

California Pest Rating Proposal for *Erysiphe peckii* (U. Braun) U. Braun & S. Takam. 2000

Current Rating: Q
Proposed Rating: B

Initiating Event: On October 29, 2018, a sample of trumpet vine, *Campsis radicans*, plants showing symptoms of powdery mildew, was collected from a residential property in Davis, Yolo County, California. The sample was collected by S. A. Kinnee, CDFA Entomology Lab, and submitted to the CDFA Plant Pathology Lab for diagnosis of the pathogen associated with the disease. On October 31, 2018, Suzanne Latham, CDFA Plant Pathologist, identified the associated pathogen as *Erysiphe peckii*. This detection marked a first record of the pathogen in California, and the pathogen was given a temporary Q rating. Subsequently, the consequences of introduction of *E. peckii* to California are assessed here and a permanent rating is proposed.

History & Status:

Background: *Erysiphe peckii* is a fungal pathogen that causes powdery mildew disease in trumpet vine. This pathogen was originally described as *Microsphaera peckii* from diseased host plants collected in Alabama, Indiana, Maryland, and Texas (Braun, 1987). Since then, it has been reported from additional states in the northeastern, southern, and northwestern United States (see: ‘Worldwide Distribution’).

Hosts: *Campsis radicans* (trumpet vine/trumpet creeper) is the only reported host of *E. peckii*.

Symptoms: White to gray powdery mildew growing in spots or patches on young plant tissue or covering entire leaves and other plant organs. Mildew growth is most common on upper side of leaves but may also be found on the underside of leaves, young shoots and stems, buds, flowers, and young fruit. Pinhead-sized spherical chasmothecia (completely closed fungal fruiting bodies containing spores) that are initially white to yellow brown and later turn black in color develop singly or in clusters on older mildew.

Disease cycle: Similar to other species in the genus *Erysiphe*, *E. peckii* is an obligate parasite that produces mycelium on the surface of plant tissues without invading it. The pathogen obtains nutrients from the plant by producing haustoria (specialized absorbing organs) that grow into the epidermal cells of the plant. On the plant surface, the mycelium produces short conidiophores that in turn produce numerous chains of conidia that appear as white powdery coating. These conidia are easily dispersed by air currents to cause new infections of host plants. When conditions are unfavorable, the pathogen may produce chasmothecia containing ascospores. The disease is common in cool or warm humid regions but can also be common in warm and dry climates since their spores only require high relative humidity and not free-standing water to be released, germinate and cause infections (Agrios, 2005). Once a plant is infected, mycelium continues to spread on a leaf surface regardless of the level of atmospheric moisture.

Dispersal and spread: Wind and infected plants.

Damage Potential: In general, powdery mildews seldom kill their hosts however they reduce photosynthesis, utilize plant nutrients, increase respiration and transpiration, impair plant growth and reduce crop yields up to 40% (Agrios, 2005).

Worldwide Distribution: *North America:* United States (Alabama, Indiana, Kentucky, Maryland, Mississippi, Ohio, Texas, Virginia, Washington, and West Virginia (Farr & Rossman, 2019). In addition, the powdery mildew pathogen was recently detected in California (see: Initiating Event).

Official Control: No official control has been reported specifically for *Erysiphe peckii*. However, the order Erysiphales and *Erysiphe* spp. are included in the ‘Harmful Organism Lists’ for Australia and Nauru (Erysiphales) and Dominica, Grenada, and Saint Lucia (*Erysiphe* spp., specifically for *Mangifera* spp. which is not a reported host for *E. peckii*) (USDA-PCIT, 2019). Presently, *Erysiphe peckii* is a quarantine-actionable pathogen in California.

California Distribution: Yolo County (see: ‘Initiating Event’).

California Interceptions: None.

The risk *Erysiphe peckii* would pose to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** Powdery mildew disease is common in cool or warm humid regions but can also be common in warm and dry climates since the fungal spores only require high relative humidity, and not free-standing water, to be released, germinate, and cause infections. Once a plant is infected, mycelium continues to spread on a leaf surface regardless of the level of atmospheric moisture. *Campsis radicans* is not native to California but is commonly grown here since it can adapt to the USDA plant hardiness zones 4-10 (USDA-NRCS-NPDC, 2004). Based on its interaction with its host under conditions of high relative humidity required for the initiation of the disease, the powdery mildew pathogen, *Erysiphe peckii*, is given a Medium rating.

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:** Presently, *Campsis radicans* (trumpet vine/trumpet creeper) is the only reported host of *E. peckii*.

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 Dispersal Potential:** The powdery mildew pathogen has high reproduction and, under conducive environmental conditions of high relative humidity and wind currents, has high dispersal potential.

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:** In particular, nursery grown ornamental plants infected with the powdery mildew pathogen *Erysiphe peckii* could result in lowered crop production and loss in sales.

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

Economic Impact: **B, 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.

Score the pest for 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:** Powdery mildew infections may significantly impact home/urban and ornamental plantings.

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.

Score the pest for 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 *Erysiphe peckii*:

Add up the total score and include it here. (Score)

- Low = 5-8 points
- Medium = 9-12 points**
- High = 13-15 points

Total points obtained on evaluation of consequences of introduction to California = **10**

- 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. (Score)

Evaluation is Low (-1): Presently, the powdery mildew pathogen, *Erysiphe peckii*, has only been detected in Yolo County.

- 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 = 9*

Uncertainty: The true distribution of *Erysiphe peckii* in California is not fully known. Subsequent detections in additional counties could lower its proposed rating to a C.

Conclusion and Rating Justification: Based on the evidence provided above **the proposed rating for *Erysiphe peckii* is B.**

References:

Agrios, G. N. 2005. Plant Pathology (Fifth Edition). Elsevier Academic Press, USA. 922 p.

Braun, U. 1987. A monograph of the Erysiphales (powdery mildews). Beihefte Zur Nova Hedwigia Heft 89. Gebrüder Borntraeger Verlagsbuchhandlung, Berlin-Stuttgart 1987. 700 p.

Farr, D. F., & Rossman, A. Y. 2019. *Erysiphe peckii*. Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved February 20, 2019, from <https://nt.ars-grin.gov/fungaldatabases/>

USDA-NRCS-NPDC. 2004. Plant Guide: Trumpet creeper *Campsis radicans* (L.) Seem. Ex Bureau Plant symbol = CARA2. United States Department of Agriculture Natural Resources Conservation Service, National Plant Data Center.

https://plants.usda.gov/plantguide/pdf/pg_cara2.pdf

USDA-PCIT. 2019. United States Department of Agriculture, Phytosanitary Certificate Issuance & Tracking System (PCIT). Accessed on Feb. 20, 2019, 4:22:51 pm CST

<https://pcit.aphis.usda.gov/PExD/faces/ViewPExD.jsp>

Responsible Party: John J. Chitambar, Primary Plant Pathologist/Nematologist, California Department of Food and Agriculture, 3294 Meadowview Road, Sacramento, CA 95832. Phone: 916-262-1110, [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov).