

Oregon Agricultural College Experiment Station

The Onion Maggot

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The Onion Maggot

The maggot is probably the most serious insect pest of onions in Oregon. The pest is present everywhere in the state where onions are grown, and has caused serious losses in the larger commercial bogs.

Description. Occurs as white or yellowish maggots, blunt behind and tapering to a point at the head end; tunneling into the stems of new onion plants or mining about in the older bulbs.

The adults are medium sized, greyish-brown, hump-backed flies. They are sluggish in their movements and rather weak fliers. They are usually plentiful in the fields in late May and early June. They are not active on cold or windy days.

Life-history. The winter is passed in the soil as small, reddish-brown, capsule-like puparia. The flies come out in May and early June. Small, elongate white eggs, conspicuous on the dark soil, are deposited about the stems of the onions. The first eggs are laid usually about the middle of May. The average number of eggs laid by a single female fly is probably about fifty. The eggs hatch in three to eight days, and the young maggots at once seek the onions and tunnel within. The maggot stage within the onion is from sixteen days to five weeks. The maggots seem to develop more slowly in the older onions.

When full grown the maggots usually crawl out of the onion to change to the puparium, locating either on the surface of the onion or in the adjacent soil. There is a second brood of flies in July attacking the older onions. This summer brood of maggots when grown change over to puparia in the soil and so remain in these capsule-like cases until the following spring.

Injury. The maggots attack the onion at all stages of its development. A single maggot will kill a young seedling onion by tunneling up the interior of the stem. In the older bulbs a number of maggots may be found, usually located about the lower half, eating out the interior and causing rots and decays to develop. The attack is always heaviest on the lower, poorly drained areas. Side hills and fields exposed to winds are seldom heavily infested. Onions are about the only general host for this maggot. The maggot found in wild mustard, cabbage, radish, etc., is a different species and probably never attacks onions.

Control. Over seventy different treatments have been recommended for onion maggot control. In general the treatments have been only partly successful. Just recently there was developed in British Columbia the "cull onion" treatment. This is by far the most successful control practice so far developed. Tests made by the Oregon Experiment Station in Oregon give promise of excellent results where the treatment is properly carried out. Proceed as follows:

The Cull Onion Treatment

Cull onions or scullions from last year's crop should be saved and sorted over, picking out the more solid, promising onions for planting. At seeding time omit planting every hundredth row, leaving these rows

unseeded. Just as soon as planting is ended, set these vacant rows to cull onions. The cull onions should be set about six inches apart in the row and deep enough (4 inches or more), so that no part of the bulb will show above ground during the growing season. These set onions start growing first and serve as flags to lure the onion maggot flies when they appear in the field for egg laying. Often one will observe the eggs piled up like cordwood about these onions. In tests made we have counted over 300 maggots in a particularly attractive trap onion, the seedling onions in the field being almost free of attack. Onions planted fairly deep, exposing at the soil surface a vigorous bushy top, are most attractive.

In counts in the British Columbia tests, to show the effectiveness of the culls as a lure and as a protection for the commercial field, note the following:

Total count of eggs and maggots from six representative cull onions.....	444
Total count of eggs and maggots in seedling row 315 feet long containing 21,546 onions	39

In other words, in the commercial field there was an average of one maggot to 555 plants. That is protection.

Remove the cull onions during June. The ideal time, if known, would be as soon as the egg-laying period by the flies has ended. Another way to figure is to remove the trap rows about the time the maggots in the cull onions are full grown. The date will usually be about June 12 to 20.

The rows of cull onions should be removed carefully, taking care to collect all the accumulated maggots. Place the onions in some maggot-proof container so they will not shatter out, remove from the field and destroy. Burying is not sufficient. Burn, treat with oil—in any event make a thorough job of it. Where this method is carefully carried out, later infestations by the second brood are usually negligible.

The Sweetened Poison Bait

The standard control recommended in the East is the sweetened poison bait, which under favorable conditions gives a fair degree of protection. Its use as a supplement to the cull onion treatment is worthy of trial. The bait consists of:

Sodium arsenite.....	¼ ounce
Molasses	1 pint
Water	1 gallon
Chopped-up onion.....	½ pound

Dissolve one ounce of sodium arsenite in 2 quarts of boiling water; cork up and label "poison," store away in a safe place for use as a stock solution.

Dissolve one pint of molasses in 2 quarts of water, add one pint of the stock solution of sodium arsenite, and one-half pound of chopped onion, let stand a few hours, add water to make a brimming gallon.

For treatment in the field, provide 24 shallow cans per acre. One gallon of solution will afford enough material for 24 cans for one week. Place a bit of felt, blotting paper or burlap in the can, allowing it to lap over one edge. Place the cans 15 feet apart in the row and in every tenth row through the field. Place in the field about May 12 to 16 and replenish weekly until the middle of July.

General Remarks

Planting a few culls here and there in the field will not prove equally effective with solid rows in the cull onion treatment. Usually the seedling onions in the row for some distance either way from these sets will be infested. In planting the trap crop it is easier to get the onions too shallow than too deep. Volunteer onions with the bulb nine inches below ground, but with an attractive top showing, were found with over 200 maggots in them.

The heaviest maggot infestation is usually found on the low, wet, poorly drained areas. An extra row of culls through such areas might be advisable. Otherwise, endeavor to have a row of culls through or adjacent to such areas.

THE ONION THRIPS

The onion thrips becomes, in an occasional season or district, a serious onion pest. Where for any reason the growth of the crop is checked for even a short time the injury may become extremely severe.

The adult thrips is very small, measuring about .04 inch. It is of a pale lemon-yellow color, with a blackish tinge. The thrips are very agile, moving with a gliding motion, the body twisting and turning as they travel. The females deposit very minute eggs in the surface of the leaf. The young nymphs resemble the adults, but are smaller and lighter in color. The various stages are of short duration, and there are several generations during the season. Winter is passed as nymphs, pupae, and probably also as adults. They occur in trash and refuse tops about the field. While onions suffer most, cabbage and kale, cucumbers, tomatoes, and several of the ornamentals are also subject to attack.

The Injury is due to a rasping of the surface of the plant. The tops of injured onions appear whitish or blighted. They wilt down and the bulb itself does not grow. An examination of the inner tender surface of an infested plant reveals groups of these minute insects hurrying about.

Control. The onion thrips illustrates to a remarkable degree the value of good farm practices in insect control. The grower who has the best prepared seed bed, follows the best cultural practices to conserve moisture, uses fertilizers intelligently; in a word, the grower who has his fields in such thrift that brief periods of drouth or adverse conditions do not seriously check the growth of the onions, seldom suffers serious thrips injury. Good farming is the very best control for onion thrips.

Nicotine dust is an insecticide of fairly recent development. It is prepared commercially under a variety of trade names. While fairly expensive, rather light applications of dust are effective, and for ease and rapidity in application and effectiveness it finds especial favor in onion thrips control. Apply when temperatures are above 60 degrees.

Black Leaf 40, 1 part to 1600 parts of water, with the addition of whale-oil soap, 4 pounds to 100 gallons of the solution, will control the thrips. Kerosene emulsion as a 7-percent solution is equally good. Whale-oil soap, 1 pound to 6 gallons of water, is also recommended. Any of these solutions, to be effective, must wet the insect. Spray thoroughly, driving the spray into the sheaths and also wetting the soil about the stem.