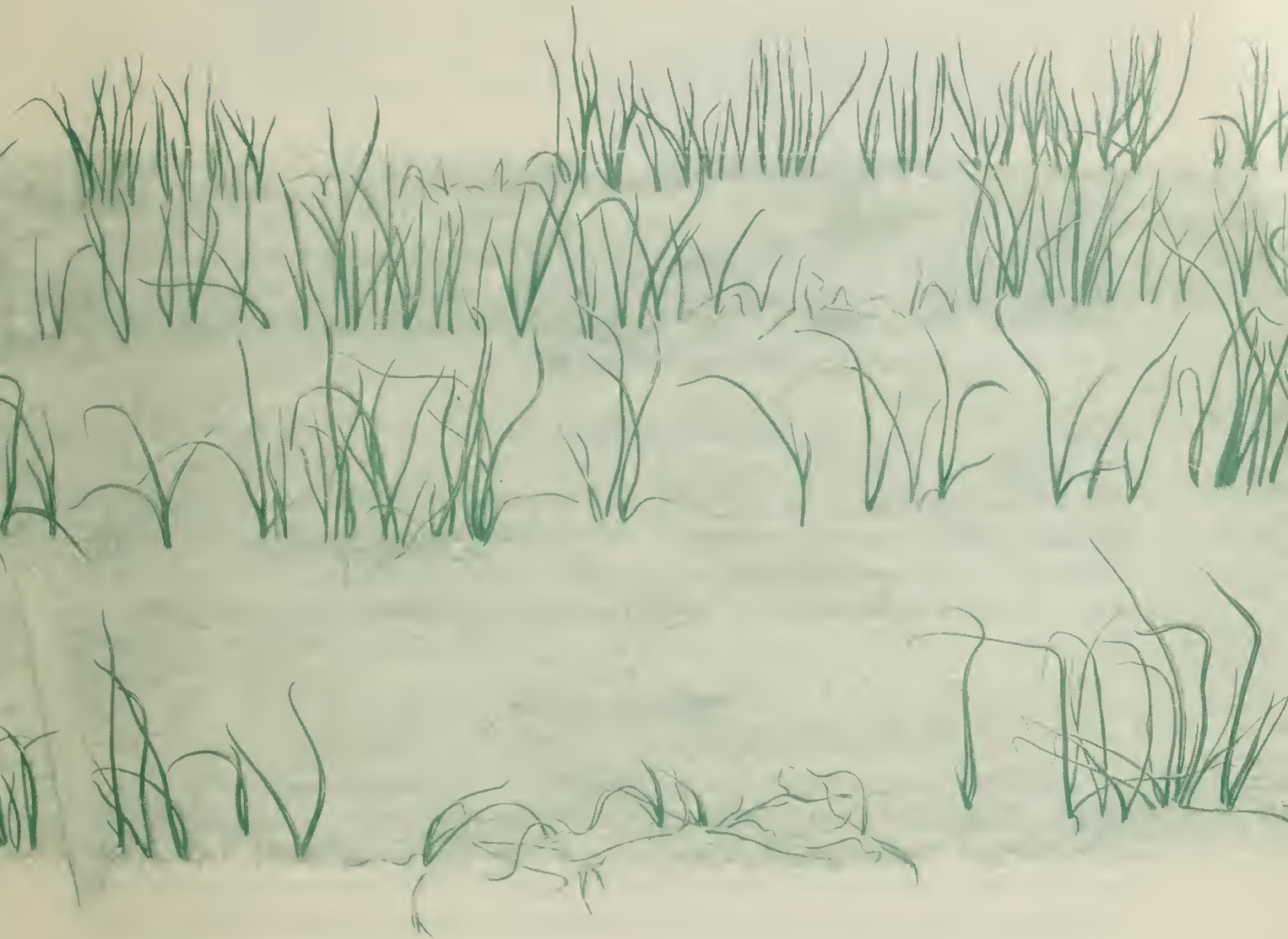


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Control of THE ONION MAGGOT

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CONTROL OF THE ONION MAGGOT

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The onion maggot⁴ is the most serious pest of onions in Canada. It attacks only onions and is found in most areas where they are grown. It is most destructive in those grown from seed but it may cause severe losses also in those grown from transplants and sets. Though the losses vary greatly with the season and the area, control measures are usually necessary, especially in areas where damage occurs often.

DISTRIBUTION

The maggot is found in all provinces of Canada but causes most serious losses in Quebec, Ontario and British Columbia. In some years, onions grown on the prairies are seriously damaged but the infestations are usually patchy. It is usually not a serious pest in the Atlantic Provinces.

DESCRIPTION OF INSECT

The adult of the maggot is a fly (Figure 1) that closely resembles the house fly but is slightly smaller and grayish in color. The creamy-white, legless maggot (Figure 2) has tiny black mouth hooks, with which it tears the plant tissue as it feeds. It is extremely small when newly hatched but when full-grown is about $\frac{1}{4}$ inch long.

LIFE HISTORY

The onion maggot spends the winter in the soil in the pupal, or resting, stage (Figure 3). In Quebec, the adults of the overwintered generation appear in the spring about the time apple trees come into bloom, usually during the last two weeks of May. In British Columbia and Ontario the flies appear during the first two weeks of May, and in Saskatchewan during the last two weeks of May.

After a week of flight the females commence laying their elongated, white eggs in or on the soil around the plants and at the junctions of the leaves. The eggs hatch in two or three days.

The young maggots attack the bulb at the roots and bore toward the stem, or enter the plant at the junction of the leaves and bore toward the bulb. After feeding for two or three weeks the maggots are full-grown, enter the soil and pupate. The flies of this generation emerge in late June or early July.

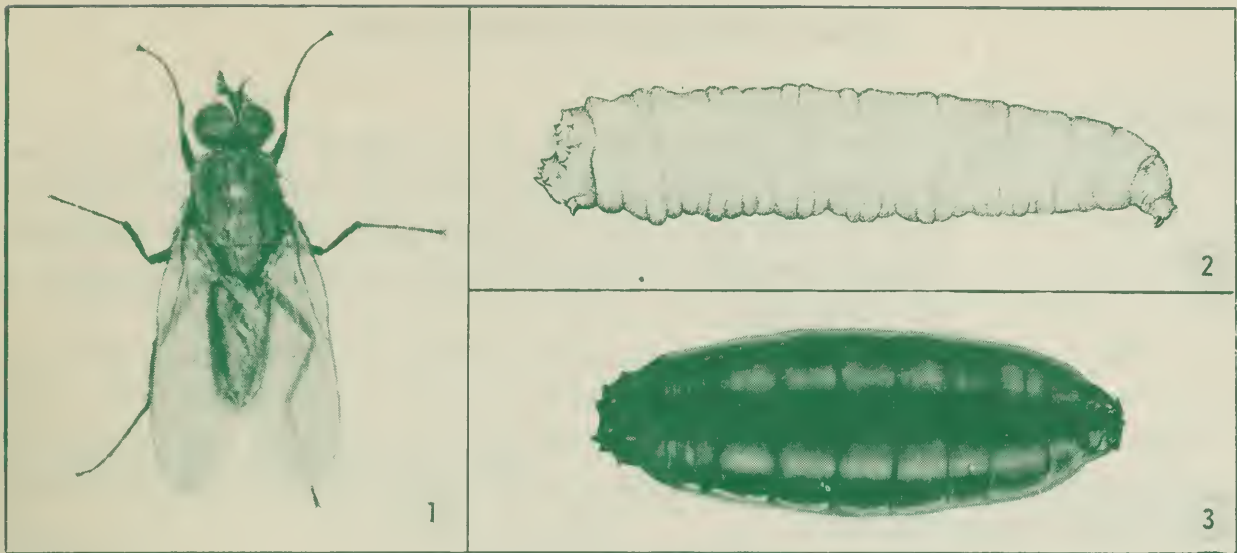
There are generally three generations a year. Maggots of the second generation appear in early July and those of the third in late August. Most adults of the third generation do not appear until the following spring; when temperatures are favorable some of the third generation do emerge in the fall.

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2 ⁴*Hylemya antiqua* (Meig.).



Figures 1-3. — Three stages of the onion maggot. 1, Adult. 2, Maggot. 3, Pupa.

DESCRIPTION OF DAMAGE

The first symptom of damage by the maggot is wilting of the leaves. This is especially noticeable in seedling onions (cover illustration). Usually the seedlings wilt and die in short sections of row as the young maggots move from one plant to another. Before maturing, one maggot may destroy a dozen or more seedlings.

Larger onions may survive an attack but usually rot or become distorted. At times, the maggots may cause damage to mature onions in late summer, or to onions already harvested and ready for topping.

NATURAL CONTROL

Many parasites and predators attack various stages of the onion maggot. Their value in control has not been studied but some of the species appear to be important. Three small wasplike insects attack the maggot and the pupae. A fungus disease, under favorable climatic conditions, destroys many of the flies. A predatory fly feeds on both the adults and the maggots. And various species of ground beetles may destroy many of the eggs, maggots and pupae.

CHEMICAL CONTROL

In most areas of Ontario, British Columbia and Quebec and in some areas of Manitoba, the onion maggot can no longer be controlled with chlorinated hydrocarbon insecticides such as aldrin, dieldrin and heptachlor. Hence, organophosphorus compounds are recommended to control the resistant strains.

In the Prairie Provinces and the Atlantic Provinces, where resistant strains have not yet developed except possibly in small areas, the hydrocarbon insecticides are still recommended.

Quebec, Ontario and British Columbia

Cooking Onions Grown from Seed

Furrow treatments.— Apply V-C 13, ethion or Trithion, 5 per cent granules, to the furrow at seeding. Apply 20 ounces per 1,000 feet of row, or 40 pounds per acre for rows 16 inches apart. Use separate hoppers so that the granules and seed are placed together in the seed furrow.

Group A
OR, in Ontario, use one of the materials in Group B in 100 gallons of water, or in 100 gallons of 1.25 per cent formaldehyde where smut is also a problem, as a furrow drench at seeding. Apply the drench at 3 gallons per 1,000 feet of row, or 100 gallons per acre for rows 16 inches apart. In British Columbia, use ethion or Trithion but not Diazinon.

Group B
Ethion 4, emulsible concentrate 3 to 4 pints
Trithion 4, flowable 4 pints
Diazinon, 25% emulsible concentrate 2 quarts
Diazinon, 25% wettable powder 4 pounds

To reduce damage from onion smut as well as from the maggot, use a mixture containing one of the insecticides in Group A and a fungicide, preferably thiram.

Seed treatments.— Wet the seed in water, or in a sticker solution (containing methyl cellulose, for example) and remove the excess moisture by shaking the seed in a cotton bag. Place the moist seed in a container, add the required amount of insecticide or insecticide-fungicide mixture, and stir the seed until it is covered evenly. In Quebec and Ontario, use one of the materials in Group C in the amount indicated per pound of seed. In British Columbia, use ethion or Trithion but not Diazinon.

Group C
Ethion, 50% wettable powder 2 ounces
Trithion, 25% wettable powder 4 ounces
Diazinon, 25% wettable powder 4 ounces

Dutch Sets and Pickling Onions

In Ontario, use one of the materials in Group A as a furrow treatment at twice the rate for cooking onions grown from seed. In British Columbia and Quebec, use one of the materials in Group C as a seed treatment at half the rate for cooking onions grown from seed.

Green Bunching Onions Grown from Seed

In British Columbia and Ontario, use ethion or Trithion as a furrow treatment at the same rate as for cooking onions grown from seed. In Quebec, use Diazinon as a seed treatment at the same rate as in Group C.

Spanish Onions Grown from Transplants

In Quebec, Ontario and British Columbia, use one of the materials in Group A as a furrow treatment at the same rate as for cooking onions grown from seed.

Atlantic and Prairie Provinces

As strains of the maggot resistant to the chlorinated hydrocarbon insecticides have not yet developed in the Atlantic Provinces or the Prairie Provinces except in some areas near East St. Paul in Manitoba, these insecticides are still recommended. If, however, any of the following materials have not given satisfactory control of the maggot in your area, use one of those recommended for Quebec, Ontario and British Columbia.

Cooking Onions Grown from Seed

Furrow treatments.— In the Atlantic Provinces, apply 5 per cent granules of heptachlor, V-C 13 or aldrin, or 50 per cent DDT wettable powder, to the furrow at seeding. In Alberta, use heptachlor or aldrin; in Manitoba, V-C 13. Furrow treatments are not recommended in Saskatchewan.

Use separate hoppers so that the insecticide and seed are placed together in the seed furrow.

Apply 20 ounces of granules to 1,000 feet of row, or 40 pounds per acre for rows 16 inches apart. DDT is not so satisfactory as heptachlor or aldrin in large plantings; in home gardens it is effective at half a pound of the wettable powder per 160 feet of row.

Seed treatments.— Except in Saskatchewan, use one of the materials in Group E in the amount indicated per pound of seed:

Group E	Diieldrin, 50% wettable powder	2 ounces
	Heptachlor, 25% wettable powder	4 ounces

In Saskatchewan, use one of these materials at half the rate given above.

Wet the seed in water, or in a sticker solution (containing methyl cellulose), and remove the excess moisture by shaking the seed in a cotton bag. Place the moist seed in a container, add the required amount of insecticide, and stir the seed until it is covered evenly.

Dutch Sets and Pickling Onions

Use one of the materials in Group E as a seed treatment at half the rate for cooking onions grown from seed.

Green Bunching Onions

Use one of the materials in Group D as a furrow treatment at the same rate as for cooking onions grown from seed.

Spanish Onions Grown from Transplants

Except in Saskatchewan, use one of the materials in Group D as a furrow treatment at the same rate as for cooking onions grown from seed. In Saskatchewan, apply the insecticide directly to the transplants before planting.

General Recommendations

If none of the treatments recommended above is satisfactory in your area, consult your local or provincial specialist for the latest recommendations.

When using a wettable powder, keep the spray in the tank agitated constantly.

As smut may kill many seedling onions, preferably treat your seed with a mixture containing a fungicide and the insecticide recommended in your area.

Sprays against the Flies

If the adult flies are numerous, particularly in July or later, spray applications against them will reduce damage by maggots of the second and third generations.

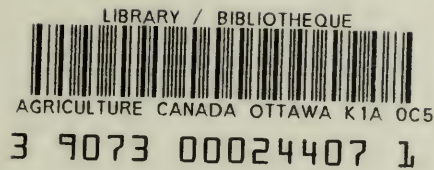
If you have applied insecticide at seeding or planting, begin the spraying in early July and continue at 7- to 10-day intervals until late August, depending on the abundance of the flies. If you have not applied insecticide at seeding or planting, begin in late May.

Use an emulsible concentrate of one of the following in enough water per acre to cover the foliage thoroughly:

Diazinon, 25%	1½ pints
Parathion, 25%	1 pint
Malathion, 50%	1 quart
DDT, 25%	2 to 3 quarts
Dibrom 9.6	½ pint

Cautions

Follow closely all the cautions listed on the insecticide label. Particular intervals are required between the last application and harvest for some of the treatments. The interval varies with the material used, the number of applications, and the amount applied. Keep to the interval given in order to avoid residues that would render the onions unfit for sale.



INQUIRIES

For more information, consult your agricultural representative or provincial specialist, or write to one of the following offices of the Canada Department of Agriculture: Scientific Information Section, Central Experimental Farm, Ottawa; Research Laboratory, St. Jean, Que.; Entomology Laboratory, Kamloops, B.C.; Research Station, 6660 N.W. Marine Drive, Vancouver S., B.C.; and Entomology Laboratory, Chatham, Ont.

Some brand names are used in this publication because the chemical names are difficult for general use and there are no official common names for the active ingredients.

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