



LANDSCAPE AND GARDEN WEED CONTROL

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April 1997

HG 508

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ALWAYS READ THE LABEL

Always read and follow precisely all instructions on the label when using any herbicide product. To do otherwise is a violation of federal law. Sometimes products containing the same active ingredient(s) will specify different uses, restrictions, etc.

INTRODUCTION

Weeds around the home are a general nuisance, mar the natural beauty of a landscape, and decrease the value or marketability of residential properties. Weeds ruin lawns, gardens, and flowerbeds. Some weeds even grow through blacktop. Weeds may cause hayfever, be a fire hazard, and harbor insects or diseases. They cause flat tires, puncture bare feet, and cause skin irritation.

Pets also are affected by weeds. Seeds or burs tangled in a pet's hair are unsightly and irritating. Sharp or barbed weed seeds may enter their ears, nose, or eyes causing great discomfort

or injury. Often a veterinarian is needed to remove the seeds.

Weeds cost Utah farmers millions of dollars each year in damage to both crops and livestock. The consumer pays more for food because of these losses.

Much of the damage caused by weeds around homes can be prevented, but considerable effort is required. Persistence and patience are the keys to successful weed control.

This pamphlet will help you identify those techniques and tools most effective in managing your own landscape and garden weeds.

HERBICIDE APPLICATION EQUIPMENT

There are several types of sprayers suitable for residential weed control. They range from inexpensive plastic sprayers to elaborate and expensive power sprayers.

To find a sprayer suitable for your situation, choose one that is dependable and gives the coverage needed.

Do not to use the same sprayer for both insect and weed control. Some herbicides such as 2,4-D are difficult to completely remove from sprayers. Damage to desirable plants could result from a herbicide-contaminated sprayer used to apply insecticides. If you decide to use the same sprayer, wash it with detergent after herbicide use. Then fill the tank and prime the system with a solution of 1 pint of household ammonia in 10 pints of water and let stand. After 12 to 24 hours, rinse and purge the sprayer several times with clean water to totally remove ammonia solution.

HAND SPRAY BOTTLES:

Several herbicides now come ready-to-use (RTU) in disposable applicator spray bottles

(similar to window cleaner spray bottles). They are used for spot treating small areas or individual weeds.

HOSE END SPRAYERS:

These sprayers attach to the end of a garden hose and are acceptable for insecticides, but are not recommended for herbicides. They are difficult to calibrate and do not apply herbicides uniformly.

COMPRESSED AIR SPRAYERS:

One to three-gallon canister compressed air sprayers are the most common sprayers used by homeowners. Some are made of metal, but plastic models are effective and less expensive.

BACKPACK SPRAYERS:

There are several models of backpack sprayers on the market. These are usually more expensive than canister sprayers, but are more versatile. They have up to a 5 gallon capacity and maintain a more uniform pressure.

POWER SPRAYERS:

If you have large areas to spray, a power sprayer can be a good investment. These sprayers have a pump and regulator that provide constant pressure, and deliver a more uniform spray pattern. Some models are designed to mount on a 4-wheel ATV or small garden tractor.

WICK-WIPERS:

Various makes and models of “wiper” applicators are available, primarily for use in applying herbicides like Roundup. A herbicide-soaked sponge or other absorbent material in the applicator tool allows direct and accurate placement of herbicide on unwanted plants, without the hazard of spray drift.

SPRAYER CALIBRATION

CALIBRATION OF YOUR SPRAYER IS ESSENTIAL

Many people do not calibrate their sprayers, and then wonder why they do not obtain good weed control. Calibration is easy. The following method will work for any kind of hand-held sprayer.

Step 1. Select an open flat area (such as the lawn or driveway) for a sprayer calibration plot. Measure an area 25 feet wide by 40 feet long (1,000 square feet). Use a string or garden hose to mark the borders of your plot.

Step 2. Using clean water only (no herbicide), uniformly spray the entire calibration plot. Walk the same speed and use the same sprayer pressure and settings as you will later when actually spraying with herbicide. Remember, you only need to lightly wet the plants. Don't spray to the point that water drips off.

Record the time it takes to spray the calibration area.

Step 3. Repeat step 2 until your spray times becomes fairly consistent (plus or minus 10 percent of the average time it takes to spray the area).

Step 4. Refill the sprayer with water and spray into an empty bucket for the average amount of time it took to spray the calibration plot. Collect and measure

(ounces) the water in the bucket. This represents the amount of liquid solution your sprayer will deliver on a 1000 square foot area.

Step 5. Empty your sprayer, then refill it with the amount of water needed to cover 1,000 square feet. From instructions on the herbicide label, determine the amount of herbicide concentrate that is to be applied on 1,000 square feet. Add that amount to the water in the sprayer. Mix the herbicide and water together thoroughly. You are now ready to spray a 1,000 square foot area for weed control.

Example: If you used 128 ounces of water to spray your calibration plot, and if the herbicide label said to apply 3 ounces of herbicide concentrate per 1,000 square feet, you would put 125 ounces of water into your sprayer and add 3 ounces of herbicide concentrate (for a total of 128 ounces), and then spray that mixture on a 1,000 square foot area.

(Note: If your sprayer capacity is large enough, you may add two or three times the amount of both water and herbicide concentrate needed per 1,000 square feet. This allows you to spray 2,000 or 3,000 square feet between refills.)

Step 6. Apply the spray solution (water + herbicide) exactly as you sprayed your calibration plot (use same walking speed, sprayer pressure, and equipment

settings). Check yourself periodically to make sure you are covering the correct square footage with each spray load.

If a herbicide label recommendation is in gallons or pounds per acre, use Table 1 to convert to amount per 1,000 square feet.

Table 1. Conversion of Herbicide Rate/Acre to Rate/1,000 Square Feet.

LIQUID MATERIALS		
Rate of Commercial Formulation Per Acre	Approximate Rate Per 1,000 Square Feet	
1 pint	¾ tablespoon	
1 quart	1½ tablespoons	
2 quarts	3 tablespoons	
1 gallon	6 tablespoons	
DRY MATERIALS		
Rate of Commercial Formulation Per Acre	Approximate Rate Per 1,000 Square Feet	
	Wettable Powder	Granular Materials
1 pound	5 teaspoons	2 ¼ teaspoons
2 pounds	3 tablespoons	4 ½ teaspoons
3 pounds	5 tablespoons	2 ¼ tablespoons
4 pounds	6 tablespoons	3 tablespoons
5 pounds	8 tablespoons	4 tablespoons
10 pounds	1 cup	½ cup
100 pounds		5 cups
TABLE OF USEFUL EQUIVALENTS		
Liquid 1 gallon = 4 quarts = 128 ounces 1 quart = 2 pints = 32 ounces 1 pint = 2 cups = 16 ounces 1 tablespoon = 3 teaspoons 16 tablespoons = 1 cup = 8 ounces 1 ounce = 29.5 milliliters 1 tablespoon = 15 milliliters = ½ ounce	Dry 1 pound = 16 ounces = 454 grams 1 ounce = 28.25 grams	
	Area 1 acre = 43,560 square feet	

LAWN WEED CONTROL

WEED CONTROL METHODS

A smooth, dark green, weed-free lawn adds to a beautiful landscape. Follow these basic management practices to create quality turf areas.

PROMOTE HEALTHY LAWN

1. Weed-free Seed

The sources of weed contamination in lawn areas include: (1) contaminated grass seed, (2) wind-blown weed seeds; (3) weed seeds in irrigation water, (4) weed-infested manure, (5) birds, and (6) invading weed roots or runners from adjacent fields or beds. Buying good quality, weed-free seed is the first step to a healthy lawn; conversely, contaminated seed invites trouble. The label on seed packages is required by law to show the percentage of weed seed. Inexpensive seed isn't always the best buy.

2. Fertilization

Good lawn management requires regular fertilization to keep the grass thick and healthy so that weeds cannot become established easily. Proper fertilization is one of the most effective and least expensive turf weed control methods.

3. Mowing

Mow grass frequently, but not too short. Setting the mower too low damages the lawn and encourages the invasion of weeds. Grasses need plenty of leaf surface to develop and maintain a healthy root system. Generally 2½ inches is the right clipping height. Keep the mower sharp. Do not remove the clippings unless they are excessive and will smother the grass.

4. Irrigation

Water according to weather and soil type. A mostly-clay soil would probably do well with one watering per week. Sandier soils may need two or three waterings per week. Allow the top half inch of soil to dry out between waterings to discourage weed seed germination. Light, frequent waterings encourage weed growth.

CONTROL LAWN WEEDS

1. Identification of Weeds

The first step in controlling lawn weeds is identifying the specific weed problem. If you don't know the names of the weeds, purchase a good weed identification book, or contact your USU Extension agent, Extension specialist, or other qualified person.

2. Digging or Pulling

Digging weeds out of a lawn is a common method of control. It requires work, but is very effective. When digging dandelions, be sure to cut the taproots off below the crown, or new growth soon appears. Pulling weeds is easier after irrigation when the soil is wet, but is difficult in dry soil.

3. Chemical Control

There are several effective herbicides on the market that control lawn weeds. When used as directed, they are safe for homeowner use; but that doesn't mean they can be used indiscriminately. Carefully read and follow the instructions on the container label to insure good and safe weed control. Broadcast applications may be needed when weed populations are high, but if weed numbers are relatively low, spot treatment of individual plants is desirable.

LIST OF LAWN HERBICIDES*

ACTIVE INGREDIENTS	REPRESENTATIVE BRAND NAMES
1- benefin	Balan, Benefin
2- benefin + trifluralin	Team
3- benefin + trifluralin + isoxaben	Prevent
4- bensulide + oxadiazon	Scott's Goosegrass and Crabgrass Control
5- DCPA	Dacthal
6- isoxaben	Gallery, Galleria
7- pendimethalin	PRE-M
8- 2,4-D	2,4-D Amine, Dandelion Killer, Weed-B-Gone, Weed-N-Feed, etc.
9- 2,4-D + 2,4-DP + MCPP	Triamine
10- 2,4-D + MCPP + dicamba	Trimec, Weed-Out, Lawn Weed Killer, Spurge & Oxalis Killer, Feed & Weed, Premium Weed & Feed, Weedit II, Weed-B-Gone, etc.
11- 2,4-D + dicamba +MCPP +MSMA	Quadmec
12- glufosinate	Finale
13- glyphosate	Roundup, Killzall, Kleenup
14- MSMA	Crabgrass Killer, etc.
15- triclopyr + clopyralid	Confront

* Some of these herbicides may not be available locally, or they may be sold under a different brand name. Consult a pesticide specialist at your local supplier to identify comparable alternatives.

WEED RESPONSE TO LAWN HERBICIDES

LAWN WEED	SELECTIVE HERBICIDES													
	(See previous table for name corresponding to herbicide number)													
	1	2	3	4	5	6	7	8	9	10	11	14	15	
bindweed	-	-	-	-	-	P	-	F	F	G	G	F	F	
black medic	-	-	-	-	-	F	-	P	F	G	G	-	E	
bull thistle	-	-	-	-	-	G	-	G	G	E	E	-	E	
Canada thistle	-	-	-	-	-	-	-	F	F	G	G	-	G	
chickweed	-	-	-	-	F	G	G	P	F	G	G	F	G	
clover	-	-	-	-	-	F	F	P	F	G	G	-	E	
dandelion	-	-	-	-	-	P	-	G	G	E	E	-	E	
mallow	-	-	-	-	-	P	-	F	F	G	G	-	G	
oxalis	-	P	P	F	-	G	G	P	P	G	G	F	G	
plantain	-	-	-	-	-	F	-	F	F	G	G	-	G	
puncturevine	-	-	-	-	-	-	F	G	G	E	E	F	G	
purslane	-	P	P	-	F	P	G	F	F	G	G	-	F	
spurge	-	P	P	-	P	P	F	F	F	G	G	-	G	
violet	-	-	-	-	-	-	-	P	F	F	F	-	G	
annual bluegrass	G	G	G	G	F	P	F	-	-	-	-	-	-	
bentgrass*	-	-	-	-	-	-	-	-	-	-	-	-	-	
bermudagrass *	-	-	-	-	-	-	-	-	-	-	-	-	-	
crabgrass	F	G	G	G	F	P	G	-	-	-	F	F	-	
green foxtail	F	E	E	G	F	P	E	-	-	-	F	F	-	
goosegrass	F	G	G	P	P	P	F	-	-	-	F	F	-	
orchardgrass*	-	-	-	-	-	-	-	-	-	-	-	-	-	
quackgrass *	-	-	-	-	-	-	-	-	-	-	-	-	-	

- = No control, or no information available

P = Partial or poor control, 10 to 60%

F = Fair or temporary control, 60 to 80%

G = Good control, 80 to 95%

E = Excellent control, 95 to 100%

* = No selective herbicides available. Spot treatments or total lawn renovation with glyphosate or glufosinate may be required for control. Application of these products kills all desirable grasses contacted.

LAWN HERBICIDE DESCRIPTIONS (Active Ingredients and Representative Brand Names)

PREVENTIVE / PREEMERGENT HERBICIDES:

1- **benefin:** (Balan, Benefin)

A selective preemergent herbicide for established lawns.

Weeds: Primarily for control of crabgrass and some other annual grassy weeds. May give partial control of some annual broadleaf weeds (not effective against spurge).

Timing: Apply in spring (before April 15) prior to crabgrass germination.

2- **benefin + trifluralin:** (Team)

A selective preemergent herbicide for established lawns.

Weeds: Primarily for control of crabgrass. Also provides control of annual bluegrass, goosegrass, barnyardgrass, green foxtail, and yellow foxtail. May give partial control of some annual broadleaf weeds.

Timing: Apply in spring (before April 15) prior to crabgrass germination.

3- **benefin + trifluralin + isoxaben:** (Prevent)

A selective preemergent herbicide for established lawns. Active ingredients make it equivalent to a pre-mix of Team + Gallery.

Weeds: Controls the same annual grasses as Team, plus the annual broadleaf weeds controlled by Gallery.

Timing: Apply in spring (before April 15) prior to crabgrass germination.

4- **bensulide + oxadiazon:** (Scott's Goosegrass and Crabgrass Control)

A selective preemergent herbicide for established lawns.

Weeds: Primarily for control of crabgrass and certain other annual grasses.

Timing: Apply in spring (before April 15) prior to crabgrass germination.

5- **DCPA:** (Dacthal)

A selective preemergent herbicide for established turf.

Weeds: Controls many broadleaf weeds (chickweed, purslane, spurge) as well as crabgrass and certain other annual grassy weeds. Generally provides better control of grasses than

broadleaf weeds.

Timing: Apply in spring (before April 15) prior to weed germination. Lawn should be watered immediately after herbicide application. Second application 8 weeks later often needed to control spurge and later annuals.

6- isoxaben: (Gallery, Galleria)

A selective preemergent herbicide for established lawns.

Weeds: Controls annual broadleaf weeds such as chickweed, filaree, knotweed, mustards, pigweed, plantain, prostrate spurge, purslane, and woodsorrel. High label rates provide partial control of annual bluegrass, barnyardgrass, and green foxtail. Also premixed with a granular fertilizer and sold as "Galleria."

Timing: Apply in fall or spring prior to weed germination. Controls only weeds that emerge from seed following application. Does not control re-emerging (overwintering) annuals, or perennials emerging from crowns or roots.

7- pendimethalin: (PRE-M)

A selective preemergent herbicide for established lawns.

Weeds: Control crabgrass and most other annual grassy weeds. Also provides control of annual broadleaf weeds such as chickweed, knotweed, puncturevine, and spurge.

Timing: Apply in spring (before April 15) prior to crabgrass germination.

POSTEMERGENCE / FOLIAR HERBICIDES:

8- 2,4-D: (2,4-D Amine, Dandelion Killer, Weed-B-Gone, Weed-N-Feed, etc.)

A postemergent herbicide for basic broadleaf weed control in established lawns. Sometimes 2,4-D is included with lawn fertilizers. Applications in both spring and fall may be required to control difficult weeds. Do not make more than two broadcast applications per year.

Weeds: Controls or suppresses many annual and some perennial broadleaf weeds, including dandelions.

Timing: Apply when weeds are actively growing, but not if air temperatures are expected to exceed 80 degrees F within 3 days after application.

9- 2,4-D + 2,4-DP + MCPP: (Triamine)

A selective postemergent herbicide for established lawns. More potent and longer-lasting than 2,4-D alone.

Weeds: Controls most annual and perennial broadleaf weeds, including chickweed, clover, mallow, plantain, thistles, and spurge.

Timing: Apply when weeds are actively growing, but not if air temperatures are expected to exceed 80 degrees F within 3 days after application.

10- 2,4-D + MCPP + dicamba: (Trimec, Weed-Out, Lawn Weed Killer, Spurge & Oxalis Killer, Feed & Weed, Premium Weed & Feed, Weed-B-Gone, Weedit II, etc.)

A selective postemergent herbicide for established lawns. More potent and longer-lasting than 2,4-D alone.

Weeds: Controls most annual and perennial broadleaf weeds, including chickweed, clover, mallow, plantain, thistles, and spurge.

Timing: Apply when weeds are actively growing, but not if air temperatures are expected to exceed 80 degrees F within 3 days after application. Do not apply within the dripline of trees or shrubs. Active herbicide can leach down into root zone of woody plants and cause injury.

11- 2,4-D + dicamba + MCPP + MSMA: (Quadmec)

A selective postemergent herbicide combination for established lawns. Do not treat within the dripline of trees or shrubs.

Weeds: Controls same annual and perennial broadleaf weeds as Trimec or Triamine, plus crabgrass and certain other annual grassy weeds.

Timing: Apply when weeds are actively growing, but not if air temperatures are expected to exceed 80 degrees F within 3 days after application.

12- glufosinate: (Finale)

A non-selective foliar-active herbicide for: 1) control of weeds prior to lawn establishment, or 2) for spot treatment of individual weeds in landscape sites. **CAUTION:** Any desirable plants (including lawn grasses) contacted by this spray will be killed.

Weeds: Quick control of annual grasses and broadleaf weeds. Provides suppression or temporary control of perennial weeds.

Timing: Apply when weeds are actively growing.

13- glyphosate: (Roundup, Killzall, Kleenup)

A non-selective foliar-active herbicide for: 1) control of weeds prior to lawn establishment, 2) for lawn edging or removal, or 3) for spot treatment of individual weeds in landscape sites. **CAUTION:** Any desirable plants (including lawn grasses) contacted by this spray will be killed.

Weeds: Controls annual grass and broadleaf weeds. Also effective against quackgrass, orchardgrass, bermudagrass, other perennial grasses, and many perennial broadleaf weeds such as field bindweed (morningglory) and Canada thistle.

Timing: Apply when weeds are actively growing. Applications to perennial weeds are generally most effective as plants enter the flowering stage, or in the early fall.

14- MSMA: (Crabgrass Killer, etc.)

A selective postemergent herbicide for established lawns.

Weeds: Primarily for control of crabgrass and certain other annual grassy weeds.

Timing: Apply when grassy weeds are small and actively growing.

15- triclopyr + clopyralid: (Confront)

A selective postemergent herbicide for established lawns.

Weeds: Controls annual and perennial broadleaf weeds. Particularly effective against clover and black medic.

Timing: Apply when weeds are actively growing.

* Common names of herbicide active ingredients are listed (with brand names of one or more representative products in parentheses). When looking for these active ingredients, keep in mind they may be found under different brand names; or in mixtures with other herbicides or lawn fertilizer. Common herbicides will be available any place where garden chemicals are sold. Other not-so-common herbicides are available only in farm stores or from chemical suppliers.

**Do not use 2,4-D products around flowers, shrubs, and sensitive garden plants. Use only the amine forms of 2,4-D in and around residential areas to reduce the chance of damage to sensitive plants. Spray only when the air is calm and the forecasted high temperature for the day is less than 80 degrees F. Early morning or late evening is the best time to spray with 2,4-D to minimize chemical drift or volatilization. Damage from 2,4-D volatilization is less likely to occur if application is made in spring or fall. Avoid mowing 4 to 5 days before, or 2 to 3 days after spraying. Avoid watering the lawn for 1 or 2 days after spraying. When using herbicide/fertilizer combination products (weed-and-feeds), follow label directions for watering. Many recommend watering turf prior to application of the product.

ORNAMENTAL WEED CONTROL

WEED CONTROL METHODS

Handweeding, tillage, mulching, and herbicides should be considered when designing a weed control program for ornamentals. The most effective method or combination of these methods will depend on the weed species. Therefore, accurate identification of the weed problems is essential.

Mulches can be very effective against weeds, especially annual weeds. Mulches work primarily by depriving young weed seedlings of vital sunlight. Many materials have been used effectively as mulches. Examples include sheets of plastic, grass clippings, sawdust, straw, wood shavings, bark chips, newspapers, gravel, and even rocks. The latest commercial mulch

materials are made of a tightly woven black fabric that prevents sunlight from reaching the soil, but allows the passage of water and air.

Several herbicide options are available for residential use. Preemergent herbicides kill weeds as they germinate. Preemergent herbicides are usually preferred in ornamentals. They must be applied before weeds sprout. Overhead irrigation (or rainfall) is required to move the herbicide into the top inch or two of soil. Preemergent herbicides may be mechanically mixed into the soil, but still need water to be activated. Application is usually made in the fall or early spring.

Spray beds freshly prepared for

transplanting and shallowly incorporate the preemergent herbicide into the soil using hand implements or sprinkler irrigation. Flowers are transplanted directly into the bed, with their roots placed below the layer of treated soil.

Preemergent herbicides usually are effective for several weeks; after which time the flowers will provide sufficient competition to prevent new weeds from becoming a serious problem. Weeds can be controlled under ornamentals trees, shrubs, and some ground covers using preemergent herbicides.

Certain selective postemergent herbicides (such as those containing the active ingredient fusilade or sethoxydim) can be applied over the top of many ornamentals to kill annual and perennial grasses without injury to the desirable plants. Even some non-selective foliar herbicides (such as those containing the active ingredient glufosinate or glyphosate) can be used in ornamentals if applied carefully as spot treatments or wiped on individual weeds in such a way to prevent contact of the chemical with any desirable plants.

LIST OF HERBICIDES FOR ORNAMENTALS*

ACTIVE INGREDIENTS	REPRESENTATIVE BRAND NAMES
1- benefin + isoxaben + trifluralin	Prevent
2- benefin + oryzalin	XL
3- bensulide	Bensumec, Betasan, Lescosan
4- DCPA	Dacthal
5- dichlobenil	Casoron, Dyclomeil
6- EPTC	Eptam
7- isoxaben	Gallery, Galleria
8- isoxaben + oryzalin	Snapshot DF
9- isoxaben + trifluralin	Snapshot TG
10- metolachlor	Pennant
11- napropamide	Devrinol
12- oryzalin	Surflan
13- oxyfluorfen + pendimethalin	Ornamental Herbicide II
14- pendimethalin	Pendulum, PRE-M
15- trifluralin	Treflan
16- fluazifop	Fusilade, Grass-B-Gone, Ornamec, Over-The-Top
17- glufosinate	Finale
18- glyphosate	Avail, Killzall, Kleenup, Roundup
19- sethoxydim	Poast, Vantage

* Some of these herbicides may not be available locally, or they may be sold under a different brand name. Consult a pesticide specialist at your local supplier to identify comparable alternatives.

WEED RESPONSE TO ORNAMENTAL HERBICIDES

WEED	SELECTIVE HERBICIDES																		
	(See previous table for name corresponding to herbicide number)																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19		
bindweed	P	-	-	-	F	-	P	P	F	-	-	-	-	-	F	N	N		
black medic	G	-	-	-	-	-	G	G	G	-	-	-	-	-	-	N	N		
bull thistle	G	-	-	-	G	-	G	G	G	-	-	-	-	-	-	N	N		
bur buttercup	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N		
Canada thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N		
chickweed	G	G	-	G	G	G	G	G	G	-	G	G	G	G	G	N	N		
clover	F	-	-	-	-	-	F	F	F	-	-	-	F	G	-	N	N		
dandelion	P	-	-	-	G	-	P	P	P	-	-	-	-	-	-	N	N		
equisetum	-	-	-	-	G	-	-	-	-	-	-	-	-	-	-	N	N		
groundsel	F	P	-	-	G	-	F	F	F	-	G	P	G	-	-	N	N		
henbit	G	G	G	-	G	G	G	G	G	-	-	G	G	G	G	N	N		
hoary cress	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N		
knotweed	G	G	-	-	G	-	G	G	G	-	G	G	G	G	G	N	N		
kochia	G	-	-	-	-	-	-	-	G	-	-	-	G	G	G	N	N		
lambsquarters	G	-	G	G	G	F	G	G	G	-	G	G	G	G	-	N	N		
mallow	P	P	-	-	-	-	P	P	P	-	P	P	G	-	-	N	N		
mustards	G	P	-	-	G	-	G	G	G	-	-	P	G	-	-	N	N		
nightshade	G	P	-	-	-	F	G	G	G	F	-	P	G	-	-	N	N		
oxalis	G	P	-	-	G	-	G	G	G	-	-	P	G	G	-	N	N		
pigweeds	G	-	G	F	-	F	G	G	G	G	G	G	G	G	G	N	N		
puncturevine	G	G	-	-	-	-	-	G	G	-	-	G	G	G	G	N	N		
ragweed	G	-	-	-	G	-	G	G	G	-	P	P	-	-	-	N	N		
shepherdspurse	G	F	G	-	G	-	G	G	G	-	-	G	G	G	-	N	N		
speedwell	G	-	-	G	-	-	G	G	G	-	-	-	G	G	-	N	N		
spurge	F	P	-	F	G	-	F	G	F	-	-	G	G	G	-	N	N		
wild buckwheat	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	N	N		
yarrow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N		
annual bluegrass	G	F	G	F	G	G	P	F	G	G	G	F	F	F	G	G	G		
annual ryegrass	G	F	-	-	G	G	P	G	G	-	G	G	-	G	G	G	G		
barnyardgrass	G	G	G	F	G	G	P	G	G	-	G	G	G	G	G	G	P		
bermudagrass	-	-	-	-	P	F	-	-	-	-	-	-	-	-	-	F	E		
crabgrass	G	G	G	G	G	G	P	G	G	G	G	G	G	G	G	G	G		
green foxtail	G	G	G	G	G	G	P	G	G	-	G	G	G	G	G	G	E		
Kentucky bluegrass	-	-	-	-	G	G	-	-	-	-	-	-	-	-	-	G	F		
perennial grasses	-	-	-	-	F	G	-	-	-	-	-	-	-	-	-	G	F		
quackgrass	-	-	-	-	F	G	-	-	-	-	-	-	-	-	-	G	F		
nutsedge	-	-	-	-	-	F	-	-	-	G	-	-	-	-	-	-	-		

- = No information available

P = Partial or poor control, 10 to 60%

F = Fair or temporary control, 60 to 80%

G = Good control, 80 to 95%

E = Excellent control, 95 to 100%

N = No control

ORNAMENTAL HERBICIDE DESCRIPTIONS

PREVENTIVE / PREEMERGENT HERBICIDES:

1- **benefin + isoxaben + trifluralin:** (Prevent)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in woody ornamentals, some ground covers, and certain bulb plants. Do not use on bedding plants, or where bedding plants will be planted or transplanted within the next year. Equivalent to a pre-mix of Team + Gallery.

Weeds: Controls a wide variety of annual grasses and broadleaf weeds.

Timing: Apply in late summer to early fall, or in early spring, before weeds germinate. Also may be applied in summer immediately following cultivation. Soil incorporation (mechanical or irrigation) is required within 3 days after application.

2- **benefin + oryzalin:** (XL)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in woody ornamentals, certain ground covers, and some bulbs. Area should be free of weeds prior to application. Equivalent to a pre-mix of Balan + Surflan.

Weeds: Controls most annual grasses and some annual broadleaf weeds.

Timing: Apply prior to emergence of weeds. Apply only to established plantings. Soil incorporation (mechanical or irrigation) is required soon after application.

3- **bensulide:** (Bensumec, Betasan, Lescosan)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

Area should be free of weeds prior to application. May be applied two or more times per season, depending on weed pressure.

Weeds: Controls most annual grasses and some annual broadleaf weeds.

Timing: Apply prior to emergence of weeds. Apply only to well-established ornamentals. Soil incorporation (mechanical or irrigation) is required soon after application.

4- **DCPA:** (Dacthal)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide that provides weed control for 1 to 2 months.

Weeds: Controls a variety of annual grasses and broadleaf weeds including barnyardgrass, crabgrass, foxtail, lambsquarters, pigweeds, and purslane. Generally provides better control of grasses than broadleaf weeds.

Timing: Apply at or before transplanting. In established ornamentals apply in early spring before

weeds emerge. If there is much delay between soil preparation (last tillage) and transplanting, it may be necessary to cultivate again lightly to remove new weed seedlings before applying the herbicide. Herbicide should be incorporated by sprinkler irrigation if at least ½ inch of rainfall does not fall within 3 days after application. Do not disturb after incorporation is complete.

5- **dichlobenil:** (Casoron, Dyclomec)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use under established woody ornamentals. Not for use in flower beds.

Weeds: Controls a wide variety of annual grasses and broadleaf weeds. Provides partial control or suppression of perennial weeds, including quackgrass and field bindweed.

Timing: Apply under established trees or vines. For annual weeds, apply in the spring before weeds germinate. For perennial weeds, apply in the late fall or early winter before ground is frozen. Remove any existing weeds prior to application. After application, sprinkle the soil lightly to incorporate herbicide. One application is generally enough to give season-long control. **CAUTION:** Do not use on extremely sandy soils or on extremely rocky or gravelly soils.

6- **EPTC:** (Eptam)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide. As with other preemergent herbicides, any weeds that are growing on the site should be removed before EPTC is applied. Soil to be treated should be loose and free of clods.

Weeds: Controls a variety of annual grasses and broadleaf weeds. Also provides good to excellent control of quackgrass, bermudagrass, and other perennial grasses.

Timing: Apply before new weeds emerge. Apply after flowers are 3 to 5 inches high, or 2 weeks after transplanting. For trees, shrubs, or ground covers, apply after growth starts in the spring, or 2 weeks after transplanting.

Broadcast evenly on the soil surface and mix immediately (within minutes) and thoroughly into the soil to a depth of 2 to 3 inches using a hand rake or hand cultivator. EPTC may also be mixed into the soil by watering immediately after application until the soil is wet to a depth of 2 inches. Shallow cultivation (1 to 1.5 inches) after incorporation will not destroy the effectiveness of EPTC.

7- **isoxaben:** (Gallery, Galleria)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in woody ornamentals, some ground covers, and certain bulb plants. Do not apply to newly established ornamentals until soil surface has settled and is crack free.

Weeds: Controls annual broadleaf weeds such as chickweed, filaree, knotweed, mustards, pigweed,

plantain, prostrate spurge, purslane, and woodsorrel. High label rates provide partial control of annual bluegrass, barnyardgrass, and green foxtail. May be tank mixed with Surflan or one of several other ornamental herbicides for control of a broader spectrum of weeds. Also premixed with a granular fertilizer and sold as "Galleria."

Timing: Apply in fall or spring prior to weed germination, or during the summer immediately following a cultivation. Controls only weeds that emerge from seeds following application. Does not control re-emerging (overwintering) annuals, or perennials emerging from crowns or roots. Activate with ½ inch sprinkler irrigation or shallow cultivation.

8- isoxaben + oryzalin: (Snapshot DF)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in woody ornamentals, some ground covers, and certain bulb plants. Equivalent to a pre-mix of Gallery + Suflan.

Weeds: Controls a wide variety of annual grasses and broadleaf weeds.

Timing: Apply in late summer to early fall, or in early spring, before weeds germinate. Also may be applied in summer immediately following cultivation. Soil incorporation (mechanical or irrigation) is required soon after application.

9- isoxaben + trifluralin: (Snapshot TG)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in woody ornamentals, some ground covers, and certain bulb plants. Do not use on bedding plants, or where bedding plants will be planted or transplanted within the next year. Equivalent to a pre-mix of Gallery + Treflan.

Weeds: Controls a wide variety of annual grasses and broadleaf weeds.

Timing: Apply in late summer to early fall, or in early spring, before weeds germinate. Also may be applied in summer immediately following cultivation. Soil incorporation (mechanical or irrigation) is required within 3 days after application.

10- metolachlor: (Pennant)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in certain flowers, shrubs, and landscape trees.

Weeds: Controls a wide variety of annual grasses and broadleaf weeds.

Timing: Apply before weeds germinate. Soil incorporation (mechanical or irrigation) is required soon after application. Do not use on ornamentals within 10 days after transplanting.

11- napropamide: (Devrinol)

Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective preemergent herbicide for use in certain ground covers, shrubs, and shade trees.

Weeds: Controls certain annual broadleaf weeds.

Timing: Apply before weeds germinate. Soil incorporation (mechanical or irrigation) is required soon after application.

12- oryzalin: (Surflan)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)
A selective preemergent herbicide for use in flower beds, shrubs, and under shade trees.

Weeds: Controls a wide variety of annual grasses and some broadleaf weeds.

Timing: Apply before weeds germinate. Soil incorporation (mechanical or irrigation) is required soon after application.

13- oxyfluorfen + pendimethalin: (Ornamental Herbicide II)

Woody Ornamentals. (See label for list of approved species and cultivars.)
A selective preemergent herbicide for established lawns. Equivalent to a pre-mix of Goal + PRE-M herbicides.

Weeds: Annual grass and broadleaf weeds.

Timing: Apply before weeds germinate.

14- pendimethalin: (Pendulum, PRE-M)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)
A selective preemergent herbicide.

Weeds: Controls annual grasses and annual broadleaf weeds.

Timing: Apply before weeds germinate.

15- trifluralin: (Treflan)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)
A selective preemergent herbicide that provides weed control for 1 to 2 months.

Weeds: Controls a variety of annual grasses and broadleaf weeds including barnyardgrass, downy brome grass, crabgrass, foxtail, lambsquarters, pigweeds, puncturevine, purslane, and sandbur. Generally provides better control of grasses than broadleaf weeds.

Timing: Apply at or before transplanting. In established ornamentals apply in early spring before weeds emerge. Mechanically incorporate herbicide into the top 1 to 2 inches of soil immediately after application. Mixing the herbicide deeper into the soil dilutes its concentration and results in poor weed control. Treflan applied to the soil surface will evaporate or be inactivated by sunlight if not mixed into the soil within 3 days.

FOLIAR / POSTEMERGENT HERBICIDES:

16- fluazifop: (Fusilade, Grass-B-Gone, Ornamec, Over-The-Top)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective postemergent herbicide for grass control in transplanted and established ornamentals.

Weeds: Controls most annual grasses, and provides temporary or partial control of perennial grasses.

Timing: Apply to emerged actively growing young grasses at the growth stage indicated on the label. Repeated treatments may be necessary to control perennial grass or later emerging flushes of annual grass.

17- glufosinate: (Finale)

Flowers and Woody Ornamentals. A non-selective postemergent herbicide for site-preparation before transplanting, or for spot treatment of weeds growing under or around woody ornamentals. Provides faster control than glyphosate products. Effects are usually visible within 2 to 3 days. Effects on perennial weeds are often only temporary. **CAUTION:** Severe injury will occur to desirable plants if contacted by the herbicide spray or mist.

Weeds: Provides complete control of most annual weeds, and temporary or partial control of most perennial broadleaf and perennial grass weeds.

Timing: Apply to emerged actively weeds. Control of perennial weeds is most effective if treated in the bud to bloom stage (boot stage for grasses), or in the early fall.

18- glyphosate: (Avail, Killzall, Kleenup, Roundup)

Flowers and Woody Ornamentals. A non-selective postemergent herbicide for site-preparation before transplanting, or for spot treatment or wiper application to weeds growing under or around woody ornamentals. Slower to act than glufosinate products, but control of perennials is generally better. **CAUTION:** Severe injury will occur to desirable plants if contacted by the herbicide spray or mist (contact with foliage, green bark, vines, or suckers of trees).

Weeds: Provides complete controls most weeds. Especially effective against perennials, including quackgrass and field bindweed.

Timing: Apply to emerged actively weeds. Control of perennial weeds is most effective if treated in the bud to bloom stage (boot stage for grasses), or in the early fall.

19- sethoxydim: (Poast, Vantage)

Flowers and Woody Ornamentals. (See label for list of approved species and cultivars.)

A selective postemergent herbicide for grass control in transplanted and established ornamentals.

Weeds: Controls most annual grasses, and provides temporary or partial control of perennial grasses.

Timing: Apply to emerged actively growing young grasses at the growth stage indicated on the label. Repeat treatments may be necessary to control perennial grass or later emerging flushes of annual grass.

VEGETABLE GARDEN WEED CONTROL

WEED CONTROL METHODS

PREVENTION

Weeds are unsightly and can reduce the yield and quality of vegetables produced in your garden. Weed control in gardens must begin with prevention. For example, barnyard manure is a good source of fertilizer and organic matter, but it can also be a source of weed seeds. Thorough composting can significantly reduce the number of live weed seeds in manure.

Water from canals and ditches is almost always contaminated with weed seeds. Irrigating with this water continually adds weed seeds to the garden. Screens or filters can reduce, but not totally eliminate, the introduction of weed seeds from the contaminated water sources. Irrigating from wells or culinary systems avoids this problem, but often is more expensive.

Irrigation method has a significant influence on the relative weediness of a garden. Irrigation methods (such as furrows or sprinklers) that wet the entire surface of a garden promote more weeds to emerge than methods that deliver water primarily to the crop and leave most of the garden surface dry (drip irrigation systems). When drip irrigation is combined with mulching, weeding requirements are reduced even further.

MECHANICAL

Most experienced vegetable gardeners consider it best to control weeds primarily by mechanical means. Hoeing, cultivation, mulching, or hand weeding provide adequate control of most weeds in a garden. These practices also eliminate the possibility of herbicide injury to garden vegetables. Gardens can be maintained weed free with the least amount of labor when good soil preparation and proper planting are practiced. Consistent, careful cultivation or hoeing will eliminate most weed problems and prevent weed seed production. It will be necessary to hoe or cultivate the garden repeatedly (at least once every 2 weeks) because new weeds germinate and grow throughout the

season.

Remove weeds when they are small and easy to control, and before competition with vegetables becomes significant. Cultivation should be no deeper than necessary to remove the weeds. Shallow cultivation of 1 to 2 inches is usually adequate. Deeper cultivation can injure the root system of many garden plants. Control weeds within vegetable rows by hand pulling when weeds are small. Waiting until later to pull large weeds will damage the roots of nearby vegetables and reduce productivity.

Be sure to keep hoes and rototiller blades sharp. Sharpen them first on a grinder, and then maintain a sharp edge by frequently using a good file.

MULCHING

One effective method of controlling weeds in gardens is the application of a mulch. In addition to weed control, mulches help maintain soil moisture and prevent soil crusting. Mulches also keep soil temperatures cool and keep vegetables cleaner. Examples of organic mulch materials include partially decomposed hay, straw, wood chips, sawdust, lawn clippings, or leaves. A layer of organic mulch from 1 to 6 inches deep may be needed to effectively control weeds.

Black plastic is also used as a mulch. It is applied by rolling out plastic sheets and then covering the edges with soil. Black plastic mulches prevent weed growth and also enhance the early maturity of warm-season vegetables such as muskmelons, watermelons, tomatoes, peppers, and eggplant. Vegetables can be transplanted after the plastic mulch has been laid down, or the plastic can be laid down after plants are up, by cutting slits or x's in the plastic over every plant and carefully pulling the leaves through. One disadvantage of plastic is that it needs to be removed at the end of each season.

Clear plastic mulch can provide weed control in mid summer, but is generally not very effective in the spring or fall. Clear plastic laid

on the soil surface in the spring acts much like a greenhouse, warming the soil and accelerating the early growth of garden plants (and weeds). In the heat of mid summer, conditions under clear plastic become so hot that new emerging weeds are killed. And in some cases, soil temperatures can become high enough to kill many non-germinated weed seeds in the top inch or two of soil.

Fabric mulch (sometimes called “weed barrier” fabric) is highly effective in preventing the establishment of annual weeds. It is permeable to air and water, but acts as a physical barrier against germinating weed seedling shoots and roots. Though designed primarily for use under bark chips in ornamental plantings, these fabrics might be used in specialized situations in vegetable gardens. Like black plastic, fabric mulches need to be laid out in the spring and removed from the garden in the fall.

HERBICIDES

It is common practice for commercial vegetable growers to apply herbicides on large acreages planted to a single crop. It is more difficult to use herbicides in the home garden where many different vegetables are grown within a small area, because no one herbicide is suitable for all garden vegetables. Some herbicide residues may remain sufficiently long in the soil that there is danger of herbicidal damage to other vegetables rotated into a treated area the following year. If using any herbicide in a vegetable garden, carefully read and follow all label information. Before applying any herbicide, make sure your sprayer is calibrated (see the section on calibration) and in proper operation condition. Remember, apply herbicides only to those crops listed on their label.

VEGETABLE GARDEN HERBICIDE DESCRIPTIONS

PREVENTIVE / PREEMERGENT HERBICIDES:

1- DCPA: (Dacthal*)

A selective preemergent herbicide for weed control in broccoli, brussels sprouts, cabbage, cauliflower, collards, cucumber, eggplant, kale, melons, mustard greens, tomatoes, turnips, garlic, onions, peppers, potatoes, radish, snap beans, and squash. Must be applied before weeds emerge. Provides control for one to two months after planting.

Weeds: Controls a variety of annual grasses and broadleaf weeds including barnyardgrass, crabgrass, foxtail, lambsquarters, pigweeds, and purslane. Generally provides better control of grasses than broadleaf weeds.

Timing: For most vegetables, apply at or before planting. However, some crops require a waiting period after transplanting before the herbicide can be applied. If there is much delay between soil preparation (last tillage) and planting, it may be necessary to cultivate again lightly to remove new weed seedlings before applying the herbicide.

The herbicide should be incorporated by sprinkler irrigation if at least ½ inch of rainfall does not fall within 3 days after application.

2- trifluralin: (Treflan*)

A selective preemergent herbicide for weed control in broccoli, brussels sprouts, cabbage, carrots,

cauliflower, collard, cucumber, green peas, kale, melons, tomatoes, turnip greens, peppers, potatoes, snap beans, and squash. Must be applied before weeds emerge. Provides control for 1 to 2 months after planting.

Weeds: Controls a variety of annual grasses and broadleaf weeds including barnyardgrass, downy brome grass, crabgrass, foxtail, lambsquarters, pigweeds, puncturevine, purslane, and sandbur. Generally provides better control of grasses than broadleaf weeds.

Timing: For most vegetables, apply at or before planting. However, some crops require a waiting period after transplanting before the herbicide can be applied. Mechanically incorporate the herbicide into the top 1 to 2 inches of soil immediately after application. Mixing the herbicide deeper into the soil dilutes its concentration and results in poor weed control. Treflan applied to the soil surface will evaporate or be inactivated by sunlight if not mixed into the soil within 3 days.

FOLIAR / POSTEMERGENT HERBICIDES:

3- glyphosate: (Roundup*)

A non-selective postemergent herbicide for site-preparation before planting or transplanting garden crops. **CAUTION:** Do not allow spray or mist to contact desirable plants.

Weeds: Controls most weeds. Especially effective against perennials, including quackgrass and field bindweed.

Timing: Apply to emerged actively growing weeds. Control of perennial weeds is most effective if treated in the bud to bloom stage (boot stage for grasses), or in the early fall.

4- sethoxydim: (Poast*)

A selective postemergent herbicide for use in beans, broccoli, brussels sprouts, cabbage, cantaloupe, cauliflower, collards, cucumber, eggplant, garlic, honeydew melon, kale, kohlrabi, lentils, lettuce, muskmelon, mustard greens, onion, peas, peppers, potato, pumpkin, rhubarb, spinach, squash, tomato, and watermelon.

Weeds: Controls most annual grasses. Provides temporary or partial control of some perennial grasses, including quackgrass.

Timing: Apply to emerged actively growing grasses at the growth stage indicated on the label. Repeated treatments may be necessary to control perennial grass or later emerging flushes of annual grass.

* Not all formulations, containers, and brands of this herbicide are labeled for use in vegetable gardens. Use only those products specifically labeled for the crop.

WEED CONTROL IN FRUIT TREES, GRAPES, AND BERRIES

Pulling, hoeing, rototilling, or mulching can be effective methods of weed control in fruit

trees, grapes, or berries. Approved herbicides can assist in the effort.

PREVENTIVE / PREEMERGENT HERBICIDES:

1- DCPA: (Dacthal*)

A selective preemergent herbicide for use in **strawberries**.

Weeds: Controls a variety of annual grasses and broadleaf weeds.

Timing: Apply before weeds germinate. May be applied prior to or at time of transplanting, or to established strawberry plants. Apply to established plantings in fall or early spring. Soil incorporation (mechanical or irrigation) is required soon after application.

2- dichlobenil: (Casaron*)

A selective preemergent herbicide for use under **grapes, raspberries, blackberries**, and some **fruit trees** (apple, cherry, peach, pear, plum, prune).

Weeds: Controls a wide variety of annual grasses and broadleaf weeds. Provides partial control or suppression of perennial weeds, including quackgrass and field bindweed.

Timing: Apply under established trees, vines, or canes. For annual weeds, apply in the spring before weeds germinate. (For spring applications to raspberries or blackberries, apply before berry shoots emerge.) For perennial weeds, apply in the late fall or early winter before ground is frozen. Remove any existing weeds prior to application. After application, sprinkle the soil lightly to incorporate herbicide. One application is generally enough to give season-long control. **CAUTION:** Do not use on extremely sandy soils or on extremely rocky or gravelly soils.

3- oryzalin: (Surflan*)

A selective preemergent herbicide for use under **grapes, raspberries, blackberries**, and some **fruit trees** (apple, apricot, cherry, peach, pear, plum, prune).

Weeds: Controls a wide variety of annual grasses and some broadleaf weeds.

Timing: Apply before weeds germinate. Soil incorporation (mechanical or irrigation) is required soon after application.

4- **trifluralin:** (Treflan*)

A selective preemergent herbicide for use under **grapes** and **fruit trees** (apricot, peach, plum, prune).

Weeds: Controls a wide variety of annual grasses and some broadleaf weeds. Can provide some suppression of field bindweed.

Timing: Apply before weeds germinate. Soil incorporation (mechanical or irrigation) is required soon after application.

FOLIAR / POSTEMERGENT HERBICIDES:

5- **fluazifop:** (Fusilade*)

A selective postemergent herbicide for use under some **fruit trees** (apricot, cherry, peach, plum, prune).

Weeds: Controls most annual grasses. Provides temporary or partial control of most perennial grasses, including quackgrass.

Timing: Apply to emerged actively growing grasses at the growth stage indicated on the label. Repeated treatments may be necessary to control perennial grass or later emerging flushes of annual grass.

6- **glufosinate:** (Rely*)

A non-selective postemergent herbicide for site preparation prior to transplanting **apples** and **grapes**. Also approved as a weed control maintenance treatment when used as a directed spray in established apples and grapes. **CAUTION:** Do not allow spray or mist to contact foliage or green bark of trees or vines. Do not use within 1 year after transplanting.

Weeds: Controls annual grasses and broadleaf weeds, and provides partial or temporary control of many perennial weeds.

Timing: Apply to actively growing weeds. Repeated treatments may be necessary to control later emerging weeds.

7- **glyphosate:** (Roundup*)

A non-selective postemergent herbicide for site-preparation before transplanting **grapes**, **berries**, and some **fruit trees**. Also approved as a maintenance treatment for weed control under established fruit trees (apple, apricot, cherry, peach, pear, plum, prune), grapes, or berry canes. **CAUTION:** Do not allow spray or mist to contact foliage, green bark, canes, vines, or suckers of trees.

Weeds: Controls most weeds. Especially effective against perennials, including quackgrass and field bindweed.

Timing: Apply to emerged actively weeds. Repeated treatments may be necessary to control some perennials or later emerging flushes of annual grass.

8- sethoxydim: (Poast*)

A selective postemergent herbicide for use under **grapes, raspberries, strawberries**, and some **fruit trees** (apple and pear).

Weeds: Controls most annual grasses. Provides temporary or partial control of most perennial grasses, including quackgrass.

Timing: Apply to emerged actively growing grasses at the growth stage indicated on the label. Repeated treatments may be necessary to control perennial grass or later emerging flushes of annual grass.

* Not all formulations, containers, and brands of this herbicide are labeled for this use. Use only those products specifically labeled for the crop.

WEED CONTROL IN PARKING AREAS AND DRIVEWAYS

Maintaining gravel parking areas, driveways, or other bare-ground areas around the home free of all vegetation can be a time consuming and labor intensive project if done only by hoeing or hand-pulling. Many times the soil or gravel is hard and compacted, and hoeing, pulling, or tilling is almost impossible. Weeds are able to grow well in these harsh sites, and need to be controlled. Fortunately, there are several herbicides that are very effective.

For temporary control of all existing vegetation, use a non-selective foliar herbicide. The two most popular choices are Roundup (or a similar products containing the active ingredient "glyphosate"), or Finale (containing the active ingredient "glufosinate"). Both herbicides provide essentially complete control of nearly all types of annual weeds, and at least temporary control of perennials. Neither herbicide has any soil activity, so only weeds that are emerged at the time of treatment are killed. Multiple applications, perhaps once every 2 to 4 weeks, might be needed to control later flushes of weeds that emerge during the summer and fall.

For more permanent bare-ground weed control, use one of several preemergent herbicides. Some of the same herbicides approved for use under woody ornamentals and fruit trees also are approved for use in driveways and other non-crop sites. Popular choices include the active ingredients oryzalin (Surflan), trifluralin (Treflan), isoxaben (Gallery), and pendimethalin (PRE-M), used alone or in

various combinations. Other safe and effective active ingredients you might find in preemergent herbicides for bare-ground residential use include oxyflurofen, norflurazon, napropamide, or prodiamine.

Preemergent herbicides need to be applied before any weeds have emerged, making early spring or late fall the best time for application. If weeds have already emerged, it's still possible to achieve control by tank mixing a preemergent herbicide with a non-selective foliar herbicide (glufosinate or glyphosate products).

Preemergent herbicides need to be incorporated into the top inch or two of soil within a few days after application. Where shallow tillage isn't practical, this can be accomplished adequately by as little as ¼ inch of rainfall or sprinkler irrigation.

Industrial and right-of-way soil sterilants (herbicides that include the active ingredients prometon, diuron, bromacil, princep, or atrazine) should never be used in residential areas. These sterilants move with precipitation or irrigation water downward or laterally in the soil, and can be taken up by roots of trees and shrubs. The result is often serious injury or even death of desirable plants, even though they may be a considerable distance away from the original site of herbicide application. Sterilant herbicides remain active in the soil for years, making it possible for them to move much further than you might expect.

BRUSH, TREE, AND STUMP REMOVAL

Occasionally it becomes necessary to remove brush or trees from a landscape. Brush is killed best with foliar sprays containing the active ingredient triclopyr. Herbicide formulations that include either dicamba or glyphosate also can be effective against brush. Prevent herbicide from coming in direct contact with desirable plants.

When removing a tree, it is best to treat with herbicide before cutting it down. The most effective herbicides for this use are products containing glyphosate, 2,4-D, or a combination of 2,4-D + MCPP + dicamba. Once inside the foliage or trunk, these systemic herbicides translocate to the deepest roots, killing the entire tree and preventing reemergence of new sprouts or suckers.

Late summer or very early fall (before leaves begin to change color) is the best time to kill trees. Place herbicide concentrate directly into the trunk 12 inches or less above the soil surface by drilling a series of holes ($\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter and 1 to 2 inches deep) around the trunk and filling them with herbicide concentrate. Angle holes downward at a 45 degree angle to act as small herbicide reservoirs. A disposable syringe (without needle) works well for placing herbicide into the holes. Cap holes with wood putty or other material to prevent evaporation. It usually requires at least 2 cc of herbicide concentrate per inch of trunk diameter to kill a tree. This means that if a tree has a 10-inch trunk, you will have to inject a total of at least 20 cc of herbicide concentrate within the several drill-holes.

Herbicide may also be placed into a tree by using a hatchet or axe to make a series of shallow horizontal cuts (called frill-cuts) low on the trunk. Cuts need to penetrate the outer bark

and reach the inner living tissue called cambium. Be careful not to completely girdle the tree, but make enough cuts to hold the needed amount of herbicide. Each cut should be angled downward to create a trough, and herbicide is placed directly into the cuts in the same dose (2 cc per inch of trunk diameter). Don't cut the tree down until the next spring. This gives the herbicide plenty of time to penetrate deep into the root system.

Although herbicide pretreatment is preferred, trunks of trees already cut down can be killed. Painting the cut surface of a trunk with herbicide concentrate is effective, but only if done within just a few minutes after the tree is felled. To treat a trunk that has been cut for some time, use the drill-hole or frill-cut technique described for standing trees. Inject herbicide concentrate directly into living parts of the trunk as near to the soil surface as possible. Without a full living tree to send sap downward, herbicide translocation into the roots is more limited, and repeated treatments and/or higher doses of herbicide may be needed. If an old stump has already begun to re-sprout, cut off all sprouts or suckers and immediately paint them with herbicide concentrate. Then inject additional herbicide into drill-holes or frill-cuts in the trunk.

Ready-to-use herbicide formulations are too dilute to be effective in killing trees. Formulations containing at least 3 to 4 pounds of active ingredient per gallon (greater than 40% active ingredient concentration) work best. Use caution when treating any trees or trunks with herbicide. It is possible for some herbicides to move into an adjacent tree through unseen root grafts, or by exuding into the soil from roots of a treated tree.

**COMMON AND CHEMICAL NAMES OF
SELECTED ACTIVE INGREDIENTS
FOUND IN RESIDENTIAL HERBICIDE PRODUCTS**

ACTIVE INGREDIENT	CHEMICAL NAME
2,4-D	2,4-dichlorophenoxy acetic acid
benefin	n-butyl-N-ethyl-a,a,a-tri-fluoro-2,6-dinitro-p-toluidine
clopyralid	3,6-dichloro-2-pyridinecarboxylic acid
DCPA	dimethyl tetrachlorotere-phthalate
dicamba	3,6-dichloro-2- methoxybenzoic acid, or 3,6-dichloro-o-anisic acid
fluazifop	(R)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]
glufosinate	monoammonium 2-amino-4-(hydroxymethylphosphinyl)butonate
glyphosate	N-(phosphonoethyl)glycine
isoxaben	N-[3-(1-ethyl-1-methylpropyl)-5-isoxazolyl]-2,6-dimethoxybenzamide
MCPA	2-methyl-4-chlorophenoxy) acetic acid
MCPP (mecoprop)	2-(2methyl-4-chlorophenoxy) propionic acid
MSMA, DSMA	Sodium, calcium (or other) methanearsonates
pendimethalin	N-(1-ethylpropyl)-3,4 dimethyl-2, 6 dinitrobenzenamine
sethoxydim	2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio) propyl]-3-hydroxy -2- cyclohexen-1-one
triclopyr	3,5,6-trichloro-2-pyridinyl-oxy acetic acid

GENERAL RULES FOR WEED CONTROL

- Don't let weeds go to seed.
- Kill weeds when they are young.
- Weeding is a good family project.
- Good management will keep out most weeds.
- Before using any pesticide, read the label.
- Just because a little herbicide is good doesn't mean a lot is better.
- Pesticides are safe if used according to label directions.
- Weed control doesn't cost, it pays.
- One year's seeding equals seven year's weeding (old adage).

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert L. Gilliland, Vice-President and Director, Cooperative Extension Service, Utah State University, Logan, Utah. (EP/04-97/DF)