

California Pest Rating Proposal

Phorodon cannabis Passerini: cannabis aphid

Hemiptera: Aphididae

Current Rating: A

Proposed Rating: C

Comment Period: **09/16/2019 through 10/31/2019**

Initiating Event:

In response to finds of *Phorodon cannabis* in cannabis nurseries in California in 2018 and 2019, a pest rating proposal was completed for this species and a rating of “A” was assigned. In August, this aphid was found in outdoor cannabis production sites in Mendocino, Shasta, and Trinity counties and is therefore considered to be established in the state. A new pest rating proposal is needed.

History & Status:

Background: Multiple sources report cannabis (*Cannabis sativa*) to be the sole host plant of *P. cannabis* (Bodlah et al., 2011; Heie, 1993; Khan and Shah, 2017). However, it has also been reported from other plants, including other *Cannabis* species and the genera *Artemisia*, *Cnicus*, *Humulus* (including hops, *Humulus lupulus*), and *Prunus* (Das, 1918; Higuchi and Miyazaki, 1969; Müller and Karl, 1976). The ability of *P. cannabis* to feed on and complete development on plants other than *C. sativa* is in doubt for the following two reasons. The similar species *P. humuli* (Schrank) (hops aphid) feeds on hops and *Prunus* species, and reports of *P. cannabis* on some of these plants could represent misidentifications of *P. humuli* (Oregon Department of Agriculture, 2017). Transfer trials failed to establish *P. cannabis* on hops and this aphid has not been reported on hosts other than *Cannabis* species in the United States (Cranshaw, 2018).

Feeding by *P. cannabis* is reported to cause wilting and yellowing of cannabis (Oregon Department of Agriculture, 2017). During examination of outdoor hemp plants infested with *P. cannabis*, Cranshaw et al. (2018) did not observe any plant injuries resulting from aphid feeding, but they did report large quantities of honeydew. They observed large numbers of predaceous insects with *P. cannabis* in the field; they speculated that these were exerting pressure on the aphids, and they noted that that damage in greenhouses (where there would likely be less control by natural enemies) could be more significant.

There appears to have been little work done regarding control of *P. cannabis*. The California Department of Pesticide Regulation (2015) lists azadirachtin, horticultural oil, insecticidal soap, rosemary and peppermint oils, and *Beauveria bassiana* as potential agents for the control of aphids on cannabis, including *P. cannabis*.

Phorodon cannabis is reported to vector at least two viruses (cucumber mosaic virus and alfalfa mosaic virus) to *Cannabis sativa* (Schmidt and Karl, 1970).

Worldwide Distribution: *Phorodon cannabis* is reported to occur in Europe (including Germany and Romania), Asia (including Pakistan and India), North Africa, and North America (Canada and the United States) (Amin et al., 2017; Batra, 1976; Blackman and Eastrop, 2019; Müller and Karl, 1976; Trotuş and Naie, 2008). In the United States, *P. cannabis* is widespread and has been found in hemp fields in Colorado, Minnesota, and Virginia, on hemp in a greenhouse in Kentucky, in suction traps in Illinois, Indiana, Iowa, Kansas, and Wisconsin, and on outdoor cannabis in California (Cranshaw et al., 2018; Lagos-Kutz, 2018; Villanueva, 2019). The species may be established in Oregon (Oregon Department of Agriculture, 2017).

Official Control: *Phorodon cannabis* is an A-rated pest in California at the time of the writing of this proposal.

California Distribution: *Phorodon cannabis* has been found in outdoor cannabis production in Mendocino, Shasta, and Trinity counties (California Department of Food and Agriculture).

California Interceptions: *Phorodon cannabis* was found on cannabis in greenhouses in Humboldt, Mendocino, Monterey, and Santa Cruz counties in 2018 and 2019 (California Department of Food and Agriculture).

The risk *Phorodon cannabis* poses to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** *Phorodon cannabis* has become established in areas with a temperate climate (Colorado, Virginia, etc.) and it is likely to tolerate the range of climates found over much of California. It is considered to already be established in Mendocino, Shasta, and Trinity counties. The distribution of *Cannabis sativa* is presumed to be fairly patchy in California, which is likely to limit the distribution of this aphid. Therefore, *P. cannabis* receives a **High (3)** in this category.
 - 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:** *Phorodon cannabis*, for the reasons stated in the Background (above), is presumed to be restricted to species of the genus *Cannabis*. Therefore, it receives a **Low (1)** in this category.
 - **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 and Dispersal Potential:** The reproduction of *Phorodon cannabis* alternates between sexual and parthenogenetic (cyclic parthenogenesis) (Gavrilov-Zimin et al., 2015). Movement of infested

plant material is probably the most effective means of long-distance dispersal. Therefore, it receives a **Medium (2)** in this category.

- 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:** *Phorodon cannabis* is already established in California. There do not appear to be reports of this species causing economic damage here, although damage is possible perhaps in greenhouse environments where natural enemies are absent. This aphid is a known vector of at least two viruses, Cucumber mosaic virus and Alfalfa mosaic virus, which are C-rated pests of alfalfa that also affect hemp and possibly cannabis. Therefore, it receives a **Medium (2)** in this category.

Economic Impact: B, E

- 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: Medium

- 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:** *Phorodon cannabis* is established in California but it has not been reported to be causing significant problems here. Therefore, it receives a **Low (1)** in this category.

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: Low

- **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 *Phorodon cannabis*: Medium (9)

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: *Phorodon cannabis* is considered to be established in Mendocino, Shasta, and Trinity counties. It receives a **Low (-1)** in this category.

–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.

Final Score:

7) The final score is the consequences of introduction score minus the post entry distribution and survey information score: Low (8)

Uncertainty:

Phorodon cannabis is probably more widely established in California than the evidence presented here suggests. It is already widely established in the United States. Cannabis pests have (understandably) received little attention from agricultural entomologists until recently because of this crop's legal status.

It is possible that this aphid may be causing significant damage to plants in some situations but that this damage has not been reported.

Very little information was found regarding the impact of alfalfa mosaic virus on hemp or cannabis. This virus is reported to cause yellowing and weakened growth in hemp (Schmidt and Karl, 1970).

Conclusion and Rating Justification:

Phorodon cannabis is an aphid that is already widely established in the United States and is now known to be established in California. It has not yet been shown to cause significant economic damage. For these reasons, a "C" rating is justified.

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Responsible Party:

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***Comment Period: 09/16/2019 through 10/31/2019**

***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 plant.health[@]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