

Phytophthora Diseases of Roots, Stems and Leaves

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Phytophthora infestans causes late blight of potato and tomato

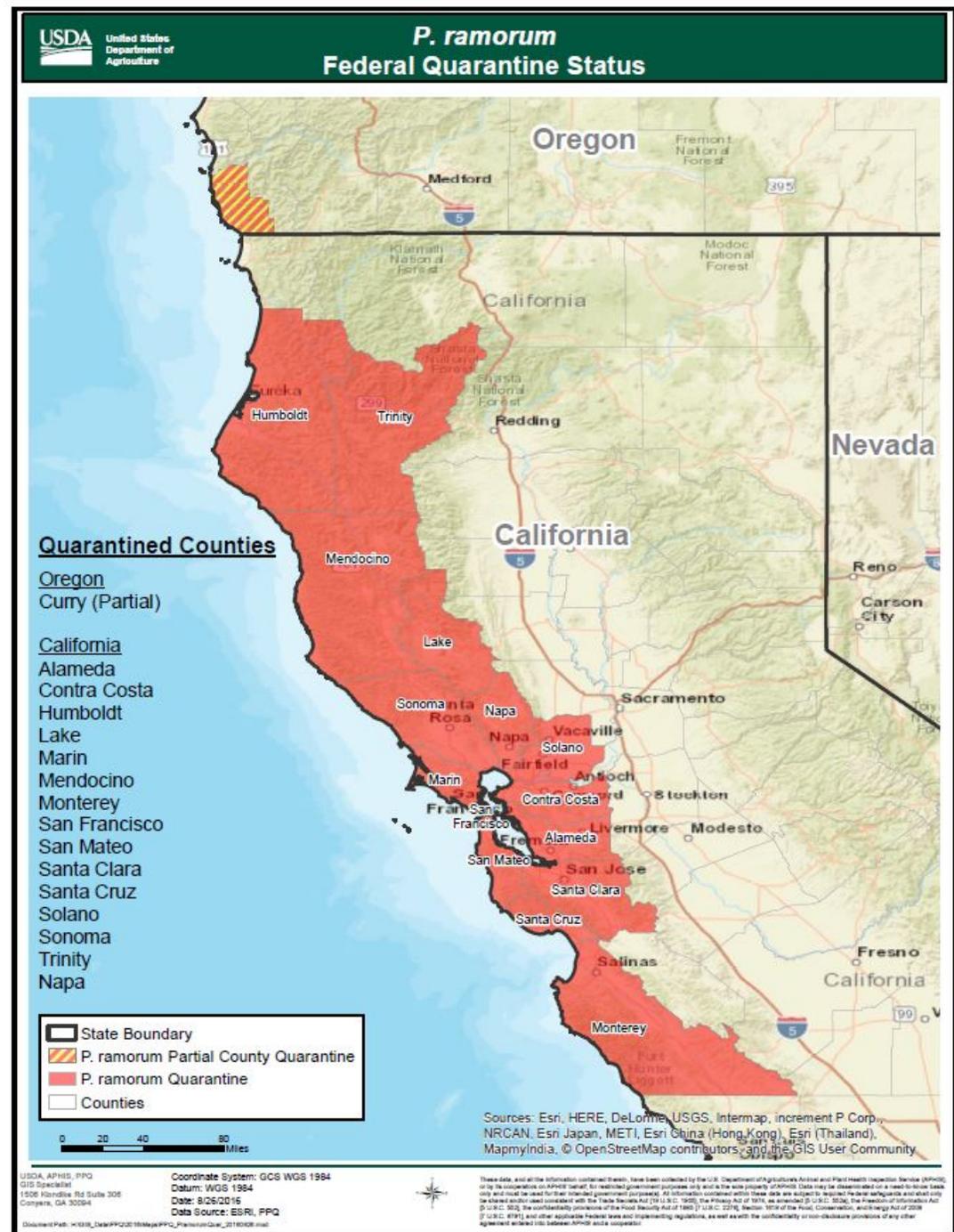


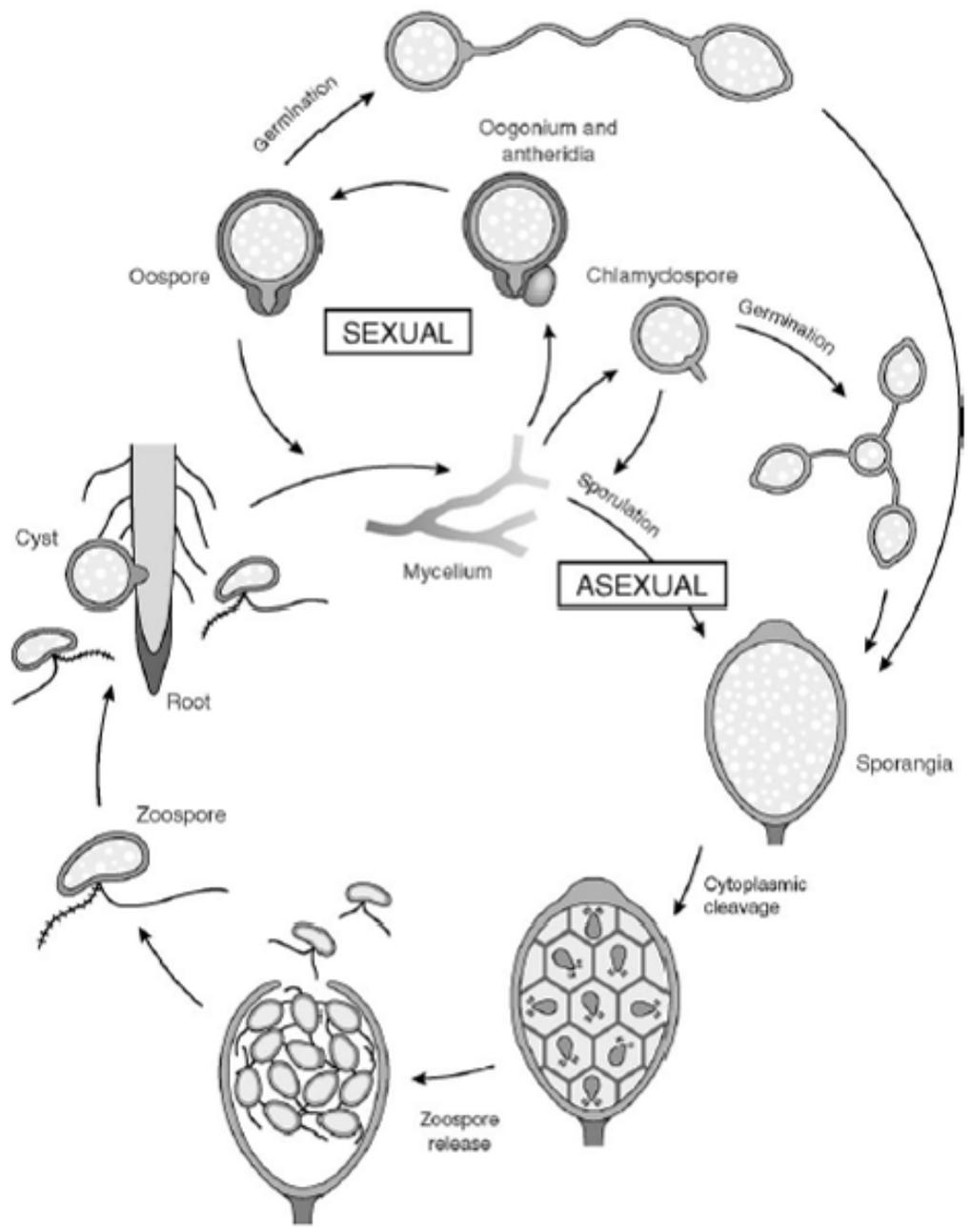
Phytophthora spp., The Plant Destroyers, not true fungi, in another kingdom: Straminipila (formerly Chromista)



Phytophthora ramorum, cause of sudden oak death, an above ground *Phytophthora*, 2005 in San Diego Co.

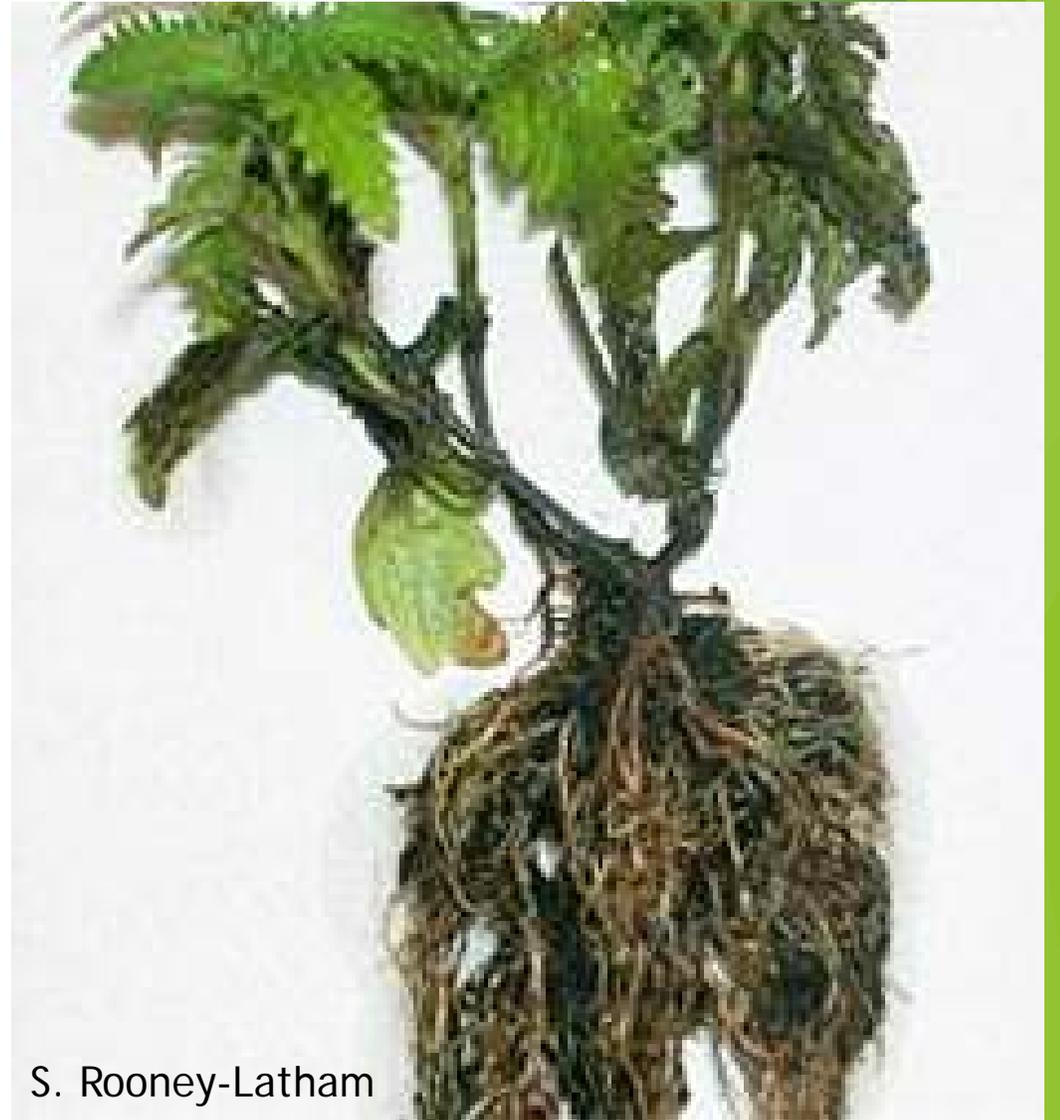
P. ramorum has killed millions of trees





Symptoms of Root Rot

- ▶ Above Ground
- ▶ Leaf yellowing
- ▶ Leaf drooping
- ▶ Leaf drop
- ▶ Dieback of twigs and branches
- ▶ Below Ground
- ▶ Lack of root hairs
- ▶ Dark color of roots and stem
- ▶ Sunken areas on roots
- ▶ Sloughing of outer layers of roots



S. Rooney-Latham

Look for sparse or black roots





California Avocado Commission

Phytophthora cinnamomi the "biological bulldozer" on avocado, infects > 3,000 spp.



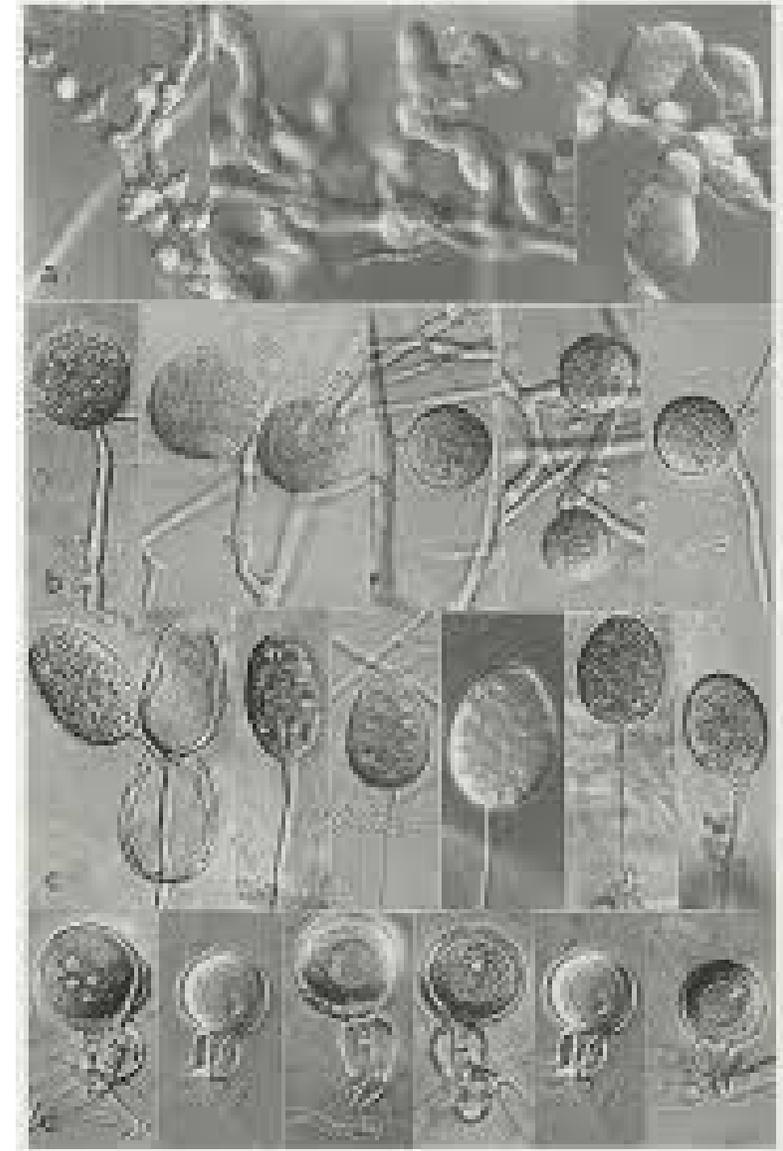
P. niederhauserii on laurel sumac, 2017



P. tentaculata on *Mimulus* by S. Rooney-Latham

Phytophthora tentaculata

- ▶ 1st described in greenhouse grown ornamentals in Germany in 1993
- ▶ 1st found in CA in Monterey County in 2012
- ▶ Hosts in: Asteraceae, Lamiaceae, Ranunculaceae, Rhamnaceae, Rosaceae, Verbenaceae
- ▶ Not detected on trees (yet)
- ▶ At least 25 other spp. found!





Agdia

Nursery Cleanliness

- ▶ REGULATIONS FOR NURSERY INSPECTIONS AND NURSERY STOCK CERTIFICATES
- ▶ Any person producing and/or selling nursery stock is required to comply with the standard of cleanliness and other requirements of this article. California Nursery Stock Certificates may be issued by the Commissioner or the Department for use on shipments of nursery stock, including seed, by any shipper complying with the requirements of this article. Shipments bearing valid certificates may move to counties without being held for inspection at destination. Specific County requirements and quarantine regulations may restrict movement of some kinds of nursery stock from certain areas.
- ▶ **3060. Nursery and Seed Inspection.**
- ▶ Definitions. The following definitions, in addition to those stated in Subarticle 10 Sections 25-49 and 5001-5008 of the Food and Agricultural Code, apply to this article.
- ▶ (a) “Qualified nursery and seed inspector” means a representative of the County Agricultural Commissioner.



Control Measures: Focus on Prevention

- ▶ Start clean. Stay clean.
- ▶ Clean containers, soil mix
- ▶ Hose ends off the ground
- ▶ No weeds
- ▶ Plants should not stand in water
- ▶ Fungicides
- ▶ Solarization doesn't provide control
- ▶ = Best Management Practices



Fungicides: UC Pest Management Guidelines

www.ucanr.edu/sites/UCNFA/files

**Common name
(trade name)**

Amount to Use

**R.E.I.+
(hours)**



When choosing a fungicide, consider the general properties of the fungicide as well as information relating to environmental impact.

A. MEFENOXAM (Subdue Maxx)	Label rates	48
MODE OF ACTION GROUP NAME (NUMBER ¹): Phenylamide (4)		
COMMENTS: The granular formulation may be applied preplant or the liquid formulation can be applied as a drench at planting. Mefenoxam is water-soluble and readily leached from soil. It is absorbed primarily through roots and is translocated in the plant through the xylem.		

B. FOSETYL-AL (Aliette)	2.5–5 lb/100 gal water for foliar spray	12
MODE OF ACTION GROUP NAME (NUMBER ¹): Phosphonate (33)		
COMMENTS: Foliar spray is more effective than the soil drench. When applied as a foliar spray it is absorbed by foliage and moves into roots.		

¹ Group numbers are assigned by the Fungicide Resistance Action Committee (FRAC) according to different modes of actions (for more information, see <http://www.frac.info/>). Fungicides with a different group number are suitable to alternate in a resistance management program. In California, make no more than one application of fungicides with mode of action Group numbers 1, 4, 9, 11, or 17 before rotating to a fungicide with a different mode of action Group number; for fungicides with other Group numbers, make no more than two consecutive applications before rotating to fungicide with a different mode of action Group number.

+ Restricted entry interval (R.E.I.) is the number of hours (unless otherwise noted) from treatment until the treated area can be safely entered without protective clothing.

Where to Find Best Management Practices

- ▶ www.ucanr.edu/sites/UCNFA/files
- ▶ www.Phytosphere.com
- ▶ www.Suddenoakdeath.org
- ▶ www.Agsci.oregonstate.edu/departments-horticulture

