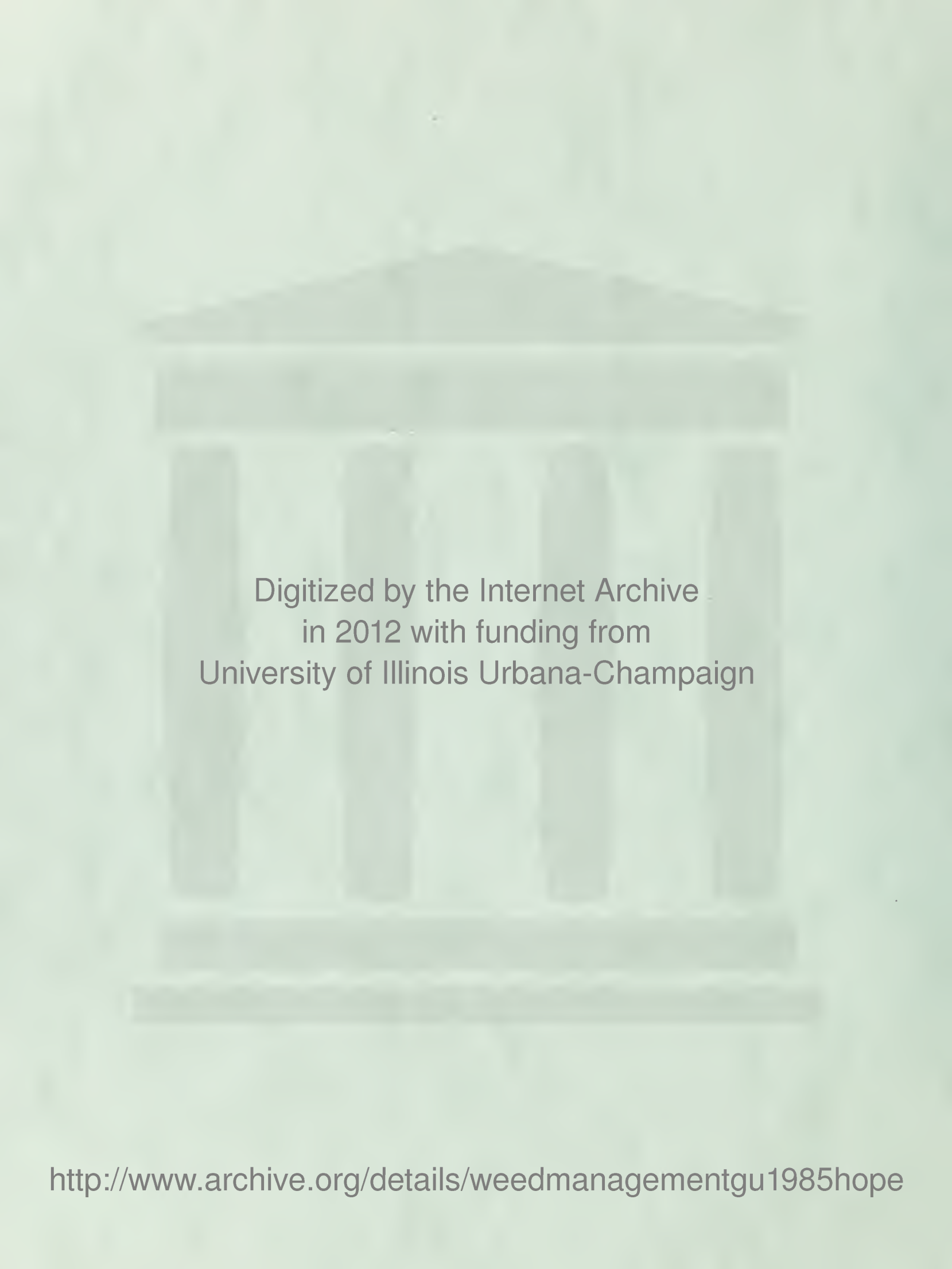

Weed Management Guide 1985

FOR COMMERCIAL VEGETABLE GROWERS

Restricted-use herbicides are identified with an asterisk(*).
You must be certified as a pesticide applicator to use restricted-use pesticides.
See your county Extension adviser in agriculture for information.

WEED GROWTH reduces the income of vegetable growers in the United States by millions of dollars annually as a result of lower yields, poorer quality, and added labor in harvesting and processing.

This guide should be used together with the grower's knowledge of soil types and the crop and weed history of the area to be treated. Whether to use herbicides or other means of weed control depends in part on the severity of past weed infestations. In some instances, mechanical control may be sufficient. If so, shave off weeds with a sharp hoe or cultivator while gently breaking up the crust. Deep tillage causes severe injury to many shallow-rooted plants and helps place a fresh supply of weed seeds in position to germinate. Keeping equipment sharp and in good condition will help reduce injury to desirable plants. Hoe carefully around your plants, and hand pull weeds close to the plants.

For warm season crops such as fresh market tomatoes, peppers, eggplant, okra, cucumbers, and melon, black polyethylene mulch will control annual weeds, conserve moisture, and increase the soil temperature in early spring. The higher temperature increases early season growth. Natural mulch materials may require considerable hand labor for application. Most organic materials are bulky and must be hauled to the place of use. This is a problem for large commercial plantings. Organic mulches tend to reduce soil temperature.

Herbicide application may be needed in addition to mechanical control. Several herbicides may be suggested for some crops. These herbicides have shown good control with no injury to the vegetables under test conditions. Not all herbicides cleared for use on a species are necessarily listed. Where the choice of more than one herbicide is suggested, the decision rests with the grower and is based on his knowledge of past weed infestations, crop rotations, and material costs. Where one herbicide will not control the weeds present, a combination of herbicides may be suggested. When using a herbicide for the first time, it is advisable to use a small-scale trial.

These suggestions for weed control in vegetables are based on research at the Illinois Agricultural Experiment Station, the U.S. Department of Agriculture, and other research institutions. The University of Illinois and its agents assume no responsibility for results from the use of herbicides, whether or not they were used in accordance with suggestions, recommendations, or directions of the manufacturer or any governmental agency.

Reading the label of the herbicide container is the most profitable time you spend in weed control. Use of the material and methods of application and use depend on registration of the herbicide by federal and state Environmental Protection Agencies (EPA). Do not use any herbicide *unless the label states that it is cleared for the use on the crop to be treated.*

Herbicides are being classified for *general use* or *restricted use* by the U.S. Environmental Protection Agency. A person wishing to use a herbicide classified for restricted use must be certified as a private or commercial pesticide applicator by the Illinois Department of Agriculture. Contact your county Extension adviser in agriculture for details about this program. Only a few herbicides have been classified at this time.

When applying mixtures of chemicals, the *user* assumes responsibility for freedom from residues if the mixture is not labeled by the EPA.

Suggestions sometimes change during the growing season, based on EPA clearances that were made after this circular was issued. This publication, printed once a year, is subject to change without notification.

Watch for notice of changes in the EPA registration of herbicides (as released by the EPA) in the *Illinois Vegetable Farmer's Letter* and the *Insect, Weed, and Plant Disease Survey Bulletin.* Subscription forms for the latter are available from the Agricultural Newsletter Service, 116 Mumford Hall, 1301 West Gregory Drive, Urbana, Illinois 61801, or your county Extension Office. You can obtain the *Vegetable Farmer's Letter* from Vegetable Crops Extension, University of Illinois, 1103 West Dorner Drive, Urbana, Illinois 61801. Some changes will be released through the Vegetable Growers "Hotline."

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN COLLEGE OF AGRICULTURE COOPERATIVE EXTENSION SERVICE
Prepared by H. J. Hopen, Department of Horticulture (revised annually) CIRCULAR 907 (October 1984)

For Application During the Growing Season (1985 Only)

Crop	*Treatment*	*Active ingredient per acre actually covered*[a]	*Weeds controlled*	*Timing of application (based on crop stage)*	*Remarks, cautions, limitations*
Asparagus (seedlings)	Amiben	3 lb.	Annuals	Immediately after seeding	Irrigation or rainfall after treatment will give maximum control.
Asparagus (established plantings)[b,c]	dalapon	5-10 lb.	Perennial grass	End of harvest season following disking	Apply when grass weeds are 3 to 4 in. tall. Direct spray under fern growth. Use surfactant as directed on label.
	diuron	1-4 lb.	Annuals	In spring, after harvest, or both	Apply after disking. Do not exceed 6 lb. per growing season; use a lighter rate on sandy soil. With diuron and Princep, a spring application may be sufficient after the first year.
	Princep	3-4 lb.	Annuals	In spring, after harvest, or both	Apply after disking. Do not treat during the last year in asparagus because of residue.
	Sinbar	1.2-2.4 lb.	Annuals	In spring, after harvest, or both	Use lower rates on coarse soils. Do not apply more than 2.4 lb. per acre per year. Do not use on soils with less than 1 percent organic matter. Do not plant to any other crop for two years after application.
	metribuzin	1-2 lb.	Primarily broadleaf weeds	Early spring before the spears emerge or after harvest	Apply after disking. Do not apply within 14 days of harvest. Can help control broadleaf weeds when used with dalapon, diuron, or Princep. Do not apply more than 2 lb./acre per growing season.
	Preemergence				
Beans, dry, lima and snap[d]	Treflan	0.5-0.75 lb.	Annuals[e] (primarily grasses)	Preplant soil application, incorporate with soil immediately	Plant crop immediately, or within 3 weeks after application. Can use up to 1 lb. per acre on dry beans.
	Basalin	0.75-1.5 lb.	Annuals (primarily grasses)	Preplant soil application, incorporate with soil immediately	
	dinoseb	6-7.5 lb.	Annuals	Can be used between planting and crop emergence	Do not use on light, sandy soil. Some stand reduction may result from use. See label for precautions.
	Postemergence				
	Basagran	0.75-1 lb.	Annual broadleaf weeds, Canada thistle, nutsedge	When weeds are small and are actively growing; after the first trifoliate leaf appears on beans	Can provide good, broad-spectrum control when combined with a grass-active herbicide. Do not mix with other pesticides. See Basagran entry under corn, postemergence for Canada thistle and nutsedge control.
Beans, snap	EPTC Eptam Extra	3 lb.	Annual grasses and nutgrass[f]	Preplant soil application, incorporate with soil immediately	
	EPTC + Treflan	2-3 lb. 0.5-0.75 lb.		Preplant soil application, incorporate with soil immediately	Research results have shown this combination to control a broader spectrum of weeds than either herbicide alone.
	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after seeding	Do not feed treated plant parts to livestock.
Beans, lima and dry	Amiben	2-3 lb.	Broad spectrum of annual weeds	Immediately after seeding, or preplant-incorporated for lima beans	Field may be rotary-hoed without destroying herbicide action.
	Dual	1.5-3 lb	Annuals	Preplant soil application, incorporate with soil, or preemergence	
	Lasso	2-3 lb.	Annuals	Lima beans: preplant soil application, incorporate into upper 1 to 2 inches, or preemergence. Dry beans: preplant soil application, incorporate into upper 1 to 2 inches, or preemergence	
Beans, dry	EPTC + Treflan	2-3 lb. 0.5-0.75 lb.		Preplant soil application, incorporate with soil immediately	Research results have shown this combination to control a broader spectrum of weeds than either herbicide alone.
	Sonalan	0.5-1.5 lb.	Annual grass and nightshade	Preplant soil application, incorporate with soil immediately	Sonalan has a tank mix or overlay label for dry beans with Amiben, Dual, Eptam, Lasso, or Basagran.
Beets, garden[d]	Pyramin	4 lb.	Annuals (primarily broadleaved)	Preemergence or after beets emerge and before weeds have two true leaves	Rainfall or irrigation needed to activate. Where grasses are a severe problem, use 4 lb. of Pyramin plus 4 lb. of Ro-Neet.
	Ro-Neet	4 lb.	Annual grasses	Preplant soil application, incorporate with soil immediately	Use a combination treatment with Pyramin to broaden control spectrum.
	Direct-seeded or transplanted				
Broccoli[d] Brussels sprouts[d]	Treflan	0.5-0.75 lb.	Annuals[e] (primarily grasses)	Preplant soil application, incorporate with soil immediately	Stunting or growth reduction may occur at recommended rates under growth stress conditions. Can use up to 1 lb. per acre on transplants.
Cabbage[d] Cauliflower[d]	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after seeding. Can also be incorporated preplant	
Broccoli Brussels sprouts Cauliflower	Devrinol	1-2 lb.	Annuals	Preplant soil incorporated	Devrinol performs better when used in combination with a second herbicide than when used alone.

All notes are at the end of this table (page 6).

For Application During the Growing Season (continued)

Crop	Treatment	Active ingredient per acre actually covered[a]	Weeds controlled	Timing of application (based on crop stage)	Remarks, cautions, limitations
Carrots[d]	**Preemergence**				
	Treflan	0.5-1 lb.	Annuals[e] (primarily grasses)	Preplant soil application, incorporate with soil immediately	Seed after application to 3 weeks later.
	Postemergence				
	linuron	0.75-1.5 lb.	Annuals	Postemergence on carrots only after the crop is 3 in. tall; grasses, less than 2 in.; broadleaves, less than 6 in.	Do not feed treated foliage to livestock or replant treated area for 4 months. More than one application may be made, but do not exceed a total of 2 lb. per acre. Do not use over 40 PSI. Use no surfactants when temperatures exceed 80°F., or crop injury may result.
	Stoddard Solvent	60-80 gal.	Annuals	After two true leaves have appeared (do not apply to carrots or parsnips after they are ¼ in. in diameter, since an oily taste may result)	Most effective when sprayed on cloudy days or during high humidity, and when weeds are not more than 2 inches high. May not control ragweed. Do not apply within 40 days of harvest. Can be used on celery, dill, parsnips, and parsley.
Corn, pop[d]	**Preemergence**				
	atrazine	2-3 lb.	(See sweet corn)	(See sweet corn)	See sweet corn, *except the section on preemergence combinations.*
	Bladex	(See remarks)	Annuals	Preemergence only	Some pop corn varieties are sensitive to the application rate. (See remarks on Bladex under sweet corn.)
	Dual	1.5-3 lb.	Annuals	Preplant soil application, incorporate with soil, or preemergence	
	Eradicane, Eradicane Extra	4-6 lb.	Difficult-to-control weeds	Preplant soil application, incorporate with soil	See sweet corn.
	Lasso	2-4 lb.	Annuals	Preemergence	See sweet corn.
	Princep	2-4 lb.	Annuals	Preemergence	Plant only crops so specified on the label the following year. Do not graze treated areas.
	Sutan+	3-4 lb.	Primarily annual grasses	Preplant soil application, incorporate with soil	See sweet corn.
	Postemergence				
	2,4-D	0.5 lb.	Broadleaved weeds	Postemergence	Apply when corn is 3 to 10 in. tall.
	Basagran	0.75-1 lb.	Broadleaved annual weeds, Canada thistle, and nutsedge	(See sweet corn)	(See sweet corn)
Corn, sweet[c,d]	**Preemergence**				
	atrazine	2-3 lb.	Annuals, annual and perennial grasses[b]	Preemergence, apply no later than 3 weeks after seeding. Shallow cultivation may improve weed control during dry weather.	Grow corn a second year without atrazine treatment. This chemical has a high soil residue. Do not plant other vegetable crops on a sprayed area until a second year of corn has been grown. Use atrazine where quackgrass is a problem. Residue hazard decreased when banded or in combination with Lasso, propachlor, or Sutan.
	Bladex	(See remarks)	Annuals	Preemergence only	Some sweet corn varieties are sensitive to the application rate. Has been shown to have less soil residue than atrazine. See label for rates and precautions. Do not use postemergence, or on sandy or loamy-sandy soils (under 1 percent organic matter). Can be combined with other herbicides to reduce the rate being used. NOTE: The Shell Chemical Co. has a bulletin on using Bladex on pop and sweet corn.
	Dual	1.5-3 lb.	Annuals	Preplant soil application, incorporate with soil, or preemergence	
	Eradicane, Eradicane Extra	4-6 lb. 4 lb.	Difficult-to-control weeds	Preplant soil application, incorporate with soil	Use to control weeds that are difficult to control with other herbicides, such as wild cane, nutsedge, quackgrass, wild Proso millet, and seedling Johnsongrass. Eradicane Extra contains an "extender" which may lengthen the period of control in fields where Eradicane control has been shortened after several years of continuous use.
	Lasso	2-4 lb.	Annuals	Preemergence	Preplant incorporation may aid control of nutgrass.
	propachlor	4-6 lb.	Annuals	Preemergence	Do *not* use on sandy soils. Is an excellent herbicide on soils with a high organic-matter content.
	butylate +	3-4 lb.	Primarily annual grasses	Preplant soil application, incorporate with soil	Especially useful on sandy soil and where nutgrass is a problem.
	Combinations				
	Dual, Eradicane, Eradicane Extra, Lasso, propachlor, and Sutan+ may be combined with atrazine or Bladex or Basagran to broaden the spectrum of weed control and reduce residue and carryover. See labels of herbicides for rates and application methods.				
	Postemergence				
	2,4-D (amine)	0.5 lb.	Broadleaved weeds	Postemergence	Preferably, apply before corn is 6 in. tall. If corn is over 12 in., reduce the rate to ¼ lb.

Corn continued on the next page.

All notes are at the end of this table (page 6).

For Application During the Growing Season (continued)

Crop	*Treatment*	*Active ingredient per acre actually covered*[a]	*Weeds controlled*	*Timing of application (based on crop stage)*	*Remarks, cautions, limitations*
Corn, sweet (continued)[c,d]	atrazine	2 lb.	Annuals, annual and perennial grasses[b]	Directed spray 3 weeks after emergence	Can be combined with crop oils for postemergence application as emergency measure. This may increase residue the following year; preemergence use preferred. Do not graze or feed treated foliage for 21 days after treatment.
	Basagran	0.75-1 lb.	Broadleaved annual weeds, Canada thistle, and nutsedge	Early postemergence when the weeds are small and actively growing. Delay will result in less control.	For Canada thistle and nutsedge, split applications are preferred. Make the first one when the plants are 6 to 8 in. tall; for nutsedge, 7 to 10 days later; for Canada thistle, 10 to 14 days later (or use one application plus cultivation). Do not mix with other pesticides.
Cucumbers Muskmelons[e] Watermelons[e]	Alanap L	3-5 lb.	Annuals[f]	Immediately after seeding or transplanting	Do not use on cold soil. Rainfall or irrigation after treatment gives maximum control.
		3-3.5 lb.		After transplanting or vining	Keep away from foliage. Apply to soil after the weeds have been removed.
	Prefar	4-6 lb.	Annuals (primarily grasses)	Preplant soil application, incorporate with soil immediately	Is primarily a grasskiller. Consult label for sensitive crops within 18 months after application. Can be used in rotation with tomatoes, broccoli, cauliflower, lettuce, carrots, onions, and summer squash within 18 months. Soybeans can be planted 12 months after application.
	Prefar plus Alanap L	4 lb. +2-3 lb.	Grasses and broadleaved weeds	Preplant light incorporation	Has value for broad-spectrum weed control. Consult label for sensitive crops within 18 months after Prefar application. Has EPA approval as a tank mixture.
	Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring.				
Eggplant	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	After plants are established, 4-6 weeks after transplanting	Cultivate and weed prior to application. Can be applied to plants as part of a uniform soil application.
	Devrinol	1-2 lb.	Annuals	Preplant soil incorporation	For use in transplanted eggplant.
	Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring.				
Greens (for beets, mustard greens, and spinach — see note d)	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after seeding	For use on collards, kale, mustard greens, and turnips.
	Treflan	0.5-0.75 lb.	Annuals[e] (primarily grasses)	Preplant soil application, incorporate with soil immediately	For use on collards, kale, mustard greens, and turnip greens.
	Furloe	1-2 lb.	Primarily broadleaved annuals	Preemergence	For spinach only. Use lower rates in cool, wet weather.
Horseradish[d]	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after transplanting	
Lettuce[c,d]	Balan	1.5 lb.	Annuals	Preplant soil incorporation Incorporate with soil immediately	Is primarily a grasskiller. Seed after application to 3 weeks later. Do not plant wheat, barley, rye, grass, onions, oats, beets, or spinach for 12 months after application.
	Kerb*	1-2 lb.	Annuals	Preemergence or preplant-incorporated	Do not use when the air temperature exceeds 85° F. Use the lower rates listed on sandy soil. Do not use on peat or muck soils. See label for rotation crops. For best results, rainfall or irrigation is needed 1 to 2 days after application, especially during warm weather.
Okra[d]	Dual	1.5-3 lb.	Annuals	Preplant soil application, incorporate with soil, or preemergence	
	Enide	3-5 lb.	Annuals	At planting	
	Treflan	0.5-1 lb.	Annuals (primarily grasses)	Preplant soil application, incorporate with soil immediately	
	Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring.				
	Preemergence				
Onions[b]	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after seeding or transplanting	May not kill smartweed or common ragweed. Can be used on seeds, sets, or seedlings. Use only on mineral soils. Use lower rates on sandy soils. A double application of Dacthal can be used at seeding, layby, or both.
	Postemergence				
	Goal	0.12 lb.	Broadleaved weeds	Postemergence after onions have 2 true leaves or to transplants. Best control when weeds are in 2- to 4-leaf stage.	Multiple applications may be made, but do not exceed 0.5 lb. per season. Use in combination with a preemergence grass herbicide.
	Furloe	3-6 lb.	Broadleaved weeds (especially smartweed)	On seeded onions: loop stage or after 3- to 4-leaf stage	In later sprays, direct at base of onion plant. If applied more than once, do not exceed 6 lb. per acre for the season. *Use lower rates in cool, wet weather.* Use no later than 30 days before harvest. Do not use on sandy soils.
	Brominal	0.25-0.38 lb.	Broadleaved weeds	When onions have 2 to 5 true leaves	Use 50 to 70 gallons of water per acre. Apply when onion foliage is dry for greatest crop safety. Suggested temperature for spraying is 80° F with low humidity.

All notes are at the end of this table (page 6).

For Application During the Growing Season (continued)

Crop	Treatment	Active ingredient per acre actually covered[a]	Weeds controlled	Timing of application (based on crop stage)	Remarks, cautions, limitations
Peas[d]	**Preemergence**				
	propachlor	4-5 lb.	Annuals	Preemergence	Do *not* use on sandy soil.
	Treflan	0.5-0.75 lb.	Annuals[e]	Preplant soil incorporation, incorporate with soil immediately	Seed after application to 3 weeks later. Some reduction of growth and stand reduction possible under stress. May suppress some root rot.
	Treflan + Surflan	0.5 lb. + 0.5 lb.	Annuals	Preplant soil application, incorporate with soil immediately	Do not use on soils of less than 1.5 percent organic matter. May suppress Aphanomyces root rot. May broaden weed control more than either herbicide alone. Do not feed forage to livestock. Do not plant any root crop for 12 months after application.
	Basalin	0.5-0.75 lb.	Annuals (primarily grasses)	Preplant soil application, incorporate with soil immediately	
	Dual	1.5-3 lb.	Annuals	Preplant soil application, incorporate with soil, or preemergence	
	Preemergence or Postemergence				
	dinoseb	0.3-9 lb.	Annuals (primarily broadleaved weeds)	Preemergence or postemergence	Preemergence, use 6 to 9 lb.; postemergence, use 0.3 to 1.1 lb. Apply prior to bloom when peas are 2 to 8 in. tall. See label for further precautions. Preemergence use may help suppress root rot.
	Postemergence				
	Basagran	0.75-1 lb.	Annual broadleaved weeds, Canada thistle, nutsedge	When weeds are small and are actively growing; after peas have 3 pairs of leaves (or 4 nodes)	Can help control Canada thistle. Can provide good, broad-spectrum control when used with a grass-active herbicide. Do not mix with other pesticides. See Basagran entry under corn, postemergence for Canada thistle and nutgrass control. Do not use crop oil.
	MCPB	1 lb.	Broadleaved weeds and Canada thistle	When peas are 3-7 in. tall and no later than 4 nodes prior to pea blossom	May delay maturity 1 to 4 days. Use at least 20 gallons of water per acre. Do not feed vines to livestock. MCPA is more effective on mustard. MCPB or Vacate may be less injurious to peas.
	MCPA (Na salt)	0.25-0.5 lb.			
	Vacate (MCPA amine)	0.115-0.154 lb.			
Potatoes, Irish[c,d]	Dual	1.5-3 lb.	Annuals	Drag-off treatment at emergence	Labeled for use in a tank mix with Lorox.
	EPTC	3-6 lb.	Annual grasses and nutgrass[f]	Drag-off treatment at emergence or preplant soil application; incorporate with soil immediately	Use lower rate on sandy soil.
	Treflan	0.5-1 lb.	Annuals[e] (primarily grasses)	Drag-off treatment at emergence	Use a light incorporation.
	linuron	0.75-2 lb.	Annuals	Apply prior to potato emergence	Plant tubers at least 2 in. deep. Do not replant treated area to other crops for 4 months after treatment. May injure crop on light, sandy soil. Do not apply over exposed tubers. Labeled for use in a tank mix with Dual.
	dalapon	7 lb.	Quackgrass	Before plowing in spring; wait 4 days before plowing and planting	Not for fields intended for red-skinned varieties or White Rose. Do not plant potatoes for 4 weeks. Use surfactant as directed on label.
	metribuzin	0.25-0.5 lb.	Annuals (primarily broadleaved)	Postemergence, following a preemergence grass herbicide	Can be used preemergence also. Do not exceed 1 lb. per acre in a season. Do not apply within 60 days of harvest. Do not use on red-skinned or early-maturing white varieties. Do not apply in cool, wet weather.
	Lasso	2.5-3 lb.	Annuals	Apply at drag-off	Do not use on sandy soils. Can be used alone or in combination with Lorox, dinoseb, Lexone, or Sencor.
	Prowl	0.75-1.5 lb.	Annuals	Drag-off treatment at emergence	Use a light incorporation within 7 days. May be combined with Sencor/Lexone, EPTC, or linuron.
Potatoes, sweet[b]	Dacthal	6-10 lb.	Annuals[g] (primarily grasses)	Immediately after planting	
	Amiben	3 lb.	Annuals	Immediately after planting	
	Enide	4-6 lb.	Annuals	Immediately after transplanting	Do not plant nonapproved crops on treated soil during the same season.
Squash Pumpkins	Amiben	3-4 lb.	Annuals	As soon after seeding as possible, or preplant-incorporated	Use on loam soils. Amiben can be applied broadcast or banded over the row in pumpkins.
	Prefar	4-6 lb.	Annuals (primarily grasses)	Preplant soil application, incorporate with soil immediately	Use on sandy soils. Is primarily a grasskiller. Consult label for sensitive crops within 18 months after application. Can be used in rotation only with tomatoes, broccoli, cauliflower, lettuce, carrots, onions, and summer squash within 18 months of application. Soybeans can be planted 12 months after application.

All notes are at the end of this table (page 6).

For Application During the Growing Season (continued)

Crop	*Treatment*	*Active ingredient per acre actually covered*[a]	*Weeds controlled*	*Timing of application (based on crop stage)*	*Remarks, cautions, limitations*
Pumpkins	propachlor	4-5 lb.	Annuals	Preemergence	Do *not* use on sandy soils. For use on processing pumpkins only. Do not use on "jack-o-lantern" type pumpkins.
Rhubarb[e]	paraquat*	(See following table)			
Tomatoes, direct-seeded and transplanted[e]	Enide	4-6 lb.	Annuals	Preemergence	Do not plant other food crops on treated areas for 6 months. If used under dry soil conditions, a shallow (1 in.) incorporation as a preplant treatment may improve weed control. Can also be used on transplanted peppers.
	Devrinol	1-2 lb.	Annuals	Preplant soil incorporated	Also used on direct-seeded and transplanted peppers. Enide + Devrinol is labeled as a tank mixture.
	Amiben	3-4 lb.	Annuals	Direct-seeded tomato plants must have 5-6 true leaves; transplants must be established	Use granular formulation and apply to dry foliage to avoid leaf burn. Do not use on sandy soils.
		3-4 lb.	Annuals	Direct-seeded application of a spray application	Use only when protected by a band application of a mixture of activated carbon plus vermiculite. See Amiben label for other use and application instructions.
	metribuzin	0.25-1 lb. (min.-max.)	Primarily broadleaf. Should be used with a grass-active herbicide.	Preplant incorporated. Postemergence, can be broadcast or directed.	Apply with ground equipment to seeded and transplanted tomatoes. Do not use air-blast or other high-pressure spray equipment. Do not use on peppers.
		0.25-0.5 lb.		Preplant incorporated, transplant tomatoes	Alone or in a tank-mix combination with Treflan.
		0.25-0.5 lb.		Broadcast spray, established tomatoes	Single or multiple applications. Minimum of 14 days between treatments. Direct-seeded plants should have 5 or 6 leaves; transplants should show new growth.
		0.5-1 lb.		Directed spray, established tomatoes	Recommended for use in fields with severe weed problems, or for fields with hard-to-control weeds.
		(For min.-max. rates)			Do not apply within 7 days of harvest, or within 3 days following cool, wet, or cloudy weather; otherwise, crop injury may occur. Do not apply to established tomatoes within 24 hours after application of other pesticides. Do not apply more than 1 lb./acre per crop season, or more than 1 lb./acre within a 35-day period. Allow at least 14 days between applications, regardless of the dosage or method used. Do not use hot caps on tomatoes within 7 days before application, or at any time afterward. Do not tank-mix with other pesticides, except Treflan.
Tomatoes and Peppers, transplanted	Treflan	0.5-1 lb.	Annuals[e] (primarily grasses)	Preplant soil application, incorporate with soil immediately	Some reduction of growth may be possible under growth stress conditions, or if rates are higher than suggested for the soil type.
	Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring.				

* Restricted-use herbicide.

[a] Based on active ingredients (actual amount of active herbicide in material or acid equivalent). Use lower rate on sandy soil and higher rate on clay and loam soils. When using a band application over the row, adjust amount of material applied to the part of an acre treated. [b] For perennial weed control, applications during and outside the growing season, see the following table. [c] For stale seedbeds, before crop emergence, see the following table. [d] For perennial grass control, applications outside the growing season, see the following table. [e] May not control ragweed and panicum. [f] May not control smartweed. [g] May not control ragweed, smartweed, and velvetleaf. [h] May not control crabgrass.

For Application Outside the Growing Season

	Stale seedbed, before crop emergence				
Asparagus	paraquat*	0.5-1 lb.	All emerged green foliage	Before crop emergence; allow maximum weed emergence prior to treatment	Weeds that emerge after treatment will not be controlled. Crop plants that have emerged at application will be injured. Do not apply within 18 months of harvest. Use with a preemergence or preplant sustained-action weed control system.
Rhubarb	paraquat*	0.5-1 lb.	All emerged green foliage	Before crop emergence; allow maximum weed emergence prior to treatment but apply before dormant rhubarb buds in crown begin to grow.	Weeds that emerge after treatment will not be controlled.
Corn, sweet Lettuce Melons Peppers Potatoes Tomatoes	paraquat*	0.5-1 lb.	All emerged green foliage	Before crop emergence	Weeds that emerge after treatment will not be controlled. Crop plants that have emerged at application will be injured. Use with a preemergence or preplant, sustained-action weed control system.

* Restricted-use herbicide. CAUTION: Special care should be taken when handling paraquat (Paraquat and Gramoxone). Wear rubber or neoprene gloves, a dual cartridge respirator, and an eye shield. Prevent all contact with skin and eyes. Follow closely all precautions outlined on the product label.

For Application Outside the Growing Season (continued)

Crop	Treatment	Active ingredient per acre actually covered[a]	Weeds controlled	Timing of application (based on crop stage)	Remarks, cautions, limitations
	Perennial weed control, applications during and outside the growing season				
Asparagus	Roundup	2-5 lb.	(See remarks)	Before emergence, or with shielded or directed sprays during fern growth	Use to control milkweed, thistle, field bindweed, quackgrass, or Johnsongrass. Apply to quackgrass when it is 6-8 in. tall in the fall or spring. Apply to Johnsongrass when it is at least 12 in. tall and actively growing. Do not till for the specified time for each species (see label). Does not provide residual weed control. Do not mix, store, or apply Roundup spray solutions in containers or spray tanks made of galvanized or unlined steel (except stainless steel).
	Perennial grass control, applications outside the growing season				
Asparagus Beans, edible Beet greens Beets, red Broccoli Cabbage Cauliflower Corn, sweet and pop Horseradish, as a weed and as a crop Jerusalem artichoke Kale Lentils Lettuce Mustard greens Okra Onions Peas Potato, Irish and sweet Radishes Spinach	Roundup	2-3 lb.	(See remarks)	(See remarks)	Use for quackgrass or Johnsongrass control. Apply to quackgrass when 6 to 8 in. tall in fall or spring. Apply to Johnsongrass when at least 12 in. tall and actively growing. Do not till until 3 to 7 days after application. Does not provide residual weed control. Do not mix, store, or apply Roundup spray solutions in galvanized steel or unlined steel containers (except stainless steel). For control of volunteer horseradish, apply 3 to 4 lb. in mid-September. Field should have been disced 4 to 6 weeks prior to application. For this control practice, use spray coverage only.

NOTE: In the suggestions in this publication, trade names of herbicides are usually used. The list below shows trade names and their corresponding common names. **Restricted-use herbicides are identified with an asterisk (*).**

Common name	Trade name
alachlor	Lasso
atrazine	AAtrex and Atrazine
benefin	Balan
bensulide	Prefar
bentazon	Basagran
bromoxynil	Brominal
butylate+safener	Genate+, Sutan+
chloramben	Amiben
chlorpropham	Furloe
cyanazine	Bladex
cycloate	Ro-Neet
dalapon	Dowpon
DCPA	Dacthal
dinoseb	Premerge-3, Sinox, Dinoseb
diphenamid	Enide
diuron	Karmex and others
ethalfluralin	Sonalan
EPTC	Eptam, Genep
EPTC + extender	Eptam Extra
EPTC+safener	Eradicane
EPTC + safener + extender	Eradicane Extra
fluchloralin	Basalin
glyphosate	Roundup, Kleen Up
linuron	Lorox, Linex
MCPA, MCPB	Vacate, numerous
metolachlor	Dual
metribuzin	Lexone, Sencor
napropamide	Devrinol
naptalam	Alanap L
paraquat*	Paraquat,* Gramoxone*
pendimethalin	Prowl
pronamide*	Kerb*
propachlor	Ramrod, Propachlor
pyrazon	Pyramin
oryzalin	Surflan
oxyfluorfen	Goal
simazine	Princep
terbacil	Sinbar
trifluralin	Treflan
Petroleum solvent	Stoddard Solvent
2,4-D (amine)	(numerous)

Storing Pesticides and Containers

Keep pesticides and containers in a separate building, room, or enclosure used only for this purpose. Such building or rooms should be dry, ventilated, and locked. Fence outside storage areas to protect children and animals and to discourage pilferage. CAUTION: Do not store weedkillers, herbicides, or defoliants in the same room with insecticides. Chlorate salts can create a fire or explosion hazard. Remove only the pesticides needed for one day's operation and return empty containers — and any unused pesticide — to the storage area each day.

Disposing of Pesticides and Containers

Surplus pesticides. To dispose of surplus pesticide mixtures, try to find other areas with the same pest problem and use up any extra tank mix or rinse water on these areas. Do not drain surplus pesticides in any location where they can contaminate wells, streams, rivers, lakes, or ponds.

Operators of landfills meeting environmental safety standards can obtain supplemental permits to handle toxic waste materials, including pesticides. To dispose of large quantities of surplus pesticides, contact the Illinois EPA Division of Land Pollution Control to locate the nearest landfill with a supplemental permit for toxic waste or to obtain specific instructions about disposal.

Pesticide containers. All empty pesticide containers, regardless of their type, should be rinsed three times before disposal. Rinse water should be dumped in the tank. Triple-rinsed containers should be punctured or broken to facilitate drainage and to prevent reuse for any purpose. They should then be hauled to a sanitary landfill for dis-

posal. Small quantities of containers may be buried singly in open fields, with due regard for the protection of surface and subsurface water.

Illinois regulations permit the burning of combustible containers provided that they are burned on the premises where they were used, that they are burned more than 1,000 feet from residential areas, that the burning will not cause undue visibility or environmental hazards, and that no reasonable alternative disposal method is available.

Do not breathe smoke from burning pesticide containers, and do not burn containers that have weedkillers such as 2,4-D or similar herbicides. When these change to a gas, the vapors may damage nearby crops and shrubbery. Pesticides containing chlorates may explode when heated and therefore should not be burned.

CAUTION: Banvel (dicamba), 2,4-D, and related chemicals (phenoxys) may seriously damage crops of grapes, tomatoes, other broadleaf vegetables, fruit trees, and ornamental plants. Spray only on tolerant crops. Before starting, survey the area for desirable plants that might be damaged by the herbicide. Spraying 2,4-D and Banvel close to a susceptible crop poses a serious threat. Sprays may drift up to a mile under certain conditions.

Spray on calm days or when there is a light breeze away from the susceptible crop. Use as low a pressure as possible to reduce drift. Use nozzles that produce large droplets or antidrift additives. Use the amine formulations to reduce the possibility of vapor drift. Use mechanical methods of weed and brush control where the spray risk is high.

Use a special sprayer for herbicides such as 2,4-D. Such chemicals are almost impossible to remove completely from a sprayer, and the remaining traces may contaminate other solutions and damage susceptible crops.

Growers with Several Crops in a Small Area

Growers with several crops in a small area should be especially careful when applying herbicides. The tendency is to apply more if the quantity measured out "looks" as if it is not enough. A low-percentage granular formulation is suggested for small areas. *Check rates and application techniques on the container label very carefully. Applications must be accurate and uniform. Excessive amounts may cause injury to present or subsequent crops.*

Ideally, a specific herbicide should be fitted to a specific crop species. When growing several different crops in a small area, however, it is often impractical and expensive to use all the appropriate herbicides. Following are two herbicides that can be used on a wide range of vegetables.

Dacthal. Dacthal is cleared on a large number of vegetables. As listed in this circular, it may not always be the herbicide of preference. It can be used on broccoli, brussels sprouts, cauliflower, cabbage, snap beans, mung beans, Southern peas, soybeans, seeded melons, cucumbers, squash, collards, kale, mustard greens, turnips (root and greens), garlic, horseradish, onions, potatoes (Irish), sweet potatoes and yams, tomatoes, eggplant, peppers, and strawberries. *Do not use on beets or Swiss chard.* Dacthal is a preemergence herbicide that must be applied to weed-free soil. It controls very small weed seedlings soon after the weed seeds germinate. It is most effective if rainfall occurs or if the soil is irrigated within 2 to 3 days after application.

A one-time application to all species is not always possible because some plants are susceptible to injury in early-growth stages. It is preferable to use Dacthal at seeding or transplanting time if the species is adapted to it. When this is not possible, the weeds should be removed and Dacthal applied to prevent further weed development. Consult the label for the appropriate application time. Dacthal is effective in controlling annual grasses that are a problem in the spring. Broadleaf weeds that escape control should be mechanically removed.

Treflan. Treflan is widely available because it is used in soybean culture in Illinois. It can be purchased as a liquid with 4 pounds of active ingredient per gallon for large garden areas or as a low-percentage granular formulation for smaller areas. The amount of Treflan to use correlates very closely with the type of soil. The appropriate amounts are shown on the container label. Treflan can be used for weed control in beans (green, lima, and dry), broccoli, brussels sprouts, cabbage, cauliflower, carrots, kale, mustard greens, okra, peas, peppers, tomatoes, and turnip greens. *Treflan may injure sweet corn.*

Treflan must be mixed with or watered into the soil to prevent loss of the chemical from the soil surface. A rototiller, disc, or similar implement should be used to mix Treflan with the soil to a 3- to 4-inch depth. When it is impractical to mix Treflan with the soil mechanically, remove all germinated and growing weeds and allow the herbicide to be carried into the soil through rainfall or sprinkle irrigation. Treflan is quite effective on annual grasses, but many broadleaf weeds will need to be mechanically removed.

Mulches — see paragraph 3, page 1

Other Publications on Weed Control

Copies of other publications on weed control are available from the office of your county Extension adviser in agriculture and the Office of Agricultural Publications, 47 Mumford Hall, 1301 West Gregory Drive, Urbana, Illinois 61801.

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