

California Pest Rating Proposal for
***Diaporthe columnaris* (D.F. Farr & Castl.) Udayanga & Castl. 2016**

Current Pest Rating: Q

Proposed Pest Rating: C

Kingdom: Fungi; Division: Ascomycota;
Class: Sordariomycetes; Order: Diaporthales;
Family: Diaporthaceae

Comment Period: 3/24/2020 through 5/8/2020

Initiating Event:

On January 29, 2020, a diseased rosemary plant from a residence was submitted to CDFA's plant pest diagnostics center by retired Los Angeles County plant pathologist Jerry Turney. On February 25, 2020, CDFA plant pathologist Suzanne Rooney-Latham diagnosed *Diaporthe columnaris* (Basonym: *Phomopsis columnaris*). This fungus is a known twig pathogen on lingonberry (*Vaccinium vitis-idaea*) in Oregon. It has not been reported from California. *Diaporthe columnaris* was assigned a temporary Q rating. The risk to California from this pathogen is described herein and a permanent rating is proposed.

History & Status:

Background: Fungal taxonomy has progressed towards providing identified fungal species with a single name instead of the past practice of having both a teleomorph and anamorph name for the different states of one species. This practice was confusing and now is unnecessary as molecular data can connect the two states. There is consensus that the older name, *Diaporthe*, should be given priority over the name *Phomopsis* (Udayanga et al., 2011). Several economically important species of *Phomopsis* have been sequenced and described as unique species within the genus *Diaporthe*. Rossman et al. (2016) used morphological characteristics and molecular sequence data to validate species identified as *Phomopsis columnaris* to be identical to those identified as *D. columnaris*.

Diaporthe spp. can cause cankers, diebacks, root rots, fruit rots, leaf spots, blights, decay, and wilts. They are hemibiotrophs with both a biotrophic (requiring living plants as a source of nutrients) phase and a necrotrophic (killing parts of their host and living off the dead tissues) phase. When susceptible hosts are infected, they may be asymptomatic during the biotrophic phase but can suffer severe effects during the necrotrophic phase. Following death of the host, the pathogen can continue to survive as a saprobe.

Hosts: *Hedera helix* (common ivy), *Vaccinium vitis-idaea* (lingonberry), and *Salvia rosmarinus* (rosemary) (Farr and Rossman, 2020).

Symptoms: On lingonberries, the disease is seen as dieback of shoots and twigs. As a Result of infection, elongated, flattened areas of necrotic tissue, called cankers, may develop. Tissue around the canker can appear silvery and speckled with black fungal pycnidia. Infected stems will wilt during the summer and the leaves may turn color earlier in the fall than on unaffected twigs.

Transmission: No specific information is available for *D. columnaris*. What is known from other *Diaporthe* spp. on other *Vaccinium* spp. can be hypothesised as similar for this pathosystem. *Diaporthe vaccinii* for example overwinters in infected plant debris. In the spring, spores are dispersed from pycnidia embedded in diseased tissue by rain splash and irrigation water. Infection occurs through flower buds from budbreak to bloom and the disease spreads from flowers into shoots and twigs. The pycnidia may contain only β -conidia, which are usually sterile and noninfective, or α -conidia, which usually are infective, or both. Production of the sexual reproductive spores in the perithecia (the *Diaporthe* state) could occur during the autumn and early winter. There are no records of the *Diaporthe* state of *D. columnaris* observed on any host. The fungus can also infect through injuries such as wounds from pruning, harvest equipment, frost cracks, and herbicide injury and produces girdling cankers (Pscheidt and Ocamb, 2019).

Damage Potential: Lingonberries in Oregon suffered a progressive twig dieback that eventually killed main stems and whole plants. Mortality in the field approached 50% (Farr et al., 2002). The rosemary plant submitted to CDFA from Los Angeles County was nearly dead.

Worldwide Distribution: United States (California and Oregon), and Germany.

Official Control: None

California Distribution: One detection in Los Angeles County.

California Interceptions: None.

The risk *Diaporthe columnaris* would pose to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** There is limited research information about climate/host interactions. The pathogen has been found in temperate climates in the United States and Europe. It has been detected near the coast in Southern 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 is narrow, only three confirmed hosts are known but they are in 3 different 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.

- 3) **Pest Reproductive Potential:** This pathogen may or may not produce sexual spores. It does produce asexual spores under field conditions. Spores are mainly spread during rainy spring weather from infected debris to young shoots and there can be multiple infection periods during the growing season.

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:** There is little economic data specific to this pathogen. For other closely related species on blueberries, economic losses are more severe on susceptible varieties. Fungicide treatment may be required during wet spring weather. More field sanitation may be beneficial for removing overwintering inoculum.

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

Economic Impact: A, D

- 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.**
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- 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: There are native species of *Vaccinium* in California and some are rare (Calflora, 2020). However, other *Diaporthe* spp. seem to be host specific in *Vaccinium*, and *D. columnaris* may be specific to lingonberry and not go to other hosts in that genus.

Environmental Impact: E (letter followed by bolded bullet)

- 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: 1

- **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 *Diaporthe columnaris*:

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.

Evaluation is 'Low'. There has been a single detection of *Diaporthe columnaris* in Los Angeles County

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 8

Uncertainty:

None.

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Diaporthe columnaris* is C.**

References:

Calflora: Information on California plants for education, research and conservation. [web application]. 2020. Berkeley, California: The Calflora Database [a non-profit organization]. Available: <https://www.calflora.org/> (Accessed: Mar 04, 2020).

Farr, D. F., Castlebury, L. A., Rossman, A. Y., and Putnam, M. L. 2002. A new species of *Phomopsis* causing twig dieback of *Vaccinium vitis-idaea* (lingonberry). *Mycol. Res.* 106: 745-752.

Farr, D. F., and Rossman, A. Y. 2020. Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved March 4, 2020, from <https://nt.ars-grin.gov/fungaldatabases/>

Pscheidt, J. W., and O'camb, C. M., senior editors. 2019. Pacific Northwest Plant Disease Management Handbook [online]. Corvallis, OR: Oregon State University. <http://pnwhandbooks.org/plantdisease>.

Rossman, A. Y., Allen, W. C., Braun, U., Castlebury, L. A., Chaverri, P., Crous, P. W., Hawksworth, D. L., Hyde, K. D., Johnston, P., Lombard, L., Romberg, M., Samson, R. A., Seifert, K. A., Stone, J. K., Udayanga, D., and White, J. F. 2016. Overlooked competing asexual and sexually typified generic names of Ascomycota with recommendations for their use or protection. *IMA Fungus* 7(2): 289-308.

Udayanga, D., Liu, X., McKenzie, E.H.C., Chukeatirote, E., Bahkali, A.H.A., and Hyde, K.D. 2011. The genus *Phomopsis*: biology, applications, species concepts and names of common phytopathogens. *Fung. Diversity* 50: 189-225.

Responsible Party:

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***Comment Period: 3/24/2020 through 5/8/2020**

*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.
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- ❖ 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: C
