

California Pest Rating Proposal for
***Uromyces asclepiadis* Cooke 1877**
milkweed rust

Current Pest Rating: Z

Proposed Pest Rating: A

Kingdom: Fungi, Phylum: Basidiomycota,
Class: Pucciniomycotina, Subclass: Pucciniomycetes,
Order: Pucciniales, Family: Pucciniaceae

Comment Period: 03/05/2021 through 04/19/2021

Initiating Event:

Between 2016 and 2020, four incoming shipments of milkweed (*Asclepias* sp.) from the same nursery in Galveston County, Texas, were intercepted by agricultural inspectors in Shasta, San Diego, and Orange Counties. All had symptoms of rust infection on their leaves and were identified by morphology as *Uromyces asclepiadis*, milkweed rust. The detections received ratings of C, Q and Z at different times from CDFA plant pathologists. The risk to California from *Uromyces asclepiadis* is described herein and a permanent rating is proposed.

History & Status:

Background: *Uromyces asclepiadis* is an autoecious pathogen that causes rust disease, commonly known as milkweed rust, only affecting members of the family Apocynaceae. The genus *Asclepias* is the major host.

Hosts: *Asclepias asperula* var. *decumbens*, *Asclepias campestris*, *A. curassavica* (bloodflower), *A. fascicularis* (Mexican milkweed), *A. galioides* (syn. *A. subverticillata*), *A. guatemalensis*, *A. incarnata* (swamp milkweed), *A. nivea*, *A. purpurascens*, *Asclepias* sp., *A. speciosa* (showy milkweed), *A. syriaca* (silkweed), *A. tuberosa* (butterfly milkweed), *A. viridis*, *Calotropis gigantea* (giant milkweed), *Gonolobus suberosus*, *Ibatia maritima*, *Oxypetalum capitatum*, *Sarcostemma clausum*, and *Vincetoxicum* sp. (Farr and Rossman, 2021)

Symptoms: Symptoms are typical for a rust disease, with yellowish-brown (uredinia) or blackish-brown (telia) pustules on the leaves, either solitary or aggregated. Uredinia develop first and produce urediniospores, followed by development of the telia, which produce teliospores. Initial symptoms of milkweed rust are the appearance of small, yellowish spots. Later, the epidermis bursts open exposing pustules full of yellowish-orange spores. Over time, pustules coalesce to form large lesions. Rust pustules normally form on foliage, on both sides, but under heavy disease pressure, could also form on flower stems. Severely infected plants could even fail to flower or produce mature seeds.

Transmission: The primary pathways for introduction of rust pathogens are by shipments of infected plants. Long distance and local spread are by wind-blown spores. These airborne spores are easily dispersed by lightly brushing a symptomatic plant and can be spread by surface-contaminated clothing, equipment, and flowers. Spores can occasionally contaminate seed lots.

Damage Potential: Rusts rarely kill their hosts, but with extremely heavy infection, plants may not flower or produce seed. There are no direct losses reported on milkweed. Some species are California natives, and some are horticultural varieties in the nursery trades.

Worldwide Distribution: Argentina, Bermuda Bolivia, Brazil, Canada, Colombia, Cuba, Dominican Republic, Guatemala, Jamaica, Peru, Puerto Rico, Trinidad and Tobago, Venezuela, United States (*California, Connecticut, Florida, Iowa, Kansas, Indiana, Massachusetts, Maine, Minnesota, Missouri, Mississippi, New Mexico, Pennsylvania, Texas, West Virginia, Wisconsin*), Virgin Islands, West Indies.

Official Control: EPPO Quarantine pest in Mexico

California Distribution: None

California Interceptions: Interceptions from Texas, see 'Initiating event'.

The risk *Uromyces asclepiadis* would pose to California is evaluated below.

Consequences of Introduction:

- 1) Climate/Host Interaction:** This pathogen has been detected in many different climates across the United States, Canada, Central America, and the Caribbean. Host plants also occur in various climatic regions of California.

Evaluate if the pest would have suitable hosts and climate to establish in California.

Score: 3

- 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.**
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- 2) Known Pest Host Range:** The host range is limited to one plant family and primarily to *Asclepias* spp. (milkweed).

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:** *Uromyces asclepiadis* has high reproduction and dispersal potential, spores could be spread long distances with wind and with movement of infected nursery stock.

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:** Rust pathogens lower the aesthetic value of their hosts while interfering with normal growth and reproduction. It is a quarantine pest in Mexico.

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

Economic Impact: A, 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.

Economic Impact Score: 3

- 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 at least three species of native milkweeds that are “rare” in California: *A. asperula* subsp. *asperula* (spider milkweed), *A. nyctaginifolia* (Mojave milkweed), and *A. solanoana* (serpentine milkweed). There are species of milkweeds that have escaped from cultivation and naturalized in areas of southern and central California, e.g. *A. curassavica* (tropical milkweed). Native species of *Asclepias* such as *A. speciosa* and *A. fascicularis* are choice species for larval feeding
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of monarch butterflies. *Asclepias physocarpa* (*Gomphocarpus physocarpus* (balloon plant)) is sometimes grown as a garden plant in southern California and is a C-rated plant that has been placed on the noxious weed list (R. Price, CDFA Botanist, pers. comm).

Environmental Impact: A, B

- 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.
- 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 *Uromyces asclepiadis*: High

Add up the total score and include it here. 13

- 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". There are no records of California detections.

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.
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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 = 13*

Uncertainty:

There have not been any surveys to detect this rust in California. Discovery of established populations would likely trigger a change in rating

Conclusion and Rating Justification:

Based on the evidence provided above the proposed rating for *Uromyces asclepiadis* is A.

References:

EPPO database 2021 <https://gd.eppo.int/taxon/UROMAS>

Farr, D.F., & Rossman, A.Y. Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved January 12, 2021, from <https://nt.ars-grin.gov/fungaldatabases/>

Responsible Party:

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***Comment Period: 03/05/2021 through 04/19/2021**

***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.
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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: A
