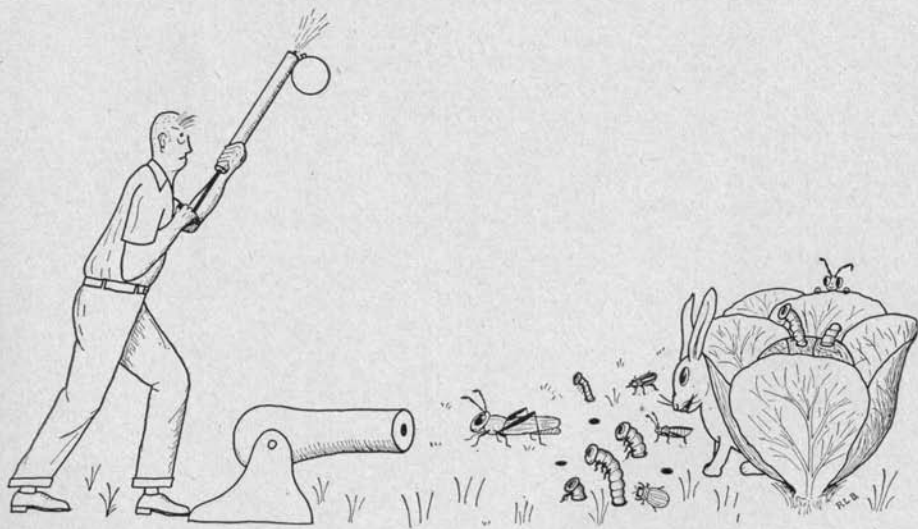


Controlling Pests of War Gardens



Connecticut Agricultural Experiment Station
New Haven

CONTENTS

INTRODUCTION	7
ARMCHAIR CONTROL OF PESTS	7
Crops not usually afflicted	7
Crops with easily controlled pests	7
Crops with serious pests	8
Outwitting the Pests	8
Adjustment of planting dates	8
Adjustment of soil acidity	9
Rotation of crop families	9
Avoid touching wet foliage	9
Purchasing disease-free seed	9
Purchasing treated seed	10
Choosing resistant varieties	11
MINIMUM LABOR REQUIRED FOR PEST CONTROL	11
Soil treatment	11
Seed treatments	11
Irrigation	12
Poisoned baits	12
TOIL AND SWEAT CONTROL OF PESTS	12
Hand picking of insects	12
Destroying weed hosts	12
Spraying or dusting to control pests	13
The materials available	13
Vegetable pests controlled by spraying or dusting	14
Crops requiring treatment every season	15
MISCELLANEOUS PESTS	16
Japanese beetle	16
Bean and pea weevils	16
Rabbits and woodchucks	17

Controlling Pests of War Gardens

NEELY TURNER AND JAMES G. HORSFALL

THIS circular has been prepared to provide the essential facts for successful pest control in the home garden. It aims at maximum production of food, rather than maximum control of pests.¹

Normally the average vegetable garden is visited by insects and diseases. In extreme cases much production is lost to such pests. Fortunately, there are ways to outwit some pests and reduce the damage from others by intelligent use of sprays, dusts, seed treatments and other methods. A well diver-

sified garden usually produces much edible food in spite of pests, although quality may be low and one or more crops may be a total loss.

Two types of pest control are possible—the “armchair” method, which involves thoughtful planning and little work, and the “toil and sweat” method, which may involve less planning but certainly some physical effort. The former method is concerned with outwitting the pests; the latter with besting them in combat. Both are necessary for the cleanest gardens.

ARMCHAIR CONTROL OF PESTS

The first of the “armchair” procedures in pest control is to list those crops not usually afflicted, then those subject to pests that are easily controlled and, finally, those with pests difficult to control.

1. **Crops not usually afflicted** are as follows:

Beets	Parsley
Chard	Parsnips
Carrots	Peppers
Midseason sweet corn	Spinach
Endive	Sweet potatoes
Lettuce	New Zealand
Okra	spinach
Onions	Turnips

These crops need essentially no treatment of foliage, although the seeds of several of them, especially beets and spinach, should be treated as described below.

Occasionally a pest may cause loss of one or more of these crops, but this occurs so infrequently that any treatment is usually ignored. Likewise, some of the crops in the list of those often seriously damaged by pests may come through a season with a fair yield without treatment. This does not detract from the classification given on the basis of records of many seasons.

2. **Crops with easily controlled pests:**

Two of the commonest vegetables, beans and early potatoes, require some, but not extensive, foliage treatment with pesticides. Other maladies can be avoided simply by seed treatment and by the use of resistant varieties.

¹ This circular has been prepared for use in Connecticut. The classification of crops, dates of planting to avoid pests and dates for application of dusts or sprays are based on research conducted in Connecticut and apply only to Connecticut climate and conditions.

3. **Crops with serious pests,** for which practical control measures are available but which require careful and rather laborious treatment for satisfactory yields, are:

Late potatoes (fall crop). Always seriously damaged by leafhoppers, flea beetles, tip burn and occasionally late blight and birdseye leaf spot.

Cabbage, cauliflower, broccoli and brussels sprouts. Affected by cabbage maggots early, cabbage worms later and frequently aphids, club root, black leg and black rot.



Bacterial wilt of squash vine

Cucumbers, melons and squash. Damaged by the striped cucumber beetle,

Outwitting the Pests

Many of these serious pests can be outwitted by a little careful planning. The methods used require no manual labor and are entirely practical.

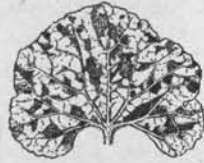
Adjustment of Planting Dates

1. **Radishes** planted before April 1 and after May 20 usually miss the *cabbage maggot*. There is no adequate home garden control method available for plantings between these dates, except to cover the row with cheesecloth.

2. **Cabbage** set after June 1 avoids *maggots*.

3. Early varieties of **peas** planted as early as possible and not later than April 15 usually mature a crop before *root-rot* kills the vines. An exceptionally heavy application of fertilizer, 15 pounds per 100 feet of row, at the sides of the row (not

squash vine borer and squash bug; and a whole catalog of diseases from foot rot to wilt and mildews.



Downy mildew on melon leaf

Extra early and late sweet corn. Seriously attacked by the European corn borer.

Tomatoes. Defoliated by leaf diseases just as the yield gets heaviest, but maturing a reasonably satisfactory crop in spite of disease. After defoliation fruits become insipid and flat.

Celery. Often seriously attacked by leaf diseases. The yield of untreated celery may be fairly good but the appearance is poor, and the disease develops in storage.

touching the seeds) will help. There is no adequate control for root-rot on late peas.

4. **Cucurbits** planted after June 1 are not so seriously damaged by *striped cucumber beetle* or *wilt*. *Mosaic* and other diseases may come in later, of course. Reasonable crops may be expected, however.

5. **Beans** (bush snap varieties) planted between June 1 and 25 usually escape the *Mexican bean beetle*.

6. **Sweet corn** planted between May 20 and June 15 matures when few *corn borers* are present.

7. **Summer squash** planted after July 1 as a second crop will bear after the early plantings have been killed by *vine borers*, *foot rot* and *wilt*.

8. **Hubbard squash** planted on or before May 15 will be so well established by July that it ordinarily escapes serious damage by *squash vine borer*.

9. **Tomatoes** grown in succession provide a means of escaping the *defoliation disease* that causes orange-colored, insipid fruits. The first two crops may be from plants transplanted May 20 and June 15. Seed for the last crop should be sown right in the field about June 1.

Adjustment of Soil Acidity

1. *Potato scab* develops in soil that has been limed suitably for spinach, beans and other vegetables. Most soils are normally very acid. If land has not been limed in past five years, 40 pounds to 1,000 square feet should not be enough to encourage scab.



Scab on potato tuber

2. *Club root* of cabbage and allied crops develops mostly in highly acid soils. Normal applications of lime (50 to 100 pounds) should be used for these crops. If club root develops on the early crops, a second application of lime should be made before later plantings.



Club root on cabbage seedling

Both these diseases cannot be controlled in the same soil. In land not cultivated recently scab is more likely to occur than club root.

Rotation of Crop Families

Crops breed their own diseases in the soil. Therefore, they should not follow each other on the same spot two years together and preferably not for three or four years. The gardener should remember, too, that this applies to plant families as well as to specific crops. The plant families concerned are as follows: the CUCURBIT FAMILY is **melons, cucumbers and squash**; the COLE or CABBAGE FAMILY includes **cauliflower, brussels sprouts, kohlrabi, broccoli, radish and turnip**; the TOMATO FAMILY includes **tomato, eggplant and pepper**. Rotation is difficult in the 1,000 square foot garden, but it is feasible in larger ones.

Avoid Touching Wet Foliage

The fungi and bacteria that produce disease on leaves, pods or fruits enjoy moisture. In fact they move from leaf to leaf only during rainy periods. Obviously, the gardener should not encourage them by picking or cultivating vegetables when the foliage is wet with rain or dew. This is particularly true of **beans, tomatoes, cucurbits and eggplants**.

Purchasing Disease-Free Seed

Many vegetable diseases get through a hard winter on the seed in the comparative comfort of a warehouse and then they ride into the garden on these seeds in the spring. Obviously, one can outwit seed-borne diseases by purchasing disease-free seeds or treated seeds.

Anthracnose or *pod spot*, *bacterial leaf scorch* and *halo leaf spot* of

beans can be controlled by specifying that the seed be grown in the Marysville area of California or the Twin-Falls area of Idaho. Seeds of any vegetable should be grown as far north as possible. Northern seed will eliminate much of the disease from eggplant, tomato, sweet corn and potatoes.



Anthracoze on bean pod and seed

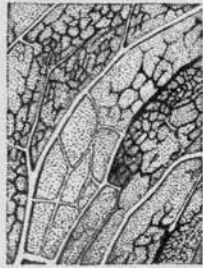
Sometimes seedsmen cannot find disease-free areas for seed production. In those cases they can resort to certification. Certified seed is available for tomatoes and potatoes. Non-certified potato seed usually produces much less yield than certified seed in Connecticut. Certified seed is almost a "must."

Purchasing Treated Seed

Failing certification, seedsmen can rid certain seeds of disease by treatment. A few seedsmen sell treated seeds. Many seedsmen, however, are loath to treat seeds they sell because consumers are likely to feel that their seeds are basically poor and that they have been treated to cover up weaknesses. Such is not the case. Reputable seed specialists should be encouraged to treat seeds because there are no sources of naturally disease-free seeds of some crops and seed treatment is excellent insurance.

Seeds of cabbage and other cole crops carry the *black rot* and *black leg* diseases which can be eliminated if the seedsmen will pasteurize the seeds in hot water. Pasteurization will also eliminate the *celery blights*

from *celery* seeds, and some of the *bacterial canker*, *bacterial fruit spot*, *anthracnose*, *small leaf spot* and *birdseye leaf spot* from *tomato* seeds. Details are not pertinent here since the procedure is very complex.



Black rot on cabbage leaf

Seeds of the cucurbit family should be treated with corrosive sublimate to control the *scab disease* on the fruit, *angular leaf spot* and some



Late blight on cabbage leaf

anthracnose or *fruit spot*. The material should be used at the rate of 1-1,000, or one tablet in one pint of water. Seeds should be soaked for five minutes, rinsed in clean water and dried.

Celery seeds carry large and small *leaf spots*, so-called *early* and *late blights*. These diseases die out of seeds held for two years in storage, and hence no further treatment is required.

Seed disinfection is valueless unless the seeds so treated are sown on

land that did not support a sick crop of the same vegetable the previous year. This involves rotation, as mentioned above.

Protective Seed Treatments

Gardeners hear much of treatments designed to protect seeds and seedlings against decay in the soil and against damping-off. Since it is easy for gardeners to overdose seeds with these chemicals, it is simpler to purchase them pretreated.

This Station has participated in a nationwide testing of these materials. Results indicate that Arasan, a new material just reaching the market, is good for **beets**, **onions** and **peas**. Red Cuprocide is first choice for **spinach**, the **cucumber** family, **lettuce**, **endive**, **beets**, **chard** and the **tomato** family. It injures the cabbage family. Semesan is first choice for the **cabbage** family and Semesan Jr. for **sweet corn**. It injures the tomato family. Spergon is first choice for **peas**, **snap beans** and **lima beans**. It injures beets and chard.

The quantity varies with the seed size. Big seeds like peas, beans, corn and cucumber family, beets and

chard, should require $\frac{1}{4}$ teaspoonful per pound of seed (0.25 percent by weight). The other seeds which are small should have one teaspoonful per pound of seed (1.0 percent by weight).

Choosing Resistant Varieties

Many vegetable diseases can be outwitted by using varieties that escape disease. The Refugee type of **bean**, such as Tendergreen, is resistant to *bacterial leaf scorch*. Of the dry beans, Geneva red kidney, Perry Marrow and Nova Scotia are resistant to *anthracnose* or *pod spot*. Robust pea bean is resistant to the bean diseases, *mosaic*, *anthracnose* and *bacterial leaf scorch*.

Cabbage varieties resistant to the *wilt* or *yellow*s disease are Jersey Queen (early), Marion Market (midseason) and Wisconsin Ballhead (late).

Stewart's wilt of **corn** may be serious in Connecticut unless resistant varieties like Golden Cross Bantam, Marcross and Carmelcross are used.

Tomato varieties resistant to *wilt* are Marglobe and Pritchard.

MINIMUM LABOR REQUIRED FOR PEST CONTROL

Some pests cannot be outwitted, but at least they can be combated with a minimum of labor. Some of the procedures involved are seed treatment, soil treatment, use of poisoned bait and irrigation of soil.

Soil Treatment

Seeds grown indoors should be sown in new-washed sand in new or sterilized flats. Soil, if used, should be cooked, either by flooding with

boiling water (which puddles the soil) or by steaming in flats in a covered kettle until temperature reaches 125° or 130° F. on a meat thermometer inserted into the soil. Treated soil should be placed only in sterilized flats and worked only with sterilized tools.

Seed Treatments

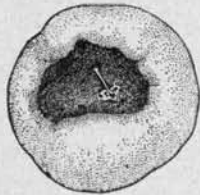
Since it will be difficult to purchase pretreated seeds, some gardeners

will desire to treat their own. Among the seed disinfectants, corrosive sublimate can be used as described on page 10. It can substitute also to some extent for the hot water pasteurization of seeds.

Any of the protective treatments described on page 11 can be applied by gardeners, especially if they are careful not to overdose. Seeds should be shaken with the chemical in a small jar or can. Usually excess dosage can be removed if the seed is screened vigorously after treatment.

Irrigation

Wilt diseases of **tomato**, **cucurbits** and **cabbage**, **pea root-rot** and **blossom-end rot** of **tomato** fruits are all more destructive in dry than in moist periods. Hence irrigation



Blossom-end rot on tomato fruit

TOIL AND SWEAT CONTROL OF PESTS

So much for the simpler ways of avoiding pest trouble. Many pests are left to be killed by hard work of some kind.

Hand Picking of Insects

The old-fashioned method of hand picking such pests as the *Mexican bean beetle*, *Colorado potato beetle*, *hornworm* on **tomatoes**, *celery caterpillar* on **parsley**, **parsnips** and other crops, and even *cabbage worms* on **broccoli** and **kale** is entirely practical. The adults and larvae can be killed by

to keep up the soil moisture level is helpful.

Poisoned Baits

Cutworms are hairless caterpillars hiding in the soil near plants during the day and feeding at night. They cut off newly-set plants near the surface of the ground. They are most destructive to **tomatoes**, **peppers**, **cabbage** and **lettuce** plants.



Cutworm and damaged plants

Paper collars wrapped around the stems of newly-set plants are very effective; or use prepared cutworm bait as directed.

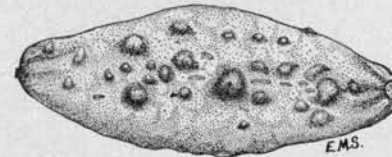
Home-mixed bait: one pound of wheat bran and one ounce of Paris green, mixed dry and later moistened until damp (not enough to drip when squeezed lightly). Scatter in the evening. One pound is enough for 2,000 square feet. Paris green is a poison, so handle with care.

dropping them into a can containing some water and a film of kerosene. Egg masses can be crushed without harming the leaves. Any diseased or dead plants that appear should be pulled and burned.

Destroying Weed Hosts

Many common weeds are host to many garden pests. This is especially true for the *virus* or *mosaic* diseases, those diseases that distort leaves or fruits and make them look mottled. However clean a gardener keeps his own premises, his neigh-

bors can grow weeds for him. Nevertheless, the important weeds are the mustard family, milkweeds, nightshade, mother wort and ground-cherry or husk tomatoes. Some ornamentals like petunia and flowering tobacco carry the mosaic disease of the cucurbit family and **tomato**.



Mosaic on cucumber fruit

Spraying or Dusting to Control Pests

Many pests remain to be combated by spraying and dusting. This discussion will contain more information than most gardeners will need. If the garden blueprint for pest control has been made properly, only a few items will need treatment, and the necessary measures will be described. This part of pest control fits into the blueprint scheme because it is entirely practical to determine the treatment needed and the equipment and materials to be purchased to be *ready* for pest control, instead of having trouble first and getting ready too late for practical good.

Some general suggestions for pest control can be made. This season the choice of materials to use in water (sprays) or as dry powders (dusts) depends more than anything else on equipment available. For many insects and all diseases *both surfaces* of all leaves must be covered for best results. For insects feeding only on the under sides of the leaves, treatment only on that surface is necessary. Either sprays or dusts must be applied with the nozzle pointing to the surface to be covered. A fine even coat of either

sprays or dusts is usually sufficient for control. Dusts can be applied most effectively either early in the morning or late in the evening when no wind is blowing. A pound of dust applied efficiently is enough to treat 500 feet of row once. The home garden of 1,000 square feet should require not more than one pound of dust for the season. Enough spray material for 10 gallons of finished spray should accomplish the same results.

The Materials Available¹

Any material containing **ROTENONE** is restricted in 1943 by Federal orders for use on **beans**, **peas**, **cauliflower**, **brussels sprouts** and **broccoli**. This applies to dusts or sprays. Most of the dusts of this type can be purchased by asking for rotenone dust, although a few products have trade names. On the other hand, spray materials containing rotenone are usually sold under a trade name.

At present there are no use restrictions on either **PYRETHRUM** dusts or sprays for home vegetable gardens. Here again the materials are sold under trade names.

NICOTINE sprays and dusts are available in large quantities and can be used successfully for many garden pests. Vegetables to be eaten without cooking should not be sprayed or dusted within a week of use.

CRYOLITE and **BARIUM FLUOSILICATE** are well-known insecticides but not commonly used in home gardens. They are poisonous to chewing insects and particularly

¹ The materials discussed here are those available as this is written (March, 1943). Because supplies are uncertain, it may be necessary to obtain less familiar materials. Dealers will be able to suggest these if the need arises.

effective for use on **potatoes, tomatoes** (early in the season), **beans** and **cabbage**. Care should be taken to avoid dust or spray drifting to leafy green vegetables, and treatment of beans and cabbage just before harvest should be avoided.

The dust materials just mentioned should be purchased ready for use in dusts. For sprays, the directions on the package may be followed.

BORDEAUX MIXTURE is an excellent spray for diseases but it is difficult to prepare. One gallon should cover 50 to 75 feet of row with hand sprayers. It is prepared by mixing one ounce of fresh hydrated lime in $\frac{1}{2}$ gallon of water, and one ounce of copper sulfate in $\frac{1}{2}$ gallon of water. The copper sulfate should be dissolved the day before use, in a glass container. The two materials are then mixed together and are ready for use. The mixture cannot be stored for use later, but should be prepared fresh for each application.

Manufacturers now sell many types of factory-made **COPPER** sprays that are less injurious to most vegetables than bordeaux mixture and are much easier to handle. Only bordeaux mixture should be used on **late potatoes** in Connecticut, however.

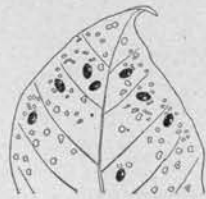
*Vegetable Pests Controlled
By Spraying or Dusting*

Aphids. Small red, green, brown or black sucking insects on the stems and leaves of various plants. Destructive most commonly to **broccoli, cabbage, tomatoes** and **potatoes**. Also occur on **spinach, chard, peppers, brussels sprouts, kale, peas, corn**, etc.

Any good contact insecticide, such as nicotine sulfate or

pyrethrum for sprays or dusts. Applications are most successful in warm part of day. Repeated treatments may be necessary.

Flea beetles. Small black beetles that jump when disturbed. Feeding marks are small round holes in the leaves of **tomatoes, eggplants, potatoes** and sometimes **peppers**.



Flea beetles on potato leaf

Pyrethrum or cryolite dusts or sprays. Damage is usually worst in May and June, and two or three treatments may be needed about May 15, 25 and June 5.

Defoliation diseases. Many vegetables are afflicted by fungous diseases that produce spots on leaves followed by defoliation. Most serious cases are **tomatoes** and **potatoes**. Attack also **celery, cucurbits, beets, carrots** and sometimes **beans**.

Usually copper sprays such as bordeaux mixture are suggested. These seldom pay except for unremitting attention, putting on several applications beginning about July 4. If a gardener takes pride in good foliage it is desirable to spray. Dusting with commercial copper dust is easier, but distinctly less effective. Dusts must be applied to damp foliage. Crops liable to defoliation diseases

must on no account be picked or cultivated when wet, because the diseases are spread on wet foliage.

**Crops Requiring Treatment
Every Season**

Beans. *Mexican bean beetle.* A yellow to brown beetle about one-fourth of an inch long, oval in shape. Has eight small black spots on each wing cover. Eggs are yellow and laid in groups on the under surface of the leaves. Larvae are light yellow and feed on the under surface of the leaves.



Mexican bean beetle larvae and adult

Hand picking of adults and crushing the egg masses is practical in the home garden. Dusts or sprays of rotenone, pyrethrum or cryolite should be applied to the under surface of the leaves.

Early beans need treatment about June 7 and 21.

As previously mentioned, midseason snap beans planted between June 1 and 25 seldom require treatment.

Late beans need treatment about July 29, August 9 and August 20. Pole and lima beans may need all treatments.

Cucumbers, melons and squash.

The *striped cucumber beetles* are about one-fourth of an inch long, yellow with three longitudinal black stripes and a black head. Beetles appear in May or early June when seedlings are just getting started. The beetles carry the *wilt disease* from plant to plant.



Striped cucumber beetles

Dusts or sprays of pyrethrum, cryolite or nicotine as soon as the first beetles appear and repeated about twice a week until the plants are well started.

Small screen wire cages may be used to protect seedlings.

Cabbage and allied crops. The *cabbage maggots* are small white maggots feeding on the tap root just below the surface of the ground. Eggs are laid in May and usually attack only early cabbage.

Set a durable paper disc around each plant immediately after planting. The edges of the disc can be held down with



Paper disc on cabbage plant

some soil. The disc must fit the stem tightly and should remain in place until June 1.

Cabbage worms of at least three species may attack any planting of cabbage. Damage is noticed first as comparatively large holes in the outer leaves. More serious on late crops.

Pyrethrum, cryolite or calcium arsenate dusts or sprays. Needed on early crop about June 20 and on later plantings once in 10 days, starting late in July. Cryolite and calcium arsenate leave poisonous residues and should not be used after heads are 4 inches in diameter.

Early potatoes. Irish Cobbler variety planted early in April. Attacked by *flea beetles* and by the black and yellow striped *potato beetle*.

Dusts or sprays of cryolite about May 25 and June 10.

Late potatoes. *Flea beetles* and *potato beetles* also attack this crop. The most destructive pest is the pale green *potato leafhopper*. A sucking insect, about one-eighth of an inch long, feeding on the under sur-

face of the leaves. The leafhopper and other factors bring about *tip-burn*, a dying of leaves beginning at the tips.

Dust or spray of cryolite or calcium arsenate about June 1 for flea beetles and potato beetles.

Late blight may kill foliage badly every few years and cause the tubers to rot. Sometimes foliage is peppered with black spots with rings in them so that they resemble bird's eyes.



Late blight on potato leaf

4-2-50 bordeaux mixture spray applied the first week in July and every ten days until the vines die. Thorough spraying of both surfaces of the leaves is necessary. This controls leafhoppers and blight and is a "must."

MISCELLANEOUS PESTS

The Japanese beetle is a serious pest in urban areas, but fortunately does little damage to vegetables. Beetles feed on the foliage of **soybeans** and **okra**. No control is available at present, but lime sprays might help.

Japanese beetles also feed on the silks of **sweet corn** silking in late July and early August.

Pollination is prevented and gaps appear in the rows of kernels. There is no remedy at present.

Weevils, that lay their eggs in the pods before harvest, frequently destroy **dried peas** and **beans**.

Fumigation with carbon bisulfide at the rate of $\frac{1}{2}$ ounce

for each bushel of seed is effective. This material is highly explosive in the gaseous state and should be used where there is no danger of fire. An ash can covered with heavy paper makes a good fumigation chamber, and should be left closed overnight. It works best when the temperature is 60° F. or more.

Heating the dried peas or beans to 120° F. for four hours should kill the eggs and young larvae or the beans may be mixed with one pound of hydrated lime for each two pounds of beans.

Rabbits and woodchucks frequently damage growing vegetables in rural and suburban areas. Fencing will protect gardens from these pests. Woodchucks

should be eliminated early in the season before vegetation hides the openings of the dens used by these animals. Woodchuck "bombs" are perhaps the most satisfactory means of controlling this pest. They may be obtained from the County Agents at cost, which is a few cents each.

Moles do some damage to gardens, but are believed to eat animals and not plants. *Mice* frequently live and feed in old mole burrows, doing much damage to crops. Methods of poisoning mice and suggestions for controlling rabbits, woodchucks and moles may be obtained from Francis B. Schuler, Fish and Wildlife Service, University of Connecticut, Storrs, Conn.

INDEX

- Angular leaf spot, 10
- Anthraxnose, 9, 10, 11
- Aphids, 8, 14
- Arasan, 11

- Bacterial canker, 10
 - fruit spot, 10
 - leaf scorch, 9, 11
- Barium fluosilicate, 13
- Beans, 7-17
 - anthracnose, 9, 11
 - bacterial leaf scorch, 9, 11
 - damping-off, 11
 - defoliation diseases, 14
 - halo leaf spot, 9
 - lima, 11, 15
 - Mexican bean beetle, 8, 12, 15
 - mosaic, 11
 - pod spot, 9, 11
 - pole, 15
 - snap, 8, 11, 15
 - weevils, 16
- Beets, 7, 11, 14
 - damping-off, 11
 - defoliation diseases, 14
- Birdseye leaf spot, 8, 10
- Black leg, 8, 10
 - rot, 8, 10
- Blight, early, 10
 - late, 8, 10, 16
- Blossom-end rot, 12
- Bordeaux mixture, 14, 16
- Broccoli, 8, 9, 12-14; see also cabbage family
- Brussels sprouts, 8, 9, 13, 14; see also cabbage family

- Cabbage, 8-12, 14-16
 - early, 11
 - late, 11
 - midseason, 11
- Cabbage family, 9, 11
 - aphids, 8, 14
 - black leg, 8, 10
 - black rot, 8, 10
 - club root, 8, 9
 - cutworms, 12
 - damping-off, 11
 - maggots, 8, 15
 - wilt, 11, 12
 - worms, 8, 12, 16
 - yellow, 11
- Calcium arsenate, 16
- Carbon bisulfide, 16
- Carrots, 7, 14
 - defoliation diseases, 14
- Cauliflower, 8, 9, 13; see also cabbage family
- Celery, 8, 10, 14
 - blights, 10
 - caterpillar, 12
 - defoliation diseases, 14
 - early blight, 10
 - late blight, 10
 - leaf spot, 10
- Certified seed, 10
- Chard, 7, 11, 14
 - aphids, 14
 - damping-off, 11
- Club root, 8, 9
- Cole family, see cabbage family
- Colorado potato beetle, 12, 16
- Copper dust, commercial, 14
 - sprays, 14
 - sulfate, 14
- Corn, see sweet corn
- Corrosive sublimate, 10, 12
- Cryolite, 13-16
- Cucumbers, 8, 9, 11, 15; see also cucurbit family
- Cucurbit family, 8, 9, 12, 14
 - angular leaf spot, 10
 - anthracnose, 10
 - damping-off, 11
 - defoliation diseases, 14
 - mildew, 8
 - mosaic, 8, 13
 - scab, 10
 - squash vine borer, 8, 9
 - striped cucumber beetle, 8, 15
 - wilt, 8, 12, 15
- Cutworms, 12
 - bait, 12

- Damping-off, 11
- Defoliation diseases, 8, 9, 14
- Disease-free seed, 9, 10
- Dried beans, 11, 16, 17
 - peas, 16, 17
- Dusting, 13, 14

- Early blight, 10
- Eggplant, 9, 10, 14
 - flea beetles, 14
- Endive, 7, 11
 - damping-off, 11
- European corn borer, 8

- Flea beetles, 8, 14, 16
- Foot rot, 8
- Fruit diseases, 9-12
- Fumigation, 16

Index

- Halo leaf spot, 9
- Hand picking, 12, 15
- Hornworm, 12
- Hot water, 10, 12
- Hubbard squash, 9; see also squash
 - squash vine borer, 8, 9
- Hydrated lime, 14, 17

- Irrigation, 11, 12
- Japanese beetle, 16

- Kale, 12, 14; see also cabbage family
- Kohlrabi, 9; see also cabbage family

- Late blight, 8, 10, 16
- Leaf diseases, 8-14, 16
- Leafhoppers, 8, 16
- Lettuce, 7, 11, 12
 - cutworms, 12
 - damping-off, 11
- Lima beans, 11, 15
- Lime, 9, 16
 - hydrated, 14, 17

- Melons, 8-10, 13, 15; see also cucurbit family
- Mexican bean beetle, 8, 12, 15
- Mice, 17
- Mildew, 8
- Moles, 17
- Mosaic, 8, 11-13

- New Zealand spinach, 7
- Nicotine, 13, 15
 - sulfate, 14
- Okra, 7, 16
 - Japanese beetle, 16
- Onions, 7, 11

- Paper collars, 12
 - discs, 15
- Paris green, 12
- Parsley, 7, 12
- Parsnips, 7, 12
- Pasteurization, 10, 12
- Pea beans, 11
- Peas, 8, 11-14, 16, 17
 - aphids, 14
 - damping-off, 11
 - root rot, 8, 12
 - weevils, 16
- Peppers, 7, 9, 12, 14; see also tomato family
 - aphids, 14
 - cutworms, 12
 - flea beetles, 14

- Planting dates, 8
- Pod spot, 9, 11
- Poisoned bait, 11, 12
- Pole beans, 15
- Potatoes, 10, 12, 14
 - aphids, 14
 - beetle, 12, 16
 - birdseye leaf spot, 8
 - defoliation diseases, 14
 - early, 7, 16
 - flea beetles, 8, 14, 16
 - late, 8, 14, 16
 - late blight, 8, 16
 - leafhopper, 8, 16
 - scab, 9
 - tip burn, 8, 16
- Protective seed treatment, 11
- Pyrethrum, 13-16

- Rabbits, 17
- Radishes, 8, 9
 - cabbage maggot, 8
- Red Cuprocide, 11
- Resistant varieties, 7, 11
- Root, club, 8, 9
- Root-rot, 8, 12
- Rotation of crop families, 9
- Rotenone, 13, 15

- Scab disease, 9, 10
- Seed treatment, 7, 10, 11
- Semesan, 11
- Small leaf spot, 10
- Snap beans, 8, 11, 15
- Soil acidity, 9
 - treatment, 11
- Soybeans, 16
 - Japanese beetle, 16
- Spergon, 11
- Spinach, 7, 9, 11, 14
 - aphids, 14
 - damping-off, 11
- Spinach, New Zealand, 7
- Spraying, 13, 14
- Squash, 8, 9, 15; see also cucurbit family
 - bug, 8
 - foot rot, 8
 - Hubbard, 9
 - summer, 8
 - vine borer, 8, 9
 - wilt, 15
- Stewart's wilt, 11
- Striped cucumber beetle, 8, 15
- Sweet corn, 7, 8, 10, 11, 14, 16
 - aphids, 14
 - damping-off, 11