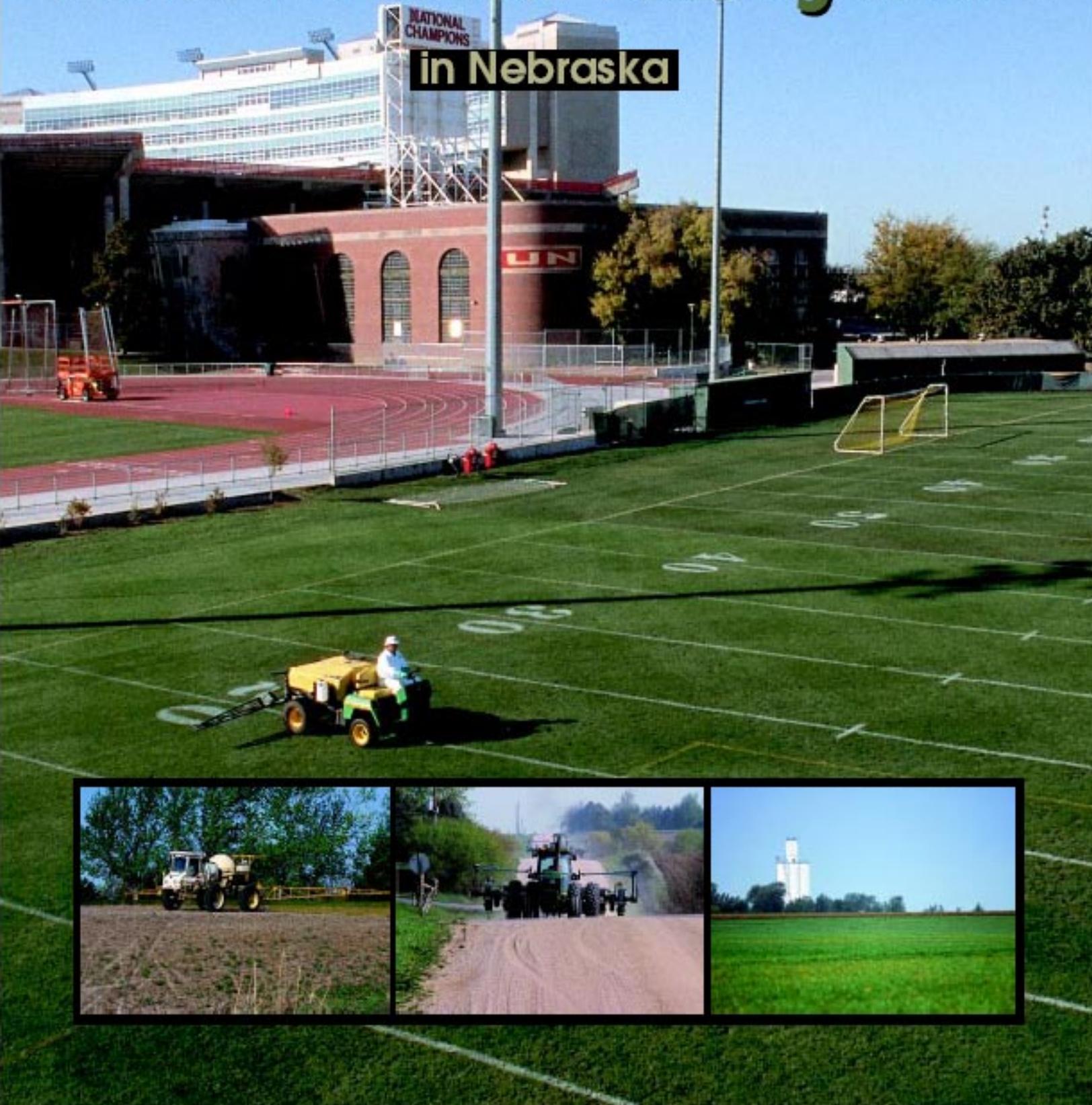
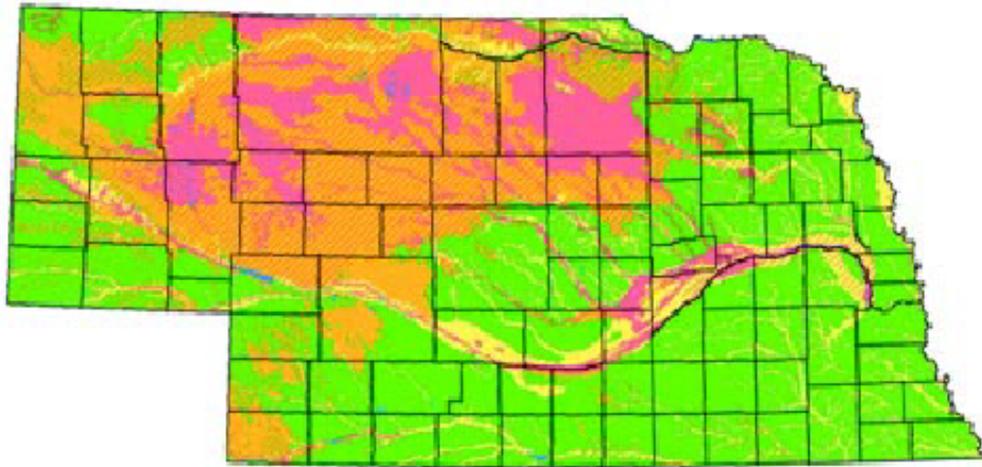


2003

Guide for Weed Management

in Nebraska





- Slight
- Slight (moderate in sandy areas)
- Slight (moderate in areas with water table near surface)
- Moderate (slight in areas with clayey, silty or loamy soils)
- Moderate
- Moderate
- Moderate (high in areas with water table near surface)
- Moderate (high in sandy areas)
- High
- Water

Groundwater Vulnerability to Pesticides in Nebraska

Users of pesticides and other agricultural chemicals must take appropriate precautions to reduce the risks of moving these materials into ground or surface water. The primary consideration should be whether the chemical is needed. If a pesticide is needed, the characteristics of the chemical, the sensitivity of the application site and the application method should be considered. The simplest way to minimize the potential for pesticide movement into water is to reduce pesticide use. This can be accomplished by using recommended **Best Management Practices** to minimize pest populations and reduce the need to use pesticides, thus protecting water resources. If pesticides are to be used, proper handling and application according to label instructions is essential. Select an effective pesticide for the intended use and, where possible, use a pesticide with lower human and environmental risk.

This circular deals principally with herbicides as an aid for crop production. The suggestions for use are based on results at Nebraska research centers and elsewhere. Consult product labels for additional information. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by Cooperative Extension is implied.

What's New in the 2003 Weed Management Guide

Several notable changes were made in this year's *Guide for Weed Management in Nebraska*, as noted below. Once again we are featuring a full-color durable cover. As always, there is much more to this guide than the cover. Existing material has been updated with the latest research-based information. In addition, several new features outlined below expand on information previously available in the guide as well as some information for new audiences. Hopefully you will find that these revisions are useful and make the guide even more valuable than the previous edition.

Each year we strive to make improvements in this publication to make it more informative and easier to use. An evaluation form is included so you can tell us what information you use most and share any suggestions for future editions. After you've had a chance to adequately use this guide, please tear out and complete the evaluation, then fold, tape and mail it back, postage-paid by us. Please mail your suggestions as soon as you can fully evaluate the guide. Suggestions received by Aug. 31, 2003 may be incorporated into the *2004 Guide for Weed Management in Nebraska*.

Additions and improvements to the 2003 Nebraska Weed Management Guide:

- ❖ A *Commercial Turfgrass Weed Control* section for turf professionals. *See page 77-78.*
- ❖ An updated *Glyphosate Comparison Table* contrasts many of the common glyphosate herbicides registered for Roundup Ready[®] corn and soybeans. *See page 117.*
- ❖ The *Pesticide Groundwater Vulnerability* map on the inside front cover has been updated to include county lines.
- ❖ The updated *Herbicide Dictionary*. *See page 121.*
- ❖ Restricted use pesticides, now indicated in dictionary entries and listed on *page 140.*
- ❖ *Forage Feed and Grazing* restrictions, see *page 111.*
- ❖ *Noxious Weeds*, see *page 88.*
- ❖ *NDA Watch Weeds*, see *inside back cover.*
- ❖ *Description of Individual Plant Treatment Techniques*, see *page 87.*
- ❖ More *weights and conversion information*, see *page 102-103.*

For the latest and most up-to-date version of the Weed Management Guide go to our Web site:

<http://weedscience.unl.edu/weedguide/>

University of Nebraska Weed Science Contacts and Authors

Steve D. Comfort
Soil Environmental Chemist
School of Natural Resource Sciences
Lincoln ñ 402-472-1502
scomfort1@unl.edu

Roch E. Gaussoin
Extension Turfgrass Specialist
Department of Agronomy and Horticulture
Lincoln ñ 402-472-8619
rgaussoin1@unl.edu

Brady F. Kappler
Extension Educator ñ Weed Science
Department of Agronomy and Horticulture
Lincoln ñ 402-472-1544
bkappler1@unl.edu

Robert N. Klein
Extension Cropping Systems Specialist
West Central Research and Extension Center
North Platte ñ 308-532-3611 ext.144
rklein1@unl.edu

Steve Z. Knezevic
Extension Integrated Weed Management Specialist
Concord ñ 402-584-2808
sknezevic2@unl.edu

Drew J. Lyon
Extension Dryland Cropping Systems Specialist
Panhandle Research and Extension Center
Scottsbluff ñ 308-632-1266
dlyon1@unl.edu

Alex R. Martin
Extension Weed Specialist
Department of Agronomy and Horticulture
Lincoln ñ 402-472-1527
amartin2@unl.edu

Robert A. Masters
Adjunct Rangeland Scientist
Department of Agronomy and Horticulture
University of Nebraska-Lincoln
Dow Agrosiences

Fred W. Roeth
Extension Weed Specialist
South Central Research and Extension Center
Clay Center ñ 402-762-3535
froeth1@unl.edu

Larry D. Schulze
Extension Pesticide Coordinator
Lincoln ñ 402-472-1632
lschulze1@unl.edu

Patrick J. Shea
Environmental Chemist
School of Natural Resource Sciences
Lincoln ñ 402-472-1533
pshea1@unl.edu

Gail A. Wicks
Extension Weed Specialist
West Central Research and Extension Center
North Platte ñ 308-532-3611 ext. 151
gwicks1@unl.edu

Robert G. Wilson
Extension Weed Specialist
Panhandle Research and Extension Center
Scottsbluff ñ 308-632-1263
rwilson1@unl.edu

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Herbicide Applications

Soil Applied

Early preplant (EPP) treatments are made 10-30 days before planting. **Preplant surface applied** (PPSA) treatments are made 0-10 days before planting. Soil disturbance by some planters may allow weed growth in rows where herbicides are applied PPSA or EPP. **Preplant incorporated** (PPI) treatments are made before planting the crop. Thoroughly incorporate with rototiller or two angled passes of a tandem disk, field cultivator or similar equipment. **Preemergence** (PRE) treatments are applied from planting time to just before crop emergence or weed seed germination. **Surface mix** (SM) is the shallow mixing of a PRE herbicide into the top 1 to 2 inches of soil using a rototiller, mulch treader, field cultivator or similar implement. Weed control with PRE treatments may

be poor if there is no rain to move the herbicide into the top inch of soil. Rainfall required for activation is generally 1/4 to 1/2 inch on coarse-textured soils and 1/2 to 1 inch on fine-textured soils. To overcome dependence on rainfall and to increase dependability, some PRE herbicides may be incorporated into the surface soil with a rotary hoe. Excessive rainfall may leach some of the more soluble herbicides into the subsoil, especially on sandy soils. Weed control with preplant herbicides is more satisfactory on surface-planted crops. Some weed species are resistant to particular herbicides. Herbicides and crops should be rotated to control a wider spectrum of weeds and to reduce the risk of herbicide carryover.

Postemergence

Early post emergence (EPOST) refers to herbicide applications made soon after the crop has emerged; control of late emerging weeds may be reduced. **Postemergence** (POST) treatments are applied after emergence of weeds or crop. **Directed** POST treatments are made to the lower portion of the crop plant.

Layby treatments are applied at last cultivation to provide an extended period of weed control.

Harvest aid treatments are applied late in the growing season to reduce weed seed production and make harvest easier.

Desiccants are applied after crop maturity to hasten drying and permit earlier harvest.

Excellent growing conditions make weeds more susceptible to POST

herbicides. Likewise, crops may be more subject to herbicide damage when growing rapidly. **Adjust herbicide and additive dosages downward** when excellent conditions for growth are present the week before application and **upward** when ideal growth is limited by one or more factors. Rate of carrier should be in accordance with label recommendations.

Mid postemergence (MPOST) refers to herbicide applications made approximately four weeks after the crop has emerged. Weeds may be 3-5 inches tall.

Late postemergence (LPOST) refers to herbicide applications made approximately six or more weeks after crop emergence. It may be combined with EPOST to provide longer weed control. If it is the only treatment, weeds are usually over 6 inches tall and control may be reduced.

Application Pointers

One component of good herbicide performance is proper application of the correct amount. Equipment must be calibrated properly before spraying. For new sprayers, flush the entire system with water before installing screens and tips.

The amount of solution applied per acre depends on the forward speed, spacing of the tips, and output of the tip which is dependent upon the size of the tip and pressure. A change in any one of these will change the rate of application. To calibrate a sprayer refer to NebGuide G88-865, **Fine Tuning a Sprayer With the Ounce Calibration Method**. Also, remember if spraying with any material other than water as the carrier, the output will be affected. This NebGuide also contains information on using fertilizers as carriers.

The selection of tips is an important criteria in herbicide application. The tip type, orifice size, boom height, pressure, ground or air speed, and wind all greatly affect drift potential and damage to nearby crops. These same criteria affect the coverage of the herbicide on the plants or soil surface. In general, flat-fan tips have given the most satisfactory results. Nozzles placed on 30-inch spacing with the height and angle adjusted for 100% overlap give uniform coverage. Do not angle any tip greater than 30° from vertical as the drift potential greatly increases.

For floaters and sprayers with booms greater than 36 inches in height, 80° flat-fan tips are recommended. For lower boom heights, 110° tips usually are recommended. The 110° tips are needed with the lower boom height to maintain 100% overlap. Also, the 110° tips yield smaller particle size, allowing lower pressures while maintaining good plant coverage and reducing the drift prone fines that occur with higher pressures. For farmer application with the lower boom heights and 110° tips, the low pressure (LP) or extended range (XR) tips are recommended. The XR and LP tips give good patterns at pressures from 15 to 40 psi and allow for reduced pressures without the pattern distortion that may occur with other tips. These tips, which maintain patterns over a wide range of pressure, work well with monitors with rate controllers. On the higher booms the 80° tips are recommended because of the difficulty in

maintaining a good pattern with the 110° tips on the higher boom heights. To get the particle sizes needed for good coverage with POST herbicides, the pressure needs to be 35 to 40 psi with the 80° tips and, therefore, the extended range or low pressure tips, are probably not as useful.

For banding PRE herbicides, even-flow flat fan tips are recommended.

For banding POST herbicides a three-tip setup over the row with cone tips gives the best pattern. The next best selection probably would be the even flat fan tip. When the crop is taller than 4 inches, the center tip should be removed to minimize crop injury. Higher pressures are normally needed for the POST herbicides, especially where good coverage is important. For additional information on tips see NebGuide G89-955, **Nozzle Selection and Sizing**.

A few pointers on herbicide application are listed below:

1. It is not recommended to use any tip that requires smaller than a 50 mesh screen in order to reduce tip plugging.
2. Buy quality tips. Stainless steel, stainless steel inserts in nylon tips, polyacetal, and ceramic tips are the most economical in the long run.
3. Use a special tip cleaning brush. Keep pocket knives, paper clips, and wire away from the tips as they will distort the pattern and also change the flow rate of the tip. Also check the sprayer with water to make sure that the tips are not plugged and fittings and hoses do not leak before adding any herbicide.
4. Use strainers before the pump and before the flow control system along with tip screens.
5. Use a diaphragm check valve or other sprayer items to give instant on and instant off control to eliminate drip and delay when the boom is turned on and off.

Reducing Drift

It is estimated that two-thirds of the drift problems involve mistakes which could have been avoided. Drift is of concern because it takes the pesticide from the intended target, making it less effective, and deposits it where it is not needed and not wanted. The pesticide then becomes an environmental pollutant in the off-target areas where it can injure susceptible vegetation, contaminate water or damage wildlife. Drift cannot be completely eliminated but the use of proper equipment and application procedures will maintain the drift deposits within acceptable limits.

There are two kinds of drift:

Particle drift is off-target movement of the spray particles.

Vapor drift is the volatilization of the pesticide molecules and their movement off target.

A Mississippi State University study analyzed data from more than 100 studies involving drift from ground sprayers. Of the 16 variables considered, three were most important.

1. Wind speed. When the wind speed was doubled, there was almost a 700% increase in drift when the readings were taken 90 feet downwind from the sprayer. Hence the recommendations of spraying in 10 mph wind or less.

2. Boom height. When the boom height was increased from 18 to 36 inches, the amount of drift increased 350% at 90 feet downwind.

3. Distance downwind. If the distance downwind is doubled, the

amount of drift decreases five-fold. Therefore, if the distance downwind goes from 100 to 200 feet, you have only 20% as much drift at 200 feet as at 100 feet and if the distance goes to 400 feet, you only have 4% of the drift you had at 100 feet. Check wind direction and speed when starting to spray a field. You may want to start spraying one side of the field when the wind is lower. Also it may be necessary to only spray part of a field because of wind speed, wind direction, and distance to susceptible vegetation. The rest of the field can be sprayed when conditions change.

New types of tips reduce drift. Also, spray pressure is important. Higher spray pressures produce smaller droplets which are more susceptible to drift. If using a rate controller, be careful of increased speed. Since most rate controllers increase the pressure to maintain the same gpa, when the speed increases, try to maintain the speed within $\pm 10\%$. For example, if you're applying 20 gpa at 8 mph at 40 psi and you increase the speed to 11 mph, the pressure will now be 75.5 psi which will produce a lot of small particles prone to drift and also the pressure will be above the operating range of most tips. Drift reduction agents are helpful.

Monsanto has published a guide and a video on on-target herbicide application. Included is information on spray particle sizes, tip selection, spray pressure, factors affecting drift and how to control it.

Conservation Tillage Systems

No-Till

Early preplant treatments generally provide the most satisfactory weed control. This involves applying residual herbicides 10 to 30 days prior to planting. The objective is to apply the herbicide prior to the germination of summer annual weeds, especially grasses. This may eliminate the need for a nonselective herbicide like Gramoxone Max or glyphosate. It is important to use treatments with adequate residual control. A split herbicide application with a portion applied early preplant and a second portion at planting can be used. This could be helpful with short residual materials or where heavy rains or delayed planting occurs following the first treatment. Properly designed early preplant treatments often can provide consistent weed control at lower cost than planting time treatments. Soil disturbance by a planter following a preplant treatment may allow weed growth in the row.

Planting time treatments of a PRE herbicide are made at or immediately after planting. When established weeds are present, a POST herbicide is combined with the PRE herbicide. Atrazine, Canopy, Preview, Pursuit Plus, glyphosate, Gramoxone Max, FallowMaster, or Landmaster BW will control established broadleaf weeds, grasses or volunteer wheat depending on plant height, density, growing conditions, weed, herbicide, and rate. Control is improved when crop oil concentrate or 28% UAN is added. In corn or soybean, 2,4-D ester also may be added for improved weed control. Gramoxone Max can be applied to grasses less than 4 inches tall. If grasses are taller than 4 inches and are growing vigorously, apply glyphosate at 16 oz/A. Kill volunteer wheat and winter annual weeds in April to prevent soil moisture loss.

Ridge-Till

With the ridge plant system, the row has fewer summer annual weeds because the weed seed produced the preceding year is not worked into the soil when the seedbed is prepared. During planting, the ridge clearing device, sweeps or disks, move soil containing corn kernels and ears, sorghum seed and/or heads, and most weed seed from the ridge. A banded herbicide treatment should be used at planting time in the row. If timely cultivation is not possible, weed density is heavy, or the field contains many hard to control weeds like velvetleaf, a broadcast herbicide treatment at planting time may be necessary.

Select the herbicide treatment from the PRE treatments of soil applied herbicides. Early preplant (EPP) treatments can be applied in March to early April prior to planting to keep winter annual and early summer annual weeds from using soil water and producing seeds.

The early herbicide treatment should eliminate planting through 4-inch or taller weed growth. Weeds like kochia and Russian thistle are

troublesome if not killed. The trouble arises along the cutting edge of the planter ridge clearing device, where larger broadleaf weeds may not be uprooted or covered. Most early germinating broadleaf weeds can be controlled effectively and economically with 2,4-D. If 2,4-D is to be used at planting it is better to apply from a spray boom on the front end or underbelly of the tractor rather than after planting. If considerable grass weed growth is present before planting, Gramoxone Max or glyphosate should be used. Another option would be to preplant cultivate for row-middle tillage, leaving ridge top weed removal to the planter ridge clearing device. This works extremely well on fields where corn was ensiled. Preplant cultivation also allows for rebuilding ridges, which may be desirable if they have been damaged by harvest equipment or livestock tramping. However, preplant cultivation mixes weed seeds into the ridge.

Ecofarming

Ecofarming is a system which controls weeds after wheat harvest and throughout the fallow period by using herbicides and/or tillage with

minimum disturbance of crop residues and soils. For a more detailed discussion, see pages 63, 65-68.

Herbicide Carryover

Certain herbicides can persist in the soil to the extent that rotational crops may be injured. The potential for herbicide carryover increases as one goes westward in Nebraska. Lower rainfall and low soil organic matter increases carryover potential. Herbicide carryover potential is greater on eroded soils and may be influenced by pH. Carryover is also a function of application accuracy. Carryover will be more apparent in headlands and other areas where sprayer overlap is common. Herbicide applications made late in the season have greater carryover potential compared to earlier applications.

Carryover can restrict crop rotation options as well as limit replant options if a crop is lost due to hail or other disasters. Care should be taken when choosing herbicides to fit your rotation sequence. Consult the weed response charts for carryover restrictions and consult herbicide labels for rotation intervals (*Replant Option Tables*, pages 104-110) and carryover restrictions. Conducting a plant bioassay can be helpful in determining whether carryover will be a problem in your fields. Additional information on conducting a bioassay can be obtained in the NebGuide G74-113, *A Quick Test for Atrazine Carryover*.

Interpreting Soil Herbicide Residue Analysis

What does a herbicide residue level of 0.3 ppm (parts per million) in the soil mean? Herbicide concentrations may be more easily visualized as lb/A rather than ppm. The tilled layer (6-7 inches deep) of an acre of loam soil weighs approximately two million pounds. Two pounds of herbicide per acre mixed in the tilled layer of soil would result in a concentration of 1 ppm (two parts herbicide per 2 million parts soil). 1 ppm = 1,000 ppb (parts per billion) which is more commonly used.

What herbicide residue levels are safe to sensitive crops? This varies with the herbicide, the environment, and the soil properties. The following information is provided as a guide. Consult herbicide manufacturer for more specific information. Check compliance with herbicide label and follow all label guidelines.

Crop Tolerance to Herbicide Residue in the Soil (Injury Threshold Guidelines)

Herbicide concentrations equal to or greater than those listed may cause crop injury.

Herbicide	Crop	Soil	
		Silt Loam 2-3% OM. pH less than 7.0	Sandy Loam 1-2% OM. pH greater than 7.0
		Concentration (ppb)*	
Atrazine	Alfalfa	100	40
	Oat	150	60
	Soybean	250	100
	Sugarbeet	5	< 5
	Wheat	180	75
Classic	Corn	3	1
	Wheat	5	2
Command	Corn	150	75
	Wheat	75	15
Prowl	Corn	250	150
	Sugarbeet	70	70
	Wheat	300	200
Pursuit	Corn	25	10
	Sorghum	10	4
	Sugarbeet	< 1	< 1
Scepter	Corn	10	5
	Wheat	30	10
Treflan	Corn	150	100
	Sugarbeet	70	70
	Wheat	200	150

*ppb = parts per billion of active ingredient.

Herbicide Resistance

Herbicide resistant weeds can develop as a result of repeatedly using the same herbicide or herbicides with the same mode of action. Herbicide resistant plants are naturally present in extremely low numbers. Repeatedly using the same herbicide allows the resistant weeds to multiply while the susceptible weeds are controlled. Over a period of time the weed population shifts to primarily herbicide-resistant weeds and weed control failures are observed. Resistant weeds cannot be controlled by increasing the herbicide rate.

Triazine-resistant kochia is common across Nebraska. Isolated cases of triazine-resistant pigweed also have been recorded. Resistance to sulfonylurea herbicides such as Glean, Ally, and Amber has been confirmed in Nebraska. In addition, isolated populations of kochia showing a high tolerance to 2,4-D + dicamba have been identified in western Nebraska. Additional cases of herbicide resistance are likely to develop unless steps are taken to prevent this. An integrated weed management program is suggested to minimize the development of herbicide-resistant weeds.

Following are suggestions to minimize the development of herbicide-resistant weeds:

1. Rotate crops to keep any one weed species from dominating. Rotations including row crops, small grains and perennial forage crops are the most effective.
2. Include tillage as a component of the weed-management program. Crop rotation permits a variation in tillage timing.
3. Utilize cultural practices that enhance crop growth thereby maximizing competitiveness with weeds. Planting sorghum and soybean in narrow rows improves their weed competitiveness.
4. Utilize herbicides with different sites of action in successive years and, where possible, within a year. This approach will slow the increase of a weed resistant to one site of action. See the discussion on *Classification of Herbicides*, pages 12-13.
5. Use short residual rather than persistent herbicides. Most cases of resistant weeds involve persistent herbicides. Where long residual herbicides are used, other control measures also should be employed.

Weed Competition

Weeds compete with crops for water, mineral nutrients, sunlight, and infrequently for carbon dioxide and oxygen. Weed species differ in competitiveness based largely on their growth rate, size, canopy shape, and emergence date. Competitive index (CI) is a term used to describe the relative competitiveness of weed species, and is expressed as a range of 1-10. A plant with a CI of 1.0 is 1/10 as competitive as a plant with a CI of 10.0. **The CI of common weeds is listed in the weed response tables in this publication.** Competitive load is a term used to describe the total competitive effect of a weed population (community) and is a summation of the number of individual weeds multiplied by the CI of each. If there are five individuals of pigweed (CI 2.5) and two individuals of shattercane (CI 3.5) per 100 sq ft, the competitive load is 5 (pigweed) X 2.5 (CI of pigweed) + 2 (shattercane) X 3.5 (CI of shattercane) = 19.5. Crop yield reductions due to weed competition are directly related to the competitive load. Crops vary in their competitiveness with weeds based on their growth characteristics. Therefore, a specific competitive load may cause a larger yield reduction in one crop than another. This equation will give an approximate estimate of yield loss. A more precise estimate can be determined with WeedSOFT.

Competitive Load Required for a 5% Yield Reduction for Weeds Normally Found With Crop

Crop	Competitive load per 100 ft ²	Relative* competitiveness
Corn	36	10.0
Soybean	10	2.8
Sorghum	10	2.8
Sugarbeet	5	1.4
Wheat, winter	50	6

CL = CI X # spp.

*Relative competitiveness of the crop in competition with the weeds common to that crop, assuming that the weeds emerge with the crop.

WeedSOFT 2003

Decision making for weed management continues to be challenging because control tactics must combine economic, regulatory, and environmental considerations with relevant biological knowledge about the weeds and crop. WeedSOFT is a decision support system (DSS) designed to help growers, consultants, and extension educators make both proactive and reactive weed management decisions. This comprehensive and ecologically sound tool will help farmers in every step of their weed management decision. WeedSOFT provides the treatment information you need for specific field conditions while factoring in economic and environmental principles. Whether you are considering early season soil applied treatments, control of mid-season infestations, or comparing treatments requiring additional costs for herbicide resistant crops, WeedSOFT is a powerful tool for your weed management decisions.

WeedSOFT treatment data is maintained through annual database updates. Periodic updates also are provided through a Web site to keep the program interface and data as up-to-date as possible. WeedSOFT consists of four modules; Advisor, EnviroFX, MapView, and WeedView.

ADVISOR is the heart of the WeedSOFT suite of decision-support tools. ADVISOR provides information to assist the grower in the weed management process by providing a bioeconomical analysis based on weed biology, weed management efficacy, and production costs.

Through query statements, the program generates a list of allowable treatments from an extensive database of possible treatments and control practices. The expected gain in yield resulting from a particular treatment is determined and becomes the criteria used to rank the allowable treatments. Treatments may be ranked by expectations of percent maximum yield or net gain.

MapView provides a first step in the process of evaluating the risk of groundwater contamination by herbicides. This module is a collection of digitized Nebraska county maps (1:20000) that are color coded to display the vulnerability of certain sites to groundwater contamination with herbicides. Once a site's vulnerability is determined, **EnviroFX** may be used to determine the relative potential of a specific herbicide to reach groundwater. These tools allow the user to make informed management decisions based on soil properties and depth to ground water.

WeedVIEW is a visual library containing color images and line drawings for each of 46 common weed species found in Nebraska. This module facilitates the correct identification of weed species. Images represent a portion of the photographs in the book, *iWeeds of Nebraska and the Great Plains* (Stubbendieck et al. 1994).

For more information visit the WeedSOFT web site at <http://weedsoft.unl.edu> or call Brady Kappler, Weed Science educator at (402) 472-1544

Integrated Weed Management (IWM)

Integrated weed management (IWM) has been defined in many ways. Some describe it as a combination of mutually supportive technologies in order to control weeds,¹ while others call it a multidisciplinary approach to weed control utilizing the application of numerous alternative control measures.¹ In practical terms, it means developing a weed management program using a combination of preventive, cultural, mechanical and chemical practices. It does not mean abandoning chemical weed control, but relying on it less.

IWM advocates the use of all available weed control options such as: plant breeding, fertilization, crop rotation, tillage practices, planting pattern, cover crops, and mechanical, biological and chemical control. A single weed control measure is not feasible due to the number of weed species, their highly variable life cycles and survival strategies. In addition, if only one or two control methods are used, weeds can adapt to those practices. Applying the principles of IWM can help minimize the overall economic impact of weeds, reduce herbicide use, and provide optimum economic returns to the producers.

In essence, the development of an integrated weed management program is based on a few general rules that can be used at any farm:

- use agronomic practices that limit the introduction and spread of weeds, preventing weed problems before they start;
- help the crop compete with weeds; and
- use practices that keep weeds off balance¹ and do not allow weeds to adapt.

Combining agronomic practices based on these rules will allow you to design an IWM program for your farm. Remember that there isn't a single recipe for all conditions and years, but that your plan will need to be changed and adjusted to a particular farming operation and season. The goal is to manage not eradicate weeds.

Prevent Weed Problems Before They Start

The best method of weed control is to keep the weeds out of your fields. **Field sanitation** involves practices that prevent weeds from entering or spreading across your field. Planting weed-free crop seed is a good starting point to reduce weed infestations. Planting weed-free, **certified seeds** will produce vigorous seedlings, good crop emergence and establishments, which are important for weed competition and yields. **Control of volunteer weeds** along field edges, fence lines, and ditches is useful in preventing the spread of weeds. **Cleaning equipment**, especially combines, before moving from field to field will further reduce the spread of weeds. **Tarping grain trucks** prevents introduction of weeds on road sides, which in turn can invade neighboring fields. **Manure** can be a problem by increasing weed numbers and introducing new weed species to a field, especially if the animals or livestock feed were imported from a different region. Aging or composting manure for at least a year before spreading on the field will reduce weed seed viability. Control patches of **new invading weeds** or **herbicide resistant weeds** before they spread. In general, preventive weed control techniques are usually the least expensive but routinely the most overlooked.

Help the Crop Compete Against Weeds

Several things can be done to give your crop an advantage over weeds. For example, **fertilizer placement** affects the crop's ability to compete with weeds. Placing the fertilizer where the crop, but not the weeds, has access allows the crop to be more competitive with weeds. Studies indicate that banding nitrogen fertilizer reduced competitiveness and population density of many weed species. **Adjusting row spacing** also will allow the crop to be more competitive. Indications are that soybean planted at 7 inches or 15 inches are more competitive against weeds than soybean planted at 30 inches or 38 inches. Certain **crop varieties** can be more competitive than others. For example, taller wheat and soybean varieties close their canopy more completely than shorter types, which helps shade out weeds. You may still need to spray the taller varieties, but weed control will be better due to added crop competition.

Keep Weeds "Off Balance" — Don't Give Them a Chance to Adapt

Crop rotation is the first step to keeping weeds off balance.¹ Diversified crop rotation will allow you to manage weeds in different ways

and at different times over the growing season. For example, using forage crops (perennial or annual) allows you to cut weeds before they set seeds, which is an important form of weed removal. Crops also differ in their **competitive ability**. For example, winter cereals are generally better competitors against summer annual weeds than spring cereals. Rotating **crops with different life cycles** will help prevent weeds from adapting. Annual weeds are more common in annual crops while biannual and perennial weeds are mostly found in perennial crops. For example, winter annual weeds adapt well in the fields of winter annual crops (e.g. downy brome in winter wheat), and perennial weeds are more common in perennial crops (e.g. dandelion in alfalfa). Rotating crops with different life cycles will prevent weeds with specific life cycles from adapting and establishing.

Rotating crops also will allow for **rotating herbicide practices**. Rotating herbicides with different modes of action and application times will help delay weed adaptation and reduce the chance of resistance developing. Selecting herbicides for a particular application window (eg. pre-plant incorporated, pre-emergence, post-emergence) will help keep weeds off balance too. For example, widespread use of post-emergence herbicides may shift weed populations toward late emerging weeds (e.g. fall panicum, crabgrass and morning glory). **Rotating herbicide-tolerant crops** also will be beneficial. Herbicide tolerant crops are not silver bullets¹ and should be viewed as just another tool for weed control.

Crops also can be selected to vary the **planting date**, which can be used to help manage a particular weed species. Planting early¹ may give a crop a better chance against late emerging weeds such as waterhemp, morning glories, and fall panicum. Planting late¹ may allow the use of a burndown herbicide or a tillage operation to control early-emerging weeds such as winter annuals (field pennycress, shepherds purse, mustards, henbit), velvetleaf, lambsquarters, and green foxtail. Changing the planting date from year to year will not allow a specific weed to adapt.

Using **cover crops** and their residues also can keep weeds off balance. They help manage weeds through competition, physical suppression and allelopathic effects. **Biological control of weeds** also has the potential for weed management through the use of grazing animals and natural enemies (insects, pathogens). It is a more suitable method of weed control in perennial crops (eg. pastures) than in annual crops. Annual crops require more rapid weed control and the site disturbance often prevents long-term establishment of a biocontrol agent. In general, keeping weeds off balance and not allowing them to adapt to your cropping practices will allow you to maintain and use a variety of tools for weed control.

Making a Spray Decision

One of the most common questions that farmers ask about herbicide use is when to spray. Before deciding whether to spray, consider the following general guidelines:

Scout your field. Assessing the type and number of weeds will help you determine if a spray operation is necessary. The entire field should be walked in an inverted W¹ pattern and weed density assessed (see **Field Scouting Technique**). Some weeds are not distributed uniformly, and can be found in patches or in low spots of the field. These areas should be sprayed separately, as fieldwide spraying may not be required. Mapping weed patches also will help assess the effectiveness of the control program over time.

Consider **timing of weed emergence** relative to the crop growth stage. Studies of crop-weed competition show that yield loss is very sensitive to small differences in the period between crop and weed emergence. Use the concepts of critical period of weed control and economic thresholds.

Critical period of weed control (CPWC) is a period in the crop growth cycle when weeds must be controlled to prevent yield losses. Weeds that emerge before or after this period may not represent a threat to crop yields. This information is essential in determining the need for and timing of weed control and in achieving efficient herbicide use.

UNL research has shown that each crop has a critical period of weed control, the length of which is influenced by cropping practices (eg. nitrogen level in corn and row spacing in soybean). Reducing the

N-fertilizer level in corn resulted in a longer critical period of weed control, thus making corn a less competitive crop. The critical period of weed control ranged from the 1st-10th, 3rd-9th, 4th-9th and 6th-9th leaf stages of corn for N-levels of 0, 55, 110 and 210 lb/A, respectively. Reducing the row spacing in soybean delayed the timing of weed control, thus increasing the crop tolerance to weed presence early in the season. In wide row soybeans (30-inch rows) the beginning of the critical period of weed control was at the 1st trifoliolate stage, suggesting that in wide-row soybeans control measures should start early in the season (at the 1st trifoliolate stage). With 15-inch rows, the beginning of the critical period of weed control was delayed and corresponded approximately to the 2nd trifoliolate stage. With 7.5-inch row soybeans, the control period was at the 3rd trifoliolate stage.

Cost of delaying weed control: Delaying weed removal beyond the start of the identified period for weed control will cost a producer an average of 2 percent in yield loss per every leaf stage of delay in both corn and soybean. From a practical standpoint, an arbitrary level of, for example, 2 percent, 5 percent or 10 percent yield loss can be used to signify the beginning of the critical period (time of weed removal). This range will allow a producer to make adjustments depending on the level of risk he or she is willing to take. To illustrate the point, an arbitrary level of 5 percent yield loss was used to determine the beginning of the critical period of weed control for corn and soybeans (see *Figures 1 and 2*).

To determine the cost of delaying weed control, use the curve above the arbitrarily selected point (the beginning of the critical period of weed control). For example, if an arbitrarily selected point is 5 percent, the 5 percent yield loss will occur if the weeds are removed at the 2nd leaf stage in 0-N-level (*Figure 1*). Delaying weed control to the 3rd leaf stage will cause about 7 percent yield loss, in essence costing producer a 2 percent of yield loss. A similar trend is observed for the later leaf stages at each of the four curves (*Figure 1*).

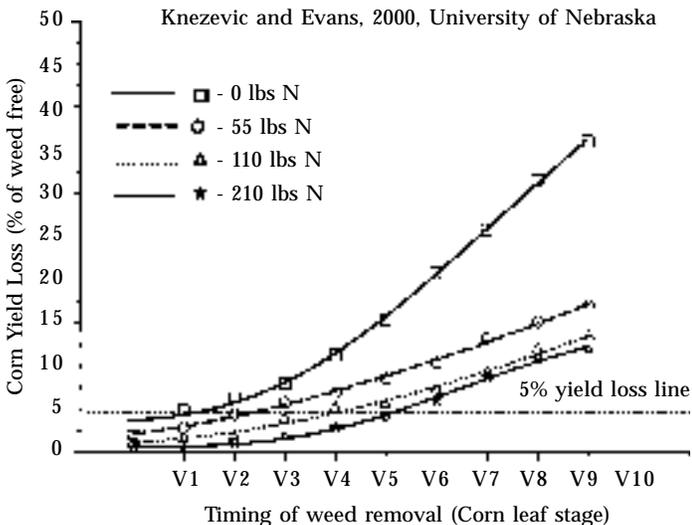


Figure 1. Corn yield loss and beginning of the critical period of weed control as influenced by the timing of weed removal and nitrogen rate.

Delaying weed control in soybean resulted in similar yield losses as in corn and was significantly influenced by crop row spacing. For example, 5 percent yield loss in drilled soybeans (7.5-inch rows) occurred at the 3rd trifoliolate stage compared to a 7 percent yield loss at the 4th trifoliolate. This indicates a 2 percent yield loss. Similar costs in delaying weed control in soybeans were observed for the later leaf stages at each of the three curves (*Figure 2*).

To determine the actual economics of delaying control, the producer can convert the percentage yield loss of the actual target yield on his farm. For example, if a target yield for corn is 100 bushels per acre, delaying weed control for every leaf stage of crop will cost producers about 2 bushels per acre of yield (thus 2 percent of 100 bushels per acre). In terms of actual economic loss, it will be about \$4 per acre for every crop leaf stage of delay, assuming a price of \$2 per bushel for corn. The loss in soybean will be about one bushel (2 percent of a 40

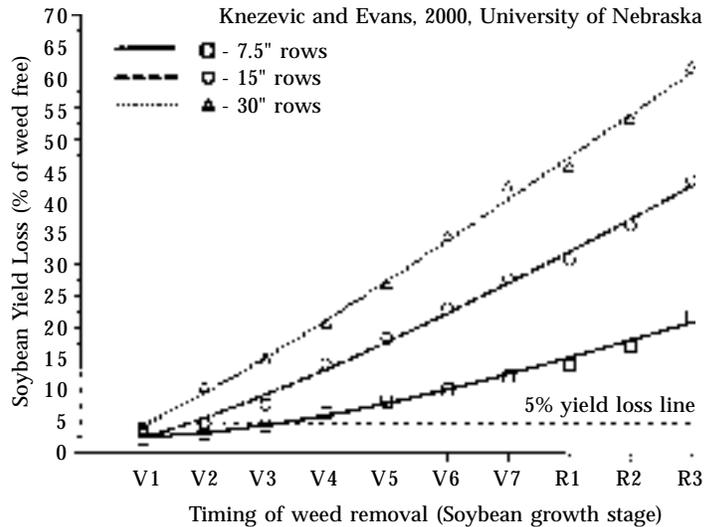


Figure 2. Soybean yield loss and beginning of the critical period of weed control as influenced by the timing of weed removal and row spacing.

bu/A target yield). Considering current prices of soybean (about \$5 per bushel), the economic loss will be about \$5 per acre for every leaf stage of delay.

Economic threshold is the level of weed infestation at which the cost of weed control equals the increased return on crop yield in the current year. The threshold values will vary with time of weed emergence, weed species competitiveness and commodity prices. A list of competitive indices for major weeds is on page 8. The bottom line is: Spray only when it pays. Spraying for annual weeds that are below threshold level is not necessary from both biological and economical perspectives.

Computer models also have been developed to aid with spray decisions. University of Nebraska weed scientists developed the decision support software, WeedSOFT. This software can help you select the most economical herbicide based on the various weed species present, their densities and the soil type in your field.

Field scouting to determine weed density: Crop producers are well aware of the effect of high weed densities on crop yields; however, it is at low weed densities that they must make weed management decisions, comparing the economic benefits of controlling weeds with the costs. Field scouting is an important part of deciding whether to spray. Accurately determining the types of weeds, their density and relative times of emergence in the field will help determine if a spray operation is necessary.

One of the major constraints to using weed thresholds at the farm level is a lack of practical sampling methods for estimating weed density over larger field scale. We suggest that the entire field should first be walked to get a feel for the weed pressure and then sampled. While several sampling methods are available, we recommend using an inverted iWi pattern as illustrated in *Figure 3*.

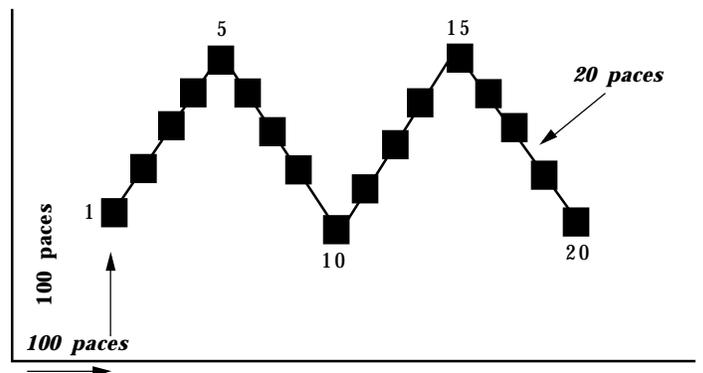


Figure 3. Field scouting pattern for determining weed thresholds.

The scout should walk for about 100 paces along the edge of the field and then turn at a right angle and walk 100 paces into the field. The sampling begins at this point. A wooden or wire quadrants enclosing a 2- by 2-foot area can be used to determine weed density at every sampling spot along the iWi pattern. At each sampling spot the quadrant should be placed to the ground and the number of weeds present in the quadrant counted and recorded. A minimum of 20 sampling units, each at least 20 paces apart, should be taken across the field and an average weed density calculated. The average weed density can be used to estimate yield loss using WeedSOFT or some other yield loss estimator.

Many times weeds are not uniformly distributed and may be more heavily concentrated in patches, low spots, and along field edges. These areas should be considered separately from the rest of the field.

Documentation and Record Keeping

Documentation and record keeping are essential to an IWM program. Field histories and information on cropping practices will help you evaluate your weed control program over time. Information can be recorded on paper or in computerized forms which can be developed as a database application. Data forms should have basic information

such as: site description, field monitoring and evaluation, records of herbicide applications and other methods of weed control. Generally, knowing the weeds on your farm, taking notes and watching for possible shifts in weed species may prevent you from costly surprises.

Integrated Weed Management ó Making It Work

Since there are many kinds of weeds with very different life cycles, no single IWM program is best under all circumstances. Obviously you can not use all of the described techniques at once; however, if new methods are implemented in a systematic manner, significant advances in weed control can be achieved. Use the best combination of techniques for your needs.

There are many ways to start developing an integrated weed management program. The easiest way is to try one or two techniques, adding more each year. After a few years, you will have developed an integrated weed management program that works well for your operation. Using a variety of weed control tools reduces the reliance on any tool, which means that those tools will still be effective in the years to come. Using various methods keeps weeds off-balance and prevents them from adapting to your management strategy. And remember, there is no such a thing as a silver bullet when it comes to weed control.

Classification of Herbicides by Mode and Site of Action and Chemical Family

Herbicides can be classified into families based on their chemical similarity or grouped by how they kill plants (mode and site of action). In some cases, herbicides from different chemical families have a similar site of action. Combinations of herbicides having the same site of action can lead to problems. For example, repeated use of ALS inhibitors can result in the selection for ALS-resistant weeds. Using sulfonylurea and imidazolinone herbicides (Classic, Pursuit, etc.) in the same growing season can result in increased carryover problems or possible crop injury. These problems can be lessened by rotating or combining herbicides with different action sites. This table lists herbicides by their broad mode of action (Roman numeral), specific action site (letter), and chemical family (number). Those herbicides with a common action site pose the highest risk of an additive effect which can lead to resistant weed development, additional carryover, or more crop injury. Refer to the journal, *Weed Technology*, 11: 384-393 (1997) for additional information on herbicide classification.

Common Name—Trade Name—Site of Uptake

I. Lipid Synthesis Inhibition

- A. ACCase inhibition
 1. Aryloxyphenoxypropionates (FOPs)
 - clodinafop propargylóDiscoveryóF
 - diclofopóHoelonóF
 - fenoxapropóAcclaim ExtraóF
 - fluazifop-PóFusilade DXóF
 - quizalofop-PóAssure IIóF
 2. Cyclohexanediones (DIMs)
 - clethodimóSelectóF
 - sethoxydimóPoast PlusóF
 - tralkoxydimóAchieveóF

II. Amino Acid Synthesis Inhibition

- A. ALS-AHAS inhibition
 1. Imidazolinones
 - imazamethabenzóAssertóR/F
 - imazamoxóRaptoróF/R
 - imazapicóPlateauóR/F
 - imazapyróArsenalóR/F
 - imazaquinóScepteróR/F
 - imazethapyróPursuitóR/F
 2. Sulfonylureas
 - bensulfuronóLondaxóF/R
 - chlorimuronóClassicóF/R
 - chlorsulfuronóGleanóF/R
 - ethametsulfuronóMusteróF
 - foramsulfuronóOptionóF
 - halosulfuronóPermit/BattalionóF/R
 - metsulfuronóAlly/EscortóF/R
 - nicosulfuronóAccentóF
 - primisulfuronóBeaconóF/R
 - prosulfuronóPeakóF/R
 - rimsulfuronóMatrixóF/R
 - sulfometuronóOustóF/R
 - sulfosulfuronóMaverick
 - thifensulfuronóHarmony/PinnacleóF/R
 - triasulfuronóAmberóF/R
 - tribenuronóExpressóF/R
 - triflusulfuronóUpbeetóF
 3. Triazolopyrimidines
 - chloransulam methylóFirstRateóF/R
 - flucarbazoneóEverestóF/R
 - flumetsulamóPhythonóR/F
- B. EPSP synthetase inhibition
 - glyphosateóRoundup/TouchdownóF
- C. Glutamine synthetase Inhibition
 - glufosinateóLibertyóF

III. Seedling Growth Inhibition

- A. Microtubule assembly inhibition
 1. Dinitroanilines
 - benfluralinóBalanóS/R
 - ethalfluralinóCurbit/SonalanóS
 - oryzalinóSurflanóS
 - pendimethalinóProwlóS
 - prodiamineóBarricadeóS
 - trifluralinóTreflanóS
 2. Pyridines
 - dithiopyróDimensionóR/F
 3. Benzamides
 - pronamideóKerbóS/R
 4. Benzoic acids
 - DCPAóDacthalóR
- B. Shoot inhibition
 1. Chloroacetamides
 - acetochloróHarness/SurpassóS/R
 - alachloróLassoóS/R
 - dimethenamidóFrontieróS/R
 - metolachloróDualóS/R
 - propachloróRamrodóS/R
 2. Oxyacetamides
 - flufenacetóDefineóS/R
 3. Acetamides
 - napropamideóDevrinolóR/S
- C. Lipid synthesis inhibition (not ACC ase)
 1. Benzofuranes
 - ethofumesateóNortron SCóS/R
 2. Phosphorodithionates
 - bensulide ó Betasan ó R
 3. Thiocarbamates
 - butylateóSutan +óS/R
 - cycloateóRo-NeetóS/R
 - EPTCóEptam/EradicaneóS/R
 - triallateóFar-GoóS/R
- D. Auxin transport inhibition
 1. Phthalamates
 - naptalamóAlanapóR/F
 2. Semicarbazone
 - diflufenzopyróDistinctóF
- E. Cell wall synthesis inhibition
 1. Benzamides
 - isoxabenóGalleryóR/S
 2. Nitriles
 - dichlobenilóCasoronóR-F

IV. Growth Regulators

- A. Synthetic auxins
 - 1. Phenoxycetic Acids
 - 2,4-DóManyóF/R
 - 2,4-DBóButyracóF
 - dichlorpropóManyóF
 - MCPAóManyóF/R
 - mecopropóManyóF
 - 2. Benzoic Acids
 - dicambaóBanvel/ClarityóF/R/S
 - 3. Pyridine carboxylic acids
 - clopyralidóStingeróF/R
 - fluroxypyróStaraneóF
 - picloramóTordonóF/R
 - triclopyróGarlonóF/R
 - 4. Quinoline carboxylic acids
 - quincloracóParamount ó F/S

V. Photosynthesis Inhibition (Photosystem II) - Classes differ in binding behavior

- A. C₁ class
 - 1. Triazines
 - ametrynóEvikóR/F
 - atrazineóAAtrexóR/F
 - cyanazineóBladexóR/F
 - prometonóPramitolóR/F
 - simazineóPrincepóR
 - 2. Triazinones
 - hexazinoneóVelparóR/F
 - metribuzinóSencoróR/F
 - 3. Phenylcarbamates
 - desmediphamóBetanexóF
 - phenmediphamóBetanalóF
 - 4. Uracils
 - bromacilóHyvaróR
 - terbacilóSinbaróR
 - 5. Pyridazinones
 - pyrazon ó Pyramin ó R/F
- B. C₂ class
 - 1. Phenylureas
 - diuronóKarmexóR
 - linuronóLoroxóR/F
 - siduronóTupersanóR
 - tebuthiuronóSpikeóR
- C. C₃ class
 - 1. Benzothiadiazinones
 - bentazonóBasagranóF
 - 2. Nitriles
 - bromoxynilóBuctrilóF
 - 3. Phenylpyridazine
 - pyridateóToughóF

VI. Cell Membrane Disruption

- A. PPO inhibition
 - 1. Diphenylethers
 - acifluorfenóBlazeróF
 - fomesafenóReflex/FlexstaróR/F
 - lactofenóPhoenix/CobraóF
 - oxyfluorfenóGoalóR/S
 - 2. N-phenylphthalimides
 - flumicloracóResourceóF
 - flumioxazin ó Valor ó S/F
 - 3. Triazolinones
 - azofenidinóMilestoneóR/S
 - sulfentrazoneóAuthority/Cover/SpartanóR
 - carfentrazone ethylóAim/AffinityóF
 - 4. Thiadiazoles
 - fluthiacet methylóActionóF
- B. Photosystem I electron diversion
 - 1. Bipyridyliums
 - diquatóRewardóF
 - paraquatóGramoxone MaxóF
- C. Cellular pH alteration
 - 1. Fatty acids
 - pelargonic acidóScytheóF

VII. Carotenoid biosynthesis inhibition

- A. Phytolene desaturase inhibition
 - fluridone ó Avast ó S/R
 - norflurazon ó Zorial ó S
- B. 4-HPPD inhibition
 - 1. Callistemones
 - mesotrioneóCallisto-F/R
 - 2. Isoxazoles
 - ixoxaflutoleóBalance ProóF/R
- C. Unknown site of action
 - amitrole ó Amitrole ó F
 - clomazone ó Command ó R/S

VIII. Unclassified or unknown

- 1. Organoarsenical
 - DSMAómanyóF
 - MSMAómanyóF
- 2. Other
 - endothallóAquatholóR/F
 - difenzoquatóAvengeóF
 - fosamineóKreniteóF

Site of Herbicide Uptake

R=Root uptake
S=Shoot uptake
F=Foliage uptake

Letter sequence indicates
primary order of
herbicide uptake.

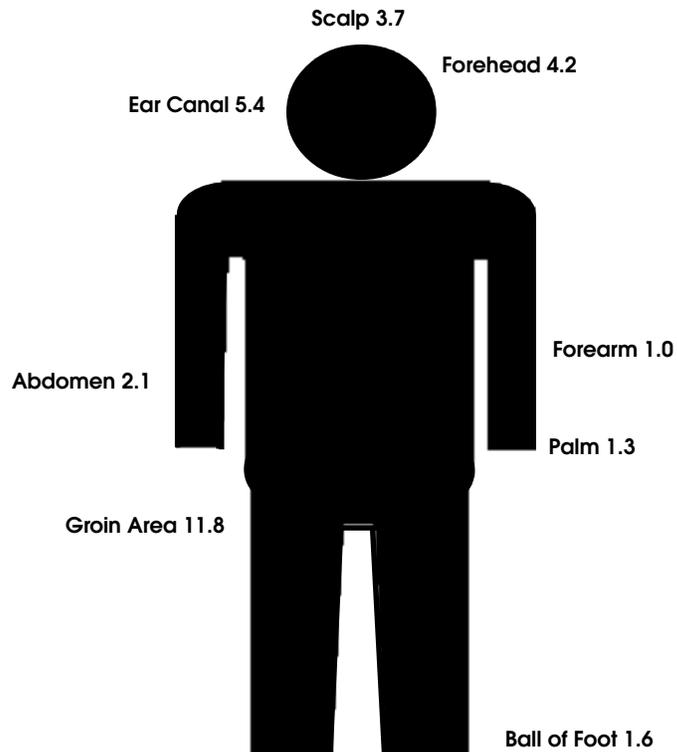
Human Hazards When Applying Herbicides

The **signal words** CAUTION (slightly toxic), WARNING (moderately toxic), and DANGER (highly toxic) indicate the relative toxicity of an herbicide or other pesticide active ingredient to humans. These words appear on the front of product labels, often with other Precautionary Statements. The word iPoisoni and the skull and crossbones symbol are associated with the iDangeri signal word on certain labels if the product may cause acute oral, acute dermal, and/or acute inhalation toxicity. No signal word is now present with Category IV toxicity pesticide products (the least toxic). Signal words are indications of the risk from acute oral, dermal, inhalation, or eye exposure. Signal words should be used as a guide for precautionary measures during herbicide handling, mixing, or application. Always consult the pesticide label for the requirements for personal protective equipment (PPE). In some cases, personal protective equipment for the same product will differ between the mixer/loader operator and the applicator.

Dermal exposure (skin contamination) is the most common method of exposure and potentially dangerous hazard for users of herbicides and other pesticides. It can occur any time a pesticide is handled, mixed, or applied and may go undetected initially. The potential danger from dermal exposure depends on the toxicity of the material, rate of absorption through the skin, the amount of skin area contaminated, and the amount of time the material is in contact with the skin. Rates of absorption through the skin are different for different parts of the body. The figure shows the rate of absorption for different parts of the body in relation to that of the forearm (1x). Absorption may be 12 times (12x) faster in the lower groin area than on the forearm. At this rate, absorption of pesticide through the skin into the bloodstream may be more dangerous than swallowing it. Absorption continues as long as the material remains in contact with the skin. Danger from exposure is increased if the contaminated area is large or if the material is left on the skin for prolonged periods.

Other components of a formulated pesticide product also can be hazardous. Many pesticides are carried in an oil base, which may be toxic if it gets into the bloodstream. Oil penetrates the skin as rapidly as some pesticides in highly sensitive areas of the body. Nitrile or neoprene aprons should be worn to protect the lower parts of the body. Absorption continues as long as the material is left on the skin. See **Fertilizer and Pesticide Containment Guidelines** (NebGuide G1185), **Rinsing Pesticide Containers** (NebGuide G1150), and **Safe Transport, Storage, and Disposal of Pesticides** (EC2507) for additional information on proper procedures for storage and handling of pesticides. For additional information, see **Protective Clothing and Equipment for Pesticide Applicators** (NebGuide G758) and **Signs and Symptoms of Pesticide Poisoning** (EC2505). Several Internet sites can provide excellent resources:

- UNL Pesticide Education Resources Web site
<http://PestEd.unl.edu>
- Pesticide Bookmarks
<http://pested.unl.edu/pestbkmk.htm>
- iThe Labeli newsletter
<http://pested.unl.edu/pestbkmk.htm>
- Pesticide-related Cooperative Extension publications
<http://www.ianr.unl.edu/pubs/pesticides/index.htm>
- Pesticide Information Profiles on individual active ingredients
<http://ace.orst.edu/info/extoxnet/ghindex.html>
- Recognition and Management of Pesticide Poisonings
<http://npic.orst.edu/rmpp.htm>



Dermal Exposure: Pesticides are absorbed at different rates by various areas of the body. Dermal skin absorption rates are compared to that of the forearm which is 1.0.

Environmental Considerations When Applying Herbicides

Maximizing herbicide effectiveness in a way that is safe for users and environmentally responsible requires awareness of possible exposure hazards and the relative potential for leaching and runoff.

Environmental Considerations

Herbicide leaching through soil can contaminate ground water, while herbicide loss in runoff can contaminate surface water. The potential for herbicide movement through runoff or leaching varies with herbicide and soil properties, as well as climatic variables and management practices. Whether herbicide residues become contaminants of ground water or surface water depends to a large extent on their retention by soil, solubility in water, and persistence. The amount of chemical applied, as well as the timing and amount of rainfall or irrigation, are important. Depth to ground water and distance to surface waters can determine the extent of herbicide contamination.

Herbicide Properties. Herbicides differ in *water solubility* and *sorption (retention)* in soil, which has a major influence on their availability for plant uptake, degradation, and movement with water. Water solubility is often given in *parts per million* (ppm). The *Koc (organic carbon partition coefficient)* indicates relative herbicide retention in soil. The figures that follow show comparative water solubility, soil retention, and persistence of herbicides used in Nebraska. The relative persistence of herbicides in soil is based on rates of degradation and may be evaluated by comparing their *half-lives*. A half-life is the time required to decrease the amount of herbicide present by one-half. The actual half-life of an herbicide in the field varies among soils and with

environmental conditions. More information on herbicides is available in the *Herbicide Handbook of the Weed Science Society of America, Seventh Edition ó 1994* and the *Supplement to the Seventh Edition ñ 1998*. Additional information on herbicide properties, soil behavior and potential for ground and surface water contamination can be found in the Nebraska Cooperative Extension Circulars EC 94-135, *Understanding Pesticides and Water Quality in Nebraska*, and EC 96-143, *Pesticide Runoff and Water Quality in Nebraska*.

Relative Risk of Ground and Surface Water Contamination. The relative potential for herbicides to leach through soil and contaminate ground water can be determined from their soil retention (Koc values), water solubility, and persistence. The relative potential for herbicides to move off a field with runoff and potentially contaminate surface waters can be estimated from their Koc values. These properties were used to classify the mobility ñ the relative risk of ground water contamination from leaching and relative runoff potential ó of the herbicides listed in the table.

Soil and Application Factors Influencing Herbicide Movement. Coarse-textured (sandy), porous soils tend to be highly permeable and may promote herbicide leaching, while runoff may be greater in fine-textured (high clay), less permeable soils. When the water table is shallow, the potential for ground water contamination may be high for many herbicides. The potential for contamination through runoff is high when herbicides are applied on steeply sloped land in close proximity to surface water. Excessive irrigation can promote herbicide loss through leaching and/or runoff.

Water Solubility

<p style="font-size: 24pt; font-weight: bold; color: white;">High</p> <p style="font-size: 24pt; font-weight: bold; color: black;">Low</p>	<i>greater than 3000 ppm</i>	Accent, Acquire, Arsenal, Authority, Banvel, Basis, Clarity, Cyclone, Distinct, Glean, Gramoxone Extra, Gramoxone Max, Hoelon, Liberty, Matrix, Peak, Plateau, Poast, Poast Plus, Python, Raptor, Rodeo, Roundup, Roundup Ultra, Roundup Ultra Max, Roundup Weather Max, Touchdown, Starane, Sterling, Ultima 160, Velpar
	<i>300 to 3000 ppm</i>	Ally, Amber, Authority, Basagran, Buctril, Classic, Command, Connect, Dual, Dual II Magnum, Eradicane, Frontier, Harmony GT, Hyvar, Maverick, MCPA, Outlook, Permit, Pursuit, Ramrod, Reward, Select, Sencor, Stinger, 2,4-D amine, 2,4-D ester, Tordon
	<i>30 to 300 ppm</i>	Aatrex, Atrazine, Axiom, Beacon, Blazer, Buctril, Connect, Define, Evik, FirstRate, Flexstar, Harness, Karmex, Lasso, Nortron, Nortron SC, Paramount, Partner, Reflex, Ro-Neet, Scepter, Surpass, Sutan+, Topnotch, Upbeet
	<i>3 to 30 ppm</i>	Affinity, Achieve, Aim, Balance Pro, Betamix, Callisto, Casoran, Kerb, Princep, Spartan, Tupersan, Zorial
	<i>less than 3</i>	Acclaim Extra, Assure, Balan, Cobra, Curbit, Dimension, Fusilade DX, Gallery, Goal, Pendimax, Phoenix, Prowl, Resource, Sonalan, Surflan, Tough, Treflan

Relative Soil Persistence

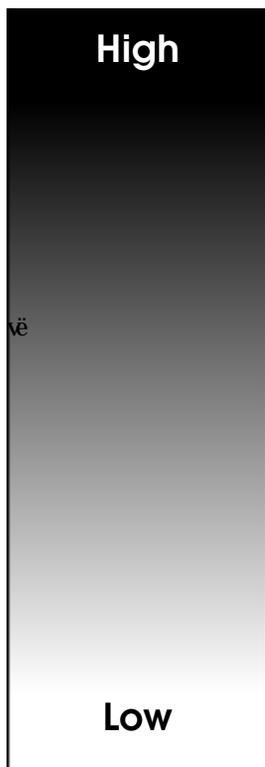
(half-life in days)



<i>greater than 100 days</i>	Authority, Balance Pro, Cyclone*, Gramoxone Extra*, Gramoxone Max*, Paramount, Plateau, Sinbar
<i>100 to 31 days</i>	Aatrex, Acquire*, Amber, Arsenal, Assure, Atrazine, Axiom, Balan, Casoran, Classic, Curbit, Define, Devinol, Dual, Dual II, Dual II Magnum, Evik, Flexstar, Gallery, Glean, Goal, Hyvar, Karmex, Kerb, Maverick, Peak, Pendimax, Prowl, Pursuit, Python, Reflex, Rodeo*, Roundup*, Roundup Ultra*, Scepter, Sonalan, Starane, Tordon, Touchdown*, Treflan, Tupersan, Velpar, Zorial
<i>30 to 16 days</i>	Accent, Achieve, Ally, Assert, Avenge, Basagran, Beacon, Betamix, Command, Dimension, FirstRate, Frontier, Hoelon, Lasso, Nortron, Nortron SC, Outlook, Partner, Permit, Raptor, Ro-Neet, Sencor, Stinger, Surflan, Tough
<i>15 to 5 days</i>	Acclaim Extra, Action, Affinity, Aim, Alanap, Banvel, Blazer, Bucril, Callisto, Clarity, Connect, Eradicane, Express, Fusilade DX, Harmony GT, Harness, Liberty, Matrix, MCPA, Poast, Poast Plus, Princep, Ramrod, Resource, Reward, Spartan, Sterling, Surpass, Sutan+, 2,4-D amine, 2,4-D ester, Topnotch, Ultima, Upbeet
<i>less than 5 days</i>	Basis, Cobra, Distinct, Phoenix, Select

*These three classes of compounds are tightly bound to the soil and are biologically inactive soon after application, therefore rotation restrictions should not be a major concern.

Relative Soil Retention (Koc)



<i>greater than 2000</i>	Acclaim Extra, Acquire, Ansar 8100, Avenge, Balan, Betamix, Cobra, Curbit, Cyclone, Dacthal, Fusilade DX, Goal, Gramoxone Extra, Gramoxone Max, H-yield, Hoelon, Pendimax, Phoenix, Prowl, Resource, Rodeo, Roundup, Roundup Ultra, Sonalan, Touchdown, Treflan
<i>500 to 2000</i>	Assure, Axiom, Bucril, Connect, Dimension, Kerb, Devinol, Ro-Neet, Surflan, Zorial
<i>150 to 500</i>	Casoran, Command, Dual, Dual II, Dual II Magnum, Eradicane, Evik, Gallery, Harness, Karmex, Lasso, Nortron, Nortron SC, Partner, Plateau, Starane, Surpass, Sutan+, Topnotch, Tough, Tupersan
<i>50 to 150</i>	Aatrex, Amber, Arsenal, Assert, Atrazine, Authority, Balance Pro, Beacon, Blazer, Classic Poast, Distinct, FirstRate, Flexstar, Frontier, Liberty, MCPA, Outlook, Permit, Poast Plus, Princep, Ramrod, Reflex, Reward, Sencor, Sinbar, Ultima 160, Upbeet, Velpar
<i>less than 50</i>	Accent, Achieve, Affinity, Aim, Alanap, Ally, Banvel, Basagran, Basis, Clarity, Express, Glean, Harmony GT, Hyvar, Matrix, Maverick, Paramount, Peak, Pursuit, Python, Raptor, Scepter, Select, Spartan, Sterling, Stinger, 2,4-D amine, 2,4-D ester, Tordon

Human and Environmental Risks of Various Herbicides Commonly Used in Nebraska

<i>Product Name</i>	<i>Common Name of Active Ingredient</i>	<i>Potential Human Exposure Hazard¹</i>	<i>Relative Use Rate²</i>	<i>Relative Risk of Contamination from Leaching³</i>	<i>Relative Runoff Potential⁴</i>
Aatrex, Atrazine	atrazine	C	H	M*	H
Accent	nicosulfuron	C	L	M*	Mw
Acclaim Extra	fenoxaprop p-ethyl	C	L	L	Ms
Accent Gold	clopyralid (51.7%); flumetsulan (19.1%), nicosulfuron (6.5%), rimsulfuron (6.5%)	D	L	H*	Mw
Achieve	tralkoxydim	C	L	M	Mw
Aim, Spartan, Affinity	carfentrazone	C	L	H*	Lw
Alanap	naptalam	W	H	H*	Mw
Ally	metsulfuron	C	L	H*	Mw
Ally Extra	thifensulfuron methyl (37.5%), tribenuron methyl (18.75%), metflufuron methyl (15%)i	W	L	H*	Mw
Amber	triasulfuron	C	L	H*	H
Ansar 8100	DSMA	C	H	L	Ms
Arsenal	imazapyr	C	M-H	H*	H
Assert	imazamethabenz	D	M	H*	H
Assure	quizalofop	D	L	M	H
Asulox	asulam	C	M-H	M*	Mw
Authority	sulfentrazone	C	L-M	H*	H
Avenge	difenzoquat	D	M-H	VL	Ms
Axiom	fluthiamide	C	M	M	H
Balan	benefin	C	H	L	Ms
Balance Pro	isoxaflutole	C	L	M	H
Banvel, Clarity, Sterling	dicamba	W, C, W	M	H	Lw
Basagran	bentazon	C	M	M	Mw
Basis	rimsulfuron	C	L	L	Mw
Basis Gold	nicosulfuron (1.34%), rimsulfuron (1.34%) atrazine (82.44%)	C	M	H*	H
Beacon	primisulfuron	C	L	H*	Mw
Betamix	phenmedipham + desmedipham	W	M	L	H
Blazer	acifluorfen	D	M	M	H
Buctril, Connect	bromoxynil	W	M	L	H
Callisto	mesotrione	C	L	L	L
Casoran	dichlobenil	C	H	M	H
Classic	chlorimuron	C	L	H*	H
Cobra, Phoenix	lactofen	D	L	VL	Ms
Command 3 me, 4EC	clomazone	C, W	M	M	H
2,4-D amine, 2,4-D ester	2,4-D	D, C	M-H	M*	Mw
Define	flufenacet	W	M	H	
Devrinol	napropamide	C	H	M	H
Dimension	dithiopyr	W	L-H	L	H
Distinct	diflufenzopyr	C	L	M	H
Dual, Dual II, Dual II Magnum	metolachlor	C	H	M	H
Eradicane	EPTC	W	H	L	H
Evik	ametryn	C	M-H	M	H
Express	tribenuron	C	L	H*	Mw
FirstRate	cloransulam-methyl	C	L	H*	H
Frontier, Outlook	dimethenamid	W	M-H	H	H
Fusilade DX/Fusilade II	fluazifop	C	L	L	Ms
Gallery	isoxaben	C	M	M	H
Glean	chlorsulfuron	C	L	H*	Mw
Goal	oxyfluorfen	W	L-H	VL	L
Gramoxone Extra, Gramoxone Max, Cyclone	paraquat	D	M	VL	Ls

Product Name	Common Name of Active Ingredient	Potential Human Exposure Hazard¹	Relative Use Rate²	Relative Risk of Contamination from Leaching³	Relative Runoff Potential⁴
Harness, Surpass, Topnotch, Degree	acetochlor	W, L, C	H	M	H
Harmony GT	thifensulfuron	C	L	H*	Mw
Hoelon	diclofop	D	M-H	H (acid)	Ms
H-Yield	MSMA	C	H	M	Ms
Hyvar	bromacil	C	M-H	M	Mw
Karmex	diuron	C	H	M	H
Kerb	pronamide	C	M-H	M	H
Lasso, Partner	alachlor	D, C	H	M	H
Liberty	glufosinate	W	H	M	H
Matrix	rimsulfuron	C	L	M*	Mw
Maverick	sulfosulfuron	C	L	H*	Mw
MCPA	MCPA	D	M-H	M*	H
Nortron, Nortron SC	ethofumesate	C	M	M	H
Paramount	quinclorac	C	M	H*	Mw
Peak	prosulfuron	C	L	M*	Mw
Permit	halosulfuron	C	L	M*	H
Phoenix	lactofen	C	L	VL	Ms
Plateau	imazapic	C	L	H*	H
Poast, Poast Plus, Ultima 160	sethoxydim	H,C,H	M	L*	H
Princep	simazine	C	H	M	H
Prowl, Pendimax	pendimethalin	C	H	L	Ms
Pursuit	imazethapyr	C	L	H*	Mw
Python	flumetsulam	C	L	M*	Mw
Raptor	imazamox	C	L	H*	Mw
Reflex, Flexstar	fomesafen	D, W	M	H	H
Resource	flumiclorac	W	L	L	Ms
Ro-Neet	cycloate	C	H	L	H
Roundup, Roundup Ultra, Rodeo, Acquire	glyphosate	C	M-H	VL	Ms
Scepter	imazaquin	C	L	H*	Mw
Select	clethodim	W	L	M	Mw
Sencor	metribuzin	C	M	M*	H
Sinbar	terbacil	C	M-H	H	H
Sonalan, Curbit	ethalfluralin	D	M-H	L	H
Starane	fluroxypyr	W	M	M	H
Stinger	clopyralid	C	L	H*	H
Surflan	oryzalin	C	H	L	H
Sutan+	butylate	C	H	M	H
Tordon	picloram	C	M-H	H*	Mw
Touchdown	glyphosate	C	M-H	VL	Ms
Tough	pyridate	W	M-H	M	H
Treflan	trifluralin	C	H	L	Ms
Tupersan	siduron	C	H	M	H
Upbeet	triflurosulfuron-methyl	C	L	M*	H
Valor	flumioxazin	C	L	L	Ls
Velpar	hexazinone	D	L-H	H	H
Zorial	norflurazon	C	M-H	M	H

¹Signal Words: C = Caution, W = Warning, D = Danger. Classification may vary with formulation.

²L = Low (less than 0.25 lb ai/acre); M = Medium (0.25-0.99 lb ai/acre); H = High (greater than .99 lb ai/acre).

³VL = Very Low; L = Low; M = Medium; H = High. Asterisk (*) indicates risk of contamination from leaching; it increases with increasing soil pH. Salt and acid formulations generally are highly leachable. Ester formulations are less leachable, but are often rapidly hydrolyzed to corresponding acid forms that may be highly leachable.

⁴Loss with runoff when leaching also occurs: Lw = Low, primarily lost with runoff water; Ls = low, primarily lost with sediment/soil in runoff; Mw = medium, primarily lost with runoff water; Ms = medium, can be lost with displaced sediment/soil in addition to runoff water; H = high, lost in both runoff water and with displaced sediment/soil. When no leaching occurs, herbicides with Koc values less than 5000 have a high potential to be lost with runoff water.

⁵Not available at time of publication.

Minimizing Water Contamination

Pesticide contamination of groundwater and surface water is a public concern. Contamination results from two types of sources ó point and non-point.

Point Source Contamination

Point source contamination results from localized spills or accidents, i.e., the contamination can be traced back to an identifiable area. Point source contamination accounts for large doses being introduced into groundwater and poses a high risk of rendering the water unfit for drinking.

Spills and other mishaps which occur during the handling and mixing of pesticides are a major contributing factor. There are several steps we can take to minimize contamination.

Wells are a direct conduit to the groundwater and extra care should be taken at these sites when handling pesticides. In addition, many wells are not adequately sealed which increases the risk of contamination in the event of a spill. Mix pesticides at least 200 ft. from a well. Using a nurse-tank as a water source helps avoid these problems. Prevent back-siphoning into the well. Keep the end of the filler hose above the water

level of the tank at all times. **Anti-backflow devices for hoses can be purchased from irrigation and spray equipment suppliers.** Clean up spills, especially near wells and other water supplies.

Because of the risk of a major mishap and groundwater contamination from chemigation, we do not suggest herbigation. If you need information, contact the specific chemical company or local NRD.

Additional practices which help prevent point source contamination include triple-rinsing and the proper disposal of pesticide containers and excess pesticides.

For help in any emergency involving spills, leaks, or fires phone CHEMTREC at 800-424-9300 (chemical industry public service hotline). For assistance with human pesticide exposures, call the Poison Center, Omaha, NE at 800-955-9119.

Non-point Source Contamination

Contamination which occurs from non-point sources cannot be traced back to a specific location or event. Examples of non-point source contamination would include the leaching of pesticides through the normal course of pesticide use, or pesticides carried into streams by surface runoff. The extent of non-point source contamination is dependent upon herbicide, soil, geology, topography, management practices, and weather.

There are several practices which minimize non-point source contamination. Apply the proper amount of herbicide for the crop, weed and site. Read the label to determine the correct rate. Proper sprayer calibration assures application uniformity and more effective control. The amount of product also can be reduced by using band applications instead of broadcast treatments. These practices not only reduce the potential for groundwater contamination but also decrease the potential for crop injury and carryover problems, and make weed control more economical.

In choosing a herbicide, less mobile, short residual products are less likely to leach to the water table. Crop and herbicide rotation also reduces risk as a result of using different herbicides each year.

Identify high risk areas. The greatest risk for groundwater contamination exists where the water table is close to the soil surface. In addition, herbicides are more likely to contaminate groundwater when applications are made to coarse-textured soils low in organic matter. High pH soils also present concerns because some herbicides leach more readily under these conditions. Extra care should be taken when any of these situations exist.

The greatest risk for surface water contamination is on steeply sloping land that drains directly into a stream/lake. Management practices such as terraces and conservation tillage to reduce water runoff will help. Reducing herbicide rates by banding or using combinations will reduce the loading potential of that product. Untreated buffer zones next to streams/lakes and grass waterways to encourage water infiltration also may be helpful.

Mixing Herbicides

The iW-A-L-Ei or iD-A-L-Ei method can help you remember the mixing order for herbicides. If you have any questions about the compatibility of the herbicides and carrier, **do a jar test first** (see compatibility jar test). Some herbicides and/or some carriers require a compatibility agent and some are not compatible even with a compatibility agent. Always check the label for any special procedures.

The recommended mixing order is:

1. First fill the spray tank with one-third of the carrier (water, fertilizer, or mix) to be used. Have agitation on.
2. Add ammonium sulfate if used for glyphosate products.
3. If compatibility problems exist, the compatibility agent is usually added before the herbicides. Check the label for instructions.

If excessive foam is a problem, a de-foamer may be required. The de-foamer works best if added before foam is a problem. Check the label.

W or **D** The **W** or **D** refers to dry wettable powders, dry flowable materials and water dispensable granules (WP, DR and WDG). These are added first to the tank. Some water soluble packets need to be allowed to soak in a small amount of water before being added to the tank. It is best to preslurry wettable powders and dry flowables at a 2:1 ratio with water before adding to the

partially filled sprayer tank. With some pesticides it is recommended that they be presoaked.

A The **A** means agitation to disperse the herbicides added. Agitation means a rolling surface action. Do not use excessive agitation which can reduce compatibility and increase foaming.

It is best to continue the agitation until the spray solution is applied. If agitation is stopped, check that the products are back in suspension before application. After these herbicides are dispersed add carrier to 80 percent of spray solution to be used.

L The **L** chemicals ó liquids and flowables are added next.

E The **E** chemicals are added next. These are the emulsifiable concentrates (EC). Microencapsulated formulations should be added after the emulsifiable concentrates.

Surfactants and oils are added last. Some surfactants, especially silicone-based ones, can cause excessive foaming.

If drift is a problem, consider using a drift control agent.

The last step is to add carrier to 100 percent of the spray solution to be used and check to make sure the spray solution is mixed thoroughly before starting application.

Compatibility (Jar Test)

Compatibility should always be checked before mixing large quantities of pesticides and/or fertilizers. You will need containers and measuring spoons to do the test. This example is based on an application rate of 25 gallons per acre. See **Table 1** for other rates.

- Use two quart jars. Larger containers will be needed for rates lower than 1/4 pound dry or 1/4 pint liquid (see herbicide rates and use, **Table 2**). If carrier is water, put 1 pint of water in each of the two jars. If carrier is fertilizer, add 1 pint of fertilizer to both jars. If a mixture of fertilizer and water, add them in the same ratio they will be used in tank. For example, with a 2:1 fertilizer to water ratio use 2/3 pint fertilizer to 1/3 pint water. Use water and fertilizer from the same source and at the same temperature as when you mix to spray.
- To one jar marked with add 1/4 teaspoon (1.2 ml, 1 teaspoon = about 5 ml liquid) of a compatibility agent and stir. For comparison, no compatibility agent is added to the other jar.
- To both jars add the appropriate amount of herbicide(s). Add dry herbicides first, flowables second, and emulsifiable concentrates last. Stir after adding each material for 5 to 10 seconds.

Dry herbicide: For each pound per acre to be applied, add 1 1/2 level teaspoons. For wettable powders and flowables, preslurrying of each product with water in the ratio of 2 parts product to 1 part water is recommended prior to its addition to the two jars.

Liquid herbicide: For each pint per acre to be applied, add 1/2 teaspoon or 2.5 ml. Also add crop oils, COC, etc.

- Five to 10 minutes after the final addition and mixing, observe both jars for the formation of large flakes, sludge, gels, or other precipitates.

If the incompatibility as described occurs in the jar without the compatibility agent added, the use of a compatibility agent is recommended.

If incompatibility in any of these forms occurs in the jar with the compatibility agent added, the carrier and the herbicide **SHOULD NOT BE TANK MIXED.**

Jars should be allowed to stand and be observed for 1/2 hour.

If you have found the mixture is compatible, start filling the tank. Strong agitation with a rolling effect on the surface of the carrier is recommended. Remember to preslurry the wettable powders and

flowables. Allow time for good dispersal and empty the tank as much as possible before mixing a new batch (See **Mixing Herbicides**, page 19).

Table 1. Amount of dry and liquid herbicide to add to 1 pt of carrier.

Spray Volume Rate/Acre Gal	Dry herbicides tsp/lb*	Liquid herbicides tsp/pt**
5	7 1/2	2 1/2
10	3 3/4	1 1/4
15	2 1/2	1
20	2	3/4
25	1 1/2	1/2
30	1 1/4	1/2
35	1 1/4	1/3
40	1	1/3

*For dry herbicide rates of 1/4 lb use 1/4 the amount listed and for 1/2 lb use 1/2 the amount listed.

**For liquid herbicide rates of 1/4 pint and 1/2 pint, larger containers will be needed. For 1/4 pint use 4 pints of carrier and for 1/2 pint use 2 pints of carrier and the appropriate amount of compatibility agent. Then use the amount of liquid herbicide listed in this table. If other herbicides are used in the mix at pound or pint rates, it is necessary to increase their rates by the rate the carrier was increased.

Table 2. Amount of dry and liquid herbicide to add to 2 gal of carrier.

NOTE: Add 4 teaspoons (20 ml) of compatibility agent to one jar marked with and stir. See Steps 2, 3, and 4, but add according to the table.

Spray Volume Rate/Acre Gal	Dry herbicides tsp/oz	Liquid herbicides tsp/oz
5	7 1/2	2 1/2
10	3 3/4	1 1/4
15	2 1/2	1
20	2	3/4
25	1 1/2	1/2
30	1 1/4	1/2
35	1 1/4	1/3
40	1	1/3

Using UAN to Keep Sprayer from Freezing

In the spring and fall when spraying, overnight temperatures may drop below 32°F causing damage to the sprayer.

What can you do to avoid damage?

One possibility would be to add 28% or 32% UAN to the sprayer tank. Make sure it is agitated because it is heavier than water. Then spray out through the booms. See **Table 1** for the amount needed for the temperature expected.

NOTE: A few herbicides may not be compatible with 28 and 32 UAN. Also UAN in the spray solution may cause injury with some herbicides, especially at higher concentrations. Surfactants plus UAN can cause crop injury. The higher UAN concentrations cause the most injury. This injury can be reduced or eliminated by adding more water and herbicides before starting to spray.

Table 1. Amount of 28 and 32 UAN to add to different amounts of water to keep sprayer from freezing.

% N	Freezing Temperature °F	gal/100 gallons water	
		28-0-0	32-0-0
0	32	0	0
2	27	6.1	5.2
4	23	13.1	11.2
6	18	21.5	18.2
8	14	31.5	26.2
10	9	43.7	35.6
12	5	59.0	47.2
14	0	78.7	61.2

Cleaning the Sprayer

Herbicide residuals in the sprayer can be dissolved by herbicides, solvents and/or adjuvants.

Pesticides may settle to the bottom of the tank if agitation is not adequate. The pesticides also may settle out in the tank, hoses, boom, etc. if the sprayer is shut down. Always end the workday, if possible, with an empty tank. A tank for fresh water mounted on the sprayer will provide water to flush the system in the field and the rinsate can be sprayed on the field of the product is labeled use.

Always keep the sprayer's inside and outside clean. Sprayers with stainless steel booms, which reduce the number of hoses and fittings on the sprayer, are easier to keep clean and have less area for pesticide to build up in the spray booms. Screens and strainers need to be cleaned or replaced. Sumps and pumps along with the inside of the sprayer tank, especially the top and around baffles and plumbing, should be checked.

Select a location to clean the sprayer where any spilled rinsate will not contaminate water supplies, streams, crops or other plants and where puddles will not be accessible to children, pets, livestock, or wildlife.

When going between crops, follow the specific cleanup procedures listed on the label. Some cleanups require special cleaning agents. Sprayer-cleaning agents (see **Table**) should be selected according to the herbicide and formulation to be removed. These agents should penetrate and dissolve pesticide residues which will be removed in the rinsate. Commercial tank cleaning agents are generally preferred and do a better job than household detergents and also can deactivate some herbicides. Following is the spray cleanup procedure listed in University of Missouri publication G4852, *Cleaning Field Sprayers to Avoid Crop Injury*, available on the Web at <http://muextension.missouri.edu/xplor/agguides/crops/g04852.htm>.

This procedure is recommended for all herbicides unless the label specifies a different cleanup procedure. With sensitive crops the best method to avoid herbicide injury from residual in the tank, is to use a separate sprayer for the crops. When some herbicides, such as glyphosate, are left in the tank for a period of time, they absorb products such as Banvel/Clarity/Sterling and hence crop injury can result.

1. Add one-half tank of fresh water and flush tanks, lines, booms, and nozzles for at least 5 minutes using a combination of agitation and spraying. Rinsate sprayed through the booms is best sprayed onto cropland that the pesticide is labeled for to avoid accumulation of pesticide-contaminated rinsate. Thoroughly rinse the inside surfaces of the tank, paying particular attention to the surfaces around the tank fill access, baffles, and tank plumbing fixtures. The use of a 360-degree nozzle, such as the TeeJet Model 27500E-TEF rinsing nozzle, permanently installed to the spray system can automate the cleaning of tops and sides of the tanks. Several nozzles may need to be carefully positioned to clean tanks with baffles. Pressure sprayers are useful for removing caked on internal and external residues. Hot water can increase penetration of dried residues, but adding a hot water rinse may cause unacceptable health hazards due to the vapors produced. Carefully review labeled safety precautions for the agrichemicals and cleaning products used.
2. Fill the tank with fresh water and the recommended cleaning solutions or a commercially available tank cleaner and agitate the solution for 15 minutes. To make a cleaning solution, add **one** of the following to each 50 gallons of water:
 - o 2 quarts of household ammonia (let stand in sprayer overnight for growth regulator herbicides such as 2,4-D, Banvel/Clarity).
 - o 4 pounds of trisodium phosphate cleaner detergent.

Operate the spray booms long enough to ensure that all nozzles and boom lines are filled with the cleaning solution. Let the solution stand in the system for several hours, preferably overnight. Agitate and spray the solution onto areas suitable for the rinsate solution.
3. Add more water and rinse the system again by using a combination of agitation and spraying. Remove nozzles, screens, and strainers and clean separately in a bucket of cleaning agent and water.
4. Rinse and flush the system once again with clean water.

Recommended cleaning agents for selected herbicides.

Herbicide	Recommended Cleaning Solution	Sensitive Crops
2,4-D amine	ammonia + water	all broadleaf crops
2,4-D ester	kerosene or diesel fuel followed by ammonia + water	all broadleaf crops
Accent	ammonia + water	sorghum, sunflower, canola
Action	ammonia or commercial tank cleaner + water	o
Aim	ammonia or commercial tank cleaner + water	sunflower, canola
Ally	ammonia + water	soybean, sunflower, corn, canola
Amber	ammonia + water	soybean, sunflower, corn, sorghum, canola
Assure II	ammonia + water	corn, sorghum, wheat, other grasses
Atrazine	detergent + water	wheat, sunflower, soybean
Authority	ammonia or commercial tank cleaner + water	corn, sorghum, canola
Banvel/Clarity/Sterling	ammonia + water	all broadleaf crops
Basagran	ammonia or commercial tank cleaner + water	o
Basis Gold	ammonia + water	wheat, sunflower, soybean, canola
Basis	ammonia + water	soybean, canola
Beacon	ammonia + water	sorghum, sunflower, soybean, canola
Bladex	ammonia or commercial tank cleaner + water	soybean
Blazer/Status	ammonia or commercial tank cleaner + water	corn, sorghum
Buctril + Atrazine	ammonia or commercial tank cleaner + water	wheat, sunflower, soybean
Buctril/Moxy/Moxynil	ammonia or commercial tank cleaner + water	o
Callisto	ammonia or commercial tank cleaner + water	sunflowers, soybean, sugarbeets, dry beans
Camix	ammonia or commercial tank cleaner + water	sunflowers, soybeans, sugarbeets, dry beans
Canopy	ammonia or commercial tank cleaner + water	corn, sorghum, sunflower, sorghum, canola
Canopy XL	ammonia or commercial tank cleaner + water	corn, sorghum, sunflower, sorghum, canola
Caparol	ammonia or commercial tank cleaner + water	o
Celebrity	ammonia or commercial tank cleaner + water	all broadleaf crops, sorghum, wheat
Classic	ammonia or commercial tank cleaner + water	corn, sorghum, sunflower, sorghum, canola
Cobra	ammonia or commercial tank cleaner + water	corn, sorghum

Table (continued)

Herbicide	Recommended Cleaning Solution	Sensitive Crops
Command	water	corn, sorghum, wheat, oat
Contour	ammonia or commercial tank cleaner + water	soybean, canola, sorghum, wheat, sunflower
Cotoran	ammonia or commercial tank cleaner + water	soybean
Domain	commercial tank cleaner + water	ó
Dual II Magnum	ammonia or commercial tank cleaner + water	ó
Epic	commercial tank cleaner + water	soybean, wheat, sorghum
Exceed	ammonia + water	sorghum, soybean, wheat, sunflower
Expert	ammonia + water	sorghum, canola, sunflower
Finesse	ammonia + water	soybean, sunflower, corn, sorghum, canola
FirstRate	ammonia + water	sunflower, sorghum, canola, corn
Frontier	ammonia or commercial tank cleaner + water	ó
Fusilade/Fusion	ammonia or commercial tank cleaner + water	corn, sorghum, wheat, other grasses
Glean	ammonia + water	soybean, sunflower, corn, sorghum, canola
Glyphosate	usually water; consult label	all crops
Gramoxone Extra	ammonia or commercial tank cleaner + water	all crops
Harmony Extra	ammonia or commercial tank cleaner + water	canola, corn, soybean, sorghum, sunflower
Harness/Keystone/Surpass	ammonia or commercial tank cleaner + water	ó
Hornet	ammonia or commercial tank cleaner + water	soybean, sunflower
Karmex	ammonia or commercial tank cleaner + water	ó
Laddok	ammonia or commercial tank cleaner + water	wheat, sunflower, soybean
Lasso/Partner/Micro-Tech	ammonia or commercial tank cleaner + water	ó
Liberty	commercial tank cleaner + water	all sensitive crops
Lightning	ammonia or commercial tank cleaner + water	soybean, sorghum, wheat, sunflower, canola
Lumax	ammonia or commercial tank cleaner + water	soybean, sunflower, sugareet, dry beans
Marksman	commercial tank cleaner + water	all broadleaf crops
MSMA/DSMA	ammonia or commercial tank cleaner + water	ó
Northstar	commercial tank cleaner + water	all broadleaf crops, sorghum, wheat
Optill	commercial tank cleaner + water	all broadleaf crops
Option	ammonia + water	sorghum, sunflower, canola
Option II	ammonia or commercial tank cleaner + water	corn, sorghum, wheat, other grasses
Peak	ammonia + water	soybean, sunflower, canola
Permit	ammonia + water	soybean, canola, sunflower
Phoenix	ammonia + commercial tank cleaner + water	corn, sorghum
Pinnacle	ammonia + water	sunflower, canola
Poast/Poast Plus	ammonia, commercial tank cleaner, or detergent + water	corn, sorghum, wheat, other grasses
Python	ammonia + water	sunflower, sorghum, canola
Prowl	ammonia or commercial tank cleaner + water	ó
Pursuit Plus	ammonia or commercial tank cleaner + water	sunflower, canola, sorghum
Pursuit	ammonia or commercial tank cleaner + water	sunflower, canola, sorghum
Reflex/Flexstar	ammonia or commercial tank cleaner + water	sorghum
Resource	ammonia or commercial tank cleaner + water	ó
Resolve	ammonia + water	sorghum + all broadleaf crops
Roundup WeatherMax	water	all crops
Scepter	ammonia or commercial tank cleaner + water	sunflower, canola, corn
Scorpion III	ammonia or commercial tank cleaner + water	soybean, sunflower
Select	ammonia or commercial tank cleaner + water	corn, sorghum, wheat, other grasses
Sencor	detergent + water	ó
Shotgun	commercial tank cleaner + water	all broadleaf crops
Squadron	ammonia or commercial tank cleaner + water	sunflower, canola, corn
Staple	ammonia + water	sorghum, corn, canola, sunflower
Steadfast	ammonia + water	sorghum, sunflower, canola
Steel	ammonia or commercial tank cleaner + water	sunflower, canola, corn
Stinger	ammonia + water	sunflower, soybean
Touchdown	commercial tank cleaner + water	all sensitive crops
Treflan	ammonia or commercial tank cleaner + water	ó
Tri-Scept	ammonia or commercial tank cleaner + water	sunflower, canola, corn
Ultra Blazer	ammonia or commercial tank cleaner + water	corn, sorghum
Valor	ammonia + water	corn, wheat, canola, sorghum
Zorial/Rapid 80	ammonia or commercial tank cleaner + water	corn, wheat

Spray Additives

Additives are commonly used with POST herbicides to improve performance. Improved performance results from increased herbicide penetration of the treated plant surface. Additive response varies with the herbicide, weed species, and environmental conditions. Therefore, it is important that additives not be indiscriminately added to the spray mixture.

POST herbicide activity is strongly influenced by the additives included in the spray mixture. The most commonly used spray additives (adjuvants) include oils, surfactants (surface active agents) and fertilizers. The degree of weed control and the potential for crop injury are both influenced by additives. Additive effectiveness varies with herbicide and weed species. The response to an additive will vary with environment, weed species, and herbicide. Often additives that increase weed control also increase crop injury. There is a fine line between increased weed control and increased crop injury.

Oil concentrates include both petroleum and seed derived oils and are usually composed of at least 17% emulsifiers and 83% oil. Combining an emulsifier with the oil results in a unit, one portion of which is highly oil soluble, the other portion water soluble. Without the emulsifier, the oil would not mix with water. Methylation improves the effectiveness of seed oils as spray additives. Oil concentrates are generally used at 1 percent v/v of spray solution or 1 to 2 pt/A depending upon the herbicide, oil, and spray volume.

A material is called a surfactant if it tends to concentrate on the surface of a liquid in which it is mixed. Compounds that function in this way generally consist of two components. One portion of the molecule is hydrophilic (water soluble) and the other portion is lipophilic (oil soluble). Surfactants concentrate at the interface of two surfaces binding them together.

Surfactants are classified by the hydrophilic portion of the molecule. There are three important classes of surfactants: (1) anionic, (2) cationic, and (3) nonionic. **Anionic** surfactants ionize in water to form a negative

ion. **Cationic** surfactants ionize in water to form a positively charged ion. **Nonionic** contain no ionizable groups and therefore carry no charge. They are by far the most commonly used surfactant type.

Organosilicone surfactants are a class of nonionic surfactants that are especially effective in reducing surface tension of water mixtures. This results in efficient wetting of very waxy surfaces. Most other nonionic surfactants interfere with the function of organosilicones and should not be used with them. Organosilicones are most stable and most effective in solutions of pH 6 to 8. In more alkaline or acidic solutions, these compounds hydrolyze with a loss in activity.

Ammonium containing fertilizers are effective spray additives with 28-0-0 and 32-0-0 UAN solutions and 21-0-0 spray grade ammonium sulfate most commonly used. The ammonium in these fertilizers enhances the uptake of certain herbicides, especially weak acids by a mechanism not well understood. While oils and surfactants function primarily at the waxy leaf surface, the ammonium ion functions inside the cell wall. This enhanced activity due to the ammonium ion is pronounced with several POST herbicides. Fertilizers are not surfactants and do not replace the need for surfactants in the spray mixture.

Surfactants exert their effect on the leaf cuticle or spray droplet to enhance penetration of foliar-applied herbicides. This results from a reduction in surface tension of the spray droplets causing them to spread out and wet the sprayed surface. Surface tension causes water to bead on a waxy surface as a result of an energy imbalance, iskin effect at the surface. Plant surfaces are composed of waxes while the spray mixture is primarily water. The surfactant with the hydrophilic end associated with the spray mixture and the lipophilic portion oriented to the lipid-containing plant surface functions as a bond between the two. The result is the spray droplets spread out more completely over the surface. This improved wetting generally results in increased herbicide uptake by the plant, hence increased herbicide activity.

Additives for POST Corn Herbicides

Check the label for specific additive rates and use conditions. Weather conditions, crop and weed growth stages, and herbicide rate will determine the proper additive and use rate. A dash indicates that the additive is not labelled for use with that herbicide.

Herbicide	Nonionic Surfactant	Nonionic Surfactant + UAN***	Crop Oil Concentrate	Crop Oil Concentrate + UAN***	Methylated Seed Oil	Methylated Seed Oil + UAN***
Accent	1-2 pt/A	1/4% + 1-2 qt/A	1%	1% + 1-2 qt/A	1%	1% + 1-2 qt/A
Accent + Atrazine	ó *	ó *	1%	1% + 2-4 qt/A	1%	1% + 2-4 qt/A
Accent + Banvel/Clarity	1/4%	1/4% + 2-4 qt/A	ó	ó	ó	ó
Accent + Buctril	1/4%	1/4% + 2-4 qt/A	ó	ó	ó	ó
Accent + Buctril + Atrazine	1/4%	1/4% + 2-4 qt/A	ó	ó	ó	ó
Accent Gold	ó *	ó	1 /100 gal	1 gal/100 gal + 2 qt/A**	1%	1% + 2 qt/A
Aim	1/4%	1/4% + 2-4 qt/A	1%	1% + 2-4 qt/A	ó	ó
Atrazine	ó *	ó	1 qt/A	ó	1 qt/A	ó
Banvel/Clarity	ó	ó	ó	ó	ó	ó
Basis	ó	1-2 qt/100 gal	ó	1 gal/100 gal	ó	1.25% + 1-2 qt/A
Basis Gold	ó	ó	1 gal/100 gal	1 gal/100 gal + 2 qt/A**	1%	1% + 2 qt/A
Beacon	1/4%	1/4%	1 qt/A	1 qt/A + 2-4 qt/A	3/4-1 qt/A	3/4 qt/A + 2-4 qt/A
Beacon + 2,4-D	1/4%	ó	ó	ó	ó	ó
Beacon + Banvel/Clarity	1/4%	ó	ó	ó	ó	ó
Beacon + Buctril	1/4%	ó	ó	ó	ó	ó
Buctril	ó *	ó	ó *	ó	ó	ó
Buctril + Atrazine	1/4%*	ó	ó	ó	ó	ó
Buctril + Banvel/Clarity	ó	ó	ó	ó	ó	ó
Clarity	1/4%	ó	ó	ó	ó	ó
Callisto	ó	ó	1%	1% + 2.5%	ó	ó
Callisto + Atrazine	ó	ó	1%	1% + 2.5%	ó	ó
Distinct	ó	1/4% + 5 qt/100 gal	ó	ó	ó	ó
Exceed	1/4%	1/4% + 2-4 qt/A	1 qt/A	1 qt/A + 1-2 qt/A	3/4-1 qt/A	3/4-1 qt/A + 2-4 qt/A
Extrazine II 4L	ó	ó	ó	ó	ó	ó
Extrazine II DF	1 qt/A dry	ó	vegetable oil-dry	ó	1% dry	ó
Glyphosate	See page 117 for glyphosate comparison table					
Hornet	1/4%	ó	1%	ó	1%	1% + 2-4 qt/A
Laddok S-12	ó	ó	1.25%	1.25% + 2-4 qt/A	1%	1% + 2-4 qt/A
Liberty	ó	ó	ó	ó	ó	ó
Lightning	ó	1/4% + 1-2 qt/A	ó	ó	ó	ó
Marksman	1/4%	ó	1.25%*	ó	ó	ó
North Star	1/4%	1/4% + 2 qt/A	3/4-1 qt/A	3/4-1 qt/A + 2 qt/A	ó	ó
Permit	1/4%	1/4% + 2-4 qt/A	1%	1% + 2-4 qt/A	ó	ó
Permit + Banvel/Clarity	1/4%	ó	ó	ó	ó	ó
Permit + Buctril	1/4%	ó	ó	ó	ó	ó
Permit + Accent or Beacon	1/4%	ó	ó	ó	ó	ó
Poast Plus or POAST	ó	ó	1.25%	1.25% + 2-4 qt/A	1.25%	1.25% + 2 qt/A
Resource	ó	ó	1.25%	1.25% + 2 qt/A	ó	ó
Sencor + Basagran	ó	ó	ó	ó	ó	ó
Shotgun	ó	ó	ó	ó	ó	ó
Spirit	1qt/100 gal	1/4% + 2-4 qt/A	1 qt/A	1 qt/A + 2-4 qt/A	3/4-1 qt/A	3/4-1 qt + 2-4 qt/A
Steadfast	ó	1/4% + 2 qt/A	ó	1% + 2 qt/A	ó	ó
2,4-D	ó	ó	ó	ó	ó	1% + 2 qt/A
Touchdown**	ó	ó	ó	ó	ó	ó

* Labeled but not normally used due to crop injury.

** Use ammonium sulfate (spray grade) 17 lb/100 gal.

*** AMS at 2-4 lb/A can be substituted for UAN.

Additives for POST Soybean Herbicides

A dash indicates that the additive is not labelled for use with that herbicide.

Herbicide	Nonionic Surfactant	Nonionic Surfactant + UAN^a	Crop Oil Concentrate (COC)	Crop Oil + UAN^a	Methylated Seed Oil	Methylated Seed Oil + UAN^a
Aim	1/4%	ó	ó	ó	ó	ó
Assure II	1/4%	1/4% + 2-4 qt/A**	1.25%	1.25% + 2-4 qt/A	ó	ó
Basagran	ó	ó	1.25%	1/4% + 2-4 qt/A	1.25%	1.25% + 2-4 qt/A
Basagran + Blazer	ó	ó	1.25%*	ó	1.25%	ó
Basagran + Poast Plus	ó	ó	1.25%	1.25% + 1-2 qt/A*,**	1.25%	1.25% + 1-2 qt/A
Basagran + Blazer + Poast Plus	ó	ó	1.25%	ó	1.25%	ó
Basagran + Scepter	1/4%	1% + 2-4 qt/A	1.25%	1.25% + 2-4 qt/A	1.25%	1.25% + 2-4 qt/A
Classic + Assure	1/4%	1/4% + 1-2 qt/A*,**	1.25%	1.25% + 1-2 qt/A**	ó	ó
Classic + Pinnacle + Assure	1/4%	1/4% + 1-2 qt/A*,**	ó	ó	ó	ó
Classic	1/4%	1/4% + 2-4 qt/A**	1/4%*	1.25% + 2-4 qt/A*,**	1%	1% + 2-4 qt/A
Cobra	ó	ó	1.25%	1.25% + 2-4 qt/A*	1.25%	1.25% + 2-4 qt/A
Concert	ó	1/4% + 1-2 qt/A**	ó	1.25% + 1-2 qt/A	ó	ó
Extreme	1 pt/100 gal					
First Rate	1-2 pt/100 gal	1 qt + 2.5%	1.25%	1.25% + 2.5%l	1.25%	1.25% + 2 qt/A
Flexstar	ó	ó	1.25%	1.25% + 2-4 qt/A	1.25%	1.25% + 2.5%
Fusilade + Basagran	1/4%	ó	1.25%	ó	1 qt/A	1 qt/A + 2-4 qt/A
Fusilade or Fusion	ó	ó	1.25%	1.25% + 2-4 qt/A	1 qt/A	ó
Galaxy	ó	ó	1.25%*	1.25% + 2-4 qt/A	1 qt/A	1 qt/A + 2-4 qt/A
Glyphosate	Refer to page 117 for glyphosate comparison table.					
Harmony GT	ó	1/4% + 2-4 qt/A**	ó	ó	1 qt/A*	1 qt/A + 2-4 qt/A
Harmony GT + Basagran	ó	1/4% + 2-4 qt/A	ó	ó	ó	ó
Harmony GT + Classic	1/4%	ó	ó	ó	ó	ó
Phoenix	1/4%	1/4% + 2-4 qt/A	ó	ó	ó	ó
Phoenix + Select	1/4%	1/4% + 2-4 qt/A	ó	ó	ó	ó
Poast Plus	ó	ó	1.25%	1/4% + 2-4 qt/A	ó	ó
Pursuit	ó	1/4% + 1-2 qt/A	ó	1.25% + 1-2 qt/A*,**	1 qt/A	1 qt/A + 2-4 qt/A
Raptor	ó	1/4% + 2-4 qt/A	ó	1/4% + 1-2 qt/A*,**	ó	1% + 1-2 qt/A
Reflex	1/4%	ó	1.25%	1.25% + 1-2 qt/A	ó	1.25% + 1-2 qt/A
Resource	ó	ó	1.25%	1.25% + 1-2 qt/A**	1.25%	1.25% + 1-2 qt/A
Rezult	ó	ó	1 pt/A	1 pt/A + 2-4 qt/A	1.25%	1.25% + 1-2 qt/A
Scepter	1/4%	ó	1.25%	ó	ó	ó
Scepter OT	1/4%	ó	ó	ó	ó	ó
Select	ó	ó	1.25%	1.25% + 2 qt/A	ó	ó
Stellar	1/4%	1/4% + 2-4 qt/A**	1.25%**	1.25% + 2-4 qt/A*,**	1.25%	1.25% + 2 qt/A
Synchrony	ó	ó	1.25%	1.25% + 1-2 qt/A**	1.25%	1.25% + 2-4 qt/A
Touchdown**	ó	ó	ó	ó	ó	ó
Ultra Blazer	1/4%	ó	1.25%	1.25% + 2-4 qt/A	1.25%	1.25% + 1-2 qt/A
Ultra Blazer + Poast Plus	ó	ó	1.25%*	1 qt/A + 2-4 qt/A	ó	ó

Additives for POST Sorghum Herbicides

Check the label for specific additive rates and use conditions. Weather conditions, crop and weed growth stages, and herbicide rate will determine the proper additive and use rate. A dash indicates that the additive is not labelled for use with that herbicide.

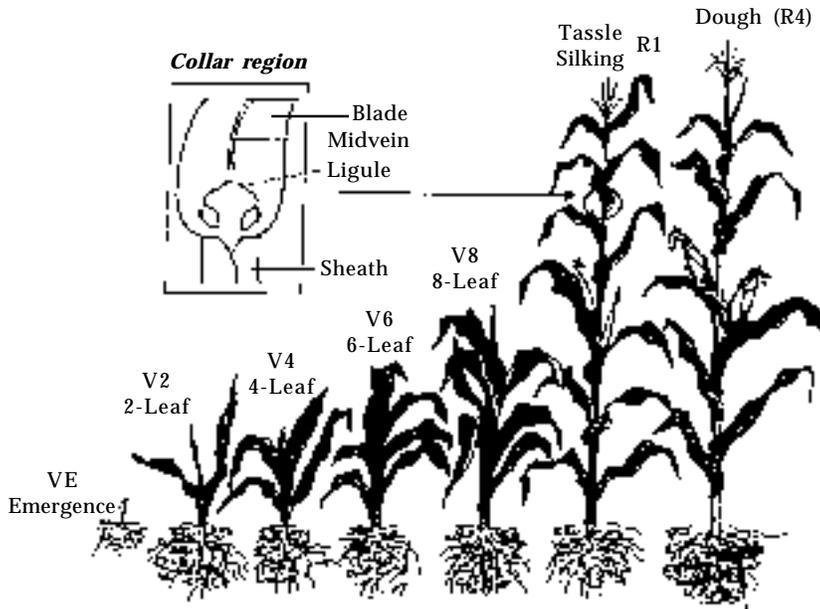
Herbicide	Nonionic Surfactant	Nonionic Surfactant + UAN^a	Crop Oil Concentrate	Crop Oil Concentration + UAN^a	Methylated Seed Oil	Methylated Seed Oil + UAN^a
Aim	1/4%	ó	ó	ó	ó	ó
Atrazine	ó	ó	1.25%	ó	ó	ó
Banvel/Clarity/Sterling	ó	ó	ó	ó	ó	ó
Buctril + Atrazine	1/4%*	ó	ó	ó	ó	ó
Laddok S-12	ó	ó	1.25%	ó	1.25%	ó
Marksman/Sterling Plus	ó	ó	ó	ó	ó	ó
Paramount	ó	ó	1.25%	1 qt + 0.5-1 gal/A**	1.25%	1.25% + 2-4 qt/A
Paramount + Atrazine	ó	ó	1.25%	1 qt + 0.5-1 gal/A**	1.25%	1.25% + 2-4 qt/A
Peak	1/4%	1/4% + 2-4 qt/A	1 qt/A	1.25% + 2-4 qt/A	1 qt/A	1 qt/A + 2-4 qt/A
Permit	1/4%	1/4% + 2-4 qt/A	1%	1% + 2-4 qt/A	1%	1% + 2-4 qt/A
2,4-D	ó	ó	ó	ó	ó	ó
Shotgun	ó	ó	ó	ó	ó	ó

* Labeled but not normally used due to crop injury.

** Use ammonium sulfate (spray grade) 17 lb/100 gal.

*** Crop injury potential is enhanced with COC. Use only for labeled conditions.

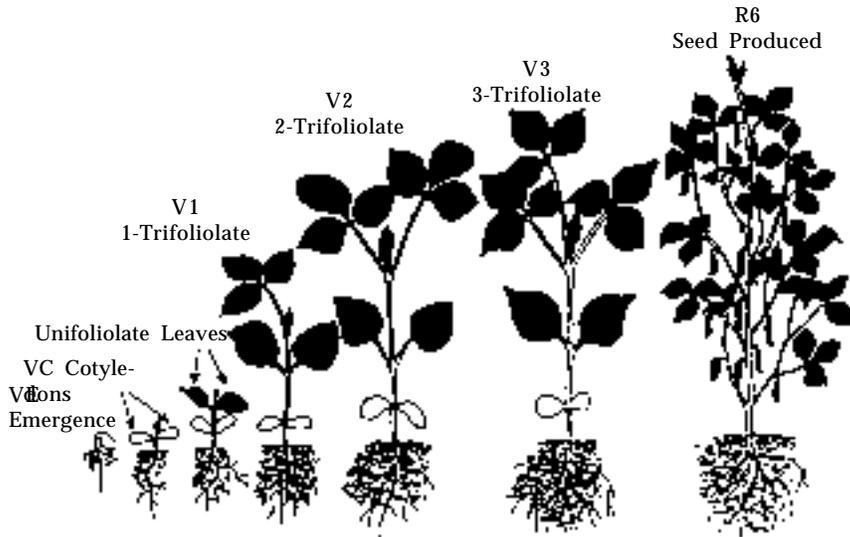
Crop Growth Stages



Corn Growth Stages

Corn Growth Stage Terms

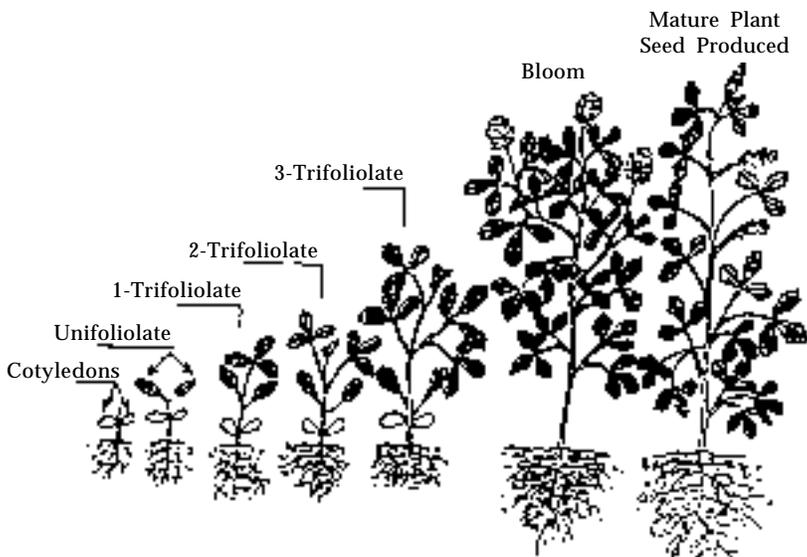
- Emergence (VE) = Plant germinates, pushing coleoptile through soil surface.
- 2 leaf (V2) = Two collars visible.
- Silking (R1) = When silks are visible outside the husks.
- Brown silks (R3) = pollination completed.
- Dough (R4) = Endosperm milk turns thick and pasty.



Soybean/Dry Edible Bean Growth Stages

Soybean/Dry Edible Bean Growth Stage Terms

- Emergence (VE) = Hypocotyl pushes through soil surface.
- Cotyledons (VC) = Unfolding endosperm or specialized seed leaves.
- 1-Trifoliolate (V1) = First node containing 3 leaflets or 1 full leaf.
- R6 = Seed produced.

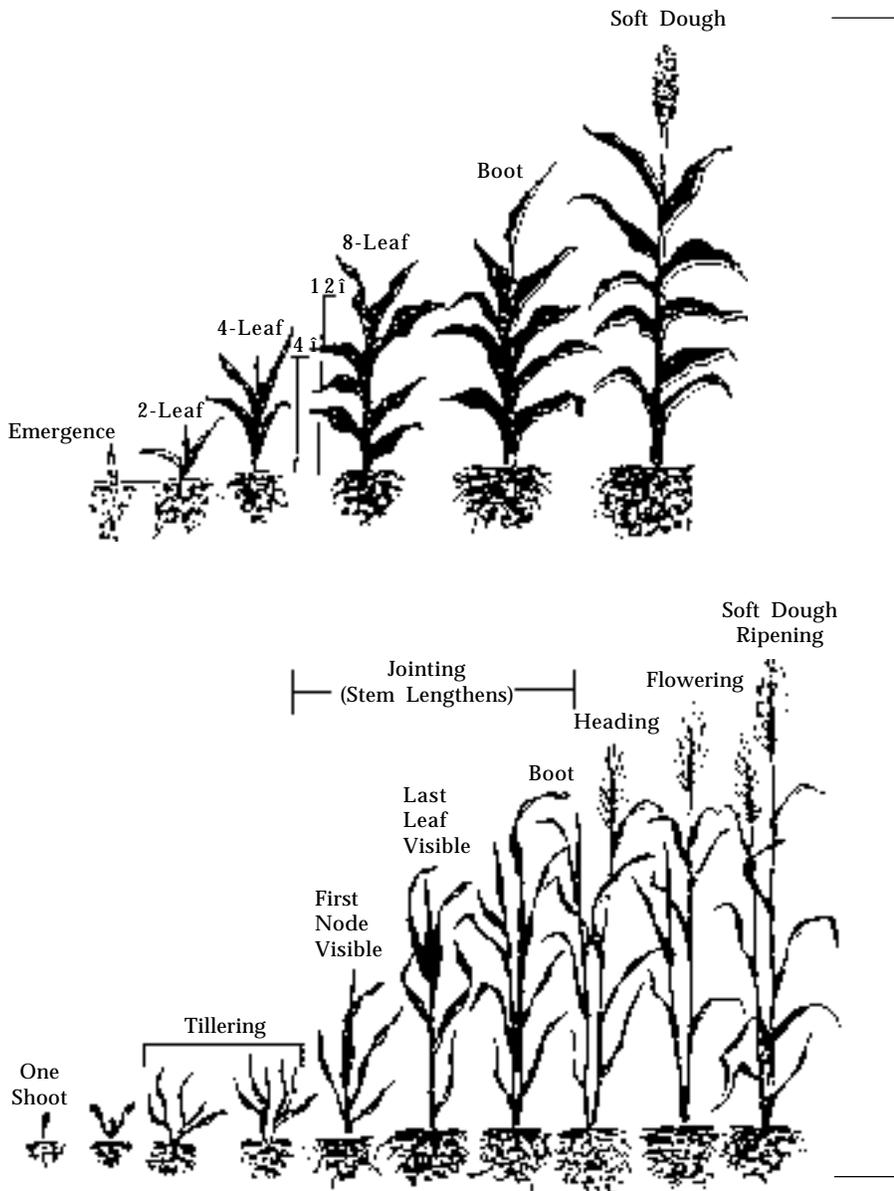


Alfalfa Growth Stages

Alfalfa Growth Stage Terms

- Cotyledons = Unfolding endosperm or specialized seed leaves.
- 1-Trifoliolate = First node containing 3 leaflets or 1 full leaf.
- Bloom = Plant initiates flower development.
- Maturity = Pods with full seed development.

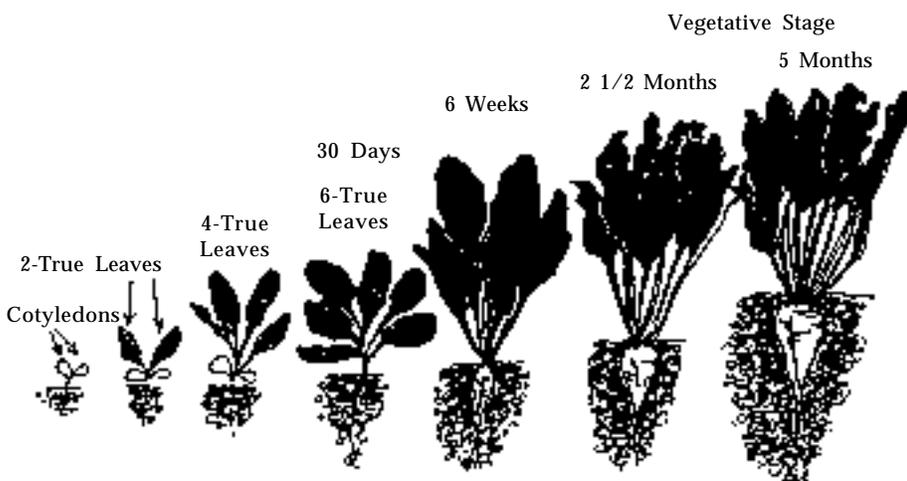
Crop Growth Stages (continued)



Sorghum/Wheat Growth Stages

Sorghum/Wheat Growth Stage Terms

- i Emergence = plant germinates, pushing coleoptile through soil surface.
- i Tillering = plant develops new tillers or shoots
- i Jointing = stem elongation
- i Boat = swelling of stem at top of plant due to developing head.
- i Heading = emergence of head or inflorescence.
- i Dough = endosperm milk turns thick and pasty.



Sugarbeet Growth Stages

Sugarbeet Growth Stage Terms

- i Cotyledons = Unfolding endosperm or specialized seed leaves.
- i 2-True Leaves = First leaves visible above cotyledons.
- i 6-True Leaves = 6 leafed nodes visible.

CRP/Sod Response to Selected Herbicides

<i>Herbicide</i>	<i>Treatment</i>		<i>Alfalfa</i>	<i>Bluegrass</i>	<i>Red Clover</i>	<i>Smooth Brome</i>	<i>Sweet Clover</i>	<i>Tall Fescue</i>
	<i>Time**</i>	<i>Rate/A</i>						
2,4-D + Banvel/Clarity	Spring	1.0 qt + 0.5 pt	9	1	10	2	10	2
2,4-D + Banvel/Clarity	Fall	1.0 qt + 0.5 pt	10	1	10	2	10	2
Gramoxone Max	Spring	1.3 pt	2	5	5	3	3	5
Gramoxone Max	Spring	2.5 pt	3	6	6	4	4	7
Gramoxone Max	Fall	1.3 pt	3	6	6	4	4	6
Gramoxone Max	Fall	2.5 pt	5	6	6	5	4	7
Glyphosate*	Spring	1.0 qt	5	8	5	4	5	5
Glyphosate*	Spring	2.0 qt	6	9	7	6	7	7
Glyphosate*	Fall	1.0 qt	6	9	7	6	7	7
Glyphosate*	Fall	2.0 qt	7	10	9	8	9	9
Glyphosate* + 2,4-D	Spring	1 qt + 1 pt	7	8	8	4	8	5
Glyphosate* + 2,4-D	Spring	2 qt + 1 qt	8	9	9	6	9	7
Glyphosate* + 2,4-D	Fall	1 qt + 1 pt	8	9	9	6	9	7
Glyphosate* + 2,4-D	Fall	2 qt + 1 qt	9	10	10	8	10	8
Glyphosate* + Banvel/Clarity	Spring	1 qt + 0.5 pt	8	8	9	4	9	5
Glyphosate* + Banvel/Clarity	Spring	2 qt + 1 pt	9	9	10	6	10	7
Glyphosate* + Banvel/Clarity	Fall	1 qt + 0.5 pt	9	9	10	6	10	7
Glyphosate* + Banvel/Clarity	Fall	2 qt + 1 pt	10	10	10	8	10	9
Gramoxone + Atrazine	Spring	1.3 pt + 2 lb	5	9	7	7	7	7

<i>Herbicide</i>	<i>Treatment</i>		<i>Warm Season Grasses</i>	<i>Wheatgrass</i>
	<i>Time</i>	<i>Rate</i>		
Gramoxone Max	Spring	1.3 pt	3	3
Gramoxone Max	Spring	2.5 pt	4	4
Gramoxone Max	Fall	1.3 pt	4	4
Gramoxone Max	Fall	2.5 pt	5	5
Glyphosate*	Spring	1.0 qt	4	4
Glyphosate*	Spring	2.0 qt	7	6
Glyphosate*	Fall	1.0 qt	7	6
Glyphosate*	Fall	2.0 qt	9	8
Glyphosate* + 2,4-D	Spring	1 qt + 1 pt	4	4
Glyphosate* + 2,4-D	Spring	2 qt + 1 qt	7	6
Glyphosate* + 2,4-D	Fall	1 qt + 1 pt	7	6
Glyphosate* + 2,4-D	Fall	2 qt + 1 qt	9	8
Glyphosate* + Banvel/Clarity	Spring	1 qt + 0.5 pt	4	4
Glyphosate* + Banvel/Clarity	Spring	2 qt + 1 pt	7	6
Glyphosate* + Banvel/Clarity	Fall	1 qt + 0.5 pt	7	6
Glyphosate* + Banvel/Clarity	Fall	2 qt + 1 pt	9	8
Gramoxone Max + Atrazine	Spring	1.3 pt + 2 lb	3	7
Gramoxone Max + Extrazine	Spring	1.3 pt + 3 lb	3	7

Rating	Percent Control
10 ó	(96-100%)
9 ó	(90-95%)
8 ó	(85-90%)
7 ó	(80-84%)
6 ó	(70-79%)
5 ó	(60-69%)
4-2 ó	less than 60%
1 ó	0

Ratings reflect favorable growing conditions.

* Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

** Response ratings assume that old growth is removed before application and 6-12 inches of new growth is present. Soil moisture affects the response. Soil moisture is usually limiting in the fall in western Nebraska. Response ratings assume the additions of AMS and appropriate surfactant. Fall applications to warm-season grasses must be made prior to dormance, usually before September 15 to October 5. Control of warm-season grasses will decrease after a light frost. Fall applications to cool-season grasses may be made through November 1.

Weed Response to Burndown Herbicides*

No-till Corn and Grain Sorghum

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, temperature, growth stage, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Herbicide	Annual Bluegrass	Chickweed	Downy Brome	Dandelion	Foxtail Barley	Evening Primrose	Henbit	Horseweed (Marestail)	Field Pennycress	Prickly Lettuce	Shepherdspurse	Purslane Speedwell	Virginia Pepperweed	Tall Knotweed	Foxtail	Barnyardgrass	Lambsquarters	Longspine Sandbur	Kochia	Kochia-Triazine-resistant	Russian Thistle	Smartweed/Pennsylvania	Velvetleaf	Sunflower	Corn 6 volunteer	Winter Wheat or Rye	Alfalfa	Sweet Clover	Hairy Vetch	Grain Sorghum**
2,4-D ester (1.0 pt)**	1	7	1	5	1	7	5	7	10	9	10	7	8	6	1	1	9	1	7	4	9	7	8	10	1	1	5	7	9	Y
2,4-D ester (1.0 pt) + Banvel (0.5 pt)**	1	10	1	7	1	8	7	8	10	9	10	7	9	9	1	1	9	2	9	9	9	9	8	10	1	1	9	8	10	N
Atrazine (2.0 qt) + COC	9	10	7	4	9	9	10	8	10	9	10	10	9	10	7	6	10	6	10	1	9	10	10	10	1	6	4	3	6	Y
Atrazine + Banvel** (2.0 qt + 0.5 pt)	10	10	8	8	10	10	10	10	10	10	10	10	10	10	9	7	10	7	10	10	9	10	9	10	2	5	7	9	10	N
Atrazine + 2,4-D** (2.0 qt + 1.0 pt)	10	10	8	6	10	10	10	10	10	10	10	10	10	10	8	7	10	7	10	6	9	10	10	10	2	7	5	8	10	Y
Balance Pro	-	8	5	2	-	-	7	8	6	8	-	-	-	-	8	8	9	8	8	8	-	8	10	7	4	3	2	1	-	N
Balance PM + atrazine	8	9	6	6	-	-	9	9	9	9	10	9	9	10	9	9	10	9	9	8	9	9	10	8	4	4	4	2	-	N
Banvel (0.5 pt)**	1	10	1	8	1	7	7	7	9	9	7	4	7	9	1	1	7	2	9	9	9	8	7	10	1	1	9	8	10	N
Field Master (4.5 qt)	10	10	10	6	8	10	10	10	10	10	10	10	10	10	9	10	10	10	10	9	10	10	10	10	10 ^a	10	4	3	6	N
Gramoxone Max (1.3 pt)	9	10	7	5	7	7	9	7	10	8	9	6	9	8	6	6	7	9	9	9	6	6	8	10	4	6	4	6	8	Y
Gramoxone Max + atrazine (1.3 pt + 2.0 qt)	10	10	10	5	10	10	10	9	10	10	10	10	10	10	9	10	10	10	10	9	9	9	10	10	5	10	5	7	7	Y
LandMaster BW	10	10	10	8	9	9	9	9	10	9	10	10	9	9	9	10	9	10	9	9	9	9	10	10	10 ^a	10	6	5	7	Y
Ready Master ATZ	10	10	10	7	9	10	10	10	10	10	10	10	10	10	9	10	10	10	10	8	10	10	10	10	10 ^a	10	4	3	6	Y
Glyphosate*** (16 oz)	10	10	10	5	9	7	7	6	10	6	10	10	7	9	9	10	7	10	7	7	8	7	7	9	10 ^a	10	4	3	5	Y
Glyphosate*** (24 oz)	10	10	10	7	9	8	9	8	10	7	10	10	8	9	10	10	8	10	8	8	9	8	9	9	10 ^a	10	5	4	6	Y
Glyphosate*** + 2,4-D (16 oz + 1.0 pt)	10	10	10	8	9	9	9	9	10	9	10	10	9	9	9	10	9	10	9	9	9	9	10	10	10 ^a	10	6	5	7	Y
Glyphosate*** + atrazine (16 oz + 1.5 pt)	10	10	10	6	8	10	10	10	10	10	10	10	10	10	9	10	10	10	10	8	10	10	10	10	10 ^a	10	4	3	6	Y

Rating	Percent Control
10 ó	(96-100%)
9 ó	(90-95%)
8 ó	(85-90%)
7 ó	(80-84%)
6 ó	(70-79%)
5 ó	(60-69%)
4-2 ó	less than 60%
1 ó	0

* This guide presents burndown preplant herbicide information only. It **does not** reflect residual weed control.

** Treatment labeled for use in no-till grain sorghum, Y = Yes, N = No.

*** Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

Broadleaf Weed Response To Selected Herbicides

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.

10⁶(96-100%), 9⁶(90-95%),
8⁶(85-89%), 7⁶(80-84%),
6⁶(70-79%), 5⁶(60-69%),
4-2⁶less than 60%, 1⁶0%

	B. Nightshade (3.5) ^β	Cocklebur (5.5)	Kochia (2.5)	Kochia, ALS-resistant (2.5)	Kochia, Triazine-resistant (2.5)	Lambsquarters (1.5)	Morningglory, annual	Pigweed (2.5)	Pigweed, Triazine-resistant (2.5)	Ragweed (4.5)	R. Thistle (2.3)	Smartweed (1.5)	Sunflower (10)	Velvetleaf (4.2)	Waterhemp (2.5)	Waterhemp, ALS-resistant (2.5)	Waterhemp, Triazine-resistant (2.5)	Crop Safety ^a
AAtrex/Atrazine ^{○□△}	9	8	10	10	1	10	9	10	1	9	9	9	7	7	9	9	1	1
Axiom [△]	7	5	5	5	2	8	4	9	7	7	5	6	6	6	7	7	6	2
Axiom + Atrazine/Axiom AT [△]	9	6	9	9	2	9	8	10	6	8	6	8	7	7	9	9	6	2
Balance Pro	8	5	10	10	10	8	4	8	8	8	6	8	6	9	8	8	8	2
Balance Pro + Atrazine	8	7	10	10	10	9	8	9	8	8	6	9	7	9	9	9	8	2
Balance Pro + Bicep II Magnum	9	6	9	9	9	9	7	9	9	7	6	8	6	8	9	9	9	2
Balance Pro + Surpass	9	7	9	9	9	9	4	9	9	8	6	8	6	8	9	9	9	2
Bicep II Magnum or Dual II Magnum + AAtrax ^{○□△}	8	7	9	2	9	9	8	8	8	8	8	6	6	9	9	8	2	
Callisto [△]	9	7	7	7	7	9	6	10	10	8	8	9	9	9	9	9	9	1
Callisto + Dual II Magnum [△]	9	7	7	7	7	9	6	10	10	8	8	9	9	9	9	9	9	2
Define	7	2	2	2	2	7	1	7	7	5	3	2	2	2	7	7	7	2
Define + Balance Pro	9	5	9	9	9	9	4	9	9	9	7	8	6	9	9	9	9	2
Degree Xtra	9	7	9	9	2	9	7	9	7	8	8	8	6	6	9	9	7	2
Dual II Magnum ^{○□△}	7	2	2	2	2	8	1	8	8	5	3	2	2	2	8	8	8	2
Epic	8	6	8	8	8	8	5	9	9	8	6	8	6	9	9	9	9	2
Fultime ^{○△}	9	7	9	9	2	9	8	9	7	8	8	8	6	6	9	9	8	2
G-Max Lite	9	6	7	7	5	8	8	9	8	8	8	8	6	6	9	9	7	2
Guardsman Max ^{○□△}	9	7	7	7	5	9	8	9	8	8	8	9	6	6	9	9	8	2
Harness ^{○△}	7	2	2	2	2	8	1	8	8	5	3	2	2	2	8	8	8	2
Harness Xtra ^{○△}	9	7	9	9	2	9	8	9	7	8	8	8	6	6	9	9	7	2
Hornet [△]	7	8	9	4	9	9	8	9	9	7	8	8	9	8	9	5	9	2
Keystone	9	7	9	9	2	9	8	9	7	8	8	8	6	6	9	9	7	2
Lariat/Bullet or Micro-Tech + Atrazine ^{○□△}	9	7	9	9	2	9	1	9	9	8	8	8	6	6	9	9	7	2
LeadOff ^{○□△}	9	7	9	9	2	9	7	9	7	8	8	8	6	6	9	9	7	2
Lumax [△]	9	7	9	9	7	9	7	10	10	8	8	9	9	9	9	9	9	2
Micro-Tech ^{○□△}	7	2	2	2	2	8	1	8	8	5	3	2	2	2	7	7	7	2
Outlook ^{○□△}	8	2	2	2	3	7	1	8	8	5	3	2	2	2	8	8	8	2
Prowl + Atrazine ^{○□△}	9	6	9	9	5	9	7	9	7	7	7	8	6	7	9	9	6	3
Python	3	5	8	1	8	8	5	8	8	3	8	8	5	8	8	1	8	2
Surpass ^{○△}	7	2	2	2	2	8	1	8	8	5	3	2	2	2	8	8	8	2
Topnotch ^{○△}	8	3	2	2	2	8	1	8	8	6	5	3	2	3	8	8	8	2

^aCrop hybrids vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury.

[○]Registered for popcorn, [□]Registered for sweet corn, [△]Registered for silage.

^βWeed Competitive Index⁶See page 8.

See page 101 for additional footnotes.

Grass Weed Response To Selected Herbicides

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 (less than 60%, 100%)

	Barnyardgrass (0.3) ^β	Crabgrass (0.5)	Fall Panicum (0.4)	Giant Foxtail	Green Foxtail	Yellow Foxtail	Sandbur (0.4)	Shattercane/Sorghum (3.5)	Shattercane, ALS-resistant (3.5)	Woolly Cupgrass	Crop Safety ^a
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Soil Applied Herbicides

AAtrax/Atrazine ^{○□△}	6	4	2	6	7	6	5	1	1	3	1
Axiom [△]	9	9	9	9	9	9	7	6	6	6	2
Axiom + Atrazine/Axiom AT [△]	9	9	9	9	9	9	7	6	6	6	2
Balance Pro	7	7	7	8	9	5	5	5	5	8	2
Balance Pro + Atrazine	8	7	7	8	9	6	5	4	4	8	2
Balance Pro + Bicep II	8	8	8	9	9	8	5	5	5	9	2
Balance Pro + Surpass	8	7	8	9	9	9	5	6	4	9	2
Bicep II Magnum ^{○□△}	9	9	9	9	9	9	6	4	4	6	2
Callisto [△]	1	7	1	1	1	1	1	1	1	1	1
Callisto + Dual II Magnum [△]	9	9	9	9	9	9	5	4	4	6	2
Define	9	9	9	9	9	9	5	4	4	6	2
Define + Balance Pro	9	9	9	9	9	9	6	5	5	8	2
Degree Xtra	9	9	9	9	9	9	6	4	4	7	2
Dual II Magnum ^{○□}	9	9	9	9	9	9	5	4	4	6	2
Epic	8	8	8	9	9	9	6	5	5	8	2
FulTime ^{○△}	9	9	9	9	9	9	6	4	4	8	2
G-Max Lite	9	9	9	9	9	9	7	4	4	8	2
Guardsman Max ^{○□△}	9	9	9	9	9	9	7	4	4	8	2
Harness ^{○△}	9	9	9	9	9	9	6	4	4	7	2
Harness Xtra ^{○△}	9	9	9	9	9	9	6	4	4	8	2
Hornet [△]	1	1	1	1	1	1	1	1	1	1	2
Keystone	9	9	9	9	9	9	6	4	4	8	2
Lariat/Bullet or Micro-Tech + Atrazine ^{○□△}	9	9	9	9	9	6	4	4	6	2	
LeadOff ^{○□△}	9	9	9	9	9	9	4	3	3	6	2
Lumax [△]	9	9	9	9	9	9	6	4	4	6	2
Micro-Tech ^{○□△}	9	9	9	9	9	9	6	4	4	6	2
Outlook ^{○□△}	9	9	9	9	9	9	5	4	4	6	2
Prowl + Atrazine ^{○□△}	8	9	9	9	9	9	7	3	3	7	3
Python	1	1	1	1	1	1	1	1	1	1	2
Surpass ^{○△}	9	9	9	9	9	9	6	4	4	7	2
Topnotch ^{○△}	9	9	9	9	9	9	6	4	4	7	2

^aCrop hybrids vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury.

[○]Registered for popcorn, [□]Registered for sweet corn, [△]Registered for silage.

^βWeed Competitive Index[○]See page 8.

See page 101 for additional footnotes.

Broadleaf Weed Response To Selected Herbicides

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 106(96-100%), 96(90-95%),
 86(85-89%), 76(80-84%),
 66(70-79%), 56(60-69%),
 4-26less than 60%, 160%

	B. Nightshade (3.5) ^b	Cocklebur (5.5)	Kochia (2.5)	Kochia, ALS-resistant (2.5)	Kochia, Triazine-resistant (2.5)	Lambsquarters (1.5)	Morningglory	Pigweed (2.5)	Pigweed, Triazine-resistant (2.5)	Ragweed (4.5)	R. Thistle (2.3)	Smartweed (1.5)	Sunflower (10)	Velvetleaf (4.2)	Waterhemp (2.5)	Waterhemp, ALS-resistant (2.5)	Waterhemp, Triazine-resistant (2.5)	Crop Safety ^a
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Postemergence Herbicides

Weed size influences performance[○]see label

AAtrax/Atrazine ^{○□△}	9	9	9	9	1	9	8	9	1	9	9	4	9	8	8	8	1	1
Accent [○]	3	5	6	1	6	4	6	7	7	1	3	7	4	4	7	1	7	2
Accent + Atrazine [○]	9	9	9	9	6	9	8	9	7	9	4	9	9	8	9	7	7	2
Accent + Banvel/Clarity or Celebrity Plus [○]	7	9	8	7	8	7	9	8	8	8	8	9	8	7	8	7	8	3
Accent + Beacon [○]	8	9	8	1	8	4	6	8	8	9	7	8	9	6	8	1	8	2
Accent + Buctril [○]	9	9	8	8	8	7	7	8	8	8	9	9	8	7	8	6	8	2
Accent Gold	7	9	6	6	6	7	7	7	7	8	5	8	9	8	6	4	6	3
Aim	9	7	6	6	6	9	7	8	8	6	6	8	5	10	7	7	7	2
Aim + Atrazine	9	8	8	8	6	9	9	9	8	7	6	8	6	10	8	8	7	2
Aim + Clarity	9	8	9	8	8	9	9	9	9	8	9	9	7	10	8	8	8	3
Aim + Atrazine + Clarity	9	8	8	8	7	9	9	9	9	8	8	8	6	10	8	8	7	2
Banvel/Clarity/Sterling ^{○△}	7	9	8	8	8	8	9	8	8	8	9	9	8	6	7	7	7	3
Basis	3	9	3	1	3	7	5	9	9	5	4	8	7	8	8	1	8	3
Basis Gold	9	9	8	3	5	9	8	9	6	9	9	8	8	8	8	7	6	2
Beacon ^{○△}	8	8	8	1	8	5	6	8	8	9	5	8	9	6	8	1	8	2
Buctril [○] /Connect [○]	9	9	8	8	8	8	7	6	6	9	7	9	9	7	6	6	6	2
Buctril + Atrazine ^{○□△}	9	9	9	9	8	9	9	9	6	9	8	9	9	8	8	8	6	2
Buctril + Banvel/Clarity/Sterling	9	9	9	9	9	7	9	8	8	7	9	9	9	8	8	8	8	3
Callisto [△]	9	9	6	6	6	9	6	9	9	6	9	9	9	9	9	9	9	1
Callisto + atrazine [△]	9	9	8	8	6	9	8	10	9	8	9	9	9	9	10	10	9	1
Distinct	7	9	8	8	8	8	9	8	8	8	9	9	8	6	7	7	7	3
Exceed ^{○□△}	8	9	8	1	8	7	7	9	9	9	4	8	9	8	8	1	8	2
Hornet [△]	7	9	6	6	6	8	7	7	7	8	5	8	9	8	6	5	6	3
Laddok S-12 ^{○□△}	7	9	8	8	7	7	8	8	2	9	2	9	9	9	8	8	1	1
Liberty	8	9	7	7	7	7	8	7	7	9	8	9	9	8	7	7	7	1
Liberty ATZ	9	9	9	9	7	9	9	9	7	9	9	9	9	9	9	9	7	1
Lightning	8	9	8	1	8	8	8	9	9	7	5	8	8	9	6	1	6	1
Lightning + Clarity	8	9	9	9	9	9	9	9	9	8	8	9	8	9	8	8	8	3
Marksman	9	9	8	8	8	9	9	9	8	9	7	9	9	8	9	9	7	2
Northstar* ^{○□△}	8	9	8	4	8	8	8	8	8	9	8	9	9	6	7	4	7	2
Option	8	5	3	1	3	6	5	7	7	5	3	3	7	7	7	1	7	2
Permit	3	9	6	1	6	5	5	9	9	9	4	7	9	9	8	1	8	2
Ready Master ATZ	8	9	9	9	7	9	8	9	8	8	9	9	9	9	9	9	8	1
Resource	4	5	3	3	3	7	5	5	5	7	3	4	4	10	5	5	5	2
Glyphosate* (1.0 qt)	8	9	8	8	8	8	6	9	9	8	7	8	9	8	9	9	9	1
Sencor + 2,4-D	7	10	8	8	5	7	9	7	7	8	2	7	8	8	7	7	8	3
Sencor + Banvel/Clarity/Sterling	8	9	8	8	8	7	9	8	8	8	9	9	8	7	8	8	7	3
Sencor + Basagran	7	9	8	8	7	7	3	7	2	9	2	9	9	9	6	6	3	2
Spirit	8	8	8	1	8	6	6	8	8	9	4	8	9	7	8	1	8	2
Steadfast	3	5	6	1	6	6	5	7	7	1	3	7	7	5	7	1	7	2
Tough + Atrazine	9	9	9	9	8	9	8	9	9	9	4	9	9	8	9	9	4	2
2,4-D ^{○□△}	6	10	5	5	5	8	9	7	7	8	4	5	7	8	8	8	8	3
Yukon	6	9	7	7	7	8	8	9	9	9	7	8	9	9	8	6	8	2

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury, unless in whorl. If stand is not lost, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety, for some herbicide combinations. Refer to product label for specific information.

[○]Registered for popcorn, [□]Registered for sweet corn, [△]Registered for silage.

^bWeed Competitive Index[○]See page 8.

* Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

Grass Weed Response To Selected Herbicides

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, temperature, growth stage, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 less than 60%, 1 0%

Barnyardgrass (0.3) ^β	Crabgrass (0.5)	Fall Panicum (0.4)	Giant Foxtail (2.0)	Green Foxtail (1.0)	Yellow Foxtail (1.0)	Sandbur (0.4)	Shattercane/Sorghum (3.5)	Shattercane, ALS-resistant (3.5)	Woolly Cupgrass (2.5)	Crop Safety ^a
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Postemergence Herbicides

Weed size influences performance see label

AAtrex/Atrazine ^{○□△}	5	4	2	5	6	6	4	2	1	5	2
Accent [○]	8	4	8	8	8	8	8	10	1	7	2
Accent + Atrazine [○]	8	2	8	8	8	8	8	10	1	8	2
Accent + Banvel/Clarity or Celebrity Plus [○]	8	2	8	8	8	7	8	10	1	7	3
Accent + Beacon [○]	4	3	7	8	8	8	8	10	1	5	2
Accent + Buctril [○]	8	2	8	8	8	8	8	10	1	7	2
Accent Gold	8	7	8	8	8	7	7	10	1	6	3
Aim	1	1	1	1	1	1	1	1	1	1	2
Aim + Atrazine	3	2	1	2	2	2	1	1	1	2	2
Aim + Clarity	1	1	1	1	1	1	1	1	1	1	3
Aim + Atrazine + Clarity/Sterling	2	1	1	2	2	2	1	1	1	1	2
Banvel/Clarity/Sterling ^{○△}	2	2	2	2	2	2	2	2	2	1	3
Basis	7	7	7	7	8	7	7	10	1	4	3
Basis Gold	8	7	8	8	8	7	7	10	1	7	2
Beacon ^{○△}	2	3	7	5	4	5	4	10	1	2	2
Buctril [○] /Connect	2	2	2	1	1	1	2	2	2	1	2
Buctril + Atrazine [○]	2	2	2	2	2	2	2	2	2	3	2
Buctril + Banvel/Clarity/Sterling	2	2	2	2	2	2	2	2	2	1	3
Callisto [△]	1	8	1	1	1	1	1	1	1	1	1
Callisto + atrazine [△]	1	8	1	1	1	1	1	1	1	1	1
Distinct	6	2	6	4	7	5	2	6	6	3	3
Exceed ^{○△}	2	2	3	4	3	4	2	9	1	2	2
Hornet	1	1	1	1	1	1	1	1	1	1	3
Laddok S-12 ^{○□}	2	2	2	2	2	2	2	2	2	2	1
Liberty	7	8	7	8	7	8	6	8	8	8	1
Liberty ATZ	6	7	6	8	8	7	6	7	7	7	1
Lightning	8	7	8	8	7	7	8	9	1	8	1
Lightning + Clarity	8	7	8	8	7	7	8	9	1	8	3
Marksman	2	2	2	2	2	2	2	2	2	2	2
Northstar	2	2	2	3	2	4	2	9	2	2	2
Option	8	7	8	8	8	8	7	10	1	6	2
Permit	1	1	1	1	1	1	1	1	1	1	2
Ready Master ATZ	9	9	9	9	9	9	9	9	9	8	1
Glyphosate* (1.0 qt)	10	9	10	10	10	10	10	10	10	9	1
Sencor + 2,4-D	2	2	2	2	2	2	2	2	2	1	3
Sencor + Banvel/Clarity/Sterling	2	2	2	2	2	2	2	2	2	1	2
Sencor + Basagran	2	2	2	1	1	1	2	2	2	1	2
Spirit	2	2	5	4	3	5	3	10	1	3	2
Steadfast	8	7	8	8	8	8	8	10	1	7	2
Tough + Atrazine	4	4	2	4	5	5	4	2	2	2	2
2,4-D ^{○□△}	2	2	2	1	1	1	2	2	2	1	3
Yukon	1	1	1	1	1	1	1	1	1	1	2

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury, unless in whorl. If stand is not lost, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety, for some herbicide combinations. Refer to product label for specific information.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

[○]Registered for popcorn, [□]Registered for sweet corn, [△]Registered for silage.

^βWeed Competitive Index[○]See page 8.

Corn

No-Till

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM		
Cool-Season Grass Sod (including smooth brome and bluegrass)					
AATREX DF ^{c□□△} + GRAMOXONE MAX ¹	1.6 lb 1.3-2.1 pt	2.2 lb 1.3-2.1 pt	2.2 lb 1.3-2.1 pt	Apply when grass is 4-6" and before corn emerges	Cost: AAtrex DF + Gramoxone Max \$9.60-\$16.40.
GLYPHOSATE**	48-64 oz	48-64 oz	48-64 oz	Fall new growth	Use appropriate herbicide at planting. Plant RR Corn. Cost: glyphosate \$9.40-\$20.00.
Alfalfa/Clover Sod					
2,4-D ester (4L) + BANVEL/CLARITY/ STERLING followed by appropriate herbicide at planting or early preplant	1 qt 0.5 pt	1 qt 0.5 pt	1 qt 0.5 pt	Apply in fall or Apr.-May to alfalfa with 4-6" new growth and at least 7 days before planting	2,4-D + Banvel used to kill alfalfa. Don't apply with 28% UAN or a triazine herbicide. If smooth brome or bluegrass is present, add glyphosate. On sandy soils delay planting corn 10 days. Cost: \$9.00.
Rye or Winter Wheat					
ATRAZINE DF ^{3□□△} + BALANCE PRO ² + GRAMOXONE MAX ¹	Do not use ^c Do not use ^c Do not use	1.6 lb 1.9-3.0 oz 1.3 pt	1.7 lb 2.2-3.8 oz 1.3 pt	Apply when rye and wheat are 2-4" and before corn emerges	On dryland, moisture may be inadequate for corn. Cost: Atrazine + Balance + Gramoxone Max \$23.30-\$36.40.
AATREX DF ^{3□□△} + GRAMOXONE MAX ¹	1.4 lb 1.3 pt	1.6 lb 1.3 pt	1.7 lb 1.3 pt		Add appropriate annual grass herbicide. Cost: AAtrex + Gramoxone Max \$10.10-\$10.90.
GLYPHOSATE**	10-13 oz	10-13 oz	10-13 oz	Apply when rye and wheat are 4-10" and before corn emerges	Use appropriate herbicide at planting. Cost: glyphosate \$2.00-\$5.00.
FIELD MASTER	3.5-5 qt	4-5 qt	4-5 qt	PRE	If 2,4-D or dicamba is needed they must be applied greater than 7 days before planting corn. Cost: \$22.46-\$32.09.

^cRate required may pose risk of groundwater contamination.

*See page 108 for more details.

** Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Corn No-Till (Continued)

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM		
Continuous Corn 6 If RR volunteer corn is present, use paraquat in tank mix.					
If split applications are made, use 2/3 of broadcast rate 30-45 days before planting and rest at planting. Products: AAtrex, Dual II Magnum, Bicep II Magnum, Bicep Lite II Magnum, Guardsman					
AATREX/ATRAZINE DF ³ □□△	1.6 lb	2.2 lb	2.2 lb		Add 0.5-1 pt of 2,4-D ester or 0.5 pt Banvel/Clarity to control broadleaf weeds. For triazine resistant kochia add Banvel/Clarity. Add Gramoxone Extra or Roundup Ultra to control emerged grass. For volunteer corn (non Roundup Ready) use Roundup Ultra ¹ at 12-16 oz in 5 gpa water before crop emergence. Cost: Atrazine \$4.30-\$5.90; Atrazine + Dual II Magnum \$14.60-\$24.30.
AATREX/ATRAZINE DF ³ □□△	1.3-1.8 lb	1.5-2.0 lb	2.0-2.2 lb	0-45 DBP	
+ DUAL II MAGNUM	0.8-1.0 pt	1.0-1.33 pt	1.33 pt		
BALANCE PRO ²	Do not use	3.0-3.7 oz	3.7-4.5 oz	8-30 DBP	Use higher rate in fields with greater grass weed density. Use only on tolerant hybrids if applied PRE. Do not apply Balance if Command was used the previous year on soybean.
		1.9-3.0 oz	2.2-3.7 oz	0-7 DBP	
BALANCE PRO ²	Do not use	1.9-3.0 oz	3.7-4.5 oz	8-30 DBP	Cost: Balance \$10.10-\$25.50; Balance + Atrazine \$13.70-\$19.80; Balance + Bicep II Magnum \$26.30-\$33.60; Balance + FulTime \$21.00-\$34.30; Balance + Harness Xtra \$27.20-\$45.40; Balance + Atrazine + Dual II Magnum \$22.80-\$28.60; Balance + Surpass + Atrazine \$26.40-\$42.90.
+ ATRAZINE DF		1.9-3.0 oz	2.2-3.0 oz	0-7 DBP	
+ DUAL II MAGNUM		0.75 pt	1.0 pt		
BALANCE PRO ²	Do not use	2.2-3.7 oz	2.2-3.0 oz	0 to 7 DBP	
+ ATRAZINE DF		1.3 lb	2.0 lb		
or BICEP II MAGNUM		1.5-1.75 qt	1.75 qt		
or FULTIME		1.5-2.0 qt	1.75-2.7 qt		
or HARNESS XTRA 6		1.5-2.0 qt	1.75-2.7 qt		
or SURPASS		1.5-2.0 qt	1.75-2.7 qt		
+ ATRAZINE DF		1.2 lb	1.7 lb		
BICEP II MAGNUM ^{□□△}	1.6 qt	2.1 qt	2.1-2.6 qt	0-45 DBP	Cost: Bicep II Magnum \$17.30-\$28.10; Bicep Lite II Magnum \$21.10-\$30.90;
BICEP LITE II MAGNUM ^{□□△}	1.5 qt	1.5-1.9 qt	1.9-2.2 qt	0-45 DBP	
FIELDMASTER ^{□□△}	3.5-5 qt	4-5 qt	4-5 qt	PRE	If 2,4-D or dicamba is needed, both must be applied more than 6 days before planting corn. Cost: Fieldmaster \$22.40-\$32.09; FulTime \$18.10-\$36.30; Guardsman Max \$13.90-\$22.30; Harness XTRA \$16.40-\$21.00; Harness XTRA 5.6 \$16.00-\$23.70; Leadoff \$11.60-\$23.10; Lumax \$27.50; Surpass + Atrazine \$16.30-\$26.50; Topnotch + Atrazine \$21.40-\$31.80.
FULTIME ^{□□△}	Do not use	2.7-4.0 qt	3.3-5.0 qt	14-40 DBP	
	Do not use	2.7-3.3 qt	3.0-5.0 qt	0-14 DBP	
GUARDSMAN MAX ^{□□△}	2.5-3 pt	3-4 pt	4 pt	0-45 DBP 12icorn	
HARNESS XTRA ^{□□,△}	1.8 qt	2.3 qt	2.3 qt	14 DPB	
HARNESS XTRA 5.6 ^{□□△}	1.4 qt	2.3-2.6 qt	2.3-3.0 qt	0-14 DBP	
KEYSTONE	Do not use	2.4-3.4 qt	2.8-3.4 qt	14-30 DBP	See label for pre and post tank-mix combinations.
		2.2-2.6 qt	2.4-2.8 qt	0-14 DBP	
		2.2-2.6 qt	2.4-2.8 qt	PRE	
LEADOFF ^{□□△}	3.0-3.5 pt	3.5-4.5 pt	4.5-5.0 pt	16-30 DBP	
	2.5-3.0 pt	3.0-4.0 pt	4.0-4.5 pt	0-15 DBP	
LUMAX ^{□□△}	2.5 qt	2.5 qt	2.5 qt	0-10 DBP	
SURPASS ^{□□△}	1.5-2.25 pt	1.5-2.5 pt	1.5-2.75 pt	0-14 DBP	
+ ATRAZINE DF	1.2 lb	1.4 lb	1.7 lb		
TOPNOTCH ^{□□△}	2.0-2.5 qt	2.5 qt	2.5-3.0 qt	10-30 DBP	
+ ATRAZINE DF	2.0 qt	2.0-2.5 qt	2.5-3.0 qt	0-10 DBP	
	1.2 lb	1.4 lb	1.7 lb		

See page 101 for additional footnotes.

Ridge-Till

Herbicide <i>(See Weed Response Charts on page 28 before selecting herbicides)</i>	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam <i>< 1% OM</i>	Silt Loam <i>1-2% OM</i>	Silty-Clay Loam <i>> 2% OM</i>		
GLYPHOSATE** ¹	24-32 oz	24-32 oz	24-32 oz	Apply 1-2 weeks preplant to prevent winter annuals and kochia from using soil water.	Glyphosate provides good control on annual grasses less than 6i tall and good to excellent control on broadleaves 6i or less. Follow with appropriate herbicide at planting. Cost: glyphosate + Banvel/Clarity/Sterling \$8.60; 2,4-D + Banvel/Clarity/Sterling \$7.30; Gramoxone Max + Atrazine \$8.90; glyphosate (generic) \$4.70-\$6.30.
GLYPHOSATE**	16 oz	16 oz	16 oz		
+ BANVEL/CLARITY/STERLING	0.5 pt	0.5 pt	0.5 pt		
2,4-D ester (4L)	1 pt	1 pt	1 pt		
+ BANVEL/CLARITY/STERLING	0.5 pt	0.5 pt	0.5 pt		
GRAMOXONE MAX ¹	1.3 pt	1.3 pt	1.3 pt		
+ ATRAZINE DF	1.2 lb	1.2 lb	1.2 lb		

Field Corn, Popcorn[○] Sweet Corn[□] and Silage[△]

Tilled Seedbed — Soil Applied

Herbicide <i>(See Weed Response Charts on pages 30-33 before selecting herbicides)</i>	Commercial Product per Acre			Application Time, Remarks and Approximate Cost/A Broadcast
	Sandy Loam <i>< 1% OM</i>	Silt Loam <i>1-2% OM</i>	Silty-Clay Loam <i>> 2% OM</i>	
AATREX/ATRAZINE DF ^{3○□△}	Do not use ^c	2.2 lb	2.2 lb	EPP, PPSA, PPI, PRE, SURFACE MIX, or EPOST ⁶ May affect sensitive crops the following year especially on high pH soils. Cost: \$5.90.
AXIOM AT [△]	6	2.0-2.75 lb	2.75-3.0 lb	EPP, PPSA, PPI, and PRE. Do not use on coarse textured soils with less than 1% organic matter content. Cost: \$11.20-\$16.80.
AXIOM DF [△] alone or with ATRAZINE DF ³	13 oz 1.1 lb	15-18 oz 1.4-1.7 lb	20-22 oz 1.7-1.8 lb	EPP, PPSA, PPI, PRE, or SURFACE MIX ⁶ Tank-mix with atrazine improves broadleaf weed control and increases soil residual. Cost: Axiom \$14.90-\$25.20; Axiom + atrazine \$11.20-\$16.80.
BALANCE PRO ^{△2}	Do not use	1.9-3.0 oz	2.2-3.8 oz	PPSA, PPI, or PRE. Do not apply after corn emerges. Tank-mix Balance with a grass herbicide for improved grass control. Balance + atrazine improves cocklebur and sunflower control. Do not use Balance where water table is within 25 feet of surface and soil organic matter is less than 2%. If soil pH is greater than 7.5, reduce Balance rate by .25 oz/A. On a soil with less than 1.5% organic matter content, use lowest rate in column. May be applied up to 30 days preplant. Plant corn at least 1 1/2 inches deep. Cost: Balance \$12.70-\$25.50; Balance + Atrazine \$16.20-\$24.10; Balance + Bicep \$29.20-\$37.10.
BALANCE PRO ^{△2} with ATRAZINE DF ³	Do not use	1.9-3.0 oz	2.2-3.0 oz	
or BICEP II MAGNUM ³		1.3 lb	1.5 lb	
BICEP II MAGNUM ^{3○□△}	1.6 qt	1.6-2.1 qt	2.1-2.6 qt	EPP, PPSA, PPI, PRE, SURFACE MIX, or EARLY POST ⁶ Bicep Lite at 1.5 qt/A has 40% less atrazine than Bicep II Magnum at 2.1 qt/A. Both products at these rates contain 1.25 lb s-metalochlor. Cost: Bicep II Magnum \$17.30-\$28.10; Bicep Lite II Magnum \$12.30-\$30.00.
BICEP LITE II MAGNUM ^{3○□△}	0.9 qt	1.1-1.5 qt	1.5-2.2 qt	
BULLET ^{3○□△}	3.0 qt	3.2 qt	3.5 qt	PPSA, PRE, or SURFACE MIX. Cost: \$14.80-\$17.30.
CALLISTO alone [△] or with DUAL II MAGNUM or BICEP II MAGNUM ³ or BICEP LITE II MAGNUM ³	6.0 oz 1.0 pt 1.6 qt 1.5 qt	6.0 oz 1.3 pt 1.8-2.1 qt 1.5 qt	6.0 oz 1.3 pt 2.1 qt 1.5-2.2 qt	PRE. Callisto can be tank mixed with other PRE herbicides to broaden weed control spectrum. For postemergence application, refer to post-emergence section. Cost: Callisto \$24.30; with Dual \$38.10-\$42.20; with Bicep \$41.60-\$47.00; with Bicep Lite \$45.40-\$55.20.

^cRate required may pose risk of groundwater contamination.

* Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Tilled Seedbed (Continued)

Herbicide <i>(See Weed Response Chart on pages 29-30 before selecting herbicides)</i>	Commercial Product per Acre			Application Time, Remarks and Approximate Cost/A Broadcast
	Sandy Loam <i>< 1% OM</i>	Silt Loam <i>1-2% OM</i>	Silty-Clay Loam <i>> 2% OM</i>	
DEFINE alone [△] or with BALANCE PRO ²	12 oz ó	14-16 oz 1.9-3.0 oz	18-20 oz 2.2-3.0 oz	PPSA, PPI, or PRE. Define can be tank mixed with many other PRE herbicides to broaden the weed control spectrum. Cost: Define \$14.70-\$24.50; Define + Balance \$29.90-\$44.60.
DUAL II MAGNUM ^{○□△} or DUAL IIG MAGNUM ^{○□△}	1.0 pt 6-8 lb	1.3 pt 8-10 lb	1.7 pt 10-12 lb	EPP, PPSA, PRE, or SURFACE MIX ó Dual II Magnum and Dual II Magnum + AAtrex may be applied early post. Dual II may be applied layby. Cost: Dual II Magnum \$13.80-\$23.40; Dual II Magnum + AAtrex \$16.80-\$22.80.
DUAL II MAGNUM ^{○□△} + AATREX DF ^{3○□△}	1.0 pt 1.1 lb	1.3 pt 1.4 lb	1.3 pt 1.8 lb	
EPIC alone or with ATRAZINE DF	Do not use Do not use	11-15 oz 0.8-1.1 lb	11-15 oz 1.1-1.4 lb	EPP, PPSA, PPI or PRE ó Use low rates for soils with pH greater than or equal to 7.4 or with less than 1.5% organic matter content. May be applied up to 14 days before planting. Do not plant any rotational crop for at least 6 months after application. Cost: Epic \$22.89-\$31.20; Epic + Atrazine \$25.10-\$35.10.
FIELDMASTER	3.5-5 qt	4-5 qt	4-5 qt	PRE. Cost: \$22.40-\$32.00.
FULTIME ^{b○△}	2.5-2.7 qt	2.7-3.0 qt	3.0-3.5 qt	EPP, PPSA, PRE, or SURFACE MIX. Cost: \$18.10-\$25.40.
G-MAX LITE	2 pt	2.5 pt	3.5 pt	PPSA, PRE, PPI. Cost: \$12.00-\$21.00.
GUARDSMAN MAX ^{3○□△}	2.4-2.8 pt	2.8-3.4 pt	3.4-4.0 pt	PPSA, PRE, PPI or EARLY POST. Cost: \$13.40-\$22.30.
HARNES ^{○△} or DEGREE	1.25-1.75 pt 2.3-3.2 pt	1.75-2.25 pt 3.2-4.0 pt	1.75-2.25 pt 3.2-4.0 pt	PPSA, PRE, SURFACE MIX, or EARLY POST. Cost: Harness \$11.70-\$21.10; Harness Xtra \$20.50-\$26.20; Degree \$12.80-\$22.30; Degree Xtra \$20.90-\$27.10; Harness Xtra 5.6 L \$12.80-\$23.70.
HARNES XTR ^{3○△} or DEGREE XTRA ³ or HARNES XTRA ³ 5.6L	1.8 qt 2.7 qt 1.4 qt	2.3 qt 3.5 qt 1.7-2.4 qt	2.3 qt 3.5 qt 2.3-2.6 qt	
HORNET WDG [△]	4.0 oz	4.0-5.0 oz	4.0-5.0 oz	PPSA, PRE, SURFACE MIX, or EPOST ó Controls broadleaf weeds only. Hornet WDG at 3.0 oz/A can be tank mixed with other labeled herbicides to broaden weed control spectrum. Cost: \$10.50-\$13.10.
KEYSTONE ^{○△}	2.2-2.4 qt	2.4-2.8 qt	2.6-3.0 qt	Application time: 0-14 DBP. See label for pre and post tank-mix combinations. Cost: \$16.24-\$22.14.
LEADOFF ^{3○□△}	2.5-3.0 pt	3.0-4.0 pt	4.0-4.5 pt	PPSA, PRE, PPI or EARLY POST. Cost: \$11.60-\$20.80.
LUMAX	2.5 qt	2.5 qt	2.5 qt	PPSA, PRE, or EPOST. Apply preplant up to 10 days before planting. EPOST up to 5-inch corn. Cost: \$27.50.
MICRO-TECH/LASSO ^{○□△} or LASSO II	2.0 qt Do not use ^a	2.5 qt 17 lb	3.0 qt 20 lb	PPSA, PRE, or EARLY POST ó Cost: Micro-Tech \$11.90-\$17.90; Micro-Tech + Atrazine \$12.30-\$18.10.
MICRO-TECH ^{○□△} + ATRAZINE DF ³	1.5 qt 1.2 lb	2.0 qt 1.5 lb	2.2 qt 1.8 lb	
OUTLOOK ^{○□△}	10-14 oz	14-16 oz	16-18 oz	PPSA, PPI, PRE, or EPOST. Tank mix with PRE herbicides to broaden weed control spectrum. Cost: \$11.10-\$20.00.
PROWL/PENDIMAX + ATRAZINE DF ³	Do not use	1.8 qt 1.33 lb	1.8 qt 1.77 lb	PRE ó Corn injury may occur if replanting is necessary. Rainfall shortly after planting required for performance. See page 84 for wild proso millet. Cost: \$13.30-\$14.50.
PYTHON	0.80 oz	1.0 oz	1.33 oz	PPSA, PPI, or PRE. Controls broadleaf weeds only. Cost: \$7.40-\$12.90.
SURPASS ^{○△}	1.5-2.25 pt	1.5-2.5 pt	1.5-2.75 pt	PPSA, PRE, SURFACE MIX, or EARLY POST. Cost: Surpass \$13.00-\$21.90.
TOPNOTCH ^{○△} alone or with ATRAZINE DF ³	2.0 qt 1.1 lb	2.0-2.5 qt 1.3 lb	2.0-3.0 qt 1.5 lb	EPP, PPSA, PRE, or SURFACE MIX. Cost: Topnotch \$18.20-\$27.20; Topnotch with Atrazine \$21.20-\$31.20.

See page 101 for additional footnotes.

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Postemergence (see page 24 for additives)

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
AATREX ^{3○□△} or ATRAZINE DF ³	1.4-2.2 lb	Corn less than 12" Broadleaf weeds 2-6"; grass weeds 1" or less	Lower atrazine rate controls broadleaf weeds. Atrazine maximum use rate (all uses) is 2.5 lb ai/A per year. Cost: \$3.80-\$5.90.
ACCENT [○] alone or with CLARITY/BANVEL/ STERLING or BUCTRIL 2E or ATRAZINE DF ³	0.67 oz 0.5-1.0 pt 1.0-1.5 pt 0.83-1.7 lb	Corn 4-36i (V10), greater than 20i use drops Shattercane 4-12i Broadleaves 1-4i Grasses 1-3i Corn less than 12i	Do not use if Counter was applied to the crop. Do not apply 3 days before or 7 days after foliar applied organophosphate insecticides. Corn ear pinching risk increases at V7-V10 stages. See Herbicide Resistance , page 8. Refer to Clarity label precautions. Cost: Accent \$23.80; Accent + Clarity \$29.30-\$34.80; Accent + Buctril \$31.40-\$35.20; Accent + atrazine \$26.00-\$28.40.
ACCENT GOLD WDG	2.9 oz	Corn less than 12i (V6) Grasses 1-3i Broadleaves 1-6i	Can be tank mixed with atrazine, Banvel/Clarity, or Marksman. Apply to hybrids with maturity ratings higher than 87 days. Same restrictions as for Accent. Cost: \$22.60.
AIM EW ^{○□△} alone or with CLARITY or ATRAZINE DF ³ or ATRAZINE DF ³ + CLARITY	0.50 oz 8.0 oz 0.56-1.1 lb 0.56 lb + 3-4 oz	Corn less than V8 Broadleaves 1-4i Velvetleaf up to 36i Corn less than 12i Corn less than 12i	Aim is a contact herbicide so thorough spray coverage is required. Aim strengthens nightshade, velvetleaf, pigweed, morningglory, and lambsquarter control in tank mixtures with other herbicides. Observe Clarity precautions when mixing with Clarity. Cost: Aim \$2.30; Aim + Atrazine \$3.80-\$5.30; Aim + Clarity \$7.80; Aim + Atrazine + Clarity \$5.90-\$6.50.
BASIS	0.33 oz	Corn spike to 2-collar/4-leaf Grasses 1-2i Broadleaves 1-3i	Do not use if Counter was applied to the crop. Do not apply 3 days before or 7 days after foliar applied organophosphate insecticides. Tank-mix Basis with 4-8 oz Banvel/Clarity, Marksman, or Atrazine for additional broadleaf control. Can tank mix Basis Gold with Banvel/Clarity (2-4 oz), Hornet, or Tough. Apply Basis Gold to hybrids with maturity ratings higher than 87 days. Cost: Basis \$5.90; Basis Gold \$17.80.
BASIS GOLD	14 oz	Corn less than 12" (V6) Grasses 1-3i Broadleaves 1-4i	
BEACON ^{○△}	0.38-0.76 oz	Corn 4-20i, Shattercane 4-12i Broadleaves 1-4i Grasses 1-3i	Do not use if Counter was applied to the crop. Do not use Beacon within 20 days of a planting or cultivation application of any organophosphate insecticide. Do not apply Beacon within 10 days of a foliar POST organophosphate insecticide. Beacon may be applied at 0.38 oz followed by a second 0.38 oz treatment if required. Can apply 0.38 oz/A Beacon with drops from 20i height to tasselling. Corn hybrids vary in tolerance. See Herbicide Resistance , page 8. Use only if grass herbicide has been used preplant or PRE. Beacon may be tank-mixed with Atrazine, Banvel/Clarity, Buctril, Marksman, or 2,4-D. Cost: Beacon \$10.00-\$20.30; Beacon + Accent \$22.20.
BEACON [○] + ACCENT	0.38 oz + 0.34 oz	Corn 4-36" greater than 20" use drops Grasses 1-3", Broadleaves 1-4"	
BUCTRIL [○] 2E + ATRAZINE DF ³	1.0-1.5 pt 0.5 lb	Corn 3-leaf to 12i Broadleaf weeds 2-6i tall	Contact herbicide. Thorough coverage, correct tips, pressure, spray, volume, rate and weed size important. Cost: Buctril \$7.60-\$11.40; Buctril + Atrazine \$10.60-\$14.40; Buctril/Atrazine \$9.80-\$14.60.
BUCTRIL/ATRAZINE ³	2.0-3.0 pt		
BUCTRIL 2E + CLARITY/BANVEL/ STERLING CLARITY/BANVEL/ STERLING ^{□△}	1.0 pt + 0.5 pt 0.5-1.0 pt	Spike to 36", greater than 8i use drops Broadleaves 2-6 leaf Corn spike to 36i Less risk when corn is small, over 8i use low rate and drop pipes to keep spray out of corn whorl. Weeds at 2-6i	Later applications may cause brittleness and increase greensnap risk. Use lower rate for good growing conditions to reduce corn injury. Do not use Clarity/Banvel/Sterling within 1/2 mile of sugarbeet, fieldbean, alfalfa, soybean, gardens and ornamentals unless drop tips are used on corn over 8". Do not apply between June 20 and Sept. 1 if sensitive crops are nearby. Use higher rate of Clarity/Banvel/Sterling only on corn at spike to 8i and on silty clay loam containing more than 2.0% organic matter. Hybrids vary in sensitivity to growth regulator herbicides. Cost: Buctril + Clarity \$13.30; Clarity/Banvel/Sterling \$5.40-\$11.00; 2,4-D \$0.90-\$1.80; 2,4-D + Clarity \$5.90.
2,4-D ESTER (4L) ^{□△}	0.5-1.0 pt		
2,4-D AMINE (4L) or 2,4-D ESTER (4L) + CLARITY/BANVEL/ STERLING	0.25 pt 0.25 pt + 0.50 pt		

See page 101 for additional footnotes.

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Postemergence (Continued)

Herbicide	Rate Per Acre	Application Time	Remarks and Approximate Cost/A Broadcast
CALLISTO [△] alone or with ATRAZINE DF ³	3.0 oz 0.3-0.6 lb	Corn to 30i or V8 Broadleaf weeds less than 5i Corn less than 12i	Do not apply if Counter or Lorsban was applied to corn. Do not apply within 7 days of a foliar organophosphate or carbamate insecticide. Cost: Callisto \$12.20; with atrazine \$13.00-\$13.80.
CELEBRITY PLUS ^{○□△}	4.7 oz	Corn 4-24i greater than 10i use drops Weeds 2-4i	Premix of Accent and Distinct. Same restrictions as for Accent and Distinct. Use drops when possible. Cost: \$24.70.
CONNECT 20WSP [○]	1.25-2.5 lb	Corn V4 to tassel	Same remarks as Buctril. Cost: \$8.80-\$17.50.
DISTINCT [△]	6 oz 4 oz	Corn 4-10i 10-36i use drops Corn 10-24i Broadleaves 2-6i	Distinct contains dicamba so do not mix with products that contain dicamba, 2,4-D, or clopyralid. Observe Clarity precautions. Do not exceed 10 oz/A per season. Suppresses grass weeds that are less than 3 inches tall. Cost: \$9.50-\$14.30.
EXCEED ^{○△}	1.0 oz	Corn 4-30" broadcast. greater than 20i use drops Weeds 2-12"	Banvel/Clarity may be added for resistant weed management. On soil above pH 7.3 carryover may injure soybean and other sensitive crops. 18 month soybean rotation restriction, but 10 months if south of I-80 and STS soybean variety planted. Refer to Beacon for OP insecticide restrictions. Cost: \$11.50.
GLYPHOSATE* (Roundup Ready hybrid required)	32.0 oz	Corn to 30i (V8) Drops greater than 24i	May apply sequentially over a preemergence herbicide. Can apply twice in crop. Cost: glyphosate 4ai (generic) \$6.30.
HORNET WDG [△]	2.0-5.0 oz	Corn at spike to 36" greater than 20i (V6) use drops Broadleaf weeds less than 8i	Use higher rate for control of dense weed population, larger weeds, or when a longer residual is desired. Cost: \$6.60-\$16.40.
LADDOK S-12 ^{3○□△}	1.3-2.3 pt	Corn less than 12"; Broadleaf weeds 2-4" high	Use 20 gal water and 40 psi. Increase rate according to the label on weeds 3-8" tall. Cost: \$7.50-\$13.20.
LIBERTY (Liberty Link hybrid required)	28-34 oz	Corn up to 36i greater than 24i use drops Weeds 1-4i	Liberty is a contact herbicide without soil residual. Apply at 15-20 GPA and 35-40 psi. Use higher rate on bigger weeds. Liberty may be tank-mixed with other post corn herbicides except for Sencor and Basis. Cost: Liberty \$20.30-\$24.70; Liberty ATZ \$16.00-\$20.00.
LIBERTY ATZ ³ (Liberty Link hybrid required)	32-40 oz	Corn up to 12i Weeds 1-4i	
LIGHTNING (Clearfield hybrid required) or with CLARITY	1.28 oz 8.0 oz	Corn to 18i Weeds to 4i Corn less than 8i (V5) Weeds to 4i	Atrazine, Buctril, Distinct, or 2,4-D also may be added to Lightning for ALS-resistant weed management. Cost: Lightning \$16.00; Lightning + Clarity \$21.50.
MARKSMAN ^{○3}	2.0-3.5 pt	Corn less than 8i (V5)	Observe precautions regarding Banvel/Clarity use near sensitive crops specified above. Do not use more than 2.0 pt/A on sands, loamy, or sandy loam soil, or soil having less than 2.0% organic matter. Cost: \$7.50-\$13.10.
NORTHSTAR ^{○△}	5.0 oz	Corn 4-36i (greater than V2) greater than 20i (V6) use drops Weeds 1-4i	Observe Beacon and Clarity precautions. Controls 4-12i shattercane. Can tank mix with Accent, atrazine (4-12i corn), Resource, or Tough. Cost: \$10.00.
OPTION	1.25-1.75 oz	Corn 0-32i greater than 16i use drops Weeds less than 4i	Can tank mix with atrazine, Clarity, Distinct, Marksman, or Tough herbicides. Do not apply within 7 days of a foliar DP insecticide or in same season as a soil-applied DP insecticide except Aztec. Cost: \$12.50-\$17.50.
PERMIT	0.66-1.33 oz	Corn spike-layby greater than 20i use drops Broadleaf weeds 2-6i	Banvel/Clarity may be added for resistance management. Cost: \$10.60-\$21.30.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Field Corn, Popcorn[○], Sweet Corn[□], and Silage[△]

Postemergence (Continued)

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
READY MASTER ATZ ³ (Roundup Ready hybrid required)	1.5-2.0 qt	Corn less than 12i Weeds 4i	Can tank mix with Harness, MicroTech, Partner or atrazine for improved residual control. Cost: \$10.30-\$13.75.
RESOURCE	4.0-6.0 oz	Corn 2-10 leaf, Broadleaf weeds less than 4"	Especially good on velvetleaf. Rate may be increased to 8 oz when using drop tips. Cost: \$5.20-\$7.80
SENCOR 75DF + BASAGRAN or 2,4-D ESTER (4L) or CLARITY/BANVEL/ STERLING	1.5-2.0 oz 0.5-1.0 pt 0.33-0.50 pt 0.50-1.0 pt	Corn to 8i Broadleaf weeds 2-4i	Observe precautions for Clarity and 2,4-D. Cost: Sencor + Basagran \$7.10-\$13.00; Sencor + 2,4-D \$2.50-\$3.40; Sencor + Clarity \$7.40-\$13.50
SPIRIT [△]	1.0 oz	Corn 4-24i, greater than 20i (V6) use drops Weeds 2-8i	Soybean rotation interval is 10 months south of I-80 and 18 months north of I-80. More rotation restrictions on soils with pH greater than 7.8. Refer to Beacon for OP insecticide restrictions. Cost: \$10.00.
STEADFAST	0.75 oz	Corn to 20i or V6 Weeds 2-4i	Can tank mix with atrazine, Marksman, Clarity, or Hornet to broaden weed control spectrum. Do not tank mix with OP insecticides. Follow directions of most restrictive label. Cost: \$15.00.
TOUGH 5 EC + ATRAZINE DF ³	12-24 oz 1.25-2.0 lb	Corn less than 12i Broadleaf weeds 2-6i Grasses 1i or less	Apply at 10 or more GPA. Cost: \$10.30-\$19.30.
YUKON	4-8 oz	Spike to 36i Weeds 1-6i	Observe Banvel/Clarity label precautions. Add Accent for grass control. Cost: \$11.20-\$22.40.

Layby

DUAL II MAGNUM ^{□△}	0.67-1.5 pt	Layby	Apply after furrowing or final cultivation. Cost: \$9.20-\$20.60.
OUTLOOK ^{○□△}	10-21 oz	Corn 12-36i	Apply after furrowing or final cultivation. Cost: \$11.10-\$23.30.
PROWL 3.3EC/PENDIMAX	1.8-3.6 pt	Corn spike to layby. Weeds unemerged	Cover brace roots by cultivation before application. Incorporate by tillage, irrigation, or rain within a week. Cost: \$4.80-\$9.70.
TREFLAN 4EC	1.5-2.0 pt	Corn 2-leaf to layby. Weeds unemerged	Incorporate with rainfall, sprinkler irrigation water or cultivate within 24 hours. Cost: Treflan \$5.30-\$7.10.

Harvest Aid

GLYPHOSATE*	1.0-3.0 qt	After black layer Corn less than 35% moisture	Allow a minimum of 7 days before harvest. Do not treat corn grown for seed. Cost: glyphosate 4ai (generic) \$6.30-\$18.90.
2,4-D ESTER (4L)	1.0 qt	After hard dough stage (dent)	For control of sunflower, cocklebur, velvetleaf and other late broadleaf weeds. Only certain brands labeled for this use. Brittleness and kernel fill not affected if silks are dry. Cost: \$3.60.

* Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Weed Response to Burndown Herbicides

No-Till Soybean

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Herbicide	Annual Bluegrass	Chickweed	Dandelion	Downy Brome	Foxtail Barley	Evening Primrose	Henbit	Horseweed (Marestail)	Pennycress	Prickly Lettuce	Shepherdspurse	Purslane Speedwell	Virginia Pepperweed	Tall Knotweed	Foxtail	Barnyardgrass	Lambsquarters	Sandbur, Longspine	Kochia	Kochia, Triazine-resistant	Russian Thistle	Smartweed ^o Annual	Velvetleaf	Sunflower	Corn ^o volunteer	Winter Wheat or Rye	Alfalfa	Sweet Clover	Hairy Vetch
2,4-D ester** (1.0 pt)	1	4	7	1	1	7	4	7	8	9	8	7	7	6	1	1	9	1	6	4	9	7	8	10	1	1	5	6	7
Aim (0.3 oz)	1	5	5	1	1	5	4	5	8	7	8	7	8	7	1	1	8	1	8	8	6	7	10	7	1	1	4	4	4
Canopy XL (2.5-8 oz)	10	10	7	3	7	6	8	8	10	9	10	4	6	9	4	4	9	4	8	8	9	9	8	8	3	3	4	0	6
Command (3ME) (1.5 pt)	1	1	3	5	4	7	1	2	6	6	6	5	6	6	6	6	6	6	8	8	6	7	9	5	3	6	4	3	3
Command (3ME) + Prowl (1.5 pt + 3.0 pt)	2	1	3	7	4	7	1	2	6	6	6	6	6	7	7	6	6	6	9	9	7	7	9	6	3	6	4	3	3
Extreme (3.0 pt)	10	10	8	10	9	8	9	9	10	9	10	9	9	10	10	10	10	10	9	9	10	10	10	10	10	9	4	3	7
Gauntlet (co-pac)	1	7	7	1	1	7	6	9	8	7	9	7	9	8	1	1	9	1	8	8	8	8	9	10	1	1	4	4	4
Glyphosates*** (16 oz)	10	10	5	10	9	7	9	6	10	6	10	10	9	9	9	10	7	10	6	6	9	7	7	9	10 ^a	10	4	3	6
Glyphosate*** (24 oz)	10	10	7	10	9	8	9	8	10	7	10	10	9	9	10	10	9	10	8	8	9	8	9	9	10 ^a	10	5	4	6
Glyphosate*** + 2,4-D ester (4L) (16 oz + 1.0 pt)	10	10	8	7	9	9	9	9	10	8	10	10	9	9	9	10	9	10	9	9	9	9	10	10	10 ^a	10	6	5	7
Glyphosate*** + Canopy XL (16 oz + 2.5-5 oz)	10	10	8	10	10	7	9	10	10	10	10	10	9	10	10	10	10	10	10	10	10	9	9	10	10 ^a	10	3	3	7
Glyphosate*** + Pursuit (16 oz + 4 oz)	10	10	8	10	9	8	9	9	10	9	10	9	9	10	10	10	9	10	9	9	10	10	10	10	10 ^a	9	4	3	7
Glyphosate*** (16 oz) + Sencor (16 oz)	10	10	7	10	9	7	9	8	10	9	10	10	9	10	9	10	8	10	8	7	10	8	8	10	10 ^a	10	4	4	7
Gramoxone Max (1.3 pt)	8	10	5	7	8	7	9	7	10	8	9	6	9	9	7	7	8	7	9	9	9	6	8	10	4	6	4	4	7
Pursuit (4 oz)	5	8	4	2	7	5	7	4	9	7	9	3	3	3	8	7	5	7	6	6	6	8	9	8	3	1	1	2	2
Pursuit Plus (2.5 pt)	5	8	4	2	7	5	7	4	9	7	9	3	3	3	8	7	5	7	6	6	6	8	9	8	4	1	1	2	2
Scepter (0.66 pt)	5	9	4	1	5	5	7	4	9	6	9	3	1	3	3	3	5	5	7	7	5	7	7	8	3	1	1	1	3
Sencor (12 oz)	2	10	5	7	8	6	8	5	10	7	9	2	6	8	5	5	5	6	9	1	7	7	8	8	3	5	5	5	6

Rating Percent Control

- 10 ó (96-100%)
- 9 ó (90-95%)
- 8 ó (85-90%)
- 7 ó (80-84%)
- 6 ó (70-79%)
- 5 ó (60-69%)
- 4-2 ó less than 60%
- 1 ó 0

* This guide presents burndown information only. It **does not** reflect residual weed control.

** Preplant interval ó 2,4-D ó 7 days for soybean, over 1 pt 30 days.

*** Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

^a Glyphosate-based products will not control Roundup Ready volunteer corn. Refer to soybean section for listing of grass herbicides for control of volunteer Roundup Ready corn. Banvel 14 days less than or equal to 8 oz and 28 days for 16 oz/A following 1 inch of rain or sprinkler irrigation. Do not use PP if less than 25i of annual precipitation.

See page 101 for additional footnotes.

Broadleaf Weed Response to Selected Herbicides

Soybean

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 (less than 60%, 160%)

	B. Nightshade (3.5) ^b	Cocklebur (5.5)	Kochia (2.5)	Kochia, ALS-resistant (2.5)	Kochia, Triazine-resistant (2.5)	Lambquarters (1.5)	Morningglory species	Pigweed (2.5)	Pigweed, Triazine-resistant (2.5)	Ragweed (3)	R. Thistle (2.3)	Smartweed (1.5)	Sunflower (10)	Velvetleaf (4.2)	Waterhemp (2.5)	Waterhemp, ALS-resistant (2.5)	Waterhemp, Triazine-resistant (2.5)	Crop Safety ^a
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Soil Applied Herbicides

Authority	8	4	9	9	9	8	6	8	8	5	9	7	3	6	8	8	8	2
Axiom	7	5	5	5	2	8	6	7	7	7	5	6	6	6	7	7	7	3
Canopy XL+ Dual II Magnum or Micro-Tech	7	8	8	8	8	9	8	9	8	9	7	9	8	8	9	8	9	2
Canopy XL	9	8	9	8	9	9	8	9	9	8	8	9	5	7	9	1	9	2
Canopy XL + Treflan or Sonalan or Prowl	2	8	9	8	7	9	8	9	8	9	8	8	7	9	9	1	9	2
Command	4	6	9	9	9	7	2	2	2	4	7	8	4	10	2	2	2	1
Command + Canopy XL	4	9	9	9	9	9	8	9	8	9	7	8	8	10	9	7	9	2
Command + Treflan or Sonalan or Prowl	3	3	9	9	9	9	2	7	7	7	7	9	4	9	7	2	7	1
Command Xtra	8	8	9	9	9	9	8	9	9	7	7	8	8	9	9	9	9	2
Domain	2	5	7	7	2	8	2	9	7	8	6	7	7	7	9	9	5	2
Dual II Magnum	7	2	2	2	2	8	1	8	8	5	3	2	2	2	8	8	8	1
Dual II Magnum + Sencor/Boundary	7	4	4	4	2	9	2	9	8	9	7	8	4	6	9	9	7	3
FirstRate	3	8	8	1	8	6	5	8	8	9	-	8	8	8	6	1	6	2
Gauntlet	9	8	9	9	9	8	8	9	9	9	8	8	8	8	9	9	9	2
Micro-Tech/Partner/Lasso	7	2	2	2	2	7	2	8	8	4	2	2	2	2	8	8	8	1
Micro-Tech + Sencor	7	4	4	4	2	9	2	9	8	9	7	8	4	6	9	9	7	3
Outlook	6	2	2	2	2	7	2	8	8	5	3	2	2	2	8	8	8	1
Prowl/Pendimax	2	2	7	7	7	7	2	7	7	2	7	2	2	4	7	7	7	2
Prowl + Sencor	2	4	7	7	7	9	2	9	7	9	9	7	4	7	9	9	7	3
Pursuit DG	9	6	8	1	8	8	6	9	9	8	-	9	8	8	6 ⁵	1	6 ⁶	2
Pursuit + Dual II Magnum	8	6	8	2	9	9	6	9	9	9	-	9	8	8	9 ⁵	7	9 ⁶	2
Pursuit Plus	9	6	9	7	9	9	6	9	9	9	-	9	8	8	8 ⁵	7	8 ⁶	2
Python	3	5	8	1	8	8	2	8	8	3	8	8	5	7	8	1	8	1
Scepter + Dual II Magnum or Micro-Tech	8	9	4	2	4	9	7	9	9	9	-	9	8	7	9	7	9	2
Squadron or Scepter + Sonalan or Treflan	8	9	7	7	7	9	7	9	9	9	7	9	8	7	9	7	9	2
Steel	9	9	8	5	8	9	8	9	9	8	-	9	9	7	9	3	7	1
Treflan	2	2	7	8	7	7	2	7	7	2	7	2	2	2	7	7	7	2
Treflan/Trifluralin + Sencor	2	4	7	8	7	9	2	9	7	9	9	7	4	7	9	9	7	3
Treflan + Sencor + Command	5	5	9	9	9	9	8	9	7	9	9	7	5	10	9	9	7	2
Valor	9	2	8	8	8	8	5	8	8	7	7	6	3	8	9	9	9	2

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury. If stand is not lost, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety, for some herbicide combinations. Refer to product label for specific information.

^bWeed Competitive Index⁶See page 8.

See page 101 for additional footnotes.

Grass Weed Response to Selected Herbicides

Soybean

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 (less than 60%), 1 (0%)

Barnyardgrass (0.3) ^b	Crabgrass (0.5)	Fall Panicum (0.4)	Giant Foxtail	Green Foxtail	Yellow Foxtail	Sandbur (0.4)	Shattercane/Sorghum (3.5)	Shattercane, ALS-resistant (3.5)	Woolly Cupgrass	Crop Safety ^a
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Soil Applied Herbicides

Authority	5	7	5	4	6	5	3	3	3	-	2
Axiom	8	9	9	8	9	8	7	6	6	-	3
Canopy XL+ Dual II Magnum or Micro-Tech	9	9	9	9	9	9	4	3	3	-	2
Canopy XL	4	6	4	6	5	7	4	2	2	2	2
Canopy XL + Treflan or Sonalan or Prowl	9	9	9	9	9	9	8	7	7	8	2
Command	9	9	9	9	9	9	6	6	6	6	1
Command + Canopy XL	8	8	8	8	9	8	6	6	6	6	2
Command + Treflan or Sonalan or Prowl	9	9	9	9	9	8	9	8	8	8	1
Command Xtra	9	9	9	9	8	7	7	7	7	7	2
Domain	9	9	9	8	9	9	7	6	5	5	3
Dual II Magnum	9	9	9	9	9	9	5	4	4	6	1
Dual II Magnum + Sencor/Boundary	9	9	9	9	9	9	4	4	4	6	3
FirstRate	1	1	1	3	1	4	1	1	1	1	1
Gauntlet	6	7	7	6	4	4	3	3	3	3	2
Micro-Tech/Partner/Lasso	9	9	9	9	9	9	4	3	3	6	1
Micro-Tech + Sencor	9	9	9	9	9	9	4	4	4	6	3
Outlook	9	9	9	9	9	9	4	4	4	6	1
Prowl/Pendimax	9	9	9	9	9	9	8	6	6	8	2
Prowl + Sencor	9	9	9	9	9	9	8	7	7	7	3
Pursuit DG	6	2	6	7	7	7	5	7	1	3	2
Pursuit + Dual II Magnum	9	9	9	9	9	9	7	7	3	5	2
Pursuit Plus	9	9	9	9	9	9	7	8	5	7	2
Python	1	1	1	2	1	1	1	1	1	1	1
Scepter + Dual II Magnum or Micro-Tech	9	9	9	9	9	9	4	4	4	5	2
Squadron or Scepter + Sonalan or Treflan	9	9	9	9	9	9	7	6	5	6	2
Steel	9	9	9	9	9	9	7	9	5	4	1
Treflan	9	9	9	9	9	9	8	7	7	7	2
Treflan/Trifluralin + Sencor	9	9	9	9	9	9	8	7	7	6	3
Treflan + Sencor + Command	9	9	9	9	9	9	8	8	8	6	2
Valor	7	6	5	7	7	7	3	3	3	5	2

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury. If stand is not lost, most crops will compensate for early injury. Refer to product label for specific information.

^bWeed Competitive Index See page 8.

See page 101 for additional footnotes.

Broadleaf Weed Response To Selected Herbicides

Soybean

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control. For generic herbicides check label to confirm site.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10ó(96-100%), 9ó(90-95%),
 8ó(85-89%), 7ó(80-84%),
 6ó(70-79%), 5ó(60-69%),
 4-2óless than 60%, 1ó0%

B. Nightshade (3,3) ^b	Cocklebur (5.5)	Kochia (2.5)	Kochia, ALS-resistant (2.5)	Kochia, Triazine-resistant (2.5)	Lambsquarters (1.5)	Morningglory species	Pigweed (2.5)	Pigweed, Triazine-resistant (2.5)	Ragweed (3)	R. Thistle (2.3)	Smartweed (1.5)	Sunflower (10)	Velvetleaf (4.2)	Waterhemp (2.5)	Waterhemp, ALS-resistant (2.5)	Waterhemp, Triazine-resistant (2.5)	Crop Safety ^a
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Postemergence Herbicides

Weed size influences performance—see label

Assure II	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1
Basagran	2	9	7	7	7	7	3	2	2	7	7	9	8	9	2	2	2	1
Basagran + Ultra Blazer/Galaxy	7	9	7	7	7	7	8	8	8	9	7	9	8	9	8	8	8	2
Basagran + Cobra	7	9	4	4	4	4	5	9	9	9	7	9	8	8	9	9	9	3
Basagran + Scepter	4	10	7	7	7	7	7	9	9	7	7	9	9	9	8	3	3	1
Classic	2	10	4	1	4	4	8	8	8	9	3	9	9	8	6 ⁵	1 ⁵	6 ⁵	3
Cobra/Phoenix	8	8	4	4	4	4	8	9	9	9	5	7	7	7	9	9	9	3
Extreme	9	9	9	9	9	9	10	9	9	8	7	9	9	9	9	9	9	1
FirstRate	2	9	4	1	4	3	5	5	5	9	3	8	9	9	4	1	4	2
Fusilade-DX	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1
Fusion	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
Glyphosate ^b (1 qt)	8	9	8	8	8	8	7	9	9	8	7	8	9	8	9	9	9	1
Glyphosate ^b (1 qt)óropewicks, wipers, etc.	-	7	2	2	2	7	7	7	7	7	4	7	4	4	7	7	7	1
Glyphosate (various trade names)	8	9	8	8	8	8	7	9	9	8	7	8	9	8	8	8	8	1
Harmony GT	2	6	4	1	4	8	5	8	8	4	3	8	6	8	6 ⁵	1	6 ⁵	3
Harmony GT + Classic	2	9	4	1	4	9	8	9	9	9	7	9	9	9	6 ⁵	1	6 ⁵	3
Poast Plus	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1
Poast Plus + Basagran	2	9	7	7	2	2	1	2	2	7	2	9	8	9	2	2	2	1
Pursuit	8	9	8	1	8	4	5	9	9	7	5	8	7	8	6 ⁵	1	6 ⁵	1
Pursuit + Blazer or Cobra or Reflex	8	9	8	4	5	4	5	9	9	9	5	9	7	7	9	8	9	3
Raptor	9	9	8	1	8	8	5	9	9	7	-	7	9	9	6 ⁵	1	6 ⁵	1
Raptor + Blazer	9	9	8	4	8	8	6	9	9	9	5	9	9	9	9	9	9	1
Reflex/Flexstar	8	7	4	4	4	5	-	9	9	9	5	8	7	7	9	9	9	2
Reliance STS	2	10	4	3	4	7	5	9	9	9	5	9	9	9	6 ⁵	1	6 ⁵	1
Resource	4	7	3	3	3	7	5	5	5	7	3	4	4	10	4	4	4	2
Select	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1
Stellar	7	7	4	1	4	7	5	7	7	9	5	5	7	10	9	9	9	3
Synchrony STS	2	9	6	1	6	9	5	9	9	9	7	9	9	9	6 ⁵	1	6 ⁵	1
Ultra Blazer	8	6	4	4	4	4	8	9	9	9	5	9	4	4	9	9	9	3

^aCrop safety ratings less than 3 usually result in no yield reduction.

^bGlyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

^cRatings for weeds tall enough for selective treatment. Includes other glyphosate labeled for this use. Rates based on 4 lb ai/gallon (3 ae equivalent). Check labels for additives.

⁵Not labeled for control.

^bWeed Competitive IndexóSee page 8.

See page 101 for additional footnotes.

Grass Weed Response To Selected Herbicides

Soybean

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, temperature, growth stage, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control. For generic herbicides check label to confirm site.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 less than 60%, 1 0%

	Barnyardgrass (0.3) ^b	Crabgrass (0.5)	Fall Panicum (0.4)	Giant Foxtail	Green Foxtail	Yellow Foxtail	Sandbur (0.4)	Shattercane/Sorghum (3.5)	Wolly Cupgrass	Shattercane, ALS-resistant (3.5)	Crop Safety ^a	Recrop Interval, in Months, When Changing to Nonlabeled Crops ^b	Regular Corn Volunteer (6.0)	RR Corn Volunteer (6.0)	LL Corn Volunteer (6.0)	Clearfield Corn Volunteer (6.0)
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Postemergence Herbicides

Weed size influences performance—see label

Assure II	9	9	9	8	8	6	9	10	9	10	1	4	10	10	10	10
Basagran	2	2	2	2	2	2	2	2	2	2	1	0	2	2	2	2
Basagran + Ultra Blazer or Galaxy	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2
Basagran + Cobra	2	4	4	4	5	2	4	4	2	4	3	0	4	4	4	4
Basagran + Scepter	2	2	2	2	2	2	2	2	2	2	1	4-26	6	6	6	0 ^g
Classic	2	2	2	2	2	1	2	2	2	2	3	3-15	3	3	3	3
Cobra/Pheonix	2	4	4	1	1	1	4	4	2	4	3	0	2	2	2	2
Extreme	10	9	10	8	10	9	10	10	9	10	1	4-26	10	6	10	10
FirstRate	1	1	1	1	1	1	1	1	1	1	2	0-30	2	2	2	2
Fusilade DX	9	9	9	8	9	8	8	10	9	10	1	2	10	10	10	10
Fusion	9	9	9	9	9	9	8	10	9	10	2	1	10	10	10 ^f	10
Glyphosate (Various trade names)	10	9	10	9	10	9	10	10	9	10	1	0	10	0	10	10
Glyphosate (1 qt) dropwicks, wipers, etc. ^c	-	-	-	-	-	-	-	10	9	10	1	0	10	0 ^e	10	10
Harmony GT	1	1	1	1	1	1	1	1	2	1	2	1-5	2	2	2	2
Harmony GT + Classic	2	2	2	2	2	2	2	2	2	2	3	3-9	2	2	2	2
Poast Plus	9	9	9	9	9	9	9	10	9	10	1	0	10	10	10	10
Poast Plus + Basagran	8	8	8	7	7	6	8	9	8	9	1	0	10	10	10	10
Pursuit	7	7	5	8	9	7	5	9	6	1	1	4-26	6	6	6	0 ^g
Pursuit + Blazer or Cobra or Reflex	7	7	4	8	8	7	4	9	6	4	3	4-26	6	6	6	0
Raptor	8	7	9	9	9	8	7	9	5	1	1	2-18	8	8	8	0
Raptor + Blazer	8	7	9	9	9	8	7	9	5	1	1	2-18	8	8	8	0
Reflex/Flexstar	2	4	4	4	5	4	4	4	1	4	2	4-18	6	6	6	6
Reliance STS ^d	2	2	2	1	1	1	2	2	1	1	1	3-30	1	1	1	1
Resource	1	1	1	1	1	1	1	1	1	1	2	0	1	1	1	1
Select	9	9	9	9	9	9	8	10	9	10	1	4	10	10	10	10
Stellar	2	4	4	4	4	4	4	4	2	4	3	0	4	4	4	4
Synchrony STS ^d	2	2	2	2	2	2	2	2	2	2	1	3-30	6	6	6	0
Ultra Blazer	2	4	4	2	2	2	4	4	2	4	3	0	3	3	3	3

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury. If stand is not lost injury, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety for some herbicide combinations. Refer to product label for specific information.

^bValues will vary with soil texture, pH, organic matter, rainfall or irrigation, rotational crop, and herbicide rate. Refer to product label for specific information.

^cRatings for weeds tall enough for selective treatment. Includes other glyphosate labeled for this use. Rates based on 4 lb ai/gallon (3 ae equivalent). Check labels for additives.

^dGlyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

^eRoundup or Touchdown will not control RR volunteer corn.

^fLiberty will not control LL volunteer corn.

^gClearfield corn will not be controlled by imidazolinones and sulfonyleurea herbicides.

^hWeed Competitive Index See page 8.

See page 101 for additional footnotes.

Soybean

No-Till

GENERAL REMARKS

EPP treatments provide excellent early weed control; however, when the interval between herbicide application and planting is 28 days or more, split applications will generally give better control. If planting is delayed longer than planned after an EPP treatment, a PRE treatment may be needed. A non-selective herbicide such as Roundup Ultra may be needed to control emerged weeds at time of application of residual herbicides. If only non-residual PRE or POST herbicides are used, apply appropriate PRE or POST herbicides as necessary. If Roundup Ready or Liberty-Link varieties are planted, consider using a residual herbicide if a high weed density is expected. Also, Roundup Ultra does not control volunteer Roundup Ready corn. Risk of developing soybean cyst nematode can be reduced if winter annual broadleaf weeds are controlled in the fall or early spring.

Herbicide <i>(See Weed Response Chart on page 41 before selecting herbicides)</i>	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM		
No-Till in Alfalfa or Clover Sod					
2,4-D ester (4L)	1.0 qt	1.0 qt	1.0 qt	Apply in FALL to alfalfa with 4" new growth	Generally it is not wise to follow alfalfa with soybean. Use appropriate residual herbicide at planting. 2,4-D + Banvel/Clarity used to kill alfalfa. Cost: \$8.95.
+ BANVEL	0.5 pt	0.5 pt	0.5 pt		
Soybean, No-Till in Cool-Season Grass Sod					
GLYPHOSATE*	24-32 oz	24-32 oz	24-32 oz	Apply in FALL to 6-12" of new growth	Plant RR soybean. Cost: glyphosate \$4.68-\$10.00.
Soybean, No-Till in Warm-Season Grass Sod					
GLYPHOSATE*	32 oz	32 oz	32 oz	Apply in August to early September	Plant RR soybean. Cost: glyphosate \$7.50-10.00.
Soybean, No-Till in Rye or Winter Wheat					
GLYPHOSATE*	14-18 oz	14-18 oz	14-18 oz	Apply when rye and wheat are 4-10" and before soybean emerge	Follow with appropriate EPP treatment. Cost glyphosate \$2.73-\$5.18.
COMMAND 3ME	2-2.67 pt	2-2.67 pt	2-2.67 pt	0-30 DBP	Do not use on soils with less than 0.5% OM. Cost: Command 3ME + Canopy \$29.84-\$40.65.
+ CANOPY XL	5 oz	6 oz	7 oz		
COMMAND EXTRA (co-pack)	21.3+8 oz	25.6+9.6 oz	32+12 oz	0-30 DBP	Do not use on sand or sandy loam with less than 1.0% OM. Cost: \$22.00-\$24.00.
EXTREME	3 pt	3 pt	3 pt	0-30 DBP	Add 2,4-D ester (1.0 pt) to enhance control of perennial weeds (e.g. swamp smartweed and hemp dogbane). If 2,4-D is used, don't plant soybean for at least 7 days after application. Cost: \$12.00.
GAUNTLET (co-pack)	5.33+0.6 oz	5.33+0.6 oz	6.67+0.75 oz	0-30 DBP	Do not use on sand or sandy loam with less than 1% OM. Cost: \$16.00-\$18.00.
PURSUIT DG	1.44 oz	1.44 oz	1.44 oz	0-30 DBP	Do not plant sorghum the following year. EPP treatments may be less effectively if rainfall does not occur within 7 days of application. Cost: Pursuit + Dual \$29.31-\$38.79; Pursuit + Micro-Tech \$30.63-\$33.73; Pursuit + Partner \$24.21- \$28.55; Pursuit Plus \$14.48; Pursuit + Outlook \$26.00-\$35.49.
+ DUAL II MAGNUM	1 pt	1.33 pt	1.67 pt	0-30 DBP	
or MICRO-TECH	2.5 qt	2.5-3 qt	2.5-3 qt	0-30 DBP	
or PARTNER	2.3-3 lb	2.3-3 lb	2.6-3.4 lb	0-30 DBP	
or OUTLOOK	16-20 oz	20-25 oz	25-30 oz	0-30 DBP	
PURSUIT PLUS	2.5 pt	2.5 pt	2.5 pt	0-45 DBP	

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Soybean

No-Till (Continued)

Herbicide <i>(See Weed Response Chart on page 41 before selecting herbicides)</i>	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam <i>< 1% OM</i>	Silt Loam <i>1-2% OM</i>	Silty-Clay Loam <i>> 2% OM</i>		
GLYPHOSATE*	24-32 oz	24-32 oz	24-32 oz	0-30 DBP	Cost: glyphosate \$4.68-\$10.00.
GLYPHOSATE* + 2,4-D LV ester (4L)	16-32 oz 1-2 pt	16-32 oz 1-2 pt	16-32 oz 1-2 pt	7-30 DBP	Use appropriate herbicide at planting. 2,4-D at 1 pt, 7 days before planting; at 2 pt, 30 days before planting. Cost: glyphosate \$4.68-\$10.00; glyphosate + 2,4-D \$6.47-\$11.79.
SENCOR 75DF or CANOPY XL + DUAL II MAGNUM or MICRO-TECH or OUTLOOK	0.33 lb 5 oz 1 pt 2.0 qt 16 oz	0.67 lb 6 oz 1.33 pt 2.5 qt 20 oz	0.83 lb 7 oz 1.66 pt 3 qt 25 oz	0-14 DBP	Add 0.25% surfactant or 1 qt/A crop oil concentrate for better burndown of small weeds up to 1.5-2i. If emerged weeds are more than 2i, add Gramoxone Extra, Roundup UltraMax or Touchdown/glyphosates as discussed in the preemergence section. Split application is not necessary except if planter causes excessive soil disturbance. Do not apply on soils with less than 0.5% OM. Reduce Sencor rate by 1/3 on calcareous soils. Do not apply Canopy on soils with pH greater than 7.0; corn or grain sorghum should not be planted within 10 months of application. Cost: Sencor with Dual II Magnum \$20.77-\$39.96; Sencor + Outlook \$17.39-\$33.42; Sencor with Micro-Tech \$18.93-\$35.04; Canopy with Dual II Magnum \$20.05-\$30.37; Canopy + Outlook \$22.09-\$32.69; Canopy + Micro-Tech \$23.63-\$34.31.
VALOR + GLYPHOSATE or 2,4-D LV ESTER (4L)	1.5 oz 16-32 oz 1 pt	1.5-2.0 oz 16-32 oz 1 pt	2.0-2.5 oz 16-32 oz 1 pt	0-14 DBP 0-14 DBP 7-14 DBP	Cost: Valor + glyphosate \$12.18-\$22.00; Valor + 2,4-D \$9.29-\$14.29.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ridge-Till

In crops planted after mid-May, weeds can be expected to grow vigorously before planting. In a ridge plant system these weeds may become too large to uproot and smother unless control efforts are applied in late April or early May. Two approaches can be used to control these weeds. The first would be to select an early preplant treatment from the no-till section and apply by mid to late April. Since the planting operation will destroy this herbicide barrier, a second herbicide application over the row is required at planting. A split application of two-thirds rate applied preplant and one-third banded over the row at planting should be effective. Another strategy is to apply a POST herbicide such as glyphosate to destroy weeds before growth exceeds 3 to 4 inches in height. Application is needed in late April to early May. Apply a PRE herbicide at planting. In most cases the time interval from application of the preplant knockdown herbicide to planting should not exceed three to four weeks. Weeds such as kochia, horseweed, smartweed, and winter annuals will warrant early treatment. Lambsquarters, velvetleaf, and grasses will emerge early in some years. The key to successful weed control is timely application of the herbicides. Appropriate herbicides can be selected from the no-till and tilled seedbed sections for this crop. Apply glyphosate at 1.0 to 2.0 pt/A, one to three weeks preplant. Cost: \$4.68-\$10.00.

Tilled Seedbed

Herbicide <i>(See Weed Response Chart on page 42 before selecting herbicides)</i>	Commercial Product per Acre			Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM	

Soil Applied Herbicides

For cocklebur, sunflower and velvetleaf, see *Troublesome Weeds and Woody Plants*, pages 90-101.

AUTHORITY	4 oz	5.3 oz	5.3 oz	PPI, PRE. Cost: \$6.23-\$7.90.
AXIOM	7 oz	10-13 oz	13 oz	EPP, PPSA, PRE, or SURFACE MIX. Cost: \$8.75-\$16.00.
BOUNDARY	Do not use	1.25-1.75 pt	1.5-2 pt	PP, PRE. Cost: \$11.00-\$20.00.
CANOPY XL or FIRSTRATE or PYTHON or SENCOR DF with DUAL II MAGNUM or FRONTIER/OUTLOOK or MICRO-TECH/LASSO or PROWL or SONALAN or TREFLAN	5.1 oz 0.60 oz 0.80 oz 0.33 lb 1.0 pt 16 oz 2.0 qt 1.8 pt 2.0 pt 1.0 pt	6.4 oz 0.60 oz 1.0 oz .40 lb 1.0 pt 20 oz 2.5 qt 2.4 pt 2.5 pt 1.5 pt	7.9 oz 0.60 oz 1.33 oz 0.50 lb 1.33 pt 20 oz 2.5 qt 2.4 pt 3.0 pt 2.0 pt	PPI with Treflan and Sonalan. PPI or SURFACE MIX with Prowl. SURFACE MIX or PRE with Dual II Magnum or Micro-Tech. EPP, PPSA, PPI, or PRE with FirstRate. PPSA, PPI, or PRE with Python. To reduce injury on calcareous soil or soil with pH greater than 7.5, reduce Sencor rate by one-third. Do not use Canopy or Canopy XL on soils with pH greater than 6.8. Treflan and Sonalan may be applied to untilled residues prior to incorporation. Cost: Canopy XL \$13.70-\$21.25; Canopy \$13.50-\$21.30; First Rate \$15.10; Python \$7.80-\$12.90; Sencor \$6.00; additional cost for combination with Dual II Magnum \$12.80-\$17.00; Frontier/Outlook \$10.70-\$16.80; Micro-Tech \$14.00-\$17.50; Prowl \$6.70-\$8.90; Sonalan \$8.10-\$12.10; Treflan \$4.10-\$8.30.
COMMAND (3ME) + TREFLAN or PROWL/PENDIMAX or SONALAN	1.0 pt 1.0 pt 1.8 pt 2.0 pt	1.6 pt 1.5 pt 2.4 pt 2.5 pt	2.0 pt 2.0 pt 2.4 pt 3.0 pt	0-30 days PPI with Treflan, Sonalan, or Commence. SURFACE MIX or PRE with Micro-Tech. Use 2.5 qt rate of Micro-Tech for heavy infestation of pigweed and lambsquarters. Command (3ME) vapor drift may temporarily whiten green vegetation. Carryover may damage wheat seeded the same fall or sugarbeet and dry edible bean the next year. Treflan and Sonalan may be applied to untilled residue.
COMMAND (3ME) + MICRO-TECH/LASSO	1.33 pt 2.0 qt	1.33 pt 2.0 qt	1.33 pt 2.0 qt	Cost: Command \$11.00; Command + Treflan \$11.70-\$23.50; Command + Prowl \$14.30-\$24.10; Command + Sonalan \$15.70-\$27.30; Command + Micro-Tech \$24.10; Command + Canopy \$28.70-\$41.50; Command + Canopy XL \$28.90-\$41.60; Commence \$14.10-\$21.40; Canopy + Dual \$28.00-\$35.00.
COMMAND (3ME) + CANOPY XL or DUAL II MAGNUM	2.0-2.67 pt 5.1 oz 1.0 pt	2.0-2.67 pt 6.4 oz 1.0 pt	2.0-2.67 pt 7.9 oz 1.33 pt	
COMMENCE	1.8-2 pt	2-2.5 pt	2.7 pt	
COMMAND EXTRA (copack)	21.3+8 oz	25.6+9.6 oz	32+12 oz	Do not use on sand less than 1% OM. Cost: \$22.00-\$24.00.

See page 101 for additional footnotes.

Soybean

Tilled Seedbed (Continued)

Herbicide <i>(See Weed Response Chart on pages 42 before selecting herbicides)</i>	Commercial Product per Acre			Remarks and Approximate Cost/A Broadcast
	Sandy Loam <i>< 1% OM</i>	Silt Loam <i>1-2% OM</i>	Silty-Clay Loam <i>> 2% OM</i>	
DOMAIN	Do not use	9-12 oz	10-16 oz	PPSA, PPI or PRE. For early season weed control only. Not recommended for use on sandy soils with less than 1% O.M. Use higher rates when weed pressure are heavy. Cost: \$8.50-\$15.20.
DUAL II MAGNUM or DUAL IIG MAGNUM	1.33 pt 6-8 lb	1.33 pt 8-10 lb	1.67 pt 10-12 lb	EPP, PRE, or SURFACE MIX. Cost: \$17.00-\$21.30 for liquid.
FRONTIER/OUTLOOK	16-20 oz	20-25 oz	25-30 oz	EPP, PRE, or SURFACE MIX. Cost: \$10.70-\$20.10.
GAUNTLET (copack)	5.33+0.6 oz	5.33+0.6 oz	6.67+0.75 oz	Do not use on sand less than 1% OM. Cost: \$16.00-\$18.00.
MICRO-TECH/LASSO or LASSO II 15G or PARTNER	2.5 qt 17 lb 3.5 lb	2.5 qt 17 lb 3.5 lb	2.5 qt 17 lb 3.5 lb	PRE or SURFACE MIX. Cost: Micro-Tech \$17.50; Lasso \$14.90; Lasso IIG \$16.80; Partner \$14.50.
OUTLOOK	12-14 oz	14-18 oz	18 oz	Cost: \$11.00-\$17.00.
PROWL (3.3EC)/PENDIMAX	1.8 pt	2.4 pt	3.6 pt	PPI or SURFACE MIX ó Cost: Prowl \$6.65-\$10.65.
PURSUIT PLUS	2.5 pt	2.5 pt	2.5 pt	SURFACE MIX ó Do not graze or feed treated soybean forage, hay, or straw to livestock. Do not plant sorghum the following year. Cost: \$14.06.
SONALAN	2.0 pt	2.5 pt	3.0 pt	PPI ó Incorporate within 48 hours. Increase Sonalan rate by 1/2-1 pt for black nightshade control. Sonalan may be applied to untilled residues. Cost: Sonalan \$8.10-\$ 12.10.
STEEL	3.0 pt	3.0 pt	3.0 pt	PPI or PRE ó Applications can be made up to 45 days before, during, or after planting. Incorporation by tillage or rainfall needed within seven days after application to insure weed control. Labeled east of Highway 81. Do not plant corn the year following treatment north of Highway 34 unless IR/IT corn is used. Cost: \$18.83.
TREFLAN	1.0 pt	1.5 pt	2.0 pt	PPI ó For best results immediately incorporate. Treflan may be applied to untilled residue. Cost: Treflan/Trifluralin \$4.10-\$8.30.
VALOR	1.5 oz	1.5-2.0 oz	2.0-2.5 oz	PRE ó Cost: \$7.50-\$12.50.

See page 101 for additional footnotes.

Soybean

Postemergence (See page 25 for additives)

Herbicide <i>(See Weed Response Chart on pages 44-45 before selecting herbicides)</i>	Rates Per Acre	Application Time	Remarks and Approximate Cost Per Acre
ASSURE II	7-8 oz	Grasses 4" Shattercane and corn 12-18"	Cost: \$7.10-\$8.10.
BASAGRAN alone or with ULTRA BLAZER or HARMONY GT or FLEXSTAR/REFLEX or SCEPTER	1-2 pt 0.5-1 pt 0.12 oz 1.0 pt 0.33 pt	Broadleaf weeds less than 4" tall	Split applications of Basagran at 1 pt/A may improve control of several weeds. See label for specific weed size. Cost: Basagran \$9.50-\$19.00; additional cost with Ultra Blazer \$4.25-\$8.50; Harmony GT \$9.70; Flexstar/Reflex \$11.00; Scepter \$9.20.
BASAGRAN + POAST PLUS	1.5-2 pt 1.5-2.5 pt	Use Basagran and Poast Plus guidelines	See label for rates and weed size. Cost: \$20.00-\$31.00.
CLASSIC	0.50-0.75 oz	Apply when most broadleaf weeds are less than 4i tall	Do not use Classic on soils above pH 7.2. May be tank-mixed with 4-6 oz Cobra or with labeled rate of Blazer or Reflex where eastern black nightshade or common waterhemp are present. Use COC only during drought conditions. Add 1 gal. of 28% UAN for velvetleaf. Cost: Classic \$5.70-\$8.55; Classic + Harmony GT \$12.59.
CLASSIC + HARMONY GT	0.25 oz 0.12 oz		
COBRA	8-12.5 oz	Apply when most broadleaf weeds are 2-6" tall	Do not use during periods of stress or weed control will be poor. See label for specific weed size. Cost: \$10.50-\$13.20.
EXTREME (Roundup Ready varieties only)	3 pt	Weeds 6-8i tall	Add NIS at 1 pt/100 gal + spray grade AMS 17 lb/100 gal. Recrop interval of 18 months for oat, sunflower, popcorn, sweetcorn and sorghum. Cost: \$12.00.
FIRSTRATE	0.30 oz	Broadleaf weeds 1-6i	Tank-mix with Blazer or Cobra or Flexstar/Reflex for waterhemp control. Cost: \$7.50.
FLEXSTAR/REFLEX	0.75-1.0 pt	Apply when most broadleaf weeds are less than 4" tall	Do not plant sorghum the following year. Do not use west of Highway 281. Do not apply Reflex or Flexstar to any field more than once every two years. Cost: \$11.00.
FUSION	6-10 oz	Grasses 4" Shattercane and corn 12-18"	Cost: \$5.40-\$9.00.
FUSILADE-DX	8-12 oz	Grasses 2-6i	Cost: \$8.00-\$12.00.
GALAXY	2 pt	Apply when most broadleaf weeds are less than 4" tall	See label for specific weeds. Cost: \$16.10.
GLYPHOSATE** (Roundup Ready variety required)	26-32 oz	Weeds less than 12i tall	Check label for maximum application amount per growing season. Cost: \$4.68-\$10.00.
PHOENIX	8-12.5 oz	Apply when most broadleaf weeds are less than 4i tall	May be tank-mixed with Select (6-8 oz) + NIS. Do not add COC. Cost: \$9.44-\$14.75.

**Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Soybean

Postemergence (Continued) (See page 25 for additives)

Herbicide (See Weed Response Chart on pages 44-45 before selecting herbicides)	Rates Per Acre	Application Time	Remarks and Approximate Cost Per Acre
POAST PLUS	1.5-2.25 pt	Grasses 8" Shattercane and corn 12-18"	Use lower rate for most grasses. COC needed for effective control. UAN or AMS will improve control of some species. Refer to label. Cost: \$9.56-\$14.34.
PURSUIT DG alone or with COBRA or ULTRA BLAZER or FLEXSTAR/REFLEX	1.44 oz 4 oz 0.5-1.0 pt 0.75-1.0 pt	Weeds less than 4" Shattercane up to 6i	Do not plant sorghum the following year. Do not use during periods of stress or weed control will be poor. Add Select to improve control of volunteer corn. Use a combination for waterhemp control. Do not graze or feed treated soybean forage, hay, or straw to livestock. Cost: Pursuit alone \$14.76; additional cost with Cobra \$4.20; Blazer \$4.25-\$8.50; Flexstar/Reflex \$8.25-\$11.00.
RAPTOR or RAPTOR + ULTRA BLAZER	5 oz 4 oz 10-16 oz	Weeds 2-4" Shattercane up to 8"	Apply only once per season. Do not graze or feed treated forage to livestock. Use 4 oz rate if a preemergence herbicide was used. Add Ultra Blazer/Status for waterhemp and smartweed control. Cost: \$28.55.
RELIANCE STS (STS variety required)	0.50 oz	Apply when most broadleaf weeds are less than 6" tall	May be tank-mixed with 4-6 oz Cobra for eastern black nightshade or waterhemp control. Can be tank-mixed with grass herbicides under certain conditions. Reliance STS may reduce grass herbicide activity. Cost: \$3.10.
RESOURCE	4.0-12.0 oz	Velvetleaf 4-30i	Add COC + AMS. Cost: \$5.22-\$10.44.
SYNCHRONY STS (STS variety required)	0.50 oz	Broadleaf weeds less than 6i	May be tank-mixed with 4-6 oz Cobra or labeled rates of Blazer or Reflex (where eastern black nightshade or waterhemp are present). Can be tank-mixed with POST grass herbicides under certain conditions. Synchrony STS may reduce POST grass herbicide activity. Cost: \$4.35
SELECT	6-8 oz	Grasses 6-8", Shattercane 6-18" Corn 12-24"	Add COC/MSO except when using with Phoenix. AMS is recommended. Cost: \$9.00.
STELLAR	5-7 oz	Broadleaf weeds less than 6i	May be tank-mixed with 6-8 oz of Select for grass control. Cost: \$7.89-\$11.05.
STORM	1.5 pt	Broadleaf weeds less than 4i tall	Cost: \$15.00.
ULTRA BLAZER	8-24 oz	Apply when most broadleaf weeds are less than 4" tall	See label for rates and specific weed size. Cost: \$8.50-\$12.75.

Harvest Aid

GLYPHOSATE* ¹	32 oz		14 days before harvest on Roundup Ready/Æ varieties only. Cost: \$7.50-\$10.00.
GRAMOXONE MAX ¹	12.8 oz	When 65% of pods are brown	Desiccant. Follow label directions on water volume and NIS additive. Do not graze for 15 days. Cost: \$3.07.

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See page 101 for additional footnotes.

Soybean

REDUCED RATES FOR BROADLEAF WEED CONTROL

READ THIS SECTION BEFORE PROCEEDING

This information is based on research conducted at the University of Nebraska and is provided for growers interested in a **management intensive** system. This system does **not** consist of simply reducing rates and proceeding as normal. A reduced rate treatment is **not** a stand alone strategy it is part of a program. Our program included a single cultivation.

Reduced rates may have a fit for you if you are willing to learn about the system and manage accordingly. To evaluate a reduced rate program, we suggest trying it on a limited area until you are comfortable with it. **The herbicide manufacturer has no product performance responsibility for below labeled rate treatments.** Our work with reduced rates has focused on broadleaf weed management in conventional-till soybean with grasses being managed with a conventional soil applied or POST program. Antagonism problems have resulted in reduced grass control when we have attempted reduced rate programs combining grass and broadleaf herbicides in a single treatment.

The approach with the reduced rate program is to apply herbicides when weeds are small and therefore controllable with low rates. Treatment timing is the key to success. Growth stage of the weed is a more reliable indication for treatment timing than days after planting (DAP) or days after emergence. Broadleaf weeds often reach the 1-2 leaf stage 10-12 days after planting and 2-3 leaf stage by 17-20 days after planting. This of course can vary with conditions. Our experience is that 1/4x rates are appropriate when weeds are in the 1-2 leaf stage and 1/2x rates for weeds in the 2-3 leaf stage. After the 3-leaf stage labelled rates should be used. Cultivation is an important part of this system and should be carried out approximately 15 days after herbicide application. Delaying cultivation beyond this point allows weeds that were stunted to recover and grow. Most growers prefer to wait five weeks after planting to cultivate in order to 1) travel faster and 2) minimize weed establishment after cultivation.

The best opportunity for success with a single application reduced rate treatment is provided by the 1/2x rate applied at 17-20 days after planting. This program followed by cultivation has provided weed control comparable to standard treatments. Utilizing the 1/4x rate 10-12 days after planting has required a second treatment 20-24 days after planting 2 out of 3 years to provide weed control comparable to standard treatments.

Success with a reduced rate program is dependent on 1) match of herbicide treatment with target weeds, 2) correct timing, and 3) high quality application. A mismatch of herbicide treatment and weed species can result in serious problems when using reduced rates.

An advantage of the reduced rate program is a widening of the treatment window for POST treatments with application rates adjusted accordingly. The risk of adverse weather can be readily managed utilizing the reduced rate early application program. If circumstances prevent a planned early application, simply revert to a standard application.

Herbicide (See Weed Response Chart on pages 42 before selecting herbicides)	Rates Per Acre	Application Time	Remarks and Approximate Cost Per Acre
BASAGRAN + BLAZER	0.38 pt + 0.17 pt	1-2 leaf weeds 10-12 DAP	Repeat treatment 20-24 DAP usually required. Cultivate 35 DAP. Cost: \$6.15.
BASAGRAN + BLAZER	0.75 pt + 0.33 pt	2-3 leaf weeds 17-20 DAP	Cultivate 35 DAP. Cost: \$11.50.
CLASSIC + HARMONY GT	1/16 oz + 0.12 oz	1-2 leaf weeds 10-12 DAP	Repeat treatment 20-24 DAP usually required. Cultivate 35 DAP. Cost: \$3.70.
PURSUIT 70 DG	0.36 oz	1-2 leaf weeds 10-12 DAP	Repeat treatment 20-24 DAP usually required. Cultivate 35 DAP. Cost: \$5.90.
PURSUIT 70 DG	0.72 oz	2-3 leaf weeds 17-20 DAP	Cultivate 35 DAP. Cost: \$10.00.

See page 101 for additional footnotes.

Broadleaf Weed Response To Selected Herbicides

Sorghum-Grain and Forage

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, temperature, growth stage, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 (less than 60%, 160%)

	B. Nightshade (3.5) ^b	Cocklebur (5.5)	Kochia (2.5)	Kochia, ALS-resistant (2.5)	Kochia, Triazine-resistant (2.5)	Lambsquarters (1.5)	Morningglory (annual)	Pigweed (2.5)	Pigweed, Triazine-resistant (2.5)	Ragweed (4.0)	R. Thistle (2.3)	Smartweed (1.5)	Sunflower (10)	Velvetleaf (4.2)	Waterhemp (2.5)	Waterhemp, ALS-resistant (2.5)	Waterhemp, Triazine-resistant	Crop Safety ^a
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Soil Applied Herbicides

AAtrex/Atrazine [△]	9	7	9	9	2	9	7	9	1	9	9	9	7	7	9	9	1	2
Bicep II Magnum	9	7	9	9	2	9	6	9	7	9	9	7	7	6	9	9	7	2
Bullet	9	5	9	9	2	9	6	9	7	9	7	7	6	5	9	9	7	2
Dual II Magnum	6	2	2	2	2	7	2	7	7	4	2	2	2	2	7	7	7	2
Dual II Magnum [△] / Micro-Tech + Atrazine	9	5	9	9	2	9	6	9	7	9	7	7	6	5	9	9	7	2
Frontier	6	2	2	2	2	7	2	7	7	4	2	2	2	2	7	7	7	2
Lariat	9	5	9	9	2	9	6	9	7	9	7	7	6	5	9	9	7	2
LeadOff/Guardsman Max	9	7	9	9	2	9	6	9	7	8	8	8	6	6	9	9	7	2

Postemergence Herbicides

Weed size influences performance—see label

AAtrex/Atrazine [△]	9	9	9	9	1	9	9	9	1	9	4	9	9	9	9	9	1	2
Aim	9	7	6	6	6	9	7	8	8	6	6	8	5	10	7	7	7	2
Aim + Atrazine + Clarity	9	8	8	8	9	9	9	9	9	8	8	8	6	10	8	8	7	2
Aim + Atrazine	9	8	8	8	6	9	9	9	8	7	6	8	6	10	8	8	7	2
Aim + Clarity	9	8	9	8	8	9	9	9	9	8	9	9	7	10	8	8	8	3
Banvel/Clarity	7	9	8	8	8	7	9	8	8	7	9	9	8	5	8	8	8	4
Buctril	9	9	8	8	8	7	9	6	6	9	7	9	9	8	6	6	6	2
Buctril + Atrazine [△]	9	9	9	9	8	9	9	9	6	9	8	8	9	9	9	9	6	2
Glyphosate* ^ó ropewicks, wipers, etc.*	-	8	6	6	6	4	-	5	5	7	4	7	7	4	5	5	5	1
Marksman	9	9	8	8	7	9	9	9	8	9	8	9	9	8	9	9	8	2
Paramount	-	-	5	5	5	5	9	5	5	5	5	-	5	5	-	5	5	2
Paramount + Atrazine	9	9	9	9	5	9	9	9	5	9	7	9	9	9	9	9	5	2
Peak	3	9	6	1	6	5	8	8	8	9	-	7	9	8	9	1	8	2
Peak + Clarity	7	9	8	7	8	7	9	9	9	9	7	9	9	8	9	8	8	4
Permit	3	9	6	6	6	5	6	8	8	9	-	7	9	8	8	1	8	2
2,4-D	4	10	4	4	4	7	10	8	8	7	9	3	7	7	8	8	8	4

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury, unless in whorl. If stand is not lost, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety, for some herbicide combinations. Refer to product label for specific information.

^bValues will vary with soil texture, pH, organic matter, rainfall or irrigation, rotational crop, and herbicide rate. Refer to product label for specific information.

[△]Registered for forage sorghum and grain sorghum.

^óWeed Competitive Index—See page 8.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

**Ratings for weeds tall enough for selective treatment.

See page 101 for additional footnotes.

Grass Weed Response To Selected Herbicides

Sorghum-Grain and Forage

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter, temperature, growth stage, and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used as suggested in this publication. See pages 90-100 for additional problem weeds and their control. If volunteer corn is a potential problem delay planting and use Roundup to control seedlings or use tillage early to help germinate the seeds.

Weed Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on the product label. High weed densities, adverse conditions, or large weeds will reduce control.
 10 (96-100%), 9 (90-95%),
 8 (85-89%), 7 (80-84%),
 6 (70-79%), 5 (60-69%),
 4-2 less than 60%, 1 60%

	Barrygrass (0.3)	Crabgrass (0.5)	Fall Panicum (0.4)	Giant Foxtail (2.0)	Green Foxtail (1.0)	Yellow Foxtail (1.0)	Sandbur (0.4)	Shattercane/Sorghum (3.5)	Shattercane, ALS-resistant	Woolly Cupgrass (2.5)	Crop Safety ^a
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Soil-applied Herbicides

AAtrex/Atrazine ^Δ	4	4	2	6	7	6	4	2	2	3	2
Bicep II Magnum	9	9	9	9	9	9	4	2	2	6	2
Bullet	9	7	7	9	9	9	4	2	2	6	2
Dual II Magnum	9	9	9	9	9	9	4	2	2	6	2
Dual II Magnum ^Δ /Micro-Tech + Atrazine	9	7	7	9	9	9	4	2	2	6	2
Frontier	9	9	9	9	9	9	4	2	2	6	2
Lariat	9	7	7	9	9	9	4	2	2	6	2
LeadOff/Guardsman	9	9	9	9	9	9	4	3	3	6	2

Postemergence Herbicides

Weed size influences performance see label

AAtrex/Atrazine + COC	2	2	2	3	4	4	2	2	2	3	2
Aim	1	1	1	1	1	1	1	1	1	1	2
Aim + Atrazine + Clarity	2	1	1	2	2	2	1	1	1	1	2
Aim + Atrazine	3	2	1	2	2	2	1	1	1	2	2
Aim + Clarity	1	1	1	1	1	1	1	1	1	1	3
Banvel/Clarity	2	2	2	2	2	2	2	2	2	1	4
Buctril	2	2	2	1	1	1	2	2	2	1	2
Buctril + Atrazine ^Δ	2	2	2	2	2	2	2	2	2	3	2
Laddok S-12 ^Δ	2	2	2	2	2	2	2	2	2	2	1
Marksman	2	2	2	2	2	2	2	2	2	2	2
Paramount	7	7	-	8	8	7	5	2	2	7	2
Paramount + Atrazine	8	8	-	9	9	8	-	2	2	8	2
Peak	1	1	1	1	1	1	1	1	1	1	2
Peak + Clarity	1	1	1	1	1	1	1	1	1	1	3
Permit	1	1	1	1	1	1	1	1	1	1	2
Glyphosate* ^o ropewicks, wipers, etc.*	-	-	-	-	-	-	-	8	8	-	1
2,4-D	2	2	2	1	1	1	2	3	2	1	4

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury, unless in whorl. If stand is not lost injury, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety, for some herbicide combinations. Refer to product label for specific information.

^bValues will vary with soil texture, pH, organic matter, rainfall or irrigation, rotational crop, and herbicide rate. Refer to product label for specific information.

^ΔRegistered for forage sorghum and grain sorghum.

^oWeed Competitive Index^o See page 8.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

**Ratings for weeds tall enough for selective treatment.

See page 101 for additional footnotes.

Sorghum

No-Till

When the interval between herbicide application and planting is expected to be 28 days or more, split applications will generally give better control. If a split application was not made and planting is delayed, a PRE treatment may be needed. If treatments are not applied until 14 days or less before planting, weeds will likely be emerged. Grasses should be 1.5 inches or less for control with atrazine. Adding crop oil concentrate, nitrogen fertilizer or nonionic surfactant will increase control. If grasses are more than 2 inches tall, use Gramoxone Extra at 1.5 to 2.5 pt/A or Roundup Ultra at 1.0 to 1.5 pt/A. Add 1.0 pt/A 2,4-D ester 4 lb/gal if broadleaf weeds are present and apply 10 days before planting.

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM		
Cool-Season Grass Sod (including smooth brome and bluegrass)					
ROUNDUP ULTRAMAX ¹	13-26 oz	13-26 oz	13-26 oz	Fall or new growth	Use appropriate herbicide at planting. Cost: \$5.00-\$10.00.
Alfalfa Clover Sod					
2,4-D ester (4L) + BANVEL/CLARITY/ STERLING followed by appropriate herbicide at planting or early preplant	1 qt 0.5 pt	1 qt 0.5 pt	1 qt 0.5 pt	Apply in fall or April to alfalfa with 4" new growth	On dryland, moisture often not adequate for sorghum. 2,4-D + Banvel/Clarity used to kill alfalfa. Don't plant sorghum for 30 days. If smooth brome or bluegrass is present add Roundup Ultra. Don't apply with UAN or atrazine. Cost: \$8.95.
Rye or Winter Wheat					
ATRAZINE DF ³ + GRAMOXONE MAX ¹ AATREX DF ³ + GLYPHOSATE* ¹ + MICRO-TECH or DUAL II MAGNUM	Do not use 1.4 lb 13-20 oz 2.3 qt 1.3 pt	2.3 lb 1.6 lb 13-20 oz 2.3 qt 1.5 pt	2.3 lb 1.8 lb 13-20 oz 2.3 qt 1.67 pt	Apply when rye and wheat are 4-10" tall and before sorghum emerges	On dryland, moisture is often not adequate for sorghum. Use safened seed with Micro-Tech or Dual II Magnum. Cost: Atrazine + Gramoxone Extra \$13.35-\$17.30; AAtrex + Roundup Ultra + Dual II Magnum \$26.45-\$32.45; Atrazine + glyphosate + Micro-Tech \$23.06-\$26.72.
Continuous Row Crop					
AATREX DF ³ △	Do not use	2.3 lb	2.3 lb	April 1-15	Use safened seed with Dual II Magnum and Bicep II Magnum, and Bicep II Lite Magnum, and Bullet. Atrazine and Bicep II Magnum will damage sorghum on sandy and low organic matter soils. If weedy, add Gramoxone Extra at 1.5-2.0 pt. Cost: Atrazine \$6.20; Bicep II Magnum \$17.30-\$21.65; Bicep Lite II Magnum \$22.50-\$25.30; Bullet \$15.00-\$20.00.
BICEP II MAGNUM ³	Do not use	1.6 qt	2.0 qt	0-30 DBP	
BICEP LITE II MAGNUM ³		1.1 fb 0.5 qt 1.6 qt	1.2 fb 0.6 qt 1.8 qt	30-45 DBP fb 1 DAP 0-30 DBP	
BULLET	Do not use	3.0 qt	3-4 qt	0-7 DBP	
GUARDSMAN MAX ³ or LEADOFF	2-4-2.8 pt 2.5-3.0 pt	2.8-3.4 pt 3.0-4.0 pt	3.4-4.0 pt 4.0-4.5 pt	16-30 DBP 0-15 DBP	
GLYPHOSATE*	13-26 oz	13-26 oz	13-26 oz	Prior to crop emergence	Add appropriate residual herbicide. If only broadleaf weeds are present, add 2,4-D (4L) ester at 1 pt/A and delay planting 10 days. Can be used preplant. Cost: Roundup Ultra Max \$5.10-\$5.90.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Sorghum Ridge Plant

In crops planted after mid-May, weeds can be expected to grow vigorously before planting. In a ridge plant system these weeds may become too large to uproot and smother unless control efforts are applied in late April or early May. Two approaches can be used to control these weeds. The first would be to select an early preplant treatment from the no-till section and apply by mid to late April. Since the planting operation will destroy this herbicide barrier, a second herbicide application over the row is required at planting. A split application of two-thirds rate applied preplant + one-third rate banded over the row at planting should be effective. Another strategy is to apply a POST herbicide such as Roundup Ultra or Gramoxone Extra to destroy weeds before growth exceeds 3 to 4 inches in height. Application is needed in late April to early May. Apply a PRE herbicide at planting. In most cases the time interval from application of the preplant knockdown herbicide to planting should not exceed three to four weeks. Weeds such as kochia, horseweed, smartweed, and winter annuals will warrant early treatment. Lambsquarters, velvetleaf, and grasses will emerge early in some years. The key to successful weed control is timely herbicide application. Appropriate herbicides can be selected from the no-till and tilled seedbed sections for this crop.

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam < 1% OM</i>	<i>Silt Loam 1-2% OM</i>	<i>Silty-Clay Loam > 2% OM</i>		
GLYPHOSATE*	26-32 oz	26-32 oz	26-32 oz	1-3 weeks preplant to prevent soil water loss	Roundup Ultra and Touchdown 5 are excellent on annual grasses less than 6" tall. Both are good to excellent on broadleaves 6" or less. Follow with appropriate PRE treatment. Cost: Roundup Ultra \$7.10-\$9.90; Gramoxone Max \$7.15-\$11.00.
GRAMOXONE MAX	1.3-2.1 pt	1.3-2.1 pt	1.3-2.1 pt		

Tilled Seedbed

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam < 1% OM</i>	<i>Silt Loam 1-2% OM</i>	<i>Silty-Clay Loam > 2% OM</i>	
AATREX/ATRAZINE DF ³ △	Do not use	2.2 lb	2.2 lb	EPP, PPSA, PP, PRE, or SURFACE MIX ó Preplant applications should be made only on fine-textured soils. Do not use atrazine on sandy, high pH or calcareous soils. Rain may leach herbicides and cause sorghum injury. Cost: \$5.95.
BICEP II MAGNUM ³	Do not use	1.6-2.1 qt	2.1 qt	EPP, PPSA, PRE, or SURFACE MIX ó Need seed safener for Bicep and Dual. Cost: Bicep II Magnum \$17.35-\$22.75; Bicep Lite II Magnum \$16.85-\$22.45; Dual II Magnum \$17.90-\$23.40; Bullet \$15.00-\$17.50.
BICEP LITE II MAGNUM ³	Do not use	1.2 qt	1.6 qt	
DUAL II MAGNUM or DUAL IIG	1.3 pt 6 lb	1.3 pt 8 lb	1.7 pt 10 lb	
BULLET	Do not use	3.0 qt	3.5 qt	
FRONTIER	20 oz	25 oz	30 oz	0-30 days. Add 2-5 fluid oz for heavy residues. Do not exceed 32 fluid oz/A. Need seed safener. Cost \$13.80-\$21.70.
OUTLOOK	13 oz	15 oz	18 oz	
G-MAX LITE ³	2 pt	2.5 pt	3.5 pt	0-30- days before planting. Need seed safener. Cost: \$12..00-\$21.00.
GUARDSMAN MAX ³	2.4 pt	2.8 pt	3.4 pt	0-30 DBP. Need seed safener. Cost: \$13.45-\$18.90.
MICRO-TECH	Do not use	2.5 qt	3 qt	PPSA, PRE, or SURFACE MIX ó Need seed safener. Cost: Lariat \$12.00-\$14.40; Micro-Tech \$15.00-\$18.00.
LARIAT	Do not use	3 qt	3.5 qt	
LEADOFF ³	Do not use	3.5 pt	4.5 pt	PPSA, PPI, PRE ó Need safened seed. Cost: \$16.10-\$20.10.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Sorghum

Postemergence (See page 17 for additives)

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
AATREX/ATRAZINE DF ³ △	1.33 lb	Broadleaf weeds less than 6" Sorghum less than 12"	Atrazine may give partial control of grass weeds under 1". Do not use on sand or loamy sand. Increase Do not exceed 2.8 pounds of Atrazine DF per calendar year. Cost: Atrazine \$4.70.
AIM EW alone or with	0.5 oz	Aim alone sorghum less than 6 leaf Aim + Clarity sorghum 3-5 leaf	Aim is a contact herbicide so thorough spray coverage is required. Cost: Aim \$2.30; Aim + Atrazine \$3.80-\$5.30; Aim + Clarity \$7.80; Aim + Atrazine + Clarity \$5.90-\$6.50.
CLARITY or ATRAZINE DF or ATRAZINE DF + CLARITY	8.0 oz 0.56-1.1 lb 0.56 lb 3-4 oz	Broadleaves 1-4i Velvetleaf less than 36i Sorghum less than 12i Sorghum 3-5 leaf	
MARKSMAN ³	2 pt	Sorghum 2-5 leaf. Broadleaf weeds 2-4"	Cost: \$7.50.
BANVEL/CLARITY/ STERLING△	0.5 pt	Sorghum 3-5 leaves	Observe label precautions when sensitive crops are nearby. Cost: \$5.85.
2,4-D AMINE (4L)△ or 2,4-D ESTER (4L)△	1 pt 0.5 pt	After sorghum is 5" tall. If over 10" use drop tips	Spraying 2,4-D before 5" stage may inhibit root development. Spraying 2,4-D without drop tips after 8" through early boot may inhibit head development; use drop tips after 8" for all Banvel/Clarity treatments. Do not use 2,4-D from early boot through soft dough stage. Cost: 2,4D \$1.90; Buctril alone \$7.65-\$11.50; with Atrazine \$9.05-\$12.90, with Banvel/Clarity/Sterling \$8.95-\$15.30; Buctril/Atrazine + Banvel \$8.65-\$12.20.
BUCTRIL with ATRAZINE DF ³ or with BANVEL/CLARITY/ STERLING	1 -1.5 pt or 0.5-0.75 pt 0.55 lb 0.12-0.5 pt	Broadleaf weeds 2-6"; sorghum 3-leaf to 12"	
BUCTRIL/ATRAZINE DF ³	2-3 pt	Sorghum 3-leaf to 12"	
BUCTRIL/ATRAZINE DF ³ + BANVEL/CLARITY/ STERLING	1.5-2.0 pt 0.12-0.25 pt	Sorghum 3-leaf to 12"	
PARAMOUNT	5.3-8.0 oz	Emergence to 12i sorghum	Requires COC or MSO additionally. UAN or AMS may be added. Best performance on annual grasses less than 2i tall. Works best on green foxtail. Cost: Paramount \$17.50-\$25.90; Paramount + Atrazine \$18.85-\$28.60.
PARAMOUNT + ATRAZINE DF	5.3-8.0 oz 0.5-1.0 lb		
PEAK alone or with 2,4-D AMINE (4L)	0.25-1.0 oz 2.0-8.0 oz	Sorghum 5-30"	On soil above pH 7.5, carryover may injure soybean and other sensitive crops. Cost: \$5.15-\$13.20.
PERMIT	0.66 oz	Sorghum 2-leaf to layby (before head emergence)	May be tank mixed with AAtrex, Buctril, Banvel/Clarity, or 2,4-D. Cost: \$11.80.

Harvest Aid

DIQUAT	1.5-2.0 pt	1-2 weeks before harvest.	Seed no more than 30% moisture.
GLYPHOSATE*	1-2 qt	Grain moisture 30% or less. 7 days before harvest.	Not for use on seed fields.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Bean Bar/Wiper Applications

<i>Crop</i>	<i>Applicator</i>	<i>Herbicide:Water Ratio</i>	<i>Remarks*</i>
Soybean and Sorghum	1. Ropewicks	GLYPHOSATE** (30% concentration)	No surfactant needed. Works best on volunteer corn and shattercane. Weeds should be 10-12" taller than soybean. Travel both directions in heavy stands. In sorghum, too wet or dripping ropes will cause droplet splash and crop injury.
Soybean	2. Bean Baró straight stream tip	GLYPHOSATE** (4% concentration)	A marking dye can be added to the spray solution so it is easier to see treated plants. Add a surfactant at 0.5% v/v.
Soybean	3. Bean Baró spreading tip	BASAGRAN 1:100 (1% concentration)	Complete coverage essential. Add 1 gal UAN to each 25 gal spray. Add Poast and COC for shattercane and volunteer corn.
		CLASSIC + PINNACLE 0.5 oz + 0.5 oz per 25 gal water	Add 1 qt COC + 1 gal 28-0-0 per 25 gal.
		POAST PLUS, FUSILADE or ASSURE 1:100 (1% concentration)	Add 1 qt COC or 1/2 pt adjuvant per 25 gal mix. Pre-harvest, intervals: Poast, 90 days; Fusilade, pre-bloom; Assure, 80 days; Fusion, Prebloom; Select, 50 days.
		SELECT 1:100 (1% concentration)	
		FUSION 1:160 (0.62% concentration)	

*Herbicide costs per acre vary from \$1.00 with light weed infestations to \$15.00 in heavy infestations.

**Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Broadleaf Weed Response to Postemergence Herbicides

Small grain

Response ratings:

Ratings are for light to moderate weed populations, favorable conditions and weed growth stage as specified on product label. High weed populations, adverse conditions, or large weeds will reduce control.

10 ó (96-100%) 6 ó (70-79%)
 9 ó (90-95%) 5 ó (60-69%)
 8 ó (85-90%) 4-2 ó less than 60%
 7 ó (80-84%) 1 ó 0

Herbicide	Blue Mustard (10) ^β	Knotweed (3)	Field Pennygrass (10)	Horseweed (5)	Kochia (5)	Kochia, ALS-resistant (5)	Lambsquarters (5)	P. Smartweed (3)	Redroot Pigweed (2)	R. Thistle (5)	Shepherdspurse (10)	Sunflower (5)	Tansy Mustard (10)	Wild Buckwheat (4)	Prickly Lettuce (10)	Waterhemp (3)	Wild Vetch (8)	Crop Safety ^a
Aim + 2,4-D	8	7	9	-	9	9	8	-	8	8	9	8	9	8	9	8	1	2
Ally	9	4	9	7	6	1	7	4	8	6	9	7	9	5	8	7	1	1
Ally + 2,4-D	10	7	10	6	9	6	10	6	10	8	10	10	10	6	10	9	6	2
Ally + Banvel/Clarity	9	7	10	6	10	7	10	9	10	9	10	9	10	7	10	9	8	3
Ally + Starane	9	4	10	7	10	8	7	4	8	6	9	7	9	5	8	7	1	1
Amber	9	4	9	7	7	1	6	5	8	6	9	8	9	8	8	7	1	1
Amber + 2,4-D	10	6	10	6	9	6	10	6	10	8	10	9	10	8	10	9	6	2
Amber + Banvel/Clarity	9	7	10	6	10	7	10	9	10	9	10	10	10	9	10	9	8	3
Amber + Starane	9	4	9	7	10	8	6	5	8	6	9	8	9	8	8	9	1	1
Banvel/Clarity + 2,4-D	6	8	10	6	10	10	9	10	10	9	10	10	10	7	8	9	8	4
Beyond ⁺	1	1	9	1	1	1	1	1	1	1	9	1	9	1	1	1	1	2
Buctril + 2,4-D	8	9	10	7	10	10	9	9	9	9	9	9	9	8	9	8	7	2
Curtail	9	9	10	9	8	8	10	10	10	8	9	10	9	9	10	9	9	2
Curtail M	7	8	9	9	8	8	8	9	8	7	9	8	9	9	8	7	8	1
Express + 2,4-D	9	7	10	6	9	6	9	6	7	8	7	7	7	7	9	8	6	1
Finesse	9	4	9	7	5	1	8	5	8	5	9	6	9	6	8	7	1	1
Finesse + 2,4-D	9	7	10	6	9	6	10	6	10	8	10	9	10	7	10	9	6	2
Finesse + Banvel/Clarity	9	7	10	6	10	7	10	9	10	9	10	9	10	8	10	9	8	3
Harmony Extra+ 2,4-D	9	6	10	7	9	6	9	8	9	8	10	8	10	8	9	8	5	1
Maverick Pro (fall applied)	5	2	9	6	3	1	3	2	4	3	9	3	9	2	8	3	1	1
MCPA	4	4	7	4	5	5	7	6	6	6	8	6	8	4	6	5	5	1
Peak	8	6	9	7	5	1	6	8	8	6	9	8	9	6	8	7	1	1
Peak + 2,4-D	10	7	10	7	9	6	10	8	10	8	10	10	10	6	10	9	6	2
Peak + Banvel/Clarity	9	7	10	7	10	7	10	9	10	9	10	9	10	9	10	9	8	3
Rave	9	7	10	6	10	7	10	9	10	9	10	10	10	9	10	9	8	3
2,4-D	7	6	9	5	6	6	9	8	9	8	9	9	9	4	9	8	7	2

^aCrop ratings of 3 or less result in no yield loss; adding liquid nitrogen may considerably reduce crop safety for some herbicide combinations.

^βWeed Competitive IndexóSee page 8.

⁺For use in Clearfield wheat varieties only.

Winter Annual Grass Response to Selected Herbicides

(See Downy Brome in *Troublesome Weeds Section*, pages 88-101, for more information.)

Herbicide(s)	Downy Brome	Jointed Goatgrass	Feral Rye	Crop Safety ^a
Preemergence				
Amber	3*	1	1	1
Finesse	4*	1	1	2
Maverick Pro	4-8*	2	1	1
Early postemergence ^b				
Beyond ⁺	9	9	7	3
Maverick Pro	6-9*	3	1	1
Late postemergence ^b				
Beyond ⁺	9	9	4	1
Maverick Pro	3-5*	1	0	1

*Requires rainfall shortly after application for best results.

⁺For use in Clearfield wheat varieties only.

^bEarly postemergence = before weeds have tillered; late postemergence = after weeds have tillered.

See page 101 for additional footnotes.

BARLEY AND SPRING WHEAT

<i>Herbicide (See Weed Response Table on p. 59)</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
AIM EW + 2,4-D ESTER (4L)	0.5 oz 0.5 pt	2 leaf to joint stage	Add 0.25% NIS. Labeled. Cost: \$2.80.
ALLY or AMBER or FINESSE or PEAK + 2,4-D ESTER (4L)	0.10 oz 0.28 oz 0.2-0.3 oz 0.25-0.50 oz 0.25-0.50 pt	Spring 5-leaf to joint stage	Use only with small grains or a proso millet rotation. For wild buckwheat use Buctril as listed for winter wheat. Add surfactant at 1 qt/100 gallons of spray solution. Cost: Ally + 2,4-D \$2.80-\$3.25; Amber + 2,4-D \$2.75-\$3.20; Finesse + 2,4-D \$3.40-\$5.30; Peak + 2,4-D \$3.30-\$6.55.
CURTAIL	2 pt	Spring 4-leaf to joint stage	Plant only small grain, field corn or sugarbeet the following year. Cost: \$9.75.
HARMONY EXTRA + 2,4-D ESTER (4L)	0.4-0.5 oz 0.25-0.50 pt	2-leaf to joint stage; weeds less than 4i tall	Add a nonionic surfactant at 1 qt/100 gallons. Any crop may be planted 60 days after application. Cost: \$5.45-\$7.15.
STARANE + SALVO	1.0-1.33 pt	Wheat - 4 leaf until flag leaf visible weeds less than 8i	Cost: \$6.40-\$8.50.
2,4-D AMINE (4L) or 2,4-D ESTER (4L)	1-1.5 pt 0.5-0.75 pt	Spring 5-leaf to joint stage	Cost: \$0.90-\$2.30.

Harvest Aid

2,4-D ESTER (4L)	1 qt	Hard dough, 7 or more days before harvest	Helps desiccate large broadleaf weeds. Only certain brands labeled for this use. Cost: \$3.60.
ALLY + 2,4-D ester (4L)	0.1 oz 0.25-0.50 pt	After dough stage	Preharvest interval of 10 days. Add surfactant at 1 qt/100 gallons of spray solution. Cost: \$2.80-\$3.25.

OAT

AIM EW + 2,4-D ESTER (4L)	0.5 oz 0.5 pt	2 leaf to joint stage	Add 0.25% NIS. Labeled. Cost: \$2.80.
MCPA BUCTRIL + 2,4-D AMINE (4L)	0.5-1.0 pt 0.5-1.0 pt 0.5 pt	Fully tillered to joint	Cost: MCPA \$1.00-\$2.00; Buctril + 2,4-D \$4.70-\$8.50.
BUCTRIL + MCPA	0.5-1.0 pt 0.5 pt	Oat 4-leaf to joint	Cost: \$4.80-\$8.60.
CURTAIL M	1.75-2.3 pt	Oat 3-leaf to joint, weeds less than 3"	Cost: \$9.75-\$12.80.
HARMONY EXTRA or PEAK + BUCTRIL or MCPA	0.3-0.4 oz 0.25-0.5 oz 0.75-1.5 pt 0.5-0.75 pt	Oat 3-leaf to joint	Add surfactant at 1 qt/100 gallons of spray solution. Cost: Harmony Extra + Buctril \$9.45-\$16.45; Harmony Extra + MCPA \$4.75-\$6.50; Peak + Buctril \$8.55-\$17.10; Peak + MCPA \$3.80-\$7.15.
2,4-D AMINE (4L)	0.5-1.0 pt	3-4 leaf	Some injury from 2,4-D may be expected at any stage. Cost: \$0.75-\$1.50.

Harvest Aid

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
2,4-D ESTER (4L)	1 qt	Hard dough 7 or more days before harvest	Helps desiccate large broadleaf weeds. Only certain brands labeled for use. Cost: \$3.60.

See page 101 for additional footnotes.

WINTER WHEAT

<i>Herbicide (See Weed Response Table on p. 59)</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
Winter Annual Grass Control			
BEYOND	4-5 oz	Wheat 3-leaf to joint, grass weeds 1-5 leaves	For use with Clearfield varieties only. For feral rye control use 5 oz./acre rate and apply in fall before rye tillers. Add surfactant at 1 qt/100 gal and nitrogen based fertilizer at 1-2.5 gal/100 gal or AMS at 5-15 lb/100 gal. Cost: \$16.00-\$20.00.
MAVERICK PRO	0.67 oz	In fall when weeds are actively growing	For downy brome control, best applied early postemergence. Use surfactant at 2 qt/100 gallons of spray solution. Cost: \$9.05.
Broadleaf Control			
AIM +	0.33-0.66 oz	Wheat to joint stage	Add UAN at 2-4 gallons/100 gallons or AMS at 4 lb/A. Cost: \$2.75-\$5.50.
2,4-D ESTER (4L)	0.25-0.50 pt		
ALLY or AMBER or FINESSE or PEAK	0.10 oz 0.28-0.35 oz 0.2-0.4 oz 0.25-0.5 oz	In fall after 2-leaf stage	Effective control on mustards and pennycress. Some wheat varieties are more sensitive than others to fall application. Add surfactant. Cost: Ally \$2.35; Amber \$2.30-\$2.85; Finesse \$2.95-\$5.90; Peak \$2.80-\$5.65.
ALLY or AMBER or FINESSE or PEAK +	0.10 oz 0.28-0.35 oz 0.2-0.3 oz 0.25-0.5 oz	Early spring from 4 tillers to joint stage	
2,4-D ESTER (4L) or BANVEL/CLARITY/STERLING	0.25-0.5 pt 2-3 oz		Add surfactant at 1-2 qt/100 gal. If the spray solution contains liquid fertilizer, do not add surfactant. Cost: Ally + 2,4-D \$2.80-\$3.25; Ally + Banvel/Clarity \$3.70-\$4.40; Amber + 2,4-D \$2.75-\$3.75; Amber + Banvel/Clarity \$3.65-\$4.95; Finesse + 2,4-D \$3.40-\$5.30; Finesse + Banvel/Clarity \$4.30-\$6.45; Peak + 2,4-D \$3.30-\$6.55; Peak + Banvel/Clarity \$4.15-\$7.70.
ALLY or AMBER +	0.10 oz 0.28-0.35 oz 0.33 pt	Spring, before boot stage; weeds less than 4ft tall	Provides excellent control of kochia, including ALS-resistant kochia, with excellent crop safety. Add surfactant at 1-2 qt/100 gal. Cost: Ally + Starane \$6.05; Amber + Starane \$6.00-\$6.60.
STARANE	0.33 pt		
2,4-D AMINE (4L) or 2,4-D ESTER (4L)	1-1.5 pt 0.5-0.75 pt	Early spring, from 4 tillers to joint stage	Do not spray winter wheat until well tillered. Spray broadleaf weeds as soon as good growing conditions occur. Cost: \$0.90-\$2.30.
BUCTRIL +	1-1.5 pt 0.5 pt	Wheat from 4 tillers to before canopy covers weeds	Most broadleaf weeds should be in 2-4 leaf stage or mustards in early rosette stage. Cost: \$8.50-\$12.35.
2,4-D ESTER (4L)	0.5 pt		
BANVEL/CLARITY/STERLING +	2-3 oz 0.5-0.75 pt	Spring, 4 tillers to joint stage	Controls most troublesome broadleaf weeds. Do not apply with fertilizer solutions. Cost: \$2.10-\$3.20.
2,4-D AMINE (4L)	0.5-0.75 pt		
CURTAIL	2.0 pt	Before boot stage	Plant only small grain, field corn or sugarbeet the following year. Cost: \$9.75.
EXPRESS or HARMONY EXTRA +	0.25-0.33 oz 0.4-0.5 oz 0.25-0.5 pt	Wheat to joint stage; weeds less than 4" tall	Add a nonionic surfactant at 1 qt/100 gallons. Any crop can be planted 60 days after application. If the spray solution contains liquid fertilizer, do not add surfactant. Cost: Express + 2,4-D \$5.20-\$7.15; Harmony Extra + 2,4-D \$5.45-\$7.15.
2,4-D ESTER (4L)	0.25-0.5 pt		
STARANE + SALVO	1.0-1.33 pt	Wheat-4 leaf until flag leaf visible weeds less than 8ft	Cost: \$6.40-\$8.50.
RAVE	2.5 oz	Early spring from 4 tillers to joint stage	Add surfactant at 1-2 qt/100 gal. Cost: \$3.50.
Harvest Aid			
ALLY +	0.1 oz 0.25-0.50 pt	After dough stage	Preharvest interval of 10 days. Add surfactant at 1 qt/100 gallons of spray solution. Cost: \$2.75-\$3.10.
2,4-D AMINE (4L)	0.25-0.50 pt		
2,4-D ESTER (4L)	1 qt		
ROUNDUP ULTRA MAX	26 oz	Hard dough 7 or more days before harvest	Rescue treatment for control of late broadleaf weeds. To reduce breakage with 2,4-D, all green color should be gone from joints. Only certain brands of 2,4-D labeled for this use. Cost: 2,4-D \$3.60; Roundup Ultra Max \$9.55; Touchdown \$10.10.
TOUCHDOWN IQ	32 oz		

See page 101 for additional footnotes.

PROSO MILLET

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
2,4-D AMINE (4L)*	1 pt	Proso in 3-5 leaf stage	Broadleaf weeds should be small. Observe all Clarity precautions when susceptible crops are within 1/2 mile of application site. Add a nonionic surfactant with Peak at 1 qt/100 gallons of spray solution. Coverage is essential for good control with Aim. Weeds should be less than 4i. Add surfactant at 1 qt/100 gal. Cost: 2,4-D \$1.50; 2,4-D + Clarity \$3.90; 2,4-D with Peak \$5.45-\$6.80; 2,4-D + Aim: To be determined after labeling.
2,4-D AMINE (4L)* + AIM	0.75 pt	See label, if approved, for use rates	
2,4-D AMINE (4L)* + CLARITY or PEAK	0.75 pt 4 oz 0.38-0.50 oz		

SUNFLOWER (See *Ecofarming* for no-till sunflower recommendations)

Preemergence

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam</i>	<i>Silt Loam</i>	<i>Silt-Clay Loam</i>	
EPTAM 7E + TREFLAN/TRIFLURALIN	2.5 pt 1.5 pt	2.5 pt 1.5 pt	2.5 pt 1.5 pt	Apply and incorporate just before planting. Cost: \$14.30-\$15.80.
PROWL (3.3 EC) PRE + RAPTOR POST	3.0 pt See label, if approved, for rates	3.6 pt See label, if approved, for rates	3.6 pt See label, if approved, for rates	
PROWL/PENDIMAX (3.3EC) PPI	1.2-2.4 pt	1.8-3.0 pt	2.4-3.6 pt	PPI up to 30 days prior to planting. Prowl PRE is most effective in controlling weeds when adequate rainfall or irrigation is received 7 days after application. Otherwise, a registered POST grass herbicide may be required. Cost: Prowl \$3.20-\$9.70; Prowl + glyphosate \$11.20-\$12.80.
PROWL (3.3 EC)/PENDIMAX PRE + GLYPHOSATE**	3.0 pt 16 oz	3.6 pt 16 oz	3.6 pt 16 oz	
TREFLAN/TRIFLURALIN	1 pt	1.25-1.5 pt	1.5-2 pt	For best results immediately incorporate. Read label for carryover precautions. Cost: Treflan/Trifluralin \$2.55-\$7.10.
SPARTAN + PROWL/PENDIMAX	See Section 3 label, if approved, for use rates			Section 3 applied for 2003. Risk of crop injury increases as soil pH increases and/or soil organic matter decreases.

Postemergence

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
POAST + DASH HC or oil concentrate	1-1.5 pt 1 pt 2 pt	Shattercane + corn 12-18i Other grasses less than 5i	Good coverage essential. Add 4-8 pt of UAN or 2.5 lbs AMS/A to control crabgrass and all volunteer cereals. Cost: \$8.75-\$13.10.
SELECT	6-8 oz	Annual grass weeds 2-6i.	

Harvest Aid

GRAMOXONE MAX ¹	1.0-1.33 pt		Use nonionic surfactant. Apply when sunflower seeds reach physiological maturity (when seed moisture is 35% or lower). For many varieties, this corresponds to the time when the back of the heads are yellow and the bracts are turning brown. Do not graze treated areas or feed treated forage to livestock. Use the higher rate when crop stands or weed infestations are heavy. Apply at least 7 days before harvest. Cost: Gramoxone Max \$4.90-\$6.50.
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*Not all 2,4-D labeled for millet.

**Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ecofarming

Ecofarming (ecofallow) is a system based on quality winter wheat stubble and timely weed control. Good quality stubble is the result of growing adapted winter wheat varieties competitive with weeds along with good disease and insect resistance. Proper planting date, fertilization according to needs, weed control in the growing wheat, harvest with minimum grain loss and good chaff and long straw distribution all contribute to the success of this program. Herbicides should be applied within 30 days after wheat harvest for wheat grown with a 10- to 14-month fallow period. If winter wheat is planted following soybean, corn, or grain sorghum, herbicides should be applied within 15 to 20 days after wheat harvest. The wheat is less competitive with weeds. Weather and weed conditions need to be correct for good results. Glyphosates (generic), Fallow Master, Gramoxone Max plus atrazine and Landmaster BW will control established broadleaf and grass weeds, and volunteer wheat depending on herbicide rate, plant height, density, and species. Check labels for use and additives. If rain is expected within six hours, Gramoxone plus atrazine is a good choice. The rainfast period required for glyphosate products can be shortened by increasing the rate and not adding atrazine to the tank-mix. Mixing atrazine with glyphosate products can create antagonism and decrease performance.

Maximum benefits from ecofarming, which includes moisture conservation and prevention of weed seed production, usually occur when treatments are timely. This is on the condition the weeds are not under drought stress, the straw has settled, dust is not present on the plants, and good coverage of the plants is possible with the spray solution. Small weeds are easier to control with the nonselective translocating herbicides containing glyphosate. Gramoxone Max plus atrazine is usually more effective in controlling small weeds and as they approach maturity.

If weeds recover from initial after-harvest herbicide applications or if volunteer wheat emerges, retreat with glyphosate. More effort is needed to prevent weeds from producing seeds in the wheat stubble.

Volunteer winter wheat and/or downy brome or jointed goatgrass are not always controlled with July and early August atrazine treatments. A split after harvest treatment with the early application of Fallow Master, glyphosates or Landmaster BW followed by 1 lb/A or more of atrazine plus Gramoxone Max (if needed) applied in September can be an

effective control measure. If maximum rates of atrazine are applied in the fall, do not add additional atrazine in the spring. Lower rates of atrazine (or none at all) need to be used on eroded areas, on soils with less than 1.2% organic matter, on soils with a pH of 7.0 or greater, some terraces, Canyon and Rosebud soils, and caliche outcroppings. High atrazine rates may carry over and destroy wheat on these areas. Total atrazine applied between wheat harvest and planting corn or sorghum should not exceed 3.25 lb 90DF or 3 qt 4 L/A.

In the spring, use glyphosate to kill volunteer wheat and annual bromes in March to prevent soil moisture loss. Consider banding over the row in weedy fields at planting for planters which disturb the soil and remove some of the preplant herbicide.

Fields not treated after harvest with herbicides are not ecofallow. Therefore, herbicides might not be as effective and grain yields may be poorer than fields treated in late summer and fall. If moisture was present after harvest and weeds produced seeds, weed density may be great enough that weed control with herbicides at rates that do not cause crop injury may be difficult. Also the soil moisture lost after harvest may be critical to the crop if the moisture during the winter and spring is limited. If a producer wants to try the spring-only treatment, the following is suggested. An early spring treatment of glyphosate, Fallow Master, RT Master, Landmaster BW, or Touchdown with atrazine as soon as good growing conditions exist in the spring is an effective treatment for volunteer wheat and downy brome. Add or increase the AAtrex/Atrazine to the lower of the maximum labeled rate or the amount the crop can tolerate and still not cause damage to the succeeding crop. Be sure to add a grass herbicide. Add Gramoxone Max or glyphosate products at 1.5 to 2.0 pt/A after April 15 depending upon size of weeds. Rates suggested depend on soil type, pH, organic matter, time of application, and weed size. For corn or sorghum use 1.4 to 1.8 lb/atrazine. Dual II Magnum or Bicep II Magnum, Bullet, Fultime, G-Max Lite or Leadoff should be applied 20 to 30 days before corn or sorghum planting. Balance should not be applied more than 7 days before corn planting unless a planned sequential application of a POST herbicide is used. For sorghum, use a seed treatment for Dual II Magnum, Bicep II Magnum, Bullet, G-Max Lite or Leadoff to prevent herbicide injury.

PLANTING ROW CROPS NO-TILL INTO LAST YEAR'S SPRING SMALL GRAIN STUBBLE (Oat, Spring Wheat, and Spring Barley)

The spring small grains are not as competitive with weeds as winter wheat. This is because the winter wheat is established in the fall and starts growth early in the spring before most weeds germinate. With good stands of winter wheat, most weeds except for winter annual weeds, are not a problem.

The quality and quantity of winter wheat stubble and straw is also superior and longer lasting than the spring grain crops. The winter wheat stubble and straw is more effective in suppressing weeds. Therefore, planting crops no-till into last year's small grain, while it can be successful, can also be a disaster if the herbicide treatments are not timely, properly selected, applied properly, and results are not evaluated to determine if retreatment or other weed control measures are necessary.

The key to this program is weed control after spring small grain harvest. Keeping the weeds from producing seeds and using stored soil moisture is done with a timely herbicide treatment after harvest. The herbicide treatments listed for winter wheat after harvest can be used in spring

small grain stubble in most situations. The higher labeled rates of herbicides are usually required. Glyphosate, Fallow Master and Landmaster BW are usually the choice nonselective herbicides for control of emerged summer annual grass weeds that are growing rapidly. As weeds approach maturity, Gramoxone Max plus atrazine may be used. If atrazine is used in the fall treatment, the next crop must be tolerant to it at the rate used (check label).

The spring herbicide treatment is necessary. Again, check the rates, etc. for the crop in the ecofarming section. Check labels and be sure to control volunteer crops. Also, do not disturb the herbicide treatment with tillage if a residue herbicide was applied last fall. Read all the general remarks under ecofarming and see footnotes on page 109.

For additional information on ecofarming, see the *1996 Proceedings of the Ecofarming and Winter Wheat Conferences*, available from NU Research and Extension Center.

CONTINUOUS WINTER WHEAT AND WINTER WHEAT FOLLOWING SOYBEAN

Continuous Winter Wheat. Select winter wheat fields that are free of downy brome, hairy chess, Japanese brome, and jointed goatgrass. Apply Glyphosate, Fallow Master or Landmaster BW within 30 days after winter wheat harvest but before summer annual weeds head. Apply glyphosate about 10 days before winter wheat planting.

No-till Wheat Following Soybean Harvest. Select early maturing soybean cultivars so that winter wheat can be planted within the

optimum window. Plant wheat at 90 lb/A dryland and 120 lb/A irrigated with a no-till drill equipped to apply starter fertilizer in the row with the seed. Weeds such as kochia are a problem in late planted winter wheat. Therefore, a herbicide treatment is usually needed in the spring. Use Ally or Amber plus 2,4-D as 2,4-D is ineffective on triazine resistant kochia because late seeded wheat is less competitive. Buctril may not be effective because of multiple flushes of kochia.

Weed Response to Herbicides Applied After Winter Wheat Harvest

Response Ratings:

Ratings are for light to moderate weed densities, good wheat stubble, favorable conditions and weed growth stage as specified on product label. High weed density, adverse conditions, or large weeds will reduce control.
 10 ó (96-100%) 5 ó (60-69%)
 9 ó (90-95%) 4-2 ó less
 8 ó (85-90%) than 60%
 7 ó (80-84%) 1 ó 0
 6 ó (70-79%)

Herbicides*

	<i>Broadleaf Weeds</i>											<i>Summer Annual Grasses</i>								<i>Winter Annual Grasses</i>					
	Buckwheat, Wild	Buffalobur	Horseweed	Knotweed, Tall	Kochia	Lambsquarters	Lettuce, P	Pigweed spp.	Smartweed, P.	Spurge, Tooth or Spotted	Sunflower, Common	Thistle, R.	Barnyardgrass	Crabgrass or Fall Panicum	Cupgrass, Prairie	Foxtail, Gr.	Foxtail, Ye.	Sandbur	Shattercane	Stinkgrass	Witchgrass	Downy Brome	Jointed Goatgrass	Volunteer Wheat	
	6 inches tall or less											4 inches tall								4 inches tall					
Fallow Master	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Glyphosate**	6	10	8	8	8	9	6	10	9	5	10	8	10	10	10	10	10	10	10	10	10	10	10	10	
Glyphosate** + atrazine	10	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Gramoxone Max	10	10	10	10	10	10	10	10	5	10	10	9	4	2	2	7	4	5	5	8	8	10	10	10	
Gramoxone Max + atrazine	10	10	10	10	10	10	10	10	10	10	10	10	9	7	6	10	9	9	10	10	10	10	10	10	
Landmaster BW	10	10	10	10	10	10	8	10	10	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Landmaster BW + atrazine	10	10	10	10	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Ready Master ATZ	9	10	10	10	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
	12 inches tall											Tillered to boot								Tillered to boot					
Fallow Master	8	10	8	9	8	10	8	8	10	7	10	8	8	8	6	10	8	8	10	10	8	10	10	10	
Glyphosate**	5	9	6	8	5	8	5	8	7	3	10	7	8	8	6	10	8	8	10	10	8	10	10	10	
Glyphosate** + atrazine + 2,4-D	10	10	10	10	8	10	8	10	10	8	10	10	5	6	4	10	5	8	10	10	8	10	10	10	
Gramoxone Max	9	7	7	7	7	7	7	7	4	7	7	7	3	1	1	4	4	3	3	5	4	6	6	6	
Gramoxone Max + atrazine + 2,4-D	9	10	10	10	10	10	10	10	8	10	10	10	3	2	2	4	4	3	3	7	6	9	9	9	
Landmaster BW	8	10	8	9	8	10	8	8	9	7	10	8	8	8	6	10	8	8	10	10	8	10	10	10	
Landmaster BW + atrazine	10	10	10	10	8	10	8	10	10	8	10	9	5	6	4	10	7	8	10	10	8	10	10	10	
Ready Master ATZ	9	10	10	10	8	10	7	10	10	8	10	10	8	6	4	10	8	8	10	10	8	10	10	10	
	24 inches tall											Headed								Headed (in spring)					
Fallow Master	6	8	8	7	6	7	8	8	8	5	7	8	8	9	6	10	8	10	10	10	10	10	10	10	
Glyphosate**	3	7	6	6	4	5	3	6	6	2	7	7	8	9	6	10	8	10	10	10	8	10	10	10	
Glyphosate** + atrazine + 2,4-D	10	10	8	8	7	9	10	10	9	6	10	8	7	8	5	10	7	9	10	10	8	10	10	10	
Gramoxone Max	8	8	9	7	8	8	8	8	4	6	7	7	6	6	6	7	8	7	4	8	8	9	9	9	
Gramoxone Max + atrazine + 2,4-D	10	10	10	8	10	9	10	10	7	9	10	10	8	9	7	10	10	6	10	10	10	10	10	10	
Landmaster BW	5	8	8	7	5	7	8	8	8	5	7	8	8	9	5	10	8	10	10	10	8	10	10	10	
Landmaster BW + atrazine	10	10	8	8	7	9	10	10	9	6	10	8	7	8	6	10	9	9	10	10	8	10	10	10	
Ready Master ATZ	8	10	7	8	7	9	10	10	9	6	10	8	7	8	5	10	7	9	10	10	8	10	10	10	

*Rate is: 32 oz/A Fallow Master, 1.3 pt/A for Gramoxone Max, 54 oz/A for Landmaster BW, 2 qt/A of Ready Master ATZ, 16 oz/A for glyphosate. Atrazine rate is 2.0 qt/A and add 2,4-D amine rate (3.8 lb EC) is 1.5 pt/A when weeds are above 8 inches tall. Increasing the rate of glyphosate will improve control of difficult weeds. For example, to control barnyardgrass, yellow foxtail, or prairie cupgrass may require 24 oz/A of glyphosate alone or 26-32 oz/A when mixed with atrazine.

**Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ecofarming

Herbicides to use after winter wheat harvest, with winter wheat planted in 2 to 3 months (continuous winter wheat), in 12 to 14 months (fall treatment in winter wheat-fallow), or in 4-5 months (spring treatment in winter wheat-fallow).

<i>(See Weed Response charts before selecting herbicides.)</i> Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silt Loam 1-2% OM	Silty-Clay Loam > 2% OM		

Winter Wheat Stubble to be Seeded 2-3 Months Later to Winter Wheat (Continuous Wheat)

Herbicides to be used within 30 days after wheat harvest.

GLYPHOSATE*	16-32 oz	16-32 oz	16-32 oz	POST; two or more applications required. Wait 15 days before planting wheat with Landmaster BW	If volunteer wheat develops close to planting, treat with glyphosate. To facilitate drilling stubble should be no taller than 12i with good straw and chaff distribution. Cost: glyphosate \$4.00-\$8.29; Landmaster BW \$5.20-\$8.32.
LANDMASTER BW ¹	40-64 oz	40-64 oz	40-64 oz		

Winter Wheat Stubble to be Seeded 12-14 Months Later (Fallow Aid)

AATREX DF ³	0.6 lb	1.1 lb	1.1 lb	Aug 10-Sept 10 (12 months or more before seeding)	Spray before weeds produce seed and not under drought stress. Volunteer wheat and downy brome control are better with late Aug. and early Sept. application. The addition of 1 pt 2,4-D ester to AAtrex + Gramoxone Max to improve control broadleaf weeds may decrease control of grasses. Cost: AAtrex + Gramoxone Max \$7.96-\$11.27; Atrazine + Gramoxone Max + 2,4-D \$9.75-\$15.12; AAtrex + Landmaster BW \$9.94-\$11.29; glyphosate + AAtrex \$7.78-\$11.26; Ready Master ATZ \$10.32-\$13.76.
+ GRAMOXONE MAX ¹	1.3-1.7 pt	1.3-1.7 pt	1.3-1.7 pt		
ATRAZINE DF ³	0.6 lb	1.2 lb	1.2 lb		
+ GRAMOXONE MAX ¹	1.3-1.7 pt	1.3-1.7 pt	1.3-1.7 pt		
+ 2,4-D ESTER (4L)	1 pt	2 pt	2 pt		
AATREX DF ³	0.6 lb	1.1 lb	1.1 lb		
+ LANDMASTER BW ¹ or GLYPHOSATE*	28-32 oz	28-32 oz	28-32 oz		
READY MASTER ATZ	1.5 qt	2 qt	2 qt		

LANDMASTER BW ¹ or GLYPHOSATE* followed by AATREX DF ³	54 oz 16-32 oz 0.6-1.1 lb	54 oz 16-32 oz 1.1 lb	54 oz 16-32 oz 1.1 lb	Apply glyphosate product after harvest. Apply atrazine between Aug. 20 - Sept 10	Good for weeds that are present early. Use Gramoxone Max or Roundup Original with AAtrex on weeds present in late August to early September. Cost: Landmaster BW fb AAtrex \$8.64-\$9.99; glyphosate fb AAtrex \$5.91-\$11.26.
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Winter Wheat Stubble to be Seeded to Winter Wheat 4-5 Months Later (Fallow Aid)

GLYPHOSATE*	16-32 oz	16-32 oz	16-32 oz	April or before boot stage of grass weeds	Cost: Glyphosate \$4.00-\$8.29; Landmaster BW \$5.20-\$7.02.
LANDMASTER BW ¹	40-54 oz	40-54 oz	40-54 oz		
TORDON 22K + 2,4-D ester (4L)	1.5 oz 0.75 pt	1.5 oz 0.75 pt	1.5 oz 0.75 pt	May 15 to June 15	Helps control wild buckwheat. Cost: Tordon + 2,4-D \$2.47.

Winter Wheat Stubble to be Planted to Corn or Sorghum the Next Spring

Check Remarks Under iEcofarmingf, page 63.

Herbicides to be used within 30 days after winter wheat harvest and 4 to 6 weeks later.
oooo Single Application oooo

GRAMOXONE MAX ¹ + AATREX/ATRAZINE DF ³	1.3-1.7 pt 2.3 lb	1.3-1.7 pt 2.3-2.9 lb	1.3-1.7 pt 2.3-3.4 lb	July-Aug. depending upon temperature and rainfall	Spray after wheat harvest and before weeds produce seed. If weeds recover, kill weeds before they develop seed. Volunteer wheat and downy brome control is better with late Aug.-Oct. applications. Barnyardgrass and yellow foxtail control requires 86 oz/A of Landmaster BW. Cost: Atrazine + Gramoxone Max \$12.55-\$17.48; AAtrex + Landmaster BW \$14.53-\$17.50; AAtrex + glyphosate \$11.65-\$17.47; Ready Master ATZ \$10.32-\$13.76.
LANDMASTER BW ¹ or GLYPHOSATE*	64 oz 24-32 oz	64 oz 24-32 oz	64 oz 24-32 oz		
+ AATREX/ATRAZINE DF ³	2.3 lb	2.3-2.9 lb	2.3-3.4 lb		
READY MASTER ATZ	1.5 qt	2 qt	2 qt		

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ecofarming (Continued)

(See Weed Response charts before selecting herbicides.)

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silty Loam 1-2% OM	Silty-Clay Loam > 2% OM		
Two Applications ó Split Treatments					
GLYPHOSATE* ¹	16-32 oz	16-32 oz	16-32 oz	July to Early Aug.	Spray after wheat harvest as soon as good growing conditions for the weeds occur and the crop residue does not protect the weeds from spray coverage. Cost: glyphosate \$4.00-\$8.29; Landmaster BW \$8.32; Fallow Master \$5.12-\$11.20.
LANDMASTER BW ¹	64 oz	64 oz	64 oz		
FALLOW MASTER ¹	32-70 oz	32-70 oz	32-70 oz		
----- followed by -----					
GRAMOXONE MAX ¹	1.3 pt	1.3 pt	1.3 pt	Late Aug. or Early Sept.	Purpose is to control escaped weeds and volunteer wheat. Cost: Gramoxone Max + Atrazine \$9.47-\$12.71.
+ AATREX/ATRAZINE DF	1.7 lb	2.3 lb	2.9lb		

Herbicides to be used within 30 days after winter wheat harvest.

Winter Wheat Stubble to be planted to soybean or sunflower the following spring

(Consider soybean in areas with over 20" rainfall)

LANDMASTER BW ¹	54-64 oz	54-64 oz	54-64 oz	2 applications with second one at lower rates	See spring treatments for soybean, pages 46-47, or sunflower on page 62. Cost: two Landmaster applications \$7.02-\$8.32; glyphosate \$4.00-\$8.29.
or GLYPHOSATE* ¹ /	16-32 oz	16-32 oz	16-32 oz		

Corn to be planted in winter wheat stubble treated with AAtrex/atrazine after harvest³

Herbicides to be used for ecofallow corn in the spring.

If volunteer wheat and/or downy brome were not controlled in the fall, spray in April or control earlier with glyphosate, Fallow Master, Roundups, Landmaster BW, or Touchdown. Low rates (less than 2 lb/A active) of atrazine usually do not give satisfactory volunteer wheat and downy brome control when applied in July or early August of the previous summer. If triazine-resistant kochia is a problem, see **Troublesome Weeds and Woody Plants**, page 94. Adding 0.5 to 1 pt/A of 2,4-D LV4 ester improves control of broadleaf weeds.

AATREX/ATRAZINE DF ³	1.4 lb	1.6 lb	1.8 lb	15-30 DBP	Cost: AAtrex \$3.78-\$4.86; Balance + Atrazine \$16.51-\$24.69; Ready Master ATZ \$10.32-\$13.76.
BALANCE PRO ²	Do not use	1.9-2.2 oz	2.2-3.0 oz	7-21 DBP	
+ AATREX/ATRAZINE DF ³		1.4 lb	1.7lb		
READY MASTER ATZ ³	1.5 qt	2 qt	2 qt		
BALANCE PRO ²	Do not use	1.5-1.9 oz	1.9-2.2 oz	0-7 DBP	FullTime and Harness appear to reduce Balance Pro injury. If applied 8-21 DBP, increase herbicide rate 20%. Use higher rate in fields with greater grass weed density. Also lower rates can be used in fields with good stubble and sprayed timely after harvest. Rates may have to be increased if weed density was great in the wheat stubble. If soil pH is greater than 7.4, reduce Balance rate by 0.25 oz. Cost: Balance + Bicep II Magnum \$20.88-\$33.70; Balance + FulTime \$20.43-\$32.87; Balance + Harness Xtra 5.6L \$21.01-\$33.00.
+ BICEP II MAGNUM ³		1.0-1.5 qt	1.25-1.75 qt		
or FULTIME		1.5-2.25 qt	1.75-2.5 qt		
or HARNESS XTRA 5.6L ³		1.2-1.8 qt	1.5-2.0 qt		
BALANCE PRO ²	Do not use	1.5-1.9 oz	1.9-2.2 oz	0-7 DBP	Plant RR corn. This is a low costs treatment for low weed density fields. If needed, apply glyphosate about 20 to 30 days after corn emergence. Cost: Balance + atrazine \$13.29-\$19.33; +glyphosate \$4.29-\$8.29.
+ ATRAZINE DF ³		1.2 lb	1.7 lb		
followed by GLYPHOSATE* ¹		1-2 pt	1-2 pt		

(Requires Roundup Ready Corn)

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ecofarming (Continued)

(See Weed Response charts before selecting herbicides.)

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silty Loam 1-2% OM	Silty-Clay Loam > 2% OM		
ATRAZINE DF + FRONTIER (6.0) or SURPASS or HARNES	0.9 lb 1.0 pt 1.5-2.0 pt 1.5-2.0 pt	1.2 lb 1.0-1.25 pt 2.0-2.5 pt 2.0-2.5 pt	1.2 lb 1.25-1.4 pt 2.0-3.0 pt 2.0-3.0 pt	For 16-30 days preplant increase rates 20%	If annual grasses produced seed in the wheat stubble or if areas of field have history of high grass density, use 20% higher rates. Cost: Frontier + atrazine \$13.43-\$18.64; Guardsman \$14.43-\$21.65; Harness + atrazine \$16.43-\$31.24; Surpass + atrazine \$15.56-\$29.49.
LEADOFF	3.0 pt	3.0-4.0 pt	4.0-4.5 pt		
GUARDSMAN MAX	2.5-3.0 pt	3.0-4.0 pt	4.0 pt	0-28 DBP	Cost: \$13.90-\$22.30.
G-MAX LITE	2.0 pt	2.5-3.0 pt	3.5 pt	0-28 DBP	Cost: \$12.60-\$21.00.
GLYPHOSATE* ¹ (Requires Roundup Ready Corn)	16-32 oz	16-32 oz	16-32 oz	POST	Excellent for fields with high grass densities. Cost: glyphosate \$4.29-\$8.29. Add Roundup seed fee \$7.00/A.
DUAL II MAGNUM	1.3 pt	1.67 pt	1.67 pt		
BICEP II MAGNUM	1.8 qt	2.1 qt	2.4 qt	0-20 DBP	If annual grasses produced seed in the wheat stubble or if areas of field have history of high grass density, use 20% higher rates of grass herbicides. Cost: Bicep II Magnum \$19.49-\$25.99; Dual II Magnum \$17.88-\$22.96;
DUAL II MAGNUM + AATREX DF	1.25 pt 0.9 lb	1.5 pt 1.2 lb	1.67 pt 1.2 lb		Dual II Magnum + AAtrex \$19.62-\$26.2?; Lumax \$27.50-\$33.00.
LUMAX	2.5 qt	2.5 qt	2.5-3.0 qt	0-10 DBP	
TOPNOTCH	2.0 qt	2.2 qt	2.5 qt		Cost: FulTime \$18.13-\$21.03; TopNotch \$18.16-\$22.70.
FULTIME	2.5 qt	2.7 qt	2.9 qt		

Soybean to be planted into winter wheat stubble treated with glyphosate or Landmaster BW after harvest (For areas with over 20" rainfall and fields with low weed density)

PURSUIT DG* + DUAL II MAGNUM	1.4 oz 1.0 pt	1.4 oz 1.25 pt	1.4 oz 1.33 pt	0-30 DBP	Add 16-24 oz/A of glyphosate ¹ if there are emerged weeds. Control weeds when they are small to conserve moisture and improve performance. Check fields within 30 days after planting to determine if postemergence herbicides are needed. Cost without Roundup: Pursuit + Dual II Magnum \$29.71-\$34.25; with Pursuit Plus \$14.53; Canopy XL \$12.75-\$19.75; Extreme \$14.39; glyphosate \$4.29-\$8.29. Add Roundup seed fee \$7.00/A.
PURSUIT PLUS*	2.5 pt	2.5 pt	2.5 pt		
CANOPY XL	5.1 oz	6.4 oz	7.9 oz		
GLYPHOSATE* ¹	16-32 oz	16-32 oz	16-32 oz	POST	
EXTREME (Requires Roundup Ready Soybean)	3 pt	3 pt	3 pt		

*See rotational crop restrictions on the Pursuit label.

Sunflower to be planted into winter wheat stubble treated with Landmaster BW, Roundup Ultra or Roundup Ultra RT after harvest (Both treatments required)

LANDMASTER BW ¹ + PROWL (3.3EC) followed by GLYPHOSATE* ¹ + PROWL (3.3EC)	40 oz 2.0 pt 16 oz 0.4 pt	40 oz 2.0 pt 16 oz 1.0 pt	40 oz 2.0 pt 16 oz 1.6 pt	Before May 1 and a minimum of 30 days prior to planting to control volunteer wheat and downy brome	The PRE treatment is to control weeds in the row. Adjust rate of Prowl depending on rainfall timing and amount after first application. Cost: Landmaster BW + Prowl \$10.58; glyphosate + Prowl \$5.37-\$8.59.
SPARTAN + PROWL	See Section 3 registration for rates				Section 3 registration has been applied for 2003. Risk of crop injury increases as soil pH increases and/or soil OM decreases.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Ecofarming (Continued)

(See *Weed Response charts* before selecting herbicides.)

Herbicide	Commercial Product per Acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Sandy Loam < 1% OM	Silty Loam 1-2% OM	Silty-Clay Loam > 2% OM		
Winter Wheat to be planted in fall (Fallow Aid)					
<i>Herbicides to be used in spring on corn or sorghum stubble when followed with winter wheat.</i>					
GLYPHOSATE* ¹	20 oz	20 oz	20 oz	Apr 16-May 1	Application time depends on year and weed species. If downy brome or volunteer wheat are present, they must be controlled before May 1. Early application is necessary to control winter annuals. Use glyphosate for control of downy brome before heading. Do not plant wheat for 20 days after Landmaster BW. Follow-up weed control may be necessary if one wants to go to no-till. Cost: Landmaster BW \$7.02; glyphosate \$4.72; Amber + glyphosate \$6.59-\$8.88; Glean + glyphosate \$10.00.
LANDMASTER BW	54 oz	54 oz	54 oz		
AMBER + GLYPHOSATE* ¹	0.28-0.56 oz	0.28-0.56 oz	0.28-0.56 oz	Before May 1	
GLYPHOSATE* ¹	16 oz	16 oz	16 oz		
GLEAN + GLYPHOSATE* ¹	0.33 oz	0.33 oz	0.33 oz		
GLYPHOSATE* ¹	16 oz	16 oz	16 oz		

Grain Sorghum to be planted in winter wheat stubble treated with AAtrex/Atrazine after harvest

If volunteer wheat and/or downy brome were not controlled in the fall, spray in April or control earlier with glyphosate, RT Master, or Landmaster BW. Low rates (less than 2 lb active) of atrazine usually do not give satisfactory volunteer wheat and downy brome control when applied in July or early August of previous summer. If triazine-resistant kochia is a problem see *Troublesome Weeds and Woody Plants*, page 91.

BICEP II MAGNUM	Do not use	1.8 qt	2.1 qt	0-30 DBP	Add 1.5-2 pt Gramoxone Extra ¹ or 54 oz Landmaster BW for emerged weeds. When using Landmaster BW wait 20 days prior to planting. Seed must be treated with approved seed safener.
BICEP LITE II MAGNUM	Do not use	1.6 qt	1.8 qt		
BULLET	3.75 qt	3.75 qt	4.0 qt	0-15 DBP	
DUAL II MAGNUM or FRONTIER + AATREX DF	1.25 pt / 20 oz / 0.6 lb	1.5 pt / 25 oz / 1.2 lb	1.67 pt / 30 oz / 1.2 lb	0-28 DBP	Use safened seed to prevent injury. Cost: Bicep II Magnum \$19.49-\$22.74; Bicep Lite II Magnum \$22.48-\$25.29; Bullet \$18.75-\$20.00; Dual II Magnum + AAtrex \$18.81-\$26.20; Frontier + atrazine \$15.42-\$23.94; Guardsman \$14.43-\$24.05; Leafoff \$16.58-\$20.84; Micro-Tech + AAtrex \$15.12-\$19.74; G-Max Lite \$12.60-\$21.00.
G-MAX LITE	2.0 pt	2.5-3.0 pt	3.5 pt	0-28 DBP	
GUARDSMAN MAX or LEADOFF	2.4 pt / 2.5-3.0 pt	2.8 pt / 3.0-4.0 pt	3.4 pt / 4.0-4.5 pt	16-30 DBP / 0-15 DBP	
MICRO-TECH + AATREX DF	2.25 qt / 0.6 lb	2.5 qt / 1.2 lb	2.75 qt / 1.2 lb	0-15 DBP	

Postemergence

See corn, grain sorghum, soybean, sunflower, or winter wheat sections for herbicide choices.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Weed Response to Herbicides in Selected Crops

Plant response may be altered by growing conditions, genetic variation in crops and weeds, soil type, pH, organic matter and application rates. Ratings may vary from season to season and geographical areas within the state. Ratings apply when herbicides are used at rates suggested.

Response Ratings: Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on product label. High weed densities, adverse conditions, or large weeds will reduce control.

10 (96-100%)
9 (90-95%)
8 (85-90%)
7 (80-84%)

6 (70-79%)
5 (60-69%)
4-2 (less than 60%)
1 (0)

Annual Morningglory	Barnyardgrass	Cocklebur	Crabgrass	Fall Panicum	Foxtail	Jimsonweed	Kochia	Kochia, Triazine-resistant	Lambsquarters	Nightshade (Hairy)	Pigweed	Ragweed	R. Thistle	Sandbur	Shattercane/Sorghum	Smartweed	Sunflower	Velvetleaf	W. Buckwheat	Crop Safety ^a
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Herbicide and application site (PPI or PRE on soil or POST on foliage)

Potato

Dual II Magnum	4	7	4	9	9	8	5	6	6	6	7	9	7	4	7	5	5	3	5	5	2
Eptam-PPI	7	9	4	9	9	9	4	6	6	7	9	7	6	4	9	9	4	2	4	7	2
Eptam + Sencor-PPI	6	7	6	9	7	9	4	6	6	9	7	9	7	6	7	7	6	6	6	7	3
Eptam + Treflan or Prowl-PPI	6	9	4	9	9	9	4	9	9	7	7	7	4	6	9	9	4	2	4	6	2
Matrix	1	9	5	5	1	8	1	8	8	5	4	9	-	3	1	1	1	1	5	1	1
Poast-POST	1	8	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1
Select-POST	1	9	1	9	9	9	1	1	1	1	1	1	1	1	9	10	1	1	1	1	1
Sencor + Dual II Magnum	4	9	6	6	9	9	7	6	2	9	7	9	9	7	6	4	7	6	7	9	2
Sencor-PRE	4	7	6	7	7	7	7	6	2	9	5	9	9	7	4	4	7	6	7	9	2
Sencor-POST	4	4	7	6	4	6	4	7	2	4	4	9	7	9	6	4	7	7	6	4	3

Dry Bean

Assure II + COC	1	8	1	8	8	9	1	1	1	1	1	1	1	1	6	9	1	1	1	1	1
Basagran-POST	5	3	7	1	1	3	8	9	9	6	6	5	5	4	1	1	8	8	7	6	2
Dual II Magnum + Treflan-PPI	5	8	5	9	9	9	5	9	9	7	8	9	5	5	9	7	5	3	5	6	2
Eptam-PPI	6	6	5	9	9	9	5	8	8	7	7	7	6	4	9	9	5	3	5	6	1
Eptam + Dual II Magnum-PPI	5	9	5	9	9	9	5	7	7	6	8	9	5	5	9	7	5	3	5	6	2
Eptam + Lasso-PPI	5	9	4	9	9	9	5	7	7	7	7	9	5	5	9	7	5	3	5	6	2
Eptam + Sonalan-PPI	5	9	5	9	9	9	5	9	9	9	10	9	5	5	9	9	5	3	5	6	1
Eptam + Treflan or Prowl-PPI	5	9	6	9	9	9	5	9	9	9	6	9	5	5	9	9	5	3	5	6	1
Lasso or Dual II Magnum-PPI	4	7	4	9	9	8	5	6	6	6	7	9	7	4	7	5	5	3	5	5	2
Lasso + Treflan-PPI	5	7	5	9	9	9	5	9	9	7	8	9	5	5	9	7	5	3	5	6	2
Outlook	1	8	2	8	8	9	1	2	2	7	6	7	5	3	6	3	3	2	2	1	1
Outlook + Eptam-PPI	5	9	5	9	9	9	5	5	5	9	8	9	5	5	9	9	5	1	5	5	2
Outlook + Sonalan-PPI	5	9	5	9	9	9	5	8	8	9	8	9	5	9	8	9	5	1	5	5	2
Partner-PPI	4	7	4	9	9	8	5	6	6	6	7	9	7	5	7	5	5	3	5	5	2
Partner + Eptam-PPI	5	9	4	9	9	9	5	7	7	7	7	9	5	5	9	7	5	3	5	6	2
Poast-POST	1	6	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1
Pursuit-POST	7	5	8	7	1	7	7	8	8	4	7	8	7	7	4	9	7	7	7	4	4
Pursuit + Basagran-POST	7	5	8	7	1	7	8	8	8	7	8	8	7	7	4	8	8	8	7	6	2
Raptor + Basagran-POST	7	5	8	7	1	7	8	8	8	8	8	8	7	7	5	8	8	7	7	7	2
Select	1	9	1	9	9	8	1	1	1	1	1	1	1	1	8	10	1	1	1	1	1

Garbanzo Beans (Chickpeas)

Assure II-POST	1	8	1	8	8	9	1	1	1	1	1	1	1	1	6	9	1	1	1	1	1
Dual II Magnum-PPI	4	7	4	9	9	8	5	6	6	6	7	9	7	4	7	5	5	3	5	5	2
Outlook-PPI	1	8	2	8	8	9	1	2	2	7	6	8	5	3	6	3	3	2	2	1	2
Prowl-PPI	1	6	2	8	7	8	4	7	7	7	5	8	4	4	6	7	4	2	2	4	2
Poast-POST	1	6	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1
Select-POST	1	9	1	9	9	9	1	1	1	1	1	1	1	1	9	10	1	1	1	1	1
Sonalan-PPI	4	9	4	9	9	9	4	7	7	8	8	7	4	7	7	7	4	2	2	4	2
Tough-POST	2	1	6	1	1	1	6	7	7	8	8	8	5	7	1	1	5	6	4	4	1

See page 101 for additional footnotes.

Weed Response to Herbicides in Selected Crops (continued)

	Annual Morningglory	Barnyardgrass	Cocklebur	Crabgrass	Fall Panicum	Foxtail	Jimsonweed	Kochia	Kochia, Triazine-resistant	Lambsquarters	Nightshade (Hairy)	Pigweed	Ragweed	R. Thistle	Sandbur	Shattercane/Sorghum	Smartweed	Sunflower	Velvetleaf	W. Buckwheat	Crop Safety ^a	
Sugarbeet																						
Assure II + COC	1	9	1	9	9	9	1	1	1	1	1	1	1	1	9	10	1	1	1	1	1	1
Betamix-POST	1	4	2	1	1	6	3	4	4	9	9	9	3	5	6	1	3	1	2	5	3	
Betamix Progress-POST	1	4	2	1	1	7	3	5	5	6	8	8	3	5	7	1	3	2	2	5	3	
Betamix + Stinger-POST	5	5	9	1	1	6	7	5	5	9	9	9	8	5	6	1	7	9	3	9	3	
Betamix + Upbeet	1	4	6	1	1	7	3	9	9	9	9	9	6	5	6	1	6	6	7	7	3	
Betanal + Betanex-POST	1	4	2	1	1	6	3	4	4	9	9	9	3	5	6	1	3	1	2	5	3	
Eptam-LAYBY	5	6	5	9	9	9	5	8	8	7	7	7	6	4	9	9	5	3	5	6	1	
Liberty	7	7	9	8	7	8	7	7	7	7	8	7	9	8	7	7	9	7	8	7	1	
Outlook-LAYBY	1	8	2	8	8	9	1	2	2	7	6	7	5	3	6	3	3	2	2	1	1	
Nortron/Etho SC	1	5	5	7	7	8	1	6	6	6	6	8	1	6	6	1	7	4	1	7	2	
Poast-POST	1	6	1	7	7	9	1	1	1	1	1	1	1	1	7	7	1	1	1	1	1	
Ro-Neet-PPI	4	5	4	8	8	9	4	3	3	8	9	9	6	4	7	7	4	2	4	4	2	
Roundup Ultra	8	10	10	10	10	10	8	9	9	9	10	10	10	8	10	10	10	10	9	7	1	
Select-POST	1	8	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1	
Stinger-POST	1	1	9	1	1	1	5	3	3	4	4	1	7	4	1	1	5	5	3	7	2	
Onion																						
Buctril-POST	9	1	7	2	2	2	9	6	6	7	9	7	9	7	2	2	9	9	9	9	3	
Dacthal 75W-PRE	4	7	4	9	4	9	4	4	4	9	6	9	4	4	7	4	4	4	4	4	2	
Fusilade-POST	4	7	1	9	9	8	1	1	1	1	1	1	1	1	7	7	1	1	1	1	1	
Goal 2XL-POST	4	4	7	2	4	4	1	6	6	7	6	7	1	6	4	2	1	6	1	7	3	
Prowl-PRE	1	6	2	8	7	7	4	7	7	7	5	8	4	4	6	7	4	4	2	4	2	
Select-POST	1	8	1	9	9	9	1	1	1	1	1	1	1	1	9	10	1	1	1	1	1	
Vine Crop																						
Curbit-PRE	4	9	4	9	9	9	4	7	7	7	6	7	4	7	7	7	4	2	2	4	2	
Dacthal 75W-PRE	4	7	4	9	4	9	4	4	4	9	6	9	4	4	7	4	4	4	4	4	2	
Poast-POST	1	6	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1	
Prefar 4E + Alanap-PRE	2	9	7	9	6	9	1	1	1	7	1	7	7	1	6	6	1	7	1	7	3	
Select-POST	1	8	1	9	9	9	1	1	1	1	1	1	1	1	9	9	1	1	1	1	1	
Strategy	4	9	6	9	9	9	8	8	8	9	8	7	8	7	7	7	9	6	9	5	2	
Treflan-PRE	4	9	4	9	9	9	4	7	7	7	4	7	4	7	7	7	4	2	2	4	2	

^aCrop safety ratings less than 3 result in no yield loss.

^bValues will vary with soil texture, pH, organic matter, rainfall or irrigation, rotational crop and herbicide rate. Refer to label.

Potato

Commercial Product per Acre

Herbicide	Sandy Loam	Silt Loam	Silty-Clay Loam	Application Time, Remarks and Approximate Cost/A Broadcast
	< 1% OM	1-2% OM	> 2% OM	
Potato				
EPTAM 7E	3.5 pt	3.5 pt	7 pt	PPI, DRAG-OFF, or LAYBY ó Apply and incorporate before planting or after potato plants have emerged. Minimum time from application to harvest is 45 days. The Superior variety potato is sensitive to Eptam and under stress conditions, early season stunting may occur. Cost: \$11.97-\$15.40.
EPTAM 7E + TREFLAN 4EC	2.5 pt 1 pt	2.5 pt 1 pt	2.5 pt 1 pt	PRE UP TO and JUST BEFORE DRAG-OFF ó Incorporate chemical immediately after application. Set incorporation equipment so that herbicide is not concentrated over the row. The Superior variety potato is sensitive to Eptam and under stress conditions, early season stunting may occur. Cost: Eptam + Treflan \$12.69; Eptam + Prowl \$14.72-\$16.96.
EPTAM 7E + PROWL (3.3EC)	1.2 pt	1.2 pt	1.8 pt	
EPTAM 7E + SENCOR 4L	3.5 pt 0.5 pt	3.5 pt 0.5 pt	4.5 pt 1 pt	PPI, DRAG-OFF, or Early POST. Apply and incorporate mechanically or through an irrigation sprinkler system. Most thin-skinned varieties such as Atlantic and Shepody are sensitive to Sencor. Cost: \$20.90-\$33.24.
DUAL II MAGNUM	1 pt	1.33 pt	1.67 pt	PPI, PRE, or DRAG OFFóIf cool, wet soil conditions occur after application, Dual II Magnum may delay maturity or injure early maturing potato varieties. Do not harvest within 60 days of application. Cost: \$8.33-\$14.65.
MATRIX	1-1.5 oz	1-1.5 oz	1-1.5 oz	Apply after hilling or drag-off but before potatoes or weeds emerge. For activation supply moisture by rainfall or sprinkle, is labeled for chemigation. Can be tank mixed with Eptam, Prowl, Dual, or Sencor; can also be applied POST after crop emergence but before the crop is 14". Maximum 2 oz/season; cannot be used on potatoes grown for seed; some varieties may show injury. Add a nonionic surfactant with post applications. Cost: \$16.50-\$24.75.
SENCOR 4L	1 pt	1.5 pt	2 pt	PRE, PPI, or DRAG-OFF AS PER LABELóDo not plant treated area to sensitive crops such as onion or sugarbeet during the next growing season. Most thin-skinned varieties such as Atlantic and Shepody are sensitive to Sencor. Cost: Dual + Sencor \$26.82-\$38.97; Sencor \$17.05; Prowl + Sencor \$21.52-\$23.74.
SENCOR 4L with	1 pt	1 pt	1 pt	
DUAL II MAGNUM or with	1 pt	1.33 pt	1.67 pt	
PROWL (3.3EC)	1.2 pt	1.2 pt	1.8 pt	
Postemergence				
POAST	1-1.5 pt	1-1.5 pt	1-1.5 pt	POST before susceptible grasses are 4" tall. Potatoes tolerant at all growth stages. Add 2 pints of crop oil concentrate. Minimum time from application to harvest 30 days. Good coverage essential for effective control. Cost: \$8.65-\$17.25.
SELECT	6-8 oz	6-8 oz	6-8 oz	POST before most grasses are 6i tall. Potatoes tolerant at all growth stages. 1 qt/A. Add COC. 30 day PHI. Cost: \$8.95-\$13.43.
SENCOR 4L	0.5-1 pt	0.5-1 pt	0.5-1 pt	POST before weeds are 1i tallóHighest rate for common sunflower and kochia; will not control triazine resistant kochia. Do not use on red skinned or early maturing white varieties or within 60 days of harvest. Cost: \$8.52.
Harvest Aid				
REGLONE	1-2 pt			Harvest AidóApply when potato leaves begin to age. Use 2 pt if a quick kill is desired. Cost: \$10.45-\$20.91.

See page 101 for additional footnotes.

Dry Bean Preplant

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Application Time, Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam < 1% OM</i>	<i>Silt Loam 1-2% OM</i>	<i>Silty-Clay Loam > 2% OM</i>	
DUAL II MAGNUM	1 pt	1.33 pt	1.67 pt	PPI or PRE Surface mixing will improve weed control and reduce crop injury. Cost: \$8.77-\$14.66.
EPTAM 20G or EPTAM 7E	11 lb 2.5 pt	20 lb 4.5 pt		PPI Apply to dry surface soil; immediately incorporate with disk or field cultivator. Apply layby at time of last cultivation as a directed spray or direct granules to the base of the plants before bean pods start to form. Do not feed or pasture vines within 45 days after application. Cost: \$11.97.
EPTAM 7E with SONALAN or with PROWL (3.3EC) or with TREFLAN	2.5 pt 2 pt 2.4 pt 1 pt	2.5 pt 2 pt 2.4 pt 1 pt		PPI Apply to dry surface soil, immediately incorporate with a disk or field cultivator. Sonalan, Treflan, or Prowl may injure fall seeded small grains, or spring seeded sugarbeet or sorghum the following year. Cost: Eptam + Dual II Magnum \$18.78; Eptam + Lasso \$17.88; Eptam + Sonalan \$16.62; Lasso \$18.47; Partner \$18.67; Sonalan + Dual \$18.67; Sonalan + Lasso \$18.02; Eptam + Prowl \$17.48; Eptam + Treflan \$12.69.
EPTAM 7E with DUAL II MAGNUM or with LASSO	2.5 pt 0.8 pt 4 pt	2.5 pt 1 pt 4 pt		
LASSO	3 qt	3 qt		
PARTNER	4.5 lb	4.5 lb		
OUTLOOK	12 oz	14 oz	16 oz	PPI, PRE or early POST (first to third trifoliolate stage). Dry beans may be harvested 70 days or more after application. Cost: \$10.74-\$14.77.
OUTLOOK with SONALAN or with EPTAM	12 oz 2 pt 2.5 pt	14 oz 2 pt 2.5 pt		PPI Apply to dry surface soil, immediately incorporate with a disk or field cultivator. Cost: Outlook + Sonalan \$19.46-\$21.54; Outlook + Eptam \$22.95-\$25.03.
PARTNER + EPTAM 7E or with TREFLAN	3.0 lb 2.5 pt 1 pt	3.0 lb 2.5 pt 1 pt		Apply to dry surface soil, immediately incorporate. Treflan at 1 pt may injure fall seeded small grain or spring seeded sugarbeet or sorghum the following year. Cost: Partner \$18.67; with Eptam \$21.00; Partner + Treflan \$22.80; Treflan + Dual II Magnum \$15.73; Treflan + Lasso \$17.36.
TREFLAN 4EC with DUAL II MAGNUM or with LASSO	1 pt 1 pt 4 pt	1 pt 1 pt 4 pt		

Postemergence

ASSURE II + COC	6-12 oz 1 qt			POST Susceptible grasses less than 4" tall. Dry bean tolerant at all growth stages. Do not apply within 30 days of harvest. Cost: \$6.09-\$12.19.
BASAGRAN + COC + UAN	1-2 pt 1 qt + 2 qt			POST Unifoliolate to first trifoliolate leaf stage. Use 1 pt for dry bean in the unifoliolate leaf stage and 2 pt for beans in the first trifoliolate leaf stage. Basagran may be reapplied at the 1 pt rate 5 to 7 days after the initial application. Broadleaf weeds 1 1/2 to 2" tall. Weeds showing moisture stress or over 6" tall are poorly controlled. Controls hairy but not eastern black nightshade. Cost: \$9.55-\$19.10.

See page 101 for additional footnotes.

Dry Bean (continued) Postemergence

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Application Time, Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam < 1% OM</i>	<i>Silt Loam 1-2% OM</i>	<i>Silty-Clay Loam > 2% OM</i>	
PURSUIT DG + NONIONIC SURFACTANT + UAN	1.08 oz 1 qt/100 gal 2 qt/A			POST Dry bean must have one trifoliolate leaf. Pursuit and Pursuit + Basagran require the addition of an adjuvant. Pursuit will carryover. Do not plant sugarbeet for 40 months. Allow at least 60 days between Pursuit application and harvest. Cost: Pursuit \$13.94; Pursuit + Basagran \$23.55.
PURSUIT DG + BASAGRAN + NONIONIC SURFACTANT + UAN	1.08 oz 1 pt 1 qt/100 gal 2 qt/A			
POAST + COC	1-1.5 pt 1 qt			POST Susceptible weeds less than 4" tall. Dry bean tolerant at all growth stages. Good coverage essential. Cost: \$9.65-\$14.48.
RAPTOR + BASAGRAN + NONIONIC SURFACTANT + UAN	4 oz 1 pt 1 qt/100 gal 2 qt/A			POST Dry bean must have at least one fully expanded trifoliolate leaf. Raptor will carryover. Do not plant sugarbeet for 18 months.
SELECT 2 EC + COC	6-8 oz 1 qt			POST Grasses 6i tall. Do not apply within 30 days of dry bean harvest (cutting or pulling plants from ground) Cost: \$8.95-\$13.43.

Harvest Aid

GRAMOXONE MAX ¹	1-1.5 pt			Desiccant. Apply when at least 80% of pods are yellowing and no more than 30% of leaves are still green. Do not harvest within 7 days of application. Add 1 qt nonionic surfactant/100 gal. Cost: \$4.00-\$6.00.
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Garbanzo Beans (Chickpeas)

<i>Herbicide</i>	<i>Commercial Product per Acre</i>			<i>Application Time, Remarks and Approximate Cost/A Broadcast</i>
	<i>Sandy Loam < 1% OM</i>	<i>Silt Loam 1-2% OM</i>	<i>Silty-Clay Loam > 2% OM</i>	
ASSURE II + COC	0.5 pt + 1 qt	0.5 pt + 1 qt	0.5 pt + 1 qt	POST before susceptible grasses are 4-6i tall. Use with crop oil concentrate. Cost: \$8.65.
DUAL II MAGNUM	1 pt	1.3 pt	1.3 pt	PPI or PPE Do not cut for hay within 120 days following Dual II Magnum. Cost: \$13.15-\$17.10.
OUTLOOK	12 oz	12 oz	14 oz	PPI or PRE Incorporation will improve weed control. Cost: \$12.50.
PROWL	1.8 pt	2.4 pt	2.4 pt	PPI Apply and incorporate before planting. Cost: \$4.70-\$6.25.
POAST + COC	1 pt + 1 qt	1 pt + 1 qt	1 pt + 1 qt	POST before susceptible grasses are 4i tall. Use with crop oil concentrate. Cost: \$8.40.
SELECT + COC	6 oz 1 qt	6 oz 1 qt	6 oz 1 qt	POST before grasses are 6i tall. Cost: \$8.95-\$13.43.
SONALAN	2 pt	2 pt	2 pt	PPI Apply and incorporate before planting. Cost: \$7.00.
TOUGH + COC	See 24(c) label, if approved, for use rates 1 qt			24(c) registration applied for 2003. Apply to actively growing weeds by the 4-leaf stage.

See page 101 for additional footnotes.

Sugarbeet

Commercial Product per Acre

Herbicide	Sandy Loam 1% OM			Silt Loam 1-2% OM			Application Time, Remarks, and Approximate Cost/A Broadcast
	Broad-cast	Product/7" Band 22" Row	Product/7" Band 30" Row	Broad-cast	Product/7" Band 22" Row	Product/7" Band 30" Row	
Sugarbeet, No-Till in Rye or Winter Wheat							
GLYPHOSATE*	32 oz	9 oz	6.5 oz	32 oz	9 oz	6.5 oz	Apply in spring when rye or wheat are 6i to 10" tall and before sugarbeet have emerged. Cost: \$1.92-\$9.45.
PPI or PRE							
NORTRON SC/ETHO SC	35 oz	11 oz	8 oz	59 oz	19 oz	16 oz	PPI or PRE: Furrow irrigation, apply preplant and incorporate 1" to 2"; for sprinkler irrigation apply PRE at planting or shortly after and immediately irrigate with 0.5" water. Cost: \$52.25-\$87.87.
RO-NEET 6E	32 oz	10 oz	7.5 oz	52 oz	17 oz	12 oz	PPI: Immediately mix into dry soil with power incorporator 2i to 3". Crop injury may occur on sandy soils below 1% organic matter or with highly saline or alkaline soil conditions. Use lower rate if POST treatments are planned. Primarily annual grass control. Cost: \$3.59-\$25.27.
Layby							
EPTAM 7E or EPTAM 20G	36 oz 11 lb	11.5 oz 3.5 lb	8 oz 2.5 lb	56 oz 15 lb	18 oz 4.7 lb	13 oz 3.5 lb	Apply Eptam after thinning and clean cultivation; incorporate immediately 2" deep with a cultivator. Cost: \$1.71-\$11.98.
TREFLAN 4EC	16 oz	5 oz	3.5 oz	20 oz	6 oz	4.5 oz	Sugarbeet 2i to 6" tall. Cover exposed beet roots with soil before Treflan application to reduce root girdling. Cost: \$0.91-\$5.18.
OUTLOOK	12 oz	3.8 oz	2.8 oz	14 oz	4.4 oz	3.2 oz	Sugarbeet 4-true-leaf stage. Do not apply after the crop reaches the 8-true-leaf stage. Apply 0.5 inch of overhead irrigation water after application to incorporate herbicide. Section 18 label in 2002, check label status in 2003. Cost: \$10.74-\$14.77.

Postemergence

Herbicide	Rate per acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Broadcast	Product Per 7i Band 22" Row	Product Per 7i Band 30" Row		
ASSURE II + COC	7-8 oz	2.2-2.6 oz	1.6-1.8 oz	Grass 1-3"	Susceptible grasses less than 4i tall. Good activity on volunteer cereals. Do not apply within 45 days of harvest. Do not mix with any herbicide or insecticide. Cost Broadcast: \$7.12-\$8.13.
BETAMIX	332-48 oz	10-15 oz	7.5-11 oz	Any stage of sugarbeet growth. Weeds cotyledon stage. Repeat in 5-7 days.	Use lower rates on small beets or when using a split application. On Nortron or Ro-Neet treated fields wait till 4-leaf stage if beets show signs of injury. Treat in late afternoon to reduce injury. Use highest rate as weed size increases. Cost: Broadcast Betamix \$27.25-\$40.87; Betamix + Stinger \$43.42.
BETAMIX with STINGER	32 oz 4 oz	10 oz 1.3 oz	7.5 oz 1.0 oz	Sugarbeet 2-leaf stage. Repeat in 5-7 days	
PROGRESS	20-36 oz	6.4-11.4oz	4.7-8.4 oz	Sugarbeet cotyledon to 2-leaf stage	Use the lower rate when sugarbeet are in the cotyledon to 2-leaf stage of growth. Follow with the higher rate in 5 to 7 days when sugarbeet is in the 4-leaf stage. Cost: Broadcast \$20.46-\$36.84.
BETAMIX 1.3EC	72-96 oz	23-31 oz	17-22 oz	Sugarbeet 4-true-leaf stage	Cost: Broadcast \$61.31-\$81.75.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Sugarbeet (Continued)

Postemergence

Herbicide	Rate per acre			Application Time	Remarks and Approximate Cost/A Broadcast
	Broadcast	Product Per 7i Band			
		22" Row	30" Row		
GLYPHOSATE* (Roundup tolerant variety required)	32 oz	10 oz	7.5 oz	Sugarbeet, 4-leaf stage Weeds 2-3i. Repeat in 10-14 days	Check with your sugar company to see if they will accept Roundup Ready sugarbeet. Cost: \$4.31-\$9.72.
POAST + COC	16-32 oz	5-10 oz	3-7 oz	Grass 1-3"	Use higher rate for larger grass or grass under drought stress. All herbicides require the addition of an adjuvant. See label. Cost Broadcast: Poast \$8.65-\$17.25; Select \$8.37-\$11.70.
SELECT 2 EC + COC	6-8 oz	2-2.5 oz	1.4-1.8 oz	Grass 1-3"	
BETAMIX with POAST or SELECT 2 EC	32 oz 24 oz 8 oz	10 oz 7.5 oz 2.5 oz	7.5 oz 5 oz 1.8 oz	Sugarbeet 2-leaf stage	Do not add crop oil to Betamix plus Poast or Betamix plus Select combinations. Grasses should be less than 2 inches. Cost Broadcast: Betamix plus Poast \$40.22; Betamix plus Select \$38.95
LIBERTY (Liberty tolerant variety required)	26 oz	8.3 oz	5.9 oz	Sugarbeet, cotyledon to two true leaves Weeds 1i Repeat in 7-10 days	Check with your sugar company to see if they will accept Liberty Link sugarbeet. Cost: \$22.95.
STINGER	4-6 oz	4-10 oz	4-10 oz	Sugarbeet, 2-8 true leaves; Canada thistle rosette to pre-bud.	Use lower rates for annual weeds and higher rates for Canada thistle. Do not plant or rotate for 1 year after treatment to any crop except small grains or corn. Cost: Broadcast \$16.17-\$42.69.
UPBEET	0.5 oz	0.17 oz	0.12 oz	Weeds less than 2" tall	For best weed control a minimum of 2 sequential applications should be applied. Should be tank mixed with Betamix or Betamix Progress. ALS-resistant Kochia will not be controlled by Upbeet. Cost broadcast: Upbeet \$22.07; Betamix + Upbeet \$49.32.
UPBEET + BETAMIX	0.5 oz 32 oz	0.17 oz 10 oz	0.12 oz 7.5 oz		

Micro-Rate Herbicide Applications to Sugarbeet

The micro-rate herbicide concept involves the application of Betamix in tank mixtures with UpBeet and Stinger at reduced rates with the addition of methylated seed oil. The rate of Betamix must not exceed 8 oz/acre (broadcast application), the rate of UpBeet would be 1/8 oz/acre (broadcast application) and the rate of Stinger would be 1.2 oz/acre (broadcast application). Methylated seed oil should be utilized at a finished spray concentration of 1.5%. A minimum of three sequential applications should be utilized. The initial herbicide application should begin immediately after weed emergence and repeat applications should occur on a 5-day interval. The herbicide applications should be applied broadcast.

Vine Crops and Onion

Herbicide	Commercial Product per Acre	Application Time	Remarks and Approximate Cost/A Broadcast
Melons and Cucurbits			
COMMAND (3ME) (Pumpkins only)	2.0 pt	Preplant	Immediately incorporate. Use on pumpkins only. Controls many annual grasses and broadleaf weeds. Cost: \$16.00.
CURBIT	3-4.5 pt	PRE	Apply postplant to the soil surface prior to weed emergence. Apply to seeded crop prior to crop emergence or apply as a banded spray between rows after crop emergence or transplanting. Do not preplant incorporate or do not use under plastic mulch. Cost: \$15.00-\$22.00.
PREFAR + ALANAP-L	4-6 qt 4-8 qt	Preplant	For cucurbits only. Immediately incorporate to a depth of 1". Use lower rate on sandy soil. Controls many annual grasses and broadleaf weeds. Cost: \$73.50-\$120.75.
STRATEGY	2-6 pt	PRE	Use lower rate on sandy soil. Controls many annual grasses and broadleaf weeds.
TREFLAN 4EC	1-2.0 pt	Crop 3-4 true leaves	Direct material to soil between the rows and mechanically incorporate. Controls germinating annual grasses and some broadleaves. Use the lower rate on sandy soils. Cost: \$3.50-\$7.00.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Vine Crops and Onion (continued)

Melons and Cucurbits (Continued)

<i>Herbicide</i>	<i>Commercial Product per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
POAST + COC	1-1.5 pt 1 qt	Grasses most susceptible under 4"	Do not apply within 14 days of harvest. Crop oil concentrate and good coverage essential for effective control. Cost: \$9.85-\$14.80.
SELECT 2EC + COC	6-8 oz + 1% v/v	Grasses 6i tall.	Do not apply. Select within 14 days of squash, cucurbits, or melon harvest. Do not apply more than 8 oz. of Select per application. Cost: \$11.00-\$13.80.

Onion

DACTHAL 75W	8-14 lb	PRE at seeding or transplanting and/or at layby	Preplant incorporation not recommended. Use lower rate on soils with less than 1% organic matter. Cost: \$113.12-\$197.75.
BUCTRIL	1-1.5 pt	POST; onion should have 2-5 true leaves	Water volume is important. Use 50-70 gallons of water per acre. Do not add surfactants. Cost: \$6.79-\$10.21.
GOAL 2 XL	0.5-1.0 pt	Onion, 2 fully developed true leaves; weeds, 2-4 leaves	Do not apply to onion under drought stress. Do not mix Goal with oil, surfactant or fertilizer. Cost: \$6.24-\$12.48.
FUSILADE DX + COC	6 oz 1 qt	Shattercane and corn 12-18". Other annual grasses less than 4"	Crop oil concentrate and good coverage essential for effective control. Donit tank mix with Buctril. Cost: \$8.21-\$14.77.
PROWL	2-3 pt	PRE to weeds, onion must have 2 to 9 true leaves	Do not apply within 45 days of harvest. Cost: \$7.44-\$11.16.
SELECT 2 EC + COC	6-8 oz 1% v/v	Grass 2-6"	Do not apply within 45 days of harvest. Crop oil concentrate and good coverage essential for effective control. Cost: \$11.03-\$13.77.

See page 101 for additional footnotes.

Commercial Turfgrass

Weeds are usually the most visible of turfgrass pests and are a major problem for turf managers and homeowners. Weeds are a concern principally because they compete with desirable turfgrass plants for space, light, water, and nutrients. In addition, weeds detract from the appearance and function of turfs.

Any plant can be considered a weed if it's growing where it's not wanted. For example, although tall fescue is a major turfgrass species, it is considered a weed if it infests Kentucky bluegrass.

Management and control measures will vary depending on which weeds are present. Proper identification of the weed problem is the first step in developing a management strategy.

Weeds often are grouped by life span. Determining a weed's life span can be important when developing a management strategy. Weeds are classified as annuals, biennials and perennials.

The best defense against weeds is a thick, well-managed turf. A vigorous turf will successfully compete with weeds for light, nutrients, and water. Weeds become established most readily in thin, weak stands of turf. Spraying by itself does not usually produce satisfactory, long-term results. Although herbicides can be used in an integrated weed control system, proper management can do much to encourage a dense, vigorous turf and discourage weeds.

Herbicides are available to control most turf weeds. Care should be used when applying any pesticide. Always read and follow label directions. Improper use can result in poor weed control, turf injury, or injury to sensitive ornamental or garden plants.

Preemergence herbicides should be applied to the turf before weeds germinate. To control most annual grasses, apply preemergence herbicides when soil temperature exceeds 50°F. A second application is sometimes needed to provide season-long control. Preemergence herbicides should be watered in immediately after application with at least 1/2 inch of water.

Postemergence herbicides are sprayed once weeds emerge and are applied to the foliage of actively growing weeds. Most postemergence

herbicides control broadleaf weeds, and some are available for grasses.

Several factors influence the effectiveness of postemergence herbicide applications. Control is easiest to achieve when the weeds are small, healthy, and actively growing. As the weeds age, changes in the leaf surface, growth habit, and physiological function occur. These changes result in reduced herbicide uptake and translocation.

Avoid mowing for several days before and after postemergence herbicide application. Mowing before application reduces the amount of weed foliage available to intercept the chemical and causes stress which reduces herbicide uptake. Mowing after application may remove the treated portion and prevent translocation to the roots.

Do not apply postemergence herbicides to turfgrass and weeds under heat or drought stress. Injury may occur to the turfgrass and weed control can be less effective. Water the turf thoroughly before application to assure that the weeds are actively growing. Unlike the preemergence herbicides, don't water for several days after application. Watering can wash the herbicide off the plant. Also, avoid spraying if rain is expected within 24 hours.

Many postemergence herbicides for the control of broadleaf weeds are very volatile, and may injure sensitive plants in the area. Care should be taken to only spray when the wind is 5 mph or less, and the air temperature is less than 80°F. Postemergence broadleaf herbicides are either applied early in the spring (April-May) or in the fall prior to the first frost.

Herbicides are a useful tool for controlling weeds, but they only provide short-term relief. The best approach is to use an integrated system which utilizes proper mowing, fertilizing, and irrigation management to establish a vigorous turf.

This year we have included this section to help commercial turfgrass personnel choose the right products for the right environment. Homeowners and consumers can get more information on turfgrass weed problems from their local University of Nebraska Cooperative Extension office.

Weed Response to Selected Turfgrass Herbicides

Plant response may be altered by growing conditions, genetic variation in turf and weeds, soil type, organic matter, temperature, growth stage and application rates. Ratings will vary from season to season and geographic areas within the state. Ratings apply when herbicides are used as suggested in this guide. See pages 88-101 for additional problem weeds and their control.

Herbicide	Timing	Annual Weeds						
		Crabgrass*	Foxtail**	Goosegrass**	Sandbur***	Prostrate Spurge**	Henbit+	Oxalis*
Acclaim Extra	POST**	9	9	8	6	0	0	0
Barricade	PRE	9	9	8	6	9	9	9
Bensumec	PRE	7-8	6-7	8	6	6	6	6
Buctril	POST	0	0	0	0	8	9	8
Confront	POST	0	0	0	0	9	9	9
Cool Power	POST	0	0	0	0	7	9	9
Dimension	PRE	9	8	7	6	8	8	6
Dimension	POST	9	7	6	6	6	6	6
Drive	POST	9	7	6-7	9	6	9	9
Gallery	PRE	4	3	2	6	9	9	9
Horsepower	POST	0	0	0	0	7	9	9
Millenium Ultra	POST	0	0	0	0	8	9	9
MSMA	POST	7	6	5	6	0	0	0
Pendimethalin	PRE	9	9	9	8	9	9	8
Trimec Classic	POST	0	0	0	0	7	9	9
Trimec Plus	POST	7	6	5	6	7	9	9
Tripower	POST	0	0	0	0	7	9	9
Triplet	POST	0	0	0	0	7	9	9
2,4-D amine	POST	0	0	0	0	8	6	7

* Apply PRE when soil temperatures in the spring are sustained at 55°F

** Apply PRE when soil temperatures in the spring are sustained at 60°F

*** Apply PRE when soil temperatures in the spring are sustained at 65°F

+ Apply PRE in the fall

++ Application at early growth stage for annual weeds and fall treatments for perennial weeds will result in better control.

6 Efficacy data not available

Perennial weeds

Herbicide	Timing	Dandelion	Clover	Ground Ivy	Violet	Plantain	Nutsedge
Buctril	POST	8	8	6	6	7	0
Confront	POST	4-8	9	8	8	9	0
Cool Power	POST	9	7	8	7	9	0
Drive	POST	9	9	6	7	0	0
Horsepower	POST	9	7	8	8	9	0
Millenium Ultra	POST	9	8	8	7	9	0
Manage	POST	0	0	0	0	0	9
MSMA	POST	0	0	0	0	0	6
PowerZone	POST	8	9	7	7	8	0
SpeedZone	POST	9	9	7	7	8	0
Trimec Classic	POST	9	9	6	6	8	0
Trimec Plus	POST	9	9	6	6	8	6
Tripower	POST	9	9	6	6	8	0
Triplet	POST	9	9	6	6	8	0
2,4-D amine	POST	9	5	5	5	7	0

0 Data on efficacy not available.

Commercial Turfgrass Herbicide Rates and Prices

Dry Products

Product	Rate oz/1000 sq ft	Costs \$/pound	Costs \$/1000 sq ft	Costs \$/acre
Barricade	0.28	37.5	0.66	28.59
Drive	0.38	98.5	2.34	101.90
Gallery	0.37	129.5	2.99	130.45
Manage	0.03	1163.00	2.18	94.99
Pendimethalin	1.15	9.25	0.66	28.96
Tupersan	3.00	17.45	3.27	142.52

Liquid Products

Product	Rate: oz/1000 sq ft	\$/gal	\$/1000 sq ft	\$/acre
Acclaim Extra	0.46	449.00	1.61	70.29
Bensumec	6.5	68.16	3.46	150.77
Buctril	0.37	60.75	0.18	7.65
Confront	0.56	108.50	0.47	20.68
Cool Power	1.00	39.90	0.31	13.58
Corsair	0.065	4492.00	2.28	99.36
Dimension	1.00	126.00	0.98	42.88
Finale	0.75	58.75	0.34	15.00
Horsepower	1.00	37.90	0.30	12.90
Millenium Ultra	0.90	40.20	0.29	12.60
MSMA	1.00	24.50	0.19	8.34
Pendimethalin (3.3EC)	1.50	41.50	0.49	21.18
PowerZone	1.80	56.50	0.81	35.30
Prograss	3.00	99.50	2.33	101.58
Razor (glyphosate)	0.75	41.25	0.24	10.53
Reward	0.55	124.00	0.53	23.21
RoundUp Pro	0.75	49.50	0.29	12.63
SpeedZone	1.50	49.50	0.56	24.75
Surflan	2.25	88.75	1.56	67.96
Trimec Classic	1.25	28.50	0.28	12.12
Trimec Plus	3.00	37.40	0.88	38.18
Tripower	1.00	32.85	0.26	11.18
Triplet	1.00	21.35	0.17	7.27
2,4-D amine	0.92	13.95	0.10	4.37

Weed Response to Selected Alfalfa Herbicides

Response Ratings:

Ratings are for light to moderate weed densities, favorable conditions and weed growth stage as specified on product label. High weed densities, adverse conditions, or large weeds will reduce control.

10 ó (96-100%) 6 ó (70-79%)
 9 ó (90-95%) 5 ó (60-69%)
 8 ó (85-90%) 4-2 ó less than 60
 7 ó (80-84%) 1 ó 0

	Annual bluegrass	Black Nightshade	Barnyardgrass	Common Sunflower	Dandelion	Downy Brome	Field Pennycress	Yellow Foxtail	Henbit	Kochia	Kochia, Triazine-resistant	Lambsquarters	Perennial bluegrass	Pigweed	R. Thistle	Sandbur	Shepherdspurse	Tall waterhemp	Tansy Mustard	Velvetleaf	Crop Tolerance ^a	Recrop Interval in Months When Changing to Nonlabeled Crop ^b
Preplant																						
Balan	7	4	9	5	2	9	2	10	4	8	8	9	1	6	10	8	2	5	2	2	2	12
Eptam	7	7	6	3	2	9	2	9	4	7	7	6	1	5	4	8	2	6	2	2	3	2
Treflan	7	2	9	1	2	9	2	9	6	8	8	7	1	7	7	8	2	5	2	2	3	18
Seedling																						
Buctril /Moxy 2E (seedling only)	1	6	2	6	2	1	7	2	4	7	7	10	1	6	10	1	9	6	6	7	3	0
Butyrac 200	1	6	2	6	2	1	5	2	4	6	5	6	1	3	5	1	5	7	5	6	2	1
Poast	5	1	9	1	1	7	1	8	1	1	1	1	5	1	1	8	1	1	1	1	1	0
Pursuit + Buctril	1	8	5	8	2	2	9	5	7	9	9	9	1	9	8	4	8	8	9	8	2	0-40
Established																						
Gramoxone Max	4	4	5	8	2	8	4	6	6	6	6	8	1	8	6	5	4	5	4	4	3	0
Karmex DF	6	8	9	8	3	5	7	7	5	10	1	7	4	7	8	6	10	6	10	5	2	24
MCP amine 4	1	7	1	7	5	1	8	7	5	5	5	7	1	7	6	1	8	7	8	6	3	1
Pursuit	1	7	5	7	2	2	8	5	7	9	9	5	1	9	7	4	7	6	8	8	2	0-40
Raptor	6	8	7	8	5	8	8	7	8	8	8	5	1	9	8	4	8	8	8	8	3	0-26
Roundup Ultra RT	4	1	1	1	4	8	5	1	7	4	4	1	4	1	4	1	5	1	8	1	3	0
Select	8	1	9	1	1	9	1	8	1	1	1	1	7	1	1	8	1	1	1	1	1	4
Sencor	1	5	8	8	8	9	9	2	7	9	1	8	1	8	7	3	10	7	10	6	3	4
Sinbar	6	8	5	8	6	9	9	3	7	10	1	8	5	8	7	6	10	8	10	6	3	24
Velpar DF	7	6	5	6	6	9	8	3	5	8	1	7	3	7	8	6	10	5	10	5	3	12-24

^aCrop safety ratings of 3 or less result in no yield loss.

^bValues will vary with soil texture, pH, organic matter, rainfall or irrigation, temperature, growth stage, rotational crop, and herbicide rate. Refer to label.

Alfalfa

See NebGuide G95-1254, *Weed Control in Alfalfa*, for more information.

Area or Use	Herbicide	Commercial Product per Acre	Application Time	Remarks and Approximate Cost/A Broadcast
To Control Alfalfa, see Troublesome Weeds and Woody Plants, page 90.				
ALFALFA (Establishing new stands)	BALAN	3.0-4.0 qt	Preplant	Apply to dry surface soil and immediately incorporate by cross tandem disking or equivalent soil mixing. Use lower rate on sandy soil. Early legume injury may occur. Controls primarily annual grasses. Cost: Balan \$12.00-\$16.00; Eptam \$8.55-\$11.97; Treflan \$6.20-\$9.30.
	EPTAM	2.5-3.5 pt		
	TREFLAN	1.0-1.5 pt		
ALFALFA (Seedling or established)	BUCTRIL/MOXY 2E	1.0-1.5 pt	Weeds less than 2" tall. Alfalfa at least 4 trifoliate leaves	Apply when the majority of alfalfa has 4 trifoliate leaves. Temperatures above 80°F following Buctril application may result in crop injury. Do not cut spring treated alfalfa for feed within 30 days following treatment. Cost: Buctril \$7.35-\$11.03; Buctril + Pursuit \$24.43.
	BUCTRIL + PURSUIT DG	1.0 pt 1.08 oz		
	BUTYRAC 200	1.0-3.0 qt	POST. Weeds less than 3" tall; alfalfa 2-4 trifoliate leaves	
ALFALFA (Seedling or established)	POAST	1.0-2.0 pt	Grasses 4" or less	Good coverage necessary. Use higher rate for sandbur, volunteer cereals, or winter annual grasses. Poast will not control over-wintered downy brome. Add COC to spray solution. Do not graze or cut for forage for 7 days or 14 days before cutting for dry hay following Poast. Cost: Poast \$8.62-\$17.25; Poast Plus \$9.56-\$19.12.
	POAST PLUS	1.5-3.0 pt	Grasses 6" or less	

See page 101 for additional footnotes.

Alfalfa

See NebGuide G95-1254, *Weed Control in Alfalfa*, for more information.

<i>Area or Use</i>	<i>Herbicide</i>	<i>Commercial Product per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
ALFALFA Seedling or established for one year	PURSUIT DG	1.08-2.16 oz	Seedling alfalfa 2nd trifoliate stage.	Do not feed, graze, or harvest alfalfa for 30 days following Pursuit treatment. Do not feed, graze, or harvest alfalfa for 20 days following Raptor treatment. Both Pursuit and Raptor require adding an adjuvant. Cost: Pursuit \$11.34-\$22.68; Raptor \$15.20-\$22.80.
	RAPTOR	4-6 oz	Weeds less than 3i	
	SELECT 2EC	6-8 oz	Grasses 2-6i	
ALFALFA (Established one year or more. For dodder control see <i>Troublesome Weeds Section</i> , page 92)	GLYPHOSATE*	8 to 12 oz	Apply in spring to alfalfa that is dormant	Roundup Ultra should not be applied after alfalfa has broken dormancy and initiated trifoliate leaf expansion. Do not use additional surfactant or ammonium sulfate. Allow 45 days after application before harvesting. Check label for local recommendations. Cost: \$2.38-\$3.56.
	GRAMOXONE MAX	1.3-2.1 pt	Dormant alfalfa	For control of downy brome and winter annual weeds. Do not cut or harvest for 42 days after application. Cost: \$7.19-\$9.58.
	KARMEX 80DF	1.5-3.0 lb	Late fall to early spring to dormant alfalfa	For control of winter and summer annual weeds. Cost: \$6.45-\$12.90.
	MCP AMINE 4	1 pt	Apply in fall to dormant alfalfa	Apply in late fall following frosts when alfalfa is dormant. The temperature at the time of spraying should be above 40°F.
	SENCOR DF	0.5-1.0 lb	Late fall to early spring to dormant alfalfa	For control of downy brome, winter annual weeds and suppression of dandelions. Do not cut or harvest for 28 days after application. Cost: Sinbar \$14.38-\$28.76; Sencor \$13.04-\$26.08.
	SINBAR 80W	0.5-1.0 lb		
	VELPAR DF	0.66-2.0 lb	Late fall to early spring to dormant alfalfa	The 0.66 lb/acre rate of Velpar is for low O.M. soils for downy brome control. Cost: Velpar DF \$20.00-\$40.00; Velpar L \$15.00-\$45.00.
	VELPAR L	2.0-6.0 pt		

Pastures and Ranges

(See pages 90-100 for specific weed)

<i>Area or Use</i>	<i>Herbicide</i>	<i>Commercial Product per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
New and established grasses	PLATEAU	New 6-4 oz	Apply preemergence or early postemergence to grass plantings. For established grasses apply early postemergence when weeds are less than 4i.	Postemergence applications of Plateau require a spray adjuvant. Use on big bluestem, littlebluestem, indiagrass, switchgrass (mixes only), sideoats and blue grama, buffalograss and eastern gamagrass. Cost: \$5.67-\$13.44.
		Established 4-8 oz		
GRASS SEEDLINGS (Cool and warm season grasses)	2,4-D ester (4L)	1.0 pt	Grass 5-leaf stage or beyond	For broadleaf weeds. After grasses are well established, increase rate to 1 qt. Cost: \$1.78.
WARM SEASON GRASSES (Grown for seed production)	AATREX DF ³	1.0-2.0 lb	Before weeds and crop emerge	Established grasses. Cost: AAtrex \$3.04-\$6.08; Bicep \$9.07-\$13.61.
	BICEP ³	1.0-1.5 qt		
SOD SEEDING (Legumes into grass)	GRAMOXONE MAX	0.8-1.5 pt	Before or immediately after legume seeding	Suppresses established sod. Seed legumes with a sod seeder. If grass is less than 3" use lower rate. During year of establishment, graze intensively for short periods only. Add X-77 surfactant. Cost: \$7.19-\$14.38.
SOD SEEDING (Native grass planted no-till)	GLYPHOSATE*	16-32 oz	Spring, on cool season grasses	Suppresses established sod. Seed grasses with a sod seeder. Do not graze seeded area until dormancy after second growing season. Apply in no more than 10 gallons water per acre and add 2 qt X-77 and 17 lb ammonium sulfate per 100 gallons. Cost: \$9.45-\$18.90.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Pastures and Ranges (continued)

(See pages 90-100 for specific weed)

<i>Area or Use</i>	<i>Herbicide</i>	<i>Commercial Product per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
ANNUAL OR BIENNIAL BROADLEAF WEEDS IN PASTURES AND RANGES (For specific weeds See pages 88-101.)	RAVE	2-4 oz	Rosette stage in fall or when weeds are small in spring	Withhold milk cows from grazing treated areas for 7 days. With Banvel/Clarity mixture do not harvest hay for dairy animals within 37 days. Do not use Banvel/Clarity within 1/2 mile of sensitive crops. Combination controls greater variety of weed species. Cost: 2,4-D \$3.56; 2,4-D + Banvel/Clarity/Sterling \$9.76; Ally \$5.56-8.34; Amber \$2.70-\$5.40; Curtail \$9.68; Escort \$7.00-\$14.00; Grazon \$6.66-\$13.33; Tordon 22K \$5.36-\$10.72; Rave \$3.78-\$5.60; Redeem R&P \$10.83-\$14.44.
	2,4-D ester (4L)	1.0 qt		
	2,4-D ester (4L)	1.0 qt		
	+ BANVEL/CLARITY STERLING	0.5 pt		
	ALLY	0.2-0.3 oz		
	AMBER	0.28-0.56 oz		
	CURTAIL	2 pt		
	ESCORT	0.2-0.4 oz		
	GRAZON P+D	2.0-4.0 pt		
	TORDON 22K	0.5-1.0 pt		
REDEEM R+P	1.5-2.0pt			
	TRANSLINE	0.25-1.3 pt		For control of broadleaf weeds in noncropland areas, rights-of-way and wildlife openings, including grazed areas, and rangeland and grass pastures. Cost/acre: \$10.00-\$52.00.
PERENNIAL BROADLEAF WEEDS IN PASTURE AND RANGES Includes: vervains, broom snakeweed, western ironweed, woolly loco, flodman thistle and wavy leaf thistle. (For other weeds see pages 90-100.)	2,4-D LV ester (4L)	1.5 qt	At bud stage of predominant weed. Oct. or April for dandelion and musk thistle	Annual treatment for 2-3 years may be necessary. Withhold milk cows from grazing for 7 days. With Banvel/Clarity mixture do not harvest hay for dairy animals for 37 days. Do not use Banvel/Clarity within 1/2 mile of sensitive crops. Cost: 2,4-D \$5.34; 2,4-D + Banvel/Clarity/Sterling \$14.10; Curtail \$9.68-\$19.36; Fuego \$6.27-\$8.63; Grazon \$9.99-\$19.98; Tordon 22K \$21.20-\$42.40; Redeem R&P \$14.44-\$28.88.
	2,4-D LV ester (4L)	1.0 qt		
	+ BANVEL/CLARITY/ STERLING	1.0 pt		
	CURTAIL	2.0-4.0 pt		
	FUEGO	8-11 A/container		
	TORDON 22K	1-2 qt		
	GRAZON P+D	3.0-6.0 qt		
REDEEM R+P	2.0-4.0 pt			
	TRANSLINE	0.25-1.3 pt		For control of broadleaf weeds in rangeland and grass pastures. Cost: \$10.00-\$52.00.
WINTER ANNUAL GRASS CONTROL in established warm season grass	GLYPHOSATE*	1.0 pt	Late winter prior to forage grass growth	Controls downy brome. Not on seed production fields. Do not harvest or graze for 8 weeks. Cost: \$4.13.
	PLATEAU	4-12 oz	Fall PRE or early POST	Add 1 qt MSO. Wait 2 days before hay harvest. Cost: \$9.36-\$28.08.
WOODY PLANT CONTROL	SPIKE 20P	0.37-0.75 oz per 100 sq ft		For woody plant control, can be used for individual plant or small stands. Use lower rate or spike in areas receiving 20 inches or less average rainfall. Cost: Spike \$0.20-\$0.40/100 sq ft; Grazon P+D + Remedy \$47.96.
	GRAZON P+D	1 gal		
	+ REMEDY	1 qt		

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See page 101 for additional footnotes.

Grazing Restrictions for Range and Pasture Herbicides

Herbicides	Product/A	Lactating Dairy Animals		Beef and Non-Lactating Dairy Animals		
		Before Grazing	Before Hay Harvest	Before Grazing	Before Hay Harvest	Removal Before Slaughter
ALLY	0.10 to 0.30 oz	0	0	0	0	0
AMBER	0.28-0.56 oz	0	0	0	0	0
CLARITY/BANVEL/ STERLING	Up to 1 pt	7 days	37 days	0	0	30 days
	Up to 2 pt	21 days	51 days	0	0	30 days
	Up to 4 pt	40 days	70 days	0	0	30 days
	Up to 16 pt	60 days	90 days	0	0	30 days
CROSSBOW 3S	1 to 6 qt	1 year	1 year	5 weeks ^e	1 year	3 days
CURTAIL	2.0 to 4.0 pt	14 days	30 days	0	30 days	7 days ^g
ESCORT	0.2-0.4 oz	0	0	0	0	0
FUEGO	8-11 A/container	7	0	0	0	30
GARLON/REMEDY	0.5-1.0 gal/100 gal	14 days	14	0-14	0-14	3 days
GRAMOXONE MAX ^b	0.8 to 1.5 pt	1 month	1 month	1 month	1 month	0
GRAZON P+D ^c	3.0-4.0 pt	7 days	30 days	0	30 days	3 days
PLATEAU	4-12 oz	0	7	0	7	0
REDEEM R&P	1.5-4.0 pt	14 days	1 year	0	7 days	3 days
ROUNDUP ULTRAMAX ¹ Spot or Wiper ^a Broadcast	Any labeled rate	14 days	14 days	14 days	14 days	0
	Any labeled rate	8 weeks	8 weeks	8 weeks	8 weeks	0
SPIKE 20P	1/2 oz per 45 sq ft	0 days ^g	1 year ^f	0	1 year ^f	0 days ^f
STINGER 3E	0.66 to 1.31 pt	0	0	0	0	0
TORDON 22K ^c	0.5 to 2.0 pt	14 days	14 days	0	14 days (if greater than 1qt/A)	3 days
TRANSLINE 2,4-D/MCPA ^d	0.25-1.3 pt	0	0	0	0	0
		7-14 days	30 days	0-7 days	0-30 days	0

^aDo not treat more than one-tenth of any given acre at one time with spot or wiper applications. Remove livestock before application.

^bRestrictions based on the degree of new seedling establishment before grazing. Suggested at least 6 inches of grass or legume seedling growth which is approximately one month. Late fall seeding may require 3 to 5 months before the suggested 6-inch height is reached.

^cMove livestock to untreated grass pasture for 7 days before transferring livestock to broadleaf crop or pasture areas. Removal before slaughter statement only applies to animals grazing treated forage for 2 weeks immediately after application. If greater than 1 qt/A, only spot treatments are allowed; total acres cannot exceed 25% of landowner's areas in any particular watershed.

^dBe sure to check individual product labels for restrictions and use rates due to the large number of formulations available.

^eOne year if more than 1.5 gal/A rate used.

^fIf no more than 20 lb per acre used.

^gWithdrawal not needed if 2 weeks or more time elapsed since application.

See page 101 for additional footnotes.

CRP Acres

PREPLANT OR PREEMERGENCE

See NebGuide G89-905, Weed Control on CRP Acres, for more information.

Herbicide	Commercial Product/A	Application Time	Remarks and Approximate Cost/A
AATREX 90 DF (NEB. STATE LABEL)	2.2 lb	PPI or PRE	Use only on loam or finer textured soils containing 1% or more organic matter. For use on big bluestem, eastern gamagrass and switchgrass. Cost: \$5.94.
GLYPHOSATE**	16-32 oz	Before or at grass seeding	Will control most emerged seedling grass and broadleaf weeds. Apply glyphosate at 10 GPA carrier or less and include surfactant at 0.5% v/v. Ammonium sulfate added at 17 lb per 100 gal solution improve glyphosate performance. Cost: glyphosate \$3.00-\$8.00.
2,4-D AMINE (4L) or ESTER (4L)	1-2 pt	At least 30 days before grass seeding	Controls most broadleaf annual weeds. Both treatments may injure grass seedlings if applied less than 30 days before planting. Cost: 2,4-D \$1.53-\$3.58; Landmaster BW \$5.29-\$9.29.
LANDMASTER BW	40-72 oz		
PLATEAU	2-4 oz	At grass/wildflower seeding	For use in big bluestem, little bluestem, indiangrass, buffalograss, sideoats grama, blue grama, selected wildflowers and legumes. Cost: \$9.38.
PROWL (3.3EC)	1.2-2.4 pt	PPI or PRE	For use on legumes only. Incorporate immediately for best results. Cost: Prowl \$3.23-\$6.45; Treflan/Trifluralin \$2.56-\$5.34.
TREFLAN/TRIFLURALIN	1-1.5 pt	PPI	

POSTEMERGENCE

For established grass, see Pastures and Ranges, page 80.
For specific weeds, see Troublesome Weeds and Woody Plants, pages 90-100.

AMBER	0.28-0.56 oz	After 3-4 leaf stage of grass	Controls most broadleaf weeds. Use Escort on selected perennial grasses. Do not use on soils with pH greater than 8.0. Do not use on grass/legume mixtures. Add surfactant at 0.25% v/v. Cost: Amber \$2.72-\$5.01; Ally \$2.77; Escort \$2.42-\$20.42.
ALLY*	0.1 oz		
ESCORT**	0.1-1.0 oz		
BANVEL/CLARITY/STERLING + 2,4-D ester (4L)	0.25-0.5 pt 0.5-1 pt	After 5-leaf stage of grass	Controls most broadleaf weeds. Use lower rates on warm-season grasses. Do not use on grass/legume mixtures. Established grasses may be treated with 0.5-1 pt Banvel/Clarity/Sterling + 0.5-2 pt 2,4-D for perennial weed control. Cost: \$3.58-\$7.17.
BUCTRIL	1.5-2 pt	After 3-leaf stage of grass	Controls many broadleaf weeds. Apply in minimum 10 GPA by air. May be used on grass/legume mixtures after third trifoliate leaf stage of alfalfa. May be tank mixed with 2,4-D or MCPA for improved control. Tank mix may injure or kill legumes. Cost: \$11.45-\$15.26.
CURTAIL	2-4 pt	Established grasses	Use only on grasses established one season or longer. Controls most broadleaf weeds including thistles. Do not use on grass/legume mixtures. Cost: \$9.76-\$19.52.
GLYPHOSATE***1	12-16 oz	Late fall or late winter	Apply when perennial grasses are dormant. Do not use ammonium sulfate. Cost: \$3.29-\$4.29.
PLATEAU	4 oz	Spring	Apply when annual broadleaf and grass weeds are less than 6" tall. Cost: \$9.36.
PURSUIT DG	1.44 oz	Legumes 3-trifoliate Grasses 4-leaf	Use on alfalfa, clover, crown vetch, birdsfoot trefoil, lespedeza, smooth brome, reed canarygrass, orchardgrass, big bluestem, little bluestem, switchgrass, Russian wildrye, wheatgrasses (intermediate, crested, tall). Cost: \$16.42.
2,4-D AMINE (4L) or 2,4-D ESTER (4L)	1 pt 0.5 pt	After 5-leaf stage of grass	Controls most broadleaf weeds. Reduce rate 25% if used on warm-season grasses. Will injure or kill legumes. Cost: \$0.90-\$1.53.

*Ally can be applied POST only at 0.1 oz/A to the following grasses: blackwell switchgrass; blue grama; big, little, plains, sand, and ww spar bluestem; buffalo grass; green sprangletop; Indian grass; kleingrass; atherstone, sand, weeping, and wilmarn lovegrass; orchard grass, Russian wild-rye, sideoats grama; and crested, intermediate, western, tall, bluebunch, pubescent, slender Siberian, streambank, and thickspike wheatgrass.

**Escort can be applied to crested wheatgrass, and smooth brome at 0.25 to 1.0 oz/A. Fescue and bluegrass at 0.25 to 0.5 oz/A.

***Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Non-Crop Acres

<i>Area or Use</i>	<i>Herbicide⁵</i>	<i>Commercial Product^{7,8}</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
ROADSIDES (Broadleaf weed control)	2,4-D (4L)	1 qt/A	Broadleaf weeds 2-6"	Repeat treatments may be necessary. Do not use near susceptible plants/trees. Cost: 2,4-D \$3.00; 2,4-D + Banvel/Clarity \$13.75.
	2,4-D (4L) + BANVEL	1 qt/A 1 pt/A		
	GARLON 4	1.0-8.0 qt	Broadleaf weeds 2-6i	Cost: \$23.75-\$90.00.
	PLATEAU	4-12 oz	Dormant (fall) or growing season (spring-early summer)	Applications made in growing season may cause yellowing especially at higher rates. Use with 1 qt/A MSO. Cost: \$11.20-\$30.00.
	REDEEM R&P	1.5-4.0 pt	Broadleaf weeds 2-6i	Cost: \$10.83-\$28.88.
	TELAR	0.25-0.5 oz/A	Weeds 0-2"	Use with surfactant 1 qt/100 gal. Cost: \$6.60-\$12.55.
	TORDON 101 MIXTURE	0.5-2.0 gal	Broadleaf weeds 2-6i	Cost: \$22.50-\$70.00.
	TRANSLINE	0.25-1.33 pt	Broadleaf weeds 2-6i	Cost: \$11.25-\$59.85.
	VISTA	0.67-1.3 pt	Broadleaf weeds 2-6i	Cost: \$7.30-\$14.70.
GRASS SUPPRESSION	OUST	1 oz/A	Grass 6-12"	Do not apply to bare soil. May move if soil moves. Suppresses height and heading of bromegrass and other cool season grasses. Do not use year after year in order to avoid development of resistant weeds. Trace amounts can harm crops and gardens. Imperative that label directions are read and followed. Cost: \$8.75-\$17.50.
	PLATEAU (tall fescue, smooth brome, Kentucky bluegrass)	4-12 oz	Dormant (fall) or growing season (spring-early summer)	Applications made in growing season may cause yellowing especially at higher rates. Use with 1 qt/A MSO. Cost: \$11.20-\$30.00.
IRRIGATION DITCHBANKS	KARMEX 80W	5-10 lb/A	Soon after ditches are open. Treat before weeds appear or soon after	Use enough water to insure good coverage. Use 50 mesh or coarser screens. May injure nearby trees and shrubs. Cost: Karmex \$24.00-\$48.00; 2,4-D \$3.56.
	2,4-D LV ester (4L)	1 qt/A	Broadleaf weeds 2-6"	
	RODEO + X-77	4 qt in 10 gal or less water/A	POST when good growth is present	Nonselective. No residual control. Use the lower rate on annual weeds and perennial grasses, the higher rates on perennial broadleaf weeds. Add X-77 at 1/2% v/v. Cost: \$71.50.
LONG-TERM VEGETATION CONTROL	ARSENAL or HYVAR X-L	1 fluid oz/1000 sq ft 0.75 pt/1000 sq ft	Treat before weeds appear or soon thereafter	Kochia has become resistant to triazines and ALS herbicides in some areas. Consult label for specific instructions on problem weeds and conditions. Do not use near root zones of trees or other desirable plants. Do not use on land subject to erosion unless erosion is controlled. Cost/1000 sq ft: Hyvar \$6.00; Krovar \$5.70; Karmex \$2.40; Arsenal \$2.35; Sahara \$2.00-\$4.00; Spike 20P \$27.50-\$220.00/A.
	KROVAR I 80W	0.5 lb/1000 sq ft		
	KARMEX 80W	0.25-0.5 pt/ 1000 sq ft		
	SAHARA	0.2-0.4 lb/1000 ft ²		
	SPIKE 20P	2.5-20 lb/A		
	SHORT-TERM VEGETATION CONTROL	EVIK DF GLYPHOSATE*		

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Non-Crop Acres (continued)

<i>Area or Use</i>	<i>Herbicide⁵</i>	<i>Commercial Product^{7,8}</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
PERENNIAL GRASSES (including smooth brome and quackgrass)	GLYPHOSATE*	64 oz/A in 10 gal or less water/A	Full foliage or Fall	Perennial grasses should have good top growth. Retreatment may be required. Cost: \$19.50.
PERENNIAL BROADLEAF WEEDS	TRANSLINE	0.3-0.6 pt	Full foliage	For non-cropland use, can be used in wildlife openings including grazed areas on these sites. Provides control of knapweeds, Canada and Musk thistle. Cost: \$13.50-\$27.00.
	TORDON 22K	0.5-4.0 pt	2i to full foliage	Cost: \$6.00-\$48.00.
	REDEEP R&P	1.5-4.0 pt	2i to full foliage	Cost: \$11.90-\$31.80.
	TORDON 101 MIXTURE	0.5-2.0 gal	2i to full foliage	Cost: \$22.50-\$70.00.

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Trees and Shrubs Including Shelterbelts, Christmas and Fruit Trees*

<i>Herbicide</i>	<i>Rate Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
CASORON 4G*	100 lb	PRE on trees at least 2 years old	Apply a 20" band on each side of tree row after trees are planted. Some injury to trees may result on low organic matter soil. Cost: \$220.00/A.
GLYPHOSATE**	1-4 qt in 10 gal water/A	Directed post-emergence	Do not spray green bark or foliage. Spray may contact brown bark. Use lower rate on annuals. Cost: \$10.00-\$38.00.
GOAL	2-4 qt	PRE- or POST-emergence to weeds	Conifers only. Grasses should be treated before they are beyond 2-leaf stage. Use before bud break or after new growth hardens. Cost: \$50.00-\$100.00.
GRAMOXONE MAX*	1.3-2.5 pt	Directed post-emergence	Nonselective contact herbicide. Keep spray off tree foliage. Add surfactant. Cost: \$7.00-\$12.85.
KARMEX 80W*	2.5-5 lb	PRE on trees at least 2 years old	Karmex use limited to conifers, honey locust, green ash, apples, and pears. Cost: \$12.00-\$24.00.
POAST*	2 pt	POST before grasses tiller	Use on fruit trees limited to nonbearing trees. Add 1 qt crop oil concentrate per acre. Thorough coverage required. Cost: \$21.00.
PRINCEP CALIBER 90*	2.2-4.4 lb	PRE on trees at least 2 years old	First tree use limited to apples, pears, sour cherries. Cost: \$10.25-\$20.50.
SOLICAM 80WP*	2.5-5.0 lb	PRE, late fall or early spring	Fruit trees only. May be combined with Karmex and Princep for improved broadleaf control. Cost: \$36.10-\$72.80.
SURFLAN A.S.*	2-4 qt	PRE	Fruit trees only. May be combined with Karmex and Princep for improved broadleaf control. Cost: \$49.00-\$98.00.
2,4-D AMINE (4L)	1 qt	POST to weeds	Keep off new bark and foliage. Controls broadleaf weeds. Cost: \$3.00.

*Denotes products registered for use on fruit trees.

**Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

Aquatic Weed Control Slow Moving and Still Water

Important: Before treating any body of water containing fish, contact the Nebraska Game and Parks Commission local representative. When possible, treat before aquatic weed growth becomes dense to avoid fish suffocation due to oxygen depletion from decaying vegetation. When dense weed growth is present in fish-containing waters, treat no more than half of the area. After vegetation in the treated area disappears, treat the remaining water.

<i>Herbicide</i>	<i>Rate Per AF (Acre Foot) or SA (Surface Acre)</i>	<i>Weeds Controlled</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost</i>
AQUATIC GLYPHOSATE*	1 gal/SA	Most annual and perennial weeds	Apply to well emerged vegetation	NIS can be applied to most water situations. No restrictions on use of water for irrigation, recreation, and domestic purposes. Cost: \$61.00.
COPPER SULFATE CRYSTALS	0.7-5.3 lb/AF	Algae (Moss) Chara	When growth first becomes visible	No restrictions on water usage at recommended rates except for use with sheep. Copper compounds can be corrosive to equipment. Use chelated copper in high pH water. Cost/SA: copper sulfate \$3.90.
COPPER CHELATES (Cutrine plus, Alge Pro)	0.67-1.25 gal/AF			
AQUATHOL G or AQUATHOL K	13-135 lb/AF or 0.3-3.2 gal/AF	Burreed Coontail Milfoil Pondweed Naiad	Water has warmed and growth is visible	Handle with caution, extremely irritating. Overdose can be harmful to fish. Do not use water within 14 days for irrigation or domestic uses. Cost/AF: \$20.75-\$221.00.

*Before use, confirm that generic glyphosates are approved for aquatic use and do not contain a surfactant. The rate listed is based on 3 lb ae aquatic glyphosate.

See page 101 for additional footnotes.

Aquatic Weed Control

Slow Moving and Still Water (continued)

<i>Herbicide</i>	<i>Rate Per AF (Acre Foot) or SA (Surface Acre)</i>	<i>Weeds Controlled</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost</i>
AVAST SRP	2.5-5.0 lb/AF	Coontail Milfoil Pondweed Duckweed Naiad	Before active growth	Do not use water for human consumption or irrigation. Cost: Consult dealer.
2,4-D AMINE or ESTER (4L) or 2,4-D 20G	1.50-4 qt/SA 7.50-20 lb/SA	Water Hyacinth Water Lily Water Primrose Duckweed Arrowhead Pondweed Milfoil	Use sprays on emerged weeds when in full leaf stage. Apply granules when first growth appears	Do not use water for 14 days for livestock or irrigation. Cost: \$4.50-\$12.00.
REWARD	1-2 gal/SA	Arrowhead Cattail Bulrush Elodea Pondweed	Post on foliage or on surface for submerged species	Do not use for 10 days for swimming, livestock or irrigation. Not effective in water with suspended silt. Cost: \$110.00-\$220.00.

Moss or Algae in Stock, Nurse, Spray and Other Water Tanks

Dissolve 1 oz copper sulfate in 1 pt of water in a glass jar. Add 7.5 tablespoons of the prepared solution to each 1,000 gallons of water. Mix thoroughly. Water can be used for crop spraying and livestock watering. Increase rate if water is extra hard. An alternative practice is to paint the tank black to prevent algae growth.

Description of Individual Plant Treatment Techniques

Individual plant treatment can be an efficient, cost-effective alternative to broadcast applications to control brush, shrubs, or vines. Individual plant treatments include spot-applied concentrate, high volume foliar, low volume basal, and cut-stump applications.

Spot-applied concentrate: Soil-applied spot applications of certain undiluted herbicides can be used to control brush species including eastern redcedar and other junipers. Apply undiluted herbicide with a spot gun, which automatically pre-measures the amount of herbicide. Apply to the soil inside the dripline in a ring around the plant.

High volume foliar: The high-volume foliar technique is ideal for small trees, vines, bushes with canes or stems, such as multiflora rose, or low-growing shrubs like buckbrush. Apply diluted herbicide directly and uniformly to the plant foliage. The treated plant should have healthy foliage. Insects, hail, freezing temperatures, drought or other conditions that damage foliage may reduce control. For best results, spray after full leaf expansion when the plants are actively growing.

Low volume basal: This method uses a high percentage of herbicide, so less spray volume is needed than other forms of basal application. Generally, the mix ratios are 20-30% herbicide plus 70-80% diesel fuel or vegetable-based oils. Use low-volume basal applications to control woody species with trunks less than 6 inches in diameter at the base of the tree. Apply enough of the spray to wet the lower 15 to 20 inches of the trunk, including the root collar area, but not to the point of runoff. Use this method any time of the year, except when snow or water prevents spraying to the groundline.

Cut-stump: Apply a solution of herbicide similar to that used for low volume basal treatments to a freshly cut stump. Spray the sides of the stump and the outer portion of the cut surface, including the cambium ring along the inner bark. Thoroughly wet the stem and root collar area, but not to the point of runoff. Treat stumps any time of the year, as long as snow or water doesn't prevent proper application.

Cut Stump Treatments—Trees and Woody Plants

<i>Herbicide</i>	<i>Herbicide Concentration</i>	<i>Remarks and Cost</i>
2,4-D ESTER (4L)	2 qt/10 gal diesel	Use to prevent resprouting of cut stumps. Apply to runoff to freshly cut surface. Delayed applications less effective. Injury to nearby trees may result from Tordon. Cost/10 gal of solution: 2,4-D ester \$3.60+ diesel, Crossbow \$25.50 + diesel; Tordon \$8.90/qt; glyphosate \$20.00-\$40.00/gal; Remedy RTU \$37.00/gal.
CROSSBOW	2 qt/10 gal diesel	
GLYPHOSATE*	Do not dilute more than 2 parts water to 1 part product	
REMEDY RTU	Do not dilute	
TORDON RTU	Do not dilute	

*Glyphosate is the active ingredient in many products. The rates provided on this page are based on a 4 lb ai or 3 lb ae formulation. See the glyphosate product comparison table on page 117 to determine use rate and more information on the product you are using.

See page 101 for additional footnotes.

Noxious Weeds

Statement from the Nebraska Department of Agriculture:

Noxious weeds compete with crops, rangeland, and pastures, reducing yields substantially. Some noxious weeds are directly poisonous or injurious to man, livestock, and wildlife. The losses resulting from noxious weed infestations can be staggering, costing residents millions of dollars due to lost production. The business of noxious weed control is everyone's concern, and their control is to everyone's benefit. The support of all individuals within the state is needed and vital for the control of noxious weeds within Nebraska.

It is the duty of each person who owns or controls land in Nebraska, to effectively control noxious weeds on such land. County boards or control authorities are responsible for administration of noxious weed control laws at the county level. This system provides the citizens of Nebraska with local control. Each county is required to implement a coordinated noxious weed program. When landowners fail to control noxious weeds on their property, the county has the ability to serve an individual notice upon the owner of such land. This notice shall give specific instructions and methods on when and how certain noxious weeds are to be controlled.

The University of Nebraska Cooperative Extension in cooperation with the Nebraska Department of Agriculture has developed a series of publications on the biology, identification, distribution and control of the state's noxious weeds. Further information on these publications and a list of weeds being watched for possible inclusion as noxious weeds are included on the inside back cover.

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
CANADA THISTLE	Tordon 22K	1 qt	Fall actively growing or spring early flower bud	For non-crop areas and spot treatment in pasture and range. Tordon may remain in the soil for three or more years. Cost: \$23.18. See NebGuide G80-509, <i>Canada Thistle Control</i> .
	Tordon 22K + 2,4-D ester (4L)	1 pt 1 qt	Fall; spring during flower bud	Cost: \$15.17.
	Roundup UltraMax	1.75-2.5 qt	Flower bud stage or in fall when growing actively	Idle ground or spot treatment in cropland before head or pod fill of crop. Avoid tillage for three days. Cost: \$22.31-\$31.88.
	Banvel/Clarity/Sterling	1-2 qt	Fall actively growing or spring early flower bud	Idle ground or grassland. Avoid tillage for five days. Injury to forage grasses may occur. Broadleaf crops may be injured for two years, after treatment. Cost: \$21.72-\$43.52.
	Curtail	2-4 pt	Rosette to pre-bud or in fall when actively growing	Curtail Use lower rate in wheat and barley, higher rate in fallow, pasture, or CRP. Stinger used in sugarbeet and corn. Transline is labeled for rangeland and permanent grass pastures. Cost: Curtail \$9.00-\$17.40; Stinger \$19.00-\$82.35; Transline \$27.99-\$66.30.
	Stinger	0.3-1.3 pt		
	Transline	0.67-1.3 pt		
	Ally + Surfactant	0.1 oz	4-6" or rosette stage	Ally used at 1.0 oz per acre is for spot treatment only. Escort or Telar for use in non ag crop land only. Use Ally in wheat, barley, or fallow to be planted to winter wheat or pasture and rangeland. One application suppresses Canada thistle. Cost: Ally \$2.35; Escort \$22.60; Telar \$22.00-\$66.30.
	Telar + Surfactant or Escort + Surfactant	1.0-3.0 oz 1.0 oz	Prebloom to bloom or in the fall when actively growing	
	Ally + Surfactant	1.0 oz		
Grazon P+D*	4.0-6.0 pt		Cost: \$13.33-\$20.00.	
Redeem R&P*	2.5-4.0 pt		Cost: \$18.05-\$28.88.	
DIFFUSE AND SPOTTED KNAPWEED	2,4-D ester (4L)	1 qt	Rosette stage	Cost: \$3.58.
	Grazon P+D*	2.0-3.0 pt		Cost: \$6.66-\$9.99.
	Transline	0.66-1 pt	Mid-bolt to last bud stage	Cost: \$27.57-\$41.78.
	Redeem R&P	1.5 qt	Rosette to bud stage	Cost: Redeem \$25.48; Tordon 22K \$11.58.
	Tordon 22K	1 pt		

*See manufacturer's label for application time.

See page 101 for additional footnotes.

Noxious Weeds (Continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>	
LEAFY SPURGE	2,4-D ester (4L)	2 qt	Bud stage in spring	Retreatment necessary. Annual applications gradually reduce infestation. Cost: 2,4-D \$7.15; Grazon P+D \$14.80. See NebGuide G87-834, <i>Leafy Spurge</i> .	
	Grazon P+D	2 qt			
	Plateau	8-12 oz	In fall 2 weeks before first		Do not apply herbicide in spring over area treated the previous fall with 8-12 oz/A. Use with MSO 1 qt/A. Cost: \$17.20-\$25.80.
	Tordon 22K	2-4 qt	Fall or spring Sept. to early Oct.		Tordon for non-crop areas and spot treatment in pasture and range. Glyphosate for use in trees or areas where grass stand is not a factor. Cost: Tordon \$46.35-\$92.70; glyphosate + 2,4-D \$11.80.
	Glyphosate*** + 2,4-D amine (4L)	1 qt			
MUSK AND PLUMELESS THISTLE	Ally	0.2-0.3 oz	Late fall or spring before bolting	Use in pastures, grasses for seed, fallow and CRP. Curtail may be used in wheat. Cost: Ally \$4.70-\$7.05; Curtail \$9.70.	
	Curtail	2 pt			
	Escort	1 oz	Bolted plants in spring prior to flowering	Use in noncropland and roadsides. Add surfactant at 1 pint/100 gal. Cost: \$22.60.	
	2,4-D ester (4L)	1.5-2 qt	Late fall treatment of rosettes or in spring before flowering stalks lengthen Oct. 1-Dec. 1	Annual treatments necessary for control of new seedlings. Fall applications after trees drop leaves and before leafing out in the spring reduces damage. Do not apply after isoil freeze-up in the fall. For use on ranges and permanent pastures only. Cost: 2,4-D \$5.37-\$7.16; 2,4-D + Banvel/Clarity/Sterling \$9.02; Grazon P+D \$7.40-\$14.80; Tordon \$5.16-\$8.64; Transline \$13.79-\$41.78; Redeem R&P \$8.34-\$16.68.	
	2,4-D ester (4L) + Banvel/Clarity/ Sterling	0.5 pt			
	Tordon 22K	8-12 oz			
	Grazon P+D	2-4 pt	Rosette to early bolt growth stage		
	Transline	0.33-1 pt			
	Redeem R&P	1.5-2.0 pt			
	PURPLE LOOSESTRIFE	Aquatic habitat (12 months under water)	2,4-D amine	5 pt/20 gal	Plants with active growth in bloom or later
2,4-D LV 4 ester			2-2.5 pt/5-15 gal		
Weedar 64			2-4 qt/100 gal		
Rodeo			4-6 pt		
AquaMaster			4 pt		
Aquatic glyphosate**			4 pt		
Semi-aquatic habitat (during dry period)			Garlon 3A	3-5 pt	
	Garlon 3A + 2,4-D amine	3 pt 2.5 pt			
	Escort	1-2 oz			
	Escort + 2,4-D amine	1 oz 2.5 pt			

*See manufacturer's label for application time.

**Before use, confirm that generic glyphosates are approved for aquatic use and do not contain a surfactant. The rate listed is based on 3 lb ae aquatic glyphosate.

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants

(See pages 23-25 for additives)

Best control will be obtained if treatments are made when plants are actively growing. Treatment in following years may be required. An application just before flowering and a second application on fall regrowth will give best results on most perennials. Dust on leaves may interfere with herbicide activity. When the crop is not indicated, the treatment is for a weed growing in noncropland, pastures or rangeland. Always consult the label for latest information and directions.

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
ALFALFA (For control before planting wheat, soybean, dry edible bean, and potato)	2,4-D ester (4L)	1 qt	Alfalfa with 4-6" new growth	Delay planting wheat 15 days and delay planting soybean, dry edible bean, and potato 30 days after application. Ester formulations are less persistent than amine formulations. Cost: \$3.57.
ALFALFA (For control before planting corn or sorghum)	2,4-D ester 4L + Banvel/Clarity/ Sterling	1 qt + 0.5 pt	Alfalfa with 4-6i new growth in fall or spring	Delay planting corn 10 days and delay sorghum 15 days. Best time to kill alfalfa is in the fall. Cost: \$9.01.
ALFALFA (For control of alfalfa in corn or sorghum)	2,4-D amine (4L) + Banvel/Clarity/ Sterling (corn only)	0.25 pt + 0.5 pt	Alfalfa with 4-6" growth	Use drop tips on crop taller than 8". See no-till section of corn, sorghum or soybean to kill alfalfa prior to planting. Sorghum at 3-5 leaf stage. Cost: 2,4-D + Banvel/Clarity \$5.95; Banvel/Clarity/Sterling \$5.44.
	Banvel/Clarity/ Sterling	0.5 pt		
ARTICHOKE JERUSALEM	2,4-D amine (4L) + Banvel/Clarity/ Sterling	0.5 pt + 0.5 pt	12-18" tall	For use in corn. Use drop tips on corn taller than 8". Cost: \$6.20.
	Classic	0.75 oz	2-8" tall	For use in soybean. Cost: \$9.45.
	Exceed	1.0 oz	1-6" tall	For use in corn. Cost: \$11.00.
	Curtail	2.0 pt	12-18" tall	For use where no crop is present. Cost: 2,4-D
	2,4-D ester (4L)	1 qt	18-24" tall	\$3.57; Curtail \$9.70.
BEDSTRAW (annual) (in corn)	Banvel/Clarity/ Sterling	0.50-1.0 pt	POST on corn less than 9i	Use lower rate on coarse-textured soils. Cost: \$5.44-\$10.88.
	Tough + Atrazine	12-24 oz + 1.25-2 lb	POST on corn less than 12i	Apply at 10 gpa or more. Cost: \$10.98-\$20.37.
BLUE MUSTARD	2,4-D ester (4L) 2,4-D amine (4L)	0.5 pt 1 pt	Nov. 15-Mar. 15 before blue mustard stem elongation	Use only on fully tillered wheat. Cost: \$0.89-\$1.52. See NebGuide G74-92, Blue Mustard Control .
	Ally or Amber or Finesse or Peak + 2,4-D ester (4L)	0.1 oz + 0.28 oz + 0.2 oz + 0.38-0.5 oz + 4.0 oz	Mar. 1-15 before blue mustard stem elongation; in spring, broadleaf weeds 2-4"	Add surfactant. Use only on wheat with four or more tillers. Use only on continuous wheat or wheat-fallow. Do not use on soils with pH of 7.9 or higher. Cost: Ally + 2,4-D \$2.80; Amber + 2,4-D \$3.36; Finesse + 2,4-D \$3.39; Peak + 2,4-D \$4.74-\$6.10; Rave \$4.80-\$6.40.
	Rave	3-4 oz		
BUCKBRUSH (snowberry)	2,4-D ester (4L)	1-2 qt	Full foliage (May 10-25)	Use sufficient water to insure good coverage. May have to retreat. Cost: \$3.58-\$7.15.
	Grazon P+D*	2.0-4.0 pt		Cost: \$6.66-\$13.33.

*See manufacturer's label for application time.

See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
BUFFALOBUR	Atrazine 4L ³	2 qt	Preplant or PRE on corn	Reduced rates less effective. Cost: \$6.35.
	Buctril	1.5 pt	In corn or sorghum weeds 3-5 leaf stage	Plants taller than 4" not controlled. Cost: \$11.04.
	Ultra Blazer	1.5 pt	Weeds 3-4 leaf stage in soybean	Weeds must be small. Follow-up treatments necessary. Cost: \$12.31.
	Callisto	3 oz	Weeds 3-4 leaf in corn	Add 0.25 ai atrazine plus COC. Cost: \$12.14.
	Cobra	12.5 oz	POST on soybean	Weeds need to have 4 true leaves. Cost: \$12.78.
	Exceed	1.0 oz	POST in corn weeds 1-5" tall	Cost: \$11.00.
	Grazon P+D*	2.0-4.0 pt		Cost: \$6.66-\$13.33.
	2,4-D ester (4L) + Banvel/Clarity/ Sterling	0.5 pt 0.5 pt	POST on corn	Plants must be small. Cost: \$6.33.
BURCUCUMBER and WILD CUCUMBER	Atrazine 4L ³	2 qt	PRE in corn	Atrazine can also be used POST. Cost: atrazine \$6.35.
	Buctril 2 EC	1.5 pt	Weeds 3-5 leaf stage in corn or sorghum	Thorough coverage required. Cost: \$11.00.
	Exceed	1.0 oz	POST on corn and weeds 1-8" tall	Cost: \$11.00.
	Princep 4L	3 qt	PRE in trees	Cost: Princep \$13.80.
	Tough + Atrazine	18 oz 1.25 qt	POST on corn	Cost: Tough + Atrazine \$14.49.
	BURSAGE, (Skeletonleaf and Woollyleaf)	Grazon P+D	3-4 pt	When growing actively to flower bud stage
Tordon 22K		2 pt		
2,4-D ester (4L) + Banvel/Clarity/ Sterling		1 qt 1 qt	June or when growing actively	See remarks for field bindweed. If soil moisture conditions are poor, use oil-water emulsions as a carrier. Cost: \$25.32.
CACTUS ó See <i>Pricklypear for Plains Pricklypear, and Brittle or Fragile Cactus</i>				
CATTAILS	2,4-D ester (4L) or	1.5 gal + 5% diesel oil + 0.5% emulsifier	Boot to early flowering	Use the equivalent of 150 gal of water per acre. Retreat regrowth as necessary. Cost: 2,4-D \$21.45.
	Rodeo or Glyphosate**		At flowering	Use Rodeo or aquatic glyphosate product in or near water. Cost: Rodeo \$67.65; glyphosate \$27.50.
CEDAR ó See <i>Red Cedar</i>				
CHEAT GRASS ó See <i>Downy brome</i>				
COCKLEBUR ó See <i>Velvetleaf</i> ó For additional treatments				POST in corn use COC or nonionic surfactant.
	Beacon	0.38-0.76 oz		Cost: \$9.80-\$19.61.

*See manufacturer's label for application time.

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
COTTONWOOD, WILLOWS, SIBERIAN ELM, CHINESE ELM	2,4-D ester (4L)	2-3 qt	Full foliage (June-July); basal treatment anytime	2,4-D with aerial equipment at least 5 gal carrier, annual treatment for 2 to 3 years may be necessary. Basal or stump treatment: 2 qt of herbicide/10 gal of diesel; apply to point of runoff. Cost: 2,4-D \$7.15-\$10.13; Crossbow \$51.10; Grazon P+D \$29.60; Grazon P+D + Remedy \$24.01-\$35.98.
	Crossbow	1 gal		
	Grazon P+D	4 qt		
	Grazon P+D	3 qt + 1.5 pt	Trees greater than 10 feet tall	
	Remedy*		per 100 gal water	
		2 qt + 1 pt	Trees less than 10 feet tall	
			per 100 gal water	
	Krenite S	2-3 gal in 100 gal water + surfactant	Late July, Aug., and Sept.	
Spike 20P	0.25 oz/1" dia	Spring or fall	Apply under drip line. Cost: \$8.60/lb.	
Velpar L	4 ml/1" dia	Spring with spot gun to tree base	Cost: \$0.08/tree inch.	
CUPGRASS, PRAIRIE (Corn)	Balance Pro ² + Harness Xtra ³	1.5-2.2 oz 1.8-2.7 qt	0-8 DBP	POST treatments may be needed. Cost: Balance Pro + Harness Xtra \$24.95-\$37.13.
	Harness Xtra 5.6L ³	2.7 qt	0-7 DBP	Always follow with a POST grass product or glyphosate on RR crops. Cost: \$23.71.
CUPGRASS, WOOLLY (Corn)	FulTime ³	2.7-3.5 qt	Less than 14 DBP or PRE	Cost: \$18.10-\$24.50.
	DANDELION ó See <i>No-Till Burndown Tables for Corn and Soybean</i> , pages 28 and 50-51			
DEVILSCLAW ó See <i>Velvetleaf</i> for control in corn and sorghum, page 97				
DOCK (Curled & Pale)	2,4-D ester (4L) + Banvel/Clarity/ Sterling	1 qt 0.5 pt	Before flowering in spring or fall	For use on idle ground or grassland. For corn in VE stage use 1.3 pt of 2,4-D + 0.5 pt of Banvel/ Clarity/Sterling. Cost: \$9.02.
	Grazon P+D*	2.0-3.0 pt		Cost: \$6.66-\$11.09.
	Glyphosate**	16 oz	Preplant	Apply 1 week before planting soybean or corn. Plant Roundup Ready soybean or Roundup Ready corn and use labeled glyphosate POST. Cost: Glyphosate \$4.40; glyphosate + 2,4-D \$9.01.
	Glyphosate** + 2,4-D ester (4L)	13 oz 0.5 pt		
	DODDER (Control in alfalfa)	Kerb 50-W	3 lb	Apply before dodder germinates in the spring
DOGWOOD	Banvel/Clarity/ Sterling	1-2 qt	Full foliage during June	Ground application only. Observe all drift precau- tions when using within 1/2 mile of sensitive crops. Cost: Banvel/Clarity/Sterling \$21.78-\$43.55; Crossbow \$51.10-\$76.65.
	Crossbow	1.0 to 1.5 gal		
	Spike 20P	0.25 oz/1" dia	Spring or fall	Apply under drip line. Cost: \$8.60/lb.

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
DOWNY BROME	Glyphosate**	12-16 oz	Fall or early spring when desirable grasses are dormant Early spring	Use glyphosate before planting corn, sorghum, soybean and in fallow. Cost: \$3.28-\$4.38; or \$3.99-\$5.18 or Oust \$8.00.
	Oust (non-cropland)	1-2 oz		
	Plateau (non-crop land, range, pasture CRP)	4-12 oz	Full PRE or early POST	Surfactant: MSO 1 qt/A. Cost: \$9.36-\$28.08.
	Alternate system			Crop rotation include a late spring seeded crop in the rotation. See NebGuide G78-422, Downy Brome Control .
FIELD BINDWEED	2,4-D ester (4L)	1 qt	Vigorous fall growth or flower bud stage in spring	Avoid tillage 5 weeks before and 1 week after application. Do not plant small grains for 15 days after 2,4-D and 45 days after Banvel/Clarity/Sterling. Plan to treat for several consecutive years. Cost: 2,4-D \$3.58; 2,4-D + Banvel/Clarity/Sterling \$9.02-\$14.46.
Retreatment is necessary (when treating crops adjust rates)	2,4-D ester (4L) + Banvel/Clarity/Sterling	1 qt 0.5-1 pt		
	Banvel/Clarity/Sterling	1-2 pt	Late summer or late fall actively growing	Apply glyphosate in 10 gal or less water/acre. Avoid tillage for 5 days. Do not plant small grains for 15 days with 2,4-D and 45 days per pint of Banvel/Clarity/Sterling. Broadleaf crops may be injured 2 years after high rates of Banvel/Clarity/Sterling in western Nebraska. Cost: glyphosate + 2,4-D \$9.01; glyphosate + Banvel/Clarity/Sterling \$14.19; Banvel/Clarity/Sterling \$10.88-\$21.76; Landmaster BW \$7.93.
	Landmaster BW	54 oz		
	Glyphosate** + 2,4-D amine (4L) or Banvel/Clarity/Sterling	32 oz 0.5 pt 0.5 pt		
	Paramount	5.3 oz	Fall	Preplant to wheat. Cost: \$16.34.
	Tordon 22K + 2,4-D ester (4L)	0.5-1 pt 1-2 pt	Fall after wheat harvest	Use in a wheat-fallow rotation. Retreat with 2,4-D or Landmaster BW in spring. Cost: \$10.74-\$18.75.
GUMWEED (Curlycup)	2,4-D ester (4L)	1.5 qt	Pre-bud	Cost: 2,4-D \$5.36; Grazon P+D \$7.40.
	Grazon P+D	1 qt		
HEMP (Marijuana)	2,4-D ester (4L)	1 qt	2-12" tall	Cost: 2,4-D ester (4L) \$3.58; Grazon P+D \$7.40.
	Grazon P+D	2 pt		
HEMP DOGBANE	2,4-D ester (4L)	0.5-1 qt	Flower bud stage, spring	Use lower rates in crops. Cost: \$1.79-\$3.58.
	2,4-D ester (4L)	1 qt	Apply after corn is in the dough stage, but before the dogbane leaves start to turn yellow	Dogbane roots should have pink swollen buds. Cost: 2,4-D \$3.58. See NebGuide G83-665, Hemp Dogbane
	Glyphosate**	4 qt	Late summer or fall	Idle ground or spot treatment in cropland before head or pod fill of crop. Avoid tillage for at least 7 days after treatment. Cost: \$35.00.
HOARY CRESS	2,4-D ester (4L)	2 qt	Rosette stage in the fall or early bud in spring	Suppression only. Growth starts in early spring. Treat twice a year for 2 to 3 years. Cost: \$7.15.
	Plateau (pasture, range, non-cropland, CRP)	6-12 oz	Late spring/summer at flowering	Cost: \$14.04-\$28.08.

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HORSETAIL	Casoron 4G	150-200 lb	Treat in fall	Cost: \$345.00-\$460.00.	
IRONWEED	2,4-D ester (4L)	1.5 qt	Flower to bud stage	Cost: \$5.36.	
	Grazon P+D*	2.0-3.0 pt	Prior to bud stage	Rangeland. Cost: \$6.60-\$11.09.	
JOHNSONGRASS (see shattercane for seedling control)	Accent	0.67 oz	6-16"	See corn POST for application restrictions. Split-applications more effective. Cost: Accent \$22.18; Beacon \$19.61.	
	Beacon	0.76 oz			
	Fusilade DX	1.5 pt	12-18" new growth	Can be used in soybean. Add 1 qt/A COC. Cost: Fusilade \$23.94.	
(Requires Roundup Ready seed)	Poast Plus + AMS	2.25 pt	Shattercane 12-18i	Can be used in soybean. Cost: Poast Plus \$14.20.	
	Glyphosate**	2-3 pt	Less than 8i	For RR corn or soybean. Avoid tillage for 7 days. Cost: Glyphosate \$8.75-\$13.25.	
JOINTED GOATGRASS	See Downy Brome , page 93.		See NebGuide G95-1252, Controlling Jointed Goatgrass		
KNAPWEED ⁶ See specified knapweed ⁶ Russian, spotted or diffuse					
KOCHIA (triazine-, ALS-resistant). May have to spray twice or cultivate for row crops.					
(In corn or sorghum)	Banvel/Clarity/Sterling	0.5 pt	Preplant to corn or sorghum. Kochia less than 2" tall	Wait 20 days before planting sorghum if Banvel/Clarity/Sterling, Landmaster BW, or Fallow Master is used. Include appropriate PRE herbicides. Banvel/Clarity/Sterling resistant kochia has been confirmed. Cost: Landmaster BW \$7.13; Banvel/Clarity/Sterling \$5.44; Gramoxone Max \$6.91; Fallow Master \$5.38; Balance \$6.10-\$23.18; include a grass herbicide. Sorghum must have 3-5 leaves when using Banvel/Clarity/Sterling. Use higher PRE rate for taller kochia. Use higher rates on dense stands of kochia. Cost: Banvel/Clarity/Sterling \$5.44; Buctril \$7.35-\$11.03; Buctril + Banvel/Clarity/Sterling \$12.80; Buctril/atrazine \$9.53-\$14.28; Buctril/atrazine + Banvel/Clarity/Sterling \$13.26-\$14.62; Marksman \$6.80-\$10.20; Tough + atrazine \$10.94.	
	Fallow Master	32 oz			
	Landmaster BW	54 oz			
	Gramoxone Max	1.5 pt			
	Balance Pro [#]	1.0-3.8 oz	PP or PRE to corn only		
	Banvel/Clarity/Sterling	0.5 pt	POST to corn or sorghum; kochia less than 2" tall		
	Buctril	1.0-1.5 pt			
	Buctril	1.0 pt			
	+ Banvel/Clarity/Sterling	0.5 pt			
	Buctril/Atrazine	2-3 pt	POST to kochia less than 4i in corn or sorghum		
	Buctril/Atrazine + Banvel/Clarity/Sterling	0.125-0.25 pt			
	Callisto	3 oz + 0.5 lb atrazine	POST to corn weeds less than 5i		Add COC + AMS. Cost: \$13.15.
	Lumax	2.5-3 qt	PRE in corn		Cost: \$27.50-\$33.00.
Marksman	2 to 3 pt				
Tough + Atrazine	1 pt	POST to corn only			

*See manufacturer's label for application time.

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
Kochia (continued)				
(In soybean)	Command (3ME)	2.0 pt	PPI in soybean, before kochia emerges	Do not rotate to small grains. Cost: \$18.00.
	Command (3ME) + Glyphosate**	2.0 pt 16 oz	Preplant to soybean for no-till	A POST herbicide or cultivation may be needed to control kochia escapes. Cost: \$22.38.
	Pursuit Plus + Glyphosate**	2.5 pt 16 oz	Preplant to soybean 15-30 days	A POST herbicide or cultivation may be needed to control ALS resistant kochia escapes. Cost: \$18.19.
	Basagran	2 pt	Kochia less than 3i	Classic + Pinnacle or Pursuit will not control ALS-resistant kochia. Cost: Basagran \$20.00; Classic + Pinnacle \$13.05; Pursuit \$15.12.
	Classic + Pinnacle	0.25 oz 0.25 oz	POST to soybean Kochia less than 1i	
	Pursuit DG	1.44 oz	POST to soybean Kochia less than 5i	
(RR crops)	Glyphosate**	32 oz	Kochia less than 4i in RR crops	POST May need to control late emerging kochia with a repeat application or another herbicide. Cost: \$8.75.
(non-crop areas)	Vista*	0.67-1.3 pt		Cost: \$6.73-\$13.36.
(cropland)	Starane*	0.67-1.3 pt		Cost: \$7.10-\$14.03.
LESPEDEZA SERICEA	Remedy Escort/Ally	1-2 pt 0.4 oz	Before bloom Fall	Cost: Remedy \$11-98-\$23.96; Escort/Ally \$9.40.
LOCUST (Honey and Black)	Banvel/Clarity/ Sterling	2 qt	Full foliage during June; cut stump or basal treatment anytime	Ground application only. Observe all drift precautions. See cottonwood for basal and cut stump treatment. Cost: Banvel/Clarity/Sterling \$21.78; Grazon P+D \$14.80-\$29.60.
	Grazon P+D	2-4 qt		
	Remedy*	2.0-4.0 pt		Cost: \$21.32-\$42.64.
	Spike 20P	0.25 oz/1" dia	Spring or fall	Apply under drip line. Cost: \$8.60/lb.
	Velpar L	4 ml/1" dia	Spot gun-spring	Cost: \$0.08/tree inch.
MARESTAIL (Horseweed)	2,4-D ester (4L) Redeem R&P Glyphosate**	1 qt 1-2 pt 24 oz	Prior to bolt Before 6" tall	Cost 2,4-D \$3.57; Redeem R&P \$8.34-\$16.68. Cost \$6.56.
	Callisto + atrazine	3 oz + 0.5 lb	Corn POST less than 10i	Add COC. Cost: \$13.15.
MILKWEED, COMMON	2,4-D ester (4L) + Banvel/Clarity/ Sterling	1 qt 0.5 pt	Flower bud to bloom stage	Do not plant small grains for 15 days after 2,4-D Banvel/Clarity/Sterling treatment. 2,4-D + Banvel/Clarity/Sterling suppresses growth for 1 year. Cost: \$9.02.
	Glyphosate**	3 qt	Flowering through maturity; ropewick application in soybean	Idle ground or spot treatment on cropland before head or pod fill of crop. Avoid tillage for 7 days. Cost: glyphosate \$26.25.
MILKWEED, HONEYVINE (climbing)	2,4-D amine (4L) 2,4-D ester (4L)	1-2 pt 0.5-1 pt	Before vines reach 3' in length	For use in corn or sorghum. Use lower rates in sorghum. Gives suppression only. Cost: \$0.89-\$3.05. See NebGuide G77-384, Common Milkweed .

*See manufacturer's label for application time.

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>	
MULLEIN, COMMON	Ally	0.2 oz	Late fall on rosettes or spring before flowering stalks lengthen	Essential to apply in rosette stage. Add surfactant 2 pt/100 gal solution. Cost: Ally \$4.70; Grazon P+D \$7.40-\$14.80.	
	Grazon P+D	2-4 pt			
NUTSEDGE 6 See Yellow Nutsedge					
OAK	Banvel/Clarity/ Sterling	2 qt	Full foliage June to July; cut stump or basal treatment anytime	Non-cropland only for Spike and Crossbow. Cost: Banvel/Clarity/Sterling \$43.55; Crossbow \$76.65; Remedy + 2,4-D ester TBA; Spike \$8.60/lb; Velpar RP \$0.10/tree inch.	
	Crossbow	1.5 gal			
	Remedy + 2,4-D ester (4L)	1 qt 1-2 qt			
	Glyphosate**	50 to 100% solution	June cut stump		Be careful of desirable tree roots grafting to treated tree roots.
	Spike 20P	0.25 oz/1" dia	Spring or fall		
	Velpar L	4 ml/1" dia	Spot gun in spring to tree base		
	OSAGE ORANGE	Crossbow	1.0-1.5 gal		Full foliage June to July; basal treatment anytime
Remedy + 2,4-D ester (4L)		1-2 pt 1 qt			
Spike 20P		0.5 oz/1" dia	Spring or fall		
Velpar L		4 ml/1" dia	Spot gun in spring to tree base		
POISON HEMLOCK		2,4-D ester (4L) + Banvel/Clarity/ Sterling	1 qt 0.5 pt	Rosettes of fall or early spring	Do not allow livestock access to dry matter. Cost: \$9.02.
	Grazon P+D*	2.0-4.0 pt		Cost: \$6.66-\$13.32.	
	POISON IVY	Crossbow	1.0 - 1.5 gal	Full foliage in spring	Thoroughly wet all vegetation. Do not apply to cropland. Cost: Crossbow \$1.75/1000 sq ft; Remedy + 2,4-D ester \$15.56-\$27.54; glyphosate \$26.25-\$43.75.
Glyphosate**		3-5 qt			
Remedy + 2,4-D ester		1-2 pt 1 qt			
PRICKLY PEAR		Tordon 22K	1-2 pt	New growth to flowering	
	Remedy + Tordon 22K	0.5-1 pt 1 pt			
	Grazon P+D	4 qt			

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>	
PUNCTURE VINE	2,4-D ester (4L)	1 qt	Pre-bloom stage most effective	Mature burs not affected by 2,4-D. Retreatment necessary on new plants. Cost: \$3.58.	
	2,4-D ester (4)	1 qt	POST on corn or sorghum	Cost: 2,4-D \$3.58; Banvel/Clarity/Sterling \$5.40.	
	Banvel/Clarity/Sterling	1 pt	EPOST on corn or sorghum		
	Ally + 2,4-D ester (4L)	0.3 oz 1 pt	PRE to seedlings	Ally provides residual control in non-crop areas. Cost: \$8.84.	
	Exceed	1.0 oz	POST on corn	Provides residual control. Add Banvel to control pigweed. Cost: \$11.00.	
	Peak	0.75-1 oz	POST on sorghum or proso millet	Cost: \$8.48-\$11.30.	
	Plateau (range, pasture CRP)	8-12 oz	Early POST	Add MSO 1 qt/A for use in warm season grasses. Cost: \$18.72-\$28.08.	
PURSLANE, Common (in fallow to be planted to winter wheat)	2,4-D ester (4L)	1 qt	When growing actively	Till 5-7 days after treatment. Do not plant small grains for 15 days. Cost: 2,4-D \$3.58.	
	Ally or Amber or Finesse + 2,4-D ester (4L)	0.1 oz 0.2-0.3 oz 0.4 oz 4.0 oz	Early POST	Add surfactant when used POST. Surfactant 1-2 qt/100 gal solution. Do not use on soils with pH of 7.9 or higher. Allow 12 days before planting wheat. Cost: Ally + 2,4-D \$2.80; Amber + 2,4-D \$2.54-\$3.57; Finesse + 2,4-D \$6.33; Rave \$6.40.	
	Rave	4 oz	Less than 6i		
	RAGWEED, WESTERN (perennial)	2,4-D ester (4L)	1 qt	Early summer	Follow-up treatments may be necessary. Cost: \$3.58.
		Grazon P+D	2-3 pt	Lower rate when weeds are small	Cost: \$7.40-\$11.10.
RED CEDAR, Eastern	Spike 20P	0.5 oz/1" dia	Spring or fall	Spike for use in non-crop areas only. Tordon and Velpar LP can be used on grazingland. Cost: Spike \$8.60/lb; Velpar RP \$0.10/tree inch; Tordon 22K \$0.63/tree inch	
	Tordon 22K	4 ml/3 ft of tree height	Spring or fall		
	Velpar L	4 ml/1" dia	Spot gun in spring to tree base		
Alternative treatment ó Prescribed Burn ó See NebGuides G88-894 or G96-1308, or EC90-121.					
RUSSIAN KNAPWEED	Banvel/Clarity/Sterling	1-2 qt	Apply at bud stage early flower	Idle ground or grassland. Avoid tillage for 7 days. Injury to forage grasses may occur. Broadleaf crops may be injured for 2 years after treatment. Cost: Banvel/Clarity/Sterling \$21.76-\$43.52; Curtail \$29.05-\$38.73; Redeem R&P \$21.23\$33.97; Tordon \$23.18-\$46.36; Transline \$41.78-\$54.31.	
	Curtail	3-4 qt			
	Tordon 22K	1-2 qt			
	Redeem R&P	2.5-4 pt	Apply from bud to mid-flower growth stage or treat in fall		
	Transline	1-1.3 pt			
	Grazon P+D*	2.5-4.0 pt			Cost: \$8.33-\$13.32.
Plateau	12 oz	Apply late in fall after killing frost	Pasture, range or noncropland. Add MSO 1qt/A. Cost: \$28.08.		
RUSSIAN OLIVE	2,4-D ester (4L) + Banvel/Clarity/Sterling	2 qt 1 qt	Full foliage (early June)	See remarks for cottonwood. Cost: \$28.91.	
	Spike 20P	0.5 oz/1" dia	Spring or fall	Use on non-cropland only. Cost: \$8.60/lb.	

RUSSIAN THISTLE ó See *Kochia* for controls, page 94.

*See manufacturer's label for application time.

See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
RYE, VOLUNTEER ó See Downy Brome , page 93. See NebGuide G94-1225 Controlling Volunteer Rye in Winter Wheat				
SAGEBRUSH (sand and fringed and green sagewort)	2,4-D ester (4L)	1.5-2 qt	4"-8" new growth (June)	1.5 qt/A 2,4-D adequate on sand sagebrush. Cost: 2,4-D \$5.36-\$7.15; Grazon + P+D \$11.10-\$14.80; See NebGuide G80-510, Sagebrush Control .
	Grazon P+D	3-4 pt		
SANDBUR (Corn treatments) (Rotate to Soybean improves control)	Accent + COC	0.67 oz 1%	POST in corn. Sandbur less than 1" Corn less than 12"	Cost: Accent \$22.18; Basis Gold \$16.98. See remarks in shattercane on precautions. See NebGuide G74-121, Field Sandbur Control in Corn .
	Basis Gold	14 oz		
	Plateau	4-10 oz	Spring PRE to early POST Sandbur less than 4i	Add 1 qt MSO/A. For use in warm season grasses. Cost: \$9.30-\$23.40.
	Glyphosate** (RR corn)	16-24 oz	POST	Cost: \$4.38-\$6.56 + RR Tech fee.
	Treatments listed for shattercane also control or suppress sandbur.			
SHATTERCANE				
Corn treatments	Accent	0.67 oz	Corn 2-6 leaf Shattercane 4"-6" Corn 4"-20" Shattercane 4"-6"	Use with COC or surfactant. Do not use if Counter was applied to the corn or within 20 days of an application at planting or cultivation application of any organophosphate (OP) insecticide. Do not apply Accent 3 days before or 7 days after a foliar POST OP treatment. Do not apply Beacon within 10 days of a foliar POST OP treatment. Beacon may be applied at 0.38 oz followed by a second 0.38 oz treatment required. Corn hybrids vary in tolerance to Accent and Beacon. Cost: Accent/Beacon \$21.01; Basis Gold \$16.98; Lightning \$14.98; Spirit \$10.10.
	Beacon	0.75 oz		
(Requires Clearfield corn)	Basis Gold	14 oz	Corn less than 12i Shattercane less than 6i	
	Lightning	1.28 oz	Corn 4-24i	
(Requires Clearfield corn)	Spirit	1.0 oz	Shattercane 4-12i	
	Pursuit DG	1.44 oz	Shattercane less than 6"	Cost: \$15.12.
(Requires Roundup Ready Corn)	Glyphosate**	16-24 oz	Shattercane less than 18i	Cost: \$4.38-\$7.31.
An alternate system ó Ridge-till.				
SHATTERCANE				
Soybean treatments	Prowl (3.3EC)	3.6 pt	Preplant to soybean	Incorporate by cross tandem disking or equivalent soil mixing. Cost: Prowl \$9.36; Sonalan \$10.46; Treflan \$5.16-\$8.59.
	Sonalan	3 pt		
	Treflan 4E/ Trifluralim	1.5-2.5 pt		
	Assure II Fusilade DX	7 oz 0.38 pt	POST Shattercane 6-12"	Use with crop oil concentrate. Cost: Assure \$7.57; Fusilade DX \$6.07; Fusion \$6.35; Poast Plus \$6.63-\$9.95.
	Fusion	6 oz		
	Poast Plus	16-24 oz		
(Roundup Ready soybean)	Pursuit DG	1.44 oz	POST Shattercane 4-8"	Add nonionic surfactant 1/4% v/v plus 2 qt/A UAN. Cost: \$15.12.
	Glyphosate**	16-24 oz	POST	Cost: Glyphosate \$5.08-\$7.81.
	Select	6 oz	Shattercane 6-12"	Use with COC. Cost: \$8.62.
An alternate system ó Ridge-till.				

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See page 101 for additional footnotes.

Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>	
SOAPWEED (Yucca)	Velpar L	4 ml/plant		Apply with spot gun in whorl or base of plant. Cost: Velpar \$0.10/plant; Tordon \$0.03/plant.	
	Tordon 22k	1 ml/plant			
	Remedy	13 oz/5 gal of diesel or fuel oil		Thoroughly wet the center of the plant to the soil surface. Cost: \$9.73/5 gal.	
SOW THISTLE (Perennial)	2,4-D ester (4L)	1.5 qt	Fall rosette or spring bud stage	See remarks for field bindweed. Cost: \$5.36.	
SUMAC	2,4-D ester (4L)	1-2 qt	Full foliage	Use sufficient water for good coverage. Cost: \$3.58-\$7.16.	
	Grazon P+D*	2.0-4.0 pt		Cost: \$6.66-\$13.32.	
SWAMP SMARTWEED (tanweed, shoestring)	2,4-D ester (4L) + Banvel/Clarity/ Sterling	1 qt 1 pt	When growing vigorously	On crops use lower rates and amine formulations. Cost: \$14.46.	
	Glyphosate**	3-4 qt in 10 gal or less water/A	Full foliage mid to late summer	Idle ground or spot treatment in cropland before head or pod fill of crop. Avoid tillage for 7 days. Cost: \$26.25-\$35.00.	
	Tordon 22K*	1.0-2.0 pt		Cost: \$10.41-\$20.82.	
VELVETLEAF <i>Corn and sorghum treatments</i> (also controls cocklebur, devil's claw and common sunflower)	Aim 2 EW	0.5 oz	2-4i	Use COC with AAtrex/atrazine and Laddok. Cost: Aim \$2.65; AAtrex/atrazine \$3.92; Basagran \$10.00-\$20.00; Buctril + Atrazine \$9.04-\$14.40; Laddok S-12 \$13.38-\$20.07.	
	AAtrex/ Atrazine DF ³	1.4 lb			
	Basagran + 28% N	1-2 pt 1 gal	Velvetleaf less than 4"		
	Laddok S-12 ²	2.4 to 3.6 pt			
	Buctril 2EC + Atrazine DF ³	1-1.5 pt 0.6-1.2 lb			
	Callisto	3 oz	POST in corn less than 5i		Use 1% COC + AMS. Cost: \$12.15.
	Exceed/Spirit (Corn only)	0.8-1.0 oz	Velvetleaf 4-12"		Use 1 gal of 28% UAN + 1 qt of COC for effective control with Exceed. Cost: Exceed/Spirit \$8.80-\$11.00; 2,4-D \$0.80-\$1.78; Marksman \$5.10-\$11.90.
	2,4-D ester (4L)	0.5-1 pt	Velvetleaf less than 6"		
	Marksman ³ Corn Sorghum	2-3.5 pt 1.5-2 pt	Emergence to 5-leaf 2-5 leaf stage		
	Hornet (Corn only)	2.4 oz	Velvetleaf less than or equal to 6i		Apply to corn up to V6 stage. Include 1 gal COC + 2.5 gal. of UAN/100 gal of water. Cost: \$9.20.
	Peak (Sorghum only)	0.75-1.0 oz	Velvetleaf 1-6"		Cost: \$8.48-\$11.30.
	Permit	0.66-1.33 oz	Velvetleaf 1-6i		Cost: \$9.44-\$19.02.
	Resource (Corn only)	4-8 oz	Velvetleaf 4-12i		Use 1 qt/A COC. Cost: \$4.93-\$9.86.

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Troublesome Weeds and Woody Plants (continued)

<i>Weed</i>	<i>Herbicide</i>	<i>Product Per Acre</i>	<i>Application Time</i>	<i>Remarks and Approximate Cost/A Broadcast</i>
VELVETLEAF (continued)				
Soybean treatments	Command 3ME	1.5-2.0 pt	PPI/PRE to soybean planting	Command drift may damage green vegetation. Command residue may damage wheat planted the same fall. Cost: Command \$13.04-\$17.39.
	Classic + Harmony GT + 28% UAN + Surfactant	0.25 oz 0.083 oz 1 gal 1/8% v/v	POST	See NebGuide G83-681, Velvetleaf . Cost: Classic + Harmony GT \$4.12.
	Pursuit DG	1.44 oz	Velvetleaf less than 3"	Use with 1-2 qt of 28% UAN + NIS at 2 pt/100 gal. Cost: \$15.12.
	Resource	12 oz	Velvetleaf 30"	Use 1 qt/A COC. Cost: Resource \$4.93-\$9.86; glyphosate \$8.75-\$10.16.
(Requires RR soybean)	Glyphosate**	32 oz		
WILD CUCUMBER ó See Burcucumber , page 91.				
WILD LICORICE	Tordon 22K	2 pt	Bloom stage	Cost: \$23.18.
WILD OAT ó In Nebraska probably weedy annual brome. See Downy Brome , page 90.				
WILD PROSO MILLET (See NebGuide G83-648)	Eptam	3.5 pt	Preplant to dry edible bean	Apply to dry surface soil and incorporate immediately with a disk or field cultivator. Cost: Eptam \$14.65; Poast \$6.31.
	Poast	1 pt	POST in dry edible bean, sugarbeet, alfalfa	
	Prowl 3.3EC	1.5-1.8 qt	Layby to corn	Direct spray to cover the base of the corn plant and in between corn rows. Incorporate with irrigation water or with cultivation. Cost: \$7.80-\$9.36.
	Accent	0.67 oz	POST in corn Wild proso millet 1-3 leaf stage	Follow label directions. Cost: \$22.18.
	Ro-Neet 6E	3.3-4.0 pt	Preplant to sugarbeet	Cost: \$25.04-\$30.35.
(Requires Roundup Ready crops)	Glyphosate**	16-24 oz	POST 3-12i	Use only on RR corn and soybean varieties. Cost: \$4.38-\$7.31.
YARROW	Grazon P+D	2 pt	Fall or spring Pre-bloom	Cost: Grazon P+D \$7.40; 2,4-D + Banvel/Clarity/Sterling \$9.02.
	2,4-D LV ester (4L) + Banvel/Clarity/ Sterling	1.0 qt 0.5 pt		
YELLOW NUTSEDGE (Corn)	Beacon	0.76 oz	1-4i	Cost: Beacon \$19.60; Permit \$19.02.
	Permit	1.33 oz		

YUCCA ó See **Soapweed**, page 99.

*See manufacturer's label for application time.

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See page 101 for additional footnotes.

List of Footnotes

Footnote numbers will pertain to factors affecting herbicides and weed control that are used throughout EC-130 and will mean the same regardless where found. Footnote letters will pertain to crop safety and environmental issues.

¹Add NIS (0.25% v/v) per 100 gal spray solution for Gramoxone Max. For Fallow Master BW and glyphosate add 17 lb ammonium sulfate (spray grade) per 100 gal and apply in 10 gpa of spray solution. Read label to determine when to add AMS or additional surfactant.

²Balance is not recommended on coarse-textured soils of less than 1.5% O.M. or pH greater than 7.4. If applied PRE on medium-textured soils with a pH greater than 7.5, decrease Balance rate 0.25 oz/A. Corn seed must be covered with 1.5 to 2.0 inches of soil. Avoid planting when surface soil is wet. Rates could be increased by 0.25 oz/A in fields with organic matter greater than 2.5% or with crop residues exceeding 5,000 lb/A. Do not use if water table is shallower than 25 ft.

³If atrazine was applied at planting, the total amount of early and late applications cannot exceed 2.5 lb ai/A per calendar year. Use no more than 1.6 lb ai/A on less than 30% crop residues on highly erodible land. Using atrazine on soils with less than 1% organic matter increased carryover injury risk to susceptible crops, especially high pH soils. Do not use on sandy soils if water table is shallower than 30 ft.

⁴Glyphosate products will not control volunteer Roundup Ready corn.

⁵Not labeled for control.

^aCrop hybrids and varieties vary in their response to herbicides. Crop safety ratings less than 3 indicate that crop yield should not be affected by any direct injury, unless in whorl of corn and sorghum. If significant stand loss does not occur, most crops will compensate for early injury. Adding surfactants, COC, or liquid nitrogen may reduce crop safety for some herbicide combinations. Refer to product label for specific information.

^bThe recropping interval varies with herbicide rate, soil texture, pH, organic matter, rainfall or irrigation, application date, and rotational crop. Refer to product label for specific information.

^cRate required poses risk for groundwater contamination.

^dFor use on herbicide resistant/tolerant hybrids or varieties.

^eGlyphosate will not control Roundup Ready volunteer corn.

^fLiberty will not control Liberty Link volunteer corn.

^gClearfield corn will not be controlled by imidazolinones and sulfonylurea herbicides.

Symbols will pertain to herbicides registered for use on a specific crop. For example in the corn section, a circle will mean that this herbicide is registered for pop corn, a square for sweet corn, and a triangle for silage corn.

^hWeed Competitive Index. For more information, see page 8.

Asterisks (*) refer to items on that page only.

Weight and Measures Conversion

Common Abbreviations

gal = gallon
 fl oz = fluid ounce
 qt = quart
 pt = pint
 t = teaspoon
 T = tablespoon
 ml = milliliter
 L = liter
 oz = ounce in weight
 lb = pound
 cu ft = cubic feet

Weight

16 ounces = 1 pound = 453.6 grams
 1 gallon water = 8.34 pounds = 3.78 liters
 1 short ton = 2,000 lbs
 1 long ton = 2,240 lbs
 1 cubic foot water = 62.5 lbs

Liquid Measure

1 fluid ounce = 2 tablespoons = 29.57 milliliters
 16 fluid ounces = 1 pint = 2 cups
 1 quart = 2 pints = 32 fluid ounces
 8 pints = 4 quarts = 1 gallon
 1 gallon = 128 ounces = 3785 milliliters
 1 cup = 16 tablespoons = 32 teaspoons
 2 Tablespoons = 1oz = 29.578 ml
 3 t = 1 T = 14.79 ml
 16 T/cup = 8 oz = 236.583 ml

Dry Measure

1 ounce = 28.3495 grams

Length

1 inch = 2.54 centimeters
 3 feet = 1 yard = 91.44 centimeters
 16.5 feet = 1 rod
 5280 feet = 1 mile = 1.61 kilometers
 320 rods = 1 mile

Area

9 square feet = 1 square yard
 43560 square feet = 1 acre = 160 square rods
 1 acre = 0.405 hectare
 640 acres = 1 square mile
 1 hectare = 2.47 acres

Speed

88 feet per minute = 1 mph
 1 mph = 1.61 km/h
 1 mph = 0.477 meter/sec

Volume

27 cubic feet = 1 cubic yard
 1 cubic foot = 1728 cubic inches = 7.48 gallons
 1 gallon = 231 cubic inches
 1 cubic foot = 0.028 cubic meters
 Volume of spire = $D^3 \times 0.5236$

Other Abbreviations and Terms

GPM = gallons per minute
 GPA = gallons per acre
 psi = pounds per square inch
 mph = miles per hour
 RPM = revolutions per minute
 GPH = gallons per hour
 FPM = feet per minute

Circles

Diameter x 3.1416 = circumference
 Radius² x 3.1416 = circle area

Spraying Systems Microns

Very fine = 153 and less
 Fine = 154 - 241
 Med = 242 - 358
 Coarse = 359 - 451
 Very coarse = 452 - 740
 Ext. coarse = greater than 740

Fertilizer Facts ó Weight at 60°F

10-34-0	11.40	28-0-0	10.65
11-37-0	11.60	32-0-0	11.06
7-21-7	11.00	82-0-0	5.15
28-0-0	10.65	12-0-0-26	11.50

Concentration

1 ppm = 1 sec in 12 days
 0.013 ounces in 100 gallons
 or about 8/10 of 1 teaspoon in 1000 gallons
 1 ppb = 1 sec in 32 years
 0.013 ounces in 100,000 gallons
 or about 8/19 of teaspoon in 1,000,000 gal
 1 ppt = 1 sec in 320 centuries

452 gpm = 1"/1 acre/1 hr

Grain Information

	Lbs/bu	Moisture %
Corn	56	15.5
Soybeans	60	13.0
Grain sorghum	56	14.0
Wheat	60	13.5
Sunflower	25	10.0

Cu ft x 0.8 = bushel of grain
 Cu ft x 0.4 = bushel of ear corn

1 horsepower = 550 ft lbs/sec
 = 33,000 ft lbs/min
 = 746 watts

More Abbreviations

ae ó acid equivalent	IMI ó imidazolinone	PT ó Poast tolerant
AF ó acre foot	IMR ó imidazolinone resistant	pt/A ó pints per acre
ai ó active ingredient	IR ó imidazolinone resistant	qt/A ó quarts per acre, qpa
AMS ó ammonium sulfate	IT ó imidazolinone tolerant	qt/100 ó quarts/100 gal of spray solution
COC ó crop oil concentrate	lb/A ó pounds per acre	RR ó Roundup ReadyÆ
DAP ó days after planting	LPOST ó late postemergence	SA ó surface acres
DBP ó days before planting	LL ó Liberty-LinkÆ	SG ó soluble granules
DF ó dry flowable	ME ó micro-encapsulated	SM ó surface mix
DG ó dispersible granules	MSO ó methylated seed oil	SP ó soluble packet
EC ó emulsifiable concentrate	NIS ó nonionic surfactant	STS ó soybean tolerance to sulfonylurea
EPOST ó early postemergence	OM ó organic matter	tsp ó teaspoon
EPP ó early preplant	OP ó organophosate insecticide	UAN ó urea-ammonium nitrate
ESO ó esterified seed oil	OS ó organosilicone surfactant	V/V ó volume per volume
F ó flowable	POST ó postemergence	WDG ó wettable dispensable
fb ó followed by	PP ó preplant	WG ó wettable granule
G ó granules	PPSA ó preplant surface applied	WP ó wettable powder
gm/A ó grams per acre	PRE ó preemergence	/ ó similar product
gal/A ó gallons per acre, gpa, GPA	PSI ó lb/sq inch	

Conversion Information and Herbicide Rainfast Table

Rate Per Acre To 1,000 Square Feet

1. Known facts and assumptions:

1 acre = 43,560 sq ft
 2 lb = 32 oz; 1 pt = 16 oz; 1 qt = 32 oz
 1 oz = 2 tablespoons = 6 teaspoons
 Herbicide rate per acre from bulletin or label
 Hand sprayers apply about 1 gal per 1,000 sq ft

2. Convert herbicide rate per acre to ounces:

For example, 2 qt per acre = 64 oz

3. Convert 64 oz per acre to oz per 1,000 sq ft

64 / 43 = 1.50 oz or 3 tablespoons per 1,000 sq ft

4. Add 3 tablespoons of the product to 1 gal of water and apply uniformly to 1,000 sq ft

Spot Treatment

For hand sprayers used for spot treatments, add 1 1/2 tablespoons of herbicide per gallon of water for each 1 qt per acre required broadcast. Apply to 1,000 sq ft. Application amounts are dependent upon spray pressure, walking speed during treatment, and tip size. For powered handgun applications, mix broadcast rate in 100 gallons of water.

NOTE: Wettable powder herbicide rates would be determined by the same procedure; however, since volume or density of wettable powder herbicides varies, the calculated rate per 1,000 sq ft should be carefully measured by weighing on a precision scale.

Active Ingredient Per Gallon Conversions

Pounds of active material per gal of commercial product	Pints of commercial product needed per acre to give the following pounds of herbicide per acre		
	1/4 lb	1/2 lb	1 lb
2.00	1	2	4
2.64	3/4	1 1/2	3
3.00	2/3	1 1/3	2 2/3
3.34	3/5	1 1/5	2 2/5
4.00	1/2	1	2
5.00	2/5	4/5	1 2/3
6.00	1/3	2/3	1 1/3

Quick Metric Conversions

Symbol	When You Know	Multiply By	To Find	Symbol
lb	pounds	0.45	kilograms	kg
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
oz	ounces	30.00	milliliters	ml
A	acres	0.40	hectares	ha
ha	hectares	2.50	acres	A
Gal	gallons	3.78	liters	L
L	liters	0.26	gallons	Gal

Time until Herbicides are Rainfast

Herbicide	Hours Until Rainfast	Herbicide	Hours Until Rainfast
ACCENT	4	GLYPHOSATE	1-4
ACCENT GOLD	4	HARMONY EXTRA	4
AIM	1	HOELON	1
ALLY	4	HORNET	6
AMBER	4	LADDOK S-12	4
ASSURE II	1	LANDMASTER BW	6
ASSERT	3	LIBERTY	4
ATRAZINE	4	LIGHTNING	1
AVENGE	6	MARKSMAN	4
BANVEL	4	MCPA	1
BASAGRAN	4	NORTHSTAR	4
BASIS	4	OPTION	2
BASIS GOLD	4	PARAMOUNT	6
BEACON	4	PEAK	4
BETAMIX	6	PERMIT	4
BICEP/BICEP II	4	PHOENIX	2
BLAZER	6	PINNACLE	1
BRONATE	1	POAST PLUS	1
BUCTRIL	1	PURSUIT	1
BUCTRIL/ATRAZINE	1	RAVE	4
BUTYRAC 200	6	RAPTOR	1
CALLISTO	1	REFLEX	1
CELEBRITY PLUS	4	RELIANCE	1
CLARITY	4	RESOURCE	1
CROSSBOW	6	REZULT	4
CURTAIL	8	ROUNDUP WEATHERMAX	1-4
CURTAIL M	6	SCEPTER	2
CLASSIC	1	SELECT 2 EC	1
COBRA	0.5	SENCOR	6
DISTINCT	4	SPIRIT	4
EXCEED	4	STARANE	1
EXPRESS	4	STEADFAST	4
EXTREME	4	STELLAR	1
FINESSE	4	STINGER	8
FIRST RATE	2	SYCHRONY	1
FLEXSTAR	1	TOUCHDOWN	1-4
FUSILADE DX	1	TOUGH	2
FUSION	1	2,4-D	1
FALLOW MASTER	6	TORDON	2
GALAXY	4	ULTIMA 60	1
GRAMOXONE MAX	0.5	UPBEET	6
GRAZON P+D	4	YUKON	4
GLEAN	4		

Replant Options and Rotation Restrictions¹

Cereal and Broadleaf Crops

<i>Herbicides</i>	<i>Common name</i>								
		Field Corn	Seed Corn	Popcorn	Sweet Corn	Winter Wheat	SpringWheat	Oat	Winter Barley
AAtrex	atrazine	AT	AT	AT	AT	NCS ^{bi}	2CS	2CS	NCS ^{bi}
Accent	nicosulfuron	AT	AT	10	10 ^a	4	8	8	4
Accent Gold	nicosulfuron + rimsulfuron + clopyralid + flumetsulam	AT	10.5	10.5	18	4	8	8	4
Accent Gold WDG	nicosulfuron + rimsulfuron + clopyralid + flumetsulam	AT	10.5	10.5	10.5/18 ^{bk}	4	8	8	4
Achieve	tralkoxydim	106 D	106 D	106 D	106 D	1	1	1	1
Aim (EC, EW)	carfentrazone-ethyl	AT	AT	AT	AT	AT	AT	AT	AT
Ally	metasulfuron	12 ^w	34 ^x	34 ^x	34 ^x	1	1	10	10
Amber	triasulfuron	4/14 ^z	4/FBA	4/FBA	4/FBA	AT	AT	6 ^y	6 ^y
Assert	imazamethabenz	NCS	15	15	15	NCS	NCS	15	NCS
Assure II	quizalofop-P	4	4	4	4	4	4	4	4
Atrazine	atrazine	AT	AT	AT	AT	NCS	2CS	2CS	NCS
Authority	sulfentrazone	10	10	10	18	4	4	4	4
Avenger	difenzoquat	NCS	NCS	NCS	NCS	AT	AT	NCS	AT
Axiom	flufenacet + metribuzin	AT	AT	12	12	12	12	12	12
Axiom AT	flufenacet + metribuzin + atrazine	AT	NCS	NCS	NCS	2CS	2CS	2CS	2CS
Backdraft	imazaquin + glyphosate	NCS/18 ^{bt, bu}	18	18	18	4/18 ^v	4/18 ^v	11/18 ^v	18
Balan	benfenif	10	10	10	10	10	10	10	10
Balance Pro	isoxaflutole	AT	AT s	6	6	4	4	18 f	6
Banvel	Dimethylamine salt of dicamba	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g
Banvel SGF	Sodium salt of dicamba	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g	NCS ^g
Basagran	bentazon	AT	AT	AT	AT	AT	AT	AT	AT
Basis	rimsulfuron + thifensulfuron	AT	18	10	10	4	8/9 ^{ab}	8/9 ^{ab}	4
Basis Gold	rimsulfuron + nicosulfuron + atrazine	AT	10	10	10	10	18	18	10
Beacon	primisulfuron	14 D ^h	8	8	8	3	8	8	3
Betamix	phenmedipham + desmedipham	NI	NI	NI	NI	120 D	120 D	120 D	120 D
Beyond	imazamox	8.5	8.5	8.5	8.5	0/3 ^{bv}	0/3 ^{bv}	9	4/9/18 ^{bx}
Bicep II	metolachlor + atrazine + benoxacor	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Bicep II Magnum	s-metolachlor + atrazine + benoxacor	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Bicep Lite II	metolachlor + atrazine + benoxacor	AT	AT	AT	AT	15	2CS	2CS	15
Bicep Lite II Magnum	s-metolachlor + atrazine + benoxacor	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Bladex	cyanazine	AT	AT	AT	AT	NCS	NCS	NCS	NCS
Boundary	s-metolachlor + metribuzin	8	8	8	8	4.5	8	12	4.5
Bronate	bromoxynil + MCPA	AT	AT	AT	AT	AT	AT	AT	AT
Bronate Advanced	bromoxynil (octanoic & heptonoic acid) + MCPA	1	1	1	1	1	1	1	1
Buctril	bromoxynil	AT	AT	AT	AT	1	1	1	1
Buctril + Atrazine	bromoxynil + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Bullet	alachlor + atrazine	NCS	NCS	NCS	NCS	2CS	2CS	2CS	2CS
Callisto	mesotrione	AT	AT	AT	AT	NCS	120 D	120 D	120 D
Camix	metalochlor + mesotrione	AT	AT	NCS	NCS	4.5	NCS	NCS	NCS
Canopy	chlorimuron + metribuzin	8/10 ^{ad}	10	10	18	4	4	30	4
Canopy SP	metribuzin + chlorimuron ethyl	8/10 ^{ad}	10	10	18	4	4	30	4
Canopy XL	sulfentrazone + chlorimuron	10 ^{br}	10 ^{br}	10 ^{br}	18 ^{br}	4 ^{br}	4 ^{br}	30 ^{br}	4 ^{br}
Canvas	thifensulfuron + tribenuron	12 ^{y, ai}	22/34 ^{ae}	22/34 ^{ae}	22/34 ^{ae}	1 ^y	1 ^y	10 ^y	10 ^y
Celebrity	dicamba + nicosulfuron	AT	AT	10	10	4	8	8	4
Celebrity Plus	dicamba + diflufenzopyr + nicosulfuron	7 D	7 D	10	10/15 ^a	4	8	8	4
Clarity	dicamba-glycolamine	NCS	NCS	NCS	NCS	NCS ^m	NCS ^m	NCS ^m	NCS ^m
Classic	chlorimuron	8/9 ^{ad}	8/9 ^{ad}	15/9 ^v	9	3	3	3	3
Cobra	lactofen	1	1	1	1	1	1	1	1
Command	clomazone	9	9/1 ^{ae}	9	9/12 ^{ae}	12/16 ^{ae}	12/16 ^{ae}	16	16
Command Xtra	sulfentrazone + clomazone	10	10	10	18	12	12	16	16
Commence	trifluralin + clomazone	9	9	9	9	2CS	2CS	2CS	2CS
Connect SP	Octanoic acid ester of bromoxynil	1	1	1	1	1	1	1	1
Contour	imazethapyr + atrazine	8.5 ^h	8.5 ^h	18	18	9.5	9.5	18	8.5
Curbit EC	ethalfluralin	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS

¹Months unless otherwise noted, (D = days) FBA = Field Bioassay; AT = Any time, NCS = Next Cropping Season; 2CS = Second Cropping Season, 3CS = Third Cropping Season, NTE = No Tolerance Established

²See **Footnotes** on page 110.

Spring Barley	Rye	Grain Sorghum	Pearl & Proso Millet	Soybean	Canola	Buckwheat	Sunflower	Sugarbeet	Dry bean	Pea & Snap bean	Potato	Alfalfa	Red Clover
2CS 8	NCS ^{bi} 4	AT 10/18 ^b	2CS 10/18 ^b	NCS ^d 15 D	2CS 10/18 ^b	2CS 10/18 ^b	2CS 11/18 ^b	2CS 10/18 ^c	2CS 10	2CS 10	2CS 10/18 ^c	2CS 12	2CS 12
8	4	12	26/FBA	10.5	26/FBA	26/FBA	18	26/FBA	10.5	18	18	10.5	26/FBA
8	4	12	26 FBA	10.5/18 ^{bp}	26 FBA	26 FBA	18	26 FBA	10.5/18 ^{bp}	10.5/18 ^{bp}	18	10.5/12 ^{bq}	26 FBA
1 AT 10 6 ^y NCS	1 AT 34 ^x 6 ^y 15	106 D AT 10 14 ^y 15	106 D AT 10 4 15	106 D AT 22/34 ^w 11/36 ^{aa} NCS	106 D 12 34 ^x 4/FBA 15	106 D AT 34 ^x 4/FBA 15	106 D 12 24/FBA 24/FBA NCS	106 D 12 34 ^x 24/FBA 20	106 D 12 34 ^x 4/FBA NCS	106 D 12 34 ^x 4/FBA 15	106 D 1 34 ^x 4/FBA 15	106 D 12 34 ^x 4/FBA 15	106 D 12 34 ^x 4/FBA 15
4 2CS 4 AT 12	4 NCS 4 NCS 12	4 AT 10 NCS 12	4 2CS 12 NCS 12	AT NCS AT AT	AT 30 NCS 12	AT 30 NCS 12	AT 30 NCS 12	AT 30 NCS 18	AT 12 NCS 12	AT 30 NCS 12	4 2CS 30 NCS 1	4 2CS 12 NCS 12	4 2CS 18 NCS 12
2CS 18 10 6 NCS ^g	2CS 18 10 18 f NCS ^g	NCS 11 10 6 NCS ^g	2CS 18 10 18 f NCS ^g	NCS ^e AT AT 6 NCS ^g	2CS 26 AT 18 f NCS ^g	2CS 18 AT 18 f NCS ^g	2CS 18 AT 6 NCS ^g	2CS 40 10 18 f NCS ^g	2CS 18 AT 18 f NCS ^g	2CS 18 AT 18 f NCS ^g	2CS 26 10 6 NCS ^g	2CS 18 AT 10 f NCS ^g	2CS 18 AT 18 f NCS ^g
NCS ^g AT 8/9 ^{ab} 18 8	NCS ^g AT 4 10 3	NCS ^g AT 10 10 8	NCS ^g AT 18 18 8	NCS ^g AT 15 D/10 ^{ab} 10 8	NCS ^g AT 18 18 18*	NCS ^g AT 18 18 18*	NCS ^g AT 10 18 8	NCS ^g AT 10 18 18*	NCS ^g AT 8/10 ^{ab} 18 8	NCS ^g AT 8/10 ^{ab} 18 8	NCS ^g AT AT 8 I	NCS ^g AT 10 18 8	NCS ^g AT 18 18*
120 D 4/9/18 ^{bx} 2CS 2CS 2CS	120 D 4 2CS 2CS 15	NI 9 AT ^j AT ^j AT ^j	NI 9 2CS 2CS 15	NI AT NCS ^{ek} NCS ^{ek} NCS ^{ek}	NI 0/26 2CS 2CS 15	NI 18 2CS 2CS 15	NI 9 2CS 2CS 15	NI 26/18 ^{bw} 2CS 2CS 2CS	NI 18 2CS 2CS 2CS	NI 18 2CS 2CS 2CS	NI 18/9 ^{bw} 2CS 2CS 2CS	NI 3 2CS 2CS 2CS	NI 18 2CS 2CS 2CS
2CS NCS 8 AT	2CS NCS 12 AT	AT ^j 1 12 AT	2CS NCS 12 AT	NCS ^{ek} NCS AT ^s AT	2CS NCS 12 AT	2CS NCS 12 AT	2CS NCS 12 AT	2CS NCS 18 AT	2CS NCS 12 AT	2CS NCS 8 AT	2CS NCS 8 AT	2CS NCS 4.5 AT	2CS NCS 12 AT
1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 2CS 2CS 120 D NCS	1 2CS 2CS 120 D NCS	1 NCS NCS NCS	1 2CS NI 2CS	1 NCS ** NCS ^l NCS	1 2CS NCS 2CS	1 2CS 18 2CS	1 2CS NCS 2CS	1 2CS 18 2CS	1 2CS 18 2CS	1 2CS 18 2CS	1 2CS NCS NCS	1 2CS 18 2CS	1 2CS 18 2CS
4 4 4 ^{br} 10 ^y 8	4 4 4 ^{br} 10 ^y 4	12 12 10 ^{br} 4/10 ^{y,ak} 10/18 ^b	30 30 30 ^{br} 10 ^y 10/18 ^c	AT AT AT ^{br} 22/34 ^{aj} 1	18 30 30 ^{br} 34 ^x 10/18 ^c	30 30 30 ^{br} 22/34 ^{ae} 10/18 ^c	18 18 18 ^{br} 22 ^y 11/18 ^b	30 30 30 ^{br} 22/34 ^{ae} 10/18 ^c	12 12 12 ^{br} 10/22 ^{ak al} 10	12 12 30 ^{br} 10/22 ^{ak al} 10	30 30 30 ^{br} 22/34 ^{ae} 10/18 ^c	10 10 12 ^{br} 10/22 ^{ak al} 12	12 12 18 ^{br} 22/34 ^{ae} 12
8 NCS ^m 3 1 16	4 NCS ^m 3 1 16	10/18 ^b NCS 15/9 ^v 1 9	10/18 ^c NI 30 1 16	4 NCS AT AT AT	10/18 ^c 2CS 18 1 16	10/18 ^c 2CS 30 1 16	11/18 ^b 2CS 9/12 ^v 1 16	10/18 ^c 2CS 30 1 9	10 2CS 9 1 9	10 2CS 9 1 9	10/18 ^c 2CS 30 1 9	12 2CS 9/12 ^v 1 16	12 2CS 9/12 ^v 1 16
16 2CS 1 9.5 NCS	16 2CS 1 9.5 NCS	10 12/18 ^{af} 1 18 NCS	16 2CS 1 NI NCS	AT AT 1 9.5 AT	24 2CS 1 40/FBA NCS	16 2CS 1 40/FBA NCS	18 2CS 1 18 AT	24 12/13 ^{ag} 1 40/FBA 8/13 ^{ae u}	18 9 1 9.5 AT	18 9 1 9.5 NCS	18 9 1 26 NCS	18 2CS 1 18 NCS	18 2CS 1 NI NCS

Replant Options and Rotation Restrictions¹

Cereal and Broadleaf Crops (continued)

Herbicides	Common name								
		Field Corn	Seed Corn	Popcorn	Sweet Corn	Winter Wheat	Spring Wheat	Oat	Winter Barley
Curtail	clpyralid + 2,4-D	1	10.5	10.5	10.5	1	1	1	1
Curtail M	clpyralid + MCPA	1	10.5	10.5	10.5	1	1	1	1
Define	flufenacet	AT	AT	12	12	12	12	12	12
Degree	acetochlor + safener	AT	AT	AT	AT	NCS	NCS	2CS	2CS
Degree Xtra	acetochlor + atrazine + safener	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Distinct	diffufenzopyr + dicamba	7 D	1	1	1	1	1	1	1
Domain	flufenacet + metribuzin	1	2CS	2CS	2CS	12	12	2CS	12
DoublePlay	EPTC + acetochlor + safener	NCS	NCS	NCS	2CS	4	4	2CS	2CS
Dual II Magnum	s-metolachlor + benoxacor	AT	AT	AT	AT	4.5	4.5	4.5	4.5
Epic	flutenacet + isoxaflutole	AT	2CS	12	2CS	12	12	12	12
Eptam	EPTC	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
Eradicane	EPTC + safener	AT	AT	AT	AT	NCS	NCS	NCS	NCS
Everest	flucarbazone-sodium	NI	NI	NI	NI	4	4	NI	11
Exceed	prosulfuron + primisulfuron	1 ^h	3 ^{an}	3 ^{an}	3 ^{an}	3 ^{an}	3 ^{an}	3 ^{an}	3 ^{an}
Extrazine II	cyazazine + atrazine	AT	AT	AT	18	15	15	15	15
Extreme	imazethapyr + glyphosate	AT/8.5 ^{ad}	AT/8.5 ^{ad}	18	18	4	4	18	9.5
Field Master	acetochlor + atrazine + glyphosate	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Finesse	chlorsulfuron + metsulfuron	11/36 ^v	FBA	FBA	FBA	0/4 ^{ae}	0/4 ^{ae}	10	10/16 ^{ae}
FirstRate	cloransulam methyl	9	9 ^s	9	18	3	3	30/FBA	30/FBA
Flexstar	fomesafen	10	10	10	10	4	4	4	4
Frontier	dimethenamid	AT	AT	AT	AT	4	NCS	NCS	4
FulTime	encapsulated acetochlor + atrazine + safener	AT	AT	AT	AT	15	15	2CS	2CS
Fusilade DX	fluaizifop-P	2	2	2	2	2	2	2	2
Fusion	fluaizifop-P + fenoxaprop	2	2	2	2	2	2	2	2
Galaxy	bentazon + acifluorfen	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
Gauntlet	sulfentrazone + cloransulam	10	10 s	9	18	4	4	12	12
Glean	chlorsulfuron	24/36 ^{bn}	FBA	FBA	FBA	0/4 ^{bm}	0/4 ^{bm}	10	10/16 ^{bm}
glyphosate	glyphosate	AT	AT	AT	AT	AT	AT	AT	AT
G-Max lite	dimethenamid + atrazine	AT	AT	AT	AT	AT	2CS	2CS	2CS
Goal	oxyfluorfen	10	10	10	10	10	10	10	10
Gramoxone Max	paraquat dichloride	AT	AT	AT	AT	AT	AT	AT	AT
Guardzman	dimethenamid + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Guardzman Max	dimethenamid-P + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Harmony Extra & XP	thifensulfuron + tribenuron	45 D	45 D	45 D	45 D	AT	AT	AT	AT
Harmony GT & XP	thifensulfuron	AT	45 D	45 D	45 D	AT	AT	AT	AT
Harness	acetochlor + MON4660 safener	AT	AT	AT	NCS	NCS	NCS	2CS	2CS
Harness Xtra 5.6L	acetochlor + Mon 4660 + atrazine	AT	AT	AT	NCS	2CS	2CS	2CS	2CS
Hornet & WDG	flumetsulam + clpyralid	AT/14 D ^{eh}	NCS	10.5	10.5/18 ^q	4	4	4	4
Karmex DF	diuron	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}
Keystone	acetochlor + atrazine	AT	AT	AT	NCS	15	NCS	2CS	2CS
Laddok S-12	bentazon + atrazine	AT	AT	AT	AT	2CS	2CS	NCS ^{ae}	2CS
Landmaster BW	glyphosate + 2,4-D amine	AT	AT	AT	AT	AT	AT	AT	AT
Lariat	alachlor + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Lasso	alachlor	AT	AT	AT	AT	NCS	NCS	NCS	NCS
LeadOff	dimethenamid + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
Liberty	glufosinate	AT	AT	AT	AT	70 D	70 D	70 D	70 D
Liberty ATZ	glufosinate + atrazine	AT	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r
Lightning	imazethapyr + imazapyr	8.5 ^h	8.5 ^h	18	18	4	4	18	9.5
Lorox DF	linuron	AT/4 ^{ae ap}	4	4	4	4	4	4	4
Lumax	s-metolachlor + atrazine + mesotrione	AT	AT	2CS	2CS	4.5	2CS	2CS	2CS
Manifest	bentazon + acifluorfen + sethoxydim	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
Marksman	dicamba + atrazine	AT	AT s	AT s	2CS	10e	10e	10e	10e
Maverick PRO	sulfosulfuron	12/FBA	12/FBA	12/FBA	12/FBA	AT	AT	12/FBA	12/FBA
MCPA	MCPA	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}
Matrix	rimsulfuron	AT ^{bc}	AT ^{bc}	10 ^{bc}	10 ^{bc}	4 ^{bc}	9 ^{bc}	9 ^{bc}	18
Micro-Tech	alachlor (micro-encapsulated)	AT	AT	AT	AT	NCS	NCS	NCS	NCS
Moxy	bromoxynil	AT	AT	AT	AT	AT	AT	AT	AT
Nortron	ethofumesate	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb
NorthStar	primisulfuron + dicamba	14 D h	8 s	8	8	3 ^{**}	8	8	3 ^{**}
OpTill	dimethenamid + dicamba	AT	AT	AT	NCS	4	NCS	NCS	4

¹Months unless otherwise noted, (D = days) FBA = Field Bioassay; AT = Any time, NCS = Next Cropping Season; 2CS = Second Cropping Season, 3CS = Third Cropping Season, NTE = No Tolerance Established

²See **Footnotes** on page 110.

Spring Barley	Rye	Grain Sorghum	Pearl & Proso Millet	Soybean	Canola	Buckwheat	Sunflower	Sugarbeet	Dry bean	Pea & Snap bean	Potato	Alfalfa	Red Clover
1	1	10.5	18	10.5/18 ^{ah}	10.5	18	10.5/18 ^{ah}	NCS	10.5/18 ^{ah}	18	18	10.5	18
1	1	10.5	18	10.5/18 ^{ah}	10.5	18	10.5/18 ^{ah}	5	10.5/18 ^{ah}	18	18	10.5	18
12	12	12	12	AT	12	12	12	4	12	12	1	12	12
2CS	2CS	NCS	2CS	NCS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
2CS	2CS	NCS**	2CS	NCS**	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	12	12	2CS	AT	2CS	12	2CS	2CS	2CS	2CS	1	12	12
2CS	2CS	NCS	2CS	NCS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
4.5	4.5	AT	NI	AT	NCS	NCS	NCS	NCS	AT	AT	AT	4	9
12	12	12	12	6	2CS	12	2CS	12	2CS	2CS	6	12	12
NCS	NCS	NCS	NCS	NCS	NCS	NCS	AT	AT	NCS	NCS	AT	AT	AT
NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
11	NI	NI	NI	NI	11	NI	NI	NI	NI	NI	12	NI	NI
3 ^{an}	3 ^{an}	10 ^{an}	10 ^{an}	18 ⁿ	18 ^{an}	18 ^{an}	18 ^{an}	18 ^{an}	18 ⁿ	10 ^{an}	18 ^{an}	18 ^{an}	18 ^{an}
15	15	1**	NI	NCS ^{o**}	18	18	18	18	18	18	18	18	18
9.5	4	18	40/FBA	AT	40/FBA	40/FBA	18	40/FBA	40/FBA	4	26	4.5	40/FBA
2CS	2CS	NCS	2CS	NCS 1	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
10/16 ^{ae}	0/4 ^{ae}	14/24/36 ^v	11/36 ^v	14/24/36 ^v	FBA	FBA	FBA	FBA	FBA	FBA	FBA	FBA	FBA
30/FBA	30/FBA	9	30/FBA	AT	30/FBA	30/FBA	30/FBA	30/FBA	9	9	30/FBA	9	30/FBA
4	4	18	18	18	18	18	18	18	18	18	18	18	18
NCS	4	AT	NCS	AT	NCS	NCS	NCS	NCS	AT	NCS	NCS	NCS	NCS
2CS	2CS	NCS	2CS	NCS**	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
2	2	2	2	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
2	2	2	2	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
NCS	NCS	NCS	NCS	AT	NCS	NCS	NCS	18	NCS	NCS	18	NCS	NCS
12	12	10	30	AT	24	30	30	30	12	30	30	12	30
10/16 ^{bm}	0/4 ^{bm}	14/24/36 ^{bn}	24/36 ^{bn}	14/26/36 ^{bn}	FBA	FBA	FBA	FBA	FBA	FBA	FBA	FBA	FBA
AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
2CS	2CS	AT	2CS	NCS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
10	10	10	10	1	NI	10	NI	3	2	2	2	2	2
AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
2CS	2CS	AT	2CS	NCS ^e	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
2CS	2CS	AT	2CS	NCS ^e	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
AT	45 D	45 D	45 D	45 D	60 D	45 D	45 D	60 D	45 D	45 D	45 D	45 D	45 D
AT	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D
2CS	2CS	NCS	2CS	NCS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
2CS	2CS	NCS	2CS	NCS ^{e**}	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
4	4	12	NI	10.5/18 ^p	26/FBA	26/FBA	18	26/FBA	10.5/18 ^p	10.5/18 ^p	18	10.5/18 ^p	10.5/18 ^p
12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}	12/24 ^{ae}
2CS	2CS	NCS	2CS	NCS 1**	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
2CS	2CS	AT	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
AT	AT	AT	3	3	3	3	3	3	3	3	3	3	3
2CS	2CS	AT ^j	2CS	NCS 1**	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
NCS	NCS	AT ^j	NCS	AT	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
2CS	2CS	AT	2CS	NCS ^e	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
70 D	70 D	70 D	70 D	AT	4	70 D	4	AT	4	4	4	4	4
NCS ^r	NCS ^r	NCS	NCS ^r	NCS ^{rek}	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r	NCS ^r
9.5	4	18	NI	9	40/FBA	40/FBA	18	40/FBA	9.5	9.5	26	9.5	NI
4	4	AT/4 ^{ae ap}	4	AT/4 ^{ae ap}	4	4	4	4	4	4	AT/4 ^{ae ap}	4	4
2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
NCS	NCS	NCS	NCS	AT	NCS	NCS	NCS	18	NCS	NCS	18	NCS	NCS
10e	10e	AT	2CS	NCS e	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA	12/FBA
0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}	0/3 ^{ae}
9 ^{bc}	18	18	18	4 ^{bc}	18	18	10 ^{bc}	18	10 ^{bc}	10 ^{bc}	AT	18	18
NCS	NCS	AT ^j	NCS	AT	NCS	NCS	NCS	NCS	AT	NCS	NCS	NCS	NCS
AT	AT	AT	AT	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb	AT	6/12 bb	6/12 bb	6/12 bb	6/12 bb	6/12 bb
8	3**	8**	18*	8	18*	18*	8**	18*	8	8	8	8**	18*
NCS	4	14 D	NCS	21 D aq	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS

Replant Options and Rotation Restrictions¹

Cereal and Broadleaf Crops (continued)

<i>Herbicides</i>	<i>Common name</i>								
		Field Corn	Seed Corn	Popcorn	Sweet Corn	Winter Wheat	Spring Wheat	Oat	Winter Barley
<i>Option</i>	foramsulfuron	7 D	2	2	2	2	2	2	2
<i>Option II</i>	fenoxaprop	1	1	1	1	1	1	1	1
<i>Outlook</i>	dimethenamid-P	AT	AT	AT	AT	4	NCS	NCS	4
<i>Paramount</i>	quinclorac	10	10	10	10	AT	AT	10	10
<i>Partner</i>	alachlor	AT	AT	AT	AT	NCS	NCS	NCS	NCS
<i>Peak t</i>	prosulfuron	1 h	10	10	10	AT	AT	AT	AT
<i>Pendimax</i>	pendimethalin	NCS	NCS	NCS	NCS	4	NCS	NCS	4
<i>Permit</i>	halosulfuron	1 h	2	3	3	2	2	2	2
<i>Phoenix</i>	lactofen	1	1	1	1	1	1	1	1
<i>Pinnacle</i>	thifensulfuron methyl	45 D	45 D	45 D	45 D	45 D	45 D	45 D	45 D
<i>Plateau</i>	ammonium salt of imazapic	9 ^{bo}	26 ^{bo}	26 ^{bo}	18 ^{bo}	4 ^{bo}	4 ^{bo}	18 ^{bo}	18 ^{bo}
<i>Poast</i>	sethoxydim	4 ^{bf}	4	4	4	4	4	4	4
<i>Poast Plus</i>	sethoxydim	AT	AT	AT	AT	AT	AT	AT	AT
<i>Prefar</i>	bensulide	4 ^{be}	4 ^{be}	4 ^{be}	4 ^{be}	4 ^{be}	4 ^{be}	4 ^{be}	4 ^{be}
<i>Princep</i>	simazine	NCS	2CS	2CS	2CS	2CS	2CS	2CS	2CS
<i>Prism</i>	clethodim	1	1	1	1	1	1	1	1
<i>Prowl</i>	pendimethalin	NCS	NCS	NCS	NCS	4**	NCS	NCS	4**
<i>Pursuit</i>	imazethapyr	8.5 ^h	8.5	18	18	4	4	18	9.5
<i>Pursuit Plus</i>	imazethapyr + pendimethalin	0/8.5 ^{ad ar}	8.5 ^s	18	18	4	4	18	9.5
<i>Python</i>	flumetsulam	AT	AT	9	10.5/18 ^s	4	4	4	4
<i>Raptor</i>	imazamox	8.5	8.5	8.5	8.5	3	3	9	4
<i>Rave</i>	triasulfuron + Na salt of dicamba	4/36 ^{at}	4/36 ^{at}	4/36 ^{at}	4/36 ^{at}	12 D	12 D	6 ^v	6 ^v
<i>Ready Master ATZ</i>	glyphosate + atrazine	AT	AT	AT	AT	2CS	2CS	2CS	2CS
<i>Reflex</i>	fomesafen	10	10	10	10	4	4	4	4
<i>Reliance STS</i>	chlorimuron + thifensulfuron	8/9 ^{ad}	8/9 ^{ad}	9	9/18 ^{aw}	3	3	3	3
<i>Resolve</i>	imazethapyr + dicamba	8.5 ^h	8.5 ^s	18 ^s	18 ^s	4	4	18	9.5
<i>Resource</i>	flumiclorac	AT	NCS	NCS	NCS	4	4	4	4
<i>Ro-Neet</i>	cycloate	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
<i>Roundup UltraMax</i>	glyphosate	AT	AT	AT	AT	AT	AT	AT	AT
<i>Roundup WeatherMAX</i>	glyphosate	AT	AT	AT	AT	AT	AT	AT	AT
<i>Scepter</i>	imazaquin	9.5/18 ^{v,ad}	18	18	18	4/18 ^v	4/18 ^v	11/18 ^v	11/18 ^v
<i>Select</i>	clethodim	1	1	1	1	1	1	1	1
<i>Sencor</i>	metribuzin	4	4	4	4	8 ^{ax}	8 ^{ax}	12	8 ^{ax}
<i>Sinbar</i>	terbacil	24	24	24	24	24	24	24	24
<i>Sonalan HFP</i>	ethalfuralin	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
<i>Spartan</i>	sulfentrazone	10	10	10	18	4	4	4	4
<i>Spirit</i>	prosulfuron + primisulfuron	1 ^h	8	8	8	3	3	3	3
<i>Squadron</i>	imazaquin + pendimethalin	9.5/18 ^{ad v}	18	18	18	4/18 ^v	4/18 ^v	18	18
<i>Starane</i>	fluroxypr	NCS	NCS	NCS	NCS	4	4	4	4
<i>Steadfast</i>	nicosulfuron + rimsulfuron	AT	10	10	10	4	8	8	4
<i>Steel</i>	imazaquin + imazethapyr	9.5/18 ^{ad v}	18/26 ^{v s}	18/26 ^v	18/26 ^v	4/18 ^v	4/18 ^v	18	11/18 ^v
<i>Stellar</i>	flumiclorac + lactofen	1	NCS	NCS	NCS	4	4	4	4
<i>Stinger</i>	clopyralid	AT	AT	10.5	10.5	AT	AT	AT	AT
<i>Storm</i>	bentazon + acifluorfen	NCS	NCS	NCS	NCS	NCS	NCS	NCS	NCS
<i>Surpass</i>	acetochlor + dichlormid safener	AT	AT	AT	2CS	4	4	2CS	2CS
<i>Synchrony STS</i>	chlorimuron + thifensulfuron	8/9 ^{v ad}	NI	9	18	3	3	3	3
<i>TopNotch</i>	acetochlor + safener	AT	AT	AT	2CS	4	4	2CS	2CS
<i>Tordon 22K</i>	picloram	FBA	FBA	FBA	FBA	NCS	NCS	NCS	NCS
<i>Touchdown IQ</i>	glyphosate	AT	AT	AT	AT	AT	AT	AT	AT
<i>Tough</i>	pyridate	AT	AT	AT	1	1	1	1	1
<i>Treflan HFP</i>	trifluralin	NCS	NCS	NCS	NCS	NCS	NCS	12/18 ^{ba}	NCS
<i>Trifluralin</i>	trifluralin	NCS	NCS	NCS	NCS	NCS	NCS	12/18 ^{ba}	NCS
<i>UpBeet</i>	triflusulfuron methyl	21 D	21 D	21 D	21 D	14 D	14 D	14 D	14 D
<i>Ultra Blazer</i>	acifluorfen	AT	AT	AT	AT	AT	AT	AT	AT
<i>Valor</i>	flumioxazin	1/2 ^{bl}	12/FBA	12/FBA	4	1/2 ^{bl}	1/2 ^{bl}	12/FBA	4
<i>Velpar</i>	hexazinone	12 ^{bg}	24	24	24	24	24	24	24
<i>Yukon</i>	halosulfuron-methyl + dicamba	0/1 ^{bs}	2	3	3	2	2	2	2
<i>Zorial Rapid 80</i>	norflurazon	16	16	16	16	16	16	16	16
<i>2,4-D ester</i>	2,4-D	7/14 D	NCS	NCS	NCS	NCS	NCS	NCS	NCS
<i>2,4-D amine</i>	2,4-D	7/14 D	NCS	NCS	NCS	3	NCS	NCS	3
<i>2,4-DB</i>	2,4-DB								

¹Months unless otherwise noted, (D = days) FBA = Field Bioassay; AT = Any time, NCS = Next Cropping Season; 2CS = Second Cropping Season, 3CS = Third Cropping Season, NTE = No Tolerance Established

²See **Footnotes** on page 110.

Spring Barley	Rye	Grain Sorghum	Pearl & Proso Millet	Soybean	Canola	Buckwheat	Sunflower	Sugarbeet	Dry bean	Pea & Snap bean	Potato	Alfalfa	Red Clover
2 1 NCS 10 NCS	2 1 4 10 NCS	2 1 AT AT AT j	2 1 NCS 10 NCS	14 D AT AT 10 AT	2 1 NCS 10 NCS	2 1 NCS 10 NCS	2 1 NCS 10 NCS	2 1 NCS 24/FBA NCS	2 1 AT 10 NCS	2 1 NCS 24/FBA NCS	2 1 NCS 24/FBA NCS	2 1 NCS 24/FBA NCS	2 1 NCS 24/FBA NCS
AT NCS 2 1 45 D	AT NCS 2 1 45 D	1 NCS 2 1 45 D	1 NCS 2 1 45 D	22 NCS 9 AT 45 D	22 NCS 15 1 45 D	22 NCS 18 1 45 D	22 NCS 36 1 45 D	22 12 ^u 9 1 45 D	22 NCS 9 1 45 D	22 NCS 9 1 45 D	22 NCS 9 1 45 D	22 NCS 9 1 45 D	22 NCS 9 1 45 D
18 ^{bo} 4 AT 4 ^{be} 2CS	4 ^{bo} 4 AT 4 ^{be} 2CS	18 ^{bo} 4 AT 4 ^{be} 2CS	26 ^{bo} 4 AT 4 ^{be} 2CS	9 ^{bo} AT AT 4 ^{be} 2CS	40 ^{bo} 4 AT 4 ^{be} 2CS	26 ^{bo} 4 AT 4 ^{be} 2CS	26 ^{bo} 4 AT 4 ^{be} 2CS	40 ^{bo} AT AT 4 ^{be} 2CS	26 ^{bo} AT AT 4 ^{be} 2CS	26 ^{bo} AT AT 4 ^{be} 2CS	40 ^{bo} AT AT 4 ^{be} 2CS	26 ^{bo} AT AT 4 ^{be} 2CS	26 ^{bo} AT AT 4 ^{be} 2CS
1 NCS 9.5 9.5 4	1 NCS 4 9.5 4	1 NCS 18 18 12	1 NCS 40/FBA 40/FBA 26/FBA	AT NCS AT AT AT	1 NCS 40/FBA 40/FBA 26/FBA	1 NCS 40/FBA 40/FBA 26/FBA	1 NCS 18 18 18	AT 12 u 40/FBA 40/FBA 26/FBA	AT NCS 40/FBA 40/FBA 4	1 NCS 4 4 4	1 NCS 26 26 12	AT NCS 4 9.5 4	1 NCS 40/FBA 40/FBA 26/FBA
4 6 ^v 2CS 4 3	4 6 ^v 2CS 4 3	9 14 ^v AT 18 9	18 4 2CS 18 30	AT 11/26/36 ^{au} NCS AT AT av	18 4/FBA 2CS 18 18	18 9 24/FBA 2CS 18	18-26 ^{as} 24/FBA 2CS 18 30	18 9 24/FBA 2CS 18	18 4/FBA 2CS 10 9	9 4/FBA 2CS 10 9	9 4/FBA 2CS 18 30	9 24/FBA 2CS 18 9	18 24/FBA 2CS 18 9
9.5 4 NCS AT AT	4 4 NCS AT AT	18 NCS NCS AT AT	40/FBA NCS NCS AT AT	9.5 AT NCS AT AT	40/FBA NCS NCS AT AT	40/FBA NCS NCS AT AT	40/FBA NCS NCS AT AT	40/FBA NCS NCS AT AT	40/FBA NCS NCS AT AT	9.5 NCS NCS AT AT	26 NCS NCS AT AT	9.5 NCS NCS AT AT	40/FBA NCS NCS AT AT
11/18 ^v 1 8 ^{ax} 24 NCS	18 1 12 24 NCS	11 1 12 24 NCS	18 1 12 24 NCS	AT AT 4 24 AT	18-26 ^v 1 12 24 NCS	18 1 12 24 NCS	18 1 12 24 NCS	40 AT 12 24 8/13 ^{ae u}	18 AT 12 24 AT	18 1 8 24 NCS	18/26 ^v 1 4 24 NCS	18 AT 4 24 NCS	18 1 12 24 NCS
4 3 18 4 8	4 3 18 NCS 4	10 10 11 NCS 10/18 ^b	12 10 18 NCS 10/18 ^{bh}	AT 10/18 ^v AT NCS 15 D	24 10/18 ^v 26 NCS 10/18 ^{bh}	12 18 18 NCS 10/18 ^{bh}	NI 18 18 NCS 11/18 ^b	24 18 40 NCS 10/18 ^{bh}	NI 10/18 ^v NCS NCS 10	NI 10 18 NCS 10	NI 10/18 ^v NCS NCS 10/18 ^{bh}	NI 18 18 NCS 12	NI 18 18 NCS 12
11/18 ^v 4 AT NCS 2CS	40 4 AT NCS 2CS	18 NCS 10.5 NCS NCS	40 NCS 18/FBA NCS 2CS	AT AT 10.5 ay AT NCS	40 NCS AT NCS 2CS	40 NCS 18 NCS 2CS	40 NCS 10.5 ay NCS 2CS	40 NCS AT 18 2CS	11 NCS 10.5 ay NCS 2CS	18 NCS 18 NCS 2CS	26 NCS 18 18 2CS	18 NCS 10.5 NCS 2CS	40 NCS 18/FBA NCS 2CS
3 2CS NCS AT 1	3 2CS FBA AT 1	9 NCS 8 AT 1	30 2CS FBA AT 1	AT NCS 36/FBA AT 1	18 2CS 36/FBA AT 1	30 2CS 36/FBA AT 1	9/18 ^{v ae} 2CS 36/FBA AT 1	30 2CS 36/FBA AT 1	9 2CS 36/FBA AT 1	9 2CS 36/FBA AT 1	30 2CS 36/FBA AT 1	9/12 ^{v ae} 2CS 36/FBA AT 1	9/12 ^{v ae} 2CS 36/FBA AT 1
NCS NCS 14 D AT 4	NCS NCS 14 D AT 4	12/18 ^{ba} 12/18 ^{ba} 14 D AT 1/2 ^{bl}	NCS NCS 14 D AT 12/FBA	AT AT 14 D AT AT	NCS NCS 14 D AT 12/FBA	NCS NCS 14 D AT 12/FBA	AT AT 14 D AT 1/2 ^{bl}	12/14 ^{az} NCS ^u AT AT 18	AT AT 14 D AT 4	AT AT 14 D AT 12/FBA	AT AT 14 D AT 12/FBA	NCS NCS 14 D AT 12/FBA	NCS NCS 14 D AT 12/FBA
24 2 16 NCS NCS	24 2 16 NCS NCS	24 2 16 7/14 D 7/14 D	24 2 16 NCS NCS	24 9 AT 7/30 D 15/30 D	24 15 16 NCS NCS	24 16 16 NCS NCS	12 bg 24 16 NCS NCS	24 24 16 NCS NCS	24 9 16 NCS NCS	24 9 16 NCS NCS	12 bg 9 16 NCS NCS	24 9 16 NCS NCS	24 9 16 NCS NCS

Not specified on the label. NCS (Next Cropping Season) for all crops.

Footnotes to Table of Replant Options and Rotation Restrictions

* All other crops.

** Injury may occur.

^a15 months for sweet corn varieties @Meriti, @Carnivali and @Sweet Successi.

^bpH <= 7.5, interval is 10-11 months; pH > 7.5, interval is 18 months.

^cpH <= 6.5, interval is 10 months; 18 months if pH > 6.5 and cumulative precipitation is < 25 inches.

^dIn eastern Nebraska, do not rotate to soybean if the rate applied was more than 2.0 lb/A ai or has a calcareous surface layer.

^eInjury may occur if surface soils are calcareous.

^f15 inches of cumulative precipitation from application to planting. (No more than 7 from overhead irrigation. Furrow or flood not to be included in total.)

^gRotation interval is 45 days per pint of Banvel applied and 23 days per pint of Banvel SGF, excluding days when the ground is frozen.

^hClearfield, IR or IMR field corn hybrids may be planted anytime.

ⁱOnly following 0.38 oz/A rate.

^jSafened seed only (Concep).

^k18 months if more than 2.0 lb/A ai atrazine or equivalent band application was made to corn or sorghum.

^lDo not plant soybean in areas where furrow irrigation is practiced.

^mApplications of 24 oz/A or less = 22 days for each 8 fluid oz; 24 oz/A or more = 45 day interval for each 16 fluid oz/A applied.

ⁿ10 months for STS soybean in Region B and canola, dry edible bean in Region C where soil pH is below 7.8.

^oIf applied after June 10, do not plant soybean the next season.

^p18 months when annual rainfall and/or irrigation is less than 15 inches on soils with less than 2% OM.

^qCertain sweet corn varieties may be planted 10.5 months following a soil or postemergence application of up to 3.2 oz/acre of Hornet or 4.0 oz per acre of Hornet WDG.

^rIf applied after June 10, do not rotate with crops other than corn or sorghum the next year, or crop injury may occur. In high plains or intermountain region where rainfall is sparse and erratic or where irrigation is required, rotate only in the 2CS (Second Cropping Season).

^sVerify with the seed company (supplier) on the safety of the herbicide on inbred lines, hybrids or varieties.

^tRotation interval is different north/south of I-80, soil pH levels and application rates and dates.

^uMoldboard plow to a depth of 12 inches prior to planting.

^vRotation interval varies by location in Nebraska, soil pH, application rate and cumulative precipitation.

^wGenerally west of Hwy. 77 and east of the Panhandle and 15 inches of cumulative precipitation. Soybeans pH <7.5 / 7.6-7.9 and 22/33 inches of cumulative precipitation.

^xAt least 28 inches of cumulative precipitation during the period.

^yWhere soil pH is 7.9 or less, and one application at a standard rate was made.

^z4 months for IR corn, 14 months for normal corn and soil pH is 6.9 or lower.

^{aa}11 months for STS varieties, 36 months or earlier with a bioassay.

^{ab}Cropping intervals are according to rate of Basis used: 1/3 oz / 1/3-1 oz per acre rates.

^{ac}Should not be planted for 18 months after application if combined rainfall and irrigation during the previous growing season was less than 20 inches.

^{ad}IR, IMR/non-IR field corn.

^{ae}Rotation interval varies with application rates.

^{af}Areas receiving 20 inches or greater cumulative rainfall and irrigation or those receiving less than 20 inches.

^{ag}Areas receiving 20 inches or greater cumulative rainfall and irrigation moldboard 12 inches deep or those with less than 20 inches.

^{ah}10.5 months or 18 months if soils contain less than 2% organic matter and natural precipitation is less than 15 inches during the 10.5 months following treatment.

^{ai}Minimum of 15 inches of cumulative precipitation.

^{aj}pH 7.5 or lower and 22 inches of cumulative precipitation or soil pH of 7.6-7.9 and cumulative precipitation of 33 inches.

^{ak}Application rate of one Soluble Pack per 10 acres on wheat, barley or fallow on non-irrigated land.

^{al}Soil pH 6.8 or lower or those with a soil pH 6.9-7.9.

^{am}Soil pH is below 7.8.

^{an}Soil pH of 7.9 or lower and 25 inches of cumulative precipitation.

^{ao}Soil should be reworked before planting.

^{ap}Soybean should not be planted in the same year as the application in areas receiving less than 25 inches of cumulative precipitation. Other areas can be planted after 1 inch of rain or irrigation.

^{ar}IR corn can be replanted, but do not rework the soil. Corn must be planted at least 2 inches deep or below the treated zone.

^{as}Soil pH is 6.2 or greater or those with a soil pH less than 6.2.

^{at}4 months for IR corn at any soil pH or 14 months for non-IR corn at a soil pH 6.9 or lower or 22 months with a soil pH 7.9 or lower, or 36 months when the soil pH is above 7.9.

^{au}STS soybeans - non-STS soybeans with a soil pH below 7.9 and 46 inches of cumulative precipitation - all pH levels and FBA.

^{av}STS soybean varieties only.

^{aw}Processing sweet corn varieties only - other sweet corn varieties.

^{ax}4 months following peas, lentils or soybean.

^{ay}Use longer interval if soils contain less than 2% organic matter and natural precipitation is less than 15 inches during the 12 months following treatment.

^{az}Spring application/fall application

^{ba}All areas receiving more than 20 inches of rainfall and irrigation - those areas receiving less than 20 inches of rainfall and irrigation to produce a crop.

^{bb}6 months following split postemergence applications totalling 12 fl oz/A or less - all types of applications totalling more than 12 fl oz/A.

^{bc}Rotation intervals may need to be extended to 18 months if drought conditions prevail after application and before the rotational crop is planted, unless supplemental sprinkler irrigation has been applied and totals greater than 15 inches during the potato growing season.

^{bd}In areas where irrigation is necessary do not rotate to winter wheat or winter barley if the crop was lost or destroyed and the land was fallowed that summer.

^{be}The soil must be tilled to a minimum depth of 4 inches prior to replanting.

^{bf}Poast Protected field corn hybrids may be planted anytime.

^{bg}Rate of Velpar did not exceed 1 lb/A for corn and 2/3 lb/A for sugarbeet and potato, except in areas of low rainfall, 20 inches or less.

^{bh}10 months for a pH of 6.5, 18 months when pH>6.5, except on irrigated soil where precipitation following application must exceed 25 prior to planting beets, where the interval is 10 months on soils with pH<7.5.

^{bi}Consult label for rate, pH and organic matter restrictions.

^{bj}2.0 oz/a or less/up to 3.0 oz/A.

^{bk}Check the label for the planting interval for specific sweet corn hybrids.

^{bl}2.0 oz per acre or less/up to 3.0 oz per acre rate of Valor and a minimum of 1 inch of rainfall/irrigation has occurred between Valor application and replanting.

^{bm}Soil pH of 7.9 or lower and Glean rate of 1/6 to 1/3 oz per acre / 1/2 oz per acre rate.

^{bn}Refer to Glean label for pH, rate and cumulative precipitation restrictions in specified Nebraska counties.

^{bo}Following the 4.0 oz per acre rate to Federal CRP (Conservation Reserve Program) land.

^{bp}For areas less than 15 inches of annual precipitation and less than 2% organic matter wait 18 months.

^{bq}Where soil pH is greater than 8.0, the interval is 12 months.

^{br}For fields south of Route 30 and east of Route 281 in Nebraska.

^{bs}IR, IMR field corn/ IT, Normal field corn.

^{bt}IR, IMR, IT field corn may be planted the next cropping season.

^{bu}If Backdraft was applied as a postemergence application at 1.5 quarts/acre and at least 10 inches of rainfall or irrigation has been received from the date of application through October of the same year.

^{bv}Clearfield wheat/normal (non-clearfield).

^{bw}West/east of Highway 83.

^{bx}Rotation interval is based on soil pH, rainfall and tillage and location west/east of Hwy. 83. See label.

Forage, Feed, and Grazing Restrictions for Row Crop Herbicides

The following information is provided as a reference to the restriction and limitations for the grazing and feeding of row crops to livestock. This information serves as a guide only and does not replace or supercede the label. Always read and follow label directions.

Herbicide	Restrictions
2,4-D	Do not forage or feed corn fodder for 7 days following application. Do not permit dairy animals or meat animals being finished for slaughter to forage treated grain fields within 2 weeks after treatment. Do not feed treated straw to livestock if a preharvest or emergency treatment is used. See label for further information.
Accent	Do not graze or feed forage or grain from the treated areas to livestock within 30 days after application.
Accent Gold	Do not graze or feed forage, hay or straw from treated areas to livestock within 85 days of application.
Achieve	Mature straw and grain may be fed to livestock 45 days after treatment. Immature crops (forage) may be grazed or cut for hay 30 days after treatment.
Aim	Product is labeled for use on corn for silage. Do not feed treated soybean forage to livestock. No information on other crops.
Arrosolo	No information on label. Consult product manufacturer.
Assure II	Do not graze treated fields or harvest for forage or hay.
Atrazine	Do not graze or feed forage from treated areas for 21 days following application, or illegal residues may result.
Authority	No information on label. Consult product manufacturer.
Axiom	No restrictions on corn. Do not graze or feed forage, hay or straw to livestock from treated soybeans.
Axiom AT	No information on label. Consult product manufacturer.
Backdraft	Do not graze or feed treated soybean forage, hay or straw to livestock.
Balance	No information on label. Consult product manufacturer.
Banvel	Do not graze or harvest for livestock feed prior to crop maturity.
Basagran	Do not graze treated fields for at least 21 days after application.
Basis Gold	Do not graze or feed forage or grain from the treated areas to livestock within 30 days after application.
Beacon	Do not graze or feed forage from treated corn to livestock within 30 days after application.
Beyond	There should be an interval of at least 30 days between an application and feeding or grazing of wheat forage and hay.
Bicep II/Bicep II Magnum, Bicep Lite II/Bicep Lite II Magnum	Do not graze or feed forage from treated areas for 30 days following application.
Blazer	Do not use treated plants for feed or forage.
Bolero	No information on label. Consult product manufacturer.
Boundary	Soybean plants or hay may be grazed or fed to livestock 40 days after application.
Broadstrike + Dual Broadstrike SF + Dual	Do not graze or feed treated soybean forage, hay or straw to livestock.
Broadstrike + Treflan	Do not graze or feed treated soybean forage, hay or straw to livestock.
Bronate	Do not graze treated fields for 30 days following application.
Buctril + atrazine	Do not cut crop for feed or graze within 30 days after application.
Buctril	Do not cut for feed or graze within 30 days after application.
Buctril + atrazine	Do not cut crop for feed or graze within 30 days after application.
Buctril	Do not cut for feed or graze within 30 days after application.
Bullet	Do not graze treated area or feed treated forage to livestock for 21 days following application.
Butyrac/Butoxone (2,4-DB)	Do not graze or feed soybean hay within 60 days after application of a 2,4-DB tank-mix application.
Callisto	Do not graze or feed cotton treated with Callisto. No other information available on label. Consult product manufacturer.
Camix	Do not graze or feed forage from treated areas for 45 days following application.
Canopy	Do not graze treated fields or harvest for forage or hay.
Canopy XL	Do not feed treated soybean forage or hay to livestock.
Caparol	Do not feed treated forage to livestock or graze treated areas or illegal residues may result.
Celebrity Plus	Do not apply within 32 days of forage harvest or 72 days of corn grain and stover harvest.
Clarity	For lactating dairy animals, do not harvest forage within 37, 51 or 70 days for 1, 2 and 4 pint use rates. No restrictions for other animals.

This table is produced in cooperation with the University of Missouri.

Forage, Feed, and Grazing Restrictions for Row Crop Herbicides (continued)

Herbicide	Restrictions
Classic	Do not graze treated fields or harvest for forage or hay.
Cobra	Do not graze animals on green forage or stubble. Do not use hay or straw for animal feed or bedding.
Command	Do not allow livestock to graze on treated fields or crop residue, or feed treated forage to livestock.
Command Xtra	Do not allow livestock to graze on treated soybean vines or feed treated soybean leaves or vine trash to livestock.
Concert	Do not graze or feed forage hay or straw from treated areas to livestock.
Conclude/Conclude Ultra/ Conclude Xact/Conclude Xtra	Do not use treated plants for feed or forage.
Cotoran	Do not feed foliage from treated cotton plants or gin trash to livestock.
Degree	No information on label. Consult product manufacturer.
Degree Xtra	No information on label. Consult product manufacturer.
Domain	Do not graze or feed forage, hay or straw to livestock.
Distinct	Do not apply within 32 days of forage harvest. Do not apply within 72 days of corn grain and stover harvest.
DSMA	Do not feed treated foliage to livestock or graze treated areas.
Dual II/Dual II Magnum	Do not graze or feed forage from treated areas for 30 days following application.
Epic	No information on label. Consult product manufacturer.
Eradicane	No information on label. Consult product manufacturer.
Exceed	Do not graze or feed forage from treated crops until 30 days following application. Do not harvest for silage until 40 days following application.
Extreme	Do not graze or feed treated soybean forage, hay or straw to livestock.
Facet	No information on label. Consult product manufacturer.
FieldMaster	Do not feed forage from corn or graze treated areas within 8 weeks of application.
FirstRate	Do not harvest soybeans for forage or hay for 14 days after application.
Flexstar	Do not graze treated areas or harvest for forage or hay. Do not graze rotated small grain crops or harvest for livestock forage or straw.
Frontier	May be grazed or fed to livestock at 40 or more days after application.
Frontrow	Do not graze or feed treated soybean forage, hay or staw to livestock.
Fultime	No information on label. Consult product manufacturer.
Fusilade DX	Do not graze or harvest for forage or hay.
Fusilade 2000	Do not graze or harvest for forage or hay.
Fusion	Do not graze or harvest for forage or hay.
Galaxy	No forage restrictions on label.
Gauntlet	No information on label. Consult product manufacturer.
Gemini	Do not graze treated fields or harvest for forage or hay.
Glyphosate (generic)	Refer to product label for specific information
G-MAX Lite	Corn: Do not graze or feed treated forage within 40 days of application Sorghum: Do not graze or feed forage within 80 days of application
Goal	Do not use treated plants for feed or forage or allow animals to graze treated areas.
Gramoxone	Soybean POST directed: Do not graze treated areas or feed treated forage to livestock. Corn harvest aid: Do not use on corn grown for fodder or forage. Do not pasture livestock in treated fields. Soybean harvest aid: Do not pasture livestock within 15 days of treatment and remove 30 days before animal harvest.
Grandstand R	Do not graze lactating dairy animals or harvest hay from treated areas for one year following treatment. Withdraw livestock from forage treated with Grandstand at least 3 days before slaughter during the year of treatment.
Guardzman/Leadoff	May be grazed or fed to livestock at 40 or more days after application.
Guardzman Max	Corn: Do not graze or feed treated forage within 40 days of application. Sorghum: Do not graze or feed forage within 80 days of application.
Harmony Extra	Do not graze or feed forage or hay from treated areas to livestock (dry-harvested straw may be used for bedding and/or feed).
Harmony GT	Do not graze or feed forage, hay or straw from treated areas to livestock.
Harness	No information on label. Consult product manufacturer.
Harness Xtra	No information on label. Consult product manufacturer.

Forage, Feed, and Grazing Restrictions for Row Crop Herbicides (continued)

<i>Herbicide</i>	<i>Restrictions</i>
Hoelon	Do not allow livestock to graze treated fields. Do not harvest forage, hay or straw from treated fields.
Hornet	No restrictions on label. Consult product manufacturer.
Karmex	Do not allow livestock to graze treated cotton.
Keystone	No information on label. Consult product manufacturer.
Laddok S-12	Do not graze treated areas or feed treated forage to livestock for 21 days following application.
Lariat	Do not graze treated area or feed treated forage to livestock for 21 days following application.
Lasso	Corn: Do not graze treated areas or feed treated forage to livestock for 21 days following application. Grain sorghum: Do not graze harvest forage for 70 days following application. Soybeans: Do not feed forage, hay or straw. Do not ensile treated soybeans.
Liberty	Do not harvest corn forage within 60 days of application.
Liberty ATZ	Do not harvest corn forage within 60 days of application. Do not feed treated green immature growing soybean plants to livestock.
Lightning	Do not graze or feed treated corn forage, silage, fodder or grain for at least 45 days after application.
Linex	Do not graze treated fields or feed forage from treated areas to livestock. Do not feed gin trash to livestock.
Londax	Do not graze treated fields or feed treated forage within 80 days of last application.
Lumax	No information on label. Consult product manufacturer.
Marksman	Do not harvest or graze corn for dairy or beef feed prior to the ensilage (milk) stage of the crop. Do not graze or feed treated sorghum forage or silage prior to mature grain stage.
MCPA	Do not forage or graze meat or dairy animals on treated areas within 7 days of slaughter.
Microtech	Corn: Do not graze treated areas or feed treated forage to livestock for 21 days following application. Grain sorghum: Do not graze harvest forage for 70 days following application. Soybeans: Do not feed forage, hay or straw. Do not ensile treated soybeans.
MSMA	Do not feed treated foliage to livestock or graze treated areas.
NorthStar	Do not graze or feed forage from NorthStar-treated corn to livestock within 30 days following application. Do not harvest silage within 45 days after application.
Outlook	Corn: Do not graze or feed forage within 40 days of application. Sorghum (forage): Do not graze or feed forage within 60 days of application. Sorghum (grain): Do not graze or feed forage within 80 days of application.
Option	Do not graze within 45 days of application.
Ordram	Do not feed rice straw if application is made within 40 days of harvest.
Paramount	Do not graze treated areas. Do not harvest hay from treated areas for 309 days. Do not feed forage or fodder from treated areas.
Partner	Corn: Do not graze treated areas or feed treated forage to livestock for 21 days following application. Grain sorghum: Do not graze harvest forage for 70 days following application. Soybeans: Do not feed forage, hay or straw. Do not ensile treated soybeans.
Peak	Do not graze or feed forage from treated crops until 30 days following application. Do not harvest for silage until 40 days following application.
Permit	Allow 30 days before grazing and harvest of forage or silage.
Phoenix	Do not graze animals on green forage or stubble. Do not feed treated soybean silage (ensiled soybeans) to cattle. Do not utilize hay or straw for animal feed or bedding.
Pinnacle	Do not graze or feed forage, hay or straw from treated areas to livestock.
Poast/Poast Plus	Do not graze treated fields and do not feed treated soybean forage (green succulent) or ensilage to livestock. Treated soybean hay may be fed. Do not apply within 60 days of harvest for fodder or 45 days for corn forage/silage.
Princep	Do not graze treated areas, or illegal residues may occur.
Prowl/Pendimax	Do not graze treated cotton or rice fields. Do not use rice straw for feed or bedding. Livestock can graze or be fed soybean forage from treated fields.
Pursuit Plus	Do not graze or feed treated soybean forage, hay or straw to livestock.
Pursuit	Do not graze or feed treated soybean forage, hay or straw to livestock.
Python	Do not graze or feed treated soybean forage, hay or straw to livestock. No corn information on label.
Ramrod	No information on label. Consult product manufacturer.
Raptor	Do not graze treated soybean forage, hay or straw to livestock.
Reflex	Do not graze treated areas or harvest for forage or hay. Do not graze rotated small grain crops or harvest for livestock forage or straw.

Forage, Feed, and Grazing Restrictions for Row Crop Herbicides (continued)

<i>Herbicide</i>	<i>Restrictions</i>
Reglone	Do not graze or feed treated forage to livestock. Do not use seed from treated plants for food, feed or oil purposes.
Resource	Do not graze treated fields or harvest for forage or hay.
Roundup	Roundup Ready crops: Do not harvest or feed treated crops for 8 weeks after application. Spot treatment: Allow 14 days following spot treatment or selective equipment before grazing domestic livestock. Corn harvest aid: Do not harvest or feed treated vegetation for 8 weeks following application. Grain sorghum harvest aid: Do not harvest or feed treated vegetation for 8 weeks following application. Soybean harvest aid: Do not graze or harvest treated crop for livestock feed within 25 days of last preharvest application. Wheat harvest aid: Wheat stubble may be grazed immediately after harvest.
Roundup WeatherMAX	Roundup Ready corn: Do not harvest or feed treated crops within 7 days of application. Roundup Ready soybeans: Do not harvest or feed treated crops within 14 days of application. Forage legumes: If application greater than 44 oz wait 8 weeks before grazing or feeding to livestock. Pastures: Do not harvest or feed treated crops within 8 weeks of application. Corn and sorghum harvest aid: Allow 7 days between application and harvest of treated vegetation. Soybean harvest aid: Do not graze or harvest treated hay or fodder for livestock feed within 25 days of application.
Scepter	Do not graze or feed treated soybean forage, hay or straw to livestock.
Scepter O.T.	Do not graze or feed treated soybean forage, hay or straw to livestock.
Select	Do not graze treated fields or feed treated forage or hay to livestock.
Sencor	Treated vines may be grazed or fed to livestock 40 days after application.
Shotgun	Do not graze for feed forage from treated areas for 21 days following application.
Sodium chlorate	Grain sorghum: Do not graze treated fields or feed treated fodder, forage or seeds within 14 days of application. Rice: No information on label. Soybeans: Do not graze treated fields or feed treated soybean foliage or fodder.
Sonalan	Do not graze or forage crop grown in treated soil or cut for hay or silage.
Spirit	Do not graze or feed forage from Spirit-treated crops to livestock until 30 days after application.
Squadron	Do not graze or feed treated soybean forage, hay or straw to livestock.
Stam	No information on label. Consult product manufacturer.
StamPro	Do not graze treated fields or feed forage within 80 days of last application.
Staple	Do not feed cotton gin byproducts (trash) to livestock.
Staple Plus	Do not feed cotton gin byproducts (trash) to livestock.
Starfire	Harvest aid: Do not use on corn grown for fodder or forage. Do not pasture livestock in treated fields.
Steadfast	Do not graze or feed forage, hay, or straw from treated areas to livestock within 30 days of application.
Steel	Do not graze or feed treated forage, hay or straw to livestock.
Stellar	Do not graze animals on green forage or stubble. Do not use hay or straw for animal feed or bedding.
Storm	Do not use treated plants for feed or forage.
Surpass EC	No information on label. Consult product manufacturer.
Sutan +/- Genate Plus	No information on label. Consult product manufacturer.
Synchrony	Do not graze treated fields for forage or hay.
TopNotch	No information on label. Consult product manufacturer.
Touchdown	Do not graze or harvest treated cover crops for feed.
Tough	Do not graze or otherwise feed treated corn grain, forage, or fodder to livestock within 68 days after application.
Treflan	No information on label. Consult product manufacturer.
Ultra Blazer	Do not use treated plants for feed or forage.
Whip 360	Do not graze or feed rice straw to livestock.
Yukon	Corn: Following application to foliage, corn may be grazed or harvested for feed after the crop reaches ensilage (milk) stage at least 30 days after application
Zorial	Do not graze treated cotton fields with livestock or feed treated cotton forage to livestock. Cover crops planted after harvest should be plowed under and not grazed or harvested.

Preharvest Intervals/Crop Stage Limits

POST Herbicides in Corn

<i>Herbicide</i>	<i>Preharvest Interval or Crop Height Limit</i>
Accent	24" broadcast, 36" directed
Accent Gold	12î
Aim	8 collar
Atrazine	12"
Banvel	1 pt 8", 0.5 pt 36", coarse-textured soils 0.5 pt
Basagran	none
Basis	2 collar
Basis Gold	12"
Beacon/Exceed	20" broadcast to 36î directed
Bladex 90 DF	4th leaf
Buctril	pre-tassel
Buctril-Atrazine	12"
Callisto	30î or 8 leaf
Celebrity Plus	24î
Clarity	8", coarse-textured soils 0.5 pt
Distinct	24î
Extrazine II	4th leaf
Glyphosate	consult label
Hornet	20î, 85 days
Laddok S-12	12"
Liberty	24î or V7
Liberty ATZ	12î
Lightning	45 days
Lumax	45 days
Marksman	5th leaf
North Star	4-20î broadcast, 20-36î directed
Option	70 days (grain)
Permit	36" directed
Pursuit (Clearfield Corn)	45 days
Resource	10 leaf
Roundup WeatherMAX	30î or V8
Sencor + Basagran	60 days
Spirit	20î broadcast, 24î directed
Steadfast	12î or 6 collar
Stinger	24î graze or harvest silage in 40 days
Touchdown	30î or V8
Tough	68 days
2,4-D	8" broadcast, pre-tassel directed

POST Herbicides in Soybean

<i>Herbicide</i>	<i>Preharvest Interval or Crop Height Limit</i>
Assure II	80 days
Basagran	30 days for forage or hay
Blazer	50 days
Classic	60 days
Cobra	45 days
FirstRate	Bloom, forage or hay 14 days
Fusilade	Bloom
Fusion	Bloom
Glyphosate	Consult label
Liberty	Bloom
Phoenix	45 days
Pinnacle	60 days
Poast Plus	90 days
Pursuit	85 days
Pursuit Plus	85 days
Raptor	85 days
Reflex/Flexstar	Bloom
Reliance	60 days
Resource	80 days
Roundup WeatherMAX	Bloom
Select	60 days
Scepter	90 days
Touchdown	Full bloom

POST Herbicides in Sorghum

<i>Herbicide</i>	<i>Preharvest Interval or Crop Height Limit</i>
Aim	6 leaf
Atrazine	12"
Banvel/Clarity	8", 15" with drops
Basagran	boot
Buctril	pre-boot
Buctril-Atrazine	12"
Laddok S-12	12"
Marksman	8"
Paramount	12î
Paramount + ATZ	12î
Peak	5-30"
Permit	pre-boot
2,4-D	8" broadcast, boot directed

Growth Regulator Herbicides

(Including 2,4-D, Banvel/Clarity, Stinger, Tordon and others)

Every year Extension specialists receive many questions about products that contain growth regulator herbicides. These include 2,4-D, Clarity, Stinger, MCPP, MCPA, Tordon and others. (See pages 12-13 for the different herbicides classified as growth regulators.) These herbicides are valuable in controlling many unwanted broadleaf weeds in crops, range, turf, and landscape situations. However these products also can easily damage nearby vegetables, ornamentals, trees, shrubs, or broadleaf crops.

First, it is important to understand the two kinds of drift: vapor drift and particle drift.

Vapor drift δ The vaporization of a herbicide followed by movement off target. The product vaporizes and can travel for long distances and eventually contact and damage non target plants. Vaporization and vapor drift increase as temperature increases.

Particle drift δ The movement of droplets (particles) from the sprayer nozzle. Spraying when the wind speed is too high is the leading cause of particle drift. Typically if the windspeed is over 10 mph, it is too windy to spray.

Any product is subject to particle drift. See page 6 for pointers on reducing drift.

No matter which growth regulator you use be sure to spray the right one in the right conditions. Below is more information on some of the common growth regulators.

2,4-D

2,4-D is a an active ingredient in many compounds. It has been used to successfully control broadleaf weeds for many years; however, each year its misuse affects many non-target species as well.

2,4-D is available in 4 lb and 6 lb formulations. The 4 lb is most common. Make sure you understand what rate of what formulation you are going to spray since it only takes 2/3 of a pint of 6 lb 2,4-D to have the same activity as 1 pint of 4 lb 2,4-D.

In addition, 2,4-D is available in ester and amine formulations. Esters vaporize and result in vapor drift which can travel long distances. The low volatility (LV) esters reduce the amount of volatilization but some will still likely volatilize at temperatures above 85°F. The amine salt formulation is non-volatile. During warm weather (temperatures above 85°F), only amine formulations of 2,4-D should be used. The ester formulation tends to penetrate the foliage easier so amine use rates are usually higher than ester rates. In the end, however, all 2,4-D formulations are subject to particle drift.

Common products containing 2,4-D are listed below:

Amine 4	Pathway
Bentgrass Selective	Range Star
Brash	Saber
Brushmaster	Savage
Champaign	Scorpion III
Chaser 2	Shotgun
Chaser Turf Herbicide	Starane + Extron
Cimmaron Max	Starane + Saber
Crossbow	Starane + Salvo
Curtail	Super Trimec
D-638	Three-way Selective
DMA4 IVM	Trimec Bentgrass
Five Star	Trimec Classic
Formula 40	Trimec Classic DSC
Four Power Plus	Trimec Plus Quadmec
Grazon P+D	Trimec Lawn Weed Killer
Hi-DEP	Triplet
Landmaster BW	Weedone LV4
MEC Amine-D	Weedone 638
Oasis	Weedmaster

Dicamba

Dicamba is the active ingredient in Banvel/Clarity/Sterling. It is not as prone to vapor drift as 2,4-D, however it is subject to particle drift and each year products containing dicamba damage trees, soybeans, alfalfa and other broadleaf plants in Nebraska.

The following is a list of products containing dicamba as one of the active ingredients. Know your herbicides and the conditions in which you spray.

Banvel	Mec Amine-D
Banvel SGF	NorthStar
Bentgrass Selective	Op-Till
Brash	Range Star
Broadspectrum	Super Trimec Classic
Brushmaster	Three-way ester II
Celebrity	Three-way Selective
Celebrity Plus	Trimec Bentgrass
Cimmaron Max	Trimec Classic DSC
Clarity	Trimec Lawn Weed Killer
Cool Power	Trimec Plus Quadmec
Dicambazine	Triplet
Dicamba DMA Salt	Tripower Selective
Distinct	Rave
Eliminate	Resolve
Fallow Master	Sequence
Fallow Star	Sterling
Four Power Plus	Sterling Plus
Fuego	Veteran
Horsepower	Weedmaster
Marksman	Yukon

Clopyralid

Clopyralid is the active ingredient in Stinger. It is used in crop and brush control situations. While not as subject to vapor drift it can have particle drift and it does have more residual with the potential to carry over into the next year's growing season.

Products that contain clopyralid include:

Accent Gold WDG	Hornet WDG
Accent Gold	Lontrel
Battleship	Millenium Ultra
Broadstrike Plus	Millenium Ultra Plus
Chaser Ultra	Momentum
Clopyr Ag	Reclaim
Confront	Redeem R&P
Cool Power	Stinger
Curtail	Transline
Curtail M	Tru Power

Picloram

Picloram is the active ingredient in Tordon. Typically this product is used in range and pasture weed control situations. This product also can have particle drift plus it has long soil residual activity resulting in carry over.

Products that contain picloram include:

Grazon P+D	Tordon RTU
Pathway	Tordon K
Tordon 22K	

Glyphosate Comparison Table

The development of a large number of glyphosate products has led to confusion concerning active ingredient formulation, surfactants and use rates for herbicides labeled for Roundup Ready[®] corn and soybean in Nebraska. The products listed in this table are current at the time of printing.

Brand Name	Distributor	Active Ingredient Salt*	Concentration		Equivalent Rates to Roundup Ultra***		Surfactant	Registered for use in	
			Salt**	Acid Equivalent***	1 pint	1 quart		RR soybeans	RR corn
			4.00 lbs / gal 4.00						
Clearout 41 Plus	CPT-LLC	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
Cornerstone	Agrilliance	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Credit Duo	NuFarm	IPA + MA	3.64 + 0.33	2.7 + 0.30	16 fl oz	32 fl oz	May be added	Yes	Yes
Credit Extra	NuFarm	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	No
Credit systemic	NuFarm	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	No
Debit TMF	NuFarm	IPA	4	3	16 fl oz	32 fl oz	Required	Yes	No
Gly-4	UCPA	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Gly-4 plus	UCPA	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
Gly Star	Albaugh	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Gly Star Plus	Albaugh	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
GlyFlo	Microflo	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	No
Glyfos	Cheminova	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Glyfos Xtra	Cheminova	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
Glyphomax	Dow	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Glyphomax Plus	Dow	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
Glyphosate Original	Griffin	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	No
Roundup Original	Monsanto	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Roundup Ultra	Monsanto	IPA	4	3	16 fl oz	32 fl oz	Not required	Yes	Yes
Roundup UltraDry	Monsanto	MA	71.40%	65%	9 wt oz	18 wt oz	May be added	Yes	Yes
Roundup UltraMax	Monsanto	IPA	5	3.7	13 fl oz	26 fl oz	Not required	Yes	Yes
Roundup WeatherMax	Monsanto	KSG	5.5	4.5	11 fl oz	22 fl oz	Not required	Yes	Yes
Silhouette	Agrilliance	IPA	4	3	16 fl oz	32 fl oz	May be added	Yes	Yes
Touchdown 5	Syngenta	TMS	5	3.4	14 fl oz	28 fl oz	May be added	Yes	No
Touchdown	Syngenta	DA	3.75	3	16 fl oz	32 fl oz	May be added	Yes	Yes

The following combination products are registered on Roundup Ready crops and contain the IPA* salt of glyphosate.

Brand Name	Distributor	Active Ingredients	Use
Backdraft	BASF	Imazaquin + IPA glyphosate	RR soybeans
Extreme	BASF	Imazethapyr + IPA glyphosate	RR soybeans
RoundupMaster ATZ	Monsanto	Atrazine + IPA glyphosate	RR corn
Ready Master ATZ	Monsanto	Atrazine + IPA glyphosate	RR corn
Field Master	Monsanto	Atrazine + Acetochlor + IPA glyphosate	RR corn

* Glyphosate may be formulated into several salts as a herbicide: IPA= Isopropylamine, MA = Monoammonium, DA = Diammonium, TMS, Trimethylsulfonium, KSG = Potassium salt of glyphosate.

** The concentration of glyphosate can be expressed two ways: salt and acid equivalent. The actual salt formulation for Roundup Ultra is 4lbs/gal but it only contains 3 lbs of glyphosate acid thus giving use to the acid equivalent of 3 lbs per gallon. Similarly Touchdown Pro contains 3.7 lbs of diammonium salt while it only contains 3 lbs of glyphosate acid per gallon.

*** Rates are equivalent to the normal use rates of Roundup Ultra in Roundup Ready corn and soybeans: 1 pint = 16 oz; 1 quart = 32 oz.

COMBINATION HERBICIDES

<i>Trade name manufacturer</i>	<i>Equivalent amount (active ingredient) contained in 1 gal. or 1 lb. of product</i>	<i>If you apply (per acre) ...</i>	<i>Then the equivalent product rates are:^{1,2}</i>
Accent Gold WDG 78.1% DuPont	0.054 lb nicosulfuron 0.054 lb rimsulfuron 0.514 lb clopyralid 0.159 lb flumetsulam	3.5 oz	0.25 oz Accent 75DF 0.19 oz ai rimsulfuron 3.0 oz Hornet WG
Axiom 68 DF Bayer	0.54 lb flufenacet 0.14 lb metribuzin	19 oz	17.1 oz Define 60 DF 3.5 oz Sencor 75DF
Axiom AT 75DF Bayer	0.196 flufenacet 0.049 lb metribuzin 0.505 atrazine	3 lb	17 oz Axion DF 1.70 lb atrazine 90DF
Backdraft BASF	0.25 lb imazaquin 0.94 lb ae glyphosate	2.0 qt	2.9 oz Scepter 70DF 1.25 pt Roundup Ultra
Basis 75DF DuPont	0.50 lb rimsulfuron 0.25 lb thifensulfuron	0.33 oz	0.17 oz ai rimsulfuron 0.33 oz Pinnacle 25DF
Basis Gold 89.5DF DuPont	0.0134 lb rimsulfuron 0.0134 lb. nicosulfuron 0.868 lb atrazine	14 oz	0.19 oz ai rimsulfuron 0.25 oz Accent 75DF 13.5 oz atrazine 90DF
Betamix 1.3 EC Bayer	0.65 lb phenmedipham 0.65 lb desmedipham	2.0 pt	0.16 lb ai phenmedipham 1.0 pt Betanex 1.3E
Betamix Progress 1.8 EC Bayer	0.60 lb phenmedipham 0.60 lb desmedipham 0.60 lb ethofumesate	2.0 pt	0.15 lb ai phenmedipham 0.9 pt Betanex 1.3E 0.3 pt Nortron SC
Bicep II Magnum 5.5L Syngenta	2.4 lb s-metolachlor 3.1 lb atrazine	2.1 qt	1.3 pt Dual II Magnum 7.64EC 1.8 lb atrazine 90DF
Bicep Lite II Magnum 6L Syngenta	3.33 lb s-metolachlor 2.67 lb. atrazine	1.5 qt	1.3 pt Dual II Magnum 7.64EC 1.1 lb atrazine 90DF
Boundary 7.8E Syngenta	6.3 lb s-metolachlor 1.5 lb metribuzin	1.5 pt	1.2 pt Dual II Magnum 7.64EC .38 lb Sencor 75DF
Bronate 4E Bayer	2.0 lb bromoxynil 2.0 lb MCPA	1.0 pt	1.0 pt Buctril 2EC 1.0 pt MCPA 2EC
Buctril + Atrazine 3L Aventis	1.0 lb bromoxynil 2.0 lb atrazine	2 pt	1.0 pt Buctril 2EC .56 lb atrazine 90DF
Bullet 4ME Monsanto	2.5 lb alachlor 1.5 lb atrazine	4 qt	2.5 qt Micro-Tech 4ME 1.7 lb atrazine 90DF
Camix Syngenta	3.34 lb s-metolachlor 0.33 lb mesotrione	2 qt/A	1.75 pt Dual II Magnum 5.3 fl oz Callisto
Canopy 75DF DuPont	0.64 lb metribuzin 0.11 lb chlorimuron	6 oz	5.1 oz Sencor 75DF 2.6 oz Classic 25DF
Canopy XL 56.3DF DuPont	0.469 lb sulfentrazone 0.094 chlorimuron	6.8 oz	4.2 oz Authority 75DF 2.6 oz Classic 25DF
Celebrity Plus 70DF BASF	0.42 lb ae dicamba 0.17 lb diflufenzopyr 0.106 lb nicosulfuron	4.7 oz	4.0 oz Distinct 0.66 oz Accent 75DF
Commence 5.25E Dow/FMC	3.0 lb trifluralin 2.25 lb clomazone	2.0 pt	1.5 pt Treflan 1.1 pt Command 4E
Conclude B & G BASF	B=2.67 lb bentazon + 1.33 lb acifluorfen G=1.5 lb sethoxydim	1.5 pt + 1.5 pt	1.5 pt Storm 4S + 1.5 pt Poast 1.5SC
Contour 3.38SC BASF	3.0 lb atrazine 0.38 lb imazethapyr	1.33 pt	0.55 lb atrazine 90DF 1.44 oz Pursuit 70DG
Crossbow 3E Dow AgroSciences	1.0 lb ae triclopyr 2.0 lb ae 2,4-D ester	1.0 gal	1.0 qt Garlon 4 2.9 qt 2,4-D 4E
Curtail 2.38E Dow AgroSciences	2.0 lb ae 2,4-D amine 0.38 ae clopyralid	2.0 pt	1.0 pt 2,4-D amine 4SC .25 pt Stinger 3C
Degree Xtra 4.04L Monsanto	2.7 lb acetochlor ME 1.34 lb atrazine	3.5qt	2.5 qt Degree 1.3 lb atrazine 90DF

COMBINATION HERBICIDES (continued)

<i>Trade name manufacturer</i>	<i>Equivalent amount (active ingredient) contained in 1 gal. or 1 lb. of product</i>	<i>If you apply (per acre) ...</i>	<i>Then the equivalent product rates are.^{1,2}</i>
Detail 4.1E BASF	3.6 lbs dimethenamid 0.5 lb imazaquin	2.0 pt	1.2 pt Frontier 6E 2.9 oz Scepter 70DG
Distinct 70 WDG Bayer	0.2 lb diflufenzopyr 0.5 lb dicamba	6 oz	1.2 oz ai diflufenzopyr 6.0 fl oz Clarity 4S
Domain 60 WDG Bayer	0.36 lb metribuzin 0.24 lb flufenacet	10 oz	4.8 oz Sencor 75DF 4.0 oz Define 60 DF
Double Play Zeneca	1.4 lb acetochlor 5.6 lb EPTC	5 pt	1.1 pt Surpass 6.4EC 4.2 pt Eradicane 6.7EC
DPX-79406 75DF DuPont	.375 micosulfuron .375 rimsulfuron	0.50 oz	.25 oz Accent 75DF .19 oz ai rimsulfuron
Epic 58 WDG Bayer	0.48 lb flufenacet 0.10 lb isoxaflutole	12 oz	9.7 oz Define 60 DF 1.6 oz Balance 75WDG
Exceed 57WG Syngenta	0.285 lb primisulfuron 0.285 lb prosulfuron	1 oz	0.38 oz Beacon 75WG 0.50 oz Peak 57WG
Extrazine II 90DF DuPont	0.225 lb atrazine 0.675 lb cyanazine	1.5 lb	0.38 lb atrazine 90DF 1.1 lb Bladex 90DF
Extreme 1.67L BASF	0.17 lb imazethapyr 1.5 lb ae glyphosate	3.0 pt	1.44 oz Pursuit 70DG 1.5 pt Roundup Ultra
Fallow Master 1.6L Monsanto	1.1 lb ae glyphosate 0.50 lb dicamba	2.0 qt	1.5 pt Roundup Ultra 0.50 pt Clarity 4S
Field Master 4.06L Monsanto	2.0 lb acetochlor 1.5 lb atrazine 0.56 lb ae glyphosate	4 qt	2.3 pt Harness 7EC 1.7 lb atrazine 90DF 1.5 pt Roundup Ultra
Finesse 75 WG DuPont	0.625 lb chlorsulfuron 0.125 lb metsulfuron	0.3 oz	0.25 oz Glean 75DF 0.063 oz Ally 60DF
Frontrow (copack) Dow AgroSciences	0.84 lb chloransulam 0.80 lb flumetsulam	0.30 oz + 0.12 oz	0.30 oz First Rate + 0.12 oz Python
FullTime Dow AgroSciences	2.4 lb acetochlor 1.6 lb atrazine	3 qt	2.2 qt TopNotch 3.2CS 1.25 lb atrazine 90DF
Fusion 2.66E Syngenta	2.0 lb fluazifop-P 0.66 lb fenoxaprop	6 fl oz	6.0 oz Fusilade DX 2.0E 6.0 oz Option II
G-Max Lite BASF	2.25 lb dimethamid-p 2.75 lb atrazine	3 pt/A	18 fl oz Outlook 1.15 lb atrazine 90 DF
Galaxy 3.67 E BASF	3.0 lb bentazon 0.67 lb acifluorfen	2 pt	1.5 pt Basagran 4SC 0.67 pt Blazer 2SC
Gauntlet (copack) FMC	0.75 lb sulfentrazone 0.84 lb chloransulam methyl	5.33 oz + 0.60 oz	5.33 oz Authority 0.60 oz FirstRate
Grazon P+D Dow AgroSciences	0.54 lb ae picloram 2.0 lb 2,4-D	2 pt	0.50 pt Tordon 22K 1.0 pt 2,4-D amine 4SC
Guardsman 5L BASF	2.33 lb dimethenamid 2.67 lb atrazine	4 pt	25 oz Frontier 6EC 1.4 lb atrazine 90DF
Guardsman Max BASF	1.7 lb dimethenamid-P 3.3 lb atrazine	3.4 pt/A	15 oz Outlook 1.6 lb atrazine
Harmony Extra DuPont	0.50 lb thifensulfuron 0.25 lb tribenuron	0.4 oz	.27 oz Pinnacle 75DF .13 oz Express 75DF
Harness Xtra 5.6L Monsanto	3.1 lb acetochlor 2.5 lb atrazine	2.3 qt	2.0 pt Harness 7E 1.6 lb atrazine 90DF
Harness Xtra 6L Monsanto	4.3 lb acetochlor 1.7 lb atrazine	2.3 qt	2.8 pt Harness 7EC 1.1 lb atrazine 90DF
Hornet WDG Dow AgroSciences	0.185 lb flumetsulam 0.50 lb clopyralid	4 oz	0.93 oz Python 80WG 5.3 fl oz Stinger 3C
Keystone Dow Agrosience	3.0 lb acetochlor 2.25 lb atrazine	2.6 qt/A	2.44 pt Surpass EC 1.62 lb atrazine 90 DF
Laddok S-12 5L BASF	2.5 lb bentazon 2.5 lb atrazine	1.6 pt	1.0 pt Basagran 4SC 1.1 lb atrazine 90DF

COMBINATION HERBICIDES (continued)

<i>Trade name manufacturer</i>	<i>Equivalent amount (active ingredient) contained in 1 gal. or 1 lb. of product</i>	<i>If you apply (per acre) ...</i>	<i>Then the equivalent product rates are.^{1,2}</i>
Landmaster BW Monsanto	0.9 lb ae glyphosate 1.5 lb 2,4-D	40 fl oz	12 oz Roundup Ultra 15 oz 2,4-D 4E
Lariat 4F Monsanto	2.5 lb alachlor 1.5 lb atrazine	3.2 pt	2.0 pt Lasso 4E 1.3 lb atrazine 90DF
LeadOff 5L DuPont	2.33 lb dimethenamid 2.67 lb atrazine	4.0 pt	25 oz Frontier 6EC 1.4 lb atrazine 90DF
Liberty ATZ 4.3L Bayer	1.0 lb glufosinate 3.3 lb atrazine	40 fl oz	24 fl oz Liberty 1.67 1.1 lb atrazine 90DF
Lightning 70DG BASF	0.525 imazethapyr 0.175 imazapyr	1.28 oz	0.96 oz Pursuit 70DG 0.90 fl oz Arsenal 2E
Lumax Syngenta	2.68 lb s-metolachlor 0.268 lb mesotrione 1.0 lb atrazine	2.5 qt/A	1.75 pt Dual II Magnum 5.4 fl oz Callisto 0.69 lb atrazine 90 DF
Manifest B&G (copack) BASF	B=(3.0 lb bentazon + 0.67 lb acifluorfen) G=1.5 lb sethoxydim	2 pt + 1.5 pt	2 pt Galaxy 3.67SC + 1.5 pt Poast 1.5SC
Marksman 3.2L BASF	1.1 lb dicamba 2.1 lb. atrazine	3.5 pt	0.50 pt Banvel 4SC 1.0 lb atrazine 90DF
Northstar 47.4WG Syngenta	0.075 lb primisulfuron 0.40 lb dicamba	5 oz	0.50 oz Beacon 75WG 4.0 fl oz Banvel 4SC
OpTill 6EC BASF	5.0 lb dimethenamid 1.0 lb dicamba	38 fl oz	32 fl oz Frontier 6EC 9.5 fl oz Banvel 4SC
Pursuit Plus 2.9EC BASF	2.7 lb pendimethalin 0.2 lb imazethapyr	2.5 pt	2.0 pt Prowl 3.3EC 4 fl oz Pursuit 2SC
Ready Master ATZ Monsanto	2.0 lb atrazine 1.5 lb glyphosate	4.0 qt	2.2 lb atrazine 90DF 2.0 pt Roundup Ultra
Redeem R&P 3L Dow Agroscience	2.25 triclopyr 0.75 clopyralid	2.0 pt	1.5 pt Garlon 3A 0.5 pt Stinger 3L
Rezult B&G (copack) BASF	B=5.0 lb bentazon G=1.0 lb sethoxydim	1.6 pt 1.6 pt	2.0 pt Basagran 4SC 1.6 pt Poast Plus 1SC
Shotgun 3.25L UAP	2.25 lb atrazine 1.0 lb 2,4-D	2 pt	0.62 lb atrazine 90DF 0.53 pt 2,4-D ester
Spirit 57WDG Syngenta	0.428 lb primisulfuron 0.142 lb prosulfuron	1 oz	0.59 oz Beacon 75WG 0.25 oz Peak 57WG
Squadron 2.33 EC BASF	2.0 lb pendimethalin 0.33 lb imazaquin	3.0 pt	1.8 pt Prowl 3.3EC 2.8 oz Scepter 70DG
Starane + Salvo Dow AgroSciences	0.75 lb fluroxypyr 3.0 lb 2,4-D ester	1.0 pt	0.5 pt Starane 0.6 pt Salvo
Starane + Saber Dow AgroSciences	0.51 lb fluroxypyr 2.5 lb 2,4-D amine	1.5 pt	0.5 pt Starane 0.9 pt 2,4-D amine 4SC
Steadfast 75DF DuPont	0.50 nicosulfuron 0.25 rimsulfuron	0.75 oz	0.50 Accent 75DF 0.19 oz ai rimsulfuron
Steel 2.59EC BASF	0.17 lb imazaquin 0.17 lb imazethapyr 2.25 lb pendimethalin	3.0 pt	1.44 oz Scepter 70 DG 1.44 oz Pursuit 70DG 2.00 pt Prowl 3.3EC
Stellar 3.1EC Valent	0.7 lb flumiclorac 2.4 lb lactofen	5 fl oz	4.0 fl oz Resource 0.86EC 6.0 fl oz Cobra 2EC
Storm 4SC BASF	2.67 lb bentazon 1.33 lb acifluorfen	1.5 pt	1.0 pt Basagran 4SC 1.0 pt Blazer 2SC
Synchrony STS 42DF DuPont	0.318 lb chlorimuron 0.102 lb thifensulfuron	0.5 oz	0.64 oz Classic 25DF 0.20 oz Pinnacle 25DF
Tri-Scept 3E BASF	2.57 lb trifluralin 0.43 lb imazaquin	2.3 pt	1.5 pt Treflan 2.9 oz Scepter 70DG
Typhoon 1.41EC Syngenta	0.47 lb fluzifop-P 0.94 lb fomesafen	3.2 pt	0.75 pt Fusilade DX 2.0E 1.6 pt Flexstar 1.88E
Weedmaster 3.87SC BASF	1.0 lb dicamba 2.87 lb 2,4-D amine	2.0 pt	0.5 pt Banvel 4SC 1.4 pt 2,4-D amine 4SC
Yukon Monsanto	0.125 lb halosulfuron-methyl 0.55 lb dicamba (sodium salt)	6 oz/A	1.0 oz Permit 7.2 fl oz Banvel

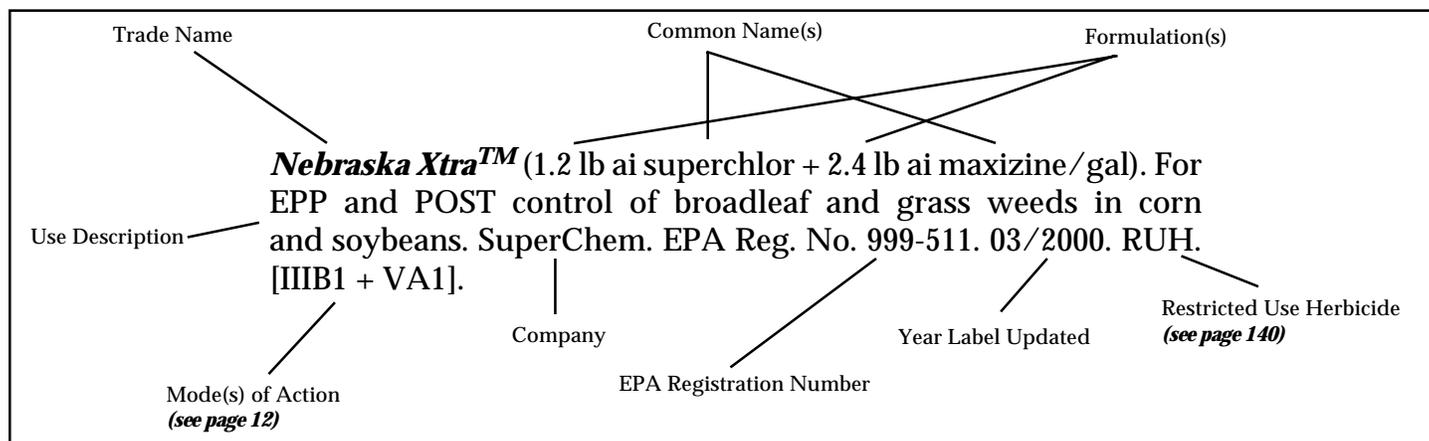
¹ai = active ingredient

ae = acid equivalent

²Active ingredients will match but formulations may differ in the single ingredient products.

Herbicide Dictionary

This section gives the trade name, common name, formulation, use description, company, EPA registration number, year label updated, whether the herbicide is a restricted use herbicide and classification for herbicide family, mode of action, and herbicide resistance group of herbicides commonly used in Nebraska. Restricted use herbicides are listed as RUH. For more information on family, mode of action, or herbicide resistance group see pages 12-13. Read and follow label information before using. Below is an example of a herbicide entry and a breakdown of the information provided in each entry.



AAtrexÆ (atrazine 64 lb ai/gal or 90% DF). Used for weed control in corn, sorghum, fallow, and CRP. Syngenta. EPA Reg. No. 100-497 or 100-585. 06/2001 or 09/2001. RUH. [VA1].

AccentÆ Gold™ (6.5% nicosulfuron + 6.5% rimsulfuron + 19.1% flumetsulam + 51.7% clopyralid). Used POST for broadleaf and grass weed control in field corn. DuPont. EPA Reg. No. 352-593. 05/1998. [IIA2 + IIA2 + IIA3 + IVA3].

Accent GoldÆ WDG (5.4% nicosulfuron + 3.4% rimsulfuron + 15.9% flumetsulam + 51.4% clopyralid). Used POST for broadleaf and grass weed control in field corn. DuPont. EPA Reg. No. 352-612. 07/2002. [IIA2 + IIA2 + IIA3 + IVA3].

AccentÆ Herbicide (nicosulfuron-75% DF). POST grass control in corn. DuPont. EPA Reg. No. 352-560. 09/1999. [IIA2].

AcclaimÆ Extra (fenoxaprop-ethyl-0.57 lb ai/gal). For selective POST grass in turf grass and ornamentals. Bayer. EPA Reg. No. 432-950. 04/2000. [IA1].

AccordÆ Concentrate (isopropylamine salt of glyphosate 64 lb ae/gal or 5 lb ai/gal). For control of woody brush, trees, and herbaceous weeds in utility right-of-way, and aquatic weed control. Dow AgroSci. EPA Reg. No. 62719-324. 10/2002. [IIB1].

AccordÆ SP (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). For control of woody brush, trees, and herbaceous weeds in utility right-of-way. Dow AgroSci. EPA Reg. No. 62719-322. 06/2002. [IIB2].

Acetochlor An active ingredient in Degree, Degree Xtra, Double Play, FulTime, Harness, Harness Extra, Harness Extra 5.6L, Keystone, Ready Master Grass, Ready Master Complete, Roundup Master Grass, Roundup Master Complete, Surpass, TopHand, and Topnotch for annual grass control in corn. [IIB1].

AchieveÆ 40DG or SC (tralkoxydim 40DG or 3.33 ai lb/gal). Used POST for control of grass weeds in wheat and barley. Syngenta. EPA Reg. No. 100-1105 or 100-1130. 07/2001 or 01/2002. [IA2].

Acifluorfen An active ingredient in Blazer, Conclude B, Conclude Ultra, Conclude Xact, Field Master, Galaxy, Manifest B, Scepter O.T., Storm, and Ultra Blazer for broadleaf weed control in soybean. [VIA1].

Aim™ (carfentrazone-ethyl 60% w/w). For EPOST control of broadleaf weeds in field and seed corn, sweet corn, popcorn, silage, grain sorghum, soybean, barley, oat, and wheat. FMC. EPA Reg. No. 279-3194. 08/2001. [VIA3].

Aim™ EW (carbentrazone-ethyl 61.65 lb ai/gal). For EPOST control of broadleaf weeds in field and seed corn, sweet corn, popcorn, silage, grain sorghum, soybean, barley, oat, and wheat. FMC. EPA Reg. No. 279-3242. 01/2002. [VIA3].

AIM™ EC (carfentrazone-ethyl-2.0 lb ai/gal). For EPOST control of broadleaf weeds in field and seed corn, sweet corn, popcorn, silage, grain sorghum, soybean, barley, oat, and wheat. FMC. EPA Reg. No. 279-3241. 01/2002. [VIA3].

Alachlor An active ingredient in Freedom, Lariat, Lasso, Lasso II, Micro-Tech, and Partner for annual grass control in corn, sorghum, and soybean. RUH. [IIB1].

AlanapÆL (naptalam 62 lb ai/gal). A PRE or POST broadleaf and grass herbicide for cucurbit and nursery stock. UniRoyal. EPA Reg. No. 400-49. 08/2002. [IIID1].

AllyÆ or AllyÆ XP (metsulfuron 60% DF). Used PP, PRE, or POST in wheat, barley, grain sorghum, pastures, rangeland, CRP, and fallow for broadleaf and certain grass weed control. DuPont. EPA Reg. No. 352-435. 07/2002. [IIA2].

AllyÆ Extra (metsulfuron 61.5% + thifensulfuron methyl 63.75% + tribenuron methyl-18.75% by wt). Used POST in wheat, barley, and fallow for broadleaf weed control. DuPont. EPA Reg. No. 352-610. 05/2001. [IIA2 + IIA2 + IIA2].

AmberÆ Custom Pak™ (triasulfuron 67.5% WDG). A PRE or POST herbicide for broadleaf weed control in wheat, barley, pastures, rangeland, CRP, and fallow. Syngenta. EPA Reg. No. 100-768. 02/2002. [IIA2].

Herbicide Dictionary

(continued)

Amber[®] Accu-Pak[®] (triasulfuron 67.5% WDG). A PRE or POST herbicide for broadleaf weed control in wheat, barley, pastures, rangeland, CRP, and fallow. Syngenta. EPA Reg. No. 100-701. 06/1999. [IIA2].

Ametryn Active ingredient in Evik. Used for directed POST weed control in corn and nonselective weed control in noncrop areas. [VA1].

Amine 4 2,4-D (2,4-D amine 63.74 lb ae/gal). Used for selective broadleaf weed control in corn, sorghum, small grains, and lawns. UAP. EPA Reg. No. 34704-120. 10/2001. [IVA1].

Amplify[™] (cloransulam-methyl 0.84 lb ai/gal). For PP or PRE broadleaf weed control in soybean. Monsanto. EPA Reg. No. 62719-275-524. 03/2001. [IIA3].

Aquamaster[™] (glyphosate 4 lb ae or 4.5 lb ai/gal). For use in aquatic sites. Monsanto. EPA Reg. No. 524-343. 01/2000. [IIB1].

Aqua Neat[™] (glyphosate 4 lb ae or 5 lb ai/gal). For use on emerged aquatic weeds and brush in aquatic and other noncrop sites. Riverdale. EPA Reg. No. 228-365-4581. 09/2002. [IIB1].

Aquathol[®] EG or K (endothall 10% G or 4.3 lb ai/gal). An aquatic herbicide for use in still water. Cerexagri. EPA Reg. No. 4581-201 or 4581-204. 10/2000. [VIII].

Aquathol[®] Super K (endothall 63% G). An aquatic herbicide for use in still water. Cerexagri. EPA Reg. No. 581-388. 11/2000. [VIII].

Arsenal[®] (imazapyr 2 or 4 lb ai/gal). Provides total vegetation control for noncrop areas. BASF. EPA Reg. No. 241-346 or 299. 04/2000. [IIA1].

Assert[®] (imazamethabenz 2.5 lb ai/gal). POST control of wildoat and wild buckwheat in spring wheat and barley. BASF. EPA Reg. No. 241-285. 10/2000 [IIA1].

Assure[®] II (quizalofop 0.88 lb ai/gal). A POST grass herbicide for use in canola, dry bean, snapbean, soybean, and sugarbeet. DuPont. EPA Reg. No. 352-541. 02/1999. [IA1].

Asulam Active ingredient in Asulox, Asulam 3.3. [IIIA3].

Asulox[®] or Asulam 3.3 (asulam 3.34 lb/gal). For POST weed control in turf, ornamentals, Christmas trees, and noncrop areas. Bayer. EPA Reg. No. 264-447 or Agrilience 9779-342. [IIIA3]. Not registered in Nebraska.

Atrazine A PP, PRE, and POST s-triazine for control of broadleaf and certain grass weeds in corn, sorghum, ecofallow, and CRP. Active ingredient in Atrazine 4L, Axiom AT, Basis Gold, Bicep Magnum, Bicep II, Bicep II Magnum, Bicep Lite II, Bromazine, Buctril + Atrazine, Bullet, Contour, Cy-Pro AT, Degree Xtra, Dicambazine, Expert, Extrazine, FulTime, Field Master, G-Max Lite, Guardsman, Harness Xtra, Harness Xtra 5.6, Keystone, Laddok S-12, Lariat, LeadOff, Liberty ATZ, Lumax, Marksman, Moxy + Atrazine, Ramrod + atrazine, Ready Master ATZ, Roundup Master ATZ, Roundup Master Complete, and Shotgun. RUH. [VA1].

Atrazine 4F AgriStar EPA Reg. No. 42750-45. 02/2000.

Atrazine 4L (atrazine 4 lb ai/gal). For season-long weed control in corn and sorghum. Used for weed control in CRP and control of certain annual grasses in perennial grass roadways. Agrilience. EPA Reg. No. 1381-158. 01/2000. RUH. [VA1]. Other companies also have atrazine 4L or 90 DF formulations.

Atrazine 4L (atrazine 4 lb ai/gal).

Atrazine 90 WDG (atrazine 90% ai). UPP. EPA Reg. No. 3474-622. AgriStar. EPA Reg. No. 42750-53. 10/1999. RUH. [VA1].

Authority[®] Herbicide (sulfentrazone 67.5% DF). For selective PRE weed control in soybean. Increased control of black nightshade and pigweed. DuPont. EPA Reg. No. 352-590. 11/1999. [VIA3].

Authority[™] Broadleaf (46.9% sulfentrazone + 9.4% chlorimuron -56.3%). For PRE broadleaf control in soybean. FMC. EPA Reg. No. 279-3179. 01/1998. [VIA3 + IIA2].

Avalanche[™] Bulk Pac (carfentrazone 1.9 lb ai/gal). For POST broadleaf control in field, sweet, seed, popcorn, and silage; grain sorghum, soybean, wheat, barley, and oat. Agrilience. EPA Reg. No. 279-3242-1381. 03/2002. [VIA3].

Avast[™] (fluridone 4 lb ai/gal). For control of aquatic weeds. Griffin. EPA Reg. No. 1812-435. 04/2000. [VIIA4].

Avenger (difenzoquat 2 lb ai/gal). Controls wildoat, but not annual bromes POST in spring small grains. BASF. EPA Reg. No. 241-266. 08/2000. [VIII].

Axiom[™] DF Herbicide (54.4% flufenacet + 13.6% metribuzin). For PP, PPI, or PRE broadleaf and grass weed control in field corn, silage corn, and soybean. Bayer. EPA Reg. No. 3125-488. 12/2000. [IIB2 + VA2].

Azofenidin Active ingredient in Milestone. [VIA3].

Backdraft[™] (0.25 lb ae imazaquin + 1.25 ai glyphosate 3 lb/gal). Used POST for weed control before planting soybean or POST in RR soybean. BASF. EPA Reg. No. 241-407. 03/2001. [IIA1 + IIB1].

Backdraft[™] SL (0.15 lb ae imazaquin + 1.20 lb glyphosate). Used POST for weed control in RR soybean. BASF. EPA Reg. No. 241-415. 07/2001. [IIA1 + IIB1].

Balan[™] DF (benfluralin 60% DF). A PPI herbicide for annual grass control in alfalfa. UAP. EPA Reg. No. 34704-746. 09/2001 [IIIA1].

Balan[™] 2.5G (benfluralin 2.5% ai) PRE control of annual grasses in lawns and golf courses. United Horticultural Supply. EPA Reg. No. 62719-96-65783. 09/2001 [IIIA1].

Balance[®] Pro (isoxaflutole 4 lb ai/gal). For selective PP and PRE control of grass and broadleaf weeds in field corn. Bayer. EPA Reg. No. 264-600. RUH. 11/2001. [VIIB1].

Banvel[®] (dimethylamineyl salt of dicamba 4 lb ae/gal). A POST and PRE herbicide for selective broadleaf weed control in corn, sorghum, small grains, and perennial grass. Micro Flo. EPA Reg. No. 51036-289. 07/2001. [IVA2].

Banvel[®] SGF[®] (dicamba 2 lb ae/gal). For weed control in small grain and fallow. BASF; Micro Flo. EPA Reg. No. 7969-135 or 51036-290. 01/2000. [IVA2].

Herbicide Dictionary

(continued)

Barrage[®] HF (2-ethylhexyl ester of 2,4-D[®] 4.7 lb ae/gal). For broadleaf weed control in pastures, grassland, rangeland, fallow; PP, PRE, or POST in corn; grain and forage sorghum, wheat and oat. Helena. EPA Reg. No. 5905-529. 01/2002. [IVA2].

Barricade[®] (prodiamine 65WG or 4FL). A PRE herbicide for residual control of annual grass and broadleaf weeds in established turf grasses, lawns, sod nurseries, and landscape ornamentals. Syngenta. EPA Reg. No. 100-834 or 100-1139. 06/2001. [IIIA1].

Basagran[®] (bentazon[®] 4 lb ai/gal). A POST dry edible bean, corn, sorghum, and soybean herbicide for control of velvetleaf, cocklebur, and other broadleaf weeds under 6 inches. BASF; Micro Flo. EPA Reg. No. 7969-45, 7969-51036. 04/2000; 12/2000. [VC1].

Basagran[®] T/O (bentazon[®] 4 lb ai/gal). POST broadleaf weed control in established turf. TopPro or Micro Flo. EPA Reg. No. 7969-51036. 07/2002. [VCI].

Basis[®] (50% rimsulfuron + 25% thifensulfuron[®] 75% WDG). A POST herbicide for selective broadleaf and grass control in corn. DuPont. EPA Reg. No. 352-571. 08/2001. [IIA2 + IIA2].

Basis Gold[®] (1.34% rimsulfuron + 1.34% nicosulfuron + 82.4% atrazine WSG). Used POST for broadleaf and grass weed control in corn. EPA Reg. No. 352-585. DuPont. 04/2001. RUH. [IIA2 + IIA2 + VA1].

Beacon[®] (primisulfuron[®] 75% WDG). POST grass and broadleaf weed control in field, silage, seed, and popcorn. Syngenta. EPA Reg. No. 100-705. 03/2002. [IIA2].

Benfluralin Active ingredient in Balan DF, Balan 2.5G, and Team Pro for weed control in seedling alfalfa, turf, and landscape ornamentals. [IIIA1].

Benoxacor Safener to protect corn and sorghum from injury. Found in Dual Magnum products.

Bensulfuron Active ingredient in Londax.

Bensulide Active ingredient in Betasan and Prefar 4-E for weed control in melons. [IIIC2].

Bentazon An active ingredient in Basagran, Basagran T/O, Conclude B, Conclude Ultra, Conclude Xact, Fortune, Galaxy, Laddok S-12, Manifest, Rezult, and Storm for broadleaf weed control in corn, sorghum, and soybean. [VC1].

Betamix[®] Herbicide (0.65 lb phenmedipham + 0.65 desmedipham[®] 1.3 lb ai/gal). For POST broadleaf weed control in sugarbeet. Bayer. EPA Reg. No. 264-621. 08/2000. [VA3 + VA3].

Betasan[®] 4-E Turf Herbicide (bebsulide[®] 4 lb ai/gal). Used for PRE control of crabgrass and annual bluegrass in turf, ornamentals, and ground cover. United Horticultural Supply. EPA Reg. No. 34704-211-65783. 10/1999. [IIIC2].

Betanex[®] (desmedipham[®] 1.3 lb ai/gal). Used POST for redroot pigweed control in sugarbeet. Bayer. EPA Reg. No. 264-620. 08/2000. [VA3].

Beyond[™] (imazamox[®] 1 lb ai/gal). Used POST to control downy brome in Clearfield winter wheat varieties. BASF. EPA Reg. No. 241-00379. 04/2001. [IIA2].

Bicep II Magnum[®] FC (2.4 lb s-metolachlor + 3.1 lb atrazine + benoxacor[®] 5.5 lb ai/gal). For PRE broadleaf and grass weed control in corn and forage and grain sorghum treated with seed safener. Syngenta. EPA Reg. No. 100-817. 09/2002. RUH. [IIIB1 + VA1].

Bicep Lite II Magnum[®] (3.33 lb s-metolachlor + 2.67 atrazine[®] 6 lb ai/gal). For PRE broadleaf and grass weed control in corn and grain and forage sorghum treated with seed safener. Syngenta. EPA Reg. No. 100-827. 09/2002. RUH. [IIIB1 + VA1].

Bicep Magnum TR[®] (2.5 lb ai s-metolachlor + 2.0 lb ai atrazine + 0.09 lb ai flumetsulan[®] 4.59 lb ai/gal). A PP, PRE, or early POST herbicide for field corn. Syngenta. EPA Reg. No. 100-928. 02/2001. RUH. [IIIB2 + VAI + IIA3].

Bison[™] (2 lb ai bromoxynil + 2 lb ae/gal MCPA). Used to control broadleaf weed in small grain. Agrilience. EPA Reg. No. 9779-347. 06/2001. [VC2 + IVA1].

Bladex[®] (cyanazine[®] 64 lb/gal or 90% DF). A short residual triazine for grass and broadleaf weed control in corn. DuPont. EPA Reg. No. 352-470 or 352-495. 07/1996. RUH. [VA1]. Cancelled 12/31/02.

Blazer and Ultra Blazer (acifluorfen[®] 2 lb ai/gal). A POST herbicide for broadleaf weed control in soybean. Ultra has less leaf burn. BASF. EPA Reg. No. 7969-79. 04/1999. [VIA1].

Boa[™] Herbicide (paraquat[®] 2.5 lb ai/gal). A contact herbicide and desiccant. Griffin. EPA Reg. No. 1812-420. RUH. 07/2000. [VIB1].

Boundary[®] (s-metolachlor 6.3 lb + metribuzin 1.5 lb ai/gal). For weed control in soybean. Syngenta. EPA Reg. No. 100-958. 01/2000. [IIIB1 + VA2].

Brash[™] (dimethyl salt of dicamba ñ 1 lb ai + 2.87 lb ae/gal of 2,4-D dimethylamine). For CRP, fallow systems, sorghum, rangeland, pastures, and wheat. Agrilience. EPA Reg. No. 51036-308-9779. 10/2001. [IVA2 + IVA1].

Broadstrike SF + Dual[®] (0.20 lb flumetsulam + 7.47 lb metolachlor[®] 6.77 lb ai/gal). Used PPI, PP, or PRE for broadleaf and grass control in corn and soybean. Syngenta. EPA Reg. No. 62719-239. 02/1997 [IIA3 + IIIB1].

Broclean[®] (bromoxynil[®] 2 lb ai/gal EC). A contact herbicide for broadleaf weed control in alfalfa, corn, sorghum, and small grains. Platte Chemical Co. EPA Reg. No. 51036-256. 12/1999. [VC2].

Bromacil Active ingredient in Hyvar X, Hyvar X-L, Krovar I DF, and Rhino. [VA4].

Bromazine (1 lb bromoxynil + 2 lb atrazine[®] 3 lb ai/gal). For POST broadleaf weed control in corn and grain sorghum. Agrilience; EPA Reg. No. 51036-256-68119. 07/1999. RUH. [VC2 + VA1].

Bromoxynil An active ingredient in Broclean, Bromazine, Bronate, Bronate Advanced, Bucril, Bucril Gel, Bucril + atrazine, Connect 20 WSP, Moxy 2E, and Starane + Broclean. [VC2].

Bronate[®] Herbicide (2 lb ai bromoxynil + 2 lb ae/gal MCPA[®] 4 lb/gal). Used to control broadleaf weeds in small grain. Bayer. EPA Reg. No. 264-438. 02/1998. [VC2 + IVA1].

Herbicide Dictionary

(continued)

Bronate AdvancedTM (2.5 ai bromoxynil + 2.5 lb ae MCPA). For broadleaf weed control in small grain. Bayer. EPA Reg. No. 264-690. 11/2002. [VC2 + IVA1].

Buckle^{AE} (10% triallate + 3% trifluralin G). For control of wildoat and green foxtail in barley and green and field peas; and in fall preplant for winter wheat to suppress downy brome. Monsanto. EPA Reg. No. 524-375. 01/2001. [IIIC3 + IIIA1].

Buctril^{AE} or Buctril^{AE} 4EC (bromoxynil 6.2 and 4 lb ai/gal EC). A contact herbicide for broadleaf weed control in alfalfa, corn, sorghum, and small grains. Bayer. EPA Reg. No. 264-437 or 264-540. 06/1998 or 08/2000. [VC2].

Buctril^{AE} + Atrazine (1 lb ai bromoxynil + 2 lb ai atrazine 6.3.0 lb ai/gal). For POST broadleaf weed control in corn and grain sorghum. Bayer. EPA Reg. No. 264-477. 11/2000. RUH. [VC2 + VA1].

Bullet^{AE} (2.5 lb ai alachlor + 1.5 lb ai atrazine 6.4 lb ai/gal). Used PRE or PPI to control broadleaf and grass weeds in all types of corn and grain sorghum. Monsanto. EPA Reg. No. 524-418. 01/2002. RUH. [IIIB1 + VA1].

Butoxone^{AE} 200 (2,4-DB 6.2 lb ae/gal). For control of seedling broadleaf weeds in alfalfa. Monterey. EPA Reg. No. 56077-26. 07/1999. [IVA1].

Butoxone^{AE} 7500 (2,4-DB 6.75 lb ae/gal). For controlling seedling broadleaf weeds in alfalfa. Monterey. EPA Reg. No. 56077-52. 07/1999. [IVA2].

Butylate Active ingredient in Sutan+. [IIIC3]. Has been discontinued.

Butyrac^{AE} 175 or 200 (2,4-DB 6.2.0 lb/gal). For selective control of cocklebur in soybean and small broadleaf weeds in alfalfa. Albaugh. EPA Reg. No. 42750-39 or 38. 10/1999 or 02/2000. [IVA1].

CallistoTM (mesotrione 6.4 lb ai/gal). Used PRE and POST for broadleaf weed control in field corn, production seed corn, and silage corn. Syngenta. EPA Reg. No. 100-1131. 01/2002. [VIIB2].

CamixTM (s-metolachlor 3.3 lb ai + mesotrione 0.33 lb ai/gal). For PRE control of annual broadleaf and grass weeds in seed corn, field corn, and corn grown for silage. Syngenta. EPA Reg. No. 100-1148. 07/2002. [IIB1 + VIIB1].

Campaign^{AE} (1.2 lb ai or 0.9 lb ae glyphosate + 1.9 ai or 1.5 ae lb/gal 2,4-D amine). For noncrop, rangeland, and industrial weed control. Monsanto. EPA Reg. No. 524-351. 09/2002. [IIIB1 + IVA1].

Canopy XL^{AE} (46.9% sulfentrazone + chlorimuron 9.4%). Used PRE for broadleaf and grass weed control in soybean. DuPont. EPA Reg. No. 352-589. 08/2001 [VIA3 + IIA2].

Carfentrazone Active ingredient in Aim, Affinity, Avalancer, and Teamwork. [VIA3].

Casoron^{AE} 4G (dichlobenil 6.4% G). For PRE weed control in woody plants and certain herbaceous perennials. Uniroyal. EPA Reg. No. 400-168. 08/2000. [IIIB2].

Celebrity^{AE} [69% dicamba + 7.5% nicosulfuron: Copack of Accent (Celebrity G) + Banvel (Celebrity B)] For POST weed control in field corn. BASF. EPA Reg. No. 7969-166. 04/1998. [IVA2 + IIA2].

Celebrity^{AE} Plus (42.4% dicamba + 17.0% diflufenzopyr + 10.6% nicosulfuron) for POST weed control in field corn. BASF. EPA Reg. No. 7969-175. 04/1999. [IVA2 + IIID1 + IIA2].

Chart An experimental POST herbicide for broadleaf weed control in soybean. Syngenta.

Chaser^{AE} Turf Herbicide (2,4-D butoxyethyl ester 6.2 lb ae + triclopyr-1 lb ae/gal). For POST control of annual and perennial broadleaf weeds in ornamental turf. United Horticultural Supply. EPA Reg. No. 62719-67. 04/2000. [IVA2 + IVA3].

Chaser^{AE} 2 Amine (2,4-D amine 6.2.78 lb ae + triclopyr 1.07 ae/gal). For POST control of annual grass and perennial broadleaf weeds in ornamental turf and sod farms. United Horticultural Supply. EPA Reg. No. 228-316-65783. 01/2001. [IVA2 + IVA3].

Chaser^{AE} Ultra (MCPA 47.77% + clopyralid 2.53% + dichloroprop-P 9.5% at 3.74 + 0.18 + 0.76 lb/gal). For broadleaf weed control in golf courses, parks, and ornamental lawns. United Horticultural Supply. EPA Reg. No. 228-372-65783. 05/2000. [IVA1 + IVA3 + IVA1].

Chlorimuron An active ingredient in Classic, Canopy, Canopy SP, Canopy XL, Concern SP, Finesse, Lorox Plus, Preview, Reliance 5TS or STS SP, Skirmish, Synchron STS, and Telar. [IIA2].

Chlorsulfuron An active ingredient in Finesse, Glean, and Telar. [IIA2].

Chopper^{AE} (imazapyr 6.2 lb ai/gal). Mixed with water and/or diesel fuel to control regrowth from cut stumps of brush and trees. BASF. EPA Reg. No. 241-296. 02/2001 [IIA1].

CimarronTM (60% metsulfuron). For weed control in pastures, rangeland, or CRP. DuPont. EPA Reg. No. 352-616. 07/2002. [IIA2].

CimarronTM Max (0.75% metsulfuron + 1.0 lb ae/gal dicamba + 2.87 lb ae/gal 2,4-D). For controlling broadleaf weeds in pastures, rangeland, or CRP. DuPont. EPA Reg. No. 352-615. 07/2002. [IIA2 + IVA2 + IVA3].

Cinch, Cinch ATZ, Cinch Lite (contains s-metolachlor + benoxacor safener, the later two also contain atrazine). Registered by DuPont for weed control in corn and sorghum. Scheduled to be available in 2003 in some states.

Clarity^{AE} (glycolamine salt of dicamba 6.4 lb ae/gal). A low volatile formulation of dicamba to be used POST for broadleaf weed control in corn, sorghum, and small grain. BASF. EPA Reg. No. 7969-137. 04/2000. [IVA2].

Classic^{AE} (chlorimuron 6.25% DF). A POST herbicide for broadleaf weed control in soybean. DuPont. EPA Reg. No. 352-436. 01/2000. [IIA2].

Clethodim Active ingredient in Envoy, Select, and Prizm. [IIA2].

Clodinafop-propargyl Active ingredient in Discovery. [IIA1].

Clomazone An active ingredient in Authority One-Pass, Command 3ME, Command Extra, and Commence. [VIIC].

Clopyr Ag (clopyralid) Under development for post broadleaf weed control in sugarbeet. Ag Value.

Herbicide Dictionary

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Clopyralid An active ingredient in Accent Gold, Broadstrike Plus, Chaser Ultra, Confront, Curtail, Curtail M, Hornet, Hornet WDG, Lontrel, Redeem R&P, Scorpion III, Stinger, and Transline. [IVA3].

Cloransulam methyl An active ingredient in Amplify, FirstRate, Frontrow, and Gauntlet. [IIA3].

Cobra[®] (lactofen 2 lb ai/gal). For PRE and POST broadleaf control in soybean. Valent. EPA Reg. No. 59639-34. 03/2002. [VIA1].

Cobra[®] Herbicide (lactofen 2.0 lb ai/gal). Used POST for broadleaf weed control in soybean. Valent. EPA Reg. No. 59639-34. 07/2002. [VIA1].

Command[®] 4EC (4 lb/gal clomazone). For PRE control of broadleaf weeds in soybean. FMC. EPA Reg. No. 279-3053. 01/1995. [VIIC].

Command[®] Extra (4 lb ai/gal sulfentrazone + 3 lb ai/gal clomazone as a copack product). For PRE control of broadleaf and grass weeds in soybean. FMC. EPA Reg. No. 279-3232. 04/2001. [IIA2 + VIIC].

Command[®] 3ME (clomazone 6.3 lb ai/gal). An encapsulated PRE herbicide for grass and broadleaf weed control in soybean. FMC. EPA Reg. No. 279-3158. 08/2001. [VIIC].

Commence[®] EC (3 lb ai trifluralin + 2.25 lb ai clomazone 6.25 lb/gal). Used PPI to control weeds in soybean. FMC. EPA Reg. No. 279-3104. 02/1995. [IIIA1 + VIIC].

Concep[®] III[®] (fluxofenim 75% WP). A protectant for corn and sorghum seeds to reduce metolachlor injury. Syngenta. EPA Reg. No. 100-NC-2. 09/1998.

Conclude[®] B (2.67 lb bentazon + 1.33 lb ai/gal acifluorfen). For POST grass and broadleaf control in soybean. Called Conclude when tank-mixed with Conclude G. BASF. EPA Reg. No. 7969-76. 04/1999. [VC1 + VIA1 + IA2].

Conclude[®] G (sethoxydim 1.5 lb ai/gal). Controls annual grasses in soybean. Called Conclude when tank mixed with Conclude B. BASF. EPA Reg. No. 7969-58. 04/1996. [IA2 + VC1 + VIA1].

Conclude[®] Ultra (1.69 lb ai bentazon 0.84 lb ai sodium acifluorfen + 1.29 lb ai sethoxydim 3.82 lb ai/gal). For POST grass and broadleaf control in soybean. BASF. EPA Reg. No. 7969-168. 04/1998. [IVA3 + IVA3 + IA2].

Conclude[®] Xact G (2.67 ai bentazon + 2 lb ai sethoxydin + 1.33 lb ai acifluorfen 6 lb ai/gal). For POST grass and broadleaf weed control in soybean. BASF. EPA Reg. No. 7969-179. 04/2001. [IVA3 + IA2 + IVA3].

Confront[™] (2.25 lb triclopyr + 0.75 lb clopyralid 6.3 lb ae/gal). For control of annual and perennial broadleaf weeds in established turf (golf course). Dow Agro Sci. EPA Reg. No. 62719-92. 08/1998. [IVA3 + IVA3].

Connect 20 WSP (octanoic acid ester of bromoxynil equivalent to 20% bromoxynil). Control certain broadleaf weeds in corn. Should be used with atrazine. Bayer. EPA Reg. No. 264-586. 02/2002. [VC2].

Cool Power[™] (3 lb ae MCPA + 0.3 lb ae triclopyr + 0.3 lb ae/gal dicamba). For broadleaf weed control in golf courses, parks, and ornamental turf lawns. Riverdale. EPA Reg. No. 228-317. 07/1998. EPA Reg. No. 07/1998. [IVA1 + IVA3 + IVA2].

Copper Sulfate Available as crystals or in chelated form for algae control in moving and still water. Several brand names.

Cornbelt[®] 4LB or 6LB. Lo Vol Ester (3.8 or 5.6 lb ae 2-óethylhexyl ester of 2,4-D). For control of many broadleaf weeds susceptible to 2,4-D. Cornbelt. EPA Reg. No. 11773-3 or 11773-4. 04/2002. [IVA1].

Cornbelt[®] 4LB Amine (2,4-D dimethylamine salt 6.3 lb ae/gal). For broadleaf weed control in grass pastures, rangelands, and certain crops. Cornbelt. EPA Reg. No. 11773-5. 04/2002. [IVA1].

Cornerstone[®] (isopropylamine salt of glyphosate 6.3 lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in Roundup Ready corn and soybean, burndown, and noncropland weed control. Additional surfactant optional. Agrilience. EPA Reg. No. 42750-60-1381. 02/2001. [IIB1].

Credit[®] or Credit Systemic (glyphosate 6.3 lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in Roundup Ready soybean, burndown, and noncropland weed control. Additional surfactant optional. NuFarm. EPA Reg. No. 71368-20. 11/1999. [IIB1].

Credit[®] Duo Herbicide (2.7 lb ae isopropylamine salt + 0.3 lb of acid/gal of glyphosate). Used for certain cropping systems including RR corn, soybean, for reduced tillage and fallow systems, and many no-crop areas. May need an 80% nonionic surfactant. NuFarm. EPA Reg. No. 71368-25. 12/2001. [IIB1].

Credit[®] Master (glyphosate 6.9 lb ae + 2,4-D ñ 1.5 lb ae/gal). For POST control of broadleaf and grass weeds in fallow and reduced tillage systems. Additional surfactant optional. NuFarm. EPA Reg. No. 71368-31. 07/2001. [IIB1].

Crossbow[™] (2 lb ae 2,4-D + 1 lb ae trichlopyr 6.3 lb ae/gal). For broadleaf weeds and woody plant control in rangeland, pastures, CRP, and noncrop areas. Dow AgroSci. EPA Reg. No. 62719-260. 02/1999. [IVA1 + IVA3].

Curbit[®] EC (ethalfluralin 6.3 lb ai/gal). Used PRE or PPI in melon, pumpkin, squash, and cucumber for grass control. UPA. EPA Reg. No. 34704-610. 08/1999. [IIIA1].

Curtail[™] (0.38 lb ae clopyralid + 2 lb ae 2,4-D-2.38 lb ae/gal). For POST broadleaf control in wheat, barley, fallow, rangeland, and pastures. Dow AgroSci. EPA Reg. No. 62719-48. 06/2001. [IVA1 + IVA3].

Curtail[™] M (0.42 lb clopyralid + 2.35 lb MCPA 6.77 lb/gal). Used for POST broadleaf control in wheat and barley. Dow AgroSci. EPA Reg. No. 62719-86. 07/2001. [IVA3 + IVA1].

Cyanazine An active ingredient in Bladex, Cy-Pro, Cy-Pro AT, and Extrazine II. RUH. [VA1]. Cancelled 12/31/02.

Cyclone[®] Max (3.0 lb paraquat cation per gal). A weed, grass and harvest desiccant/defoliant herbicide. Syngenta. EPA Reg. No. 100-1074. RUH. 10/2002. [VIB2].

Cycolate Active ingredient in Ro-Neet. [IIIC3].

Herbicide Dictionary

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Cy-Pro™ 4L (cyanazine). See Bladex. Griffin Corp. EPA Reg. No. 1812-366. RUH. [VA1]. Cancelled 12/31/02.

Dacthal (also called DCPA) The active ingredient in Dacthal W-75, Dacthal Flowable.

Dacthal® W-75 (DCPA 675%). Used for control of annual grass weeds in potato and turf. AMVAC. EPA Reg. No. 5481-490. [IIIA4].

Dash HC An anionic surfactant by BASF. EPA Reg. No. 34313-TX01.

DCPA Active ingredient in Dacthal. [IIIA3].

Debit™ F (isopropylamine salt of glyphosate 64 lb ae or 5.4 lb ai/gal). For POST control of broadleaf and grass weeds in RR soybean, burndown, and noncropland weed control. Additional surfactant optional. NuFarm. EPA Reg. No. 71368-21. 09/2001. [IIB1].

Define™ DF (flufenacet 60%). Used PPI or PRE for controlling certain grass and broadleaf weeds in field corn. Bayer. EPA Reg. No. 3125-487-264. 01/2001. [IIIB2].

Degree™ Herbicide (3.8 lb ai/gal acetochlor). An encapsulated acetochlor with safener. EPP or PRE. Monsanto. EPA Reg. No. 524-496. 10/2002. RUH. [IIB1].

Degree Xtra™ Herbicide (2.7 lb ai acetochlor + 1.34 lb ai atrazine/gal). For EPP and PRE control of broadleaf and grass weeds in field corn. Monsanto. EPA Reg. No. 524-511. 10/2002. RUH. [IIB1 + VA1].

Derringer (glufosinate lb ae/gal). For nonselective weed control of emerged weeds in noncrop areas. Bayer. EPA Reg. No. 432-1228. 03/2001. [IIC1].

Des-I-Cate (endothall 60.52 lb ae/gal). Used POST as a desiccant in alfalfa, clover, and potato. Cerexagri. EPA Reg. No. 4581-206. 12/2000. [VIII].

Desmedipham An active ingredient in Betamix, Betamix Progress, Betanex, and Progress. [VA3].

Dicamba An active ingredient in Banvel, Banvel SGF, Brushmaster, Celebrity, Celebrity Plus, Clarity, Dicambazine, Dicamba DMA Salt, Distinct, Fallow Master, Fallow Master BroadSpectrum, Fallow Star, Fuego, Marksman, Mec Amine-D, NorthStar, Op-Till, Range Star, Super Trimec Classic, Trimec Classic DSC, Trimec Lawn Weed Killer, Trimec Plus Quadmec, Rave, Resolve, Sequence, Sterling, Sterling Plus, Vanquish, Weedmaster, and Yukon. [IVA2].

Dicamba SMA Salt™ (dicamba 64 lb ae/gal). For weed control in corn, sorghum, small grain, pasture, hay, rangeland, and alfalfa. Albaugh. EPA Reg. No. 42750-40. 02/2000. [IVA2].

Dicambazine® (dicamba 1.1 lb ae + atrazine 2.1 lb ai/gal). For weed control in corn, grain sorghum, and ecofallow systems. Albaugh. EPA Reg. No. 42750-41. 12/2000. RUH. [IVA2 + VA1].

Dichlobenil Active ingredient in Casoron. [IIB2].

Dichlormid Safener in Surpass and TopNotch.

Dichlorprop Active ingredient in Brushmaster, Chaser Turf Herbicide, Chaser Ultra. Also called 2,4-DP. [IVA1].

Diclofop Active ingredient in Hoelon to control certain annual grasses POST in wheat. [IA1].

Difenzoquat Active ingredient in Avenge to control wildoat in small grain. [VIII].

Diflufenzopyr An active ingredient in Celebrity Plus and Distinct. Used POST in corn for broadleaf weed control. [IIID2].

Dimension® or Dimension™ EC (dithiopyr 61 lb ai/gal). Lawn, ornamental turf, and landscape ornamental herbicide for control of annual grasses and broadleaf weeds in several turf grasses including buffalo grass. Dow AgroSci. EPA Reg. No. 707-245 or 62719-426. 02/2001. [IIIA2].

Dimension® Ultra WPS (dithiopyr 40%). Lawn, ornamental turf, and landscape ornamental herbicide for control of annual grasses and broadleaf weeds. Each 5-ounce WS pouch contains 0.125 lb ai. Dow AgroSci. EPA Reg. No. 707-284. 07/2002. [IIIA2].

Dimethenamid An active ingredient in Detail, Frontier, G-Max Lite, Guardsman, LeadOff, Op-till, Outlook, Stature, and Weedtrine D for annual grass control in corn, grain sorghum, and soybean. [IIIB1].

Diquat Active ingredient in Reglone and Reward. [VIB1].

Direx® 4L or 80 DF (diuron 64 lb ai/gal or 80 DF). Similar to Karmex. Griffin. EPA Reg. No. 1812-257 or 1812-362. 06/2002. [VB1].

Discover® (clodinafop-propargyl 62 lb ai/gal) for POST grass control in spring wheat. Syngenta. EPA Reg. No. 100-907. 05/2000. [IA1].

Distinct® (diflufenzopyr 0.2 lb ae + dicamba 60.5 lb ae gal). Used POST to control broadleaf weeds in corn. BASF. EPA Reg. No. 7969-150. 04/2002. [IIID2 + IVA2].

Dithiopyr Active ingredient in Dimension EC and Dimension Ultra WSP. [IIIA2].

Diuron An active ingredient in Direx, Diuron DF, Diuron 4LIVM, Karmex, Krovar I DF, Sahara, and Topsite. [VB1].

Diuron DF or Diuron WDG (diuron 80% WP). A substituted urea for selective annual weed control at low rates in established alfalfa and as a soil sterilant at higher rates. Agrilience or UAP. EPA Reg. No. 9779-318 or 34704-648. 03/2000. [VB1].

Diuron 4L IVM or 80 DF IVM (diuron 64 lb ai/gal or 80 DF). For nonselective weed control in noncropland. Dow AgroSci. EPA Reg. No. 62719-311 or 310. 07/2000 or 02/2002. [VB1].

DMA™ 4IVM (diamethylamine salt of 2,4-D 63.8 lb ae/gal). For selective broadleaf weed control in noncropland, non-crop turf, and aquatic areas. Dow AgroSci. EPA Reg. No. 62719-3. 02/2001. [IVA1].

Domain™ 60 DF (24% flufenacet + 36% metribuzin). Used PP, PPI, PRE, or POST weed control in soybean. Bayer. EPA Reg. No. 3125-527. 04/1999. [IIIB2 + VA2].

DoublePlay® (5.6 lb EPTC + 1.4 lb acetochlor + R-29148 safener 7.0 lb ai/gal). Used PPI for selective grass control in corn. Syngenta. EPA Reg. No. 100-1083. 09/2002. RUH. [IIIC3 + IIB1].

Herbicide Dictionary

(continued)

DPX-79406 75 DF (37.5% nicosulfuron + 37.5% rimsulfuron) For use POST control of broadleaf and grass weeds in field corn. Dupont. EPA Reg. No. 352-572. 04/2001. [IIA2 + IIA2].

Driver 75 DF (quinclorac 75% DF). Used PRE or early POST for weed control in turf including crabgrass and foxtail. BASF. EPA Reg. No. 7969-130. 04/2001. [IVA4].

DSMA Active ingredient in DSMA Plus. [VIII].

DSMA Plus (DSMA 63.6 lb ai/gal). Used to control weeds in turfgrass. UAP. EPA Reg. No. 50534-27-34704. 06/2000. [VIII].

Dual Magnum E (s-metolachlor + benoxacor 67.62 lb ai/gal). Active isomer of metolachlor used to control annual broadleaf and grass weeds in corn, grain or forage sorghum, potato, and soybean. Need safened seed for sorghum. Syngenta. EPA Reg. No. 100-816. 03/2000. [IIB1].

Dual II Magnum E (s-metolachlor + benoxacor 67.64 lb ai/gal or 16% G). For annual broadleaf and grass weed control in corn, potato, pod crops, grain or forage sorghum, and soybean. The granules are used only on corn (all types), potato, and soybean. Syngenta. EPA Reg. No. 100-818 or 910. 04/2002. [IIB1].

Dual II Magnum SI (s-metolachlor 6.3 lb ai/gal). Custom application to dry fertilizer for weed control in corn and soybean. Syngenta. EPA Reg. No. 100-829. 04/2002. [IIB1].

D-638TM (2,4-D acid + 2,4-D butoxyethyl ester 6.8 lb ae/gal). For controlling field bindweed, Russian knapweed, Canada thistle, cattail, annual broadleaf weeds, and brush in pastures, rangeland, fallow ground, CRP, field corn, grain sorghum POST, and preplant on soybean. Albaugh. EPA Reg. No. 42750-36. 03/2000. [IVA1].

EagreTM (isopropylamine salt of glyphosate 4 lb ae or 5.4 lb ai/gal). For control of aquatic weeds and brush. Griffin. EPA Reg. No. 352-609-1812. 09/2002. [IIB1].

EngameTM (1.23 lb of glyphosate + 9.1 lb of monocarbamide dihydrogen sulfate/gal). For controlling weeds before crop emergence in conservation tillage systems including ecofarming. Entek. EPA Reg. No. 68891-8.

Endothall Active ingredient in Aquathol K, Aquathol Super K, Des-I-Cate, and Herbicide 273. [VIII].

EnduranceTM (prodiamine 65% WP). PRE control of weeds in noncrop areas, landscape ornamentals, established perennial and wildflower plantings, and conifer and hardwood seedling nurseries. Syngenta. EPA Reg. No. 100-834. DATE. [IIA1].

Ethametsulfuron Active ingredient in Muster. [IIA2].

Envoy E Herbicide (clethodim 0.94 lb ai/gal). Used POST for annual and perennial weed grass control in ornamentals, conifer trees, non-bearing food crops, and non-crop areas. Valent. EPA Reg. No. 59639-78. 01/2002 [IA2].

EpicTM DF (48% flutenacet + 10% isoxaflutole 58% DF). Used PP, PPI, or PRE for weed control in field corn and corn grown for silage. Bayer. EPA Reg. No. 3125-522. 05/2002. RUH. [IIB2 + VIIA1].

Eptam E (EPTC 67 lb ai/gal). Used PPI for control of grass and broadleaf weeds in corn, legumes, sugarbeet, and many horticultural crops. Syngenta. EPA Reg. No. 10182-220. 10/2000. [IIIC3].

EPTC An active ingredient in Double Play, Eradicane, and Eptam. [IIIC3].

Eradicane 6.7-ER (EPTC + R-29418 safener 6.7 ai/gal). For controlling foxtails, seedling johnsongrass, nutsedge, and suppression of woody cupgrass and wild proso millet in field, sweet, pop, and silage corn. Syngenta. EPA Reg. No. 100-1026. 08/2001. [IIIC1].

Escort E and Escort XP (metsulfuron-60% DF). An industrial formulation of Ally. Used to control broadleaf weeds and brush in conifers and industrial turfgrass. DuPont. EPA Reg. No. 352-439. 06/2002. [IIA2].

Esteron E 99 E (2-ethylhexyl ester of 2,4-D 3.8 lb ae/gal). Used for broadleaf weed control in pastures, certain crops, and non-crop areas. NuFarm. EPA Reg. No. 62719-09-AA-71368. 10/2001. [IVA1].

Ethalfuralin Active ingredient in Curbit and Sonalan. [IIIA1].

Ethametsulfuron Active ingredient in Muster. [IIA2].

Etho SC (ethofumesate 42%) A PPI, PRE, or POST herbicide for sugarbeet. Ag Value. EPA Reg. No. 37429-GA-1. [IIIC1]

Ethofumesate An active ingredient in Betamix Progress, Etho SC, Ethotron, Norton SC, Progress, and Progress. [IIB4].

Ethotron (ethofumesate 42%) A PPI, PRE, or POST herbicide for sugarbeet. United Phosphorous. EPA Reg. No. 264-613-70506. [IIIC1].

Everest E (flucarbazone 6.6% ae). For POST control of wildoat and green foxtail in winter and spring wheat. Bayer. EPA Reg. No. 3125-835. 03/2001. [IIA3].

Exceed E CP (28.5% prosulfuron + 28.5% primisulfuron 57% WDG). For POST broadleaf weeds and shattercane control in field corn and popcorn. Syngenta. EPA Reg. No. 100-774. 03/2001. [IIA2 + IIA2].

ExpertTM (metolachlor + glyphosate + atrazine). Under development for PRE weed control in corn and soybean. Syngenta. EPA Reg. No. 100-972. [IIB1 + IIB1 + VA1].

Express E XP (tribenuron 75% DF). A short residual POST herbicide for broadleaf weed control in wheat, barley, and fallow. DuPont. EPA Reg. No. 352-509. 09/2002. [IIA2].

Express E Extra XP (50% thifensulfuron + 25% tribenuron). For broadleaf weed control in wheat, barley, oat, and fallow. DuPont. EPA Reg. No. 352-611. 07/2001. [IIA2 + IIA2].

Extrazine E II (3 lb cyanazine + 1 lb atrazine 6 available in 4 lb ai/gal and 90% DF). For PP, PRE, or EPOST control of broadleaf and grass weeds in corn. DuPont. EPA Reg. No. 352-500 or 352-577. 07/1996. RUH. [VA1 + VA1]. Cancelled 12/31/02.

Extreme E (imazethapyr + isopropylamine salt of glyphosate at 0.17 lb + 2 lb ai/gal 2.17 lb ai/gal). For weed control in RR soybean. BASF. EPA Reg. No. 241-405. 04/2001. [IIA1 + IIB1].

Extreme E CP (35% imazethapyr + 20.5% glyphosate). Used for weed control in RR soybean. BASF. EPA Reg. No. 241-406. 10/2001. [IIA1 + IIB1].

Evik E DF (ametryn 80% WDG). Used as a POST directed spray for weeds in corn and non-cropland. Syngenta. EPA Reg. No. 100-786. 06/2001. [VA1].

Herbicide Dictionary

(continued)

Fallow Master^Æ Broad Spectrum (1.1 lb ae glyphosate + 0.5 lb ae dicamba 1.6 lb ae/gal). For total weed control in fallow and reduced tillage small grain systems in selected counties. Monsanto. EPA Reg. No. 524-570. 01/2000. [IIB1 + IVA2].

Fallow Master^Æ Broad Spectrum (isopropylamine salt of glyphosate 1.6 lb ae + 0.4 lb ae dicamba). Used to control weeds POST in fallow and reduced tillage systems for selected counties in Nebraska. Monsanto. EPA Reg. No. 524-507. 01/2000. [IIB1 + IVA2].

Fallow StarTM (glyphosate 1.1 lb ae + dicamba 0.5 lb ae/gal). Controls or suppresses emerged weeds in fallow and reduced tillage small grain. Albaugh. EPA Reg. No. 42750-63. 06/2001. [IIB1 + IVA2].

Far-Go^Æ (trifluralin 10% DF or 4 lb ai/gal). For PRE control of downy brome and other grass weeds in winter wheat and garbanzo bean. Monsanto. EPA Reg. No. 524-292 or 524-145. 01/2000. [IIC3].

Fenoxaprop Active ingredient in Acclaim Extra, Fusion, Option II, Puma, and Twister that controls annual grasses in soybean and turf. [IA1].

Field Master^Æ (2.1 lb ai acetochlor + 1.5 lb ai atrazine + 0.56 lb ae glyphosate). For PP or PRE control of weeds in no-till and minimum tillage systems field, seed, silage, and pop corn. Also POST in RR Corn. Monsanto. EPA Reg. No. 524-497. 10/2002. RUH. [IIB1 + VA1 + IIB1].

Finale^Æ (glufosinate 1.0 lb ai/gal). For nonselective weed control of emerged weeds in non-crop areas. Aventis. EPA Reg. No. 482-1229. 07/2001. [IIC1].

Finesse^Æ (62.5% chlorsulfuron + 12.5% metsulfuron 75% DF). For selective broadleaf weed control in barley, wheat, and fallow. DuPont. EPA Reg. No. 352-445. 08/2001. [IIA2 + IIA3].

Fire PowerTM (3 lb ae/gal glyphosate + 0.25 lb ai/gal oxyfluron). For control of weeds in dormant trees and fallow systems. Monsanto. EPA Reg. No. 524-520. 01/2002. [IIB1 + VIA2].

FirstRateTM (cloransulam methyl 64% ai WDG). For PRE and POST broadleaf weed control in soybean. Dow AgroSci. EPA Reg. No. 62719-275. 02/2001. [IIA3].

Five StarTM (2,4-D isooctyl ester 5 lb ae/gal). For control of broadleaf weeds in field, pop, and sweet corn, grain sorghum, sorghum-sudan grass, wheat, oat, barley, and rye. Albaugh. EPA Reg. No. 42750-49. 10/1999. [IVA1].

Flexstar^Æ HL (fomesafen 1.88 lb ai/gal). POST broadleaf weed control in soybean east of U.S. 281. Syngenta or Zeneca. EPA Reg. No. 100-01101 or 10182-418. 02/2001. [VIA1].

Fluazifop An active ingredient in Fusilade DX, Fusion, Tornado, Twister, and Typhoon. [IA1].

Flucarbazone Active ingredient in Everest. [IIA3].

Flufenacet An active ingredient in Axiom, Axiom AT, Define, Domain, and EPIC. [IIB1].

Flumetsulam An active ingredient in Accent Gold, Broadstrike + Dual, Broadstrike + Treflan, Frontrow, Hornet, Python, and Scorpion III that controls broadleaf weeds in corn and soybean. [IIA3].

Flumiclorac An active ingredient in Resource, Resource 80 WP, and Stellar that controls broadleaf weeds in corn and soybean. [VIA2].

Flumioxazin Active ingredient in Valor. [VIA2].

Fluridone Active ingredient in Avast! and Sonar A.S. Used for aquatic weed control. [VIIA4].

Fluroxypyr Active ingredient in Starane, Starane + Broclean, Starane Estron, Starane + MCPA, Starane + Saber, Starane + Salvo, Starane + Sword, and Vista. [IVA3].

Fluthiacet methyl Active ingredient in Action. [VIA4].

Fluxofenim Safener for sorghum seed. Called Concep III.

Fomesafen An active ingredient in Flexstar, Reflex, Tornado, Twister, and Typhoon. [VIA1].

Foramsulfuron An active ingredient in Option corn herbicide. [IIA2].

Formula 40^Æ (2,4-D acid 3.67 lb ai/gal). For broadleaf weed control in corn, millet, small grain, sorghum. Riverdale. EPA Reg. No. 228-357. 10/2002. [IVA1].

ForrestersTM (sopropylamine salt of glyphosate at 4 lb ae/gal). Used in forestry, rights-of-way, and habitat restoration areas. Riverdale. EPA Reg. No. 228-381. [IIB1].

Fortune^Æ (bentazon-4 lb ai/gal). For broadleaf weed control in turf. BASF. EPA Reg. No. 7969-45. 04/2000. [VC1].

Fosamine Active ingredient in Krenite S. [VIII].

Freedom^Æ (0.33 lb trifluralin + 2.67 lb alachlor 3 lb ai/gal). Used PPI for controlling broadleaf and grass weeds in soybean. Monsanto. EPA Reg. No. 524-422. 01/2001. RUH. [IIIA1 + IIB1].

Frontier^Æ 6.0 (dimethenamid 6.0 lb ae/gal). For PRE or PPI grass weed control in corn and soybean. BASF. EPA Reg. No. 5969-147. 04/2000. [IIB1].

FrontrowTM (0.84 lb ai cloransulam + 0.80 lb ai flumetsulam WDG). Co-pack produced for POST broadleaf weed control in soybean. Dow AgroSci. EPA Reg. No. 62719-299. 11/2002. [IIA3 + IIA3].

FuegoTM (triasulfuron 75% + diglycolamine salt of dicamba 4 lb ai/gal). Packaged as a co-pack for broadleaf weed control in pastures, rangeland, roadsides, and non-food crop sites. Syngenta. EPA Reg. No. 100-975. 02/2001. [IIA2 + IVA2].

FullTimeTM Herbicide (2.4 lb of encapsulated acetochlor + 1.6 lb/gal of atrazine 4 lb ai/gal). For selective PRE annual grass and broadleaf weed control in field, seed, silage, and pop corn. Dow AgroSci. EPA Reg. No. 62719-371. 08/1999. RUH. [IIB1 + VA1].

Furazole Reduces corn and sorghum seed injury from metolachlor and acetochlor. Monsanto.

Fusilade^Æ DX (fluazifop-P 2 lb/gal). A selective POST herbicide for control of shattercane, volunteer corn, and other grasses in soybean, fallow, nursery stock, and ornamentals. Syngenta. EPA Reg. No. 100-1070. 04/2002. [IA1].

Herbicide Dictionary

(continued)

Fusilade[®] II (2 lb ai fluazifop P₆₂ lb/gal). Used for selective grass control in landscape areas, roadsides, nurseries, greenhouses, flower beds, groundcovers, sports fields, golf courses, and residential areas. EPA Reg. 100-1084. 10/2001. [IA1].

Fusion[®] (2 lb fluazifop-P + 0.56 lb fenoxaprop_{62.56} lb ai/gal). For POST annual and perennial grass weed control in soybean and highway rights-of-way. Syngenta. EPA Reg. No. 10182-343. 02/2001. [IA1 + IA1].

Galaxy[®] Herbicide (3 lb bentazon + 0.67 lb acifluorfen_{63.67} lb ai/gal). For POST broadleaf weed control in soybean. BASF. EPA Reg. No. 7969-77. 04/1999. [VC1 + VIA1].

Galigan[®] 2E, Galigan[®] Delta 305 (2 lb ai/gal oxyfluorfen). For PRE broadleaf weed control in broccoli, cabbage, cauliflower, nonbearing citrus, conifers, and some deciduous trees. Makhleshim-Agran. EPA Reg. No. 66222-28. 11/2001. [VIA1].

Gallery[™] 75 DF or Gallery T&V (75% ai isoxaben). For PRE control of broadleaf weeds in established turf, landscape ornamentals, ornamental bulbs, Christmas trees, and non-bearing orchards. Dow AgroSci. EPA Reg. No. 62719-145. 10/2000. [III1]. Not labeled in Nebraska.

Garlon[™] 3A or Forestry Garlon 4A (triclopyr₆₃ or 4 lb ae/gal). For control of woody plants and broadleaf weeds on rights-of-way, industrial sites, and noncrop areas. Dow AgroSci. EPA Reg. No. 62719-37 (02/2001) or 62719-40 (02/2002). [IVA1].

Gauntlet[™] (sulfentrazone 75% DF + cloransulam 84%). Co-pack containing 26.5 oz of sulfentrazone and 5 water soluble packets each containing 0.6 oz of FirstRate. For weed control in soybean. FMC. EPA Reg. No. 279-3231. 09/2000. [IIA2 + IIA3].

Glean[®] EFC (chlorosulfuron_{675%} DF). POST broadleaf herbicide for small grains. Restrictions on crop rotations. DuPont. EPA Reg. No. 352-522. 07/1998. [IIA2].

Glufosinate Active ingredient in Derringer, Final, Liberty ATZ, Rely, and Remove. [IIC1].

Gly-Flo (isopropylamine salt of glyphosate₆₃ lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in RR corn, RR soybean, burndown, and noncropland weed control. Additional surfactant optional. MicroFlo. EPA Reg. No. 51036-312. 06/1999. [IIB1].

Glyfos[®] E (isopropylamine salt of glyphosate₆₃ lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in RR corn and soybean, canola, and in burndown and noncropland weed control. Additional surfactant optional. Cheminova. EPA Reg. No. 524-445-4787. 07/2002. [IIB1].

Glyfos[®] Aquatic (isopropylamine salt of glyphosate₆₄ lb ae or 2.4 lb ai/gal). For control of actively growing partially or fully emerged plants before seed head formation. Cheminova. EPA Reg. No. 4787-34. 07/2002. [IIB1].

Glyfos[®] Pro (glyphosate₆₃ lb ae/gal). For professional use on industrial turf and ornamental weed control. Labeled for controlling undesirable vegetation by habitat management and natural crops including rangeland and wildlife refuges. Additional surfactant not required. Cheminova. EPA Reg. No. 6776-57.07/2001. [IIB1].

Glyfos[®] X-TRA (isopropylamine salt of glyphosate₆₃ lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in RR soybean, burndown, and noncropland weed control. Additional surfactant not required. Cheminova. EPA Reg. No. 4787-23. 07/2001. [IIB1].

GlyMIX[™] MT (isopropylamine salt of glyphosate₆₃ lb ae/gal + 2,4-D amine 0.4 lb ae/gal). For annual and perennial weed control in non-cropland and PP, and POST harvest in corn, grain sorghum, soybean, and fallow systems in selected countries. Dow AgroSci. EPA Reg. 62719-366. 06/2001. [IIB1 + IVA1].

Glyphomax[™] (isopropylamine salt of glyphosate₆₃ lb ae or 4 lb ai/gal) For POST control of broadleaf and grass weeds in RR corn and soybean, burndown, fallow cropland, and noncropland weed control. Additional surfactant optional. Dow AgroSci. EPA Reg. No. 62719-323. 10/2002. [IIB1].

Glyphomax[™] Plus (glyphosate₆₃ lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in RR corn and soybean, burndown, and noncropland weed control. Additional surfactant not required. Dow AgroSci. EPA Reg. No. 62719-322. 10/2002. [IIB1].

Glyphosate An active ingredient in Accord, Accord Concentrate, Accord SP, Acquire, Aquamaster, AquaNeat, Backdraft, Campaign, Cornerstone, Credit, Credit Due, Credit Master, Debit, Eagre, Expert, Extreme CP, Extreme Herbicide, Fallow Master, Fallow Masterr Broadpectrum, Fallow Star, Field Master, Fire Power, Forresters, GlyFlo, Glyfos, Glyfos Aquatic, Glyfos Pro, Glyfos X-TRA, Glymix MT, Glyphomax, Glyphomax Plus, Glyphosate herbicide, Glyphosate Original, Glyphosate VMF, Glypro, Glypro Plus, Gly Star, Gly Star 5, Gly Star Plus, Honcho, Kleenup Pro, Landmaster BW, Mirage, Prosecutor, Protocol, Quik Pro, Rattler, Razor SPI, Ready Master ATZ, Ready Master Grass, Ready Master Complete, Rodeo, Roundup Custom, Roundup Master, Roundup Master ATZ, Roundup Master Complete, Roundup Original, Roundup Original RT, Roundup Pro, Roundup Pro Concentrate, Roundup Solugran, Roundup Ultra, Roundup UltraMax, Roundup UltraDry, RT Master, Sequence, Silhouette, Touchdown, Touchdown Pro. [IIB1].

Glyphosate Herbicide (isopropylamine salt of glyphosate₆₃ lb ae or 4 lb ai/gal). Used for nonselective weed control in non-cropland and before planting crops. DuPont. EPA Reg. No. 352-607. 10/2000. [IIB1].

Glyphosate Original (glyphosate₆₃ lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds in RR soybean, ecofarming systems, burndown, and noncropland weed control. Additional surfactant optional. Griffin. EPA Reg. No. 352-607-1812. 04/2001. [IIB1].

Glyphosate VMF (glyphosate_{65.44} lb ai or /gal). For control of many annual weeds, perennial weeds, woody brush, and trees along electric power, pipeline, and telephone rights-of-way. DuPont. EPA Reg. No. 352-609. 03/2001. [IIB1].

Glypro[™] (isopropylamine salt of glyphosate₆₄ lb ae or 5.4 lb ai/gal). For POST control of annual and perennial weeds and woody plants in forests, non-crop sites and around aquatic sites. Dow AgroSci. EPA Reg. No. 62719-324. 02/2002. [IIB1].

Herbicide Dictionary

(continued)

Glypro™ Plus (glyphosate 63 lb ae or 4 lb ai/gal). For control of annual and perennial weeds and woody plants in noncropland and industry sites. Dow AgroSci. EPA Reg. No. 62719-322. 03/2001. [IIB1].

Gly Star™ Original (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). For POST control of emerged broadleaf and grass weeds in PP to corn, sorghum, and soybean, burndown, and noncropland weed control. Licensed for RR corn and soybean. Additional surfactant optional. Albaugh. EPA Reg. No. 42750-60. 03/2001. [IIB1].

Gly Star™ Plus (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). For POST control of emerged broadleaf and grass weeds in PP, PRE, preharvest, and post-harvest corn, sorghum, and soybean, burndown, and noncropland weed control. Also POST on RR crops. Additional surfactant not required. Albaugh. EPA Reg. No. 42750-61. 01/2002 [IIB1].

Gly Star™ 5 (isopropylamine salt of glyphosate 64 lb ae or 4 lb ai/gal). For controlling weeds before planting crops. Must add NIS. Albaugh. EPA Reg. No. 42750-59. 02/2001. [IIB1].

G-Max Lite™ (dimethenamid-P-2.25 lb + 2.75 lb ai/gal atrazine). Used for weed control in field, pop, seed, and sweet corn, and grain sorghum. BASF. EPA Reg. No. 7969-200. 06/2002. [IIB1 + VA1].

Goal™ 2XL (oxyfluorfen 2 lb/gal). A PRE herbicide for soybean, onion, and nursery stock. Dow AgroSci. EPA Reg. No. 707-243. 07/2002. [VIA1].

Gramoxone™ Max Herbicide (paraquat dichloride 63 lb ai/gal). Similar use as Gramoxone Extra. Syngenta. EPA Reg. No. 100-01074. 09/2001. RUH. [VIB1].

Gramoxone™ Super TRES (paraquat dichloride 63 lb ai/gal). For weed, grass, and harvest aid desiccant/defoliant herbicide. Syngenta. EPA Reg. No. 10182-372. 07/2001. RUH. [VIB1].

Grazon™ P+D (0.54 lb ae picloram + 2.0 lb ae 2,4-D). For woody and perennial weed control in range and permanent grass pastures. Dow AgroSci. EPA Reg. No. 62719-182. 03/2001. RUH. [IVA3 + IVA1].

Guardsman™ (2.33 lb dimethenamid + 2.67 lb atrazine 65 lb ai/gal). For selective PRE or EPOST broadleaf and grass weed control in field, pop, and sweet corn and grain sorghum. BASF. EPA Reg. No. 7969-146. 04/2000 RUH. [IIB1 + VA1].

Guardsman Max™ (1.7 lb dimethenamid-P + 3.3 lb atrazine 65 lb ai/gal). For selective PRE or EPOST broadleaf and grass weed control in field, pop, sweet corn, and grain sorghum. BASF. EPA Reg. No. 7969-192. 04/2001. RUH. [IIB1 + VA1].

Halosulfuron Active ingredient in Manage, Permit, Sempra, Top Hand, and Yukon. [IIA2].

Harmony™ Extra or Harmony Extra XP (50% thifensulfuron + 25% tribenuron 75% DF). For broadleaf weed control in barley, wheat, oat, and fallow. DuPont. EPA Reg. No. 352-538 or 352-611. 03/2000 or 09/2002. [IIA2 + IIA2].

Harmony™ GT or Harmony™ GT XP (75% thifensulfuron). For broadleaf weed control in wheat, barley, oat, soybean, and fallow. DuPont. EPA Reg. No. 352-446. 08/2000 or 05/2002. [IIA2].

Harness™ (acetochlor + MON 4660 safener 67 lb ai/gal). Used PP or PRE for selective grass weed control in field, seed, silage, and popcorn. Monsanto. EPA Reg. No. 524-473. 01/2001. RUH. [IIB1].

Harness™ 20G (acetochlor + MON 4660 safener 20% G). Used PP or PRE for selective grass weed control in field, seed, silage, and popcorn. Monsanto. EPA Reg. No. 524-487. 10/2002. RUH. [IIB1].

Harness™ Extra 5.6L (3.1 lb acetochlor + MON 4660 safener + 2.5 lb atrazine 65.6 lb ai/gal). For PRE control of broadleaf and grass weeds in field corn, seed corn, silage corn, and popcorn. Monsanto. EPA Reg. No. 524-485. 10/2002. RUH. [IIB1 + VA1].

Harness™ Extra (4.3 lb acetochlor + MON 4660 safener + 1.7 lb atrazine 66.0 lb ai/gal). Used PRE for selective broadleaf and grass weed control in field corn, seed corn, silage corn, and popcorn. Monsanto. EPA Reg. No. 524-480. 10/2002. RUH. [IIB1 + VA2].

Herbicide 273 (endothall 63 lb ae/gal). A POST sugarbeet herbicide especially effective against broadleaf weeds. Cerexagri. EPA Reg. No. 4581-223. 08/1995. [VIII].

Hexazinone Active ingredient in Outstar and Velpar. [VA2].

Honcho (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). Monsanto. EPA Reg. No. 524-445. 01/2002. [IIB1].

Hoelon™ 3EC (diclofop 63 lb ai/gal). Used PPI or POST for certain annual grasses on wheat. Bayer. EPA Reg. No. 264-641. 12/1999. RUH. [IA1].

Hornet™ (23.1% flumetsulam + 62.5% clopyralid 60.856 lb ai/gal). For selective PP, PRE, or POST broadleaf control in field corn. Dow AgroSci. EPA Reg. No. 62719-253. 02/2000. [IIA3 + IVA3].

Hornet™ WDG (18.5% flumetsulam + 60.0% clopyralid 60.785%). For selective PP, PRE, or POST broadleaf weed control in field corn. Dow AgroSci. EPA Reg. No. 62719-315 02/2000. [IIA3 + IVA3].

Horsepower™ (MCPA 63.8 lb ae + triclopyr 60.38 lb ae + dicamba 60.38 lb ae/gal). For broadleaf weed control in ornamental lawns and turf grasses. Riverdale. EPA Reg. No. 228-313. 10/1997. [IVA2 + IVA3 + IVA2].

Hyvar™ EX (bromacil 80% WP or Hyvar™ X-L 2 lb ai/gal). Used as a soil sterilant and for woody plant control. DuPont. EPA Reg. No. 352-287 or 352-346. 12/2001. [VA4].

Image™ 1.5 LC or 70DG (imazaquin 1.5 lb ai/gal or 70%). For weed control in zoysiagrass lawns and selected ornamentals. BASF. EPA Reg. No. 241-303 or 241-319. 04/2001 or 09/2000. [IIA1].

Imazamox Active ingredient in Raptor and Beyond. [IIA1].

Imazapic Active ingredient in Contend, Oasis, Plateau, and Plateau DG Eco-Pac. [IIAI].

Imazamethabenz Active ingredient in Assert. [IIA1].

Imazapyr An active ingredient in Arsenal, Chopper, Chopper RTU, Contain, Lightning, Sahara, and Topside. [IIA1].

Imazaquin An active ingredient in Backdraft, Detail, Image, Scepter, Scepter O.T., Squadron, Steel, and Tri-Scepter. [IIA1].

Herbicide Dictionary

(continued)

Imazethapyr An active ingredient in Contour, Extreme CP, Extreme Herbicide, Lightning, Passport, Pursuit, Pursuit DG, Pursuit Plus, Resolve, Stature, and Steel. [IIA1].

Isoxaben Active ingredient in Gallery and Snapshot. [IIIE1].

Isoxaflutole Active ingredient in Balance Pro and Epic for weed control in corn. RUH. [VIIB1].

Karmex DF (diuron 680% WP). For annual weed control in alfalfa at low rates and a soil sterilant at high rates. Griffin. EPA Reg. No. 1812-362. 04/2001. [VB1].

Kerb™ 50W or KERB T/O (pronamide 650% WS). Use PRE or EPOST in alfalfa. Dow AgroSci.; Rohm/Haas. EPA Reg. No. 62719-397; 707-159. 06/2002. RUH. [IIIA1].

Keystone™ Herbicide (3.0 lb ai acetochlor + 2.25 lb ai/gal atrazine). A new PP and PRE herbicide for weed control in corn. Dow AgroSci. EPA Reg. No. 62719-368. 08/2002. RUH. [IIIB1 + VA1].

Kleenup™ Pro (3 lb ae/gal glyphosate). For weed control of winter annual and tall fescue in dormant Bermudagrass. UHS. EPA Reg. No. 524-445-65783. 08/2001. [IIB1].

Krenite™ ES (fosamine 64 lb ai/gal). A water soluble brush control agent that can be used on noncropland areas adjacent to water. DuPont. EPA Reg. No. 352-395. 09/2001. [VIII].

Krovar™ I DF (40% bromacil + 40% diuron DG). For control of annual weeds in noncropland. DuPont. EPA Reg. No. 352-505. 10/2002. [VA4 + VB1].

Lactofen An active ingredient in Cobra, Phoenix, and Stellar. [VIA1].

Laddok™ S-12 (2.5 lb bentazon + 2.5 lb atrazine 65.0 lb ai/gal). For POST broadleaf weed control in corn and sorghum. Sipcam Agro. EPA Reg. No. 60063-18. 01/2001. RUH. [VC1 + VA1].

Landmaster™ BW (0.9 lb ae glyphosate + 1.5 lb ae 2,4-D 2.4 lb ae/gal). Used primarily for weed control in no-till systems before planting. Monsanto; Albaugh. EPA Reg. No. 524-351 (01/1997) or 42750-62. 06/2001. [IIB1 + IVA1].

Lariat™ (2.5 lb alachlor + 1.5 lb atrazine 64 lb ai/gal). Used PRE for selective weed control in field, silage, sweet and pop corn and grain sorghum. Monsanto. EPA Reg. No. 524-329. 10/2002. RUH. [IIIB1 + VA1].

Lasso™ (alachlor 64 lb ai/gal). Used PP or PRE for annual grass and some broadleaf weeds in corn, sorghum, soybean, and dry edible bean. Monsanto. EPA Reg. No. 524-314. 10/2002. RUH. [IIIB1].

Lasso™ II (alachlor 15% G). Granular formulation of Lasso. Monsanto. EPA Reg. No. 524-296. 01/1997. RUH. [IIIB1].

LeadOff™ Herbicide (2.33 lb ai dimethenamid + 2.67 lb ai atrazine 65 lb ai/gal). Used PRE for field corn, seed corn, sweet corn, or popcorn, and grain sorghum. DuPont. EPA Reg. No. 352-600. 07/1998. RUH. [IIIB1 + VA1].

Liberty™ (glufosinate 1.67 lb/gal). Registered for use in herbicide tolerant LibertyLink™ corn, canola, and soybean. Bayer. EPA Reg. No. 264-660. 01/2002. [IIC1].

Liberty™ ATZ (glufosinate 10.0% + atrazine 631.75%) For use in herbicide tolerant LibertyLink™ corn. Bayer. EPA Reg. No. 264-668. 01/2002. RUH. [IIC1 + VA1].

Lightning™ (52.5% imazethapyr + 17.5% imazapyr WDG). Used for POST broadleaf and grass control in Clearfield™ corn. BASF. EPA Reg. No. 241-377. 04/2001. [IIA1 + IIA1].

Linuron Active ingredient in Linex 50 DF and Lorox DF. [VB1].

Linex™ 4L (linuron 4 lb ai/gal). For PRE grass and broadleaf weed control in field corn, grain sorghum, soybean, and potato. Griffin. EPA Reg. No. 1812-245. 10/2000. [VB1].

Londax™ (60% bensulfuron). For PRE use in rice. Dow Agri. Sci. EPA Reg. No. 352-506. 12/2001. [IIA2].

Lontrel™ (cloprialid 63 lb ae/gal) For selective POST control of broadleaf weeds in turf, sod farms, and certain ornamental plantings. Dow AgroSci. EPA Reg. No. 62719-305. 03/2001. [IVA3].

Lorox DF (50% linuron). For weed control in corn, potato, soybean, and hybrid poplar. Griffin. EPA Reg. No. 1812-320. 04/2000. [VB1].

Lumax™ (s-metolachlor 2.68 lb + mesotrione 0.268 lb + atrazine 1.0 lb/gal). PRE herbicide for field, seed, and silage corn. Syngenta. EPA Reg. No. 100-1152. 07/2002. RUH. [IIIB1 + VIIB1 + VA1].

Manage™ (halosulfuron 75% WDG). For control of nutsedge and other weeds in turfgrass and landscape areas. Monsanto. EPA Reg. No. 524-465. 02/2000. [IIA2].

Manifest™ B (bentazon 3 lb + acifluorfen 0.67 ai/gal). For POST broadleaf and grass weed control in soybean. BASF. EPA Reg. No. 7969-77. 04/1998. [IVA1 + VIA1].

Manifest™ G (sethoxydim 1.5 lb ai/gal). Used POST for grass control in soybean. BASF. EPA Reg. No. 7969-58. 04/1996. [VIA1].

Marksman™ (1.1 lb ai dicamba + 2.1 lb ai atrazine 63.2 lb/gal). For POST broadleaf weed control in corn and sorghum. BASF. EPA Reg. No. 7969-136. 04/2000. RUH. [IVA2 + VA1].

Matador™ Herbicide (0.88 lb ai/gal quizalofop P-ethyl) A burndown herbicide for annual grasses before or after planting soybean. FMC. EPA Reg. No. 279-3183. 02/1997. [IA1].

Matrix™ (rimsulfuron 625% DF). Used PRE or POST for selective broadleaf and grass control in potato. DuPont. EPA Reg. No. 352-556. 03/2000. [IIA2].

Maverick™ (sulfosulfuron 75% WDG). For selective control of several annual and perennial weeds in winter and spring wheat. Monsanto. EPA Reg. No. 524-500. 01/2002. [IIA2].

Maverick™ PRO (sulfosulfuron 75% WDG). For selective control of downy brome, Japanese brome, hairy chess, field penny-cress, and tansy mustard in winter wheat. For use in Colorado, Kansas, Nebraska, Oklahoma, Texas, and Wyoming. Monsanto. EPA Reg. No. 524-525. 01/2000. [IIA2].

MCPA A phenoxy similar to 2,4-D for control of broadleaf weeds, but safer on oat and legumes. Active ingredient in Bronate, Chaser Ultra, Curtail M, MCPA amine, MEC Amine-D, Rhino, Rhomene, Rhonox brand MCPA, Starane + MCPA, Starane + Sword, Sword, and other trade names. [IVA1].

Herbicide Dictionary

(continued)

MCPA Amine (3.7 lb ae/gal MCPA) For broadleaf weed control in spring and fall planted small grains, pastures, rangeland, and CRP. Agrilience. EPA Reg. No. 1381-104. 07/2002. [IVA1].

MCPP mecoprop Active ingredient in many turf herbicide products. [IVA1].

MEC Amine-DÆ Turf Herbicide (2.44 lb ae 2,4-D amine + 1.30 lb ae MCPA + 0.22 lb dicamba/gal). For dandelion, clover, plantain, etc. control in lawns. United Horticultural Supply. EPA Reg. No. 34704-239-65783. 04/1999. [IVA1 + IVA1 + IVA2].

Mecoprop Active ingredient in MCPP, Super Trimec, Trimec Plus Quadmec, Trimec Classic, Trimec Classic DSC, and 2 + 2. [IVA1].

Mesotrione Active ingredient in Callisto, Camix, and Lumax used to control broadleaf weeds in field corn. [VIII1].

Metolachlor An active ingredient in Bicep II, Bicep Lite II, Boundary, Broadstrike + Dual, Camix, Dual Magnum, Dual II Magnum, Dual II Magnum SI, Expert, Lumax, Pennant, Pennant Magnum, and Sequence used for grass control in corn, sorghum, soybean, nurseries, and turf grass. [IIIB1].

Metribuzin Used PRE or POST for annual weeds in corn, soybean, alfalfa, and potato; often used in combination with other herbicides. An active ingredient in Axiom, Axiom AT, Boundary, Domain, Finesse, Preview, Salute, and Sencor. [VA2].

Metsulfuron Active ingredient in Ally and Escort. [IIA2].

Micro-TechÆ Micro-encapsulated alachlor (4 lb ai/gal). For weed control in all types of corn, grain sorghum, soybean, and types of dry bean except red kidney bean. Grain sorghum needs safened seed. Monsanto. EPA Reg. No. 524-344. 10/2002. RUH. [IIIB1].

Mon 4660 Safener in Harness, Harness Extra, Harness Xtra 5.6.

MirageÆ (3 lb ae or 4 lb ai/gal of glyphosate isopropylamine salt). For control of weeds in noncrop areas or desirable vegetation. UAP. EPA Reg. No. 524-445-34704. 10/1997. [IIB1].

Moxy™ 2E (bromoxynil 2 lb/gal). Used for weed control in alfalfa, corn, small grains, and grain and forage sorghum. Agrilience. EPA Reg. No. 9779-346. 03/2001. [VC2].

Moxy™ + atrazine Herbicide (1 lb/gal bromoxynil + 2 lb/gal atrazine). Used for POST control of grass and broadleaf weeds in corn. Agrilience. EPA Reg. No. 42750-50-1381. 01/2000 RUH. [VC2 + VA1].

MSMA (monosodium methanearsonate). Active ingredient in Hi-Yield 529, MSMA 6.6, 120 Herbicide, 912 Trimec Lawn Weed Killer, and Trimec Plus Quadmec. Used for selective crabgrass control in turf. [VIII].

MSMA 6.6 Turf (MSMA 6.6 lb ai/gal). POST control of grass in turfgrass. United Hort. Supply. EPA Reg. No. 34704-111-65783. 07/2002. [VIII].

MusterÆ (ethametsulfuron 75% DF). For control of weeds in canola and crambe. DuPont. EPA Reg. No. 352-558. 04/2001. [IIA2].

Naproamide Active ingredient in PrePair [IIIB3].

Naptalam Active ingredient in Alanap and Rescue. [IIID1].

Nicosulfuron An active ingredient in Accent, Accent Gold, Basis Gold, Celebrity, Celebrity Plus, and Steadfast. [IIA2].

912 (MSMA 6.6 lb ai/gal). For POST weed control in lawns and turf. Agrilience. EPA Reg. No. 9779-133. 09/1999. [VIII].

Norflurazon Active ingredient in Solicam and Zorial Rapid 80. [VIA3].

NorthStar™ CR (7.5% primisulfuron + 39.9% dicamba WDG). For POST control of broadleaf weeds in field corn and popcorn. Syngenta. EPA Reg. No. 100-923. 06/2000. [IIA2 + IVA2].

NortronÆ SC (ethofumesate 64 lb/gal). A PPI, PRE, or POST herbicide for sugarbeet. Bayer. Reg. No. 264-613. 08/2002. [IIIC1].

OasisÆ (2 lb ae imazapic + 4 lb ae/gal 2,4-D). For weed control, native grass release, and turf growth suppression on roadsides and other noncrop areas. BASF. EPA Reg. No. 241-409. 10/2000. [IIA1 + IVA1].

120 Herbicide (MSMA 51%). For control of grass weeds in non-bearing grape, deciduous fruits, nut, and citrus orchards. Control of sandbur, mustards, barnyardgrass, chickweed, and wood sorrel in zoysia, buffalograss, and Bermuda lawns. Agrilience. EPA Reg. No. 9779-96. 01/1998. [VIII].

Op-Till (5 lb ai dimethenamid + 1 lb ae dicamba/gal). For PRE or PPI control of grass and broadleaf weeds in reduced till corn. BASF. EPA Reg. No. 7969-148. 04/1999. [IIIB1 + IVA2].

OptionÆ Corn Herbicide (foramsulfuron 63.5% WDG). A POST grass and broadleaf herbicide for use in field corn. AgrEvo/Bayer. EPA Reg. No. 264-685. 03/2002. [IIA2].

Option II (fenoxaprop 6.67 lb/gal). A POST grass herbicide in soybean similar to Fusilade and Poast. AgrEvo. EPA Reg. No. 45639-185. RUH. [IA1]. Discontinued.

Oryzalin Active ingredient in Surflan A.S. and Oryzalin 4 PRO. [IIIA1].

Oryzalin 4 PRO (4 lb ai/gal). Used PRE for annual grass and broadleaf weeds in landscape ornamentals, Christmas tree plantations, and established buffalograss turf. Farm Saver. Com. LLC. EPA Reg. No. 72167-15-AA-74477. 10/2002. [IIA1].

OustarÆ (hexazinone 63.2% + sulfometuron 11.8% DG). For weed control in the establishment of loblolly, slash, and longleaf pines. DuPont. EPA Reg. No. 352-603. 09/2002. [VA2 + IIA2].

OustÆ (sulfometuron 75% DG). A noncropland herbicide that also provides suppression of perennial grasses at lower rates. DuPont. EPA Reg. No. 352-401. 03/1998. [IIA2].

OustÆ XP (sulfometuron 75% DG) For control of weeds in industrial sites and forest sites. DuPont. EPA Reg. No. 352-601. 11/1999. [IIA2].

OutlookÆ (dimethenamid-p 6.6 lb ai/gal). For PP and PRE use in corn (field, pop, seed, and sweet), dry edible bean, grain sorghum, and soybean. BASF. EPA Reg. No. 7969-156. 04/2001. [IIIB1].

Outrider™ (sulfosulfuron-75% WDG) For PRE and POST control of many annual and perennial weeds on noncrop areas. Monsanto. EPA Reg. No. 524-500. 01/2002. [IIA2].

Oxabetrinil A seed protectant (Concep II) for reducing corn and sorghum injury from metolachlor.

Oxadiazon An active ingredient in PrePair and Ronstar. [VIII].

Herbicide Dictionary

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Oxasulfuron Active ingredient in Expert. [IIA1].

Oxyfluorfen Active ingredient in Fire Power, Galigan, Galigan Delta, and Goal. [VIA1].

ParamountÆ (quinclorac 75% DF). Used POST for grass and broadleaf control in grain sorghum, fallow, and field bindweed. BASF. EPA Reg. No. 7969-113. 04/2002. [IVA4].

Paraquat Active ingredient in Boa, Cyclone Concentrate, Cyclone Max, Gramoxone Extra, Gramoxone Max, and Starfire. RUH. [VIB1]

Pathfinder™ II (triclopyr 0.75 lb ae/gal). Ready to use for control of woody plants in rights-of-way, etc. Dow AgroSci. EPA Reg. No. 62719-176. 10/2002. [IVA1].

Pathway™ (picloram 63% + 2,4-D acid 11.2%). For controlling unwanted trees via cut surface in noncrop areas. Dow AgroSci. EPA Reg. No. 62719-31. 06/1998. RUH. [IVA3 + IVA2].

PeakÆ CP (proflusuron 65.7% WDG). PRE and POST for broadleaf weed control in grain sorghum, cereals, and proso millet. Syngenta. EPA Reg. No. 100-763. 02/2002. [IIA2].

Pelargonic Acid Active ingredient in Scythe. Used for aquatic weed control. [VIC1].

Pendimax™ 3.3 (pendimethalin 3.3 lb ai/gal). Equivalent to Prowl. Dow AgroSci. EPA Reg. No. 68156-6-62719. 10/1999. [IIIA1].

Pendimethalin An active ingredient in Pendimax 3.3, Pendulum Aqua Cap, Pendulum 2G, Pendulum WDG, PendulumÆ 3.3EC, Pentagon, Prowl, Pursuit Plus, Squadron, and Steel and in some PRE turf herbicides for grass and broadleaf weed control. [IIIA1].

Pendulum AquaCap™ (3.8 lb ae microencapsulated pendimethalin in an aqueous carrier). Used PRE weed control in noncrop areas, ornamental plantings, and nonresidential turf. BASF. EPA Reg. No. 241-4160. 10/2002. [IIIA1].

PendulumÆ 2G (2% pendimethalin). For use in turfgrass, ornamentals, landscape, or ground maintenance. BASF. EPA Reg. No. 241-375. 04/2001. [IIIA1].

PendulumÆ 3.3 EC (pendimethalin 3.3 lb ai/gal). For use in turfgrass, ornamentals, landscape, or noncrop areas. BASF. EPA Reg. No. 241-341. 04/2001. [IIA1].

PendulumÆ WDG (60% pendimethalin). For use in turfgrass, ornamentals, landscape, or noncrop areas. BASF. EPA Reg. No. 241-340. 04/2001. [IIIA1].

PennantÆ Liquid (metolachlor 8 lb/gal). For weed control in nurseries, zoysiagrass, and landscape plantings. Syngenta. EPA Reg. No. 100-691. 02/1998. [IIIB1].

Pennant Magnum (s-metolachlor- 7.62 lb ai/gal). For weed control in nurseries, warm season turfgrasses, and landscape plantings. Syngenta. EPA Reg. No. 100-950. 09/2001. [IIIB1].

PentagonÆ WDG (pendimethalin 60%). For weed control in selected crops including sunflower. BASF. EPA Reg. No. 241-268. 02/2002. [IIIA1].

PermitÆ (halosulfuron-75% WSG). Used POST for broadleaf weed control in field corn, field corn grown for seed, and grain sorghum. Monsanto. EPA Reg. No. 524-465. 01/2002. [IIA2].

Phenmedipham An active ingredient in Betamix, Betamix Progress, Progress, and Spin-Aid. [VA3].

Phoenix 2 (lactofen 2.0 lb ai/gal). Used POST for broadleaf control in soybean. Valent. EPA Reg. No. 29639-118. 07/2002. [VIA1].

Phenoxy 0.88™ (2,4-D acid + 2,4-D butoxyethyl ester 2.8 lb ae/gal). For broadleaf control. Labeled for PP, PRE, and POST in corn, POST in sorghum, and PP for soybean. Agrilience. EPA Reg. No. 42750-36-9779. 01/1998. [IVA1 + IVA1].

Picloram An active ingredient in Grazon P+D, Pathway, Tordon 22K, Tordon RTU, and Tordon K. [IVA3].

PlateauÆ (imazapic 2 lb ai/gal or 70% DG). For PRE or POST control of selected grass and broadleaf weeds in range, pasture, wildflower and native grass establishments, crown vetch, and non-crop areas. BASF. EPA Reg. No. 241-365 or 241-393. 04/2001. [IIA1].

PoastÆ (sethoxydim 1.50 lb ai/gal). A POST herbicide for control of shattercane, volunteer corn, and other grass weeds in alfalfa, soybean, and other broadleaf crops. BASF or Micro-Flo. EPA Reg. No. 7969-58 or 7969-58-51036. 04/1999; 10/2002. [IA2].

PoastÆ HC (sethoxylin 3 lb ai/gal). A POST herbicide for control of shattercane, volunteer corn, and other grass weeds in alfalfa, soybean, and other broadleaf crops. BASF. EPA Reg. No. 7969-129. 04/1996. [IA2].

Poast PlusÆ (sethoxydim 1.0 lb ai/gal). A combination of sethoxydim + Dash surfactant. A POST herbicide for control of shattercane, volunteer corn, and other grass weeds in alfalfa, soybean, and other broadleaf crops. BASF or Micro-Flo. EPA Reg. No. 7969-88 or 7969-88-51036. 04/1999 or 10/2002. [IA2].

PramitolÆ 25E (prometon 2 lb ai/gal). Used primarily for season-long control of annual and perennial weeds in noncropped areas. UAP. EPA Reg. No. 66222-22-34704. 08/2000 [VA1].

Pramitol 5PS (5% prometon + 0.76% simazine + 40% sodium chlorate + 40% sodium metaborate). Soil sterilant. UAP. EPA Reg. No. 66222-23-34704. 02/2002. [VA1 + VA1 + VIII + VIII].

PrefarÆ 4-E (bensulide 4 lb/gal). Used PRE for grass and broadleaf weeds in cantaloupe, cucumber, and watermelon. Gowan. EPA Reg. No. 10163-220. 10/2002. [IIIC2].

Primisulfuron An active ingredient in Beacon, Exceed, NorthStar, and Spirit. [IIA2].

PrincepÆ 4L or PrincepÆ Caliber 90Æ (simazine 4 lb ai/gal or 90% WDG). A long lasting PRE for corn and shelterbelts. Syngenta. EPA Reg. No. 100-526 or 100-603. 06/2001. [VA1].

PrismÆ (clethodim 0.94 lb ai/gal). Used POST for selective control of grass weeds in dry bulb onion, soybean, and sugarbeet. Valent. EPA Reg. No. 59639-78. 01/2002. [IA2].

Prodiamine Active ingredient in Barricade and Endurance. [IIIA1].

PrograssÆ (ethofumesate 1.5 lb ai/gal). For weed control in ornamental turf. Bayer. EPA Reg. No. 432-941. 09/2002. [IIIC1].

ProgressÆ Herbicide (phenmedipham 7% + desmedipham 7% + ethofumesate 67% in 1.8 lb ai/gal). For POST control of weeds in sugarbeet. Bayer. EPA Reg. No. 264-632. 04/2001. [VA3 + VA3 + IIIC1].

Herbicide Dictionary

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Prompt[®] 5L (bentazon-2.5 lb + atrazine 2.5 lb ai/gal) BASF or Top-Pro. POST control of weeds in athletic fields and lawns containing bermudagrass or zoysia. EPA Reg. No. 7969-120-51036. 04/2000. [VC1 + VA1].

Promiamine Active ingredient in Barricade 65WG. [IIIA1].

Prometon An active ingredient in Pramitol 25E and Pramito 15PS. [VA1].

Pronamide Active ingredient in Kerb. [IIIA1].

Propachlor Active ingredient in Ramrod and Ramrod + atrazine. Used for grass weed control in corn and sorghum. [IIB1].

Prosuluron Active ingredient in Exceed, Peak, and Spirit. [IIA2].

Protocal[®] (isopropylamine salt of glyphosate-3 lb ae or 4 lb ai/gal). Monsanto. EPA Reg. No. 524-326. 01/1997. [IIB1].

Prowl[®] (pendimethalin-3.3 lb ai/gal). Used PRE or EPOST on corn and PP or PRE on soybean and sunflower. BASF. EPA Reg. No. 241-337. 04/2001. [IIIA1].

Puma[®] 1 EC (fenoxaprop-ethyl-1 lb ai/gal). For selective control of emerged green and yellow foxtail, millet, barnyardgrass, and wild oat in wheat and barley. Bayer. EPA Reg. No. 264-666. 06/2002. [IA1].

Prowl H₂O (pendimethalin). A water-based formulation under development for use on corn, soybean, and sunflower. BASF. [IA1].

Pursuit[®] W (imazethapyr-2 lb ai/gal). Used PP, PRE, or POST for broadleaf and grass weed control in alfalfa, Clearfield[®] corn, and soybean. BASF. EPA Reg. No. 241-385. 04/2001. [IIIA1].

Pursuit[®] Plus EC (0.2 lb imazethapyr + 2.7 lb pendimethalin-2.9 lb ai/gal). Used PPI to control broadleaf and grass weeds in Clearfield[®] field corn and soybean. BASF. EPA Reg. No. 241-331. 04/2001. [IIA1 + IIIA1].

Pursuit[®] WDG (imazethapyr - 70% DG). Used POST for controlling broadleaf and grass weeds in alfalfa, Clearfield[®] corn, and dry edible bean. BASF. EPA Reg. No. 241-350. 04/2001. [IIIA1].

Pyramin SC or DF (pyrazon-4.5 lb/gal or 65% DF). Used PRE for control of broadleaf weeds in sugarbeet. BASF. EPA Reg. No. 7969-108 or 7969-81. 04/2000 or 04/1999. [VA5].

Pyrazon Active ingredient in Pyramin. [VA5].

Pyridate Active ingredient in Tough. [VC3].

Python[™] WDG (80% flumetsulam). For broadleaf weed control in field corn and soybean. Dow AgriSci. EPA Reg. No. 62719-277. 08/2001. [IIA3].

Quik Pro[™] (glyphosate ammonium salt 73.3% + 2.9% diquat dibromide). For use in noncrop and non-timber areas to control unwanted vegetation. Monsanto. EPA Reg. No. 524-535. 10/2001. [IIB1 + VIB1].

Quinclorac Active ingredient in Drive and Paramount. [IVA4].

Quizalofop Active ingredient in Assure II and Matador. [IA1].

R-25788 Safener in Sutan+.

R-29418 Safener in Doubleplay, Eradicane.

Range Star (dicamba 1 lb ae + 2,4-D amine 2.87 lb ae/gal). For weed control in pastures, rangeland, wheat, and sorghum. Albaugh. EPA Reg. No. 42750-55. 03/2000. [IVA2 + IVA1].

Rapid 80[®] Herbicide See Zorial Rapid 80.

Raptor[®] (imazamoxó1 lb ai/gal). Used for selective POST grass and broadleaf weed control in soybean. BASF. EPA Reg. No. 241-379. 04/2001. [IIA1].

Rattler (isopropylamine salt of glyphosate 3 lb ae or 4 lb ai/gal). May need extra NIS. Helena. EPA Reg. No. 524-455-5905. 01/1997. [IIB1].

Rave[™] (8.8% triasulfuron + 50% dicamba WDG). Used POST for controlling broadleaf weeds in wheat, barley, fallow, CRP, and pastures. Syngenta. EPA Reg. No. 100-927. 03/2001. [IIA2 + IVA2].

Razor[™] SPI (isopropylamine salt of glyphosate 3 lb ae/gal). For POST control of vegetation; contains a temporary blue colorant to assist in uniform coverage. NeFarm. Riverside. EPA Reg. No. 228-366. 09/2002. [IIB1].

Ready Master[™] ATZ (2 lb ai glyphosate + 2 lb ai atrazineó4 lb ai/gal). Used for weed control in RR corn, ecofallow, and chemical fallow. Monsanto. EPA Reg. No. 524-509. 01/1999. [IIB1 + VA1].

Redeem[™] R&P (2.25 triclopyr + 0.75 lb clopyralidó3 lb ae/gal). For control of annual and perennial broadleaf weeds in rangeland and permanent grass pastures. Dow AgroSci. EPA Reg. No. 62719-337. 02/2001. [IIA1 + IVA3].

Reflex[®] (fomesafenó2 lb ai/gal). Used POST for selective POST broadleaf weed control in soybean east of U.S. 281. Syngenta. EPA Reg. No. 10182-83. 02/2001. [VIA1].

Reglone[®] Dessicant (diquató2 lb ai/gal). Used to desiccate seed crops of alfalfa, clover, grain sorghum, and soybean, also for potato. Syngenta. EPA Reg. No. 10182-353. 04/2000. [IVB1].

Rely[®] (glufosinateó1 lb ai/gal). For control of emerged weeds in apples, grapes, tree nuts, and for potato vine dessication. Bayer. EPA Reg. No. 264-652. 04/2001. [IIC1].

Remedy[™] (triclopyró4 lb ae/gal). For control of woody plants and broadleaf weeds on rangeland and grass pasture. Dow AgroSci. EPA Reg. No. 62719-70. 04/1999. [IIA1].

Remove[™] (glufosinateó1.67 lb ai/gal). Used to remove non-glufosinate-ammonium tolerant corn and soybean plants in seed production fields. Bayer. EPA Reg. No. 264-663. 05/2002. [IIC1].

Resource[®] (flumicloracó0.86 lb/gal). Used for selective POST broadleaf weed control (especially velvetleaf) in soybean and corn. Valent. EPA Reg. No. 59639-82. 07/2002. [VIA2].

Reward[®] Landscape and Aquatic (diquató2 lb ai/gal). Used for noncrop and aquatic weed control. Syngenta. EPA Reg. No. 100-1091. 11/2002. [VIB1].

Rezult[®] B (bentazonó5 lb ai/gal). A twin pack of Rezult B (bentazon) and Rezult G (sethoxydim-1 lb/gal) for POST broadleaf and grass weed control in soybean. BASF. EPA Reg. No. 7969-112. 04/1999 and 7969-88. 04/1999. [VC1 + IA2].

Herbicide Dictionary

(continued)

RhinoTM (bromoxynil 62.5 lb ai + MCPA 1.9 lb ai/gal). For control of broadleaf weeds in wheat, barley, oat, rye, and flax. Bayer. EPA Reg. No. 264-699. 04/2002. [VC2 + IVA1].

Rhomene^{AE} MCPA amine (MCPA amine 64 lb ae/gal). Used for broadleaf weed control in flax, pea, and small grain. Bayer, NuFarm. Reg. No. 264-47AA or 11685-19-AA-71368. 11/1999 or 09/2001. [IVA1].

Rhonox^{AE} brand MCPA (MCPA ester 63.7 lb ae/gal). Used to control broadleaf weeds in small grain, rangeland, and turf. Bayer or NuFarm. EPA Reg. No. 11685-21-264. or 11685-21-71368. 09/2001 [IVA1].

Rimsulfuron An active ingredient in Accent Gold, Basis, Basis Gold, Matrix, Shadeout, and Steadfast. [IIA2].

Rodeo^{AE} (glyphosate 64 lb ae/gal). Special formulation of glyphosate for aquatic weed control. Dow AgroSci. EPA Reg. No. 62719-324. 05/2002. [IIB1].

Ro-Neet^{AE} 6E (cycloate 6 lb ai/gal). Used PPI in sugarbeet, table beet, and spinach for controlling annual grasses and some broadleaf weeds. Monterey. EPA Reg. No. 73767-5-56077. 09/2001. [IIIC3].

Ronstar^{AE} 50 WSP (oxadiazon 50% ai). For selective PRE control of annual weeds in turf including buffalograss and ornamentals. Bayer; Aventis ES. EPA Reg. No. 432-893. 07/2001 [VIII].

Roundup Custom^{AE} (isopropylamine salt of glyphosate 4 lb ae or 5 lb ai/gal). Need to add NIS with more than 70% ai. For nonselective weed control. For PP or PRE control of emerged weeds before seeding alfalfa, cereals, corn, grain sorghum, and soybean. Monsanto. EPA Reg. No. 524-343. 07/2002. [IIB1].

Roundup OriginalTM or Roundup OriginalTM II (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). NIS at 0.5% v/v may be added to improve weed control. Used for PP burndown in corn and soybean. RT is a bulk formulation and is excluded in some counties. Monsanto. EPA Reg. No. 524-445 or 524-454. 01/2000 or 10/2002. [IIB1].

Roundup^{AE} Pro^{AE} (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal). For industrial, turf, and ornamental weed control. Monsanto. EPA Reg. No. 524-475. 01/1999. [IIB1].

Roundup Pro ConcentrateTM (isopropylamine salt of glyphosate 65 lb ai/gal). For use in industry, turf, and ornamental weed control. Monsanto. EPA Reg. No. 524-529. 01/2001. [IIB1].

Roundup Pro DryTM (ammonium salt of glyphosate 71% or 64.9% ae w/w). For weed control in noncrop areas. Monsanto. EPA Reg. No. 524-505. 02/2001. [IIB1].

Roundup Ultra^{AE} (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal + surfactant). A POST non-selective translocated herbicide for annual and perennial grass and broadleaf weed control. Roundup Ultra is labeled for weed control in RR corn hybrids and soybean varieties. Monsanto. EPA Reg. No. 524-475. 01/2000. [IIB1]. Being phased out.

Roundup UltraMaxTM or UltraMaxTM RT (isopropylamine salt of glyphosate 63.7 lb ae or 5 lb ai/gal). For POST control of broadleaf and grass weeds in RR corn and soybean, burndown and noncropland weed control. Additional surfactant not required. Monsanto. EPA Reg. No. 524-512. 01/2001. [IIB1].

Roundup WeatherMaxTM (potassium salt of glyphosate 64.5 lb ae or 5.5 lb ai/gal). Selective control of weeds in RR crops. Nonselective control of weeds in other cropping systems. Monsanto. EPA Reg. No. 524-537. 04/2002. [IIB2].

Roundup Ultra RTTM (glyphosate 63 lb ae or 4 lb ai/gal). Only available in a 100-gallon returnable shuttle. Can only be used in western two-thirds of Nebraska. Monsanto. EPA Reg. No. 524-475. 01/2000 [IIB1]. Being phased out.

RT MasterTM (isopropylamine salt of glyphosate 63 lb ae or 4 lb ai/gal + 2,4-D amine at 0.4 lb ai/gal). For use in cropland and noncropland. Restricted to counties in western Nebraska. Monsanto. EPA Reg. No. 524-531. 01/2001. [IIB1].

s-metolachlor Active ingredient in Bicep Magnum RT, Bicep II Magnum, Bicep II Magnum FG, Boundary, Camix, Dual Magnum, Dual II Magnum, Dual II Magnum SI, Lumax, and Pennant Magnum. More active isomer than Dual. [IIB1].

Saber^{AE} (2,4-D dimethyl amine salt 63.8 lb/gal). For control of broadleaf weeds in small grain, corn, and grain sorghum. UAP. EPA Reg. No. 34704-803. 04/1999. [IVA1].

Sahara^{AE} EDG (7.78% imazapyr + 62.22% diuron). For control of all plants where bare ground is desired. BASF. EPA Reg. No. 241-372. 04/2001. [IIA1 + VB1].

Salvo (isooctyl ester of 2,4-D 65 lb/gal). A low volatile ester. UAP. EPA Reg. No. 34704-609. 07/2001. [IVA1].

Savage (2,4-D 695% WP 78.9% ae). Water soluble crystals of dimethylamine salt of 2,4-D. UAP. EPA Reg. No. 34704-606. 05/2002. [IVA1].

Scepter^{AE} 70DG (imazaquin 670% DG). A PPI, PRE, or POST grass and broadleaf weed control herbicide for soybean. BASF. EPA Reg. No. 306. 04/2001. [IIA1].

Scythe (pelargonic acid 4.2 lb ai/gal). For aquatic weed control. Also labeled to mix with glyphosate. Dow AgroSci.; Mycogen. EPA Reg. No. 62719-342 or 53219-7. 05/2002 or 04/1998. [VIC1].

Select^{AE} (clethodim 62 lb/gal). Used POST for annual and perennial grasses in alfalfa, canola, potato, soybean, sunflower, sugarbeet, and others. Valent. EPA Reg. No. 59639-3. 07/2002. [IA2].

Sempra^{AE} (halosulfuron-methyl 675%). Use for POST broadleaf weeds and nutsedge control in field, sweet, and popcorn, grain sorghum, and turf sod. Monsanto. EPA Reg. No. 524-465. 01/2001. [IIA2].

Sencor^{AE} 4 or DF (metribuzin 64 lb ai/gal or 75% DF). Trade name for metribuzin used for weed control in alfalfa, corn, potato, soybean, and fallow. Bayer. EPA Reg. No. 3125-314 (9/2000) or 3125-325. 11/2000. [VA2].

Sethoxydim Active ingredient in Conclude, Conclude G, Conclude Ultra, Conclude Xact, Manifest G, Poast, Poast Plus, Rezult, and Ultima 160 for grass control in alfalfa, soybean, and other broadleaf crops. [IA2].

Herbicide Dictionary

(continued)

Shadeout[®] (rimsulfuron 25% DF). PRE or POST for broadleaf and grass weed control in tomato. DuPont. EPA Reg. No. 352-556. 10/2000. [IIA2]. Not labeled in Nebraska.

Shotgun[®] (1.0 lb 2,4-D + 2.25 lb atrazine 63.75 lb/gal). For POST broadleaf weed control in sorghum and corn. UAP. EPA Reg. No. 34704-728. 05/1999. RUH. [IVA1 + VA1].

Silhouette[®] (glyphosate 63 lb ae or 4 lb ai/gal). For POST control of broadleaf and grass weeds for burndown, and noncropland weed control. Additional surfactant optional. Agrilience. EPA Reg. No. 524-445-1381. 2001. [IIB1]

Simazine An active ingredient in Aquazine, Pramitol 5PS, Princep, Princep Caliber, and Simazine 4L and 90 DF. Used for aquatic weed control, corn, shelterbelts, and soil sterilants. [VA1].

Simazine 4L or 90 DF Used for weed control in fruit and nut crops, corn, and shelterbelts. Agrilience. EPA Reg. No. 9779-296 or 9779-297. 08/2002 or 10/2002. [VA1].

Sinbar[®] (terbacil 680% WP). Used in dormant season for control of annual grass and broadleaf weeds in established alfalfa. DuPont. EPA Reg. No. 352-317. 11/1999. [VA4].

Snapshot[™] 2.5 TG (2.0% trifluralin + 0.5% isoxaben 1.25%) For PRE control of annual broadleaf and grass weeds in landscape ornamental and ground covers. Dow AgroSci. EPA Reg. No. 62719-175. 02/1999. [IIA1 + IIIE1].

Sodium chlorate An active ingredient in Riverside sodium chlorate, Pramitol 5PS. [VIII].

Sodium Chlorate Weed Killer (sodium chlorate 6 lb/gal). Used as a corn, dry edible bean, sorghum, soybean, or sunflower desiccant. Simplot. EPA Reg. No. 7001-342. 08/1999. [VIII].

Sodium metaborate An active ingredient in Pramitol 5PS.

Solicam[®] EDF (norflurazon 678.6% DF). Used PRE for controlling weeds in asparagus, grapes, and fruit trees. Syngenta. EPA Reg. No. 100-849. 10/2002. [VIA3].

Sonalan[™] HFP or 10G (ethalfluralin 63 lb ai/gal or 10G). Use PPI for annual grasses and certain broadleaf weeds in corn, dry edible bean, soybean, and sunflower. Dow AgroSci. EPA Reg. No. 62719-188 (12/1998) or 62719-184. 06/1999. [IIIA1].

Spartan[®] (sulfentrazone 675% DF or 4F which is 4 lb ai/gal). Labeled for tobacco but had a section 18 permit for broadleaf weed control in sunflower. FMC. EPA Reg. No. 279-3189 or 279-3220. 05/2001 or 02/2001. [VIA3].

Spike[™] 80 DF (tebuthiuron). Used for total vegetation and selective brush control in grassland and noncrop areas. Dow AgroSci. EPA Reg. No. 62719-107. 09/1999. [VB1].

Spin-Aid[®] (phenmedipham 1.1 lb ai/gal). For POST weed control in spinach and red beet. Bayer. EPA Reg. No. 264-616. 08/1995. [AV3].

Spirit[™] Herbicide (14.2% prosulfuron + 42.8% primsulfuron WDG). Used for POST broadleaf weed control in field corn and popcorn. Syngenta. EPA Reg. No. 100-911. 05/1999. [IIA2 + IIA2].

Squadron[®] (0.33 ai lb imazaquin + 2 ai lb pendimethalin 2.33 lb/gal). For PP, PPI, or PRE weed control in soybean. BASF. EPA Reg. No. 241-327. 04/2001. [IIA1 + IIIA1].

Starane[™] (fluroxypyr 1.5 lb ae/gal). POST for controlling kochia and other broadleaf weeds in small grain, corn and grain sorghum. Dow AgroSci. And UAP. EPA Reg. No. 62719-286. 05/2001. [IVA3].

Starane[™] + Esteron (0.75 lb ae fluroxypyr + 2,4-D ester 63 lb ae/gal). For control of broadleaf weeds and volunteer potato in small grains. Dow AgroSci. EPA Reg. No. 62719-306. 05/2001. [IVA3 + IVA1].

Starane[™] + MCPA (0.71 lb ae fluroxypyr + 2.84 lb ae/gal MCPA). For control of annual and perennial broadleaf weeds and volunteer potato in small grain. Dow AgroSci. EPA Reg. No. 62719-307. 05/2001. [IVA3 + IVA1].

Starane[™] + Saber[®] (0.5 lb ae fluroxypyr + 2.0 lb ae 2,4-D amine 2.5 lb ae/gal) Used POST for broadleaf control in small grain. UPA. EPA Reg. No. 62719-333. 05/2001. [IVA3 + IVA1].

Starane[™] + Salvo[®] (0.75 lb ae fluroxypyr + 3 lb ae 2,4-D ester 3.75 lb ae/gal). For POST broadleaf weed control in small grain. Dow AgroSci. EPA Reg. No. 62719-306. 05/2001. [IVA3 + IVA1].

Starane[™] + Sword (0.71 lb ae fluroxypyr + 2.84 lb ae MCPA 3.55 lb ae/gal). Used POST for controlling broadleaf weeds in small grain. Dow AgroSci. And UAP. EPA Reg. No. 62719-307. 05/2001/ [IVA3 + IVA1].

Starfire[®] Herbicide (1.5 lb/gal paraquat cation). A weed and grass, and harvest aid herbicide. Syngenta. EPA Reg. No. 10182-103. 08/2001. RUH. [VIB1].

Steadfast[™] (50% nicosulfuron + 25% rimsulfuron DG). For POST broadleaf and grass control in field corn. DuPont. EPA Reg. No. 352-608. 12/2001. [IIA2 + IIA2].

Steel[®] (0.17 lb imazaquin + 0.17 lb imazethapyr + 2.59 lb pendimethalin 3.4 lb ai/gal). For PP, PPI, or PRE control of grass and broadleaf weeds in soybean. BASF. EPA Reg. No. 241-376. 04/2001. [IIA2 + IIA2 + IIIA2].

Stellar[®] (0.7 lb flumiclorac + 2.4 lb/gal lactofen). Used for POST broadleaf weed control in soybean. Valent. EPA Reg. No. 59639-92. 07/2002. [IIA3 + VIA1].

Sterling[™] (dimethylamine salt of dicamba 4 lb ae/gal). For PP, PRE, or POST broadleaf weed control in field, seed and silage corn, popcorn and small grains. Some varieties are more sensitive. Also for pasture, hay, rangeland, and non-cropland. Agrilience. EPA Reg. No. 51036-289-9779. 03/2000. [IVA2].

Sterling[™] Plus (potassium salt of dicamba 1.1 lb ai ae + 2.1 lb ai/gal of atrazine). Used for weed control in corn, grain sorghum, and fallow systems. Agrilience. EPA Reg. No. 51036-307-9779. 04/2001. [IVA2 + VA1].

Stinger[™] (clopyralid 3 lb ae/gal). For POST broadleaf weed control in sugarbeet and corn. Dow AgroSci. EPA Reg. No. 62719-73. 03/2001. [IVA3].

Storm[®] (bentazon 2.67 lb + acifluorfen-1.33 lb ai/gal). For weed control in soybean. BASF. EPA Reg. No. 7969-76. 04/1999. [VC1 + VIA1].

Sulfentrazone An active ingredient in Authority, Authority Broadleaf, Authority One-Pass, Canopy XL, Command Xtra, Cover, Gauntlet, Oustar, and Spartan. [IIA2].

Herbicide Dictionary

(continued)

Sulfometuron Active ingredient in Oust, Oust XP, and Oustar. [IIA2].

Sulfosulfuron Active ingredient in Maverick for control of downy brome in winter wheat and Outrider for non cropland. [IIA2].

SurflanTM A.S. (oryzalin 4 lb ai/gal). Used PRE for annual grass and broadleaf weeds in fruit, nut, and Christmas trees, turf, and ornamentals. Dow AgroSci. EPA Reg. No. 62719-112 or 113. 05/2002. [IIA1].

SurpassTM EC or 20G (acetochlor + dichlormid safener 6.4 lb ai/gal or 20G). Used PRE for control of annual grass weeds in corn. Dow AgroSci. EPA Reg. No. 62719-367 or 370. 03/2001. [IIIB1].

Sword (MCPA 65.2 lb/gal). Used for broadleaf weed control in small grain and pastures. UAP. EPA Reg. No. 228-267-34704. 10/2001. [IVA1].

SWPTM 2,4-D LV4 (2-ethylhexyl ester of 2,4-D 3.76 lb ae/gal). Used to control broadleaf weeds in cereal crops, corn, sorghum, soybean, weeds, and brush in rangeland and pastures, and rights-of-way. Agrilience. EPA Reg. No. 42750-22-2A9779. 06/2001. [IVA1].

SynchronyTM STS^{AE} (31.8% chlorimuron + 10.2% thifensulfuron DG). For POST broadleaf control in STS soybean. DuPont. EPA Reg. No. 352-599. 08/2001. [IIA2 + IIA2].

TeamTM Pro (found in Turf Fertilizer as 0.43% benfluralin + 0.43% trifluralin 0.86%). PRE control of annual grasses and broadleaf weeds in established turf and established landscape ornamentals. Dow AgroSci., Agrilience, or UHS. EPA No. 62719-289. 06/2001. [IIIA1 + IIIA1].

TeamworkTM (carfentrazone 40% w/w). For early POST control of broadleaf weeds in field and seed corn, popcorn, silage corn, grain sorghum, soybean, barley, oat, and wheat. Agrilience. EPA Reg. No. 279-3194-1381. 08/2000. [VIA3].

Tebuthiuron Active ingredient in Spike. [VB1].

Telar^E DF (75% chlorsulfuron). Labeled for weed control in noncrop and industrial sites. DuPont. EPA Reg. No. 352-522. 07/1998. [IIA2].

Terbacil Active ingredient in Sinbar. [VA4].

Thifensulfuron An active ingredient in Basis, Canvas, Concert SP, Express Extra XP, Harmony Extra, Harmony GT, Pinnacle, Reliance STS, and Synchrony STS. [IIA2].

TopHand (acetochlor + halosulfuron + furalazole safener). Being developed for selective PRE weed control in corn. Monsanto. [IIIB1 + IIA2].

TopNotchTM (acetochlor + safener 3.2 lb ai/gal). An encapsulated form of Surpass for selective PRE weed control in field, seed, silage, and popcorn. Dow AgroSci. EPA Reg. No. 62719-369. 03/2001. RUH. [IIIB1].

TopsiteTM (0.5% imazapyr + 2.0% diuron 2.5% G). Controls many annual and perennial weeds in non-crop areas. BASF or Riverdale. EPA Reg. No. 241-344 or 228-308 or 34913-22. 02/1996. [IIA2 + VB1].

Tordon 101 Mixture (0.541 lb Picloram + 2.0 lb 2,4-D 2.5 lb ae/gal). For control of annual and perennial broadleaf weeds, woody plants and vines on noncrop areas. Dow AgroSci. EPA Reg. No. 62719-5. 05/1999. [IVA3 + IVA1].

TordonTM 22K or Tordon K (picloram 2 lb/gal). A POST herbicide for annual and perennial broadleaf weeds. Residues may last for several years in the soil. RTU is applied as a cut surface treatment on trees. Dow AgroSci. EPA Reg. No. 62719-6 12/1998 or 62719-17 09/2002. RUH. [IVA3].

Touchdown^E Pro (diammonium salt of glyphosate 3 lb ae or 3.75 lb ai/gal). For non selective weed control in turf, industrial, and noncropland uses. Additional surfactant optional. Syngenta. EPA Reg. No. 100-1121. 01/2002. [IIB1].

Touchdown^E (glyphosate diammonium salt 3 lb ae/gal or 3.75 lb ai/gal). For nonselective weed control and POST in glyphosate-tolerant corn or soybean. An NIS surfactant may be added. Syngenta; Zeneca. EPA Reg. No. 100-117; 10182-449. 08/2001; 11/2000. [IIB1].

Tough^E 5EC (pyridate 5 lb ai/gal). Used in combination with atrazine for POST weed control in corn. Syngenta. EPA Reg. No. 100-880. 05/1999. [VC3].

Tralkoxydim Active ingredient in Achieve used for summer annual grass control in wheat and barley. [IA2].

Trans-StarTM A special translocating surfactant used with glyphosate and Touchdown. Monsanto. Reg. EPA No. 10182-449.

TranslineTM (cloprialid 3 lb ae/gal). For selective control of broadleaf weeds in non-crop areas. Dow AgroSci. EPA Reg. No. 62719-259. 07/1999. [IVA3].

TreflanTM HFP or TR-10 (trifluralin 4 lb/gal or 10% WP). Used PPI or PRE (spinkler irrigation) in corn, dry edible bean, soybean, several vegetables, and nursery stock for annual grass and broadleaf weed control. Dow AgroSci. EPA Reg. No. 62719-250 or 131. 10/1999 or 01/2000. [IIIA1].

Triallate An active ingredient in Far-Go and Buckle. [IIIC3].

Triasulfuron An active ingredient of Amber, Fuego, and Rave [IIA2].

Tribenuron An active ingredient of Ally Extra, Canvas, Express XP, Express Extra XP, and Harmony Extra. [IIA2].

Triclopyr An active ingredient in Chaser 2, Chaser Turf Herbicide, Confront, Crossbow, Garlon 3A or 4A, Pathfinder II, Redeem R&P, Turflon Ester, and Weed B Gon. [IVA3].

Trifluralin An active ingredient in AgriStar Trifluralin, Broadstrike + Treflan, Buckle, Commence, Freedom, Passport, Preenin Green, Salute, Snapshot, Team Pro, Treflan HFP, Triflurex HPF, Tri-4, Tri-HF, Trific, Trillin, Tri-Scept, and Trust. [IIIA1].

Trifluralin 4EC Agri StarTM or Cornbelt^E Trifluralin EC (trifluralin 4 lb ai/gal). For PPI control of weeds in established alfalfa, pea, canola, potato, and soybean. Albaugh or Van Diest. EPA Reg. No. 42750-32 or 1812-355-11773. 10/1999. [IIIA1].

Triflurex^E HFP (trifluralin 4 lb ai/gal). For PPI weed control in established alfalfa, asparagus, most dry and fresh bean or pea, chicory, many vegetables, trees and soybean. Makhteshim-Agan. EPA Reg. No. 66222-46. 10/2002. [IIIA1].

Herbicide Dictionary

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Triflusalufuron Active ingredient in Upbeet. [IIA2].

Trillin[®] 5A 4L formulation of trifluralin. Griffin. EPA Reg. No. 1812-353. 09/1999. [IIA2].

Trimec Plus (MSMA 61.8 lb + 2,4-D 0.48 lb ae + mecoprop-0.24 lb ae + dicamba-0.12 lb ae/gal). For POST control of grass and broadleaf weeds in lawns. PBI/Gordon. EPA Reg. No. 2217-709. 11/2000. [IVA1 + IVA1 + IVA2].

Trimec Turf Herbicide (2.44 lb ae 2,4-D + 1.3 lb ae mecoprop + 0.22 lb ae/gal dicamba). For lawn broadleaf weed control in lawns. PBI/Gordon. EPA Reg. No. 217-517. 10/2000. [IVA1 + IVA1 + IVA2].

Triplet[®] ES (2,4-D 2.38 lb ae + MCPA 0.63 lb ae + dicamba 0.22 lb ae/gal). For broadleaf control in turfgrasses. Riverdale. EPA Reg. No. 228-312. 12/2000. [IVA1 + IVA1 + IVA2].

Trust[®] Herbicide EX or 10G (trifluralin 64 lb ai/gal or 4 lb ae/gal 10G) For PPI control of weeds in established alfalfa, canola, pea, potato, and soybean. Agrilience. EPA Reg. No. 1381-146 or 9779-303. 09/2001 or 10/2000. [IIIA1].

Tupersan[®] (siduron 50% w/w). For control of annual grasses in turf grasses. Gowan. EPA Reg. No. 10163-213. 12/1999. [VB1].

Turflon[™] Ester (triclopyr 4 lb ae/gal). For control of annual and perennial broadleaf weeds in ornamental turf. Dow AgroSci. EPA Reg. No. 62719-258. [IVA3].

2,4-D A growth regulating phenoxy herbicide for broadleaf weed control in grass crops. Many trade names contain 2,4-D. Some are Amine 4, Brushmaster, Champaign, Chaser 2, Chaser Turf Herbicide, Cornbelt 4 Lb. Amine, Crossbow, Curtail, D-638, DMA4 IVM, Esteron 99, Five Star, Formula 40, Grazon P+D, Hi-DEP, Landmaster BW, MEC Amine-D, Oasis, Pathway, Range Star, Saber, Savage, Scorpion III, Shotgun, Starane + Extron, Starane + Saber, Starane + Salvo, Super Trimec, S WP 2,4-D LV4, Trimec Classic, Trimec Classic DSC, Trimec Plus Quadmec, Trimec Lawn Weed Killer, 2,4-D Amine 4, 2,4-D LV6, Weedar 64, Weedone LV4, Weedone 638, Weedmaster. [IVA1].

2,4-D Amine 4 (3.8 lb ae/gal 2,4-D amine). PP, PRE, POST control of annual and biennial broadleaf weeds in field corn, sweet corn, PP to soybean, POST to small grains, grain sorghum, fallow, pastures, rangeland, turf grass, lawns, and aquatic areas. Agrilience. EPA Reg. No. 1381-103. 11/2001. [IVA1].

2,4-DB A growth regulating phenoxy herbicide for broadleaf weed control in alfalfa and soybean. An active ingredient in Butyrac 175, Butyrac 200, Butoxone 200, Butoxone 7500, and Rescue. [IVA1].

2,4-D LV6 (5.6 lb ae/gal of 2-ethylhexyl ester 2,4-D). For control of same weeds listed under 2,4-D amine 4, except aquatic areas. Agrilience. EPA Reg. No. 1381-101. 11/2001. [IVA1].

2,4-DP see dichlorprop.

Ultra Blazer[™] Has less leaf burn than Blazer. EPA Reg. No. 7969-079. 04/1999. [VA1].

Valor[™] or Valor[®] WP (flumioxazin 65.1% WDG or WP). Use PRE for broadleaf weeds and grass suppression in soybean. Valent. EPA Reg. No. 59639-99 or 59369-98. 09/2002. [VIA2].

Vanquish[®] (diglycolamine salt of dicamba 64 lb ai/gal). For selective broadleaf and brush control on noncropland and lawns. Syngenta. EPA Reg. No. 100-884. 06/2001. [IVA2].

Velpar[®] DF, or Velpar[®] L (hexazinone 75% DF or 2 lb ai/gal). Used for nonselective POST weed control on noncropland, Christmas tree plantings, and alfalfa. DuPont. EPA Reg. No. 352-581 (08/2001) or 352-392 (08/2001). [VA2].

Vista (fluroxypyr 61.5 lb ae/gal). Selective POST control of annual and perennial broadleaf weeds in non-crop areas. Dow AgroSci. EPA Reg. No. 62719-308. 02/1999. [IVA3].

Weedar[®] 64 (2,4-D dimethylamine salt 63.8 lb ae/gal). For broadleaf weed control in small grain, field and sweet corn, grain sorghum, and preplant to soybean. NuFarm. EPA Reg. No. 71368-1. 05/2002. [IVA1].

Weedmaster[®] Herbicide (dicamba 61 lb ae + 2.87 lb ae 2,4-D dimethylamine salt). For use in barley, forage sorghum, oat, rye, sudangrass, rye, wheat, pastures, rangeland, and non-crop land. BASF. EPA Reg. No. 7969-133. 04/1998. [IVA2 + IVA1].

Weedone[®] 638 (1 lb 2,4-D acid and 1.8 lb of 2,4-D ester 2.8 lb/gal). NuFarm. EPA Reg. No. 71368-3. 09/2001. [IVA1 + IVA1].

Weedone[®] ELV4 Solventless (isooctyl ester of 2,4-D 3.8 lb ae/gal). For broadleaf control of weeds in small grain, field corn, grain sorghum, and preplant to soybean. NuFarm. EPA Reg. No. 71368-14. 09/2001. [IVA1].

Weedone[®] ELV6 (isocetyl ester of 2,4-D 5.4 lb ae/gal). For broadleaf control of weeds in small grain, field corn, grain sorghum, and preplant to soybean. NuFarm. EPA Reg. No. 71368-11. 08/2001. [IVA1].

Yukon[™] (halosulfuron 12.5% + 55% sodium salt of dicamba WDG). For selective control of broadleaf and nutsedge in corn, field corn grown for seed, and grain sorghum. Monsanto. EPA Reg. No. 33906-11-524. 02/2002. [IIA2 + IVA2].

Zorial Rapid 80[®] (norflurazon 78.6% WP). Used for controlling weeds in alfalfa and soybean. Syngenta. EPA Reg. No. 100-848. 05/1999. [VIA3]. Not labeled in Nebraska.

Approximate Retail Prices of Selected Herbicides (Sept 2002)

<i>Product</i>	<i>Price (\$) per unit</i>	<i>Product</i>	<i>Price (\$) per unit</i>	<i>Product</i>	<i>Price (\$) per unit</i>
2,4-D amine	12.20/gal	Eptam 7E	33.50/gal	Phoenix	151.00/gal
2,4-D ester 4#	14.30/gal	Eradicane	29.00/gal	Plateau	300.00/gal
2,4-D ester 6#	19.30/gal	Escort	20.00/oz	Poast	70.00/gal
AAtrex 4L	12.50/gal	Evik	6.50/lb	Poast Plus	52.00/gal
AAtrex DF	2.70/lb	Exceed	11.50/oz	Pramitol 25E	28.50/gal
Accent	35.50/oz	Express	19.00/oz	Pramitol SP 5 PS	2.20/gal
Accent Gold	7.80/oz	Extreme	36.60/gal	Princep 4L	18.00/gal
Aim	7.00/oz	Fallow Master Broad Spectrum	20.40/gal	Princep 80W	4.10/lb
Alanap L	35.60/gal	Fieldmaster	25.60/gal	Progress	128.00/gal
Ally	23.50/oz	Finesse	14.70/oz	Prowl	21.50/gal
Amber	8.20/oz	FirstRate	26.00/oz	Pursuit DG	11.40/oz
Ammonium Sulfate	0.17/lb	Freedom	12.50/gal	Pursuit Plus	46.50/gal
Aquathol	17.50/lb	Frontier (6.0)	88.00/gal	Python	9.30/oz
Aquathol 1.6E	69.20/gal	Frontrow	360.00/lb	Raptor	4.10/oz
Arsenal	302.80/gal	Fuego	276.00/case	Rave	1.40/oz
Assure II	142.00/gal	Fultime	29.00/gal	Ready Master ATZ	27.50/gal
Authority	27.60/lb	Fusilade DX	136.00/gal	Reflex	93.00/gal
Authority Broadleaf	35.00/lb	Fusion	150.00/gal	Resource	166.00/gal
Axiom	18.30/lb	Garlon 3 lb A	75.00/gal	Reward	110.50/gal
Axiom AT	5.60/lb	Garlon 4 lb E	95.00/gal	Remedy	94.00/gal
Balan DF	9.45/lb	Gauntlet	3.12/oz	Remedy RTU	37.20/gal
Balance Pro	6.70/oz	Glean	16.00/oz	Rodeo	60.00/gal
Banvel	86.00/gal	Glyphosate (generic)	25.00/gal	Ro-Neet 6E	60.70/gal
Basagran	84.00/gal	G-Max Lite	48.00/gal	Ro-Neet 7E	61.30/gal
Basis	18.00/oz	Goal 2XL	100.00/gal	Roundup Original	34.50/gal
Basis Gold	20.30/lb	Gramoxone Extra	35.00/gal	Roundup Weather Max	58.00/gal
Beacon	26.70/oz	Gramoxone Max	39.00/gal	Roundup UltraMax	47.00/gal
Betamix	109.00/gal	Grazon P+D	29.60/gal	RT Master	23.50/gal
Beyond	535.00/gal	Guardsman	38.50/gal	Sahara	10.00/lb
Bicep II Lite Magnum	56.20/gal	Guardsman Max	44.50/gal	Sceptor 70 DG ECO	84.00/lb
Bicep II Magnum	43.30/gal	Harmony GT	11.70/gal	Select 2 EC	196.00/gal
Blazer 2L	68.00/gal	Harmony Xtra	12.50/oz	Sencor DF	19.80/lb
Boundary	80.00/gal	Harness	74.60/gal	Sinbar	32.00/lb
Bronate	48.00/gal	Harness 20G	2.20/lb	Sonalan	27.90/gal
Bronate Advanced	60.00/gal	Harness Xtra 5.6L	36.50/gal	Sonalan 10G	1.00/lb
Buctril	61.00/gal	Harness Xtra 6L	45.60/gal	Spartan	44.60/lb
Buctril + Atrazine	39.00/gal	Hi-Dep	20.00/gal	Spike 20P	11.00/lb
Bullet	20.00/gal	Hoelon	60.20/gal	Spirit	10.00/oz
Butyrac	36.00/gal	Hornet WDG	52.50/lb	Squadron	37.30/gal
Callisto	518.00/gal	Hyvar XL	64.00/gal	Starane	90.00/gal
Canopy XL	2.50/oz	Karmex 80W	4.80/lb	Starane + Salvo	51.00/gal
Canvas	14.30/oz	Kerb	38.80/lb	Steadfast	20.00/oz
Casoron 4G	2.20/lb	Keystone	29.52/gal	Steel	46.00/gal
Celebrity Plus	84.00/lb	Krenite	55.40/gal	Stellar	211.00/gal
Cimarron	21.50/oz	Krovarl	11.40/lb	Stinger	130.00/qt
Cimarron MAX	272.00/case	Ladclok S-12	46.00/gal	Surfactant/Nonionic 90%	16.60/gal
Clarity	88.00/gal	Landmaster BW	16.00/gal	Surflan	98.00/gal
Classic	12.60/oz	Lariat	19.20/gal	Surpass	70.00/gal
Cobra	142.00/gal	Lasso	23.80/gal	Synchrony	10.00/oz
Command 3ME	79.90/gal	LeadOff	37.00/gal	Telar	23.50/oz
Command Extra CoPack	410.00/case	Liberty	93.00/gal	Topnotch	36.30/gal
Connect 20 WSP	7.00/lb	Liberty ATZ	64.00/gal	Tordon 22K	96.00/gal
Crop Oil Conc.	4.40/gal	Lightning	12.50/oz	Tordon RTU	35.00/gal
Crossbow	51.00/gal	Lorox DF	11.00/lb	Touchdown IQ	40.40/gal
Curtail	39.00/gal	Lumax	44.00/gal	Tough	74.80/gal
Curtail M	44.50/gal	Marksman	30.00/gal	Transline	360.00/gal
Dacthal 75W	14.10/lb	Matrix	13.60/oz	Treflan	28.50/gal
Define	19.60/lb	Maverick Pro	13.50/oz	Treflan HFP	28.50/gal
Degree	44.50/gal	MCPA	16.00/gal	Trifluralin	20.50/gal
Degree Xtra	31.00/gal	Micro-Tech	24.00/gal	Ultra Blazer	72.20/gal
Dimension	115.00/gal	MSO	12.00/gal	Upbeet	50.00/oz
Distinct	38.00/lb	North Star	2.00/oz	Valor	80.00/lb
Diuron	3.70/lb	Nortron SC	120.00/gal	Velpar DF	22.30/lb
Domain	13.50/lb	Option	10.00/oz	Velpar L	60.00/gal
DoublePlay	32.00/gal	Outlook	142.00/gal	Yukon	2.80/oz
Dual II Magnum	110.00/gal	Paramount	3.10/oz	Zorial Rapid 80	15.10/lb
Epic	33.30/lb	Peak	11.30/oz		
Eptam 20G PRE/PPI	1.10/lb	Permit	16.00/oz		

Restricted Use Herbicides

Atrazine	Guardsman Max
AAtrex	Harness
Axiom AT	Harness Xtra
Balance	Hoelon
Basis Gold	Kerb
Bicep II Magnum	Keystone
Bicep Magnum TR	Laddok
Bicep Lite II Magnum	Lariat
Bladex, Boa	Lasso
Buctril/Atrazine	Liberty ATZ
Bullet	Lumax
Contour	Marksman
Degree	Micro-Tech
Degree Xtra	Option II
Double Play	Paraquat
Epic	Partner
Extrazine II	Pathway
Field Master	Ramrod/Atrazine
Freedom	Ready Master ATZ
Fultime	Roundup Master
G-Max Lite	Shotgun
Gramoxone Max	Surpass
Grazon P+D	Topnotch
Guardsman/LeadOff	Tordon

The label will indicate if a product is ***Restricted Use***. Only certified applicators should apply or supervise the application of restricted use herbicides. See your Extension Educator if you need to be certified.

Weed Science References

Most of the following resources are published by the University of Nebraska Cooperative Extension and are available from your Extension Educators. Many also are available on the Web.

Annual Grass and Perennial Weed Identification ó RP92

Aquatic Weed Control ó RP241

Banvel/Clarity and 2,4-D Damage to Fieldbeans and Soybean ó G802

(<http://www.ianr.unl.edu/pubs/pesticides/g802.htm>)

Best Management Practices for Agricultural Pesticide to Protect Water Resources ó G1182

(<http://www.ianr.unl.edu/pubs/water/g1182.htm>)

Blue Mustard Control ó G1272 (<http://www.ianr.unl.edu/pubs/weeds/g1272.htm>)

Canada Thistle Control ó G509 (<http://www.ianr.unl.edu/pubs/weeds/g509.htm>)

Common Milkweed ó G384 (<http://www.ianr.unl.edu/pubs/weeds/g384.htm>)

Common Weed Seedlings of the United States and Canada. Cooperative Extension Service, University of Georgia

Conducting a Prescribed Burn and Prescribed Burning Checklist ó EC121

Control of Downy Brome in Alfalfa ó G436 (<http://www.ianr.unl.edu/pubs/weeds/g436.htm>)

Controlling Jointed Goatgrass ó G1252 (<http://www.ianr.unl.edu/pubs/weeds/g1252.htm>)

Controlling Volunteer Rye in Winter Wheat ó G1225 (<http://www.ianr.unl.edu/pubs/fieldcrops/g1225.htm>)

Cultural Practices to Improve Weed Control in Winter Wheat ó G1389 (<http://www.ianr.unl.edu/pubs/weeds/g1389.htm>)

Downy Brome Control ó G422 (<http://www.ianr.unl.edu/pubs/weeds/g422.htm>)

Ecofarming: Fallow Aids in Winter Wheat Fallow Rotations ó G546 (<http://www.ianr.unl.edu/pubs/fieldcrops/g546.htm>)

Ecofarming: Spring Row Crop Planting and Weed Control in Winter Wheat Stubble ó G551

(<http://www.ianr.unl.edu/pubs/fieldcrops/g551.htm>)

Ecofarming-Growing the Winter Wheat Crop ó G1009 (<http://www.ianr.unl.edu/pubs/fieldcrops/g1009.htm>)

Ecofarming-Managing Corn and Sorghum Residue During Fallow ó G1010

(<http://www.ianr.unl.edu/pubs/fieldcrops/g1010.htm>)

Ecofarming ó No-Till Sorghum Following Ecofallow Corn or Sorghum ó G809

(<http://www.ianr.unl.edu/pubs/fieldcrops/g809.htm>)

Effective Herbicide Use in Christmas Tree Plantations ó RP251

Factors Affecting Foliar-Applied Herbicides ó RP250

Factors That Affect Soil-Applied Herbicides ó G1081 (<http://www.ianr.unl.edu/pubs/pesticides/g1081.htm>)

Fertilizer and Pesticide Containment Guidelines ó G1185

Field Records for Restricted Use Pesticide Applications and Integrated Crop Management by Private Applicators ó EC2540

Fine Tuning a Sprayer With the 'Ounce' Calibration Method ó G865 (<http://www.ianr.unl.edu/pubs/water/g1185.htm>)

Hemp Dogbane ó G665 (<http://www.ianr.unl.edu/pubs/weeds/g665.htm>)

Herbicide Mode of Action and Injury Symptoms ó RP377

Herbicide Resistant Weeds ó RP468

Herbicide Resistant Weeds ó G1399

Integrated Turfgrass Management for the Northern Great Plains ó EC1557

Leafy Spurge ó G834 (<http://www.ianr.unl.edu/pubs/weeds/g834.htm>)

Management of Eastern Redcedar on Grasslands ó G1308 (<http://www.ianr.unl.edu/pubs/range/g1308.htm>)

Musk Thistle ó G1109 (<http://www.ianr.unl.edu/pubs/weeds/g1109.htm>)

No-Till Corn in Alfalfa Sod ó G131

Nozzles-Selection and Sizing ó G955 (<http://www.ianr.unl.edu/pubs/farmpower/g955.htm>)

Pesticide Laws and Regulations ó G479 (<http://www.ianr.unl.edu/pubs/pesticides/g479.htm>)

Pigweed Identification ó A Pictorial Guide to the Common Pigweeds of the Great Plains ó EC138

Plumbing Systems for Agricultural Sprayers ó G1020 (<http://www.ianr.unl.edu/pubs/farmpower/g1020.htm>)

Questions and Answers About Atrazine ó G1158 (<http://www.ianr.unl.edu/pubs/pesticides/g1158.htm>)

Quick Test for Atrazine Carryover ó G113 (<http://www.ianr.unl.edu/pubs/pesticides/g113.htm>)

Rinsing Pesticide Containers ó G1150 (<http://www.ianr.unl.edu/pubs/pesticides/g1150.htm>)

Sagebrush Control ó G510 (<http://www.ianr.unl.edu/pubs/weeds/g510.htm>)

Sandbur Control in Corn ó G121 (<http://www.ianr.unl.edu/pubs/weeds/g121.htm>)

Shattercane and Its Control ó G1205 (<http://www.ianr.unl.edu/pubs/weeds/g1205.htm>)

Spray Drift of Pesticides ó G1001 (<http://www.ianr.unl.edu/pubs/pesticides/g1001.htm>)

The Thistles of North Dakota ó NDSU Ext. Serv. W-1120.

Toxic Varieties ó Plants and Mushrooms in the Midwest. Poison Control Center, Children's Memorial Hospital, Omaha.

Velvetleaf ó G681 (<http://www.ianr.unl.edu/pubs/weeds/g681.htm>)
Vine Weeds ó RP33
Weed Control in Alfalfa ó G1254 (<http://www.ianr.unl.edu/pubs/weeds/g1254.htm>)
Weed Control in No-Till Corn, Grain Sorghum and Soybean Production ó G899
(<http://www.ianr.unl.edu/pubs/weeds/g899.htm>)
Weed Control in CRP Acres ó G905 (<http://www.ianr.unl.edu/pubs/weeds/g905.htm>)
Weed Control in Soybean ó G875 (<http://www.ianr.unl.edu/pubs/weeds/g875.htm>)
WeedSOFT ó Computer Program for Weed Management
Where Do Weeds Come From ó G807 (<http://www.ianr.unl.edu/pubs/weeds/g807.htm>)
Wild Proso Control ó G648 (<http://www.ianr.unl.edu/pubs/weeds/g648.htm>)
Worker Protection Standard for Agricultural Pesticides ó G1219 (<http://www.ianr.unl.edu/pubs/pesticides/g1219.htm>)

Others

Weeds of Nebraska and the Great Plains. Bureau of Plant Industry, Nebraska Department of Agriculture.
Crop Watch Newsletter, P.O. Box 830918, University of Nebraska, Lincoln, NE 68583-0918

Internet Web Sites

Agronomy Department, University of Nebraska
<http://agronomy.unl.edu>

Cooperative Extension Web Publications, University of Nebraska
<http://www.ianr.unl.edu/pubs/>

CropWatch, University of Nebraska
<http://cropwatch.unl.edu>

Pesticide Education Resources, University of Nebraska
<http://pested.unl.edu/>

WeedSOFT, University of Nebraska
<http://www.weedsoft.unl.edu>

Software

WeedSOFT ó Weed Management Decision Support System, available from the University of Nebraska, Department of Agronomy and Horticulture, P.O. Box 830910, Lincoln, NE 68583-0910

Evaluation Form for the 2003 Guide for Weed Management

Please fill out and return this evaluation after you've had time to adequately use and evaluate the **2003 Weed Management Guide**. Your response helps us provide the information you need and produce a better quality guide. This form is pre-addressed and postage-paid. Just tear out this sheet, fold, tape, and mail it back to us. Please return by August 31, 2003. Thank you for your time and information.

Have you used the Weed Management Guide for Nebraska in previous years? Yes No

If so, for how many years? 1-5 6-10 Greater than 10

What is your profession:

Farmer Pesticide/Fertilizer Dealer UNL Staff
 Applicator State/Fed. Govt. Agency Field Scout
 Agribusiness Turf Business Other _____

Approximately how many acres will you grow, manage, or scout this year?

Corn Soybeans Wheat Sorghum Alfalfa
 Turf Other _____

Please rate the guide on the following criteria. (Circle one for each section):

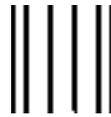
	Not Very	Somewhat	Moderately	Very Much
Guide is useful	1	2	3	4
Information is relevant	1	2	3	4
Information is reliable	1	2	3	4
Increased your weed management knowledge	1	2	3	4

On what portion of the acres you grow, manage, or scout will you change your practices as a result of what you have learned through the Weed Management Guide ? _____ % of acres

What would you estimate the value of this guide to you _____ (\$/A).

What suggestions do you have for future Weed Management Guides?

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Agronomy and Horticulture
Brady Kappler
362A Plant Science Bldg.
P.O. Box 830910
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EC130 Review



Nebraska Noxious Weeds

For information on controlling Nebraska's noxious weeds, see pages 88-89. For more detailed information on the biology, identification, distribution and control of each of these weeds, refer to the following extension circulars available from your local University of Nebraska Cooperative Extension Office or the Nebraska Department of Agriculture.



Canada Thistle
EC02-171



Plumeless Thistle
EC02-172



Spotted Knapweed
EC02-173



Diffuse Knapweed
EC02-173



Leafy Spurge
EC02-174



Musk Thistle
EC02-176



Purple Loosestrife
EC02-177

Nebraska Weed Watch List

The Nebraska Department of Agriculture has created a "watch list" of weeds in addition to the noxious weed list. Control of these weeds is not mandated by law; however, they are placed on the watch list when they have the potential for developing into a designated "noxious weed" or have already been designated in surrounding states. It is important that people be aware of these weeds and take steps to control them. Weeds on the watch list are:

Amur Honeysuckle / *Lonicera maackii*
Bull Thistle / *Cirsium vulgare*
Dalmation Toadflax / *Linaria dalmanica*
European Buckthorn / *Rhamnus cathartica*
Garlic Mustard / *Allaria petiolata*
Hairy Whitetop / *Candaria dubia*
Houndstongue / *Cynoglossum officinale*
Johnsongrass / *Sorghum halepense*
Kudzu / *Pueraria lobata*

Multiflora Rose / *Rosa multiflora*
Narrow-leaf birds-foot-trefoil / *Lotus tenuis*
Russian Knapweed / *Actoptilon repens*
Phragmites / *Phragmites australis*
Salt Cedar / *Tamarix ramosissima*
Scotch Thistle / *Onopordum acanthium*
Sericea Lespedeza / *Lespedeza cuneata*
Yellow Starthistle / *Centaurea solstitialis*
Yellow Toadflax / *Linaria vulgaris*



**Cooperative Extension
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln**

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