

How to identify onion diseases?



DOWNY MILDEW – Fungal disease

» **Onion downy mildew, caused by the fungus *Peronospora destructor*, is very common. This fungus can overwinter in plant debris or be brought in on sets or seed. Temperatures between 10-13°Celsius, long periods of leaf wetness and/or high relative humidity (95%) are optimal for infection and spread.**

Symptoms: Downy mildew may be first detected in the early morning as a violet, velvety sporulation. With time, infected areas of leaves become pale and later turn yellow. These lesions may girdle the leaf and cause it to collapse. Epidemics may begin in small spots in a field that will spread, mainly during periods of high relative humidity, and cause considerable defoliation.



PURPLE BLOTCH – Fungal disease

» **Purple blotch, caused by *Alternaria porri*, is probably one of the most common diseases of onion and is distributed worldwide. During periods favorable for sporulation (leaf wetness or relative humidity of 90% or higher for 12 or more hours), inoculum becomes wind-borne and spreads to new foliage. Infection is highest at 25°Celsius. Older plant tissue is more susceptible to infection by purple blotch. Thrips feeding is thought to increase susceptibility of onion tissue to this disease.**

Symptoms: Purple blotch symptoms are first observed as small, elliptical, tan lesions that oftenturn purplish-brown. Concentric rings can be seen in lesions as they enlarge. Lesions usually girdle leaves, causing them to fall over. Lesions may also start at the tips of older leaves.



NECK ROT OR BOTRYTIS NECK ROT – Fungal disease

» **Botrytis neck rot is the most damaging fungal disease with severe losses occurring both in the field and in storage. The fungus causing Botrytis neck rot, *Botrytis allii*, can survive in the soil or on rotting bulbs as sclerotia.**

Symptoms: Although the bulk of losses to Botrytis neck rot are in storage, severe losses can be experienced in field situations. Plants infected in the field exhibit leaf distortion, stunted growth, and splitting of leaves around the neck area. A grayish sporulation of the fungus may be observed between leaf scales near the neck area. In storage, infection can be internal with no discernable symptoms on the onion. Apparently, the infection enters the neck and continues to grow undetected in storage until the onions are removed. It has been demonstrated that Botrytis neck rot is not capable of sporulation in controlled atmosphere storage (high CO₂, low O₂, refrigerated storage), but continues to grow and destroy infected onion tissue. Infected tissue is sunken, water soaked and spongy with a reddish brown color. The grayish fungal sporulation can be seen between scales in infected bulbs.



STEMPHYLIUM LEAF BLIGHT – Fungal disease

» **This fungal disease, caused by *Stemphylium vesicarium*, This disease typically attacks leaf tips, purple blotch lesions and injured or dying onion leaves and is often identified as purple blotch. Disease cycle and epidemiology are similar to purple blotch. *Stemphylium vesicarium* may enter purple blotch lesions causing a black fungal growth.**

Symptoms: Since this fungus is usually found coinfecting with *Alternaria porri*, symptoms are identical or at least very similar to purple blotch. However, *Stemphylium* leaf blight lesions appear to contain a darker, more olive brown to black color than do purple blotch lesions. In the case of *Stemphylium* leaf blight, lesions are often more numerous on the sides of onion leaves facing the prevailing wind. These lesions grow rapidly, coalesce and cause severe leaf blighting during periods of prolonged leaf wetness.



BACTERIAL SOFT ROT – Bacterial disease

» **Bacterial soft rot, caused by *Erwinia carotovora* pv. *carotovora*, is a common problem in many vegetables, usually during storage. It usually develops in onions after heavy rains or after irrigation with contaminated water. This disease is primarily a problem on mature onion bulbs during warm (20-30°C), humid conditions.**

Symptoms: Field symptoms are very similar to those seen with center rot in that it causes center leaves of onions to become pale and collapse. Infected scales of bulbs are initially water-soaked and later appear yellow or pale brown. In advanced stages of infection, scales become soft and watery and fall apart easily. As the interior of the bulb breaks down, a foul-smelling liquid fills the core area of the bulb. When harvesting, the tops of infected onions will pull off leaving the rotting bulb still in the ground.



BACTERIAL STREAK AND BULB ROT – Bacterial disease

» **This bacterial disease of onion, caused by *Pseudomonas viridiflava*, the disease is favored by excessive fertilization and prolonged periods of rain during the cool spring months of onion production.**

Symptoms: Leaf symptoms initially appear as oval lesions or streaks that later result in the total collapse of the entire leaf. Initially, streaks are usually green and water-soaked but later cause constricted, dark green to almost black lesions near the base of infected leaves. Infected leaves will generally fall off the bulb when any pressure is applied to pull them off. A reddishbrown discoloration has been observed in the inner scales of harvested bulbs.



HERBICIDE DAMAGE – Noninfectious disease

» **Generally, foliar damage occurs when the herbicides are applied at excessive rates, at the wrong stage of plant growth or during unfavorable weather conditions. Damage often occurs from herbicide drift when crops or weeds adjacent to the onions have been sprayed. Damage from drift is usually most severe at the edge of the field closest to where the herbicide was applied, with the damage decreasing the further you move away from the source.**

Symptoms: Contact herbicides typically will cause chlorotic or necrotic spots. Multiple spots can result in deformed leaves as well as leaf curling. Systemic herbicides, those that are translocated in the plant, tend to cause a yellowing of the foliage. They may also cause necrotic spots and leaf curling.



NUTRITIONAL DEFICIENCIES – Noninfectious disease

» **Acid or alkaline soils often lead to nutrient deficiencies due to the immobilization of the nutrients. Some soils are naturally low in specific nutrients due to their composition. The excessive, or unbalanced, use of fertilizer may also cause some nutrients to become unavailable to the plants.**

Symptoms: The following symptoms are indicative of nutritional deficiencies, however, soil and foliar fertilizer analyses should be conducted to verify nutritional needs:

Nitrogen: Deficiencies result in stunted plants with pale green to yellow leaves that die-back from the tips. Also, the foliage tends to be erect and the bulbs are smaller than normal mature earlier. Excess nitrogen causes rapid plant growth and delays maturity. The bulbs tend to be softer and more susceptible to storage rots.

Phosphorus: Deficiencies result in slow growth, delayed maturity and a high percentage of thick necked bulbs at harvest. Leaves become a dull green color and die back from the tips without the yellowing associated with nitrogen and potassium deficiencies.

Potassium: Deficiencies result in the foliage initially becoming darker green and the tips of the older leaves begin to wilt, especially on the upper surface. Eventually the leaves droop and take on a satiny progressing to paper-like appearance and develop chlorosis similar to that caused by nitrogen deficiencies.



STORM DAMAGE – Noninfectious disease

» **Raindrops, hailstones and soil particles blown by strong winds wound leaf, neck and flower stalk tissues.**

Symptoms: Injury from wind, pelting rain or hail is usually visible only on the side of the leaves that were facing the prevailing winds during the storm. Spots develop that are typically 1-5 mm in diameter, white to yellow in color and round or irregular in shape. Although rain damage is rarely serious, hail damage may defoliate a crop. Storm damage may be confused with Botrytis leaf blight or herbicide injury and can also make plants more susceptible to fungal and bacterial pathogens.



SUNSCALD – Noninfectious disease

» **Direct sun can heat dark soils to temperatures as high as 65°C resulting in tissue death at the soil line. Harvesting and curing onions in direct sunlight can result in sunscald on the bulbs.**

Symptoms: Sunscald is primarily a problem on young seedlings and mature bulbs. High soil temperatures damage seedling tissue at the soil line, resulting in shriveling and collapse of the plants. On onion bulbs, affected tissue collapses and becomes bleached, soft and slippery. Affected areas dry and shrivel rapidly, and scales eventually become brown and necrotic.



THRIPS DAMAGE – Noninfectious disease

» **Thrips over-winter in bulbs, as larvae or pupae in leaf litter or in the soil, and on alternate hosts. The life cycle of the insect from egg to adult can be completed within two weeks. Thrips damage is greatest after periods of hot, dry weather. Cool, rainy weather reduces thrips populations and damage.**

Symptoms: Thrips damage is characteristic on onion plants, and results from the piercing and rasping action of the cone-shaped mouth parts of the insect. At first, tiny, dark green spots appear on the leaf. These spots become white or silver with time and if widespread, can impart a silvery streaked appearance to the leaves, which will appear as a bright sheen in direct sunlight. Severely affected leaf tissues can wither and collapse when plants are water stressed. Thrips are most commonly found between the newest growing leaves or in seed heads.