cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal for

Pseudopezicula tracheiphila (Müller – Thurgau 1913 (Korf et. al, 1986)

Rotbrenner (red fire) disease of grapevine

Current Pest Rating: none

Proposed Pest Rating: B

Kingdom: Fungi, Phylum: Ascomycota,
Subphylum: Pezizomycotina, Class: Leotiomycetes,
Order: Helotiales, Family: Drepanopezizaceae

Comment Period: 04/12/2023 through 05/27/2023

Initiating Event:

This pathogen has not been through the pest rating process. The risk to California from *Pseudopezicula tracheiphila* is evaluated herein and a permanent rating is proposed.

History & Status:

Background:

California produces wine grapes, table grapes and raisins on over 900,000 acres. The crops are valued at over $5B annually. Vineyards are spread along the coast from Santa Barbara to Mendocino, throughout the Sacramento and Central valleys, the Sierra foothills, and the low desert.

Rotbrenner, caused by *Pseudopezicula tracheiphila*, is an important disease for grapes in the cool viticulture regions of northern Europe (Pearson et al., 1991). Rotbrenner causes economic yield loss in common European cultivars of *Vitis vinifera*, causing early leaf fall and depression of the quality of wine by lowering the sugar content of the juice. The anamorph is *Phialophora tracheiphila* (Sacc. and Sacc.) Korf. However, this form which produces conidiophores and conidia has only been seen on artificial media in the lab. The importance of the anamorph to pathogenesis in the field is unknown.

Pseudopezicula has traditionally been classified as a discomycete. Discomycetes are an artificial grouping of apothecia-producing fungi in the phylum Ascomycota. Specifically, it is an inoperculate discomycete; each ascus contains eight sexual spores that are forcibly discharged into the air when

mature. The ascospores escape through an apical circular pore at the tip of the ascus or by splitting of ascus at the apex. This group includes two orders, Ostropales and Helotiales. Molecular-based studies have revealed that the discomycetes can be found among ten classes of Ascomycota. The traditional classification of discomycetes has been a major challenge to modernize due to the lack of a clear understanding of the important morphological characters, as well as a lack of reference strains (Ekanayaka et al., 2017).

The fungus is composed of two mating types and uses a bipolar, heterothallic mating system. The apothecia form from the leaf tissue, often associated with the veins. The apothecia are formed on overwintered leaves in the spring, and on current-season infections, in late summer or fall. Secondary spread is uncommon but can occur. Following an incubation period of 2-4 weeks, the fungus invades the vascular elements of infected leaves, which causes symptom development. Alternately, the fungus may remain quiescent in green leaves, showing no symptoms (Wilcox et al., 2005).

Hosts: Parthenocissus quinquefolia (Virginia creeper), *P. tricuspidata* (Boston ivy), *Vitis* spp., *Vitis vinifera* (grapevine) (CABI, 2023). The USDA fungal database lists only *Vitis* spp. (Farr and Rossman, 2023).

Symptoms: Leaf lesions start as yellow spots on white-cultivars and bright red spots on red-and black cultivars. Over time, a red-brown necrosis forms in the center of the lesions, leaving a margin of yellow or red tissue between the necrotic and healthy tissues. Lesions are confined from spreading by the major veins. Occasionally, late in the season, freckled spots or discoloration scattered over the leaf surface can occur. Late infections can result in significant defoliation. The pathogen also attacks the flowers before or during bloom, causing them to rot and dry out (Wilcox et al., 2005). Fruit is not infected directly, but if the pedicel and portion of the subrachis become infected, causing fruit distal to the site of the infection will wither and dry (Pearson and Smith, 1988; Pearson et al., 1991).

Transmission: Apothecia are produced on older leaves and release ascospores under moist conditions with rain when temperatures exceed 13^{o}C. Natural dispersal of ascospores occur with wind and water (rain, dew, or sprinklers). There are no known vectors. Transporting infected plant material (specifically infected older leaves) is responsible for introduction of this disease into new areas (CABI, 2023).

Damage Potential: Attack of flower clusters results in a depression of yield that ranges from approximately 25 to 100% (Holz, 2000). Early infections generally result in lower losses than late infections. Inflorescences can be attacked before or during flowering, causing them to rot and dry out. In severe cases, berries are lost, leaving the rachis naked. High levels of infection during flowering can lead to severe yield losses of up to 90%. On American cultivars such as Concord, the leaves can be heavily damaged, but the flowers are not infected (Wilcox et al., 2005).

Worldwide Distribution: Africa: *Tunisia*; America: *Brazil*; Asia: *Jordan*; Europe: *Austria, France, Germany, Hungary, Luxembourg, Moldova, Romania, Serbia, Switzerland, Türkiye, Ukraine.* Oceania: *Australia* (EPPO, 2023; Farr and Rossman, 2023).

Official Control: *Pseudopezicula tracheiphila* is on the USDA PCIT's harmful organism list for Brazil, China, Colombia, Egypt, Honduras. It is on the EPPO A1 list for Egypt, Brazil, and Chile, and is a quarantine pest in Australia, Canada, China, and the United States (CABI, 2023).

California Distribution: none

California Interceptions: none

The risk *Pseudopezicula tracheiphila* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** In Europe, the pathogen is confined to cooler, northern climates. It requires significant leaf wetness periods to infect. Most California grape growing regions are likely too warm and too dry, but favorable environments may exist on the north coast or at higher elevation vineyards.

   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 limited to *Vitis* and *Parthenocissus.*

   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:** This fungus uses ascospores to reproduce and is generally limited to one life cycle per year. It requires water to disperse and infect.

   Evaluate the natural and artificial dispersal potential of the pest.

   Score: 1
   - **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:** In favorable climates, the pathogen can be highly destructive to leaves and fruit. It is a quarantine pest in the United States.

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

Economic Impact: A, C

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 susceptibility of native *Vitis*, including *V. californica*, *V. arizonica* and *V. girdiana* is unknown. It could have an impact on home gardening and ornamental plantings of grapes and *Parthenocissus*.

Evaluate the environmental impact of the pest to 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 *Pseudopezicula tracheiphila:* Low

Add up the total score and include it here. **8**
-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 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:

There is a very closely related species, *Pseudopezicula tetraspora*, which causes angular leaf spot and has been identified in Eastern North America.

Conclusion and Rating Justification:

Based on the evidence provided and the lack of California detections, the proposed rating for *Pseudopezicula tracheiphila* is B.

References:

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Responsible Party:

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*Comment Period: 04/12/2023 through 05/27/2023

*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: B