



Fusarium Basal Rot of Onion – A Major Threat for Onion Growers

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Onion (*Allium cepa*) a member belongs to family *Alliaceae* and second most widely cultivated vegetable worldwide following tomato. Onion production is low due to many biotic and abiotic constraints; biotic factors include pathogens attack which results in diseases like anthracnose-twister, downy mildew, purple blotch, stemphylium blight, Basal rot and insect pest like thrips and *Ditylenchus dipsaci* nematode while abiotic influences include temperature, drought, rainfall and other environmental conditions.

Fusarium basal rot is an important disease of *Allium* crops appearing at pre- as well as post-harvest. The disease is prevalent in all parts of the world where onion and garlic are grown causing sizeable crop losses.

Symptoms: Disease occurs in patches; leaves turn yellow and then dry up slowly. As infections progress, wilting and rapid die-back of leaves from the tips occurs. Affected roots are dark brown to dark pink. Whitish mould growth appears on the scale. The bulbs become soft and when cut a watering decay is noticed. Under dry conditions, stem plate tissues become pitted and show dry rot. Under storage the disease may continue if the conditions prevail as 30-40 °C temperature and above 70% relative humidity. Fusarium also causes damping-off, wilting, root rot and seed infection and leads 30-40% storage losses of bulbs.

Causal organism: Fusarium basal rot caused by a complex set of Fusarium species, generally *Fusarium oxysporum* f.sp. *cepae*, which is a soil-borne pathogen produces mycelium as well as three types of asexual spores viz., microconidia, macroconidia and chlamydospores. The pathogen can survive in the soil for many years as chlamydospores or as saprophyte on crop residues.

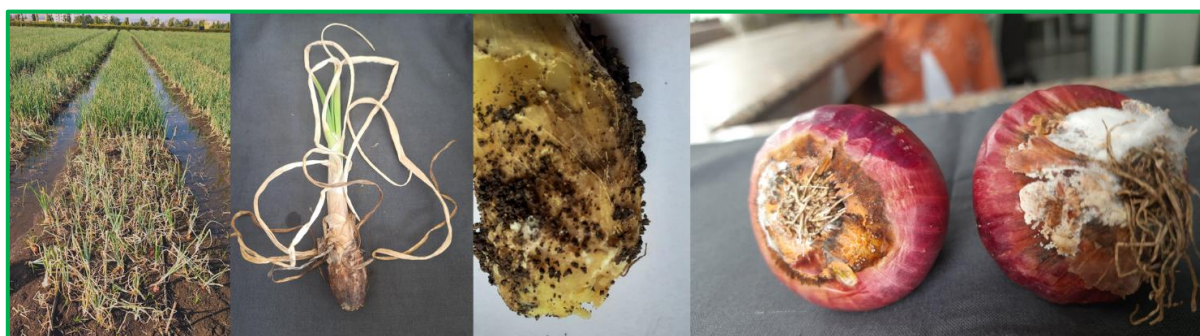
Favourable conditions: The disease generally appears when the soil temperature is 25-28 °C along with high soil moisture. Relative humidity is above 70%. Stress due to high temperature and drought increases the disease incidence. Basal rot is more severe in transplanted onion than direct seeded onion.

Disease cycle: Pathogen perpetuates in soil through chlamydospores. Under favourable conditions, this inoculum can infect and colonize the host, resulting in disease symptoms. Primary infection of Fusarium spp. occurs when the fungus penetrates directly into roots or through wounds on roots or on the basal plate of bulb scales or bulbs by onion maggots (*Delia antiqua*) or other insects. The fungus may be disseminated by infected onion sets, movement of infested soil on equipment and irrigation water.

Management:

- Deep summer ploughing and soil solarisation
- Follow long crop rotation with Maize or spring wheat
- Mixed cropping with tobacco, sorghum

- Avoid injuries during inter cultivation
- Flooding the soil in off-season
- Green-manuring increases antagonistic microbial population in the soil
- Proper curing of onion and storing at cool temperature.
- Seed treatment or seedling dip with *Trichoderma spp.*+ *Psuedomonas fluorescens* (5g/lit water) reduces basal rot incidence
- Dipping of seedlings before transplanting in the suspension of carbendazim (0.1%)
- Soil application of *Trichoderma harzianum*, *T. viride*, *T. koningii*, *T. hamatum*, *T. pseudokoningii*, *Psuedomonas fluorescens* and *Bacillus subtilis*.
- Pre-harvest sprays of carbendazim (0.2%).
- Spraying of 0.1% carbendazim at 30, 20, 10 days before harvest reduce the post-harvest decay in storage.



Symptoms of Fusarium Basal rot disease

References

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