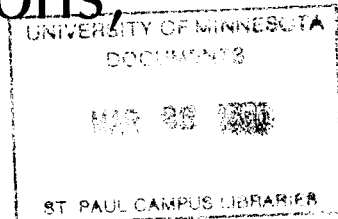


AG-FO-1884—Revised 1990

# COMMERCIAL VEGETABLE Weed, Insect, and Disease Control Guide: Asparagus, Cucumbers, Melons, Pumpkins, Squash, Rhubarb



W. D. Hutchison, F. L. Pflieger, and Leonard B. Hertz, and J. D. Pokorny

Pesticide suggestions in this guide are based on current state and federal registrations and tolerances set by the Environmental Protection Agency (EPA). *Directions given in this guide and on current container labels should be read, understood, and followed carefully in order to control pests and diseases effectively without causing excessive residues to remain on the crops.* The following information is up to date at the time of this printing. Information regarding any changes during the 1990 season will be made available to all commercial growers.

Suggestions for sampling and action thresholds are sometimes based on local studies, but are often

derived from those of other states in the North Central Region, especially Michigan, due to lack of local data.

This publication is for your information. The University of Minnesota and its officers or employees make no claims or representations that the chemicals discussed will or will not result in residues on agricultural commodities and assume no responsibility for results of their use.

**State and Federal laws require that only certified applicators may use or supervise the application of certain pesticides with restricted uses. Information about certification is available from your county extension agent-agriculture.**

## RATES OF APPLICATION FOR INSECTICIDES AND FUNGICIDES

Sometimes small amounts of insecticides or fungicides are listed in terms of tablespoons and teaspoons. These always mean level measures—not rounded or heaping.

Recommendations may be given in terms of pounds or gallons of commercial preparation or as pounds of active ingredient per acre. "Pounds active ingredient" means the equivalent of 100-percent chemical. For example: 2 pounds of 50-percent methoxychlor wettable powder contains 1 pound of actual methoxychlor; 4 pounds of a 25-percent wettable powder contains 1 pound of active ingredient, and 20 pounds of a 5-percent dust contains 1 pound of active ingredient.

If you are preparing sprays that contain emulsifiable concentrates, read the label to determine how many pounds of active ingredient are in each gallon of concentrate. For example, 25-percent methoxychlor emulsifiable concentrate contains 2 pounds of active ingredient per gallon. If you wish to apply 1 pound of actual methoxychlor per acre, decide on the amount of liquid you want to apply per acre and add 1/2 gallon of 25-percent methoxychlor concentrate to the amount of water needed for 1 acre.

Most insecticides and fungicides can be mixed. Read the label instructions for specific combinations.

## 1990 Herbicide, Insecticide, and Fungicide Suggestions

## ASPARAGUS

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
SEEDBEDS			
Germinating annual weeds	Sinbar 80 W (terbacil)	1-2 lb.	Spray activated charcoal in a 2-inch band over seeded row at 300 lb/A at planting. Then apply herbicide.
Emerged annual weeds	Gramoxone Extra 2.5E (paraquat)	3 pt.	Apply before asparagus emerges but after weeds emerge. Include 1 pt. non-ionic surfactant/acre.
Emerged grasses	Fusilade 2000 (fluazifop-P)	1 qt.	Apply to actively growing grasses. Include 1 qt crop oil concentrate/acre.

†Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wettable powder. Dosages of insecticides are actual chemical per acre, with some exceptions.  
\*Restricted use pesticide. Post treated areas when required by label.

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
<b>ESTABLISHED BEDS</b>			
Germinating annuals	Karmex 80 DF (diuron)	2-4 lb.	Apply either Karmex or Princep after disking or chopping fern in the spring before weeds emerge. May be reapplied after harvest season if needed. Use lowest rate on sandy soils. Do not exceed 6 lb./A/year of Karmex.
	Princep 80 W (simazine)	2½-5 lb.	Do not exceed 5 lb/A/year of Princep.
	Devrinol 50 W (napropamide)	8 lb.	Apply before crop emergence and incorporate. Good grass control.
	Sencor 4 F, Lexone 4 L (metribuzin)	1-2 qt.	Apply in the spring before asparagus emerges or after harvest.
	Sinbar 80 W (terbacil)	1½-3 lb.	Apply before asparagus and weeds emerge or after harvest. Use lower rate on coarse soils.
Emerged weeds and quackgrass	Roundup 3 E (glyphosate)	2 qt.	Apply up to 1 week prior to spear emergence or after last harvest. Do not contact fern growth.
Emerged broadleaves	2,4-D amine (Formula 40)	2 qt.	Apply before spear emergence or immediately after harvest to avoid injury. For postharvest sprays use drop nozzle to avoid fern contact.
Emerged annuals	Gramoxone Extra 2.5E (paraquat)	3 pt.	Apply before crop harvest or after last harvest.

Insects	Chemical†	Formulation		Dose in lb. A/acre	Remarks and limitations
		Recommended	Product/acre		

Regularly check 20 randomly selected crowns from each of five locations in the asparagus field. Look for asparagus beetle or 12-spotted asparagus beetle adults and larvae and for eggs on the spears. Also watch for cutworms or their damage, as spears cut below ground or at the tips. If cutworms, rather than asparagus beetles, are suspected to be the cause of observed damage, check the ground around the crowns for hiding cutworms. They are more likely to occur in weedy parts of the field. After the harvest season ends, or in the spring if you have unharvested asparagus that ferns out then, check ferns for signs of asparagus aphids or their damage. These minute blue-green insects cause premature shooting of buds, resulting in dwarfed, very bushy plants that are silvery or blue-green in color. Young transplants can be seriously damaged or killed by this aphid. Although a serious pest in the western states, in the midwest it rarely becomes abundant enough to pose a severe threat to mature asparagus plants. The plants can tolerate more feeding by asparagus beetles in the fern stage, hence the higher action threshold below. See AG-FO-1861 for more details on asparagus insects and their damage.

Asparagus beetles	carbaryl (Sevin)	XLR plus 80W	2 pt 1¼ lb	1	1 day phi. Do not repeat within 3 days.
Action thresholds:					
Harvest season:	chlorpyrifos (Lorsban)	4 E	2 pt	1	1 day phi.
5-10 adults/100 crowns, or 2% spears with eggs	malathion (Cythion)	5E	2 pt	1¼	1 day phi.
Postharvest:	*methomyl (Lannate)	1.8 L	2-4 pts	0.45-0.90	1 day phi. 90SP is NOT Restricted Use.
5-10 adults/10 crowns		90 SP	½-1 lb		
	methoxychlor	2E	4 pt	1	3 day phi (unless washed or blanched).
	*permethrin (Ambush, Pounce)	3.2E	2-4 fl oz	0.05-0.1	3 day phi. Do not exceed 0.4 lb A/acre/season.
		2E	3.2-6.4 fl oz		
		25W	3.2-6.4 fl oz		
Asparagus aphid	malathion	5E	2 pt	1¼	1 day phi.
	chlorpyrifos (Lorsban)	4 E	2 pt	1	1 day phi.
					In greenhouse, for experimental use only, asparagus NOT to be eaten, can use Orthene (75SP) @ 1/3-1/2 lb./gal. to control aphids.
Cutworms	carbaryl (Sevin)	20% B	10 lb	2	1 day phi.
	chlorpyrifos (Lorsban)	4 E	2 pt	1	1 day phi.
	*methomyl (Lannate)	1.8 L, 90 SP	2-4 pts, ½-1 lb	0.45-0.90	1 day phi. 90SP is NOT Restricted Use.
Action threshold:	*permethrin (Ambush, Pounce)	2E	3.2-6.4 fl oz	0.05-0.1	3 day phi. Do not exceed 0.4 lb A/acre/season.
1 larva/10 crowns		3.2E	2-4 fl oz		
		25W	3.2-6.4 fl oz		

Diseases	Chemical†	Remarks
Crown rot	Manzate 200 DF, Ridomil 2 E	
Rust	Dithane M-45, Manzate 200 DF, Dithane DF, Penncozeb	Grow resistant varieties such as Mary Washington and Waltham Washington. Destroy volunteer asparagus plants in vicinity. Do not allow fern growth in field until after harvest.

†Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wetable powder. Dosages of insecticides are actual chemical per acre, with some exceptions.

\*Restricted use pesticide. Post treated areas when required by label.

## CUCUMBERS

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
<b>CUCUMBERS (seeded)</b>			
Germinating grasses	Prefar 4 E (bensulide)	6 qt.	Apply before planting and incorporate into top 2 inches of soil, or spray after planting and immediately irrigate.
Germinating broad-leaves	Alanap 2 E (naptalam)	8 qt.	Apply after seeding, before weeds emerge. Irrigation after application will improve results.
Germinating broad-leaves and grasses	Prefar 4 E + Alanap 2 E	6 qt. + 8 qt.	Apply as a tank mix before or after planting and irrigate immediately or apply Prefar prior to planting; incorporate, plant, and then apply Alanap.
	Amiben 75 DS + seed protectant	3 lb.	Apply an activated carbon and vermiculite anticrustant seed protection system in the seed furrow. After seeding and before weeds and cucumbers emerge, apply Amiben as a broadcast treatment. Refer to label for rates of seed protection system.
Emerg ed weeds	Curbit 3E (ethalfluralin)	3 pt.	Apply after seeding, but before weeds emerge. Do not incorporate
	Gramoxone Extra 2.5E (paraquat)	3 pt.	Apply before or after seeding, but before crop emergence. Include 1 pt. non-ionic surfactant/acre.
	Roundup 3E (glyphosate)	2 qt.	Apply to emerg ed weeds before planting cucumbers.
Emerg ed grasses	Poast 1.5E (sethoxydim)	1½ pt.	Apply to actively growing grasses. Add 1 qt. crop oil concentrate per acre.
<b>CUCUMBERS (transplants)</b>			
Germinating broad-leaves	Alanap 2 E (naptalam)	8 qt.	Apply before or after transplanting but before weeds emerge. Irrigate after application if soil is dry. Apply with Prefar before planting when grasses are a problem.
Germinating grasses	Prefar 4 E (bensulide)	6 qt.	Apply before transplanting. Irrigate or incorporate into top 2 inches of soil. Apply with Alanap if broadleaves a problem.

## MELONS, SQUASH, PUMPKINS

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
<b>MELONS (seeded)</b>			
Germinating annuals	Dacthal 75 W (DCPA)	12 lb.	Apply when crop has 4-5 true leaves. Apply to weed free ground.
Germinating grasses and broadleaves	Amiben 75 DS + seed protectant	3 lb.	Use only with an activated carbon and vermiculite anticrustant seed protection system. See cucumbers.
	Curbit 3 E (ethalfluralin)	3 pt.	Apply after seeding, but before weeds emerge. Do not incorporate.
Germinating broadleaves	Alanap 2E (naptalam)	8 qt.	Apply before or after seeding but before weeds emerge. If soil is dry, irrigate after application. Can be tank mixed with Prefar.
Germinating grasses	Prefar 4E (bensulide)	6 qt.	Apply before seeding. Irrigate or incorporate 2-3 inches into soil immediately after spraying. Do not apply to soil which will be covered with plastic.
Emerg ed weeds	Gramoxone Extra 2.5E (paraquat)	3 pt.	Apply before or after seeding, but before crop emergence.
Emerg ed grasses	Poast 1.5E (sethoxydim)	1½ pt.	Apply to actively growing grasses. Add 1 qt crop oil concentrate per acre.
<b>SQUASH, PUMPKINS (seeded)</b>			
Germinating annuals	Command 4E (clomazone)	1 qt.	Pumpkins only. Incorporate 2-3 inches before seeding.
Germinating grasses	Dacthal 75 W (DCPA)	12 lb.	Apply when crop has 4-5 true leaves. Apply to weed free soil. Squash only.
Emerg ed annuals	Gramoxone Extra 2.5E (paraquat)	3 pt.	Apply before or after seeding, but before crop emergence.

†Abbreviations used in tables: HS—harvest season, PH—postharvest, phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, and W—wetable powder.

## CUCUMBERS, MELONS, SQUASH, PUMPKINS

Insects	Chemical†	Formulation		Dose in lb Al/acre	Remarks and limitations
		Recommended	Product/acre		
<p>Regularly check the plants in 10 randomly selected hills from each of five areas of the field. Look for striped or spotted cucumber beetle adults, squash bugs, and cutworms or their damage. Do not mistake feeding on the stem by adult cucumber beetles for cutworm damage. Cutworms are more likely to be abundant in a weedy field. If you find suspected cutworm damage, check the ground around the plants for hiding worms. Check 20 randomly selected leaves from each of the five locations for colonies of aphids and for squash bug eggs, which will be laid in neat rows on the underside. Squash bug eggs will hatch in 1 to 2 weeks. The nymphs, if abundant, should be controlled while they are young, as they can be very difficult to control. Deep tillage or removal of crop residues in the fall severely reduces overwinter survival, delaying population buildup in the spring.</p> <p>Also look out for sawdust-like excrement (frass) exuding from small holes in the stems, showing the presence of squash vineborer larvae inside. Older larvae leave the plant, so open up damaged stems to check that larvae are still present. Once the runners are at least 2 feet long and so long as borers are not located close to the main stem, loss of a runner or two to borers will not cause economic loss because the rest of the plant will compensate. Boring close to the main stem could kill the whole plant if not stopped in time. Squash vine borer larvae are also more easily controlled before they have bored into the plant. So if you notice a noisy moth with clear wings buzzing around the squash plants, spray immediately.</p> <p>NOTE: Make light applications using dusts or wettable powders on cucurbits. These plants are injured by heavy treatments and by certain formulations. Hybrid squashes cannot self-pollinate, but bees enable them to produce fruit. Also, the sugar content of melons increases with each visit by a bee. To protect bees, apply all pesticides late in the day if possible, preferably at dusk when bees will have left the fields. Methoxychlor and thiodan are not quite as toxic to bees as most of the other insecticides, but even they are harmful if bees are sprayed directly.</p>					
Aphids	diazinon (e.g., AG 500)	50W 4E	1 lb 1 pt	1/2	7 day phi.
	dimethoate (Cygon, Defend, Dimex, Rebelate)	4E	1 pt	1/2	Melons only. 3 day phi. 4-day re-entry.
	endosulfan (Thiodan)	3E	1 1/3 pt	1/2	NTL. 24-hr. re-entry.
	malathion (Cythion)	4D	12 lb	1/2	1 day phi.
	*methomyl (Lannate)	1.8L 90SP	2-4 pt 1/2-1 lb	0.45-0.90	1 day phi for 1/2 lb or 2 pt/acre, otherwise 3 day phi. NOT labeled for pumpkins. 90SP is NOT Restricted Use.
	oxydemetonmethyl (Meta-systox-R)	2E	1 1/2-2 pt	3/8-1/2	14 day phi, winter squash, cucumbers, pumpkins; 1 day, summer squash. 48-hr. re-entry.
	*parathion	4E	1/2 pt	1/4	15 day phi. 48 hr. re-entry.
	*permethrin (Pounce)	3.2E	8 fl. oz.	0.20	1 day phi. Do not apply more than 1.6 lb Al/acre/season.
Cucumber beetles (striped and spotted) Action threshold: 4-5 adults/50 plants	carbaryl (Sevin)	XLR plus 80W	2 pt 1 1/4 lb	1	NTL. Carbaryl is very toxic to honey bees; XLR plus is the safest formulation of Sevin for honey bees. Avoid treating when bees are in field. Note plant damage warning on label.
	endosulfan (Thiodan)	3E 50W	1 1/3-2 2/3 pt 1-2 lb	1/2-1	NTL. 24 hr. re-entry
	*esfenvalerate (Asana XL)	0.66E			3 day phi. Do not exceed 0.25 lb. Al/acre/season.
	malathion (Cythion)	5E	2 pt	1 1/4	1 day phi.
	*methomyl (Lannate)	1.8L 90SP	2-4 pt 1/2-1 lb	0.45-0.90	1 day phi for 1/2 lb or 2 pt/acre, otherwise 3 day phi. NOT labeled for pumpkins. 90SP is NOT Restricted Use.
	methoxychlor (Marlate)	50 W	2 lb	1	1 day phi.
	*permethrin (Pounce)	3.2E	4-8 fl. oz.	0.1-0.20	1 day phi. (See restrictions under aphids.)
Cutworms Action threshold: 1-2/100 plants	carbaryl (Sevin)	5%B 20%B	20 lb 5 lb	1	NTL.
	*esfenvalerate (Asana XL)	0.66E	5.8-9.6 fl oz	.03-.05	3 day phi. Do not exceed 0.25 lb. active ingredient/acre/season.
	*methomyl (Lannate)	1.8L 90SP	2-4 pt 1/2-1 lb	0.45-0.90	1 day phi for 1/2 lb or 2 pt/acre, otherwise 3 day phi. NOT labeled for pumpkins. 90SP is NOT Restricted Use.
	*permethrin (Ambush, Pounce)	2E 3.2E	6.4-12.8 fl. oz. 4-8 fl. oz.	0.1-0.20	1 day phi. (See restrictions under aphids.)
Seed corn maggot	lindane		1 oz./100 lb. seed		Seed treatment.
	chlorpyrifos (Lorsban)	50SL	2 oz./100 lb. seed		Slurry seed treatment.
Treatment is strongly recommended for fields where manure or cover crops have been partially buried by recent tillage.					
Squash bugs	endosulfan (Thiodan)	3E	1 1/3-2 2/3 pt	1/2-1	NTL. Lower dosage for nymphs. 24-hr. re-entry
	carbaryl (Sevin)	XLR plus 80W	2 pt 1 1/4 lb	1	NTL.
	*esfenvalerate (Asana XL)	0.66E	5.8-9.6 fl oz	.03-.05	3 day phi. Do not exceed 0.25 lb. Al/acre/season.
	*permethrin (Ambush, Pounce)	2E	12.8 fl. oz.	0.20	1 day phi. (See restrictions under aphids.)
	*parathion	3.2E 4E	8 fl. oz. 1/2 pt	1/4	15 day phi. 48 hr. re-entry.

† Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wetable powder. Dosages of insecticides are actual chemical per acre, with some exceptions.  
\*Restricted use pesticide. Post treated areas when required by label.

## CUCUMBERS, MELONS, SQUASH, PUMPKINS (continued)

Insects	Chemical†	Formulation		Dose in lb AI/acre	Remarks and limitations
		Recommended	Product/acre		
Squash vine borer Critical stage: runners <2 ft. long	carbaryl (Sevin)	80 W	1¼ lb	1	NTL.
	endosulfan (Thiodan)	3E	2⅔ pt	1	NTL. 24-hr. re-entry.
	*esfenvalerate (Asana XL)	0.66E	5.8-9.6 fl oz	.03-.05 lb	3 day phi. Do not exceed 0.25 lb. AI/acre/season.
	methoxychlor	2E	4 pt	1	1 day phi.
	*permethrin (Pounce)	3.2E	4-8 fl. oz.	0.1-0.20	1 day phi. (See restrictions under aphids.)
White grubs, wireworm	diazinon (e.g., AG 500)	50W	8 lb	4	Broadcast soil treatment at planting.
		14G	28 lb		

In fields with a history of wireworm damage, bait stations can be used to sample wireworms 2 to 3 weeks before planting. Treatment is recommended if captures average more than 1 per trap.

Diseases	Chemical†	Remarks
<b>CUCUMBERS, MELONS, AND SQUASH</b>		
Downy mildew	Ridomil/Bravo 81W, Bravo	Begin applications when plants are in first true leaf stage or when conditions are favorable for disease development and continue at 14-day intervals until threat of disease is over. Do not make the last application within 5 days of harvest. See label.
Alternaria, Anthracnose, Cercospora leaf spot, gummy stem blight, and scab	Ridomil MZ58	Begin applications when conditions are favorable for disease, but before infection, and continue at 14 day intervals until the threat of disease is over.
Downy mildew Cucumbers (Greenhouse)	Ridomil MZ58	
Powdery mildew	Karathane WD	
<b>CUCUMBERS (Field)</b>		
Seed rot, damping off	Captan, Thiram	There are many different fungicide formulations for seed treatment made by several different companies. Read and follow all label instructions.
<b>Fungal foliar diseases</b>		
Anthracnose	Bravo, C-O-C-S W, Benlate 50 DF	Bravo is available in the following formulations; Bravo 500, Bravo 720, Bravo 90 DG, Bravo Flowable, and Bravo W-75.
	Basic Copper Sulfate	There are several formulations of basic copper sulfate including Basic Copper, Basicop, Copper 5 Dust, Copper Hydroxysulfate, Copper oxysulfate, Kilcop-53, Kobasic, Microblu-53, Super CU, TBCS-53, Top Cop, and Tribasic.
Downy mildew	C-O-C-S W, Bravo, Basic Copper Sulfate, Citcop, Kocide 101, Kocide 606 F, Copper-Count-N	Disease appears on small area of plants in the field. Square spots appear on the upper leaf surface, with gray purplish mold on the undersides of leaves.
Alternaria Leaf Blight	C-O-C-S, Basic Copper Sulfate, Citcop, K-Cop, Copper-Count-N	Fungus forms concentric rings on infected foliage.
Powdery Mildew	Benlate 50 DF, Basic Copper Sulfate, Citcop, K-Cop, Copper-Count-N, Bayleton 50 DF, Karathane*	*Do not make last application within 7 days of harvest. See label.
Cucumber mosaic virus		Plant resistant varieties.
Cucumber scab		
<b>Bacterial diseases</b>		
Angular leaf spot	C-O-C-S W, Basic Copper Sulfate, Citcop, Kocide 101, K-Cop, Kocide 606 F, Copper-Count-N	Bacterium causes spots on the foliage that are irregular in shape. Dead tissue can tear away, leaving irregular holes in foliage.
Bacterial wilt	C-O-C-S W, Basic Copper Sulfate	Control cucumber beetles.

†Abbreviations used in tables: HS—harvest season, PH—postharvest, phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DF—dry flowable, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, and W—wetable powder.

\*Restricted use compound. Post treated areas when required by label.

**CUCUMBERS, MELONS, SQUASH, PUMPKINS (continued)**

Diseases	Chemical†	Remarks
<b>MELONS</b>		
Seed-rot, damping off	Thiram	
Fungal foliar diseases		
Alternaria	C-O-C-S W, Bravo, Basic Copper Sulfate, Copper-Count-N, K-Cop	Fungus forms concentric rings on infected foliage.
Gummy stem blight	Bravo 720	
Anthracnose	C-O-C-S W, Benlate 50 DF, Basic Copper Sulfate	Fungus causes sunken, pitted areas on infected fruit.
Powdery mildew	Benlate 50 DF, Karathane, Basic Copper Sulfate, Copper-Count-N, Bayleton 50 DF, K-Cop, Bravo	Bravo is available in the following formulations: Bravo 500, Bravo 720, Bravo 90 DG, and Bravo W-75.
Downy mildew	C-O-C-S W, Basic Copper Sulfate, Copper-Count-N, K-Cop, Kocide 606 F	
Bacterial diseases		
Bacterial wilt	Basic Copper Sulfate	Control cucumber beetles.
Cucumber mosaic virus		There are no resistant muskmelons. Controlling aphids may be helpful.
<b>PUMPKINS</b>		
Seed rot, damping-off	Captan, Thiram	There are many different fungicide formulations for seed treatments made by several different companies. Read and follow all label instructions.
Fungal foliar diseases		
Alternaria leaf blight	Bravo 500, Basic Copper Sulfate, Citcop	
Anthracnose	Benlate 50 DF, Bravo 500, Basic Copper Sulfate	
Gummy stem blight	Benlate 50 DF, Basic Copper Sulfate, Bravo	
Downy mildew	Basic Copper Sulfate,	
Powdery mildew	Benlate 50 DF, Karathane, Kocide 101, Kocide 606 F, Bayleton 50 DF, Bravo, Citcop	
Scab	Bravo	
<b>SQUASH</b>		
Seed rot, damping off	Captan, Thiram	There are many different fungicide formulations for seed treatment made by several different companies. Read and follow all label instructions.
Fungal foliar diseases		
Alternaria	C-O-C-S W, Bravo, Basic Copper Sulfate, Citcop, Copper-Count N, K-Cop	
Anthracnose	C-O-C-S W, Benlate 50 DF, Basic Copper Sulfate	
Gummy stem blight	Benlate 50 DF, Basic Copper Sulfate, Bravo	
Downy mildew	C-O-C-S W, Basic Copper Sulfate, Copper-Count-N	
Powdery mildew	Karathane, Basic Copper Sulfate, Bravo, Citcop, Kocide 101, Kocide 606F, Copper-Count-N, Benlate 50 DF, Bayleton 50 DF, K-Cop	
Scab	Bravo	

†Abbreviations used in tables: HS—harvest season, PH—postharvest, phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, and W—wetable powder.

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
<b>RHUBARB</b>			
Emerged annuals	Gramoxone Extra 2.5E (paraquat)		For use on <i>dormant rhubarb</i> . Apply before buds in crown begin to grow. Do not make more than 2 applications per season. Use 50 to 100 gallons spray mix per acre. Some suppression of quackgrass.
	Poast 1.5E (sethoxydim)	1.5 pt.	Apply in spring when grasses are actively growing. Add 1 qt. crop oil concentrate per acre. Up to 2 applications can be made after harvest.
Insects	Chemical		Remarks and limitations
Rhubarb curculio	Handpick from plant. Control weeds, especially dock in which insects breed.		Effective insecticides have not been registered for use on rhubarb.
Stalk borer	Control grassy and large-stemmed weeds.		

†Abbreviations used in tables: HS—harvest season, PH—postharvest, phi—preharvest interval, NTL—no time limitations, B—bait, D—dust, DF—dry flowable, DG—dispersible granules, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, and W—wetable powder.

#### CHEMIGATION OF PESTICIDES

Minnesota Pesticide Control Law as of 1988 requires each chemigation system used for applying pesticides with the irrigation water to be registered with the Minnesota Department of Agriculture (MDA) and contain the necessary approved anti-pollution check valves. Only pesticides displaying product label approval for chemigation application can be applied by this method. Minnesota law also requires the treated field to be posted throughout the period of chemigation application for any pesticide. Chemigation has the potential to allow the injected chemical to backflow into the water source when the irrigation pump shuts down if proper check valves and interlocks are not in place or maintained. Specific information on check valves and registration is available from the MDA (612/297-2614)

Chemigation can be an effective application method if the needed pesticide is suited for this practice and the irrigation and chemigation system is properly engineered and maintained. Accurate calibration of the irrigation system and the desired pesticide application rate is most important. Information on how to determine the chemical injection rate is available from the manufacturer and the Minnesota Extension Service offices.

W. D. Hutchison is extension entomologist and assistant professor, Department of Entomology; F.L. Pflieger is extension plant pathologist and associate professor, Department of Plant Pathology; Leonard B. Hertz is extension horticulturist and professor, Department of Horticultural Science; and J.D. Pokorny is director, Plant Disease Clinic, Department of Plant Pathology. The authors acknowledge the contributions of Dave Noetzel, extension entomologist, in the development of previous versions of this publication as well as the assistance of other members of these departments.

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