CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profilefor

Onion yellow dwarf virus

Pest Rating: C

Kingdom: Viruses and viroids, Realm: Riboviria, Subrealm: Orthornavirae, Phylum: Pisuviricota, Class: Stelpaviricetes, Order: Patatavirales, Family: Potyviridae, Genus: Potyvirus

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Comment Period: 08/01/2025 through 09/15/2025

Initiating Event:

This pathogen is listed as a pest of concern for export seed programs. It has not been through the pest rating process. The risk to California from Onion yellow dwarf virus (OYDV) is described herein, and a permanent rating is proposed.

History & Status:

Background: This disease was first described in Iowa by Melhus et al. in 1929. The virus survives mainly in the bulbs. When new plants grow, they are already infected. In the field, the virus can be transmitted to new healthy plants by aphids (Manglli et al., 2020). Outbreaks of OYDV on onion crops in Southern Spain can have an infection rate up to 100% (Parrella et al., 2005). In combination with other viruses, OYDV contributes to garlic mosaic symptoms (Swett et al., 2019a, 2019b).

OYDV 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, OYDV is transmitted by a variety of aphids in a nonpersistent manner (Rai et al., 2023).

Hosts: All hosts are in the genus *Allium*: *Allium ampeloprasum* (wild leek), *A. angulosum* (mouse garlic), *A. caeruleum* (blue globe onion), *A. cepa* (onion), *A. cernuum* (nodding onion), *A. cristophii* (star of Persia), *A. flavum* (small yellow onion), *A. giganteum* (giant allium), *A. karataviense* (Turkistan onion), *A. macrostemon* (Japanese wild onion), *A. moly* (lily leek), *A. porrum* (leek), *A. sativum* (garlic), *A. suaveolens, A. thunbergii* (Japanese onion), *A. zebdanense* (Lebanon onion) (EPPO, 2025).

Symptoms: The virus and the disease it causes are called “yellow dwarf” because of the symptoms seen on onions. Symptoms include plant stunting and leaves with irregular yellow striping, downward curling, flattening, crinkling, flaccidity, and in some cases, almost complete yellowing of the plant (Melhus et al., 1929; Swett et al., 2019a). It also causes deterioration of bulbs and premature sprouting of onion bulbs during storage (Bos, 1976).

In onion seed plants, the virus causes striping, curling, and distortion of flower stems, reduction in the number of flowers and seeds, and reduction of the seed quality (Härdtl, 1965; Manglli et al., 2020). In shallots, leaf symptoms are similar, but leaf curling and plant stunting are often more severe (Brierley and Smith, 1946).

When OYDV is found as part of a mixture of potyviruses infecting garlic, garlic mosaic symptoms develop. These include small, angular, light-green-to-yellow discolored regions of tissue arranged in a mosaic pattern among darker tissue, irregularly shaped light-green blotches among normally colored tissues, striping, and streaking of leaves. Symptoms are usually more pronounced in young leaves. Infected plants are stunted, and their bulb size is reduced (Swett et al., 2019b).

Transmission: Because it survives in bulbs and sets, this virus is easily transmitted through vegetative reproduction. Overwinter, the virus remains persistent in onion sprouts, plant residues, and bulbs (Schwartz and Mohan 2008; Katis et al. 2012). Similar to other potyviruses, the green peach aphid, *Myzus persicae*, a widely prevalent and C-rated insect in California, as well as other aphids, spreads the virus from plant to plant in a nonpersistent manner. The virus can also survive in volunteer onions, which act as a source of inoculum to new plantings. Seed transmission has been reported only in a few local cultivars and is not considered a major factor in the epidemiology of the disease (Ibrahim et al. 1996; Abd El-Wahab et al., 2009; Härdtl, 1972; CABI, 2025).

Damage Potential: Although the virus does not infect the seed in most varieties, seeds harvested from infected plants are of poor quality. In one study, infection of bulbs caused a quick decline of plants and resulted in 31% loss of productive plants for seed production (Manglli et al., 2020).

OYDV is usually found in mixed infection with several other poty- and tospoviruses. Virus-infected plants show a yield reduction of 30-60%, compared to virus-free plants. Losses are greater if plants are co-infected with Leek yellow stripe virus or Iris yellow spot virus. The role of OYDV in this yield reduction is dependent on the other viruses present (Walkey and Antill, 1989; Lot et al., 1998; Manglli et al., 2020).

Worldwide Distribution: Likely worldwide, with specific records in: Africa: *Morocco, Nigeria, South Africa, Tunisia*. America: *Argentina, Brazil, Canada, Chile, Ecuador, United States of America* (California, Connecticut, Iowa, Louisiana, Minnesota, Montana, New York, Oregon, Washington, West Virginia). Asia: *China, India, Indonesia, Iraq, Japan, Oman, Thailand*. Europe: *Austria, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Moldova, Poland, Romania, Serbia, Switzerland, Türkiye, Ukraine, United Kingdom*, Oceania: *Australia, New Zealand* (EPPO, 2025; Pappu et al., 2005).

Official Control*:* Onion yellow dwarf virus is on the EPPO's A1 list for Jordan, the A2 list for Bahrain, Egypt, and the Inter-African Phytosanitary Council (IAPSC). It is a quarantine pest in Mexico and a regulated non-quarantine pest in Switzerland and the United Kingdom (EPPO, 2025). It is on the USDA PCIT's harmful organisms list for Antarctica, Colombia, Cook Islands, Ecuador, Egypt, Indonesia, Japan, Madagascar, Mexico, Mozambique, Nicaragua, Panama, Sri Lanka, Timor-Leste, and Yemen (USDA-PCIT, 2025).

California Distribution: Official records have been made in these counties, but it is likely to occur statewide. Alameda, Imperial, Kings, Merced, San Benito, San Diego, Tuolumne (French, 1989; California Department of Food and Agriculture (CDFA) Pest Damage Record (PDR) database, 2025; Swett et al., 2019a).

California Interceptions: none

The risk that Onion yellow dwarf 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 limited to *Allium* sp.

   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 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:** This virus has a significant negative impact on plants grown to produce seed. It is vectored by aphids and is a regulatory concern for seed grown for export from California.

   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:** none

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

   Environmental Impact:
   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 Onion yellow dwarf virus*:* Medium

Add up the total score and include it here. **11**
-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.

   OYDV is classified as a widely prevalent virus in California, meaning it would raise no new regulatory concerns at the State or Federal level if it were identified. (https://www.prevalentviruses.org/state.cfm?id=us_CA)

   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* ***= 11-3=8***

Uncertainty:

Understanding the role of OYDV in yield reduction is often complicated by the presence of multiple viruses that are common and co-occurring in commercial onions, garlic, and shallots.

Conclusion and Rating Justification:

Based on the evidence provided above, the proposed rating for **Onion yellow dwarf virus is C.**

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*Comment Period: 08/01/2025 through 09/15/2025

*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.

Pest Rating: C
