Onion

Diseases

Damping-off (*Fusarium oxysporum* f.sp.cepae; *Pythium sp.; Sclerotium rolfsii and S. cepivorum and Colletotrichum sp.*):

The disease is more prevalent during kharif season and causes about 60-75% damage. High soil, moisture and moderate temperature along with high humidity especially in the rainy season leads to the development of the disease. Two types of symptoms are observed-

Pre-emergence damping-off: The pre-emergence damping off results in seed and seedling rot before these emerge out of the soil.

Post-emergence damping-off: The pathogen attacks the collar region of seedlings on the surface of soil. The collar portion rots and ultimately the seedlings collapse and die.

Control: Healthy seed should be selected for sowing. The seed should be treated with Thiram @ 2g/kg of seed before sowing. Continuous raising of nursery in the same plot should be avoided. The topsoil of nursery should be treated with Thiram @ 5g/m^2 area of the soil and nursery should be drenched with the same chemical @ 2g/litre of water at fortnightly interval. Soil solarization by spreading 250 gauge polythene sheet over the bed for 30 days before sowing and application of bio-control agent *Trichoderma viride* in soil @ 1.2kg/ha is also found effective to control damping-off to considerable extent.

Purple Blotch (*Alternaria porri*):

It is an important disease prevalent in all the onion growing areas. Hot and humid climate with temperature ranging from 21-30°C and relative humidity (80-90%) favour the development of the disease. It is more common in kharif season. The symptoms occur on leaves and flower stalks as small, sunken, whitish flecks with purple coloured centres. The lesions may girdle leaves/stalk and cause their drooping. The infected plants fail to develop bulbs .The intensity of disease varies from season to season.

Control: Use of healthy seeds for planting and crop rotation of 2-3 years with non-related crops checks the disease. Spraying Mancozeb (0.25%) or Chlorothalonil (0.2%) or Iprodione (0.25%) after one month from transplanting at fortnightly interval reduces the disease incidence. The sticker triton/sandovit should also be mixed in spray solution.

Stemphylium Blight (*Stemphylium vesicarium*):

The Stemphyliium blight is a serious problem in Northern parts of the country especially in the seed crop. This disease is very common on onion leaves and flower stalks. Infection occur on radial leaves of transplanted seedlings at 3- 4 leaf stage during late March and early April. The symptoms appear as small yellowish to orange flecks or streaks in the middle of the leaves, which soon develop into elongated spindle shaped

spots surrounded by pinkish margin. The disease appearing on the inflorescence stalk causes severe damage to the seed crop.

Control: Field sanitation and collecting and burning of crop residues minimizes the spread of infection. Spraying Mancozeb (0.25%) along with Monocrotophos (0.05%) with sticker triton on appearance of disease at fortnightly interval controls the disease.

Basal Rot (*Fusarium oxysporum f.sp. cepae*):

The disease incidence is more in the area where onion crop is grown continuously. A moderate temperature of 22-28°C favours disease development. Initially yellowing of leaves and stunted growth of plant is observed and later on, the leaves dry from tip downwards. In early stage of infection, the roots of the plants become pink in colour and rotting take place later. In advanced stage, the bulb starts decaying from lower ends and ultimately whole plant die.

Control: Since the pathogen is soil borne, it is difficult to control disease. Mixed cropping and crop rotation reduce the incidence of disease. Soil solarization by spreading polythene sheet of 250 guage in summer season for 30 days reduces the infectious propagules, which in turn reduces the disease. Seed treatment with Thiram (2 g/kg of seed) and soil application of Carbendazim, Thiophanate Methyl (Topsin-M) or Benomyl @ 0.1% is effective in the controlling the disease. Seedling dip in Carbendazim (0.1%) or with antagonist viz*. Pseudomonas cepacis,* and *Trichoderma viride* significantly reduces the basal rot in onion crop.

Downy Mildew (*Perenospora destructor*):

The disease is caused by and reported from northern hilly track and plains particularly in high humid locations. The disease is worst in damp conditions and late planting of the crop, application of higher doses of fertilizers and numerous irrigation increased disease severity. Symptoms appear on the surface of leaves or flower stalk as violet growth of fungus, which later becomes pale greenish yellow and finally the leaves or seed stalks collapse.

Control: For managing the disease effectively, onion bulbs meant for seed crop should be exposed to sun for 12 days to destroy the fungus. Spraying with Zineb (0.2%), Karathane (0.1%) or Tridemorph (0.1%) also gives good control of the disease.

Onion Smut (*Urocystis cepulae*):

The disease occurs in areas where temperature remains below 30°C. Since the fungus remains in soil, disease appears on the cotyledon of the young plant soon after it emerges. Smut appears as elongated dark, slightly thickened areas near the base of seedlings. The black lesions appear near the base of the scales on planting. The affected leaves bend downwards abnormally. On older plants, numerous raised blisters occur near the base of the leaves. The lesions on plant at all stages often expose a black powdery mass of spores.

Control: Treating the seeds with Captan or Thiram (2.5g/kg of seed) before sowing controls the disease. Seed bed treatment with Methyl Bromide (1 kg/25 m^2.) is effective in controlling the disease.

Onion Smudge *(Colletotrichum circinans)*:

It occurs on white onion varieties and reduces the market value of the bulbs. The disease is characterized by small dark green to black spots, which appear on the outer scales.

Control: Thorough curing of the bulb after harvesting and storing the bulbs in well-ventilated rooms can control the disease

Black Mould (*Aspergillus niger)*:

The disease is common in onions stored in hot climates where the temperature ranges between 30- 45^{0}C. It is characterized by the black powdery mass of spores that appear on the exterior of the scales. The black spore masses are also seen on inner scales. It reduces the market value of the bulbs.

Control: For effective control of die disease, left for drying in the field for two days. These bulbs should be further dried in shade for 10-15 days before storage. Care should be taken to avoid injury to the bulbs during post harvest handling. The crops should be sprayed with Carbendazim (0.2%) 10-15 days before harvesting.

Bacterial Brown Rot (*Pseudomonas aeruginosa*):

It is very serious disease of onions in storage. The infection occurs through the wounds. The rot begins at the neck of the bulbs which later gives foul smell through the neck when squeezed.

Control: Proper curing and rapid drying of the bulbs after harvesting is essential for controlling the disease. Affected bulbs should be discarded before storage. If rains occur during maturity, spraying of Streptocycline (0.02%) is recommended.

Onion Yellow Dwarf:

This is a viral disease caused by onion yellow dwarf virus. It is transmitted mechanically as well as by insect vectors. The symptoms of the disease are severe stunting of the plants, dwarfing and twisting of the flower stalk. The affected leaves and stems change their normal green colour to various shades of yellow and leaves tend to flatten and crinkle and as a result bend over.

Control: Removal and destruction of the diseased plants checks the spread of the disease. Healthy bulbs should be used for seed production. Spraying of Malathion (0.1%) or Metasystox (0.1%) to control the vectors checks further spread of the disease.

Anthracnose (*Colletotrichum gloeosporiodes or Colletotrichum circinans)*:

The symptoms appear initially on the leaves as water soaked pale yellow spots, which spreads lengthwise covering entire leaf blade. The affected leaves shrivel and droop down.

Control: Since the pathogen survives on crop debris, sanitation and destruction of infected crop debris helps in reducing the disease. Mancozeb (0.25%), Carbendazim (0.1%) or Thiophanate Methyl (0.1%) as foliar spray is effective against the disease.

White rot (*Sclerotium rolfsii*):

The initial symptom of the disease is yellowing and dieback of leaf tips. Scales, stem plate and roots get destroyed. The bulbs become soft and water soaked. White fluffy or cottony growths of mycelium with abundant black sclerotia resembling mustard grain are seen on the infected bulbs.

Control: Repeated cultivation of onions on the same piece of land should be avoided. Crop rotation with cereal crops is recommended. Seed treatment with Thiram (4 g/kg of seed) and drenching of soil with Mancozeb (0.25%) are effective in controlling the disease. Application of bio-control agents like *Trichoderma viride* to the soil reduces the disease inoculum.

Neck rot (*Botrytis allii*):

The infection usually takes place in the field and symptoms become evident in storage. It is more severe when moist conditions prevail just before and during harvest and while onions are cured in the field. Excessive nitrogen and untimely irrigation increases the incidence of this disease, which is more severe in mild than in pungent onions. The fungus causes softening of the scales which appear water soaked. Under moist conditions, a grayish fungal mat develops on the surface of the scales.

Control: For effective control of die disease, left for drying in the field for two days. These bulbs should be further dried in shade for 10-15 days before storage. Care should be taken to avoid injury to the bulbs during post harvest handling. The crops should be sprayed with Carbendazim (0.2%) 10-15 days before harvesting