
Fusarium Wilt- A Major Problem in Cucurbits

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ABSTRACT

Cucurbitaceae family is a large and oldest group of vegetable crops including 118 genera and 825 species. India is one of the largest producer of vegetables worldwide. It contains rich amounts of carbohydrates, protein and (90%) water. There are a number of factors which hampers its production among which plant diseases are a major concern. Cucurbits are attacked by a large number of plant pathogens among which Fusarium wilt is the most destructive one. It is responsible for causing heavy economic losses to the crop around the world. The fungus is soil borne in nature. Soil borne diseases are economically very important as these are responsible for significant decline in fruit yield. The pathogen is host specific and infects only its particular host therefore each species has a specific formae speciales. Due to stress of fruit load, the disease shows high severity later in the season.

INTRODUCTION

Cucurbits are one of the oldest cultivated vegetable crops (Wehner and Guner, 2004). It is a rich source of vitamins, minerals and dietary fibre. Plant diseases are one of the major constraints in cucurbits production. Fusarium wilt is among the most destructive diseases of cucurbits and causes significant losses to cucurbits around the world. The pathogen causing the Fusarium wilt is a soil saprophyte and it causes infection on a varied range of plant species worldwide. The

most economically important cucurbits attacked by the *Fusarium* wilt pathogen include muskmelon, cucumber, watermelon, bitter gourd etc.

SIGNIFICANCE

Fusarium wilt causes economic losses in various ways. In cases of heavy field infestation by *Fusarium* wilt pathogen, losses may approach 100% (Egel and Martyn, 2007). First, and foremost which is the most obvious, is a direct loss in its yield in the form of harvested fruit because the plant dies at initial stage of its growth. Second, but very important, is the loss in marketable yield, because the fruits which are formed are very small, low in sugar content and may be sunburned or cracked. This in turn reduces the market value and sale of cucurbit fruits.

SYMPTOMS

The wilt pathogen attacks cucurbits at all stages of plant growth. *Fusarium* wilt symptoms appear with the clearing of veins on the younger leaves while drooping of the older lower leaves. The disease leads to leaf yellowing, stunted growth, marginal necrosis, defoliation and finally plant death. Symptoms can occur at any stage of plant growth. The plants infected with the fungus *Fusarium* might exhibit various symptoms from seedling damping off to having poor growth with chlorotic foliage. As the plant matures, wilt symptoms start appearing at the tips of the infected plants. A light brown discoloration develops in the vascular tissue present in the lower stem and roots. If the disease is more severe, entire root may turn dark brown in colour and develops a soft rot near the crown area.

CAUSAL ORGANISM

The causal organism of the *Fusarium* wilt disease is *Fusarium oxysporum* (Schlechtend.:Fr.) Synd. and Hans). This pathogen is the most widely dispersed one and it is present worldwide. However there is no known sexual stage present in this fungus, but different types of asexual spores are produced by this pathogen viz., macroconidia, microconidia as well as chlamydospores. Among all the three, microconidia are the most abundantly produced spores. The chlamydospores are the primary means of survival and can survive for many years in the soil.

The wilt diseases in the plant family cucurbitaceae are caused by different formae speciales (f. sp.) of *F. oxysporum*. Although the formae speciales are morphologically similar, but they are generally host-specific. *F. oxysporum* is host-specific and that is why it has formae speciales. Each host has a different formae speciales which is host-specific. For e.g. the formae speciales that affect muskmelon is *F. oxysporum* f. sp. *melonis*. Similarly, other hosts are attacked by their host specific formae specialis like watermelon (*F. oxysporum* f. sp. *niveum*), cucumber (*F. oxysporum* f. sp. *cucumerinum*), bitter gourd (*F. oxysporum* f. sp. *momordicae*) etc.

EPIDEMIOLOGY

F. oxysporum is a devastating pathogen which is soil-borne and it can survive in soils for many years. The wilt fungus spreads with the movement of infested seed, infested soil or diseased plants. Tillage practices, contaminated farm equipments (cultivators, tractors etc.), heavy rain or flooding, and other cultural or environmental factors may also be involved in the disease spread. It penetrates through roots, moves through the xylem vessels and then blocks the vessels by

filling its spores in it, thereby limiting water movement within the plant which results in wilting of the plant. Due to weight of fruit, Fusarium wilt disease shows high severity later in the season.

CONCLUSION

Fusarium wilt is considered as a killer disease of cucurbits. It not only hampers the production of the crop but also affects its fruit quality. Due to this, the market value declines and heavy losses occur. Since *Fusarium* is a vascular pathogen, it chokes the vessels and prevents the uptake of water by the plants. Due to its large resting spores i.e. chlamydospores, it also has long-term survival in the soil.

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CONFLICT OF INTEREST

All the authors declare no conflict of interest.

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