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EC03-1885 Sugar Beet Disease Profiles I: Fungal Root Rots

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University of Nebraska Cooperative Extension EC03-1885-S

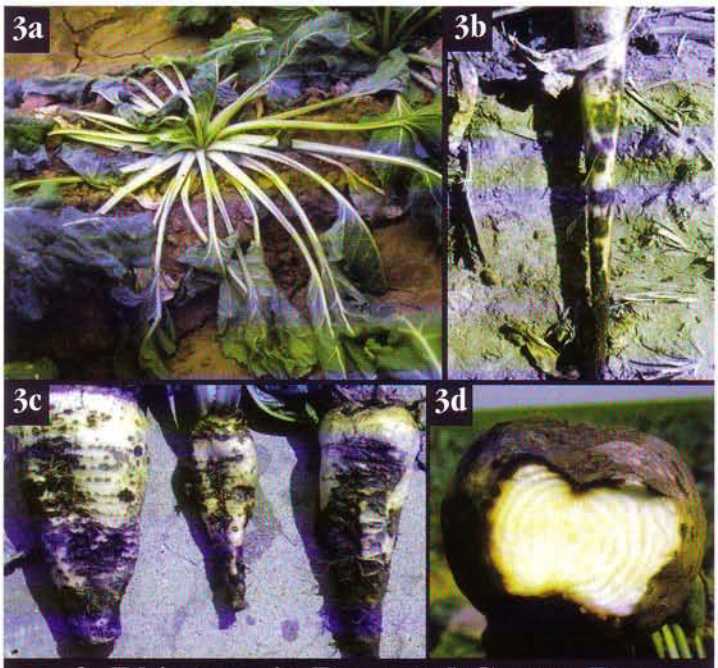
Sugar Beet Disease Profiles I

Fungal Root Rots

University of Nebraska Lincoln

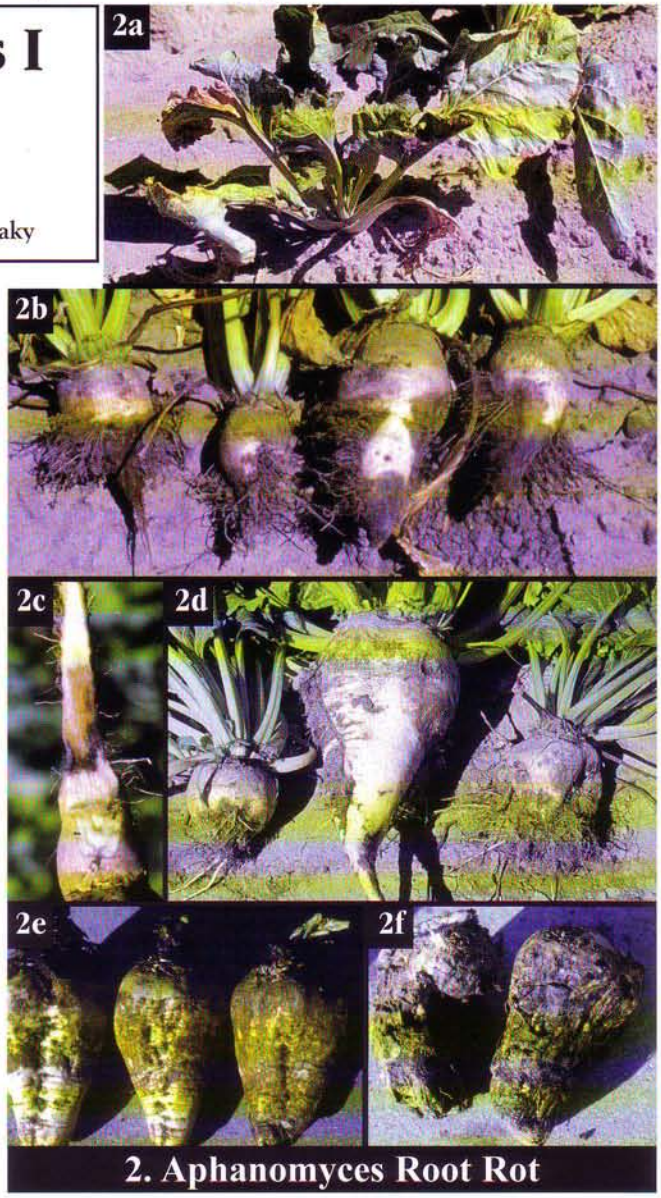
UNL Extension Plant Pathology Team
Robert M. Harveson, James P. Stack, John E. Watkins, Loren J. Giesler, and Jennifer L. Chaky

1. Seedling Diseases

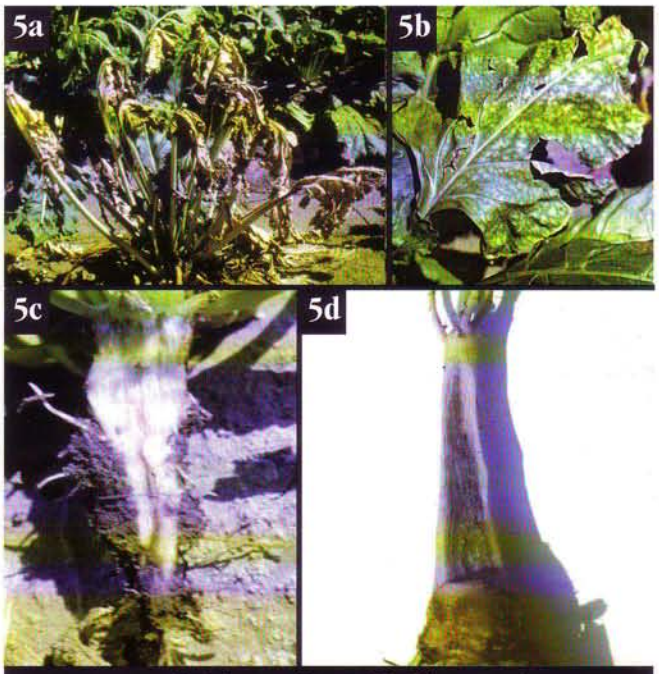


3. Rhizoctonia Root and Crown Rot

4. Pythium Root Rot



2. Aphanomyces Root Rot



5. Fusarium Yellows

Disease	Symptoms
1. **Seedling** *Phoma betae*	Most damage occurs after emergence and consists of dark brown to black necrosis on hypocotyls *(Fig. 1a)*. Disease is more serious at lower temperatures. Little infection occurs above 75°F.
Pythium ultimum	Cool weather pathogen (60-65°F). Infection primarily causes preemergence damping-off.
P. aphanidermatum	Warm weather pathogen (85-95°F). Infection of emerged seedlings begins below soil surface and progresses up hypocotyls, resulting in wilting of leaves and often plant death *(Fig. 1b)*. Symptoms are indistinguishable from those of post-emergence damping-off by *P. ultimum*.
Rhizoctonia solani	Causes both pre- and post-emergence damping-off, but most damage occurs on emerged seedlings. Infection does not occur below 60°F, but can occur anytime above 68-70°F. Symptoms are essentially identical to those of *Pythium* spp. *(Fig. 1c)*.
Aphanomyces cochlioides	Infection begins post-emergence with lesions on hypocotyls near soil surface that progress from gray to black. Stems become very thin and thread-like. Cotyledons seldom wilt before advanced stages. Primarily diagnostic symptoms include thin black stems and lack of wilting *(Fig. 1d)*.
2. **Aphanomyces Root Rot** *A. cochlioides*	Pathogen can cause a root rot anytime during the season, given warm, moist soil conditions. Foliar symptoms include stunting, yellowing, and non-vigorous growth *(Fig 2a)*. Root symptoms can vary from dark external lesions often at root tips *(Fig. 2b)* with yellowish-brown interior *(Fig. 2c)* to severely rotted taproots *(Fig. 2d)*. Mildly infected plants can recover to varying degrees, but still may retain superficial scarring *(Fig. 2e)* or severe distortion and rotting *(Fig 2f)*.
3. **Rhizoctonia Root Rot** *R. solani*	Foliar symptoms are characterized by sudden and permanent wilting *(Fig. 3a)* and small necrotic lesions *(Fig 3b)* that coalesce, causing larger areas of roots to become rotted *(Fig. 3c)*. Necrosis and rot often are restricted to outer layers of the root *(Fig. 3d)* until very advanced stages of disease.
4. **Pythium Root Rot** *P. aphanidermatum*	Foliar symptoms are very similar to those caused by *R. solani*, including permanent wilting *(Fig 3a)*. Root symptoms include dark brown to black lesions, often covered by white mycelium *(Fig. 4a)*. To distinguish from Rhizoctonia root rot, lesions on roots infected by *Pythium* generally penetrate into the interior, causing a black, wet rot *(Fig. 4b)*.
5. **Fusarium Yellows** *F. oxysporum* f. sp. *betae*	Foliar symptoms are characterized by wilting and scorching of leaves *(Fig 5a)*, and interveinal yellowing *(Fig. 5b)*. Root symptoms consist of moderate *(Fig. 5c)* to severe *(Fig. 5d)* vascular necrosis and discoloration. The pathogen invades vascular tissues which prohibits normal water translocation, resulting in wilting and scorching symptoms on leaves.

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