

ASPARAGUS FUSARIUM CROWN AND ROOT ROT

Fusarium infection of asparagus was first noted in 1908. In 1941, *Fusarium oxysporum* f.sp. *asparagi* was identified as the causal agent of wilt and root rot in asparagus. In 1979, *Fusarium moniliforme* was reported to be as the causal of stem and crown rot. The Fusarium root and crown rot complex occurs in all major asparagus growing areas. This is an economically important disease of asparagus, as it can reduce the plant stand by up to 50%. *F. oxysporum* f.sp. *asparagi* is a unique pathogen to asparagus. *F. moniliforme* has been found associated with many plant species, including vegetable crops.

Symptoms

Infection is more likely when plants are stressed by drought. Yellowing of ferns of infected plants is a common symptom (Figure 1). Russet-colored lesions develop on roots, crowns (Figure 2), and lower stems. One or more shoots per crown become stunted, turn yellow, and may wilt and die. When cut in cross-section, the vascular bundles within the infected stem may appear discolored. Reddish-brown elliptical lesions are often seen at the base of the stem, sometimes girdling it, and causing a cortical decay. The cortex of diseased roots may be completely destroyed. Brown elliptical lesions are often found at sites of lateral root emergence. Emerging seedlings may be stunted and yellow or wilted. Wilting is associated with the complete collapse of the primary root.



Figure 1. Yellowing symptoms of asparagus caused by *Fusarium* crown and root rot (picture from the University of Massachusetts).

Disease Cycle

F. oxysporum f.sp. *asparagi* is a soilborne pathogen, and persist in soil as chlamydospores and on infected symptomless hosts. *F. moniliforme* survives mainly in crop residues. *F. oxysporum* f.sp. *asparagi* is a typical vascular pathogen. *F. moniliforme* primarily infects the lower stem at wounded sites created by insects or harvesting. Weak plants are highly susceptible to infection by this pathogen, which proceeds into the crown of the plant. Crown symptoms may not be visible until plants come under stress. Both pathogens are associated with asparagus seeds.

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Conidia of these fungi may contaminate the seeds. Inoculum on the seeds may cause damping-off or seedling blight. Some studies have shown that *Fusarium* populations in infested fields may decline after five years out of asparagus production.

Disease Management

Management of *Fusarium* crown and root rot is difficult. Integrated management strategies should be considered for reducing the incidence of *Fusarium* crown and root rot of asparagus. The following practices have been recommended for *Fusarium* crown and root rot.

- Cultural practices: new planting should not be established where asparagus has been grown within the previous five years. Poorly drain and acidic (low pH) soils should be avoided. Blemish-free, vigor crowns, with proper transplanting practices, should be considered for establishing successful production of asparagus. To maintain vigor of the plants, long harvest periods should be avoided.
- Resistant cultivars: although progress has been reported in developing resistant cultivars, no resistant asparagus cultivar is available for commercial production. Tolerant, vigorous cultivars can be used, if they are available.
- Chemical management: only Cannonball fungicide has been recommended for managing *Fusarium* crown and root rot of asparagus in the Midwestern states. Label directions of the fungicide should be followed carefully.



Figure 2. Symptoms of Fusarium crown and root rot on asparagus crown (picture from the University of Massachusetts).