

2003

EC03-1886 Sugar Beet Disease Profiles II: Foliar, Viral, and Nematode Diseases

Robert M. Harveson

University of Nebraska - Lincoln, rharveson2@unl.edu

James P. Stack

University of Nebraska - Lincoln

John E. Watkins

University of Nebraska - Lincoln, jwatkins1@unl.edu

Loren J. Giesler

University of Nebraska - Lincoln, lgiesler1@unl.edu

Jennifer L. Chaky

University of Nebraska - Lincoln

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Harveson, Robert M.; Stack, James P.; Watkins, John E.; Giesler, Loren J.; and Chaky, Jennifer L., "EC03-1886 Sugar Beet Disease Profiles II: Foliar, Viral, and Nematode Diseases" (2003). *Historical Materials from University of Nebraska-Lincoln Extension*. 1612.
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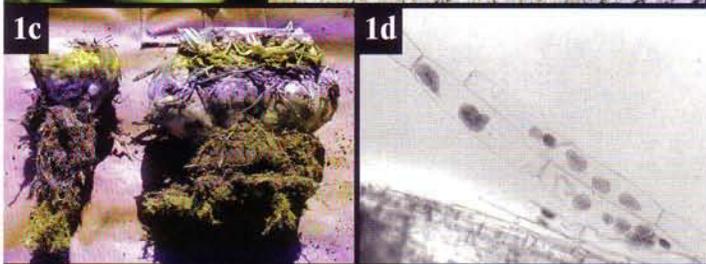
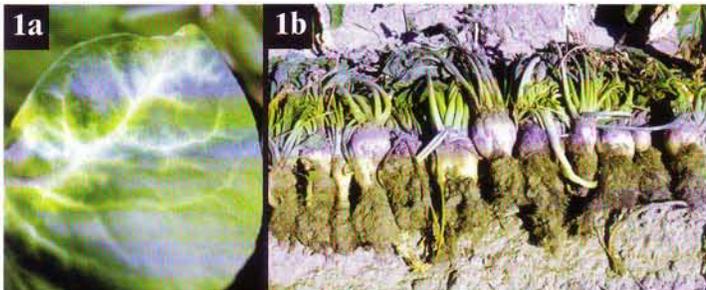
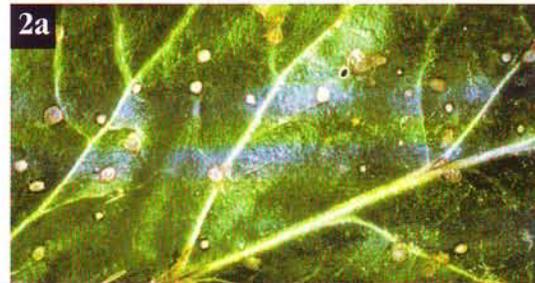
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Sugar Beet Disease Profiles II

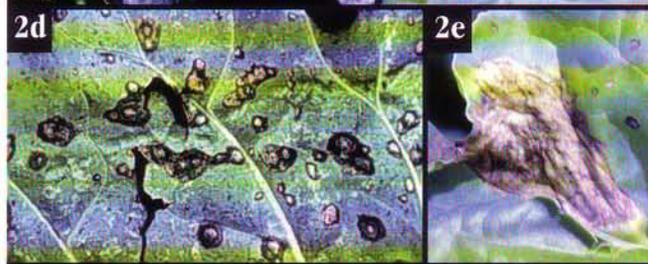
Foliar, Viral, and Nematode Diseases



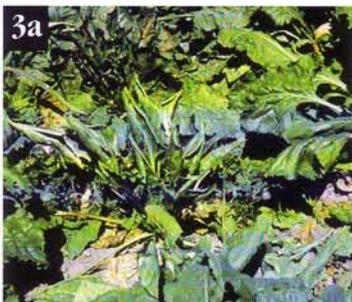
UNL Extension Plant Pathology Team
Robert M. Harveson, James P. Stack, John E. Watkins, Loren J. Giesler, and Jennifer L. Chaky



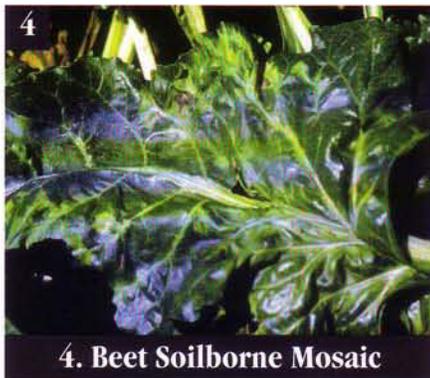
1. Rhizomania



2. Foliar



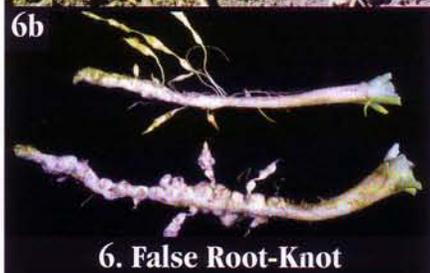
3. Beet Curly Top



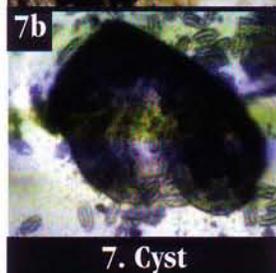
4. Beet Soilborne Mosaic



5. Nematodes



6. False Root-Knot



7. Cyst



8. Root-Knot

Disease	Symptoms
1. Rhizomania <i>Beet necrotic yellow vein virus</i>	Systemic infection results in foliar symptoms consisting of yellow vein clearing (Fig. 1a), which may later turn necrotic. This rarely seen symptom is the source for the name of the pathogen. Classical symptoms following early infection include small, stunted taproots with large masses of secondary roots (Fig. 1b). Later infections often cause roots to be constricted, resulting in a wineglass appearance (Fig. 1c). The virus is transmitted by the soilborne fungus <i>Polymyxa betae</i> . The fungus survives in soil or root debris as thick-walled survival structures (cystosori) (Fig. 1d), which also contain the virus. Under conditions of high soil moisture, the cystosori liberate zoospores that inoculate the virus into plants as they infect roots.
2. Foliar	
Cercospora Leaf Spot <i>C. beticola</i>	Cercospora leaf spot symptoms initially occur on older leaves before developing on new ones. Lesions are circular (1/8 inch in diameter), with tan to ash gray centers and a brown to purple border (Fig. 2a). As lesions coalesce, severely affected leaves become yellow, wither and die.
Powdery Mildew <i>Erysiphe polygoni</i>	Symptoms first appear on older leaves as small, radiating whitish mats. As disease progresses, the pathogen spreads rapidly over both leaf surfaces, resulting in a dry, dusty appearance (Fig. 2b). Severely affected leaves turn yellow, become dry and brittle and die.
Phoma Leaf Spot <i>P. betae</i>	This same pathogen can cause seedling disease at low temperatures, and a root rot that later can be problematic in storage piles after harvest. The leaf spot phase consists of spots (1/2 to 1 inch in diameter) that are light brown and round to oval with dark concentric rings (Fig. 2c). Disease intensity is generally more severe on lower leaves.
Bacterial Leaf Spot <i>Pseudomonas syringae</i> pv. <i>aptata</i>	Disease symptoms consist of dark brown to black leaf spots on leaves (Fig. 2d). Spots may coalesce, giving the affected leaves a blighted appearance. The pathogen also can enter leaves through hydathodes, resulting in necrotic angular lesions on leaf edges (Fig. 2e).
3. Beet Curly Top <i>Beet curly top virus</i>	The virus is transmitted to plants by the beet leafhopper, <i>Circulifer tenellus</i> . Infected plants are stunted, with leaves rolled inward and upward (Fig. 3a). The pathogen invades the phloem, causing these tissues to appear necrotic in cross section (Fig. 3b). Other diagnostic symptoms include raised, roughened veins with blister-like swellings (Fig. 3c).
4. Beet Soilborne Mosaic <i>Beet soilborne mosaic virus</i>	The pathogen causing beet soilborne mosaic is closely related to, but distinct from, the virus causing rhizomania. It also is vectored by <i>Polymyxa betae</i> . Root symptoms vary and infected roots may be symptomless, or may appear similar to those associated with rhizomania. Foliar symptoms are also rare and consist of light yellow vein banding that progresses to broad chlorotic patches associated with veins (Fig. 4).
5. Nematodes	All nematode diseases are characterized by similar foliar symptoms, including stunting, wilting, and yellowing of leaves (Fig. 5). Root symptoms, however, are distinctive to each nematode (Figs. 6-8).
6. False Root-Knot <i>Nacobbus aberrans</i>	The most visible root symptom is a proliferation of side roots and the presence of warty galls or swellings (Figs. 6a and 6b). Contrast this with the root-knot nematode, which produces galls that are smoother (Fig. 8).
7. Cyst <i>Heterodera schachtii</i>	Affected plants have small storage roots and excess fibrous roots. The most easily observed symptom is the presence of white, lemon-shaped cysts attached to fibrous roots (Fig. 7a). The cysts (bodies of dead females) stay in the soil and contain eggs that later hatch to cause new infections (Fig. 7b).
8. Root-Knot <i>Meloidogyne hapla</i>	The pathogen attacks roots and induces the formation of galls, which are smooth, rounded or knobby (Fig. 8). A single gall may contain one to several adult nematodes.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Dean and Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.

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