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Isolation of Fusarium Oxysporum F.Sp. Lycopersici Causing Fusarium Wilt of Tomato and Their Control

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ABSTRACT

Diseases are a major limiting factor for tomato production. Diseases can be classified into two groups. The first are those caused by infectious microorganisms that include fungi, bacteria, viruses and nematodes. These diseases are contagious and can spread from plant to plant in a field, often very rapidly when environmental conditions are favourable. Present investigation of isolation and their control measures of fusariumwilt on tomato. the Pathogen was isolated from infected plant parts by tissue isolation technique on Potato Dextrose Agar (PDA) medium.

Keyword: - Tomato, Isolation, Fusarium, Control measures etc

I. INTRODUCTION

Diseases are a major limiting factor for tomato production. Diseases can be classified into two groups. The first are those caused by infectious microorganisms that include fungi, bacteria, viruses and nematodes. These diseases are contagious and can spread from plant to plant in a field, often very rapidly when environmental conditions are favourable. The second group includes those caused by non-infectious physical or chemical factors, such as adverse environmental factors, nutritional or physiological disorders and herbicide injury. Non-infectious diseases cannot spread from plant to plant; however, the distribution of the disease may be quite uniform and extensive if an entire planting was exposed to the adverse factor.

It is critical for effective disease control to recognize the difference between infectious and non-infectious diseases, and the type of microorganism causing an infectious disease be determined. For example, use of a fungicide to control a non-infectious disease, such as blossom-end rot, is a wasted expense that will not correct the problem.

Wilt diseases are caused by pathogens that invade the vascular system (xylem tissue) and disrupt water flow through the plant. Fusarium wilt is the major wilt disease of tomato in Oklahoma. Verticillium wilt is easily confused with Fusarium wilt.

The first symptom is usually a yellowing of the lower leaves, which gradually wilt and die. Symptoms may first occur on only one side of the plant (Figure 1). The disease progresses up the stem until all of the foliage is killed

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and the plant dies. If stems or petioles from wilted areas of diseased plants are cut, a reddish-brown discoloration can be seen between the pith (center of the stem) and the outer green part of the stem (Figure 2). The fungus survives and persists indefinitely in field soil. The fungus is also seedborne and is thought to spread long distances in this manner. The disease is most serious in sandy soils and at temperatures between 80 F to 90 F. Soils become infested by planting infected transplants and from movement of infested soil by wind and water erosion or on farm implements.

Uys*et al.* (1996) studied tomato diseases and disorders in the main tomato growing regions of South Africa during survey between 1992-1995. Early blight caused by *Alternaria solani,* was the most prevalent leaf disease, followed by bacterial leaf spot.Ramgiry et al. (1997) survey conducted and report that Alternaria solani and *Pencillium notatum* were the most frequent causal agents of tomato decay in fields and vegetable markets in Jhabua of Madhya Pradesh.Bhatt *et al.* (2000) recorded the *Alternaria alternat*a as the causal agent of leaf blight disease of tomato and capsicum, which was the first confirmed record of this fungus from Kumaon hills of Uttar Pradesh. Kanjilal *et al.* (2000). Conducted the survey on field and post-harvest diseases of hybrid and desi cultivars of tomatoes in four districts of West Bengal, (India) and revealed that among fungal diseases, the blight caused by Alternaria sp.was the most predominant with the crop loss in the field ranged from 70 to 100 per cent.Tumwine et al. (2002) conducted survey on tomato early blight situation and current practices for disease management in Uganda during 1996-1999. Ten districts solani as major disease. Kamble (2006) conducted a survey in Thane and Raigad districts in Konkan region of Maharashtra on early blight of tomato caused by *Alternaria solani .*

II. MATERIAL AND METHODS

1) Collection of material

The present experiment conducted *In Vitro* at Department of Botany, MSP Art, science and K.P.T commerce, College, Manora District Washim. During this experiment, plant sample were collected from Tomato infected by fusarium wilt disease in growing track of washim

2) Isolation of *Fusarium oxysporum f.sp. lycopersici*method followed by C.V.Chudhary in 2006.

Pathogen was isolated from infected plant parts by tissue isolation technique on Potato Dextrose Agar (PDA) medium. Diseased parts were cut into small pieces with the help of sterilized blade. Pieces were washed with sterilized distilled water and disinfected with 1 per cent $HgCl_2$ solution for 10 seconds. Thus, obtained disinfected tissues were immediately washed thrice with sterilized distilled water and aseptically transferred on PDA plates. Inoculated Petri plates were incubated at room temperature (27±2 °C). The obtained culture was purified by using hyphal tip culture method, and maintained on same medium for the further investigations.

III. RESULTS AND CONCLUSION

1) Isolated *Fusarium oxysporum f.sp. lycopersici* (fungus) from infected tomato leaves

Control Measures

Fusarium wilt can be difficult to manage once it is introduced and there is no known cure once it has become established within an area. However, there are preventative and disease reduction measures that can be implemented:

- **Select resistant varieties.** For fields with a history of Fusarium wilt, planting resistant varieties of tomato will inhibit severe symptoms. See the *Southeastern US Vegetable Crop Handbook* for a list of varieties with resistance. Seek guidance from a specialist to help identify which race is present in your field.
- **Use grafted tomatoes.** Tomato rootstocks that are resistant to Fusarium wilt are available and can be used with a susceptible scion variety. See vegetablegrafting.org for more information.
- **Crop rotations for 3-5 years**. Rotating away from tomato crops will reduce inoculum (spores) in the soil. This will not guarantee the elimination of disease, but will reduce the severity and incidence of infection on the subsequent crop. Weeds, such as pigweed, mallow, and crabgrass, can be hosts for the Fusarium wilt pathogen, so frequent maintenance of the infested area is necessary during this period of time.
- **Only plant healthy transplants.** Closely inspect transplants for symptoms of disease before planting to decrease the likelihood of introducing disease.
- **Wash tractors and equipment between fields**. Infested soil can be carried to other fields on equipment and tools. Frequent cleaning is highly recommended, particularly if moving from an infested field to a clean field.
- **Use sterile potting media**. If you are starting your own seedlings, use of a sterile soilless potting media is suggested to minimize the chance of introduction of the disease.
- **Manage soil pH**. Raising soil pH to a neutral range (6.5 - 7.0) by using lime will reduce the persistence of the pathogen.
- **Avoid excessive nitrogen**. High levels of nitrogen and low levels of potassium in the soil can increase a plant's susceptibility to Fusarium wilt. Avoid over-application of high nitrogen fertilizers and use a soil test to determine nutrient levels.

Chemical methods

The most effective method in preventing tomato from Fusarium wilt infections is by mixing the tomato seeds with chemical fungicides. However, the use of chemical fungicides can be harmful to other living organisms besides reduction of soil microflora.

There is a constant threat that pathogens may become resistant to fungicide treatment. As for example, various pathogens became resistant to methyl benzimidazole. Other classes of fungicides were tested against *F. oxysporum*f.sp. lycopersici. The demethylationinhibiting (DMI) fungicides (prochloraz, propiconazole and cyproconazole/propiconazole) act by inhibiting the demethylation step in the biosynthesis of sterols needed in fungal walls. Prochloraz proved to be the most effective fungicide against the Fusarium wilt pathogens of tomato.

Biological methods

Biological control is a non-chemical measure that has been reported in several cases to be as effective as chemical control.

However, the efficacy of biological control was occasionally inadequate and variability in control level may be high. Understanding the mechanisms involved in biological control might enable enhancing control efficacy and reducing the inconsistency and variability

IV. CONCLUSION

Treating fusarium wilt of tomatoes is not possible. Affected branches or entire plants can only be destroyed, as they will die eventually. Prevention is the only way to avoid the damage of fusarium wilt in your tomato garden. Start with varieties that resist the disease. Also, avoid planting tomatoes in the same spot year after year. The fungus persists in the soil for a long time. Make sure that the soil drains well where you plant tomatoes to deter fungal growth. Use raised beds, if necessary. If you have had issues with fusarium wilt in the past, or if you just grow a lot of tomatoes, practice good garden tool hygiene

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