

## California Pest Rating Profile for

### *Phytophthora austrocedri* Gresl. & E.M. Hansen (2007)

#### Pest Rating: A

Kingdom: Chromista, Phylum: Oomycota,  
Class: Oomycetes, Order: Peronosporales,  
Family: Peronosporaceae

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Comment Period: **10/15/2024 through 11/29/2024**

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#### Initiating Event:

This pathogen was recently detected for the first time in North America in nurseries in Oregon. The extent of the infestation is not yet known. It has not been through the pest rating process. The risk to California from *Phytophthora austrocedri* is described herein and a permanent rating is proposed.

#### History & Status:

##### Background:

*Phytophthora* is a genus of major importance with over 150 described species and informally designated taxa. Most are plant pathogens that are responsible for branch, foliar, and fine root diseases and collar rots of woody plant species (Brasier 2009). *Phytophthora* species can be highly invasive, and when they are introduced to new areas, they can affect the health and life span of trees drastically, sometimes destabilizing ecosystems. Several of the most destructive epidemics of trees and forests have been caused by *Phytophthora* species including the extensive mortality of *Quercus* spp. and *Notholithocarpus densiflorus* in California by *P. ramorum* (Rizzo et al., 2002; Grunwald et al., 2012).

*Phytophthora austrocedri* (synonym: *P. austrocedrae* Gresl. & E. M. Hansen, sp. nov.) was first described in 2007 from southern Argentina. There, it is associated with widespread mortality of the native Chilean cedar, *Austrocedrus chilensis* (Cupressaceae) (Greslebin and Hansen, 2010; Greslebin et al., 2007). Molecular phylogeny based on four mitochondrial loci placed *P. austrocedri* in *Phytophthora* clade 8 subclade d, which includes other important tree pathogens including *P. ramorum*, *P. lateralis*, *P. syringae*, and *P. obscura* (Martin et al., 2014; Grünwald et al., 2012; Abad et al., 2023).

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The first isolate of this pathogen (then unnamed) was collected from a creeping juniper (*J. horizontalis*) in an import-export nursery in Germany in the early 2000s. In 2007, this species was discovered to be the cause of dieback and death of Chilean cedar, where the disease it causes is known as “mal del ciprés”. Chilean cedar is native to South America and is the only species in the *Austrocedrus* genus. *Phytophthora austrocedri* is now thought to have been present in Argentina since at least the 1960s. Subsequently it was reported causing extensive dieback and mortality of *Juniperus communis* in northern Britain (Green et al., 2015). Genetic evidence suggests that it was introduced to South America and Europe from elsewhere, but exactly where is still unknown (Henricot et al., 2017).

*Phytophthora austrocedri* mainly parasitizes conifers in the Cypress family, including *Austrocedrus*, *Juniperus*, *Chamaecyparis*, and *Cupressus*. It is likely the host range will be expanded as the susceptibility to North American members of this family is largely unknown. In saturated soils, *P. austrocedri* attacks tree roots and collars. The lesions can girdle the main stem, cutting off the flow of nutrients and killing the plant. This species was listed as a pathogen of concern during the 2009 *Phytophthora* prioritization project conducted by USDA APHIS PPQ CPHST PERAL. It was listed in the “Additional Pests of Concern” by the National Cooperative Agricultural Pest Survey (CAPS) for 2017, 2018, and 2019.

**Hosts:** Hosts (most of which are members of the cypress family) include: *Austrocedrus chilensis* (Chilean cedar), *Callitropsis nootkatensis* (Alaskan cedar), *Chamaecyparis lawsoniana* (Port Orford cypress), *Cupressus sempervirens* (Italian cypress), *Fitzroya cupressoides* (Patagonian cypress), *Ginkgo biloba* (ginkgo), *Juniperus communis* (common juniper), *J. horizontalis* (creeping juniper), *Metasequoia glyptostroboides* (dawn redwood), *Pinus nigra* (Austrian pine), and *Pilgerodendron uviferum* (EPPO, 2024; Farr and Rossman, 2024; Taccari et al., 2019).

**Symptoms:** *Phytophthora austrocedri* most often attacks the roots and root collars, moving up into the bases of trunks and, in the case of junipers, the lower parts of branches. Symptoms include changes in the color of the foliage, starting with yellowing and progressing to red or bronze-brown over all or most of the tree once the trunk is girdled. In juniper, the disease can infect one sub-branch of the tree each year, eventually killing it entirely. The dieback can be scattered on shoots or individual branches. Under the bark, the phloem turns from white to orange-brown, sometimes displaying a diffuse yellow color before forming a necrotic lesion. The phloem may develop resin pockets (Green et al., 2015; Green et al., 2016).

**Transmission:** *Phytophthora austrocedri* produces asexual spores (sporangia) and sexual spores (oospores). Resting spores (chlamydospores) have not been described. Soilborne *Phytophthora* species can survive as spores in soil or water, with infected roots, and with organic debris. The movement of contaminated soil and water and infected plants for planting, are the major pathways for *Phytophthora* movement on a regional, national or international scale. *Phytophthora* infestations of nursery stock are well documented in Oregon (Parke et al., 2014) and California (Rooney-Latham et al., 2019). Nursery stock is seen as major pathway of *Phytophthora* diseases into forests and semi-natural ecosystems within and between continents (Jung et al., 2016).

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**Damage Potential:** In Patagonia, the Chilean cedar is of high economic value and *P. austrocedri* is widespread across that tree's native range, causing localized areas of high mortality, including inside national parks (Velez et al., 2014). In the U.K., *P. austrocedri* is widespread on *J. communis* and is considered a major threat to its survival (Green et al., 2015). *Callitropsis nootkatensis* (Alaskan cedar), *Chamaecyparis lawsoniana* (Port Orford cypress), and *Juniperus communis* (common juniper) have native populations in California. All three are found in northern coastal areas, and *J. communis* extends to the northern and central Sierras. The susceptibility of other native members of the Cupressaceae, including the extremely important California populations of *Sequoia*, *Sequoiadendron*, *Hesperocyparis*, *Thuja* and *Calocedrus* is unknown. These trees have critical components of their ecosystems functions, and their loss would negatively impact forestry, ornamental plantings, tourism, native biodiversity and be a threat to the loss of other native species, and could result in ecosystem level change.

**Worldwide Distribution:** Argentina, Iran, Slovakia and the United Kingdom (Farr and Rossman, 2024).

**Official Control:** *Phytophthora austrocedri* is a regulated non-quarantine pest in United Kingdom (EPPO, 2024).

**California Distribution:** none

**California Interceptions:** none

The risk that *Phytophthora austrocedri* would pose to California is evaluated below.

## Consequences of Introduction:

- 1) Climate/Host Interaction:** Climate appears to affect the establishment and impact of *P. austrocedri*, with the disease most prevalent in cool regions (Patagonia and northern Britain) and in areas of high soil moisture and poor drainage. These are also the climates favored by its hosts, some of which are found in north coastal California and in the Sierra Nevada.

Evaluate if the pest would have suitable hosts and climate to establish in California.

**Score: 2**

- Low (1) Not likely to establish in California; or likely to establish in very limited areas.
- **Medium (2) may be able to be established in a larger but limited part of California.**
- High (3) likely to establish a widespread distribution in California.

- 2) Known Pest Host Range:** The host range is many members of the cypress family, and some hosts in other families have been reported.

Evaluate the host range of the pest.

**Score: 2**

- Low (1) has a very limited host range.
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- **Medium (2) has a moderate host range.**
- High (3) has a wide host range.

**3) Pest Reproductive Potential:** This *Phytophthora* species produces multiple types of spores that move with water and soil. The greatest known risk of inadvertent long-distance dispersal of *P. austrocedri* both regionally and internationally is via the plant trade

Evaluate the natural and artificial dispersal potential of the pest.

**Score: 3**

- Low (1) does not have high reproductive or dispersal potential.
- Medium (2) has either high reproductive or dispersal potential.
- **High (3) has both high reproduction and dispersal potential.**

**4) Economic Impact:** This pathogen can cause significant tree mortality. It is spread with moving water.

Evaluate the economic impact of the pest on California using the criteria below.

**Economic Impact: A, B, G**

- A. The pest could lower crop yield.**
- B. The pest could lower crop value (including increasing crop production costs).**
- C. The pest could trigger the loss of markets (including quarantines).
- D. The pest could negatively change normal cultural practices.
- E. The pest can vector, or is vectored, by another pestiferous organism.
- F. The organism is injurious or poisonous to agriculturally important animals.
- G. The organism can interfere with the delivery or supply of water for agricultural uses.**

**Economic Impact Score: 3**

- Low (1) causes 0 or 1 of these impacts.
- Medium (2) causes 2 of these impacts.
- **High (3) causes 3 or more of these impacts.**

**5) Environmental Impact:** This pathogen could cause serious and significant environmental impacts and greatly affect ornamental plantings

Evaluate the environmental impact of the pest on California using the criteria below.

**Environmental Impact: A, B, C, E**

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.**
  - B. The pest could directly affect threatened or endangered species.**
  - C. The pest could impact threatened or endangered species by disrupting critical habitats.**
  - D. The pest could trigger additional official or private treatment programs.
  - E. The pest significantly impacts cultural practices, home/urban gardening, or ornamental plantings.**
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**Environmental Impact Score: 3**

- Low (1) causes none of the above to occur.
- Medium (2) causes one of the above to occur.
- High (3) causes two or more of the above to occur.

**Consequences of Introduction to California for *Phytophthora austrocedri*: High**

Add up the total score and include it here. **13**

- Low = 5-8 points
- Medium = 9-12 points
- High = 13-15 points

- 6) **Post-Entry Distribution and Survey Information:** Evaluate the known distribution in California. Only official records identified by a taxonomic expert and supported by voucher specimens deposited in natural history collections should be considered. Pest incursions that have been eradicated, are under eradication or have been delimited with no further detections should not be included.

**Evaluation is 'Not established'.**

**Score: 0**

**-Not established (0) Pest never detected in California or known only from incursions.**

-Low (-1) Pest has a localized distribution in California or is established in one suitable climate/host area (region).

-Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

-High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

- 7) **The final score is** the consequences of the introduction score minus the post-entry distribution and survey information score: (Score)

**Final Score:** *Score of Consequences of Introduction – Score of Post Entry Distribution and Survey Information = 13*

**Uncertainty:**

The recent detections in Oregon may suggest that this species is already established in that state increasing the risk to California. Plant pathologists may also discover new hosts in the Pacific Northwest that extend into Northern California, and there may therefore be additional corridors of natural dispersal.

**Conclusion and Rating Justification:**

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Based on the evidence provided above the proposed rating for *Phytophthora austrocedri* is **A**.

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## Responsible Party:

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**\*Comment Period: 10/15/2024 through 11/29/2024**

**\*NOTE:**

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You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at [permits\[@\]cdfa.ca.gov](mailto:permits[@]cdfa.ca.gov).

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### **Comment Format:**

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

#### **Example Comment:**

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to "Climate/Host Interaction" here.]

- ❖ Posted comments will not be able to be viewed immediately.
  - ❖ Comments may not be posted if they:
    - Contain inappropriate language which is not germane to the pest rating proposal;
    - Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;
    - Violates agency regulations prohibiting sexual harassment or other forms of discrimination;
    - Violates agency regulations prohibiting workplace violence, including threats.
  - ❖ Comments may be edited prior to posting to ensure they are entirely germane.
  - ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.
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### **Pest Rating: A**

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