <i>Cobra</i> application and soybean harvest.</li> </ul>
	+ crop oil concentrate	+	+	
<b>Annual broadleaves</b> (including ragweed, pigweed, smartweed, and velvetleaf only)	chloramben ( <i>Amiben</i> )	3	6 qt 2L OR 3.6 lb 75% DS	<ul style="list-style-type: none"> <li>● For postemergence control of common ragweed, redroot pigweed, and smartweed less than 3 in., and velvetleaf less than 5 in. ONLY.</li> <li>● Provides soil activity for later germinating weeds.</li> <li>● Timing is critical for effectiveness.</li> <li>● Do not apply later than 33 days after planting. DO NOT apply at cracking.</li> <li>● Recommended only where preemergence application of <i>Amiben</i> is not possible.</li> </ul>
	+ crop oil concentrate	+	+	
<b>Annual broadleaves</b> (redroot pigweed and cocklebur only)	imazaquin ( <i>Scepter</i> )	0.063	½ pt	<ul style="list-style-type: none"> <li>● For redroot pigweed and cocklebur control ONLY.</li> <li>● Apply ⅔ pt/A if soil activity to stop germinating weed seeds is desired or to control redroot pigweed from 4 to 12 in. in height. HOWEVER, only soybeans or dry edible beans can be planted the year following a ⅔ pt/A application.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>● Allow 90 days between <i>Scepter</i> application and soybean harvest.</li> </ul>
	+ crop oil concentrate	+	+	
	OR surfactant	OR ¼%	OR ¼%	
<b>Annual broadleaves</b> (except black nightshade)	imazaquin ( <i>Scepter</i> )	0.063	½ pt	<ul style="list-style-type: none"> <li>● Common ragweed greater than 4 leaf will NOT be controlled by this tank-mix. Control of common ragweed, lambsquarters, and black nightshade will be poor compared to a <i>Basagran</i> plus acifluorfen tank mix.</li> <li>● Increase <i>Scepter</i> rate to ⅔ pt/A if soil activity is desired to stop germinating weed seeds. HOWEVER, only soybeans or dry edible beans can be planted the year following a ⅔ pt/A application.</li> <li>● SEE LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>● Most effective on small weeds. See label.</li> <li>● Use 2 pt/A of <i>Basagran</i> if common lambsquarters pressure is heavy.</li> <li>● Allow 90 days between <i>Scepter</i> application and soybean harvest.</li> </ul>
	+ bentazon ( <i>Basagran</i> )	+	+	
	+ crop oil concentrate	¾	1½ pt	
		+	+	

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## SOYBEANS — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	acifluorfen ( <i>Blazer 2L</i> or <i>Tackle 2L</i> )	¼	1 pt	<ul style="list-style-type: none"> <li>● Most effective on small weeds. See labels.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>● Do not apply if soybeans are under stress from herbicide injury, cold or dry weather, or hail damage.</li> <li>● Increased crop injury may occur with the addition of crop oil concentrate to acifluorfen.</li> <li>● DO NOT use a fertilizer additive in place of crop oil concentrate if common lambsquarters is present.</li> <li>● Use 2 pt/A of <i>Basagran</i> if common lambsquarters pressure is heavy.</li> <li>● Delay 7 days between application of <i>Basagran</i> plus <i>Blazer</i> before applying <i>Assure</i>, <i>Fusilade 2000</i>, <i>Hoelon</i> or <i>Poast</i>.</li> <li>● A prepackaged mix of <i>Basagran</i> plus <i>Blazer</i> is available as <i>Galaxy</i> or <i>Storm</i>.</li> </ul>
	+	+	+	
	bentazon ( <i>Basagran</i> )	¾	1½ pt	
	+	+	+	
	crop oil concentrate	1 pt	1 pt	
Nutsedge Canada thistle	bentazon ( <i>Basagran</i> )	¾ + ¾	1½ pt + 1½ pt	<ul style="list-style-type: none"> <li>● Increase <i>Basagran</i> rate to 1 qt/A for each application for more effective Canada thistle control.</li> <li>● Treat when nutsedge is 4 to 6 in. and again 10 days later.</li> <li>● See nutsedge remarks under Special Weed Problems.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>● Delay 7 days between <i>Basagran</i> application and <i>Assure</i>, <i>Fusilade 2000</i>, <i>Poast</i>, or <i>Hoelon</i> treatments.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt + 1 qt	1 qt + 1 qt	
Annual grasses	diclofop ( <i>Hoelon</i> )	1	1⅓ qt	<ul style="list-style-type: none"> <li>● Apply to grasses less than 4 in. tall.</li> <li>● Do not tank mix with other chemicals.</li> <li>● Delay 7 days between <i>Hoelon</i> application and <i>Basagran</i> or acifluorfen treatment.</li> <li>● No soil activity. Controls only grasses present when sprayed.</li> <li>● Treat actively-growing grass up to a maximum of 4 in. tall (see label).</li> <li>● <i>Poast</i> can be reduced to ¾ pt/A for 1 to 4 in. barnyardgrass, green and giant foxtail, and fall panicum.</li> <li>● Use 5 to 20 gal/A and a minimum of 40 psi.</li> <li>● Addition of 2.5 lb/A ammonium sulfate in <i>Poast</i> applications increases large crabgrass control.</li> <li>● Wait 1 day after <i>Poast</i> application before applying <i>Basagran</i> or acifluorfen. Wait 7 days after <i>Basagran</i> or acifluorfen application before applying <i>Poast</i>.</li> <li>● Avoid drift onto corn, sorghum, small grains, and turf.</li> <li>● Rainfall within 1 hr of application may reduce control.</li> <li>● No soil activity. Controls only grasses present when sprayed.</li> <li>● Treat actively-growing grasses up to a maximum of 4 in. tall (see label).</li> <li>● Use 5 to 40 gal/A and 40 to 60 psi.</li> <li>● <i>Fusilade 2000</i> can be reduced to 1¼ pt/A for certain conditions. See label.</li> <li>● Wait 3 days after <i>Fusilade 2000</i> application before applying <i>Basagran</i> or acifluorfen. Wait 7 days after <i>Basagran</i> or acifluorfen application before applying <i>Fusilade 2000</i>.</li> <li>● Avoid drift onto corn, small grains, and turf.</li> <li>● Rainfall within 1 hr of application may reduce control.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	sethoxydim ( <i>Poast</i> )	0.19	1 pt	
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	OR	OR	OR	
	DASH	1 qt	1 qt	
	fluazifop-P-butyl ( <i>Fusilade 2000</i> )	0.188	1½ pt	
	+	+	+	
crop oil concentrate	1 qt	1 qt		

(Continued next page)

## SOYBEANS — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b>	quizalofop ( <i>Assure</i> )	0.088	0.88 pt	<ul style="list-style-type: none"> <li>● No soil activity. Controls only grasses present when sprayed.</li> <li>● Treat actively-growing grasses up to a maximum of 4 in. tall (see label).</li> <li>● Use 10 to 40 gal/A and a minimum of 40 psi.</li> <li>● 1 pt/A required for barnyardgrass and crabgrass control.</li> <li>● DO NOT cultivate for 7 days before or 7 days after treatment.</li> <li>● Wait 1 day after <i>Assure</i> application before applying <i>Basagran</i> or acifluorfen. Wait 7 days after <i>Basagran</i> or acifluorfen before applying <i>Assure</i>.</li> <li>● Avoid drift onto corn, small grains, or turf.</li> <li>● Rainfall within 1 hr of application may reduce control.</li> <li>● Allow 80 days between <i>Assure</i> application and soybean harvest.</li> </ul>
	+	+	+	
	crop oil concentrate OR	1% OR	1% OR	
	surfactant	¼%	¼%	
<b>Volunteer corn</b>	fluazifop-P-butyl ( <i>Fusilade 2000</i> )	0.094	¾ pt	<ul style="list-style-type: none"> <li>● Refer to above remarks on annual grass control.</li> <li>● Treat volunteer corn up to 24 in.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	sethoxydim ( <i>Poast</i> )	0.24	1 pt	<ul style="list-style-type: none"> <li>● Refer to remarks on annual grass control.</li> <li>● Treat volunteer corn up to 20 in.</li> <li>● <i>Poast</i> can be reduced to ¾ pt/A if volunteer corn is less than 12 in. tall.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	+	+	+	
	28% liquid nitrogen OR	1 gal OR	1 gal OR	
	ammonium sulfate	2½ lb	2½ lb	
	quizalofop ( <i>Assure</i> )	0.063	0.63 pt	<ul style="list-style-type: none"> <li>● Refer to remarks on annual grass control.</li> <li>● Treat volunteer corn up to 18 in.</li> </ul>
	+	+	+	
	crop oil concentrate OR	1% OR	1% OR	
surfactant	¼%	¼%		
diclofop ( <i>Hoelon</i> )	1	1½ qt	<ul style="list-style-type: none"> <li>● Refer to remarks on annual grass control.</li> <li>● Treat volunteer corn up to 12 in.</li> </ul>	
+	+	+		
crop oil concentrate	1 qt	1 qt		
<b>Volunteer corn Weed escapes Perennials</b>	glyphosate ( <i>Roundup</i> )	Rate varies	See label	<ul style="list-style-type: none"> <li>● Use with ropewick applicator, wipe-on applicator, or recirculating sprayer.</li> </ul>
<b>Quackgrass</b>	quizalofop ( <i>Assure</i> )	0.125	1¼ pt	<ul style="list-style-type: none"> <li>● Make application when quackgrass is 6–10 in. tall.</li> <li>● Two applications may be needed for best quackgrass control. Make second application of 0.88 pt/A 14 to 21 days later when quackgrass has reached 4–8 in. Cultivation may replace second application.</li> <li>● Use 10 to 40 gal/A and a minimum of 40 psi.</li> </ul>
	+	+	+	
	crop oil concentrate OR	1% OR	1% OR	
	surfactant	¼%	¼%	
fluazifop-P-butyl ( <i>Fusilade 2000</i> )	0.188	1½ pt	<ul style="list-style-type: none"> <li>● Make application when quackgrass is 6–10 in. tall.</li> <li>● Two applications may be needed for best quackgrass control. Make a second application of 1 pt/A 14 to 21 days later before quackgrass reaches 10 in. Cultivation may replace second application.</li> <li>● Use 5 to 40 gal/A and 40 to 60 psi.</li> </ul>	
+	+	+		
crop oil concentrate	1 qt	1 qt		
sethoxydim ( <i>Poast</i> )	0.29 + 0.24	1½ pt + 1 pt	<ul style="list-style-type: none"> <li>● Make application when quackgrass is 6–8 in. tall.</li> <li>● Two applications will be needed for best quackgrass control. Make the second application of 1 pt/A 14 to 21 days later when quackgrass has regrowth. Cultivation may replace second application.</li> <li>● Use 5 to 20 gal/A and a minimum of 40 psi.</li> </ul>	
+	+	+		
crop oil concentrate	1 qt + 1 qt	1 qt + 1 qt		
+	+	+		
28% liquid nitrogen OR	1 gal + 1 gal OR	1 gal + 1 gal OR		
ammonium sulfate	2½ lb + 2½ lb	2½ lb + 2½ lb		

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## SOYBEANS — SPECIAL WEED PROBLEMS — VELVETLEAF

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Preplant Incorporated</i>				
Velvetleaf	clomazone ( <i>Command</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● Preplant incorporate immediately on moist soils and within 8 hrs on dry soils.</li> <li>● Do not apply to very moist soils.</li> <li>● Use a drift additive to avoid spray drift.</li> <li>● Consult <i>Command</i> label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● Excellent velvetleaf control.</li> <li>● Reduce metribuzin rate to ¼ lb a.i./A if soil pH is above 7.0.</li> <li>● On sandy loam soils or loamy sand soils with greater than 1% organic matter, reduce the metribuzin rate to ¼ lb a.i./A.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● DO NOT use on soils with less than ½% organic matter, or on sands, loamy sands with less than 1% organic matter.</li> <li>● SEE <i>COMMAND</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
	+	+	+	
	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	¾	¾ pt 4L OR ½ lb 75% DF	
<hr/>				
	clomazone. ( <i>Command</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● SEE BOTH <i>COMMAND</i> AND <i>PREVIEW</i> LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Soybean stunting and injury to labeled rotation crops will occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½ to 5%. Reduce <i>Preview</i> rate on soils with less than 3% organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Excellent control of velvetleaf and cocklebur. Good control of jimsonweed.</li> <li>● Use a drift additive to reduce spray drift.</li> <li>● Consult label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● DO NOT apply to very moist soils. Preplant incorporate immediately on moist soils and within 8 hours on dry soils.</li> <li>● <b>Special precaution:</b> A special sprayer cleanout procedure is required for <i>Command</i> and <i>Preview</i>. See labels for specific instructions.</li> </ul>
	+	+	+	
	metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾	½ lb 75% DG	

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## SOYBEANS — SPECIAL WEED PROBLEMS — VELVETLEAF

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Preplant Incorporated</i>				
	clomazone ( <i>Command</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE BOTH <i>COMMAND</i> AND <i>SCEPTER</i> LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use on soils with less than ½% organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Excellent control of velvetleaf and cocklebur. Good control of jimsonweed.</li> <li>● Use a drift additive to reduce spray drift.</li> <li>● Consult label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● DO NOT apply to very moist soils. Preplant incorporate immediately on moist soils and within 8 hours on dry soils.</li> <li>● Apply 2 pt/A of <i>Command</i> if annual grass pressure is heavy.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● Common ragweed control is best when <i>Scepter</i> is applied preemergence. However, black nightshade control is better when <i>Scepter</i> is preplant incorporated.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
	+ imazaquin ( <i>Scepter</i> )	+ 0.125	+ ¾ pt	
	clomazone ( <i>Command</i> )	1	2 pt	<ul style="list-style-type: none"> <li>● Preplant incorporate immediately on moist soils and within 8 hrs. on dry soils.</li> <li>● Do not apply to very moist soils.</li> <li>● Use a drift additive to avoid spray drift.</li> <li>● Consult <i>Command</i> label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● SEE <i>COMMAND</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> </ul>
	+ alachlor ( <i>Lasso, Arena, or Micro-tech Lasso</i> )	+ 2	+ 2 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	

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## SOYBEANS — SPECIAL WEED PROBLEMS — VELVETLEAF (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>				
<b>Velvetleaf</b>	trifluralin ( <i>Treflan</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● This application rate of <i>Command</i> only controls velvetleaf. Other weed control relies on metribuzin plus the third herbicide.</li> <li>● Preplant incorporate immediately on moist soils and within 8 hrs on dry soils.</li> <li>● Do not apply to very moist soils.</li> <li>● Use a drift additive to avoid spray drift.</li> <li>● If soil pH is above 7.4, DO NOT apply metribuzin.</li> <li>● Reduce metribuzin rate to ¼ lb a.i./A if soil pH is above 7.0, or if the soil is a sandy loam or loamy sand with 1% or more organic matter.</li> <li>● DO NOT use on soils with less than ½% organic matter, or on sands, loamy sands with less than 1% organic matter.</li> <li>● SEE COMMAND LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Consult label for buffer zones to prevent off-site drift to sensitive areas.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out procedure is required for <i>Command</i>. See label for specific instructions.</li> <li>● A prepackaged mix of <i>Sencor</i> plus <i>Dual</i> is available (<i>Turbo</i>).</li> <li>● A prepackaged mix of <i>Sencor</i> plus <i>Treflan</i> is available (<i>Salute</i>).</li> <li>● A prepackaged mix of <i>Command</i> plus <i>Treflan</i> is available (<i>Commence</i>). The <i>Command</i> rate in this prepackage is 0.56 lb a.i./A when <i>Treflan</i> is applied at ¾ lb. a.i./A.</li> </ul>
	OR	OR	OR	
	pendimethalin ( <i>Prowl</i> )	1	1 qt	
	OR	OR	OR	
	ethalfluralin ( <i>Sonalan</i> )	0.9	2½ pt	
	OR	OR	OR	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	2	2 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	¾	¾ pt 4L OR ½ lb 75% DF		
+	+	+		
FMC-57020 ( <i>Command</i> )	¾	¾ pt		
<b>Preemergence</b>				
<b>Velvetleaf</b>	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● Applied preemergence. More effective when preplant incorporated.</li> <li>● Good to excellent velvetleaf control.</li> <li>● SEE PREVIEW LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8 as injury to rotation crops will occur.</li> <li>● Use caution to avoid misapplication or overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½ to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out is required for <i>Preview</i>. See label for specific instructions.</li> </ul>
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾	½ lb 75% DG		

(Continued next page)

## SOYBEANS — SPECIAL WEED PROBLEMS — VELVETLEAF (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preemergence</b>				
<b>Velvetleaf</b>	alachlor (Lasso, Arena or Micro-Tech Lasso)	2	2 pt	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Use for velvetleaf control when organic matter is less than 3% and a preemergence treatment is desired.</li> <li>● Good velvetleaf control.</li> <li>● SEE <i>LOROX PLUS</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8 as injury to rotation crops will occur.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● See <i>Lorox Plus</i> label for specific rates for soil type and organic matter.</li> <li>● Plant soybeans at least 1¼ in. deep.</li> <li>● <b>Special precaution:</b> A special sprayer clean out is required for <i>Lorox Plus</i>. See label.</li> </ul>
	OR	OR	OR	
	metolachlor (Dual)	2	2 pt	
	+	+	+	
	linuron + chlorimuron-ethyl (Lorox Plus)	0.6	1 lb 60% DG	
<b>Postemergence</b>				
<b>Velvetleaf</b>	bentazon (Basagran)	1	2 pt	<ul style="list-style-type: none"> <li>● For velvetleaf control up to 5 in. (4-6 leaf).</li> <li>● Use a minimum of 40 psi and 20 gal of water/A. Do not use flood nozzles.</li> <li>● Do not substitute 28% liquid nitrogen (urea-ammonium nitrate) for 1 qt/A crop oil concentrate if lambsquarters or common ragweed are also target weeds.</li> </ul>
	+	+	+	
	28% liquid nitrogen	1 gal	1 gal	
	chlorimuron-ethyl (Classic)	0.012	¾ oz 25% DF	<ul style="list-style-type: none"> <li>● For velvetleaf control up to 6 in. (8 leaf).</li> <li>● DO NOT APPLY TO SOILS WITH A pH GREATER THAN 6.8.</li> <li>● SEE <i>CLASSIC</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use a minimum of 25 psi and 10 gal of water/A. For heavy weed pressure increase volume to 15 gal/A. Do not use flood nozzles.</li> </ul>
+	+	+		
28% liquid nitrogen	1 gal	1 gal		
OR	OR	OR		
10-34-0	2 qt	2 qt		
	+	+	+	
	surfactant	¼%	¼%	

## SOYBEANS — SPECIAL WEED PROBLEMS — COCKLEBUR

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>				
<b>Cocklebur</b>	trifluralin (Treflan)	¾	1½ pt	<ul style="list-style-type: none"> <li>● Applied preplant incorporated.</li> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION.</li> <li>● SEE LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● A prepackaged mix of <i>Prowl</i> plus <i>Scepter</i> is available (<i>Squadron</i>).</li> </ul>
	OR	OR	OR	
	pendimethalin (Prowl)	1	1 qt	
	OR	OR	OR	
	ethalfuralin (Sonalan)	0.9	2½ pt	
	OR	OR	OR	
	alachlor (Lasso, Arena or Micro-Tech Lasso)	2	2 qt	
	OR	OR	OR	
	metolachlor (Dual)	2	2 pt	
	OR	OR	OR	
	clomazone (Command)	¾	1½ pt	
+	+	+		
	imazaquin (Scepter)	0.125	⅔ pt	

(Continued next page)

## SOYBEANS — SPECIAL WEED PROBLEMS — COCKLEBUR (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations	
<b>Preplant Incorporated</b>					
<b>Cocklebur</b>	trifluralin ( <i>Treflan</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● Applied preplant incorporated.</li> <li>● SEE LABELS OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8. Injury to labeled rotation crops will occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter from ½% to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer clean-out is required for <i>Preview</i>. See label for specific instructions.</li> </ul>	
	OR	OR	OR		
	pendimethalin ( <i>Prowl</i> )	1	1 qt		
	OR	OR	OR		
	ethalfluralin ( <i>Sonalan</i> )	0.9	2½ pt		
	OR	OR	OR		
	alachlor ( <i>Lasso, Arena, or Micro-Tech Lasso</i> )	2	2 qt		
	OR	OR	OR		
	metolachlor ( <i>Dual</i> )	2	2 pt		
	OR	OR	OR		
	clomazone ( <i>Command</i> )	¾	1½ pt		
+	+	+			
metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾	½ lb 75% DG			
<hr/>					
<b>Preplant incorporated</b>					
<b>Cocklebur</b>	trifluralin ( <i>Treflan</i> )	¾	1½ pt	<ul style="list-style-type: none"> <li>● Applied preplant incorporated.</li> <li>● This application rate of <i>Scepter</i> only controls cocklebur. Other weed control relies on metribuzin and the third herbicide.</li> <li>● SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Reduce metribuzin rate to ¼ lb a.i./A, if soil pH is above 7.0, or soil is a sandy loam or loamy sand with less than 1% organic matter.</li> <li>● DO NOT use on sands or soils with less than ½% organic matter.</li> <li>● A prepackaged mix of <i>Squadron (Prowl plus Scepter)</i> or <i>Tri-Scept</i> (trifluralin plus <i>Scepter</i>) contains <i>Scepter</i> at a ¾ pt/A rate.</li> <li>● A prepackaged mix of <i>Dual plus Sencor</i> is available (<i>Turbo</i>).</li> <li>● A prepackaged mix of <i>Treflan plus Sencor</i> is available (<i>Salute</i>).</li> </ul>	
	OR	OR	OR		
	pendimethalin ( <i>Prowl</i> )	1	1 qt		
	OR	OR	OR		
	ethalfluralin ( <i>Sonalan</i> )	0.9	2½ pt		
	OR	OR	OR		
	alachlor ( <i>Lasso, Arena or Micro-Tech Lasso</i> )	2	2 qt		
	OR	OR	OR		
	metolachlor ( <i>Dual</i> )	2	2 pt		
	+	+	+		
	metribuzin ( <i>Lexone or Sencor</i> )	¾	¾ pt 4L		
		OR			
		½ lb 75% DF			
+	+	+			
imazaquin ( <i>Scepter</i> )	0.063	⅓ pt			
<hr/>					
<b>Preemergence</b>					
<b>Cocklebur</b>	alachlor ( <i>Lasso, Arena or Micro-Tech Lasso</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● ONLY SOYBEANS OR DRY EDIBLE BEANS CAN BE PLANTED THE YEAR FOLLOWING <i>SCEPTER</i> APPLICATION. SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> </ul>	
	OR	OR	OR		
	metolachlor ( <i>Dual</i> )	2	2 pt		
	+	+	+		
	imazaquin ( <i>Scepter</i> )	0.125	⅔ pt		

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## SOYBEANS — SPECIAL WEED PROBLEMS — COCKLEBUR (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preemergence</b>				
<b>Cocklebur</b>	alachlor (Lasso, Arena or Micro-Tech Lasso)	2	2 qt	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● This application rate of <i>Scepter</i> only controls cocklebur. Other weed control relies on metribuzin and the third herbicide.</li> <li>● SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Reduce metribuzin to ¼ lb a.i./A rate if soil pH is above 7.0, or if soil is a sandy loam or loamy sand soils with less than 1% organic matter.</li> <li>● DO NOT use on sands or soils with less than ½% organic matter.</li> <li>● A prepackaged mix of <i>Dual</i> plus <i>Sencor</i> is available (<i>Turbo</i>).</li> </ul>
	OR	OR	OR	
	metolachlor (Dual)	2	2 pt	
	+	+	+	
	metribuzin (Lexone or Sencor)	¾	¾ pt 4L OR ½ lb 75% DF	
	+	+	+	
	imazaquin (Scepter)	0.063	⅓ pt	
	alachlor (Lasso, Arena or Micro-tech Lasso)	2	2qt	<ul style="list-style-type: none"> <li>● Applied preemergence. More effective when preplant incorporated.</li> <li>● Good cocklebur control.</li> <li>● SEE <i>PREVIEW</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8 as injury to rotation crops will occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use on soils with organic matter ½ to 5%. See <i>Preview</i> label for specific rates for soil type and organic matter.</li> <li>● Use caution to avoid misapplication or overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer cleanout is required for <i>Preview</i>. See label for specific instructions.</li> </ul>
	OR	OR	OR	
	metolachlor (Dual)	2	2 pt	
	+	+	+	
	metribuzin + chlorimuron-ethyl (Preview)	¾	½ lb 75% DG	
	alachlor (Lasso, Arena or Micro-tech Lasso)	2	2 qt	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Good cocklebur control.</li> <li>● SEE <i>LOROX PLUS</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT use if soil pH is greater than 6.8 as injury to rotation crops will occur.</li> <li>● DO NOT use on sands. DO NOT use on soils with less than ½% organic matter.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer cleanout is required for <i>Lorox Plus</i>. See label for specific instructions.</li> </ul>
	OR	OR	OR	
	metolachlor (Dual)	2	2 pt	
	+	+	+	
	linuron + chlorimuron-ethyl (Lorox Plus)	0.6	1 lb 60% DG	
<b>Postemergence</b>				
<b>Cocklebur</b>	bentazon (Basagran)	¾	1½ pt	<ul style="list-style-type: none"> <li>● For cocklebur control up to 6 in.</li> <li>● Apply 2 pt/A for control up to 12 in.</li> <li>● Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	chlorimuron-ethyl (Classic)	.0078	½ oz 25% DF	<ul style="list-style-type: none"> <li>● For cocklebur control up to 6 in.</li> <li>● Apply ¾ oz/A for control up to 12 in.</li> <li>● DO NOT APPLY TO SOILS WITH A pH GREATER THAN 6.8.</li> <li>● SEE <i>CLASSIC</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>● Use a minimum of 25 psi and 10 gal/A of water. For heavy weed pressure increase volume to 15 gal/A. Do not use flood nozzles.</li> </ul>
+	+	+		
surfactant	¼%	¼%		

(Continued next page)

## SOYBEANS — SPECIAL WEED PROBLEMS — COCKLEBUR (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Postemergence</b>				
Cocklebur	imazaquin ( <i>Scepter</i> )	0.063	1/3 pt	<ul style="list-style-type: none"> <li>For cocklebur control up to 6 in.</li> <li>2/3 pt/A will control cocklebur up to 12 in, but <b>crop rotation will be restricted.</b></li> <li>SEE <i>SCEPTER</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> </ul>
	+	+	+	
	surfactant OR crop oil concentrate	1/4% OR 1 qt	1/4% OR 1 qt	

## SOYBEANS — SPECIAL WEED PROBLEMS — NUTSEDGE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>				
Nutsedge	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	3	3 qt	<ul style="list-style-type: none"> <li>Preplant incorporate to a depth of 2 to 3 in.</li> <li>Shallow incorporation will improve control under conditions of limited moisture.</li> </ul>
	OR metolachlor ( <i>Dual</i> )	OR 2 1/2	OR 2 1/2 pt	
<b>Postemergence</b>				
Nutsedge	bentazon ( <i>Basagran</i> )	3/4 + 3/4 See Remarks	1 1/2 pt + 1 1/2 pt	<ul style="list-style-type: none"> <li>TWO 1 1/2 pt/A APPLICATIONS REQUIRED FOR BEST NUTSEDGE CONTROL.</li> <li>Use a minimum of 40 psi and 20 gal/A of water. Do not use flood nozzles.</li> <li>Postemergence.</li> <li>Treat when nutsedge is 4 to 6 in. and again 10 days later.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt + 1 qt	1 qt + 1 qt	
Nutsedge	chlorimuron-ethyl ( <i>Classic</i> )	0.0106	2/3 oz 25% DF	<ul style="list-style-type: none"> <li>Treat when nutsedge is 3 to 4 in. tall.</li> <li>Rate varies with nutsedge height. See label.</li> <li>SEE <i>CLASSIC</i> LABEL OR TABLE 12 FOR CROP ROTATION RESTRICTIONS.</li> <li>DO NOT APPLY <i>CLASSIC</i> IF SOIL pH IS GREATER THAN 6.8.</li> <li>Under hot dry conditions surfactant may be replaced with crop oil concentrate at 1%. However injury may result.</li> <li>Use a minimum of 25 psi and 10 gal/A. For heavy weed pressure, increase volume to 15 gal/A.</li> <li>Avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li><b>Special precaution:</b> A special sprayer clean-out is required for <i>Classic</i>. See label for specific instructions.</li> </ul>
	+	+	+	
	surfactant	1/4%	1/4%	

## SOYBEANS — PREEMERGENCE — ORGANIC SOILS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses Annual broadleaves	chloramben ( <i>Amiben</i> )	3	1 1/2 gal 2L OR 3.6 lb 75% DS	<ul style="list-style-type: none"> <li>May require postemergence applications for complete control (see next page).</li> </ul>
	+	+	+	
Annual grasses	alachlor ( <i>Lasso, Arena</i> )	4	1 gal	
	alachlor ( <i>Lasso, Arena</i> )	4	1 gal	

FOLLOWED BY:

**Annual broadleaves** *Basagran* plus acifluorfen. For specific broadleaf weed control, see POSTEMERGENCE SECTION. Note that *Lasso* controls grasses, redroot pigweed, and black nightshade only.

## SOYBEANS — POSTEMERGENCE — ORGANIC SOILS

See Soybeans — Postemergence Pages 44–47.

## SOYBEANS — NO-TILL

(Following corn, small grains, or with rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grasses	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	3/8	3/4 pt 4L OR 1/2 lb 75% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduce metribuzin rate if soil pH is above 7.0.</li> <li>● If soil pH is above 7.4, do not apply metribuzin.</li> <li>● Note label for rotational crop restrictions.</li> <li>● Paraquat applied before rye jointing (24 to 26 in. tall) may not provide complete control.</li> <li>● To avoid excessive cover crop growth, paraquat or <i>Roundup</i> may be applied prior to planting.</li> <li>● Use 3 qt <i>Lasso</i> with heavy annual grass (especially fall panicum and crabgrass) infestations.</li> <li>● Maximum <i>Dual</i> rate in metribuzin tank mixes is 2 1/2 pt on fine textured soils.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> <li>● Use 1/2 pt non-ionic surfactant per 100 gal water with paraquat applications. Double surfactant rate if liquid fertilizer is used as a carrier.</li> <li>● Do not use suspension or high phosphate liquid fertilizers as carriers for paraquat applications.</li> <li>● Follow mixing directions on paraquat and <i>Roundup</i> labels.</li> <li>● Paraquat gives faster knockdown. <i>Roundup</i> may provide better control if weed or cover crop growth is dense. Use <i>Roundup</i> if horseweed (marestalk) is present.</li> <li>● May need follow up treatment with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1 1/2 pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt per acre. (See Label).</li> <li>● A prepackaged mix of <i>Lasso</i> + <i>Roundup</i> (<i>Bronco</i>) is available.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> )	2 1/2	2 1/2 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2 1/2 pt	
	OR	OR	OR	
	glyphosate ( <i>Roundup</i> )	1 1/8	1 1/2 qt	

(Continued next page)

## SOYBEANS — NO-TILL

(Following corn, small grains, or with rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b> <b>Annual grasses</b>	linuron ( <i>Lorox</i> or <i>Linex</i> )	¾	¾ qt 4L OR 1½ lb 50% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Do not use on coarse textured sands or loamy sand soils or on soils with less than 1% organic matter.</li> <li>● If heavy rainfall occurs soon after application, injury to crop may result.</li> <li>● Plant soybeans at least 1¾ in. deep.</li> <li>● Paraquat applied before rye jointing (24 to 36 in. tall) may not provide complete control.</li> <li>● To avoid excessive cover crop growth, paraquat or <i>Roundup</i> may be applied prior to planting.</li> <li>● Use 3 qt <i>Lasso</i> with heavy annual grass (especially fall panicum and crabgrass) infestations.</li> <li>● Maximum <i>Dual</i> rate in <i>Lorox</i> tank mixes is 2½ pt on fine textured soils.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> <li>● Use ½ pt non-ionic surfactant per 100 gal water with paraquat applications. Double surfactant rate if liquid fertilizer is used as a carrier.</li> <li>● Do not use suspension or high phosphate liquid fertilizers as carriers for paraquat applications.</li> <li>● Follow mixing directions on paraquat or <i>Roundup</i> labels.</li> <li>● Paraquat gives faster knockdown. <i>Roundup</i> may provide better control if weed or cover crop growth is dense.</li> <li>● Use <i>Roundup</i> if horseweed (maretail) is present.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1½ pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt/A. (See Label.)</li> <li>● May need follow-up treatment with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● A prepackaged mix of <i>Lasso</i> plus <i>Roundup</i> (<i>Bronco</i>) is available.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt	
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1⅛	1½ qt		
<b>Annual broadleaves</b> <b>Annual grasses</b>	metribuzin + chlorimuron ethyl ( <i>Preview</i> )	¾	½ lb 75% DG	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL FOR CROP ROTATION RESTRICTIONS.</li> <li>● DO NOT USE IF SOIL pH IS GREATER THAN 6.8 as soybean stunting and injury to labeled rotation crops will occur.</li> <li>● Do not use on sands. Do not use on soils with less than ½% organic matter.</li> <li>● Do not use on soils with organic matter greater than 5%.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● <b>Special precaution:</b> A special sprayer cleanout procedure is required for <i>Preview</i>. See label for specific instructions.</li> <li>● Paraquat applied before rye jointing (24 to 26 in. tall) may not provide complete control.</li> <li>● To avoid excessive cover crop growth, paraquat or <i>Roundup</i> may be applied prior to planting.</li> <li>● Use 3 qt <i>Lasso</i> with heavy annual grass (especially fall panicum and crabgrass) infestations.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Microtech-Lasso</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt	
OR	OR	OR		
glyphosphate ( <i>Roundup</i> )	1⅛	1½ qt		

(Continued next page)



## SOYBEANS — NO-TILL

(Following corn, small grains, or with rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual broadleaves Annual grasses	linuron + chlorimuron ethyl ( <i>Lorox Plus</i> )	0.6	1.0 lb 60% DG	<ul style="list-style-type: none"> <li>● Use 1/2 pt non-ionic surfactant per 100 gal water with paraquat applications. Double surfactant rate if liquid fertilizer is used as a carrier.</li> <li>● Do not use suspension or high phosphate liquid fertilizers as carriers for paraquat applications.</li> <li>● Follow mixing directions on paraquat and <i>Roundup</i> labels.</li> <li>● Paraquat gives faster knockdown. <i>Roundup</i> may provide better control if weed or cover crop growth is dense. Use <i>Roundup</i> if horseweed (marestalk) is present.</li> <li>● May need follow-up treatment with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1 1/2 pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt per acre. (See Label).</li> <li>● A prepacked mix of <i>Lasso plus Roundup (Bronco)</i> is available.</li> <li>● Improved control of velvetweed, cocklebur, and jimsonweed compared to metribuzin.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	2 1/2	2 1/2 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2 1/2 pt	
	OR	OR	OR	
	glyphosate ( <i>Roundup</i> )	1 1/8	1 1/2 qt	

*(Continued next page)*

## SOYBEANS — NO-TILL

(Following corn, small grains, or with rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves Annual grasses</b>	imazaquin ( <i>Scepter</i> )	0.125	$\frac{2}{3}$ pt	<ul style="list-style-type: none"> <li>● May need follow-up treatment with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● A prepackaged mix of <i>Lasso</i> + <i>Roundup</i> (<i>Bronco</i>) is available.</li> <li>● Improved control of velvetleaf, jimsonweed, and cocklebur compared to linuron.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2½ pt	
OR	OR	OR		
glyphosate ( <i>Roundup</i> )	1½	1½ qt	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● SEE LABEL FOR CROP ROTATION RESTRICTIONS.</li> <li>● Do not plant seed corn the year following a <i>Scepter</i> application.</li> <li>● Use caution to avoid misapplication or spray overlap as carryover may occur to labeled rotation crops.</li> <li>● Soybean stunting (shortening of internodes) may occur on sandy soils.</li> <li>● Paraquat applied before rye jointing (24 to 26 in. tall) may not provide complete control.</li> <li>● To avoid excessive cover crop growth, paraquat or <i>Roundup</i> may be applied prior to planting.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> <li>● Use 1/2 pt non-ionic surfactant/100 gal water with paraquat applications. Double surfactant rate if liquid fertilizer is used as a carrier.</li> <li>● Do not use suspension or high phosphate liquid fertilizers as carriers for paraquat applications.</li> <li>● Follow mixing directions on paraquat and <i>Roundup</i> labels.</li> <li>● Paraquat gives faster knockdown. <i>Roundup</i> may provide better control if weed or cover crop growth is dense. Use <i>Roundup</i> if horseweed (maretail) is present.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1½ pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt/A. (See Label).</li> <li>● May need follow-up treatment with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● A prepackaged mix of <i>Lasso</i> + <i>Roundup</i> (<i>Bronco</i>) is available.</li> <li>● Excellent control of cocklebur. Good control of jimsonweed. Fair control of velvetleaf.</li> </ul>	

*(Continued next page)*

## SOYBEANS — NO-TILL

(Following corn, small grains, or with rye or wheat cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves Annual grasses</b>	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	3/8	3/4 pt 4L OR 1/2 lb 75% DF	<ul style="list-style-type: none"> <li>● Applied preemergence.</li> <li>● Reduce metribuzin rate if soil pH is above 7.0.</li> <li>● If soil pH is 7.4 or above, do not apply metribuzin.</li> <li>● Note label for rotational crop restrictions.</li> <li>● Paraquat applied before rye jointing (24 to 26 in. tall) may not provide complete control.</li> <li>● To avoid excessive cover crop growth, paraquat or <i>Roundup</i> may be applied prior to planting.</li> <li>● Use 3 qt <i>Lasso</i> with heavy annual grass (especially fall panicum and crabgrass) infestations.</li> <li>● Maximum <i>Dual</i> rate in metribuzin tank mixes is 2 1/2 pt on fine textured soils.</li> <li>● Use 20 to 60 gal spray/A with paraquat and 20 to 30 gal spray/A with <i>Roundup</i>.</li> <li>● Use 1/2 pt non-ionic surfactant/100 gal water with paraquat applications. Double surfactant rate if liquid fertilizer is used as a carrier.</li> <li>● Do not use suspension or high phosphate liquid fertilizers as carriers for paraquat applications.</li> <li>● Follow mixing directions on paraquat and <i>Roundup</i> labels.</li> <li>● Paraquat gives faster knockdown. <i>Roundup</i> may provide better control if weed or cover crop is dense. Use <i>Roundup</i> if horseweed (marestail) is present.</li> <li>● Where no cover crop is present and annual weeds are small, the rate of paraquat may be reduced to 1 1/2 pt/A or the rate of <i>Roundup</i> may be reduced to 1 qt/A. (See Label.)</li> <li>● May need follow-up treatments with a postemergence herbicide (see "Postemergence" section for weeds controlled and use directions) for weed escapes.</li> <li>● A prepackaged mix of <i>Lasso</i> + <i>Roundup</i> (<i>Bronco</i>) is available.</li> </ul>
	+	+	+	
	chloramben ( <i>Amiben</i> )	2	4 qt 2L OR 2 1/2 lb 75% DS	
	+	+	+	
	alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> )	2 1/2	2 1/2 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	1 qt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.47	2 1/2 pt	
	OR	OR	OR	
glyphosate ( <i>Roundup</i> )	1 1/8	1 1/2 qt		

*(Continued next page)*

## SOYBEANS — NO-TILL — MARESTAIL (HORSEWEED) CONTROL

*(Following corn, soybeans, or small grains without a cover crop)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Early Preplant</b>				
<b>Annual grasses</b>	glyphosate ( <i>Roundup</i> )	0.56	1½ pt	<ul style="list-style-type: none"> <li>● Apply 10 to 14 days before planting.</li> <li>● If marestail exceed 2 in., increase <i>Roundup</i> rate to 1 qt/A.</li> <li>● Must be followed by a sequential application preemergence.</li> <li>● Do not treat when plants are under stress.</li> <li>● Apply when air temperature is at least 60°F.</li> <li>● Control will be maximized with spray volume of 5 to 10 gal/A.</li> <li>● Use flat fan nozzles.</li> </ul>
<b>Annual broadleaves</b>	+	+	+	
<b>Marestail</b>	surfactant	½%	½%	
<b>FOLLOWED BY:</b>				
<b>Preemergence</b>	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	¾	¾ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Apply preemergence.</li> <li>● If annual weeds exceed 3 in., increase <i>Gramoxone Super</i> rate to 2½ pt/A or <i>Roundup</i> rate to 1½ qt/A.</li> <li>● If absolutely no green weeds are present, paraquat or <i>Roundup</i> may be omitted.</li> <li>● Fields must be scouted closely before omitting paraquat or <i>Roundup</i>.</li> <li>● Use ½ pt non-ionic surfactant per 100 gal water with paraquat application. Double surfactant rate if liquid fertilizer is used as the carrier.</li> <li>● See remarks and limitations for each herbicide under Soybeans — No-Till.</li> </ul>
	OR	OR	OR	
	metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	¾	½ lb 75% DG	
	OR	OR	OR	
	linuron ( <i>Lorox</i> or <i>Linex</i> )	¾	¾ qt 4L OR 1½ lb 50% DF	
	OR	OR	OR	
	linuron + chlorimuron-ethyl ( <i>Lorox Plus</i> )	0.6	1 lb 60% DG	
	+	+	+	
	alachlor ( <i>Lasso</i> , <i>Arena</i> or <i>Micro-Tech Lasso</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	paraquat ( <i>Gramoxone Super</i> )	0.28	1½ pt	
	OR	OR	OR	
	glyphosate ( <i>Roundup</i> )	¾	1 qt	

*(Continued next page)*

## SOYBEANS — NO-TILL — MARESTAIL (HORSEWEED) CONTROL

*(Following corn, soybeans, or small grains without a cover crop)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations	
<b>Early Preplant</b>					
	metribuzin <i>(Lexone or Sencor)</i>	¼	½ pt 4L OR ¾ lb 75% DF	<ul style="list-style-type: none"> <li>● Apply 10 to 14 days before planting.</li> <li>● Apply before marestail exceed 3 in.</li> <li>● Must be followed by sequential application preemergence.</li> </ul>	
	+ alachlor <i>(Lasso, Arena or Micro-Tech Lasso)</i>	+	+ 1½ qt		
	OR metolachlor <i>(Dual)</i>	OR 1½	OR 1½ pt		
<b>FOLLOWED BY: Preemergence</b>					
	metribuzin <i>(Lexone or Sencor)</i>	⅛	¼ pt 4L OR ¾ lb 75% DF	<ul style="list-style-type: none"> <li>● Apply preemergence.</li> <li>● If absolutely no green weeds are present, paraquat or Roundup may be omitted.</li> <li>● Fields must be scouted closely before omitting paraquat or Roundup.</li> <li>● If annual weeds exceed 3 in., increase Gramoxone Super rate to 2½ pt/A or Roundup rate to 1½ qt/A.</li> <li>● See remarks and limitations for each herbicide under Soybeans—No-Till.</li> </ul>	
	+ alachlor <i>(Lasso, Arena or Micro-Tech Lasso)</i>	+	+ 1 qt		
	OR metolachlor <i>(Dual)</i>	OR ½	OR ½ pt		
	+ paraquat <i>(Gramoxone Super)</i>	+	+ 1½ pt		
	OR glyphosate <i>(Roundup)</i>	OR ¾	OR 1 qt		
<b>Early Preplant</b>					
	metribuzin + chlorimuron-ethyl <i>(Preview)</i>	¼	¾ lb 75% DG		<ul style="list-style-type: none"> <li>● Apply 10 to 14 days before planting.</li> <li>● Apply before marestail exceed 3 in.</li> <li>● Must be followed by sequential application preemergence.</li> </ul>
	+ alachlor <i>(Lasso, Arena or Micro-Tech Lasso)</i>	+	+ 1½ qt		
	OR metolachlor <i>(Dual)</i>	OR 1½	OR 1½ pt		
<b>FOLLOWED BY: Preemergence</b>					
	metribuzin + chlorimuron-ethyl <i>(Preview)</i>	⅛	¾ lb 75% DG	<ul style="list-style-type: none"> <li>● Apply preemergence.</li> <li>● If absolutely no green weeds are present, paraquat or Roundup may be omitted.</li> <li>● Fields must be scouted closely before omitting paraquat or Roundup.</li> <li>● If annual weeds exceed 3 in., increase Gramoxone Super rate to 2½ pt/A or Roundup rate to 1½ qt/A.</li> <li>● See remarks and limitations for each herbicide under Soybeans—No-Till.</li> </ul>	
	+ alachlor <i>(Lasso, Arena or Micro-Tech Lasso)</i>	+	+ 1 qt		
	OR metolachlor <i>(Dual)</i>	OR ½	OR ½ pt		
	+ paraquat <i>(Gramoxone Super)</i>	+	+ 1½ pt		
	OR glyphosate <i>(Roundup)</i>	OR ¾	OR 1 qt		

*(Continued next page)*

## SOYBEANS — NO-TILL — MARESTAIL (HORSEWEED) CONTROL

(Following corn, soybeans, or small grains without a cover crop)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Early Preplant</b>				
	linuron + chlorimuron-ethyl ( <i>Lorox Plus</i> )	0.4	$\frac{2}{3}$ lb 60% DG	<ul style="list-style-type: none"> <li>● Apply 10 to 14 days before planting.</li> <li>● Apply before marestalk exceed 3 in.</li> <li>● Must be followed by sequential application preemergence.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	1½	1½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	1½	1½ pt	
<b>FOLLOWED BY: Preemergence</b>				
	linuron + chlorimuron-ethyl ( <i>Lorox Plus</i> )	0.2	$\frac{1}{3}$ lb 60% DG	<ul style="list-style-type: none"> <li>● Apply preemergence.</li> <li>● If absolutely no green weeds are present, paraquat or <i>Roundup</i> may be omitted.</li> <li>● Fields must be scouted closely before omitting paraquat or <i>Roundup</i>.</li> <li>● If annual weeds exceed 3 in., increase <i>Gramoxone Super</i> rate to 2½ pt/A or <i>Roundup</i> rate to 1½ qt/A.</li> <li>● See remarks and limitations for each herbicide under Soybeans — No-Till.</li> </ul>
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	1	1 qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	½	½ pt	
	+	+	+	
	paraquat <i>Gramoxone Super</i> )	.28	1½ pt	
	OR	OR	OR	
	glyphosate ( <i>Roundup</i> )	$\frac{3}{4}$	1 qt	
<b>Preemergence</b>				
	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	$\frac{3}{8}$	$\frac{3}{4}$ pt 4L OR ½ lb 75% DF	<ul style="list-style-type: none"> <li>● Apply preemergence.</li> <li>● Apply before marestalk exceed 3 in.</li> <li>● If annual weeds are small (3 in. or less), <i>Roundup</i> rate may be reduced to 1qt/A.</li> <li>● Do not treat when plants are under stress.</li> <li>● Apply when air temperature is at least 60°F.</li> <li>● Use a maximum of 40 gal of water/A.</li> <li>● Requires rainfall following application for adequate control.</li> <li>● See remarks and limitations for each herbicide under Soybeans — No-Till.</li> </ul>
	OR	OR	OR	
	metribuzin + chlorimuron-ethyl ( <i>Preview</i> )	$\frac{3}{8}$	½ lb 75% DG	
	OR	OR	OR	
	linuron + chlorimuron-ethyl ( <i>Lorox Plus</i> )	0.6	1 lb 60% DG	
	+	+	+	
	alachlor ( <i>Lasso, Arena</i> or <i>Micro-Tech Lasso</i> )	2½	2½ qt	
	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	2 pt	
	+	+	+	
	glyphosate ( <i>Roundup</i> )	1½	1½ qt	

# SMALL GRAINS

## BARLEY AND WHEAT WITHOUT LEGUME SEEDINGS — ALL TILLAGE SYSTEMS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	2,4-D amine	1/2	1 pt	<ul style="list-style-type: none"> <li>● Apply at or after full tillering but before the boot stage (the grain is usually 6 to 8 in. tall at full tillering, and the boot stage is reached when the upper sheath is beginning to swell with the enlarging head).</li> <li>● Do not apply in the fall.</li> <li>● Most effective when weeds are small (less than 4 in.).</li> <li>● Not effective on smartweed and wild buckwheat.</li> </ul>
	bromoxynil (Buctril)	3/8	1 1/2 pt 2E	<ul style="list-style-type: none"> <li>● May be applied from emergence and up to boot stage.</li> <li>● Good coverage is essential.</li> <li>● Bromoxynil must be applied to small weeds (less than 4 in. tall, or 1 in. rosettes) for effective control.</li> <li>● Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> <li>● Very good crop safety.</li> </ul>
	dicamba (Banvel)	1/8	1/4 pt	<ul style="list-style-type: none"> <li>● Do not apply to spring-seeded barley.</li> <li>● May be applied from early spring until full tillering (the grain is usually 6 to 8 in. tall at this stage).</li> <li>● Most effective when weeds are small (less than 4 in.).</li> <li>● See remarks and limitations for dicamba (Banvel) in Corn — Postemergence section.</li> <li>● More effective than 2,4-D on smartweed, wild buckwheat, and perennials.</li> </ul>
	DPX-M6316 (Harmony) + surfactant	0.023 + 1/4%	1/2 oz. + 1/4%	<ul style="list-style-type: none"> <li>● Apply to winter wheat after the 2-leaf stage but before the 3rd node is detectable.</li> <li>● Apply to barley after the 2-leaf stage but before the 1st node is detectable (full tillering).</li> <li>● Most effective if weeds are small (4 in. or less).</li> <li>● Addition of surfactant is essential for adequate results.</li> <li>● With ground equipment, use a minimum of 5 gal of water/A and 30 psi.</li> <li>● Uniform coverage is essential.</li> <li>● For severe infestation, increase <i>Harmony</i> rate to 2/3 oz. per acre.</li> <li>● For mayweed (dogfennel) control, <i>Harmony</i> rate may be reduced to 1/3 oz. per acre.</li> <li>● Control of common ragweed is inconsistent.</li> <li>● Do not make more than one application to a crop during one growing season.</li> <li>● Do not graze or feed forage or hay from treated areas to livestock.</li> <li>● Do not plant treated area to any crop other than wheat or barley for 60 days after application.</li> <li>● Do not apply to wheat or barley underseeded with another crop.</li> <li>● Injury symptoms will appear on weeds in 1 to 3 weeks after application.</li> <li>● Very good crop safety.</li> <li>● Special sprayer cleanout required (see <i>Harmony</i> label).</li> </ul>
Perennials (bindweed, thistles)	2,4-D ester	3/4	1 1/2 pt	<ul style="list-style-type: none"> <li>● Use when grain is fully tillered but before the boot stage.</li> <li>● Control is limited.</li> <li>● Injury may occur.</li> <li>● Some control of wild onion and wild garlic.</li> </ul>
	dicamba (Banvel)	1/8	1/4 pt	<ul style="list-style-type: none"> <li>● Do not apply to spring-seeded barley.</li> <li>● Some control of wild onion and wild garlic.</li> <li>● May be applied from early spring until full tillering (the grain is usually 6 to 8 in. tall at this stage).</li> <li>● See "Remarks and Limitations" for <i>Banvel</i> in Corn — Postemergence section.</li> </ul>

(Continued next page)

## BARLEY AND WHEAT (WITHOUT LEGUME SEEDINGS) (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Wild garlic Wild onion	DPX-M6316 <i>Harmony</i>	0.031	$\frac{2}{3}$ oz	<ul style="list-style-type: none"> <li>● See remarks and limitations with <i>Harmony</i> for control of annual broadleaves (previous page).</li> <li>● Apply when wild garlic plants are less than 12 in. tall with 4 to 6 in. of new growth.</li> <li>● For best results, treat actively growing wild garlic when air temperature is at least 60°F.</li> <li>● Less effective for wild onion control.</li> </ul>
	+	+	+	
	surfactant	$\frac{1}{4}\%$	$\frac{1}{4}\%$	
	dicamba ( <i>Banvel</i> )	$\frac{1}{8}$	$\frac{1}{4}$ pt	<ul style="list-style-type: none"> <li>● Do not apply to spring-seeded barley.</li> <li>● May use either ester or amine 2,4-D.</li> <li>● Provides suppression only.</li> <li>● Should be applied at full tillering (the grain is usually 6 to 8 in. tall at this stage).</li> <li>● See "Remarks and Limitations" for <i>Banvel</i> in Corn—Postemergence section.</li> </ul>
+	+	+		
2,4-D	$\frac{1}{2}$	1 pt		

## OATS WITHOUT LEGUME SEEDINGS — ALL TILLAGE SYSTEMS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	2,4-D amine	$\frac{3}{8}$	$\frac{3}{4}$ pt	<ul style="list-style-type: none"> <li>● Use when grain is fully tillered but before boot stage.</li> <li>● Most effective when weeds are small (less than 4 in.).</li> <li>● Some yield reduction may occur but generally less than caused by weeds.</li> </ul>
	MCPA	$\frac{3}{8}$	$\frac{3}{4}$ pt	<ul style="list-style-type: none"> <li>● Less injurious than 2,4-D</li> <li>● Less effective than 2,4-D.</li> <li>● Most effective when weeds are small (less than 4 in.).</li> <li>● Apply at or after full tillering but before the boot stage.</li> </ul>
	bromoxynil ( <i>Buctril</i> )	$\frac{3}{8}$	1 $\frac{1}{2}$ pt 2E	<ul style="list-style-type: none"> <li>● May be applied from emergence up to boot stage.</li> <li>● Good coverage essential.</li> <li>● Bromoxynil must be applied to small weeds (less than 4 in. tall, or 1 in. rosettes) for effective control.</li> <li>● Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> <li>● Very good crop safety.</li> </ul>

## SMALL GRAINS SEEDED TO LEGUMES — ALL TILLAGE SYSTEMS

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	MCPA	$\frac{3}{8}$	$\frac{3}{4}$ pt	<ul style="list-style-type: none"> <li>● Apply at or after full tillering but before the boot stage.</li> <li>● A canopy of grain and weeds over the seeding will reduce the possibility of injury to the legume.</li> <li>● Apply at 5 to 6 GPA to minimize crop injury.</li> <li>● Sweet clover is very sensitive to MCPA.</li> </ul>

(Continued next page)



## SMALL GRAINS SEEDED TO LEGUMES — ALL TILLAGE SYSTEMS (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
(continued)	bromoxynil (Buctril)	3/8	1 1/2 pt 2E	<ul style="list-style-type: none"> <li>• WHEAT OR BARLEY SEEDED WITH ALFALFA ONLY.</li> <li>• Apply after alfalfa has reached at least the 2 to 4 trifoliate stage of alfalfa and between emergence and boot stage of wheat or barley.</li> <li>• Do not treat when air temperatures exceed 70°F at and 3 days following application as unacceptable alfalfa injury may occur.</li> <li>• Do not use any spray additives as increased injury may occur.</li> <li>• Alfalfa leaf burn following application is likely, but plants recover rapidly in favorable growing conditions.</li> <li>• Warm, humid conditions enhance leaf burn.</li> <li>• Less injurious than MCPA.</li> <li>• Do not treat when plants are under stress.</li> <li>• With ground application, use a minimum of 20 gal of water/A and 30 psi.</li> <li>• For best results, weeds must be small (2 in. or less: 4 leaf stage or less).</li> <li>• Redroot pigweed and wild mustard must be controlled when very small (refer to label for details).</li> <li>• Weak on common chickweed.</li> <li>• Do not graze or cut for feed for 30 days after application.</li> </ul>

# FORAGES

## ALFALFA, TREFOIL AND CLOVER SEEDINGS

(clear seedings without small grain companion crops)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>				
Annual broadleaves Annual grasses	EPTC (Eptam or Genep)	3	3 1/2 pt	<ul style="list-style-type: none"> <li>• Incorporate into soil immediately after application.</li> <li>• Seed may be planted immediately after this operation.</li> <li>• Do not use when grass is seeded with legumes.</li> </ul>
	benefin (Balan)	1 1/8	3 qt	<ul style="list-style-type: none"> <li>• See remarks above for EPTC.</li> </ul>
<b>Postemergence—All Tillage Systems</b>				
Annual broadleaves	4-(2,4-DB) amine (Butoxone 200 or Butyrac 200)	1	2 qt	<ul style="list-style-type: none"> <li>• Apply postemergence when legume seedlings are at or beyond the 1 to 2 trifoliate leaf stage.</li> <li>• Can be used if annual broadleaf problem develops after using Eptam, Genep or Balan.</li> <li>• This treatment is not labeled for use with small grain companion crops.</li> <li>• Do not apply to sweet clover or established clovers grown for seed.</li> <li>• Do not graze or feed hay from forage for 60 days after application.</li> <li>• Do not apply when crop is under stress.</li> <li>• Do not apply when the daytime temperature is expected to exceed 90°F within the next 3 days. Do not apply if temperature is expected to fall below 40°F shortly after treatment.</li> <li>• Do not apply 2,4-DB within 7 days of Poast application.</li> </ul>
<b>Postemergence—All Tillage Systems</b>				
Common Chickweed Volunteer Cereals	Pronamide (Kerb)	3/4	1 1/2 lb 50W	<ul style="list-style-type: none"> <li>• Apply in the fall following spring or summer seeding.</li> <li>• Apply after soil temperature has dropped below 55°F.</li> <li>• Do not apply until crop seedlings have at least one fully developed trifoliate.</li> <li>• Do not graze for 120 days after application.</li> </ul>

## ALFALFA, TREFOIL AND CLOVER SEEDINGS (continued)

*(clear seedings without small grain companion crops)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Perennial weeds</b> (quackgrass, Canada thistle, milkweed, etc.)	glyphosate (Roundup)	Rate varies, see label.		<ul style="list-style-type: none"> <li>● Apply to perennials at labeled rate and growth stage before establishment.</li> </ul>

## ALFALFA (Only) — POSTEMERGENCE — ALL TILLAGE SYSTEMS

*(Clear seedings without small grain comparison crops)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses</b> <b>Volunteer corn</b>	sethoxydim (Poast) + crop oil concentrate	0.19  + 1 qt	1 pt  + 1 qt	<ul style="list-style-type: none"> <li>● Use on spring seedings.</li> <li>● Apply postemergence prior to first cutting.</li> <li>● Treat actively-growing grass up to a maximum of 4 in. tall.</li> <li>● Use 5 to 20 gal/A and 40 to 60 psi.</li> <li>● Avoid spray drift onto corn, sorghum, small grains, and turf.</li> <li>● Rainfall within 1 hr of application will reduce control.</li> <li>● Does not control nutsedge or broadleaved weeds.</li> <li>● Do not apply within 7 days of feeding, grazing, or harvesting forage, or within 20 days of feeding or harvesting for hay.</li> <li>● Do not apply more than 5 pt/A in one season.</li> <li>● Do not tank-mix with 2,4-DB.</li> <li>● Do not apply Poast within 7 days of 2,4-DB application.</li> </ul>
<b>Volunteer cereals</b> (wheat, barley, oats, rye)	sethoxydim (Poast) + crop oil concentrate	0.29  + 1 qt	1½ pt  + 1 qt	<ul style="list-style-type: none"> <li>● Use on spring or summer seedings.</li> <li>● Apply postemergence prior to first cutting.</li> <li>● Treat actively-growing grass up to a maximum of 4 in. tall.</li> <li>● Use 5 to 20 gal/A and 40 to 60 psi.</li> <li>● Avoid spray drift onto corn, sorghum, small grains, and turf.</li> <li>● Rainfall within 1 hr of application will reduce control.</li> <li>● Does not control nutsedge or broadleaved weeds.</li> <li>● Do not apply within 7 days of feeding, grazing, or harvesting forage, or within 20 days of feeding or harvesting for hay.</li> <li>● Do not apply more than 5 pt/A in one season.</li> <li>● Do not tank-mix with 2,4-DB.</li> <li>● Do not apply Poast within 7 days of 2,4-DB application.</li> </ul>
<b>Annual broadleaves</b>	bromoxynil (Buctril)	¾	1½ pt 2E	<ul style="list-style-type: none"> <li>● Apply postemergence to spring or summer seedings.</li> <li>● Apply after alfalfa has reached at least the 2 to 4 trifoliate stage.</li> <li>● Do not treat when air temperatures exceed 70°F at and 3 days following application as unacceptable crop injury may occur.</li> <li>● Do not use any spray additives as increased injury will occur.</li> <li>● Leaf burn following application is likely, but plants recover rapidly in favorable growing conditions.</li> <li>● Warm, humid conditions enhance leaf burn.</li> <li>● Do not treat when plants are under stress.</li> <li>● With ground application, use a minimum of 20 gal of water/A and 30 psi.</li> <li>● For best results, weeds must be small (2 in. or less: 4 leaf stage or less).</li> <li>● Redroot pigweed and wild mustard must be controlled when very small (refer to label for details.)</li> <li>● Weak on common chickweed.</li> <li>● Do not graze or cut for feed for 30 days after application.</li> </ul>

## ALFALFA (ESTABLISHED STAND)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Yellow rocket and broadleaved winter annuals</b>	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	1/2	1 lb 50W OR 1 pt 4L OR 2/3 lb 75% DF	<ul style="list-style-type: none"> <li>● Apply to <i>dormant</i> alfalfa in late fall or early spring.</li> <li>● Non-dormant alfalfa may be severely injured.</li> </ul>
	terbacil ( <i>Sinbar</i> )	1	1 1/4 80W	<ul style="list-style-type: none"> <li>● Apply to <i>dormant</i> alfalfa in late fall or early spring.</li> <li>● Note label for rotational crop restrictions.</li> <li>● Early spring applications will control other broadleaf weeds and suppress quackgrass infestations.</li> </ul>
	hexazinone ( <i>Velpar</i> )	1/2	.6 lb 90W OR 1 qt 2L	<ul style="list-style-type: none"> <li>● Apply in late fall or early spring before alfalfa growth exceeds 2 in. Applications to <i>dormant</i> alfalfa provide the greatest crop safety.</li> <li>● Application can be made between cuttings before regrowth exceeds 2 in. in height, however, alfalfa injury may result if plants are under stress. Do not make more than one application in one growing season.</li> <li>● Do not apply to seedling alfalfa or alfalfa-forage grass mixtures.</li> <li>● Do not apply when crop is under stress.</li> <li>● Do not apply to snow covered or frozen ground.</li> <li>● Use at least 20 gal water/A for ground application.</li> <li>● Do not graze or feed treated forage to livestock for 30 days following application.</li> <li>● <b>Rotational restriction:</b> Corn may be planted 12 mo. following the last application provided the soil is moldboard plowed prior to planting. Do not plant any other crop for two years after application.</li> </ul>
<b>Dandelions</b>	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	1	2 lb 50W OR 1 qt 4L OR 1 1/3 lb 75% DF	<ul style="list-style-type: none"> <li>● Apply in spring <i>before</i> alfalfa breaks dormancy.</li> <li>● Non-dormant alfalfa may be severely injured.</li> <li>● Perennial grasses may also be suppressed.</li> <li>● Early spring applications will control other broadleaf weeds and suppress quackgrass infestations.</li> </ul>
	hexazinone ( <i>Velpar</i> )	1	1.1 lb 90W OR 2 qt 2L	<ul style="list-style-type: none"> <li>● Apply in spring before alfalfa growth exceeds 2 in. Spring applications to <i>dormant</i> alfalfa provide the greatest crop safety.</li> <li>● Application can be made between cuttings before regrowth exceeds 2 in. in height, however, alfalfa injury may result if plants are under stress. Do not make more than one application in one growing season.</li> <li>● Do not apply to seedling alfalfa or alfalfa-forage grass mixtures.</li> <li>● Do not apply when crop is under stress.</li> <li>● Do not apply to snow covered or frozen ground.</li> <li>● Use at least 20 gal water/A for ground application.</li> <li>● Do not graze or feed treated forage to livestock for 30 days following application.</li> <li>● <b>Rotational restriction:</b> Corn may be planted 12 mo. following the last application provided the soil is moldboard plowed prior to planting. Do not plant any other crop for two years after application.</li> <li>● Will also provide partial control of quackgrass.</li> </ul>

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## FORAGES — ALFALFA (ESTABLISHED STAND) — (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Hoary alyssum Annual broadleaves	4-(2,4-DB) amine (Butoxone 200 or Butyrac 200)	1	2 qt	<ul style="list-style-type: none"> <li>• Early April.</li> <li>• Spray when hoary alyssum seedlings are in the two to four leaf stage.</li> <li>• Do not graze or feed hay from forage for 30 days after application.</li> <li>• Do not apply when crop is under stress.</li> <li>• Do not apply when the daytime temperature is expected to exceed 90°F within the next 3 days. Do not apply if temperature is expected to fall below 40°F shortly after treatment.</li> </ul>
Quackgrass	pronamide (Kerb)	1½	3 lb	<ul style="list-style-type: none"> <li>• Apply in late fall when soil temperatures are below 55°F.</li> <li>• For light to moderate quackgrass infestations, rate can be reduced to 1 lb a.i./A (2 lb/A of formulated product).</li> </ul>

## BIRDSFOOT TREFOIL (ESTABLISHED STAND)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Hoary alyssum Annual broadleaves	4-(2,4-DB) amine (Butoxone 200 or Butyrac 200)	1	2 qt	<ul style="list-style-type: none"> <li>• Early April.</li> <li>• Spray when hoary alyssum seedlings are two to four leaf stage.</li> <li>• Do not graze or feed hay from forage for 60 days after application.</li> <li>• Do not apply when crop is under stress.</li> <li>• Do not apply when the daytime temperature is expected to exceed 90°F within the next 3 days. Do not apply if temperature is expected to fall below 40°F shortly after treatment.</li> </ul>
Quackgrass	pronamide (Kerb)	1½	3 lb	<ul style="list-style-type: none"> <li>• Apply in late fall when soil temperatures are below 55°F.</li> <li>• For light to moderate quackgrass infestations, rate can be reduced to 1 lb a.i./A (2 lb/A of formulated product).</li> </ul>

## RED CLOVER (CURRENT YEAR SEEDING)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Yellow rocket and broadleaved winter annuals	MCPA	½	1 pt	<ul style="list-style-type: none"> <li>• Spray after killing frost when legumes are dormant.</li> </ul>

## GRASS PASTURE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Biennials and Perennials	2,4-D ester	1	1 qt	<ul style="list-style-type: none"> <li>• Apply in fall or spring.</li> </ul>

## LEGUME PASTURE — SPOT TREATMENT

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Perennial broad- leaves, Biennials	2,4-D ester	1	1 qt	<ul style="list-style-type: none"> <li>• Legumes may be injured or killed.</li> <li>• Spot spray patches.</li> </ul>

# DRY EDIBLE BEANS

## PREPLANT

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> (including nightshade)	alachlor ( <i>Lasso, Arena</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● Incorporate to 2 in. depth.</li> <li>● DO NOT use <i>Lasso</i> on sands or loamy sands as injury can occur.</li> <li>● REDUCE <i>Dual</i> rate on coarse textured soils low in organic matter (see label).</li> <li>● This treatment is used for black nightshade control.</li> <li>● <i>Lasso, Arena</i> or <i>Dual</i> should be preplant incorporated to minimize danger of bean injury.</li> <li>● <i>Amiben</i> may be applied preplant incorporated or preemergence.</li> <li>● <i>Lasso</i> will provide better nightshade control than <i>Dual</i>.</li> <li>● <i>Dual</i> will provide better yellow nutsedge suppression than <i>Lasso</i>.</li> </ul>
<b>Annual grasses</b>	OR	OR	OR	
	metolachlor ( <i>Dual</i> )	2	1 qt	
	+	+	+	
	chloramben ( <i>Amiben</i> )	2	4 qt 2L OR 2½ lb 75% DS	
<b>Annual broadleaves</b> (except nightshade)	EPTC ( <i>Eptam</i> or <i>Genep</i> )	2¼	1¼ qt	<ul style="list-style-type: none"> <li>● Incorporate immediately after application.</li> <li>● If heavy redroot pigweed, common ragweed, or black nightshade pressure, <i>Amiben</i> should also be applied (see below).</li> </ul>
<b>Annual grasses</b>	+	+	+	
	trifluralin ( <i>Treflan</i> )	½	1 pt	
	OR	OR	OR	
	pendimethalin ( <i>Prowl</i> )	¾	1½ pt	
	OR	OR	OR	
	ethalfluralin ( <i>Sonalan</i> )	¾	2 pt	
<b>Annual broadleaves</b>	EPTC	2¼	1¼ qt	<ul style="list-style-type: none"> <li>● Incorporate immediately after application.</li> <li>● Rainfall isn't critical for activation of <i>Amiben</i> as when it is surface applied.</li> <li>● Provides some nightshade control.</li> <li>● Black nightshade and common ragweed control is improved when <i>Amiben</i> is applied as a preemergence overlay (see below).</li> </ul>
<b>Annual grasses</b>	( <i>Eptam</i> or <i>Genep</i> )			
	+	+	+	
	chloramben ( <i>Amiben</i> )	2	4 qt 2L OR 2½ lb 75% DS	
	+	+	+	
	trifluralin ( <i>Treflan</i> )	½	1 pt	
	OR	OR	OR	
	pendimethalin ( <i>Prowl</i> )	¾	1½ pt	
	OR	OR	OR	
	ethalfluralin ( <i>Sonalan</i> )	¾	2 pt	

## PREPLANT FOLLOWED BY PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Preplant Incorporated</b>				
<b>Annual broadleaves</b> (including nightshade)	EPTC ( <i>Eptam</i> or <i>Genep</i> )	2¼	1¼ qt	<ul style="list-style-type: none"> <li>● Incorporate immediately after application.</li> <li>● Follow with preemergence herbicide <i>Amiben</i> for complete control.</li> </ul>
<b>Annual grasses</b>	+	+	+	
	trifluralin ( <i>Treflan</i> )	½	1 pt	
	OR	OR	OR	
	pendimethalin ( <i>Prowl</i> )	¾	1½ pt	
	OR	OR	OR	
	ethalfluralin ( <i>Sonalan</i> )	¾	2 pt	

(Continued next page)

## DRY EDIBLE BEANS — PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>FOLLOWED BY Preemergence</b>	chloramben ( <i>Amiben</i> )	2	4 qt 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>Effectiveness depends on adequate rainfall after treatment.</li> </ul>
<b>Annual broadleaves (including nightshade) Annual grasses</b>	metolachlor ( <i>Dual</i> ) + chloramben ( <i>Amiben</i> )	2 + 2	1 qt + 4 qt 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>Reduce <i>Dual</i> rate on coarse textured soil low in organic matter (see label).</li> <li>DANGER of bean injury is greater when <i>Dual</i> is applied preemergence.</li> <li>This treatment is used for black nightshade control.</li> <li>Requires rainfall for activation.</li> </ul>

## POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves (including cocklebur, velvetleaf and jimsonweed)</b>	bentazon ( <i>Basagran</i> ) + crop oil concentrate	¾ + 1 qt	1½ pt + 1 qt	<ul style="list-style-type: none"> <li>Controls only certain broadleaves. Poor control of redroot pigweed or black nightshade. Fair control of common ragweed and common lambsquarters. See label and postemergence soybean section.</li> <li>Check label for specific rate and proper weed growth stage.</li> <li>Beans must have 1 to 2 trifoliolate leaves before application.</li> <li>Use 1 gal/A of 28% liquid nitrogen (urea ammonium nitrate) INSTEAD OF crop oil concentrate for improved velvetleaf control. Do not use 28% liquid nitrogen if lambsquarters is present.</li> </ul>
<b>Nutsedge Canada thistle</b>	bentazon ( <i>Basagran</i> ) + crop oil concentrate	¾ + ¾ + 1 qt + 1 qt	1½ pt + 1½ pt + 1 qt + 1 qt	<ul style="list-style-type: none"> <li>See remarks for nutsedge control under soybeans.</li> <li>Beans must have 1 to 2 trifoliolate leaves before application.</li> </ul>

# SUNFLOWERS

## PREPLANT

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual grasses Annual broadleaves</b>	chloramben ( <i>Amiben</i> ) + trifluralin ( <i>Treflan</i> ) OR pendimethalin ( <i>Prowl</i> )	2 + ¾ OR 1	1 gal 2L OR 2½ lb 75% DS + 1½ pt OR 2 pt	<ul style="list-style-type: none"> <li>Incorporate <i>Treflan</i> thoroughly into top 2 or 3 in. of soil within 24 hours after application. <i>Prowl</i> incorporation may be delayed 7 days.</li> <li>On light soils (sandy and sandy loam) low in organic matter use ½ lb <i>Treflan</i> or ¾ lb <i>Prowl</i>.</li> <li>Use 6 qt of <i>Amiben</i> for heavy ragweed, mustard, or nightshade populations.</li> </ul>
	chloramben ( <i>Amiben</i> ) + alachlor ( <i>Lasso, Arena</i> )	2 + 2½	1 gal 2L OR 2½ lb 75% DS + 2½ qt	<ul style="list-style-type: none"> <li>May be applied either preplant incorporated or pre-emergence.</li> </ul>
<b>Annual grasses Annual broadleaves (except ragweed, smartweed, mustard, and nightshade)</b>	trifluralin ( <i>Treflan</i> ) OR pendimethalin ( <i>Prowl</i> )	¾ OR 1	1½ pt OR 2 pt	<ul style="list-style-type: none"> <li>Incorporate <i>Treflan</i> within 24 hours or <i>Prowl</i> within 7 days into top 2 or 3 in. of soil.</li> <li>On light soils (loamy sands) low in organic matter use ½ lb <i>Treflan</i> or ¾ lb <i>Prowl</i>.</li> </ul>

## SUNFLOWERS — PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses Annual broadleaves	chloramben (Amiben)	2	1 gal 2L OR 2½ lb 75% DS	<ul style="list-style-type: none"> <li>Do not graze or feed sunflower forage from Amiben-treated areas.</li> <li>Amiben may follow preplant treatments of Treflan or Prowl.</li> <li>Use 6 qt of Amiben for heavy ragweed, mustard, or nightshade populations.</li> </ul>
	chloramben (Amiben)  + alachlor (Lasso, Arena)	2  + 2½	1 gal 2L OR 2½ lb 75% DS  + 2½ qt	

## SUNFLOWERS — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses Volunteer	sethoxydim (Post)	0.19	1 pt	<ul style="list-style-type: none"> <li>Use ¾ pt/A Poast plus 2½ lb ammonium sulfate or 1 gal of 28% liquid nitrogen per acre in addition to crop oil concentrate if the volunteer corn is less than 12 in.</li> <li>For volunteer corn control, always add 2½ lb ammonium sulfate or 1 gal of 28% liquid nitrogen per acre.</li> <li>No soil activity from Poast. Controls only grasses present when sprayed.</li> <li>Treat actively growing grass. Treat foxtails, fall panicum, and barnyardgrass up to 8 in. and crabgrass up to 4 in.</li> <li>Poast can be reduced to ¾ pt/A for 1 to 4 in. barnyardgrass, green and giant foxtails, and fall panicum.</li> <li>Ammonium sulfate can be added at 2½ lb/A to enhance crabgrass control.</li> <li>Use a minimum of 5 gal of water/A and 40 psi for Poast.</li> <li>Avoid drift onto corn, sorghum, small grains or turf.</li> <li>Rainfall within one hour of application will reduce control.</li> <li>Does not control nutsedge.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
Quackgrass	sethoxydim (Poast)	0.29 + 0.19	1½ pt + 1 pt	<ul style="list-style-type: none"> <li>TWO APPLICATIONS ARE NEEDED FOR BEST QUACKGRASS CONTROL. MAKE SECOND APPLICATION 14 TO 21 DAYS FOLLOWING INITIAL TREATMENT. CULTIVATION MAY REPLACE SECOND APPLICATION.</li> <li>Addition of ammonium sulfate or liquid nitrogen is necessary for these Poast application rates. Apply 2½ pt of Poast followed by 1½ pt of Poast per acre if only crop oil concentrate is added.</li> <li>No soil activity from Poast. Controls only grass present when sprayed.</li> <li>Treat actively growing quackgrass 6 to 8 in. tall.</li> <li>Use a minimum of 5 gal of water/A and 40 psi for Poast application.</li> <li>Avoid drift onto corn, sorghum, small grains or turf.</li> <li>Rainfall within one hour of application will reduce control.</li> <li>Addition of other herbicides to spray tank may reduce quackgrass control.</li> </ul>
	+ ammonium sulfate	+ 2½ lb + 2½ lb	+ 2½ lb + 2½ lb	
	OR	OR	OR	
	28% liquid nitrogen + crop oil concentrate	1 gal + 1 gal + 1 qt + 1 qt	1 gal + 1 gal + 1 qt + 1 qt	

# POTATOES

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Quackgrass	dalapon (Dowpon M)	10	13½ lb	<ul style="list-style-type: none"> <li>• Spray in spring when quackgrass is 4 to 6 in. tall. Wait one week before plowing.</li> <li>• Use in 30 to 40 gal water/A.</li> <li>• Control of quackgrass will be reduced when heavy stand of rye cover is present.</li> </ul>
	glyphosate (Roundup)	1½	2 qt	<ul style="list-style-type: none"> <li>• Apply to actively growing quackgrass at least 8 in. tall.</li> <li>• Use 15 to 20 gal water/A.</li> <li>• No soil residue.</li> <li>• Can plow or till 3 days after application and plant crop.</li> <li>• Do not plow or till prior to treatment.</li> <li>• Emerged potatoes are very sensitive to Roundup damage. Do not use near growing potato plants.</li> <li>• Heavy stand of rye cover may reduce quackgrass control.</li> <li>• Roundup rate of 1 qt may be used for single season quackgrass control. Apply 1 qt in 5 to 10 gal water/A with 0.5% non-ionic surfactant.</li> </ul>

## PREPLANT FOLLOWED BY DELAYED PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Preplant Incorporated</i> Annual grasses Annual broadleaves	EPTC (Eptam or Genep)	4	4½ pt	<ul style="list-style-type: none"> <li>• Work into soil immediately after application.</li> <li>• Use 6¾ pt/A if nutsedge is a problem.</li> <li>• Preplant incorporated.</li> </ul>
FOLLOWED BY: <i>Delayed Preemergence</i>				
	linuron (Lorox or Linex)	1	1 qt 4L OR 2 lb 50% DF	<ul style="list-style-type: none"> <li>• Treatment should be made prior to potato emergence and to germinating weeds and weeds that have emerged, but are very small.</li> <li>• A preemergence application of metribuzin to Atlantic and Shepody varieties is not recommended since injury can occur, especially under adverse weather conditions and when high metribuzin rates are used.</li> </ul>
	OR metribuzin (Lexone or Sencor)	OR ½	OR 1 pt 4L OR ¾ lb 75% DF	

## POTATOES — EARLY PREEMERGENCE FOLLOWED BY DELAYED PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>Early Preemergence</i> Annual grasses (especially barnyard-grass) Annual broadleaves	metolachlor (Dual) OR pendimethalin (Prowl)	2  OR ¾	2 pt  OR 1½ pt	<ul style="list-style-type: none"> <li>• If field leveling is necessary it should be done soon after planting.</li> <li>• Apply <i>early preemergence</i> — make application soon after planting.</li> <li>• Most effective on germinating grasses that have <i>not</i> emerged.</li> <li>• Do not use Prowl on muck soils or loamy sands with less than 1.5% organic matter.</li> <li>• A preemergence application of metribuzin to Atlantic or Shepody varieties is not recommended since injury can occur, especially under adverse weather conditions where high metribuzin rates are used.</li> <li>• Follow with Lexone or Sencor or Lorox or Linex.</li> </ul>

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## POTATOES — EARLY PREEMERGENCE FOLLOWED BY DELAYED PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
FOLLOWED BY: <b>Delayed Preemergence</b>				
	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	1/2	1 pt 4L OR 2/3 lb 75% DF	<ul style="list-style-type: none"> <li>● These treatments follow <i>Prowl</i> or <i>Dual</i> preemergence.</li> <li>● Delayed preemergence.</li> <li>● Apply before potato emergence.</li> <li>● Most effective on germinating and small <i>emerged</i> weeds.</li> <li>● A preemergence application of metribuzin to Atlantic or Shepody varieties is not recommended since injury can occur, especially under adverse weather conditions where high metribuzin rates are used.</li> </ul>
	OR linuron ( <i>Lorox</i> or <i>Linex</i> )	OR 1	OR 1 qt 4L OR 2 lb 50% DF	

## POTATOES — DELAYED PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b>	linuron ( <i>Lorox</i> or <i>Linex</i> )	1 1/2	1 1/2 qt 4L OR 3 lb 50% DF	<ul style="list-style-type: none"> <li>● If field leveling is necessary, it should be done soon after planting to allow weed emergence before spraying.</li> <li>● Apply delayed preemergence before grasses are 2 in. and broadleaves are 4 in., but BEFORE POTATOES EMERGE.</li> <li>● On soils with greater than 5% organic matter apply 2 lb a.i./A to emerged weeds.</li> <li>● Use up to 1 lb a.i. metribuzin on high organic (muck) soil.</li> <li>● If field leveling is necessary, it should be done soon after planting to allow weed emergence before spraying.</li> <li>● Apply delayed preemergence before weeds are 1 in., and before potatoes emerge.</li> <li>● A preemergence application of metribuzin to Atlantic or Shepody varieties is not recommended since injury can occur, especially under adverse weather conditions where high metribuzin rates are used.</li> </ul>
	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	1/2	1 pt 4L OR 2/3 lb 75% DF	

## POTATOES — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b>	metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	1/4	1/2 pt 4L OR 1/3 lb 75% DF	<ul style="list-style-type: none"> <li>● Do not make overall postemergence applications following 3 days of cool, wet or cloudy weather as crop injury may occur.</li> <li>● Not recommended for early maturing varieties.</li> <li>● Not recommended for red skin varieties.</li> <li>● Do not apply postemergence within 60 days of harvest.</li> <li>● Greater possibility of injury to potatoes when sprayed overall at 12- to 15-in. stages.</li> <li>● Treat when weeds are less than 1 in. tall.</li> <li>● Not recommended on Atlantic, Shepody, Chip Belle, Bell Chip, or Centennial varieties.</li> <li>● Will not control emerged weeds.</li> <li>● Do not apply within 40 days of harvest.</li> <li>● Do not apply to potatoes at green tip (cracking).</li> <li>● Refer to remarks for metribuzin postemergence.</li> <li>● Application should be made only as a directed or semi-directed spray to avoid chlorosis, minor necrosis, and leaf distortion.</li> </ul>
	metolachlor ( <i>Dual</i> )	2	2 pt	
	metolachlor ( <i>Dual</i> ) + metribuzin ( <i>Lexone</i> or <i>Sencor</i> )	2  +	2 pt  +	
		1/4	1/2 pt 4L OR 1/3 lb 75% DF	

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## POTATOES — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses	sethoxydim (Poast)	0.19	1 pt	<ul style="list-style-type: none"> <li>● Use a minimum of 5 gpa and a maximum of 20 gpa, and 40-60 psi.</li> <li>● No soil activity.</li> <li>● Do not cultivate within 5 days prior to and 7 days following application.</li> <li>● Apply to annual grasses up to 8 in. (crabgrass only up to 4 in.)</li> <li>● Poast can be reduced to ¼ pt/A for 1 to 4 in. barnyard-grass, green and giant foxtails, and fall panicum.</li> <li>● Do not apply to grasses under stress as poor weed control may result.</li> <li>● Wait 1 day after Poast application before applying metribuzin. Wait a minimum of 7 days after metribuzin before applying Poast.</li> <li>● Do not apply within 30 days of harvest.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
Quackgrass	sethoxydim (Poast)	0.29 + .19	1½ pt + 1 pt	<ul style="list-style-type: none"> <li>● TWO APPLICATIONS MAY BE NECESSARY FOR QUACKGRASS CONTROL. Make a second application of 1 pt/A 14 to 21 days following initial treatment. Cultivation may replace second application.</li> <li>● Do not cultivate within 5 days prior to and 14-21 days following application.</li> <li>● Use a minimum of 5 gpa and a maximum of 20 gpa, and 40-60 psi.</li> <li>● Treat actively growing quackgrass 6 to 8 in. tall.</li> <li>● Do not apply to quackgrass under stress as poor control may result.</li> <li>● Wait 1 day after Poast application before applying metribuzin. Wait a minimum of 7 days after metribuzin before applying Poast.</li> <li>● Do not apply within 30 days of harvest.</li> </ul>
	+ crop oil concentrate	+ 1 qt + 1 qt	+ 1 qt + 1 qt	
Volunteer cereals	sethoxydim (Poast)	0.29	1½ pt	<ul style="list-style-type: none"> <li>● Apply before tillering (up to 4 in.)</li> <li>● See remarks for annual grass control with Poast.</li> <li>● Poast is NOT recommended for spring control of cereals that emerged the previous fall.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	

## POTATOES — VINE KILL

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Potato Vine desiccation	ametryn (Evik)	1.2-2.0	1½-2½ lb 80W	<ul style="list-style-type: none"> <li>● For vine kill of summer potatoes, apply 1½-2½ lb of 80W.</li> <li>● Apply 10 to 14 days before harvest.</li> <li>● Wait a minimum of 3 weeks before planting a rye cover crop. Use the lowest Evik rate for better rye establishment.</li> <li>● DO NOT apply in September if sensitive crops are to be planted the following spring.</li> </ul>
	diquat (Diquat)	¼	1 pt	
	+ surfactant	+ ½%	+ ½%	

# SUGAR BEETS

## PREPLANT

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses	cycloate ( <i>Ro-Neet</i> )	3	2 qt	<ul style="list-style-type: none"> <li>● Incorporate immediately to 2 to 3 in.</li> <li>● Must be followed preemergence by <i>Pyramin</i>.</li> <li>● Injury may occur when <i>Betamix</i> or <i>Betanex</i> is applied postemergence before the 6 true leaf stage.</li> <li>● <i>Ro-Neet</i> provides good velvetleaf suppression.</li> </ul>
Annual grasses Redroot pigweed	diethatyl ethyl ( <i>Antor</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● Incorporate to 1 to 2 in.</li> <li>● Follow preemergence with <i>Pyramin</i> alone or <i>Nortron</i> plus <i>Pyramin</i>.</li> <li>● Apply 3 qt/A on clay loam soils.</li> </ul>

## PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves Annual grasses	pyrazon ( <i>Pyramin</i> )	4	4 qt	<ul style="list-style-type: none"> <li>● <i>Antor</i> should be included even if grasses are not a problem since better control of annual broadleaves, especially redroot pigweed, will result.</li> <li>● Do not use <i>Pyramin</i> on sands or loamy sands as crop injury may occur.</li> <li>● Reduce the <i>Antor</i> rate to 2 qt/A on a sandy loam soil.</li> <li>● Reduce the <i>Pyramin</i> rate to 3 qt/A on a sandy loam soil, and/or if soil organic matter is less than 3%.</li> <li>● If soils are high in clay and/or organic matter, and velvetleaf is a problem, apply 5 qt/A of <i>Pyramin</i>.</li> <li>● <i>Pyramin</i> plus <i>Nortron</i> provides better velvetleaf suppression than either herbicide alone. These herbicides are not as effective as <i>Ro-Neet</i>.</li> <li>● In order to approach 100% weed control it will, in most cases, be necessary to follow with a postemergence application.</li> </ul>
	+	+	+	
	diethatyl ethyl ( <i>Antor</i> )	3	3 qt	
	pyrazon ( <i>Pyramin</i> )	3	3 qt	
	+	+	+	
	ethofumesate ( <i>Nortron</i> )	2	5 1/3 qt EC	
	+	+	+	
	diethatyl ethyl ( <i>Antor</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● See all remarks for <i>Pyramin</i> plus <i>Antor</i>.</li> <li>● <i>Pyramin</i> plus <i>Nortron</i> provides better velvetleaf suppression than either herbicide alone. These herbicides are not as effective as <i>Ro-Neet</i>.</li> </ul>

## EARLY POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	desmedipham + phenmedipham ( <i>Betamix</i> )	1/2	3 pt	<ul style="list-style-type: none"> <li>● Split (low rate) applications of <i>Betamix</i> may be applied to sugar beets at early growth stages (less than 4 true leaf stage) to control early germinating weed seedlings at the cotyledon stage. Weeds not completely controlled by the first treatment will be checked and controlled by the second application.</li> <li>● Second application should be made AT LEAST 7 days later and AFTER another flush of weeds germinate.</li> <li>● The rate of <i>Betamix</i> in the second application can be increased to 3/4 lb a.i./A.</li> <li>● For second application, see remarks under <i>Betamix</i> plus <i>H-273</i>.</li> <li>● DO NOT add crop oil concentrate in first application.</li> </ul>
	FOLLOWED BY:			
	desmedipham + phenmedipham ( <i>Betamix</i> )	1/2	3 pt	
	+	+	+	
	endothall ( <i>H-273</i> )	1/2	1 1/3 pt	

## SUGAR BEETS — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> (including smartweed)	desmedipham + phenmedipham ( <i>Betamix</i> )	1	6.2 pt	<ul style="list-style-type: none"> <li>● Apply when the beets are in the 2 to 4 true leaf stage, (6 true leaf stage if <i>Ro-neet</i> was applied) and weeds have 4 leaves or less.</li> <li>● When cultivating the unsprayed area, be sure to cut away a portion of the sprayed area on the first cultivation and don't roll fresh unsprayed soil back beyond the cut away point.</li> <li>● When temperature is 75°F or greater, apply in late afternoon or early evening.</li> <li>● Do not apply when plants are under stress, such as temperatures above 85°F, or when rapid climatic changes from cool, overcast days to hot, bright days, or injury can occur.</li> <li>● Add 1 qt/A crop oil concentrate for hard to control large weeds or if plants are not vigorously growing. <i>Betamix</i> rate should then be reduced 25% to reduce injury.</li> <li>● Reduce <i>Betamix</i> rate 25% and do not add crop oil if high temperature, high humidity conditions have been prevalent.</li> </ul>
	+	+	+	
	endothall ( <i>H273</i> )	1/2	1 1/3 pt	
	desmedipham ( <i>Betanex</i> )	1	6.2 pt	<ul style="list-style-type: none"> <li>● Refer to remarks under <i>Betamix</i> plus <i>H273</i>.</li> <li>● More effective pigweed control than <i>Betamix</i>.</li> <li>● Does not control green or yellow foxtail.</li> <li>● Less effective than <i>Betamix</i> on lambsquarters and common ragweed.</li> </ul>
	+	+	+	
	endothall ( <i>H273</i> )	1/2	1 1/3 pt	
	ethofumesate ( <i>Nortron</i> )	3/4	4 pt EC	<ul style="list-style-type: none"> <li>● Provides full season weed control because of soil persistence of <i>Nortron</i>.</li> <li>● Refer to remarks under <i>Betamix</i> plus <i>H273</i>.</li> <li>● DO NOT add crop oil concentrate.</li> <li>● Apply when beets are in the 4 true leaf stage or larger.</li> </ul>
	+	+	+	
	desmedipham + phenmedipham ( <i>Betamix</i> )	1	6.2 pt	
	+	+	+	
	endothall ( <i>H273</i> )	1/2	1 1/3 pt	
	ethofumesate ( <i>Nortron</i> )	3/4	4 pt EC	<ul style="list-style-type: none"> <li>● Provides full season weed control because of soil persistence of <i>Nortron</i>.</li> <li>● Refer to remarks under <i>Betamix</i> plus <i>H273</i>.</li> <li>● DO NOT add crop oil concentrate.</li> <li>● Apply when beets are in the 4 true leaf stage or larger.</li> <li>● More effective pigweed control with <i>Betanex</i> than <i>Betamix</i>.</li> <li>● Less effective than <i>Betamix</i> on lambsquarters and common ragweed.</li> </ul>
	+	+	+	
	desmedipham ( <i>Betanex</i> )	1	6.2 pt	
	+	+	+	
	endothall ( <i>H273</i> )	1/2	1 1/3 pt	

(Continued next page)

## SUGAR BEETS — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
<b>Annual broadleaves</b> (including smartweed)	pyrazon ( <i>Pyramin</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● <i>Pyramin</i> will provide residual weed control (stop germinating weed seeds).</li> <li>● Apply when the beets are in the 2 to 4 true leaf stage, (6 true leaf stage if <i>Ro-Neet</i> was applied) and weeds 4 leaves or less.</li> <li>● When cultivating the unsprayed area, be sure to cut away a portion of the sprayed area on the first cultivation and don't roll fresh unsprayed soil back beyond the cut away point.</li> <li>● Maximum total amount of pyrazon that can be used for beets grown and processed in Michigan is 7¼ qt/A.</li> <li>● When temperature is 75°F or greater, apply in late afternoon or early evening.</li> <li>● Do not apply when plants are under stress such as temperatures above 85°F, or when rapid climate changes from cool, overcast days to hot bright days, or injury can occur.</li> <li>● Add 1 qt/A of crop oil concentrate for hard to control weeds, or if plants aren't vigorously growing. <i>Betamix</i> rate should then be reduced 25% to reduce injury.</li> <li>● Reduce <i>Betamix</i> rate 25% and do not add crop oil concentrate if high temperature, or high humidity conditions have been prevalent.</li> </ul>
	+	+	+	
	desmedipham + phenmedipham ( <i>Betamix</i> )	1	6.2 pt	
	+	+	+	
	endothall ( <i>H273</i> )	½	1⅓ pt	
	pyrazon ( <i>Pyramin</i> )	2	2 qt	<ul style="list-style-type: none"> <li>● Refer to remarks under <i>Pyramin</i> + <i>Betamix</i> + <i>H273</i>.</li> <li>● More effective pigweed control than <i>Betamix</i>.</li> <li>● Does not control green or yellow foxtail.</li> <li>● Less effective than <i>Betamix</i> on lambsquarters and common ragweed.</li> </ul>
+	+	+		
desmedipham ( <i>Betanex</i> )	1	6.2 pt		
+	+	+		
	endothall ( <i>H273</i> )	½	1⅓ pt	
<b>Smartweed and buckwheat</b>	endothall ( <i>H273</i> )	1	2⅔ pt	<ul style="list-style-type: none"> <li>● Refer to remarks under <i>Betamix</i> and <i>H273</i>.</li> <li>● Will control large smartweed and buckwheat.</li> </ul>
<b>Perennial sowthistle and Canada thistle</b> <b>Cocklebur</b>	clopyralid ( <i>Stinger</i> )	0.188	½ pt	<ul style="list-style-type: none"> <li>● Use ⅓ pt/A for Canada thistle.</li> <li>● Apply after sugar beets have reached the third leaf pair AND before thistles have reached the bud stage.</li> <li>● DO NOT cultivate before OR for a minimum of 14 days after application.</li> <li>● DO NOT tank mix with other herbicides, if applying for thistle control.</li> <li>● Banded applications are NOT recommended. Instead make a broadcast application over the thistle infested area.</li> <li>● Allow 105 days between application and sugar beet harvest.</li> </ul>
	+	+	+	
	crop oil concentrate OR	1 qt OR	1 qt OR	
	ammonium sulfate	2½ lb	2½ lb	
<b>Annual grasses</b>	sethoxydim ( <i>Poast</i> )	0.19	1 pt	<ul style="list-style-type: none"> <li>● Treat actively growing grass. Treat foxtails, fall panicum, and barnyardgrass up to 8 in. and crabgrass up to 4 in.</li> <li>● <i>Poast</i> can be reduced to ¾ pt/A for 1 to 4 in. barnyardgrass, green and giant foxtails, and fall panicum.</li> <li>● Ammonium sulfate or 28% liquid nitrogen (urea-ammonium nitrate) can be added at 2½ lb/A to enhance crabgrass control.</li> <li>● No soil activity from <i>Poast</i>. Controls only grasses present when sprayed.</li> <li>● Use a minimum of 5 gal of water/A and 40 psi.</li> <li>● Does not control yellow nutsedge.</li> <li>● Rainfall within one hour of application will reduce control.</li> </ul>
	+	+	+	
	crop oil concentrate OR	1 qt OR	1 qt OR	
	( <i>Dash</i> )	1 qt	1 qt	

*(Continued next page)*

## SUGAR BEETS — POSTEMERGENCE (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Volunteer corn</b>	sethoxydim ( <i>Poast</i> )	0.19	1 pt	<ul style="list-style-type: none"> <li>● Use ¾ pt/A <i>Poast</i> plus 2½ lb ammonium sulfate or 1 gal of 28% liquid nitrogen (urea-ammonium nitrate) in addition to crop oil concentrate if the volunteer corn is less than 12 in.</li> <li>● Rainfall within one hour of application will reduce control.</li> <li>● Does not control nutsedge.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	OR	OR	OR	
	( <i>Dash</i> )	1 qt	1 qt	
	+	+	+	
ammonium sulfate	2½ lb	2½ lb		
OR	OR	OR		
28% liquid nitrogen	1 gal	1 gal		
<b>Small grains</b>	sethoxydim ( <i>Poast</i> )	0.29	1½ pt	<ul style="list-style-type: none"> <li>● Apply before tillering (up to 4 in. tall).</li> <li>● Spring seeded cereals only.</li> </ul>
	+	+	+	
	crop oil concentrate	1 qt	1 qt	
	OR	OR	OR	
	( <i>Dash</i> )	1 qt	1 qt	
	+	+	+	
ammonium sulfate	2½ lb	2½ lb		
OR	OR	OR		
28% liquid nitrogen	1 gal	1 gal		
<b>Quackgrass</b>	sethoxydim ( <i>Poast</i> )	0.29 + 0.19	1½ pt + 1 pt	<ul style="list-style-type: none"> <li>● TWO APPLICATIONS ARE NEEDED FOR BEST QUACKGRASS CONTROL. MAKE SECOND APPLICATION 14 TO 21 DAYS FOLLOWING INITIAL TREATMENT. CULTIVATION MAY REPLACE SECOND APPLICATION.</li> <li>● DO NOT TANK MIX with <i>Betamix</i>, <i>Betanex</i>, <i>Pyramin</i>, or <i>H-273</i> as crop injury or reduced quackgrass control may occur, especially with nitrogen additives.</li> <li>● Addition of ammonium sulfate or liquid nitrogen is necessary for these <i>Poast</i> application rates. Apply 2½ pt of <i>Poast</i> followed by 1½ pt of <i>Poast</i> if only crop oil concentrate is added.</li> <li>● No soil activity from <i>Poast</i>. Controls only grass present when sprayed.</li> <li>● Treat actively growing quackgrass 6 to 8 in. tall.</li> <li>● Use a minimum of 5 gal of water/A and 40 psi for <i>Poast</i> application.</li> <li>● Avoid drift onto corn, sorghum, small grains or turf.</li> <li>● Rainfall within one hour of application will reduce control.</li> </ul>
	+	+	+	
	ammonium sulfate	2½ lb + 2½ lb	2½ lb + 2½ lb	
	OR	OR	OR	
	28% liquid nitrogen	1 gal + 1 gal	1 gal + 1 gal	
	+	+	+	
crop oil concentrate	1 qt + 1 qt	1 qt + 1 qt		
OR	OR	OR		
( <i>Dash</i> )	1 qt + 1 qt	1 qt + 1 qt		

# FORAGE SORGHUM

## FORAGE SORGHUM — PREEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b> <b>Annual grasses</b> (except fall panicum, green foxtail, giant foxtail, witchgrass, and crabgrass)	atrazine (commercial product)	2	2½ lb 80W OR 2 qt 4L OR 2.2 lb 50% WDG	<ul style="list-style-type: none"> <li>Do not use on sands, loamy sands, sandy clay loams, or any soil with less than 1% organic matter.</li> <li>Heavy rains following application may cause injury.</li> <li>May be applied preplant incorporated.</li> <li>Do not apply to sudangrass.</li> <li>See label for details.</li> </ul>
<b>Annual broadleaves</b> <b>Annual grasses</b>	atrazine (commercial product)	1	1¼ lb 80W OR 1 qt 4L OR 1.1 lb 90% WDG	<ul style="list-style-type: none"> <li>CAUTION: Seed must be treated with CGA-92194 (<i>Concep II</i>) herbicide antidote.</li> <li>See label for additional restrictions.</li> <li>A commercial prepackage mix (<i>Bicep</i>) is available.</li> <li>May be applied preplant incorporated.</li> <li>Do not apply to sudangrass or sorghum-sudangrass hybrids.</li> </ul>
	+ metolachlor ( <i>Dual</i> )	+ 1½	+ 1½ pt	

## FORAGE SORGHUM — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b>	atrazine (commercial product)	1.2	1.5 lb 80W OR 1.2 qt 4L OR 1.3 lb 90% WDG	<ul style="list-style-type: none"> <li>Apply after sorghum has reached the 3-leaf stage.</li> <li>Apply before common lambsquarter and redroot pigweed reach 6 in. and other broadleaf weeds 4 in.</li> <li>Heavy rainfall following application may cause injury.</li> <li>Do not apply on sands or loamy sands.</li> <li>Do not graze or cut for feed for 21 days following application.</li> <li>Do not apply to sudangrass.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
	2,4-D amine	½	1 pt	<ul style="list-style-type: none"> <li>Apply when sorghum is 6 to 8 in. tall.</li> <li>If sorghum is planted in rows, drop nozzles can be used when the crop is 8 to 15 in. tall.</li> <li>Do not graze or harvest for forage for 14 days after treatment.</li> <li>See remarks and limitations for 2,4-D under Corn — Postemergence.</li> <li>Do not apply to sudangrass or sorghum-sudangrass hybrids.</li> <li>Consult the 2,4-D label for clearance on forage sorghum.</li> </ul>
	bromoxynil ( <i>Buctril</i> )	¾	1½ pt 2E	<ul style="list-style-type: none"> <li>Apply to weeds less than 4 in. tall for effective control.</li> <li>Do not mix with spray additives or liquid fertilizers.</li> <li>Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> <li>Some leaf burn may occur, especially under cool and cloudy or hot and humid conditions.</li> <li>Do not cut for feed or graze for 30 days after application.</li> <li>Do not apply to sudangrass or sorghum-sudangrass hybrids.</li> </ul>

## SORGHUM-SUDANGRASS HYBRIDS — POSTEMERGENCE

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<b>Annual broadleaves</b>	atrazine (commercial product)	1.2	1.5 lb 80W OR 1.2 qt 4L OR 1.3 lb 90% WDG	<ul style="list-style-type: none"> <li>● Apply after sorghum has reached the 3-leaf stage.</li> <li>● Apply before common lambsquarter and redroot pigweed reach 6 in. and other broadleaf weeds 4 in.</li> <li>● Heavy rainfall following application may cause injury.</li> <li>● Do not apply on sands or loamy sands.</li> <li>● Do not graze or cut for feed for 21 days following application.</li> <li>● Do not apply to sudangrass.</li> </ul>
	+ crop oil concentrate	+ 1 qt	+ 1 qt	
	bromoxynil ( <i>Buctril</i> )	3/8	1½ pt 2E OR ¾ pt 4E	<ul style="list-style-type: none"> <li>● Apply to weeds less than 4 in. tall for effective control.</li> <li>● Do not mix with spray additives or liquid fertilizers.</li> <li>● Redroot pigweed and mustard must be controlled when very small (refer to label for details).</li> <li>● Some leaf burn may occur, especially under cool and cloudy or hot and humid conditions.</li> <li>● Do not cut for feed or graze for 30 days after application.</li> <li>● Do not apply to sudangrass or sorghum-sudangrass hybrids.</li> </ul>



**TABLE 2 — WEED RESPONSE TO HERBICIDES IN CORN\***

	ANNUAL BROADLEAVES								ANNUAL GRASSES							PERENNIALS						
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	WILD PROSO MILLET	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDGE
<b>Preplant Incorporated</b>																						
ATRAZINE	F	F	E	E	G	E	G	F	E	G	P	F	F	G	P	P	P	P	P	F	G	F
BLADEX	F	P	E	G	F	E	G	P	G	G	G	G	G	G	F	F	F	N	N	N	N	N
DUAL	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	E
ERADICANE	P	P	G	P	F	F	F	F	F	E	E	E	E	E	E	E	G	N	N	N	G	G
ERADICANE EXTRA	P	P	G	P	F	F	F	F	F	E	E	E	E	E	E	E	G	N	N	N	G	G
GENATE + /SUTAN +	P	P	P	N	P	P	P	F	P	E	E	E	E	E	E	F	N	N	N	P	G	
LASSO	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	G
PRINCEP	G	F	E	E	E	E	G	F	E	G	F	F	F	G	P	P	P	P	P	P	F	F
<b>Preemergence</b>																						
ATRAZINE	F	F	E	E	G	E	G	F	E	G	P	F	F	G	P	P	P	P	P	F	G	F
BLADEX	F	P	E	G	F	E	G	P	G	G	F	F	G	G	F	F	F	N	N	N	N	N
DUAL	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	G
LASSO	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
PRINCEP	G	F	E	E	E	E	G	F	E	G	F	F	F	G	P	P	P	P	P	P	F	F
PROWL	N	N	G	P	F	P	P	P	P	E	E	E	E	E	E	F	N	N	N	N	N	
RAMROD	N	P	P	N	F	P	P	P	P	G	E	E	E	E	G	G	-	N	N	N	N	N
<b>Postemergence</b>																						
ATRAZINE + OIL	G	G	E	G	E	E	G	E	E	F	P	F	G	G	P	P	P	P	P	G	G	G
BANVEL	G	G	G	G	G	G	E	G	F	N	N	N	N	N	N	N	N	F	G	F	N	N
BASAGRAN + OIL	E	G	F	P	P	F	G	G	E	N	N	N	N	N	N	N	N	N	N	G	N	G
BLADEX	F	P	E	G	F	E	G	F	G	G	F	F	G	G	P	P	F	N	N	N	N	N
BUCTRIL	G	G	E	G	F	G	G	G	F	N	N	N	N	N	N	N	N	P	P	P	N	N
EVIK <sup>1</sup>	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	F	F	F	P	F
GRAMOXONE SUPER	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	P	P	P	P	P
LINEX/LOROX <sup>1</sup>	F	F	G	G	G	G	G	G	G	F	F	F	F	F	F	F	F	N	N	N	N	N
2,4-D AMINE	F	F	G	G	G	G	P	F	G	N	N	N	N	N	N	N	N	P	F	F	N	N
2,4-D ESTER	F	F	G	G	G	G	P	G	G	N	N	N	N	N	N	N	N	F	G	G	N	N
TANDEM + "TRIAZINE"	G	G	E	G	E	E	G	G	E	G	G	G	G	G	P	P	G	P	P	F	F	F

P = Poor; F = Fair; G = Good; E = Excellent; N = None

<sup>1</sup>Post Directed Only

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

# TABLE 3 — WEED RESPONSE TO HERBICIDES IN SOYBEANS\*

	ANNUAL BROADLEAVES										ANNUAL GRASSES							PERENNIALS					
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	HORSEWEED (MARESTAIL)	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	WILD PROSO MILLET	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEGE
<b>Preplant Incorporated</b>																							
AMIBEN	P	P	G	G	G	F	G	F	F	-	P	P	P	P	P	P	P	P	N	N	N	N	N
COMMAND	F	F	G	P	P	G	G	E	P	-	G	E	E	E	G	G	G	F	N	N	N	N	N
DUAL	N	N	P	F	G	P	P	N	P	-	E	E	E	E	E	G	G	F	N	N	N	N	G
LASSO	N	N	P	G	G	P	P	N	P	-	E	E	E	E	E	G	G	F	N	N	N	N	F
LEXONE/SENCOR	G	F	E	N	E	G	E	G	E	-	F	F	F	G	G	F	F	P	N	N	N	N	N
PREVIEW	E	G	E	P	E	G	E	G	E	-	F	F	F	G	G	F	F	P	N	N	N	N	F
PROWL	N	N	G	P	F	P	P	F	P	-	E	E	E	E	E	E	E	F	N	N	N	N	N
SCEPTER	E	G	G	G	E	F	G	G	G	-	F	P	G	G	G	P	P	P	N	N	N	N	F
SONALAN	N	N	G	F	G	P	P	N	P	-	E	E	E	E	E	E	E	F	N	N	N	N	N
TREFLAN	N	N	G	N	G	N	P	N	P	-	E	E	E	E	E	E	E	F	N	N	N	N	N
<b>Preemergence</b>																							
AMIBEN	P	P	G	G	E	G	G	P	F	P	F	F	F	F	F	F	F	F	N	N	N	N	N
DUAL	N	N	P	F	G	P	P	N	P	P	E	E	E	E	E	G	G	F	N	N	N	N	F
LASSO	N	N	P	G	G	P	P	N	P	P	E	E	E	E	E	G	G	F	N	N	N	N	P
LEXONE/SENCOR	F	F	E	N	E	G	E	G	E	G	F	F	F	G	G	F	F	P	N	N	N	N	N
LINEX/LOROX	P	P	G	F	G	G	G	F	G	P	F	F	F	F	F	F	F	P	N	N	N	N	N
LOROX PLUS	G	G	E	F	E	G	G	G	E	G	F	F	F	F	F	F	F	P	N	N	N	N	F
PREVIEW	G	G	E	P	E	G	E	G	E	E	F	F	F	G	G	F	F	P	N	N	N	N	F
SCEPTER	G	G	G	F	E	G	G	F	G	P	F	P	G	G	G	P	P	P	N	N	N	N	P
<b>Postemergence</b>																							
AMIBEN (Foliar Activity)	N	N	P	P	F	F	F	F	P	-	N	N	N	N	N	N	N	N	N	N	N	N	N
ASSURE	N	N	N	N	N	N	N	N	N	N	G	G	E	E	E	E	E	E	N	N	N	E	N
BASAGRAN	E	G	F	P	P	F	G	G	E	G	N	N	N	N	N	N	N	N	N	N	G	N	G
BLAZER 2L/TACKLE 2L	F	G	P	G	E	G	G	F	E	P	N	N	F	F	F	F	N	N	P	P	P	N	N
CLASSIC	E	G	N	P	E	G	G	G	E	F	N	N	P	P	P	N	N	N	N	N	N	N	G
COBRA	G	G	P	G	E	G	P	F	E	P	N	N	N	N	N	N	N	N	P	P	P	N	N
FUSILADE 2000	N	N	N	N	N	N	N	N	N	N	E	E	E	E	E	E	E	E	N	N	N	G	N
HOELON	N	N	N	N	N	N	N	N	N	N	G	G	G	G	G	G	G	G	N	N	N	N	N
POAST	N	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	E	N	N	N	F	N
SCEPTER	E	P	N	P	E	P	P	P	P	P	N	N	F	F	F	N	N	N	N	N	N	N	N

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

# TABLE 4 — WEED RESPONSE TO HERBICIDES IN FORAGES\*

	ANNUAL BROADLEAVES											ANNUAL GRASSES						PERENNIALS						
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	HOARY ALLYSUM	YELLOW ROCKET	CHICKWEED (COMMON)	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	BINDWEED (FIELD)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEGE	DANDELION
BALAN	N	N	G	N	G	N	P	N	P	P	—	—	E	E	E	E	E	E	G	N	N	N	P	N
BUCTRIL	G	G	E	G	F	G	G	G	F	—	—	P	N	N	N	N	N	N	N	P	P	N	N	P
EPTAM/GENEP	P	P	G	P	F	F	F	F	F	F	F	F	E	E	E	E	E	E	E	N	N	F	P	N
KERB	P	P	P	P	P	P	P	P	P	P	—	G	F	F	P	F	F	P	P	N	N	G	N	N
LEXONE/SENCOR	E	G	E	N	E	E	E	E	E	E	E	E	G	G	G	E	E	G	G	N	N	P	P	G
MCPA	F	F	G	G	G	G	G	F	G	G	F	P	N	N	N	N	N	N	N	P	F	N	N	P
POAST	N	N	N	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	N	N	F	N	N
SINBAR	G	G	G	G	G	G	G	G	G	G	E	E	G	G	G	G	G	G	G	P	F	F	P	F
2,4-DB	P	P	G	F	G	F	P	F	F	G	F	P	N	N	N	N	N	N	N	P	P	N	N	N
VELPAR	G	G	E	F	E	E	E	G	E	E	E	E	G	G	E	E	E	E	E	F	F	F	F	E

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

**TABLE 5 — WEED RESPONSE TO HERBICIDES  
IN DRY EDIBLE BEANS\***

	ANNUAL BROADLEAVES										ANNUAL GRASSES							PERENNIALS				
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	WILD PROSO MILLET	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDEGE
<b>Preplant Incorporated</b>																						
AMIBEN	P	P	G	G	G	F	G	F	F	P	P	P	P	P	P	P	P	N	N	N	N	N
DUAL	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	G
EPTAM/GENEP	P	P	G	P	F	F	F	F	F	E	E	E	E	E	E	F	N	N	N	F	F	
LASSO	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
TREFLAN	N	N	G	N	G	N	P	N	P	E	E	E	E	E	E	F	N	N	N	N	N	
SONALAN	N	N	G	F	G	P	P	N	P	E	E	E	E	E	E	F	N	N	N	N	N	
PROWL	N	N	G	P	F	P	P	F	P	E	E	E	E	E	E	F	N	N	N	N	N	
<b>Preemergence</b>																						
AMIBEN	P	P	G	G	E	G	G	F	F	F	F	F	F	F	F	F	N	N	N	N	N	
DUAL	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
<b>Postemergence</b>																						
BASAGRAN	E	G	F	P	P	F	G	G	E	N	N	N	N	N	N	N	N	N	G	N	G	

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

## TABLE 6—WEED RESPONSE TO HERBICIDES IN POTATOES\*

	ANNUAL BROADLEAVES									ANNUAL GRASSES							PERENNIALS					
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	WILD PROSO MILLET	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDGE
<b>Preplant Incorporated</b>																						
EPTAM/GENEP	P	P	G	P	F	F	F	F	F	E	E	E	E	E	E	E	F	N	N	N	F	F
<b>Preemergence</b>																						
DUAL	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
LEXONE/SENCOR	F	F	E	N	E	E	E	G	E	F	F	F	G	G	F	F	P	N	N	N	N	N
LINEX/LOROX	P	P	G	F	G	G	G	F	G	F	F	F	F	F	F	F	P	N	N	N	N	N
PROWL	N	N	G	P	F	P	P	F	P	E	E	E	E	E	E	E	F	N	N	N	N	N
<b>Delayed Preemergence</b>																						
LEXONE/SENCOR	F	F	E	N	E	E	E	G	E	F	F	F	G	G	F	F	P	N	N	N	N	N
LINEX/LOROX	P	P	G	F	G	G	G	F	G	F	F	F	F	F	F	F	P	N	N	N	N	N
<b>Postemergence</b>																						
LEXONE/SENCOR	G	F	E	N	E	E	E	G	E	F	F	F	F	F	F	F	P	N	N	N	N	N
POAST	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	E	N	N	N	F	N

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

## TABLE 7—WEED RESPONSE TO HERBICIDES IN SMALL GRAINS\*

	ANNUAL BROADLEAVES												ANNUAL GRASSES	PERENNIALS						
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE	PIGWEEED	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	HOARY ALLYSUM	YELLOW ROCKET	CHICKWEED (COMMON)		MAYWEED (DOGFENNEL)	BINDWEED (FIELD)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDGE	WILD GARLIC	WILD ONION
BANVEL	G	G	G	G	G	G	E	G	F	G	G	G	F	N	F	F	N	N	F	F
BUCTRIL	G	G	E	G	F	G	G	G	F	-	-	P	F	N	P	P	N	N	N	N
HARMONY	-	-	E	-	E	F	E	-	E	-	-	F	E	N	-	P	N	-	G	F
MCPA	F	F	G	G	G	G	P	F	G	G	G	P	P	N	P	F	N	N	P	P
2,4-D AMINE	F	F	G	G	G	G	P	F	G	G	G	P	P	N	P	F	N	N	P	P
2,4-D ESTER	F	F	G	G	G	G	P	G	G	G	G	P	P	N	F	G	N	N	F	F

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

**TABLE 8 – WEED RESPONSE TO HERBICIDES IN SUGAR BEETS\***

	ANNUAL BROADLEAVES									ANNUAL GRASSES						PERENNIALS					
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDGE
<b>Preplant Incorporated</b>																					
ANTOR	N	N	P	F	F	P	P	N	P	G	G	G	G	G	G	G	N	N	N	N	G
RO-NEET	P	P	F	P	F	F	P	F	P	G	G	G	G	G	G	G	N	N	N	F	G
<b>Preemergence</b>																					
ANTOR	N	N	P	F	F	P	P	N	P	G	G	G	G	G	G	G	N	N	N	N	F
NORTRON	F	F	G	G	G	P	G	P	G	P	G	P	F	F	P	P	N	N	N	N	F
PYRAMIN	P	P	E	G	G	G	G	P	G	F	F	F	F	F	F	F	N	N	N	N	N
<b>Postemergence</b>																					
BETAMIX	F	F	E	F	F	G	G	P	G	P	P	P	F	F	P	P	N	N	N	N	N
BETANEX	F	F	G	F	G	F	G	P	G	P	P	P	P	P	P	P	N	N	N	N	N
H273	P	P	P	P	P	P	E	P	P	N	N	N	N	N	N	N	N	N	P	N	N
NORTRON	F	F	G	G	G	P	G	P	G	P	G	P	F	F	P	P	N	N	N	N	P
POAST	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	N	N	N	F	N
PYRAMIN	P	P	F	F	F	F	F	P	F	P	P	P	P	P	P	P	N	N	N	N	N
STINGER	E	E	P	P	P	G	P	P	P	N	N	N	N	N	N	N	P	P	G	P	N

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

**TABLE 9 – WEED RESPONSE TO MISCELLANEOUS AND NON-SELECTIVE HERBICIDES\***

	ANNUAL BROADLEAVES									ANNUAL GRASSES						PERENNIALS					
	COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (BLACK)	PIGWEEED (REDROOT)	RAGWEED	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	WILD PROSO MILLET	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS
GRAMOXONE SUPER	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
RANGER	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
ROUNDUP	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

P = Poor; F = Fair; G = Good; E = Excellent; N = None

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

## TABLE 10 — GLOSSARY OF CHEMICAL NAMES

COMMON NAME	TRADE NAME* AND (MANUFACTURER)	CONCENTRATION AND COMMERCIAL FORMULATION†
ACIFLUORFEN	BLAZER 2L (BASF) TACKLE 2L (Rhone-Poulenc)	2 lb/gal L
ALACHLOR	LASSO (Monsanto) MICRO-TECH LASSO, ARENA (Monsanto)	4 lb/gal L; 15% G 4 lb/gal L
ALACHLOR + GLYPHOSATE	BRONCO (Monsanto)	3.6 lb/gal L (2.6 + 1)
AMETRYNE	EVIK (Ciba-Geigy)	80% WP
ATRAZINE	Several (various)	80% WP; 4 lb/gal L; 90% WDG
ATRAZINE + ALACHLOR	LARIAT (Monsanto)	4 lb/gal L (1.5 + 2.5)
ATRAZINE + BENTAZON	LADDOK (BASF)	3.3 lb/gal L (1.7 + 1.7)
ATRAZINE + BROMOXYNIL	BUCTRIL-ATRAZINE (Rhone-Poulenc)	3 lb/gal L (2 + 1)
ATRAZINE + BUTYLATE + R-25788	SUTAZINE (ICI) RHINO (PPG)	6 lb/gal L (1.2 + 4.8), 24 G (6 + 18) 6 lb/gal L (1.7 + 4.3)
ATRAZINE + CYANAZINE	EXTRAZINE II (DuPont)	4 lb/gal L (1 + 3), 90% DF (21.4 + 67.5)
ATRAZINE + DICAMBA	MARKSMAN (Sandoz)	3.2 lb/gal L (2.1 + 1.1)
ATRAZINE + METOLACHLOR	BICEP (Ciba-Geigy)	4.5 lb/gal L (2 + 2.5), 6.0 lb/gal L (2.7 + 3.3)
ATRAZINE + PENDIMETHALIN	PROZINE (American Cyanamid)	70% DF (35 + 35)
BENEFIN	BALAN (Elanco)	1½ lb/gal L, 60% DF
BENTAZON	BASAGRAN (BASF)	4 lb/gal L
BROMOXYNIL	BUCTRIL (Rhone-Poulenc)	2 lb/gal L, 4 lb/gal L
BUTYLATE + R-25788	SUTAN PLUS (ICI) GENATE PLUS (PPG)	6.7 lb/gal L; 10% G 6.7 lb/gal L
CHLORAMBEN	AMIBEN (Rhone-Poulenc)	10% G; 2 lb/gal L; 75% DS
CHLORIMURON ETHYL	CLASSIC (DuPont)	25% DF
CLOMAZONE	COMMAND (FMC)	4 lb/gal L
CLOMAZONE + TRIFLURALIN	COMMENCE (Elanco/FMC)	5.25 lb/gal L (2.25 + 3)
CLOPYRALID	STINGER (Dow)	3 lb/gal L
CYANAZINE	BLADEX (DuPont)	80% WP; 4L; 90% DF
CYCLOATE	RO-NEET (ICI)	6 lb/gal L; 10% G
DALAPON	DOWPON M (Vertac)	74% WSP
DESMEDIPHAM	BETANEX (Nor-Am)	1.3 lb/gal L
DESMEDIPHAM + PHENMEDIPHAM	BETAMIX (Nor-Am)	1.3 lb/gal L (0.65 + 0.65)
DICAMBA	BANVEL (Sandoz)	4 lb/gal L
DICLOFOP	HOELON (Hoechst-Roussel)	3 lb/gal L
DIETHATYL ETHYL	ANTOR (Nor-Am)	4 lb/gal L
DIQUAT	ORTHO DIQUAT (Chevron)	2 lb/gal L
DPX-M6316	HARMONY (DuPont)	75% DF
ENDOTHALL	HERBICIDE 273 (Pennwalt)	3 lb/gal L
EPTC	EPTAM (ICI) GENEP (PPG)	7 lb/gal L; 10% G 7 lb/gal L
EPTC + R-25788	ERADICANE (ICI)	6.7 lb/gal L
EPTC + R-25788 + R-33865	ERADICANE EXTRA (ICI)	6 lb/gal L
ETHALFLURALIN	SONALAN (Elanco)	3 lb/gal L
ETHOFLUMESATE	NORTRON (Nor-Am)	1½ lb/gal L
FLUAZIFOP-P-BUTYL	FUSILADE 2000 (ICI)	1 lb/gal L
GLYPHOSATE	RANGER (Monsanto) ROUNDUP (Monsanto)	2 lb/gal L 3 lb/gal L
HEXAZINONE	VELPAR (DuPont)	2 lb/gal L; 90% WP

*(Continued next page)*

\*"Several" means there are numerous trade names for the chemical. The mention of trade names does not imply that they are endorsed or recommended over those of similar nature not listed.

†DF—dry flowable, DS—dry soluble granule, G—granular, L—liquid, WDG—water dispersible granule, WP—wetttable powder.

## TABLE 10 — GLOSSARY OF CHEMICAL NAMES (continued)

COMMON NAME	TRADE NAME* AND (MANUFACTURER)	CONCENTRATION AND COMMERCIAL FORMULATION†
IMAZAQUIN	SCEPTER (American Cyanamid)	1.5 lb/gal L
LACTOFEN	COBRA (PPG)	2 lb/gal L
LINURON	LOROX (DuPont)	50% WP; 4 lb/gal L; 50% DF
	LINEX (Griffin)	4 lb/gal L
LINURON + CHLORIMURON ETHYL	LOROX PLUS (DuPont)	60% DG (56.9 + 3.1)
MCPA	Several (various)	Various L
METOLACHLOR	DUAL (Ciba-Geigy)	8 lb/gal L; 25% G
METRIBUZIN	LEXONE (DuPont)	50% WP; 75% DF; 4 lb/gal L
	SENCOR (Mobay)	50% WP; 75% DF; 4 lb/gal L
METRIBUZIN + CHLORIMURON ETHYL	PREVIEW (DuPont)	75% DG (68.5 + 6.5)
METRIBUZIN + METOLACHLOR	TURBO (Mobay)	8 lb/gal L (1.45 + 6.55)
METRIBUZIN + TRIFLURALIN	SALUTE (Mobay)	4 lb/gal L (1.33 + 2.67)
PARAQUAT	GRAMOXONE SUPER (ICI)	1.5 lb/gal L
PENDIMETHALIN	PROWL (American Cyanamid)	4 lb/gal L
PENDIMETHALIN + IMAZAQUIN	SQUADRON (American Cyanamid)	2.33 lb/gal L; (2.0 + 0.33)
PRONAMIDE	KERB (Rhom and Haas)	50% WP (in soluble pouches)
PROPACHLOR	RAMROD (Monsanto)	4 lb/gal L; 65% WP; 20% G
PYRAZON	PYRAMIN (BASF)	80% WP; 4 lb/gal L
QUIZALOFOP	ASSURE (DuPont)	0.8 lb/gal L
SETHOXYDIM	POAST (BASF)	1.53 lb/gal L
SIMAZINE	PRINCEP (Ciba-Geigy)	4 lb/gal L; 80% WP; 4% G; 90% WDG
TERBACIL	SINBAR (DuPont)	80% WP
TRIDIPHANE	TANDEM (Dow)	4 lb/gal L
TRIFLURALIN	TREFLAN (Elanco)	4 lb/gal L; 10% G
TRIFLURALIN + IMAZAQUIN	TRI-SCEPT (American Cyanamid)	3 lb/gal L (2.57 + 0.43)
2,4-D	Several (various)	various
2,4-DB	BUTYRAC (Union Carbide)	2 lb/gal L
	BUTOXONE (Vertac)	2 lb/gal L

\*"Several" means there are numerous trade names for the chemical. The mention of trade names does not imply that they are endorsed or recommended over those of similar nature not listed.

†DF—dry flowable, DS—dry soluble granule, G—granular, L—liquid, WDG—water dispersible granule, WP—wetable powder.



## TABLE 11 — HERBICIDE PREMIXES

TRADE NAME	COMPANY	FORMULATION	FORMULATION EQUIVALENTS*	TYPICAL USE RATE = EQUIVALENT RATES
<b>CORN HERBICIDES</b>				
Bicep	Ciba-Geigy	4L	1.25 qt Dual + 2 qt Atrazine 4L	3.2 qts/Acre = 1 qt Dual + 1.6 qt Atrazine 4L
Bicep 6L	Ciba-Geigy	6L	1.68 qt Dual + 2.68 qt Atrazine 4L	2.4 qts/Acre = 1 qt Dual + 1.6 qt Atrazine 4L
Bronco	Monsanto	4L	2.6 qt Lasso + 1.4 qt Roundup	4 qt/Acre = 2.6 qt Lasso + 1.4 qt Roundup
Buctril + Atrazine	Rhone-Poulenc	3L	2 qt Buctril 2E + 2 qt Atrazine 4L	1 qt/Acre = 0.5 qt Buctril 2E + 0.5 qt Atrazine 4L
Extrazine II DF	DuPont	90% DF	.75 lb Bladex 90 DF + .25 lb Atrazine 90	2.2 lbs/Acre = 1.65 lb Bladex 90 DF + 0.55 lb Atrazine 90
Extrazine II 4L	DuPont	4L	3 qt Bladex 4L + 1 qt Atrazine 4L	2 qts/Acre = 1.5 qt Bladex 4L + 0.5 qt Atrazine 4L
Laddok	BASF	3.3L	1.65 qt Basagran + 1.65 qt Atrazine 4L	3.5 pts/Acre = 0.72 qt Basagran + 0.72 qt Atrazine 4L
Lariat	Monsanto	4L	2.48 qt Lasso + 1.52 qt Atrazine 4L	3qts/Acre = 1.86 qt Lasso + 1.14 qt Atrazine 4L
Marksman	Sandoz	3.2L	1.12 qt Banvel + 2.12 qt Atrazine 4L	3.5 pts/Acre = 1 pt Banvel + 1 qt Atrazine 4L
Prozine	American Cyanimid	70% DF	.67 pt Prowl 4E + .39 lb Atrazine 90	3 lbs/Acre = 1 qt Prowl + 1.2 lbs Atrazine 90
Rhino	PPG	6L	2.56 qt Genate Plus + 1.72 qt Atrazine 4L	3.5 qts/Acre = 2.25 qt Genate Plus + 1.5 qt Atrazine 4L
Sutazine	ICI	6L	2.88 qt Sutan Plus + 1.2 qt Atrazine 4L	3.5 qts/Acre = 2.5 qt Sutan Plus + 1 qt Atrazine 4L
<b>SOYBEAN HERBICIDES</b>				
Commence	FMC/ELANCO	5.25	6 pt Treflan + 4.4 pt Command	2 pt/Acre = 1½ pt Treflan + 1.1 pt Command
Galaxy	BASF	3.67	6 pt Basagran + 2.6 pt Blazer	2 pt/Acre = 1½ pt Basagran + ¾ pt Blazer
Salute	Mobay	4.0	5.3 pt Treflan + 2.7 pt Sencor	2¼ pt/Acre = 1½ pt Treflan + ¾ pt Sencor
Storm	BASF	4.0	5.3 pt Basagran + 5.3 pt Blazer	1½ pt/Acre = 1 pt Basagran + 1 pt Blazer
Squadron	American Cyanamid	2.33	4 pt Prowl + 1.75 pt Scepter	3 pt/Acre = 1½ pt Prowl + ¾ pt Scepter
Tri-Scept	American Cyanamid	3.0	5.2 pt Treflan + 2.3 pt Scepter	2⅓ pt/Acre = 1½ pt Treflan + ¾ pt Scepter
Turbo	Mobay	8.0	6.6 pt Dual + 3 pt Sencor	2 pt/Acre = 1⅓ pt Dual + ¾ pt Sencor

\*For Formulation Equivalents, dry flowable formulations are given in lbs or pts per lb of premix, and liquid formulations are given in pts or qts per gallon of premix.

## TABLE 12 – SOYBEAN HERBICIDE

	CROP ROTATION RESTRICTIONS											
	SOIL pH RESTRICTION	SOYBEANS	FIELD CORN	SEED CORN	WHEAT	OATS	BARLEY	RYE	ALFALFA	DRY BEANS	SUGAR BEETS	POTATOES
Command 1½ pt	<6.0	0	9	9	12	16	16	16	16	9	9	9
2 pt	<6.0	0	9	12	12	16	16	16	16	9	9	9
Scepter <sup>b</sup> ⅓ pt	None	0	11	11	4	4	4	4	18	11	18	18
⅔ pt	None	0	18	18	16	16	16	16	18	11	18	18
Preview	>6.8	0	10	**	4	**	4	**	10 <sup>a</sup>	12	**	**
Lorox Plus	>6.8	0	10	**	4	4	4	4	**	**	**	**
Classic <sup>c</sup>	>6.8	0	9	*	3	3	3	3	9	9	**	**

<sup>aa</sup>12 months on clover.

<sup>b</sup>Extension of recrop intervals of *Scepter* application following *Preview* or *Lorox Plus*.

<sup>c</sup>Extension of recrop intervals following *Scepter*, *Lorox Plus*, or *Preview*.

\*Field bioassay after 9 months.

\*\*Field bioassay after 18 months.

**TABLE 13 — TOXICITY, SOLUBILITY, ADSORPTIVITY, AND PERSISTENCE OF HERBICIDES (continued)**

HERBICIDE	TOXICITY mg/kg (acute oral LD50)	WATER SOLUBILITY (ppm at 25°C)	ADSORPTIVITY TO SOIL	SOIL PERSISTENCE AT STANDARD RATE (months)
Amiben	3,500	700	weak	1.5-2
Antor	2,318	105	moderate	1-2.5
Assure	1,480	<1	moderate	½
Atrazine	3,080	33	strong	2-8
Balan	5,000	1	v. strong	4-5
Banvel	1,030	4500	weak	1-6
Basagran	1,100	500	weak	½
Betamix	*	1	moderate	1
Betanex	3,720	7	moderate	1
Bladex	335	171	strong	2-3
Blazer/Tackle	3,330	infinite	strong	1
Buctril	440	130	*	*
Classic	5,000+	300	strong	1-10
Cobra	2,533	*	*	*
Command	2,340	1100	v. strong	3-6
2,4-D	500	900	weak	1
2,4-DB	1,960	insoluble	weak	1
Diquat	230	infinite	v. strong	*
Dowpon	7,570	110	v. weak	*
Dual	2,534	530	strong	1-3
Eptam/Genap	1,650	370	strong	1.5-2
Eradicane	1,370	370	strong	1.5-2
Evik	1,750	185	v. strong	1-3
Fusilade 2000	4,830	2	moderate	¼
Gramoxone Super	120	infinite	v. strong	1
Harmony	5,000+	2,400	*	¼
Herbicide 273	200	100,000	*	*
Hoelon	580	3000	strong	½
Kerb	5,620	15	strong	2-9
Lasso	1,200	242	strong	1-2
Lexone/Sencor	1,950	1200	moderate	2-4
Lorox/Linex	1,500	75	v. strong	2-4
Lorox Plus	2,300	*	v. strong	1-10
MCPA	800	insoluble	v. weak	1-4
Nortron	6,400	110	strong	1-4
Poast	2,676	48	moderate	¼
Preview	1,500	*	v. strong	1-10
Princep	5,000	5	strong	2-8
Prowl	3,380	<1	v. strong	3-6
Pyramin	3,600	1	strong	1-2
Ramrod	4,700	700	moderate	1-1.5
Roneet	3,160	85	strong	1-3
Roundup	5,000+	infinite	v. strong	1
Scepter	5,000+	60	moderate	2-8
Sinbar	5,000+	710	moderate	5-6
Sonalan	10,000	1	v. strong	3-5
Stinger	5,000+	1000	moderate	1-10
Suton+/Genate	3,880	45	v. strong	1.5-2
Tandem	2,882	2	moderate	1-2
Treflan	3,700	<1	v. strong	3-6
Velpar	1,690	33,000	strong	4-6
(Table Salt)	3,320	360,000	—	—
(Aspirin)	1,200	2,500	—	—

\*-No information available.

Sources: numerous including *Herbicide handbook*, 1988 *Herbicide Manual for Ag Chem. Dealers* Iowa State, *U of Illinois Custom Spray Operation Training Manual* 1979, 1987 *Illinois Pest Control*



# PESTICIDE EMERGENCY INFORMATION



*(Please post in an appropriate place)*

*For any type of emergency involving a pesticide, the following Emergency Information Centers should be contacted immediately for assistance. This Cooperative Extension Service Bulletin is the latest information available as of July 1988, and replaces all previous listings of similar information.*

## **HUMAN PESTICIDE POISONING**

### **Eastern Half of Michigan**

*within the Detroit City proper*

**\*(313) 745-5711**

*within the 313 area code*

**\*1-800-462-6642**

*Poison Control Center  
Children's Hospital of Michigan  
3901 Beaubien  
Detroit, MI 48201*

### **Western Half of Michigan**

*within the Grand Rapids City proper*

**\*(616) 774-7854**

*statewide*

**\*1-800-632-2727**

*Blodgett Regional Poison Center  
Blodgett Memorial Medical Center  
1840 Wealthy, S.E.  
Grand Rapids, MI 46506*

### **Upper Peninsula of Michigan**

*within the Marquette City proper*

**\*(906) 225-3497**

*Upper Peninsula only*

**\*1-800-562-9781**

*U.P. Poison Control Center  
Marquette General Hospital  
420 West Magnetic Street  
Marquette, MI 48955*

## **SPECIAL PESTICIDE EMERGENCIES**

### **Animal Poisoning**

Your Personal Veterinarian

( ) -

and/or

Animal Health Diagnostic Laboratory, Michigan State University

**(517) 353-1683**

### **Pesticide Fire**

Local Fire Department

( ) -

and

Fire Marshal Division, Michigan State Police

**(517) 322-1924**

### **Traffic Accident**

Local Police Department or Sheriff's Department

( ) -

and

Operations Division, Michigan State Police

**\*(517) 337-6102**

### **Environmental Pollution**

Pollution Emergency Alerting System (PEAS)

Michigan Department of Natural Resources

**\*1-800-292-4706**

toll free for environmental emergencies

Michigan Department of Natural Resources

Waste Management Division

**(517) 373-2730**

for information on pesticide disposal and local pick-up days

Pesticides & Plant Pest Management Division

Michigan Department of Agriculture

**(517) 373-1087**

**\* Telephone Number Operated 24 Hours**



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