



Studies on Wilt Complex Disease of Pomegranate

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Abstract:

Pomegranate (*Punica granatum* L.) is one of the important arid zone fruit crop which is infected by soil born pathogen like *Fusarium oxysporum* Schl., *Ceratocystis fimbriata* and nematode which are responsible to cause wilt disease in pomegranate. The wilt disease is prevalent in Maharashtra, Karnataka, Andhra Pradesh, Gujarat, and Tamilnadu state (Jadhav and Sharma, 2009). In Maharashtra, the severity of this disease has increased in past 25-30 year, especially in the Pomegranate growing areas of Sangola, Pandharpur, Baramati, Malegaon, Satana, Rahuri and Deola Tahsils. *Punica granatum* L. Wilt complex is caused by the as *In-vitro* evaluation of systemic fungicide against *C. fimbriata* it was observed that Hexaconazole and Tricyclazole completely inhibited colony growth of pathogen. This treatment was found significantly superior to the rest of the fungicide treatments. Among non systemic fungicides copper oxychloride and Mancozeb was found to be most effective. *In-vitro* evaluation of systemic fungicide against *F. oxysporum* Schl. Among the fungicide tested it was observed that Carbendazim completely inhibited the growth colony of pathogen and in non-systemic fungicides Mancozeb completely inhibited the growth of *Fusarium* fungus.

Keyword- *Fusarium oxysporum*, Wilt, copper oxychloride.

Introduction

Pomegranate (*Punica granatum* L.) belongs to the family *Lythraceae*, is one of the favourite table fruit of tropical and subtropical regions. The fruit crop is native of Iran to the Himalayas in northern India and cultivated over the whole Mediterranean countries like Spain, Morocco, Egypt, Iran, Afghanistan and Baluchistan since ancient times. It is widely cultivated in India and the drier part of southeast Asia, Malaya, Myanmar, China, Japan, USA (California), East Indies and tropical America. However, In India area (000 ha) and production (MT) is to be 197 and 2306, 216 and 2613, and 234 and 2845 in the year 2015, 2016, and 2017 respectively. (Horticulture Statistic at a glance-2018).

The wilt disease is prevalent in Maharashtra, Karnataka, Andhra Pradesh, Gujarat, and Tamilnadu state (Jadhav and Sharma, 2009). In Maharashtra, the severity of this disease has increased in past 25-30 year, especially in the Pomegranate growing areas of Sangola, Pandharpur, Baramati, Malegaon, Satana, Rahuri and Deola Tahsils. There are many views regarding the cause of disease, such some insect like pinhole boring the trunk near roots and on main roots. Nematode infestation on root, unfavourable soil condition, improper irrigation and less spacing between the plants. But whatever the source of damage to roots, wilting of Pomegranate due to infection of fungal pathogen from injured or weakened roots. If roots of partially wilted plant are observed near soil surface by splitting them, black brown streak are observed.

Punica granatum L. Wilt complex is caused by the association of *Ceratocystis fimbriata* and *Fusarium oxysporum* Schl.

Symptoms:

Wilt complex of pomegranate results in complete wilting of plant and is characterized by the initial symptoms as yellowing and wilting of leaves on one to several branches. At times only one or two stems of the tree showed wilting and it took a few weeks to some months for the entire tree to completely wilt. Although yellowing of leaves normally produced acropetally, occasionally some plants revealed wilt symptoms all of a sudden by senescing the entire plant's foliage at once. Wilt infected plants often revealed dried foliage and fruits being attached to the branches for many months.

Survival and Spread:

Wilt fungus *C. fimbriata* can survive in the soil and in infested plant debris for several years (5-7 yrs). Wilt caused by root-knot nematode is reported from all type of soils but more severe in sandy loam soil with more aeration. Majority of wilt pathogen including fungus and nematodes spreads through infected planting material to new areas while intercultural operations like weeding, manure application, farm machinery and pruning tools, root grafts, flooding/runoff irrigation water and insects like shot hole borer can spread the pathogens within and nearby orchards.

Management:

1. Use disease free planting material

2. Soil solarization for 6 weeks in the hottest month (April-May) using 50-75 LLDPE (Linear Low Density Polyethylene) sheet kills the soil borne pathogen. Prepare the plot selected for planting, irrigate it and
 3. Apply promising bioformulations such as *Aspergillus niger* AN27 (IRG 07) and Mycorrhiza [*Rhizophagus irregularis* Syn. *Glomus irregularis*], @ 1kg/acre and *Trichoderma harzianum*, *T. viride*, *Pseudomonas* spp. *Paecilomyces* spp. etc., right from planting, every 6 months. These serve as best preventive measure for all types of wilt pathogens.
 4. Grow green manure crops like dhaincha (*Sesbania aculeata*) and sunhemp (*Crotalaria juncea*) during rainy season and incorporate in soil before flowering.
 5. Apply boron depending on soil test value.
 6. On observing first symptoms of wilt -1st drenching with Propiconazole 25 EC @ 2ml/ L + Chlorpyrifos 20 EC @ 2ml/L. After 30 days of first application; 2nd drenching with *Aspergillus niger* AN 27 (IRG 07) @ 5g/plant with 2Kg FYM/plant followed by 3 rd cover with the LLDPE sheet for better results.
 7. Pruning tools should be disinfected after each use; plants cut ends painted with 10% Bordeaux paste. *Azadirachta indica* (neem) oil may be added @ 50ml/L in the paint during rainy season.
 8. Grow green manure crops like dhaincha (*Sesbania aculeata*) and sunhemp (*Crotalaria juncea*) during rainy season and incorporate in soil before flowering.
 9. Soil solarization or formalin should be used to disinfect such pits after removing the diseased (wilt affected) plants. For this 1 foot deep and 2X2 feet pit should be made at the place where trunk has been removed.
 10. *In-vitro* evaluation of systemic fungicide against *C. fimbriata* it was observed that Hexaconazole and Tricyclazole completely inhibited colony growth of pathogen. This treatment was found significantly superior to the rest of the fungicide treatments. Among non systemic fungicides copper oxychloride and Mancozeb was found to be most effective. *In-vitro* evaluation of systemic fungicide against *F. oxysporum* Schl. Among the fungicide tested it was observed that Carbendazim completely inhibited the growth colony of pathogen and in non-systemic fungicides Mancozeb completely inhibited the growth of *Fusarium* fungus.(Chaudhari Thesis 2015)
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