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MAJOR DISEASES OF CITRUS IN PAKISTAN: A REVIEW

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ABSTRACT

Among the citrus diseases in Pakistan citrus greening, citrus slow decline, citrus canker and citrus whither tip are most damaging and are gaining importance. Leaf mottling is the best foliar symptom for the diagnosis of greening. Fruits on severely affected trees are small, lopsided and poorly coloured, remaining dull green, hence the name greening given to the disease. Causal organisms of this disease has been remained the subject of debate. The highest incidence and severity of this disease has been reported in Peshawar followed by Sargodha. The first evident symptom of citrus slow decline (CSD) is drying of twigs and reduction in terminal growth. These trees are not killed but maintain life on a limited scale and produce a reduced crop of inferior fruit. *Tylenchulus semipenetrans* Cobb. and other nematode species are associated with the rhizosphere of diseased plants. Citrus canker is a bacterial disease incited by *Xanthomonas campestris* (Pammel) Dopws. Pv. *citri* (Hasse) Dye. Symptoms of the disease can appear on fruit, leaves and twigs of infected plants, and typically consist of small, round blister-like formations called lesions. These lesions are usually raised, crate-like and are tan to brown in colour and surrounded by an oily, water soaked margin. Citrus wither tip caused by *Colletotrichum gloeosporioides* Penz. is one of the serious diseases throughout the country. Symptoms appear initially from top and transmit downward to bottom of infected tree. Diseased twigs start drying at tips and all affected parts become silvery gray and develop black dots. Defoliation and death of the entire plant also occur under severe conditions. Some other fungal diseases in Pakistan are *Septoria* spot (*Septoria* sp.), stem end rot (*Phomopsis* sp. and *Diploidia* sp.), Trunk gummosis (*Phomopsis* sp. and *Diploidia* sp), foot rot (*Phytophthora* sp.), root rot (water logging + fungi), damping off (*Pythium* sp., *Rhizoctonia solani*, *Phytophthora* sp.), and citrus quick decline [*Fusarium solani* (Mart.) Sacc.].

Key-words: Citrus diseases, greening, slow decline, canker, Pakistan

INTRODUCTION

Citrus, a best source of vitamin C, sugar, amino acids, organic acids and other nutrients, is an important member of family Rutaceae. In Pakistan total area under citrus production is 196.1 thousand hectare with total annual production of 2037 thousand tons (Anonymous, 2001). Sargodha, Faisalabad, Okara, Chiniot, Jhang, Sahiwal, Sammundari and Mandi Bahauddin are known for citrus production in Punjab. This important fruit tree is attacked by a number of diseases in Pakistan viz., greening, slow decline, canker *Septoria* spot, stem end rot, trunk gummosis, foot rot, root rot, and damping off (Catara and Azzaro, 1987; Hussain *et al.*, 1988, Ansar *et al.*, 1994). Among these diseases greening and slow decline, canker and wither tip are gaining importance and have been observed as widespread diseases.

1- Citrus Greening Disease

Citrus greening disease (CGD), one of the most severe diseases of citrus has a large geographical distribution. It is a major cause of tree and production losses in Asia and Africa, two of the main citrus growing areas of the world (Jagoueix *et al.*, 1996). Studies conducted by Akhtar and Ahmad (1999) revealed the presence of CGD in citrus orchards of both NWFP and Punjab of the 183 locations they visited in to geographical areas, 68% had CGD symptoms. The maximum number of locations i.e., 90% having CGD were observed in Peshawar followed by 66, 62, 57 and 52% in Mandi Bahauddin, Sargodha, Faisalabad and Jhang respectively. Sahiwal, Okara and Cheniot had comparatively low incidence of CGD i.e., 27, 20 and 16% respectively.

The most characteristic symptom of CGD is leaf mottle i.e. normal green patches on a pale green background. At early stages of infection symptoms are seen only on one part of the canopy. Plants affected with CGD are generally stunted, here sparse yellow foliage and show twig dieback (Khan, 1989). Fruits on severely affected trees are small, lopsided and poorly colored, remaining dull green, hence the name greening given to the disease. Occasionally color development on affected fruits starts at the peduncular end rather than at the stylar end, as it is the case in normal fruits. Variable numbers of aborted seeds are present in fruits of affected sweet orange and mandarin tree.

The causal organism of CGD has been remained a subject of protracted debate. Initial reports suggested a virus as the causal agent (Hoffmeyer and Oberholzer, 1948). According to Lafleche and Bone (1970) mycoplasma organisms were responsible for the disease. By contrast, Hull (1972) claimed it as a bacterial disease. Garnier *et al.*, (1984) proved it a gram-negative bacterium. Jagoueix *et al.*, (1996) claimed that greening is caused by an uncultured