CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

Gymnosporangium sabinae (Dickson) G. Winter
pear-juniper rust/pear trellis rust

Pest Rating: B

Kingdom: Fungi, Phylum: Basidiomycota,
Class: Pucciniomycotina, Subclass: Pucciniomycetes,
Order: Pucciniales, Family: Gymnosporangiaceae

Comment Period: 08/01/2025 through 09/15/2025

Initiating Event:

This pathogen has not been through the pest rating process. The risk to California from *Gymnosporangium sabinae* is described herein, and a permanent rating is proposed.

History & Status:

Background:

California is the 3rd largest pear-producing state in the nation after Washington and Oregon, with production on 20,000 acres, mainly in Mendocino, Lake, and Sacramento counties. The value for California pears in 2022 was $102M (https://www.cdfa.ca.gov/Statistics/PDFs/2022-2023_Ag_Stats_Review.pdf). Additionally, pears are widely grown in home orchards in Northern California. Southern California lacks the chill hours required to break dormancy and initiate flowering in most pear varieties.

The rust fungi belong to one of the largest groups of Basidiomycota, in the order Pucciniales. Rust-causing pathogens are biotrophic fungi and obligate parasites of plants; they develop and reproduce without killing their hosts. Macrocyclic rust fungi have life cycles that involve up to five different spore types or stages: pycniospores, aeciospores, urediniospores, teliospores, and basidiospores. These spore stages are produced sequentially on two separate hosts, and both hosts are necessary to complete the life cycle (Aime et al., 2014).

The rust pathogens significant for fruit trees belong to the genus *Gymnosporangium* (Helfer, 2005). Members of *Gymnosporangium* are unique rust fungi. The aecial stage develops on a Rosaceae host

(secondary or alternate host) and the telia stage on cedars and junipers (primary or telia host). More than half of the species in Rosaceae are susceptible to rust fungi (Helfer, 2005). The most common and worldwide distributed diseases caused by *Gymnosporangium* sp. are cedar apple rust (caused by *G. juniperi-virginianae*), Japanese pear rust (*G. asiaticum*), and pear trellis rust (*G. sabinae* (=*G. fuscum*)).

Pear trellis rust has been known as a disease of junipers and pears in Europe, Asia Minor, and North Africa for centuries (Ziller, 1961). *Gymnosporangium sabinae* is a heteroecious, demicyclic (absent uredinia) rust, which overwinters in juniper twigs (Cummins and Hiratsuka, 2003). *Gymnosporangium* is the only genus of the rust fungi having a telio stage that develops on gymnosperms (Aime, 2006). The distribution of pear trellis rust has significantly increased in the 21st century in Europe, especially in organic pear orchards (Filipp et al., 2012; Kellerhals et al., 2012). Intensive cultivation of orchard pear trees and *Juniperus sabina* (or other *Juniperus* spp.) nearby has favored the spread of the disease in Europe, where it is an economically important disease, especially in organic orchards. Eradication of all rust-infected juniper plants is compulsory in some European countries (EPPO, 2025).

The aecial stage of *G. sabinae* was identified on a Bartlett pear growing in a residential area of Contra Costa County in 1960 (McCain, 1961). This was the first report of the disease in the United States. In the summer of 1961, CDFA Plant Pathologists surveyed the neighborhood and found primary hosts, *Juniper chinensis* var. *pfitzeriana* and *J. sabina* var. *tamariscifolia,* with telial horns near the site where the pear had been heavily infected the previous summer (McCain and Rosenberg, 1961). The disease had been known in Canada since the 1930s including in the lower mainland of British Columbia. It was assumed that it was spread by juniper nursery stock, because of the difficulty of identifying characteristic symptoms, which usually take 15 to 18 months to develop on juniper.

The disease has been detected sporadically in Contra Costa County over the past 60 years, including in 1992 and 2013, from pear nursery stock. *Pyrus calleryana*, which is an invasive species in California but has a popular and widely planted ornamental variety named ‘Bradford’, is also a host (Kenaley et al., 2012).

Hosts: Juniperus chinensis (Chinese juniper), *Juniperus communis* (common juniper), *Juniperus excelsa* (Greek juniper), *Juniperus oxycedrus* (prickly juniper), *Juniperus phoenicea* (Phoenician juniper), *Juniperus sabina* (savin juniper), *Juniperus sabina* var. *tamariscifolia* (tamarix-leaved savin), *Juniperus* sp. (Juniper), *Juniperus virginiana* (eastern redcedar), *Pyrus amygdaliformis* (almond-leaved pear), *Pyrus calleryana*, *Pyrus communis* (common pear) (Farr and Rossman, 2025).

Symptoms: In the early spring, on junipers, fusiform conical or laterally compressed gelatinous swellings (2–3 × 4–6 mm in size) appear on branches. They start as dark brown, later turning orange, in which first teliospores and later basidiospores are produced. Infections on the telial host (junipers) may be persistent, with branches able to release basidiospores over many years. The basidiospores infect pear leaves, shoots, and occasionally fruits (Lāce et al., 2022). The first symptoms on the pear appear approximately one month after infection. The tops of the leaves develop bright yellow-orange spots, which gradually enlarge. Later in the summer, spermogonia develop in the middle of the spots. At the end of summer until leaf fall, dark brown aeciospores develop in globoid to ellipsoid aecia. The aecia are unique, producing elongated orange tubes in a grid or “trellis” like formation (Cummins and

Hiratsuka, 2003). This is the reason for the common name of pear trellis rust. Heavily infected leaves can defoliate early, and infected fruit will be culled (Hilber et al., 1990; Hunt and O'Reilly, 1978).

Transmission: The aeciospores that move the pathogen from pears to junipers, and the basidiospores that move the pathogen from junipers to pears, are both wind-dispersed and released during cool, rainy weather (Ormrod et al., 1984). The aeciospores can be dispersed over long distances as they are less susceptible to drying. After germinating on the telial host, an overwintering latent mycelium is produced. The pathogen does not persist in the aecial host once the infected leaves or fruits have fallen. There is no repeating phase of urediniospores in this rust's life cycle. Long-distance spread is with the movement of nursery stock, either junipers or pears, but they must be planted close to one another for the disease to amplify. The rust pustules on pears are easily seen. The ephemeral telial horns can be seen on junipers only during rainy weather in the spring, and they are much more difficult to detect, making juniper nursery stock higher risk for accidental movement (CABI, 2025).

Damage Potential: Damage caused by pear trellis rust is reported worldwide (CABI, 2025). Disease severity can depend on the pear cultivar (Prokopova, 2011; Lāce and Bankina, 2013). Damage may be severe when infected junipers are within 30m of pear trees, but it will diminish as the alternate hosts are distanced. At 300 m, the infection risk is negligible (Ormrod et al., 1984). The disease hurts pears only when a large proportion of the leaves (fruit or twigs) are infected. Growth and fruit set of heavily infected pear trees are inhibited, and leaves tend to drop early in the season. Eradication of all rust-infected juniper plants is compulsory in some European countries (EPPO, 2025).

Worldwide Distribution: Africa: *Algeria, Libya, Morocco.* Asia: *China, Korea (Democratic People's Republic), Korea (Republic of), Lebanon, Syrian Arab Republic, United Arab Emirates,* Europe: *Austria, Belarus, Belgium, Bulgaria, Cyprus, Czechia, Denmark, France, Germany, Greece, Italy, Latvia, Netherlands, Norway, Poland, Romania, Russia, Serbia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.* North America: *Canada, United States* (Alabama, California, Michigan, New York, Virginia, Washington) (Farr and Rossman, 2025; EPPO, 2025).

Official Control*: Gymnosporangium sabinae* is on the EPPO's A1 list for Bahrain, Comite de Sanidad Vegetal del Cono Sur (COSAVE), Paraguay, and Uruguay, and is a quarantine pest in China (EPPO, 2025). It is on the USDA PCIT's harmful organisms list for Canada, Chile, China, European Union, Honduras, Oman, Peru, Qatar, Taiwan, the Republic of Korea, and the United Arab Emirates (USDA-PCIT, 2025).

California Distribution: Contra Costa and Marin counties.

California Interceptions: none.

The risk that *Gymnosporangium sabinae* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** This pathogen is likely to be found anywhere its hosts can grow. Popular pear cultivars in California, including Bartlett, Bosc, and Comice are susceptible, as well as the ornamental street tree, Bradford.

   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 includes multiple species of junipers and pears.

   Evaluate the host range of the pest.

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

3) **Pest Reproductive Potential:** This rust has a complicated life cycle, and the proximity of its two hosts to one another is very important. The spores do not disperse long distances.

   Evaluate the natural and artificial dispersal potential of the pest.

   Score: 2
   - 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 disease reduces the productivity of pear trees. It is a quarantine pest in some jurisdictions. Pears and junipers should not be planted within 300m of each other in areas where the disease is established (Ormrod et al., 1984).

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

   Economic Impact: A, B, C, D
   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:** *Juniper communis* is a known host and is native to California (Calflora, 2025). The main danger to junipers where this disease occurs is that they will be removed to protect pears. In California, this is mostly an issue for home gardeners where susceptible junipers are planted close to pear trees.

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

Environmental Impact: 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.

Environmental Impact Score: 2

- 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 *Gymnosporangium sabinae:* Medium

Add up the total score and include it here. **11**
-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.

Based on 60 years of records, this disease appears to be established in a limited part of Contra Costa County. It has been observed approximately once a decade, more as a novelty than an economic issue.

Evaluation is 'low"

Score: -1
-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* ***= 10***

Uncertainty:

none

Conclusion and Rating Justification:

Based on the evidence provided above the proposed rating for ***Gymnosporangium sabinae*** **is B.**

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Responsible Party:

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***Comment Period: 08/01/2025 through 09/15/2025**

***NOTE:**

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.

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.

Pest Rating: B
