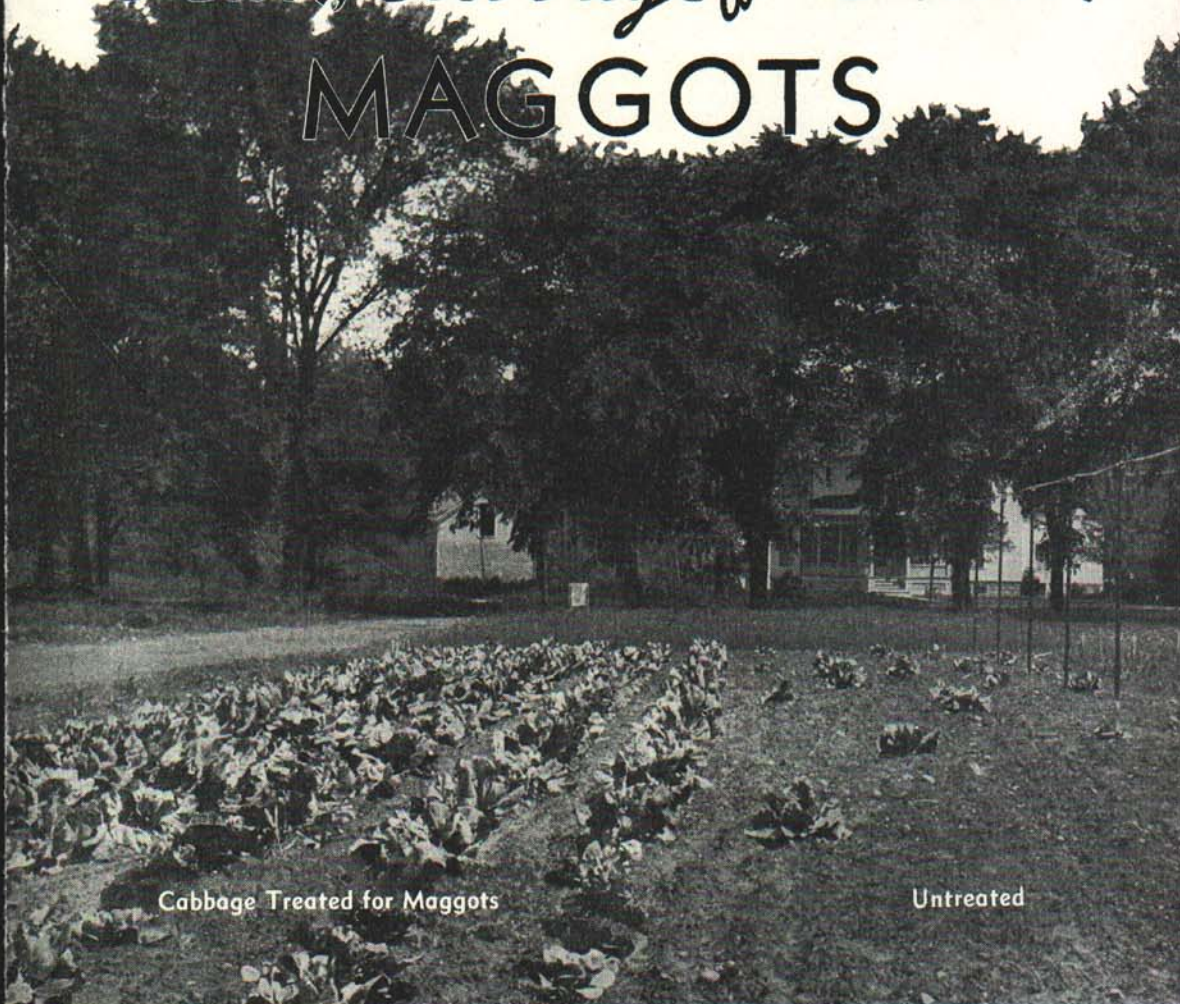


Bean, Cabbage and Onion MAGGOTS



Cabbage Treated for Maggots

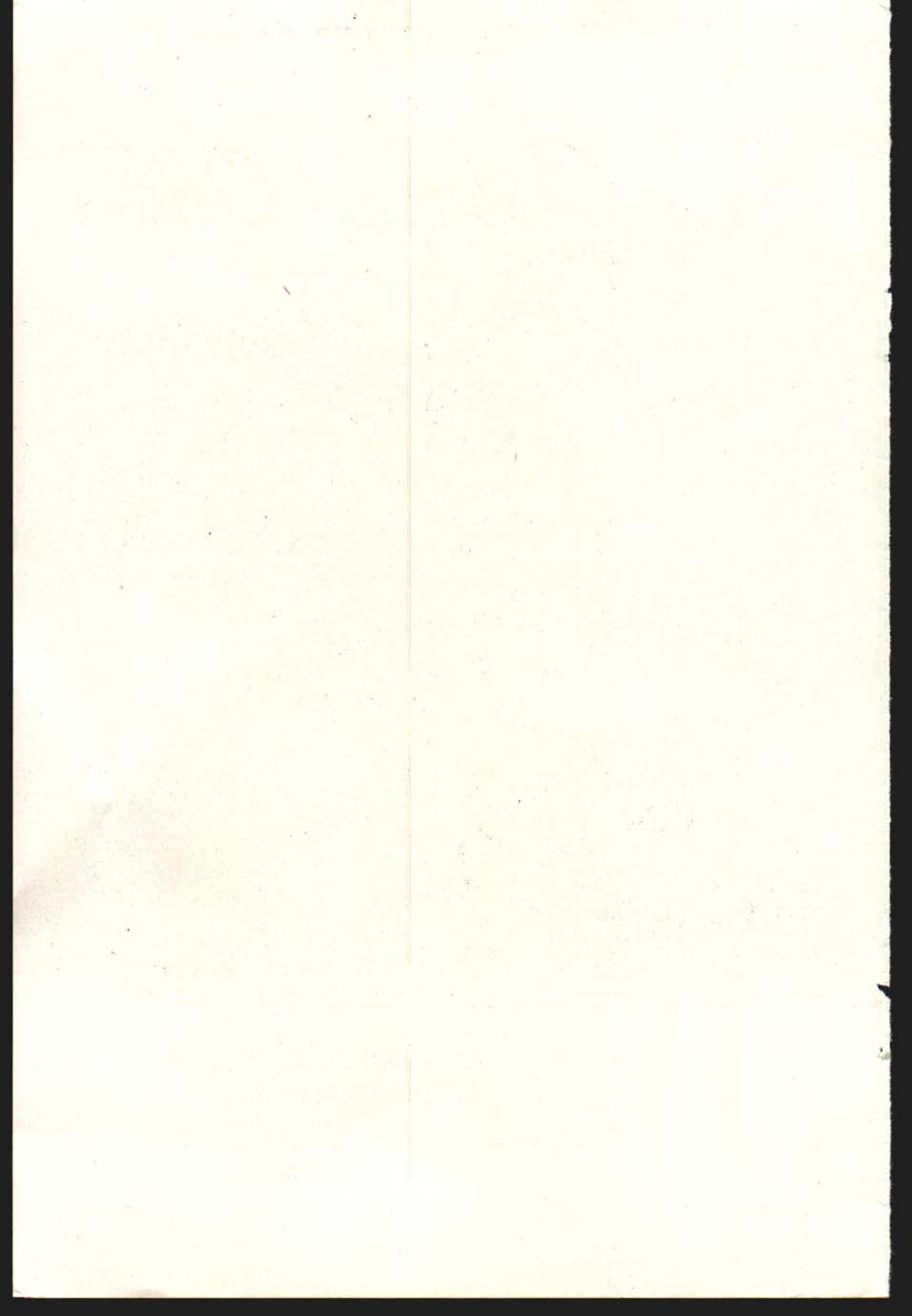
Untreated

MICHIGAN STATE COLLEGE

EXTENSION DIVISION

R. J. BALDWIN, DIRECTOR

—
EAST LANSING



BEAN, CABBAGE AND ONION MAGGOTS

RAY HUTSON

Insect infestations vary with seasonal conditions. Maggots commonly cause trouble in comparatively moist, late seasons. The damage from maggot feeding is aggravated by infection by disease organisms gathered by the insect in moving through the soil and brought in contact with wounded surfaces.

Any conditions, such as fertilization or proper land fitting, which will contribute to the growing of a healthy, vigorous, normal plant will decrease maggot injury. Consequently, every reasonable effort should be bent toward getting susceptible plants established and growing healthily as soon as possible after the seed is planted or the plants are placed in the field.

THE BEAN MAGGOT

(*Hylemia cilicrura*)

The bean maggot is closely related to the cabbage maggot and the onion maggot. It is sometimes known as the seed-corn maggot. In appearance the three species resemble one another closely, but, in habit, differences exist that call for entirely different control measures.



Fig. 1. Very young bean plants attacked by bean maggots.

In Michigan the majority of the bean maggots pass the winter in the maggot stage on the roots of clovers and in fresh manure. Regardless, they may be found in clover roots at the time when beans are planted, and when beans are put on recently plowed, infested clover sod, the maggots simply move over from the dying clover roots to the fresh sprouting corn and bean plants. Bean plants where the seed is deeply planted may be fairly riddled by the maggots, before they appear above the surface of the soil.

Control—

Conditions favorable to the bean maggot, from the maggot's standpoint, are late spring plowing (so that the larvae do not have time to pupate before the beans sprout), fresh manure, clover straw on or in the soil, and deep seeding.

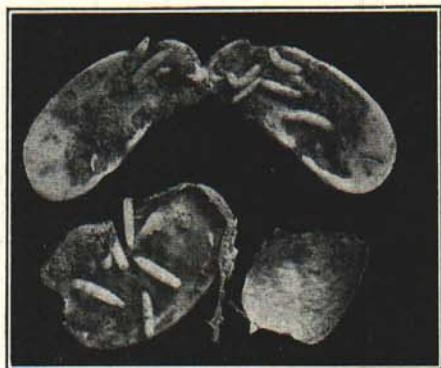


Fig. 2. Work of bean maggot in sprouting beans, taken from infested field. (Enlarged.)

Therefore, it is recommended that bean land be plowed in the fall or EARLY spring, and that the seeding average little more than one-half inch deep, in order that the beans may appear above the ground before the tiny bud, which is to be found between the cotyledons (halves of the seed) is eaten off. If manure is used, plow it under; manure as a top dressing attracts bean maggots. Alfalfa roots are fleshy and serve to nourish the maggots much

longer than do roots of June clover or of any of the other clovers. Therefore, if alfalfa land is to be used, plow it in the fall. Canada thistle roots serve the same purpose, and, for this reason, it is advisable to plow land infested with thistles in the fall. Occasional instances of heavy growths of dandelions should be treated in the same way, if possible.

The later generations of maggots seldom, if ever, do much damage to beans; since the bean roots are less succulent by the time the maggots appear.



Fig. 3. Adult of bean maggot (enlarged about four times).

CABBAGE MAGGOT

(*Hylemia brassicae*)

The cabbage maggot is the immature or larval stage of a small fly which resembles the housefly.

This pest hatches from an egg laid by the parent fly on or near the stem of the plant at the ground level. The damage to plants arises from the feeding habits of the insect which tunnels into the root tissues infecting them with rots. Cabbage, cauliflower, turnip, radish, rape, mustard, in fact all cultivated plants belonging to the cabbage family, are attacked in the same way.

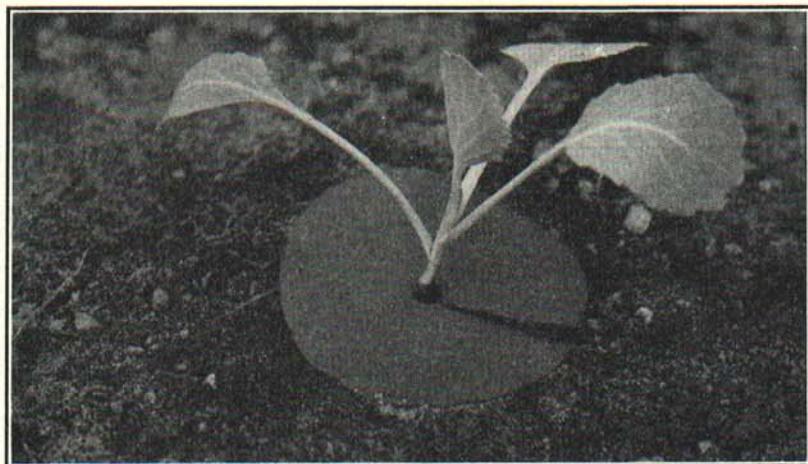


Fig. 4. Tarred paper disk in place for maggot protection.

Control—

Healthy, thrifty plants in fertile, well-watered soil are less susceptible to maggot infestation.

The method to use for cabbage maggot control depends largely upon the size of the planting and the plant attacked.

Watering cabbage with a corrosive sublimate solution is a reliable treatment. It is applied by watering about the plants when they are set out and two times afterward at weekly intervals.

The same treatment must be repeated several times on radishes starting when the leaves appear.

Corrosive sublimate (bichloride of mercury) is a violent poison and must be handled with care. It corrodes metals, consequently it must be handled in wood, pottery, glass, or other resistant containers. A metal container coated with asphalt is sometimes used.

A solution of corrosive sublimate suitable for protecting cabbages and other susceptible plants from cabbage maggot is made by dissolving one ounce of corrosive sublimate in one gallon of water. One pint of this stock solution is diluted to one gallon and applied at the rate of one-half teacupful about the roots of each plant.

Tar paper disks placed about the plants at the ground level and in close contact with the soil are preferred by some growers chiefly because but one application is necessary. The tarred felt paper disks are commonly made about 3 inches in diameter, with a small hole in the center and a cut from this hole to the edge. Although the disk illustrated is round they may be made in any shape and will work just as well, provided they are carefully pressed down around the plant when applied. Tar paper and not asphalt is the proper material.

As a general rule one man can place these disks as fast as two men can set plants.

THE ONION MAGGOT

(*Hylemyia antiqua*)

The onion maggot is a footless, white maggot, which tunnels in the bulbs and underground stems of onions, both seed onions and multipliers. The adults of these maggots are flies resembling house-flies, except that they are much smaller. The flies lay their eggs on onion plants at the ground level, and from the eggs are hatched maggots that tunnel down into the onion bulbs. In a small way, it is possible to control the maggots just as one controls the cabbage maggot in rows of radishes, using a solution of corrosive sublimate. (For directions see page 5.)



Fig. 5. Onion maggot, adult fly.
Enlarged.

The high cost of the corrosive sublimate treatment, due to the cost of materials and the labor involved, has thus far operated against the popularity of the treatment and resulted in instituting a search for some agent which can be applied rapidly as a soil spray, and which will not injure the plants if they also become wetted.

It has been found that several of the commercial emulsions and miscible oils used at the rate of 2 parts to 100 of water and that homemade emulsion prepared with caseinate calcium or with bordeaux mixture at the same rate serve well for this purpose. However, the main onion crop in Michigan is one of seed onions, and while one can effect a very satisfactory degree of control of the first generation of maggots by the use of these emulsions, when the second generation appears, the ground is so completely covered by the tops of the onions that it is impossible to get through with machinery to continue the treatment. Such a treatment has been found eminently satisfactory in Illinois, where "set onions" are grown. It is believed that isolated fields of seed onions could be so protected during the development of the first generation of maggots that the injury ordinarily done by the second generation could be ignored. However, the bulk of Michigan onions are grown in

large tracts of muck land cut up into small holdings, so that almost continuous areas planted to onions extend for miles. It is obvious that under such conditions a redistribution of the pests will necessarily take place when the second generation of flies is developed so that little benefit is noticeable in treated plats at harvest time.

Recently made field observations conclusively prove that the most important source of infestation in Michigan commercial onion fields comes from cull onions left either on the ground, scattered or in piles, or about packing or sorting houses. An examination of such piles of cull onions discloses almost unbelievable numbers of pupae both in the piles of onions themselves or buried in the underlying soil. At the time when seed onions first appear above ground it is possible to stir up swarms of the adults of onion maggots from such accumulations of culls located at no great distance from newly planted fields. One may



Fig. 6. Onion maggot and its work in small onion, enlarged about twice.

observe flies laying eggs on the decaying onions, while others make their way to new fields and deposit their eggs on the young plants. This process of laying eggs takes place over a considerable period of time. If onions free from maggots are to be grown, it is imperative that all cull onions be disposed of *immediately* after onion harvest. When cull onions are allowed to lie on the ground for even a few days, the maggots begin to leave the onions and to bury themselves in the soil a few inches beneath the surface, while others remain hidden among the culls. All culls should be disposed of immediately after harvest, and before the maggots have buried themselves in the soil. The destruction of the culls may be accomplished by burying under a foot or more of compacted soil, by fire, or in some special cases by boiling, either with steam or in some other manner.

Spring practice: Early deep spring plowing will accomplish a good deal, although fall plowing is preferable.

It is obvious that any treatment should be followed out over large areas if best results are to be expected, although local treatment will more than pay for itself.

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