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An overview on: Management of major disease of *Allium spp*

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Abstract

Onion and garlic are the most important commercial crops and consumed in all over the world in various forms. Bulb crops are rich in minerals like phosphorus, calcium and carbohydrate. The pungency in onion and garlic due to Allyl propyl disulphide and allinase. Onion contains anti-inflammatory, anti-cholesterol, anticancer and antioxidant properties. It has also reported that garlic extract inhibited vascular calcification in human patients with high blood cholesterol. Onion and Garlic are attacked by many disease at different crop stage growth, which cause considerable loss in the yield. The disease of onion and garlic alter the cropping pattern and also effect local and export market. The consistent use of chemical to control the plant disease not only pose a serious threat to the environment and mankind and also slowly build up resistance in the pathogens.

Keywords: Onion, garlic, pathogens

Introduction

Onion (*Allium cepa*) and Garlic (*Allium sativum*) are the most important commercial crops grown all over the world. In India onion and garlic have been under cultivation from last 5000 years. Onion is popularly used both in immature and mature bulb stage as vegetable and as spice. It contains Vitamin B and traces of Vitamin C and also some traces of iron and calcium. The outstanding characteristics of onion is its pungency, which is due to the volatile oil Allyl propyl disulphide. The pungency varies with the variety. India ranks second in the area and production in the world after China and third in export after Netherland and Spain. Maharashtra, Karnataka, Gujarat, Orissa, Andhra Pradesh, Uttar Pradesh, Tamil Nadu, Rajasthan and Bihar are the major onion producing states in India.

Garlic (*Allium sativum*) is an important spice or condiment cultivated throughout the India. It is chiefly used for flavouring and seasonal vegetable and meat dishes. In its medicinal use, garlic preparations are used in whooping cough and other lung diseases, stomach complaints resulting from child hood, and specific remedy for sore eyes. Gujarat, Orissa, Madhya Pradesh and Uttar Pradesh are the leading states. Onion and Garlic are attacked by many disease at different crop stage growth, which cause considerable loss in the yield.

Management of Major Disease of Onion and Garlic

A. Major Fungal Diseases

1. Purple Blotch of Onion and Garlic (*Alternaria porri*)

Symptoms: Small water soaked areas develop on the leaf on or the seed stock that usually turn brown in colour. Gradually these symptomatic areas enlarge to become zonate and purplish in colour. Spots are usually surrounded by the yellow halo. In moist weather condition, the surface of the spots are covered with brown to black sporulation of the fungus. When few large lesion develop on the leaf, they shrink, turn yellow and die. Mycelium may remain alive in the disease crop debris and Chlamydospores, if formed they survive in the soil.

Management

- Cultural method include long crop rotation should be related with non-host crop.
- Field should be kept drained and lowering the density of transplanted crop and cause reduced infection.
- Avoid excess drainage of nitrogen.

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- In standing crop of onion mancozeb may be sprayed three to four times after 10-15 days interval.

2. Downy Mildew of Onion and Garlic (*Peronospora destructor*)

Symptoms: Oval to cylindrical spots of the pale colour are usually formed on the leaves. The spots may exhibit alternating green and chlorotic zones. During humid condition, white to purplish downy growth of the pathogen are seen. If the crops are grown in the infected field there may be the result in stunting and distortion of the plants.

Management

- The pathogen perpetuates in the soil through the diseased bulb.
- Use healthy bulb for the propagation.
- Spray the crop with zineb and mancozeb.

3. Damping off: *Pythium*, *Phytophthora spp*, *Rhizoctonia solani*

Symptoms: Two types of symptoms are observed which are as follows:

- **Pre Emergence Damping off:** The Pre emergence damping off results in seed and seedling rot before these emerges out of the soil.
- **Post Emergence Damping off:** The Post emergence damping off results pathogen attack on the collar region of the on the surface of the soil. The collar portion rots and ultimately the seedling on the surface of the soil.

Management

- Healthy seeds should be selected for sowing.
- Continuous raising of nursery in the same plot should be avoided.
- Application of safer fungicides in the soil at the time of nursery can substantially reduce the crop damage.
- Soil solarization by spreading 250 gauge polythene sheet over the bed for 30 days before sowing and application of bio-control agent.
- The seed should be treated with thiram 2g/kg of seed before sowing.
- The top soil of nursery should be treated with thiram or captan at 5g/m² area of the soil and nursery should be drenched with the same chemical 2g/liter of water at fortnight interval.
- *Trichoderma viride* in soil at 4-5kg/ha is found effective to control damping off to considerable extent.

4. Black mold (*Aspergillus Niger*)

Symptoms: This disease is common in onion and garlic stored in hot climate where the temperature ranges between 30-45 degree Celsius. It is characterized by the black powdery mass of spores that appears on the exterior of the scales. Invaded tissue became water soaked. Black mold also cause slow shriveling. Black spore masses are also seen on the inner scale which reduces the market value of the bulb crop.

Management

- For effective control of the diseases bulb should be left for drying in the field for two days. The bulb should be further dried in the shade for 10-15 days before storage.
- Care should be taken avoid injury of the bulb during post-harvest handling.

- The crop should be sprayed by the Carbendazim (0.2%) 10-15 days before harvesting.

5. Pink Rot of Onion and Garlic (*Phomaterrestris*)

Symptoms: The disease appear in the field when the crop is about to mature. Root of the affected plant turn pinkish in colour at the beginning, later it changes to purplish colour and finally it turns brown to black in colour. In most cases pink root turn brown shrivel and die. New roots are also attacked and killed. No symptoms are usually observed on the aerial parts. Plant infected in early stage may fail to develop bulbs, resulting in failure of the crop.

Management

- Long rotation of 3-6 years with crop not susceptible to the pathogen will reduce but not eliminate the occurrence of the disease.
- Soil solarization during the nursery raising.
- Some onion cultivar possess resistance to the pathogen should be planted in the field.

6. Basal Rot (*Fusarium oxysporum*)

Symptoms: An initial symptom of the disease is yellowing of the leaves and stunted growth of the plant 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 advance stage, the bulb start decaying from lower end and ultimately whole plant die. Disease also appear during storage when temperature is 35-40 degree Celsius and relative humidity is 70% are high in the month of July to August.

Management

- Since the pathogen is soil borne, it is difficult to control diseases.
- Mixed cropping and crop rotation reduce the incidence of diseases.
- Soil solarization by spreading 250 gauge polythene sheet in summer season for 30 days.
- Application of *Trichoderma spp* at the the time of transplanting.
- Seedling dip in Carbendazim (0.1%) found effective.

B. Bacterial diseases

1. Sour skin (*Pseudomonas cepacia*)

Symptoms: Primary symptoms on onion include a slimy pale yellow to light brown decay and break down of one or few inner bulb scales. Externally bulb appears sound, but the neck region may soften after leaves have collapsed. In the advanced stage healthy scales slip off during handling.

Management

- Proper maturing of the crop and quick drying after topping.
- Contaminated irrigation water has been implicated in the spread of pathogen, the use of recycled or irrigation runoff water should be avoided.
- Method of irrigation has also a substantial impact on the incidence of sour skin. Long overhead irrigation provide favourable environment for infection.
- Where sour skin is a potential problem, changing from sprinkler to furrow irrigation at least from bulbing to end of season, is advisable where feasible.

2. Bacterial Brown rot (*Pseudomonas aeruginosa*)

Symptoms: It is very serious disease of onion in storage. Infection occurs through the wound. The rot begins at the neck of the bulb which later gives foul smell through the neck when squeezed.

Management

- Proper curing and rapid drying of the bulbs.
- Affected bulbs should be discarded before storage.
- If rain occurs during maturity spraying of streptocycline (0.02%) is recommended.

C. Viral Diseases

1. Onion Yellow Dwarf Virus

Vector-Aphid

Symptoms: The symptoms of the disease are severe stunting of the plants, dwarfing and twisting of the flower stalk. The affected leaf and stem change their normal green colour to various shades of yellow and leaves tend to flatten and crinkle and result bend over.

Management

- Removal and destruction of diseased plants check the spread of the diseases.
- Healthy bulbs should be used for the seed production.
- Spraying of Metasystox (0.1%) to control the vectors.

2. Iris Yellow Spot Virus

It is caused by Gemini virus.

Symptoms: Plant infected with Iris yellow spot virus is characterized by yellow to straw coloured lesions. Lesion may be more or less round with or without necrotic center or may be diamond shaped. Lesion will appear on both seed stalks and the leaves. Seed stalks may swell at the point of the infection.

Management

- Removal and destruction of diseased plants check the spread of the diseases.
- Healthy bulbs should be used for the seed production.
- Spraying of Metasystox (0.1%) to control the vectors.

Conclusion

There are number of pathogens that attack onion and garlic plants throughout their developmental stages and significantly reduce the crop yield. The present manuscript deals with management of major fungal, bacterial and viral disease of onion and garlic. By proper management, the yield which is reduced by diseases can be increased.

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