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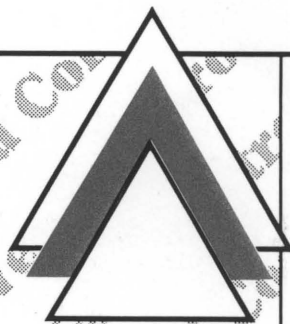
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Weed Control

in Vegetable, Fruit and Nut Crops



Texas Agricultural Extension Service • Zerle L. Carpenter, Director
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Weed Control

in Vegetable, Fruit and Nut Crops

Lynn Brandenberger and Julian Sauls
Texas Agricultural Extension Service
Texas A&M University



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Weed Control in Vegetable, Fruit and Nut Crops

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Weed control in cropland can be accomplished through the use of cultural, mechanical and chemical means. Judicious use of these individual methods, or a combination of them, can result in effective weed management without causing economic loss or adverse environmental effects.

Deciding which practice to employ will depend largely on the weed(s) being controlled and infestation levels. Also, the crop being grown will play a major role in determining the timeliness of control measures.

Considerations for cultural and mechanical weed control should include the following:

1 Remove light or spotty infestations of weeds by hand-hoeing or spot-cultivation to prevent spreading of weed seed, rhizomes or roots.

This is of particular importance with perennial weeds because of the nature in which they propagate (by seed and root tissue). However, one should exercise caution when plowing perennial weeds, being careful to prevent the transport and spread of plant parts to other areas of the field.

2 Use weed-free planting seed to protect against weed infestations in the row and introduction of new weed species.

3 Thoroughly clean equipment before moving from field to field.

4 Use mechanical tillage to remove initial weed flushes prior to planting, thereby eliminating or at least reducing the potential for continued infestation.

5 Consider the economics of using mechanical cultivation alone for weed control in the crop, especially where only light infestations of annual weeds are present.

6 Practice rotation to crops which physically out-compete certain weeds, resulting in gradual removal of that species. Crop rotation should also be considered when chemical methods are labeled only for certain crops.

Herbicide labels should be carefully reviewed for additional details on specific uses of each product.

Product names are not intended as endorsement of the product of a specific manufacturer, nor is there any implication that other formulations containing the same active chemical are not equally as effective. Product names are included solely to aid readers in locating and identifying the herbicides suggested.

Degree of control will depend upon herbicide rate, application timing, amount and timing of rainfall, soil type and infestation levels of the various weeds.

Sprayer Equipment

Tanks

Sprayer tanks should be rust resistant, preferably fiberglass, polypropylene or stainless steel. Filler openings should be wide enough for ease in filling. A splash proof filler should be in the tank to prevent pesticides from splashing onto people during filling or while spraying. Each tank should be equipped with a drain. Intake on the suction line should be at the bottom of the tank. Mechanical or return agitation should be used to keep pesticides in solution or suspension.

Pumps

There are several types of pumps capable of spraying pesticides. Roller, gear, centrifugal and piston pumps are most often used. Sprayer operation and pesticide formulations influence pump selection. Piston, roller and diaphragm pumps are positive displacement; therefore, the flow rate is determined by pump speed, not pressure. Centrifugal pumps are a nonpositive displacement type with flow rate influenced by pressure.

- **Gear pumps:** can be used to spray emulsifiable concentrates. Wettable powders will cause excessive wear and shorten pump life.
- **Roller pumps:** are economical, light- to moderate-duty pumps with limited life expectancy. Certain pesticides and wettable powders will significantly shorten the life of a roller pump.

- **Centrifugal pumps:** operate at over 3,000 rpm. They are high volume, low pressure pumps.
- **Piston pumps:** are often the most expensive. They operate at high and low pressure. Volume ranges from 2 to 50 gpm.

Piston and centrifugal pumps are better for handling abrasive materials such as wettable powders. Proper agitation is important in all spray mixes but is critical for wettable powders.

Before selecting a pump, the desired capacity should be determined using the following formula:

$$\frac{\text{mph} \times \text{swath width (ft)} \times \text{gpa}}{495} = \text{gpm}$$

Example: A two row sprayer with an 8 foot boom operated at 3 mph and a rate of 35 gallons per acre:

$$\frac{3 \times 8 \times 35}{495} = 1.7 \text{ gpm}$$

This is the delivery rate for the pump. Adequate return agitation requires a pump capacity about 1/3 above the calculated rate.

Pressure Regulators

Pressure regulators adjust the solution flow from the pump. When the regulator is open, a constant flow is directed to the nozzles, and the overflow returns to the tank. When closed, all flow is diverted to the tank.

Pressure Gauges

Pressure gauges show the solution pressure at the location of the gauge. The gauge should be located between the pressure regulator and nozzles. The most accurate pressure reading at the nozzles is with the gauge on the boom. However, it is more convenient to place the gauge near the regulator and operator for easier pressure adjustment. However, there will be some drop in pressure because of flow restriction from the hoses. A pressure gauge is necessary for accurate calibration.

Strainers

Screen strainers are used to protect the pump and nozzle tips. A screen with large openings may not adequately screen out particles which can damage a pump or clog nozzles. If the openings are too small they become clogged and restrict flow. Strainers located in the nozzle should have a diameter slightly smaller than the nozzle orifice. A slotted strainer is suggested when applying wettable powders. Spring-loaded nozzle strainers also prevent chemical loss from the lines during turns or transport to and from the field.

Nozzles

Nozzles have three functions in the spray operation. They control the flow rate, droplet atomization and droplet distribution. They are available in several different types, and each has a specific purpose in pesticide application.

- **Hollow cone nozzles:** concentrate most of the spray solution at the outer edge of a conical pattern. They operate at high pressure and produce small droplets which effectively penetrate plant canopies. Hollow cone nozzles are often used with foliar **nutrients, fungicides and insecticides**. They operate in a pressure range between 60 to 100 psi.
- **Flat fan spray nozzles:** produce a flat, fan-shaped spray pattern. A greater proportion of spray solution is deposited near the center of the pattern, and a lesser amount is deposited at the outer margin. To get a uniform application, patterns from adjacent nozzles must overlap. **Broadcast** herbicides, soil fungicides and soil insecticides are applied using **flat fan** nozzles. A pressure of 20 to 40 psi is required for optimum utilization. **Even flat fan** spray nozzles produce an elliptical pattern with even deposition of the material across the pattern. **Banded** pesticides are applied with **flat even fan** nozzles. Common fan angles are 65 degrees, 80 degrees and 110 degrees although some other angles are also available. Table 1 gives the nozzle height required for effective spray application with fan nozzles.
- **Flooding flat fan nozzles:** are used to apply preemergence and postemergence herbicides. They deposit a fan pattern horizontally to the soil surface. Droplets are large, a condition which is **useful in reducing drift** problems. They should operate at a pressure of 5 to 20 psi.

Table 1. Nozzle height for flat fan nozzles.

Spray angle	Nozzle height (inches)	
	20" spacing	30" spacing
65°	21-23	32-34
80°	17-19	24-26
110°	10-12	13-15

Hoses

Hoses used on sprayers should be oil resistant and have a test pressure twice the operating pressure. A two ply hose should be used on the suction side of the pump to prevent collapsing. Hoses should be of sufficient size to prevent excessive pressure drop or loss. Table 2 lists hose sizes and flow rates.

Table 2. Normal hose flow rates.

Hose size in inches	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"
Max. flow	2 gpm	4	8	12	20	40

Number of Nozzles Per Row

The number of nozzles per row depends on the crop being sprayed and plant size. Small, flat growing plants normally require one or two nozzles over the top. Drop nozzles direct the spray on the lower half of the plant for post-directed sprays.

Table 3 lists various materials used in the manufacture of nozzles. Most producers use brass or nylon nozzles because of availability and cost. Nozzles should be checked regularly to make sure tips are free of debris, and the orifice is not worn. Clogged tips should never be cleaned with a knife; use a soft toothbrush. When the nozzles are worn or damaged, it is time to replace them. If a herbicide treatment costs \$50 an acre, a 10 percent overspray on a 100 acre farm costs \$500. The sprayer should be washed after each use when applying herbicides, with water and ammonia or water and bleach (but not both).

- Replace screens and nozzles. Make sure all nozzles and screens are of the correct size and type.
- Check hoses and connections for leaks.
- Adjust the pressure regulator to the desired pressure with tractor running at desired rpm.
- Operate the sprayer and check the discharge rate of all tips.

Any nozzle which is off 10 percent from the average rate should be replaced.

Steps in Calibrating

1 Use Table 4 for distance to drive in field. Use nozzle spacing for booms. For directed and banding rigs, use the row spacing. Mark off this distance in the field.

2 Attach all equipment to the tractor that will be used during spraying. Determine the throttle setting and gear that will be used. Attain operating speed (usually 3 to 5 mph) before passing the starting mark, and note the time (in seconds) required to drive from the starting to finishing mark of the distance measured in step 1. Repeat to insure accuracy.

Table 3. Materials used in the manufacture of nozzles and resistance to corrosive and abrasive chemicals.

Material	Corrosive	Abrasive	Cost
Brass	Moderate to Resistant	Susceptible	Inexpensive
Nylon	Resistant	Susceptible	Inexpensive
Stainless Steel	Resistant	Resistant	Expensive
Hardened Tungsten	Resistant	Resistant	Very Expensive
Ceramic	Resistant	Resistant	Very Expensive

Sprayer Calibration

No matter how effective or safe a pesticide is, its performance is dependent on applying the proper rate. The accurate calibration of spray equipment is the most important part of chemical pest control. Poor calibration accounts for about 90 percent of weed control failures.

Applications made using sprayers that are not properly calibrated can result in plant injury, ineffective control, excessive pesticide costs and possible residue problems. The following steps should be followed before calibrating any sprayer.

- Rinse and clean the tank with clear water.
- Remove and clean all nozzles and screens.
- Start sprayer and flush hoses and boom with clean water.

Table 4. Required distance to travel at different nozzle spacing for calibrating.

Row width or nozzle spacing (inches)	Distance (feet)	Row width or nozzle spacing (inches)	Distance (feet)
40	102	24	170
38	107	22	185
36	113	20	204
34	120	18	227
32	127	16	255
30	136	14	291
28	146	12	340
26	157	10	408

3 Catch the nozzle discharge for the noted time from step 2 in a container graduated in ounces. If using a broadcast boom with evenly spaced nozzles, catch the output from one nozzle per row. If a directed spray is to be applied, catch the spray from each nozzle and combine the total number of ounces.

4 The total output in ounces from one nozzle (or group of nozzles if more than one nozzle per row is used) is equal to gallons per acre applied.

5 Check each of the nozzles to ensure they are discharging the same amount of liquid. Repeat steps 3 and 4 and replace any nozzles that vary more than 10 percent. The spray volume can be increased by decreasing tractor speed, increasing sprayer pressure, decreasing nozzle spacing or increasing nozzle size. It is better to use a larger nozzle at a lower pressure than to increase the pressure. Higher pressures will cause more drift problems. Most nozzle manufacturers and distributors can provide approximate flow rates (GPA) for a given nozzle based on pressure, nozzle spacing and tractor speed.

Calibration Examples

Situation 1 – Broadcast application

Apply Treflan 4EC at 1 pint per acre, preplant incorporated, prior to transplanting peppers, using a 200-gallon tank, flat fan nozzles spaced 20 inches apart, and a disk for incorporation.

- Measure a distance of 204 feet (based on the 20-inch nozzle spacing).
- Choose a gear and throttle setting, and with the disk engaged, travel 204 feet (assume it took 35 seconds).
- Set the spray pressure and catch one nozzle's output for 35 seconds (the time required to travel 204 feet).
- If you catch 20 ounces of spray from one nozzle in 35 seconds, the application rate is 20 gallons per acre.
- Recheck each nozzle's output to be sure they do not vary more than 10 percent (if the average spray volume is 20 ounces, then a nozzle should not deliver more than 21 ounces or less than 19 ounces).

How many acres can be sprayed from one 200-gallon tank?

$$\frac{200 \text{ gallons per tank}}{20 \text{ gallons per acre volume}} = 10 \text{ acres sprayed per tank}$$

How much Treflan 4EC should be added to the tank?

$$10 \text{ acres covered per tank} \times 1 \text{ pint/acre desired} = 10 \text{ pints}$$

Situation 2 – Banded spray

Apply Prefar on a 16-inch band preplant incorporated at 5 quarts per acre for watermelons on 80-inch rows, using a 500-gallon tank, even flat fan nozzles spaced 80 inches apart and a rototiller for incorporation.

- Measure a distance of 51 feet based on the 80-inch nozzle spacing.
- Choose a gear and throttle setting and note the time required to travel 51 feet (assume it took 12 seconds).
- Since it is difficult to accurately measure the spray nozzle output in only 12 seconds, catch the spray nozzle output from one nozzle for 24 seconds. If you collect 22 ounces in 24 seconds, divide it by 2, giving you a spray volume of 11 gallons per acre.
- Recheck each nozzle's output as previously described.

How many acres can be sprayed from one 500-gallon tank?

$$\frac{500 \text{ gallons per tank}}{11 \text{ gallons per acre spray volume}} = 45.5 \text{ acres sprayed per tank}$$

How much Prefar should be added to the tank?

$$\frac{16\text{-inch band} \times 5 \text{ quarts/acre}}{80\text{-inch rows}} = 1 \text{ quart per acre}$$

$$1 \text{ quart/acre} \times 45.5 \text{ acres/tankful} = 45.5 \text{ quarts}$$

Situation 3 – Post-directed banded spray

Apply Sencor 4 at 1 1/2 pints per acre on a 14-inch band to tomatoes on 40-inch rows. The tomatoes were transplanted 2 1/2 weeks ago, and the spray rig has two cultivator mounted, flat fan nozzles per row (off-center tips are good) and a 300-gallon tank.

- Measure a distance of 102 feet (based on 40-inch rows).
- Set the speed with the cultivator down.
- Assuming it took 25 seconds to travel 102 feet, catch the total discharge at a set pressure from both nozzles for 25 seconds. Let's assume 10 ounces per tip, for a total of 20 ounces caught in 25 seconds. The spray volume is 20 gallons per acre.

- Check all the other nozzles for each row for uniformity.

How many acres can be sprayed from one 300-gallon tank?

$$\frac{300\text{-gallon tank}}{20 \text{ gallons/acre}} = 15 \text{ acres per refill}$$

How much Sencor 4 should be added to the tank?

$$\frac{14\text{-inch band width} \times 1 \frac{1}{2} \text{ pints/acre}}{40\text{-inch row spacing}} = 0.525 \text{ pint/acre}$$

Since we already know a tankful will spray 15 acres:

$$0.525 \text{ pints/acre} \times 15 \text{ acres} = 7.8 \text{ pints per tankful}$$

For further information refer to publication L-1839 *Mixing Instructions for Liquid Herbicides*. As an aid to proper calibration, common conversions are given in Table 5.

Table 5. Conversion Table.
1 tablespoon = 3 teaspoons = 0.5 ounce
1 ounce = 2 tablespoons
1 cup = 1/2 pint = 16 tablespoons = 8 ounces
1 pint = 2 cups = 32 tablespoons = 16 ounces = 1 pound
1 gallon = 16 cups = 8 pints = 4 quarts = 8.4 pounds of water
1 cubic foot = 7.48 gallons of water = 62.4 pounds
1 acre = 43,560 square feet
1 mph = 88 feet/minute

Cleaning and Care of Sprayers

More pumps wear out from improper maintenance than from proper use. Pump wear and deterioration are brought about by ordinary use, but they are also accelerated by misuse. Following are suggestions that will help minimize labor problems and prolong the useful life of the pump and sprayer.

- Put clean chemicals and solutions into the sprayer, and use clean water. A small amount of silt or sand particles can rapidly cause wear on pumps and other parts of the sprayer system.
- Use chemicals that the sprayer and pump were designed to use. For example, liquid fertilizers which are sometimes mixed with herbicides are corrosive to copper, bronze, ordinary steel and galvanized surfaces. If the pump is made from one of these materials, it may be completely ruined by just one application of liquid fertilizer. Stainless steel is not adversely affected by liquid fertilizers. Use pumps made from this substance for applying these types of fertilizers.

- Before using a new sprayer, remove the nozzles and flush the system, including screens, nozzles, etc., of all metal chips and other foreign solid materials.

- Flush the spray system with clean water after each day of spraying.
- Inspect all strainers, screens and nozzle tips after each day of spraying. If these need cleaning, remove the accumulation by soaking and brushing. Never use a metal object for cleaning. Hard instruments scraping on a fine mesh screen can enlarge openings. This is also true of nozzle tip orifices.
- Some chemicals such as 2,4-D leave residues that are difficult to remove. When spraying susceptible crops, do not use spray equipment that has been used for 2,4-D and other herbicides.

- Clean the sprayer thoroughly after each use or when chemicals are changed. Many chemicals cause rapid corrosion of the metal in the sprayer. Remove and flush immediately after use. Sometimes a chemical residue will react with succeeding chemicals, causing a loss of effectiveness. Some of these risks may be eliminated by following this cleaning procedure:

- Flush the sprayer with a tank of clean water.
- Remove all strainers, screens and nozzles and wash them in kerosene with a soft brush of appropriate size.
- Mix a medium-sized box of laundry detergent and 30 gallons of water in the sprayer tank. Circulate this mixture through the bypass pressure regulator and jet agitator for 30 minutes. Drain the mixture.
- Replace the screens and nozzles.
- Fill the tank one-half full with one part household ammonia to 49 parts of water. Circulate this mixture through the pump and bypass, allowing a small amount to leak out through the nozzles. Let the solution stay in the sprayer overnight and run it out through the nozzles.
- Flush with clean water. Remove the nozzles.
- Nozzle openings should be sealed between cleaning and subsequent use to preclude insect entry and possible nest building inside the spray basin.

Recommended Herbicides for Texas Vegetables.

Herbicide	Asparagus	Beans	Cantaloupe	Carrots	Celery	Cole Crops	Cucumber	Eggplant	Garlic	Greens	Lettuce	Okra	Onions	Peas	Peppers	Potatoes	Pumpkins	Radishes	Southern Peas	Spinach	Squash	Sweet Corn	Sweet Potatoes	Table Beets	Tomatoes	Watermelons
Aatrex 4L			X				X															X				
Alanap-L			X				X															X				X
Balan DF											X															
Basagran		X												X									X			
Buctril									X				X													
Chiptox MCPA														X					X							
Command 4-EC																	X									
Dacthal W-75		X	X			X	X	X	X	X			X		X	X		X			X		X		X	X
Devrinol 50 DF	X					X		X							X											X
Diquat																X										
Dual 8E																X										
Eptam 7E		X														X							X	X	X	
Ethrel			X												X											X
Formula 40	X																						X			
Goal 1.6 E						X							X													
Gramoxone	X	X	X	X		X	X	X	X	X	X		X		X	X	X				X	X			X	X
Karmex DF	X																									
Kerb 50W											X															
Lexone DF	X															X										
Lorox DF				X	X																					
Poast	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X			X	X		X		X	X
Prefar 4-E			X	X		X	X				X		X		X		X				X					X
Prowl 3.3 EC		X								X						X					X			X		
Pyramin DF																										X
Ro-Neet 6-E																					X					X
Roundup	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sencor 4	X			X												X										X
Sinbar	X																									
Solicam DF	X																									
Thistrol														X												
Tillam 6-E																										X
Touchdown	X																									
Treflan	X	X	X	X	X	X	X					X	X		X	X		X							X	X
Tri-4 EC			X	X	X	X	X					X			X	X			X						X	X
Turbo 8-EC													X			X										

If the registration of a herbicide is cancelled by federal or state agencies, recommendations are no longer valid. Please read and follow the current label for proper use.

Asparagus

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Devrinol 50DF	napropamide	Preemergence 8 lb/A	Incorporate to a 2-4" depth or irrigate after application.
Formula 40	2,4-D Amine	Postemergence 1.5-2.0 qt/A	Broadleaf weed control. Don't apply when asparagus spears are present or other susceptible crops are in the area. Maximum of 2 applications per season. Direct application to avoid spraying fern. Follow state phenoxy herbicide regulations.
Gramoxone Extra^{2,3}	paraquat	Preplant Postemergence 2-3 pt/A	Will kill emerged asparagus.
Karmex DF¹	diuron	Preemergence 1-4 lb/A	Apply prior to weed emergence no earlier than 4 weeks before spear emergence or immediately after cutting. Do not apply to young plants in the first growing season or to newly seeded asparagus.
Lexone DF Sencor 4	metribuzin	Preemergence 1.3-2.66 lb/A Postharvest and Preemergence 2-4 pt/A or 1.3-2.6 lb/A	Apply prior to spear emergence in well established plantings; 14-day preharvest interval. Follow rotation restrictions.
Poast	sethoxydim	Postemergence 1.5-2.5 pt/A	Controls emerged grasses in non-bearing asparagus. Rate determined by grass species and size. Use 2 pt/A crop oil concentrate. Do not apply within one year of harvest.
Roundup	glyphosate	Postemergence 0.5-3.0 pt/A	Good for perennial weeds like johnson-grass. Rate varies with weed species and size. Not selective, will kill asparagus if emerged. Don't apply within one week of spear emergence. Will only control emerged weeds and doesn't provide any residual control.
Sinbar	terbacil	Preemergence 1.5-3.0 lb/A	Direct seeded asparagus use 1-2 lb/A rate.
Solicam DF	norflurazon	Preemergence broadcast application 2-4 lb/A	Do not apply within 14 days of harvest. Maximum of 2.5-5.0 lb/A/year.
Treflan *5	trifluralin	Preemergence Postharvest 1-4 pt/A	Apply before spear emergence or after harvest before fern growth begins in established asparagus. Follow soil preparation and incorporation procedures. Do not use in Reeves County or Pecos County.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Use 1-2 pt/100 gal of spray volume of nonionic surfactant.

³Postemergent use may result in damage to crop plants; be certain to refer to label for specific instructions.

Beans

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Basagran	bentazon	Postemergence 1-2 pt/A	Controls small broadleaf weeds and can control or suppress yellow nutsedge. Wait until at least one trifoliate leaf is fully expanded. Use crop oil concentrate. May cause temporary speckling of leaves.
Dacthal W-75	DCPA	Preemergence 6-14 lb/A	Can be preplant incorporated.
Eptam 7E	EPTC	3.5-4.5 pts/A Preplant incorporated	See label for restrictions.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast¹	sethoxydim	Postemergence 0.5-2.5 pt/A	Controls only emerged grasses. Always use 2 pints of crop oil concentrate. Rate depends on grass size.
Prowl 3.3 EC	pendemethalin	Preplant incorporated 1.2-3.6 pt/A	Incorporate after application.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan	trifluralin	Preplant incorporated 1.0-1.5 pt/A	Requires thorough incorporation 2-3". Do not use in Reeves County or Pecos County. Some lower rates are suggested for specific bean types.

Cantaloupe

Alanap-L	naptalam	Preemergence, post planting and after vining 4-8 qt/A	On irrigated melons can incorporate prior to planting.
Dacthal W-75	DCPA	Postemergence at 4-5 leaf growth stage of crop 6-14 lb/A	Incorporation not recommended.
Gramoxone Extra	paraquat	Preplant preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast	sethoxydim	Postemergence up to 1.5 pt/A	Always add 1 quart of oil concentrate per acre.
Prefar 4-E	bensulide	Preplant preemergence 5-6 qt/A	Incorporate to a depth of 1-2" before planting crop.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

Cantaloupe (continued)

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Roundup	glyphosate	Apply prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC	trifluraline	Postplant application 1-2 pt/A	Apply after 3-4 true leaves emerge and avoid contact with foliage.

Carrots

Gramoxone Extra	paraquat	Preplant preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Lorox DF¹	linuron	Postemergence 1.5-3.0 lb/A	Apply after carrots are 3" tall and weeds are less than 6" tall.
Prefar 4-E	bensulide	Preplant preemergence 5-6 qt/A	Incorporate 1-2" deep prior to planting.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Sencor 4	metribuzin	Postemergence 0.5 pt/A	Apply after carrots have 5-6 true leaves and before weeds are 1" in height.
Treflan EC	trifluralin	Preplant incorporated 1.0-2.0 pt/A	Incorporate immediately once into the top 2-3". Follow label rotation restrictions. In areas receiving less than 20" of rainfall, see restrictions.

Celery

Lorox DF¹	linuron	Postemergence 1.5-3.0 lb/A	Apply before celery is 8" tall. Also has preemergence activity.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Controls emerged grasses. Rate depends on grass species and size. Always use 1 quart of oil concentrate.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC^{1,2}	trifluralin	Preplant incorporated 1.25-2.0 pt/A	Apply and incorporate prior to transplanting or direct seeding.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

**Cole Crops
(Cabbage, Broccoli, Cauliflower, Brussels Sprouts)**

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Dacthal W-75¹	DCPA	Apply at seeding or transplanting 6-14 lb/A	Can be preplant incorporated.
Devrinol 50DF	napropamide	Preplant incorporated 1-2 lb/A	Preplant incorporated to a depth of 1-2" after seeding or directly after transplanting. Irrigate to activate the herbicide if applied after planting.
Goal 1.6E	oxyfluorfen	Pretransplant application 1.25-2.5 pt/A	For use with transplanted crops only.
Gramoxone Extra	paraquat	Preplant preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast¹	sethoxydim	Postemergence 1.0-1.5 pt/A	Controls emerged grasses. Rate depends on grass species and size. Always use 1 quart of oil concentrate per acre.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate to a depth of 1-2".
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC^{1,2}	trifluralin	Preplant incorporated 1.0-1.5 pt/A	Incorporate to a depth of 2". May cause some stunting and stand loss.

Cucumbers

Alanap-L	naptalam	Preemergence/ postplant and after vining 4-8 qt/A	Can be preplant incorporated on irrigated crop.
Dacthal W-75	DCPA	Postemergence at 4-5 true leaf state 6-14 lb/A	Incorporation not recommended.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast	sethoxydim	Postemergence 0.5-1.5 pt/A	Use 2 pints of crop oil concentrate in a 10 gal/A spray volume. Will only control emerged grasses. Rate depends on grass size and geographic location.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate 1-2" deep prior to seeding.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

Cucumbers (continued)

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan	trifluralin	Post-directed 1-2 pt/A	Wait until plants have reached the 3-4 leaf stage. Direct spray away from plants but onto the shoulder of the bed. If planting every other 40" bed, bust center bed and reshape shoulders prior to application. Incorporate into the bed to depth of 1-2" and throw treated soil toward the crop row.

Eggplant

Dacthal W-75	DCPA	Post planting or transplanting 6-14 lb/A	Do not apply to direct seeded crop until plants are 4-6" high.
Devrinol 50DF	napropamide	Preplant 2-4 lb/A	Transplanted crop only.
Gramoxone Extra	paraquat	Preplant 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast¹	sethoxydim	Postemergence up to 1.5 pt/A	Always add 1 quart of oil concentrate per acre.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

Garlic

Buctril	bromoxynil	Postemergence 1.0-1.5 pt/A	Avoid application during cool, wet weather. See label for crop specific recommendations.
Dacthal W-75	DCPA	Apply at seeding, transplanting or layby 6-14 lb/A	Preplant incorporation not recommended.
Gramoxone Extra	paraquat	Preplant preemergence 2.0-3.0 pt/A	Crop plants emerged at time of application will be killed. Maximum of 3 pints/acre/season.
Poast	sethoxydim	Postemergence 0.5-1.5 pt/A	Follow crop oil or surfactant recommendations closely. Rate depends on grass size and species. Only controls emerged grasses.
Prowl 3.3 EC	pendimethalin	Postemergence 1.2-3.6 pt/A	Apply as a broadcast treatment. Do not apply within 45 days of harvest.
Roundup	glyphosate	Apply prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

Greens
(Collard, Kale, Mustard, Turnip)

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Dacthal W-75	DCPA	Preemergence 6-14 lb/A	Can be preplant incorporated.
Gramoxone Extra	paraquat	Preplant/ Preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed. Do not use on mustard and kale.
Poast	sethoxydim	Postemergence 1.5 pt/A	Always add 1 quart of oil concentrate per acre.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC^{1,3}	trifluralin	Preplant incorporated 1.0-1.5 pt/A	Use on preformed beds and incorporate immediately to a depth of 2". For processing greens crops.

Lettuce

Balan DF^{1,2}	benefin	Preplant incorporated 3-4 qt/A	Incorporate prior to seeding. All types of lettuce.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Kerb 50 W¹	pronamide	Preplant incorporated 2.0-4.0 lb/A	Apply preplant incorporated. Postemergence application should be before lettuce thinning but prior to weed emergence. For use on lettuce, endive and escarole. Follow variety precautions.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Controls emerged grasses. Rate depends on grass species and size. Always use 1 quart of oil concentrate.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Use only on lettuce to be irrigated up. Apply preplant and incorporate to a depth of 1-2" prior to planting.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Use 1-2 pt/100 gal of spray volume of nonionic surfactant.

³Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

Okra

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan	trifluraline	Preplant incorporated 1.0-2.0 pt/A	Requires thorough incorporation to a depth of 1-1 ¹ / ₂ ".

Onions (Dry Bulbs)

Buctril	bromoxynil	Postemergence 1.0-1.5 pt/A	Avoid application during cool, wet weather. See label for crop specific recommendations for onions.
Dacthal W-75¹	DCPA	Apply at seeding, transplanting or layby 6-14 lb/A	Preplant incorporation is not recommended. See precautions on label.
Goal 1.6 E	oxyfluorfen	Postemergence 0.6-1.25 pt/A	Onions should have at least 2 true leaves prior to application.
Gramoxone Extra	paraquat	Preplant/ preemergence 2.0-3.0 pt/A	Crop plants emerged at time of application will be killed. Maximum of 3 pt/A/season.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Follow crop oil or surfactant recommendations closely. Rate depends on grass size and species. Only controls emerged grasses.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan	trifluralin	Apply after crop emergence 0.75-1.25 pt/A	Apply as directed spray to prevent damage to foliage and bulbs.
Turbo 8-EC	metolachlor-metribuzin	Preemergence and after dragoff 2-5 pt/A	Do not exceed 5.5 pt/A/year.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

Peas

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Basagran	bentazon	Postemergence 1-2 pt/A	Controls small broadleaf weeds and can control or suppress yellow nutsedge. Wait until at least 1 trifoliate leaf is fully expanded. Use crop oil concentrate. May cause temporary speckling of leaves.
Chiptox MCPA	MCPA	Postemergence 0.5-1.5 pt/A	Treat when peas are 4-6" tall. Not for use on Southern peas.
Poast	sethoxydim	Postemergence 0.5-2.5 pt/A	Controls only emerged grasses. Always use 2 pints of crop oil concentrate. Rate depends on grass size.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Thistrol	MCPB	Postemergence 2-6 pt/A	Peas are tolerant to Thistrol from shoot emergence until about 3 leaf nodes prior to flowering.

Peppers

Dacthal W-75	DCPA	Apply 4-6 weeks after transplanting or at 4-6" height 6-14 lb/A	Do not apply to seeded plants until plants are 4-6" in height.
Devrinol 50DF²	napropamide	Preplant incorporated 2-4 lb/A	Incorporate into prepared bed at 1-2" prior to seeding or transplanting. Rate depends on soil type.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Controls emerged grasses. Use 1 quart of oil concentrate per acre.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate to a depth of 1-2" prior to planting. Use only on crops to be irrigated.
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan	trifluralin	Preplant incorporated 1.25-2.0 pt/A	Incorporate to a depth of 2". For transplanted peppers only.
Tri-4 EC	trifluralin	Preplant for transplanted peppers 1-2 pt/A	Apply and incorporate prior to transplanting.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

Potatoes

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Dacthal W-75	DCPA	Apply at planting, drag-off or layby 6-14 lb/A	Preplant incorporation not recommended.
Dual 8E	metolachlor	Preemergence 1.5-3.0 pt/A	Controls annual weeds. Can be tank-mixed with Sencor/Lexone.
Eptam 7E	EPTC	Preplant/ Preemergence 3.5-7.0 pt/A	Do not exceed 7 pints of Eptam/A/year. Apply just prior to planting, at drag-off and layby.
Gramoxone Extra²	paraquat	Preplant/ Preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Lexone DF	metribuzin	Preemergence 0.66-1.3 lbs/A Postemergence 0.6 lb/A	Check precautions for postemergent application. Do not apply within 60 days of harvest.
Poast¹	sethoxydim	Postemergence 1.0-2.5 pt/A	Controls emerged grasses only. Rate depends on grass species and size. Always use 1 quart of oil concentrate/acre.
Prowl 3.3 EC	pendimethalin	Postplant Preemergence 1.8-3.6 pt/A	Apply Prowl and incorporate after planting, but before potatoes and weeds emerge.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

Pumpkins

Command 4-EC	clomazone	Preemergence up to 2.0 pt/A	Drift may cause yellowing or whitening of some plants.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast	sethoxydim	Postemergence up to 1.5 pt/A	Always add 1 quart of oil concentrate/acre.
Prefar 4-E	bensulide	Preplant/ preemergence 5-6 qt/A	Incorporate to a depth of 1-2" preplant.
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Use 1-2 pt/100 gal spray volume of nonionic surfactant.

Radishes

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC	trifluralin	Preplant/ preemergence 1.0-1.5 pt/A	Apply as preplant soil incorporated.

Southern Peas

Prowl 3.3 EC	pendimethalin	Preplant/ incorporated 1.2-3.6 pt/A	Mechanically incorporate into the top 1-2" of soil.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Tri-4 EC	trifluralin	Preplant/ preemergence 1-2 pt/A	Apply and incorporate prior to planting.

Spinach

Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Only controls emerged grasses. Rate depends on grass species, height and geographic location. Always use 1 quart of oil concentrate.
Ro-Neet 6-E¹	cycloate	Preplant incorporated 0.5 gal/A	Incorporate thoroughly to a depth of 2-3" immediately after application.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

Squash

Dacthal W-75	DCPA	Post-directed 6-14 lb/A	Apply after plants have developed 4-5 true leaves. Will not control emerged weeds. Irrigate after application to activate herbicide.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast	sethoxydim	Postemergence 0.5-1.5 pt/A	Use 1 quart of oil concentrate/A spray volume. Will only control emerged grasses. Rate depends on grass size and geographic location.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate 1-2" deep prior to seeding.
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

Sweet Corn

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Aatrex 4L^{1,2}	atrazine	Preplant incorporated Preemergence Postemergence 2.5-4.0 pt/A	Can be applied preplant incorporated, preemergence or early postemergence. Use in combination with Dual or Lasso for better grass control. Do not plant any other vegetable crop the following year or injury may occur. Can be followed by corn or sorghum.
Basagran	bentazon	Postemergence 1.5-2.0 pt/A	Rate depends on weed species and size. Use with oil concentrate, depending on weed species.
Formula 40	2,4-D	Preemergence and postemergence 0.5-4.0 pt/A	Avoid spray drift. Can be applied post-emergence until corn is 8" tall.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Prowl 3.3 EC	pendimethalin	Preemergence 1.8-4.8 pt/A	Apply Prowl preemergence after planting, but before weeds and crop emerge. Do Not incorporate or serious injury will occur.
Roundup	glyphosate	Postemergence 0.5-3.0 pt/A	Spot treatment only. Contact of spray with desirable crops will result in severe damage or death of crop.

Sweet Potatoes

Dacthal W-75¹	DCPA	Transplanting or Layby 6-14 lb/A	Apply to the soil at transplanting. Can be sprayed directly over transplants. Layby application can be made up to 6 weeks after transplanting but prior to weed emergence.
Eptam 7E¹	EPTC	Preplant incorporated 2.5-3.5 pt/A	Incorporate 2-3" deep just before planting. Options are available as outlined on the label.
Poast	sethoxydim	Postemergence up to 1 pt/A	Always add 1 quart of oil concentrate/acre.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

Table Beets

Pyramin DF²	chloridazon	Preemergence Postemergence 4.6-5.4 lb/A	Not recommended on coarse (sandy) soils. Can be used preemergence and early postemergence. Consider banding rather than broadcast application. Post-emergence spray is applied at 2-true-leaf-stage of beets and before weeds have emerged.
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¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

Table Beets (continued)

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Ro-Neet 6-E^{1,2}	cycloate	Preplant incorporated 0.5-0.6 gal/A	Incorporate thoroughly to a depth of 2-3" immediately after application.
Roundup	glyphosate	Apply prior to crop emergence 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.

Tomatoes

Dacthal W-75¹	DCPA	Apply post-emergence to seeded crop at 4-6" height or 4-6 weeks after transplanting 6-14 lb/A	Plants should be well established and growing well prior to application.
Devrinol 2-E	napropamide	Preplant incorporated 2-4 lb/A	Incorporate 1-2" prior to seeding or transplanting.
Gramoxone Extra^{2,3}	paraquat	Preplant Preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Lexone DF¹	metribuzin	Preplant incorporated or Postemergence 0.3-0.6 lb/A 0.5-2.0 pt/A	For postemergence, apply no earlier than 2 weeks after transplanting and when regrowth is evident. Preplant incorporated application can be used only on transplanted crop. Avoid application following cool, wet weather.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Controls emerged grasses. Always use 1 quart of oil concentrate. Rate depends on grass species, size and location. Do not apply within 20 days of harvest.
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Use on direct seeded crops only. Contact of spray with desirable crops will result in severe damage or death of crop.
Sencor 4¹	metribuzin	Preplant incorporated or Postemergence 0.3-0.6 lb/A 0.5-2.0 pt/A	For postemergence, apply no earlier than 2 weeks after transplanting and when regrowth is evident. Preplant incorporated application can be used only on transplanted crop. Avoid application following cool, wet weather.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Use 1-2 pt/100 gal of spray volume of nonionic surfactant.

³Postemergent use may result in damage to crop plants; be certain to refer to label for specific instructions.

Tomatoes (continued)

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Tillam 6-E	pebulate	Preplant incorporated 2.6-4.0 qt/A	Transplanted tomatoes only. Provides some control of purple and yellow nutsedge. Can also be tank-mixed with Devrinol. Incorporate immediately after application to prevent herbicide loss.
Treflan EC^{1,2}	trifluralin	Preplant incorporated Postemergence 1.0-2.0 pt/A	Incorporate into prepared bed 1-2" deep prior to transplanting. Can also be used as a post directed incorporated spray when direct seeded tomatoes are blocked or thinned. Do not apply post-planting for transplanted tomatoes.
Tri-4 EC	trifluralin	Preplant/ preemergence 1-2 pt/A	Transplants only. Apply and incorporate prior to planting.

Watermelons

Alanap-L	naphthalam	Preemergence 4-6 qt/A	Avoid using on light soils. Can provide some control of field bindweed but does not control grasses. Apply to the soil surface after seeding.
Dacthal W-75	DCPA	Post-directed 6-14 lb/A	Apply after plants have developed 4-5 true leaves. Will not control emerged weeds. Irrigate after application to activate herbicide.
Gramoxone Extra	paraquat	Preplant/ preemergence 1.5-3.0 pt/A	Crop plants emerged at time of application will be killed.
Poast	sethoxydim	Postemergence 0.5-1.5 pt/A	Use 2 pints of crop oil concentrate in a 10/gal/acre spray volume. Will only control emerged grasses. Rate depends on grass size and geographic location.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate 1-2" deep prior to seeding.
Roundup	glyphosate	Apply only prior to planting 0.5-3.0 pt/A	Contact of spray with desirable crops will result in severe damage or death of crop.
Treflan EC	trifluralin	Post-directed 1-2 pt/A	Wait until plants have reached the 3-4 leaf stage. Direct spray away from plants but onto the shoulder of the bed. If planting every other 40" bed, bust out center bed and reshape shoulders prior to application. Incorporate into the bed to depth of 1-2" and throw treated soil toward the crop row.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Use 1-2 pt/100 gal of spray volume of nonionic surfactant.

Vine Crops Quick Guide

	Treflan	Dacthal	Alanap	Prefar	Poast
Cucumber	X	X	X	X	X
Cantaloupe	X	X	X	X	X
Watermelon	X	X	X	X	X
Pumpkin				X	X
Honeydew		X			
Crenshaw				X	
Cassaba					
Squash		X		X	X
Persian				X	

Vine Crops Quick Guide

Trade name	Common name	Application time in relation to crop and rate/acre	Remarks
Alanap-L¹	naphthalam	Preemergence 6-8 qt/A	Avoid using on light soils. Can provide some control of field bindweed but does not control grasses. Apply to the soil surface after seeding.
Dacthal W-75¹	DCPA	Post-directed 6-14 lb/A	Apply after plants have developed 4-5 true leaves. Will not control emerged weeds. Irrigate after application to activate herbicide.
Poast¹	sethoxydim	Postemergence 0.5-1.5 pt/A	Use 1 quart of oil concentrate/A spray volume. Will only control emerged grasses. Rate depends on grass size and geographic location.
Prefar 4-E	bensulide	Preplant incorporated 5-6 qt/A	Apply preplant and incorporate 1-2" deep prior to seeding.
Treflan EC^{1,2}	trifluralin	Post-directed 1-2 pt/A	Wait until plants have reached the 3-4 leaf stage. Direct spray away from plants but onto the shoulder of the bed. If planting every other 40" bed, bust out center bed and reshape shoulders prior to application. Incorporate into the bed to depth of 1-2" and throw treated soil towards the crop row.

¹Application rates vary according to climate and soil; be certain to refer to label for specific instructions.

²Several formulations of this herbicide are labeled for use on this crop; refer to each product's label for specific instructions.

Recommended Herbicides for Fruit and Nut Crops.

Herbicide	Deciduous Tree Fruits					Citrus and Subtropical Fruits								Small Fruits					Nuts			
	Apple	Nectarine	Peach	Pear	Plum	Orange	Grapefruit	Lemon	Lime	Tangerine	Tangelo	Avocado	Banana	Papaya	Blackberry	Blueberry	Fig	Grape	Strawberry	English Walnut	Pecan	Pistachio
Bueno 6	X		X	X	X	X	X	X	X											X		
Dacthal W-75																			X			
Devrinol 50DF	X	X	X	X	X	X	X	X		X	X				X	X	X	X	X	X	X	X
Eptam 7E						X	X		X													
Fusilade DX	X	X	X	X	X	X	X	X	X	X	X				X		X	X		X	X	X
Goal 1.6 E	X	X	X	X	X	X	X	X	X	X	X					X	X			X	X	X
Gramoxone Extra	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hyvar L						X	X	X	X	X												
Hyvar X						X	X	X	X	X												
Ignite	X																X			X	X	
Karmex DF	X		X	X		X	X	X	X	X		X	X				X				X	
Krovar I						X	X	X	X	X												
Krovar II						X	X	X	X	X												
Poast	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
Princep	X		X	X		X	X								X	X		X		X	X	
Prowl 3.3 EC	X	X	X	X	X	X	X	X	X	X							X			X		X
Roundup	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sinbar	X		X												X	X			X		X	
Solicam DF	X	X	X	X	X	X	X	X	X	X	X				X	X		X		X	X	
Surflan	X	X	X	X	X	X	X	X			X				X	X	X	X		X	X	X
Touchdown	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Treflan		X	X		X	X	X		X	X							X			X	X	

If the registration of a herbicide is cancelled by federal or state agencies, recommendations are no longer valid. Please read and follow the current label for proper use.

Deciduous Tree Fruits
Apple, Nectarine, Peach, Pear and Plum

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Bueno 6	MSMA	Post-directed 2.66 pt/A	For use in nonbearing apples, peaches, pears and plums. Apply up to 3 applications per year in 100 gallons of water per acre spray volume. Can also be used as a spot treatment. Do not allow spray to contact leaves, stem or bark of trees.
Devrinol 50DF	napropamide	Preplant incorporated 8 lb/A	For use in apples, nectarines, peaches, pears and plums. Incorporate by tillage or irrigation within 24 hours. Do not apply within 35 days of harvest.
Fusilade DX	fluazifop-p-butyl	Postemergence 16-24 oz/A	Only controls emerged grasses. Rate depends on grass species, size, location and condition. Do not apply to grasses that are stressed or have formed seed heads. Always use crop oil concentrate or surfactant. For use on nectarines, peaches and plums. Don't apply more than 4.5 pt/A per season or within 14 days of harvest. For nonbearing apples and pears, use 1.0 to 1.5 pt/A, and don't harvest fruit for 1 year after application.
Goal 1.6E	oxyfluorfen	Preemergence 6-10 pt/A Postemergence 2.5-10.0 pt/A	For use in apples, nectarines, peaches, pears and plums. Avoid drift. Postemergence applications at higher rates will also provide preemergence control. Do not apply after buds start to swell in the spring or when fruit/nuts are present. Greater residual control can be obtained by tank-mixing with Karmex, Princep, Surflan or Solicam.
Gramoxone Extra	paraquat	Post-directed 2-3 pt/A	Use in apples, nectarines, peaches, pears and plums. Will only burn down existing weeds. Can be tank-mixed with a preemergence residual herbicide. Do not contact green stems, fruit or foliage. Use a shield or wrap plant when spraying around young trees. Add a surfactant or crop oil concentrate. Complete coverage is essential for effective weed control.
Ignite	glufosinate-ammonium	Postemergence 3-6 qt/A	For use on apples only. Avoid contact with green bark on young trees. Do not apply on trees within 1 year of transplanting. Do not allow contact with desirable foliage. May be used for sucker control.
Karmex DF	diuron	Preemergence Apples and Pears- 4 lb/A Peaches-2-5 lb/A	Apply in spring prior to weed emergence. Do not treat dwarf varieties. Use in apples, peaches and pears. Addition of surfactant will also provide postemergence activity. Do not use on light soils.
Poast	sethoxydim	Postemergence Broadcast: 1.5-2.5 pt/A Spot Treatment: 1.0-1.5% by volume	Use on bearing or nonbearing apples and pears. Will only control emerged grasses. Doesn't have any residual activity. Rate depends on grass size and species. Always use 2 pints of crop oil concentrate per acre. Do not use on nonbearing nectarines, peaches and plums within 1 year of harvest.

Deciduous Tree Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Princep	simazine	Preemergence 4L 2-4 qt/A 80W 2.5-5.0 lb/A Caliber 90 2.2-4.4 lb/A	For use in apples, peaches and pears established for at least 1 year. Do not use on coarse (sandy) soils. Apply only once per year except as noted otherwise. Can use lower rates on peaches as stated on the label. Limit overhead sprinkling to 0.5".
Prowl 3.3 EC	pendimethalin	Preemergence 2.4-4.8 qt/A	For use in nonbearing apples, nectarines, peaches, pears and plums. Do not apply to leaves or stems. Use directed spray in at least 20 gallons of water/A. Do not apply to newly transplanted trees until ground is settled and no cracks are present.
Roundup	glyphosate	Postemergence 1-5 qt/A Spot treatment: 0.75-1.5% by volume	For use in apples, nectarines, peaches, pears and plums. Extreme care must be taken to avoid all contact of this herbicide with desirable vegetation. Rate depends on weed species and size. Can also be applied as a wiper application. Do not apply more than 10.6 qt/A/year. Follow surfactant recommendations. Good treatment for emerged perennial weeds.
Sinbar	terbacil	Preemergence 2-3 lb/A	For use on apples and peaches established in orchard for at least 3 years. Do not use on sandy soils low in organic matter. Don't allow spray to drift onto desirable plants or fruit. Use as a directed spray either banded or broadcast in 40 gallons of water per acre, one application per year. Rate depends on soil type.
Solicam DF	norflurazon	Preemergence	May be applied directly after establishing apple orchards or 18 months after establishing nectarine, peach, pear or plum orchards. On sandy soils use on a few trees first to establish level of safety, especially with peaches. Rate depends on soil type, maximum 5 lb/A per year. Irrigation needed for activation. Do not use on nursery rootstock.
Surflan A.S.	oryzalin	Preemergence 2-6 qt/A	For use in apples, nectarines, peaches, pears and plums. Rate will determine the duration and spectrum of weed control. Can be tank-mixed with Gramoxone or Roundup to control emerged weeds. Can also be tank-mixed with many other preemergence herbicides to broaden the spectrum of weed control. Irrigate with 1/2 to 1" of water with a sprinkler irrigation system to activate the herbicide.
Touchdown	sulfosate	Postemergence 1.3-5.3 pt/A Spot treatment: 0.25-5.0 % by volume	For use in nonbearing apples, pears, peaches, nectarines and plums. Rate depends on weed species and size. Must avoid contact with all desirable vegetation. A surfactant is required.

Deciduous Tree Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Treflan E.C.	trifluralin	Preplant incorporated 1-4 pt/A	For use in nectarines, peaches and plums. Apply and incorporate 1-2 pt/A prior to transplanting or apply 2-4 pt/A in established orchards and incorporate 1-2" deep within 24 hours after application. Rate depends on soil type.

Citrus and Subtropical Fruits

Orange, Grapefruit, Lemon, Lime, Tangerine, Tangelo, Avocado, Banana, Papaya

Bueno 6	MSMA	Post-directed 2.66 pt/A	For use in nonbearing oranges, grapefruit, lemons, limes and tangerines. Apply up to 3 applications per year in 100 gallons of water per acre spray volume. Can also be used as a spot treatment. Do not allow spray to contact leaves, stem or bark of trees.
Devrinol 50WP	napropamide	Preemergence 8 lb/A	For use in all citrus except limes. Irrigate to activate the herbicide. Apply prior to weed emergence. Do not apply within 35 days of harvest.
Eptam 7E	EPTC	Postplant incorporated 3.5-7.0 pt/A	Incorporate soil-applied Eptam with cultivation equipment after lining out orange, grapefruit, lemon and tangerine nursery stock and young field plantings. In established groves, meter 3.5 pt/A into flood irrigation water. Do not apply within 15 days of harvest. Gives suppression of nutsedge.
Fusilade DX	fluazifop-p-butyl	Postemergence 16-24 oz/A	For use in all citrus listed and avocados. Controls emerged grasses. Do not use on trees to be harvested within 1 year of application. Use crop oil concentrate or surfactant.
Goal 1.6E	oxyfluorfen	Preemergence 6-10 pt/A Postemergence 2.5-10.0 pt/A	For use in avocados and nonbearing citrus. Postemergence application at higher rates will also provide preemergence control. Avoid drift. Do not apply until growth flush has hardened.
Gramoxone Extra	paraquat	Post-directed 2-3 pt/A	For use in all citrus and subtropical fruits listed. Will only burn down existing weeds. Can be tank-mixed with a residual herbicide. Avoid all tree contact.
Hyvar X or L	bromacil	Preemergence or Postemergence 2-8 lb or 2-8 qt/A	For use in all citrus. Rate depends on tree age and soil type. Apply just before or just after weed emergence. Remove or mow any dense vegetation.

Citrus and Subtropical Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Karmex DF	diuron	Preemergence or Postemergence 2-6 lb/A	<p>Citrus - Grove should be established at least 1 year and not have had freeze damage within the last 6 months. Well-established weeds should be eliminated by cultivation. Use 2-4 lb/A on annual weeds and 4-6 lb/A on johnsongrass seedlings.</p> <p>Banana - Use 1.5-3.0 lb/A on new plantings after soil has settled. Use up to 6.0 lb/A on established plantings. Repeat as needed with at least 6 weeks between applications and not more than 12.0 lb/year. Surfactant needed for postemergence control of emerged weeds at 1 pt/25 gallons of spray.</p> <p>Papaya - Must be established orchard at least 1 year old. Apply 2.5-5.0 lb/A, preferably before weeds emerge. If weeds have emerged, use 1 pt of surfactant per 25 gallons of spray mix.</p>
Krovar I	bromacil + diuron (1:1)	Preemergence 2-8 lb/A	For use in citrus. Rate depends on tree age and soil type. Has some postemergence activity on small weeds, particularly with the use of surfactant at 1 qt/100 gal. Can be tank-mixed with Gramoxone for more effective control of emerged weeds. Keep constant agitation in tank and avoid overlapping spray. Krovar I is more effective on some annual weeds than Krovar II but is slightly less persistent.
Krovar II	bromacil + diuron (2:1)	Preemergence 3-8 lb/A	For use in citrus. Rate depends on tree age and soil type. Has some postemergence activity on small weeds, particularly with the use of surfactant at 1 qt/100 gal. Can be tank-mixed with Gramoxone for more effective control of emerged weeds. Keep constant agitation in tank and avoid overlapping spray. Krovar II is slightly more effective on some perennial weeds than Krovar I and will give slightly longer control.
Poast	sethoxydim	Postemergence Broadcast: 1.5-2.5 pt/A Spot treatment: 1.0-1.5% by volume	For use in citrus and nonbearing avocados. Will only control emerged grasses. Use 2 pints of crop oil concentrate per acre.
Princep	simazine	Preemergence 4L 4.0-4.8 qt/A 80W 5-6 lb/A Caliber 90 4.4-5.3 lb/A	For use in grapefruit and oranges. Do not use in nurseries. Do not apply to bedded trees or those under stress from freeze damage for 1 year after the freeze.
Prowl 3.3 EC	pendimethalin	Preemergence 2.4-4.8 qt/A	For use in all types of nonbearing citrus. Use as a directed spray in at least 20 gallons of water/A. Do not apply to newly transplanted trees until ground has settled and no cracks are present. Avoid tree contact.

Citrus and Subtropical Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Roundup	glyphosate	Postemergence 1-5 qt/A Spot treatment: 0.75-1.5% by volume	For use in citron, grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine, avocado, banana and papaya. Can be tank-mixed with many preemergence herbicides for a more complete weed control program. Extreme care must be taken to avoid all contact with desirable vegetation. Rate depends on weed species and size. Do not apply more than 10.6 quarts/A/yr. Follow surfactant recommendations. Good treatment for emerged perennial weeds. Can also be applied as a wiper application.
Solicam DF	norflurazon	Preemergence 2.5-5.0 lb/A	May be used in newly planted or established citrus and in avocado older than 6 months, but not in seed-beds. Can be applied through several types of irrigation systems. Rate varies with soil type, 10 lb maximum/year for citrus, 5.0 lb maximum per acre per year in avocado.
Surflan A.S.	oryzaline	Preemergence 2-6 qt/A	For use in grapefruit, lemons, oranges and avocados. Rate will determine the duration and spectrum of weed control. Can be tank-mixed with many other herbicides to either control emerged weeds or broaden the spectrum of control. Irrigation after application is useful in activating the herbicide.
Touchdown	sulfosate	Postemergence up to 5.3 pt/A Spot treatment: 0.25-5.0 % by volume	For use in nonbearing citrus and avocado, not within 1 year of harvest.
Treflan	trifluralin	Preplant incorporated 1-4 pt/A	For use in grapefruit, lemons, oranges, tangelos and tangerines. Apply and incorporate prior to transplanting or apply as a directed spray in established orchards and incorporate. The difficulty in incorporating Treflan in established orchards without causing root injury may preclude its use. Rate depends on soil, rainfall and grove age.

Small Fruits
Blackberry, Blueberry, Fig, Grape and Strawberry

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Dacthal W-75	DCPA	Preplant incorporated 8-12 lb/A	For use in strawberries at transplanting or fall to early spring in established plantings and preplant incorporated. Do not apply bloom through harvest.
Devrinol 50DF	napropamide	Preemergence 8 lb/A	For strawberries, do not apply from bloom to harvest. May also be used in grapes, figs, blackberries and blueberries. Do not apply within 35 days of harvest. Irrigate to activate the herbicide. Apply prior to weed emergence.
Fusilade DX	fluazifop-p-butyl	Postemergence 1.0-1.5 pt/A	For use in nonbearing blackberries, figs and grapes. Controls emerged grasses. Do not use on plants to be harvested within 1 year of application. Use crop oil concentrate or surfactant. Do not apply to grasses that are stressed or have formed seed heads.
Goal 1.6 E	oxyfluorfen	Preemergence 6-10 pt/A Postemergence 2.5-10.0 pt/A	For use in figs and grapes. Avoid drift. Postemergence application at higher rates will also provide preemergence control. Do not apply after buds start to swell or when fruit are present.
Gramoxone Extra	paraquat	Post-directed 1.5-3.0 pt/A	For blackberries, blueberries, figs and grapes, use 2-3 pt/A but only 1.5 pt/A on strawberries. Apply before emergence of new canes or shoots. For grapes, treat when sucker growth is no longer than 8". Will only burn down existing weeds. Can be tank-mixed with residual herbicides. Do not contact green stems, fruit or foliage of crop. For strawberries apply by directing a spray between the rows and using shields to prevent spray contact with crop plants.
Ignite	glufosinate-ammonium	Postemergence	For use on all grapes. Avoid contact with green bark. Do not allow contact with desirable foliage. May be used for sucker control.
Karmex DF	diuron	Preemergence 2-6 lb/A	For use only on grapes established for at least 3 years. Not recommended for use on light soils, if rainfall is imminent or just prior to irrigation. Use as a directed spray on a band along grape rows.
Poast	sethoxydim	Postemergence Broadcast: 1.5-2.5 pt/A Spot treatment: 1.0-1.5 % by volume	For use in bearing and nonbearing blueberries, grapes and strawberries, and in nonbearing blackberries and figs. In the latter, do not apply within 1 year of harvest. Will only control emerged grasses and doesn't have any residual control. Always use 2 pints of crop oil concentrate per acre.

Small Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Princep	simazine	Preemergence 4L 2-4 qt/A 80 W 2.5-5.0 lb/A Caliber 90 2.2-4.4 lb/A	For use in blueberries, blackberries and grapes. In blueberries or blackberries established less than 6 months apply at 1/2 rate. Do not apply when fruit is present or illegal residues may result. Do not use in grape vineyards established less than 3 years. Do not use in sandy soils with less than 1% organic matter or apply more than once per year.
Prowl 3.3 EC	pendimethalin	Preemergence 2.4-4.8 qt/A	For use in nonbearing dormant grapes only. Do not apply if buds have started to swell. Use as a directed spray in at least 20 gallons of water/A. Do not apply to newly transplanted trees until ground is settled and no cracks are present.
Roundup	glyphosate	Postemergence 1-5 qt/A Spot treatment: 0.75-1.5% by volume	For use in all small fruits listed including grapes. Extreme care must be taken to avoid all contact of this herbicide with desirable vegetation. Rate depends on weed species and size. Do not apply more than 10.6 qt/A/yr. Follow surfactant recommendations. Good treatment for emerged perennial weeds. Can also be applied as a wiper application.
Sinbar	terbacil	Preemergence Blackberries: 1-2 lb/A Blueberries: 2-4 lb/A	Treat only healthy plantings established for 1 year or more. Apply as a directed spray beneath the plants. Do not use on sandy soils or when subsoil or roots are exposed. Do not apply within 70 days of harvesting blackberries.
Solicam DF	norflurazon	Preemergence 2.5-5.0 lb/A	For use in blackberries, blueberries and grapes. May be used on 6-month-old blueberry plantings. Apply to dormant blackberries only, established for at least 18 months. Grapes should be established for 2 years before application. Rates depend upon crop and soil texture, maximum 5.0 lb/A per year.
Surflan A.S.	oryzalin	Preemergence 2-6 qt/A	Can be used in blackberries, blueberries, figs and grapes. Rate will determine the duration and spectrum of weed control. Can be tank-mixed with a contact herbicide to control emerged weeds or with another preemergence herbicide for a broader spectrum of control.
Touchdown	sulfosate	Postemergence 1.3-5.3 pt/A Spot treatment: 0.25-3.0% by volume	For use in nonbearing blackberries, raspberries, blueberries, figs and grapes. Rate depends on weed species and size. Must avoid contact with all desirable vegetation. A surfactant is required.

Small Fruits (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Treflan	trifluralin	Preplant incorporated 1-4 pt/A	For use on grapes. Apply and incorporate prior to transplanting or as a directed incorporated spray in established vineyards. Incorporate 1-2" deep within 24 hours after application. The difficulty in incorporating Treflan in established vineyards without causing root damage may preclude its use. Rate depends on soil, rainfall and vineyard age. Do not apply to vineyards within 60 days of harvest.

Nuts English Walnut, Pecan and Pistachio

Devrinol 50DF	napropamide	Preemergence 8 lb/A	For use in walnuts, pecans and pistachios. Do not use within 35 days of harvest. Irrigate to activate the herbicide. Apply prior to weed emergence. Do not apply when nuts are on the ground during harvest season.
Fusilade DX	fluazifop-p-butyl	Postemergence 16-24 oz/A	For use in pecans. Only controls emerged grasses. Rate depends on grass species, size, location and condition. Do not apply to grasses that are stressed or have formed seed heads. Always use crop oil concentrate or surfactant. Don't apply more than 4.5 pints per acre per season. Do not apply within 30 days of harvest. Do not graze. For use in nonbearing pistachios and walnuts, apply 1 to 1.5 pt/A, and do not harvest for 1 year.
Goal 1.6 E	oxyfluorfen	Preemergence 6-10 pt/A Postemergence 2.5-10 pt/A	For use in walnuts, pecans and pistachios. Postemergence application at higher rates will also provide preemergence control.
Gramoxone Extra	paraquat	Post-directed 2-3 pt/A	For use in pecans, walnuts and pistachios. Do not apply when nuts to be harvested are on the ground. Will only burn down existing weeds but can be tank-mixed with a residual herbicide. Do not contact green stems or foliage. Use a shield or wrap plants when spraying around young trees. Do not graze.
Ignite	glufosinate-ammonium	Postemergence 3-6 qt/A	For use in pecans and walnuts. Do not apply on trees within 1 year of transplanting. Avoid contact with green bark. Do not allow contact with desirable foliage. May be used for sucker control.
Karmex DF	diuron	Preemergence 2-4 lb/A	For use in pecans established at least 3 years as a single annual application. Do not use on eroded areas where subsoil or roots are exposed, nor on diseased or non-vigorous trees.

Nuts (continued)

Trade name	Common name	Application time and rate per acre broadcast	Remarks
Poast	sethoxydim	Postemergence Broadcast: 1.5-2.5 pt/A Spot treatment: 1.0-1.5% by volume	For use in nonbearing walnuts, pecans and pistachios. Will only control emerged grasses. Doesn't have any residual activity. Rate depends on grass size and species. Always use 2 pints of crop oil concentrate per acre.
Princep	simazine	Preemergence 4L 2-4 qt/A 80 W 2.5-5.0 lb/A Caliber 90 2.2-4.4 lb/A	For use in pecans and walnuts. In pecans don't apply in West Texas or when nuts are on the ground. Do not apply to orchards established less than 2 years. Do not use on gravelly, sandy, loamy sand soils, soils with a pH greater than 7.8, on soils with less than 1% organic matter or in areas you wish to apply more than 1/2" of irrigation immediately following application. Do not graze.
Prowl 3.3EC	pendimethalin	Preemergence 2-4 qt/A	For use in nonbearing walnuts and pistachios. Use as a directed spray in at least 20 gallons of water/A. Do not apply to newly transplanted trees until ground has settled and no cracks are present.
Roundup	glyphosate	Postemergence 1-5 qt/A Spot treatment: 0.75-1.5% by volume	Can be used in walnuts, pecans and pistachios. Can be tank-mixed with many preemergence herbicides for a more complete weed control program. Extreme care must be taken to avoid all contact of this herbicide with desirable vegetation. Rate depends on weed species and size. Do not apply more than 10.6 qt/A/yr. Follow surfactant recommendations. Good treatment for emerged perennial weeds.
Sinbar	terbacil	Preemergence 2-3 lb/A	For use in pecans established at least 1 year, one application per year. Do not use on eroded areas where subsoil or roots are exposed, nor on diseased or non-vigorous trees. Do not graze or feed forage from treated areas.
Solicam DF	norflurazon	Preemergence 2.5-5.0 lb/A	For use in pecans and walnuts established for at least 18 months. Rate depends on soil type, 5.0 lb/A per year maximum.
Surflan A.S.	oryzalin	Preemergence 2-6 qt/A	For use in walnuts, pecans, pistachios. Rate will determine the duration and spectrum of weed control. Can be tank-mixed with many other herbicides to either control emerged weeds or broaden the spectrum of control. Irrigation after application is useful in activating the herbicide.
Touchdown	sulfosate	Postemergence 1.3-5.3 pt/A Spot treatment: 0.25-5.0% by volume	For use in nonbearing pecans, walnuts and pistachios. Rate depends on weed species and size. Must avoid contact with all desirable vegetation. A surfactant is required.
Treflan EC	trifluralin	Preplant incorporated 1-4 pt/A	For use in pecans and walnuts. Apply and incorporate prior to transplanting or as a directed incorporated spray in established orchards. The difficulty in incorporating Treflan in established orchards without causing root damage may preclude its use. Rate depends on soil, rainfall and orchard age.

List of Herbicides Found in This Guide

Trade name	Common name	Manufacturer
Aatrex 4L	Atrazine	Ciba-Geigy
Alanap-L	Naptalam	Uniroyal Chemical
Balan DF	Benefin	DowElanco
Basagran	Bentazon	BASF
Buctril	Bromoxynil	Rhône-Poulenc
Bueno 6	MSMA	Fermenta
Chiptox MCPA	MCPA	Rhône-Poulenc
Command 4-EC	Clomazone	FMC
Dacthal W-75	DCPA	Fermenta
Devrinol 50DF	Napropamide	ICI
Dual 8E	Metolachlor	Ciba-Geigy
Eptam 7E	EPTC	ICI
Formula 40	2,4-D	Rhône-Poulenc
Fusilade DX	Fluazifop-p-butyl	ICI
Goal 1.6 E	Oxyfluorfen	Rohm and Haas
Gramoxone Extra	Paraquat	ICI
Hyvar L	Bromacil (lithium salt)	DuPont
Hyvar X	Bromacil	DuPont
Ignite	Glufosinate-ammonium	Hoechst Celanese
Karmex DF	Diuron	DuPont
Kerb 50 W	Pronamide	Rohm and Haas
Krovar I	Bromacil + Diuron	DuPont
Krovar II	Bromacil + Diuron	DuPont
Lexone DF	Metribuzin	DuPont
Lorox DF	Linuron	DuPont
Poast	Sethoxydim	BASF
Prefar 4-E	Bensulide	ICI
Princep	Simazine	Ciba-Geigy
Prowl 3.3 EC	Pendimethalin	Cyanamid
Pyramin DF	Chloridazon	BASF
Ro-Neet 6-E	Cycloate	Zeneca
Roundup	Glyphosate	Monsanto
Sencor 4	Metribuzin	DuPont
Sinbar	Terbacil	DuPont
Solicam DF	Norflurazon	Sandoz
Surflan	Oryzalin	DowElanco
Thistrol	MCPA	Rhône-Poulenc
Tillam 6-E	Pebulate	ICI
Touchdown	Sulfosate	Zeneca
Treflan	Trifluralin	DowElanco
Tri-4 EC	Trifluralin	Cyanamid
Turbo 8-EC	Metolachlor	Miles

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