cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal for

Puccinia horiana (Hennings 1901)

Chrysanthemum white rust

Current Pest Rating: A

Proposed Pest Rating: C

Kingdom: Fungi, Phylum: Basidiomycota,
Class: Pucciniomycetes, Order: Pucciniales,
Family: Pucciniaceae

Comment Period: 11/19/2026 through 01/03/2027

Initiating Event:

Puccinia horiana was assigned an A rating in July 2019. In October 2026, USDA APHIS deregulated chrysanthemum white rust and removed its designation as a Federal quarantine pest. This decision was based on their conclusions that the current eradication-based approach is no longer technically or economically justified. CWR is now considered established in the United States. This change in status will allow imports of cut flowers and cuttings, plus in vitro plantlets from 20 countries under a systems approach. Maintaining an A-rating for California is no longer necessary and could put California producers at a disadvantage compared with producers in other states and countries.

History & Status:

Background:

Chrysanthemum white rust (CWR) is a disease caused by a fungal pathogen, *Puccinia horiana* (Henn.) (Pucciniaceae: Uredinales). This species is not known to be established in California and for decades was considered to be a pest of plant quarantine significance in the United States, Canada, and Mexico. In the last 30 years, multiple localized introductions of CWR have occurred within all three countries in both commercial and residential plantings. The first positive detections in California of CWR were from commercial cut and potted flowers grown in Carpinteria, Santa Barbara County, in 1991. Subsequently, periodic and sometimes serious outbreaks have been found in commercial nurseries in San Diego, Ventura, San Luis Obispo, Monterey, and Santa Clara counties.

In 2009, USDA-APHIS produced an economic assessment of the impact of deregulating chrysanthemum white rust using a partial budgeting model and concluded there would be a net economic benefit of deregulation to the country approximately 66.5% of the time. This was due to the number of states at risk for the disease (9 states) and the number of likely outbreaks per year (5 outbreaks). Additionally, they considered the cost of inspections of foreign shipments of cut flowers, the cost of domestic surveys, and the cost of eradication under state or federal oversight. https://www.aphis.usda.gov/plant_health/plant_pest_info/cwr/downloads/CWR%20Economic%20Assessment.pdf

A notice of proposed rulemaking in 2012 by the USDA (Federal Register Vol 77, no 211) solicited suggestions for changes to domestic chrysanthemum white rust outbreaks and policy regarding rules for the importation of host plants (https://www.regulations.gov/document?D=APHIS-2012-0001-0054). The final rule was published in the Federal Register on October 8, 2026, with effective changes made on November 9, 2026. At the federal level, a detection of *P. horiana* will no longer be treated as a detection of a quarantine significant pest requiring an eradication response. Fresh cut flowers will no longer face special import restrictions because they originate in a country with CWR. APHIS has formally stated that CWR is likely established/endemic in the United States.

Puccinia horiana is an obligate biotrophic pathogen that infects mainly fresh tissue of growing plants (Firman, 1968). It is an autoecious microcyclic rust fungus that requires only one plant host to complete its life cycle. Teliospores germinate in situ (in the leaves), and each 2-celled teliospore can produce 16 basidiospores. The basidiospores (sporidia) can form without requiring a period of dormancy. Although they are very delicate and sensitive to drying and UV light, the basidiospores can be dispersed by air currents up to a distance of 700 meters (Zandvoort et al., 1968). It is the dispersal of very large numbers of basidiospores that explains the rapid development of *P. horiana* epidemics. Under ideal environmental conditions, the life cycle of the pathogen averages 4 weeks but can be as short as 2 weeks (Schubert, 2016). High humidity and a thin film of moisture on the leaf surface are essential for the germination of both telio- and basidiospores. Low humidity is often a limiting factor for disease spread outside of greenhouses (Horst and Nelson, 1997). Leaves can be latently infected for several weeks before pustules and teliospores (necessary for disease identification) are formed (Pedley, 2009). In 2012, there was a report that *P. horiana* was able to overwinter in Pennsylvania (O'Keefe and Davis). This led to research that showed evidence for systemic infection of chrysanthemums by *P. horiana* (Bonde et al. 2015).

Hosts:

Chrysanthemum ×morifolium, Chrysanthemum ×morifolium var. *sinense*, *Chrysanthemum hortorum, Chrysanthemum indicum, Chrysanthemum indicum* var. *acutum, Chrysanthemum japonense, Chrysanthemum makinoi, Chrysanthemum makinoi* var. *wakasaense*, *Chrysanthemum morifolium, Chrysanthemum pacificum, Chrysanthemum shiwogiku, Chrysanthemum shiwogiku* f. *modestum, Chrysanthemum shiwogiku* var. *kinokuniense, Chrysanthemum sinensis,* and *Chrysanthemum* sp., *Chrysanthemum yezoense, Dendranthema ×grandiflorum, Dendranthema indicum, Dendranthema lavandulifolium, Dendranthema morifolium, Dendranthema sinense, Dendranthema yezoense* (Farr et al., 2026).

Symptoms: Symptoms are primarily exhibited on the leaves. Basidiospores are spread by air movement or rain splash, land on the top surface of the leaves, germinate, and if moisture is present, penetrate the leaf epidermis. Pale-green to yellow spots up to 5 mm in diameter develop on the upper leaf surface. Early infections are very difficult to differentiate from insect damage, especially leaf miner stings. The centers of these spots become brown and necrotic with age. Raised, buff or pinkish pustules (sori) that produce the teliospores develop on the corresponding lower leaf surface. The sori turn white at maturity when the teliospores begin to produce basidiospores and later tan with age. As the spots on the upper surface become sunken, the pustules on the lower leaf become quite prominent. Sori with teliospores are occasionally found on the upper leaf surface. Severely attacked leaves wilt and hang down the stem, and gradually dry up completely (Horst and Nelson, 1997). Sori and teliospores occasionally develop on flower bracts and stems. Infection has been recorded as necrotic flecking with occasional pustules on petals (Dickens, 1970).

Transmission: This rust is spread by wind/air currents and rain splashes in open environments. Long-distance spread is through the movement of infected plants or cuttings. In greenhouses and for mother plants, early and accurate identification of CWR is essential to limit the spread and ensure clean stock for propagation.

Damage Potential: Rust pathogens rarely kill their hosts but can weaken them and stunt their growth (Agrios, 2005). Large numbers of pustules on leaves, stems, bracts, and flowers cause serious cosmetic damage to potted plants and cut flowers, rendering them unmarketable.

Worldwide Distribution: The disease was first discovered in Japan in 1895 (Hiratsuka) and described by Hennings in 1901. Although confined to Japan and China until 1963 (Baker), global trade of chrysanthemums for planting and by chrysanthemum hobbyists has helped disseminate *P. horiana* around the world. The pathogen occurs commonly in Japan, China, Taiwan, and Thailand and has become established in South Africa as well as many countries in Europe (EPPO A2 list) and South America (CABI 2018). Although occasionally reported, this rust is considered eradicated from Australia and New Zealand (Walker, 1983). There is a 2015 report of the pathogen in India for the first time (Deepak et al). In North America, it is present in Mexico but is considered a quarantine pest of limited distribution. There have been multiple outbreaks in British Columbia and Ontario, but the pathogen is currently listed as eradicated from Canada (CABI, 2018). Whenever *P. horiana* has been detected in the United States, USDA-APHIS has treated it as transient and actionable, and it has had a national eradication plan in place. In addition to California (CDFA 1992), CWR has also been detected in New Jersey (1977), Pennsylvania (1977, 2004, 2006-10), Oregon and Washington (1990), New York (2003-04), Delaware (2004), Massachusetts (2008), and Maryland (2011).
https://www.invasivespeciesinfo.gov/terrestrial/pathogens-and-diseases/chrysanthemum-white-rust

Argentina, Australia, Austria, Belgium, Brazil, Brunei Darussalam, Bulgaria, Czechia, Chile, China, Colombia, Cyprus, Denmark, Finland, France, Germany, Hong Kong, India, Ireland, Italy, Japan, Luxembourg, Korea, Republic of (South Korea), Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Russia, Singapore, South Africa, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, United States, Uruguay, Venezuela, Viet Nam (Farr et al., 2026).

Official Control: *Puccinia horiana* is on the USDA PCIT's Harmful Organisms list for Albania, Australia, Azerbaijan, Canada, Colombia, Costa Rica, Dominican Republic, Egypt, Eurasian Customs Union, European Union, French Polynesia, Georgia, Guatemala, Holy See (Vatican City State), Iceland, India, Israel, Jordan, Mexico, Monaco, Morocco, Mozambique, Namibia, Nauru, New Caledonia, Nicaragua, Norway, Republic of North Macedonia, San Marino, Serbia, South Africa, Svalbard and Jan Mayen, The Republic of Türkiye, Tunisia, Ukraine, United Kingdom, and Uzbekistan (USDA PCIT, 2026). It is on the EPPO's A1 list for Armenia, Azerbaijan, Egypt, Georgia, Kazakhstan, Russian Federation, Ukraine, and Uzbekistan; the A2 list for the European Plant Protection Organization, Jordan, Serbia, and Türkiye; a quarantine pest in Belarus, Canada, Mexico, Moldova, Morocco, Norway, and Tunisia; and a regulated non-quarantine pest in Switzerland and the United Kingdom (EPPO, 2026).

California Distribution: none

California Interceptions: Chrysanthemum white rust has been found periodically at indoor and outdoor nurseries that grow cut flowers and potted plants in the major chrysanthemum-producing counties in California, and in additional counties from the results of trace-forwards of nursery stock.

The risk that *Puccinia horiana* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** *Puccinia horiana* has been detected from a wide range of climates worldwide, wherever chrysanthemums can grow. This includes parts of the Northeastern United States with below-freezing temperatures in the winter months. Humidity is a limiting factor for spore dispersal and leaf infections

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

   Score: **3**
   - Low (1) Not likely to be established 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 restricted to Chrysanthemums; some species and varieties are resistant to CWR

   Evaluate the host range of the pest.

   Score: 1
   - 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:** The pathogen has high reproductive potential. Natural spread is limited by the need for high relative humidity. Movement of infected cuttings is a major pathway of disease spread.

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 reproductive and dispersal potential.**

4) **Economic Impact:** Under suitable conditions for epidemics, the pathogen could lower plant growth and value. It remains a quarantine pest in many jurisdictions.

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

Economic Impact: A, B, C

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:** The pathogen could significantly impact commercial cultural practices, home gardening, and ornamental plantings.

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 *Puccinia horiana:* Medium

Add up the total score and include it here. **12**
-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 is 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* ***= 12***

Uncertainty:

Although the USDA no longer considers CWR to be a pest of quarantine significance, many other countries do. California growers may need to maintain a pest-free place of production to meet export requirements. If infected cuttings are able to enter the United States, this may become much more difficult.

Conclusion and Rating Justification:

Based on the evidence provided above, the proposed rating for ***Puccinia horiana*** **is C.**

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Responsible Party:

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***Comment Period: 11/19/2026 through 01/03/2027**

***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.

Proposed Pest Rating: C