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## Basil Fusarium Wilt

*Basil is the most popular herb in the U.S. and because of its profitability is widely produced by container and hydroponic greenhouse growers. Basil is susceptible to fusarium wilt, a common soil-borne fungal disease.*

Various Fusarium wilt diseases affect many commonly grown vegetables (tomato, cucurbits, pepper) and ornamentals (cyclamen, garden mums, carnations). The pathogen specific to basil is *Fusarium oxysporum* f. sp. *basilicum*; basil is not susceptible to other forms of *Fusarium oxysporum* that are specialized to attack other plant species. This article will describe the symptoms, likely sources of and prevention strategies for basil Fusarium wilt.

### Symptoms

Early symptoms of Fusarium wilt, as its name implies, are plants that suddenly wilt, appear stunted, or show yellow leaves (Figure 1). These changes in appearance are due to infection of the xylem vessels, which can become plugged and restrict water movement. The xylem vessels will appear discolored. Eventually, brown lesions on the stem may be apparent (Figure 2). Severely twisted stems leading to a "shepherds crook" (Figure 3) and leaf drop can occur. Young seedlings typically do not exhibit symptoms: rather, symptoms

Figure 1. Basil with fusarium wilt. Notice wilted, yellow leaves and distorted new growth.



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become evident when the plants are six to twelve inches tall.

### Disease source and transmission

Fusarium wilt in basil was first reported in the U.S. in the early 90s. The disease is primarily introduced to field, greenhouse, and hydroponic production settings from infected seed. Fusarium wilt has become a devastating disease in sweet basils, cropping up from time to time with infected seed lots as well as spreading within the greenhouse from handling or splashing irrigation water onto infected plants. Fusarium can overwinter in the field and survive for many years. Sweet basils are more sensitive to Fusarium than other varieties.



Figure 2. Symptoms of basil fusarium wilt including stem-lesions (often one-sided initially), wilting and leaf yellowing. As symptoms progress, older leaves may fall off plant.

## Prevention

There are no fungicides registered for control of Fusarium wilt on greenhouse-grown basil. Therefore cultural controls such as trying to avoid infected seeds, treating seeds with hot water and crop rotation in the field are the primary treatment methods. Hot water disinfection is impractical, however, because basil seeds become sticky after treatment. Only purchase basil seed that has been tested and found free from the Fusarium wilt pathogen. These tests grow out a large number of seed from each lot and look for disease symptoms. While testing does not guarantee absence of disease, it reduces the risk. Three "Genovese-type" sweet basils are resistant to Fusarium wilt: 'Nufar', 'Aroma 1', and 'Aroma 2'. While these cultivars are resistant to Fusarium wilt, they are susceptible to basil downy mildew, another devastating basil disease. High ammonium-nitrogen fertility appears to promote development of the disease while nitrate-nitrogen may reduce its development. Good greenhouse cultural and sanitation practices should be followed. Always remove infected plants immediately—sporulation on the surface of the dead stem areas can otherwise be splashed to nearby pots or even become airborne. Disinfect greenhouse benches and hydroponic equipment between crops or immediately after an outbreak occurs.



Figure 3. Stems can become distorted and exhibit a characteristic "shepherd's crook" as seen in the dead stem in this picture.

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Figure 4. Stem lesions on basil infected with fusarium wilt.

Figure 5. Fusarium wilt infection of three basil plants in the same container. Notice plants on right were infected first and eventually the disease progressed to plant on the left.

