April 1992 Circular 1025

IFAS UNIVERSITY OF FLORIDA

INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

Some Diseases of Vegetable and Agronomic Crops Caused by Fusarium in Florida

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Introduction

The Genus *Fusarium* contains many species (Fusaria) of fungi that are commonly found in soil. Some Fusaria are capable of causing wilts, crown rots, root rots, or fruit rots. Others are opportunists because they colonize plant tissues after some type of stress debilitates the plant; that is, Fusaria do not cause the initial damage in those situations. Interestingly, many Fusaria that abound in the soil are not capable of causing disease.

Fusarium wilts are caused by the species *Fusarium oxysporum*. Infection of plants by other Fusaria or other organisms can cause wilt, but diseases called Fusarium wilts are caused only by *F. oxysporum*. Within *F. oxysporum*, specificity exists because some forms (form species) within the species are capable of infecting certain plant species. For example, *F. oxysporum* f. sp. *lycopersici* causes Fusarium wilt in tomato and *F. oxysporum* f. sp. *niveum* causes Fusarium wilt in watermelon. Further complicating this situation is the existence of pathogenic races within form species. One pathogenic race may cause disease in certain varieties of a crop species but not in other varieties. Other varieties may be infected by other pathogenic races. Form species and races of Fusaria are indistinguishable in appearance. For the remainder of this publication, the generic term Fusarium wilt will be used to identify the complex group of wilt diseases caused by *F. oxysporum* and its form species and races.

Other species of *Fusarium* cause plant diseases. *Fusarium solani* causes root rots, stem rots, crown rots and fruit rots. *Fusarium subglutinans* infects sugarcane, corn, sorghum, and some broad leaf plants. Identification of the species of Fusarium associated with a problem is of little benefit for the grower unless specific control practices (e.g., resistant varieties) are available for control of specific species, form species, or pathogenic races.

Some Fusaria, including *F. oxysporum* and *F. solani,* produce thick-walled spores called chlamydospores. *F. subglutinans* does not. Chlamydospores are capable of surviving in soils, soil debris, or other substrates for more than 10 or 20 years. Chlamydospores that survive in the soil germinate and form tube-like structures (hyphae) that penetrate roots or other plant parts. These spores can be carried in or on seed, transplants, wooden field stakes, clonal propagation stock, such as potato seed piece tubers, and soil attached to equipment.

Fusarium spp. can also survive by colonizing roots or stems of so-called non-host plants. For example, roots of barley and nutsedge can serve as colonization sites for the Fusarium wilt pathogen of cotton. Brazilian pepper, cudweed, and carpet weed will continually support populations of the fungus that causes crown rot in tomato. The fungus that causes Fusarium wilt in tomato has been found to infect eggplant, mallow, amaranthus, crabgrass, and ricegrass. The watermelon wilt pathogen has been associated with roots of citron, bitter apple, rice, peanut, and tomato. Thus, the production of thick-walled spores and the ability of *Fusarium* spp. to colonize alternate plant hosts provide mechanisms for long-term survival in soil.

Wind-blown dispersal of spores of *Fusarium* spp. may occur. For example, air-borne spores (conidia) of the crown rot pathogen of tomato can recontaminate nearby fumigated sites in the field or the greenhouse. However, for most diseases caused by Fusaria, soil-borne chlamydospores are generally regarded as the primary source of inocula.

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