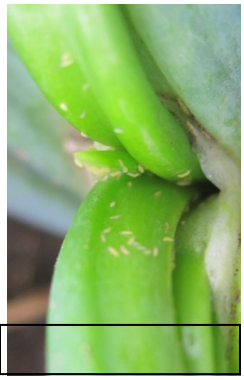
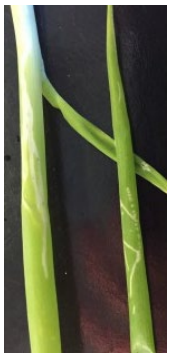
UMass Extension

MAJOR INSECT PESTS OF ONION




Onion thrips (*Thrips tabaci*) are tiny insects that range in color from yellow to black and are only 1-2 mm in length. They spend the winter as adults in crop remnants, alfalfa, wheat, greenhouses and weeds along the border of crop fields. Adults lay eggs singly, nymphs feed on leaves, and pupation occurs in the soil. There are multiple generations per year in the Northeast. Thrips have rasping mouth parts which they use to tear open plant cells to feed on plant juices. Populations are favored by hot, dry weather. Heavy rain or overhead irrigation can lower populations. In onions feeding occurs in protected, succulent areas where new leaves are emerging, deep between the leaf blades. Damage may appear as silver lines, white patches, tip dieback, curling and twisting of leaves, slowed growth, reduced bulb size and yields, or if severe enough can result in plant death. Plants are most sensitive when bulbs are forming. Thrips damage can increase occurrence of purple blotch (*Alternaria porri*), as fungus can penetrate the plant through wounds caused by feeding.


Allium leafminer (*Phytomyza gymnostoma*) flies emerge in early spring and lay eggs in allium crops – most commonly in overwintered or wild perennial onions or early scallions – leaving behind characteristic rows of round, white feeding and oviposition scars. The larvae hatch within the leaf and eat their way down towards the bulb, where they pupate. Some larvae may also tunnel out of the bulb to pupate in the soil. Larvae and pupae can be found within or between bulb layers. Flies look like small houseflies, with a yellow-orange spot on their head, between their eyes. Larvae are yellow to white and headless, growing up to 8 mm long. Pupae are dark brown, 3.5 mm long. This pest remains dormant during the summer months, and the next generation adults emerge in mid-September to lay eggs again. The fall generation primarily affects leeks but can affect onions that still have green foliage. Second generation pupae overwinter in the crop or soil. As of 2021, allium leafminer has only been confirmed at a few sites in MA but we suspect it is more widespread. Please report any suspected findings to the UMass Extension Vegetable Program at umassveg@umass.edu or (413) 577-3976 so we can monitor this important emerging pest.

Leek Moth (*Acrolepiopsis assectella* Zeller) adults are small, reddish-brown with a white triangular mark on the middle of the folded wings. The hindwings of the moth are heavily fringed and are pale to dark grey. Eggs are iridescent white, 0.4 mm in diameter and difficult to detect. Larvae are yellowish-green with a pale brown head capsule and eight small grey spots on each abdominal segment. At maturity, larvae reach 13-14 mm in length. The reddish brown pupa is encased in a loosely netted cocoon. Most cocoons are found on host plants. Leek moth is a pest in Ontario, Quebec, New York, and Northern Vermont but not yet in other parts of the northeast. Larvae can cause extensive damage by tunneling mines and feeding on leaf tissue and occasionally on bulbs. On alliums with flat leaves, including leeks and garlic, larvae feed on top of and inside the leaf material. They bore through folded leaves towards the center of the plant, causing a series of pinholes on the inner leaves. Larval mines in the central leaves become longitudinal grooves in the mature plant. Leek moth larvae enter hollow leaves, such as those of onions and chives, to feed

internally, creating translucent "windows" on the plant surface. Affected plants may appear distorted and are more susceptible to plant pathogens. In general, damage is more prevalent near field perimeters.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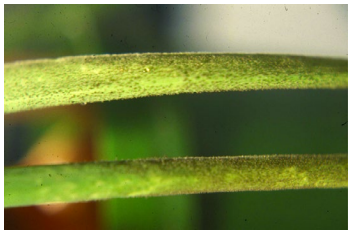
Onion Maggot flies spend the winter as small brown pupae in the soil. Adults emerge in spring and can travel considerable distances in search of host plants (1/2 to 1 mile). Female flies seek out their host crop to lay eggs at the base of the stem. Cool, moist soil conditions favor survival of the eggs, and soil temperatures over 95 F kill them. When the soil temperatures in the upper ½ to 1 inch are high (>100 degrees F) that soil temperature itself then provides control. There are three generations each year. Emergence of this pest is similar to cabbage root maggot which coincides with blooming of the common roadside weed, yellow rocket. When eggs hatch, larvae feed on roots and can cause complete destruction of the root system. In onions, newly hatched larvae crawl behind the leaf sheath and enter the bulb, and feed on the roots, stem, and developing bulb. Feeding damage also encourages entry of soft rot pathogens.

MAJOR DISEASES OF ONION

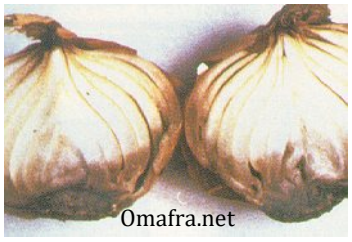
Botrytis Leaf Blight (*Botrytis squamosal*) overwinters in onion cull piles, on onion leaf debris, or as sclerotia (survival structures) in the soil. The pathogen sporulates and conidia (spores) are spread by wind; if there is sufficient leaf wetness and moderate temperatures (72-75˚ F) infection occurs. Infection frequency increases with the increasing leaf wetness duration. Older or senescent leaves are more susceptible to blighting. Severely affected fields will appear blighted with most leaves dead and desiccated. Losses in yield occur because of smaller bulb size resulting from premature leaf senescence.

Purple Blotch (*Alternaria porri*) overwinters on infected bulbs and debris, and can be seedborne. Symptoms appear on leaves as small water-soaked lesions with white centers. Zones may appear as the spot enlarges and the lesion turns brown to purplish. In moist weather, the spot's surface usually becomes covered with dark powdery fungal growth. Leaves with large spots turn yellow and blow over in wind. Older leaves, and thrips feeding or other injury increases susceptibility. Spores require rain or dew to cause infection. Optimum temperatures are 77 to 81°F. Almost no infection occurs below 55°F. Bulbs may become infected at harvest through the neck or wounds. Decay shows first as a watery rot around the neck causing yellowish to wine-red discoloration and as it moves through the scales, tissue dries to a papery texture.



Downy Mildew (*Pernospora destructor*) infection occurs in high leaf wetness usually below 75°F. Symptoms are first seen on older leaves while dew is present. Infected leaves have 1-12 inch long pale patches and greyish violet furry spores may be visible. The pathogen over-winters in volunteer onion plants as oospores, or as mycelium in stored bulbs or seed. Infected bulbs become soft and shriveled, some sprouting prematurely.

White Rot (*Sclerotium cepivorum*) activity is favored by cool soils and is restricted above 75°F. It produces hardy sclerotia which persist in soil for years. Disease is spread by movement of infected soil and plants. Pathogen activity increases with root development and foliage symptoms develop after the pathogen grows into the stem plate or bulb. Leaves yellow and die prematurely, plants become stunted, and rapid death of all foliage follows. A fluffy mycelium on the stem plate and bulb is seen and small sclerotia (0.02 inch) form in and on the surface of the bulb, often around the neck. White rot can continue to decay bulbs in storage if humidity is not kept low.



Fusarium Basal Rot (*Fusarium oxysporum f. sp.* cepae) infects onion, garlic, shallot, and chives. It is commonly found in the soil and persists there for long periods. The pathogen is disseminated widely by infected onion sets and garlic cloves. Plants can be infected at any stage of growth with injury of roots, basal plate, or bulb by onion maggot and other insects. The first symptoms are yellowing, curving, and necrosis of leaves beginning at the tips and progressively developing downward. Infected plants may wilt and affected bulbs appear brown and watery when cut open. The disease progresses from the stem plate up and the roots will eventually rot. Bulbs may exhibit no disease at harvest, but subsequently decay in storage.

Sour Skin (*Pseudomonas (Burkholderia) cepacia*) losses appear in storage, but infection usually occurs in the field. Primary symptoms include a light brown decay of one or a few inner bulb scales. The bulbs appear intact and remain firm, but rot proceeds internally. This bacterium is found in soil and water or as a pathogen of plants and/or animals. It exists as pathovars or strains. Infection occurs through a wound after bulb formation or when contaminated water flows down the neck. Development is favored by high temperatures. Season-long overhead irrigation provides a favorable environment.