



Horticulture Diagnostic Laboratory

Extension Education Center
423 Griffing Ave, Ste 100
Riverhead, NY 11901-3071
631-727-4126

www.ccesuffolk.org

Bayard Cutting Arboretum
Montauk Hwy
Great River, NY 11739
631-727-4126

**Cornell
Cooperative
Extension**
Suffolk County

Onion Maggot

Introduction: The onion maggot (*Delia antiqua*) can be a serious pest in home gardens. This pest attacks only those crops in the onion family. Onions grown from sets, transplants and seeds are susceptible to attack by the onion maggot.

Description: Adult onion maggot flies (**Fig. 1**) resemble houseflies, but they have longer legs, are more slender, and overlap their wings when at rest. The adult fly is less than a 1/3 of an inch. The elongate shaped eggs (**Fig. 2**) are 1/25th inch in length and are white in color. The legless larvae (maggots) (**Fig. 3**) are tapered, creamy-white in color, and reach a length of about 1/3 inch. The pupa is chestnut brown and 1/3 inch long.

Life Cycle: Three overlapping broods of onion maggot occur in New York State. On Long Island the first adults emerge from pupae in the spring, usually in early May. Peak flights of adults will occur about 2 weeks later. Females begin laying eggs approximately 7-10 days after emergence. Onion flies can survive for 2 - 4 weeks and may lay several hundred eggs. The second or summer brood begins emerging in early July with peak flights in mid- to late July. Emergence of the final or fall flight begins in late August, peaks in early to mid-September, and may continue into October.

Female flies lay their eggs on the soil near the stem and occasionally on the young leaves and neck of the onion plant. The eggs will hatch into maggots 2-3 days after being laid.

The maggots will develop through three larval stages in 2 to 4 weeks depending on the temperature. Most newly hatched larvae crawl below the soil surface and feed upon the roots or burrow into the basal plate of the bulbs. The larvae use their hooked mouthparts to feed on the tissue of the onion plants.

When full-sized, the maggot leaves the bulb and enters the soil to pupate at a depth of 1-4 inches. First and second generation pupae remain in the soil for 2-4 weeks before adult emergence occurs. Larvae of the third generation develop into pupae and will pass the winter as pupae in the soil. The flies which will emerge from these pupae the following spring constitute the spring flight.

Damage: The onion maggot larvae cause damage by using their hooked mouth parts to enter the base of the plant. First generation maggots cause very noticeable damage to the seedlings, which first wilt and then become flaccid. Frequently, attacked seedlings die before the maggots are fully grown, forcing the maggots to move to adjacent plants.

Second generation maggots feed on developing bulbs, resulting in distorted growth accompanied by rotting tissue, and further feeding by third generation maggots on late season onion bulbs also results in unusable onions for fresh eating or storage.



Fig. 1 - An adult onion maggot fly (G. Dively, HGIC, University of Maryland)



Fig. 2 - An adult onion maggot fly along with elongate white eggs. (University of Maine Cooperative Extension)



Fig. 3 - The onion maggot. (Pests of the Northeastern United States, Cornell University)

In addition, feeding and burrowing by the maggot may introduce and spread fungal and bacterial pathogens. Such infected and rotting onions present a potential for reducing the quality of adjacent onions that are in storage.

Management: Locate new plants in a part of the garden different from the previous year's location. If that is not possible try removing infested soil and replace with fresh soil if this is practical. Avoid high organic matter soils. Deep rototilling or double-digging the soil in the fall may help reduce the population of over wintering pupae. Remove infested onions from the garden. Do not leave these onions in the garden soil, since such a practice may allow onion maggots in those onions to complete their life cycle.

The Alternative Control Outreach Research Network (ACORN) at Purdue University has tested the following pest exclusion method

for onion maggot control: Cover seedbeds with a floating row cover immediately after seeds are sown to prevent infestation. Be sure the cover extends at least 6 inches on each side of the seed row. Covers can be removed when plants are big enough to tolerate damage.

Contact your local Cooperative Extension for specific pesticide recommendations.

Always check the pesticide label to make sure both the crop and the pest are listed, and to check for the minimum number of days to wait between application and picking the crop ("Days to Harvest").

Prepared by: Thomas Kowalsick, Senior Horticulture Consultant, Cornell Cooperative Extension - Suffolk County. January 2006. Revised 10/2009.

References: *Onion Maggot (Delia antiqua) – Life Cycle*. Y. Li, W.T. Wilsey, C.R. Weeden, A.M. Shelton. Pests of the Northeast. Cornell University. Last update March 25, 2001; *Onion Maggot – Damage to Onions*. Y. Li, W.T. Wilsey, C.R. Weeden, A.M. Shelton. Pests of the Northeast. Cornell University. Last update March 25, 2001; *Onion Maggot*.

Part I Pest Management around the Home, Cultural Methods. C. Klass and Karen L. Snover. Cornell University. 7/2000.

The New York State Department of Environmental Conservation (NYSDEC) Bureau of Pest Management maintains a web site with a searchable database for pesticide products currently registered in New York State. Individuals who have Internet access can locate currently registered products containing the active ingredients at <http://www.dec.ny.gov/nyspad/products?0>.

~~This publication contains pesticide~~ recommendations. Changes in pesticide regulations occur constantly and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (NYSDEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension Specialist or your regional NYSDEC office. Read the label before applying any pesticide.

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