CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

Cerotelium fici (Castagne) Arthur 1917

fig rust

Pest Rating: C

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

Comment Period: 07/16/2026 through 08/30/2026

Initiating Event:

In 2000, a Santa Barbara County regulatory plant pathologist submitted a sample of fig leaves from a home orchard in the city of Santa Barbara to CDFA's Plant Pest Diagnostics Center. CDFA plant pathologist Tim Tidwell identified fig rust, *Cerotelium fici,* by morphology and assigned a temporary Q-rating. Over the past 25 years, regulatory samples have been submitted from gardens, nurseries, and incoming shipments in California, and the rating was changed to Z. This pathogen has not been through the pest rating process. The risk to California from *Cerotelium fici* is described herein, and a permanent rating is proposed.

History & Status:

Background: California leads the nation in fig production. Commercial fig orchards are located in Fresno, Madera, Merced, and Kern Counties. Figs are grown on approximately 7,000 acres in California and are valued at $28M annually (CDFA Ag Stats, 2024).

Rust fungi are obligate parasites that must have a living host to parasitize. Rusts can have complex life cycles involving up to five types of spores produced annually and sequentially. The five types of spores are: stage 0: spermogonia-bearing spermatia, stage I: aecia-bearing aeciospores, stage II: uredinia-bearing urediniospores, stage III: telia-bearing teliospores, and stage IV: basidia-bearing basidiospores. All five spore types of a given species can occur on a single host (i.e., rose rust); alternatively, the different spore types of a species can colonize two very disparate hosts in a strict, alternating sequence (e.g., cedar-apple rust). Many of the rusts important to agronomic crops have evolved much simpler

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life cycles, with all stages of spore production occurring on a single host and often with fewer than five spore stages. This type of abbreviated life cycle, with fewer than five spore stages, is called microcyclic. Some microcyclic rusts have only uredinia (e.g., hollyhock rust), or telia and basidia (e.g., chrysanthemum white rust) (Agrios, 2005).

Cerotelium fici is a rust fungus in the family Phakopsoraceae. The species was first described as *Uredo fici* Castagne in 1848 and was later transferred to *Cerotelium* by Arthur in 1917. Index Fungorum and MycoBank list the accepted name as *Cerotelium fici* (Castagne) Arthur, with *Uredo fici* Castagne as the basionym. The historical placement of *C. fici* reflects the development of rust taxonomy from early uredinial-stage names to later generic concepts based on rust morphology. The basionym *Uredo fici* reflects the early description of the fungus under a broad rust genus used for uredinial stages. Arthur transferred the species to *Cerotelium* in his study of the relationship of *Kuehneola*, placing the fig rust fungus in the name combination that remains in current use (Index Fungorum, 2026).

Cerotelium fici is documented from uredinial and telial stages on *Ficus carica*. Spermogonia and aecia are unknown, and no alternate host has been demonstrated. The disease cycle is based on repeating production of urediniospores on susceptible Moraceae hosts, while telia and teliospores have been described but are not reported from all specimens (Huseyin and Selcuk, 2004; Parthasarathy et al., 2020). Fig rust has long been recognized as an important foliar disease of edible fig, *Ficus carica*, especially in warm and humid fig-growing regions. The disease affects leaves primarily, producing leaf spots and rust pustules that can lead to premature defoliation. Under severe disease pressure, defoliation can reduce tree vigor and interfere with fruit ripening. Modern disease reports continue to document *C. fici* as a rust pathogen of Moraceae, with edible fig as the principal crop host and black mulberry, *Morus nigra*, and Osage orange *Maclura aurantiaca,* as confirmed additional hosts, along with related species, many of which are ornamentals. Nuclear large subunit rDNA sequence analysis provides modern diagnostic support, as there are other rusts of *Ficus* spp. found around the world (Solano-Báez et al., 2017; Parthasarathy et al., 2020; Gonçalves et al., 2023; Farr et al., 2026).

Hosts: *Broussonetia papyrifera* (paper mulberry), *Broussonetia* sp. (paper mulberry species), *Ficus aurea* (Florida strangler fig), *F. beecheyana*, *F. carica* (common fig), *F. citrifolia* (shortleaf fig), *F. combsii*, *F. cordata* subsp. *salicifolia* (wadi fig), *F. coronata* (creek sandpaper fig), *F. crassinervia*, *F. cumingii*, *F. doliaria*, *F. elastica* (rubber plant), *F. erecta* (Japanese fig), *F. esquiroliana*, *F. exasperata* (sandpaper fig), *F. formosana* (Taiwan fig), *F. gibbosa*, *F. glomerata* (cluster fig), *F. hauili*, *F. hirta* (hairy fig), *F. hispida* (hairy fig), *F. hochstetteri* (Hochstetter's fig), *F. ibapohi*, *F. involuta*, *F. konishii* (Konishi fig), *F. laevigata*, *F. lentiginosa*, *F. macrophylla* (Moreton Bay fig), *F. membranacea*, *F. minahassae*, *F. mitrophora*, *F. monckii*, *F. odorata*, *F. padifolia*, *F. palmata* (wild Himalayan fig), *F. pretoriae* (fig), *F. pumila* (creeping fig), *F. radula*, *F. religiosa* (sacred fig), *F. retusa* (laurel fig), *F. salicifolia* (willow-leaf fig), *F. semicordata* (drooping fig), *F. simplicissima*, *Ficus* sp. (fig species), *F. subulata*, *F. superba* var. *japonica*, *F. turbinata*, *F. vallis-choudae*, *F. vasculosa*, *F. wightiana* (Wight's fig), *Maclura aurantiaca* (Osage orange), *M. pomifera* (Osage orange), *Maclura* sp. (maclura species), *M. tinctoria* (old fustic), *Malaisia scandens* (burny vine), *Morus acidosa*, *M. alba* (white mulberry), *M. australis* (Korean mulberry), *M. formosana*, *M. indica*, *M. insignis*, *M. nigra* (black mulberry), *M. rubra* (red mulberry), *Morus* sp. (mulberry) (Farr et al., 2026)

***Symptoms*:** On *Ficus carica*, fig rust commonly begins as small yellowish spots on the upper leaf surface. Reddish-brown to orange uredinial pustules develop primarily on the lower leaf surface opposite the upper leaf spots. Lesions can become angular, brown, coalescent, and necrotic. Heavy infection causes yellowing, premature defoliation, bare branches, and poor fruit ripening on defoliated trees. Raised pustules may also occur on fruit (Verga and Nelson, 2014; Parthasarathy et al., 2020).

In Mexico, Solano-Báez et al. 2017 reported angular necrotic lesions on the upper surface of mature fig leaves and reddish-brown erumpent pustules on the lower surface. Premature defoliation was observed on infected plants. Voucher specimens were deposited, and the pathogen was confirmed by morphology and LSU rDNA sequence analysis (Solano-Báez et al., 2017).

In India, Parthasarathy et al. 2020 reported reddish-brown angular spots on the upper leaf surface, numerous orange to reddish pustules on the lower leaf surface, coalescing necrotic patches, upward curling of leaf edges, premature abscission, bare branches, unripe fruit, and blister-like pustules on fruit. Disease incidence in surveyed orchards averaged 97.66 percent, with 100 percent incidence in some locations (Parthasarathy et al., 2020).

On *Morus nigra* in Brazil, rust symptoms included light brown pustules with yellowish halos, leaf yellowing, and premature leaf fall at high disease severity (Gonçalves et al., 2023).

Transmission: *Cerotelium fici* produces uredinia and urediniospores on infected leaves and sometimes on fruit. Spores are spread by wind and splashing rain. Infection is favored by warm, humid conditions and prolonged leaf wetness. Verga and Nelson 2014 reported that spores require at least 14 hours of continuous wetness to germinate, and that fallen infected leaves can serve as inoculum for new infections. Disease is more severe during windy, rainy weather that promotes spore dispersal and germination (Verga and Nelson, 2014). Long-distance movement is most likely associated with infected plant material or windborne spores. No evidence was found that *C. fici* is seed-transmitted or soilborne.

Damage Potential: Fig rust can cause significant defoliation and yield loss under warm, humid conditions. Damage occurs primarily through loss of photosynthetic leaf area, premature defoliation, reduced tree vigor, and failure of fruit on defoliated trees to ripen fully. Parthasarathy et al. 2020 documented severe disease in commercial fig orchards in India, with high disease incidence, premature defoliation, bare branches, and unripe fruit. Verga and Nelson 2014 reported that figs grown in hot, dry climates are less at risk, while warm, humid climates are highly favorable for disease development (Verga and Nelson, 2014; Parthasarathy et al., 2020).

In California, economic damage is most likely to occur in humid, coastal, irrigated, nursery, greenhouse, or landscape situations where susceptible hosts and prolonged leaf wetness coincide. Major commercial fig production areas with hot, dry summers may be less favorable for damaging rust epidemics.

Worldwide Distribution: Africa: *Eritrea, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Mauritius, Morocco, Nigeria, South Africa, Tanzania, Uganda, Zimbabwe*. Asia: *China, Hong Kong, India, Indonesia,*

Israel, Japan, Malaysia, Pakistan, Philippines, Taiwan, Turkey. Europe: *Portugal, Spain*. North America/Caribbean: *Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Mexico, Puerto Rico, Trinidad and Tobago, United States*. Oceania: *Australia, New Caledonia, Papua New Guinea, Tonga*. South America: *Argentina, Brazil, Peru, Uruguay, Venezuela*.

Official Control*: Cerotelium fici* is on the USDA-PCIT Harmful Organism list (USDA, 2026) for Chile and the Republic of Korea, and it is on the EPPO's A1 list for Chile (EPPO, 2026).

California Distribution: Orange, San Diego, Santa Barbara, and Ventura counties (CDFA PDR database, 2026).

California Interceptions: Many interceptions from various shippers in Florida, Pennsylvania, South Carolina, and Tennessee.

The risk that *Cerotelium fici* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** Susceptible hosts are present in California, including commercial edible fig and ornamental ficus, grown indoors and outdoors. Fig rust is established in coastal Southern California but has not been found in the Central Valley, where summers are hot and dry.

   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 hosts are all in the plant family Moraceae, including many species of figs and mulberries, plus Osage orange.

   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 fungus produces mainly one type of spore. It is spread short distances by wind and rain. Movement of infected planting material is responsible for spreading to new areas.

   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: Fig rust can cause premature defoliation, reduced tree vigor, unripe fruit on defoliated trees, and yield loss in favorable climates. California damage is plausible in conducive environments, but a high statewide economic impact has not been demonstrated.

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

Economic Impact: A

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: **1**

- 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: No direct evidence was found that *C. fici* causes significant impacts to native California ecosystems. The documented hosts are primarily cultivated or ornamental Moraceae, including edible fig, black mulberry, Osage orange and ornamental *Ficus*. Ornamental or landscape impacts are possible where susceptible hosts occur under favorable conditions

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 *Cerotelium fici:* Medium

Add up the total score and include it here. **9**
-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.

   There are official records of this rust in southern coastal California.

   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* ***= 8***

Uncertainty:

none

Conclusion and Rating Justification:

Based on the evidence provided above, the proposed rating for ***Cerotelium fici*** **is C.**

References:

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Responsible Party:

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***Comment Period: 07/16/2026 through 08/30/2026**

***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: C
