

California Pest Rating Proposal for *Colletotrichum plurivorum* Damm, Alizadeh & Toy. Sato 2018

Current Pest Rating: Q

Proposed Pest Rating: B

Comment Period: **11/14/2019 through 12/29/2019**

Initiating Event:

On October 9, 2018, diseased leaves of Sweet-heart hoya (*Hoya kerrii*) exhibiting leaf spotting symptoms were collected during a regulatory inspection from a nursery in Vista, CA by San Diego County officials and sent to the CDFA Plant Pathology Laboratory for diagnosis. A *Colletotrichum* sp. was detected by CDFA plant pathologist Suzanne Latham in culture. Sequencing of ACT genes showed it was a 100 percent match to *Colletotrichum plurivorum*. This was the first record of this pathogen in the United States and it was given a temporary Q rating.

On May 2, 2019, an incoming shipment of dracaena plants (*Dracaena fragrans*) from Florida with leaf spotting symptoms were collected from a nursery in Menifee, CA by Riverside County officials and sent to CDFA. On May 23, 2019, *Colletotrichum plurivorum* was identified the pathogen causing disease on the dracaena. Consequently, the infected plants were treated by the nurseries and are being periodically re-inspected and are eligible for release when they are free from disease.

The risk to California from *C. plurivorum* is described herein and a permanent pest rating is proposed.

History & Status:

Background:

Colletotrichum plurivorum causes anthracnose and leaf blight disease in its host plants. This fungal pathogen was originally described and named *Colletotrichum sichuanensis* by Liu and Gong (2016) infecting *Capsicum annuum* in China, but this name was invalidated as no type strain was specified (Farr and Rossman, 2019). The pathogen was then described again with a new species name based on

a strain from coffee in Vietnam first isolated by Nguyen et al. (2010). The species epithet “*plurivorum*” is based on the large host range of this species (Damm et al., 2019)

Colletotrichum plurivorum belongs to the *C. orchidearum* species complex. It has a large host range, including many important fruits plus cotton, orchids and foliage plants.

Hosts: Anacardiaceae (*Mangifera*), Araceae (*Amorphophallus*, *Spathiphyllum*), Caricaceae (*Carica*), Fabaceae (*Glycine*, *Phaseolus*), Malvaceae (*Abelmoschus*, *Gossypium*), Musaceae (*Musa*), Orchidaceae (*Arundina*, *Cymbidium*, *Oncidium*), Passifloraceae (*Passiflora*), Rubiaceae (*Coffea*), Solanaceae (*Capsicum*, *Lycopersicon*), and Theaceae (*Camellia*) (Damm et al., 2019; Farr and Rossman, 2019). The recently-reported hosts, *Hoya kerrii* and *Dracaena fragrans*, should be added to the host list (see ‘Initiating Event’).

Symptoms: Generally, *Colletotrichum*-infected host plants exhibit symptoms of anthracnose, which include dark brown leaf spots, stem and fruit spots, fruit rot, and wilting of leaves that often results in dieback and reduction in plant quality. *Colletotrichum* spp. have similar life cycles and survive between crops during winter as mycelium on plant residue in soil, on infected plants, and on seeds. During active growth, the pathogen produces masses of hyphae (stromata) that bear conidiophores on the plant surface. Conidia (spores) are produced at the tips of the conidiophores. Conidia germinate, penetrate host tissue by means of specialized hyphae (appressoria), and invade host tissue.

Transmission: Conidia are transmitted to host plants and humid, wet, rainy weather is necessary for infection to occur. Conidia can be spread via wind, wind-driven rain, cultivation tools, and human contact. These requirements in particular may limit the occurrence of the pathogen in California fields and therefore the pathogen may be more of a problem in the controlled environment of greenhouses.

Damage Potential: Estimates of yield/crop loss due to this pathogen vary widely. Anthracnose fruit rot is the main postharvest problem of papaya in Taiwan (Sun et al., 2019) and chili pepper in China (Liu et al., 2016). A severe leaf blight caused by *C. plurivorum* was observed in the field-grown chili crops that resulted in substantial yield loss in India (Sakthivel et al., 2018). On cassava, *C. plurivorum* is a minor but common disease where necrotic lesions are formed on the leaf, stem, and base of the leaf petiole that lead to leaf wilt, shoot tip die back, and defoliation (Liu et al., 2019). In California, nursery and greenhouse production of orchids, *Hoya*, *dracaena*, and other host plants would be particularly at risk as nursery conditions are often conducive to infection by *Colletotrichum* species. In California’s cultivated fields, disease development may be sporadic as it is affected by levels of pathogen inoculum and environmental conditions.

Worldwide Distribution: Benin, Brazil, China, India, Iran, Japan, Taiwan, and Vietnam (Farr and Rossman, 2019).

Official Control: *Colletotrichum plurivorum* is not reportable to the USDA, it is not on the USDA-APHIS PCIT list of Harmful Organisms, and it is not a quarantine pest on the EPPO list. In California, it has a temporary Q rating

California Distribution: *Colletotrichum plurivorum* has been found in one greenhouse in San Diego County in California

California Interceptions: *Colletotrichum plurivorum* has been intercepted once in Riverside County on dracaena plants from Florida (see 'Initiating Event').

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

Consequences of Introduction:

- 1) Climate/Host Interaction:** Similar to other species of *Colletotrichum*, *C. plurivorum* 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 host range of *C. plurivorum* is very large with hosts in multiple families containing important horticultural, agronomic, and ornamental plants.

Evaluate the host range of the pest.

Score: 3

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

- 3) Pest Dispersal 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. 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, fruit production, and value. It is not a quarantine pest for other countries
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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.

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 *Colletotrichum plurivorum* 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
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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'. This pathogen has only been found in one commercial greenhouse location in California.

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:

Final Score: *Score of Consequences of Introduction – Score of Post Entry Distribution and Survey Information = 12-1=11*

Uncertainty: None

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Colletotricum plurivorum* is B**

References:

Damm, U., Sato, T., Alizadeh, A., Groenewald, J. Z., and Crous, P. W. 2019. The *Colletotrichum dracaenophilum*, *C. magnum* and *C. orchidearum* species complexes. *Stud. Mycol.* 92: 1-46.

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Fu, M., Crous, P. W., Bai, Q., Zhang, P. F., Xiang, J., Guo, Y. S., Zhao, F. F., Yang, M. M., Hong, N., Xu, W. X., and Wang, G. P. 2019. *Colletotrichum* species associated with anthracnose of *Pyrus* spp. in China. *Persoonia* 42: 1-35.

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Nguyen, P. T. H., Vinnere Pettersson, O., Olsson, P. 2010. Identification of *Colletotrichum* species associated with anthracnose disease of coffee in Vietnam. European Journal of Plant Pathology 127:73–87.

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Responsible Party:

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***Comment Period: 11/14/2019 through 12/29/2019**

*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 [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]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
