cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal for

Sugarcane mosaic virus

Current Pest Rating: C/X

Proposed Pest Rating: C

Kingdom: Viruses and viroids, Category: Riboviria,
Phylum: Pisuviricota, Class: Stelpaviricetes,
Order: Patatavirales, Family: Potyviridae

Comment Period: 08/08/2025 through 09/22/2025

Initiating Event:

This pathogen has not been through the pest rating process. The risk to California from Sugarcane mosaic virus is described herein, and a permanent rating is proposed.

History & Status:

Background: Sugarcane mosaic virus (SCMV) infects maize, sorghum, sugarcane, and other poaceous species throughout the world. SCMV belongs to the sugarcane mosaic subgroup of the Potyviridae, together with Maize dwarf mosaic virus, Johnsongrass mosaic virus, Sorghum mosaic virus, Zea mosaic virus, Pennisetum mosaic virus, and Cocksfoot strike virus. SCMV is an important pathogen, especially in European and Chinese maize production, causing serious losses in grain and forage yields in susceptible cultivars (Wu et al., 2012; Gan et al., 2010).

SCMV is in the genus Potyvirus, a large and economically important group of plant-infecting viruses in the family Potyviridae. The genus is named after the type species, Potato virus Y. The genome is a monopartite, single-stranded positive-sense RNA. The virions are filamentous, flexuous particles, and they induce cylindrical pinwheel inclusions in the cytoplasm of plant cells. As is typical for potyviruses, SCMV is transmitted by a variety of aphids in a nonpersistent manner (Rai et al., 2023).

SCMV was first identified in California sweet corn plantings over 60 years ago, and during the 1960s and 1970s, some growers sustained severe losses due to the disease. Affected plants were stunted, sometimes so severely that the crop was abandoned. Some varieties develop leaf scorching or ear blanking. Plants infected early in their development are more severely affected than later infections (Johnson et al., 1972).

Hosts: The hosts of SCMV include more than 100 species in 40 genera of the Gramineae family. Sugarcane and maize are the primary hosts of most SCMV genetic variants, although other crop and wild species of the family Poaceae are known or suspected hosts.

Symptoms: On most hosts, infected leaves have irregular yellow and green zones, stripes, or mottles that alternate with parallel veins. These symptoms are more easily visible when leaves are held up against the sunlight. Some leaves are mostly green with only a few narrow pale-yellow streaks, some show very obvious whole leaf chlorosis, and the seriously infected leaves turn yellow or yellow white, leaving only a few green islets or a small amount of red spotty necrosis. The tips of new leaves are abnormally twisted. Some varieties show cryptic or indistinct anomalies at a high temperature, but the symptoms will recur as the temperature drops (Koike and Gillaspie, 1989; Grisham, 2011).

Symptoms in corn include narrow, light green to yellow streaks or broken linear stripes between the veins of the leaves, leaf sheaths, and husks. Plants may be stunted and have numerous tillers. Ears have a poor kernel set. Infected plants may be predisposed to ear rot and stalk rot (Johnson et al., 1972).

Transmission: SCMV is transmitted by aphid vectors in a non-persistent manner. The following aphid species are known vectors of this virus and are C-rated and present in California: *Dactynotus ambrosiae*, *Hysteroneura setariae*, *Longiunguis sacchari*, *Rhopalosiphum maidis*, and *Toxoptera graminum* (CABI, 2025). Aphids move SCMV from older infected crops to new fields or other grassy hosts that serve as a source of inoculum.

There have been no reports of seed transmission of SCMV in sugarcane and most other hosts. However, a low level of seed transmission has been reported in maize (Fuchs et al., 1990). For sugarcane, stalk pieces that are used to propagate sugarcane vegetatively (setts) transmit SCMV and other viruses from one crop to the next. Mature sugarcane plants with mild symptoms may be used as planting material, and this is likely why the virus is distributed widely (Srisink et al., 1993).

On grasses grown as lawns in Florida, SCMV can be efficiently transmitted by mechanical means. Lawn mowers, line trimmers, and other equipment can transfer clippings and sap containing virions from lawn to lawn. The disease can also be spread by planting infected sod during the times of year when symptoms are mild and not obvious (Harmon, 2015).

Damage Potential: In infected sugarcane plants, growth is significantly reduced, resulting in shorter internodes, fewer millable stems, shorter roots, and a significantly lower sprouting rate of setts and lower yield of cane stems. Juice content, sucrose content, and the crystallization rate can be cut drastically (Viswanathan and Balamuralikrishnan, 2005; Koike and Gillaspie, 1989; Singh et al., 2003).

California sweet corn was severely affected in the past up to the point that fields were abandoned prior to harvest (Johnson et al., 1972). New varieties of corn with tolerance or resistance replaced highly susceptible varieties, and losses were ameliorated.

Sod with SCMV should not be used to establish new lawns. Outbreaks on St. Augustine grass included plants that turned necrotic and developed into severe dieback that completely killed some infected lawns (Harmon, 2015).

Worldwide Distribution: Africa: *Angola, Cameroon, the Democratic Republic of the Congo, Cote d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Morocco, Nigeria, Reunion, Sierra Leone, South Africa, United Republic of Tanzania, Uganda, Zambia, Zimbabwe*. America: *Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, French Guiana, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, United States of America* (California, Florida, Hawaii), *Venezuela, Virgin Islands (US).* Asia: *Bangladesh, Cambodia, China, India, Indonesia, Islamic Republic of Iran, Israel, Japan, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam*. Europe: *Czechia, France, Germany, Hungary, Italy, Portugal, Romania, Serbia, Spain, Türkiye, Ukraine.* Oceania: *Australia, Fiji, Papua New Guinea* (EPPO, 2025).

Official Control*:* Sugarcane mosaic virus is on the EPPO's A1 list for Bahrain and Jordan, the A2 list for the Asia and Pacific Plant Protection Commission, and is a quarantine pest in Morocco (EPPO, 2025). It is on the USDA PCIT's harmful organisms list for Bangladesh, French Polynesia, Japan, Madagascar, Morocco, Myanmar, Nepal, New Caledonia, New Zealand, Oman, Pakistan, Timor-Leste, United Arab Emirates (USDA-PCIT, 2025).

California Distribution: Colusa, Fresno, Glenn, Humboldt, Imperial, Madera, Orange, Sacramento, San Joaquin, Santa Clara, Solano, Tulare, and Yolo (French, 1989; CDFA PDR database, 2025).

California Interceptions: none

The risk that Sugarcane mosaic virus would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** This disease is likely to be found wherever its hosts are grown and will have a higher incidence when environmental conditions are favorable to the reproduction and dissemination of aphids.

   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 be established 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 extensive, including many species in the grass family.

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 Reproductive Potential:** This pathogen reproduces only inside its host plants. It is spread by aphids, but only non-persistently. Seed transmission is not a significant factor for this disease.

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:** For susceptible varieties of sugarcane, corn, and ornamental grasses, this disease lowers crop yield and value. It is a quarantine pest in Mexico, an important trading partner, and it is vectored by aphids.

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

Economic Impact: A, B, C, E

A. The pest could lower crop yield.
B. The pest could lower crop value (including increasing crop production costs).
C. The pest could trigger the loss of markets (including 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:** This disease has been widespread and established in California for many decades. No environmental impacts have been reported.

Evaluate the environmental impact of the pest on California using the criteria below.

Environmental Impact: 1

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 Sugarcane mosaic virus*:* 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 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 'high'.

Score: -3
-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 the 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:

Understanding the role of SCMV in yield reduction is often complicated by the presence of multiple viruses that are common and co-occurring in sugarcane, corn, and grasses (Shukla et al., 1992).

Conclusion and Rating Justification:

Based on the evidence provided above, the proposed rating for **Sugarcane mosaic virus is C.**

References:

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***Comment Period: 08/08/2025 through 09/22/2025**

***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: C