RECENT PLANT DISEASE ISSUES IN OR AROUND UTAH

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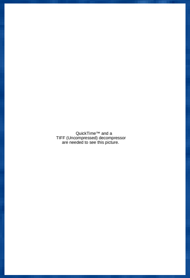
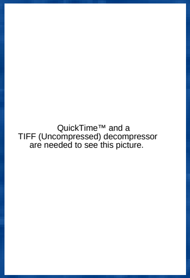
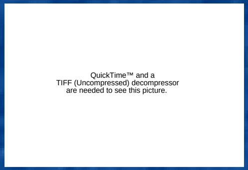
UtahState UNIVERSITY COOPERATIVE extension

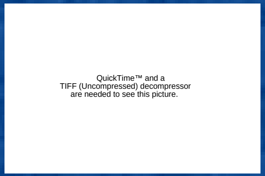
UDAF current plant disease quarantines

Karnal Bunt (*Tilletia indica*)

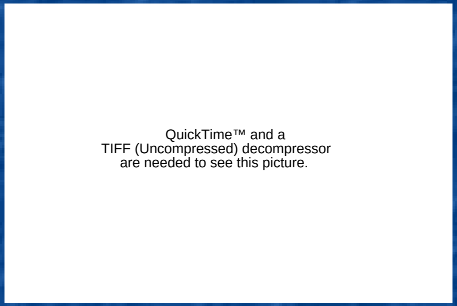








Potato Virus Y (Necrotic Strain)



Mint Wilt (*Verticillium albo-atrum, V. dahliae*)

At present these diseases are not known to occur in Utah.

UDAF is trying to keep them out by imposing quarantines.

Main points for Karnal Bunt:
http://www.rules.utah.gov/publicat/code/r068/r068-018.htm

No wheat for SEED from entire state of AZ and NM counties Dona Ana, Hildalgo, Luna, and Sierra and TX counties El Paso, Hudspeth.

No equipment from those quarantined areas or plant products (soil too).

At present these diseases are not known to occur in Utah.

UDAF is trying to keep them out by imposing quarantines.

Main points for Potato Virus Y:
http://www.rules.utah.gov/publicat/code/r068/r068-017.htm

No potatoes for propagation or plants from the *Solanaceae* from Canadian provinces of New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec, or any other subsequent area it is found or any other plant, plant part, or article of conveyance….

At present these diseases are not known to occur in Utah.

UDAF is trying to keep them out by imposing quarantines.

Main points for Mint Wilt Quarantine:

http://www.rules.utah.gov/publicat/code/r068/r068-012.htm

No mint plants from outside of UT and only certified planting stock carrying approved documents (tags). No article or means of conveyance. (stay out)

Pests Near Utah but not (yet) in Utah:

Potato Cyst Nematode (*Globodera pallida*)

Sudden Oak Death (*Phytophthora ramorum*)

Pine Wilt Nematode (*Bursaphelenchus xylophilus*)

Potato Cyst Nematode (*Globodera pallida*) identification based on morphological and molecular characters:

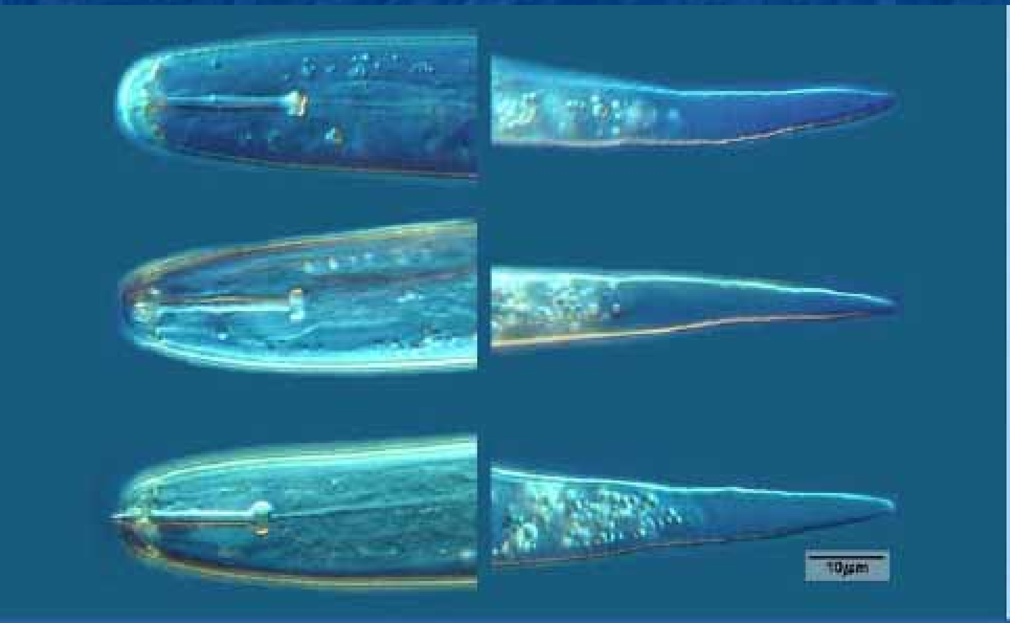
- Cyst shape
- Characteristics of cyst terminal cone including nature of fenestration (small windowlike thin areas)
- Cyst wall pattern
- Anal-vulval distance
- Number of cuticular ridges between anus and vulva
- Granek’s ratio

Globodera pallida J2 from Idaho tare soil; differential interference contrast composite images of central and superficial focal planes

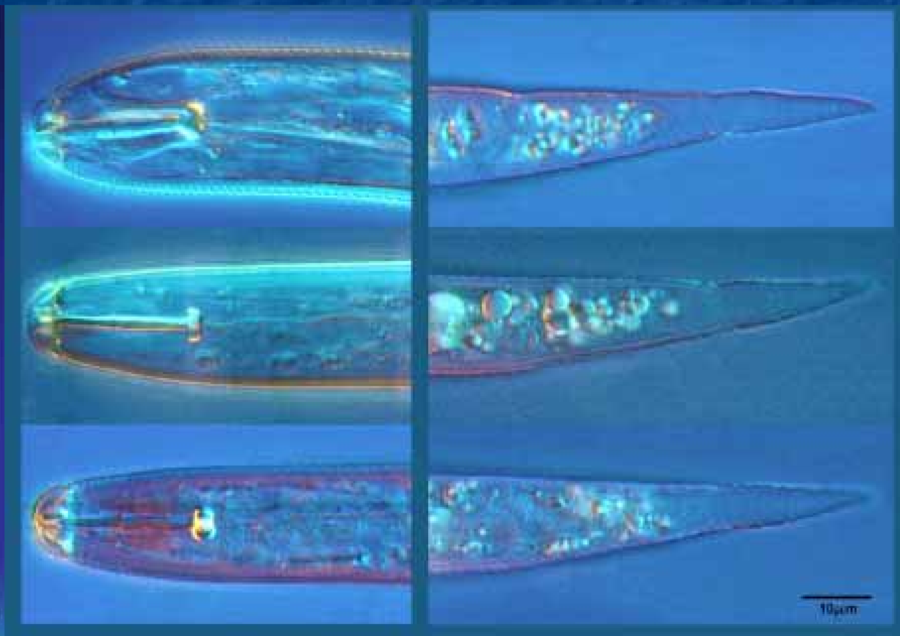
The second-stage juvenile morphology critical for identification:

- Body length
- Stylet length
- Shape of stylet knobs
- Shape and length of tail
- Shape and length of hyaline tail terminus
- Number of refractive bodies in the hyaline part of tail

Morphological differences of the J2 heads (lip region) and tails of *Globodera rostochiensis* versus *G. pallida*

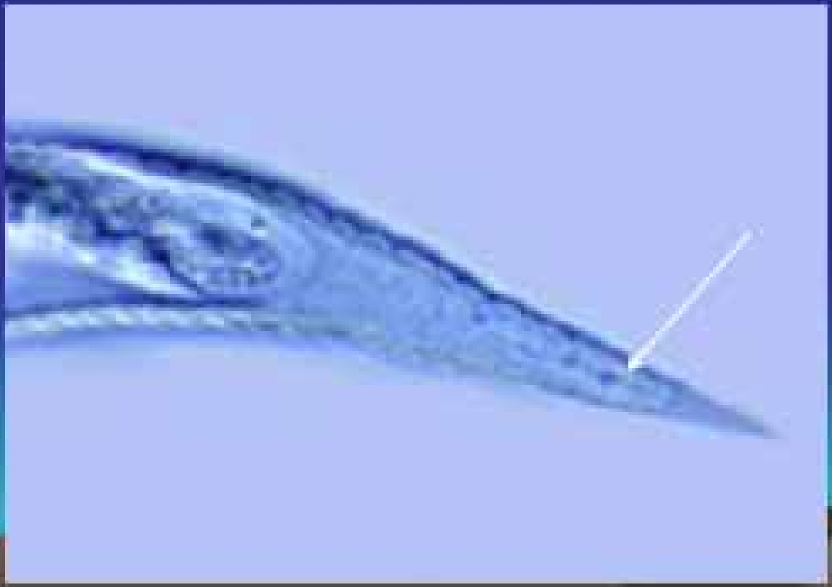


Globodera rostochiensis J2 heads, tails from New York

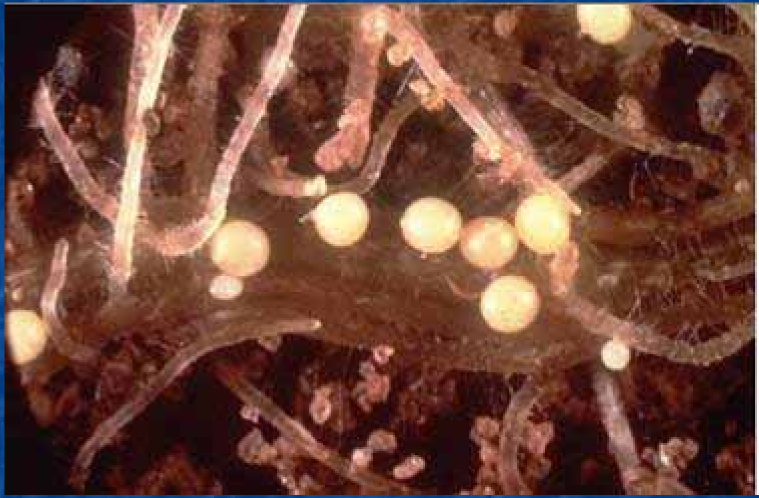


Globodera pallida J2 heads, tails from tare soil, Idaho.

Some tails from the new population are somewhat more acutely pointed than the original population of *G. pallida*.



G. pallida has 4-7 distinctive refractive bodies in the hyaline portion of tail vs. 2 in *G. rostochiensis*.




Molecular diagnosis as *G. pallida*

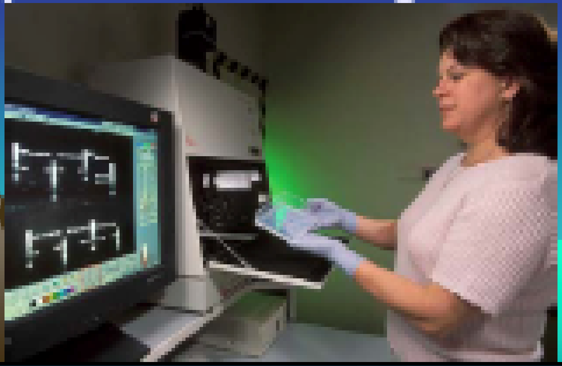
Clear confirmation by two tests:

PCR-RFLP profiles of a ribosomal DNA fragment using restriction enzymes RsaI, TaqI, and AluI were consistent with a *G. pallida* control and not *G. rostochiensis*.

The ribosomal DNA region that extends from the 3' end of the 18S ribosomal subunit and includes all of ITS1, 5.8S, and ITS2, to the 5' end of the 28S ribosomal subunit was used to generate the most accurate species determination. Sequences obtained from three individual juveniles were compared to those from several *Globodera* species, revealing unequivocal similarity to *G. pallida*.

Andrea Skantar, Ph. D.,

Research Molecular Biologist

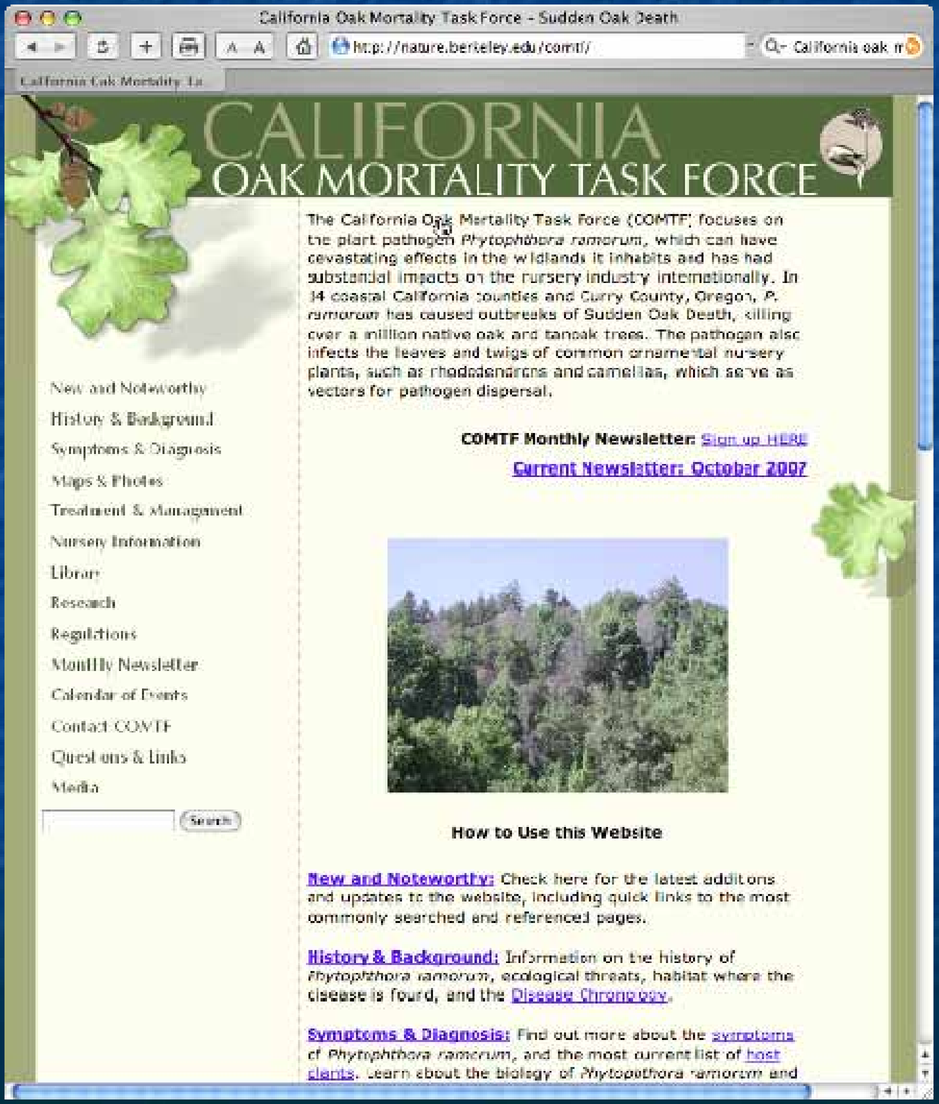


Sudden Oak Death (*Phytophthora ramorum*)

Was quarantined (no commerce of horticultural plants and/or soil from CA back in 2003-04.

Quarantine was lifted but new research has broadened the list of hosts and has pointed out newer more disconcerting information.

http://nature.berkeley.edu/comtf/



Pathogen Description

Phytophthora species are water molds that are well known plant pathogens. They are water-loving and produce plentiful spores in moist, humid conditions. While most foliar hosts do not die from the disease, they do play a key role in the spread of *P. ramorum*, acting as breeding ground for inoculum, which may then be spread through wind-driven rain, water, plant material, or human activity. Trunk hosts such as oaks are considered terminal hosts - the pathogen does not readily spread from intact bark cankers - and they become infected only when exposed to spores produced on the leaves of neighboring plants.

Multiple symptoms as the list of hosts is quite extensive.

Causes cankers on some hosts, leaf lesions on others, both on some.

New research:

Dart, N. L., Chastagner, G. A., Rugarber, E. F., and Riley, K. L. 2007. Recovery frequency of *Phytophthora ramorum* and other *Phytophthora* spp. in the soil profile of ornamental retail nurseries. Plant Dis. 91:1419-1422.

Recovery Frequency of *Phytophthora ramorum* and Other *Phytophthora* spp. in the Soil Profile of Ornamental Retail Nurseries

N. L. Dart, G. A Chastagner, E. F. Rugarber, and **K. L. Riley,** Department of Plant Pathology, Washington State University Research and Extension Center, Puyallup 98371-4998

ABSTRACT

Dart, N. L., Chastagner, G. A, Rugarber, E. F., and Riley, K. L. 2007. Recovery frequency of *Phytophthora ramorum* and other *Phytophthora* spp. in the soil profile of ornamental retail nurseries. Plant Dis. 91:1419-1422.

We tested the hypothesis that inoculum of the aboveground exotic plant pathogen *Phytophthora ramorum* would be limited to the organic layer (top layer of plant debris) of soils at infested retail nurseries located outside of the area where the pathogen has become established in the landscape. To test this hypothesis and compare inoculum levels of *P. ramorum* with levels of other *Phytophthora* spp. in the soil profile, soil cores were collected and sampled from three Washington State retail nurseries at which the soil had previously tested positive for *P. ramorum*. *Phytophthora* was isolated from soil using rhododendron leaves as bait, and pure cultures were obtained and stored on V8 juice agar. Isolates were identified to species using a combination of DNA sequencing of the internal transcribed spacer (ITS) region of rDNA, real-time polymerase chain reaction (PCR) diagnostic testing, and culture morphology. Recovery frequencies were tabulated and compared by species at the organic layer, 0 to 5 cm, 5 to 10 cm, and 10 to 15 cm depth classes. The three most common *Phytophthora* spp. recovered from the soil cores were *P. citricola* (32%), *P. drechsleri* (32%), and *P. ramorum* (27%). *P. citricola* and *P. drechsleri* were more evenly distributed throughout the soil profile, whereas *P. ramorum* was primarily recovered from the organic and 0 to 5 cm depth class (86% of recoveries). *P. ramorum* was not detected below 10 cm.

Phytophthora ramorum S. Werres & A.W.A.M. de Cock is an exotic plant pathogen responsible for the death of tan oak (*Lithocarpus densiflorus* (Hook. & Arn.) Rehd.), coast live oak (*Quercus agrifolia* Née), and California black oak (*Q. kelloggii* Newb.) in parts of coastal California, tan oak in southwestern Oregon

potting media (10), and rhododendron plants have been infected when grown in infested potting media in laboratory experiments (9,11). However, the overall significance of the soil phase in the *P. ramorum* disease cycle (or role in the epidemiology of the pathogen) in nursery systems is still unknown.

ramorum adjacent to containerized nursery plants where the foliage tested positive during nursery inspections (17). Positive soil tests in a number of U.S. retail nurseries have confounded the mitigation process to eradicate the pathogen from these sites.

One of the obstacles in developing mitigation procedures to eradicate this pathogen from nursery soil is the lack of field data on the abundance and depth at which *P. ramorum* can be isolated from soils in nursery settings. Thus far, field research on the survival and recovery of *P. ramorum* from soil depths has focused on situations where the pathogen has established itself in a forest or park-like setting. These studies have demonstrated that *P. ramorum* can be recovered from inoculated leaf disks 6 months after being buried in forest soil in California (7). In a park setting in the Netherlands, the pathogen has been recovered from soil sampled 20 cm deep adjacent to the roots of infested rhododendrons (1).

In retail nursery settings, containerized plants are commonly displayed aboveground, and any inoculum entering the nursery soil presumably comes from fallen, infested leaves or inoculum originating on these plants. Moreover, the roots of containerized plants are generally confined to their pots and are therefore not as likely to provide a potential route for *P.*

"The recovery of P. ramorum as deep as the 5 to 10 cm (about 2-4 inches) depth class indicates that soil treatments at nurseries where the pathogen is detected in soil should aim to remove or kill inoculum to a depth of at least 10 cm. To minimize the potential for P. ramorum soil positives at retail nurseries, nursery personnel should consider storing and displaying known and associated host containerized nursery stock (16) on concrete, blacktop, or well-drained gravel surfaces."

Pine Wilt Nematode (*Bursaphelenchus xylophilus*)

Why the concern?

Confirmed in Weld and Larimer Counties in Colorado.

Biology. (*Bursaphelenchus xylophilus*) is transported to pine trees by Pinesawyer beetles where it feeds on Blue-stain fungus as well as cells lining the resin canals of the tree.

The nematodes spread throughout the tree and multiply very rapidly. As they destroy the resin canal cells, the tree's water-moving system becomes clogged and resin flow stops.

Pine Wilt Nematode (*Bursaphelenchus xylophilus*)

Ecology. The widespread distribution of the pinewood nematode suggests that it is native to the United States.

Symptoms. Pine wilt symptoms develop very quickly. Affected trees can turn brown and die in as little as 3-weeks.

Damage to other crops. Pine wilt is most serious on Scots pine, although it has also been reported on Austrian and white pines. It is considered to be a potentially serious problem in landscape settings, windbreaks, Christmas tree farms, and recreational plantings.

East campus, UNL
Scotch pine with Pine wilt disease

Aug. 20, 2003	Aug. 25, 2003	Sept. 2, 2003

Control. Dead trees must be cut down and burned before the sawyer beetles emerge in early to mid summer. Once infected there is no effective control measure.

There are many pathogens to be concerned about but these are nearby and coming at Utah through commerce routes.

Remember, knowledge is power!

Look for the unusual.

Be vigilant.

Ask questions.

Don’t hesitate to send a sample to the Utah Plant Pest Diagnostic Laboratory, we can help.

Tomorrow: Distance Diagnostics In Utah (DDIU)

Training on the Leica EZ4D scopes and the associated software that comes with it.

Training from Arthropod Diagnostician, Ryan Davis regarding tips to help him help you.

Training from specialists Diane Alston, Erin Hodgson, and Kent Evans regarding some diagnostic tips they have up their sleeves too.

Drive safely.