

California Pest Rating Proposal for
***Colletotrichum godetiae* Neerg. 1950**

Apple bitter rot; Anthracnose of avocado

Current Pest Rating: Q

Proposed Pest Rating: B

Kingdom: Fungi; Division: Ascomycota;

Class: Sordariomycetes; Order: Glomerellales;

Family: Glomerellaceae

Comment Period: 02/19/2020 through 04/04/2020

Initiating Event:

Arctostaphylos pallida, commonly called the Alameda manzanita, Oakland hills manzanita, or the pallid manzanita, is a shrub that is native to California. It is listed as endangered by the State of California and threatened by the Federal government (CalFlora, 2020). On March 18, 2019, a sample of *A. pallida* with leaf lesions from a botanic regional preserve in Richmond, California was submitted to CDFA's Plant Pest Diagnostics Center at Meadowview by a park employee. On May 20, 2019, the fungus *Colletotrichum godetiae* associated with the leaf spots on this sample was identified in culture by Plant Pathologist Suzanne Latham. As a first detection in the State, it was given a Q rating. The present status and rating of *C. godetiae* is reevaluated here.

History & Status:

Background: The taxonomy of the genus *Colletotrichum* has been under revision for a long time and a comprehensive taxonomic definition of the species included in this genus has been developed (Cannon et al., 2012). The genus *Colletotrichum* includes many plant pathogens of major importance, causing diseases of a wide variety of woody and herbaceous plants. It has a primarily tropical and subtropical distribution, although there are some high-profile species affecting temperate crops. Fruit production is especially affected, such as for strawberry, apple, mango, citrus, and avocado, and staple crops such

as banana. The future of *Colletotrichum* taxonomy will be reliant on consensus classification and adoption of robust identification tools.

Colletotrichum godetiae is named after its original host, *Godetia*, also known as *Clarkia*. It has been synonymized with the name *C. clavatum* (Farr and Rossman, 2020).

Hosts: *Azalea japonica*, *Ceanothus* sp., *Cydonia oblonga*, *Malus domestica*, *Olea europaea*, *Prunus avium*, *Acer cappadocicum*, *Aeschynomene virginica*, *Clarkia* sp., *Cornus mas*, *Fragaria X Ananassa*, *Fragaria vesca*, *Frangula alnus*, *Godetia* sp., *Helleborus* sp., *Persea americana*, *Podocarpus* sp., *Prunus dulcis*, *Sambucus nigra*, *Schinus mole*, *Solanum betaceum*, *Ugni molinae*, *Vitis vinifera*. (Farr and Rossman, 2020; Juárez-Vázquez et al., 2019)

Symptoms: Generally, *Colletotrichum*-infected host plants exhibit symptoms of “anthracnose” disease symptoms including limited, often sunken necrotic lesions on leaves, stems, flowers, and fruit, as well as crown and stem rots, seedling blight, dark brown leaf, stem and fruit spots, and wilting of leaves, which often result in dieback and reduction in plant quality. *Colletotrichum godetiae* causes leaf and fruit spots. Pre-harvest symptoms on apples can include circular, brown, slightly sunken necrotic lesions on the fruit surface. When in humid environments, acervuli with orange conidial masses will develop. On apples in storage at a packing house with controlled atmosphere, lesions were round, 1 to 5 cm in diameter, gray, and dry with acervuli, producing orange spore masses in concentric rings (Baroncelli et al., 2014b; Munda, 2014; Wenneker et al., 2016). Symptoms observed on avocado fruit included brown-black spots in the exocarp and soft rot in the mesocarp. Lesion size increased over the course of days until they were ~1 cm and acervuli were observed on them (Hernández-Lauzardo et al., 2016). On grapes, symptoms on grape berry skins varied from circular brown spots to rotting fruits. Both berries and petioles were covered with creamy salmon-colored masses of conidia. Rotten grape berries lost turgor and turned into ‘mummies’ over time (Zapparata et al., 2017; Baroncelli et al., 2014a). On Cornelian cherry (*Cornus mas*), brown, shriveled, sunken spots appeared on the surface of ripening fruits, with orange conidial masses within the spots. Conidia present in acervuli were colorless and fusiform (Annamária et al., 2017; Tóth et al., 2017). On loquats, anthracnose type symptoms were observed on fruit (Juárez-Vázquez et al., 2019).

Transmission: During active growth, the pathogen produces masses of hyphae (stromata) on the plant surface that bear conidiophores. Conidia (spores) are produced at the tips of the conidiophores and disseminated by wind, rain, cultivation tools, equipment, and field workers. Leaves and twigs become covered with fungal conidiospores, which can become airborne. On fruit during humid or moist conditions, abundant orange-brown to salmon-colored conidia spore masses form in lesions and are dispersed passively by splashing rain or irrigation water. *Colletotrichum* survives between crops during winter as mycelium on plant residue in soil, on infected plants, and on seeds. After the conidia are transmitted to host plants, they germinate, penetrate host tissue by means of specialized hyphae (appressoria), and ramify throughout the host tissue. Humid, wet, rainy weather is necessary for infection to occur (Agrios, 2005). These requirements may limit the occurrence of the pathogen in California fields and subsequently, the pathogen may be more of a problem under controlled environments inside greenhouses.

Damage Potential: In general, anthracnose disease of fruits and leaves caused by *Colletotrichum* spp., can result in reduction in yield quantity and quality of agricultural crops and fruit trees. *Colletotrichum godetiae* can result in reduced plant quality, growth, fruit production, and marketability. Estimates of yield/crop loss range from 10-100% when it causes fruit symptoms, either pre-or post-harvest. Nursery productions of ornamental plants are particularly at risk as nursery conditions are often conducive to infection by *Colletotrichum* species. In open fields, disease development may be sporadic as it is affected by levels of pathogen inoculum and environmental conditions.

Worldwide Distribution: Australia, Belgium, Chile, Colombia, Croatia, Denmark, France, Greece, Hungary, Iran, Ireland, Israel, Italy, Mexico, Montenegro, Netherlands, Norway, Portugal, Serbia, Slovenia, South Africa, Spain, United Kingdom, United States (Arkansas) (CABI-CPC).

Official Control: None

California Distribution: One detection has been made in a botanic reserve in Contra Costa County (see 'Initiating event').

California Interceptions: One detection has been made in Placer County on an incoming shipment of black tupelo, *Nyssa sylvatica*, from an Oregon wholesale shipper

The risk *Colletotrichum godetiae* would pose to California is evaluated below.

Consequences of Introduction:

- 1) Climate/Host Interaction:** Similar to other species of *Colletotrichum*, *godetiae* requires humid, wet, rainy weather for conidia to infect host plants. This environmental requirement may limit the ability of the pathogen to fully establish and spread under dry field conditions in California.

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 establish in a larger but limited part of California.**
- High (3) likely to establish a widespread distribution in California.

- 2) Known Pest Host Range:** The known host range includes multiple plant families.

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.
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3) Pest Reproductive Potential: The pathogen has high reproductive potential and conidia are produced successively. They are transmitted by wind, wind-driven rain, cultivation tools, and human contact. However, conidial germination and plant infection require long, wet periods. 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: Under suitable, wet climates, the pathogen could lower plant growth and fruit production and value and trigger the loss of markets.

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

Economic Impact: A, B

- A. The pest could lower crop yield.**
- B. The pest could lower crop value (includes increasing crop production costs).**
- C. The pest could trigger the loss of markets (includes 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: 2

- 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 cultural practices or home garden plantings. The host that it has been found on in the environment in California, the pallid manzanita, is a threatened and endangered species that could be negatively impacted.

Environmental Impact: 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.**

Environmental Impact Score: 3

- Low (1) causes none of the above to occur.
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- 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 *Colletotrichum godetiae* is 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 '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 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 = 11*

Uncertainty:

None.

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Colletotrichum godetiae* is B.**

References:

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Responsible Party:

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***Comment Period: 02/19/2020 through 04/04/2020**

***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](mailto: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.
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Proposed Pest Rating: B
