REVISED JANUARY 1981 PEST MANAGEMENT GUIDE 12

Control of Insects, Diseases, and Weeds in the Home Vegetable Garden

VIRGINIA COOPERATIVE EXTENSION SERVICE

EXTENSION DIVISION

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES.

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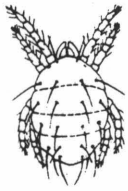
VIRGINIA INSECT CONTROL RECOMMENDATIONS FOR HOME VEGETABLE GARDENERS

J. E. Roberts, Sr.*

Crop	Insect	Treatment and Amount to Mix with 1 Gallon of Water or as Indicated Otherwise	Remarks and Days Between Last Application and Harvest
Asparagus	Asparagus beetle Grasshoppers (Sevin only)	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5%dust Malathion 57% EC, 1 tbsp. Treat spears during harvest. Do not repeat a carbaryl application within 3 days.	1 day 1 day 1 day
Beans (snaps and limas) 	Mexican bean beetle Grasshoppers	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Diazinon 25% EC, 2 Tsp. OR Diazinon 4% dust	0 days for sevin and 7 days for Diazinon. Treat when damage appears. Diazinon 4% dust not labeled for grasshoppers.
	Corn earworm	Carbaryl (Sevin) 50% WP, 3 tbsp. OR Carbaryl (Sevin) 5% dust Treat when first pods are 1 inch long and weekly thereafter.	0 days 0 days
	Mites	Dicofol (Kelthane 18.5% EC, 1 tbsp.	7 days Treat when damage appears.
Beets	Flea beetle	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Diazinon 25% EC, 2 tsp. Treat when insects appear in damaging numbers. Repeat as needed.	0 days 0 days 10 days
Cabbage, broccoli, cauliflower, brussels sprouts	Caterpillars 	Bacillus thuringiensis, 2 to 3 tbsp. (Bactur, Thuricide, or Dipel)	0 days. May be applied as a bait. Follow directions on label. Treat every 4 days after first true leaves appear unitl harvest if worms are present.
	Aphids (plant lice)	Malathion 4% dust OR Malathion 57% EC, 1 tbsp. Treat when insects appear in damaging numbers.	Cabbage 7 days, broccoli 3 days, brussels sprouts 7 days. Cauliflower not registered for 57% EC.

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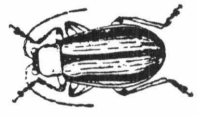
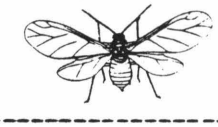
Crop	Insect	Treatment and Amount to Mix with 1 Gallon of Water or as Indicated Otherwise	Remarks and Days Between Last Application and Harvest
Cabbage, broccoli, cauliflower, brussels sprouts (Continued)	Aphids (plant lice) Flea beetles	diazinon 25% EC, 2 tsp. (Not for Brussels sprouts) OR diazinon 4% dust Treat when insects appear in damaging numbers.	Cauliflower 5 days, cabbage 7 days, broccoli 5 days.
	Cabbage root maggot	See Control Recommendations under Special Section on Soil Insects below.	
	flea beetles	Carbaryl (Sevin) 50% WP, 2 tbsp. or carbaryl (Sevin) 5% dust. Treat when damage appears.	3 days. Repeat treatment at 7 to 14 day intervals as needed.
Cucurbits (cantaloupes) cucumbers, squash, pumpkins, and watermelons)	cucumber beetle 	Carbaryl (Sevin) 50% WP, 1 tbsp. OR Carbaryl (Sevin) 5% dust. Malathion 4% dust or Malathion 57% EC, 1 tbsp. Treat when seedlings emerge from soil if damage appears. Repeat at 5-day intervals as needed.	Carbaryl - 0 days. Malathion - 3 days Make application in late afternoon. Carbaryl may kill bees when applied between 10 a.m. and 2 p.m. To avoid injury to tender foliage, do not apply when rain or humidity is expected during the next 2 days.
	Squash bug Pickleworm	Carbaryl (Sevin) 50% WP, 1 tbsp. OR Carbaryl (Sevin) 5% dust Treat when damage appears. Malathion 4% dust or Malathion 57% EC, 1 tbsp.	
	Squash vine borer	Malathion dust OR Malathion 57% EC, 1 tbsp. Methoxychlor 50% WP, 2-3 tbsp. Treat when vines begin to run, apply to bases of plants four times at 7-day intervals.	1 day. Honeybees are necessary for good fruit set. Insecticides are toxic to bees. Apply in evening when fewer bees are working.
	Aphids (plant lice)	Malathion 4% dust OR Malathion 57% EC, 1 tbsp.	CARBARYL WILL NOT CONTROL APHIDS. Malathion 3 days, all others 1 day. Treat when insects appear in damaging numbers.
	Mites	Dicofol (Kelthane) 18.5% EC, 1 tbsp. Treat when damage appears. Malathion 4% dust or Malathion 57% EC, 1 tbsp.	Do not use Diazinon on pumpkins. 2 days - Kelthane Repeat as needed. Malathion - 3 days
	Leafhoppers, leafminers	Malathion 4% dust or Malathion 57% EC, 1 tbsp. Treat when damage appears.	3 days. Repeat as needed.
Eggplant	Flea beetle, Colorado potato beetle Grasshoppers	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Treat when damage appears.	0 days 0 days Repeat as needed
Greens or leaf crops (turnips, collards, kale, spinach)	Caterpillar (looper)	Bacillus thuringiensis, 2 to 3 tbsp. (Bactur, Thuricide, or Dipel)	0 days. Treat every 4 days after first true leaves appear until harvest if worms are present.
	Flea beetle Harlequin bug (SEVIN ONLY) Grasshoppers (SEVIN ONLY)	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Diazinon 25% EC, 2 tsp.	Carbaryl 14 days, 10 days Diazinon. Treat when insects appear in damaging numbers. Repeat as needed.
	Aphids (plant lice)	Diazinon 25% EC, 2 tsp. Malathion 4% dust OR Malathion 57% EC, 1 tsp.	10 days- Diazinon, turnips 3 days, all others 7 days. Treat when insects appear in damaging numbers.

Crop	Insect	Treatment and Amount to Mix with 1 Gallon of Water or as Indicated Otherwise	Remarks and Days between Last Application and Harvest
Lettuce	Aphids (plant lice)	Diazinon 25% EC, 2 tsp. Malathion 4% dust OR Malathion 57% EC, 1 tsp. Treat when insects appear in damaging numbers.	10 days 14 days leaf; 7 head 14 days leaf; 7 head
Okra	Aphids (plant lice)	Malathion 5% dust OR Malathion 57% EC, 1 tbsp. Treat when insects appear in damaging numbers.	1 day 1 day
Onions	Thrips Onion maggots (MALATHION ONLY)	Diazinon 25% EC, 2 tsp. Malathion 5% dust OR Malathion 57% EC, 1 tbsp. Treat when thrips appear in damaging numbers.	10 days onions-Diazinon 3 days green onions - Malathion. For onion maggot control, apply Malathion spray 3 times at 7-day intervals when flies are seen.
Peas (Garden or English, Southern)	Aphids (plant lice)	Diazinon 25% EC, 2 tsp. OR Diazinon 4% dust Malathion 5% dust OR Malathion 57% EC, 1 tbsp. Treat when insects appear in damaging numbers.	7 days Southern; 1 garden 1 day Southern; 3 garden 1 day Southern; 3 garden
(Southern)	Earworm, cow pea Curculio Grasshoppers	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust	0 days. Treat when worm are present in damaging numbers. Treat for cow pea curculio when pods begin to form. Repeat at weekly intervals as needed.
Peppers (Bell or Hot)	European corn borer Grasshopper	Carbaryl (Sevin) 50% WP, 1 tbsp.	0 days. Use at 4 to 5-day intervals as long as needed.
	Aphids (plant lice	Diazinon 25% EC, 2 tsp. OR Diazinon 4% dust	5 days. Treat when insects appear in damaging numbers.
Potatoes (Irish)	Colorado potato beetle, flea beetle, potato leafhopper, European corn borer (CARBARYL ONLY) Grasshoppers (SEVIN ONLY)	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Diazinon 25% EC, 2 tsp. Treat when insects and/or damage appears.	0 days - Carbaryl. 35 days Diazinon. To control European corn borer, make three applications at 7-day intervals starting in mid-May.
	Aphids (plant lice)	Diazinon 25% EC, 2 tsp. Malathion 5% dust OR Malathion 57% EC, 1 tsp.	35 days Diazinon. 0 days Malathion. Treat when insects appear in damaging numbers
	Potato tuberworm	See narrative under special section below.	
Radishes	Flea beetle	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Diazinon 25% EC, 2 tsp.	3 days - Carbaryl. 10 days - Diazinon. Treat when insects appear in damaging numbers.
	Aphids (plant lice)	Diazinon 25% EC 2 tsp. Malathion 5% dust OR Malathion 57% EC, 1 tsp.	10 days Diazinon, 7 days Malathion. Treat when insects appear in damaging numbers.

Crop	Insect	Treatment and Amount to Mix with 1 Gallon of Water or as Indicated Otherwise	Remarks and Days Between Last Application and Harvest
Strawberries	Mites	Dicofol (Kelthane) 18.5% EC, 1 tbsp.	2 days Dicofol. Treat when damage appears. Damage usually occurs in hot, dry seasons, and it may be severe.
	Leafroller, root lice	Diazinon 25% EC, 2 tsp. Malathion 5% dust OR Malathion 57% EC, 2 tsp.	5 days Diazinon, 3 days Malathion. Treat when damage appears or insects appear in damaging numbers.
	Aphids (plant lice)	Diazinon 25% EC, 2 tsp.	5 days Diazinon. Treat when insects appear in damaging numbers.
	Strawberry weevil "Clipper"	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Malathion 5% dust OR Malathion 57% EC, 1 tbsp.	1 day Carbaryl, 3 days Malathion. Start treatment when cut buds are seen. This is usually just after begining of bloom (late March or early April). Treat at weekly intervals as needed.
Sweet corn 1/	Flea beetle, grasshoppers	Carbaryl (Sevin) 50% WP, 2 tbsp. Diazinon 25% EC, 2 tsp. Treat when insects and damage appear on young plants.	0 days Carbaryl, 1 day Diazinon. Application of Carbaryl to the tassel region of corn during the pollen shedding period will seriously reduce bee population.
	Fall armyworm, budworm	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Treat when damage appears on leaves of young corn or in whorls of older corn.	
	European corn borer	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Treat when 50% of plants show tiny pin holes in leaves.	
	Corn sap beetle, European corn borer in the ear, corn earworm, Japanese beetle	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust Apply to silks every other day beginning at 10% silking and continuing until 90% of silks have wilted and turned brown.	
Tomatoes 1/	Flea beetle, horn worm, stink bugs, Colorado potato beetle, grasshoppers	Carbaryl (Sevin) 50% WP, 2 tbsp. or Carbaryl (Sevin) 5% dust	0 days. Treat when damage appears or when insects appear in damaging numbers.
	Flea beetle, Colorado potato beetle	Diazinon 25% EC, 2 tsp.	1 day. Treat when damage appears or when insects appear in damaging numbers.

1/ Keep seedbeds free of vegetation for 3 weeks prior to planting time; will aid in control of cutworms. For more details on cutworm control see special section on soil insects.

Crop	Insect	Treatment and Amount to Mix with 1 Gallon of Water or as Indicated Otherwise	Remarks and Days Between Last Application and Harvest
Tomatoes (Continued)	Fruitworm	Carbaryl (Sevin) 50% WP, 2 tbsp. OR Carbaryl (Sevin) 5% dust	0 days. Treat every 5 to 7 days when fruit begins to set. Continue as long as fruit is present if needed.
	Aphids (plant lice), blister beetles	Diazinon 25% EC, 2 tsp. OR Diazinon 4% dust Malathion 5% dust OR Malathion 57% EC, 1 tbsp.	1 day Diazinon, 1 day Malathion. Treat when insects appear in damaging numbers.
	Mites	Dicofol (Kelthane) 18.5% EC, 1 tbsp.	2 days. Treat when insects appear in damaging numbers.
	Cutworms	See special section on soil insects.	

The various formulations of Diazinon are now sold for home and garden use under the Spectricide label, the Ortho label, and several others. For this reason we urge home gardeners to read the label and act accordingly.

Dusts should always be applied as a "fog" to cover leaf surfaces with a very light but visible film of insecticide. A hand operated crank duster is in most cases the only hand equipment that is really acceptable for applying dusts. However, a puff duster is adequate for small plants such as young cucumbers and for treating silking ears of corn.

Sprays should be applied to the point of runoff. An effort should be made to spray undersides of leaves, especially for effective spider mites control.

Wettable powders are omitted in some cases to conserve space. They are generally as effective at comparable rates, but usually require more agitation.

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THE POTATO TUBERWORM

Each year Virginia home gardeners are plagued by injury to their white potatoes by the potato tuberworm.

The injury shows up in stored potatoes as unsightly feeding tunnels filled with excrement throughout the flesh of the tubers and, consequently, the tubers become unfit for food. Each year many people asked how these pests get in the stored potatoes and how they can be controlled.

The potato tuberworm is the larva or immature stage of a gray moth not over one-fourth inch long. It has small dark brown or black markings on the wings. The female moth lays her pearly-white eggs on the leaves and stems of the plants or in the eye of exposed tubers in the field or in storage. The moths are seldom seen because they hide during the daytime but are active at night. The female usually lays from 150 to 200 eggs. In warm storage places the tuberworm may continue to reproduce and be a pest throughout the winter. In the field it overwinters as a larva or pupa in the soil. The life cycle may be as short as 2 weeks in the summer or as long as 7 months in the winter. In the field there are five or six generations in the South, but probably not more than three or four in Virginia.

The full grown larva of the potato tuberworm is about one-half inch long. b Its head is brown and its pinkish green or white body sometimes has a reddish-purple band down the back. CONTROL MEASURES. Protective measure in controlling the potato tuberworm include the following: 1) planting only seed pieces that are not infested, 2) cultivating so as to hill the soil against the plants - keeping at least 2 inches of soil over the developing tubers, 3) harvesting as soon as the crop is mature. During harvest do not leave the dug potatoes in the field overnight, and do not cover piles of potatoes with potato tops, 4) destroy all culled or infected potatoes as soon as possible, 5) store tubers at temperatures below 52 F. if possible and practical. Use either new or thoroughly cleaned bags or baskets when storing. The storage area should be screened or enclosed in such a way that moths cannot get in. Without such an enclosed storage area, the moths can fly in although the storage area was clean and the potatoes insect-free when stored.

There is no legal chemical control for this insect.

SLUGS

An increase in slug population is undoubtedly the result of favorable environmental conditions for slug reproduction and survival. Any type of mulch may give rise to greater problems with slugs. Young seedlings and the more succulent parts of plants and even some entire plants are devoured by these pests. They leave a trail of mucus on the surfaces on which they crawl, and, on drying, silvery marks result. It seems that moist, humid environments favor slug development. Slugs generally spend the winter in sheltered situations, outdoors. Eggs are usually deposited in moist habitats and maturity requires a year or more. Many different modern-day insecticides have been tested against slugs and very few show any promise at all. The following are suggestions for minimizing slug damage to either vegetable or flower gardens:

1. Spade or rototill the garden area in the fall.
2. Spade or rototill the garden again around April 1.
3. Maintain a system of clean cultivation by hoeing so that the surface of the soil is dry and crumbly.
4. Where heavy infestations of slugs cause serious damgage, hand-picking will reduce slug populations. Use a flashlight to check infestation. About 10.00 p.m., inspect garden for active slugs. Those detected can be picked up with an old teaspoon. Place captured slugs in a container of salt which will kill them. If this activity is continued for 3 or 4 nights in a row, damage can be greatly reduced.
5. In order to increase organic material in the soil, it is best to compost materials such as grass clippings, leaves and other plant debris for at least one year. At the end of this time the compost should be black and crumbly. This then should be spread over the garden and spaded into the soil.
6. Gardeners have reported some success with beer placed in small cups or pans sunken in the soil so the lip of the container is slightly below the level of the ground. Slugs are attracted to the containers; once inside they drown. The beer needs to be replaced about every three days for best results. However, stale beer may be used. Slug populations can be greatly reduced if this method is started early in the spring and enough of the containers are set out.
7. Slug baits are available and effective against this pest if applied exactly as directed on the label. None of these commercial baits are to be used directly on food crops.

SOIL INSECTS

PRE-PLANT APPLICATIONS ONLY. READ ALL LABELS CAREFULLY. Home and garden formulations of Diazinon are available under several trade names for the control of cutworms, onion maggots, root maggots, rootworms and wireworms. The following table indicates (in part) the EPA labeled uses for the different formulations of Diazinon for control of soil insects in the home garden.

	Diazinon 5% Granules	Diazinon 4% Dust	Diazinon 25%EC
Beans		CW, WW	CW, WW (snap only)
Beets			CW, WW
Cabbage	CW, RM, WW	CW, WW,	CW, RM, WW
Carrots	WW	CW, WW	CW, WW
Cauliflower	CW, RM, WW	CW, WW	
Celery	CW, WW		
Collards	CW, WW		
Sweet corn	WW, RW	CW, WW	CW, WW
Cucumbers	CW, WW	CW, WW	
Endive	CW, WW	CW, WW	
Kale	CW, WW		
Lettuce	CW, WW	CW, WW	CW, WW

	Diazinon 5% Granules	Diazinon 4% Dust	Diazinon 25%EC
Lima Beans	CW, WW		
Melons		CW, WW	
Muskmelons	CW, WW		
Onions	OM, WW	CW, WW	
Parsley	CW, WW		
Parsnips		CW, WW	
Peas	CW, WW	CW, WW	CW, WW
Peppers	CW, WW	CW, WW	
Potatoes	CW	CW, WW	
Radishes	RM		CW
Snap Beans	CW, WW		CW
Spinach	CW, WW	CW, WW	
Summer Squash	CW, WW		
Watermelons	CW, WW		
Winter Squash	CW, WW	CW, WW	
Swiss Chard	CW, WW		
Tomatoes	CW, WW	CW, WW	CW
Turnips	RM		

CW - Cutworms, OM - Onion maggots, RM - Root maggots, RW - Root worms, WW - Wireworms

CUTWORM AND WIREWORM CONTROL

For control of surface and subterranean cutworms apply 5% Diazinon granules to soil. Apply at the rate of 7 to 14 ounces per 500 square feet just prior to planting time and thoroughly mix into the soil. For all the crops listed above, except potatoes and sweet corn, mix the 5% Diazinon granules 2 to 3 inches for surface cutworms and 3 to 6 inches for subterranean cutworms. For control of cutworms on potatoes, mix the 5% Diazinon granules into the soil 4 to 6 inches deep. For cutworm control on sweet corn, apply the 5% Diazinon granules at the rate of 7 to 11 ounces per 500 square feet and mix into the soil to a depth of 1-2 inches for surface cutworms and 3 to 6 inches for subterranean cutworms. See abbreviations under Diazinon 5% granules above.

For the control of wireworms on the crops listed above, sweet corn excepted, apply 5% Diazinon granules at the rate of 7 to 14 ounces per 500 square feet and mix into the soil to a depth of 4 to 8 inches. For the control of wireworms on sweet corn, apply 7 to 15 ounces per 500 square feet in a broadcast application. Mix into soil to a depth of 4 to 6 inches. See abbreviations under Diazinon 5% dust above.

For the control of cutworms and wireworms with 4% Diazinon dust, apply at the rate of 1/2 pound per 225 square feet. Four-percent Diazinon dust should be applied evenly as a broadcast treatment. Immediately after the dust is spread, it should be mixed thoroughly into the soil to a depth of 6 to 8 inches. See abbreviations under Diazinon 5% dust above.

For the control of cutworms with 25% Diazinon emulsifiable concentrate, apply 6 ounces of the concentrate insecticide per 1,000 sq. ft. in sufficient water to achieve thorough coverage. Broadcast the spray material to the soil evenly and work into the soil 2 to 3 inches for surface cutworms and 5 to 6 inches for subterranean cutworms. See abbreviations under Diazinon 25% EC above.

For the control of wireworms with 25% Diazinon EC, apply 6 ounces of the concentrate insecticide per 1,000 sq. ft. in sufficient water to achieve thorough coverage. Apply broadcast and work into the soil immediately just prior to planting. See abbreviations under Diazinon 25% EC above.

ROOT MAGGOTS

For the control of root maggots on broccoli, cabbage, and caulitlower, apply 7 to 11 ounces of 5% Diazinon graules per 500 square feet over entire seedbed before planting or transplanting and mix into the soil to a depth of 3 to 4 inches. See abbreviations under Diazinon 5% granules above.

For the control of root maggots on cabbage with 25% Diazinon EC, apply 4.5% fluid ounces in sufficient water, achieve thorough coverage. Apply broadcast and work into the soil immediately just prior to seeding the seedbed or just prior to transplanting. See abbreviations under Diazinon 25% EC above.

For the control of root maggots on radishes, sprinkle 5% Diazinon granules lightly at the rate of 3-4 ounces per 500 linear feet of row in seed furrow at planting time. See abbreviations under Diazinon 5% granules above.

Onion Maggot. For the control of onion maggots on onions, apply 4 ounces of Diazinon 5% granules per 500 square feet in the seed furrow at planting. See abbreviations under Diazinon 5% granules above.

Rootworms. For the control of corn root worms on sweet corn, apply 4 to 7 ounces of 5% Diazinon granules per 500 square feet in a band over the row at planting time. See abbreviations under Diazinon 5% granules above.

WHITE FLIES

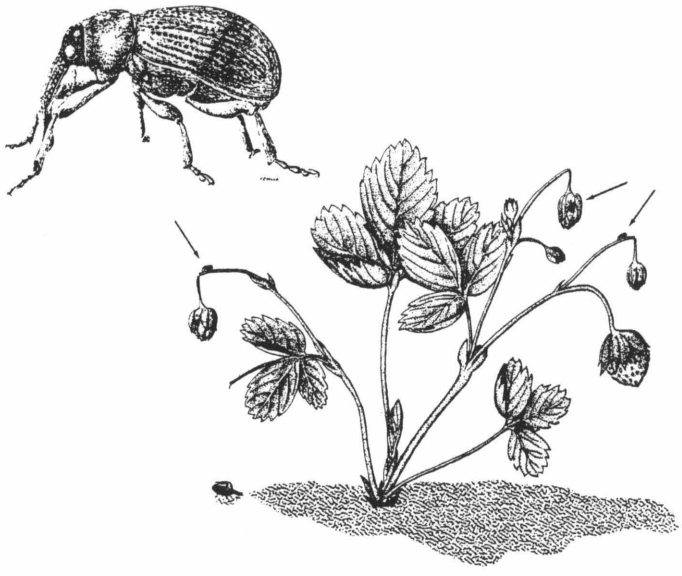
During the past several years white flies have become a serious problem in home gardens. This is a very small insect with sucking mouthparts that is closely related to aphids. They are likely to be found on several garden crops such as tomatoes, beans, squash, etc. The problem may arise from plants that become infested in greenhouses. This insect is almost totally resistant to any of the insecticides commonly used in the home garden. In a nutshell, this insect is not only extremely hard to kill, there is nothing legal to recommend for its control in the home garden.

The residue tolerances for the insecticides recommended in this publication are as follows:

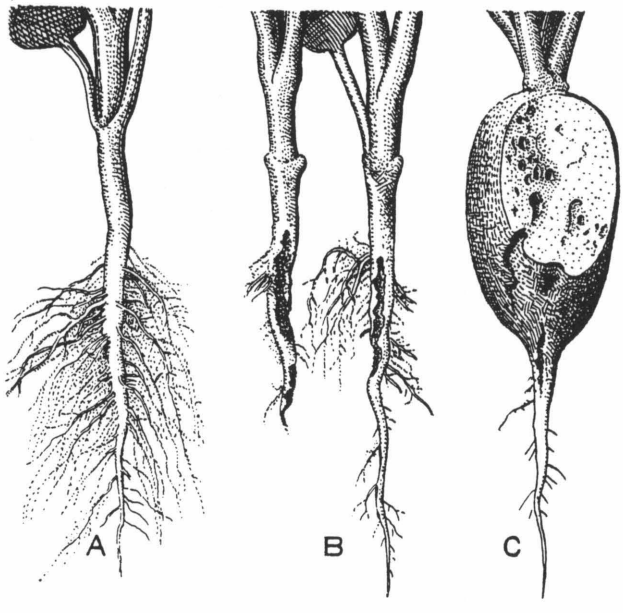
CHEMICAL	RESIDUE TOLERANCE IN PARTS PER MILLION	
Malthion	8.0	
Carbaryl	10.0	with the following exceptions:
	12.0	Beets (tops), mustard, collards, kale, spinach, turnips
	5.0	Beets (roots), radishes, corn (kernel), corn (cob), turnip (roots)
	100.0	corn (forage), peas (forage)
	0.2	Potatoes
Diazinon	0.75	with the following exceptions:
	25.0	Beans (forage)
	10.0	Beans (hay)
	0.1	Potatoes, sweet potatoes
Dicofol	5.0	
Methoxychlor	14.0	

NOTE: Bacillus thuringiensis (Biotrol, Thuricide, and Dipel) are exempt form tolerance.

Grateful acknowledgement is extended to Dr. R. N. Hofmaster, Entomoligist and Scientist in Charge, Virginia Truck and Ornamentals Station, Painter, Virginia, for assistance in reviewing this publication.



strawberry weevil clips the first buds.
Inset: A side view of the strawberry weevil.



Cabbage maggot feeding usually shows no effect until late in the spring. The first outward sign is a slight drooping of the leaves of a few plants, which later wilt and die. Such plants have had the root system entirely destroyed and some may have the tap root entirely cut off leaving only a stub. In small plants, the maggots sometimes burrow up into the stem and cause quick wilting. Usually they destroy the branch roots and make furrows in the side of the tap root, sometimes completely gridling it.

Cabbage maggot injury:

A. uninjured cabbage plant

B. injured cabbage plants

C. infested radish

MANAGEMENT OF DISEASES OF HOME VEGETABLES

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The control of diseases in the home vegetable garden is important if the gardener is to harvest attractive nutritious vegetables. Although diseases are frequently seasonal in their occurrence, losses are highest if consideration is not given to a few basic principles. These are 1) using disease-free seed of resistant varieties, 2) practicing rotation so that the same vegetable or closely related vegetables are not planted in the same location on consecutive years, and 3) the safe judicious use of fungicides and nematicides. See Control Series entitled

Crop Disease	Fungicide and Formulation; Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
ASPARAGUS			
Rust	Maneb (80% WP); maneb	2 tbsp	Use resistant varieties or apply several post-harvest sprays at 7- to 10-day intervals. See Control Series 171.
BEANS (Snap and Lima)			
Anthracnose	Zineb (75% WP); zineb OR Maneb (80% WP); maneb	2 tbsp 2 tbsp	Use certified western-grown seed. Spray at 7-day intervals. Do not work in garden when plants are wet. Do not apply Zineb within 7 day of picking.
Bacterial blights	Fixed Copper (50% WP); copper OR Kocide 101 (77% WP); copper	3 tbsp 2 tbsp	Use certified western-grown seed. Spray at 7- to 10-day intervals.
Powdery mildew	Sulfur (95% WP); sulfur OR Sulfur dust (90-95%); sulfur	6 tbsp	Use resistant varieties. Apply spray or dust when mildew first appears. Repeat at 7- to 10-day intervals. See Control Series 171.
Rhizoctonia root rot	Terraclor (75% WP); PCNB	0.20 oz in 1.0 gal/water per 100 ft row-bush beans, 0.38 oz in 1.0/100 ft row-pole beans	Spray planting furrow and covering soil at planting time.
Rust	Bravo (75% WP); chlorothalonil OR Maneb (80% WP); maneb OR Sulfur dust (90-95%); sulfur OR Zineb (75% WP); zineb OR Bravo (4.17 F); chlorothalonil	3 tbsp 2 tbsp 2 tbsp 4 tsp	Spray or dust plants when rust threatens and repeat at 7-day intervals. Do not apply Bravo or zineb within 7 days of harvest. Maneb and Bravo on snap beans only. Do not apply maneb within 4 days of harvest. Do not graze Bravo-treated areas or feed treated plant parts to livestock.
Seed decay	Captan (75%); captan OR Thiram (70%); thiram	1.3 oz/bu	Use as dust or slurry as a seed treatment. (Do not use treated seed for food or feed).

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulation; Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
BEANS (Snap and Lima) (Cont'd)			
Sclerotinia white mold	Benlate (50% WP); benomyl	1 1/2 tsp	Apply at 25 to 50 percent bloom and repeat at peak bloom. Do not apply within 14 days of harvest for other than lima; lima 28 days. Not to be used for animal forage purposes.
Botrytis gray mold	Benlate (50% WP); benomyl	1 1/2 tsp	
Viruses (peanut stunt, bean yellow mosaic and others)	No chemicals registered.		Clover control around edge of garden areas is important because clovers are hosts of bean viruses. Some bean varieties are resistant. Consider aluminum foil mulch to prevent aphid feeding. See Control Series 171.
Downey mildew (lima)	Maneb (80% WP); maneb	2 tbsp	Spray at 7-day intervals when conditions are favorable for disease. Do not apply maneb within 4 days of harvest.
BEETS			
Cercospora leaf spot	Zineb (75% WP); zineb	2 tbsp	Spray at 7- to 10-day intervals beginning when disease first appears. Do not apply within 7 days of harvest if tops are to be consumed.
CABBAGE, BROCCOLI, BRUSSELS, SPROUT, CAULIFLOWER, TURNIPS, KALE, COLLARDS			
Black leg, Black rot (see below), Alternaria			Use western-grown hot-water-treated seed. Use resistant varieties for black rot control. See Control Series 171.
Club root	Terraclor (75% WP); PCNB	6-8 tbsp	Applied mixed with transplant water. Use 3/4 pt/plant. (Not registered for turnips, kale and collards.) Use healthy transplants.
Downey mildew, leaf spot	Bravo (75% WP); chlorothalonil OR Maneb (80% WP); maneb OR Zineb (75% WP); zineb OR Bravo (4.17 F); chlorothalonil	2 tbsp 2 tbsp 2 tbsp 2 1/2 tsp	Begin garden application when the disease threatens and continue at 7-day intervals. Shorten intervals to 3 to 5 days under severe disease conditions. Do not apply maneb later than 7 days before harvest (10 days on kale, collards and turnips.) If maneb is applied to broccoli within 3 days of harvest, remove excess residue by washing. Apply copper at 7- to 10-day intervals.
Black rot	Kocide 101 (77% WP); copper hydroxide	2 tbsp	
CARROTS			
Leaf blight	Bravo (75% WP); chlorothalonil OR Bravo (4.17 F); chlorothalonil OR Kocide 101 (77% WP); copper OR Maneb (80% WP); maneb OR Zineb (75% WP); zineb OR Captan (50% WP); captan	2 tbsp 2 1/2 tsp 2 tbsp 2 tbsp 2 tbsp 2 tbsp	Make applications at 7- to 10-day intervals, or more frequently if needed. There is a 7-day waiting period for zineb if tops are to be used for food.

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulation; Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
CELERY			
Leaf blights	Maneb (80% WP); maneb	2 tbsp	Apply as a spray at 7- to 10-day intervals after disease first appears. Do not apply maneb within 14 days of harvest. Do not apply Benlate or Bravo within 7 days of harvest.
	OR		
	Benlate (50% WP); benomyl	1 1/2 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	2 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
CUCURBITS (Cucumbers, Summer Squash, Cantaloupes, Pumpkin)			
Angular leaf spot	Kocide 101 ( ); copper	1 tbsp	Apply as spray at 7- to 10-day intervals. (Copper may injure some young plants.) Not registered for squash, pumpkins and cantaloupe. Use resistant varieties. See Control Series 171.
Anthracnose	Benlate (50% WP); benomyl	1 1/2 tbsp	Start applications when plants are in the two-leaf stage and repeat at 5- to 7-day intervals. Direct spray for thorough coverage of both upper and lower leaf surfaces. (Maneb is not registered for cucumbers, squash and pumpkins). (Benlate not registered for cucumbers, squash and pumpkins). Do not apply maneb on cantaloupes later than 5 days before harvest. Do not apply Benlate within 7 days of harvest. Use resistant varieties. See Control Series 171.
	OR		
	Maneb (80% WP); maneb	3 tbsp	
	OR		
	Phaltan (50% WP); folpet	3 tbsp	
	OR		
	Captan (50% WP); captan	2 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	2 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
Downy mildew	Maneb (80% WP); maneb	2 tbsp	Apply at 7-day intervals throughout the season after runners are formed. Do not apply maneb, on cucumber of cantaloupes later than 5 days before harvest. Use resistant varieties. See Control Series 171.
	OR		
	Captan (50% WP); captan	2 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	2 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	4 tsp	
Gummy stem blight	Benlate (50% WP); benomyl	1 1/2 tbsp	Apply at 7- to 10-day intervals throughout the season. (Maneb for ths disease is not registered for pumpkins). Do not apply maneb on summer squash, or cantaloupes later than 5 days before harvest. Do not apply Benlate within 7 days of harvest.
	OR		
	Maneb (80% WP); maneb	3 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	2 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
Powdery mildew	Benlate (50% WP); benomyl	2 tbsp	Apply at 7- to 10-day intervals. Do not apply closer than 7 days before harvest. Benlate not registered for pumpkins. Do not apply Benlate within 7 days of harvest. Bravo not registered for squash, pumpkin or watermelon. Use resistant varieties. See Control Series 171.
	OR		
	Bravo (75% WP); chlorothalonil	3 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	4 tsp	
EGG PLANT			
Verticillium wilt			Do not plant in the same garden area more frequently than every 4 to 5 years. Rotate with vegetables other than tomatoes, pepper or potatoes.

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulation; Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
IRISH POTATOES			
Early blight, Late blight	Maneb (80% WP); maneb OR Captan (50% WP); captan OR Bravo (75% WP); chlorothalonil OR Bravo (4.17 F); chlorothalonil	2 tbsp 4 tbsp 4 tsp 2 tsp	Start applications as soon as the plants are 2 to 6 inches high and continue at 5- to 10-day intervals as long as blights threaten. When late blight is present, reduce intervals to 3 to 5 days. Use late blight resistant varieties. See Control Series 171.
Rhizoctonia	Terraclor (75% WP): PCNB		Use according to manufacturer's directions. Plant certified seed.
Scab			Plant soil with pH 5.0 to 5.5. Use a fertilizer with an acid reaction in soil with pH above 5.5. Use resistant varieties. See Control Series 171.
Seed piece decay	Captan (7.5% dust); captan OR Captan (15% dust); captan OR Captan (50% WP); captan	1.0 lb/100.0 lb of seed 8.0 oz/100.0 lb of seed 1-3 tbsp/gal	Use as seed treatment dust according to manufacturer's label. Dust seed pieces immmediately after cutting. Do not use treated seed pieces for food. Dip seed potatoes.
LETTUCE			
Downy mildew	Phaltan (50% WP); folpet OR Maneb (80% WP); maneb	1 tbsp 3 tbsp	Apply as a spray at 7- to 10-day intervals after disease first appears. Do not apply within 10 days of harvest. Remove residue by trimming or washing.
OKRA			
Fusarium and Verticillium wilt			Do not plant in the same garden area more frequently than every sixth year.
ONION			
Blast, Purple blotch	Dyrene (50% WP); dyrene OR Maneb (80% WP); maneb OR Bravo (75% WP); chlorothalonil OR Bravo (4.17 F); chlorothalonil	2-6 tbsp 3 tbsp 3 tbsp 4 tsp	Apply as a spray at 7- to 10-day intervals, after disease first appears. Do not apply Bravo to dry bulb onions within 7 days of harvest or to green onions within 14 days of harvest. Dyrene not registered for blast.
Downy mildew	Maneb (80% WP); maneb OR Zineb (75% WP); zineb OR Phaltan (50% WP); folpet OR Bravo (75% WP); chlorothalonil OR Bravo (4.17 F); chlorothalonil	2 tbsp 3 tbsp 2 tbsp 3 tbsp 4 tsp	Apply as a spray at 7- to 10-day intervals, after disease first appears. Do not apply zineb to green onions within 7 days of harvest.

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulations Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
PEPPERS			
Anthracnose	Maneb (80% WP); maneb	3 tbsp	Make applications every 7 to 10 days. More often during wet season.
Bacterial spot	Fixed Copper (50% WP); copper	2 tbsp	Make foliar applications at 7- to 10-day intervals. More often during wet season.
	OR		
	Kocide 101 (77% WP); copper	3 tbsp	
Cercospora leaf spot	Maneb (80% WP); maneb	3 tbsp	Make applications every 7 to 10 days.
SPINACH			
Damping-off	Thiram (75%); thiram	5.0 oz/100.0 lb of seed	Apply seed treatment according to manufacturer's label.
Downy mildew	Maneb (80% WP); maneb	1 1/2 tbsp	Start applications when disease first appears in area and continue at 7- to 10-day intervals. (Do not apply later than 10 days before harvest.) (Remove maneb residues by washing.)
	OR		
	Zineb (75% WP); zineb	1 1/2 tbsp	
	OR		
	Captan (50% WP); captan	2 tbsp	
White rust	Maneb (80% WP); maneb	3 tbsp	Apply every 7 to 10 days throughout the season. (Do not apply later than 10 days before harvest). (Remove excess residues of maneb by washing).
	OR		
	Zineb (75% WP); zineb	2 tbsp	
SWEET CORN			
Bacterial wilt	No chemicals registered.		Plant resistant varieties. Spray with approved insecticide to control flea beetles.
Leaf blight	Maneb (80% WP); maneb	1 1/2 tbsp	Plant resistant varieties. Bravo and maneb registered for Helminthosporium leaf blight only. Do not fee maneb, zineb or Bravo treated forage or husks to dairy animals or animals being finished for slaughter. See Control Series 171.
	OR		
	Zineb (75% WP); zineb	2 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	2 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
Seed decay	Captan (75% WP); captan	3/4 oz/bu of seed	Use as a seed treatment. Do not use treated seed for food or feed.
	OR		
	Thiram (75% WP); thiram	1.0 oz/bu of seed	
Smut	No chemicals registered.		Under severe disease conditons use resistant varieties.

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulations Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
SWEET POTATOES			
Black rot, Scurf	Tersan (75% WP); thiram	1.0 lb in 7 1/2 gal of water	Use disease-free bedding stock. Use as a dip for 1/2 minute. Do not use treated roots for food or feed.
Pox	No chemicals registered.		Use disease-free seed and keep soil pH below 5.2.
Post harvest decay	Botran (75% WP); botran	1.0 lb in 100gal of water	Dip washed roots for 10 to 15 seconds in well-agitated suspension. Do not rinse after treatment.
TOMATOES			
Anthracnose, Gray leaf spot, Septoria leaf spot, Gray leaf mold	Maneb (80% WP); maneb	2 tbsp	Make foliar application when plants begin to set fruit. Repeat at 7- to 10-day intervals throughout the season. Under severe disease conditions, shorten spray intervals. Do not apply maneb or zineb later than 5 days before harvest. *Use for gray leaf spot of tomatoes. Bravo not registered for septoria leaf spot. Use resistant varieties to early blight and gray leafspot. See Control Series 171.
	OR		
	Zineb (75% WP); zineb	2 tbsp	
	OR		
	Captan (50% WP); captan	4 tbsp	
	OR		
	Benlate* (50% WP); benomyl	1 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	3 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	4 tsp	
Bacterial spot	Fixed Copper (50% WP); copper	3 tbsp	Make foliar applications every 7 to 10 days throughout the season.
	OR		
	Kocide 101 (77% WP); copper	2 tbsp	
Early blight	Dyrene (50% WP); dyrene	2-5 tbsp	Make application every 7 to 10 days throughout the season. Under severe disease conditions, shorten spray intervals. Do not apply maneb or zineb later than 5 days before harvest.
	OR		
	Maneb (80% WP); maneb	2 tbsp	
	OR		
	Zineb (75% WP); zineb	4 tbsp	
	OR		
	Captan (50% WP); captan	4 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	3 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
	OR		
	Kocide 101 (77% WP); copper	3 tbsp	
Late blight	Fixed Copper (50% WP); copper	1 tbsp	Make regular applications every 7 to 10 days. When disease is severe, reduce intervals to 3 to 5 days. Do not apply maneb or zineb later than 5 days before harvest.
	OR		
	Maneb (80% WP); maneb	2 tbsp	
	OR		
	Zineb (75% WP); zineb	2 tbsp	
	OR		
	Captan (50% WP); captan	4 tbsp	
	OR		
	Bravo (75% WP); chlorothalonil	4 tbsp	
	OR		
	Bravo (4.17 F); chlorothalonil	2 1/2 tsp	
Fusarium wilt, Verticillium wilt, Root knot nematode			Use resistant varieties (VFN). See Control Series 171.
Bacterial speck	Kocide 101 (77% WP); copper	2 tbsp	Apply at 10- to 30-day intervales when disease threatens.

Home Vegetables (Cont'd)

Crop Disease	Fungicide and Formulations Active Ingredient	Rate/Gal. (Unless Otherwise Stated)	Remarks
TOMATOES (Cont'd)			
Seed decay	Thiram (75%); thiram	1 tsp/lb of seed	Use as seed treatment according to manufacturer's label.
WATERMELON			
Anthracnose, Downy mildew, Gummy stem blight, Alternaria leaf blight	Maneb (80% WP); maneb OR Benlate (50% WP); benomyl OR Bravo (75% WP); chlorothalonil OR Bravo (4.17 F); chlorothalonil	2 tbsp 1 1/2 tbsp 3 tbsp 4 tsp	Start application when conditions are favorable for disease development. Repeat applications at 7-day intervals. Do not apply maneb later than 5 days before harvest. Benlate not registered for downy mildew or Alternaria leaf blight. Maneb not registered for Alternaria. Use resistant varieties. See Control Series 171.

NEMATODE AND SOIL-BORNE DISEASE CONTROL IN VEGETABLES

Nematodes	Fumigant; Application Rates	Remarks
ROOT-KNOT ROOT-LESION SPIRAL STING LANCE and Various Soil-borne Pathogens	Vapam; 1.0 qt per 100 sq ft overall treatment	Apply as a Preplant Application: This treatment is effective against nematodes and other soil-borne plant pathogens. Treated area must be immediately covered with a plastic film. GENERAL DIRECTIONS Soil Preparation: Before treating, cultivate the area thoroughly, breaking up clods and loosening soil deeply and thoroughly. Keep the soil moist, watering if necessary until time to treat. Soil temperature should be between 60° to 90°F at 3-inch depth. Preplanting Instruction: Cultivate 5 to 7 days after application to promote escape of vapors. Allow an additional 7 to 9 days before planting on well-drained light- to medium-textured soil; 14 days for heavy clay or organic soil; and up to 30 days if soil temperatures are below 60°F. Use Precautions: Do not apply to confined spaces without adequate ventilation nor in greenhouses where growing plants are present. Do not apply within 3 ft of plant drip line or to areas underlaid by roots or valuable plants. Keep children and pets out of treated area. Sprinkling Can Application: Place 0.398 lb (1.0 pt) in sprinkling can, fill with water, and apply to 50 sq ft of well-prepared soil. Hose Proportioner Application: Add 0.795 lb (1.0 qt) to 3 qt of water per 100 sq ft. Continue watering to depth of control desired. Rotary Tiller Application: Sprinkle or spray using 0.795 lb (1.0 qt) in 2.5 gal of water per 100 sq ft in front of tiller.
	Vorlex; 7.0-15.0 gal/A	Broadcast with shanks 6 to 8 inches apart and inject 6 to 8 inches deep. Cultivate after 7 days and wait another week before planting.

NEMATICIDES FOR COMMERICAL VEGETABLE PRODUCTION

Crop Nematodes Controlled	Product; Rate/A	Method of Application	Remarks
ALL CROPS			
Lance Lesion Rootknot Spiral Sting Stubby root	D-D or Vidden D; 20.0-25.0 gal/A	The preplant treatment should be applied broadcast to a depth of 6 to 8 inches with shanks spaced 12 inches apart.	A 21-day waiting period before planting is recommended. Fall application is preferred to spring when early spring plantings are desired.
	Telone II; 12.0-15.0 gal/A	Same.	Same.
	Vorlex; 7.0-15.0 gal/A	The preplant treatment should be applied broadcast to a depth of 6 to 8 inches with shanks spaced 8 inches apart.	Same.
LIMA BEANS, BROCCOLI, CUCUMBER, POTATO, SWEET CORN, SWEET POTATO, TOMATO			
Lance Rootknot Spiral Sting Stubby root	Soilbrom 85; 4 1/2-6.0 gal/A	The preplant treatment should be applied broadcast to a depth of 6-8 inches with shanks spaced 12 inches apart.	Seven- to twenty-one-day exposure, aerate and wait one week.
BEANS, LIMA and SNAP			
Lesion Rootknot Sting Stubby rot	Mocap 10G; 20.0-30.0 lb/A	Apply in a 12 inch band on the row, and incorporate 4- to 6-inches deep.	Beans grown in treated soil may remain green longer than other beans, and mature one to two weeks later.
CABBAGE			
Root knot Sting	Nemacur 15G; 20.0 lb/A	Same.	Do not allow treated bands to overlap.
POTATO			
Rootknot Lesion	Temik 15G; 30.0 lb/A	Apply in 7- to 12-inch band over the row, and incorporate 4- to 6- inches deep. Plant seed pieces in treated zone.	Do not make more than one application per crop. Do not harvest within 90 days of an at-planting application. Do not apply a post-emergence application within 50 days of harvest.
SWEET CORN			
Sting Stubby root	Dasanit 15G; 13 1/2 lb/A	Apply in a 12-inch band over the row, and incorporate 3 inches deep.	

Crop Nematodes Controlled	Product; Rate/A	Method of Application	Remarks
SWEET CORN (Cont'd)			
Sting Stubby root	Mocap 10G; 20.0 lb/A	Apply in a 12-inch band over the row, and incorporate 3 inches deep.	
	Mocap 10G; 60.0 lb/A	Apply broadcast, and incorporate 4- to 6-inches deep.	Do not use as a seed furrow treatment or allow granules to contact seed.
SWEET POTATO			
Rootknot	Mocap 10G; 60.0 lb/A	Same.	Apply Mocap 2 to 3 weeks before planting.
	Dasanit 15G; 20.0-46.0 lb/A	Same.	
TOMATO			
Rootknot	Dasanit 15G; 66.0-134.0 lb/A	Same.	
	Dasanit 15G; 21.0-42.0 lb/A	Apply in a 12-inch band, and incorporate 4 to 6 inches deep.	

WEED CONTROL IN VEGETABLE CROPS

N. K. Rogers, O. E. Rud, and H. P. Wilson*

HOME VEGETABLE PRODUCTION

There are many herbicides cleared for use in vegetable crops. However, most of these are designed for commercial vegetable production rather than the home garden. They are formulated in large packages, require precise rates of application, and may leave residues in the soil that would interfere with growing other plants in the area the next growing season. Commercial producers should consult the "Commercial Vegetable Production Recommendation"** for weed control recommendations in specific vegetable crops.

In most home garden situations, it is more practical to use cultural methods of weed control rather than chemicals. A hoe and rototiller are very effective if weeds are not allowed to get ahead. Mulching is also very practical in a home garden situation. The mulch could be several layers of newspaper, tarred felt paper (roofing paper), black plastic or sawdust.

In areas infected with nutsedge, wiregrass or similar troublesome weeds, the black plastic mulch is placed over the tilled soil and then plants such as tomatoes or peppers planted by punching holes in the plastic. During the growing season, the weeds will starve beneath the black plastic. The next year, this process can be repeated in an adjacent area and row crops planted in the area where the plastic was the pevious year.

Sanitation is another important aspect of home gardening. If you allow weeds to mature and seed, you create more severe weed problems for the years ahead. When a crop is harvested, cultivate the area to prevent weeds from maturing and seeding.

DCPA (Dacthal) is cleared on a wide variety of vegetables, has good crop tolerance, is readily available in small quantities, and is safe to the user. For this reason, dacthal is the only herbicide that we recommend for use in the home vegetable garden. It is a preemergent herbicide and kills seeds as they germinate. It remains active in the soil about 8 weeks during the growing season. Thus, repeat treatments are necessary for season-long control.

VEGETABLES CLEARED FOR DCPA (Dacthal) APPLICATIONS

Vegetable	Time of Application
Broccoli, brussels sprouts, cauliflower, cabbage	At seeding or transplanting
Beans, field, snap, Southern peas	At seeding
Melons, Canteloupe, honeydew, watermelons, cucumbers, squash	4-6 weeks after seeding
Collards, kale, mustard greens turnips (greens and roots)	At seeding
Garlic and onions	At seeding or transplanting
Lettuce (Head)	1-6 weeks after seeding
Lettuce (Leaf)	1-3 weeds after emergence
Potatoes (Whole or cut pieces)	At planting, drag-off, or at lay-by
Sweet Potatoes and yams	At tramsplanting and lay-by
Tomatoes, eggplant and peppers	4-6 weeks after transplanting and lay-by
Strawberries (New Planting)	At transplanting
Strawberries (established)	Fall or spring. Do not apply after first bloom

DCPA is not cleared for use on okra, sweet corn, carrots, or beets. All applications must be made on freshly tilled or clear cultivated soil.

* Cooperator for Vegetable Research: H. P. Wilson, Plant Physiologist, Virginia Truck and Ornamentals Research Station, Painter, Virginia 23420

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WEEDS CONTROLLED AT TIME OF GERMINATION ONLY

Annual bluegrass*	Green foxtail	Redroot Pigweed*
Barnyardgrass*	Hairy crabgrass	Smooth crabgrass
Carpetweed	Johnsongrass from seed	Spiny pigweed
Common chickweed	Lambsquarter	Spotted spurge
Dodder*	Lovegrass	Stinkgrass
Fall panicum	Purslane	Witchgrass
Goosegrass	Prostrate spurge*	Yellow foxtail

*Use higher rate and expect only fair control of these weeds.

NOT CONTROLLED

Velvet leaf	Mustards	Galinsoga (Quickweed)
Common ragweed	Bromes and Cheats	Smartweeds
Wild oat	Jimsonweed	

No established perennial weeds or emerged annual weeds are controlled by DCPA.

In addition to its use in the vegetable garden, Dacthal is also safe to use for crabgrass control in lawns and weed control in flower beds.

Follow directions on the dacthal label for the proper amount to apply.

1 pound per acre = 1/3 oz per 1000 sq ft

1 ounce of Dacthal 75W product = 4.5 level tablespoons

SAMPLE CALCULATION

Desired amount - 10 lb/A

Amount per 1000 sq ft = 10 x 1/3 ounce = 3-1/3 ounce

3 1/3 x 4 1/2 = 10/3 x 9/2 = 90/6
= 15 level tablespoons

DO NOT SPRAY VEGETABLES
WITH A SPRAYER THAT HAS
BEEN USED TO APPLY 2,4-D.

WEED CONTROL IN SWEET CORN

The following recommendations should not be considered if sweet corn is surrounded by other vegetables as might be the case in a home garden. Since the correct application rates of these herbicides is critical to obtain satisfactory weed control without causing crop injury, the grower should not attempt to use these herbicides unless the proper equipment for application and incorporation is available. Do not plant and crop except corn or sorghum for one year on land treated with atrazine or sorghum.

Preemergence

Weed Problem	Chemical Rate/A	Product/A	Remarks
Annual grasses and some broadleaf weeds	Alachlor 1.5-3.0 lb	Lasso 1.5-3.0 qt OR Lasso II 16.0-20.0 lb	Apply after planting but prior to weed emergence. Unusually dry soil conditions may result in reduced weed control.
Annual grasses and many broadleaf weeds	Alachlor 1.5-2.0 lb + atrazine 1.0-1.6 lb	Lasso 1.5-3.0 qt + AAtrex 80W 1.25-2.0 lb or 4L 1.0-1.6 qt or 90W 1.1-1.78 lb	Do not use atrazine if any crop other than corn is to be planted within one year after application. Can be applied as postemergence treatment until weeds reach 2-leaf stage and corn is less than 5 inches tall.
Many annual grasses and broadleaf weeds (See label for complete list)	atrazine 1.0-1.5 lb + simazine 1.0-1.9 lb	AAtrex 80WP 1.25-1.8 lb + Princep 80W 1.25-2.4 lb or 4L 1.0-1.9 qt	Do not plant any crop except those specified on the label the following year. Apply immediately after planting.
Annual grasses and broadleaf weeds including nutsedge, bermudagrass and suppression of wild cane and johnsongrass	EPTC 3.0-4.0 lb + safener	Eradicane 6.7E 3.75-4.75 pt	Soil must be well-worked and dry enough for good mixing. Apply before planting and incorporate immediately to prevent losses from the soil surface. OBSERVE ALL PRECAUTIONS ON THE LABEL.

Postemergence

Yellow nutsedge and some broadleaf weed seedings	bentazon 0.75-1.5	Basagran 1.5-3.0 pt	Apply when weeds are small and actively growing.
Annual and some perennial broadleaf weeds	2,4-D 0.25-1.0 (amine salts)		Do not apply over-top of corn and do not treat corn after tasseling. Do not apply with sprayer which will be used to treat sensitive broadleaf crops.