CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal for

Brugmansia latent virus

Current Pest Rating: Q

Proposed Pest Rating: Q

Realm: Riboviria; Kingdom: Orthornavirae

Phylum: Kitrinoviricota; Class: Alsuviricetes

Order: Martellivirales; Family: Virgaviridae

Genus: Tobamovirus

Comment Period: 7/17/2020 through 8/31/2020

Initiating Event:

On March 3, 2020, an agricultural inspector from Contra Costa County submitted samples of 4 inch pot size Brugmansia plants 'Pink velvet' with suspect viral symptoms that were found during a regulatory nursery inspection. The inspector returned to the nursery on March 20, 2020 and collected samples of additional varieties 'Charles Grimaldi' and 'Wedding bells', plus a second sample of 'Pink Velvet'. CDFA plant pathologist Tongyan Tian observed Tobamovirus particles under the electron microscope and was able to obtain a fragment of nucleotide sequence by RT-PCR and Sanger sequencing. Based on the comparison of this sequence with reference sequences in GenBank, on April 24, 2020 he identified Brugmansia latent virus from these samples. 'Pink velvet' and 'Charles Grimaldi' were also positive for Colombian Datura Virus while 'Wedding bells' was not. As this is the first detection of Brugmansia latent virus in North America, it was assigned a temporary 'Q' rating. The risk to California is described herein and a rating for nursery stock is proposed.

History & Status:

Background:

Brugmansia is a plant genus in the family Solanaceae. Originally from South America, it is a widely used ornamental in landscapes. They are perennial shrubs or small trees in temperate climates and will be damaged by temperatures below -5° C. With large and striking flowers that are single, pendent,

---

trumpet or funnel-shaped, white, yellow, pink, purple, or scarlet in color, and up to 30 cm long. *Brugmansia* spp. have the common name of “angel’s trumpet” and are closely related to the genus *Datura* with the common name of “devil’s trumpet”. Both genera are highly poisonous, and their consumption can cause respiratory depression, arrhythmias, hallucinations, psychosis, and even death. Both are prized for their fast growth and large scented flowers.

The information in GenBank indicates that Brugmansia latent virus was originally collected in United Kingdom in 2015 from *Brugmansia* x *candida* by A. Scott-Brown, M. C. Vanderspool, S. Hanson, T. D'Elia, J. E. Funderburk, and S. Adkins. The sequence was uploaded to the database in 2018. Named after the type strain Tobacco mosaic virus, the genus Tobamovirus contains rod-shaped viruses. Their genome consists of one positive single-stranded RNA [(+) ssRNA] and their protein coat consists of a single protein subunit arranged in a helix.

Brugmansia latent virus is distinct from Colombian datura potyvirus which was detected at the same time. Colombian datura virus has recently been reviewed and a permanent C rating has been proposed https://blogs.cdfa.ca.gov/Section3162/?p=7212

Hosts: Brugmansia x *candida,* and additional cultivated *Brugmansia* forms ‘Pink Velvet’, ‘Wedding Bells’, and ‘Charles Grimaldi’ that are horticultural hybrids whose origin may involve the species *B. suaveolens*, *B. versicolor*, and *B. aurea*.

Symptoms: Tobamovirus symptoms usually consist of various degrees of mottling, chlorosis, curling, distortion, and dwarfing of leaves, flowers, and entire plants. In some cases, necrotic areas develop on the leaves. On some hosts, leaflets may become long and pointed and shoestring like. Infections of young plants generally produce more pronounced symptoms. Infected plant cells contain virus particles that can be seen easily with an electron microscope and sometimes visible as crystalline aggregates or amorphous bodies with a compound light microscope (Agrios, 2005). Specifically, for Brugmansia latent virus, plants of variety ‘Wedding bells’ that were not co-infected with Colombian datura virus showed a mild mosaic of their leaves with some yellowing. Plants of varieties ‘Pink velvet’ and ‘Charles Grimaldi’ that were co-infected with Colombian datura virus showed more severe mosaic with extensive yellowing of leaves.

Transmission: Tobamoviruses are easily transmitted mechanically with infected sap, and in nature they are spread by incidental contact and wounding. They are not transmitted by any known vectors (Agrios, 2005). In nurseries, Brugmansia latent virus is most likely transmitted when infected plants are used for clonal propagation.

Damage Potential: Tobamoviruses cause serious losses in their hosts by damaging the leaves, flowers, and fruits and by causing yellowing and stunting of the plants. The losses are greatest when the plants are infected young. Infections at later stages of growth cause smaller losses (Agrios, 2005).

Worldwide Distribution: United Kingdom, United States

Official Control: A Q-rating requires destruction of infected blocks.

California Distribution: Contra Costa County (see initiating event).

California Interceptions: None

The risk **Brugmansia latent virus** would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** Brugmansia latent virus is expected to be distributed within California wherever *Brugmansia* are grown. Climates suitable for *Brugmansia* will also favor development of the disease. Also, distribution of the virus will largely be dependent on the production and distribution of virus-free propagative stock. Vectors are not expected to be an issue.

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.**

2) **Known Pest Host Range:** Of what is currently known, Brugmansia latent virus appears to have a limited host range of *Brugmansia* spp. only.

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:** The virus is highly likely to spread primarily through infected propagative material. A vector may or may not be found. Without definite answers it is not possible to adequately evaluate this category.

Evaluate the natural and artificial dispersal potential of the pest.

Score: #

- 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:** It is not known what effect Brugmansia latent virus could have on crop yield. Also, it remains to be determined if management of the virus would change certain cultural practices in order to reduce/eliminate incidences and causes spread. The removal of infected plants could result in

altered cultural practices in the field. It is highly unlikely that there will be any cure once Brugmansia latent virus has infected plants. Until definite information becomes available, several criteria listed below are not known to allow an accurate evaluation of the virus within this category.

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

Economic Impact:

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: **#**

- 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:** Information on the effect of Brugmansia latent virus on the environment is currently not known. Therefore, criteria listed below cannot be answered accurately.

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:

- 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 Brugmansia latent virus*:* Insufficient data to enable an accurate evaluation

Add up the total score and include it here. **#**

-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 'Low'. Brugmansia latent virus has been identified in one county and all plants in the blocks were destroyed.

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* **= Not determined**

Uncertainty:

The host range could change once more information is available on its mode of spread and if testing is testing is done for other plant species, specifically in Solanaceae. With the current lack of biological information on Brugmansia latent virus, a permanent rating cannot be justified. Therefore, a Q rating is currently proposed for nursery detections of this virus. This rating will enable administration of necessary action to ascertain freedom of stock from Brugmansia latent virus. The "Q: rating will be revisited when further information is available to allow the assignment of a permanent rating.

Conclusion and Rating Justification:

Based on the evidence provided above the proposed rating for Brugmansia latent virus is Q.

References:

Agrios, G. N. 2005. Plant Pathology, 5th Edition. Elsevier Academic Press. 922 pg

Responsible Party:

Heather J. Scheck, Primary Plant Pathologist/Nematologist, California Department of Food and Agriculture, 204 West Oak Ave, Lompoc, CA. Phone: 805-736-8050, permits[@]cdfa.ca.gov.

***Comment Period: 7/17/2020 through 8/31/2020**

***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: Q