

Phytophthora Rot of Asparagus

Dennis A. Johnson

Department of Plant Pathology, Washington State University, Pullman, WA

Phytophthora rot of asparagus is an important disease of asparagus in California, New Zealand, and Europe; however, the disease has not been identified in central Washington State. Several species of *Phytophthora* cause the disease, including *P. cactorum*, *P. cryptogea*, *P. richardiae*, and *P. megasperma*. *Phytophthora megasperma* var. *sojae* was the predominant pathogenic *Phytophthora* species encountered on asparagus in California in a study in 1982-1983. Highly aggressive isolates of *P. cryptogea* were occasionally found during the mentioned study in California (Falloon and Grogan 1988).

Disease Symptoms

Spears, crowns and roots can be infected, and infected plants may die. Infection is associated with field flooding or overly wet field conditions. Infected spears show water soaked, slightly sunken lesions at or just above soil-level, and are usually crooked (Art 1938). The water soaked lesions develop to an odorless, soft decay. Rotting is usually predominantly at the base of the spears. A white moldy growth of mycelium generally develops on the spear surface under wet conditions. Light brown lesions, which caused the spears to shrivel, occur under dry conditions. If the tips become infected, secondary bacteria often follow, inhibiting development of mycelium and imparting a disagreeable odor to the affected tissue. Affected plants show yellow to light brown shoots and phylloclades and a light brown to reddish-brown root system and crown. Fleshy roots may be hollow (Boesewinkel 1974).

Disease Development

The species of *Phytophthora* that infect asparagus are soil-inhabitants, and survive in the sexual state as thick-walled oospores. In wet conditions they produce sporangia, which are the asexual state. Sporangia may give rise to motile, zoospores. Infection by either sporangia or zoospores occurs after heavy or prolonged rain, or may be associated with field flooding. Roots and crowns may be invaded, causing substantial reduction in yield, or even death of the plant. Spear tips may become infected if spears are hydro-cooled after harvest with contaminated water.

Management

Most importantly, do not overwater fields. Overly wet fields provide ideal conditions for plant infection. The disease can be substantially reduced with a well-timed application of the fungicide, metalaxyl (Cheah 1987). However, populations of *Phytophthora* resistant to the

fungicide can quickly develop. Precautions must be taken to avoid development of fungicide resistance. These include applying only one application of metalaxyl or its isomer, mefenoxam, per season, avoiding overwatering, and applying cultural tactics in an integrated disease management strategy. Check fungicide label for registration.

Cultural tactics include improving field drainage when appropriate, the use of seedling transplants instead of crowns, or, alternatively, the storage of crown transplants until field conditions are dry and warm. Chlorination of hydro-cooling water helps to protect harvested spears. Some asparagus cultivars are partially resistant to this disease (Falloon 1986).

Key References

Ark, P.A., and Barrett, J.T. 1938. Phytophthora rot of asparagus in California. *Phytopathology* 28:754-656

Boesewinkel, H.J. 1974. Phytophthora on asparagus in New Zealand. *Plant Disease Reporter* 58:525-529.

Cheah, L.H. 1987. Metalaxyl controls Phytophthora rot of asparagus. *Proc. 40th New Zealand Weed and Pest Control Conf.* pp. 64-66.

Falloon, P.G. 1986. Phytophthora rot of asparagus. 2. Resistant varieties and recommendations for control in established asparagus. *New Zealand Commercial Grower* 41:9.

Falloon, P.G., and Grogan, R.G. 1988. Isolation, distribution, pathogenicity, and identification of *Phytophthora* spp. on asparagus in California. *Plant Disease* 72:495-497.