Vegetable Garden

Insect Pests

Extension Bulletin 747

Revised March 1976
Avoid Pesticide Residues on Vegetables

1. Apply pesticides to plants only at the rates recommended.
2. Always wash vegetables thoroughly in running water before using.
3. Strip and discard outside leaves from head lettuce, cabbage, and similar vegetables.
4. Observe the suggested time interval between the last application of an insecticide and harvest. These intervals may vary considerably both with the insecticide and the crops to which it is applied. The specific time intervals between application and harvest are listed on the labels. If instructions are followed, only insignificant amounts of residue will remain on the treated vegetables.

CABBAGE MAGGOTS

The “stem” or “leafy” type cole crops (cabbage, cauliflower, broccoli) do not require perfect control of these root maggots. Also, control is seldom needed in the plant bed where sets for transplanting are grown. Immediately after transplanting, the sets can be treated individually as follows: dust or ring the bases of the plants (1 teaspoon per plant) with chlordane* or diazinon dusts. If the maggots in your area are resistant to the chlordane family of insecticides, only the diazinon treatment will be effective. Liquid application of these same materials can...
Dilute dust formulations are frequently used for home gardens because they are easy to handle. Some products are sold in dual-purpose containers which serve as dust applicators.

Insecticides also are available as emulsifiable concentrates which form a milky emulsion when diluted with water. These emulsions can be applied easily with a compressed air or trombone-type hand sprayer. Sprayers which attach to the garden hose are preferred by some. If this type of equipment is used, follow the manufacturer's directions.

Wettable powder formulations require constant agitation in the spray tank and cannot be applied as satisfactorily as the emulsions with the type of equipment usually available to the home gardener. Insecticides are sometimes available in a granular form for use as broadcast or furrow treatments.

Always read the label before using a pesticide. Follow the manufacturer's directions for preparing the dilute spray. The chart on the right gives the suggested dilution rate for the insecticide formulations as well as dust concentrations usually available from dealers.

Pesticides Can Be Used Safely

The pesticides suggested in this bulletin have been selected on the basis of their effectiveness, availability, and safety. These pesticides are among the less hazardous to the user, and can be used safely if precautions are observed.

Follow the manufacturer's precautions on the pesticide label. These are not intended to frighten the user, but to impress upon him the need for careful use of pesticides.

- Store pesticides in a safe place, out of reach of children.
- Destroy empty containers or those without labels.

Common Insecticides and Concentrations for Small-Quantity Use

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Amount to mix with 1 gallon of water</th>
<th>Approximate dust concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baits</td>
<td>Purchase prepared</td>
<td>5%</td>
</tr>
<tr>
<td>Carbaryl (Sevin)</td>
<td>2 to 4 tablespoonfuls 50% W.P.(^1)</td>
<td>5%</td>
</tr>
<tr>
<td>Chlordane*</td>
<td>1 to 2 tablespoonfuls 44% E.C.(^2)</td>
<td>10%</td>
</tr>
<tr>
<td>Diazinon</td>
<td>2 teaspoonfuls 25% E.C.</td>
<td>4%</td>
</tr>
<tr>
<td>Dicofol (Kelthane)</td>
<td>2 teaspoonfuls 18.5% E.C.</td>
<td>3%</td>
</tr>
<tr>
<td>Malathion</td>
<td>2 teaspoonfuls 57% E.C.</td>
<td>4%</td>
</tr>
<tr>
<td>Metaldehyde</td>
<td>Prepared baits or 1 tablespoonful 50% W.P.</td>
<td>15%</td>
</tr>
<tr>
<td>Methoxychlor</td>
<td>1 tablespoonful 50% W.P.</td>
<td>5%</td>
</tr>
<tr>
<td>Rotenone</td>
<td>1 to 2 teaspoonfuls E.C.</td>
<td>1%</td>
</tr>
</tbody>
</table>

\(^1\) W.P. = Wettable powder.
\(^2\) E.C. = Emulsifiable concentrate.
* See note on page 4.
which has had some degree of success is the application of two or three drenching sprays of diazinon along the rows. Use one teaspoonful of liquid concentrate in one gallon of water and use heavily enough to wet the soil around the roots. The first application should be made when the first true leaves are showing, the second about mid-season, and the last not later than 10 days before maturity.

Radishes also can be protected by the methods described for turnips and rutabagas, but a third method may be suggested. Dilute granules or dust of diazinon can be sprinkled in the furrow at the time of planting. Because the concentration of the granules or dusts may vary according to the manufacturer, follow label directions for rate of application. A small screw-cap jar with holes punched in the lid can be used to apply these dry materials. (Note: The furrow treatment method described for radishes is not recommended for turnips or rutabagas because of injury to seedlings and lack of satisfactory maggot control on crops that require a longer growing period.)

**ONION MAGGOT**

This insect, the larva of a fly and a "cousin" to the cabbage maggot, attacks only onions and a few closely related plants. Early in the season, seedlings are actually killed by the maggots; later on, maturing onions are ruined for storage.

For effective control, sprinkle diazinon dust or granules into the open furrow at the rate of about 1/2 tablespoonful of 4% material per 20 feet of row. Other concentrations of dusts or granules can be used, but follow the directions on the label for rate of application. A small screw-cap jar with holes punched in the lid can be used like a salt shaker to apply these materials.

Green or bunching onions or onions grown for mature bulbs also may be protected by sprays or dusts of malathion or diazinon. Start treating soon after planting, before seedlings emerge. Continue dusting or spraying at 10-day intervals until the end of June. Two or three more treatments should be made, but the last not closer than 10 days before harvest (diazinon), or 3 days of harvest (malathion).

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Note: This bulletin is to help home gardeners control insects safely. If you have insect problems not covered here your county Extension agents can provide control information. Commercial growers, pesticide applicators, and others with a professional interest in insect control may be interested in obtaining OSU’s annually revised *Insect Control Handbook*. This complete guide, and similar handbooks on *Plant Disease Control* and on *Weed Control*, are available @ $7.50 each from OSU Bookstores, P.O. Box 491, Corvallis, Oregon 97330.

*Many uses of chlordane were suspended by the Environmental Protection Agency on December 24, 1975. However, existing stocks of chlordane may be used as labeled. Follow label directions.*
### Control of Vegetable Insect Pests

<table>
<thead>
<tr>
<th>Insect and damage</th>
<th>Control</th>
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<tbody>
<tr>
<td><strong>Cutworms</strong>: Several species of dingy, soil-inhabiting worms damage crops by cutting off seedlings at the soil line, eating holes in edible roots, and feeding on foliage.</td>
<td>Cutworm baits, available ready-mixed on the market, are effective when plant growth is sparse. Baits are more effective when applied in the evening and when the ground is wet. If worms are cutting plants at or below the ground level, spray or dust carbaryl (Sevin) on the area infested. When cutworms are feeding on foliage of crops such as beets, apply carbaryl (Sevin) to the foliage.</td>
</tr>
<tr>
<td><strong>Grasshoppers</strong>: Well-known insects which may be very injurious to vegetables and flowers in late summer.</td>
<td>Use sprays or dusts of malathion or carbaryl (Sevin). Attempt to keep grasshoppers out of the garden by early application to vegetation around outside edges.</td>
</tr>
<tr>
<td><strong>Slugs and snails</strong>: Land molluscs common to western Oregon. Very destructive to seedling vegetables, flowers, and root crops, especially in rainy years.</td>
<td>Slug and snail baits are most effective if applied in the evening. Baiting in September and October after the first fall rains is particularly effective since this precedes the period of heaviest egg laying.</td>
</tr>
<tr>
<td><strong>Earwigs</strong>: Pests of seedlings. They also infest ears of corn and leafy vegetables.</td>
<td>Spread earwig bait according to directions on the package. Apply in the evening as earwigs feed at night. Malathion is also effective to a lesser degree.</td>
</tr>
<tr>
<td><strong>Symphylans (Symphylids)</strong>: Small, white, centipede-like animals. They attack root systems of most garden plants which they stunt or kill.</td>
<td>No satisfactory chemical control measure is available for home gardeners. Thorough pulverization of the soil with rotary tillers when the soil is on the dry side and easily put into good tilth will scatter and destroy symphylans. This practice makes it possible to grow crops in infested soil without resorting to the use of chemicals.</td>
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Observe the suggested time interval between the last application of an insecticide and harvest.
### Control of Vegetable Insect Pests—Continued

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<tr>
<td><strong>Wireworms</strong>: Brown, jointed larvae of click beetles. They kill young plants, damage edible roots and tubers.</td>
<td>To control wireworms, use a pre-planting soil treatment of diazinon or chlordane.* Apply either of the insecticides at the rate suggested on the label and mix thoroughly with the soil to a depth of 6 to 8 inches. *See note on page 4.</td>
</tr>
<tr>
<td><strong>Spider mites</strong>: Tiny, spider-like creatures on the lower sides of leaves. The leaves turn yellow and die.</td>
<td>Use malathion, diazinon, or dicofol (Kelthane). Direct the spray or dust to the undersides of leaves. Spider mites usually appear in late season. Repeated applications are often necessary for satisfactory control. Do not apply diazinon or dicofol (Kelthane) to eggplant.</td>
</tr>
<tr>
<td><strong>Blister beetles</strong>: Large black or gray beetles which eat foliage of vegetables and flowers.</td>
<td>Use malathion, methoxychlor, or carbaryl (Sevin) sprays or dusts as needed.</td>
</tr>
<tr>
<td><strong>Pillbugs, sowbugs, millipedes</strong>: Many-legged arthropods which inhabit moist, shaded areas. They may attack seedling plants or fruits in contact with soil.</td>
<td>These pests prefer decaying organic matter but may be serious in wet seasons or in greenhouses. Use malathion, chlordane,* or carbaryl (Sevin). *See note on page 4.</td>
</tr>
<tr>
<td><strong>Seed-corn maggot</strong>: White larvae of a fly similar to cabbage maggot. It attacks most vegetables, mainly the germinating seeds.</td>
<td>Apply diazinon granules or wettable powder in seed furrow as suggested for maggots on radishes, (page 4). If damage is severe, replant.</td>
</tr>
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</table>

### Asparagus

**Asparagus beetle**: Bluish-black, yellow-spotted beetle. Adults damage sprouts by feeding and egg laying. Beetles and gray larvae defoliate ferns.

**Asparagus**: Rotenone, methoxychlor, malathion, or carbaryl (Sevin) dusts or sprays are effective on both adults and larvae. Control in late season is important to reduce numbers of overwintering beetles as well as to protect ferns.
**Twelve-spotted asparagus beetle:** Brick-red, black-spotted beetle. Adults appear later in the spring and attack both sprouts and ferns. Larvae feed on berries only.

Control measures suggested for asparagus beetle will take care of the 12-spotted species.

**Western spotted cucumber beetle:** Yellowish-green, black-spotted beetle common to western Oregon. Adults attack seedlings and green pods.

Adulst may be controlled with most insecticides recommended for home gardens, including methoxychlor, carbaryl (Sevin), diazinon, and rotenone. Beetles frequently migrate in large numbers, so repeated applications may be necessary.

**Black bean aphid:** Black plant louse which forms colonies on leaves and pods.

Use malathion or diazinon as dusts or sprays when needed.

**Nitidulid beetle:** Small, black beetles migrate into gardens and infest blossom of beans and cause blossom drop. A nuisance on flowers.

Beetles may migrate into gardens in large numbers during late July and early August, but they do not cause serious damage.

**BEANS**

**BEETS**

**Western spotted cucumber beetle:** Yellowish-green, black-spotted beetle may attack seedlings. Feeds on foliage at all stages of plant growth.

Dusts or sprays of methoxychlor, diazinon, carbaryl (Sevin), or rotenone are effective. Apply lightly when needed.

**BROCCOLI and BRUSSELS SPROUTS—See Cabbage**

Observe the suggested time interval between the last application of an insecticide and harvest.
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<tr>
<td><strong>Aphids:</strong> Gray, mealy plant lice which suck sap from all cole crop plants. They form large colonies and weaken or kill the plants.</td>
<td>Use malathion or diazinon dusts or sprays. Start control measures early in the season and repeat when necessary.</td>
</tr>
<tr>
<td><strong>Cabbage worms:</strong> Imported or common cabbage worm, cabbage looper, diamond-back moth larvae, and other caterpillars which feed on the foliage of cole crops.</td>
<td>Rotenone, malathion, diazinon, methoxychlor, and carbaryl (Sevin) are effective. Worms may be active during the entire growing season and regular applications may be necessary to protect plants.</td>
</tr>
<tr>
<td><strong>Root maggots:</strong> White maggots may kill or weaken plants by feeding on the roots. The egg-laying fly is active during most of the season.</td>
<td>Chlordane* or diazinon dusted or ringed (½ teaspoonful dust per plant) around bases of plants will protect them from damage. Treatment should be made within 24 hours of setting plants out in the field. See the section on cabbage maggots, pages 2 to 4. *See page 4.</td>
</tr>
<tr>
<td><strong>Cabbage flea beetle:</strong> Small, blue-black, jumping insect which eats holes in leaves of all cole crops.</td>
<td>Use carbaryl (Sevin), rotenone, methoxychlor, or malathion as needed.</td>
</tr>
</tbody>
</table>

**CARROTS**

**Rust fly:** Straw-colored maggots; ruin the roots for eating. The carrot rust fly has not been a problem for several years. If it should be causing damage, apply diazinon dust or granules in the furrow at planting time as suggested by the manufacturer, or use diazinon as suggested for wireworm control.

**Aphids:** Yellowish-gray plant lice on foliage in certain seasons. Apply diazinon or malathion sprays or dusts when needed. Aphids are hard to see and they weaken plants if not controlled.
### Aphids
Dark-colored plant lice form large colonies on undersides of leaves and progressively kill foliage. They are often attended by ants.

### Squash bug
Large, dark insects appear in late spring. They suck juices from squash plants, kill leaves and whole vines.

### Cucumber beetle
Striped beetles are serious foliage feeders in certain seasons. The spotted cucumber beetle is not a serious pest of cucurbits.

### Western potato flea beetle and western spotted cucumber beetle
Tiny, black, jumping beetles eat holes in leaves or yellowish-green spotted beetles feed on young plants.

### Spider mites
Tiny, spider-like creatures on undersides of leaves.

### CUCURBITS (Squash, cucumbers, etc.)
Use diazinon or malathion sprays or dusts. Direct insecticides to the undersides of leaves, and do not apply when leaves are wet since plant injury may result.

### Squash bug
Carbaryl (Sevin) directed under leaves and at the base of plants will aid in control. It is important to kill overwintered adults before they lay eggs or kill seedling plants. Hand picking is effective—bugs hide under boards placed in fields.

### Cucumber beetle
Use methoxychlor, diazinon, carbaryl (Sevin), or rotenone dusts or sprays. Apply lightly. Many insecticides cause plant injury if applied heavily and when leaves are wet.

### EGGPLANT
Treat lightly with methoxychlor, malathion, or rotenone. Repeat when necessary.

### Spider mites
Mites may be particularly injurious to eggplant. See "spider mites" on page 6. Do not use diazinon or dicofol (Kelthane) on eggplant.

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Observe the suggested time interval between the last application of an insecticide and harvest.
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<td><strong>LETTUCE</strong></td>
<td></td>
</tr>
<tr>
<td>Western spotted cucumber beetle, various worms: Common black-spotted green beetles, alfalfa loopers, and other leaf-eating insects sometimes attack lettuce.</td>
<td>Methoxychlor, diazinon, carbaryl (Sevin), or rotenone dusts or sprays are effective. Young lettuce plants are most susceptible to attack by these insects.</td>
</tr>
<tr>
<td><strong>ONIONS</strong></td>
<td></td>
</tr>
<tr>
<td>Onion maggot: White worm which kills seedlings and ruins older onion bulbs. Parent fly lays eggs on soil around plants.</td>
<td>Use diazinon dust or granules in furrows at planting time. See the section on onion maggots, page 4.</td>
</tr>
<tr>
<td>Thrips: Tiny insects which cause foliage to turn white or silvery and wilt. Reduces onion yields.</td>
<td>Use diazinon or malathion. Sprays are more effective. Thrips appear in midseason; they are not serious in western Oregon in most seasons.</td>
</tr>
<tr>
<td><strong>PEAS</strong></td>
<td></td>
</tr>
<tr>
<td>Pea weevil: Egg-laying weevils appear when first pods are setting. Grubs feed on the inside of the green peas.</td>
<td>Use two or three applications of malathion, rotenone, or methoxychlor at weekly intervals as soon as the first pods set. Early application is necessary to kill adult weevils before egg-laying starts.</td>
</tr>
<tr>
<td>Pea aphid: Large, green plant lice which form large colonies in the growing tips of the vines.</td>
<td>Malathion or diazinon sprays or dusts are effective. Thorough application to growing tips and undersides of leaves is important.</td>
</tr>
</tbody>
</table>
Western potato flea beetle: Bronze-black, jumping beetle which eats holes in the foliage.

Tuber flea beetle: Similar to western flea beetle, but jet black. Larvae feed on and seriously damage tubers.

Colorado potato beetle: Large striped beetles and reddish grubs both eat foliage and vines. They are a pest only in eastern Oregon.

Diamond-back moth: Small larvae of a moth which eats holes in leaves, mostly from the undersides.

Aphids: The same gray-colored plant louse which infests cabbage and other "stem" crucifers (cole crops).

Cabbage flea beetle: The same blue-black jumping beetle found on other cole crops.

Root maggots: White maggots or worms which feed on the roots and ruin them for food. The parent is a fly.

POTATOES

Apply carbaryl (Sevin) or diazinon sprays or dusts. Begin applications to potato foliage when the first leaves appear. Continue applications at 7- to 10-day intervals. Control is aimed at killing adults before they lay eggs.

Apply carbaryl (Sevin) as necessary. The program suggested for control of tuber flea beetle will control this pest. Spot treatment at intervals early in the season may save treating whole potato plantings later.

RADISHES AND OTHER ROOT CRUCIFERS

Use malathion or diazinon dusts or sprays. Aphids are not as important on "root" crops unless greens are to be eaten.

Apply methoxychlor, diazinon, or malathion as needed to protect the seedlings.

Use malathion, methoxychlor, diazinon, carbaryl (Sevin), or rotenone directed to undersides of leaves.

Use the methods of control suggested in the section on cabbage maggots, pages 2 to 4.
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<td><strong>Western spotted cucumber beetle:</strong></td>
<td>Use methoxychlor, rotenone, diazinon, or carbaryl (Sevin) dusts or sprays.</td>
</tr>
<tr>
<td>Spotted beetles which eat holes in leaves. They may be serious on the seedling plants.</td>
<td></td>
</tr>
</tbody>
</table>

**SQUASH**—See Cucurbits

**SWEET CORN**

Corn earworm: Large, green (also brown, black, or reddish) worms which get into tips of ears and feed on silk and kernels. Serious in most areas.

Use carbaryl (Sevin) or malathion dust daubed onto silks of each ear with a brush. Make three to four applications at 3-day intervals and start when silks first appear.

**TOMATOES**

Western potato and tuber flea beetles: Small, black beetles (same as on potatoes) which attack the leaves in early summer.

Apply carbaryl (Sevin), diazinon, or methoxychlor lightly, as needed. Damage is most likely to occur soon after transplanting.

Hornworm: Very large, green worms with diagonal stripes and a single “horn” at the back end.

Hand picking of worms (or snipping with scissors) is effective in small plantings. A pest only in eastern Oregon.

**TURNIPS**

See radishes

Observe the suggested time interval between the last application of an insecticide and harvest.