



Fig. 1. Symptoms on bean plants causing brown roots and lower stem (a). Zoospores encysting at the end of the sporangia (b). Oospores in the tip of a bean root (c).

Common Name: Aphanomyces root rot of legumes.

Disease: *Aphanomyces euteiches*

Classification: K: Chromista, D: Oomycota, C: Oomycetes, O: Saprolegniales, F: Leptolegniaceae

Aphanomyces euteiches is a fungal pathogen found in many areas of Australia causing browning of roots and in some cases the hypocotyl. The pathogen is found commonly affecting peas, beans, faba beans, clover and lucerne. The fungus produces motile zoospores that are produced during periods of high rainfall or excessive irrigation which is also required for infection. Zoospores can either develop from oospores that survive in the soil for many years or from hyphae in infected plant material. The hyphae have no septa and contain cellulose in the cell wall.

Host Range:

Aphanomyces euteiches has been shown to exist as different forma specialis (f.sp.) with the type isolated from beans (*A. euteiches* f.sp. *phaseolus*) not infecting peas. The pea isolate known as *A. euteiches* f.sp. *pisi* may cause some infection on bean roots without symptoms on the hypocotyl. Broad cross infection studies with genetic comparisons have not been undertaken with different Australian isolates.

Impact:

Aphanomyces is commonly assumed to be part of a soil borne disease complex but it can be the prime cause of disease on its own. In beans and peas the disease causes browning of the roots and the lower stem reducing plant vigour and yield but not causing plant death. Plants can wilt and die due to reduced root activity if hot weather occurs and where rainfall or irrigation is inadequate. Crops that do survive may have variability in pod maturation reducing the ability to machine harvest. *Aphanomyces* is difficult to isolate from infected plant material, often overtaken by species of *Fusarium* and *Pythium*.

Key Distinguishing Features:

Aphanomyces species produce characteristic zoospores that are produced by segmentation of the protoplasmic contents of the sporangia. The zoospores are then ejected, form into a spherical shape, congregate and encyst at the sporangial opening. This process can easily be observed if cultures or infected roots are placed in water. Oospores are also characteristic and numerous in infected plant material.

Control:

No chemical control methods are available. There are limited if any resistant varieties across the host range. Avoidance of fields with severe infections is the only way to reduce the impact from this disease, but this is often difficult as the fungus can survive for many years in soil. Metalaxyl does not control *Aphanomyces* however a seed dressing containing hymexazol successfully controls *Aphanomyces cochlioides* on sugar beet in the United States. The product has also shown to be effective as a seed dressing on beans but is unlikely to be available in Australia.

Further Reading:

Scott WW (1961) A monograph of the Genus *Aphanomyces*. *Technical Bulletin* 151 Virginia Agricultural Experiment Station.

Pfender WF & Hagedorn DJ (1982) *Phytopathology* 72, 306-310.

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