CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

***Resseliella maxima* Gagné: Soybean gall midge**

Diptera: Cecidomyiidae

Previous Pest Rating: Q

Pest Rating: A as of 05/30/2021

Comment Period: 4/15/2021 – 5/30/2021

Initiating Event:

Resseliella maxima was described relatively recently and has become a pest of soybean in the midwestern United States. This species has not been rated. Therefore, a pest rating proposal is needed.

History & Status:

Background: *Resseliella maxima* was described in 2019 (Gagné et al., 2019). The larvae, which are orange, feed in the bases of stems of soybean, sweet clover, and alfalfa (A. Arango, pers. comm.; Sever, 2021). The feeding damage is visible externally as dark brown or black areas, and the stems become weak and can break near the soil. This pest appears to result in the death of plants. Plants near the edges of fields are preferentially attacked (Gagné et al., 2019; McMechan et al., 2019). Losses in Nebraska soybean fields ranged from 17-78%, although some of this may have been from other causes (McMechan et al., 2021). This species probably overwinters as larvae in cocoons (Knodel, 2019). There are two generations per year in Minnesota (Potter, 2021). Damage may have been noticed as early as 2011, but it was not recognized as being caused by this not-yet-described species (Sever, 2021). Eggs are laid in openings in the stems of the host plant. Some of these openings could be the result of damage (e.g., from hail), but oviposition was reported in the natural fissures that appear on soybean stems as well (McMechan et al., 2021). There is uncertainty

regarding the significance of this species as a primary pest of healthy, undamaged plants. There may be factors, such as disease, that predispose plants to infestation.

Worldwide Distribution: *Resseliella maxima* is only known from the United States (Missouri, Nebraska, Iowa, South Dakota, and Minnesota) (A. Arango, pers. comm.). The origin of this species is not known. It may be native to the United States, and if so, could have switched from a non-commercially important native host to commercially-valuable hosts (other hosts (soybean, sweet clover, and alfalfa), which could explain why it was so recently discovered (Gagné et al., 2019).

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

California Distribution: *Resseliella maxima* is not known to be established in California.

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

The risk *Resseliella maxima* poses to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** The climate of a significant portion of California may be too dry for *Resseliella maxima*. Two of the three known hosts, alfalfa and sweet clover, are widespread in the state and soybean is grown in some areas. Therefore, it receives a **Medium (2)** 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:** The three reported hosts are all in the family Fabaceae. 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:** *Resseliella maxima* can fly. In addition, infested alfalfa could be moved as fodder and this pest could be dispersed this way. 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**. *Resseliella maxima* is considered a pest of soybean. Soybean is grown on a limited scale in California. It could lower yield and increase crop production costs if it became established in California. The other two known hosts, alfalfa and sweet clover, are important forage crops in California and could also be impacted by this pest. Therefore, it receives a **Medium (2)** in this category.

Economic Impact: A, B

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**. Infestations of *R. maxima* could trigger treatment programs in soybean fields, although there do not appear to be effective treatments known at the current time (Soybean gall midge). None of the known hosts of *R. maxima* are native to California. Therefore, *R. maxima* receives a **Medium (2)** in this category.

Environmental Impact: D

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: Medium (2)

– 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 *Resseliella maxima*: 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:** *Resseliella maxima* is not known to be established 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: Medium (9)

Uncertainty:

There are three areas of uncertainty. First, the climate of California may be unsuitable for *R. maxima*, even in soybean-growing areas. Second there is uncertainty regarding the pest significance of this species. Regarding soybean, disease, weather, or other variables may play a role in promoting infestation of soybean plants. Regarding alfalfa and sweet clover, these are known hosts but impacts to these crops have not been reported. Third, there is some uncertainty regarding if the midge that feeds on soybean is the same as the midge that feeds on sweet clover and alfalfa. Research is currently underway that may help answer this question (Sever, 2021).

Conclusion and Rating Justification:

Resseliella maxima is a midge that feeds on soybean, a crop that is grown on a small scale in California. It is apparently capable of killing plants and causing losses in soybean fields. It is not known to be in California. For these reasons, an "A" rating is justified.

References:

California Department of Food and Agriculture. Pest and damage record database. Accessed March 12, 2021: https://pdr.cdfa.ca.gov/PDR/pdrmainmenu.aspx

Gagné, R. J., Yukawa, J., Elsayed, A. K., and McMechan, A. J. 2019. A new pest species of *Resseliella* (Diptera: Cecidomyiidae) on soybean (Fabaceae) in North America, with a description of the genus. Proceedings of the Entomological Society of Washington 121:168-177.

McMechan, A. J., Hodgson, E. W., Varenhorst, A. J., Hunt, T., Wright, R., and Potter, B. 2021. Soybean gall midge (Diptera: Cecidomyiidae), a new species causing injury to soybean in the United States. Journal of Integrated Pest Management 12:1-4.

Knodel, J. J. 2019. Soybean gall midge. North Dakota State University Crop & Pest Report: Entomology. Accessed March 23, 2021: https://www.ag.ndsu.edu/cpr/entomology/soybean-gall-midge-07-25-19

Potter, B. 2021. Soybean gall midge in Minnesota soybean. https://extension.umn.edu/soybean-pest-management/soybean-gall-midge-minnesota-soybean Accessed March 23, 2021:

Sever, M. 2021. Soybean gall midge: How do you solve a problem you know little about? Crops & Soils Magazine January-February 2021:1-6.

Soybean gall midge. Accessed March 23, 2021: https://lancaster.unl.edu/ag/SuccessfulFarmer2020/SucFarm_DeboraMontezano_SoybeanGallMidge.pdf

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*Comment Period: 4/15/2021 – 5/30/2021

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***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: A