

California Pest Rating Proposal

Aceria drabae (Nal.): Hoary cress gall mite

Acari: Eriophyidae

Current Rating: Q

Proposed Rating: D

Comment Period: **6/4/2020 – 7/19/2020**

Initiating Event:

An application was submitted for a permit for the release of *Aceria drabae* in California for the control of the invasive weed hoary cress (a group of closely related Eurasian species of Brassicaceae including *Lepidium draba*, *L. appelianum*, and *L. chalepense*, which are extensively naturalized in North America). In 2018, the USDA issued a Decision and Finding of no significant impact approving the release of *A. drabae* in the contiguous United States. This mite has not been rated. A pest rating proposal is needed.

History & Status:

Background: Adult *A. drabae* are approximately 0.2-0.3 mm in length. They overwinter on roots or other parts of the host plant. In the spring, they start to feed on upper portions of the plant, eventually including the flower buds. Feeding on the flower buds induces the formation of galls. The mites enter these galls and remain inside for several generations. Dispersal probably occurs via wind. Later in the year, when the host plant is dying, the mites return to the roots or other overwintering areas (USDA-ARS, 2018).

Aceria drabae appears to be a specialist of hoary cress. Other plants have been reported as hosts (e.g., Boczek and Petanovic, 1996 and Houard, 1908), but the results of host specificity testing

suggest these reports may be associated with other species of mites. Most Eriophyidae are specific to a single genus or species of host plant.

Host specificity testing was done in Montana by Littlefield (2018). Over 80 species of plants, mostly in the family Brassicaceae, were tested. Many species native to North America, including some in the genera *Arabis* and *Lepidium*, and species reported as alternate hosts in the literature, were included. After 30 days, live mites were only found on *L. draba*/*L. chalepense* (not distinguished in these tests) and *Lepidium appelianum*, and galls were only found on *L. draba*/*L. chalepense*.

Aceria drabae is reported to infest hoary cress at high levels and to have a significant impact on the reproduction of this plant. In Romania, up to 80% of the inflorescences of hoary cress were reported to be attacked (Tălmăciu et al., 2010). In Spain, Lipa et al. (1998) found up to 60% of plants infested (i.e., visible deformation), and at high densities the flowers were deformed to the extent that seed production was not possible.

Worldwide Distribution: *Aceria drabae* is reported over a wide area in Europe and Eurasia and it is presumed to be native there (USDA-ARS, 2018).

Official Control: *Aceria drabae* is not known to be under official control in any country.

California Distribution: *Aceria drabae* is not known to be present in California.

California Interceptions: *Aceria drabae* has not been intercepted in California (California Department of Food and Agriculture).

The risk *Aceria drabae* poses to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** The main host plant of *A. drabae*, hoary cress, is widely distributed in California (Calflora). This mite is widely distributed in Europe and can tolerate a temperate climate. *Aceria drabae* could probably become established over much of the state. Therefore, it 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:** Based on host specificity testing, *Aceria drabae* is only able to colonize hoary cress. 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:** *Aceria drabae* is reportedly dispersed passively via wind. The host plant, hoary cress, is not likely to be moved by humans. 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.** *Aceria drabae* is not known to damage any economically-significant plant. Host specificity testing included crops such as kale, broccoli, and broccoli rabe and they were not reported to be impacted. Therefore, it receives a **Low (1)** in this category.

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

- **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.** The only group of plant species reported to be galled by *Aceria drabae*, hoary cress, are invasive weeds of Eurasian origin. No impact was observed on other Brassicaceae native to the United States included in these tests. Therefore, *A. drabae* 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 (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 *Aceria drabae*: Low (8)

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: *Aceria drabae* is not known to be present in California. It receives a **Not established (0)** 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:

It is possible that *A. drabae* may attack native California plants that were not included in the host specificity testing. It is also possible that *A. drabae* will not prove to be an effective biological control

agent in California. Lastly, it is possible that what has been identified as *A. drabae* actually includes multiple cryptic species with different host preferences. In this case, a conservative approach is to limit releases of *A. drabae* to those collected from Greece, where the material used in the host specificity testing by Littlefield (2018) came from.

Conclusion and Rating Justification:

Aceria drabae is a highly host-specific eriophyid mite that does not appear to pose a risk to California agriculture or environment. It could be useful in controlling hoary cress, a weed already widely established in California. For these reasons, an “D” rating is justified.

References:

Boczek, J. and Petanovic, R. 1996. Eriophyid mites as agents for the biological control of weeds. pp. 127-131 in Moran, V. C. and J. H. Hoffmann (eds.), Proceedings of the IX International Symposium on Biological Control of weeds. University of Cape Town, Stellenbosch, South Africa.

Calflora. Accessed April 23, 2020:
<https://www.calflora.org>

California Department of Food and Agriculture. Pest and damage record database. Accessed April 7, 2020:
<https://pdr.cdfa.ca.gov/PDR/pdrmainmenu.aspx>

Houard, C. 1908. Les zoocécidies des plantes d'Europe et du bassin de la Méditerranée. Librairie Scientifique A. Hermann, Paris, France.

Lipa, J. J., Murillo, J., Castro, F., Viñuela, E., Del Estal, P., Budía, F., and Caballero, P. 1998. Primera cita de *Aceria drabae* (Nalepa) (Acarina: Eriophyidae) en España. Boletín de Sanidad Vegetal, Plagas 24:797-802.

Littlefield, J. 2018. Biological control of Russian knapweed and other weeds invasive to lands managed by the BLM – Final report 2003 to 2008. Accessed April 22, 2020:
http://files.cfc.umn.edu/cesu/BLM/MSU/2005/Littlefield_biocontrol%20agents05-08_frpt.pdf

Tălmăciu, N., Tălmăciu, M., and Humă, R. 2010. Observations regarding the main biological control agents of the invasive weeds from a natural pasture. Lucrări Științifice 51:316-321.

USDA-ARS. 2018. Field release of the gall mite, *Aceria drabae* (Acarina: Eriophyidae), for classical biological control of hoary cress (*Lepidium draba* L., *Lepidium chalapense* L., and *Lepidium appelianum* Al-Shehbaz) (Brassicaceae), in the contiguous United States. Environmental Assessment, January 2018.

Responsible Party:

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***Comment Period: 6/4/2020 through 7/19/2020**

***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](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.

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: D