

First Report of
Phytophthora cinnamomi
in Oak Woodlands in
California

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Problem: Oak decline

Locations:

Del Dios Area (Lake Hodges)

County Parks

Rural Areas







Oak Tree Survey at Del Dios

Who is involved?

David Shaw, UCCE

Matteo Garbelotto, UCB

Daniel Huberli, UCB

Pat Nolan, SD County

Thom Porter, CDF

Oak Tree Survey at Del Dios

Quercus agrifolia and
Quercus engelmannii trees were
inspected, mapped, and
sampled for *Phytophthora*.













Oak Tree Survey at Del Dios

Results:

Of 474 *Quercus agrifolia* trees,
27% had bleeding cankers on the trunk.

Of 86 *Quercus engelmannii* trees,
none showed bleeding.

Oak Tree Survey at Del Dios

Results:

Phytophthora cinnamomi was isolated from four trees in three distinct sites and from four soil samples.

Pathogenicity Tests:

Q. agrifolia and Q. engelmannii

10, 5 year old trees in 15 gal containers

3 isolates and control

February and September 2002

Lesions measured after 2 months

Reisolation of pathogen on PARP





Pathogenicity Tests

February Results:

Q. agrifolia **26mm lesions**

Q. engelmannii **no lesions**

Control **no lesions**

Temperature: **14, 19, 9° C**

Pathogenicity Tests

September Results:

| | |
|-----------------------|-----------------------|
| Q. agrifolia | 135 mm lesions |
| Q. engelmannii | 49 mm lesions |
| Control | no lesions |
| Temperature: | 21, 24, 18° C |

Pathogenicity Tests

Results:

Lesion length was significantly different between the two hosts.

Significant differences were observed among the three isolates.

Cold temperatures are unfavorable to this pathogen.

*Quercus
engelmannii*







Read it online

**First Report on an Infestation of
Phytophthora cinnamomi in
Natural Oak Woodlands of
California and its Differential
Impact on Two Native Oak
Species.**

Plant Disease 90:685, 2006



Oak Maladies:

Root Problems

Injury

Insects

Diseases

Stress

Root Problems:

Root disturbance

Compacted Soils

Change of Grade

Insects:

Oak Twig Girdler

Scales

Whitefly

Borers

Many Others!

Diseases:

Armillaria Root Rot

Phytophthora Root Rot

Heart Rots

Powdery Mildew

Twig Blights

Stress:

Water Stress – Too Much

Water Stress – Too Little

Competition

**Stress can be cumulative
from many factors**

**Oak appearance can vary
during the year**

Pytophthora cinnamomi:

Optimum Temperature: 21-30 C.

Little to no infection at 9-12, >33 C.

Optimum pH: 6.5

Control at pH of 3.0-3.5

Pytophthora cinnamomi:

Positive identification is through culture of the fungus on selective media (PARP).

Pytophthora cinnamomi:

Dissemination is through

Soil

Nursery Stock

Infected Root Pieces

Water

Pytophthora cinnamomi:

Infection of vasculat tissue can occur in oak roots, root crown, and trunk.

Bleeding!

Canker with easily seen margins

Further work:

**More Root/Crown
Excavation**

Data Analyses

**Inoculation of Seedling
Trees**

***P. cinnamomi* Control**

Cultural:

Resistant Plants/Rootstocks

Clean Stock

Prevention of Field Spread

Proper Planting

P. cinnamomi Control

Chemical:

Aliette

Phosphorous Acid

Applications of Ca and Mg

Mulch